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KAISER·HILL
COMPANY

FINAL

2001 Annual Rocky Flats Cleanup Agreement (RFCA) Groundwater Monitoring Report for the Rocky Flats Environmental Technology Site

Safe Sites
OF COLORADO, LLC
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

Text, Figures and Appendices

Environmental Media Management
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2001 ANNUAL ROCKY FLATS CLEANUP AGREEMENT

(RFCA)

GROUNDWATER MONITORING REPORT

for the

Rocky Flats Environmental Technology Site

November 2002

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EXECUTIVE SUMMARY

This report, which is required annually by the Rocky Flats Cleanup Agreement (RFCA, 1996), summarizes the groundwater compliance activities, groundwater flow conditions, groundwater characterization activities, and well abandonment and replacement program (WARP) activities at the Rocky Flats Environmental Technology Site (RFETS) for calendar year (CY) 2001. The report is presented in two volumes; one that contains text, tables, figures, and appendices and another that contains plates. It is intended as a stand-alone document where all groundwater issues at RFETS for CY 2001 can be referenced and reviewed.

Only CY 2001 analytical and potentiometric data is utilized for certain sections. These are Section 2.0 (Data Summary for RFCA-Designated Wells Sampled in 2001), Section 3.0 (Groundwater Flow Conditions During 2001), Section 5.0 (Building Decontamination and Decommissioning [D&D] Monitoring Through 2001), Section 6.0 (Present Sanitary Landfill – 2001 Update) and Section 11.0 (Groundwater Data Quality Assessment for 2001). In the remaining sections of this report, where CY 2002 potentiometric and analytical data is available (generally for the 1st and 2nd quarters), it is utilized when it is pertinent to the specific discussion.

It is difficult to construct an Executive Summary for a document of this magnitude, especially when it contains information from the numerous and varied groundwater projects that are currently being implemented at RFETS at the present time. The following paragraphs serve to identify and familiarize the reader with the main sections of this document.

Section 1.0 serves as an introduction to the report and summarizes the Site environmental history and hydrogeologic setting. Section 2.0, Data Analysis, discusses the groundwater quality data collected in CY 2001 with respect to exceedances of RFCA groundwater action levels. Section 3.0 presents groundwater flow conditions during CY 2001 and compares them to groundwater flow conditions documented during CY 1996. Hydrologic conditions during calendar year 1996 are considered to represent a sitewide baseline that is used in assessing annual changes to the groundwater flow system in the remaining years of plant closure and during post-closure monitoring. Section 3.0 also contains a discussion of the real time groundwater-monitoring network. Section 4.0 discusses performance monitoring of RFETS groundwater remediation systems and source removals. The areas discussed in Section 4.0 include the Mound Site, Solar Evaporation Ponds, East Trenches, 881 Hillside, and Ryan's Pit. Section 5.0 presents a summary of building D&D related groundwater activities that have taken place historically and is updated for CY 2001. Section 6.0 presents a discussion of the historic and current conditions at the Present Sanitary Landfill.

Plume degradation monitoring of the Carbon Tetrachloride Plume (IHSS 118.1), the 903 Pad/Ryan's Pit Plume, and the Property Utilization and Disposal (PU&D) Yard Plume is discussed in Section 7.0. Section 8.0, Groundwater Evaluations, discusses the evaluation activities that are in progress for areas of the Site having reportable concentration values or where it is known that contaminant plumes have reached surface water. Section 9.0 presents a summary of ongoing or recently completed groundwater characterization activities at RFETS including the Actinide Migration Project, the Site-wide Water Balance, and the current Solar Ponds Plume investigation. Section

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10.0 serves to outline other Groundwater Program activities including the CY 2001 WARP activities and a summary of two White Papers recently published by the Water Programs Group. Section 11.0 contains a CY 2001 groundwater data quality assessment regarding the precision, accuracy, representativeness, completeness, and comparability (PARCC parameters) of analytical data. Section 12.0 presents conclusions and recommendations for future RFETS groundwater monitoring, characterization, evaluation, and remediation activities. Section 13.0 lists the bibliography for the all references that are cited in the text of this document.

There are six appendices to this report. Appendix A consists of trend plots of analytical chemistry results. Appendix B consists of CY 2001 water level data. Appendix C presents well hydrographs that have been updated through CY 2001. Appendix D presents borehole logs and well construction diagrams for monitoring wells installed during 2001. Appendix E presents data quality assessment tables from Section 11.0. Appendix F presents historical RFETS aquifer test data (slug and pumping tests).

1.0 INTRODUCTION

This Annual Groundwater Monitoring Report summarizes the groundwater monitoring activities and results at RFETS for CY 2001, as required in the Rocky Flats Cleanup Agreement (RFCA, 1996) and outlined in the 2001 Integrated Monitoring Plan (IMP) (Kaiser-Hill [K-H], 2000a). Section 1.0 serves as an introduction to the report. Section 2.0 discusses the groundwater quality data collected in CY 2001. Section 3.0 presents baseline (CY 1996) and CY 2001 hydrogeologic data for the RFCA groundwater-monitoring network. Section 4.0 discusses the performance monitoring activities that are in process for the various groundwater remediation projects ongoing at RFETS. Section 5.0 discusses groundwater issues with respect to building D&D activities. Section 6.0 discusses the CY 2001 monitoring results for the Present Landfill. Sections 7.0, 8.0, and 9.0 discuss plume degradation activities, groundwater evaluations, and groundwater characterization activities, respectively. Section 10.0 discusses other groundwater program activities and Section 11.0 provides a data quality assessment of the groundwater data collected during CY 2001. Section 12.0 presents conclusions and future groundwater related activities, and Section 13.0 lists all references found in this report.

1.1 Site Description

The RFETS is located 16 miles northwest of Denver in Jefferson County, Colorado. The Site is a U.S. government-owned and contractor-operated facility that encompasses approximately 6,550 acres (Figure 1-1). Site ownership, however, does not include surface and subsurface minerals or water rights. Site construction was initiated in 1951 and operations were begun in 1952.

Prior to the current closure mission, RFETS was part of the nationwide nuclear weapons research, development, and production complex. The plant produced metal components for nuclear weapons from plutonium, uranium, beryllium, and stainless steel. Other production activities included chemical recovery and purification of recyclable transuranic radionuclides, metal fabrication and assembly, and related quality control functions. The plant conducted research and development programs in metallurgy, machining, nondestructive testing, coatings, remote engineering, chemistry, and physics. Parts manufactured at the Site were shipped offsite for final assembly.

Major plant structures, including all production buildings, are located within the centralized 400-acre Industrial Area (IA) of the Site that is surrounded by a 6,150-acre Buffer Zone. Industrial activity immediately adjoining the Site includes present and/or prior coal and clay mining, petroleum recovery, natural classified-aggregate quarrying, and fabricated-aggregate mining. Other activities include cattle ranching and wind energy research. Several irrigation ditches traverse the Site, transmitting water for downstream agricultural, industrial, and municipal purposes. Three ephemeral streams drain the Site and flow eastward (see Figure 1-2).

1.2 Geology and Hydrogeology

1.2.1 Introduction

The Site is situated approximately two miles east of the Front Range of Colorado (Figure 1-1) on the western margin of the Colorado Piedmont section of the Great Plains Physiographic Province (Spencer, 1961). Haun and Kent (1965) have summarized the geologic history of the Colorado Rocky Mountain region, which includes the Site area. The elevation at the Site is approximately 6,000 feet above mean sea level (MSL). The Industrial Area of the Site is located on an alluvial-covered pediment. The upper surface of the alluvium slopes easterly 1 to 2 degrees. Most of the surrounding area in the Buffer Zone is more prominently dissected with intermittent streams. These small, eastward flowing streams include Rock Creek, Walnut Creek, Woman Creek, and several tributaries and surface water diversion ditches.

1.2.2 Stratigraphy

The stratigraphic sequence that underlies the Site extends from the crystalline Precambrian gneiss, schist, and granitoids at 3,000 feet below MSL to the unconsolidated Quaternary deposits at the surface approximately 6,000 feet above MSL. Based upon aerial photographic interpretation, field geologic mapping, coal and aggregate mine development, petroleum exploration in the vicinity, and numerous borehole investigations, a substantial amount of lithologic information has been gained about the Site. The generalized lithologic section in the Rocky Flats area is shown in Figure 1-3.

The Upper Cretaceous Pierre Shale and Fox Hills Sandstone underlie the Site, with the latter exposed in quarries along the western edge of the Site. The Cretaceous Laramie and Arapahoe Formations are exposed at the surface or underlie the Site. The Quaternary Rocky Flats Alluvium, and to a limited extent Verdos Alluvium, unconformably overlie the Arapahoe and Laramie Formations in the central portion of the Site. More recent valley fill alluvium and hillslope colluvium are also present. The unconsolidated surficial deposits, combined with the weathered portion of subcropping bedrock formations, form the sequence of rocks that have the greatest importance regarding groundwater flow and contaminant transport at the Site.

1.2.2.1 Rocky Flats Alluvium

Scott (1975) identified several Quaternary alluvial pediment covers in the vicinity of the Site. The Rocky Flats Alluvium is an unconsolidated deposit derived from quartzites and granites of the Coal Creek Canyon provenance west of the Site. The deposit thins from west to east with thicknesses ranging from approximately 100 feet to less than one foot. In the central portion of the Site the deposit is approximately 15 to 25 feet thick. The Rocky Flats Alluvium is a heterogeneous deposit dominantly composed of angular to subrounded, poorly sorted, coarse, bouldery-gravel with a clay and sand matrix. Clay, silt, and sand lenses as well as varying amounts of caliche are also present.

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Exposures of Rocky Flats Alluvium in the aggregate quarries north and west of the Site exhibit some large scale cross-stratification. Depositional processes include fluvial and debris-flow transport (Shroba and Carrara, 1994) infilling paleotopographic lows and leaving a widespread surface of erosion with extremely low relief.

1.2.2.2 Other Surficial Deposits

In addition to the pediment covering alluvial deposits, younger Quaternary units consisting of colluvium, landslide alluvium, and valley fill alluvium mantle the hillslopes and valley bottoms below the pediment surface. Colluvial deposits are derived from older alluvial deposits and Arapahoe and Laramie Formations. This unit consists of sheetwash, soil creep, and landslide materials with a total thickness of 3 to 16 feet (Shroba and Carrara, 1994). These deposits locally flank the Rocky Flats Alluvium and generally extend to lower parts of the slopes along the principal drainages.

Landslide deposits commonly flank the Rocky Flats Alluvium. They are often bounded by headwall scarps and lobate toes at the downslope margins. Seeps issuing from the base of the Rocky Flats Alluvium contribute to landslide colluvium generation. The landslide units include earth flows, slumps, and debris flows with thicknesses estimated between 10 to 33 feet (Shroba and Carrara, 1994).

Valley-fill alluvial deposits, present in the bottoms of modern stream channels, flood plains, and terraces, are composed of clay, silt, sand, and gravel. They are commonly less than 10 feet thick but can be tens of feet thick. Usually these deposits contain more sand and are well sorted compared to the Rocky Flats Alluvium.

1.2.2.3 Arapahoe Formation

The Arapahoe Formation is composed of claystone and silty claystone with lenticular sandstone in the basal portion of the formation. The Arapahoe Formation is generally less than 25 feet thick in the Site area, occurring as erosional remnants of fine grained sandstone above the Laramie Formation at various locations on Site (EG&G, 1995a). This basal Arapahoe Formation sandstone, often referred to as the No. 1 Sandstone, is of concern as a potential contamination pathway, especially where it subcrops beneath the alluvium.

1.2.2.4 Laramie Formation and Fox Hills Sandstone

The Laramie Formation is approximately 600 to 800 feet thick and is composed of a lower sandstone/claystone/coal interval and an upper, thick claystone interval. Within the upper claystone interval, thin, lenticular sandstone lenses (i.e., Sandstones 2 through 5 in the 1991 Geologic Characterization Report [EG&G, 1991a]) occur. The discontinuous nature of these sandstone lenses coupled with the large claystone layer that encloses them mitigates their potential for transmitting groundwater contamination in both a horizontal and vertical direction.

The Fox Hills Sandstone is primarily fine-grained sandstone with thin siltstone and claystone interbeds and an approximate thickness of between 75 and 125 feet. The Fox Hills Sandstone is exposed in quarries and subcrops

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along a narrow, north-south trending pattern in the extreme western part of the Site, upgradient from known sources of contamination.

The permeable lower sandstones and coals of the Laramie, combined with the permeable sandstones of the Fox Hills, constitute a regional aquifer system known as the Laramie-Fox Hills aquifer. This aquifer system is an important water source in the South Platte River Basin (Pearl, 1980), and is the sole water supply for some residents in the Rocky Flats area. This aquifer lies approximately 500 to 600 feet below the Industrial Area and is protected from contamination by the intervening Laramie Formation claystones.

1.2.2.5 Pierre Formation

The Pierre Formation is a 7,500-foot thick, dark gray, silty bentonitic shale that acts as a lower confining layer for the Laramie-Fox Hills aquifer in the Denver Basin. This thick marine shale unit subcrops only in the extreme western part of the Site.

1.2.3 Geologic Structure

The Site is located along the western margin of the Denver Basin, an asymmetric basin with a steeply east-dipping western flank and a gentle west-dipping eastern flank. The interpretation of the subsurface structure is generalized in the east-west geological cross section of the Site area presented in Figure 1-4. A monoclinal fold limb present west of the Site is the most significant surficial structural feature in the Site area. Along the west limb of the fold, an angular unconformity exists between the Upper Cretaceous bedrock and the base of the Quaternary Rocky Flats Alluvium.

No active faults have been identified at the Site. Several high angle bedrock faults have been inferred to exist in the IA based on various stratigraphic and borehole correlation criteria. These faults appear to have only a limited hydrologic significance with regard to vertical groundwater movement and contaminant transport (RMRS, 1996a).

1.2.4 Hydrogeology

This section presents the basic concepts regarding hydrogeologic conditions at the Site that affect groundwater monitoring and protection. Characterization of the hydrogeologic setting is based on the currently accepted conceptual geologic and hydrogeologic models described in the Sitewide Geoscience Characterization Study (EG&G, 1995a; 1995b; 1995c). These conceptual geologic and hydrogeologic models are used to predict the direction and rate of groundwater flow, identify potential pathways for contaminant migration, and determine the extent of contaminant plumes given varying physical, chemical, and biological factors.

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1.2.4.1 Definition of the Uppermost Aquifer for the Site

The term *aquifer* as defined by 40 CFR Section 260.10 is a "geologic formation, group of formations, or a part of a formation that is capable of yielding a significant amount of water to a well or spring." An *uppermost aquifer* is also defined as "the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's boundary." Geologic materials with similar hydrologic properties comprise a hydrostratigraphic unit (HSU) (Fetter, 1988). For purposes of this report, the uppermost aquifer or upper hydrostratigraphic unit (UHSU) consists of the unconfined saturated zone, in which unconsolidated and consolidated groundwater-bearing strata are in hydraulic communication. The UHSU consists of the following geologic units: Rocky Flats Alluvium, valley-fill alluvium, colluvium, landslide deposits, weathered Arapahoe and Laramie Formation bedrock, and all sandstones within the Arapahoe and upper Laramie Formations in hydraulic communication with the overlying unconsolidated surficial deposits. The UHSU is considered to be equivalent to the uppermost aquifer at the Site, although in many areas of the site the amount of water available in the UHSU is insufficient to meet the definition of aquifer given above.

Beneath the surficial materials and the consolidated deposits of the UHSU are the geologic units of the lower hydrostratigraphic unit (LHSU). The LHSU consists of the consolidated, unweathered bedrock zone of the Arapahoe and upper Laramie Formations not in hydraulic communication with the overlying UHSU. The Arapahoe and upper Laramie Formations comprising the geologic units of the LHSU consist of lesser amounts of sandstone and greater amounts of adjacent claystones. Because of the low permeability of the claystones, they behave as aquitards restricting hydraulic communication with the UHSU. The lower Laramie Formation and Fox Hills Sandstone comprise a stratigraphically lower and third hydrostratigraphic unit beneath the site. Groundwater within the three-hydrostratigraphic units are hydraulically separated beneath the IA. Because of monoclinal folding and erosional proximity they do converge, however, and potentially mix immediately upgradient of RFETS near the western margin of the Site. Background geochemical characterization of the UHSU and LHSU has revealed that these units have statistically different groundwater chemistry, resulting in the delineation of separate hydrostratigraphic units (EG&G, 1993a).

1.2.4.2 Groundwater Occurrence and Distribution

The Site is located in a regional groundwater recharge area (EG&G, 1991a), however, discharge may occur locally to streams and seeps. Groundwater recharge occurs from the infiltration of incident precipitation and as base flow near the upgradient area of the Site drainage basin that extends west to Coal Creek. Groundwater net recharge also occurs from stream, ditch, and pond seepage, and from leaking utilities such as water supply lines, sanitary sewers, and storm drains. Some of the groundwater that discharges from the UHSU to streams and seeps evaporates as it is being discharged. The Site-wide Water Balance (SWWB) indicated that most of the precipitation component of recharge was lost to evapotranspiration (ET) demands (K-H, 2002c). ET removes groundwater from storage in either the unsaturated zone or the saturated zone.

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In the western part of the Site, where the thickness of the Rocky Flats Alluvium may exceed 100 feet, the depth to the water table is 50 to 70 feet below the surface. The depth to water generally becomes shallower from west to east as the alluvial material thins and the underlying claystones are closer to the ground surface. At the head of stream drainages and along valley sides, seeps are common and occur at the base of the Rocky Flats Alluvium where it is in contact with claystones of the Arapahoe/Laramie Formations, and where the Arapahoe Formation sandstone crops out. In summary, the unconsolidated surficial materials are thicker in the western, higher elevations at the Site. Accordingly, the saturated thickness of these materials also thins eastward. The potentiometric surface of groundwater in permeable units of the UHSU has been mapped and is shown sitewide on Plates 3 and 4, and for the IA on Plates 5 and 6. The periods illustrated, spring and fall quarters, represent the times of year when static water levels are generally highest and lowest. Current areas of unsaturated and seasonally unsaturated alluvium and colluvium are indicated in the north/central IA, and east, northeast, and southeast of the IA.

Groundwater in the Arapahoe Formation sandstone units, which subcrop beneath the alluvial material, is not confined when in contact with the surficial materials. In this setting, a hydraulic connection exists between the bedrock sandstone and the alluvial material allowing the bedrock groundwater to exist under unconfined conditions as part of the UHSU. The subcropping Arapahoe Formation No. 1 Sandstone, located in the eastern portion of the IA and in the area between South Walnut Creek and Woman Creek, is part of the UHSU (EG&G, 1991a). The upper discontinuous sandstones of the Laramie Formation also subcrop beneath alluvium and colluvium, but in limited areas in the valleys and along valley slopes. Groundwater in the lenticular sandstone units of the Laramie Formation occurs under confined conditions over scattered areas of the Site.

Groundwater levels in UHSU wells fluctuate in response to seasonal recharge events. Of the wells that are not dry during at least one of the quarterly sampling events, approximately half cannot yield sufficient water volume (approximately 4.5 gallons) necessary for well purging and collection of a full suite of laboratory samples. As a result, sampling crews must return after wells have recovered to obtain additional sample volume.

1.2.4.3 Groundwater Flow

The shallow groundwater flow regime at the Site is illustrated by the configuration of potentiometric contours in Plates 3 and 4. These maps indicate that groundwater flow is largely controlled by the topography of the bedrock surface, which is generally reflected by the topography of the ground surface. Shallow (UHSU) groundwater flow on a regional scale is primarily lateral because of the low permeability of the underlying claystone bedrock (i.e., conductivity contrast between UHSU material and unweathered bedrock) but locally can be controlled by many factors. Groundwater on the ridge tops generally flows toward the east with flow off the ridge tops to the north-northeast and south-southeast. In areas where the ridge tops are bisected by east-northeast trending stream drainages, groundwater flows to the north or south toward the bottom of the valleys. In the valley bottoms, groundwater flows to the east, generally following the course of the stream.

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The potential for vertical groundwater flow is limited by the low permeability of bedrock claystones, as indicated by the presence of strong downward vertical hydraulic gradients between the UHSU and underlying bedrock units. This is evidence of poor hydraulic communication. For example, vertical gradients on the order of 0.79 to 1.05 ft/ft have been calculated between colluvium and bedrock sandstones. The vertical groundwater velocity through claystones is estimated to be small, on the order of 10^{-10} to 10^{-7} cm/sec, based on calculations provided in RMRS (1996a). Fracturing, where evident, is most abundant in the weathered bedrock zone and is observed to decrease with depth in unweathered bedrock. Preferential vertical groundwater flow and contaminant transport along fractures or fault zones does not appear to represent a viable pathway for contaminant migration based on an assessment of available data (RMRS, 1996a).

1.2.4.4 Hydraulic Conductivity

The UHSU at the Site has a relatively low to moderate hydraulic conductivity that typically yields small amounts of water to groundwater monitoring wells. The UHSU exhibits a wide range of hydraulic conductivities because of the diverse nature of the individual geologic units that comprise this unit. Summary statistics for UHSU hydraulic conductivities (EG&G, 1995c; Table G-2) indicate a range of 5.0×10^{-2} cm/sec to 3.0×10^{-8} cm/sec. The individual units of the UHSU are listed in order of decreasing "average" geometric mean hydraulic conductivity: valley-fill alluvium (9.197×10^{-4} cm/sec); Arapahoe No. 1 sandstone (7.88×10^{-4} cm/sec); Rocky Flats Alluvium (4.18×10^{-4} cm/sec); colluvium (9.33×10^{-5} cm/sec); weathered Laramie Formation sandstones (3.89×10^{-5} cm/sec); and weathered Laramie Formation claystones (8.82×10^{-7} cm/sec).

Hydraulic conductivities for LHSU materials are generally the lowest measured at the Site with geometric mean values for individual lithologic groups ranging from 1.6×10^{-7} to 5.8×10^{-7} cm/sec (EG&G, 1995c; Table G-2).

In summary, the following major geologic and hydrologic parameters influence groundwater flow at the Site (EG&G, 1995a; 1995b):

(1) The surface waters of the upslope drainage basin in part recharge groundwater and the three principal streams draining the Site. The majority of shallow groundwater is intercepted by these drainages.

(2) The semi-arid climate limits the amount of precipitation available for groundwater recharge. The lithology and permeability of the unconsolidated surficial deposits permit meteoric waters to recharge the water table in the cooler times of the year (during low ET) and during extended precipitation events. The water table is contained in these surface deposits and weathered bedrock.

(3) Paleotopography of the bedrock pediment, which is less permeable than the overlying unconsolidated surficial deposits, serves to direct groundwater movement along bedrock "lows."

(4) Paleoweathering of shallow bedrock materials has enhanced the permeability of the upper 10 to 60 feet relative to unweathered bedrock.

(5) The permeability of bedrock units, composed primarily of claystone with lesser amounts of siltstone and sandstone, is generally several orders of magnitude less than that for unconsolidated surficial deposits.

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The 600 plus feet of unweathered, upper Laramie Formation claystone bedrock between the shallow groundwater flow system and deep regional Laramie-Fox Hills aquifer provides an effective aquitard that restricts downward vertical groundwater flow and contaminant transport (RMRS, 1996a).

1.3 Environmental History

Processing and fabrication of weapons-related components began at the Site in 1952 and continued through 1989. Fabrication of stainless steel components continued in one building, however, through the early 1990's. During operation, environmental protection measures were established that at the time seemed consistent with prudent environmental management. However, some activities resulted in the environmental contamination of portions of the Site. Efforts to document the extent of Site contamination became a major focus in the 1980s and continue today in accordance with the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the RFCA, a cooperative agreement between U.S. Department of Energy (DOE), U.S. Environmental Protection Agency (EPA), and Colorado Department of Public Health and Environment (CDPHE). In addition, a historical release report (HRR) (DOE, 1992a) has been developed that documents contamination arising from past practices. The HRR is updated on an annual basis with the knowledge gained from ongoing monitoring and investigative activities. These annual updates are submitted to the EPA and CDPHE as addenda to the original document.

Documented areas of soil contamination have been designated as Individual Hazardous Substance Sites (IHSSs). Many of these IHSSs have been characterized as part of the Remedial Investigation/Feasibility Study (RI/FS) process which was conducted under the Interagency Agreement (IAG, 1991) between DOE, CDPHE and EPA. Some IHSSs have already been remediated and Environmental Restoration, in accordance with a Site environmental remediation priority ranking system, currently schedules others for remediation.

Groundwater investigations at the Site have determined that some IHSSs have released hazardous and radionuclide contaminants to groundwater. The most widespread contamination is that of volatile organic compounds (VOCs). Plate 13 shows the distribution of VOC contamination in the UHSU. Plume definition is inexact, however, because of limitations in well coverage, sampling frequency, variability of hydrostratigraphic conditions, local variations in groundwater velocity, and uncertainty regarding some source area locations. Previously published plume maps for VOCs can be found in previous RFCA Annual Reports (RMRS, 1997e; DOE, 1998b; RMRS, 1999m and 2000d; and SSOC, 2001a), annual RCRA Groundwater reports (EG&G, 1992; 1993c; 1994b; 1995d; and RMRS/K-H, 1996), the Well Evaluation Report (EG&G, 1994a), and in individual Operable Unit RI/RFI reports.

Compared to all other contaminants, groundwater VOC plumes at RFETS have the greatest potential to impact surface water, based on spatial distribution, mobility, and concentration considerations. These plumes have been defined on the basis of concentration values above the RFCA Tier II action level. Tier I and Tier II action levels at RFETS are derived from regulated maximum concentration limits (MCLs). Tier II action levels equal the MCLs; to delineate areas of very high groundwater VOC concentrations, Tier I action levels equal 100 x Tier II action levels.

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Plate 13 presents the distribution of some of the most common VOC contaminants in groundwater at RFETS. The most likely sources of VOC contamination were identified using the results of recent field sampling programs and knowledge of Site processes (see RMRS, 1996b). Contaminants besides VOCs are also addressed when their distribution indicates that there is a potential impact to surface water.

Six VOC groundwater contaminant plumes have historically been identified where contaminant concentrations are above Tier I action levels. These groundwater contaminant plumes include the IHSS 119.1 Plume, Mound Plume, 903 Pad/Ryan's Pit Plume, Carbon Tetrachloride Plume, East Trenches Plume, and Industrial Area Plume. In addition, there is a plume with contaminant concentrations above Tier II action levels that has the potential to impact surface water. This VOC plume is associated with the Present Landfill and the Property Utilization and Disposal (PU&D) Yard.

In addition to the VOC plumes, there is a nitrate and uranium plume that emanates from the Solar Ponds. There are also some isolated point sources with constituents that are above Tier II action levels. These are being evaluated on a case by case basis.

1.3.1 Rocky Flats Cleanup Agreement

The RFCA was officially adopted on July 19, 1996 (RFCA, 1996). The RFCA replaces the IAG as the environmental cleanup agreement for RFETS. The RFCA outlines the goals, objectives, and strategies that will lead to the RFETS cleanup and closure mission objectives. The Action Level Framework (ALF) attachment to the RFCA contains specific requirements for environmental monitoring and reporting, and it sets action levels for contaminant concentrations in groundwater (identified in Section 1.3.2) and in other media. The IMP is required under RFCA to further define the monitoring programs for the Site.

To align the groundwater-monitoring program with the new RFETS mission and RFCA requirements, the monitoring network was evaluated in 1996. A data quality objective (DQO) process was used to determine what decisions were necessary for groundwater and the function of each well in the network in supporting those decisions. DOE, CDPHE, EPA, and stakeholders were directly involved in decisions involving the monitoring network. Results of this evaluation are presented in the IMP, which is discussed below.

1.3.2 Integrated Monitoring Plan for Groundwater

The IMP is a summary document that outlines the goals for groundwater monitoring (and other environmental media), and describes the various components of the groundwater monitoring program (K-H, 2000a). Factors influencing groundwater-monitoring requirements include the RFCA ALF for groundwater, the Site history and areas of contamination, the physical and hydrogeologic setting of the Site, the effect of contaminated areas on groundwater, and the nature of the groundwater contaminant plumes. This information is presented in the IMP Background Document (K-H, 2000b), and Appendices A, B, C, and D of the groundwater section of the IMP

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Background Document. Appendix E of the groundwater section lists the wells that will be monitored for water quality or groundwater flow.

In the past, two plans were required at RFETS to comply with DOE Order 5400.1 (DOE, 1988; Page III-2), a Groundwater Protection & Management Program Plan and a Groundwater Monitoring Plan. These two plans were historically combined into one document, the Groundwater Protection and Monitoring Program Plan (GPMPP) (EG&G, 1993d), which defines and describes the groundwater protection and monitoring programs at the Site. In addition, an assessment groundwater-monitoring plan was required under RCRA for the interim status units on Site. This plan was called the Groundwater Assessment Plan (GWAP) (DOE, 1993a). Other monitoring plans were developed to address groundwater monitoring requirements as outgrowths of various CERCLA Interim Measure/Interim Remedial Action (IM/IRA) decision documents.

The IMP serves as the Groundwater Monitoring Plan for the Site and it replaces the group of plans named above. It also revises the requirements of the routine groundwater monitoring portion of the IA IM/IRA Decision Document (DOE 1994b) and the French Drain Performance Monitoring Plan (DOE, 1992c). The original IMP was published in May 1997. The IMP and IMP Background Document are updated annually with any changes to the monitoring programs.

Groundwater reporting has been integrated under the IMP. Four quarterly reports are produced annually that document concentration values above RFCA action levels. Also documented are changes in water quality for wells not monitored for comparison to action levels. A RFCA Annual Groundwater Monitoring Report is also required to summarize all actions taken for groundwater compliance within each calendar year.

For confirmed values above action levels and Site background in the designated program monitoring wells, an evaluation of impact to surface water is required. These evaluations are determined on a case by case basis, depending on the data requirements necessary to perform an impact analysis. Section 8.0 of this report discusses the status of the current evaluations that were implemented based on elevated concentrations in groundwater.

The groundwater monitoring network, as defined in the IMP (K-H, 2000a), has eight categories of monitoring wells. Table 1-1 identifies the wells in the current monitoring program. Table 1-2 presents the analytical suites associated with each well in the program and is found at the end of Section 1.0. The decision rules presented in the original IMP have been retained for determining Tier I and II exceedances of groundwater action levels. The well types and decision rules are defined below.

Boundary (B) Monitoring Wells

These wells monitor groundwater leaving the eastern Site boundary. A reportable exceedance occurs if a measured concentration is above both a Tier II action level **and** the background Mean plus 2 Standard Deviations (M2SDs). When there is no historical data, **or** a value is greater than the M2SD of the historical concentration in a well at which there have been historical exceedances of Tier II action levels, the required action is to initiate monthly

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sampling for that analyte. Appropriate parties (DOE, CDPHE and EPA) are notified and possible impacts to surface water are evaluated if contaminant levels are above action levels, by the above criteria, for three consecutive months.

D&D (DD) Monitoring Wells

These wells monitor for releases to groundwater from D&D activities. A concentration value is reportable when a measured concentration is above the M2SD of the established historical baseline concentration downgradient of the building(s). The required action is to inform appropriate parties and initiate an evaluation of the situation.

Table 1-1 IMP Wells

Well No	Frequency	Class	Plume/Area	Formation	Purpose
00100	Semiannual	DD	Building 779	AL/BD	D & D Monitoring for Building 779
00197	Semiannual	PE	Old Landfill	AL	Plume Extent well monitoring the Industrial Area Plume
00200	Semiannual	DD	Building 707	AL/BD	D & D Monitoring for Building 707
00297	Semiannual	PD	Solar Ponds	AL	Plume Definition well monitoring the southern migration of the Solar Ponds Plume
00300	Semiannual	DD	Building 707	AL/BD	D & D Monitoring for Building 707
00397	Semiannual	PE	PU&D	AL	Plume Extent well monitoring the PU&D Yard Plume
00400	Semiannual	DD	Building 776/777	AL/BD	D & D Monitoring for Building 776/777 Complex
00491	Semiannual	PD	903 Pad	BD/UHSU	Plume Definition well monitoring the 903 Pad VOC Plume
00500	Semiannual	DD	Building 776/777	AL/BD	D & D Monitoring for Building 776/777 Complex
00597	Semiannual	PD	PU&D/Landfill	AL	Plume Definition well monitoring the Landfill/PU&D yard Plume
00600	Semiannual	DD	Building 776/777	AL/BD	D & D Monitoring for Building 776/777 Complex
00700	Semiannual	DD	Building 776/777	AL/BD	D & D Monitoring for Building 776/777 Complex
00797	Semiannual	PM	881 Hillside	AL	Performance Monitoring for 881 Footing Drain Sump
00897	Semiannual	PM	Mound	BD/UHSU	Performance Monitoring on the Mound Source remediation
00997	Semiannual	D	NA	AL	Drainage well below Pond B-4 in South Walnut Creek Drainage
01097	Semiannual	PA	PU&D/Landfill	AL	Plume Degradation well monitoring upgradient of the Landfill/PU&D Yard Plume
01497	Semiannual	PA	PU&D	AL	Plume Degradation well monitoring the PU&D Yard Plume
01697	Semiannual	PE	PU&D	AL	Plume Extent well monitoring the PU&D Yard Plume
02291	Semiannual	PM	Mound	BD/UHSU	Performance Monitoring on the Mound Source remediation
02397	Semiannual		Building 779	AL	D&D monitoring upgradient of Building 779
02497	Semiannual	DD	Building 779	AL	D&D monitoring downgradient of Building 779
02500	Semiannual	DD	Building 779	AL/BD	D&D monitoring downgradient of Building 779
0386	Semiannual	B	Boundary	BD/UHSU	Boundary Well – in small drainage north of the east access gate

Well No	Frequency	Class	Plume/Area	Formation	Purpose
03991	Semiannual	PD	East Trenches	AL	Plume Definition well monitoring the East Trenches Plume
04091	Semiannual	PE	East Trenches	AL	Plume Extent well monitoring the northward migration of the East Trenches Plume
04591	Semiannual	PE	East Trenches	AL	Plume Extent well monitoring the southward migration of the East Trenches Plume
0487	Semiannual	PD	881 Hillside	AL	Plume Definition well for the 881 Hillside Plume
04991	Semiannual	PE	East Trenches	AL	Plume Extent well monitoring the eastward migration of the East Trenches Plume
05091	Semiannual	PE	East Trenches	AL	Plume Extent well monitoring the eastward migration of the East Trenches Plume
05391	Semiannual	PD	East Trenches	AL	Plume Definition well monitoring eastward concentration of VOCs from the East Trenches Plume
05691	Semiannual	PM	East Trenches	AL	Performance Monitoring well monitoring effects of remediation downgradient of Trench T-4
06091	Semiannual	PE	East Trenches	AL/BD	Plume Extent well monitoring the northeast migration of the East Trenches Plume
06491	Semiannual	B	Boundary	BD/UHSU	Boundary Well – in small drainage east of RFETS at Indiana St.
07391	Semiannual	PM/PA	903 Pad/Ryan's Pit	AL/BD	Performance Monitoring/Plume Degradation well monitoring effects of remediation of Ryan's Pit
08091	Semiannual	PE	Mound/E. Trench	AL	Plume Extent well monitoring the southern migration of Mound and East Trenches Plumes
1187	Semiannual	PA	903 Pad/Ryan's Pit	BD/UHSU	Plume Degradation well monitoring the southern migration of the 903 Pad/Ryan's Pit Plume
1386	Quarterly	PE/PM	Drainage/ Solar Ponds	AL	Performance Monitoring – SEP Treatment System, Plume Extent Monitoring for Solar Ponds Plume
1786	Quarterly	PE/PM	Solar Ponds	AL	Performance Monitoring – SEP Treatment System, Plume Extent Monitoring for Solar Ponds Plume
1986	Semiannual	PE	Industrial Area	AL	Plume Extent well monitoring the northern migration of the IA Plume
2186	Semiannual	PE	Industrial Area	BD/UHSU	Plume Extent well monitoring the northern migration of the IA Plume
3386	Semiannual	PE	Solar Ponds	AL	Plume Extent well monitoring the southern migration of the SEP Nitrate and VOC Plumes
3586	Semiannual	PE/PM	Mound	AL	Plume Extent well tracking migration of Solar Ponds nitrate Plume
3687	Semiannual	PM	East Trenches	BD/UHSU	Performance Monitoring well monitoring effects of remediation downgradient of Trench T-4
4087	Quarterly	RCRA	Landfill	AL	RCRA/Plume Extent well monitoring downgradient of Present Landfill
4787	Semiannual	PE	881 Hillside	AL	Plume Extent south of the 881 Hillside Plume
4887	Semiannual	PE	881 Hillside	AL	Plume Extent south of the 881 Hillside Plume
5187	Semiannual	DD	Building 881	AL	D & D Monitoring for Building 881
5387	Semiannual	PE	881 Hillside	AL	Plume Extent south of the 881Hillside Plume
5587	Semiannual	D	NA	AL	Drainage well monitoring the Woman Cr. Drainage south of the 881 Hillside Plume

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Well No	Frequency	Class	Plume/Area	Formation	Purpose
5887	Quarterly	RCRA	PU&D/Landfill	AL	RCRA upgradient/ Plume Extent well monitoring the PU&D Yard Plume and Present Landfill
6186	Semiannual	PE	Industrial Area	AL	Plume Extent well monitoring eastward migration of IA Plume
6286	Semiannual	PD	903 Pad	BD/USHU	Plume Definition well monitoring pathway to Woman Cr. In the 903 Pad/Ryan's Pit Plume
6386	Semiannual	PD	903 Pad	AL	Plume Definition well monitoring pathway to Woman Cr. In the 903 Pad/Ryan's Pit Plume
6486	Semiannual	D	NA	AL	Drainage well monitoring the Woman Creek drainage downgradient of the 881 Hillside Plume
6586	Semiannual	D	NA	AL	Drainage well monitoring the N side of Woman Creek below 903Pad/Ryans Pit Plume
7086	Semiannual	PE	IA/Old Landfill	AL	Plume Extent well monitoring IA Plume and Old Landfill Plume pathway in Woman Cr.
10098	Semiannual	DD	Building 123	AL	D & D Monitoring for Building 123
10194	Semiannual	PE	East Trenches	AL	Plume Extent well monitoring the southern migration of the East Trenches Plume
10198	Semiannual	DD	Building 123	AL	D & D Monitoring for Building 123
10294	Semiannual	B	Boundary	AL	Boundary Well – in drainage below Pond D-2 in the southeast corner of the Site
10298	Semiannual	DD	Building 123	AL	D & D Monitoring for Building 123
10394	Semiannual	B	Boundary	AL	Boundary Well – in the Woman Cr. Drainage at the Indiana Street Boundary
10398	Semiannual	DD	Building 123	AL	D & D Monitoring for Building 123
10498	Semiannual	DD	Building 123	AL	D & D Monitoring for Building 123
10592	Semiannual	PM	881 Hillside	AL	Performance Monitoring for the French Drain
10598	Semiannual	DD	Building 123	AL	D & D Monitoring for Building 123
10692	Semiannual	PM	881 Hillside	AL	Performance Monitoring for the French Drain
10792	Semiannual	PM	881 Hillside	AL	Performance Monitoring for the French Drain
10992	Semiannual	PM	881 Hillside	AL	Performance Monitoring for the French Drain
10994	Semiannual	PE	IA/Old Landfill	AL	Plume Extent IA VOA Plume/Old Landfill Plume near Woman Creek
11092	Semiannual	PM	881 Hillside	AL	Performance Monitoring for the French Drain
11791	Semiannual	PA	903 Pad/Ryan's Pit	AL/BD	Plume Degradation well monitoring the southern migration of the 903 Pad/Ryan's Pit Plume
11891	Semiannual	PM	East Trenches	BD/UHSU	Performance Monitoring well monitoring effects of remediation downgradient of Trench T-3
12191	Semiannual	PM	East Trenches	BD/UHSU	Performance Monitoring at edge of T3 soil excavation
12691	Semiannual	PM	East Trenches	BD/UHSU	Performance Monitoring well monitoring effects of remediation downgradient of Trench T-4
15599	Semiannual	PM	Mound	AL	Performance Monitoring for the Mound groundwater treatment system
15699	Semiannual	PM	Mound	AL	Performance Monitoring for the Mound groundwater treatment system
15799	Semiannual	PM	Mound	AL	Performance Monitoring for the Mound groundwater treatment system
18199	Semiannual	PA/D D	IHSS 118.1/B771	AL	Plume Degradation well monitoring the IHSS 118.1 plume and D&D monitoring for Building 771 Complex

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Well No	Frequency	Class	Plume/Area	Formation	Purpose
18399	Semiannual	PA	IHSS 118.1	AL	Plume Degradation well monitoring the IHSS 118.1 plume
18499	Semiannual	PA	IHSS 118.1	AL	Plume Degradation well monitoring the IHSS 118.1 plume
18799	Semiannual	PA	IHSS 118.1	AL	Plume Degradation well monitoring the IHSS 118.1 plume
20998	Semiannual	DD	Building 771	AL	D & D Monitoring for Building 771 Complex
21098	Semiannual	PE	IHSS 118.1	AL	Plume Extent well monitoring the IHSS 118.1 plume
22596	Semiannual	PE	Industrial Area	AL	Plume Extent well monitoring the northern migration of the IA Plume
22696	Semiannual	PE	Industrial Area	AL	Plume Extent well monitoring the westward migration of the IHSS 118.1 Plume
22796	Semiannual	PE	Industrial Area	AL	Plume Extent well monitoring the northern migration of the IHSS 118.1 Plume
22896	Semiannual	PD	Industrial Area	AL	Plume Definition well monitoring the northward extent of the Tier I part of IA-VOA Plume
22996	Semiannual	DD	Building 886	AL	D & D Monitoring for Building 886
23096	Semiannual	PE	903 Pad	AL	Plume Extent well monitoring the southern migration of the Ryan's Pit – OU2 VOA Plume
23296	Semiannual	PE/PM	East Trenches	AL	Plume Extent/Performance Monitoring well monitoring the East Trenches Treatment System
30100	Semiannual	PE	PU&D	AL	Plume Extent well monitoring the PU&D Yard Plume
30900	Semiannual	PA	PU&D	AL	Plume Degradation well monitoring the PU&D Yard Plume
37101	Semiannual	DD	Building 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37201	Semiannual	DD	Building 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37301	Semiannual	DD	Building 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37402	Semiannual	DD	Building 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37501	Semiannual	DD	Building 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37601	Semiannual	DD	Building 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37701	Semiannual	DD	Building 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37791	Semiannual	DD	Building 881	AL	D & D Monitoring for Building 881
38591	Semiannual	D	NA	AL	Drainage well in Woman Creek drainage below 881 Hillside
39691	Semiannual	DD	Building 881	AL/BD	D & D Monitoring for Building 881
40099	Semiannual	DD	Building 444	AL/BD	D & D Monitoring for Building 444 Complex
40199	Semiannual	DD	Building 444	AL/BD	D & D Monitoring for Building 444 Complex
40299	Semiannual	DD	Building 444	AL/BD	D & D Monitoring for Building 444 Complex
40399	Semiannual	DD	Building 444	AL/BD	D & D Monitoring for Building 444 Complex
40499	Semiannual	DD	Building 444	AL/BD	D & D Monitoring for Building 444 Complex
40599	Semiannual	DD	Building 771	AL/BD	D & D Monitoring for Building 771 Complex
40699	Semiannual	DD	Building 771	AL/BD	D & D Monitoring for Building 771 Complex
40799	Semiannual	DD	Building 771	AL/BD	D & D Monitoring for Building 771 Complex
40899	Semiannual	DD	Building 771	AL/BD	D & D Monitoring for Building 771 Complex
40999	Semiannual	DD	Building 886/865	AL/BD	D & D Monitoring for Buildings 886 and 865
41099	Semiannual	DD	Building 886	AL/BD	D & D Monitoring for Building 886
41199	Semiannual	DD	Building 886	AL/BD	D & D Monitoring for Building 886
41299	Semiannual	DD	Building 444	AL/BD	D & D Monitoring for Building 444 Complex
41499	Semiannual	DD	Building 771	AL/BD	D & D Monitoring for Building 771 Complex

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Well No	Frequency	Class	Plume/Area	Formation	Purpose
41591	Semiannual	B	Boundary	AL	Boundary Well – in small drainage near east access gate
41599	Semiannual	DD	Building 771	AL/BD	D & D Monitoring for Building 771 Complex
41691	Semiannual	B	Boundary	AL	Boundary Well – in the Walnut Cr. Drainage at the Indiana Street Boundary
43392	Semiannual	PE	Industrial Area	AL	Plume Extent well monitoring southward migration of IA Plume
52894	Quarterly	RCRA	Landfill	AL	RCRA/Plume Extent well monitoring downgradient of Present Landfill
52994	Quarterly	RCRA	Landfill	AL	RCRA/Plume Extent well monitoring downgradient of Present Landfill
55901	Semiannual	DD	Building 559	AL/BD	D & D Monitoring for Building 559
56001	Semiannual	DD	Building 559	AL/BD	D & D Monitoring for Building 559
56101	Semiannual	DD	Building 559	AL/BD	D & D Monitoring for Building 559
56201	Semiannual	DD	Building 559	AL/BD	D & D Monitoring for Building 559
56301	Semiannual	DD	Building 559	AL/BD	D & D Monitoring for Building 559
60299	Semiannual	DD	Building 776/777	AL/BD	D & D Monitoring for Building 776/777 Complex
60499	Semiannual	DD	Building 707	AL/BD	D & D Monitoring for Building 707
60599	Semiannual	DD	Building 707	AL/BD	D & D Monitoring for Building 707
60699	Semiannual	DD	Building 707	AL/BD	D & D Monitoring for Building 707
61099	Semiannual	DD	Building 883	AL/BD	D & D Monitoring for Building 883
61199	Semiannual	DD	Building 883	AL/BD	D & D Monitoring for Building 883
61499	Semiannual	DD	Building 707	AL/BD	D & D Monitoring for Building 707
70099	Quarterly	PM	Solar Ponds	AL/BD	Performance Monitoring of groundwater treatment system below Solar Pond
70193	Quarterly	RCRA	PU&D/Landfill	BD/UHSU	RCRA upgradient/Plume Extent well monitoring the Present Landfill
70299	Quarterly	PM	Solar Ponds	AL/BD	Performance Monitoring of groundwater treatment system below Solar Ponds
70393	Quarterly	RCRA	PU&D/Landfill	AL	RCRA upgradient /Plume Definition well monitoring the edge of the PU&D Yard Plume
70493	Quarterly	RCRA	PU&D	BD/UHSU	RCRA upgradient/Plume Definition well monitoring the edge of the PU&D Yard Plume
70693	Semiannual	PA	PU&D/Landfill	AL	Plume Degradation well monitoring the Landfill/PU&D Yard Plume
75992	Semiannual	PE	Mound/East Trench	AL	Plume Extent well monitoring So. Walnut Cr. Drainage below Mound Site Plume
76992	Semiannual	PE	PU&D/Landfill	AL	Plume Extent well monitoring the eastward migration of the PU&D Yard/Landfill Plume
77392	Semiannual	PD	Landfill	AL	Plume Definition well monitoring the eastward migration of the PU&D Yard Plume
83101	Semiannual	DD	Building 883/881	AL/BD	D & D Monitoring for Buildings 883 and 881
83201	Semiannual	DD	Building 883	AL/BD	D & D Monitoring for Building 883
86501	Semiannual	DD	Building 865	AL/BD	D & D Monitoring for Building 865
86601	Semiannual	DD	Building 865	AL/BD	D & D Monitoring for Building 865
86701	Semiannual	DD	Building 865	AL/BD	D & D Monitoring for Building 865
88101	Semiannual	DD	Building 881	AL/BD	D & D Monitoring for Building 881
90099	Semiannual	PA	903 Pad/Ryan's Pit	AL/BD	Plume Degradation well monitoring the southern migration of the 903 Pad/Ryan's Pit Plume
90199	Semiannual	PE	903 Pad/Ryan's Pit	AL/BD	Plume Extent well monitoring the southern migration of the 903 Pad/Ryan's Pit Plume

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Well No.	Frequency	Class	Plume/Area	Formation	Purpose
90299	Semiannual	PE	903 Pad/Ryan's Pit	AL/BD	Plume Extent well monitoring the southern migration of the 903 Pad/Ryan's Pit Plume
90399	Semiannual	PA	903 Pad/Ryan's Pit	AL/BD	Plume Degradation well monitoring the southern migration of the 903 Pad/Ryan's Pit Plume
95099	Semiannual	PM	East Trenches	AL	Performance Monitoring of groundwater treatment system below East Trenches
95199	Semiannual	PM	East Trenches	AL	Performance Monitoring of groundwater treatment system below East Trenches
95299	Semiannual	PM	East Trenches	AL/BD	Performance Monitoring of groundwater treatment system below East Trenches
99101	Semiannual	DD	Building 991	AL/BD	D & D Monitoring for Building 991
99201	Semiannual	DD	Building 991	AL/BD	D & D Monitoring for Building 991
99301	Semiannual	DD	Building 991	AL/BD	D & D Monitoring for Building 991
99401	Semiannual	DD	Building 991	BD/UHSU	D & D Monitoring for Building 991
B206989	Quarterly	RCRA	Landfill	BD/UHSU	RCRA/Plume Extent well monitoring downgradient of Present Landfill
B208289	Semiannual	PE	Solar Ponds	BD/UHSU	Plume Extent well monitoring the northeast migration of the SEP Nitrate Plume
B208789	Semiannual	PE	Solar Ponds	AL	Plume Extent well monitoring the northeast migration of the SEP Nitrate Plume
P114389	Semiannual	PE	Industrial Area	AL	Plume Extent well to monitor extent of Industrial Area plume pathway to Walnut Creek
P209289	Semiannual	PD	IHSS 118.1	AL	Plume Definition well for IHSS 118.1
P209389	Semiannual	PD	IHSS 118.1	BD	Plume Definition well for IHSS 118.1
P209489	Semiannual	PD	Solar Ponds	BD/UHSU	Plume Definition well for IHSS 118.1
P218089	Semiannual	DD	Building 707	AL	D & D Monitoring for Building 707
P218389	Semiannual	PE	Solar Ponds	AL	Plume Extent well monitoring the northern migration of the SEP Nitrate Plume
P219089	Semiannual	DD	Building 771	AL/BD	D & D Monitoring for Building 771 Complex
P219189	Semiannual	PD	IHSS 118.1	AL	Plume Definition well for IHSS 118.1
P219489	Semiannual	PE	Solar Ponds	AL	Plume Extent well monitoring the northern migration of the SEP Nitrate Plume
P313589	Semiannual	PE	Industrial Area	AL	Plume Extent to monitor the eastward migration of IA Plume near Building 881
P314289	Semiannual	PE	Industrial Area	AL	Plume Extent to monitor the southern migration of IA Plume near Building 850
P317989	Semiannual	DD	Building 886/865	AL	D & D Monitoring for Buildings 886 and 865
P416689	Semiannual	PE	Industrial Area	AL	Plume Extent to monitor southern migration of IA Plume south of Building 440
P416789	Semiannual	PD	Industrial Area	AL	Plume Definition of IA Plume south of 400 area along pathway to Woman Creek
P416889	Semiannual	PD	Industrial Area	AL	Plume Definition of IA Plume south of Building 664 along pathway to Woman Creek
P419689	Semiannual	DD	Building 444	AL/BD	D & D Monitoring for Building 444 Complex
891COL WEL	Quarterly	PM	881 Hillside	AL	Performance Monitoring of groundwater in collection well on 881 Hillside
ETP ef	Semiannual	PM	East Trenches	NA	Performance Monitoring of groundwater treatment system below East Trenches
ETP in	Semiannual	PM	East Trenches	NA	Performance Monitoring of groundwater treatment system below East Trenches

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Well No	Frequency	Class	Plume/Area	Formation	Purpose
R1-0	Semiannual	PM	Mound	NA	Performance Monitoring of groundwater treatment system below Mound
R2-E	Semiannual	PM	Mound	NA	Performance Monitoring of groundwater treatment system below Mound
371-Basement	Semiannual	DD	Building 371/374	NA	D & D Monitoring for Building 371/374 Complex at foundation drain outfall
371-Sub-Basement	Semiannual	DD	Building 371/374	NA	D & D Monitoring for Building 371/374 Complex at foundation drain outfall
FD-559/561	Semiannual	DD	Building 559	NA	D & D Monitoring for Building 559 at foundation drain access point
FD-707-4	Semiannual	DD	Building 707	NA	D&D Monitoring for Building 707 at foundation drain access point
771FDOut #2	Semiannual	DD	Building 771	NA	D&D Monitoring for Building 771 at foundation drain outfall
BS-865-2	Semiannual	DD	Building 865	NA	D & D Monitoring for Building 865 at foundation drain access point
SW099	Quarterly	PM	Landfill	PM	Performance Monitoring of groundwater intercept system below Present Landfill
SW100	Quarterly	PM	Landfill	PM	Performance Monitoring of groundwater intercept system below Present Landfill
SW13494	Quarterly	DD	Building 881	NA	D&D Monitoring for Building 881

Plume Definition (PD) Monitoring Wells

These wells are located within known contaminant plumes and produce samples with contaminant concentrations which are above Tier II action levels, but are below the Tier I action levels established in the ALF. A value is reportable when a measured concentration is above all of the following: a Tier I action level, the background M2SD, **and** the M2SD of the historical concentration in the well. The required action is to reclassify the well as a Tier I reportable well and evaluate possible impacts to groundwater.

Plume Extent (PE) Monitoring Wells

These wells are located at the edges of known groundwater contaminant plumes, along pathways to surface water, and monitor for an increase in concentrations that may result in future impacts to surface water. A value is reportable if a measured concentration is above a Tier II action level **and** the background M2SD. When there is no historical data, **or** a value is greater than the M2SD of the historical concentration in a well at which there have been historical values above Tier II action levels, the required action is to initiate monthly sampling. Appropriate parties are notified and possible impacts to surface water are evaluated if contaminant levels are above action levels, by the above criteria, for three consecutive months.

Drainage (D) Monitoring Wells

These wells are located in stream drainages, downgradient of contaminant plumes. They have the same reporting requirements as PE wells under the IMP. That is, a value is reportable when a measured concentration is above the Tier II action level and the background M2SD. When there are no historical data, **or** a value is greater than the

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M2SD of the historical concentration in a well at which there have been historical values above Tier II action levels, the required action is to initiate monthly sampling. Appropriate parties are notified and possible impacts to surface water are evaluated if values are above action levels, by the above criteria, for three consecutive months.

Performance Monitoring (PM) Wells

These wells monitor the effect of a remediation or source removal action, as required in the ALF. If an increasing trend in the concentration of a contaminant is noted, then the appropriate parties are notified and an evaluation of the situation is initiated.

RCRA Monitoring Wells

These wells monitor upgradient and downgradient groundwater contaminant concentrations at RCRA units. If the mean concentration of a contaminant in a downgradient well is greater than the mean concentration in upgradient wells and concentrations at the well show an upward trend with time, a report will be made to appropriate agencies and an investigation will be initiated to investigate possible causes.

Plume Degradation (PA) Monitoring Wells

These wells monitor the downgradient portions of groundwater plumes or plume sources to establish whether natural processes are degrading (also called attenuating) the nature and extent of the plume prior to affected groundwater entering the surface water environment. In areas where monitoring can document a plume degradation process, other remediation activities may not be necessary. These wells differ from plume extent wells in that the analyte suite may include parameters that focus on measuring the degradation process. Also, evaluations of data from these wells would not only include concentration of contaminants but also the breakdown products from these contaminants. If significant plume degradation can be substantiated, then a non-remedial decision may be promulgated for the plume.

1.3.3 Changes to the Groundwater Monitoring Program

Additions to the Groundwater Monitoring Network

Wells have been added to the Site monitoring network based on the results or in support of groundwater evaluations, remediation activities, and closure activities. Plate 1 shows the locations of all existing monitoring wells at RFETS.

The Building D&D monitoring program was expanded with the addition of monitoring wells around Buildings 371/374, 883, 865, 881, 991 and 559. With this addition, all major buildings with the potential to impact groundwater quality have monitoring networks in place.

The largest programmatic improvement for groundwater has been in the evaluation of the Industrial Area VOC Plume. Evaluation of the Industrial Area Plume involved the installation of 14 wells in the interior of the plume to

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identify the sources for the groundwater contamination such that multiple plumes may be identified. The results of this evaluation are reflected in plume maps for the IA VOCs (Section 8.2) and in the Composite VOC Plume map (Plate 13; Section 8.3) for the Site.

An evaluation was performed during the spring and summer of 2002 to determine if the Composite VOC Plume map should be constructed differently than had been done previously. Concerns revolved around presentation of data that represented a combination of new data and historic data. The decision was made to present the new plume configuration and a representative plume configuration from 1997. These changes will be reflected in the 2001 Composite VOC Plume map (Plate 13). See Section 8.3 of this 2001 Annual Report for a detailed discussion of the Composite VOC Plume map.

Given the large amount of new data with respect to the nature and extent of groundwater contamination at RFETS, a review of the groundwater-monitoring network will begin in FY02. The evaluation will be part of the Well Abandonment and Replacement Project, which will start in FY02. This project will help focus the abandonment of wells no longer necessary at RFETS for monitoring purposes. It is anticipated that changes will be proposed to the monitoring program based on this evaluation.

Removals from the Groundwater Monitoring Network

Wells are proposed for removal from the Site monitoring network either to facilitate improvements to the network, because of well damage, or because of closure activities. Well 02197 was removed from the program because of poor water production.

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Table 1-2 Analyte Suites

				VOC	Metals			SR						Cesium							Water Quality			
Well Number	Frequency	Plume/Area	Drivers	Suite	Suite	Tritium	PU/AM	89/90	Uranium	Nitrate	Fluoride	Sulfate	Cyanide	137	Chloride	Sulfide	TOC	Methane	Ethene	Suite	Np-237	TPH	PCB
100	Semiannual	Bldg. 779		X	X		X		X	X													
197	Semiannual	Old Landfill	RFCA	X	X	X		X	X	X	X	X											
200	Semiannual	Bldg. 707		X	X		X		X												X		
297	Semiannual	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X	X	X	X											
300	Semiannual	Bldg. 707		X	X		X		X												X		
397	Semiannual	PU&D	RFCA	X	X	X			X	X	X	X											
400	Semiannual	Bldg. 776/777		X	X	X	X		X	X													
491	Semiannual	903 Pad		X	X		X		X	X		X											
500	Semiannual	Bldg. 776/777		X	X	X	X		X	X													
597	Semiannual	PU&D/Landfill	RFCA	X	X	X			X	X	X	X											
600	Semiannual	Bldg. 776/777		X	X	X	X		X	X													
700	Semiannual	Bldg. 776/777		X	X	X	X		X	X													
797	Semiannual	881 Hillside	RFCA	X	X				X	X		X											
897	Semiannual	Mound		X	X		X		X	X													
997	Semiannual	Drainage	RFCA	X	X		X	X	X														
1097	Semiannual	PU&D		X						X		X			X	X	X		X				
1497	Semiannual	PU&D		X						X		X			X	X	X		X				
1697	Semiannual	PU&D	RFCA	X	X	X			X	X	X	X											
2097	Semiannual	PU&D		X						X		X			X	X	X		X				
2291	Semiannual	Mound		X	X		X		X	X													
2397	Semiannual	Bldg. 779		X	X		X		X	X													
2497	Semiannual	Bldg. 779	RFCA	X	X		X		X	X													
2500	Semiannual	Bldg. 779		X	X		X		X	X													
386	Semiannual	Boundary	RFCA, AIP	X	X	X	X		X	X	X	X											
3991	Semiannual	East Trenches	RFCA	X	X		X		X	X													
4091	Semiannual	East Trenches	RFCA	X	X		X		X	X													
4591	Semiannual	East Trenches	RFCA	X	X		X		X	X													
487	Semiannual	881 Hillside	RFCA	X	X				X	X		X											

				VOC	Metals			SR						Cesium							Water Quality			
Well Number	Frequency	Plume/Area	Drivers	Suite	Suite	Tritium	PU/AM	89/90	Uranium	Nitrate	Fluoride	Sulfate	Cyanide	137	Chloride	Sulfide	TOC	Methane	Ethene	Suite	Np-237	TPH	PCB
4991	Semiannual	East Trenches	RFCA	X	X		X		X	X													
5091	Semiannual	East Trenches	RFCA	X	X		X		X	X													
5391	Semiannual	East Trenches		X	X		X		X	X													
5691	Semiannual	East Trenches		X	X		X		X	X													
6091	Semiannual	East Trenches	RFCA	X	X		X		X	X													
6491	Semiannual	Boundary	RFCA, AIP	X	X	X	X		X	X	X	X											
7391	Semiannual	903 Pad/Ryan's Pit		X	X		X		X	X		X			X	X	X	X	X				
8091	Semiannual	Mound/E. Trench	RFCA	X	X		X	X	X	X													
1187	Semiannual	903 Pad/Ryan's Pit		X						X		X			X	X	X	X	X				
1386	Quarterly**	Drainage/Solar Ponds	RFCA, RCRA	X	X	X	X	X	X+X (D&T)	X	X	X												
1786	Quarterly**	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X+X (D&T)	X	X	X												
1986	Semiannual	Ind. Area	RFCA	X	X		X		X	X													
2186	Semiannual	Ind. Area	RFCA	X	X		X		X	X													
3386	Semiannual	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X	X	X	X											
3586	Semiannual	Mound		X	X		X		X	X													
3687	Semiannual	East Trenches		X	X		X		X	X													
4087	Quarterly	Landfill	RFCA, RCRA	X	X	X			X	X	X	X											
4787	Semiannual	881 Hillside	RFCA	X	X				X	X		X											
4887	Semiannual	881 Hillside	RFCA	X	X				X	X		X											
5187	Semiannual	Bldg. 881		X	X		X		X	X													X*
5387	Semiannual	881 Hillside	RFCA	X	X				X	X		X											
5587	Semiannual	Drainage	RFCA	X	X			X	X	X		X											
5887	Quarterly	PU&D	RFCA, RCRA	X	X	X			X	X	X	X											
6186	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X													
6286	Semiannual	903 Pad	RFCA	X	X		X		X	X		X											
6386	Semiannual	903 Pad	RFCA	X	X		X		X	X		X											
6486	Semiannual	Drainage	RFCA	X	X			X	X	X		X											
6586	Semiannual	Drainage	RFCA	X	X		X		X	X													
7086	Semiannual	IA/Old Landfill	RFCA	X	X			X	X	X		X											
10098	Semiannual	Bldg. 123		X	X		X		X	X			X	X									

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Well Number	Frequency	Plume/Area	Drivers	VOC Suite	Metals Suite	Tritium	PU/AM	SR 89/90	Uranium	Nitrate	Fluoride	Sulfate	Cyanide	Cesium 137	Water Quality Suite						Np-237	TPH	PCB
															Chloride	Sulfide	TOC	Methane	Ethene				
10194	Semiannual	East Trenches	RFCA	X	X		X		X	X													
10198	Semiannual	Bldg. 123		X	X		X		X	X			X	X									
10294	Semiannual	Boundary	RFCA, AIP	X	X	X	X		X	X	X	X											
10298	Semiannual	Bldg. 123		X	X		X		X	X			X	X									
10394	Semiannual	Boundary	RFCA, AIP	X	X	X	X	X	X	X	X	X											
10398	Semiannual	Bldg. 123		X	X		X		X	X			X	X									
10498	Semiannual	Bldg. 123		X	X		X		X	X			X	X									
10592	Semiannual	881 Hillside	RFCA, IM/IRA -FD	X	X				X	X		X											
10598	Semiannual	Bldg. 123		X	X		X		X	X			X	X									
10692	Semiannual	881 Hillside	RFCA, IM/IRA -FD	X	X				X	X		X											
10792	Semiannual	881 Hillside	RFCA, IM/IRA -FD	X	X				X	X		X											
10992	Semiannual	881 Hillside	RFCA, IM/IRA -FD	X	X				X	X		X											
10994	Semiannual	IA/Old Landfill	RFCA	X	X			X	X	X		X											
11092	Semiannual	881 Hillside	RFCA, IM/IRA -FD	X	X				X	X		X											
11791	Semiannual	903 Pad/Ryan's Pit		X						X		X			X	X	X	X	X				
11891	Semiannual	East Trenches		X	X		X		X	X													
12191	Semiannual	East Trenches	East Trenches	X	X		X		X	X													
12691	Semiannual	East Trenches		X	X		X		X	X													
15599	Semiannual	Mound		X			X		X														
15699	Semiannual	Mound		X			X		X														
15799	Semiannual	Mound		X			X		X														
18199	Semiannual	IHSS 118.1/Bldg 771		X	X	X	X		X	X		X			X	X	X	X			X		
18399	Semiannual	IHSS 118.1		X						X		X			X	X	X	X					
18499	Semiannual	IHSS 118.1		X						X		X			X	X	X	X					
18799	Semiannual	IHSS 118.1		X						X		X			X	X	X	X					
20998	Semiannual	Bldg. 771		X	X	X	X		X	X											X		
21098	Semiannual	IHSS 118.1		X						X		X			X	X	X	X					
22596	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X													
22696	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X													
22796	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X													

Well Number	Frequency	Plume/Area	Drivers	VOC Suite	Metals Suite	Tritium	PU/AM	SR 89/90	Uranium	Nitrate	Fluoride	Sulfate	Cyanide	Cesium 137	Chloride	Sulfide	TOC	Methane	Ethene	Water Quality Suite	Np-237	TPH	PCB
22896	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X													
22996	Semiannual	Bldg. 886	RFCA, IM/IRA for IA	X	X		X		X	X													
23096	Semiannual	903 Pad	RFCA	X	X		X		X	X		X											
23296	Semiannual	East Trenches	RFCA	X	X		X		X	X													
30100	Semiannual	PU&D		X	X	X			X	X	X	X											
30900	Semiannual	PU&D		X						X		X			X	X	X		X				
37101	Semiannual	Bldg. 371/374		X	X		X		X	X												X*	
37201	Semiannual	Bldg. 371/374		X	X		X		X	X												X*	
37301	Semiannual	Bldg. 371/374		X	X		X		X	X												X*	
37402	Semiannual	Bldg. 371/374		X	X		X		X	X												X*	
37501	Semiannual	Bldg. 371/374		X	X		X		X	X												X*	
37601	Semiannual	Bldg. 371/374		X	X		X		X	X												X*	
37701	Semiannual	Bldg. 371/374		X	X		X		X	X												X*	
37791	Semiannual	Bldg. 881		X	X		X		X	X													X*
38591	Semiannual	Drainage	RFCA	X	X			X	X	X		X											
39691	Semiannual	Bldg. 881		X	X		X		X	X													X*
40099	Semiannual	Bldg. 444		X	X	X			X	X			X										
40199	Semiannual	Bldg. 444		X	X	X			X	X			X										
40299	Semiannual	Bldg. 444		X	X	X			X	X			X										
40399	Semiannual	Bldg. 444		X	X	X			X	X			X										
40499	Semiannual	Bldg. 444		X	X	X			X	X			X										
40599	Semiannual	Bldg. 771		X	X	X	X		X	X												X	
40699	Semiannual	Bldg. 771		X	X	X	X		X	X												X	
40799	Semiannual	Bldg. 771		X	X	X	X		X	X												X	
40899	Semiannual	Bldg. 771		X	X	X	X		X	X												X	
40999	Semiannual	Bldg. 865/886		X	X		X		X	X													
41099	Semiannual	Bldg. 886		X	X		X		X	X													
41199	Semiannual	Bldg. 886		X	X		X		X	X													
41299	Semiannual	Bldg. 444		X	X	X			X	X			X										
41499	Semiannual	Bldg. 771		X	X	X	X		X	X												X	

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Well Number	Frequency	Plume/Area	Drivers	VOC Suite	Metals Suite	Tritium	Pu/Am	SR 89/90	Uranium	Nitrate	Fluoride	Sulfate	Cyanide	Cesium -137	Chloride	Sulfide	TOC	Methane	Ethene	Water Quality Suite	Np-237	TPH	PCB
41591	Semiannual	Boundary	RFCA, AIP	X	X	X	X		X	X	X	X											
41599	Semiannual	Bldg. 771		X	X	X	X		X	X											X		
41691	Semiannual	Boundary	RFCA, AIP	X	X	X	X	X	X	X	X	X											
43392	Semiannual	Ind. Area	RFCA	X	X		X		X	X													
52894	Quarterly	Landfill	RFCA, RCRA	X	X	X			X	X	X	X											
52994	Quarterly	Landfill	RFCA, RCRA	X	X	X			X	X	X	X											
55901	Semiannual	Bldg. 559		X	X		X		X	X													X*
56001	Semiannual	Bldg. 559		X	X		X		X	X													X*
56101	Semiannual	Bldg. 559		X	X		X		X	X													X*
56201	Semiannual	Bldg. 559		X	X		X		X	X													X*
56301	Semiannual	Bldg. 559		X	X		X		X	X													X*
60299	Semiannual	Bldg. 776/777		X	X	X	X		X	X													
60499	Semiannual	Bldg. 707		X	X		X		X												X		
60599	Semiannual	Bldg. 707		X	X		X		X												X		
60699	Semiannual	Bldg. 707		X	X		X		X												X		
61099	Semiannual	Bldg. 883		X	X				X	X												X*	X*
61199	Semiannual	Bldg. 883		X	X				X	X												X*	X*
61499	Semiannual	Bldg. 707		X	X		X		X												X		
70099	Quarterly	Solar Ponds							X (T)	X													
70193	Quarterly	PU&D	RFCA, RCRA	X	X	X			X	X	X	X											
70299	Quarterly	Solar Ponds							X (T)	X													
70393	Quarterly	PU&D	RFCA, RCRA	X	X	X			X	X	X	X											
70493	Quarterly	PU&D	RFCA, RCRA	X	X	X			X	X	X	X											
70693	Semiannual	PU&D/Landfill		X						X		X			X	X	X		X				
75992	Semiannual	Mound/E. Trench	RFCA	X	X		X	X	X	X													
76992	Semiannual	PU&D/Landfill	RFCA, RCRA	X	X	X			X	X	X	X											
77392	Semiannual	Landfill	RFCA	X	X	X			X	X	X	X											
83101	Semiannual	Bldg. 883/881		X	X		X		X	X												X*	X*
83201	Semiannual	Bldg. 883		X	X				X	X												X*	X*
86501	Semiannual	Bldg. 865		X	X				X	X													

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				VOC	Metals			SR						Cesium							Water Quality			
Well Number	Frequency	Plume/Area	Drivers	Suite	Suite	Tritium	PU/AM	89/90	Uranium	Nitrate	Fluoride	Sulfate	Cyanide	137	Chloride	Sulfide	TOC	Methane	Ethene	Suite	Np-237	TPH	PCB
86601	Semiannual	Bldg. 865		X	X				X	X													
86701	Semiannual	Bldg. 865		X	X				X	X													
88101	Semiannual	Bldg. 881		X	X		X		X	X													X*
90099	Semiannual	903 Pad/Ryan's Pit		X						X		X			X	X	X	X	X				
90199	Semiannual	903 Pad/Ryan's Pit		X	X		X		X	X		X											
90299	Semiannual	903 Pad/Ryan's Pit		X	X		X		X	X		X											
90399	Semiannual	903 Pad/Ryan's Pit		X	X		X		X	X		X			X	X	X	X	X				
95099	Semiannual	East Trenches	RFCA	X																			
95199	Semiannual	East Trenches	RFCA	X																			
95299	Semiannual	East Trenches	RFCA	X																			
99101	Semiannual	Bldg. 991		X	X		X		X	X												X*	
99201	Semiannual	Bldg. 991		X	X		X		X	X												X*	
99301	Semiannual	Bldg. 991		X	X		X		X	X												X*	
99401	Semiannual	Bldg. 991		X	X		X		X	X												X*	
B206989	Quarterly	Landfill	RFCA, RCRA	X	X	X			X	X	X	X											
B208289	Semiannual	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X	X	X	X											
B208789	Semiannual	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X	X	X	X											
P114389	Semiannual	Ind. Area	RFCA	X	X		X		X	X													
P209289	Semiannual	Carbon Tet	RFCA, RCRA	X	X	X	X	X	X	X	X	X											
P209389	Semiannual	Carbon Tet	RFCA, RCRA	X	X	X	X	X	X	X	X	X											
P209489	Semiannual	Solar Ponds		X	X	X	X	X	X	X	X	X											
P218089	Semiannual	Bldg. 707		X	X		X		X												X		
P218389	Semiannual	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X	X	X	X											
P219089	Semiannual	Bldg. 771		X	X	X	X		X	X											X		
P219189	Semiannual	Carbon Tet	RFCA, RCRA	X	X	X	X	X	X	X	X	X											
P219489	Semiannual	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X	X	X	X											
P313589	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X													
P314289	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X													
P317989	Semiannual	Bldg. 865/886		X	X		X		X	X													
P416689	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X													

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Well Number	Frequency	Plume/Area	Drivers	VOC Suite	Metals Suite	Tritium	PU/AM	SR 89/90	Uranium	Nitrate	Fluoride	Sulfate	Cyanide	Cesium 137	Chloride	Sulfide	TOC	Methane	Ethene	Water Quality Suite	Np-237	TPH	PCB
P416789	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X													
P416889	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X													
P419689	Semiannual	Bldg. 444		X	X	X			X	X			X										
891COLWEL	Quarterly	881 Hillside		X	X				X														
ETP ef	Semiannual	East Trenches		X	X (T)							X			X								
ETP in	Semiannual	East Trenches		X	X (T)							X			X								
R1-0	Semiannual	Mound		X	X (T)		X		X (T)			X			X					X			
R2-E	Semiannual	Mound		X	X (T)		X		X (T)			X			X					X			
371 Basement	Semiannual	Bldg. 371/374		X	X		X		X	X												X*	
371 SubBasement	Semiannual	Bldg. 371/374		X	X		X		X	X												X*	
FD-559/561	Semiannual	Bldg. 559		X	X		X		X	X													X*
FD-707-4	Semiannual	Bldg. 707		X	X		X		X												X		
771FDOut#2	Semiannual	Bldg. 771		X	X	X	X		X	X											X		
BS-865-2	Semiannual	Bldg. 865		X	X				X	X													
SW099	Quarterly	Landfill		X																			
SW100	Quarterly	Landfill		X																			
SW13494	Quarterly***	881 Hillside/Bldg. 881		X	X		X		X	X													X*

Notes:

* If not detected in samples from first sampling round, discontinued from analytical suite.

** Full IMP suite semiannually, reduced Solar Ponds Plume suite in remaining quarters.

*** IMP suite quarterly, with additional Bldg. 881 samples semiannually.

(D), (T) Field filtered, unfiltered, respectively.

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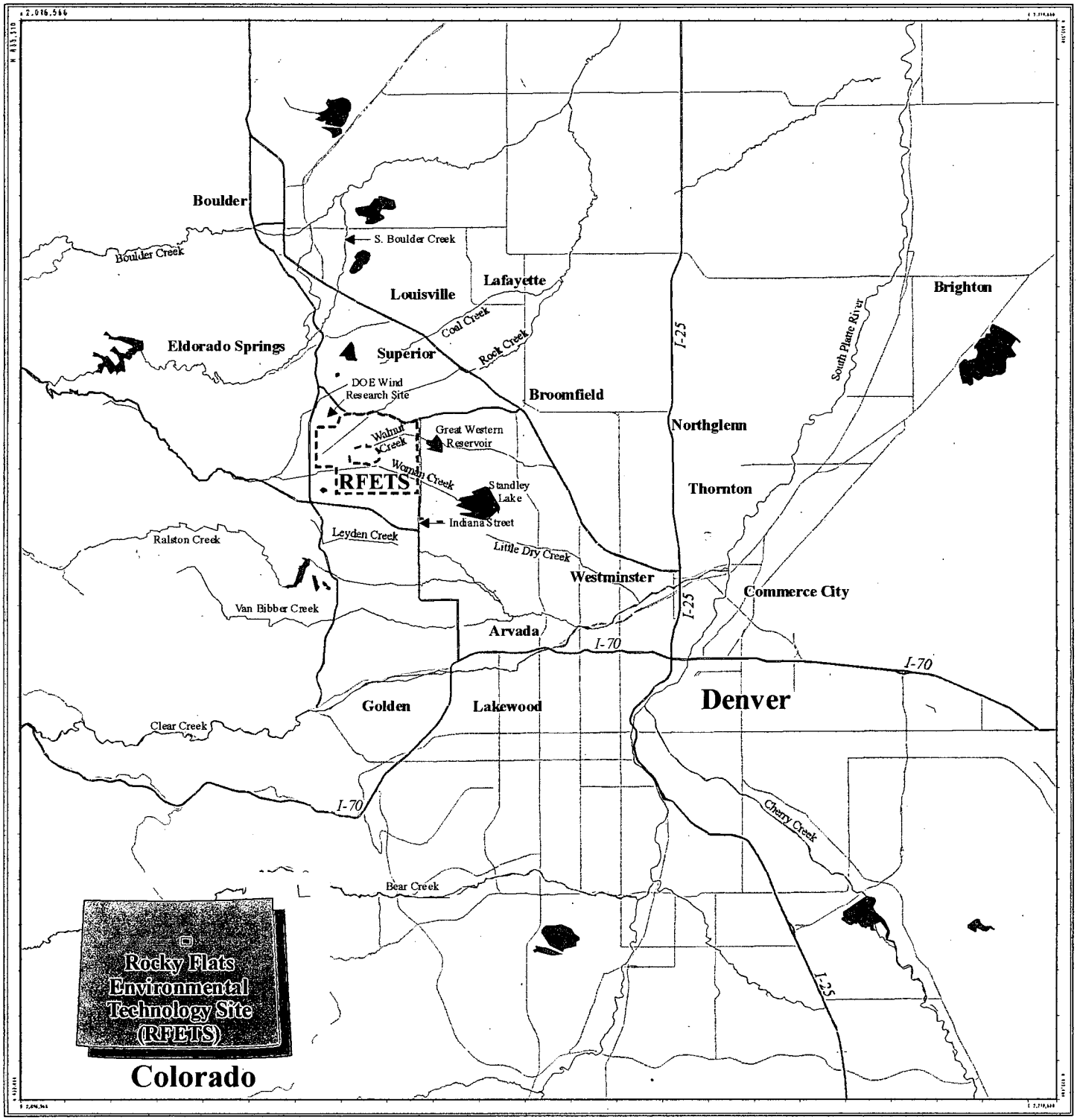

Figure 1-1 Location of Rocky Flats Environmental Technology Site (RFETS) 2001 Annual RFCA Groundwater Monitoring Report

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Rocky Flats Environmental Technology Site
P.O. Box 464 Golden, CO 80402-0464

5,000' 0' 10,000' 20,000'
Scale in Feet

w:/projects/fy2002/02-0781/fig1-1.cdr

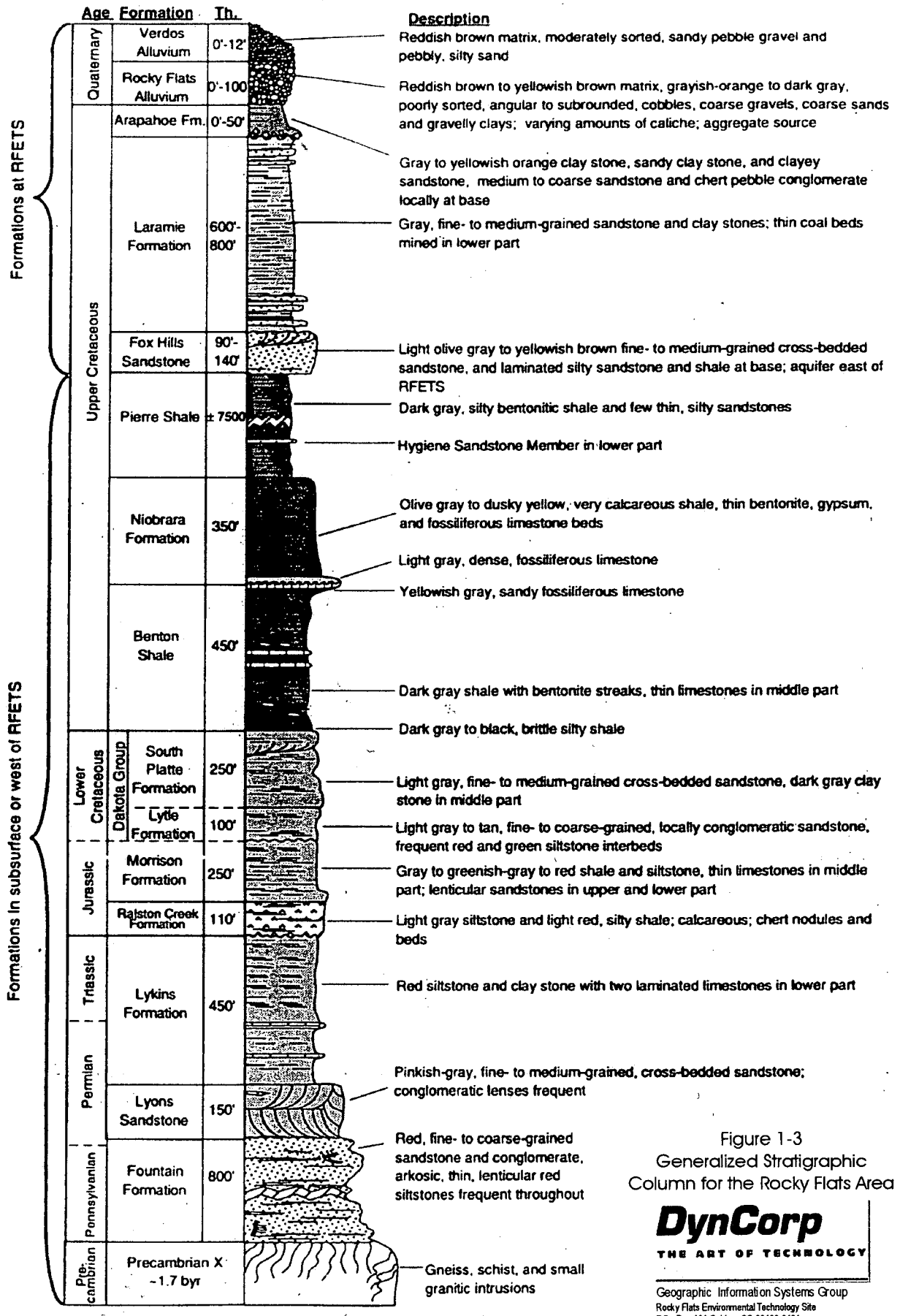

Figure 1-3
Generalized Stratigraphic Column for the Rocky Flats Area

Modified from LeRoy and Weimer (1971)w:/projects/fy2002/02-0781/fig1-3.cdr

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Rocky Flats Environmental Technology Site
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Geologic Units

- Qv — Verdos Alluvium
- Qrf — Rocky Flats Alluvium
- Ka — Arapahoe Formation
- Kl — Laramie Formation
- Kfh — Fox Hills Sandstone
- Kp — Pierre Shale/Hygiene Member
- Kn — Niobrara Formation
- Kb — Benton Shale
- Kd — Dakota Group
- Jm — Morrison Formation
- TR Pl — Lykins Formation
- PIPf — Lyons & Fountain Formations
- pЄ — Undivided Igneous & Metamorphic Units

Structural interpretation from EG&G, 1993a.

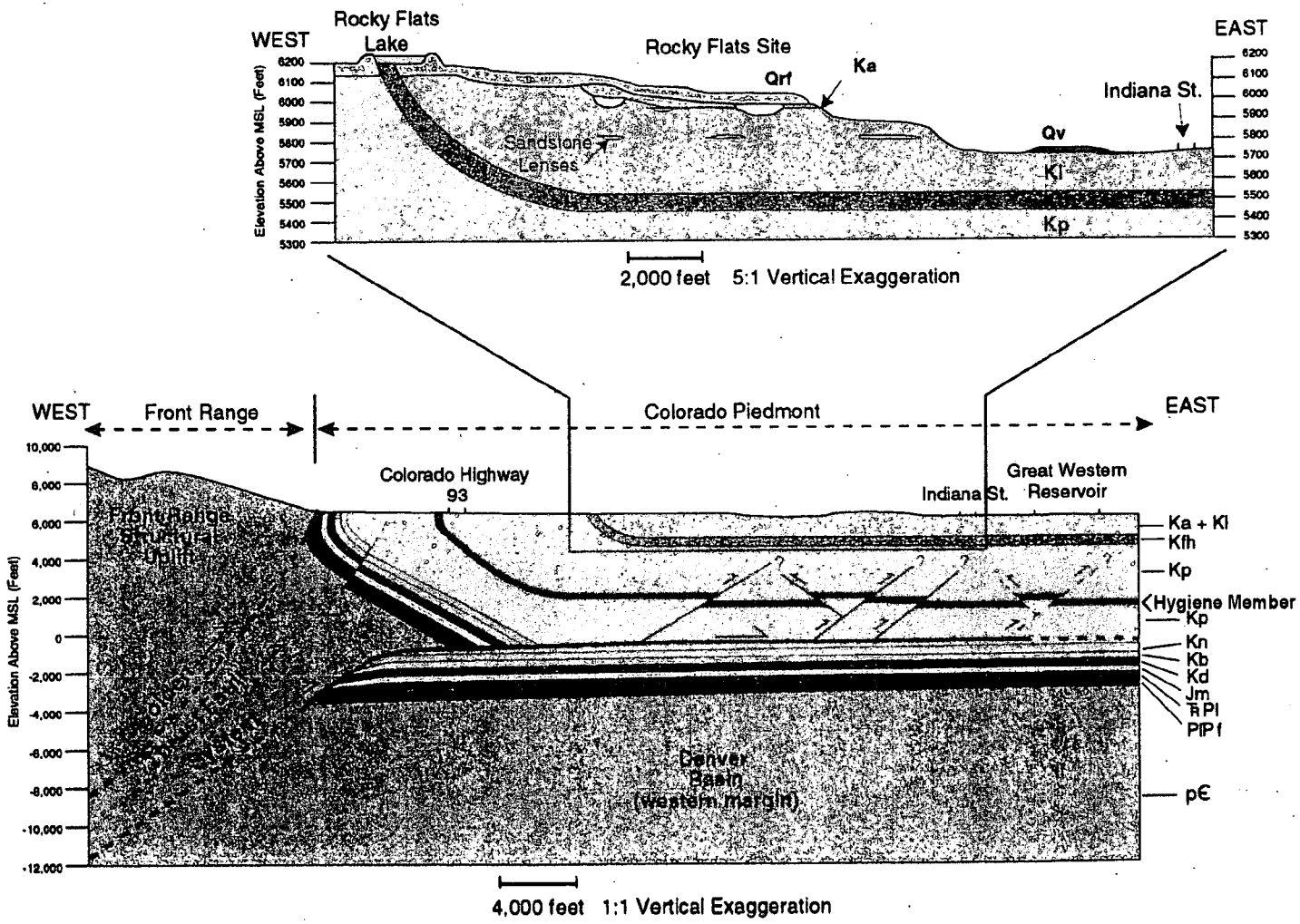

Figure 1-4
Generalized Geologic Cross Section of the Front Range and the Rocky Flats Area

2001 Annual RFCA Groundwater Monitoring Report

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Projects/fy2002/02-0781/fig1-4.cdr

2.0 DATA SUMMARY FOR RFCA-DESIGNATED WELLS SAMPLED IN 2001

2.1 Data Screening

RFCA groundwater analytical data for 2001 were evaluated to assess compliance with RFCA well classifications as set forth in the DQOs section of the IMP (K-H, 2000a and 2000b). Because many well categories rely on Tier I or Tier II action levels to trigger further action, the Tier II action level has been adopted to screen the data set to a manageable size for presentation and discussion.

Boundary, Drainage, Plume Definition and Plume Extent wells are presented in this section. Performance monitoring wells, which do not employ Tier I or Tier II action levels for determining a course of action are discussed in Section 4.0. D&D monitoring wells are discussed in Section 5.0. RCRA monitoring wells (not action level based), which include only the Present Sanitary Landfill in this 2001 Annual Report, are evaluated in Section 6.0 by comparing upgradient to downgradient groundwater quality. Plume Degradation wells in IHSS 118.1, the 903 Pad/Ryan's Pit Plume, and the PU&D Yard are examined in Section 7.0.

Table 2-1 provides a summary of 2001 IMP well groundwater samples from 189 locations. Table 2-2 provides a summary of 23 dry and 17 partially dry RFCA sampling locations during 2001. Table 2-3 presents a summary of results for contaminants with concentrations greater than Tier II action levels; 146 of 189 RFCA-designated monitoring locations had concentrations of one or more analytes above Tier II action levels. Table 2-3 has been updated as needed to include data that were unavailable at the time the quarterly reports were completed or when errors were found in the data. Table 2-3 includes all IMP well classes, not just those discussed in this section. Tables 2-1 and 2-3 are found at the end of Section 2.0.

Plates 7, 8, 9, and 10 summarize annual sampling results for radionuclides, VOCs, water quality parameters and metals, respectively. Plate 7, Radionuclides in Groundwater, presents analytical results for americium, plutonium, strontium, tritium and uranium isotopes where at least one uranium isotope result had a value equal to or greater than 8.0 picoCuries/Liter (pCi/L). The 8.0 pCi/L concentration level was selected solely for the convenience of displaying a manageable number of locations on the plate. Plate 8, VOCs in Groundwater, presents analytical results for 1,1,1-trichloroethane (1,1,1-TCA); 1,1,2-trichloroethane (1,1,2-TCA); 1,1-dichloroethene (1,1-DCE); carbon tetrachloride; chloroform; cis-1,2-dichloroethene (cis-1,2-DCE); methylene chloride; tetrachloroethene (PCE); trichloroethene (TCE); and vinyl chloride. These 10 VOCs represent the most common contaminants of concern found at RFETS. Wells shown with a box plot on Plate 8 had at least one result that was greater than a Tier II action level for any of the listed compounds. VOCs that were not detected were omitted from the plate. VOCs were also omitted where sample collection was impossible because of dry conditions or insufficient water available for sampling. Plate 9, Water Quality Parameters in Groundwater, presents analytical results for fluoride, nitrate/nitrite, and sulfate where at least one result was greater than a Tier II action level. Plate 10, Metals in Groundwater, presents results for metals that exceeded their Tier II action level.

Historic trend plots of concentrations for the contaminants of concern for selected Boundary, Drainage, Plume Definition, and Plume Extent wells are presented in Figures A-1 through A-201 (Appendix A). The trend plots depict VOCs that exceeded Tier II action levels, as well as other analytes that exceeded both Tier II action levels and background M2SD (Mean plus 2 Standard Deviations) concentrations. Background values are based on the 1993 Background Geochemical Characterization Report (DOE, 1993b) with the exception of radionuclides. Background values for radionuclides were taken from the Draft Background Comparison for Radionuclides in Groundwater Report (DOE, 1997a). Analytical data were extracted directly from the Soil and Water Database (SWD) and/or the local groundwater database to calculate historic M2SDs for locations with analytes exceeding Tier II action levels. The decision rules that define the conditions under which values above action levels become "reportable" are described in Section 1.3.2 of this report. A reportable result occurs when contaminant concentrations exceed the Tier I action level (100x Tier II).

Table 2-2 Dry RFCA-designated Wells-Groundwater 2001

Dry Wells 2001		IMP Well Class	Partially Dry Wells (Successfully sampled once with at least two quarterly attempts)	IMP Well Class
00197		Plume Extent	02197	Plume Extent
00297		Plume Definition	15599	Performance Monitoring
00397		Plume Extent	38591	Drainage
08091		Plume Extent	40699	D&D Bldg. 771
11092		Plume Extent	40899	D&D Bldg. 771
15799		Performance Monitoring	4787	Plume Extent
3386		Plume Extent	52894	RCRA
39691	4Q only	D&D Bldg. 881	60299	D&D Bldg. 776/777/EIAP
4887		Plume Extent	6386	Plume Definition
5187	4Q only	D&D Bldg. 881	6486	Drainage
52994		RCRA	76992	Plume Extent
5587		Drainage	P209289	Plume Definition
56001	4Q only	D&D Bldg. 559	P218389	Plume Extent
56101	4Q only	D&D Bldg. 559	P314289	Plume Extent
77392		Plume Definition	P317989	D&D Bldg. 886/865
86701	4Q only	D&D Bldg. 865	SW099	Performance Monitoring
88101	4Q only	D&D Bldg. 881	SW100	Performance Monitoring
90199		Plume Extent		
95299		Plume Degradation		
99101	4Q only	D&D Bldg. 991		
99201	4Q only	D&D Bldg. 991		
99401	4Q only	D&D Bldg. 991		
B208289		Plume Extent		

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2.2 Values Above Tier I and Tier II Action Level Criteria

Thallium results for 2001, which warrant a specific discussion, are described in detail in Section 11.3.1.

2.2.1 Boundary Wells

Six IMP designated Boundary Wells (0386, 06491, 10294, 10394, 41591, and 41691) were sampled in 2001. Boundary wells monitor groundwater exiting the eastern RFETS boundary through stream drainage channels.

Reportable concentrations of nickel were detected in samples from Well 41591 in the 1st and 3rd quarters of 2001 (Table 2-3 and Figure A-148). Nickel in 41591 was above the Tier II level, the background and historic M2SDs. Samples collected prior to 1999 were hand bailed, field filtered, and analyzed for dissolved metals. In 1999, Well 41591 was equipped with a downhole pump. Typically samples collected from wells with downhole pumps are not field filtered and are analyzed for total metals. Because high concentrations of total nickel were observed in these wells, the analysis was switched back to dissolved metals in 2001 to determine if the type of analysis was affecting the results. Two reportable 2001 values for nickel continue to exhibit a trend of high values for either total or dissolved nickel established in 1999-2000.

Sulfate was detected in reportable concentrations in Wells 06491 (1st quarter, Figure A-24) and 10294 (1st and 3rd quarters, Figure A-38). Results for both wells were above background but below historic M2SDs. In the past year, sulfate has increased in each well but remains within its usual range.

There was one reportable result for U-235 in Well 06491 in 2001 (Figure A-25). The result was above background but below the historic M2SD. The U-235 activity concentration increased in Well 06491during 2001 but is still within its usual range.

U-233/234 and U-238 were detected above Tier II action levels in all six Boundary Wells. All of the uranium isotope analytical results were below the background M2SD benchmarks and, therefore, were not considered reportable values. Because these isotopes occur naturally, and increase in a downstream direction, these values may be a reflection of natural processes.

2.2.2 Drainage Wells

Drainage Wells are located downgradient of contaminant plumes in stream drainages at RFETS. Five Drainage Wells, 00997 (South Walnut Creek above Pond B-5), 38591 and 5587 (west Woman Creek), 6486 (central Woman Creek) and 6586 (east Woman Creek) were sampled in 2001. Well 5587 was dry during 2001.

Nickel was detected above the Tier II action level, background, and historic M2SDs for a sample collected from Well 6586 in the 3rd quarter 2001 (Table 2-3 and Figures A-154). This value represents a reportable value; however, a sample collected in the 1st quarter contained nickel that was below the Tier II action level.

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Well 6586 also contained a non-reportable result (3rd quarter) for thallium that was above the Tier II action level and its historic M2SD but below the background M2SD benchmark (Figure A-155). An earlier 2001 sample result was a non-detect.

U-233/234 and U-238 were detected above Tier II action levels in Drainage Wells, 00997, 38591, 6486, and 6586. All of the uranium isotopic results were below the background benchmarks and, therefore, are not reportable values.

2.2.3 Plume Definition Wells

Plume Definition Wells are located within known plumes where groundwater concentrations exceed Tier II action levels. Seventeen Plume Definition Wells were monitored during 2001. These locations monitored the following areas: the 903 Pad/Ryan's Pit Plume, the PU&D Yard Plume, the East Trenches Plume, the 881 Hillside Plume, the Carbon Tetrachloride Plume (IHSS 118.1), the Industrial Area VOC Plume, and the Solar Ponds Plume (SPP). Location 891COLWEL (881 Hillside), which will be switched from Performance Monitoring to Plume Definition in the 2002 IMP, will be discussed here. As reported in Table 2-3, fourteen of the plume definition wells contained at least one or more contaminants that exceeded Tier II action levels.

903 Pad/Ryan's Pit VOC Plume

Wells 00491, 6286 and 6386 are Plume Definition Wells that monitor the 903 Pad/Ryan's Pit Plume, which is characterized by VOC contamination. Samples from Well 00491 had results above the Tier II action levels but below Tier I (Table 2-3) for carbon tetrachloride (Figure A-1), PCE (Figure A-2), TCE (Figure A-3), U-233/234 and U-238. All analytes were below background or historic M2SD benchmarks and are not reportable. After generally declining in concentration from late 1991 to mid-1995, carbon tetrachloride, PCE, and TCE concentrations have remained constant from mid-1995 through the end of 2001.

Plume Definition Well 6286 exhibited non-reportable amounts of carbon tetrachloride, selenium, U-233/234, and U-238. The results were all below Tier I action levels but above Tier II levels. Carbon tetrachloride results (Figure A-150) were below historic M2SD levels and uranium isotope results were below background M2SDs. Carbon tetrachloride concentrations have remained relatively stable in this well since 1994. Selenium concentrations have increased since the start of 2001 (Figure A-151) and have been above both background and historic M2SD levels. Well 6286 is one of seven wells in the southern portion of the IA that contained elevated selenium during 2001.

Plume Definition well 6386 was dry in the 1st quarter of 2001, but VOC, metal, uranium isotope, nitrate/nitrite, total dissolved solids and sulfate samples were collected in the 3rd quarter. Non-reportable concentrations of selenium, thallium, U-233/234 and U-238 were detected. Selenium and thallium were below Tier I but above Tier II and background M2SD benchmarks (Figures A-152 and A-153). Because of insufficient data, historic M2SDs could not be calculated for these analytes in this well. While previous nickel results have been well below the Tier II action level, the 2001 result shows a significant increase. Selenium also shows a significant increase over preceding

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sampling events, but unlike nickel has had previously high values. An attempt to sample the well in the 1st quarter 2002 was unsuccessful due to a lack of water. Uranium isotopes were both below background M2SD levels.

PU&D Yard Plume

Plume Definition Wells 00597 and 77392 monitor groundwater in the PU&D Yard Plume.

The 2001 contaminant of concern in 00597 is nitrate. Nitrate was above Tier II but below the Tier I action level (Table 2-3). No historical M2SD data are available for this well. From December of 1997 through September 2000 the nitrate in 00597 increased from 9 mg/L to 17 mg/L (Figure A-4). In 2001 the concentration declined slightly and remained within its normal range.

Plume Definition Well 77392 was dry throughout 2001.

East Trenches Plume

Two Plume Definition Wells (03991 and 05391) monitor the East Trenches Plume for VOCs.

Well 03991 contained non-reportable concentrations of carbon tetrachloride (Figure A-16), U-233/234, and U-238 that were above the Tier II action levels but below Tier I action levels. Carbon tetrachloride was below its historic M2SD and the uranium isotopes were below their background M2SDs. The carbon tetrachloride trend plot shows a decrease in concentration during 2001.

Carbon tetrachloride (Figure A-19), U-233/234, and U-238 were present in Well 05391 at non-reportable concentrations that were above the Tier II but below the Tier I action levels. Carbon tetrachloride was below its historic M2SDs and the uranium isotopes were below background M2SDs. As shown in the trend plot, carbon tetrachloride concentrations in 2001 decreased in comparison to 2000.

881 Hillside Plume

Four Plume Definition locations (0487, 891COLWEL, P416789 and P416889) are used to monitor the 881 Hillside Plume, which is contaminated by VOCs.

Well 0487 contained TCE (Figure A-18), selenium (Figure A-17), U-233/234, and U-238 above Tier II, but below Tier I action levels. TCE results in 0487 were below the historic M2SD, selenium was above the background M2SD benchmark but below its historic M2SD, and the uranium isotopes were below background M2SDs. The concentration of TCE increased slightly in 2001. Selenium concentrations for 2001 also increased slightly. TCE and selenium concentrations in Well 0487 are relatively low compared to values prior to 1996.

891COLWEL is a collection well that produces water above the former French Drain System, which was removed in the summer of 2000. In CY 2001, concentrations in 891COLWEL were below Tier I and therefore were not reportable occurrences as a Plume Definition location; but 1,1-DCE, carbon tetrachloride, methylene chloride, PCE,

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TCE, selenium, thallium, U-233/234, and U-238 were above Tier II action levels. The VOCs were all below their historic M2SDs while selenium was above its background M2SD but below its historic M2SD benchmark. Thallium was below both background and historic M2SD benchmarks and uranium isotope results were below background M2SDs.

2001 quarterly samples at 891COLWEL for 1,1-DCE do not indicate a clear trend (Figure A-163). The 1st quarter sample result shows a decline that started in 2000, while the 2nd and 3rd quarter concentrations increased successively and the 4th quarter result decreased but remained higher than the 1st quarter sample. Carbon tetrachloride increased slightly in 2001 over 2000 (Figure A-164). Methylene chloride, though present, was qualified as blank contaminated in the 1st and 2nd quarters (Figure A-165). Because of the lack of non-blank qualified data, the trend of methylene chloride concentration is difficult to determine. The concentration of PCE has not changed significantly since late 2000 (Figure A-167). The concentration of TCE had one relatively high value in the 3rd quarter but generally remains similar to the 2000 values (Figure A-169). Selenium concentrations have also remained the same since 2000, and have not departed from the historic mean (Figure A-166). Thallium concentration increased in the 4th quarter but was not detected during the rest of the year (Figure A-168).

Plume Definition monitoring well P416789 exhibited non-reportable U-233/234 and U-238 that were above Tier II action levels but below the Tier I action levels. Both analytes were well below background M2SD benchmarks.

Plume Definition monitoring well P416889 contained non-reportable concentrations of PCE and U-233/234 that were below Tier I but above Tier II action levels. PCE in P416889 was below its historic M2SD in both April and November (Figure A-197). In 2001, PCE concentrations were close to its historic mean. The uranium concentration was below its background M2SD.

Carbon Tetrachloride Plume (IHSS 118.1)

The Carbon Tetrachloride Plume (IHSS 118.1) is monitored by Plume Definition wells P209289, P209389, P209489, and P219189. VOCs detected in these wells include carbon tetrachloride; 1,1-DCE; and TCE. Concentrations of these constituents appear to be declining.

Well P209289 was dry during the 4th quarter of 2001 but was sampled during the 2nd quarter. All results for samples collected in the 2nd quarter were below Tier II action levels.

Monitoring well P209389 samples contained 1,1-DCE and U-238 at low enough concentrations to be non-reportable. Two sampling events showed 1,1-DCE to be above the Tier II but below the Tier I action level. Figure A-184 shows that the 1,1-DCE concentration was below its historic M2SD range and has generally declined since sampling began in 1991. U-238 was well below the background M2SD level.

Samples from well P209489 had concentrations of carbon tetrachloride, TCE, thallium, nitrate, U-233/234, U-235, and U-238 that were above the Tier II action levels. None of these results were above the Tier I action level; hence,

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they were not reportable. VOCs, thallium, and nitrate were below their historic M2SDs. Thallium, U-233/234, and U-238 were below background M2SDs, and nitrate was above the background M2SD. Carbon tetrachloride (Figure A-185) and TCE (Figure A-188) concentrations appear to be decreasing although the carbon tetrachloride results are erratic. Thallium was not detected in the 2nd quarter but was detected in the 4th quarter (Figure A-187). The nitrate results have been relatively constant since 1997 (Figure A-186). In general, nitrate concentrations have declined since sampling began in 1990. U-235 was above background in the 2nd quarter but below background in the 4th quarter (Figure A-189). Both U-235 results were below the historic M2SD.

Because Well P219189 provided limited amounts of water, complete sample suites could not be collected during 2001. For the samples that were collected, the contaminants of concern in Plume Definition Well P219189 are 1,1-DCE and uranium isotopes. Results for the contaminants of concern were above the Tier II but below the Tier I benchmarks. The 1,1-DCE concentration was below its historic M2SD (Figure A-191). Although concentrations appear to be increasing since 2000, the October sample decreased to a level below the historic mean. Over the long term, the concentration of 1,1-DCE has remained relatively constant in P219189. Uranium results were slightly below background M2SDs.

Industrial Area VOC Plume

Plume Definition Well 22896 monitors the IA VOC Plume. The 1st quarter 2001 TCE result for this well was above both the Tier I and Tier II action levels and thus, was reportable (Figure A-116). The 3rd quarter result was below Tier I and above Tier II. Both results were the lowest values recorded to date. The well also contained non-reportable nitrate from the 1st quarter where the result was above Tier II but not Tier I (Figure A-115). The 3rd quarter result was below the Tier II action level. Both nitrate results were the lowest values recorded to date.

Solar Ponds Plume

The southern margin of the SPP, which consists of groundwater impacted with nitrate and uranium isotopes, is monitored by Plume Definition Well 00297. As in 2000, Well 00297 was dry during 2001.

2.2.4 Plume Extent Wells

Forty-four Plume Extent wells are used to monitor the various RFETS groundwater plumes. These wells are discussed in relation to the specific contaminant plume they monitor. A few of the wells have dual monitoring purposes. In Table 2-4, these wells have been listed according to the respective plumes they monitor.

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Table 2-4 Plumes Versus Monitoring Wells

Location	Plumes									
	East Trenches	Solar Ponds	Industrial Area VOC	Mound	Old Landfill	Carbon Tetra-chloride (IHSS 118.1)	903 Pad-Ryan's Pit	PU&D-Present Landfill	881 Hillside	Unnamed IA Plume North of Bldg. 771
00197			X							
00397								X		
01697								X		
02197								X		
04091	X									
04591	X									
04991	X									
05091	X									
06091	X									
08091	X									
10194	X									
10992									X	
10994			X							
11092									X	
1386		X								
1786		X								
1986			X							
2186			X							
21098						X				
22596			X							
22696			X							
22796										X
23096							X			
23196							X			
23296	X									
30100								X		
3386		X				X				
3586				X						
43392			X							
4787									X	
4887									X	
5387									X	
6186			X							
7086					X					
75992				X						
76992								X		
90199							X			
90299							X			
B208289		X								
B208789		X								
P114389			X							
P218389		X								
P219489		X								
P313589			X							
P314289			X							
P416689			X							

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East Trenches Plume

The East Trenches Plume is monitored by eight Plume Extent Wells including 04091, 04591, 04991, 05091, 06091, 08091, 10194, and 23296. As shown on Plate 13, these wells are located along the outermost edge of the East Trenches Plume. They monitor plume migration from potential source areas such as Trench T-3, Trench T-4, and the northeast lobe of the 903 Pad/Ryan's Pit Plume. The East Trenches Plume Treatment System was completed in September 1999 and is designed to remove VOCs from groundwater. VOCs in the East Trenches Plume during 2001 were elevated in two of the seven sampled Plume Extent Wells (06091 and 23296). Well 06091 had two reportable carbon tetrachloride results that were above the Tier II and historic M2SDs (Figure A-23). Although there appears to be an upward trend in carbon tetrachloride in Well 06091, concentrations are relatively low (i.e., less than 10 µg/L).

Samples from Well 23296 contained reportable concentrations of carbon tetrachloride, cis-1,2-DCE, methylene chloride, PCE, and TCE. These VOCs were above the Tier II action levels. No historic M2SDs are available for this well. The 2nd quarter 2001 carbon tetrachloride concentration (Figure A-118) remained consistent with the 4th quarter 2000 sample and the concentration increased slightly in the 4th quarter of 2001. Cis-1,2-DCE concentrations in 23296 appear to fluctuate considerably. There is no apparent trend in the data (Figure A-119). Low method-blank contaminated concentrations or non-detections (Figure A-120) characterized methylene chloride in well 23296 during 2001. PCE (Figure A-121) and TCE (Figure A-123) concentrations in 23296 for 2001 were lower than in 2000 and followed the pattern of high spring and low fall concentrations observed in 1998 and 1999. All of these VOCs continue to occur at concentrations that are similar to those prior to installation of the East Trenches Plume Treatment System in 1999. Concentrations of VOCs are expected to decrease in the future as the initial effects of construction of the treatment system dissipate.

As in 2000, Well 08091 was dry during 2001. Samples from the seven remaining East Trenches Wells had

U-233/234 and U-238 analytical results that were above Tier II action levels but below the background M2SD benchmarks. None of the uranium isotope results were reportable. Location 23296 contained thallium that was significantly above the Tier II action level and background M2SD benchmark (Figure A-122). Thallium was detected in 1997 at similar levels, but from mid-1998 to the end of 2001 it was not detected.

Solar Ponds Plume

Plume Extent Wells 1386, 1786, 3386, B208289, B208789, P218389, and P219489 are located at the edge of the SPP and monitor for nitrate and uranium isotope contamination associated with the plume. The main part of the plume extends north from the Solar Ponds to North Walnut Creek, with minor groundwater pathways to the east and south toward South Walnut Creek (Plate 13). Wells 3386 and P208289 were dry during 2001. Well P218389 was sampled in the 2nd quarter, had no results greater that Tier II, and was dry in the 4th quarter. During 2001, nitrate, metals, and U-isotopes were the principal contaminants found in samples from these wells. No VOCs were reported at concentrations above Tier II action levels. U-isotopes are discussed at the end of the subsection.

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Plume Extent well 1386 had two reportable occurrences of nickel in 2001 that were above the Tier II action level, the background M2SD, and historic M2SD (Figure A-75). The nickel concentration decreased compared to the samples collected in 2000 but still remains above the background and historic benchmarks. Well 1386 also had a 4th quarter 2001, non-reportable result for thallium that was below background but above the historic M2SD (Figure A-76). This result is similar to the October 2000 result. Thallium samples collected subsequent to these two (in April 2001 and 2002) were below the detection limit. Well 1386 is part of a program to investigate potential effects of sample collection technique and/or well completion materials on nickel concentrations.

During 2001, Plume Extent Well 1786 exhibited four reportable results for nitrate, two for selenium, and one for thallium. The nitrate and thallium results were above their Tier II action levels and background M2SD benchmarks but below the historic M2SDs for the wells (Figures A-81 and A-83). Nitrate concentrations are generally consistent with past results. The October 2001 nitrate result, as reported electronically by the laboratory, was 7.7 mg/l. The hardcopy result from the laboratory was 538 mg/l, which is more consistent with past sampling. The laboratory has been notified of the discrepancy and should submit a correction. This correction was not included in the Fourth Quarter Groundwater Monitoring Report (SSOC, 2002a). Selenium concentrations were above all three benchmarks (Figure A-82). The two selenium results are consistent with the trend established in late 1998 that marked the start of total metals sampling at the well. High levels of thallium detected in October 2000 and 2001 were followed by values below the detection limit in April 2001 and 2002.

Plume Extent Well B208789 had one non-reportable detection for thallium (Figure A-183). This detection was above Tier II, but below the background M2SD for the site. Because of a lack of data between 1991 and 1995, historic M2SDs could not be calculated for thallium in this well. Similar to Wells 1386 and 1786, thallium concentrations from October 2000 and 2001 were followed by values below Tier II in April 2001 (non-detection) and 2002.

The nitrate concentrations in Plume Extent Well P219489 for 2001 samples were above the Tier II action level and background M2SD (Figure A-192). Because of insufficient data between 1991 and 1995, a historic M2SD for nitrate could not be calculated for this well. The April-June sampling was part of a monthly sequence triggered by the December 2000 nitrate analysis, which was the highest recorded to date (57 mg/L). Nitrate concentrations in this well (Figure A-192) have been consistently above the Tier II action level.

Uranium isotopes commonly monitored at RFETS are above Tier II action levels in SEPs Plume Extent Wells 1386, 1786, B208789, and P219489. Wells 1386, B208789 and P219489 had non-reportable U-233/234 and U-238 that were above Tier II but below background M2SD benchmarks. Well 1786 also had non-reportable U-233/234 and U-238 that were above Tier II but below background. However, the December U-235 activity concentration measured in 1786 was reportable because it was above Tier II action levels and the background M2SD benchmark (Figure A-84).

Industrial Area VOC Plumes

Plume Extent Wells that monitor the IA VOC Plume include 00197, 10994, 1986, 2186, 22596, 22696, 43392, 6186, P114389, P313589, P314289, and P416689. Wells 00197 and 10994 also monitor potential groundwater contamination emanating from the Old Landfill located on the hillside south of the Building 130 and Building 400 complexes. The Carbon Tetrachloride Plume (IHSS 118.1) is monitored by Plume Extent Well 21098. Plume Extent Well 22796 monitors an unnamed plume that lies to the north/northwest of Building 771. Plume Extent Well 00197 was dry during 2001. Plume Extent Wells 22596 and 43392, which produced enough water for complete sample suites, did not contain any contaminants of concern. Well P314289, with limited water available, did not show evidence of contamination.

As shown on Plate 13, the IA VOC Plume encompasses the central portion of the IA and is oriented in a southwest/northeast direction. The southern portion of the plume migrates south towards Woman Creek and the northern portion migrates northeast towards North Walnut Creek. Carbon tetrachloride, PCE, and TCE are the primary contaminants. There are no known inorganic or radionuclide groundwater plumes that coincide with the location of the IA VOC plume.

Samples from Plume Extent Well 10994 contained no VOCs above Tier II levels. However, there were two selenium and two nitrate detections that were reportable. The 2001 selenium results were also above the background M2SD but below the historic M2SD (Figure A-52). Selenium analyses for 2000 and 2001 appear to be increasing compared to values measured in 1997 through 1999. Nitrate samples collected in 2001 were at or slightly above the Tier II action level and the background M2SD (Figure A-51). No historic M2SD nitrate values are available for well 10994. The nitrate concentration in 10994 appears to be relatively constant.

Plume Extent Well 1986 also had no VOC detections above Tier II action levels but had concentrations of manganese and thallium that were above Tier II action levels. The dissolved manganese analyses were reportable and above both the background M2SD and the historic M2SD for the well (Figure A-104). The manganese concentration, although elevated since early 1997, appears to be relatively constant in Well 1986. Thallium was above Tier II but below the background and the historic M2SD benchmarks, and therefore not reportable (Figure A-105). Thallium concentrations were above the Tier II action levels at the end of 2000 and 2001, while the respective spring sample results (in 2001 and 2002) were below the detection limit.

Well 2186 contained one, non-reportable, thallium result (Figure A-111) that was above the Tier II action level but below the background and historic M2SD benchmarks. The subsequent 2002 analysis (not shown in the trend plot) indicates that thallium is not present. Thallium concentrations appear to be relatively constant in well 2186.

Plume Extent Well P314289 had a reportable nickel and non-reportable antimony concentrations in 2001. The nickel was above Tier II and background M2SD but below the historic M2SD for the well (Figure A-194). The reportable nickel in January was followed by a much lower value in September. In general, long-term nickel concentrations remained constant in this well. However, small-scale fluctuations appear to be present that may be related to seasonal variation in groundwater levels. Antimony was above Tier II and below the background and the

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historic M2SD benchmarks (Figure A-193). Antimony was very low from early 1998 through early 2000 and then began to increase to September 2001. There is no historical M2SD for the well because of frequent dry conditions.

Plume Extent Well 21098 monitors the Carbon Tetrachloride Plume in IHSS 118.1. Well 21098 was treated as a Plume Degradation Well in the 2001 Quarterly Reports but has been changed to a Plume Extent Well in the 2002 IMP and is reported as such in this Annual Report. In 2001, Well 21098 contained carbon tetrachloride, chloroform, and PCE greater than Tier II action levels. These results would have been reportable if the well was classified as a Plume Extent Well. Carbon tetrachloride concentrations have increased significantly in 2001 (Figure A-107). Chloroform concentrations in 2001 appear to have decreased from a previously high value recorded in late 2000 (Figure A-108). PCE was undetected at a detection limit of 50 µg/l in May; it was estimated at 5 µg/l in November (Figure A-110). Continued monitoring of 21098 during 2002 will show whether the high 2001 VOC values are anomalous.

Plume Extent Well 22796 monitors an unnamed VOC plume north/northwest of Building 771. In 2001, TCE, chromium, and thallium were detected above their Tier II action levels. The TCE concentrations were reportable (Figure A-114) and one value was the highest concentration to date. In October, the TCE result decreased by more than half the value measured in the 2nd quarter. Chromium was also reportable because it was above Tier II and the background M2SD (Figure A-112). Thallium was below background and was not reportable (Figure A-113). Thallium appears to follow a trend established for several other wells. It was detected in late 2000, not detected in early 2001, and detected again later in 2001(with a non-detection in early 2002).

All analytical results for uranium isotopes from Plume Extent Wells were above the Tier II action levels but below the background M2SDs; on this basis, they were not reportable. Wells 10994, 1986, 2186, 22696, 22796, 6186, P114389, P313589 and P416689 each had results above Tier II action levels for U-233/234 and U-238. See Table 2-3 for a specific list of isotopes and values for each well. Wells 22596, 43392 and P314289 did not have any uranium isotopic analyses greater than Tier II. Uranium isotopes were the only analytes with results over Tier II for Wells 22696, 6186, P114389, and P416689.

903 Pad/Ryan's Pit VOC Plume

Potential migration of the 903 Pad/Ryan's Pit Plume toward Woman Creek is monitored by Plume Extent Wells 23096, 23196, 90199, and 90299. Wells 90199 and 90299 were discussed in the 2001 Quarterly Reports as Plume Degradation wells but were changed to Plume Extent Wells for the 2002 IMP. These two wells replace Well 23196, which was removed from the Groundwater Sampling Program during 2001 because it failed to produce acceptable amounts of water. Plate 13 illustrates the location of these wells in relationship to the distal end of the 903 Pad/Ryan's Pit Plume and Woman Creek. The plume is mainly composed of carbon tetrachloride from the 903 Pad area and TCE from Ryan's Pit.

During 2001, no VOC, metals, or water quality parameters were detected above Tier II action levels in Plume Extent Well 23096. A sample with reportable plutonium-239/240 activity was collected in August (Figure A-117).

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Because of this result, the Groundwater Program collected three monthly samples in January, February, and March of 2002. These three samples were below the detection limits and similar to those values preceding the August 2001 sample. Based on historical values, the August 2001 result may be spurious. Uranium isotopes U-233/234 and U-238 were detected above Tier II action levels in 23096, but because both isotopes were well below background M2SD levels, the results were not reportable.

In May 2001, Plume Extent Well 23196 had a selenium result (118 µg/l) that was reportable because it was above both the Tier II action level and background M2SD. The well has only been sampled twice because of insufficient water. The first selenium result (106 µg/l), collected in November 2000, triggered monthly sampling.

Plume Extent Well 90199 was dry during the 1st and 3rd quarter sampling events.

In September 2001, Plume Extent Well 90299 had U-233/234, U-235, and U-238 activity concentrations that were above the Tier II action level. These occurrences were below background M2SD levels.

PU&D Yard Plume

Plume Extent Wells 00397, 02197, and 76992 monitor VOC contamination associated with the PU&D Yard Plume. The primary plume contaminants consist of PCE, TCE, and 1,1,1-TCA. The PU&D Yard Plume is an elongate feature south of the Present Sanitary Landfill that extends from the PU&D Yard on the west to well 02197 on the east (Plate 13). Wells 01697 and 30100 will be added to this group for 2002, but were not sampled in 2001. The wells were added to establish greater real coverage of the PU&D Yard Plume. Well 02197 has been removed from the sampling list because it does not produce adequate water for sampling.

Well 00397 was dry throughout 2001 and Well 76992 was essentially dry with only one VOC, one tritium, and one nitrate sample collected from the well. There were no results greater than Tier II action levels associated with these samples.

Plume Extent Well 02197 was dry in the 1st quarter but was successfully sampled in the 3rd quarter, which indicated the presence of nitrate, U-233/234, and U-238. These constituents were above their Tier II action levels. Nitrate was also above the background M2SD, and therefore was reportable (Figure A-9). The July 2001 result prompted the Groundwater Program to collect monthly nitrate samples in February, March, and April of 2002. Sampling was successful in February and March with the results below Tier II (they have been included on the trend plot figure). Uranium isotopes were well below background.

881 Hillside Plume / Building 881 Footing Drain Sump

Plume Extent Wells 10992, 11092, 4787, 4887, and 5387 monitor the extent of the 881 Hillside Plume. Well 5387 also monitors the Building 881 Footing Drain Sump, which is Performance Monitoring location SW13494. Wells 11092 and 4887 were dry during both semiannual sampling events in 2001. Only VOC and metal samples could be collected at Well 4787 (3rd quarter samples). There were no analytes greater than Tier II associated with these

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samples. Well 5387 contained uranium isotopes U-233/234 and U-238 at concentrations that were above Tier II but below the background M2SDs, and as a result they were not reportable.

Plume Extent Well 10992 was classified as a Plume Definition Well in the 2001 Quarterly Reports. It was changed to a Plume Extent Well in the 2002 IMP, and therefore is discussed here. Well 10992 contained selenium, nitrate, U-233/234, and U-238 in concentrations greater than Tier II. Because of the scarcity of data from 1991 through 1995 no historic M2SDs could be computed for 10992. The concentration of selenium (Figure A-50) appears to be relatively constant while nitrate (Figure A-49) decreased to its lowest recorded levels. Uranium isotopes are not reportable because they were below background.

Mound Plume

The Mound Plume is monitored by Plume Extent Wells 3586 and 75992. Well 3586 also monitors the southeastern end of the Solar Ponds Plume.

Plume Extent Well 75992 had non-reportable results for U-233/234 and U-238. The results were above the Tier II levels but below the background M2SDs.

In 2001, Plume Extent Well 3586 produced samples containing vinyl chloride, manganese, thallium, U-233/234, and U-238 at concentrations that exceeded their Tier II action levels. Activity concentrations for U-isotopes were less than their background M2SDs, and therefore were not reportable. However, vinyl chloride and manganese results were above background M2SDs, and therefore were reportable. Vinyl chloride was above Tier II but well below the historic M2SD for the well. Vinyl chloride concentration (Figure A-126) appears to show a significant decreasing trend in this well. The 2001 manganese results are consistently above the background and historic M2SD benchmarks, as they were in 2000. The trend plot (Figure A-124) suggests that an increase in manganese concentration may be occurring. Thallium in Well 3586 was below the background and the historic M2SD benchmarks and was not reportable (Figure A-125). Thallium appears to exhibit a trend that is present in several other wells. Concentrations appear to fluctuate from the highest values in the fall of 2000 and 2001 to the lowest value in the spring of 2001.

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Table 2-1 Summary of Samples Collected – Groundwater 2001

PRINCIPAL ANALYTES																																				
									RADIONUCLIDES																WATER QUALITY PARAMETERS												
Well /Location	Volatile Organic Compounds				Metals				^{239}Plutonium/ ^{241}Americium				U-isotopes (233/234,235,238)				Tritium				$^{89/90}$Strontium				Total Nitrate+Nitrite				Total Dissolved Solids				Sulfate				Fluoride			
Quarters	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
00100		S		S		S		S		S		S		S		S										S		S		S		S						
00197	D	D	D		D		D						D		D		D		D		D		D		D		D		D		D		D		D		D	
00200		S		S		S		S		S		S		S		S														S								
00297		D		D		D		D		D		D		D		D		D		D		D		D		D		D				D		D		D		D
00300		S		S		S		S		S		S		S		S																						
00397	D		D		D		D						D		D		D		D						D		D		D		D		D		D		D	
00400		S		S		S		S		S		S		S		S		S		S						S		S										
00491	S		S		I		S		I		S		I		S										I		S		I		S		I		S				
00500		S		S		S		S		S		S		S		S		S		S						S		S										
00597	S		S		S		S						S		S		S		S						S		S		S		S		S		S		S	
00600		S		S		S		S		S		S		S		S		S		S						S		S										
00700		S		S		S		S		S		S		S		S		S		S						S		S										
00797	S		S		S		S						S		S										S		S		S		S		S		S			
00897		S		S		S		S		S		S		S		S										S		S		S		S						
00997	S		S		S		S		S		S		S		S						S		S						S		S							
01097	S		S																														S		S				
01497	S		S																														S		S				
02097	S		S																														S		S				
02197	D		S		D		S						D		S		D		S						D		S		D		S		D		S		D		S	
02291		S		S		S		S		S		S		S		S										S		S		S									
02397		S		D		S		D		I		D		S		D										S		D		I		D							
02497		S		S		S		I		S		I		S		I										S		S		S		I							
02500		S		S		S		S		S		S		S		S										S		S		S		S							
0386	S		S		S		S		S		S		S		S		S		S						S		S		S		S		S		S		S	
03991	S		S		S		S		S		S		S		S										S		S		S		S							
04091	S		S		S		S		S		S		S		S										S		S		S		S							
04591	S		S		S		S		S		S		S		S										S		S		S		S							
0487	S		S		S		S						S		S										S		S		S		S		S		S			
04991	S		S		S		S		I		S		S		S										I		S		I		S							
05091	S		S		S		S		S		S		S		S										S		S		S		S							
05391	S		S		S		S		S		S		S		S										S		S		S		S							
05691	S		S		S		S		S		S		S		S										S		S		S		S							
06091	S		S		S		S		S		S		S		S										S		S		S		S							
06491	S		S		S		S		S		I		S		S		S		S						S		S		S		I		S		I		S		I	
07391	S		S		S				I		S		S		S										S				S		S		S		S				

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Well /Location	PRINCIPAL ANALYTES																RADIONUCLIDES																				WATER QUALITY PARAMETERS															
	Volatile Organic Compounds				Metals				^{239}Plutonium/ ^{241}Americium				U-isotopes (233/234,235,238)				Tritium				$^{89/90}$Strontium				Total Nitrate+Nitrite				Total Dissolved Solids				Sulfate				Fluoride			
08091	D		D		D		D		D		D		D		D						D		D		D		D		D		D									
10098	S		S		S		S		I		S		S		S										S		S		S		S									
10194	S		S		S		S		S		S		S		S										S		S		S		S									
10198	S		S		S		S		S		S		S		S										S		S		S		S									
10294	S		S		S		S		S		S		S		S		S		S						S		S		S		S		S		S		S		S	
10298	S		S		S		S		S		S		S		S										S		S		M		S									
10394	S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S	
10398	S		S		S		S		I		S		I		S										S		S		I		S									
10498	S		S		S		S		S		S		S		S										S		S		S		S									
10592	S		S		S		S						S		S										S		S		S		S		S		S					
10598	S		S		S		S		S		S		S		S										S		S		S		S									
10692	S		S		S		S						S		S										S		S		S		S		S		S					
10792	S		S		I		S						I		S										S		S		S		S		S		S					
10992	S		S		S		S						S		S										S		S		S		S		S		S					
10994	S		S		S		S						S		S						S		S		S		S		S		S		S		M					
11092	D		D		D		D						D		D										D		D		D		D		D		D					
11791	S		S																														S		S					
1187	S		S																														S		S					
11891		S		S		S		S		S		S		S		S										S		S		S		S								
12191		S		S		S		S		S		S		S		S										S		S		S		S								
12691	S		S		S		S		S		S		S		S										S		S		S		S									
1386		S		S		S		S		S		S	S	S	S	S		S		S		S		S	S	S	S	S	S	S	S	S		S		S		S		S
15599		S		D						I		D		I		D																								
15699		S		S						S		I		S		S																								
15799		D		D						D		D		D		D																								
1786		S		S		S		S		S		S	S	S	S	S		S		S		S		S	S	S	S	S	S	S	S	S		S		S		S		S
18199		S		S		S	S	S		S	S	S		S	S	S		S	S	S							S			S	S	S		S		S				
18399		S		S																										S		S		S		S				
18499		S		S																										S		S		S		S				
18799		S		S																										S		S		S		S				
1986		S		S		S		S		S		S		S		S										S		S		S		S								
20998		S	S	D		I	I	D		I	I	D		I	I	D		I	I	D						S	I	D		I	I	D								
21098		S		S																										S		S		S		S				
2186		S		S		S		S		S		S		S		S										S		S		S		S								
22596	S		S		S		S		S		S		S		S										S		S		S		S									
22696	S		S		I		S		I		S		I		S										S		S		I		S									
22796		S		S		S		S		S		S		S		S				S						S		S		S		S								
22896	S		S		S		S		S		S		S		S										S		S		S		S									
22996	S		S		S		S		S		S		S		S										S		S		S		S									

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Well /Location	PRINCIPAL ANALYTES																																			
	RADIONUCLIDES																				WATER QUALITY PARAMETERS															
	Volatile Organic Compounds				Metals				^{239}Plutonium/ ^{241}Americium				U-Isotopes ($^{233/234,235,238}$U)				Tritium				^{89,90}Strontium				Total Nitrate+Nitrite				Total Dissolved Solids				Sulfate				Fluoride			
23096	S		S		S		S		S		S		S		S										S		S		S		S		S				
23196						S	D																													
23296		S		S		S		S		S		S		S		S										S		S		S		S				
3386		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D
3586		S		S		S		S		S		S		S		S										S		S		S						
3687		S		S		S		S		S		S		S		S										S		S		S						
37101			S				S				S				S												S			S						
37201			S				S				S				S												S			S						
37301			S				S				S				S												S			S						
37401			S				S				S				S												S			S						
37501			S				S				S				S												S			S						
37601			S				S				S				S												S			S						
37701			S				S				S				S												S			S						
37791				S				S				S				S												S			S					
38591	S		D		S		D						S		D						S		D		S		D		S		D					
39691				D				D				D				D												D			D					
40099	S		S		S		S						S		S		S		S						S		S		S							
40199	S		S		S		S						S		S		S		S						S		S		S							
40299	S		S		S		S						S		S		S		S						S		S		S							
40399	S		S		S		S						S		S		S		S						S		S		S							
40499	S		S		S		S						S		S		S		S						S		S		S							
40599		S	S	D		I	I	D		I	I	D		I	I	D		I	I	D						S	I	D		I	I	D				
40699		D	S	D		D	I	D		D	I	D		D	I	D		D	I	D						D	I	D		D	I	D				
40799		S	S	D		I	I	D		I	I	D		I	I	D		S	I	D						S	I	D		I	I	D				
4087	S	S	S	D	S	S	S	D					S	S	S	D	S	S	S	D					S	S	S	D	S	S	I	D	S	S	I	D
40899		S	D	D		I	D	D		I	D	D		I	D	D		S	D	D						S	D	D		I	D	D				
40999	S		S	S	S		S	I	I		S		S		S	I									S		S	I	S		I	I				
41099	S		S		S		S		S		S		S		S										S		S		S		S					
41199	S		S		S		S		S		S		S		S										S		S		S		S					
41299	S		S		S		S						S		S		S		S						S		S		S		S					
41499		S	S	I		I	I	I		I	I	S		I	I	I		S	I	I						S	I	I		I	I	I				
41591	S		S		S		S		S		S		S		S		S		S						S		S		S		S		S		S	
41599		I	S	D		I	I	D		I	I	D		I	I	D		S	I	D						S	I	D		I	I	D				
41691	S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S	
43392	S		S		S		S		S		S		S		S										S		S		S							
4787	D		S		D		S						D		I										D		I		D		I		D		I	
4887	D		D		D		D						D		D										D		D		D		D		D		D	
5187				D				D				D				D												D			D					
52894	D	D	S	D	D	D	S	D					D	D	S	D	D	D	S	D					D	D	S	D	D	D	S	D	D	D	S	D

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PRINCIPAL ANALYTES																									WATER QUALITY PARAMETERS											
	RADIONUCLIDES																																			
Well /Location	Volatile Organic Compounds				Metals				^{239}Plutonium/ ^{241}Americium				U-isotopes ($^{233/234,235,238}$U)				Tritium				$^{89/90}$Strontium				Total Nitrate+Nitrite				Total Dissolved Solids				Sulfate				Fluoride			
52994	D	D	D	D	D	D	D	D					D	D	D	D	D	D	D	D					D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
5387	S		S		S		S						S		S										S		S		S		S		S					
5587	D		D		D		D						D		D						D		D		D		D		D		D		D					
55901				S				S				S				S												S										
56001				D				D				D				D												D										
56101				D				D				D				D												D										
56201				S				S				S				S												S										
56301				S				S				S				S												S										
5887	S	S	S	S	S	S	S	S					S	S	S	S	S	S	S	S					S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
60299		S		D		I		D		I		D		I		D		I		D						S		D				D						
60499		S		S		S		S		S		S		S		S																I						
60599		S		S		S		I		S		I		S		S																I						
60699	S	S		S		I		I		I		I	S	S		I																I						
61099	S			S				S					S			S												S				S						
61199	S			S				S					S			S												S				S						
61499		S		D		S		D		I		D		S		D																						
6186	S		S		S		S		S		S		S		S										S		S		S		S							
6286	S		S		S		S		S		S		S		S										S		S		S		S		S					
6386	D		S		D		S		D		I		D		S										D		S		D		S		D		S			
6486	S		D		S		D						S		D						S		D		S		D		S		D		S		D			
6586	S		S		S		S		S		S		S		S										S		S		S		S							
70193	S	S	S	S	S	S	S	S					S	S	S	S	S	S	S	S					S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
70393	S	S	S	S	S	S	S	S					S	S	S	S	S	S	S	S					S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
70493	S	S	S	S	S	S	S	S					S	S	S	S	S	S	S	S					S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
70693	S		S																													S		S					
7086	S		S		S		S						S		S						S		S		S		S		S		S		S					
75992	S		S		S		I		S		S		S		I						S		I		S		S		S		S		S					
76992	D		S		D		I						D		I		D		S						D		S		D		I		D		I			
771 FD OUT #2		S		D		S		D		S		D		S		D		S		D						S		D		S		D						
77392	D		D		D		D						D		D		D		D						D		D		D		D		D		D		D	
83101				S				S								S												S				S						
83201				S				S								S												S				S						
86501				S				S								S												S				S						
86601				S				S								S												S				I						
86701				D				D								D												D				D						
88101				D				D				D				D												D				D						
891COLWEL	S	S	S	S	S	S	S	S					S	S	S	S													S	S	S	S							
90099	S		S																										S		S		S		S				
90199	D		D				D				D				D												D				D				D				

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Well /Location	PRINCIPAL ANALYTES																																			
	Volatile Organic Compounds				Metals				^{239}Plutonium/^{241}Americium				RADIONUCLIDES: U-isotopes ($^{233/234,235,238}$)				Tritium				$^{89/90}$Strontium				WATER QUALITY PARAMETERS: Total Nitrate+Nitrite				Total Dissolved Solids				Sulfate				Fluoride			
90299	S		S				S				S				S												S		S				S				
90399	S		S				S				S				S												S		S				S				
95099		S		S																																
95199		S		S																																
95299		D		D																																
99101				D				D				D			D										D			D								
99201				D				D				D			D										D			D								
99301				S				S				S			S										S			S	S							
99401				D				D				D			D										D			D								
B206989	S	D	S	S	S	D	S	S					I	D	S	S	S	D	S	S					S	D	S	S	I	D	S	S	I	D	S	S	I	D	S	S
B208289		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D
B208789		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S
B371BAS			S				S				S				S											S			S									
B371SUBBAS			S				S				S				S											S			S									
BS-865-2				S				S								S											S				S							
FD-559-561				S				S				S				S											S				S							
FD-707-4		S		S																																
P114389	S		S		S		S		S		S		S		S										S		S		S		S							
P209289		S		D		S		D		S		D		S		D		S		D		S		D		S		D		S		D		S		D		D
P209389	S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S	
P209489		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S
P218089		S		S		S		S		S		S		S		S														S								
P218389		S		D		S		D		S		D		S		D		S		D		S		D		S		D		S		D		S		D		D
P219089		S	S	S		S	S	S		S	S	S		S	S	S		S	S	S						S	S	S		S	S	S						
P219189		S		S		I		I		I		I		S		S		S		S		I		I		S		S		I		I		I		I		I
P219489		S		S		S		S		I		I		I		S		S		I		I		I		S		S		I		I		I		I		I
P313589	S		S		S		S		S		S		S		S										S		S		S		S							
P314289	D		S		D		I		D		I		D		I										D		S		D		I							
P317989	D		S	D	D		S	D	D		I		D		S	D									D		S	D	D		I	D						
P416689		S		S		S		S		S		I		S		S										S		S		S		S							
P416789		S		S		S		I		S		I		S		I										S		S		S		I							
P416889		S		S		S		S		S		S		S		S										S		S		S		S							
P419689	S		S		S		S						S		S		S		S						S		S		S		S							
SW085		S		D		S		D		S		D		S		D										S		D		S		D							
SW099	D	S	D	D																									D	S	D	D						
SW100	D	S	D	D																									D	S	D	D						
SW13494	S	S	S	S	S	S	S	S				S	S	S	S	S											S		S	S	S	S							

Well /Location	Dissolved Gas (Methane)				Sulfide				Chloride				Nitrite (=Ntri) or Nitrate (=S)				Total Organic Carbon				Polychlorinated Biphenyls				Total Cyanide				^{137}Cesium				^{237}Neptunium				Alkalinity				Total Recoverable Petroleum Hydrocarbons			
Quarters	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
00100																																											
00197																																											
00200																														S		S											
00297																																											
00300																														S		S											
00397																																											
00400																																											
00491																																											
00500																																											
00597																																											
00600																																											
00700																																											
00797																																											
00897																																											
00997																																											
01097	S		S		S		S		S		S		Ntri		S		S		S														S		S							
01497	S		S		S		S		S		S		Ntri		S		S		S														S		S							
02097	S		S		S		S		S		S		Ntri		S		S		S														S		S							
02197																																											
02291																																											
02397																																											
02497																																											
02500																																											
0386																																											
03991																																											
04091																																											
04591																																											
0487																																											
04991																																											
05091																																											
05391																																											
05691																																											
06091																																											
06491																																											
07391	S		S		S		S		S		S		S		S		S		S																						
08091																																											

Well /Location	Dissolved Gas (Methane)				Sulfide				Chloride				Nitrite (=Ntrl) or Nitrate (=S)				Total Organic Carbon				Polychlorinated Biphenyls				Total Cyanide				^{137}Cesium				^{237}Neptunium				Alkalinity				Total Recoverable Petroleum Hydrocarbons			
10098																									S		S		S		S													
10194																																												
10198																									S		S		S		S													
10294																																												
10298																									S		S		S		S													
10394																																												
10398																									S		S		S		S													
10498																									S		S		S		S													
10592																																												
10598																									S		S		S		S													
10692																																												
10792																																												
10992																																												
10994																																												
11092																																												
11791	S		S		S		S		S		S		S		S		S		S																								
1187	S		S		S		S		S		S		S		S		S		S																								
11891																																												
12191																																												
12691																																												
1386																																												
15599																																												
15699																																												
15799																																												
1786																																												
18199		S		S		S		S		S		S		S		S		S		S												S	S	S								
18399		S		S		S		S		S		S		S		S		S																								
18499		S		S		S		S		S		S		S		S		S																								
18799		S		S		S		S		S		S		S		S		S																								
1986																																												
20998																						I	D										I	I	D								
21098		S		S		S		S		S		S		S		S		S																								
2186																																												
22596																																												
22696																						S																					
22796																							S											S									
22896																																												
22996																																												
23096																																												

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Well /Location	Dissolved Gas (Methane)	Sulfide	Chloride	Nitrite (=Ntri) or Nitrate (=S)	Total Organic Carbon	Polychlorinated Biphenyls	Total Cyanide	^{137}Cesium	^{237}Neptunium	Alkalinity	Total Recoverable Petroleum Hydrocarbons
23196											
23296											
3386											
3586											
3687											
37101											S
37201											S
37301											S
37401											S
37501											S
37601											S
37701											S
37791						S					S
38591											
39691						D					D
40099							S S				
40199							S S				
40299							S S				
40399							S S				
40499							S S				
40599						I D			I I D		
40699						I D			D I D		
40799						I D			I I D		
4087											
40899						D D			I D D		
40999											
41099											
41199											
41299							S S				
41499						I I			I I S		
41591											
41599						I D			I I D		
41691											
43392											
4787											
4887											
5187						D					D
52894											
52994											

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Well /Location	Dissolved Gas (Methane)				Sulfide				Chloride				Nitrite (=Ntri) or Nitrate (=S)				Total Organic Carbon				Polychlorinated Biphenyls				Total Cyanide				^{137}Cesium				^{237}Neptunium				Alkalinity				Total Recoverable Petroleum Hydrocarbons			
5387																																											
5587																																											
55901																					S																						
56001																					D																						
56101																					D																						
56201																					S																						
56301																					S																						
5887																																											
60299																																											
60499																																	I		S									
60599																																	I		I									
60699																																	I										I	
61099																					S																						S	
61199																					S																						S	
61499																																	I		D									
6186																																											
6286																																											
6386																																											
6486																																											
6586																																											
70193																																											
70393																																											
70493																																											
70693	S		S		S		S		S		S		Ntri		S		S		S															I			S		S				
7086																																											
75992																																											
76992																																											
771 FD OUT #2																					D												S		D									
77392																																											
83101																					S																						S	
83201																					S																						S	
86501																																											
86601																																											
86701																																											
88101																					D																						D	
891COLWEL																																											
90099	S		S		S		S		S		S		S		S		S		S																							
90199																																											
90299																																											

64

Well /Location	Dissolved Gas (Methane)				Sulfide				Chloride				Nitrite (=Ntri) or Nitrate (=S)				Total Organic Carbon				Polychlorinated Biphenyls				Total Cyanide				^{137}Cesium				^{237}Neptunium				Alkalinity				Total Recoverable Petroleum Hydrocarbons			
90399	S		S		S		S		S		S		S		S		S																									
95099																																											
95199																																											
95299																																											
99101																																											D
99201																																											D
99301																																											I
99401																																											D
B206989																																											
B208289																																											
B208789																																											
B371BAS																																										S	
B371SUBBAS																																										S	
BS-865-2																																											
FD-559-561																							S																			
FD-707-4																																											
P114389																																											
P209289																							D										D									
P209389																																											
P209489																																											
P218089																																	S		S							
P218389																																											
P219089																						S	S										S	S	S							
P219189																					S		I										I		I							
P219489																																											
P313589																																											
P314289																																											
P317989																																											
P416689																																											
P416789																																											
P416889																																											
P419689																									S		S															
SW085																																											
SW099																																											
SW100																																											
SW13494																							S																			S

Note: S = sampled, I = insufficient water, D = dry

Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Report-able Result?
Boundary	0386	1/23/01	GW07153RG	URANIUM-233,-234	REAL	TR1	11.10	PCI/L	1.06		V1	0.13		10.47	60.70	0.18			No
	0386	8/2/01	GW07630RG	URANIUM-233,-234	REAL	TR1	11.30	PCI/L	1.06		V1	0.08		10.66	60.70	0.19			No
	0386	1/23/01	GW07153RG	URANIUM-238	REAL	TR1	7.64	PCI/L	0.77		V1	0.07		9.95	41.80	0.18			No
	0386	8/2/01	GW07630RG	URANIUM-238	REAL	TR1	8.20	PCI/L	0.77			0.05		10.68	41.80	0.20			No
	06491	1/9/01	GW07163RG	SULFATE	REAL	TR1	530.00	MG/L	500.00		J1	1.00	25.00	1.06	435.60	1.22	1199	0.44	Yes
	06491	1/9/01	GW07163RG	URANIUM-233,-234	REAL	TR1	26.70	PCI/L	1.06		V	0.07		25.19	60.70	0.44			No
	06491	9/12/01	GW07639RG	URANIUM-233,-234	REAL	TR1	40.50	PCI/L	1.06		V1	0.13		38.21	60.70	0.67			No
	06491	1/9/01	GW07163RG	URANIUM-235	REAL	TR1	1.14	PCI/L	1.01		V	0.09		1.13	1.79	0.64			No
	06491	9/12/01	GW07639RG	URANIUM-235	REAL	TR1	1.84	PCI/L	1.01		V1	0.03		1.82	1.79	1.03	2.976	0.62	Yes
	06491	1/9/01	GW07163RG	URANIUM-238	REAL	TR1	18.00	PCI/L	0.77		V	0.07		23.44	41.80	0.43			No
	06491	9/12/01	GW07639RG	URANIUM-238	REAL	TR1	25.90	PCI/L	0.77		V1	0.03		33.72	41.80	0.62			No
	10294	2/15/01	GW07346RG	SULFATE	REAL	TR1	810.00	MG/L	500.00		V1	1.00		1.62	435.60	1.86	1183	0.68	Yes
	10294	7/27/01	GW07649RG	SULFATE	REAL	TR1	790.00	MG/L	500.00		V1	1.00	50.00	1.58	435.60	1.81	1183.02	0.67	Yes
	10294	2/15/01	GW07346RG	URANIUM-233,-234	REAL	TR1	13.40	PCI/L	1.06		V1	0.11		12.64	60.70	0.22			No
	10294	7/27/01	GW07649RG	URANIUM-233,-234	REAL	TR1	20.80	PCI/L	1.06		V1	0.19		19.62	60.70	0.34			No
	10294	7/27/01	GW07649RG	URANIUM-235	REAL	TR1	1.16	PCI/L	1.01		V1	0.22		1.15	1.79	0.65			No
	10294	2/15/01	GW07346RG	URANIUM-238	REAL	TR1	11.20	PCI/L	0.77		V1	0.15		14.58	41.80	0.27			No
	10294	7/27/01	GW07649RG	URANIUM-238	REAL	TR1	17.20	PCI/L	0.77		V1	0.09		22.40	41.80	0.41			No
	10394	2/20/01	GW07347RG	URANIUM-233,-234	REAL	TR1	3.77	PCI/L	1.06		V1	0.14		3.56	60.70	0.06			No
	10394	7/16/01	GW07650RG	URANIUM-233,-234	REAL	TR1	2.20	PCI/L	1.06			0.10		2.08	60.70	0.04			No
	10394	2/20/01	GW07347RG	URANIUM-238	REAL	TR1	3.00	PCI/L	0.77		V1	0.18		3.91	41.80	0.07			No
	10394	7/16/01	GW07650RG	URANIUM-238	REAL	TR1	1.60	PCI/L	0.77			0.05		2.08	41.80	0.04			No
	41591	3/21/01	GW07360RG	NICKEL	REAL	TR1	238.00	UG/L	140.00		V1	0.30	1.00	1.70	21.37	11.14	11.16	21.33	Yes
	41591	9/10/01	GW07663RG	NICKEL	REAL	TR1	180.00	UG/L	140.00		V1	1.00	1.00	1.29	21.37	8.42	11.16	16.13	Yes
	41591	3/21/01	GW07360RG	URANIUM-233,-234	REAL	TR1	12.00	PCI/L	1.06		V1	0.10		11.32	60.70	0.20			No
	41591	9/10/01	GW07663RG	URANIUM-233,-234	REAL	TR1	8.30	PCI/L	1.06		V1	0.08		7.83	60.70	0.14			No
	41591	3/21/01	GW07360RG	URANIUM-238	REAL	TR1	10.00	PCI/L	0.77		V1	0.02		13.02	41.80	0.24			No
	41591	9/10/01	GW07663RG	URANIUM-238	REAL	TR1	5.90	PCI/L	0.77		V1	0.05		7.68	41.80	0.14			No
	41691	8/30/01	GW07664RG	URANIUM-233,-234	REAL	TR1	1.16	PCI/L	1.06		V1	0.05		1.09	60.70	0.02			No
	41691	2/13/01	GW07362RG	URANIUM-238	REAL	TR1	0.94	PCI/L	0.77	J	V1	0.07		1.23	41.80	0.02			No
	41691	8/30/01	GW07664RG	URANIUM-238	REAL	TR1	0.95	PCI/L	0.77	J	V1	0.06		1.24	41.80	0.02			No
D&D Bldg 123	10098	2/24/01	GW07372RG	THALLIUM	REAL	TR1	16.60	UG/L	2.00		V1	3.88	1.00	8.30	4.90	3.39	ND		No
	10098	1/24/01	GW07372RG	URANIUM-233,-234	REAL	TR1	1.31	PCI/L	1.06		V1	0.07		1.24	60.70	0.02			No
	10098	9/7/01	GW07674RG	URANIUM-233,-234	REAL	TR1	1.26	PCI/L	1.06		V1	0.11		1.19	60.70	0.02			No
	10098	1/24/01	GW07372RG	URANIUM-238	REAL	TR1	1.06	PCI/L	0.77		V1	0.07		1.38	41.80	0.03			No
	10098	9/7/01	GW07674RG	URANIUM-238	REAL	TR1	0.95	PCI/L	0.77	J	V1	0.06		1.24	41.80	0.02			No
	10198	7/18/01	GW07675RG	CESIUM-137	REAL	TR1	1.84	PCI/L	1.51		V	7.33		1.22			ND		No
	10298	8/23/01	GW07676RG	NITRATE/NITRITE	REAL	TR1	11.00	MG/L	10.00		V1	0.50	10.00	1.10	4.66	2.36	ND		No
	10398	9/13/01	GW07677RG	THALLIUM	REAL	TR1	2.00	UG/L	2.00	BJ	UJ1	1.80	1.00	1.00	4.90	0.41	ND		No
	10398	9/20/01	GW07677RG	URANIUM-233,-234	REAL	TR1	1.19	PCI/L	1.06		V1	0.12		1.12	60.70	0.02			No
	10498	1/25/01	GW07376RG	CADMIUM	REAL	TR1	5.31	UG/L	5.00		V1	0.27	1.00	1.06	4.25	1.25	ND		No
	10498	1/25/01	GW07376RG	TETRACHLOROETHENE	REAL	DL1	980.00	UG/L	5.00	D	J	50.00	50.00	196.00			ND		No
	10498	1/25/01	GW07376RG	URANIUM-233,-234	REAL	TR1	1.12	PCI/L	1.06		V1	0.07		1.06	60.70	0.02			No
	10498	1/25/01	GW07376RG	URANIUM-238	REAL	TR1	1.26	PCI/L	0.77		V1	0.13		1.64	41.80	0.03			No
	10598	1/25/01	GW07377RG	BARIUM	REAL	TR1	2590.00	UG/L	2000.00		V1	0.16	1.00	1.30	152.54	16.98	ND		No
	10598	1/25/01	GW07377RG	CADMIUM	REAL	TR1	18.30	UG/L	5.00		V1	0.27	1.00	3.66	4.25	4.31	ND		No
	10598	1/25/01	GW07377RG	CESIUM-137	REAL	TR1	3.70	PCI/L	1.51	J	V1	2.68		2.45			ND		No
	10598	7/24/01	GW07679RG	CESIUM-137	REAL	TR1	1.55	PCI/L	1.51	U	V	4.23		1.03			ND		No
	10598	1/25/01	GW07377RG	THALLIUM	REAL	TR1	11.40	UG/L	2.00		V1	3.88	1.00	5.70	4.90	2.33	ND		No
D&D Bldg 371	37201	8/10/01	GW07681RG	URANIUM-233,-234	REAL	TR1	1.19	PCI/L	1.06		1	0.15		1.12	60.70	0.02			No
	37201	8/10/01	GW07682RG	URANIUM-238	DUP	TR1	1.08	PCI/L	0.77		1	0.14		1.41	41.80	0.03			No
	37301	8/9/01	GW07684RG	BARIUM	REAL	TR1	2300.00	UG/L	2000.00		V1	0.25	1.00	1.15	152.54	15.08	ND		No
	37301	8/9/01	GW07684RG	MANGANESE	REAL	TR1	8400.00	UG/L	1720.00		V1	0.69	1.00	4.88	162.33	51.75	ND		No
	37401	8/13/01	GW07685RG	URANIUM-233,-234	REAL	TR1	27.50	PCI/L	1.06		1	0.16		25.94	60.70	0.45			No
	37401	8/13/01	GW07685RG	URANIUM-238	REAL	TR1	22.00	PCI/L	0.77		1	0.10		28.65	41.80	0.53			No
	37501	8/14/01	GW07686RG	BARIUM	REAL	TR1	2100.00	UG/L	2000.00		J1	0.25	1.00	1.05	152.54	13.77	ND		No
	37601	8/13/01	GW07687RG	URANIUM-233,-234	REAL	TR1	2.31	PCI/L	1.06		1	0.18		2.18	60.70	0.04			No
	37601	8/13/01	GW07687RG	URANIUM-238	REAL	TR1	1.50	PCI/L	0.77		1	0.09		1.95	41.80	0.04			No
	37701	8/14/01	GW07688RG	URANIUM-233,-234	REAL	TR1	7.30	PCI/L	1.06		1	0.17		6.89	60.70	0.12			No
	37701	8/14/01	GW07688RG	URANIUM-238	REAL	TR1	5.08	PCI/L	0.77		1	0.08		6.61	41.80	0.12			No
	B371BAS	8/14/01	SW07689RG	URANIUM-233,-234	REAL	TR1	2.39	PCI/L	1.06		1	0.14		2.25	60.70	0.04			No
	B371BAS	8/14/01	SW07689RG	URANIUM-238	REAL	TR1	1.40	PCI/L	0.77		1	0.11		1.82	41.80	0.03			No
	B371SUBBAS	8/15/01	SW07690RG	URANIUM-233,-234	REAL	TR1	2.44	PCI/L	1.06		1	0.05		2.30	60.70	0.04			No
	B371SUBBAS	8/15/01	SW07690RG	URANIUM-238	REAL	TR1	1.68	PCI/L	0.77		1	0.04		2.19	41.80	0.04			No
D&D Bldg 444	40099	2/26/01	GW07413RG	1,1-DICHLOROETHENE	REAL	TR1	299.00	UG/L	7.00		V	10.00	10.00	42.71			ND		No
	40099	8/13/01	GW07737RG	1,1-DICHLOROETHENE	REAL	TR1	190.00	UG/L	7.00		V	10.00	10.00	27.14			ND		No
	40099	2/26/01	GW07413RG	cis-1,2-DICHLOROETHENE	REAL	TR1	741.00	UG/L	70.00		V	10.00	10.00	10.59			ND		No
	40099	8/13/01	GW07737RG	cis-1,2-DICHLOROETHENE	REAL	TR1	520.00	UG/L	70.00		V	20.00	20.00	7.43			ND		No
	40099	2/26/01	GW07413RG	METHYLENE CHLORIDE	REAL	TR1	6.80	UG/L	5.00	BJ	JB	10.00	10.00	1.36			ND		No
	40099	2/26/01	GW07413RG	TETRACHLOROETHENE	REAL	TR1	24.80	UG/L	5.00		V	10.00	10.00	4.96			ND		No
	40099	8/13/01	GW07737RG	TETRACHLOROETHENE	REAL	TR1	15.00	UG/L	5.00		V	10.00	10.00	3.00			ND		No
	40099	2/26/01	GW07413RG	TRICHLOROETHENE	REAL	TR1	726.00	UG/L	5.00		V	10.00	10.00	145.20			ND		No
	40099	8/13/01	GW07737RG	TRICHLOROETHENE	REAL	TR1	530.00	UG/L	5.00		V	20.00	20.00	106.00			ND		No
	40199	8/13/01	GW07738RG	URANIUM-233,-234	REAL	TR1	1.24	PCI/L	1.06		1	0.11		1.17	60.70	0.02			No
	40299	2/28/01	GW07415RG	TETRACHLOROETHENE	REAL	DL1	78.00	UG/L	5.00	D	J1	5.00	5.00	15.60			ND		No
	40299	7/23/01	GW07740RG	TETRACHLOROETHENE	DUP	TR1	56.00	UG/L	5.00		V	0.36	1.00	11.20			ND		No
	40499	2/28/01	GW07417RG	TETRACHLOROETHENE	REAL	TR1	7.00	UG/L	5.00		J1	1.00	1.00	1.40			ND		No
	40499	8/13/01	GW07743RG	TETRACHLOROETHENE	REAL	TR1	6.60	UG/L	5.00		V	1.00	1.00	1.32			ND		No
	41299	2/26/01	GW07418RG	1,1-DICHLOROETHENE	REAL	TR1	9.10	UG/L	7.00		V	5.00	5.00	1.30			ND		No
	41299	7/17/01	GW07744RG	1,1-DICHLOROETHENE	REAL	RX1	11.00	UG/L	7.00		V1	0.20	1.00	1.57			ND		No

ID = Insufficient Data to calculate Historic Mean +/- 2-Standard Deviations for 1991-1995
ND = Location has no Historic Data prior to 1995

Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Repo-rtable Result?
	41299	2/26/01	GW07418RG	CHROMIUM	REAL	TR1	330.00	UG/L	100.00		V1	0.18	1.00	3.30	12.44	26.53	ND		No
	41299	7/17/01	GW07744RG	CHROMIUM	REAL	TR1	260.00	UG/L	100.00		V1	0.12	1.00	2.60	12.44	20.90	ND		No
D&D Bldg 444	41299	2/26/01	GW07418RG	TETRACHLOROETHENE	REAL	TR1	265.00	UG/L	5.00		V	5.00	5.00	53.00			ND		No
	41299	7/17/01	GW07744RG	TETRACHLOROETHENE	REAL	DL1	330.00	UG/L	5.00		1	3.60	10.00	66.00			ND		No
	41299	2/26/01	GW07429RG	TRICHLOROETHENE	DUP	TR1	38.20	UG/L	5.00		V	5.00	5.00	7.64			ND		No
	41299	7/17/01	GW07744RG	TRICHLOROETHENE	REAL	RX1	54.00	UG/L	5.00		V1	0.22	1.00	10.80			ND		No
	41299	2/26/01	GW07418RG	URANIUM-233,-234	REAL	TR1	1.47	PCI/L	1.06		V1	0.07		1.39	60.70	0.02			No
	41299	7/17/01	GW07744RG	URANIUM-233,-234	REAL	TR1	2.00	PCI/L	1.06			0.07		1.89	60.70	0.03			No
	41299	7/17/01	GW07744RG	URANIUM-238	REAL	TR1	0.95	PCI/L	0.77			0.01		1.24	41.80	0.02			No
	P419689	2/26/01	GW07431RG	TETRACHLOROETHENE	REAL	TR1	18.80	UG/L	5.00		V	2.00	2.00	3.76			49.4	0.38	No
	P419689	8/13/01	GW07719RG	TETRACHLOROETHENE	REAL	TR1	10.00	UG/L	5.00		V	1.00	1.00	2.00			49.4	0.20	No
D&D Bldg 559	55901	12/17/01	GW07871RG	1,1-DICHLOROETHENE	REAL	TR1	13.00	UG/L	7.00		V1	0.20	1.00	1.86			ND		No
	55901	12/17/01	GW07871RG	CARBON TETRACHLORIDE	REAL	TR1	49.00	UG/L	5.00		V1	0.19	1.00	9.80			ND		No
	55901	12/17/01	GW07871RG	TETRACHLOROETHENE	REAL	TR1	5.50	UG/L	5.00		V1	0.36	1.00	1.10			ND		No
	55901	12/26/01	GW07871RG	THALLIUM	REAL	TR1	2.50	UG/L	2.00	B	V	2.10	1.00	1.25	4.90	0.51	ND		No
	55901	12/17/01	GW07871RG	TRICHLOROETHENE	REAL	TR1	14.00	UG/L	5.00		V1	0.22	1.00	2.80			ND		No
	56201	12/17/01	GW07876RG	1,1-DICHLOROETHENE	REAL	TR1	8.20	UG/L	7.00		V1	0.20	1.00	1.17			ND		No
	56201	12/17/01	GW07876RG	CARBON TETRACHLORIDE	REAL	TR1	37.00	UG/L	5.00		V1	0.19	1.00	7.40			ND		No
	56201	12/17/01	GW07876RG	TRICHLOROETHENE	REAL	TR1	20.00	UG/L	5.00		V1	0.22	1.00	4.00			ND		No
	56301	12/12/01	GW07877RG	1,1-DICHLOROETHENE	REAL	TR1	21.00	UG/L	7.00		V	0.20	1.00	3.00			ND		No
	56301	12/12/01	GW07877RG	CARBON TETRACHLORIDE	REAL	DL1	44.00	UG/L	5.00		V	0.38	2.00	8.80			ND		No
	56301	12/12/01	GW07877RG	TETRACHLOROETHENE	REAL	TR1	9.70	UG/L	5.00		V	0.36	1.00	1.94			ND		No
	56301	12/12/01	GW07877RG	TRICHLOROETHENE	REAL	TR1	16.00	UG/L	5.00		V	0.22	1.00	3.20			ND		No
	56301	12/13/01	GW07877RG	URANIUM-233,-234	REAL	TR1	2.37	PCI/L	1.06		V	0.09		2.24	60.70	0.04			No
	56301	12/13/01	GW07877RG	URANIUM-238	REAL	TR1	1.43	PCI/L	0.77		V	0.09		1.86	41.80	0.03			No
D&D 559-561	FD-559-561	12/13/01	SW07878RG	1,1-DICHLOROETHENE	REAL	DL1	14.00	UG/L	7.00		V	0.40	2.00	2.00			ID		No
	FD-559-561	12/13/01	SW07878RG	CARBON TETRACHLORIDE	REAL	DL1	100.00	UG/L	5.00		V	1.90	10.00	20.00			ID		No
	FD-559-561	12/13/01	SW07878RG	TETRACHLOROETHENE	REAL	DL1	5.50	UG/L	5.00		V	0.72	2.00	1.10			ID		No
	FD-559-561	12/13/01	SW07878RG	TRICHLOROETHENE	REAL	DL1	270.00	UG/L	5.00		V	2.20	10.00	54.00			ID		No
	FD-559-561	12/13/01	SW07878RG	URANIUM-233,-234	REAL	TR1	1.35	PCI/L	1.06		V	0.18		1.27	60.70	0.02			No
D&D Bldg 707	00200	10/18/01	GW07842RG	THALLIUM	REAL	TR1	3.90	UG/L	2.00	B	UJ1	2.10	1.00	1.95	4.90	0.80	ND		No
	00300	10/10/01	GW07843RG	THALLIUM	REAL	TR1	3.00	UG/L	2.00	B	UJ1	2.10	1.00	1.50	4.90	0.61	ND		No
	00300	5/22/01	GW07540RG	TRICHLOROETHENE	REAL	TR1	17.00	UG/L	5.00		V1	1.00	1.00	3.40			ND		No
	00300	10/10/01	GW07843RG	TRICHLOROETHENE	REAL	TR1	5.80	UG/L	5.00		V1	0.22	1.00	1.16			ND		No
	00300	5/22/01	GW07540RG	URANIUM-233,-234	REAL	TR1	27.00	PCI/L	1.06		V1	0.10		25.47	60.70	0.44			No
	00300	11/6/01	GW07843RG	URANIUM-233,-234	REAL	TR1	23.90	PCI/L	1.06		V1	0.36		22.55	60.70	0.39			No
	00300	5/22/01	GW07540RG	URANIUM-238	REAL	TR1	19.00	PCI/L	0.77		V1	0.15		24.74	41.80	0.45			No
	00300	11/6/01	GW07843RG	URANIUM-238	REAL	TR1	15.80	PCI/L	0.77		V1	0.18		20.57	41.80	0.38			No
	60499	10/10/01	GW07844RG	THALLIUM	REAL	TR1	3.50	UG/L	2.00	B	J1	2.10	1.00	1.75	4.90	0.71	ND		No
	60499	6/5/01	GW07541RG	URANIUM-233,-234	REAL	TR1	5.33	PCI/L	1.06		V1	0.09		5.03	60.70	0.09			No
	60499	10/10/01	GW07844RG	URANIUM-233,-234	REAL	TR1	4.74	PCI/L	1.06		V1	0.19		4.47	60.70	0.08			No
	60499	6/5/01	GW07541RG	URANIUM-238	REAL	TR1	3.39	PCI/L	0.77		V1	0.04		4.41	41.80	0.08			No
	60499	10/10/01	GW07844RG	URANIUM-238	REAL	TR1	2.81	PCI/L	0.77		V1	0.15		3.66	41.80	0.07			No
	60599	5/22/01	GW07542RG	TETRACHLOROETHENE	REAL	DL1	260.00	UG/L	5.00	D	J1	10.00	10.00	52.00			ND		No
	60599	10/11/01	GW07845RG	TETRACHLOROETHENE	REAL	DL1	170.00	UG/L	5.00		V1	1.20	3.33	34.00			ND		No
	60599	6/11/01	GW07542RG	URANIUM-233,-234	REAL	TR1	16.30	PCI/L	1.06		V1	0.11		15.38	60.70	0.27			No
	60599	10/11/01	GW07845RG	URANIUM-233,-234	REAL	TR1	16.50	PCI/L	1.06		V	0.34		15.57	60.70	0.27			No
	60599	6/11/01	GW07542RG	URANIUM-238	REAL	TR1	13.20	PCI/L	0.77		V1	0.05		17.19	41.80	0.32			No
	60599	10/11/01	GW07845RG	URANIUM-238	REAL	TR1	10.50	PCI/L	0.77		V	0.42		13.67	41.80	0.25			No
	60699	3/8/01	GW07422RG	URANIUM-233,-234	REAL	TR1	95.00	PCI/L	1.06		V1	0.28		89.62	60.70	1.57	ND		No
	60699	6/29/01	GW07598RG	URANIUM-233,-234	REAL	TR1	70.00	PCI/L	1.06		V1	0.14		66.04	60.70	1.15			No
	60699	3/8/01	GW07422RG	URANIUM-235	REAL	TR1	2.81	PCI/L	1.01		V1	0.29		2.78	1.79	1.57	ND		No
	60699	6/29/01	GW07598RG	URANIUM-235	REAL	TR1	2.10	PCI/L	1.01		V1	0.10		2.08	1.79	1.17			No
	60699	3/8/01	GW07422RG	URANIUM-238	REAL	TR1	60.90	PCI/L	0.77		V1	0.13		79.30	41.80	1.46	ND		No
	60699	6/29/01	GW07598RG	URANIUM-238	REAL	TR1	48.00	PCI/L	0.77		V1	0.12		62.50	41.80	1.15			No
	61499	4/23/01	GW07543RG	TETRACHLOROETHENE	REAL	TR1	5.00	UG/L	5.00		V1	1.00	1.00	1.00			ND		No
	61499	6/5/01	GW07543RG	URANIUM-233,-234	REAL	TR1	8.11	PCI/L	1.06		V1	0.23		7.65	60.70	0.13			No
	61499	6/5/01	GW07543RG	URANIUM-238	REAL	TR1	6.72	PCI/L	0.77		V1	0.14		8.75	41.80	0.16			No
	P218089	10/22/01	GW07841RG	THALLIUM	REAL	TR1	4.50	UG/L	2.00		UJ1	2.10	1.00	2.25	4.90	0.92	ID		No
	P218089	4/20/01	GW07538RG	URANIUM-233,-234	REAL	TR1	1.50	PCI/L	1.06		V	0.23		1.42	60.70	0.02			No
	P218089	11/29/01	GW07841RG	URANIUM-233,-234	REAL	TR1	4.13	PCI/L	1.06		V1	0.17		3.90	60.70	0.07			No
	P218089	4/20/01	GW07538RG	URANIUM-238	REAL	TR1	0.90	PCI/L	0.77		V	0.15		1.17	41.80	0.02			No
	P218089	11/29/01	GW07841RG	URANIUM-238	REAL	TR1	2.04	PCI/L	0.77		V1	0.15		2.66	41.80	0.05			No
D&D Bldg 771	20998	5/22/01	GW07527RG	CARBON TETRACHLORIDE	REAL	DL1	190.00	UG/L	5.00	D	J1	10.00	10.00	38.00			ND		No
	20998	7/27/01	GW07747RG	CARBON TETRACHLORIDE	REAL	TR1	220.00	UG/L	5.00	E	J1	1.00		44.00			ND		No
	40599	5/9/01	GW07521RG	NITRATE/NITRITE	REAL	TR1	26.00	MG/L	10.00		V1	0.05	50.00	2.60	4.66	5.57	ND		No
	40699	7/26/01	GW07749RG	1,1-DICHLOROETHENE	REAL	DL1	200.00	UG/L	7.00		V1	0.80	4.00	28.57			ND		No
	41499	7/27/01	GW07752RG	1,1-DICHLOROETHENE	REAL	TR1	9.90	UG/L	7.00		V1	1.00		1.41			ND		No
	41499	4/26/01	GW07525RG	NITRATE/NITRITE	REAL	TR1	19.00	MG/L	10.00		V1	0.05	20.00	1.90	4.66	4.07	ND		No
	41499	4/19/01	GW07525RG	TRICHLOROETHENE	REAL	DL1	62.00	UG/L	5.00	D	J	2.00	2.00	12.40			ND		No
	41499	7/27/01	GW07752RG	TRICHLOROETHENE	REAL	TR1	130.00	UG/L	5.00	D	V1	1.00		26.00			ND		No
	771 FD OUT #2	5/15/01	SW07529RG	CARBON TETRACHLORIDE	REAL	DL1	310.00	UG/L	5.00	D	V1	10.00	10.00	62.00			ND		No
	771 FD OUT #2	5/15/01	SW07529RG	CHLOROFORM	REAL	DL1	120.00	UG/L	100.00	D	V1	10.00	10.00	1.20			ND		No
	771 FD OUT #2	5/15/01	SW07529RG	TETRACHLOROETHENE	REAL	TR1	7.00	UG/L	5.00		V1	1.00	1.00	1.40			ND		No
	771 FD OUT #2	5/15/01	SW07529RG	URANIUM-233,-234	REAL	TR1	3.00	PCI/L	1.06		V1	0.02		2.83	60.70	0.05			No
	771 FD OUT #2	5/15/01	SW07529RG	URANIUM-238	REAL	TR1	2.40	PCI/L	0.77		V1	0.02		3.13	41.80	0.06			No
	P219089	10/30/01	GW07839RG	THALLIUM	REAL	TR1	2.70	UG/L	2.00	B	UJ1	2.10	1.00	1.35	4.90	0.55	ID		No
	P219089	4/24/01	GW07528RG	URANIUM-233,-234	REAL	TR1	9.60	PCI/L	1.06		V	0.20		9.06	60.70	0.16			No
	P219089	7/30/01	GW07754RG	URANIUM-233,-234	REAL	TR1	5.43	PCI/L	1.06		V1	0.30		5.12	60.70	0.09			No
	P219089	10/30/01	GW07839RG	URANIUM-233,-234	REAL	TR1	6.12	PCI/L	1.06		V1	0.21		5.77	60.70	0.10			No

ID = Insufficient Data to calculate Historic Mean +/- 2-Standard Deviations for 1991-1995
ND = Location has no Historic Data prior to 1995

Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Report-able Result?
	P219089	4/24/01	GW07528RG	URANIUM-238	REAL	TR1	7.30	PCI/L	0.77		V	0.13		9.51	41.80	0.17			No
	P219089	7/30/01	GW07754RG	URANIUM-238	REAL	TR1	4.21	PCI/L	0.77		V1	0.17		5.48	41.80	0.10			No
	P219089	10/30/01	GW07839RG	URANIUM-238	REAL	TR1	3.32	PCI/L	0.77		V1	0.23		4.32	41.80	0.08			No

ID = Insufficient Data to calculate Historic Mean +/- 2-Standard Deviations for 1991-1995
ND = Location has no Historic Data prior to 1995

Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Rep-orta-ble Result?
D&D Bldg 776/777	00400	6/5/01	GW07545RG	URANIUM-233,-234	REAL	TR1	3.20	PCI/L	1.06		V1	0.18		3.02	60.70	0.05			No
	00400	11/28/01	GW07848RG	URANIUM-233,-234	REAL	TR1	2.05	PCI/L	1.06		V1	0.25		1.93	60.70	0.03			No
	00400	6/5/01	GW07545RG	URANIUM-238	REAL	TR1	1.88	PCI/L	0.77		V1	0.17		2.45	41.80	0.04			No
	00400	11/28/01	GW07848RG	URANIUM-238	REAL	TR1	1.01	PCI/L	0.77		V1	0.28		1.32	41.80	0.02			No
	00500	5/15/01	GW07547RG	MANGANESE	DUP	TR1	4660.00	UG/L	1720.00		V1	0.02	1.00	2.71	162.33	28.71	ND		No
	00500	11/12/01	GW07849RG	MANGANESE	REAL	TR1	2610.00	UG/L	1720.00		V1	0.23	1.00	1.52	162.33	16.08	ND		No
	00500	11/12/01	GW07849RG	THALLIUM	REAL	TR1	2.40	UG/L	2.00	B	J1	2.10	1.00	1.20	4.90	0.49	ND		No
	00600	11/15/01	GW07850RG	THALLIUM	REAL	TR1	4.40	UG/L	2.00		J1	2.10	1.00	2.20	4.90	0.90	ND		No
	00700	5/29/01	GW07550RG	1,1-DICHLOROETHENE	REAL	TR1	330.00	UG/L	7.00		V1	50.00	50.00	47.14			ND		No
	00700	11/14/01	GW07853RG	1,1-DICHLOROETHENE	REAL	DL1	500.00	UG/L	7.00		V1	40.00	200.00	71.43			ND		No
	00700	11/14/01	GW07853RG	1,2-DICHLOROETHANE	REAL	RX1	7.90	UG/L	5.00		V1	1.90	6.66	1.58			ND		No
	00700	5/29/01	GW07550RG	CARBON TETRACHLORIDE	REAL	DL1	2900.00	UG/L	5.00	D	V1	100.00	100.00	580.00			ND		No
	00700	11/14/01	GW07853RG	CARBON TETRACHLORIDE	REAL	DL1	3000.00	UG/L	5.00		V1	38.00	200.00	600.00			ND		No
	00700	5/29/01	GW07550RG	CHLOROFORM	REAL	TR1	230.00	UG/L	100.00		V1	50.00	50.00	2.30			ND		No
	00700	11/14/01	GW07853RG	CHLOROFORM	REAL	RX1	340.00	UG/L	100.00		V1	1.50	6.66	3.40			ND		No
	00700	5/29/01	GW07550RG	METHYLENE CHLORIDE	REAL	TR1	92.00	UG/L	5.00	B	JB1	50.00	50.00	18.40			ND		No
	00700	5/29/01	GW07550RG	TETRACHLOROETHENE	REAL	TR1	11.00	UG/L	5.00	J	V1	50.00	50.00	2.20			ND		No
	00700	11/14/01	GW07853RG	TETRACHLOROETHENE	REAL	RX1	11.00	UG/L	5.00		V1	2.40	6.66	2.20			ND		No
	00700	5/29/01	GW07550RG	TRICHLOROETHENE	REAL	TR1	17.00	UG/L	5.00	J	V1	50.00	50.00	3.40			ND		No
D&D Bldg 779	00100	5/23/01	GW07530RG	CARBON TETRACHLORIDE	REAL	TR1	5.00	UG/L	5.00		V1	1.00	1.00	1.00			ND		No
	00100	11/15/01	GW07856RG	CARBON TETRACHLORIDE	DUP	TR1	5.70	UG/L	5.00		V1	0.19	1.00	1.14			ND		No
	00100	11/15/01	GW07856RG	THALLIUM	DUP	TR1	2.90	UG/L	2.00	B	J1	2.10	1.00	1.45	4.90	0.59	ND		No
	00100	5/23/01	GW07530RG	TRICHLOROETHENE	REAL	TR1	38.00	UG/L	5.00		V1	1.00	1.00	7.60			ND		No
	00100	11/15/01	GW07856RG	TRICHLOROETHENE	DUP	TR1	55.00	UG/L	5.00		V1	0.22	1.00	11.00			ND		No
	00100	5/23/01	GW07530RG	URANIUM-233,-234	REAL	TR1	3.11	PCI/L	1.06		V1	0.12		2.93	60.70	0.05			No
	00100	11/15/01	GW07855RG	URANIUM-233,-234	REAL	TR1	2.30	PCI/L	1.06		V	0.33		2.17	60.70	0.04			No
	00100	5/23/01	GW07530RG	URANIUM-238	REAL	TR1	0.97	PCI/L	0.77	J	V1	0.12		1.27	41.80	0.02			No
	00100	11/15/01	GW07856RG	URANIUM-238	DUP	TR1	1.08	PCI/L	0.77		V	0.21		1.41	41.80	0.03			No
	02397	5/14/01	GW07536RG	NITRATE/NITRITE	REAL	TR1	11.00	MG/L	10.00		V	0.05	10.00	1.10	4.66	2.36	ND		No
	02500	6/6/01	GW07533RG	NITRATE/NITRITE	REAL	TR1	11.00	MG/L	10.00		V1	0.05	10.00	1.10	4.66	2.36	ND		No
	02500	10/23/01	GW07858RG	NITRATE/NITRITE	REAL	DL1	15.70	MG/L	10.00		V1	0.10	5.00	1.57	4.66	3.37	ND		No
	02500	10/23/01	GW07858RG	THALLIUM	REAL	TR1	7.40	UG/L	2.00		UJ1	2.10	1.00	3.70	4.90	1.51	ND		No
	02500	6/6/01	GW07533RG	TRICHLOROETHENE	REAL	TR1	18.00	UG/L	5.00		V1	1.00	1.00	3.60			ND		No
	02500	10/23/01	GW07858RG	TRICHLOROETHENE	REAL	TR1	19.00	UG/L	5.00		V1	0.22	1.00	3.80			ND		No
	02500	6/6/01	GW07534RG	URANIUM-233,-234	DUP	TR1	6.01	PCI/L	1.06		V1	0.21		5.67	60.70	0.10			No
	02500	10/23/01	GW07858RG	URANIUM-233,-234	REAL	TR1	6.27	PCI/L	1.06		V1	0.27		5.92	60.70	0.10			No
	02500	6/6/01	GW07534RG	URANIUM-238	DUP	TR1	3.02	PCI/L	0.77		V1	0.13		3.93	41.80	0.07			No
	02500	10/23/01	GW07858RG	URANIUM-238	REAL	TR1	3.26	PCI/L	0.77		V1	0.18		4.24	41.80	0.08			No
	SW085	5/4/01	SW07298RG	AMERICIUM-241	REAL	TR1	0.32	PCI/L	0.15		V1	0.02		2.21			ID		No
	SW085	5/4/01	SW07298RG	PLUTONIUM-239/240	REAL	TR1	0.47	PCI/L	0.15		V1	0.01		3.11			ID		No
	SW085	5/4/01	SW07298RG	URANIUM-233,-234	REAL	TR1	5.90	PCI/L	1.06		V1	0.15		5.57	60.70	0.10			No
	SW085	5/4/01	SW07298RG	URANIUM-238	REAL	TR1	3.20	PCI/L	0.77		V1	0.04		4.17	41.80	0.08			No
D&D 865	86501	12/4/01	GW07879RG	URANIUM-233,-234	REAL	TR1	37.20	PCI/L	1.06		V1	0.17		35.09	60.70	0.61			No
	86501	12/4/01	GW07879RG	URANIUM-235	REAL	TR1	1.10	PCI/L	1.01		V1	0.35		1.09	1.79	0.61			No
	86501	12/4/01	GW07879RG	URANIUM-238	REAL	TR1	26.50	PCI/L	0.77		V1	0.30		34.51	41.80	0.63			No
	86601	12/10/01	GW07880RG	URANIUM-233,-234	REAL	TR1	17.40	PCI/L	1.06		V	0.08		16.42	60.70	0.29			No
	86601	12/10/01	GW07880RG	URANIUM-238	REAL	TR1	12.00	PCI/L	0.77		V	0.08		15.63	41.80	0.29			No
	BS-865-2	12/13/01	SW07911RG	URANIUM-233,-234	REAL	TR1	4.20	PCI/L	1.06		V	0.09		3.96	60.70	0.07			No
	BS-865-2	12/13/01	SW07911RG	URANIUM-238	REAL	TR1	3.23	PCI/L	0.77		V	0.04		4.21	41.80	0.08			No
D&D 881	37791	12/11/01	GW07888RG	THALLIUM	DUP	TR1	2.30	UG/L	2.00	B	UJ1	2.10	1.00	1.15	4.90	0.47	1.95	1.18	No
	37791	12/11/01	GW07884RG	URANIUM-233,-234	REAL	TR1	7.36	PCI/L	1.06		V	0.13		6.94	60.70	0.12			No
	37791	12/11/01	GW07884RG	URANIUM-238	REAL	TR1	5.87	PCI/L	0.77		V	0.04		7.64	41.80	0.14			No
D&D Bldg 883	61099	3/8/01	GW07425RG	TETRACHLOROETHENE	REAL	DL1	26.00	UG/L	5.00	BD	V1	2.00	2.00	5.20			ND		No
	61099	12/11/01	GW07892RG	TETRACHLOROETHENE	REAL	TR1	15.00	UG/L	5.00		V	0.36	1.00	3.00			ND		No
	61099	3/8/01	GW07425RG	URANIUM-233,-234	REAL	TR1	1.33	PCI/L	1.06		V1	0.07		1.25	60.70	0.02			No
	61099	12/17/01	GW07892RG	URANIUM-233,-234	REAL	TR1	1.19	PCI/L	1.06		V	0.05		1.12	60.70	0.02			No
	61099	3/8/01	GW07425RG	URANIUM-238	REAL	TR1	0.92	PCI/L	0.77	J	V1	0.07		1.19	41.80	0.02			No
	61099	12/17/01	GW07892RG	URANIUM-238	REAL	TR1	0.80	PCI/L	0.77	J	V	0.09		1.05	41.80	0.02			No
	61199	3/8/01	GW07426RG	METHYLENE CHLORIDE	REAL	TR1	5.00	UG/L	5.00	JB	JB1	10.00	10.00	1.00			ND		No
	61199	3/8/01	GW07426RG	TETRACHLOROETHENE	REAL	TR1	230.00	UG/L	5.00		V1	10.00	10.00	46.00			ND		No
	61199	12/11/01	GW07891RG	TETRACHLOROETHENE	REAL	DL1	160.00	UG/L	5.00		V	1.80	5.00	32.00			ND		No
	61199	12/11/01	GW07891RG	THALLIUM	REAL	TR1	2.20	UG/L	2.00	B	UJ1	2.10	1.00	1.10	4.90	0.45	ND		No
	61199	3/8/01	GW07426RG	TRICHLOROETHENE	REAL	TR1	17.00	UG/L	5.00		V1	10.00	10.00	3.40			ND		No
	61199	12/11/01	GW07891RG	TRICHLOROETHENE	REAL	TR1	11.00	UG/L	5.00		V	0.22	1.00	2.20			ND		No
	61199	3/8/01	GW07426RG	URANIUM-233,-234	REAL	TR1	2.75	PCI/L	1.06		V1	0.14		2.59	60.70	0.05			No
	61199	12/11/01	GW07891RG	URANIUM-233,-234	REAL	TR1	2.33	PCI/L	1.06		V	0.15		2.20	60.70	0.04			No
	61199	3/8/01	GW07426RG	URANIUM-238	REAL	TR1	1.59	PCI/L	0.77		V1	0.08		2.07	41.80	0.04			No
	61199	12/11/01	GW07891RG	URANIUM-238	REAL	TR1	1.17	PCI/L	0.77		V	0.15		1.52	41.80	0.03			No
	83201	12/27/01	GW07894RG	MERCURY	REAL	TR1	2.90	UG/L	2.00		V	0.02	1.00	1.45	0.25	11.60	ND		No
	83201	12/27/01	GW07894RG	SELENIUM	REAL	TR1	58.30	UG/L	50.00		J	2.40	1.00	1.17	43.72	1.33	ND		No
	83201	12/27/01	GW07894RG	THALLIUM	REAL	TR1	3.60	UG/L	2.00	B	J	2.10	1.00	1.80	4.90	0.73	ND		No
	83201	12/12/01	GW07894RG	URANIUM-233,-234	REAL	TR1	161.00	PCI/L	1.06		V	0.18		151.89	60.70	2.65			No
	83201	12/12/01	GW07894RG	URANIUM-235	REAL	TR1	7.19	PCI/L	1.01		V	0.22		7.12	1.79	4.02			No
	83201	12/12/01	GW07894RG	URANIUM-238	REAL	TR1	127.00	PCI/L	0.77		V	0.22		165.36	41.80	3.04			No
D&D 883/881	83101	12/6/01	GW07893RG	CADMIUM	REAL	TR1	5.30	UG/L	5.00		V1	0.18	1.00	1.06	4.25	1.25	ND		No
	83101	12/5/01	GW07893RG	TETRACHLOROETHENE	REAL	TR1	29.00	UG/L	5.00		V	0.36	1.00	5.80			ND		No
	83101	12/5/01	GW07893RG	TRICHLOROETHENE	REAL	TR1	8.60	UG/L	5.00		V	0.22	1.00	1.72			ND		No
	83101	12/10/01	GW07893RG	URANIUM-233,-234	REAL	TR1	8.14	PCI/L	1.06		V1	0.17		7.68	60.70	0.13			No
	83101	12/10/01	GW07893RG	URANIUM-238	REAL	TR1	7.56	PCI/L	0.77		V1	0.25		9.84	41.80	0.18			No
D&D 6	22996	3/20/01	GW07449RG	URANIUM-233,-234	DUP	TR1	2.42	PCI/L	1.06		V1	0.08		2.28	60.70	0.04			No

ID = Insufficient Data to calculate Historic Mean +/- 2-Standard Deviations for 1991-1995
ND = Location has no Historic Data prior to 1995

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Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Report-able Result?
D&D 886	22996	8/1/01	GW07694RG	URANIUM-233,-234	REAL	TR1	1.64	PCI/L	1.06		V1	0.29		1.55	60.70	0.03			No
	22996	3/20/01	GW07449RG	URANIUM-238	DUP	TR1	1.87	PCI/L	0.77		V1	0.08		2.43	41.80	0.04			No
	22996	8/1/01	GW07694RG	URANIUM-238	REAL	TR1	1.02	PCI/L	0.77		V1	0.23		1.33	41.80	0.02			No
D&D Bldg 886	41099	3/14/01	GW07446RG	NITRATE/NITRITE	REAL	TR1	30.00	MG/L	10.00		V1	0.05	25.00	3.00	4.66	6.43	ND		No
	41099	8/13/01	GW07692RG	NITRATE/NITRITE	REAL	TR1	22.00	MG/L	10.00		V1	1.00	20.00	2.20	4.66	4.72	ND		No
	41099	3/14/01	GW07446RG	URANIUM-233,-234	REAL	TR1	27.40	PCI/L	1.06		V1	0.07		25.85	60.70	0.45			No
	41099	7/31/01	GW07692RG	URANIUM-233,-234	REAL	TR1	21.50	PCI/L	1.06		V1	0.28		20.28	60.70	0.35			No
	41099	3/14/01	GW07446RG	URANIUM-238	REAL	TR1	17.70	PCI/L	0.77		V1	0.07		23.05	41.80	0.42			No
	41099	7/31/01	GW07692RG	URANIUM-238	REAL	TR1	13.50	PCI/L	0.77		V1	0.21		17.58	41.80	0.32			No
	41199	3/14/01	GW07427RG	URANIUM-233,-234	REAL	TR1	9.03	PCI/L	1.06		V1	0.13		8.52	60.70	0.15			No
	41199	7/16/01	GW07693RG	URANIUM-233,-234	REAL	TR1	9.20	PCI/L	1.06			0.06		8.68	60.70	0.15			No
D&D Bldg 886/865	40999	3/15/01	GW07445RG	URANIUM-233,-234	REAL	TR1	9.70	PCI/L	1.06		V1	0.03		9.15	60.70	0.16			No
	40999	7/23/01	GW07691RG	URANIUM-233,-234	REAL	TR1	9.00	PCI/L	1.06			0.07		8.49	60.70	0.15			No
	40999	3/15/01	GW07445RG	URANIUM-238	REAL	TR1	7.80	PCI/L	0.77		V1	0.03		10.16	41.80	0.19			No
	40999	7/23/01	GW07691RG	URANIUM-238	REAL	TR1	6.60	PCI/L	0.77			0.02		8.59	41.80	0.16			No
	41199	3/14/01	GW07427RG	URANIUM-238	REAL	TR1	3.34	PCI/L	0.77		V1	0.07		4.35	41.80	0.08			No
	41199	7/16/01	GW07693RG	URANIUM-238	REAL	TR1	3.20	PCI/L	0.77			0.06		4.17	41.80	0.08			No
	P317989	8/7/01	GW07697RG	SELENIUM	REAL	TR1	96.00	UG/L	50.00		V1	0.66	2.00	1.92	43.72	2.20	ID		No
	P317989	9/21/01	GW07697RG	URANIUM-233,-234	REAL	TR1	50.40	PCI/L	1.06		V1	0.05		47.55	60.70	0.83			No
	P317989	9/21/01	GW07697RG	URANIUM-235	REAL	TR1	2.30	PCI/L	1.01		V1	0.14		2.28	1.79	1.28	ID		No
	P317989	9/21/01	GW07697RG	URANIUM-238	REAL	TR1	37.80	PCI/L	0.77		V1	0.11		49.22	41.80	0.90			No
D&D 991	99301	12/6/01	GW07897RG	SELENIUM	REAL	TR1	164.00	UG/L	50.00		V1	2.40	1.00	3.28	43.72	3.75	ND		No
	99301	12/6/01	GW07897RG	TRICHLOROETHENE	REAL	TR1	55.00	UG/L	5.00		V	0.22	1.00	11.00			ND		No
	99301	12/13/01	GW07897RG	URANIUM-233,-234	REAL	TR1	21.40	PCI/L	1.06		V	0.15		20.19	60.70	0.35			No
	99301	12/13/01	GW07897RG	URANIUM-238	REAL	TR1	16.20	PCI/L	0.77		V	0.12		21.09	41.80	0.39			No
Drainage	00997	1/8/01	GW07251RG	URANIUM-233,-234	REAL	TR1	7.57	PCI/L	1.06		V	0.07		7.14	60.70	0.12			No
	00997	7/13/01	GW07629RG	URANIUM-233,-234	REAL	TR1	8.50	PCI/L	1.06		V1	0.08		8.02	60.70	0.14			No
	00997	1/8/01	GW07251RG	URANIUM-238	REAL	TR1	5.14	PCI/L	0.77		V	0.07		6.69	41.80	0.12			No
	00997	7/13/01	GW07629RG	URANIUM-238	REAL	TR1	5.70	PCI/L	0.77			0.04		7.42	41.80	0.14			No
	38591	1/12/01	GW07359RG	URANIUM-233,-234	REAL	TR1	15.60	PCI/L	1.06		V1	0.13		14.72	60.70	0.26			No
	38591	1/12/01	GW07359RG	URANIUM-238	REAL	TR1	9.86	PCI/L	0.77		V1	0.08		12.84	41.80	0.24			No
	6486	1/9/01	GW07342RG	URANIUM-233,-234	REAL	TR1	7.44	PCI/L	1.06		V	0.12		7.02	60.70	0.12			No
	6486	1/9/01	GW07342RG	URANIUM-238	REAL	TR1	4.68	PCI/L	0.77		V	0.12		6.09	41.80	0.11			No
	6586	9/17/01	GW07646RG	NICKEL	REAL	TR1	391.00	UG/L	140.00		V1	3.00	1.00	2.79	21.37	18.30	79	4.95	Yes
	6586	9/17/01	GW07646RG	THALLIUM	REAL	TR1	2.70	UG/L	2.00	BJ	UJ1	1.80	1.00	1.35	4.90	0.55	1.98	1.36	No
	6586	2/22/01	GW07343RG	URANIUM-233,-234	REAL	TR1	2.51	PCI/L	1.06		V1	0.14		2.37	60.70	0.04			No
	6586	9/17/01	GW07646RG	URANIUM-233,-234	REAL	TR1	5.59	PCI/L	1.06		V1	0.21		5.27	60.70	0.09			No
	6586	2/22/01	GW07343RG	URANIUM-238	REAL	TR1	2.46	PCI/L	0.77		V1	0.20		3.20	41.80	0.06			No
	6586	9/17/01	GW07646RG	URANIUM-238	REAL	TR1	5.09	PCI/L	0.77		V1	0.24		6.63	41.80	0.12			No
Performance Monitoring	00797	1/10/01	GW07151RG	URANIUM-233,-234	REAL	TR1	8.91	PCI/L	1.06		V	0.07		8.41	60.70	0.15			No
	00797	8/16/01	GW07628RG	URANIUM-233,-234	REAL	TR1	7.95	PCI/L	1.06	B	V1	0.07		7.50	60.70	0.13			No
	00797	1/10/01	GW07151RG	URANIUM-238	REAL	TR1	6.48	PCI/L	0.77		V	0.15		8.44	41.80	0.16			No
	00797	8/16/01	GW07628RG	URANIUM-238	REAL	TR1	5.57	PCI/L	0.77		V1	0.16		7.25	41.80	0.13			No
	00897	4/25/01	GW07463RG	METHYLENE CHLORIDE	REAL	TR1	420.00	UG/L	5.00	JB	JB1	500.00	500.00	84.00			ND		No
	00897	4/25/01	GW07463RG	TETRACHLOROETHENE	REAL	TR1	15000.00	UG/L	5.00	U	V1	500.00	500.00	3000			ND		No
	00897	10/5/01	GW07775RG	TETRACHLOROETHENE	REAL	DL1	22000.00	UG/L	5.00		V1	360.00	1000	4400			ND		No
	00897	10/5/01	GW07775RG	THALLIUM	REAL	TR1	4.40	UG/L	2.00		UJ1	2.10	1.00	2.20	4.90	0.90	ND		No
	00897	4/25/01	GW07463RG	TRICHLOROETHENE	REAL	TR1	1500.00	UG/L	5.00		V1	500.00	500.00	300.00			ND		No
	00897	10/5/01	GW07775RG	TRICHLOROETHENE	REAL	RX1	1500.00	UG/L	5.00		V1	22.00	100.00	300.00			ND		No
	00897	4/25/01	GW07463RG	URANIUM-233,-234	REAL	TR1	3.50	PCI/L	1.06		V	0.03		3.30	60.70	0.06			No
	00897	10/5/01	GW07775RG	URANIUM-233,-234	REAL	TR1	4.31	PCI/L	1.06		V1	0.20		4.07	60.70	0.07			No
	00897	4/25/01	GW07463RG	URANIUM-238	REAL	TR1	2.10	PCI/L	0.77		V	0.09		2.73	41.80	0.05			No
	00897	10/5/01	GW07775RG	URANIUM-238	REAL	TR1	2.06	PCI/L	0.77		V1	0.20		2.68	41.80	0.05			No
	02291	4/10/01	GW07464RG	TETRACHLOROETHENE	REAL	TR1	5200.00	UG/L	5.00		V	167.00		1040.00			4201.94	1.24	No
	02291	10/11/01	GW07776RG	TETRACHLOROETHENE	REAL	DL1	6800.00	UG/L	5.00		V1	72.00	200.00	1360.00			4204.6	1.62	No
	02291	10/11/01	GW07777RG	THALLIUM	DUP	TR1	4.90	UG/L	2.00		UJ1	2.10	1.00	2.45	4.90	1.00	2.03	2.41	No
	02291	4/10/01	GW07464RG	TRICHLOROETHENE	REAL	TR1	620.00	UG/L	5.00	D	V	167.00		124.00			453.73	1.37	No
	02291	10/11/01	GW07776RG	TRICHLOROETHENE	REAL	DL1	630.00	UG/L	5.00		V1	44.00	200.00	126.00			453.73	1.39	No
	02291	4/10/01	GW07465RG	URANIUM-233,-234	DUP	TR1	3.35	PCI/L	1.06		V	0.15		3.16	60.70	0.06			No
	02291	10/11/01	GW07776RG	URANIUM-233,-234	REAL	TR1	2.49	PCI/L	1.06		V	0.15		2.35	60.70	0.04			No
	02291	4/10/01	GW07464RG	URANIUM-238	REAL	TR1	2.53	PCI/L	0.77		V	0.12		3.29	41.80	0.06			No
	02291	10/11/01	GW07776RG	URANIUM-238	REAL	TR1	1.36	PCI/L	0.77		V	0.15		1.77	41.80	0.03			No
	05691	2/22/01	GW07161RG	CARBON TETRACHLORIDE	REAL	TR1	112.00	UG/L	5.00		V1	1.00	2.00	22.40			228.07	0.49	No
	05691	8/20/01	GW07638RG	CARBON TETRACHLORIDE	REAL	TR1	87.00	UG/L	5.00		J1	1.00	1.00	17.40			228.07	0.38	No
	05691	2/22/01	GW07161RG	TETRACHLOROETHENE	REAL	TR1	27.80	UG/L	5.00		V1	1.00	2.00	5.56			62.16	0.45	No
	05691	8/20/01	GW07638RG	TETRACHLOROETHENE	REAL	TR1	20.00	UG/L	5.00		V1	1.00	1.00	4.00			62.15	0.32	No
	05691	2/22/01	GW07161RG	TRICHLOROETHENE	REAL	TR1	12.60	UG/L	5.00		V1	1.00	2.00	2.52			41.18	0.31	No
	05691	8/20/01	GW07638RG	TRICHLOROETHENE	REAL	TR1	11.00	UG/L	5.00		V1	1.00	1.00	2.20			41.18	0.27	No
	05691	2/22/01	GW07161RG	URANIUM-233,-234	REAL	TR1	2.83	PCI/L	1.06		V1	0.13		2.67	60.70	0.05			No
	05691	8/24/01	GW07638RG	URANIUM-233,-234	REAL	TR1	2.64	PCI/L	1.06	B	V1	0.12		2.49	60.70	0.04			No
	05691	2/22/01	GW07161RG	URANIUM-238	REAL	TR1	1.78	PCI/L	0.77		V1	0.16		2.32	41.80	0.04			No
	05691	8/24/01	GW07638RG	URANIUM-238	REAL	TR1	1.47	PCI/L	0.77		V1	0.07		1.91	41.80	0.04			No
	07391	3/6/01	GW07410RG	1,1,1-TRICHLOROETHANE	REAL	TR1	1200.00	UG/L	200.00		V1	1000	1000	6.00			143508	0.01	No
	07391	3/6/01	GW07164RG	1,1-DICHLOROETHENE	REAL	TR1	130.00	UG/L	7.00	J	V1	1000	1000	18.57			1387	0.09	No
	07391	3/6/01	GW07410RG	CARBON TETRACHLORIDE	REAL	TR1	130.00	UG/L	5.00	J	J1	1000	1000	26.00			2929.55	0.04	No
	07391	3/6/01	GW07335RG	CHLOROFORM	DUP	TR1	1400.00	UG/L	100.00		V1	1000	1000	14.00			4439.22	0.32	No
	07391	8/23/01	GW07724RG	CHLOROFORM	REAL	TR1	1100.00	UG/L	100.00		V1	1000	1000	11.00			4439.22	0.25	No
	07391	3/6/01	GW07335RG	cis-1,2-DICHLOROETHENE	DUP	TR1	100.00	UG/L	70.00	J	V1	1000	1000	1.43			1127.39	0.09	No
	07391	3/6/01	GW07164RG	METHYLENE CHLORIDE	REAL	TR1	570.00	UG/L	5.00	BJ	JB1	1000	1000	114.00			2722.64	0.21	No
	07391	3/6/01	GW07410RG	NITRATE	REAL	TR1	67.00	MG/L	10.00		V1	0.05	25.00	6.70	4.66	14.37	33.62	1.99	No

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Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Repo-rtable Result?
	07391	8/23/01	GW07724RG	NITRATE	REAL	TR1	65.00	MG/L	10.00		V1	1.20	25.00	6.50	4.66	13.94	33.62	1.93	No
	07391	3/6/01	GW07335RG	TETRACHLOROETHENE	DUP	TR1	970.00	UG/L	5.00	J	V1	1000	1000	194.00			3030.17	0.32	No
	07391	8/23/01	GW07724RG	TETRACHLOROETHENE	REAL	TR1	800.00	UG/L	5.00	J	V1	1000	1000	160.00			3030.17	0.26	No
	07391	3/6/01	GW07164RG	TRICHLOROETHENE	REAL	DL1	70000.00	UG/L	5.00	D	V1	5000	5000	14000			158350	0.44	No
Performance Monitoring	07391	8/23/01	GW07724RG	TRICHLOROETHENE	REAL	TR1	47000.00	UG/L	5.00		V1	2000	2000	9400			158350	0.30	No
	07391	3/6/01	GW07164RG	URANIUM-233,-234	REAL	TR1	31.90	PCI/L	1.06		V1	0.33		30.09	60.70	0.53			No
	07391	8/23/01	GW07724RG	URANIUM-233,-234	REAL	TR1	29.10	PCI/L	1.06		V1	0.26		27.45	60.70	0.48			No
	07391	3/6/01	GW07335RG	URANIUM-235	DUP	TR1	1.89	PCI/L	1.01		V1	0.46		1.87	1.79	1.06	1.6287	1.16	No
	07391	8/23/01	GW07724RG	URANIUM-235	REAL	TR1	1.58	PCI/L	1.01		V1	0.18		1.56	1.79	0.88			No
	07391	3/6/01	GW07335RG	URANIUM-238	DUP	TR1	96.40	PCI/L	0.77		V1	0.18		125.52	41.80	2.31	43.4	2.22	No
	07391	8/23/01	GW07724RG	URANIUM-238	REAL	TR1	86.10	PCI/L	0.77		V1	0.14		112.11	41.80	2.06	43.4	1.98	No
	10592	3/19/01	GW07441RG	SELENIUM	REAL	TR1	194.00	UG/L	50.00		V1	1.10	1.00	3.88	43.72	4.44	ID		No
	10592	7/27/01	GW07619RG	SELENIUM	REAL	TR1	170.00	UG/L	50.00			0.33		3.40	43.72	3.89	ID		No
	10592	3/19/01	GW07441RG	URANIUM-233,-234	REAL	TR1	29.00	PCI/L	1.06		V1	0.09		27.36	60.70	0.48			No
	10592	7/27/01	GW07619RG	URANIUM-233,-234	REAL	TR1	14.10	PCI/L	1.06		V1	0.29		13.30	60.70	0.23			No
	10592	3/19/01	GW07441RG	URANIUM-238	REAL	TR1	19.00	PCI/L	0.77		V1	0.06		24.74	41.80	0.45			No
	10592	7/27/01	GW07619RG	URANIUM-238	REAL	TR1	9.33	PCI/L	0.77		V1	0.24		12.15	41.80	0.22			No
	10692	1/10/01	GW07348RG	URANIUM-233,-234	REAL	TR1	17.80	PCI/L	1.06		V	0.15		16.79	60.70	0.29			No
	10692	7/27/01	GW07651RG	URANIUM-233,-234	REAL	TR1	16.60	PCI/L	1.06		V	0.37		15.66	60.70	0.27			No
	10692	1/10/01	GW07348RG	URANIUM-238	REAL	TR1	10.60	PCI/L	0.77		V	0.15		13.80	41.80	0.25			No
	10692	7/27/01	GW07651RG	URANIUM-238	REAL	TR1	11.70	PCI/L	0.77		V	0.22		15.23	41.80	0.28			No
	10792	7/26/01	GW07620RG	SELENIUM	REAL	TR1	53.10	UG/L	50.00		V1	0.20	1.00	1.06	43.72	1.21	ID		No
	10792	7/31/01	GW07620RG	URANIUM-233,-234	REAL	TR1	5.21	PCI/L	1.06		V	0.22		4.92	60.70	0.09			No
	10792	7/31/01	GW07620RG	URANIUM-238	REAL	TR1	4.42	PCI/L	0.77		V	0.09		5.76	41.80	0.11			No
	11891	4/25/01	GW07471RG	CARBON TETRACHLORIDE	REAL	DL1	470.00	UG/L	5.00	D	V1	25.00	25.00	94.00			737.11	0.64	No
	11891	10/5/01	GW07784RG	CARBON TETRACHLORIDE	REAL	DL1	490.00	UG/L	5.00		V1	3.80	20.00	98.00			737.11	0.66	No
	11891	4/25/01	GW07471RG	METHYLENE CHLORIDE	REAL	TR1	9.00	UG/L	5.00	JB	JB1	10.00	10.00	1.80			5.29	1.70	No
	11891	4/25/01	GW07471RG	TETRACHLOROETHENE	REAL	TR1	210.00	UG/L	5.00		V1	10.00	10.00	42.00			319.91	0.66	No
	11891	10/5/01	GW07784RG	TETRACHLOROETHENE	REAL	DL1	220.00	UG/L	5.00		V1	7.20	20.00	44.00			319.9	0.69	No
	11891	10/5/01	GW07784RG	THALLIUM	REAL	TR1	4.10	UG/L	2.00		UJ1	2.10	1.00	2.05	4.90	0.84	2.33	1.76	No
	11891	4/25/01	GW07471RG	TRICHLOROETHENE	REAL	TR1	46.00	UG/L	5.00		V1	10.00	10.00	9.20			407.56	0.11	No
	11891	10/5/01	GW07784RG	TRICHLOROETHENE	REAL	RX1	35.00	UG/L	5.00		V1	0.44	2.00	7.00			97.07	0.36	No
	11891	4/25/01	GW07471RG	URANIUM-233,-234	REAL	TR1	3.10	PCI/L	1.06		V	0.19		2.92	60.70	0.05			No
	11891	10/5/01	GW07784RG	URANIUM-233,-234	REAL	TR1	2.65	PCI/L	1.06		V1	0.65		2.50	60.70	0.04			No
	11891	4/25/01	GW07471RG	URANIUM-238	REAL	TR1	1.70	PCI/L	0.77		V	0.03		2.21	41.80	0.04			No
	11891	10/5/01	GW07784RG	URANIUM-238	REAL	TR1	1.16	PCI/L	0.77		V1	0.73		1.51	41.80	0.03			No
	12191	6/7/01	GW07472RG	CARBON TETRACHLORIDE	REAL	TR1	200.00	UG/L	5.00		V1	10.00	10.00	40.00			435.97	0.46	No
	12191	10/18/01	GW07786RG	CARBON TETRACHLORIDE	REAL	DL1	110.00	UG/L	5.00		V1	1.90	10.00	22.00			435.97	0.25	No
	12191	6/7/01	GW07472RG	HEXACHLOROBUTADIENE	REAL	TR1	2.00	UG/L	1.09	J	V1	10.00	10.00	1.83			1.4	1.43	No
	12191	6/7/01	GW07472RG	METHYLENE CHLORIDE	REAL	TR1	41.00	UG/L	5.00	B	V1	10.00	10.00	8.20			29.2	1.40	No
	12191	6/7/01	GW07472RG	TETRACHLOROETHENE	REAL	TR2	430.00	UG/L	5.00	D	V1	25.00	25.00	86.00			486.46	0.88	No
	12191	10/18/01	GW07786RG	TETRACHLOROETHENE	REAL	DL1	470.00	UG/L	5.00		V1	3.60	10.00	94.00			486.5	0.97	No
	12191	10/16/01	GW07786RG	THALLIUM	REAL	TR1	3.30	UG/L	2.00	B	UJ1	2.10	1.00	1.65	4.90	0.67	2.62	1.26	No
	12191	6/7/01	GW07472RG	TRICHLOROETHENE	REAL	TR1	38.00	UG/L	5.00		V1	10.00	10.00	7.60			67.86	0.56	No
	12191	10/18/01	GW07786RG	TRICHLOROETHENE	REAL	TR1	40.00	UG/L	5.00		V1	0.22	1.00	8.00			67.86	0.59	No
	12191	6/7/01	GW07472RG	URANIUM-233,-234	REAL	TR1	2.21	PCI/L	1.06		V1	0.15		2.08	60.70	0.04			No
	12191	10/18/01	GW07786RG	URANIUM-233,-234	REAL	TR1	1.77	PCI/L	1.06		V	0.20		1.67	60.70	0.03			No
	12191	6/7/01	GW07472RG	URANIUM-238	REAL	TR1	1.32	PCI/L	0.77		V1	0.05		1.72	41.80	0.03			No
	12191	10/18/01	GW07786RG	URANIUM-238	REAL	TR1	1.18	PCI/L	0.77		V	0.15		1.54	41.80	0.03			No
	12691	1/15/01	GW07352RG	CARBON TETRACHLORIDE	DUP	TR2	496.00	UG/L	5.00	D	V	5.00	10.00	99.20			1211.85	0.41	No
	12691	8/24/01	GW07654RG	CARBON TETRACHLORIDE	REAL	TR1	580.00	UG/L	5.00		V1	20.00	20.00	116.00			1211.85	0.48	No
	12691	1/15/01	GW07351RG	cis-1,2-DICHLOROETHENE	REAL	TR1	70.20	UG/L	70.00		V	1.00	2.00	1.00			67.09	1.05	No
	12691	1/15/01	GW07351RG	TETRACHLOROETHENE	REAL	TR1	139.00	UG/L	5.00		V	1.00	2.00	27.80			646.52	0.21	No
	12691	8/24/01	GW07654RG	TETRACHLOROETHENE	REAL	TR1	120.00	UG/L	5.00		V1	20.00	20.00	24.00			646.52	0.19	No
	12691	1/15/01	GW07351RG	TRICHLOROETHENE	REAL	TR1	91.50	UG/L	5.00		V	1.00	2.00	18.30			356.26	0.26	No
	12691	8/24/01	GW07654RG	TRICHLOROETHENE	REAL	TR1	65.00	UG/L	5.00		V1	20.00	20.00	13.00			356.26	0.18	No
	12691	1/15/01	GW07351RG	URANIUM-233,-234	REAL	TR1	2.58	PCI/L	1.06		V1	0.15		2.43	60.70	0.04			No
	12691	8/24/01	GW07654RG	URANIUM-233,-234	REAL	TR1	2.53	PCI/L	1.06			0.12		2.39	60.70	0.04			No
	12691	1/15/01	GW07351RG	URANIUM-238	REAL	TR1	2.06	PCI/L	0.77		V1	0.16		2.68	41.80	0.05			No
	12691	8/24/01	GW07654RG	URANIUM-238	REAL	TR1	1.98	PCI/L	0.77			0.05		2.58	41.80	0.05			No
	15599	5/7/01	GW07488RG	TETRACHLOROETHENE	REAL	DL1	41.00	UG/L	5.00	D	V1	4.00	4.00	8.20			ND		No
	15599	5/7/01	GW07488RG	TRICHLOROETHENE	REAL	DL1	75.00	UG/L	5.00	D	V1	4.00	4.00	15.00			ND		No
	15699	4/17/01	GW07489RG	1,1-DICHLOROETHENE	REAL	TR1	16.00	UG/L	7.00	D	V1	15.00		2.29			ND		No
	15699	10/22/01	GW07801RG	1,1-DICHLOROETHENE	REAL	DL1	86.00	UG/L	7.00		V1	0.80	4.00	12.29			ND		No
	15699	10/22/01	GW07801RG	cis-1,2-DICHLOROETHENE	REAL	DL1	200.00	UG/L	70.00		V1	1.00	4.00	2.86			ND		No
	15699	4/17/01	GW07489RG	TETRACHLOROETHENE	REAL	TR1	190.00	UG/L	5.00	D	V1	15.00		38.00			ND		No
	15699	10/22/01	GW07801RG	TETRACHLOROETHENE	REAL	DL1	920.00	UG/L	5.00		V1	14.00	40.00	184.00			ND		No
	15699	4/17/01	GW07489RG	TRICHLOROETHENE	REAL	TR1	350.00	UG/L	5.00	D	V1	15.00		70.00			ND		No
	15699	10/22/01	GW07801RG	TRICHLOROETHENE	REAL	DL1	1400.00	UG/L	5.00		V1	8.80	40.00	280.00			ND		No
	15699	4/25/01	GW07489RG	URANIUM-233,-234	REAL	TR1	15.00	PCI/L	1.06		V	0.19		14.15	60.70	0.25			No
	15699	12/10/01	GW07801RG	URANIUM-233,-234	REAL	TR1	17.70	PCI/L	1.06		V	0.11		16.70	60.70	0.29			No
	15699	4/25/01	GW07489RG	URANIUM-238	REAL	TR1	13.00	PCI/L	0.77		V	0.13		16.93	41.80	0.31			No
	15699	12/10/01	GW07801RG	URANIUM-238	REAL	TR1	11.70	PCI/L	0.77		V	0.09		15.23	41.80	0.28			No
	3687	4/23/01	GW07470RG	1,1-DICHLOROETHENE	REAL	TR1	18.00	UG/L	7.00		UJ	1.00	1.00	2.57			187	0.10	No
	3687	10/16/01	GW07782RG	1,1-DICHLOROETHENE	REAL	DL1	23.00	UG/L	7.00	J	V1	8.00	40.00	3.29			191.6	0.12	No
	3687	4/23/01	GW07470RG	CARBON TETRACHLORIDE	REAL	DL1	290.00	UG/L	5.00	D	V	250.00	250.00	58.00			1255.4	0.23	No
	3687	10/16/01	GW07783RG	CARBON TETRACHLORIDE	DUP	DL1	370.00	UG/L	5.00		V1	7.60	40.00	74.00			1255.4	0.29	No
	3687	4/23/01	GW07470RG	CHLOROFORM	REAL	DL1	150.00	UG/L	100.00	JD	V	250.00	250.00	1.50			1072.39	0.14	No
	3687	10/16/01	GW07782RG	CHLOROFORM	REAL	DL1	140.00	UG/L	100.00		V1	9.20	40.00	1.40			1072.39	0.13	No
	3687	4/23/01	GW07470RG	TETRACHLOROETHENE	REAL	DL1	290.00	UG/L	5.00	D	V	250.00	250.00	58.00			814.46	0.36	No

ID = Insufficient Data to calculate Historic Mean +/- 2-Standard Deviations for 1991-1995
ND = Location has no Historic Data prior to 1995

Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Report-able Result?
	3687	10/16/01	GW07783RG	TETRACHLOROETHENE	DUP	DL1	390.00	UG/L	5.00		V1	14.00	40.00	78.00			814.46	0.48	No
	3687	10/16/01	GW07783RG	THALLIUM	DUP	TR1	3.90	UG/L	2.00	B	UJ1	2.10	1.00	1.95	4.90	0.80	2.21	1.76	No
	3687	4/23/01	GW07470RG	TRICHLOROETHENE	REAL	DL1	9500.00	UG/L	5.00	D	V	250.00	250.00	1900.00			91325.32	0.10	No
	3687	10/16/01	GW07782RG	TRICHLOROETHENE	REAL	DL1	11000.00	UG/L	5.00		V1	88.00	400.00	2200.00			91325.32	0.12	No
	3687	4/23/01	GW07470RG	URANIUM-233,-234	REAL	TR1	1.60	PCI/L	1.06		V	0.27		1.51	60.70	0.03			No
	3687	10/16/01	GW07783RG	URANIUM-233,-234	DUP	TR1	1.80	PCI/L	1.06		V	0.21		1.70	60.70	0.03			No

ID = Insufficient Data to calculate Historic Mean +/- 2-Standard Deviations for 1991-1995
ND = Location has no Historic Data prior to 1995

Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Repo-rtable Result?
Performance Monitoring	3687	4/23/01	GW07470RG	URANIUM-238	REAL	TR1	1.00	PCI/L	0.77		V	0.12		1.30	41.80	0.02			No
	3687	10/16/01	GW07782RG	URANIUM-238	REAL	TR1	0.95	PCI/L	0.77	J	V	0.17		1.23	41.80	0.02			No
	95199	4/12/01	GW07495RG	TRICHLOROETHENE	REAL	TR1	65.00	UG/L	5.00	D	V	2.00		13.00			ND		No
	95199	10/23/01	GW07807RG	TRICHLOROETHENE	REAL	TR1	51.00	UG/L	5.00		V1	0.22	1.00	10.20			ND		No
	SW13494	1/24/01	GW07386RG	TETRACHLOROETHENE	REAL	DL1	28.00	UG/L	5.00	D	V1	2.00	2.00	5.60			30.7	0.91	No
	SW13494	4/20/01	SW07510RG	TETRACHLOROETHENE	REAL	TR1	30.00	UG/L	5.00		V	1.00	1.00	6.00			30.7	0.98	No
	SW13494	8/28/01	SW07706RG	TETRACHLOROETHENE	REAL	TR1	30.00	UG/L	5.00		V1	1.00	1.00	6.00			30.7	0.98	No
	SW13494	12/12/01	SW07890RG	TETRACHLOROETHENE	REAL	TR1	27.00	UG/L	5.00		V	0.36	1.00	5.40			30.7	0.88	No
	SW13494	1/24/01	GW07386RG	URANIUM-233,-234	REAL	TR1	4.13	PCI/L	1.06		V1	0.07		3.90	60.70	0.07			No
	SW13494	4/20/01	SW07510RG	URANIUM-233,-234	REAL	TR1	4.00	PCI/L	1.06		V	0.18		3.77	60.70	0.07			No
	SW13494	8/28/01	SW07706RG	URANIUM-233,-234	REAL	TR1	4.03	PCI/L	1.06			0.06		3.80	60.70	0.07			No
	SW13494	12/12/01	SW07890RG	URANIUM-233,-234	REAL	TR1	3.17	PCI/L	1.06		V	0.16		2.99	60.70	0.05			No
	SW13494	1/24/01	GW07386RG	URANIUM-238	REAL	TR1	1.98	PCI/L	0.77		V1	0.07		2.58	41.80	0.05			No
	SW13494	4/20/01	SW07510RG	URANIUM-238	REAL	TR1	3.00	PCI/L	0.77		V	0.10		3.91	41.80	0.07			No
	SW13494	8/28/01	SW07706RG	URANIUM-238	REAL	TR1	2.96	PCI/L	0.77			0.01		3.85	41.80	0.07			No
	SW13494	12/12/01	SW07890RG	URANIUM-238	REAL	TR1	2.53	PCI/L	0.77		V	0.18		3.29	41.80	0.06			No
Plume Definition	00491	3/21/01	GW07138RG	CARBON TETRACHLORIDE	REAL	DL1	79.00	UG/L	5.00	D	V1	5.00	10.00	15.80			545	0.14	No
	00491	7/12/01	GW07623RG	CARBON TETRACHLORIDE	REAL	DL1	91.00	UG/L	5.00		V	0.38	2.00	18.20			545	0.17	No
	00491	3/21/01	GW07138RG	TETRACHLOROETHENE	REAL	DL1	30.00	UG/L	5.00	D	V1	5.00	10.00	6.00			54	0.56	No
	00491	7/12/01	GW07623RG	TETRACHLOROETHENE	REAL	TR1	21.00	UG/L	5.00		V	0.36	1.00	4.20			58.51	0.36	No
	00491	3/21/01	GW07138RG	TRICHLOROETHENE	REAL	DL1	67.00	UG/L	5.00	D	V1	5.00	10.00	13.40			153.17	0.44	No
	00491	7/12/01	GW07623RG	TRICHLOROETHENE	REAL	TR1	39.00	UG/L	5.00		V	0.22	1.00	7.80			153.17	0.25	No
	00491	7/12/01	GW07623RG	URANIUM-233,-234	REAL	TR1	4.80	PCI/L	1.06		V1	0.09		4.53	60.70	0.08			No
	00491	7/12/01	GW07623RG	URANIUM-238	REAL	TR1	3.60	PCI/L	0.77			0.02		4.69	41.80	0.09			No
	00597	1/10/01	GW07148RG	NITRATE/NITRITE	REAL	TR1	11.00	MG/L	10.00		V1	0.05	25.00	1.10	4.66	2.36	ND		No
	00597	7/19/01	GW07628RG	NITRATE/NITRITE	DUP	DL1	10.00	MG/L	10.00		V	0.04	2.00	1.00	4.66	2.14			No
	03991	1/23/01	GW07154RG	CARBON TETRACHLORIDE	REAL	TR1	11.00	UG/L	5.00		V1	1.00	1.00	2.20			27.15	0.41	No
	03991	8/7/01	GW07631RG	CARBON TETRACHLORIDE	REAL	TR1	7.10	UG/L	5.00		V1	1.00	1.00	1.42			27.15	0.26	No
	03991	1/23/01	GW07154RG	URANIUM-233,-234	REAL	TR1	1.92	PCI/L	1.06		V1	0.14		1.81	60.70	0.03			No
	03991	8/7/01	GW07631RG	URANIUM-233,-234	DUP	TR1	1.61	PCI/L	1.06		V1	0.12		1.52	60.70	0.03			No
	03991	1/23/01	GW07154RG	URANIUM-238	REAL	TR1	1.14	PCI/L	0.77		V1	0.07		1.48	41.80	0.03			No
	03991	8/7/01	GW07631RG	URANIUM-238	REAL	TR1	1.09	PCI/L	0.77		V1	0.04		1.42	41.80	0.03			No
	0487	1/11/01	GW07158RG	SELENIUM	REAL	TR1	80.90	UG/L	50.00		V1	2.37	1.00	1.62	43.72	1.85	699.76	0.12	No
	0487	8/14/01	GW07635RG	SELENIUM	REAL	TR1	110.00	UG/L	50.00	N	J1	0.33	1.00	2.20	43.72	2.52	699.76	0.16	No
	0487	1/11/01	GW07158RG	TRICHLOROETHENE	REAL	TR1	95.00	UG/L	5.00		V1	1.00	2.00	19.00			1330.06	0.07	No
	0487	8/13/01	GW07635RG	TRICHLOROETHENE	REAL	TR1	150.00	UG/L	5.00		V	5.00	5.00	30.00			1330.06	0.11	No
	0487	1/11/01	GW07158RG	URANIUM-233,-234	REAL	TR1	12.60	PCI/L	1.06		V1	0.07		11.89	60.70	0.21			No
	0487	8/14/01	GW07635RG	URANIUM-233,-234	REAL	TR1	9.60	PCI/L	1.06		1	0.11		9.06	60.70	0.16			No
	0487	1/11/01	GW07158RG	URANIUM-238	REAL	TR1	8.45	PCI/L	0.77		V1	0.07		11.00	41.80	0.20			No
	0487	8/14/01	GW07635RG	URANIUM-238	REAL	TR1	7.00	PCI/L	0.77		1	0.08		9.11	41.80	0.17			No
	05391	1/11/01	GW07160RG	CARBON TETRACHLORIDE	REAL	TR1	13.40	UG/L	5.00		V1	1.00	2.00	2.68			32.88	0.41	No
	05391	8/16/01	GW07637RG	CARBON TETRACHLORIDE	REAL	TR1	14.00	UG/L	5.00		V1	1.00	1.00	2.80			32.88	0.43	No
	05391	1/11/01	GW07160RG	URANIUM-233,-234	REAL	TR1	2.38	PCI/L	1.06		V1	0.13		2.25	60.70	0.04			No
	05391	8/16/01	GW07637RG	URANIUM-233,-234	REAL	TR1	1.90	PCI/L	1.06	B	V1	0.20		1.79	60.70	0.03			No
	05391	1/11/01	GW07160RG	URANIUM-238	REAL	TR1	1.21	PCI/L	0.77		V1	0.12		1.58	41.80	0.03			No
	05391	8/16/01	GW07637RG	URANIUM-238	REAL	TR1	1.19	PCI/L	0.77		V1	0.14		1.55	41.80	0.03			No
	22896	1/11/01	GW07356RG	NITRATE/NITRITE	REAL	TR1	11.00	MG/L	10.00		V	0.05	10.00	1.10	4.66	2.36	ND		No
	22896	1/11/01	GW07356RG	TRICHLOROETHENE	REAL	TR1	1550.00	UG/L	5.00		V1	12.50	25.00	310.00			ND		Yes
	22896	9/12/01	GW07660RG	TRICHLOROETHENE	DUP	TR1	170.00	UG/L	5.00		V1	7.00	7.00	34.00			ND		No
	6286	1/8/01	GW07340RG	CARBON TETRACHLORIDE	REAL	TR1	5.60	UG/L	5.00		V1	1.00	2.00	1.12			9.76	0.57	No
	6286	7/18/01	GW07643RG	CARBON TETRACHLORIDE	REAL	TR1	5.80	UG/L	5.00		V1	0.19	1.00	1.16			9.76	0.59	No
	6286	1/8/01	GW07340RG	SELENIUM	REAL	TR2	69.00	UG/L	50.00		V1	2.37	1.00	1.38	43.72	1.58	65.96	1.05	No
	6286	7/18/01	GW07643RG	SELENIUM	REAL	TR1	82.90	UG/L	50.00		V1	0.20	1.00	1.66	43.72	1.90	65.96	1.26	No
	6286	1/8/01	GW07340RG	URANIUM-233,-234	REAL	TR1	5.22	PCI/L	1.06		V	0.15		4.92	60.70	0.09			No
	6286	7/24/01	GW07643RG	URANIUM-233,-234	REAL	TR1	5.20	PCI/L	1.06			0.05		4.91	60.70	0.09			No
	6286	1/8/01	GW07340RG	URANIUM-238	REAL	TR1	3.72	PCI/L	0.77		V	0.07		4.84	41.80	0.09			No
	6286	7/24/01	GW07643RG	URANIUM-238	REAL	TR1	4.00	PCI/L	0.77			0.04		5.21	41.80	0.10			No
	6386	8/8/01	GW07644RG	NICKEL	REAL	TR1	280.00	UG/L	140.00		V1	1.00	1.00	2.00	21.37	13.10	ID		No
	6386	8/8/01	GW07644RG	SELENIUM	REAL	TR1	66.00	UG/L	50.00		V1	0.66	2.00	1.32	43.72	1.51	ID		No
	6386	8/8/01	GW07644RG	URANIUM-233,-234	REAL	TR1	5.75	PCI/L	1.06		V1	0.07		5.42	60.70	0.09			No
	6386	8/8/01	GW07644RG	URANIUM-238	REAL	TR1	5.08	PCI/L	0.77		V1	0.04		6.61	41.80	0.12			No
	891COLWEL	4/26/01	GW07511RG	1,1-DICHLOROETHENE	REAL	TR1	18.00	UG/L	7.00		V1	10.00	10.00	2.57			44.16	0.41	No*
	891COLWEL	9/6/01	GW07707RG	1,1-DICHLOROETHENE	REAL	TR1	23.00	UG/L	7.00		V	20.00	20.00	3.29			44.16	0.52	No*
	891COLWEL	12/17/01	GW07823RG	1,1-DICHLOROETHENE	REAL	TR1	14.00	UG/L	7.00		V1	0.20	1.00	2.00			44.16	0.32	No*
	891COLWEL	3/13/01	GW07387RG	CARBON TETRACHLORIDE	REAL	TR1	14.00	UG/L	5.00		V1	10.00	10.00	2.80			34.7	0.40	No*
	891COLWEL	4/26/01	GW07511RG	CARBON TETRACHLORIDE	REAL	TR1	10.00	UG/L	5.00	J	V1	10.00	10.00	2.00			34.7	0.29	No*
	891COLWEL	9/6/01	GW07707RG	CARBON TETRACHLORIDE	REAL	TR1	20.00	UG/L	5.00	J	V	20.00	20.00	4.00			34.7	0.58	No*
	891COLWEL	12/17/01	GW07823RG	CARBON TETRACHLORIDE	REAL	TR1	13.00	UG/L	5.00		V1	0.19	1.00	2.60			34.7	0.37	No*
	891COLWEL	3/13/01	GW07387RG	METHYLENE CHLORIDE	REAL	TR1	6.00	UG/L	5.00	JB	JB1	10.00	10.00	1.20			19.99	0.30	No*
	891COLWEL	4/26/01	GW07511RG	METHYLENE CHLORIDE	REAL	TR1	9.00	UG/L	5.00	JB	JB1	10.00	10.00	1.80			19.99	0.45	No*
	891COLWEL	3/13/01	GW07387RG	SELENIUM	REAL	TR1	659.00	UG/L	50.00		V1	0.78	1.00	13.18	43.72	15.07	924.05	0.71	No*
	891COLWEL	4/26/01	GW07511RG	SELENIUM	REAL	TR1	621.00	UG/L	50.00		V1	0.65	1.00	12.42	43.72	14.20	924.05	0.67	No*
	891COLWEL	9/6/01	GW07707RG	SELENIUM	REAL	TR1	590.00	UG/L	50.00		V1	16.00	50.00	11.80	43.72	13.49	924.05	0.64	No*
	891COLWEL	12/17/01	GW07823RG	SELENIUM	REAL	TR1	664.00	UG/L	50.00		V1	2.40	1.00	13.28	43.72	15.19	924.05	0.72	No*
	891COLWEL	3/13/01	GW07387RG	TETRACHLOROETHENE	REAL	TR1	28.00	UG/L	5.00		V1	10.00	10.00	5.60			154.58	0.18	No*
	891COLWEL	4/26/01	GW07511RG	TETRACHLOROETHENE	REAL	TR1	30.00	UG/L	5.00		V1	10.00	10.00	6.00			154.58	0.19	No*
	891COLWEL	9/6/01	GW07707RG	TETRACHLOROETHENE	REAL	TR1	33.00	UG/L	5.00		V	20.00	20.00	6.60			154.58	0.21	No*
	891COLWEL	12/17/01	GW07823RG	TETRACHLOROETHENE	REAL	TR1	29.00	UG/L	5.00		V1	0.36	1.00	5.80			154.58	0.19	No*
	891COLWEL	12/17/01	GW07823RG	THALLIUM	REAL	TR1	4.40	UG/L	2.00		UJ1	2.10	1.00	2.20	4.90	0.90	5.37	0.82	No*
	891COLWEL	3/13/01	GW07387RG	TRICHLOROETHENE	REAL	DL1	310.00	UG/L	5.00	D	V1	20.00	20.00	62.00			1234.43	0.25	No*

ID = Insufficient Data to calculate Historic Mean +/- 2-Standard Deviations for 1991-1995
ND = Location has no Historic Data prior to 1995

Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Report-able Result?
Plume Definition	891COLWEL	4/26/01	GW07511RG	TRICHLOROETHENE	REAL	TR1	300.00	UG/L	5.00		V1	10.00	10.00	60.00			1234.43	0.24	No*
	891COLWEL	9/6/01	GW07707RG	TRICHLOROETHENE	REAL	TR1	420.00	UG/L	5.00		V	20.00	20.00	84.00			1234.43	0.34	No*
	891COLWEL	12/17/01	GW07823RG	TRICHLOROETHENE	REAL	DL1	320.00	UG/L	5.00		V1	2.20	10.00	64.00			1234.43	0.26	No*
	891COLWEL	3/13/01	GW07387RG	URANIUM-233,-234	REAL	TR1	11.00	PCI/L	1.06		V1	0.16		10.38	60.70	0.18			No*
	891COLWEL	4/26/01	GW07511RG	URANIUM-233,-234	REAL	TR1	9.40	PCI/L	1.06		V	0.25		8.87	60.70	0.15			No*
	891COLWEL	9/6/01	GW07707RG	URANIUM-233,-234	REAL	TR1	11.40	PCI/L	1.06		V1	0.09		10.75	60.70	0.19			No*
	891COLWEL	12/17/01	GW07823RG	URANIUM-233,-234	REAL	TR1	11.30	PCI/L	1.06		V	0.11		10.66	60.70	0.19			No*
	891COLWEL	3/13/01	GW07387RG	URANIUM-238	REAL	TR1	7.57	PCI/L	0.77		V1	0.18		9.86	41.80	0.18			No*
	891COLWEL	4/26/01	GW07511RG	URANIUM-238	REAL	TR1	7.30	PCI/L	0.77		V	0.19		9.51	41.80	0.17			No*
	891COLWEL	9/6/01	GW07707RG	URANIUM-238	REAL	TR1	8.50	PCI/L	0.77		V1	0.04		11.07	41.80	0.20			No*
	891COLWEL	12/17/01	GW07823RG	URANIUM-238	REAL	TR1	7.83	PCI/L	0.77		V	0.04		10.20	41.80	0.19			No*
	P209389	2/13/01	GW07367RG	1,1-DICHLOROETHENE	REAL	TR1	11.00	UG/L	7.00		V	1.00	1.00	1.57			88.48	0.12	No
	P209389	7/23/01	GW07669RG	1,1-DICHLOROETHENE	REAL	TR1	13.00	UG/L	7.00		V1	0.20	1.00	1.86			88.48	0.15	No
	P209389	2/13/01	GW07367RG	URANIUM-233,-234	REAL	TR1	1.27	PCI/L	1.06		V1	0.13		1.20	60.70	0.02			No
	P209489	4/23/01	GW07479RG	CARBON TETRACHLORIDE	REAL	TR1	23.00	UG/L	5.00		V	2.00	2.00	4.60			83.26	0.28	No
	P209489	10/5/01	GW07791RG	CARBON TETRACHLORIDE	REAL	TR1	35.00	UG/L	5.00		V1	0.19	1.00	7.00			83.26	0.42	No
	P209489	4/23/01	GW07479RG	NITRATE/NITRITE	REAL	TR1	160.00	MG/L	10.00		V	0.05	100.00	16.00	4.66	34.31	316.34	0.51	No
	P209489	10/5/01	GW07791RG	NITRATE/NITRITE	REAL	DL1	186.00	MG/L	10.00		V1	2.10	100.00	18.60	4.66	39.88	316.34	0.59	No
	P209489	10/8/01	GW07791RG	THALLIUM	REAL	TR1	3.40	UG/L	2.00	B	UJ1	2.10	1.00	1.70	4.90	0.69	6.54	0.52	No
	P209489	4/23/01	GW07479RG	TRICHLOROETHENE	REAL	TR1	45.00	UG/L	5.00		V	2.00	2.00	9.00			90.4	0.50	No
	P209489	10/5/01	GW07791RG	TRICHLOROETHENE	REAL	TR1	49.00	UG/L	5.00		V1	0.22	1.00	9.80			90.4	0.54	No
	P209489	4/23/01	GW07479RG	URANIUM-233,-234	REAL	TR1	32.00	PCI/L	1.06		V	0.31		30.19	60.70	0.53			No
	P209489	10/8/01	GW07791RG	URANIUM-233,-234	REAL	TR1	26.50	PCI/L	1.06		V1	0.35		25.00	60.70	0.44			No
	P209489	4/23/01	GW07479RG	URANIUM-235	REAL	TR1	1.80	PCI/L	1.01		V	0.37		1.78	1.79	1.01			No
	P209489	10/8/01	GW07791RG	URANIUM-235	REAL	TR1	1.13	PCI/L	1.01		V1	0.32		1.12	1.79	0.63			No
	P209489	4/23/01	GW07479RG	URANIUM-238	REAL	TR1	26.00	PCI/L	0.77		V	0.37		33.85	41.80	0.62			No
	P209489	10/8/01	GW07791RG	URANIUM-238	REAL	TR1	21.70	PCI/L	0.77		V1	0.29		28.26	41.80	0.52			No
	P219189	5/21/01	GW07481RG	1,1-DICHLOROETHENE	REAL	DL1	39.00	UG/L	7.00	D	J1	2.00	2.00	5.57			46.76	0.83	No
	P219189	10/9/01	GW07793RG	1,1-DICHLOROETHENE	REAL	TR1	21.00	UG/L	7.00		V1	0.20	1.00	3.00			46.79	0.45	No
	P219189	6/29/01	GW07481RG	URANIUM-233,-234	REAL	TR1	57.00	PCI/L	1.06		V1	0.15		53.77	60.70	0.94			No
	P219189	11/29/01	GW07793RG	URANIUM-233,-234	REAL	TR1	52.80	PCI/L	1.06		V1	0.41		49.81	60.70	0.87			No
	P219189	6/29/01	GW07481RG	URANIUM-235	REAL	TR1	1.50	PCI/L	1.01		V1	0.11		1.49	1.79	0.84			No
	P219189	11/29/01	GW07793RG	URANIUM-235	REAL	TR1	1.62	PCI/L	1.01		V1	0.57		1.60	1.79	0.91			No
	P219189	6/29/01	GW07481RG	URANIUM-238	REAL	TR1	40.00	PCI/L	0.77		V1	0.13		52.08	41.80	0.96			No
	P219189	11/29/01	GW07793RG	URANIUM-238	REAL	TR1	37.90	PCI/L	0.77		V1	0.46		49.35	41.80	0.91			No
	P416789	4/12/01	GW07484RG	URANIUM-233,-234	REAL	TR1	2.58	PCI/L	1.06		V	0.07		2.43	60.70	0.04			No
	P416789	4/12/01	GW07484RG	URANIUM-238	REAL	TR1	0.96	PCI/L	0.77	J	V	0.15		1.28	41.80	0.02			No
	P416889	4/23/01	GW07485RG	TETRACHLOROETHENE	REAL	TR1	41.00	UG/L	5.00		V	10.00	10.00	8.20			77.7	0.53	No
	P416889	11/13/01	GW07797RG	TETRACHLOROETHENE	REAL	TR1	57.00	UG/L	5.00		V1	0.36	1.00	11.40			79.6	0.72	No
	P416889	4/23/01	GW07485RG	URANIUM-233,-234	REAL	TR1	1.40	PCI/L	1.06		V	0.12		1.32	60.70	0.02			No
	P416889	11/13/01	GW07797RG	URANIUM-233,-234	REAL	TR1	1.07	PCI/L	1.06		V	0.15		1.01	60.70	0.02			No
Plume Degradation	01497	1/24/01	GW07395RG	1,1-DICHLOROETHENE	REAL	DL1	79.00	UG/L	7.00	D		5.00	5.00	11.29					No
	01497	9/4/01	GW07734RG	1,1-DICHLOROETHENE	REAL	TR1	32.00	UG/L	7.00		V	2.00	2.00	4.57					No
	01497	1/24/01	GW07395RG	CARBON TETRACHLORIDE	REAL	TR1	6.00	UG/L	5.00		V	1.00	1.00	1.20					No
	01497	1/24/01	GW07395RG	TETRACHLOROETHENE	REAL	TR1	13.00	UG/L	5.00		V	1.00	1.00	2.60					No
	01497	9/4/01	GW07734RG	TETRACHLOROETHENE	REAL	TR1	5.80	UG/L	5.00		V	2.00	2.00	1.16					No
	01497	1/24/01	GW07395RG	TRICHLOROETHENE	REAL	DL1	33.00	UG/L	5.00	D		5.00	5.00	6.60					No
	01497	9/4/01	GW07734RG	TRICHLOROETHENE	REAL	TR1	20.00	UG/L	5.00		V	2.00	2.00	4.00					No
	02097	1/24/01	GW07397RG	1,1-DICHLOROETHENE	REAL	TR1	9.00	UG/L	7.00		V	1.00	1.00	1.29					No
	02097	1/24/01	GW07397RG	TETRACHLOROETHENE	REAL	TR1	5.00	UG/L	5.00		V	1.00	1.00	1.00					No
	02097	1/24/01	GW07397RG	TRICHLOROETHENE	REAL	DL1	30.00	UG/L	5.00	D		2.00	2.00	6.00					No
	02097	9/6/01	GW07736RG	TRICHLOROETHENE	REAL	TR1	22.00	UG/L	5.00		V	1.00	1.00	4.40					No
	11791	3/9/01	GW07411RG	CARBON TETRACHLORIDE	REAL	DL1	250.00	UG/L	5.00	D	V1	20.00	20.00	50.00			878	0.28	No
	11791	8/22/01	GW07725RG	CARBON TETRACHLORIDE	REAL	TR1	390.00	UG/L	5.00		V1	10.00	10.00	78.00			878	0.44	No
	11791	3/9/01	GW07411RG	TETRACHLOROETHENE	REAL	DL1	79.00	UG/L	5.00	D	V1	20.00	20.00	15.80			143.1	0.55	No
	11791	8/22/01	GW07725RG	TETRACHLOROETHENE	REAL	TR1	93.00	UG/L	5.00		V1	10.00	10.00	18.60			143.1	0.65	No
	11791	3/9/01	GW07411RG	TRICHLOROETHENE	REAL	DL1	54.00	UG/L	5.00	D	V1	20.00	20.00	10.80			150.6	0.36	No
	11791	8/22/01	GW07725RG	TRICHLOROETHENE	REAL	TR1	61.00	UG/L	5.00		V1	10.00	10.00	12.20			150.6	0.41	No
	1187	3/9/01	GW07409RG	CARBON TETRACHLORIDE	REAL	TR1	65.00	UG/L	5.00	J	J1	100.00	100.00	13.00			762.3	0.09	No
	1187	8/27/01	GW07723RG	CARBON TETRACHLORIDE	REAL	TR1	340.00	UG/L	5.00		V1	100.00	100.00	68.00			762.3	0.45	No
	1187	3/9/01	GW07409RG	METHYLENE CHLORIDE	REAL	TR1	46.00	UG/L	5.00	BJ	JB1	100.00	100.00	9.20			79.64	0.58	No
	1187	3/9/01	GW07409RG	TETRACHLOROETHENE	REAL	TR1	30.00	UG/L	5.00	J	V1	100.00	100.00	6.00			87.35	0.34	No
	1187	3/9/01	GW07409RG	TRICHLOROETHENE	REAL	TR1	2300.00	UG/L	5.00		J1	100.00	100.00	460.00			4197.49	0.55	No
	1187	8/27/01	GW07723RG	TRICHLOROETHENE	REAL	TR1	3400.00	UG/L	5.00		V1	100.00	100.00	680.00			4197.49	0.81	No
	18199	5/9/01	GW07520RG	CARBON TETRACHLORIDE	REAL	DL1	18000.00	UG/L	5.00	D	V1	500.00	500.00	3600			ND		No
	18199	10/29/01	GW07830RG	CARBON TETRACHLORIDE	REAL	DL1	19000.00	UG/L	5.00		V1	130.00	666.70	3800			ND		No
	18199	5/9/01	GW07520RG	CHLOROFORM	REAL	DL1	3300.00	UG/L	100.00	D	V1	500.00	500.00	33.00			ND		No
	18199	10/29/01	GW07830RG	CHLOROFORM	REAL	DL1	3300.00	UG/L	100.00		V1	15.00	66.67	33.00			ND		No
	18199	5/9/01	GW07520RG	METHYLENE CHLORIDE	REAL	TR1	94.00	UG/L	5.00	B	V1	50.00	50.00	18.80			ND		No
	18199	5/9/01	GW07520RG	TETRACHLOROETHENE	REAL	TR1	65.00	UG/L	5.00		V1	50.00	50.00	13.00			ND		No
	18199	10/29/01	GW07830RG	TETRACHLOROETHENE	REAL	DL1	44.00	UG/L	5.00	J	V1	24.00	66.67	8.80			ND		No
	18199	10/29/01	GW07830RG	THALLIUM	REAL	TR1	2.30	UG/L	2.00	B	UJ1	2.10	1.00	1.15	4.90	0.47	ND		No
	18199	5/9/01	GW07520RG	TRICHLOROETHENE	REAL	TR1	6.00	UG/L	5.00	J	V1	50.00	50.00	1.20			ND		No
	18399	5/7/01	GW07516RG	CARBON TETRACHLORIDE	REAL	DL1	31000.00	UG/L	5.00	D	V1	1000	1000	6200			ND		No
	18399	10/29/01	GW07826RG	CARBON TETRACHLORIDE	REAL	DL1	55000.00	UG/L	5.00		V1	380.00	2000	11000			ND		No
	18399	5/7/01	GW07516RG	CHLOROFORM	REAL	DL1	2700.00	UG/L	100.00	D	V1	1000	1000	27.00			ND		No
	18399	10/29/01	GW07826RG	CHLOROFORM	REAL	DL1	3700.00	UG/L	100.00		V1	46.00	200.00	37.00			ND		No
	18399	5/7/01	GW07516RG	METHYLENE CHLORIDE	REAL	TR1	65.00	UG/L	5.00	B	V1	50.00	50.00	13.00			ND		No
	18399	5/7/01	GW07516RG	TETRACHLOROETHENE	REAL	TR1	12.00	UG/L	5.00	J	V1	50.00	50.00	2.40			ND		No
	18499	5/9/01	GW07517RG	CARBON TETRACHLORIDE	REAL	DL1	17000.00	UG/L	5.00	D	V1	500.00	500.00	3400			ND		No

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Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Rep-abl Result?
	18499	10/30/01	GW07827RG	CARBON TETRACHLORIDE	REAL	DL1	24000.00	UG/L	5.00		V1	380.00	2000	4800			ND		No
	18499	5/9/01	GW07517RG	CHLOROFORM	REAL	DL1	3500.00	UG/L	100.00	D	V1	500.00	500.00	35.00			ND		No

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Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Report-able Result?
Plume Degradation	18499	10/30/01	GW07827RG	CHLOROFORM	REAL	DL1	5468.00	UG/L	100.00		V1		2000	54.68			ND		No
	18499	10/30/01	GW07827RG	HEXACHLOROETHANE (TIC	REAL	DL1	1602.00	UG/L	6.08	J	V1		80.00	263.49			ND		No
	18499	5/9/01	GW07517RG	METHYLENE CHLORIDE	REAL	TR1	98.00	UG/L	5.00	B	U1	50.00	50.00	19.60			ND		No
	18499	10/30/01	GW07827RG	METHYLENE CHLORIDE	REAL	DL1	100.00	UG/L	5.00		V1	71.00	80.00	20.00			ND		No
	18499	5/9/01	GW07517RG	TETRACHLOROETHENE	REAL	TR1	62.00	UG/L	5.00		V1	50.00	50.00	12.40			ND		No
	18499	10/30/01	GW07827RG	TETRACHLOROETHENE	REAL	DL1	78.00	UG/L	5.00	J	V1	29.00	80.00	15.60			ND		No
	18799	10/30/01	GW07828RG	1,1-DICHLOROETHENE	REAL	DL1	11.00	UG/L	7.00		V1	0.50	2.50	1.57			ND		No
	18799	5/10/01	GW07518RG	CARBON TETRACHLORIDE	REAL	DL1	460.00	UG/L	5.00	D	V1	25.00	25.00	92.00			ND		No
	18799	10/30/01	GW07828RG	CARBON TETRACHLORIDE	REAL	DL1	850.00	UG/L	5.00		V1	4.80	25.00	170.00			ND		No
	18799	5/10/01	GW07518RG	CHLOROFORM	REAL	DL1	410.00	UG/L	100.00	D	V1	25.00	25.00	4.10			ND		No
	18799	10/30/01	GW07828RG	CHLOROFORM	REAL	DL1	520.00	UG/L	100.00		V1	5.80	25.00	5.20			ND		No
	18799	5/10/01	GW07518RG	TETRACHLOROETHENE	REAL	TR1	14.00	UG/L	5.00		V1	10.00	10.00	2.80			ND		No
	18799	10/30/01	GW07828RG	TETRACHLOROETHENE	REAL	DL1	12.00	UG/L	5.00		V1	0.90	2.50	2.40			ND		No
	70693	1/24/01	GW07396RG	1,1-DICHLOROETHENE	REAL	TR1	22.00	UG/L	7.00		V	1.00	1.00	3.14			101.4	0.22	No
	70693	9/5/01	GW07735RG	1,1-DICHLOROETHENE	REAL	TR1	15.00	UG/L	7.00		V	1.00	1.00	2.14			101.4	0.15	No
	70693	1/24/01	GW07396RG	TRICHLOROETHENE	REAL	TR1	9.00	UG/L	5.00		V	1.00	1.00	1.80			37.3	0.24	No
	70693	9/5/01	GW07735RG	TRICHLOROETHENE	REAL	TR1	8.80	UG/L	5.00		V	1.00	1.00	1.76			37.3	0.24	No
	90099	3/8/01	GW07405RG	CARBON TETRACHLORIDE	REAL	TR1	360.00	UG/L	5.00		J1	50.00	50.00	72.00			ND		No
	90099	8/22/01	GW07717RG	CARBON TETRACHLORIDE	DUP	TR1	780.00	UG/L	5.00		V1	40.00	40.00	156.00			ND		No
	90099	8/22/01	GW07716RG	CHLOROFORM	REAL	TR1	100.00	UG/L	100.00		V1	40.00	40.00	1.00			ND		No
	90099	3/8/01	GW07405RG	METHYLENE CHLORIDE	REAL	TR1	43.00	UG/L	5.00	BJ	JB1	50.00	50.00	8.60			ND		No
	90099	3/8/01	GW07405RG	TETRACHLOROETHENE	REAL	TR1	24.00	UG/L	5.00	J	V1	50.00	50.00	4.80			ND		No
	90099	8/22/01	GW07716RG	TETRACHLOROETHENE	REAL	TR1	40.00	UG/L	5.00	J	V1	40.00	40.00	8.00			ND		No
	90099	3/8/01	GW07405RG	TRICHLOROETHENE	REAL	TR1	880.00	UG/L	5.00		J1	50.00	50.00	176.00			ND		No
	90099	8/22/01	GW07716RG	TRICHLOROETHENE	REAL	TR1	1400.00	UG/L	5.00		V1	40.00	40.00	280.00			ND		No
	90399	3/8/01	GW07408RG	CARBON TETRACHLORIDE	REAL	DL1	130.00	UG/L	5.00	D	V1	10.00	10.00	26.00			ND		No
	90399	8/27/01	GW07722RG	CARBON TETRACHLORIDE	REAL	TR1	290.00	UG/L	5.00		V1	20.00	20.00	58.00			ND		No
	90399	3/8/01	GW07408RG	TRICHLOROETHENE	REAL	DL1	110.00	UG/L	5.00	D	V1	10.00	10.00	22.00			ND		No
	90399	8/27/01	GW07722RG	TRICHLOROETHENE	REAL	TR1	220.00	UG/L	5.00		V1	20.00	20.00	44.00			ND		No
	90399	8/27/01	GW07722RG	URANIUM-233,-234	REAL	TR1	7.20	PCI/L	1.06			0.06		6.79	60.70	0.12			No
	90399	8/27/01	GW07722RG	URANIUM-238	REAL	TR1	5.15	PCI/L	0.77			0.05		6.71	41.80	0.12			No
Plume Extent	02197	7/19/01	GW07612RG	NITRATE/NITRITE	REAL	DL1	10.10	MG/L	10.00		V1	0.10	5.00	1.01	4.66	2.17	ND		Yes
	02197	7/18/01	GW07612RG	URANIUM-233,-234	REAL	TR1	3.20	PCI/L	1.06		V1	0.07		3.02	60.70	0.05			No
	02197	7/18/01	GW07612RG	URANIUM-238	REAL	TR1	2.60	PCI/L	0.77			0.06		3.39	41.80	0.06			No
	04091	3/15/01	GW07435RG	URANIUM-233,-234	REAL	TR1	1.61	PCI/L	1.06		V1	0.06		1.52	60.70	0.03			No
	04091	8/22/01	GW07613RG	URANIUM-233,-234	REAL	TR1	1.87	PCI/L	1.06	B	V1	0.12		1.76	60.70	0.03			No
	04091	8/22/01	GW07613RG	URANIUM-238	REAL	TR1	0.90	PCI/L	0.77	J	V1	0.12		1.17	41.80	0.02			No
	04591	2/1/01	GW07157RG	URANIUM-233,-234	REAL	TR1	2.95	PCI/L	1.06		V1	0.14		2.78	60.70	0.05			No
	04591	8/21/01	GW07634RG	URANIUM-233,-234	REAL	TR1	2.32	PCI/L	1.06	B	V1	0.07		2.19	60.70	0.04			No
	04591	2/1/01	GW07157RG	URANIUM-238	REAL	TR1	1.37	PCI/L	0.77		V1	0.08		1.78	41.80	0.03			No
	04591	8/21/01	GW07634RG	URANIUM-238	REAL	TR1	1.16	PCI/L	0.77		V1	0.15		1.51	41.80	0.03			No
	04991	3/13/01	GW07436RG	URANIUM-233,-234	REAL	TR1	5.50	PCI/L	1.06		V1	0.07		5.19	60.70	0.09			No
	04991	9/12/01	GW07614RG	URANIUM-233,-234	REAL	TR1	5.88	PCI/L	1.06		V1	0.09		5.55	60.70	0.10			No
	04991	3/13/01	GW07436RG	URANIUM-238	REAL	TR1	2.00	PCI/L	0.77		V1	0.05		2.60	41.80	0.05			No
	04991	9/12/01	GW07614RG	URANIUM-238	REAL	TR1	2.90	PCI/L	0.77		V1	0.05		3.78	41.80	0.07			No
	05091	1/11/01	GW07159RG	URANIUM-233,-234	REAL	TR1	3.64	PCI/L	1.06		V1	0.07		3.43	60.70	0.06			No
	05091	8/14/01	GW07636RG	URANIUM-233,-234	REAL	TR1	3.84	PCI/L	1.06		1	0.03		3.62	60.70	0.06			No
	05091	1/11/01	GW07159RG	URANIUM-238	REAL	TR1	1.99	PCI/L	0.77		V1	0.07		2.59	41.80	0.05			No
	05091	8/14/01	GW07636RG	URANIUM-238	REAL	TR1	1.91	PCI/L	0.77		1	0.08		2.49	41.80	0.05			No
	06091	8/24/01	GW07615RG	CARBON TETRACHLORIDE	REAL	TR1	7.80	UG/L	5.00		V1	1.00	1.00	1.56			4.44	1.76	Yes
	06091	3/20/01	GW07437RG	URANIUM-233,-234	REAL	TR1	3.39	PCI/L	1.06		V1	0.12		3.20	60.70	0.06			No
	06091	8/24/01	GW07615RG	URANIUM-233,-234	REAL	TR1	3.51	PCI/L	1.06		V1	0.08		3.31	60.70	0.06			No
	06091	3/20/01	GW07437RG	URANIUM-238	REAL	TR1	2.36	PCI/L	0.77		V1	0.07		3.07	41.80	0.06			No
	06091	8/24/01	GW07615RG	URANIUM-238	REAL	TR1	2.08	PCI/L	0.77			0.05		2.71	41.80	0.05			No
	10194	1/11/01	GW07345RG	URANIUM-233,-234	REAL	TR1	2.29	PCI/L	1.06		V1	0.15		2.16	60.70	0.04			No
	10194	8/16/01	GW07648RG	URANIUM-233,-234	REAL	TR1	2.21	PCI/L	1.06	B	V1	0.15		2.08	60.70	0.04			No
	10194	1/11/01	GW07345RG	URANIUM-238	REAL	TR1	1.43	PCI/L	0.77		V1	0.07		1.86	41.80	0.03			No
	10194	8/16/01	GW07648RG	URANIUM-238	REAL	TR1	1.42	PCI/L	0.77		V1	0.15		1.85	41.80	0.03			No
	10992	1/26/01	GW07349RG	NITRATE/NITRITE	REAL	TR1	14.00	MG/L	10.00		V1	0.05	25.00	1.40	4.66	3.00	ID		No*
	10992	7/18/01	GW07652RG	NITRATE/NITRITE	REAL	DL1	18.00	MG/L	10.00		V1	0.10	5.00	1.80	4.66	3.86	ID		No*
	10992	1/26/01	GW07349RG	SELENIUM	REAL	TR1	408.00	UG/L	50.00		V1	2.93	1.00	8.16	43.72	9.33	ID		No*
	10992	7/18/01	GW07652RG	SELENIUM	REAL	TR1	464.00	UG/L	50.00		V1	0.20	1.00	9.28	43.72	10.61	ID		No*
	10992	1/26/01	GW07349RG	URANIUM-233,-234	REAL	TR1	6.61	PCI/L	1.06		V1	0.07		6.24	60.70	0.11			No
	10992	7/24/01	GW07652RG	URANIUM-233,-234	REAL	TR1	6.50	PCI/L	1.06			0.06		6.13	60.70	0.11			No
	10992	1/26/01	GW07349RG	URANIUM-238	REAL	TR1	4.41	PCI/L	0.77		V1	0.15		5.74	41.80	0.11			No
	10992	7/24/01	GW07652RG	URANIUM-238	REAL	TR1	4.80	PCI/L	0.77			0.06		6.25	41.80	0.11			No
	10994	1/11/01	GW07350RG	NITRATE/NITRITE	REAL	TR1	10.00	MG/L	10.00		V	0.05	10.00	1.00	4.66	2.14	ID		Yes
	10994	8/14/01	GW07653RG	NITRATE/NITRITE	REAL	TR1	11.00	MG/L	10.00		V1	1.00	20.00	1.10	4.66	2.36	ID		Yes
	10994	1/11/01	GW07350RG	SELENIUM	REAL	TR1	515.00	UG/L	50.00		V1	2.37	1.00	10.30	43.72	11.78	1097.2	0.47	Yes
	10994	8/14/01	GW07653RG	SELENIUM	REAL	TR1	790.00	UG/L	50.00	N	J1	0.33	1.00	15.80	43.72	18.07	1097.2	0.72	Yes
	10994	1/11/01	GW07350RG	URANIUM-233,-234	REAL	TR1	8.76	PCI/L	1.06		V1	0.12		8.26	60.70	0.14			No
	10994	8/14/01	GW07653RG	URANIUM-233,-234	REAL	TR1	9.30	PCI/L	1.06		1	0.18		8.77	60.70	0.15			No
	10994	1/11/01	GW07350RG	URANIUM-238	REAL	TR1	5.68	PCI/L	0.77		V1	0.12		7.40	41.80	0.14			No
	10994	8/14/01	GW07653RG	URANIUM-238	REAL	TR1	6.00	PCI/L	0.77		1	0.16		7.81	41.80	0.14			No
	1386	4/16/01	GW07500RG	NICKEL	REAL	TR1	557.00	UG/L	140.00		V1	0.30	1.00	3.98	21.37	26.06	308.75	1.80	Yes
	1386	11/1/01	GW07812RG	NICKEL	REAL	TR1	382.00	UG/L	140.00		V	3.40	1.00	2.73	21.37	17.88	308.75	1.24	Yes
	1386	11/1/01	GW07812RG	THALLIUM	REAL	TR1	2.80	UG/L	2.00	B	J	2.10	1.00	1.40	4.90	0.57	1.84	1.52	No
	1386	1/23/01	GW07392RG	URANIUM-233,-234	REAL	TR1	9.97	PCI/L	1.06		V1	0.15		9.41	60.70	0.16			No
	1386	4/16/01	GW07500RG	URANIUM-233,-234	REAL	TR1	12.30	PCI/L	1.06		V1	0.07		11.60	60.70	0.20			No
	1386	8/28/01	GW07712RG	URANIUM-233,-234	REAL	TR1	7.50	PCI/L	1.06			0.08		7.08	60.70	0.12			No

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11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Repo-rtable Result?
	1386	10/25/01	GW07812RG	URANIUM-233,-234 (total)	REAL	TR1	5.88	PCI/L	1.06		V1	0.31		5.55	60.70	0.10			No
	1386	1/23/01	GW07392RG	URANIUM-238	REAL	TR1	7.96	PCI/L	0.77		V1	0.16		10.36	41.80	0.19			No
Plume Extent	1386	4/16/01	GW07500RG	URANIUM-238	REAL	TR1	9.92	PCI/L	0.77		V1	0.14		12.92	41.80	0.24			No
	1386	8/28/01	GW07712RG	URANIUM-238	REAL	TR1	6.40	PCI/L	0.77			0.04		8.33	41.80	0.15			No
	1388	10/25/01	GW07812RG	URANIUM-238 (total)	REAL	TR1	4.31	PCI/L	0.77		V1	0.09		5.61	41.80	0.10			No
	1786	1/23/01	GW07393RG	NITRATE/NITRITE	REAL	TR1	570.00	MG/L	10.00		V1	0.05	500.00	57.00	4.66	122.21	689.31	0.83	Yes
	1786	4/17/01	GW07501RG	NITRATE/NITRITE	REAL	TR1	620.00	MG/L	10.00		V	0.05	500.00	62.00	4.66	132.93	689.31	0.90	Yes
	1786	7/11/01	GW07713RG	NITRATE/NITRITE	REAL	DL1	363.00	MG/L	10.00		V1	2.10	100.00	36.30	4.66	77.83	689.31	0.53	Yes
	1786	10/16/01	GW07813RG	NITRATE/NITRITE	REAL	TR1	528.00	MG/L	10.00					52.80	4.66	113.21	689.31	0.77	Yes
	1786	4/17/01	GW07501RG	SELENIUM	REAL	TR1	560.00	UG/L	50.00		V1	0.65	1.00	11.20	43.72	12.81	290.81	1.93	Yes
	1786	10/16/01	GW07813RG	SELENIUM	REAL	TR1	465.00	UG/L	50.00		V1	2.40	1.00	9.30	43.72	10.64	245.7	1.89	Yes
	1786	10/16/01	GW07813RG	THALLIUM	REAL	TR1	5.30	UG/L	2.00		UJ1	2.10	1.00	2.65	4.90	1.08	5.6	0.95	Yes
	1786	1/23/01	GW07393RG	URANIUM-233,-234	REAL	TR1	36.70	PCI/L	1.06		V1	0.08		34.62	60.70	0.60			No
	1786	4/17/01	GW07501RG	URANIUM-233,-234	REAL	TR1	37.30	PCI/L	1.06		V1	0.07		35.19	60.70	0.61			No
	1786	7/11/01	GW07713RG	URANIUM-233,-234	REAL	TR1	43.00	PCI/L	1.06			0.09		40.57	60.70	0.71			No
	1786	10/16/01	GW07813RG	URANIUM-233,-234 (total)	REAL	TR1	32.30	PCI/L	1.06		V	0.26		30.47	60.70	0.53			No
	1786	1/23/01	GW07393RG	URANIUM-235	REAL	TR1	1.30	PCI/L	1.01		V1	0.10		1.29	1.79	0.73			No
	1786	4/17/01	GW07501RG	URANIUM-235	REAL	TR1	1.25	PCI/L	1.01		V1	0.14		1.24	1.79	0.70			No
	1786	7/11/01	GW07713RG	URANIUM-235	REAL	TR1	1.40	PCI/L	1.01			0.09		1.39	1.79	0.78			No
	1786	10/16/01	GW07813RG	URANIUM-235 (total)	REAL	TR1	1.96	PCI/L	1.01		V	0.14		1.94	1.79	1.09	1.99	0.98	Yes
	1786	1/23/01	GW07393RG	URANIUM-238	REAL	TR1	26.90	PCI/L	0.77		V1	0.08		35.03	41.80	0.64			No
	1786	4/17/01	GW07501RG	URANIUM-238	REAL	TR1	25.90	PCI/L	0.77		V1	0.12		33.72	41.80	0.62			No
	1786	7/11/01	GW07713RG	URANIUM-238	REAL	TR1	33.00	PCI/L	0.77			0.03		42.97	41.80	0.79			No
	1786	10/16/01	GW07813RG	URANIUM-238 (total)	REAL	TR1	24.00	PCI/L	0.77		V	0.12		31.25	41.80	0.57			No
	1986	5/10/01	GW07467RG	MANGANESE	REAL	TR1	4010.00	UG/L	1720.00		V1	0.02	1.00	2.33	162.33	24.70	3304	1.21	Yes
	1986	10/8/01	GW07779RG	MANGANESE	REAL	TR1	3500.00	UG/L	1720.00		V1	0.23	1.00	2.03	162.33	21.56	3316.1	1.06	Yes
	1986	10/8/01	GW07779RG	THALLIUM	REAL	TR1	3.80	UG/L	2.00	B	UJ1	2.10	1.00	1.90	4.90	0.78	4.21	0.90	No
	1986	5/10/01	GW07467RG	URANIUM-233,-234	REAL	TR1	3.40	PCI/L	1.06		V1	0.05		3.21	60.70	0.06			No
	1986	10/8/01	GW07779RG	URANIUM-233,-234	REAL	TR1	2.80	PCI/L	1.06		V1	0.10		2.64	60.70	0.05			No
	1986	5/10/01	GW07467RG	URANIUM-238	REAL	TR1	2.80	PCI/L	0.77		V1	0.02		3.65	41.80	0.07			No
	1986	10/8/01	GW07779RG	URANIUM-238	REAL	TR1	1.55	PCI/L	0.77		V1	0.18		2.02	41.80	0.04			No
	21098	5/7/01	GW07519RG	CARBON TETRACHLORIDE	REAL	DL1	2300.00	UG/L	5.00	D	V1	100.00	100.00	460.00			ND		No
	21098	11/1/01	GW07829RG	CARBON TETRACHLORIDE	REAL	DL1	4300.00	UG/L	5.00		V1	19.00	100.00	860.00			ND		No
	21098	5/7/01	GW07519RG	CHLOROFORM	REAL	TR1	260.00	UG/L	100.00		V1	50.00	50.00	2.60			ND		No
	21098	11/1/01	GW07829RG	CHLOROFORM	REAL	DL1	230.00	UG/L	100.00		V1	23.00	100.00	2.30			ND		No
	21098	5/7/01	GW07519RG	METHYLENE CHLORIDE	REAL	TR1	73.00	UG/L	5.00	B	U1	50.00	50.00	14.60			ND		No
	21098	11/1/01	GW07829RG	TETRACHLOROETHENE	REAL	RX1	5.00	UG/L	5.00	J	V1	3.60	10.00	1.00			ND		No
	2188	11/13/01	GW07780RG	THALLIUM	REAL	TR1	2.20	UG/L	2.00	B	J1	2.10	1.00	1.10	4.90	0.45	3.46	0.64	No
	2186	5/8/01	GW07468RG	URANIUM-233,-234	REAL	TR1	2.20	PCI/L	1.06		V1	0.16		2.08	60.70	0.04			No
	2186	11/13/01	GW07780RG	URANIUM-233,-234	REAL	TR1	3.32	PCI/L	1.06		V	0.23		3.13	60.70	0.05			No
	2186	11/13/01	GW07780RG	URANIUM-238	REAL	TR1	1.20	PCI/L	0.77		V	0.30		1.56	41.80	0.03			No
	22696	7/23/01	GW07658RG	URANIUM-233,-234	REAL	TR1	9.30	PCI/L	1.06			0.04		8.77	60.70	0.15			No
	22696	7/23/01	GW07658RG	URANIUM-238	REAL	TR1	6.30	PCI/L	0.77			0.01		8.20	41.80	0.15			No
	22796	5/14/01	GW07474RG	CHROMIUM	REAL	TR1	106.00	UG/L	100.00		V1	0.22	1.00	1.06	12.44	8.52	ND		Yes
	22796	10/9/01	GW07787RG	THALLIUM	REAL	TR1	4.30	UG/L	2.00		UJ1	2.10	1.00	2.15	4.90	0.88	ND		No
	22796	5/14/01	GW07474RG	TRICHLOROETHENE	REAL	DL1	57.00	UG/L	5.00	D	V1	5.00	5.00	11.40			ND		Yes
	22796	10/9/01	GW07787RG	TRICHLOROETHENE	REAL	DL1	23.00	UG/L	5.00		V1	0.44	2.00	4.60			ND		Yes
	22796	5/14/01	GW07474RG	URANIUM-233,-234	REAL	TR1	2.40	PCI/L	1.06		V1	0.06		2.26	60.70	0.04			No
	22796	10/9/01	GW07787RG	URANIUM-233,-234	REAL	TR1	2.95	PCI/L	1.06		V1	0.27		2.78	60.70	0.05			No
	22796	5/14/01	GW07475RG	URANIUM-238	DUP	TR1	2.00	PCI/L	0.77		V1	0.02		2.60	41.80	0.05			No
	22796	10/9/01	GW07787RG	URANIUM-238	REAL	TR1	2.22	PCI/L	0.77		V1	0.25		2.89	41.80	0.05			No
	23096	8/14/01	GW07661RG	PLUTONIUM-239/240	REAL	TR1	0.16	PCI/L	0.15		J1	0.01		1.04			ND		Yes
	23096	1/12/01	GW07358RG	URANIUM-233,-234	REAL	TR1	1.79	PCI/L	1.06		V1	0.13		1.69	60.70	0.03			No
	23096	8/14/01	GW07661RG	URANIUM-233,-234	REAL	TR1	2.38	PCI/L	1.06		1	0.18		2.25	60.70	0.04			No
	23096	1/12/01	GW07358RG	URANIUM-238	REAL	TR1	1.72	PCI/L	0.77		V1	0.15		2.24	41.80	0.04			No
	23096	8/14/01	GW07661RG	URANIUM-238	REAL	TR1	2.34	PCI/L	0.77		1	0.11		3.05	41.80	0.06			No
	23196	5/30/01	GW07584RG	SELENIUM	REAL	TR1	118.00	UG/L	50.00		V1	0.65	1.00	2.36	43.72	2.70	ND		Yes
	23296	4/24/01	GW07497RG	CARBON TETRACHLORIDE	REAL	TR1	6.00	UG/L	5.00	J	V	10.00	10.00	1.20			ND		Yes
	23296	10/23/01	GW07809RG	CARBON TETRACHLORIDE	REAL	TR1	10.00	UG/L	5.00		V1	0.19	1.00	2.00			ND		Yes
	23296	10/23/01	GW07809RG	cis-1,2-DICHLOROETHENE	REAL	DL1	150.00	UG/L	70.00		V1	2.60	10.00	2.14			ND		Yes
	23296	4/24/01	GW07497RG	METHYLENE CHLORIDE	REAL	TR1	10.00	UG/L	5.00	B	JB	10.00	10.00	2.00			ND		Yes
	23296	4/24/01	GW07497RG	TETRACHLOROETHENE	REAL	TR1	17.00	UG/L	5.00		V	10.00	10.00	3.40			ND		Yes
	23296	10/23/01	GW07809RG	TETRACHLOROETHENE	REAL	TR1	12.00	UG/L	5.00		V1	0.36	1.00	2.40			ND		Yes
	23296	10/23/01	GW07809RG	THALLIUM	REAL	TR1	6.40	UG/L	2.00		UJ1	2.10	1.00	3.20	4.90	1.31	ND		Yes
	23296	4/24/01	GW07497RG	TRICHLOROETHENE	REAL	DL1	530.00	UG/L	5.00	D	V	25.00	25.00	106.00			ND		Yes
	23296	10/23/01	GW07809RG	TRICHLOROETHENE	REAL	DL1	380.00	UG/L	5.00		V1	2.20	10.00	76.00			ND		Yes
	23296	4/24/01	GW07497RG	URANIUM-233,-234	REAL	TR1	20.00	PCI/L	1.06		V	0.18		18.87	60.70	0.33			No
	23296	10/23/01	GW07809RG	URANIUM-233,-234	REAL	TR1	17.70	PCI/L	1.06		V1	0.17		16.70	60.70	0.29			No
	23296	4/24/01	GW07497RG	URANIUM-238	REAL	TR1	16.00	PCI/L	0.77		V	0.18		20.83	41.80	0.38			No
	23296	10/23/01	GW07809RG	URANIUM-238	REAL	TR1	13.20	PCI/L	0.77		V1	0.17		17.19	41.80	0.32			No
	3586	4/17/01	GW07491RG	MANGANESE	REAL	TR1	4460.00	UG/L	1720.00		V1	0.02	1.00	2.59	162.33	27.47	4357	1.02	Yes
	3586	10/22/01	GW07803RG	MANGANESE	REAL	TR1	5190.00	UG/L	1720.00		V1	0.23	1.00	3.02	162.33	31.97	4358	1.19	Yes
	3586	10/22/01	GW07803RG	THALLIUM	REAL	TR1	2.40	UG/L	2.00	B	UJ1	2.10	1.00	1.20	4.90	0.49	3.49	0.69	No
	3586	4/17/01	GW07491RG	URANIUM-233,-234	REAL	TR1	2.13	PCI/L	1.06		V1	0.14		2.01	60.70	0.04			No
	3586	10/22/01	GW07803RG	URANIUM-233,-234	REAL	TR1	1.89	PCI/L	1.06		V1	0.24		1.78	60.70	0.03			No
	3586	4/17/01	GW07491RG	URANIUM-238	REAL	TR1	1.71	PCI/L	0.77		V1	0.11		2.23	41.80	0.04			No
	3586	10/22/01	GW07803RG	URANIUM-238	REAL	TR1	1.28	PCI/L	0.77		V1	0.21		1.67	41.80	0.03			No
	3586	4/17/01	GW07491RG	VINYL CHLORIDE	REAL	TR1	5.00	UG/L	2.00		V1	1.00		2.50			776	0.01	Yes
	3586	10/22/01	GW07803RG	VINYL CHLORIDE	REAL	TR1	5.40	UG/L	2.00		V1	0.21	1.00	2.70			776.32	0.01	Yes
	5387	3/19/01	GW07439RG	URANIUM-233,-234	REAL	TR1	8.77	PCI/L	1.06		V1	0.14		8.27	60.70	0.14			No

ID = Insufficient Data to calculate Historic Mean +/- 2-Standard Deviations for 1991-1995
ND = Location has no Historic Data prior to 1995

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Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Report-able Result?
	5387	8/8/01	GW07617RG	URANIUM-233,-234	REAL	TR1	9.50	PCI/L	1.06		V1	0.06		8.96	60.70	0.16			No
	5387	3/19/01	GW07439RG	URANIUM-238	REAL	TR1	7.15	PCI/L	0.77		V1	0.07		9.31	41.80	0.17			No
	5387	8/8/01	GW07617RG	URANIUM-238	REAL	TR1	7.10	PCI/L	0.77		V1	0.05		9.24	41.80	0.17			No
	6186	1/9/01	GW07339RG	URANIUM-233,-234	REAL	TR1	2.74	PCI/L	1.06		V	0.12		2.58	60.70	0.05			No
Plume Extent	6186	8/21/01	GW07642RG	URANIUM-233,-234	REAL	TR1	2.44	PCI/L	1.06	B	V1	0.07		2.30	60.70	0.04			No
	6186	1/9/01	GW07339RG	URANIUM-238	REAL	TR1	2.17	PCI/L	0.77		V	0.12		2.83	41.80	0.05			No
	6186	8/21/01	GW07642RG	URANIUM-238	REAL	TR1	1.86	PCI/L	0.77		V1	0.13		2.42	41.80	0.04			No
	7086	9/10/01	GW08647RG	URANIUM-233,-234	REAL	TR1	1.07	PCI/L	1.06		V1	0.15		1.01	60.70	0.02			No
	7086	2/23/01	GW07344RG	URANIUM-238	REAL	TR1	1.05	PCI/L	0.77		V1	0.07		1.37	41.80	0.03			No
	7086	9/10/01	GW08647RG	URANIUM-238	REAL	TR1	0.83	PCI/L	0.77	J	V1	0.05		1.08	41.80	0.02			No
	75992	1/12/01	GW07364RG	URANIUM-233,-234	REAL	TR1	6.35	PCI/L	1.06		V1	0.13		5.99	60.70	0.10			No
	75992	1/12/01	GW07364RG	URANIUM-238	REAL	TR1	5.33	PCI/L	0.77		V1	0.07		6.94	41.80	0.13			No
	90299	9/12/01	GW07721RG	URANIUM-233,-234	REAL	TR1	25.90	PCI/L	1.06		V1	0.18		24.43	60.70	0.43			No
	90299	9/12/01	GW07721RG	URANIUM-235	REAL	TR1	1.33	PCI/L	1.01		V1	0.10		1.32	1.79	0.74			No
	90299	9/12/01	GW07721RG	URANIUM-238	REAL	TR1	19.70	PCI/L	0.77		V1	0.11		25.65	41.80	0.47			No
	B208789	10/19/01	GW07789RG	THALLIUM	REAL	TR1	3.70	UG/L	2.00	B	UJ1	2.10	1.00	1.85	4.90	0.76	ID		No
	B208789	4/16/01	GW07477RG	URANIUM-233,-234	REAL	TR1	10.60	PCI/L	1.06		V	0.07		10.00	60.70	0.17			No
	B208789	11/6/01	GW07789RG	URANIUM-233,-234	REAL	TR1	7.38	PCI/L	1.06		V1	0.27		6.96	60.70	0.12			No
	B208789	4/16/01	GW07477RG	URANIUM-238	REAL	TR1	7.26	PCI/L	0.77		V	0.07		9.45	41.80	0.17			No
	B208789	11/6/01	GW07789RG	URANIUM-238	REAL	TR1	5.55	PCI/L	0.77		V1	0.27		7.23	41.80	0.13			No
	P114389	1/11/01	GW07366RG	URANIUM-233,-234	REAL	TR1	2.87	PCI/L	1.06		V1	0.14		2.71	60.70	0.05			No
	P114389	8/28/01	GW07668RG	URANIUM-233,-234	REAL	TR1	3.23	PCI/L	1.06			0.12		3.05	60.70	0.05			No
	P114389	1/11/01	GW07366RG	URANIUM-238	REAL	TR1	2.08	PCI/L	0.77		V1	0.14		2.71	41.80	0.05			No
	P114389	8/28/01	GW07668RG	URANIUM-238	REAL	TR1	2.09	PCI/L	0.77			0.04		2.72	41.80	0.05			No
	P219489	4/17/01	GW07482RG	NITRATE/NITRITE	REAL	TR1	42.00	MG/L	10.00		V	0.05	100.00	4.20	4.66	9.01	51.57	0.81	Yes
	P219489	5/7/01	GW07582RG	NITRATE/NITRITE	REAL	TR1	40.00	MG/L	10.00		V1	0.05	50.00	4.00	4.66	8.58	51.57	0.78	Yes
	P219489	6/5/01	GW07583RG	NITRATE/NITRITE	REAL	TR1	34.00	MG/L	10.00		V1	0.05	50.00	3.40	4.66	7.29	51.57	0.66	Yes
	P219489	11/6/01	GW07794RG	NITRATE/NITRITE	REAL	DL1	36.10	MG/L	10.00		V	0.21	10.00	3.61	4.66	7.74	ID		Yes
	P219489	12/5/01	GW07794RG	URANIUM-233,-234	REAL	TR1	4.49	PCI/L	1.06		V1	0.43		4.24	60.70	0.07			No
	P219489	12/5/01	GW07794RG	URANIUM-238	REAL	TR1	2.09	PCI/L	0.77		V1	0.21		2.72	41.80	0.05			No
	P313589	9/6/01	GW07672RG	ANTIMONY	REAL	TR1	7.10	UG/L	6.00	B	UJ1	1.70	5.00	1.18	39.54	0.18	66.2	0.11	No
	P313589	1/15/01	GW07370RG	NICKEL	REAL	TR1	150.00	UG/L	140.00		V	1.03	1.00	1.07	21.37	7.02	254.49	0.59	Yes
	P313589	1/15/01	GW07370RG	URANIUM-233,-234	REAL	TR1	2.35	PCI/L	1.06		V1	0.06		2.22	60.70	0.04			No
	P313589	9/6/01	GW07672RG	URANIUM-233,-234	REAL	TR1	1.84	PCI/L	1.06		V1	0.04		1.74	60.70	0.03			No
	P313589	1/15/01	GW07370RG	URANIUM-238	REAL	TR1	1.58	PCI/L	0.77		V1	0.06		2.06	41.80	0.04			No
	P313589	9/6/01	GW07672RG	URANIUM-238	REAL	TR1	1.22	PCI/L	0.77		V1	0.01		1.59	41.80	0.03			No
	P416689	4/23/01	GW07483RG	URANIUM-233,-234	REAL	TR1	2.06	PCI/L	1.06		V	0.13		1.94	60.70	0.03			No
	P416689	12/14/01	GW07795RG	URANIUM-233,-234	REAL	TR1	2.47	PCI/L	1.06		V	0.10		2.33	60.70	0.04			No
	P416689	4/23/01	GW07483RG	URANIUM-238	REAL	TR1	0.93	PCI/L	0.77	J	V	0.15		1.21	41.80	0.02			No
	P416689	12/14/01	GW07795RG	URANIUM-238	REAL	TR1	0.85	PCI/L	0.77	J	V	0.10		1.10	41.80	0.02			No
RCRA	4087	2/20/01	GW07378RG	URANIUM-233,-234	REAL	TR1	12.00	PCI/L	1.06		V1	0.13		11.32	60.70	0.20			No
	4087	4/10/01	GW07502RG	URANIUM-233,-234	REAL	TR1	13.20	PCI/L	1.06		V	0.06		12.45	60.70	0.22			No
	4087	7/26/01	GW07698RG	URANIUM-233,-234	REAL	TR1	19.00	PCI/L	1.06			0.08		17.92	60.70	0.31			No
	4087	2/20/01	GW07378RG	URANIUM-238	REAL	TR1	9.60	PCI/L	0.77		V1	0.07		12.50	41.80	0.23			No
	4087	4/10/01	GW07502RG	URANIUM-238	REAL	TR1	9.09	PCI/L	0.77		V	0.11		11.84	41.80	0.22			No
	4087	7/26/01	GW07698RG	URANIUM-238	REAL	TR1	14.00	PCI/L	0.77			0.05		18.23	41.80	0.33			No
	52894	7/17/01	GW07700RG	URANIUM-233,-234	REAL	TR1	16.00	PCI/L	1.06			0.07		15.09	60.70	0.26			No
	52894	7/17/01	GW07700RG	URANIUM-238	REAL	TR1	12.00	PCI/L	0.77			0.05		15.63	41.80	0.29			No
	70193	10/11/01	GW07818RG	THALLIUM	REAL	TR1	3.00	UG/L	2.00	B	UJ1	2.10	1.00	1.50	4.90	0.61	1.93	1.55	No
	70393	2/21/01	GW07383RG	1,1-DICHLOROETHENE	REAL	TR1	15.20	UG/L	7.00		V1	1.00	2.00	2.17			20.72	0.73	No
	70393	4/26/01	GW07507RG	1,1-DICHLOROETHENE	REAL	TR1	8.00	UG/L	7.00		V1	1.00	1.00	1.14			20.73	0.39	No
	70393	7/11/01	GW07703RG	1,1-DICHLOROETHENE	REAL	TR1	10.00	UG/L	7.00		V	0.20	1.00	1.43			20.72	0.48	No
	70393	10/10/01	GW07819RG	1,1-DICHLOROETHENE	REAL	TR1	11.00	UG/L	7.00		V1	0.20	1.00	1.57			21.16	0.52	No
	70393	2/21/01	GW07383RG	TETRACHLOROETHENE	REAL	TR1	7.00	UG/L	5.00		V1	1.00	2.00	1.40			9.06	0.77	No
	70393	7/11/01	GW07703RG	TETRACHLOROETHENE	REAL	TR1	5.70	UG/L	5.00		V	0.36	1.00	1.14			9.06	0.63	No
	70393	10/10/01	GW07819RG	TETRACHLOROETHENE	REAL	TR1	5.60	UG/L	5.00		V1	0.36	1.00	1.12			9.06	0.62	No
	70393	2/21/01	GW07383RG	TRICHLOROETHENE	REAL	TR1	22.60	UG/L	5.00		V1	1.00	2.00	4.52			36.33	0.62	No
	70393	4/26/01	GW07507RG	TRICHLOROETHENE	REAL	TR1	13.00	UG/L	5.00		V1	1.00	1.00	2.60			36.33	0.36	No
	70393	7/11/01	GW07703RG	TRICHLOROETHENE	REAL	TR1	15.00	UG/L	5.00		V	0.22	1.00	3.00			36.33	0.41	No
	70393	10/10/01	GW07819RG	TRICHLOROETHENE	REAL	TR1	17.00	UG/L	5.00		V1	0.22	1.00	3.40			36.33	0.47	No
	70493	10/17/01	GW07820RG	THALLIUM	REAL	TR1	3.00	UG/L	2.00	B	UJ1	2.10	1.00	1.50	4.90	0.61	2.81	1.07	No
	70493	1/26/01	GW07384RG	URANIUM-233,-234	REAL	TR1	1.89	PCI/L	1.06		V1	0.07		1.78	60.70	0.03			No
	70493	4/9/01	GW07508RG	URANIUM-233,-234	REAL	TR1	1.61	PCI/L	1.06		V	0.07		1.52	60.70	0.03			No
	70493	10/17/01	GW07820RG	URANIUM-233,-234	REAL	TR1	1.64	PCI/L	1.06		V	0.18		1.55	60.70	0.03			No
	70493	1/26/01	GW07384RG	URANIUM-238	REAL	TR1	0.99	PCI/L	0.77	J	V1	0.07		1.29	41.80	0.02			No
	70493	4/9/01	GW07508RG	URANIUM-238	REAL	TR1	1.00	PCI/L	0.77		V	0.12		1.30	41.80	0.02			No
	B206989	3/20/01	GW07385RG	LITHIUM	REAL	TR1	2140.00	UG/L	730.00		J1	0.05	1.00	2.93	142.55	15.01	ID		Yes
	B206989	8/7/01	GW07705RG	LITHIUM	REAL	TR1	1100.00	UG/L	730.00		V1	2.20	1.00	1.51	142.55	7.72	ID		Yes
	B206989	10/9/01	GW07821RG	LITHIUM	REAL	TR1	1150.00	UG/L	730.00		V1	4.10	1.00	1.58	142.60	8.07	ID		Yes
	B206989	2/20/01	GW07385RG	NITRATE/NITRITE	REAL	TR1	60.00	MG/L	10.00		V1	0.05	50.00	6.00	4.66	12.86	75.35	0.80	Yes
	B206989	7/17/01	GW07705RG	NITRATE/NITRITE	REAL	DL1	33.30	MG/L	10.00		V1	0.21	10.00	3.33	4.66	7.14	75.35	0.44	Yes
	B206989	10/9/01	GW07821RG	NITRATE/NITRITE	REAL	DL1	31.40	MG/L	10.00		V1	0.10	5.00	3.14	4.70	6.73	75.35	0.42	Yes
	B206989	3/20/01	GW07385RG	SELENIUM	REAL	TR1	272.00	UG/L	50.00		V1	0.78	1.00	5.44	43.72	6.22	ID		Yes
	B206989	8/7/01	GW07705RG	SELENIUM	REAL	TR1	280.00	UG/L	50.00		V1	0.66	2.00	5.60	43.72	6.40	ID		Yes
	B206989	10/9/01	GW07821RG	SELENIUM	REAL	TR1	303.00	UG/L	50.00		J1	2.40	1.00	6.06	43.70	6.93	ID		Yes
	B206989	8/7/01	GW07705RG	SULFATE	REAL	TR1	2800.00	MG/L	500.00		V1	1.00	1.00	5.60	435.60	6.43	ID		Yes
	B206989	10/22/01	GW07821RG	SULFATE	REAL	DL1	2760.00	MG/L	500.00		V1	10.00	100.00	5.52	435.60	6.34	ID		Yes
	B206989	10/9/01	GW07821RG	THALLIUM	REAL	TR1	4.50	UG/L	2.00		UJ1	2.10	1.00	2.25	4.90	0.92	ID		No
	B206989	8/30/01	GW07705RG	URANIUM-233,-234	REAL	TR1	60.50	PCI/L	1.06		V1	0.07		57.08	60.70	1.00			No
	B206989	12/4/01	GW07821RG	URANIUM-233,-234	REAL	TR1	53.40	PCI/L	1.06		V1	0.37		50.38	60.70	0.88			No

ID = Insufficient Data to calculate Historic Mean +/- 2-Standard Deviations for 1991-1995
ND = Location has no Historic Data prior to 1995

Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Repo-able Result?
	B206989	8/30/01	GW07705RG	URANIUM-235	REAL	TR1	1.50	PCI/L	1.01		V1	0.07		1.49	1.79	0.84			No
	B206989	12/4/01	GW07821RG	URANIUM-235	REAL	TR1	1.64	PCI/L	1.01		V1	0.37		1.62	1.79	0.92			No
	B206989	8/30/01	GW07705RG	URANIUM-238	REAL	TR1	37.20	PCI/L	0.77		V1	0.06		48.44	41.80	0.89			No
	B206989	12/4/01	GW07821RG	URANIUM-238	REAL	TR1	32.10	PCI/L	0.77		V1	0.31		41.80	41.80	0.77			No

No* = IMP Well Class for 10992 and 891COLWEL were changed for 2002 IMP. Results at these locations were recorded as non-reportables in the Quarterly reports under Performance Monitoring.

ID = Insufficient Data to calculate Historic Mean +/- 2-Standard Deviations for 1991-1995
ND = Location has no Historic Data prior to 1995

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Table 2-3: 2001 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/12/02

Well Class	Well /Location	Sample Date	Sample #	Analyte	QC Type	Result Type	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Tier II Ratio	Back-ground M2SD	Back-ground Ratio	Historic M2SD	Historic Ratio	Report-able Result?

Abbreviations

ID = Insufficient number of 1991-95 samples (5)

DL1- see TR2 below

MG/L = Milligrams per liter

ND = No 1991-1995 data, no Historic M2SD.

PCI/L = Picocuries per liter

TR1 = First analytical run

TR2 = Second analytical run, implies dilution (also DL1, DIL)

TR3 = Third analytical run, etc.

UG/L = Micrograms per liter (or mg/L)

Lab Qualifiers (note analyte group)

B = Detected concentration less than contract required detection limit (CRDL) but above instrument detection limit (IDL) (metals & other inorganics)

B = Analyte present in both sample and method blank (MB) (organics)

B = Activity in the method blank exceeds minimum detectable activity (MDA) (radionuclides)

D = Sample run at a dilution (organics)

E =analyte exceeds calibration range of instrument (organics)

E = reported result is estimated due to interference (inorganics)

J = Positively identified below sample quantification limit (SQL), result estimated (organics)

J = Estimated quantification (inorganics & radionuclides)

U = Target analyte not detected (all analytes)

Validation/Verification Qualifiers*

(list in order from highest confidence to lowest)

V/V1 = Valid

J/J1 = Estimated

NJ/NJ1 = Presumptively Estimated

UJ/UJ1 = Estimated at an elevated level of detection

R/R1 = Rejected

1 = Unvalidated/Unverified member of TR1-TR2 pair. Other pair member should be Validated/Verified.

*Validation is a more thorough review of laboratory package than verification.

ID = Insufficient Data to calculate Historic Mean +/- 2-Standard Deviations for 1991-1995

ND = Location has no Historic Data prior to 1995

3.0 GROUNDWATER FLOW CONDITIONS DURING 2001

Groundwater level data collected throughout calendar year 2001 were reviewed to determine whether significant changes in groundwater flow direction, flow velocity, and quantity have occurred within the upper hydrostratigraphic unit since 1996. Because it is the year prior to the commencement of D&D activities, the 1996 data set has been adopted as a sitewide baseline. In that regard, it will be used for assessing annual changes to the groundwater flow system during the remaining years of plant closure and the post-closure monitoring period.

The data review included preparation of semiannual potentiometric surface maps, quarterly linear flow velocity calculations, selected well hydrographs, and water level change maps. In addition, an evaluation was performed on the real time groundwater-monitoring network, which includes 33 monitoring wells outfitted with downhole dataloggers that measure water levels simultaneously six times a day.

Comparison of the 2001 data to previous potentiometric surface maps (from previous RFCA Annual Reports) and historical water level trends presented in the individual well hydrographs provide a framework for identifying the type of potentiometric configurations, seasonal fluctuations, and long-term trends typically associated with pre-1996 plant operations.

The variations in water levels and linear flow velocities are probably in response to the timing of water level measurements with respect to natural recharge (precipitation), artificial recharge, or artificial dewatering events. Artificial events may involve recharge or dewatering related to construction, demolition, onsite industrial processes, water line leaks, monitoring well sampling, and building perimeter drain activity or inactivity.

3.1 Potentiometric Surface Maps

Potentiometric surface maps of the Site (Plates 3 and 4) and of the Industrial Area (Plates 5 and 6) were constructed from water level data collected during the second and fourth quarters (April and October data, respectively) of 2001. The data utilized are from unconsolidated surficial deposits and selected weathered bedrock components comprising the UHSU. These maps provide information on groundwater flow direction and saturated extent that were used in the selection of wells for velocity calculations and definition of plume extent and migration. The non-contoured areas on Plates 3 and 4 indicate areas where well coverage is absent. When the measured depth to water was below the bottom of the well screen (in the case where a sump is present), the well was assumed to be dry. Potentiometric contour refinements were made with respect to building foundation drain elevations.

Potentiometric maps constructed for the UHSU were based entirely on data from wells screened in surficial deposits and weathered bedrock units (including the Arapahoe No.1 Sand) thought to be representative of regional shallow groundwater flow conditions. For this reason, wells completed in perched alluvial groundwater zones, such as Wells 50494, 50694, and 51594 in the West Spray Field, are not utilized for construction of potentiometric contours. Where nested UHSU Well Pairs show conflicting water level elevations, for example one of the wells is dry, well

completion data and historic and current water level data in the vicinity was reviewed and the water level data thought to be most representative was selected for construction of potentiometric contours. Nested UHSU Well Pairs that show one well dry and the other with valid potentiometric data, consist generally of one well screened to the base of alluvium (the dry well), the other well screened in some portion of the alluvium, and into the upper weathered bedrock or just in the upper weathered bedrock.

Areas previously labeled as unsaturated, particularly areas from the 1993 maps (EG&G, 1994b), were evaluated and reconfigured utilizing new monitoring well coverage (i.e., D&D Wells) and the current water level data. It is important to note that just because an area is mapped as unsaturated alluvium on a potentiometric map does not necessarily mean that there is no UHSU groundwater at that location. The well may not fully penetrate the UHSU, instead, it may only penetrate the alluvial portion of the UHSU at that location.

Information on seep areas was added to Plates 5 and 6 from the 1995 Hydrogeologic Characterization Report (EG&G, 1995b). Seep areas may be overlain by current unsaturated alluvial coverage. This situation can exist because the seep may be a result of saturated weathered bedrock that crops out on a hillside, while the alluvium at that location, as described above, may be unsaturated.

The configuration of the 2nd and 4th quarter Site potentiometric surfaces (Plates 3 and 4), depicted on a 20-foot contour interval, generally matches the configurations depicted in previous Annual Reports. The configuration of the 2nd and 4th quarter IA potentiometric surfaces (Plates 5 and 6), depicted on a 5-foot contour interval, were prepared to facilitate more detailed groundwater evaluations with respect to increased well coverage and the effects of building foundation drains. In the future, the effect of certain building foundation drains may still be observed after the completion of D&D activities. If the drains are gravity flow in nature, they will continue to impact the water table even after a given building has undergone D&D. This assumes that structures that are below ground level are left in place and not completely plugged, including the trench that the foundation drain is backfilled in. In the case of a building where the foundation drain does not operate by gravity flow but rather groundwater is collected and pumped to a storage and/or treatment area, the water table should equilibrate to a normal elevation after D&D activities cease and the active pumping systems are abandoned.

Plant operations appear to have locally impacted groundwater flow patterns in areas where potentiometric contours deviate from ground-surface topographic and/or bedrock surface topographic configurations. The presence of irregular potentiometric contours suggests that the groundwater surface has been influenced by the presence of subsurface barriers; sinks, such as building foundation drains; deep storm drains; excavations; buried utility corridors, and extensive paved areas.

The pattern and configuration of potentiometric contour lines in the immediate vicinity of Buildings 371/374, 444, 771/774, 881, 883, 865, 886, and 991 suggest that foundation drains have localized yet pronounced impacts on UHSU groundwater flow in the IA (Plates 5 and 6). Compressed potentiometric contours on these maps indicate a steeper hydraulic gradient in many of those areas that may be associated with building foundation drains. The most

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extensive area of steep hydraulic gradient exists in the northwest and north central IA. This area, including Buildings 371/374, 566, the northwest portion of 776, and the southeast portion of 771, presents a complex combination of artificial and bedrock controls on the UHSU potentiometric surface configuration.

Unsaturated alluvial areas depicted on the 2001 maps were generally less extensive, especially for the fourth quarter, than shown on the 1996 and 1999 maps. This condition probably reflects the fact that annual precipitation at RFETS during 2001 was greater than average (although the second half of 2001 yielded almost no precipitation). The horizontal flow velocity of UHSU groundwater in these localized areas may be slightly lower as the existing UHSU groundwater is flowing through weathered bedrock (with a lower hydraulic conductivity), but the overall effect on groundwater flow velocity is probably negligible.

A comparison of the 2001 to 2000 potentiometric maps with respect to unsaturated alluvium revealed that during the 2nd quarter of both years, the unsaturated alluvial extent east and southeast of the IA are approximately the same. The 2nd quarter unsaturated alluvial areas in the north-central and northeast IA are less extensive in 2001 than 2000. Unsaturated alluvial areas north of the North Perimeter Road are much less extensive in 2001 than in 2000. Unsaturated alluvial areas in the Woman Creek drainage are more extensive in 2001 than in 2000. During the 4th quarter of both years, the unsaturated alluvium in the north-central and northeast IA, as well as east and southeast of the IA, is less extensive in 2001 than in 2000. The 4th quarter extent of unsaturated alluvium north of the IA is much less extensive in 2001 than in 2000. Unsaturated alluvial material in the Woman Creek drainage is slightly more extensive in 2001 than in 2000.

3.2 Average Linear Flow Velocities

Linear flow velocities can be used together with potentiometric and water level change maps, hydrographs, and chemical trend data in monitoring contaminant plume concentration dynamics and potential migration toward surface water. Average horizontal linear groundwater flow velocities (seepage velocities) were calculated for UHSU Well Pairs located generally within and adjacent to the IA (Figure 3-1). The original 24 Well Pairs used in previous RFCA Annual Reports have been discontinued in favor of Well Pairs that generally have potentiometric data available for both wells during the 2nd and 4th quarters, and wells which are pertinent to current and future groundwater monitoring and Site Closure activities. In future RFCA Annual Reports, the well pair list may vary annually depending on the current water table conditions and groundwater monitoring objectives. The historical list of linear flow velocity Well Pairs was amended because in some areas the alluvium has become intermittently dewatered, and the pertinence of obtaining linear flow velocities in other areas was reevaluated. In addition, certain areas of RFETS have had their hydraulic properties disrupted by remediation systems (i.e., groundwater collection trenches or treatment cells). The new Well Pairs were selected based on flow directions derived from data depicted on the 2001 potentiometric surface maps included in this RFCA Annual Report.

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The Darcy equation was used to calculate the seepage velocity (v):

$$v = \frac{K}{n}(dh / dl)$$

where:

K = hydraulic conductivity
n = effective porosity
dh/dl = hydraulic gradient (change in elevation divided by linear distance)

Values for hydraulic gradient were calculated from quarterly or biannual water level measurements made between Well Pairs located along an identified groundwater pathway. The current Well Pairs were chosen on the basis of their perpendicular orientation to current potentiometric contour lines. Hydraulic conductivity values used for velocity calculations were derived from the geometric mean values (recalculated for Rocky Flats Alluvium, see discussion below) reported for the Rocky Flats Alluvium (Qrf) and Quaternary colluvium (Qc) presented in Table G-2 of EG&G (1995b). For each well pair, the K value chosen for the calculation was based on the predominant lithologic unit comprising the flow path between the wells. In the case of two Well Pairs (00100/70799 and 2686/70999), the K value utilized was the average of the hydraulic conductivity of the Qrf and the Qc. This was done because approximately half of the lengths of the groundwater flow pathway for each well pair was located in each of the Qrf and Qc. In the absence of measured values of n (effective porosity), a conservative value for unconsolidated material of 0.1 is assumed based on its usage in previous velocity calculations performed at RFETS.

The Site hydraulic conductivity values calculated for the Qrf and the Valley Fill Alluvium (Qvf) have changed since the 1999 RFCA Annual Report. The previously used data, presented in Table G-2 of EG&G (1995b), did not include data from approximately 40 aquifer tests performed in 1995. These tests were performed only on wells completed in the Qrf and Qvf; therefore, the geometric mean K values calculated for the other water bearing formations listed in Table G-2 have not changed. The geometric mean hydraulic conductivity value for the Qrf changed from 2.10E-04 cm/sec to 4.18E-04 cm/sec based on the new data. The geometric mean hydraulic conductivity value for the Qvf changed from 2.54E-03 cm/sec to 9.197E-04 cm/sec based on the new data. Only the change in the K value for the Qrf is pertinent to this discussion of linear flow velocities. Basically, the change in K for the Qrf, with other parameters (i.e., hydraulic gradient, effective porosity) staying the same, amounts to doubling the velocity in cm/sec or ft/yr. With order of magnitude K value changes being considered significant, this is a relatively minor change.

Groundwater flow velocities can be used as estimates of the migration rates for conservative (i.e., non-reactive) groundwater chemical constituents. Because they do not consider the effects of dispersion and chemical reactions (e.g., volatilization, biodegradation, dissolution/precipitation, and adsorption) on the concentrations of constituents along a flow path, seepage velocities approximate only the unattenuated rate of migration for dissolved constituents in groundwater. Attenuated, volatile, biodegradable, or redox-sensitive species will likely exhibit migration rates slower than the average linear velocity of groundwater flow. Using data from wells that are screened across

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different lithologies could also lead to variance between actual contaminant migration rates and calculated average rates.

Large-scale changes in the hydraulic gradient caused by reconfiguration of the groundwater recharge and discharge regime during plant closure have the potential to impact groundwater flow directions and velocities which, in turn, can affect plume concentration, configuration, and movement. Two hypothetical closure scenarios are evaluated in the SWWB (K-H, 2002c). Although the actual linear flow velocity between the members of any given well pair are somewhat uncertain, changes in relative flow velocities, combined with potentiometric mapping, and specific well hydrograph results overlain with contaminant concentration trend plots, provides insight into plume dynamics and movement. Linear flow velocity calculations are sensitive mainly to the magnitude of the hydraulic gradient (order of magnitude or greater changes) and potentially to the K value (factor of four to five change between Qrf and Qc); the assigned value of n is constant.

As shown in Table 3-1, the calculated 2001 groundwater flow velocities for all formations ranged from a minimum of 42.1 feet per year (ft/yr) between well pair 1490/1290 (2nd quarter), located northwest of the IA, to a maximum of 241.4 ft/yr between well pair 56994/57094 (4th quarter), located south of the IA. Well pair 56994/57094 is located in on a hillslope in the Old Landfill (OU5) area. The minimum value is associated with the Qrf. The maximum value is associated with the Qc. Hydraulic gradients are always higher on hillslopes; the hydraulic gradients associated with Qc in this discussion are generally an order of magnitude higher than hydraulic gradients associated with Qrf.

Linear flow velocities calculated for the Qrf ranged from 42.1 ft/yr to 180.9 ft/yr. The next highest velocity calculated for groundwater moving through Qrf is 122.1 ft/yr. The minimum linear flow velocity calculated for the Qc was 83.1 ft/yr. In general, flow velocity ranges for the Qrf and the Qc is similar. The average linear flow velocity for the Qrf is 98.7 ft/yr; the average for the Qc is 135.9 ft/yr. The flow velocities for the two Well Pairs where the K value consists of the averaged K values of the Qrf and Qc ranged from 152.9 ft/yr (well pair 2686/70999; 2nd quarter) to 239.7 ft/yr (well pair 00100/70799; 4th quarter).

Table 3-1 presents the calculated 2nd and 4th quarter 2001 linear flow velocities. The entire discussion in Section 3.0, as far as potentiometric and water level change data, is with respect to 2nd and 4th quarter data. For Well Pairs that were represented by both 2nd and 4th quarter 2001 data, the flow velocities are consistent between both quarters; generally within 10 percent. Only two Well Pairs had flow velocities that varied between quarters by more than 10 ft/yr. Differences in linear flow velocity from quarter to quarter are because of variation in the hydraulic gradient, which is caused by seasonal fluctuations in water levels at one or each of the two wells constituting a well pair.

Because the flow velocity Well Pairs have been reevaluated and reselected, we cannot compare the current flow velocities to the 1996 flow velocities. If some of the current transects are used for the 2002 Annual Report, those velocities will be compared to the current ones. It is interesting to note that, historically, the major changes in flow velocities (when comparing previous years with data for the same Well Pairs, for instance 1996 and 2000) were in

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Well Pairs located in or immediately downgradient of the IA. This phenomenon may be expected in the IA versus the Buffer Zone because of all the artificial features associated with the IA (building drains, pavement, piping and utility corridors, etc.), and the ongoing changes to these features during Site closure. Velocities reported for 1996 through 2000 were generally higher than velocities reported in pre-1996 annual RCRA groundwater monitoring reports largely because sitewide mean K values are now employed in the calculations instead of the individual OU mean K values that were used in the past.

The area encompassed by Well Pair 1490/1290, located on the pediment northwest of the IA, may be most indicative of the actual flow velocity of groundwater through the Qrf without the anthropogenic affects of the IA. Regardless of the anthropogenic effects of the IA, the Qrf and Qc are heterogeneous materials and linear velocity variation is inherent within these materials from location to location.

3.3 Well Hydrographs and Water Level Change Maps

Hydrograph plots for many RFCA water quality wells are contained in Appendix C. The hydrographs have been constructed in order to observe changes in water table elevation with time. In addition to illustrating seasonal fluctuations in water table elevation, hydrographs are useful for evaluating trends that might result from either artificial activities (plant closure) or natural causes (climate change). For example, a comparison of IA well hydrographic data to background well hydrographic data may suggest whether any of the observed trends are naturally or artificially induced. If groundwater levels within RFETS have reached a steady state condition since the cessation of production operations in 1989, it is conceivable that plant D&D activities are disrupting this condition and causing local water levels to rise or fall, depending on the closure action. These changes in water level elevations will be evaluated in future years using annual water level change maps that will be based on the current water levels compared to water levels collected during the 1996 baseline year.

Water levels measured during 2001 were, for the most part, observed to fluctuate within previously observed ranges. For all site wells, where appropriate data were available for the 2nd and 4th quarters, water levels were higher in exactly 50 percent of the wells during the first half of 2001 compared to the second half of the year. The wells were scattered randomly over the site; there was no apparent pattern, with regard to location, of the 50 percent of the wells where water levels were higher in the first half of the year as opposed to the second half. Overall, water levels were similar in 2001 to the levels observed in 1996, which were higher than average and were thought to reflect the residual influence of the record high water levels experienced in 1995. The mean annual precipitation for the Site is about 14.5 inches based on rain gauge totals from the Site meteorological station located northwest of the IA.

Table 3-1 Linear Flow Velocities

Well Pair	Area	2001 QTR	WL Elevation Well 1	WL Elevation Well 2	Dh (ft)	Dl (ft)	dh/dl (hydraulic gradient)	K (cm/sec)	n_e	v (cm/sec)	v (ft/yr)	Time to Traverse Transect (yrs)
P415989/60399	West Central IA	2	6037.15	5978.18	58.97	2904.50	0.0203	4.18E-04	0.1	8.49E-05	87.8	33.08
P415989/60399	West Central IA	4	6035.83	5980.72	55.11	2904.50	0.0190	4.18E-04	0.1	7.93E-05	82.1	35.40
P416089/P416689	Southwest IA	2	6042.3	6005.48	36.82	1304.07	0.0282	4.18E-04	0.1	1.18E-04	122.1	10.68
P416089/P416689	Southwest IA	4	6039.09	6006.69	32.4	1304.07	0.0248	4.18E-04	0.1	1.04E-04	107.5	12.14
10498/40199	Buildings 123/444	2	6027.3	6009.79	17.51	438.06	0.0400	4.18E-04	0.1	1.67E-04	172.9	2.53
10498/40199	Buildings 123/444	4	6027.02	6008.7	18.32	438.06	0.0418	4.18E-04	0.1	1.75E-04	180.9	2.42
56994/57094	OU5 Old Landfill	2	6003.07	5938.29	64.78	268.79	0.2410	9.33E-05	0.1	2.25E-04	232.6	1.16
56994/57094	OU5 Old Landfill	4	6004.03	5936.8	67.23	268.79	0.2501	9.33E-05	0.1	2.33E-04	241.4	1.11
58494/58194	OU5 Old Landfill	2	5991.41	5924.61	66.8	435.98	0.1532	9.33E-05	0.1	1.43E-04	147.9	2.95
58494/58194	OU5 Old Landfill	4	ND	ND	ND	435.98	ND	9.33E-05	0.1	ND	ND	ND
37191/61295	OU1 881 Hillside	2	5936.27	5863.55	72.72	547.96	0.1327	9.33E-05	0.1	1.24E-04	128.1	4.28
37191/61295	OU1 881 Hillside	4	5935.61	5862.51	73.1	547.96	0.1334	9.33E-05	0.1	1.24E-04	128.8	4.26
07291/23096	Ryan's Pit	2	5957.38	5828.1	129.3	966.82	0.1337	9.33E-05	0.1	1.25E-04	129.1	7.49
07291/23096	Ryan's Pit	4	5958.02	5825.16	132.9	966.82	0.1374	9.33E-05	0.1	1.28E-04	132.7	7.29
60994/90299	Ryan's/903 Pad	2	5921.04	5807.36	113.7	832.35	0.1366	9.33E-05	0.1	1.27E-04	131.8	6.31
60994/90299	Ryan's/903 Pad	4	5923.36	5805.51	117.8	832.35	0.1416	9.33E-05	0.1	1.32E-04	136.7	6.09
00100/70799	Solar Ponds	2	5970.73	5886.2	84.53	977.21	0.0865	2.56E-04*	0.1	2.21E-04	228.8	4.27
00100/70799	Solar Ponds	4	5972.1	5883.55	88.55	977.21	0.0906	2.56E-04*	0.1	2.32E-04	239.7	4.08
2686/70999	Solar Ponds	2	5964.5	5899.92	64.58	1117.45	0.0578	2.56E-04*	0.1	1.48E-04	152.9	7.31
2686/70999	Solar Ponds	4	5964.87	5899.76	65.11	1117.45	0.0583	2.56E-04*	0.1	1.49E-04	154.1	7.25
P218389/B208289	Solar Ponds	2	5943.62	5835.4	108.2	1110.82	0.0974	9.33E-05	0.1	9.09E-05	94.0	11.81
P218389/B208289	Solar Ponds	4	5943.66	5835.39	108.3	1110.82	0.0975	9.33E-05	0.1	9.09E-05	94.1	11.81
41199/06991	Southeast IA	2	5982.94	5956.16	26.78	1526.31	0.0175	4.18E-04	0.1	7.33E-05	75.9	20.11
41199/06991	Southeast IA	4	5981.26	5955.28	25.98	1526.31	0.0170	4.18E-04	0.1	7.11E-05	73.6	20.73
02097/B208789	PU&D Yard	2	5967.33	5905.42	61.91	719.16	0.0861	9.33E-05	0.1	8.03E-05	83.1	8.65
02097/B208789	PU&D Yard	4	5967.36	5902.54	64.82	719.16	0.0901	9.33E-05	0.1	8.41E-05	87.0	8.27
1490/1290	Northwest BZ	2	6015.98	5987.17	28.81	2957.22	0.0097	4.18E-04	0.1	4.07E-05	42.1	70.19
1490/1290	Northwest BZ	4	6017.7	5989.28	28.42	2957.20	0.0096	4.18E-04	0.1	4.02E-05	41.6	71.15

Notes: ND = no data; * = averaged K value of Qrf and Qc

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Sitewide precipitation data from 1995 through 2001 indicates that precipitation was very high in 1995 (21.6 inches), 1996 produced average precipitation (14.4 inches), 1997 produced above average precipitation (17.7 inches), 1998 produced average precipitation (14.4 inches), 1999 produced above average precipitation (17.8 inches), 2000 produced below average precipitation (13.0 inches), and 2001 produced above average precipitation (16.0 inches). The continuing trend of higher than average UHSU water levels may be based on recurrent higher than average precipitation (except for 2000), since 1995, providing ample groundwater recharge. This trend implies that climate is the dominant cause of water level changes at RFETS.

Water level change maps (Plates 11 and 12) were prepared utilizing the difference between 2001 and 1996 water levels at wells that had water level measurements in common for the two years. These data are used to compare the 2001 potentiometric surface for the second (April data) and fourth (October data) quarters to the 1996 potentiometric surface for the corresponding quarters. The water level change maps indicate areas of the site where changes in saturated thickness, either positive or negative, have taken place between the 1996 base level year and the current year (2001). It is important to note that wells that have been purged for sample collection a short time prior to the water level measurement and that have a slow recharge rate, can reflect an artificially large discrepancy in water level change from 1996 to the year of the current RFCA Annual Report.

Second Quarter 1996 compared to Second Quarter 2001

The water level change map comparing the second quarters of 1996 and 2001 (Plate 11) generally shows no change to slightly negative change in the IA, indicating static to slightly lower water levels during 2001, as compared to 1996. The western portion of the IA shows an area of positive water level change (greater than +3 feet) indicating higher water levels in 2001 compared to 1996. A localized area of strongly negative water level change (greater than -5 feet) is observed immediately east of the Solar Ponds, possibly because of closure of the Solar Ponds. An area of negative to slightly positive (greater than -1 foot to +1 foot) water level change extends from southwest of the Solar Ponds to the northeast through the A- and B-Ponds drainages. In addition, an area southwest of the 903 Pad shows strongly negative water level change (greater than -5 feet). This area of negative water level change trends to the northeast through the 903 Pad to the East Trenches area showing negative water level change of up to two feet. An isolated area of strongly negative (greater than -5 feet) water level change is located along Indiana Street just north of the East Access entrance.

The West Spray Field and West Buffer Zone shows a slightly positive (less than +1) to slightly negative (less than -1) water level change that may be a lingering result of ample groundwater recharge from the high precipitation experienced during 2001. The background area north and west (upgradient) of the Present Landfill shows negative (up to -2 feet) water level change. This background area may be most indicative of actual water level change without the anthropogenic affects of the IA. A localized area of high positive water level change is found extending from Building 774 north-northeast to the three storage tanks (MSTs) north of the North Perimeter Road.

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The general trend of water level change for the 2nd quarter of 2001 compared to the 2nd quarter of 1996, with respect to the IA, is negative. This may be a result of lower than average precipitation during 2000 and the first three months of 2001.

Fourth Quarter 1996 compared to Fourth Quarter 2001

The water level change map comparing the fourth quarters of 1996 and 2001 (Plate 12) generally shows that there is negative water level change (greater than -5 to less than -1 feet) in the western and central portion of the IA and slightly positive water level change (greater than +1 feet) in the eastern third of the IA. The southwest portion of the IA exhibits strongly negative water level change that indicates that the 4th quarter water levels in this area were substantially lower during 2001. The area immediately east of the Solar Ponds exhibits slightly negative water level change that extends to the northeast through the A- and B-Ponds drainages. Included in this area are four isolated areas of strongly negative water level change. These bullseyes are associated with individual wells (1386, 10594, 75992, and 75292) in the North and South Walnut Creek drainages and may be a result of pond discharge timing or in the case of well 75992, treatment system location. The southeastern portion of the IA, encompassing the 903 Pad, exhibits slightly negative water level change. This area extends southwest towards the SID with greater negative water level change (greater than -3 feet).

The West Spray Field and West Buffer Zone shows positive water level change (less than +1 to greater than +3 feet) indicating that the water levels were higher in this area during the 4th quarter of 2001. This area of positive water level change extends to the area north and west (upgradient) of the Present Landfill. As described above, this background area may be most indicative of actual water level change without the anthropogenic affects of the IA. The Present Landfill generally shows slightly negative water level change, with stronger negative water level change (greater than -2 feet) in the area of the PU&D Yard. The positive water level change in the west and northwest Buffer Zone in the 4th quarter may be a result of ample groundwater recharge from the higher than average precipitation during 2001, especially because most of the 2001 precipitation took place during the 2nd and 3rd quarters.

With respect to the IA, the general trend of water level change for the 4th quarter of 2001 compared to the 4th quarter of 1996 is negative. This may be a result of lower than average precipitation during 2000 and the first three months of 2001.

3.4 Real Time Groundwater Monitoring Network

As a requirement of the RFETS IMP, a real time water level monitoring network was established for the UHSU during 1998, and expanded during 1999. The network currently consists of 33 monitoring wells equipped with downhole In-Situ Inc., Model SP4000 Troll® data loggers. The 33 monitoring stations were chosen for the program based on location, historical groundwater occurrence at each location, stratigraphic completion interval, and monitoring well construction details. The network provides for frequent simultaneous measurement of groundwater levels at all locations. The goals of the real time groundwater monitoring network are to provide ample, concurrent, water level measurements for environmentally or hydrogeologically sensitive areas of RFETS, such as beneath and

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downgradient of the IA, and along stream channels to the north, south, and east of the IA. These data, also utilized by the SWWB (K-H, 2002c), are important to modeling and understanding groundwater dynamics on a short term scale that quarterly or even monthly water level measurements do not allow. Combined with surface water and precipitation data this information allows a greater understanding of the effects of infiltration events and ET on the UHSU.

The Troll® is a compact downhole instrument that contains a data logger, temperature sensor, pressure transducer, and battery in a self-contained watertight unit. The transducer is vented at the surface so as to negate the effects of barometric pressure changes. The Troll® measures and records temperature and temperature corrected water level and allows for unattended long-term monitoring. It is programmed and downloaded with a portable computer. In-Situ Inc.'s Win-Situ® software allows the user to communicate with the Trolls® in order to program a variety of short-term tests, program a long-term monitoring scheme, or download data without withdrawing the unit from the monitoring well.

Currently, each of the Trolls® is programmed to measure the water level every four hours; 12:00 A.M., 4:00 A.M., 8:00 A.M., 12:00 P.M., 4:00 P.M., and 8:00 P.M. As shown on Plate 14 and Figure 3-2, monitoring wells utilized for the real time groundwater-monitoring network are located to provide sitewide coverage with additional specific coverage in the IA, immediately east (downgradient) of the IA, and in the north Buffer Zone. In addition, locations were chosen to monitor water levels in colluvial, alluvial, and weathered bedrock (pediment surface) deposits within the UHSU. The arrangement of Trolls® throughout RFETS allows observation, simultaneously across the site, of the impact of a precipitation event on the UHSU. The location of the Trolls® within the various sedimentary depositional environments and weathered bedrock which comprise the UHSU will allow for a better understanding of the relationship between groundwater and surface water at various locations around RFETS.

The Monitoring Wells in the 2001 real time groundwater-monitoring network include: 0186, 1086, 3686, 3986, 4786, 5586, 6886, 0187, 1487, 1587, 4287, P114889, P115489, P119389, P209889, P213689, P414189, P415889, P416589, B200589, B200889, B210489, 1190, 03791, 05191, 20691, 20991, 37591, 77492, 05293, 10794, 11494, and 51494 (see Figure 3-2 and Plate 14).

Data presented on Plate 14 are from calendar years 1999 through 2001. Data downloaded from the real time monitoring network for CY 2001 are complete except for well P209889, which only has data through September 2, 2001 due to a malfunction in the downhole unit. The malfunction was not realized until the spring 2002 download event. The unit was removed from the well and sent to In-Situ Inc. for repairs, then reinstalled in well P209889. There will be a data gap for this well from early September 2001 until July 2002.

There are certain wells from which earlier data are incomplete. The eight wells added to the program in spring 1999, have slightly less than a year of data recorded for CY 1999. Also, during 1999 all real time groundwater-monitoring stations were brought into compliance for year 2000 (Y2K) computer issues. Monitoring Wells 77492, 10794, 6886, and 51494 inadvertently had some early 1999 data deleted from them while uploading the Trolls® with new Y2K compliant firmware. Monitoring Wells 20991 and 4786 initially had Trolls® installed during late 1998 beneath a water column of greater than 34.5 feet. This exceeded the 15 pounds per square inch (psi) pressure rating

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of the transducer diaphragms. This was remedied by raising the Trolls® in the wells so that the water column exerted less than 15 psi. These are the only two wells in the real time groundwater monitoring system that could be affected by this pressure phenomenon.

Data presented in the 2001 Annual RFCA Groundwater Monitoring Report from the real time groundwater-monitoring network has been analyzed for the period of January 1999 through December 2001. Three yearly cycles of water level fluctuations and precipitation data are displayed, allowing for the following analysis and discussion. Plate 14 presents the 33 monitoring locations with a hydrograph of the groundwater elevation data collected from each station. Please note that the water table elevation scale, located on the right side of the hydrograph, varies from well to well. Superimposed on each hydrograph is precipitation data from the nearest RFETS surface water station that contains a rain gauge. There are a few gaps in the precipitation data because of problems that are inherent with unheated rain gauges. As stated above, CY 1999 was a year of above average precipitation (17.8 inches); CY 2000 had below average precipitation (13.0 inches); CY 2001 had above average precipitation (16.0 inches).

The following are general observations made from the three years of real time groundwater monitoring data collected from the network:

- The hydrographs indicate that responses to precipitation events and subsequent groundwater recharge are varied and dependent on the location and hydrologic parameters at the individual well location.
- Wells located in the western and northern Buffer Zone (5586, 51494, 4786, 1190, B200589, and B2008890) exhibit background baseflow without the anthropogenic effects of the IA, and generally show a very subtle response to the below average 2000 precipitation as compared to above average 1999 and 2001 precipitation. Two wells immediately east of the IA (1587 and 20691) exhibit this same phenomenon.
- Certain wells located east and southeast of the IA (03791, 3986, 05191, and 20991) exhibit almost no recharge during lower than average precipitation year 2000.
- Wells located in the IA (P213689, P416589, P415889, P115489, P114889, P119389, 77492, and P209889) with the exception of P414189, exhibit a relatively greater response to the below average precipitation that occurred during 2000 than Buffer Zone wells.
- Wells located in or adjacent to streambeds are the most sensitive to precipitation and pond discharge events with respect to groundwater recharge and dewatering response times and hydrographs graphically show the effects of ET, or lack of ET, depending on the season.

The following are specific observations made from the three years of real time groundwater monitoring data collected from the entire network:

Hydrographs from the series of Buffer Zone Wells trending from the south to the north and then northeast along the pediment surface west and north of the IA are thought to reflect in situ groundwater baseflow conditions without the anthropogenic effects of the IA. These wells include 5586, 11494, 51494, 4786, 1190, B200589, and B200889. Generally, these wells show a high water level achieved during the spring or summer of 1999 because of the high precipitation during 1999. Most (except 11494) show minimal spring responses to precipitation that occurred in 2000 compared to their 1999 hydrographs. Four of these wells (11494, 5586, 51494, and 4786) are located in the portion of the site where much of the alluvial groundwater recharge takes place. Two wells (51494 and 4786) which lie in a north-south line due north of the Raw Water Pond, exhibit constant diurnal fluctuation superimposed on the baseflow. This diurnal fluctuation may be related to excessive ET and/or may be attributed to some artificial effect caused by the pumping of groundwater from the adjacent (to the west) gravel pits. This diurnal fluctuation is

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exhibited to a lesser degree in Well 11494. Comparing the results of these wells to the IA wells, over time, should allow a better understanding of various facility specific effects on individual well responses to recharge or dewatering events.

Wells in the IA, of which there are 12 with Trolls®, generally exhibit baseflow, including a relatively high overall response to the less than average precipitation of 2000, superimposed with responses to acute precipitation events or a series of precipitation events that take place over a period of a week or two. The one exception to this is Well P114889, located in an extensive asphalt parking lot just southeast of the southwest corner of the PA, which exhibits general baseflow curves with little or no apparent responses to precipitation events. It is situated between two wells with Trolls®, P119389 and P115489, which exhibit marked responses to precipitation events. Wells P114889 and P119389 show a higher water table elevation in response to 2000 annual precipitation than the greater 1999 annual precipitation. Another unusual hydrograph is from Well P209889, located on the vegetated hillside just north of the SEPs, which exhibits a slight baseflow decline between the seasonal highs of the three years with minor individual precipitation event responses superimposed on the baseflow. The well maintains a relatively high water level all year. It also shows the drawdown effects of sampling events. Monitoring Well 05293, located in the PA downgradient of Building 707, shows groundwater elevation fluctuations that are dissimilar to any other well in the IA. This may be because the well lies in the downgradient shadow of the Building 707 foundation drain. The hydrograph from Well 05293 appears more like a hydrograph from a well adjacent to a streambed. Well 0187, located on the hillside immediately southwest of Building 881, shows the greatest and most immediate response to each precipitation event of any well other than those adjacent to a streambed. The grassy area to the north and east of this well was regularly watered, as was the Building 850 lawn, which may account for the unusual recharge spikes observed on the hydrograph during 1999 and 2000.

Wells (4287, B210489, 3686, 10794, 0186, and 6886) in or immediately adjacent to streambeds exhibit an almost immediate, although varying in magnitude and length, response to precipitation events during low ET times of the year. These same wells will show minimal to no response to precipitation events during high ET times of year (approximately July through September). With this in mind, each of the six well hydrographs differs somewhat from the others. It is also important to note that the dry time periods displayed on the hydrographs for these wells are dependent on the depth of well penetration into the Quaternary valley-fill alluvium. The streambeds are not dry at depth; the wells just do not penetrate the water table. Four of the near stream wells, 4287, B210489, 0186, and 6886 show a sustained, relatively high water table elevation for the fall, winter, and mid-spring of 1999-2001. The response in these wells reflects the lag time resulting from a stream receiving groundwater recharge from precipitation, combined with low ET during the cooler time of year, which encompasses late fall through mid-spring. Monitoring Wells 10794 and 3686 did not exhibit this phenomenon. Well 10794, downstream of the A- and B-Ponds, exhibits distinct responses to discharges from Ponds A-4 and B-5, possibly superimposed with minor responses to precipitation events. During mid-September 1999 through early March 2000, the area immediately adjacent to well 3686 was undergoing maintenance of a pipeline that extends from the Sewage Treatment Plant to Pond B-3 and routes water around Ponds B-1 and B-2. South Walnut Creek has been routed around Ponds B-1 and B-2 for some time and well 3686 generally only contains water for short periods in the spring and summer when precipitation recharge exceeds ET.

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Wells 03791, 20991, 20691, 1587, 05191, and 3986 are located east of the IA. Four of the wells (03791, 20991, 05191, and 3986) generally exhibit baseflow conditions with little or no response to individual precipitation events. These wells show a relatively smooth decline in water level during the last six months of 1999, almost no response to year 2000 precipitation, and then a moderate response to above average 2001 precipitation. Well 20691, located just northeast of the 903 Pad, and Well 1587, located due east of the 903 Pad, exhibit the general trend of the other wells east of the IA, but show a marked overall response to 2000 precipitation with precipitation event responses superimposed on the baseflow. The hydrographs for Wells 20691 and 1587 are strikingly similar. Well 20691 is screened in a buried paleochannel, which may account for its increased sensitivity to groundwater recharge.

Well 1487, located approximately 850 feet southeast of the 903 Pad, exhibits a sustained, relatively high water table elevation for the fall, winter, and mid-spring of 1999-2000, and the second half of 2001. During these periods there was relatively low precipitation. This UHSU well is screened entirely in weathered Arapahoe/Laramie sandstone and siltstone. This material exhibits a moderately lower hydraulic conductivity than alluvial and colluvial materials which would be found along the hillside north of the well. The lower hydraulic conductivity at this location may be responsible for the fact that the water table elevation stays relatively stable with very little variation in elevation through the course of an entire season. Groundwater percolating down the hillside through more permeable colluvial materials probably slows down as it gets into the weathered bedrock; the slower draining bedrock effectively causing the water level to remain high through the dry portions of the year.

Well 1086, located immediately upgradient of the Present Landfill, exhibits an almost immediate response time to precipitation events. This well does not fit into any of the previously discussed groups of wells in the real time monitoring network. Its overall response to Site annual precipitation is most similar, with regard to relative magnitude of recharge, to the majority of wells located in the IA; it exhibits the higher response to the less than average precipitation in 2000. But its immediate response to precipitation events differs from those IA wells in that they seem to react more to lateral flow. This may be a response to the location of the well with respect to the Present Sanitary Landfill. Potential groundwater mounding at the upgradient end of the landfill, which may be caused by the surface water diversion structure in this area, may increase the sensitivity of this well with respect to precipitation events.

In summary, groundwater flow conditions for 2001 appear to generally resemble flow conditions described for recent years with slight variations depending on the location and the localized precipitation variations within the RFETS site boundary. This situation is not unexpected because closure activities undertaken to date have been minimal and the relative impact to the UHSU, especially in the IA, is probably negligible except in localized areas. Positive water level changes observed west of the IA may be the result of mounding associated with consistently higher than average precipitation, combined with relatively slow lateral flow.

4.0 PERFORMANCE MONITORING

Performance monitoring refers to monitoring the effect(s) of a remediation system or source removal action, as required in the RFCA. If an increasing trend in the concentration of a contaminant is noted, then the appropriate parties are notified and an evaluation of the situation is initiated.

4.1 Mound Plume

4.1.1 Mound Site Source Removal

The Mound Site is located north of Central Avenue and northeast of the 903 Pad and consists of a former waste burial area where 1,405 drums were stored (Figure 4-1). Initially placed on the ground, the drums were buried with soil between April 1954 and September 1958, thus generating a "mound". The drums originated in Buildings 444, 771, 776, and 883 and contained uranium and beryllium contaminated lathe coolant (a mixture of approximately 70% hydraulic oil and 30% carbon tetrachloride), PCE and other VOCs, and low levels of plutonium.

In 1970, all of the drums were exhumed from the Mound Site along with some soil contaminated with radionuclides. The Mound Site area has been disturbed often, generally by construction projects, since the initial source removal. Additional radioactive soils were identified during these projects and removed at later dates. Subsequent investigations detected VOCs, primarily PCE, in subsurface soils at concentrations above the subsurface soil action levels that require cleanup.

The Mound Site (IHSS 113) source removal was the third accelerated source removal action at RFETS to remediate contaminated soils that were contributing to the degradation of groundwater in the area (RMRS, 1997c). This section evaluates performance of the source removal action per RFCA (RFCA, 1996) with regard to groundwater.

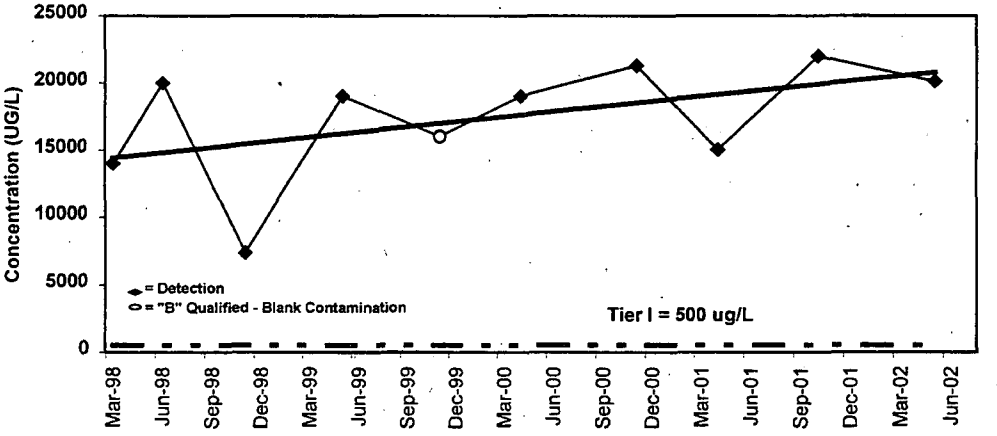
The accelerated soil removal action, which was completed during the spring of 1997, included the excavation and treatment of 724.5 cubic yards of soil contaminated with VOCs above Tier I action levels for subsurface soil (RMRS, 1997c). The excavation was completed in April 1997; soils were treated in August 1997 using low temperature thermal desorption to remove the VOCs and the treated soils were returned to the excavation in September 1997. As part of this project, a permanent culvert was installed in the previously unlined Central Avenue Ditch, which is located immediately upgradient of the source area and had contributed water to the Mound Site Plume.

The Closeout Report for the Source Removal at the Mound Site, IHSS 113 (RMRS, 1997c) summarizes the source removal action. In addition to PCE and TCE, carbon tetrachloride, and methylene chloride were also identified as contaminants of interest based on soil samples, however, carbon tetrachloride was never detected in Mound Site samples and detections of methylene chloride were determined to be a result of laboratory contamination (RMRS, 1997c).

Excavation boundary samples identified PCE contamination (12 and 86 mg/Kg) in two of the fourteen excavation bottom samples which exceed the VOC Cleanup Target Levels for Excavation stated in the Propose Action Memorandum (PAM) (RMRS, 1997c). However, because the majority of contaminated soil had been removed, because of problems with excavating deeper into the bedrock, and because the limiting conditions established in the PAM (excavation through the highly weathered bedrock) had been met, it was decided that excavation activities would cease (RMRS, 1997b and 1997c).

Well 00897 was installed in 1997 to monitor groundwater immediately downgradient of the Mound Site. PCE concentrations appear to fluctuate with a mean concentration of 17,380 µg/L and range from a minimum of 7400 µg/L in November 1998 to 22,000 µg/L in October 2001. As illustrated on Figure 4.1-1, PCE concentrations in well 00897 appear to exhibit a slight upward trend. The trend is apparent and not statistically significant because the slope of the trend line cannot be differentiated from zero.

Figure 4.1-1 Tetrachloroethene Trend Plot For Well 00897



TCE concentrations, as shown in Figure 4.1-2, range from an initial high of 2000 µg/L in March and June 1998 to a minimum of 1500 µg/L in April and October 2001 with a mean concentration of 1691 µg/L for 1998 to 2001.

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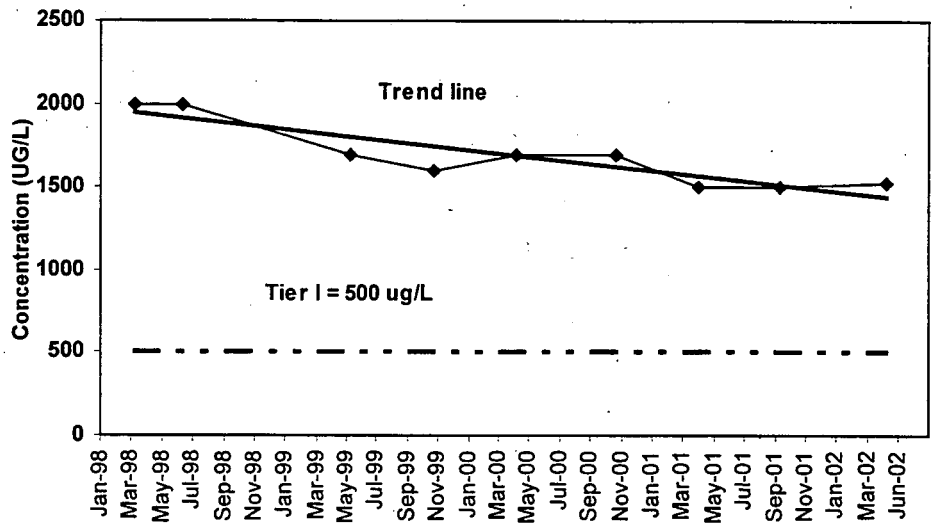
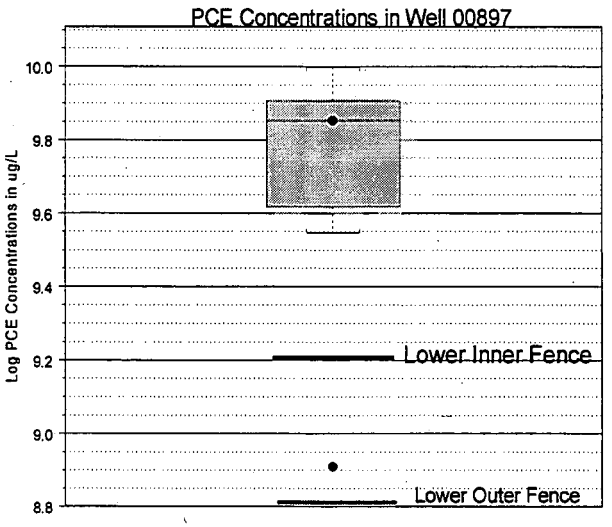
Figure 4.1-2 Trichloroethene Trend Plot For Well 00897



TCE concentrations in this well have decreased slightly as illustrated by the downward (negative) slope to the trend line on Figure 4.1-2. This downward trend is statistically significant because the slope of the trend line can be statistically differentiated from zero. The concentrations of PCE in Well 00897 are an order of magnitude greater than the concentrations of TCE. All results of PCE and TCE in Well 00897 constitute Tier I exceedances.

One low PCE value was considered suspect but was retained for trend analysis because it falls between the lower inner and outer fences as shown on the box and whisker plots below (Figure 4.1-3).

Figure 4.1-3 Box and Whisker Plot of PCE Concentrations in Well 00897



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One low TCE value was determined to be highly suspect and was considered an outlier because it falls outside the lower outer fence (Figure 4.1-4). The histogram and probability plots (Figures 4.1-5 and 4.1-6) also support this conclusion. The low data points are detached from the main body of data on the histogram and depart significantly from a best-fit line on the normal probability plot.

Figure 4.1-4 Box and Whisker Plot of TCE Concentrations in Well 0089716

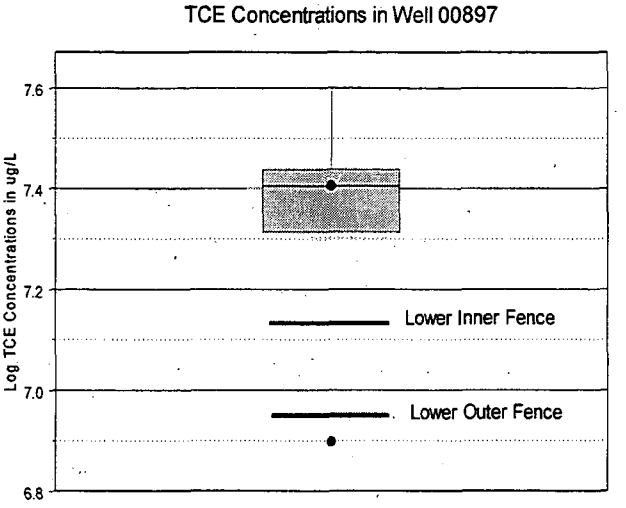

Figure 4.1-5 Histogram of TCE Concentrations in Well 00897

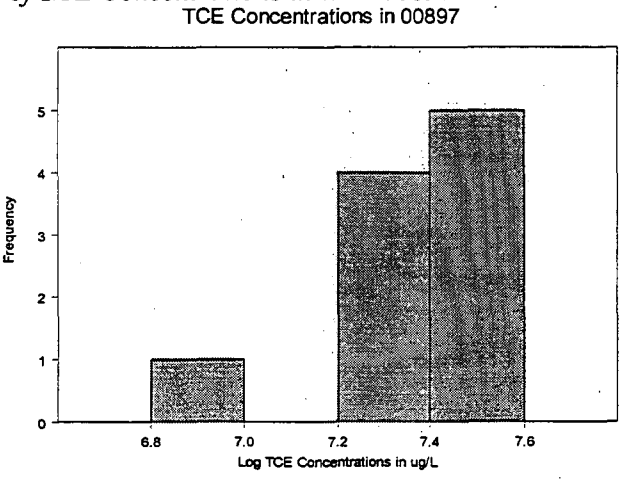

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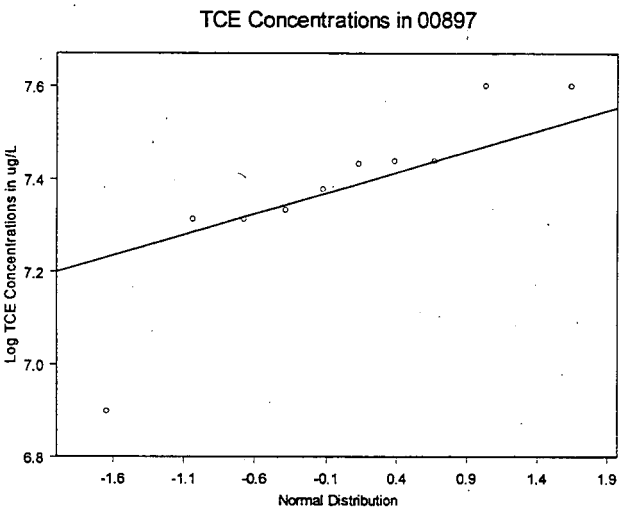
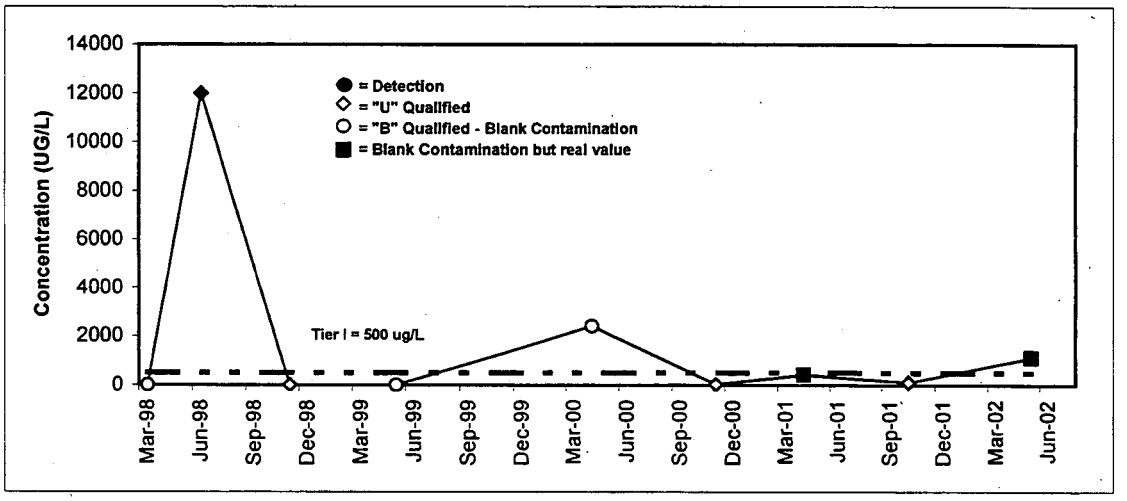
Figure 4.1-6 Probability Plot of TCE Concentrations in 00897



Methylene chloride was detected at 12,000 µg/L during one sampling event in June 1998 (Figure 4.1-7). Recent sampling indicates that methylene choride concentrations are partly due to laboratory contamination. However, these values (1120 and 420 µg/L) are considerably greater than five times the blank value suggesting that they are real values and representative of methylene chloride contamination in this area.

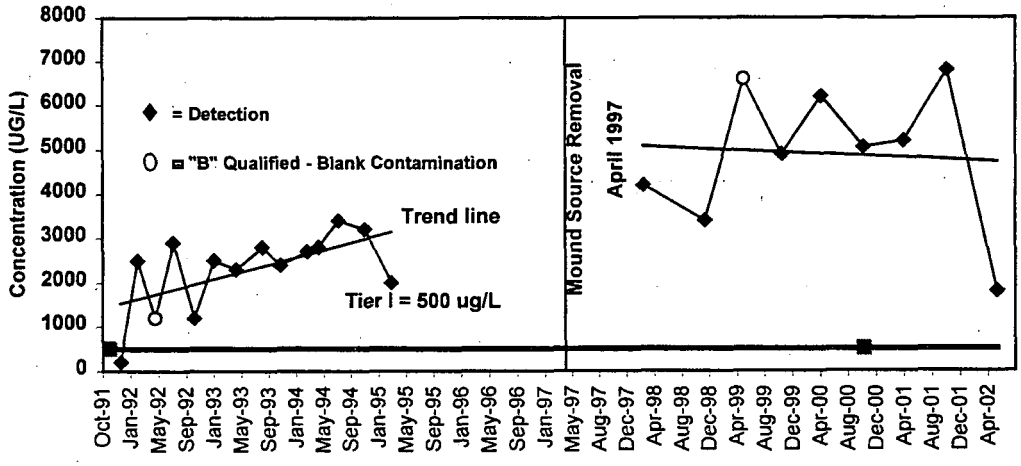
Figure 4.1-7 Methylene Chloride Trend Plot For Well 00897



In summary, there has been no statistically significant change in PCE concentrations while TCE has decreased slightly in downgradient Well 00897 after the accelerated source removal action. Monitoring will continue until VOC concentrations decrease to below Tier I action levels.

Well 02291 is also located downgradient of the Mound Site, approximately equidistant between the Mound Site and the Mound Site Plume Treatment System (MSPTS). PCE concentrations appear to fluctuate with a mean concentration of 3316 µg/L and range from a minimum of 210 µg/L in December 1991 to a maximum of 6800 µg/L in October 2001 (Figure 4.1-8). A three-year data gap from 1995 to 1998 occurs as a result of removing Well 02291 from the ground water monitoring program. PCE levels in well 02291 appear to be increasing over the long term although there has been a noticeable decrease in concentration from the fourth quarter 2001 to the first quarter of 2002. Concentrations are currently above Tier I action levels. Trend lines (least squares linear regression line) were constructed prior and subsequent to mound source removal in April 1997 and indicate that PCE concentrations have exhibited a statistically significant upward trend before the mound source was removed. A slight downward trend subsequent to the removal has occurred is illustrated on Figure 4.1-8, although this trend is apparent and not statistically significant.

Figure 4.1-8 Tetrachloroethene Trend Plot For Well 02291



Prior to conducting the regression analysis, two data points (non-detects) were determined to be statistical outliers and were omitted from further trend analysis. The box and whisker plot below (Figure 4.1-9) indicates that two sampling values are considered highly suspect because they lie outside the lower outer fence. A third data point is very slightly outside as well but was retained because it was attached to the main body of data on the histogram (Figure 4.1-10).

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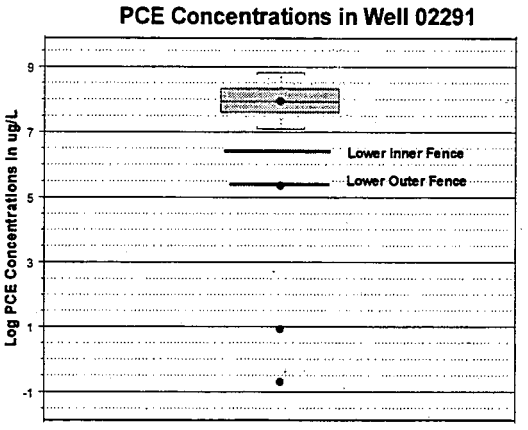
Figure 4.1-9 Box and Whisker Plot of PCE Concentrations in Well 02291



The histogram and probability plot (Figures 4.1-10 and 4.1-11) also support this conclusion. The low data points are detached from the main body of data on the histogram and depart significantly from a best-fit line on the normal probability plot.

Figure 4.1-10 Histogram of PCE Concentrations in Well 02291

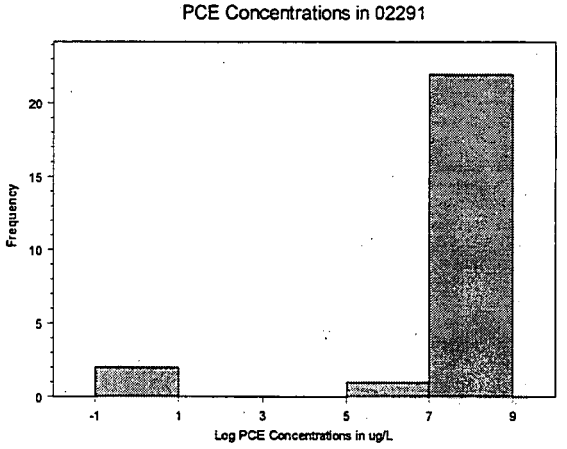
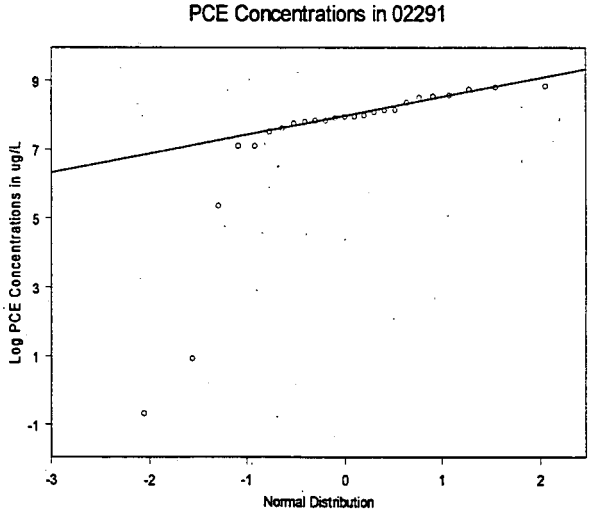


Figure 4.1-11 Probability Plot of PCE Concentrations in Well 02291



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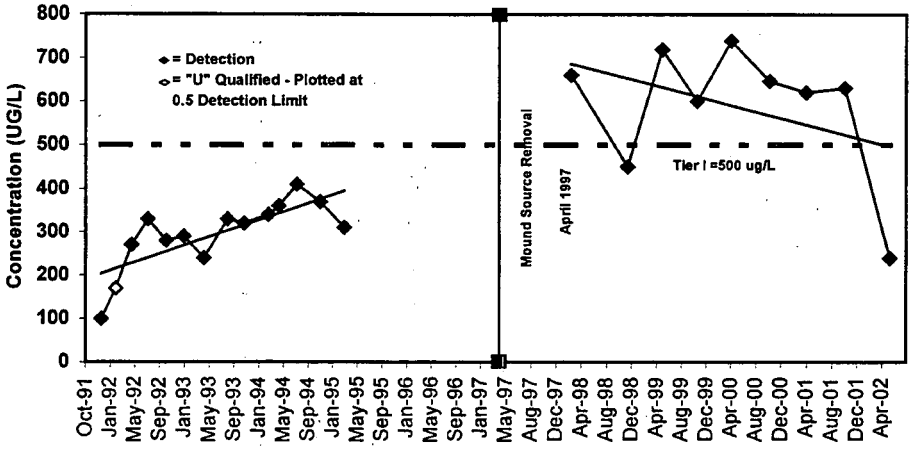
TCE in Well 02291 (Figure 4.1-12) follows a similar trend to PCE, except that, as with near source Well 00897, the concentrations of TCE are an order of magnitude lower than the concentrations of PCE. PCE concentrations have consistently exceeded Tier I action levels (500 µg/L) while TCE in Well 02291 has been exceeding this level consistently since May 1999. TCE concentrations vary with a mean concentration of 410 µg/L and range from a minimum of 100 µg/L in December 1991 to a maximum of 740 µg/L in April 2000. A trend line before mound source removal indicates that TCE concentrations were increasing. Subsequent to mound source removal there appears to be an apparent downward slope to the trend line. However, the slope of this trend line is statistically not significant and cannot be differentiated from a zero.

Figure 4.1-12 Trichloroethene Trend Plot For Well 02291



As shown on Figures 4.1-13 through 4.1-15, one (non-detect) data point was determined to be a statistical outlier and was excluded from further trend analysis.

Figure 4.1-13 Box and Whisker Plot of TCE Concentrations in Well 02291

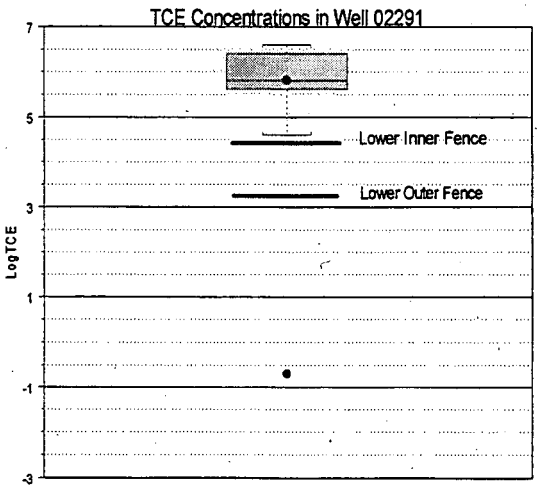


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Figure 4.1-14 Histogram of TCE Concentrations in Well 02291

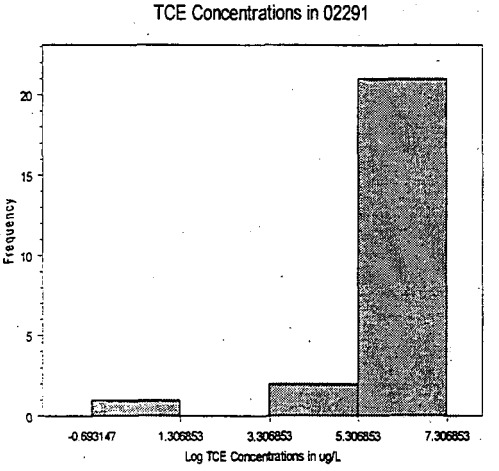
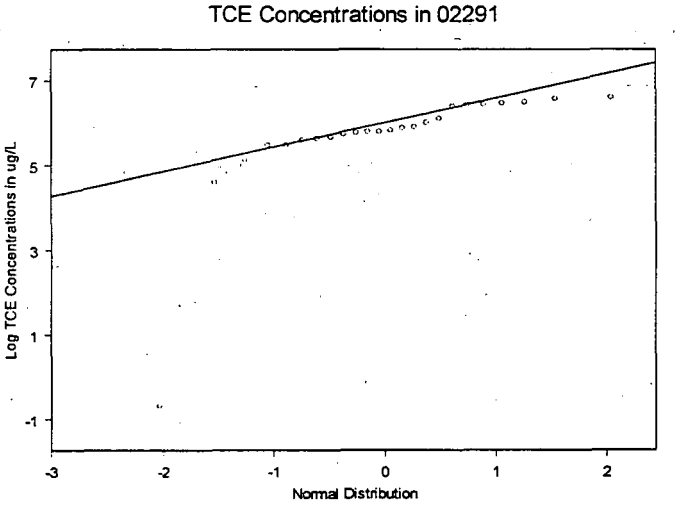


Figure 4.1-15 Probability Plot of TCE Concentrations in Well 02291



In summary, concentrations of TCE at the Mound Site have been observed to statistically decrease in Downgradient Well 00897 but has remained constant in well 02291 after the accelerated source removal action. PCE concentrations have remained statistically unchanged in Well 02291 and 00897. Monitoring will continue until VOC concentrations decrease to below Tier I action levels.

4.1.2 Mound Plume/SW059 Remediation System

As stated above, the Mound Site is located north of Central Avenue and northeast of the 903 Pad and consists of a former waste burial area where drums were stored. Ten percent of the drums were suspected to have leaked, resulting in soil and groundwater contamination.

From the Mound Site, the ground surface slopes steeply downward to the north, towards the incised drainage of South Walnut Creek. The Mound Site Plume is located north of Central Avenue and east of the PA fence. The

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plume, comprised primarily of VOC contamination, discharged as seeps and subsurface flow into the South Walnut Creek drainage in the vicinity of seep SW059 prior to the installation of the Mound Site Plume Treatment System (MSPTS). The VOC contamination is found along a line of monitoring wells downgradient (north) of the Mound Site, between the Mound Site and South Walnut Creek, indicating that the Mound Site is the primary source of the plume. Figure 4-1 presents the location of the Mound Site Plume area.

A pre-remedial groundwater investigation was performed in March and April of 1997 to examine the nature and extent of the Mound Site Plume adjacent to South Walnut Creek. The results of the investigation indicate that the water level and quantity of groundwater present generally declines towards the east and west margins of the plume. The most commonly detected VOCs from the source area to the distal end of the plume are PCE and TCE. Other VOCs are present in the plume, mainly towards the distal end, as degradation products of PCE and TCE (DOE, 1997c). The goal of the investigation was to provide the necessary information to support the design of an interception/collection trench and the proper disposal of soil removed during construction of the interception/collection trench.

The Mound Site Plume project employs an innovative technology for the collection and treatment of groundwater contaminated with chlorinated organic compounds and low levels of radionuclides. Installation of the MSPTS was completed in September 1998. The MSPTS is a passive subsurface groundwater treatment system consisting of an impermeable barrier membrane constructed of high density polyethylene (HDPE) to capture and redirect contaminated groundwater; an engineered permeable filter media backfill, consisting of sand and pea gravel, and containing a 4-inch perforated HDPE pipe routed to a central collection sump; treatment cells containing zero-valence iron; and a barrier monitoring system (piezometers 16199 through 16599 on Figure 4-1). Figure 4-2 presents a schematic of the MSPTS. Two sets of MSPTS influent/effluent samples were collected in 2001. The results of the sampling indicate that most of the contaminants of interest, VOCs, U-235, U-238, and americium-241 have been reduced to below Tier II action levels in effluent from Reactor II, the second treatment cell. Two VOCs, methylene chloride (6 µg/L) and chloromethane (31 µg/L) were detected one time each at concentrations that slightly exceed their Tier II action levels.

The system is designed to protect surface water by reducing mass loading consistent with RFCA action levels. The zero-valence iron, contained in two buried treatment cells, is used to remediate VOC and radionuclide contaminated groundwater by breaking down the VOCs and sorbing the radionuclides. After treatment, the water is discharged back to groundwater on the downgradient side of the treatment system through a French drain (RMRS, 1999e). During construction of the treatment system, a buried drainpipe was discovered that was probably contributing contaminated groundwater to the SW059 seep. The treatment system also collects this water.

Currently, the following four wells are being sampled as Performance Monitoring wells for the MSPTS: 3586, 15599, 15699, and 15799 (Figure 4-1). These wells are all located downgradient of the MSPTS collection trench with well 3586 being farther downgradient and adjacent to South Walnut Creek, while the other three wells are immediately downgradient of the interceptor trench.

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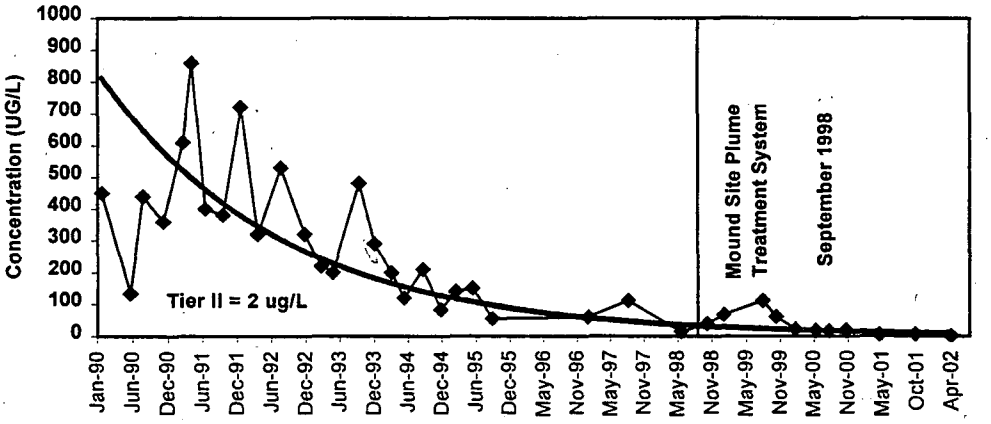
Vinyl chloride concentrations have been consistently above Tier II action levels in well 3586 (Figure 4.1-16) since sampling started in January 1990. However, since April 1991, there has been an exponential decrease in vinyl chloride concentrations that is unrelated to the installation of the remediation system. Recent data from 2002 indicate that vinyl chloride concentrations (1.0 µg/L) are below Tier II levels. Because of the non-linear nature of the data, an exponential trend line was considered to be the most appropriate model to use to evaluate the long-term temporal variations in the data.

Figure 4.1-16 Vinyl Chloride Trend Plot For Well 3586



Low levels of methylene chloride have also been detected in Well 3586. However, since 1997, methylene chloride concentrations have been below Tier II action levels.

Concentrations of PCE and TCE in Well 15699 (Figures 4.1-17 and 4.1-18) have been elevated since sampling began in March 1999 and have consistently exceeded Tier I action levels. Trend lines (least squares linear regression line) for PCE and TCE data indicate that concentrations of these compounds have remained generally unchanged with time since sampling started. Although there is an apparent downward trend to the TCE data, statistically, the slope of this trend line cannot be differentiated from zero. This means statistically that there is no trend or change in the data with time.

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Figure 4.1-17 Tetrachloroethene Trend Plot For Well 15699

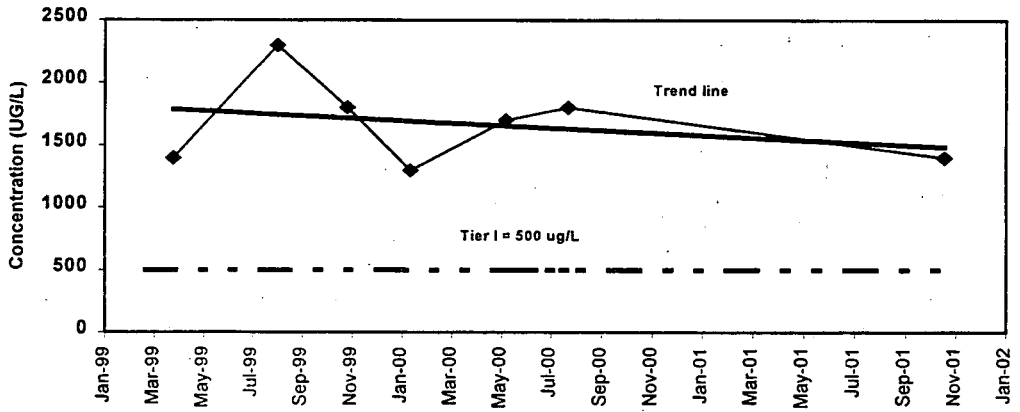
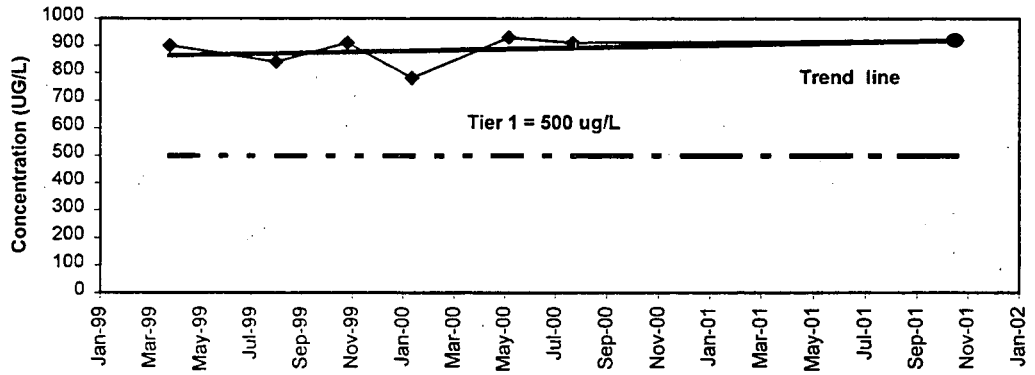


Figure 4.1-18 Trichloroethene Trend Plot For Well 15699



Prior to conducting the regression analysis, the data were statistically evaluated for outliers. Two PCE and two TCE values were determined to be outliers and were omitted from further trend analysis. The outlier analysis was performed using graphical statistical methods that include box and whisker plots, histograms, and normal probability plots. Because of the highly skewed nature of the data, a natural log transformation was performed. The box and whisker plots below (Figures 4.1-19 and 4.1-20) indicate that two values, shown by a solid circle, on each figure were considered highly suspect because they lie outside the lower outer fence. The lower outer fence is equivalent to more than three standard deviations from the mean.

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Figure 4.1-19 Box and Whisker Plot of PCE Concentrations in Well 15699

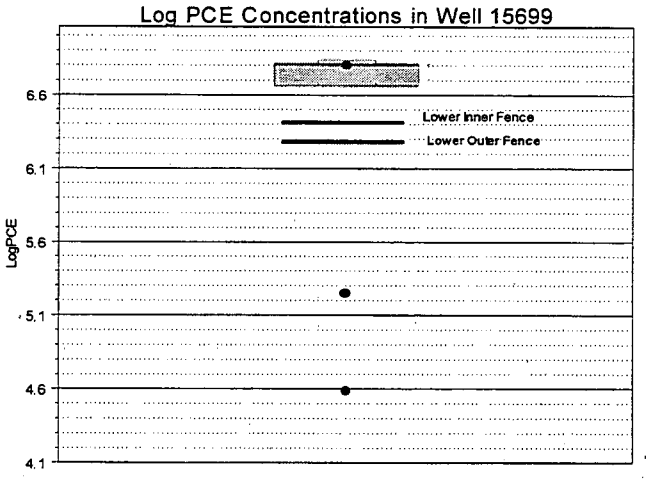
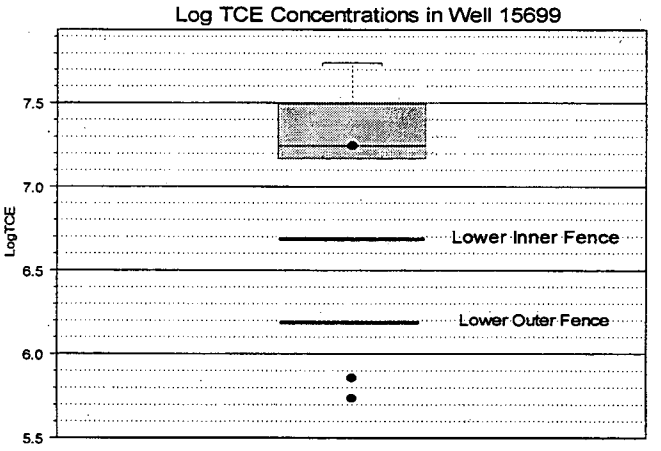


Figure 4.1-20 Box and Whisker Plot of TCE Concentrations in Well 15699



The histogram and probability plots (Figures 4.1-21 through 4.1-24) also support this conclusion. The low data points are detached from the main body of data on the histogram and depart significantly from a best-fit line on the normal probability plot.

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Figure 4.1-21 Histogram of PCE Concentrations in Well 15699

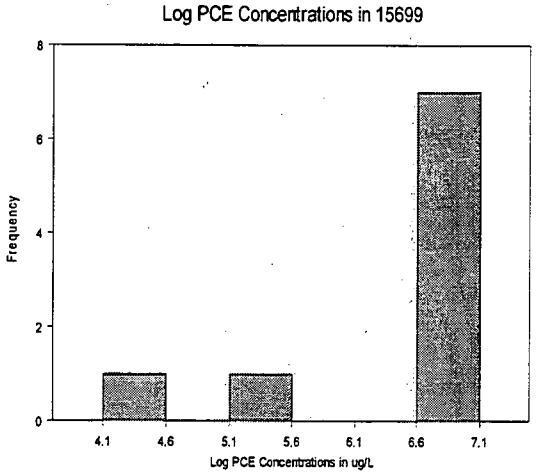

Figure 4.1-22 Histogram of TCE Concentrations in Well 15699

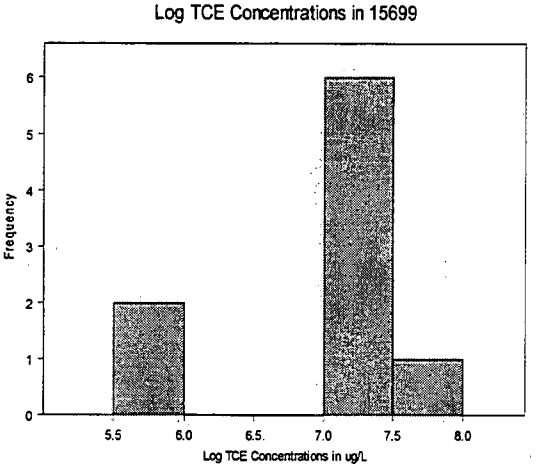

Figure 4.1-23 Probability Plot of PCE Concentrations in Well 15699

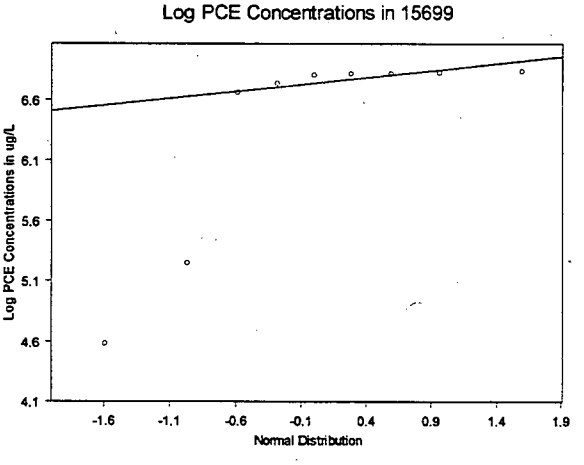

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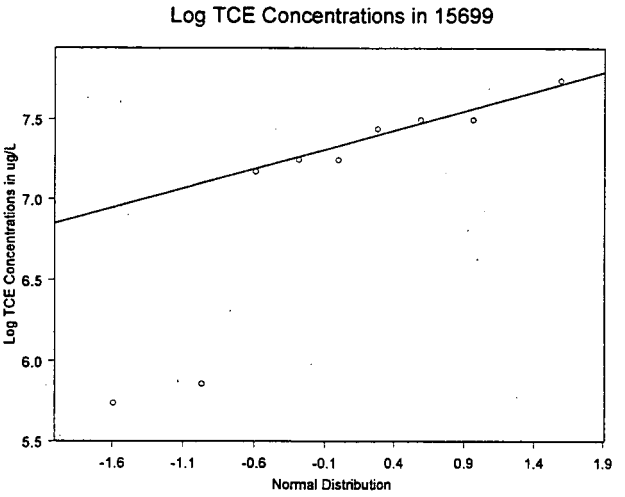
Figure 4.1-24 Probability Plot of TCE Concentrations in 15699



Concentrations of cis-1,2-DCE (Figure 4.1-25) and 1,1-DCE (Figure 4.1-26) have been detected in well 15699 above their Tier II action levels, which are 70 µg/L and 7 µg/L, respectively. Trend lines for these compounds appear to indicate slight decreases in these concentrations; however, the trends are apparent and not statistically significant. Since mid 1999, concentrations of cis-1,2-DCE and 1,1-DCE have generally decreased in this well. No cis-1,2-DCE values were determined to be outliers.

Figure 4.1-25Cis-1,2-Dichloroethene Trend Plot For Well 15699

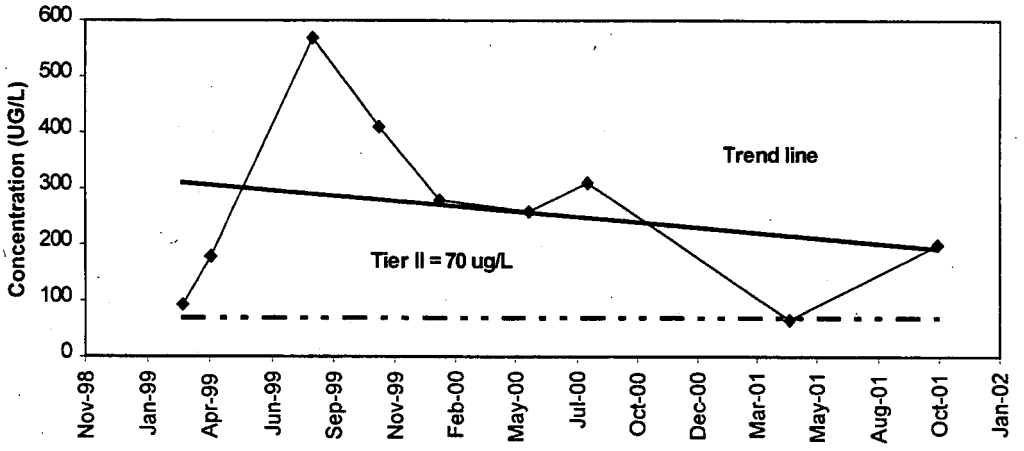


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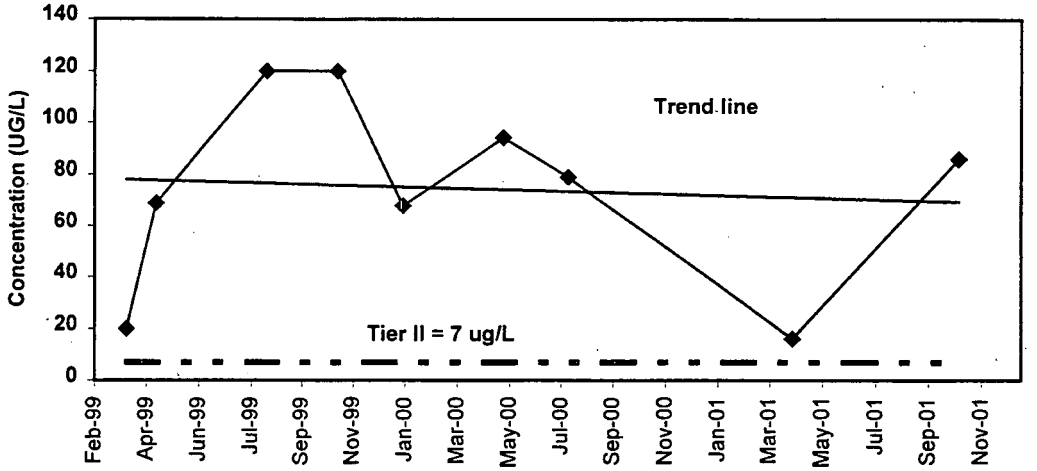
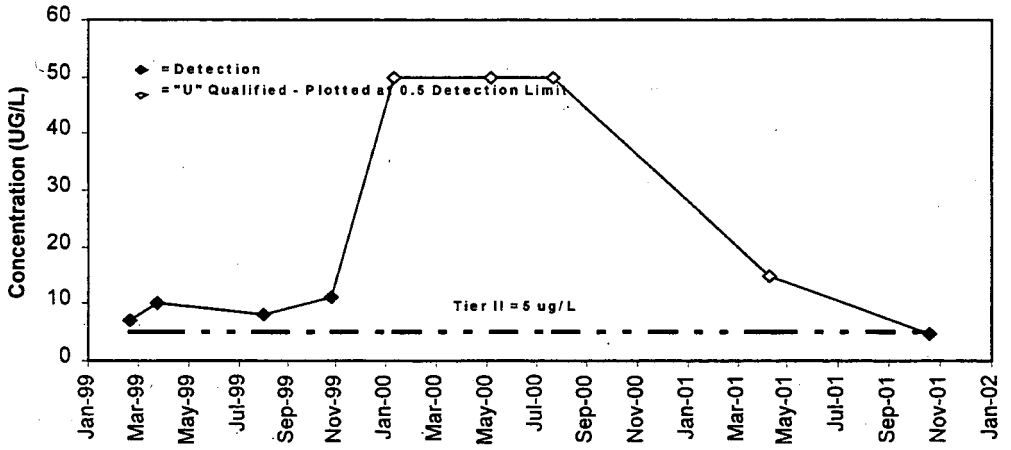
Figure 4.1-26 1,1-Dichloroethene Trend Plot For Well 15699



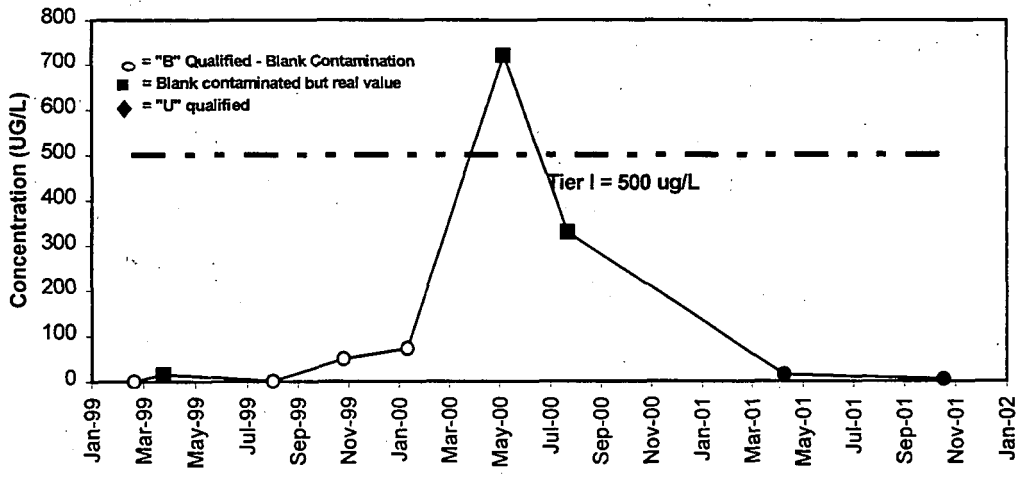
Concentrations of 1,2- DCA, slightly greater than Tier II levels, have also been detected in Well 15699 (Figure 4.1-27). However, since November 1999, the compound has been detected only once at a very low level (10 µg/L). High non-detect values from 2000 are due to elevated detection limits that result from sample dilution.

Figure 4.1-27 1,2 Dichloroethane Trend Plot For Well 15699



Low levels of methylene chloride were also detected in Well 15699 during 2001. The most recent sample collected in the 4th quarter 2001 indicates that concentrations of this compound have fallen below Tier II levels (Figure 4.1-28)

Figure 4.1-28 Methylene Chloride Trend Plot For Well 15699



Well 15599 has been frequently dry since its installation and therefore has not been sampled on a regular basis. Samples collected in May 2001 indicate the presence of PCE at 50 µg/L and TCE at 81 µg/L.

Hydrographs of Wells 3586, 15599, 15699, and 15799 are included in Appendix C. A slight decline in water levels may have occurred in Well 3586 as a result of the interception/collection trench. This trend has continued into 2001. The long-term decline is illustrated by the contrast between the downward slope of the regression line for data collected after the MSPTS was installed and the slight upward trend for data that occurred prior to the system. A lack of sufficient data precludes a trend analysis for water levels in Well 15599. Trend lines for Wells 15699 and 15799 indicate a statistically significant decline in water levels with time.

Sampling data from 2001 and the 1st quarter 2002 indicate that the MSPTS is continuing to treat contaminated groundwater to below Tier II groundwater levels. Ongoing maintenance, including raking the iron media weekly to break up the oxidized crust and collecting flow rate and water level data, are required activities. Sampling will continue in order to verify the performance of the MSPTS.

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4.2 Solar Ponds Nitrate/Uranium Plume

The SPP is an area of groundwater contamination that extends from the Solar Ponds to the northeast towards North Walnut Creek and to the southeast towards South Walnut Creek (Figure 4-3). The primary analytes of concern are nitrate and various uranium isotopes; however, other inorganic and organic compounds have also been identified at concentrations above Tier II action levels.

VOCs have been detected in monitoring wells located in the western and southern portions of the Solar Ponds. The VOCs are thought to have originated from sources farther to the west and southwest of the Solar Ponds, and therefore are thought to be distinct from the SPP. Several metal analytes have also been detected in SPP monitoring wells at concentrations above groundwater action levels.

The predominant direction of plume migration is toward the northeast to North Walnut Creek. The Interceptor Trench System (ITS) was constructed in 1981 to dewater the hillside between North Walnut Creek and the Solar Ponds so as to prevent the SPP from advancing to North Walnut Creek. The ITS traverses the hillside to the north of the Solar Ponds and collects surface water infiltration as well as most of the alluvial groundwater; however, the ITS does not collect all of the contaminated groundwater from the alluvium and weathered bedrock present below the alluvium. Water collected by the ITS from 1993 until the fall of 1999 was stored in the Modular Storage Tanks north of Walnut Creek prior to treatment at Building 374. The ITS was modified substantially during the construction of the Solar Ponds Plume Treatment System (SPPTS). See the discussion below regarding the SPPTS.

As an initial phase in determining the appropriate remedial action for the SPP, Water Programs began sampling for uranium and nitrate in 1997 to evaluate alternatives for the management and treatment of the water collected by the ITS. The purpose of the study was to determine a permanent remedy for the SPP. Final evaluation of the alternatives required a detailed characterization of the water quality in the alluvium and weathered bedrock in the vicinity and downgradient of the Solar Ponds (McLane Environmental, 1998). The primary objective of this characterization sampling was to determine the nature and extent of the SPP in the alluvium, weathered bedrock, and competent bedrock during low flow (late fall/early winter) and high flow (spring) seasons.

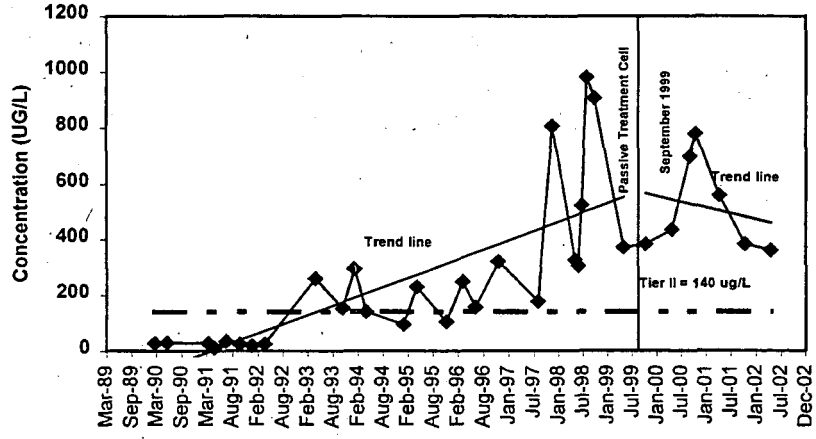
The secondary objective of this sampling effort was to evaluate the amount and distribution of uranium in the groundwater associated with the SPP, and estimate what portion of it is attributable to past RFETS activities. Initially, low flow samples (November 1997 through February 1998) collected from a combination of background, Walnut Creek drainage, and SPP wells were analyzed for uranium isotopes by alpha spectroscopy. Seven SPP wells were resampled during the high flow season (April 1998). In addition to analysis by alpha spectroscopy, four low flow samples and five high flow samples were subsequently sent to Las Alamos National Laboratory (LANL) for analysis of uranium isotopes by high resolution inductively coupled plasma/mass spectrometry (ICP/MS). The results of these analyses were used to calculate uranium isotope ratios, which can be used to differentiate between naturally occurring and anthropogenic uranium. (Section 8.1 of this Annual Report provides a detailed discussion of the ICP/MS sampling to date.)

Based on the results of the 1997 through 1998 investigation, the *Solar Ponds Plume Decision Document* (RMRS, 1999f) was prepared. The document outlines the remediation strategy, treatment goals, applicable regulatory requirements, and implementation schedule to accomplish a long-term and cost effective remedy for the groundwater collection, management, and treatment of the SPP. A reactive barrier, consisting of a funnel system to direct SPP groundwater to a treatment cell containing zero-valence iron and a carbon source, was selected as the preferred remedial alternative. The other alternatives described in the Decision Document were found to be ineffective in treating the contaminants or did not achieve the long-term goals for the SPP and RFETS (RMRS, 1999f).

Installation of the SPPTS, which consists of a 1100-foot long collection system along with a passive treatment cell containing reactive iron and wood chips, was completed in September 1999. This system cuts through and intercepts the water collected by the pre-existing ITS. The northern portion of the ITS, north of the SPPTS, was abandoned except for a segment of the northernmost lateral, which now serves as the effluent pipe from the treatment cell to the discharge area. The SPPTS is different from the passive, flow through systems installed at the Mound Plume (Section 4.1) and East Trenches Plume (Section 4.3). Water was planned and initially designed to be intercepted and flow by gravity to the treatment cell without retention in the collection trench. Logistical problems related to Preble's Jumping Mouse habitat caused the flow-through treatment cell to be located immediately adjacent to the collection trench and not 400 feet downgradient as originally planned. As a result, the collection trench for the SPPTS must collect and store groundwater with approximately 12 feet of hydraulic head in order for groundwater to flow through the treatment cell. During CY 2001, fluctuating groundwater levels within the collection trench caused flow through the treatment cell to be intermittent. However, samples were collected on a monthly basis at both influent and effluent locations. The 2001 Quarterly Reports for the Rocky Flats Groundwater Plume Treatment Systems can be referenced for more details. During CY 2002, the system will be monitored and evaluated along with weekly monitoring of the piezometers in the collection trench. Additional surface water samples from GS13 and Pond A-3 will monitor potential impacts to North Walnut Creek.

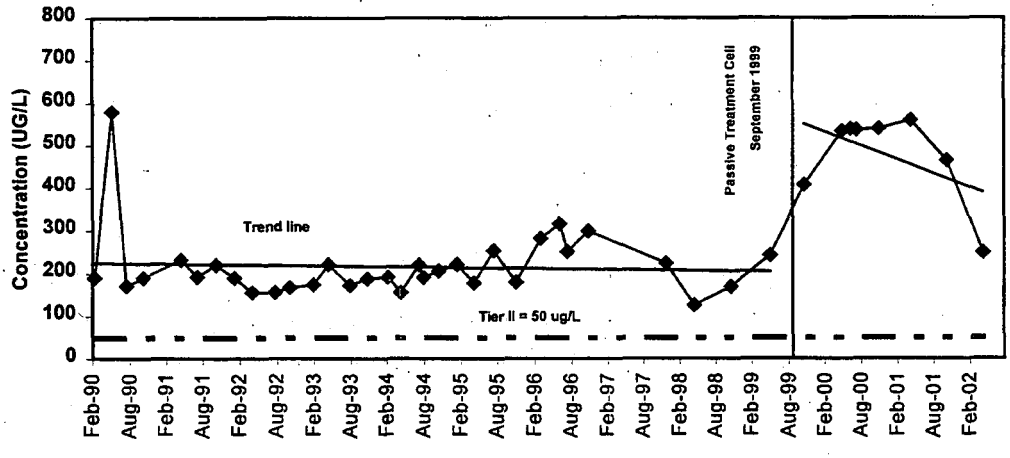
Four Monitoring Wells, 1386, 1786, 70099, and 70299 are designated for performance monitoring of the SPPTS. Nickel concentrations in Well 1386 (Figure 4.2-1) have increased steadily since spring 1992 and, except for two sample dates, have been over the Tier II action level since spring 1993. The upward (positive) trend line shown on Figure 4.2-1 depicts a significant increase in nickel prior to installation of the treatment cell. Statistically, there is no significant change in concentrations subsequent to the installation of the treatment cell. No outliers were identified during statistical analysis of the data. This increase in nickel with time may result from several causes, one of which may be leaching from the stainless steel well casing materials. Investigation of this upward trend in nickel concentrations in Well 1386 is currently being conducted.

Figure 4.2-1 Nickel Trend Plot For Well 1386



Selenium in Well 1786 (Figure 4.2-2) has been consistently above Tier II action levels since sampling was initiated in February 1990. As shown on Figure 4.2-2, selenium concentrations remained relatively constant prior to the installation of the SPPTS. After installation, concentrations increased up to April 2001 at which time, they started to decline. A trend line for post SPPTS data indicates there is a downward trend to selenium concentrations since the completion of the SPPTS. However, this trend is statistically insignificant and cannot be distinguished from a zero slope.

Figure 4.2-2 Selenium Trend Plot For Well 1786



No outliers were identified during statistical analysis of the selenium data.

Nitrate in Well 1786 (Figure 4.2-3) remained essentially unchanged with time prior to the installation of the passive treatment cell as illustrated by the relatively flat slope to the trend line. Least squares regression analysis indicates

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that the slope of this trend line cannot be differentiated from zero and that nitrate concentrations have statistically not changed during this period. A trend analysis for later data (post-SPPTS) indicates a statistically significant downward slope to the data. One low nitrate value from 2001 data was determined to be an outlier because it falls outside the lower outer fence (Figure 4.2-5). The histogram and probability plots (Figures 4.2-6 and 4.2-7) also support this conclusion. The low data point is detached from the main body of data on the histogram and departs significantly from a best-fit line on the normal probability plot.

Figure 4.2-4 Nitrate Trend Plot For Well 1786

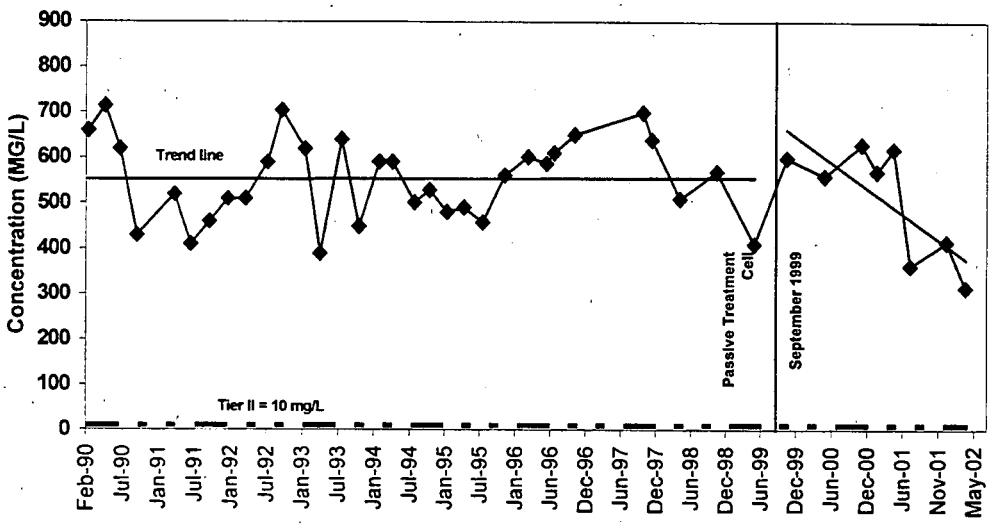

Figure 4.2-5 Box and Whisker Plot of Nitrate Concentrations in Well 1786

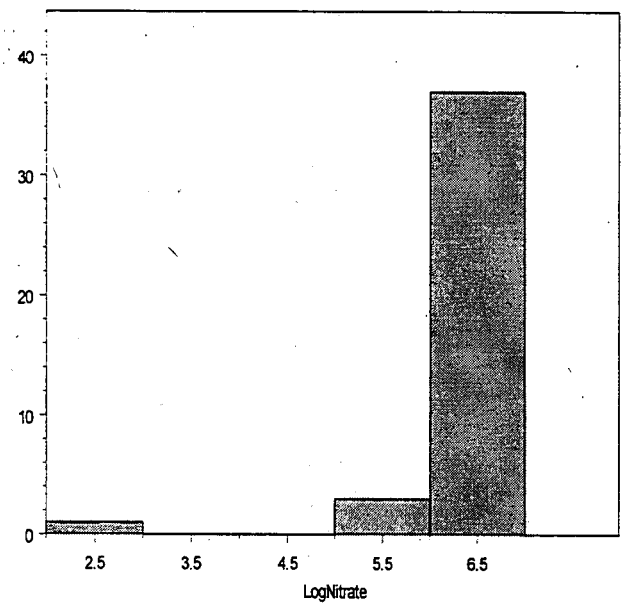

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Figure 4.2-6 Histogram of Nitrate Concentrations in Well 1786

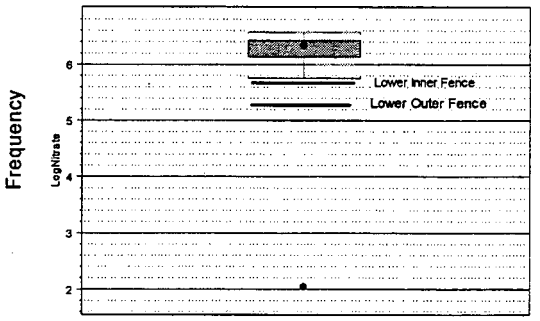
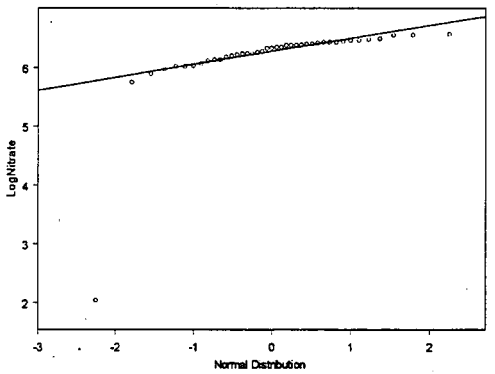
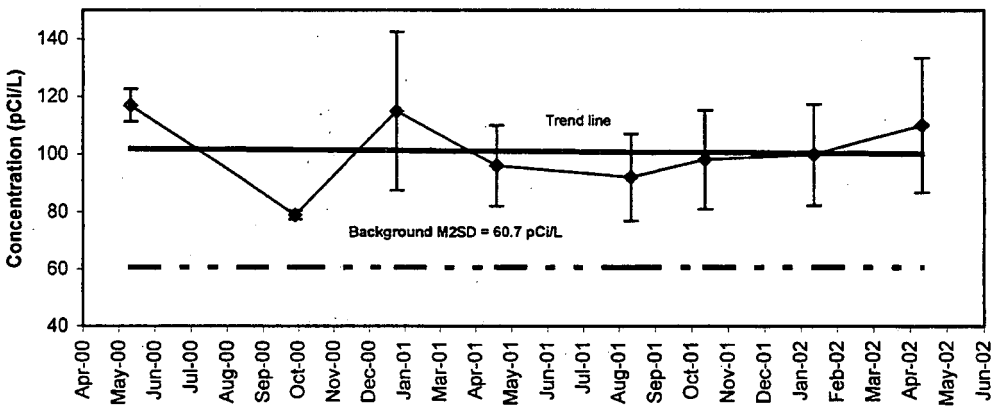


Figure 4.2-7 Probability Plot of Nitrate Concentrations in 1786



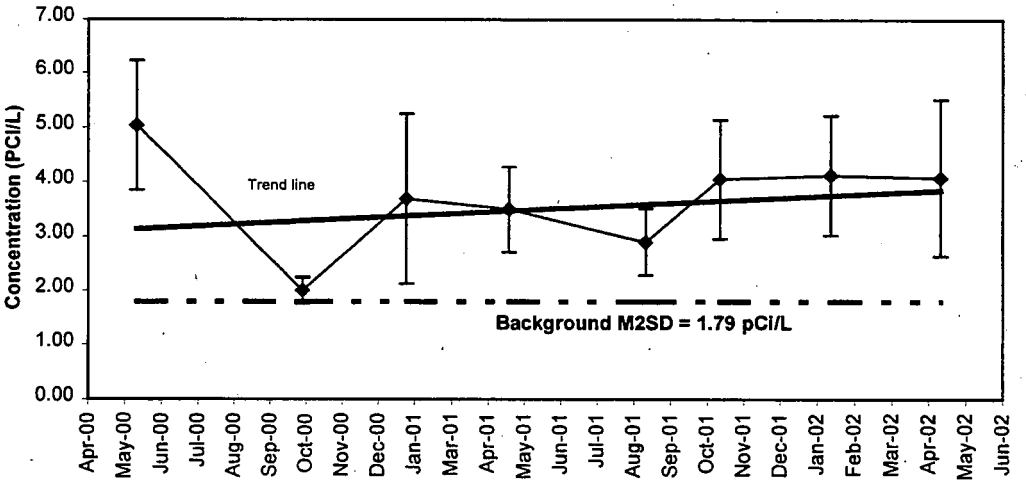
U-233/234 concentrations in Well 70099 (Figure 4.2-8) have been elevated above background levels (60.7 pCi/L) since sampling was initiated in June 2000. The trend line to the data is essentially flat with no statistical significance.

Figure 4.2-8 Uranium 233/234 Trend Plot For Well 70099 with Error Bars (Note Use of background M2SD for comparison-not Tier II action level)



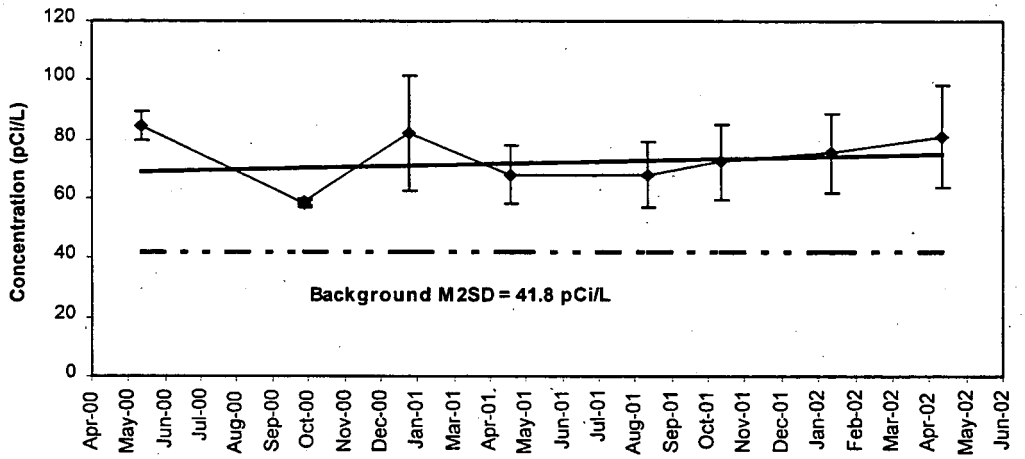
Similar to U-233/234, the U-235 concentration in well 70099 (Figure 4.2-9) has been elevated above the background level (1.79 pCi/L) since sampling was initiated in June 2000. Although there appears to be a slight upward trend to the data, this trend is not statistically significant.

Figure 4.2-9 Uranium U-235 Trend Plot For Well 70099 With Error Bars (Note Use of background M2SD for comparison – not Tier II action level)



The U-238 concentration in Well 70099 (Figure 4.2-10) has been above the background level (41.8 pCi/L) since sampling at the well began. Although there appears to be a slight upward trend to the data, this trend is statistically insignificant and cannot be differentiated from zero.

Figure 4.2-10 Uranium-238 Trend Plot For Well 70099 With Error Bars (Note Use of background M2SD for comparison – not Tier II action level)



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The nitrate concentration in Well 70099 has been below the Tier II and background action levels during 2001 and through the second quarter 2002. U-233/234 and U-238 concentrations in Well 70299 have been below background but above Tier II action levels during 2001 and through the second quarter 2002. U-235 concentrations have been consistently below both background and Tier II action levels.

Hydrographs of Wells, 1386, 1786, 70099, and 70299, located downgradient of the SPPTS, are included in Appendix C. A slight upward trend in water level elevations has occurred in Wells 1386, 1786, and 70299 while water levels in Well 70099 show a statistically significant downward trend. A complete set of analytical data for CY2001 can be found in the RFCA Groundwater Quarterly Reports.

4.3 East Trenches Plume

4.3.1 Trenches T3 and T4 Source Removal

The Trenches T3 and T4 (IHSS 110 and IHSS 111.1, respectively) source removal was the second accelerated source removal action at the RFETS to remediate contaminated soils that were contributing to the degradation of groundwater (RMRS, 1996d). This section evaluates performance of the source removal action per RFCA (DOE, 1996) with regard to groundwater. The Trenches T3 and T4 source removal area is located north of the East Access Road and east of the East Perimeter road. Figure 4-4 presents the location of Trenches T3 and T4. The accelerated source removal action consisted of the excavation and treatment of approximately 3800 cubic yards of soil contaminated with VOCs above Tier I action levels for subsurface soil (RMRS, 1996d). The *Completion Report for the Source Removal at Trenches T-3 and T-4 (IHSSs 110 and 111.1)* (RMRS, 1996d) summarizes the source removal action.

Trenches T-3 and T-4 were used between 1964 and 1967 for disposal of sanitary sewage sludge, crushed drums, and miscellaneous waste contaminated with low levels of uranium, plutonium, and VOCs, (DOE 1992b). In 1996 these trenches were excavated as part of an accelerated source removal action. Trench T-3, located approximately 300 feet north of the East Access Road and immediately west of Trench T-4, was approximately 134 feet long, 20 feet wide, and 10 feet deep. Trench T-4 was approximately 110 feet long, 15 feet wide, and 10 feet deep. The excavated soil and debris were thermally treated to remove the VOCs, which consisted primarily of carbon tetrachloride, TCE, PCE, and additional VOCs as summarized in the Completion Report (RMRS, 1996d). The remediated soil, which was then below Tier II action levels, was returned to the trench excavation and the area was revegetated (RMRS, 1996d). The excavation and treatment activities were completed in August 1996, and the treated soils were returned to the excavations in September 1996.

Samples collected at the excavation boundary identified TCE contamination at a concentration of 22 mg/Kg at a depth of 26 feet in one of the subdivided grids of Primary Grid 32 of the T-4 excavation (RMRS, 1996d). This concentration exceeded the VOC cleanup target level of 9.27 mg/Kg stated in the PAM (RMRS, 1996e). However, it was decided that because of the difficulty of excavating deeper into the bedrock sandstone (encountered at a depth

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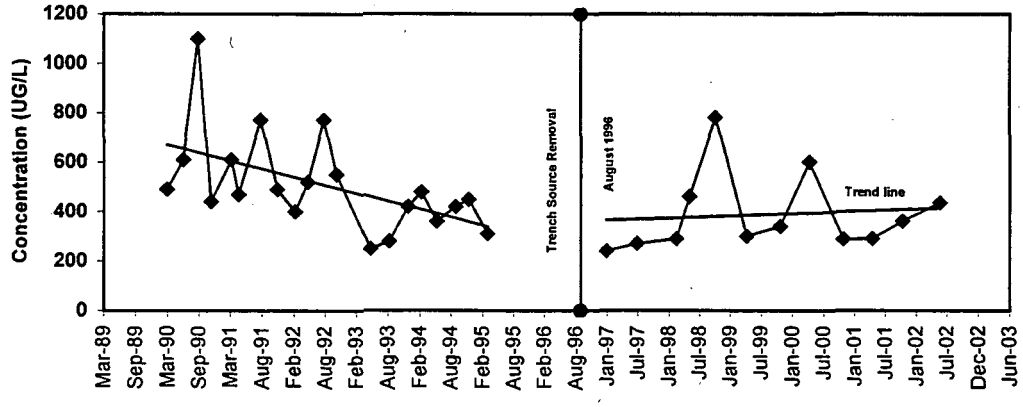
of 22 feet) and because other limiting conditions established in the PAM had been met (excavation through the highly weathered bedrock) that excavation activities would cease (RMRS, 1996d).

Five Performance Monitoring Wells (3687, 05691, 11891, 12191, and 12691) are used to monitor the source removal action in trenches T3 and T4.

PCE concentrations in Well 3687 have generally been declining with time (Figure 4.3-1). A trend plot for PCE in this well indicates a downward trend prior to source removal in the east trenches. From 1995 to 1997, a data gap occurs during which time trench source material was removed. Data collected after removal of trench source material exhibit an apparent upward trend. However, because of the poor linear correlation, the slope of this latter trend line cannot be statistically differentiated from zero.

Figure 4.3-1 Tetrachloroethene Trend Plot For Well 3687



Prior to conducting the trend analysis, the data were evaluated for outliers. The results of exploratory statistical methods, as shown in Figures 4.3-2 to 4.3-4, indicate that one low PCE value was considered highly suspect and was excluded from further analysis.

Figure 4.3-2 Box and Whisker Plot of Tetrachloroethene in Well 3687

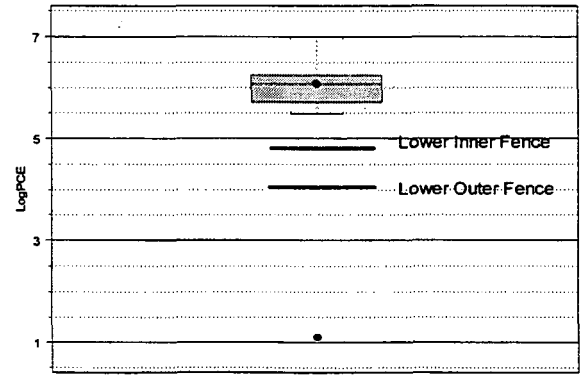


Figure 4.3-3 Histogram of Tetrachloroethene in Well 3687

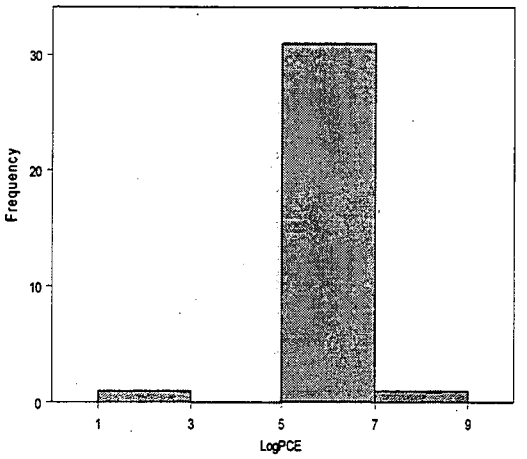
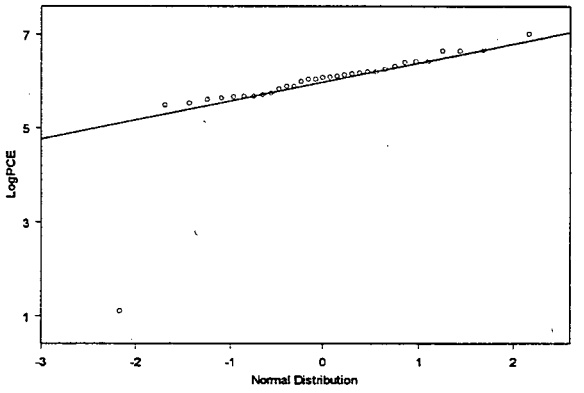
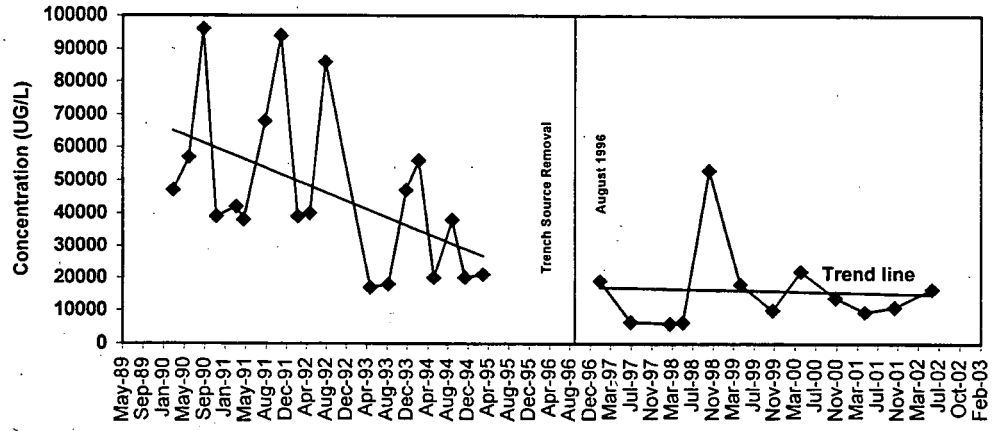


Figure 4.3-4 Probability Plot of Tetrachloroethene in Well 3687



TCE concentrations in well 3687 have also been generally decreasing with time. A trend plot (Figure 4.3-5) indicates a statistically significant downward or negative slope to the data prior to excavation and treatment of contaminated soils in Trenches T3 and T4. However, because of the poor linear correlation, the slope of the latter trend line, plotted from post treatment data, cannot be statistically differentiated from zero indicating that TCE concentrations have remained unchanged with time.

Figure 4.3-5 Trichloroethene Trend Plot For Well 3687



Prior to conducting the trend analysis, the data were statistically evaluated for outliers. Two low TCE values were determined to be outliers and were omitted from further trend analysis. The box and whisker plot below (Figure 4.3-6) indicates that two values are highly suspect because they lie outside the lower outer fence. The histogram and probability plot (Figures 4.3-7 and 4.3-8) also support this conclusion. The low data points are detached from the main body of data on the histogram and depart significantly from a best-fit line on the normal probability plot.

Figure 4.3-6 Box and Whisker Plot of Trichloroethene in Well 3687

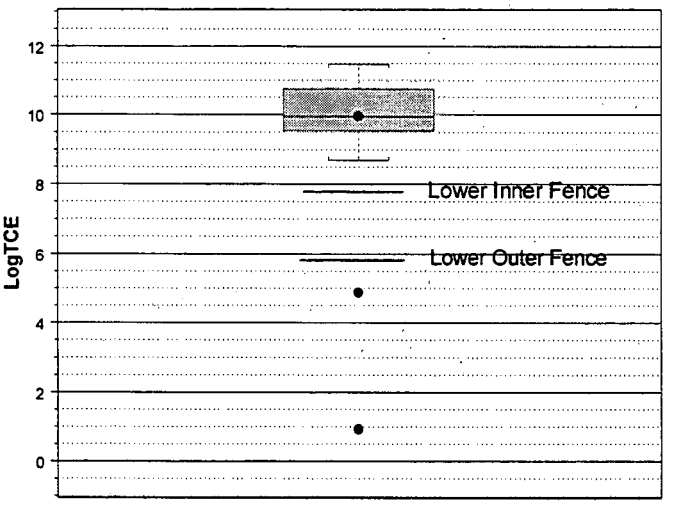


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Figure 4.3-7 Histogram of Trichloroethene in Well 3687

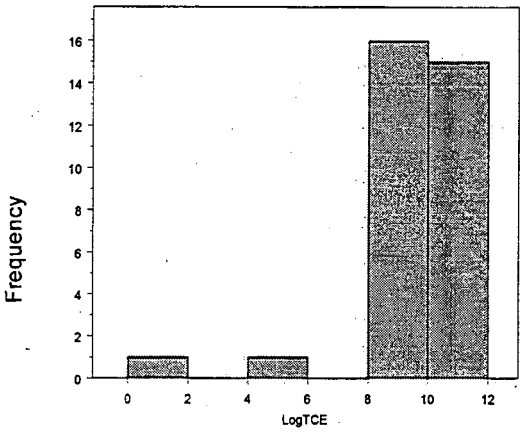
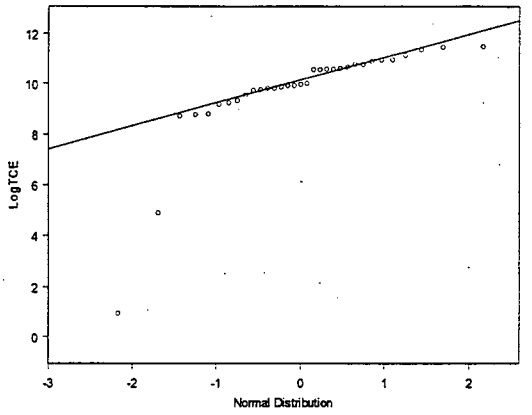
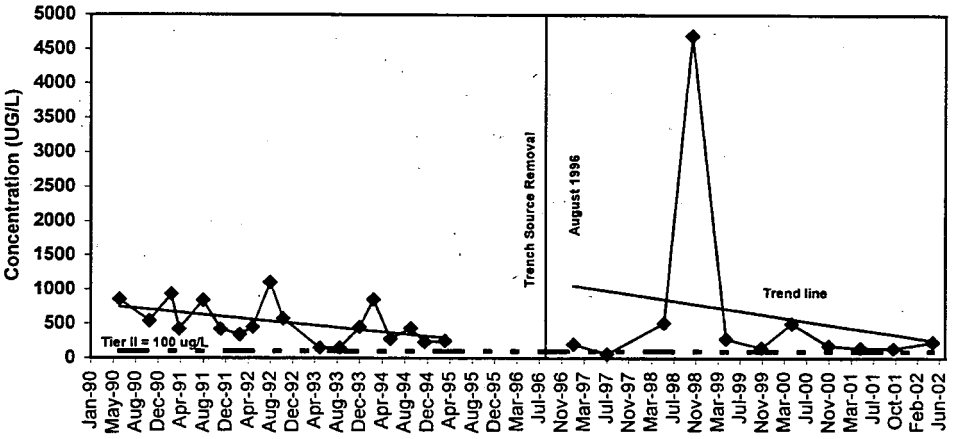


Figure 4.3-8 Probability Plot of Trichloroethene in Well 3687



Chloroform concentrations in Well 3687 have been generally decreasing except for a sharp spike that occurred in the 4th quarter 1998 (Figure 4.3-9). This spike appears to coincide with similar increases in PCE and TCE as shown on figures 4.3-1 and 4.3-5 and occurs after trench source material had been excavated and treated. However, later sampling indicates that chloroform concentrations have decreased significantly. Trend analysis on data collected prior to treatment of contaminated trench soil shows that there was a downward trend to chloroform concentrations with time. While a downward trend for later data also appears to exist, this trend is apparent and cannot be considered statistically significant.

Figure 4.3-9 Chloroform Trend Plot for Well 3687



Statistical analysis of the chloroform data indicates the presence of one low outlier (Figures 4.3-10 to 4.3-12). This data point was omitted from further analysis because it lay outside the lower outer fence on the box and whisker plot, was detached from the main body of data on the histogram, and departed significantly from the straight line on the probability plot. Although one high value was considered statistically suspect, it was retained because it did not lie beyond the upper outer fence on the box and whisker plot was connected to the main data on the histogram (Figure 4.3-11). The upper outer fence is not shown on the box and whisker plot because it is beyond the vertical scale of the plot.

Figure 4.3-10 Box and Whisker Plot of Chloroform in Well 3687

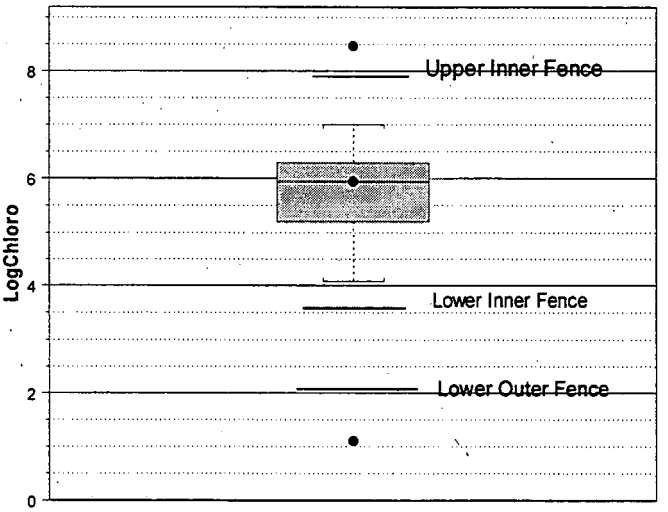


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Figure 4.3-11 Histogram of Chloroform in Well 3687

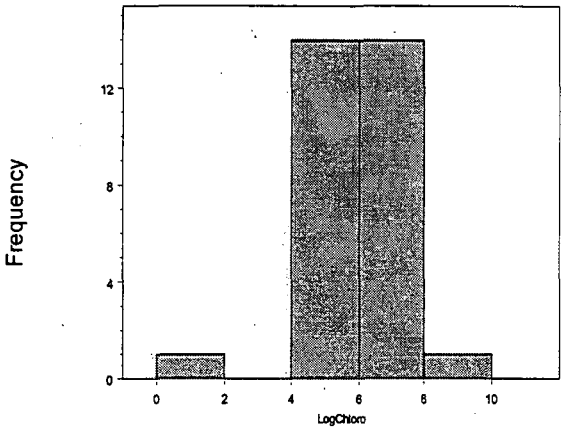
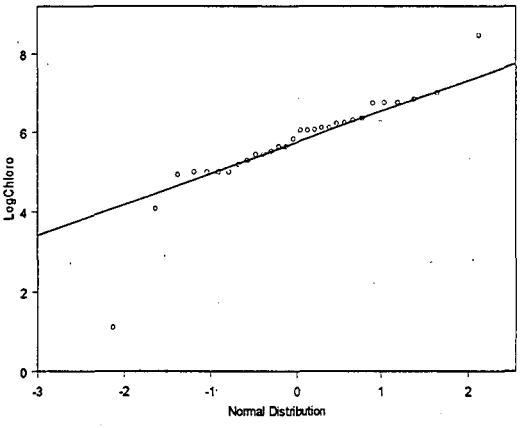


Figure 4.3-12 Probability Plot of Chloroform in Well 3687



Since 1993, carbon tetrachloride concentrations in Well 3687 have remained fairly constant as shown by the relatively flat trend lines on Figure 4.3-13. Concentration trends, as depicted by either the upward or downward slope, are apparent and without any statistical significance. However, carbon tetrachloride concentrations have frequently been above Tier I action levels and consistently above Tier II action levels.

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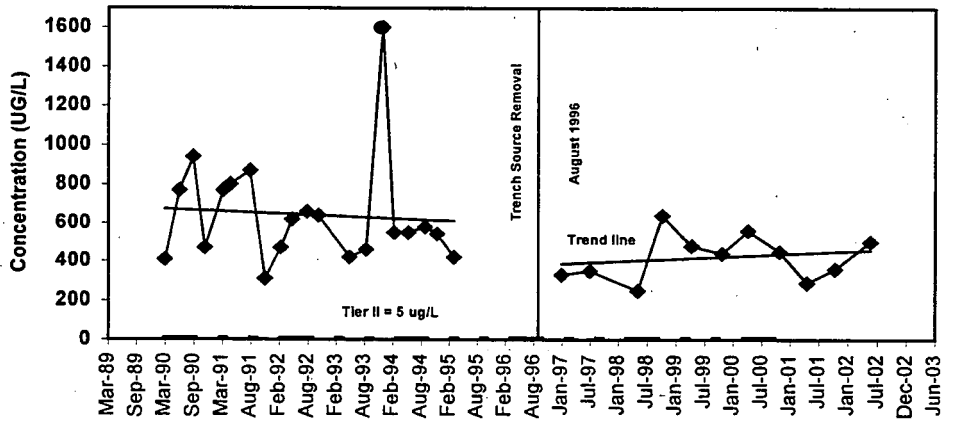
Figure 4.3-13 Carbon Tetrachloride Trend Plot for Well 3687



Statistical analysis of the carbon tetrachloride data indicates the presence of one low outlier (Figures 4.3-14 to 4.3-16). This one data point was omitted from further analysis because it was considered highly suspect and fell outside the lower outer fence on the box and whisker plot. The histogram and probability plots also indicate that this point, statistically, is an outlier. Although one high value was considered statistically suspect, it was retained because it did not lie beyond the upper outer fence on the box and whisker plot and was included in the main body of data on the histogram (Figures 4.3-15 and 4.3-16).

Figure 4.3-14 Box and Whisker Plot of Carbon Tetrachloride in Well 3687

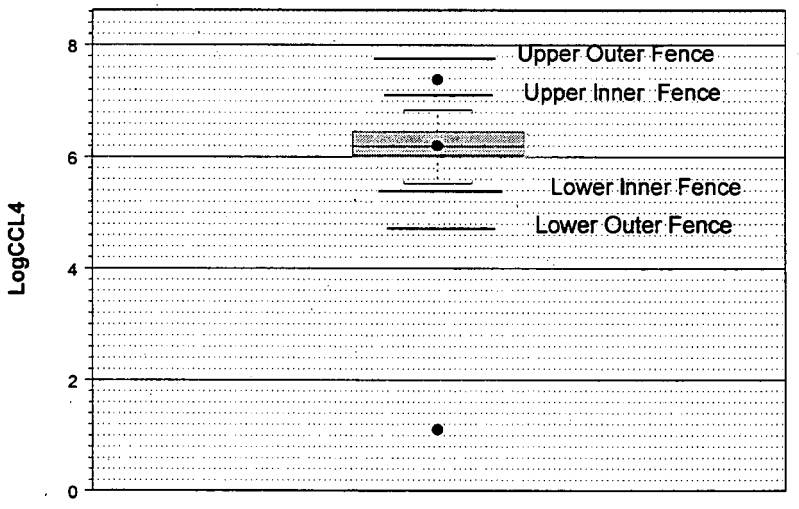


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Figure 4.3-15 Histogram of Carbon Tetrachloride in Well 3687

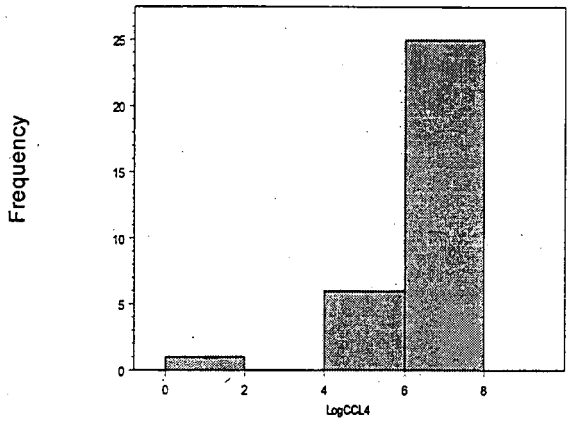
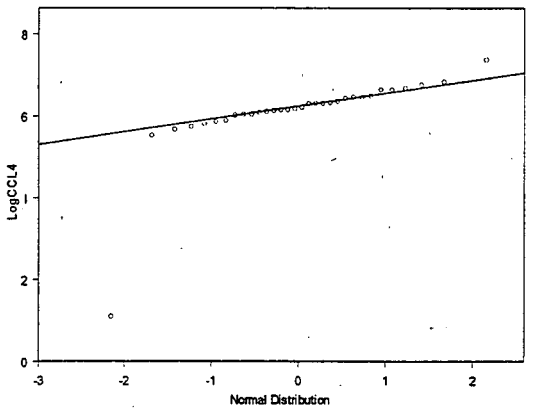


Figure 4.3-16 Probability Plot of Carbon Tetrachloride in Well 3687



The methylene chloride concentrations in Well 3687 have either been non-detect or "B" qualified since the 2nd quarter 1998. The "B" qualified data are considered an artifact of laboratory contamination.

Trend plots of PCE, TCE, and carbon tetrachloride for Well 05691 show a general decrease in concentrations up to the present time (Figures 4.3-17 to 4.3-19). However, except for PCE, which displays a significant downward trend prior to the removal of trench source material, trend lines for these other VOCs are apparent and not statistically significant. However, PCE, TCE, and carbon tetrachloride concentrations have been consistently above Tier II action levels since the 4th quarter 1996 (Figures 4.3-17 and 4.3-19). No outliers were identified during exploratory statistical analysis of these compounds. As shown on Figures 4.3-21 to 4.3-23, a two-year data gap occurs from 1995 to 1997 during which time the trench source material was removed.

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Figure 4.3-17 Tetrachloroethene Trend Plot for Well 05691

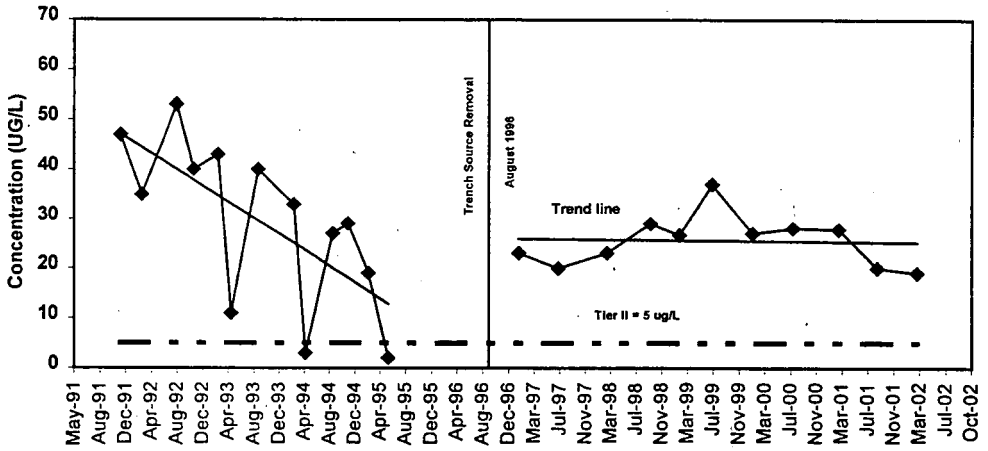


Figure 4.3-18 Trichloroethene Trend Plot for Well 05691

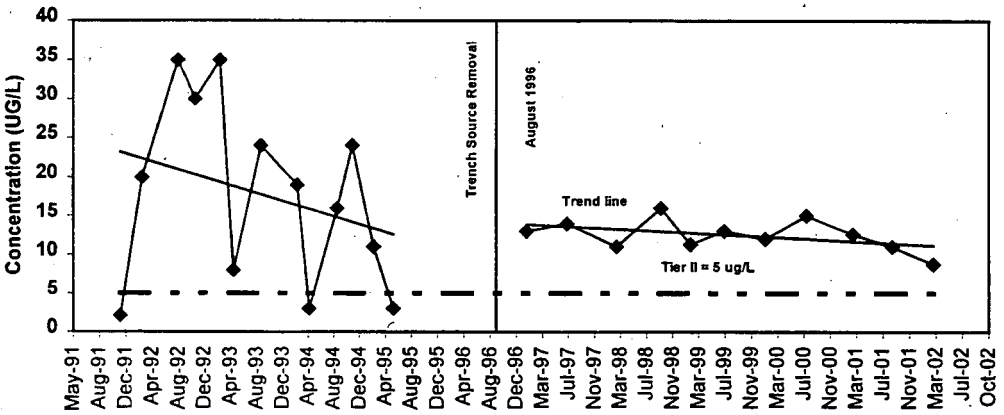
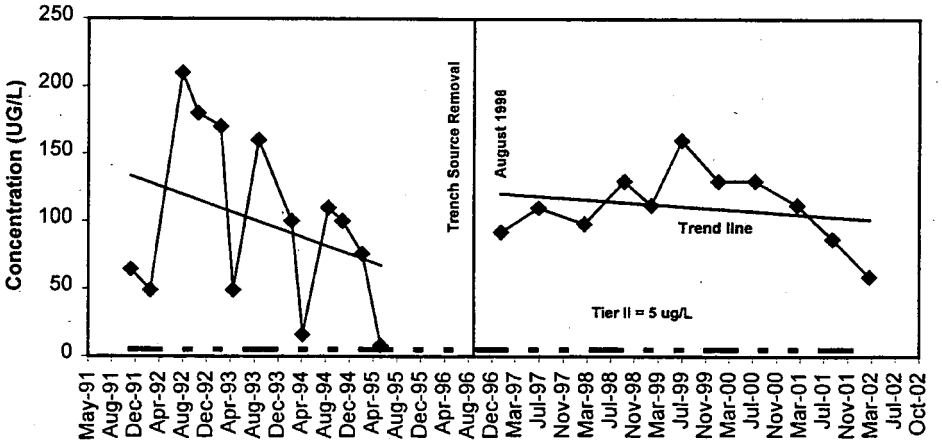


Figure 4.3-19 Carbon Tetrachloride Trend Plot of Well 05691



PCE and carbon tetrachloride concentrations have generally increased or remained the same with time in Well 11891 as shown on Figures 4.3-20 and 4.3-21. The increase in carbon tetrachloride concentrations from early sampling rounds to current levels has been approximately an order of magnitude, whereas PCE concentrations have increased approximately twofold. Trend analysis for PCE indicates an apparent upward trend or positive slope prior to treatment of trench source material and a flat trend post removal of source material. However, because of a poor fit of data to the linear model, the slope of these trend lines cannot be statistically differentiated from zero, indicating PCE concentrations have no statistically significant trend. Trend analysis for carbon tetrachloride data collected prior and subsequent to remediation of trench source material indicates statistically insignificant upward trends to the data from Well 11891. Concentrations of PCE and carbon tetrachloride have been consistently above Tier II action levels. As shown on Figures 4.3-20 to 4.3-22, a two year data gap occurs from 1995 to 1997 during which time the trench source material was removed.

Figure 4.3-20 Tetrachloroethene Trend Plot for Well 11891

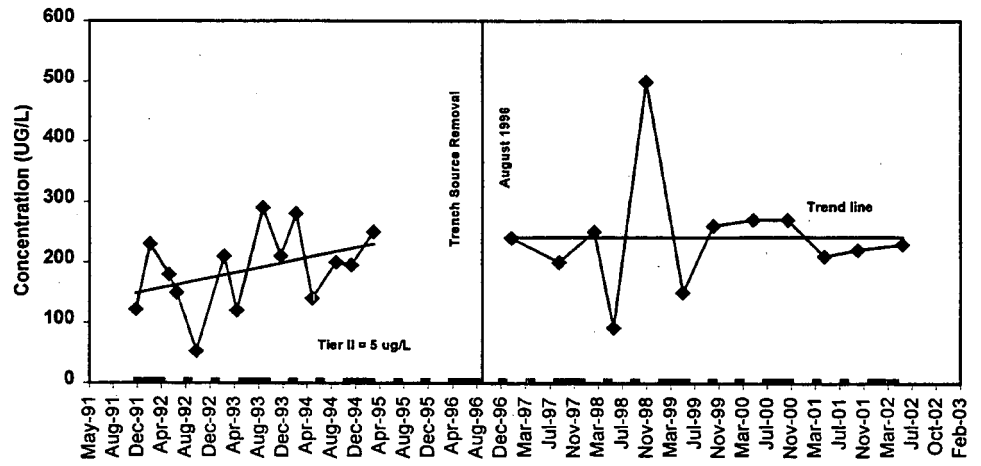


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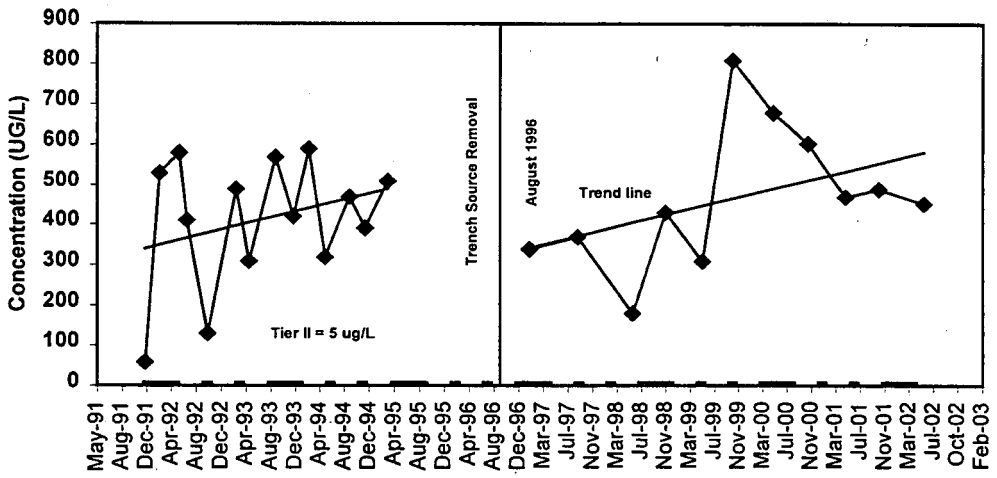
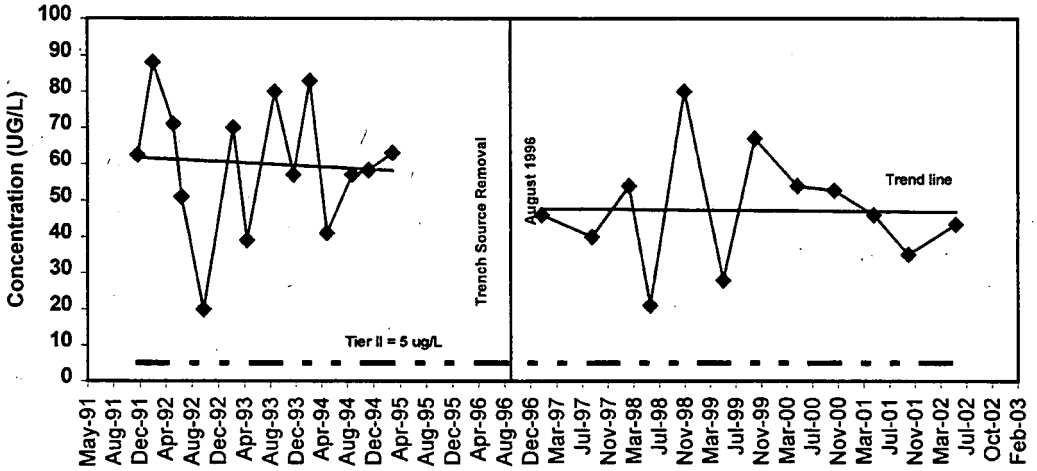
Figure 4.3-21 Carbon Tetrachloride Trend Plot for Well 11891



Except for one exceedance, PCE concentrations in 11891 have been below the Tier I action level. Carbon tetrachloride concentrations have frequently been above Tier I action levels. TCE concentrations in well 11891 have fluctuated (Figure 4.3-22) and trend analysis indicates no change statistically in TCE concentrations. The slopes of the early versus later data are also statistically the same. TCE concentrations have been consistently above Tier II action levels but below Tier I action levels. No outliers were identified during exploratory statistical analysis for these compounds.

Figure 4.3-22 Trichloroethene Trend Plot in Well 11891



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Trend lines of PCE, TCE, and carbon tetrachloride for Well 12691 are relatively flat indicating that concentrations of these compounds have remained essentially unchanged with time (Figures 4.3-23 to 4.3-25). In addition, there is no statistical difference between the slope of the data collected prior to and subsequent to removal of the trench source material.

Figure 4.3-23 Tetrachloroethene Trend Plot for Well 12691

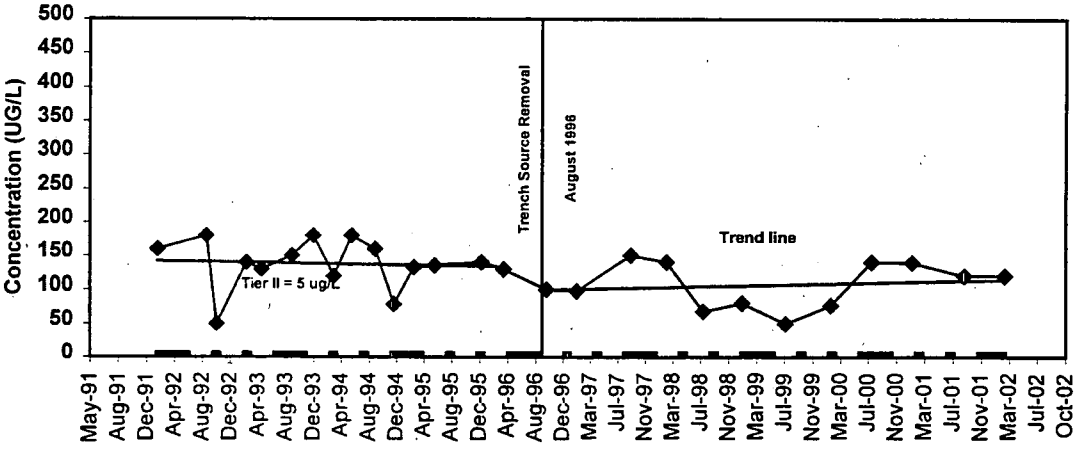


Figure 4.3-24 Trichloroethene Trend Plot for Well 12691

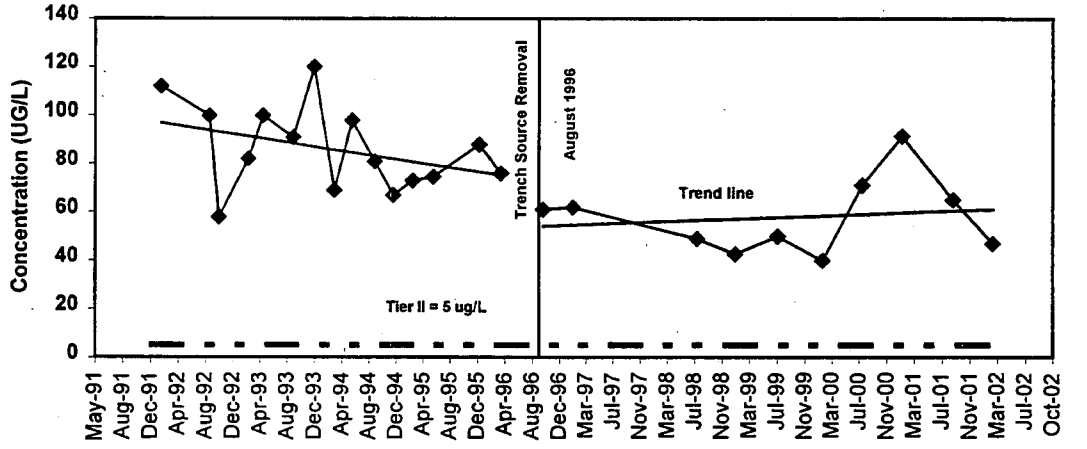
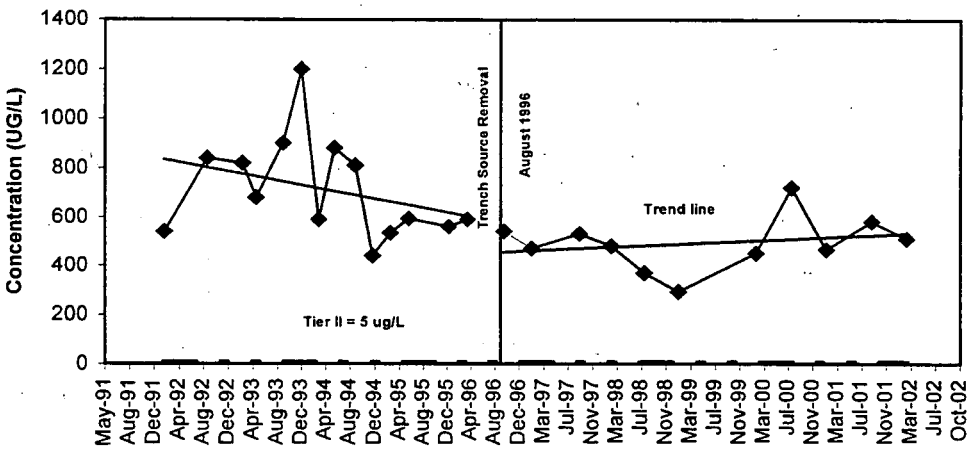


Figure 4.3-25 Carbon Tetrachloride Trend Plot for Well 12691



One outlier in the PCE data in Well 12691 was identified during exploratory statistical analysis and was excluded from the trend plot. This high value was considered highly suspect because it fell outside the upper outer fence on the box and whisker plot (Figure 4.3-26). In addition, the value was detached from the main body of data on the histogram (Figure 4.3-27) and departed significantly from the best-fit line on the probability plot (Figure 4.3-28).

Figure 4.3-26 Box and Whisker Plot of PCE in Well 12691

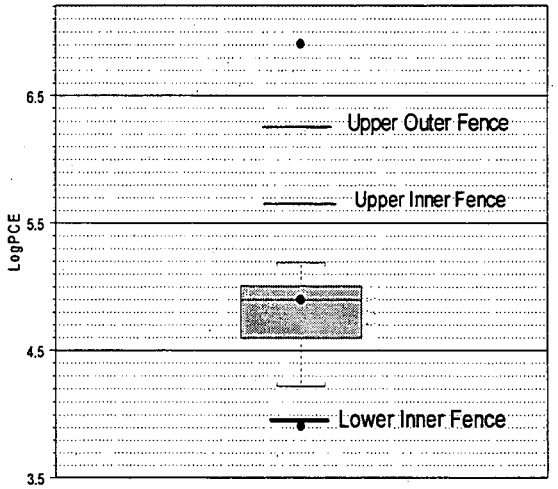


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Figure 4.3-27 Histogram of PCE in Well 12691

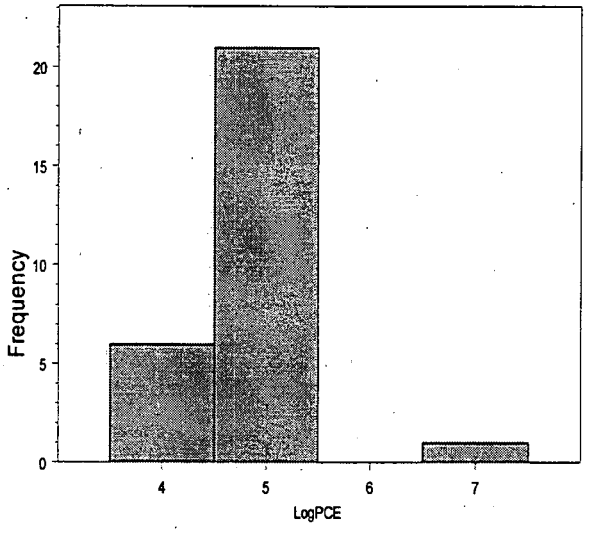
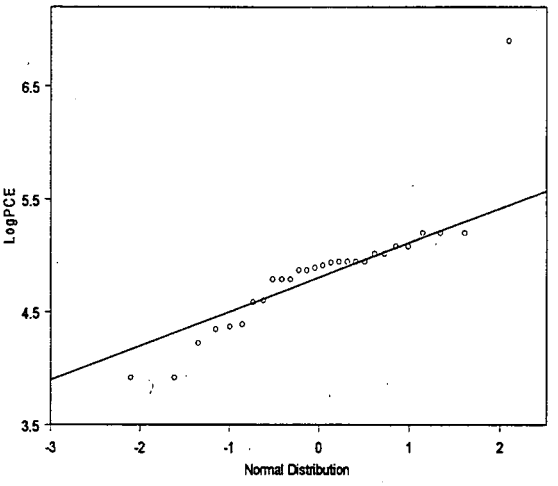


Figure 4.3-28 Probability Plot of PCE in Well 12691



Two outliers, one high and one low value, were identified in the TCE data for Well 12691 and were excluded from further trend analysis. These values are shown on Figures 4.3-29 to 4.3-31.

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Figure 4.3-29 Box and Whisker Plot of TCE in Well 12691

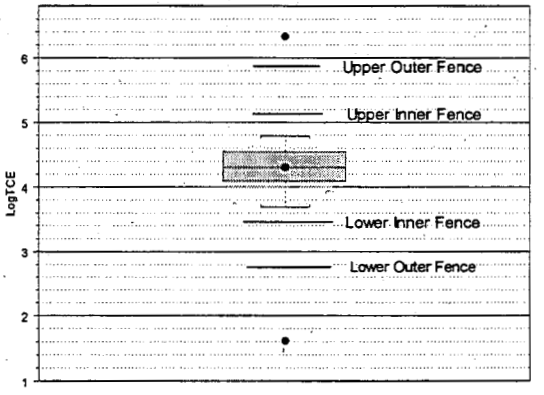


Figure 4.3-30 Histogram of TCE in Well 12691

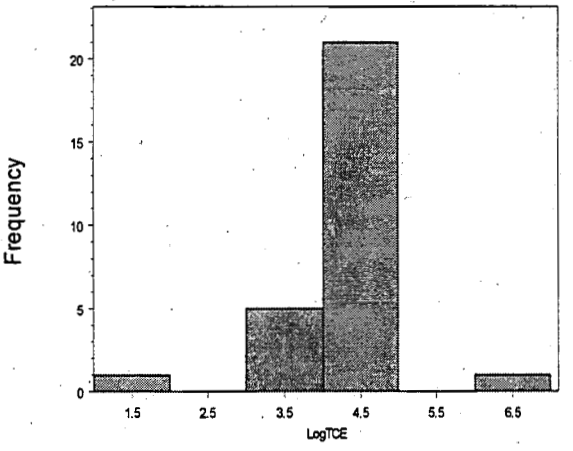
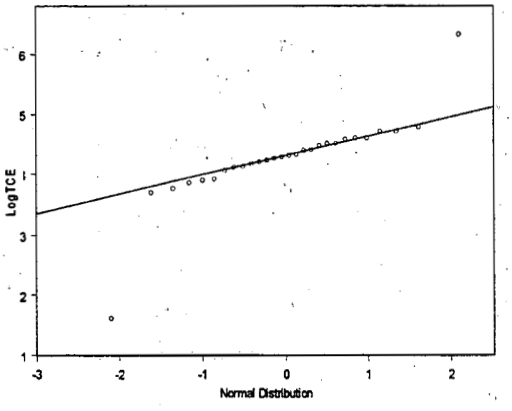


Figure 4.3-31 Probability Plot of TCE in Well 12691



Exploratory statistical analysis identified three outliers in the carbon tetrachloride data for Well 12691. One outlier was a high value that fell outside the upper outer fence while the other two were low values that lay below the lower

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outer fence (4.3-32). Although these values may not be apparent outliers on the histogram (Figure 4.3-33), these points depart significantly from the best-fit line on the normal probability plot (Figure 4.3-34).

Figure 4.3-32 Box and Whisker Plot of Carbon Tetrachloride in Well 12691

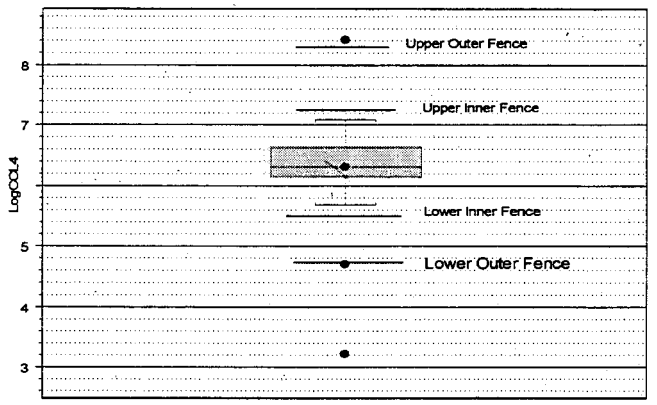


Figure 4.3-33 Histogram of Carbon Tetrachloride in Well 12691

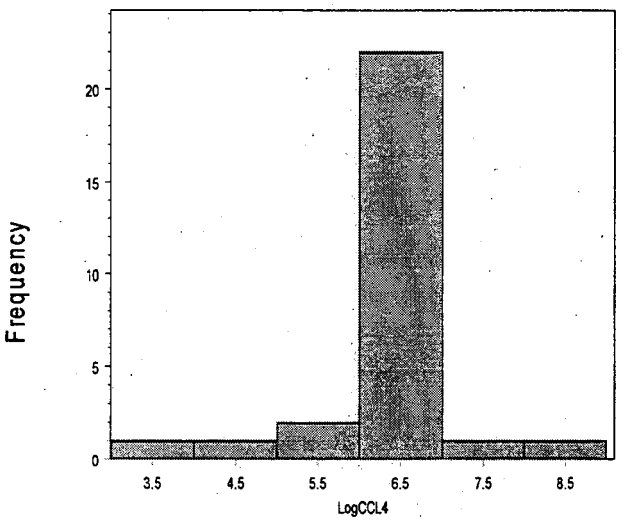
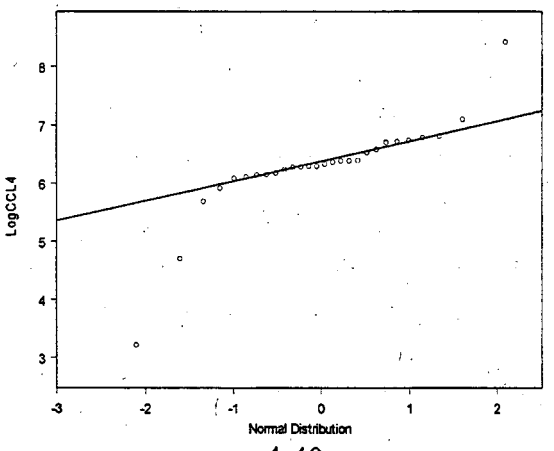


Figure 4.3-34 Probability Plot of Carbon Tetrachloride in Well 12691



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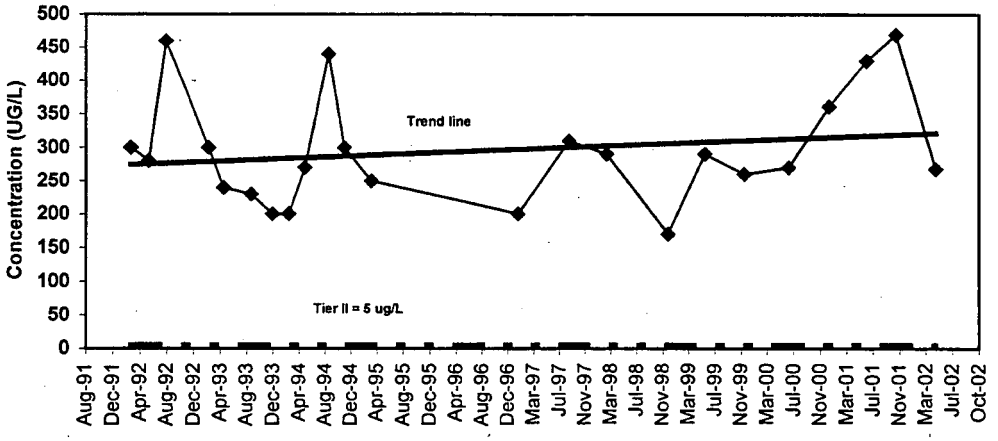
Methylene chloride in Well 12691 has either been not detected or has been found in the blank and, thus, is considered an artifact of laboratory contamination.

PCE concentrations in Well 12191 have fluctuated considerably over a ten-year period and range from 170 to 460 µg/L (Figure 4.3-35). However, the long-term trend in PCE concentrations has remained constant as illustrated by the slightly upward slope (zero slope statistically) of the trend line in Figure 4.3-35. Well 12191 is upgradient to Trench T-3 and therefore has been unaffected by removal of source material from this area.

Figure 4.3-35 Tetrachloroethene Trend Plot for Well 12191



Based on exploratory statistical analysis, one data point was considered highly suspect and excluded from the data set. This outlier is shown on the box and whisker plot (Figure 4.3-36) below the lower outer fence. A histogram and probability plot of the data also support this conclusion (Figures 4.3-37 and 4.3-38).

Figure 4.3-36 Box and Whisker Plot of PCE in Well 12191

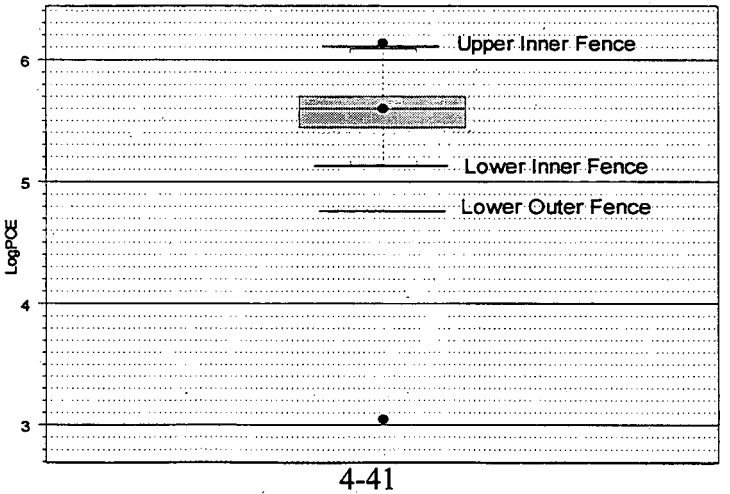


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Figure 4.3-37 Histogram of PCE in Well 12191

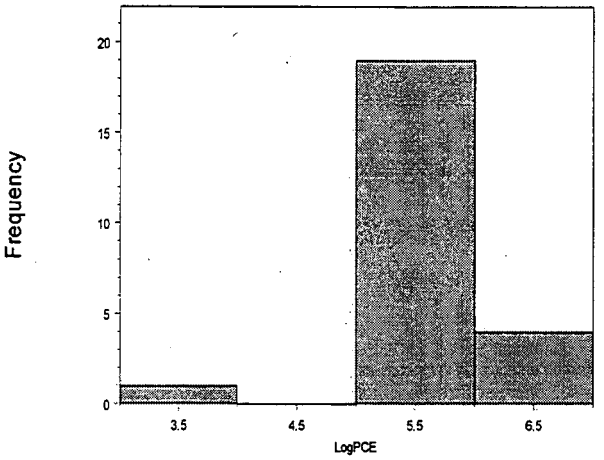
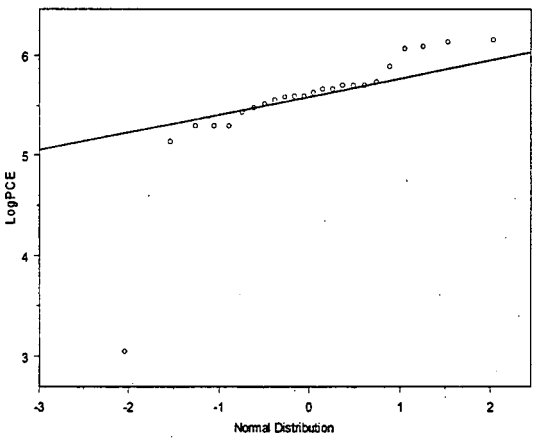
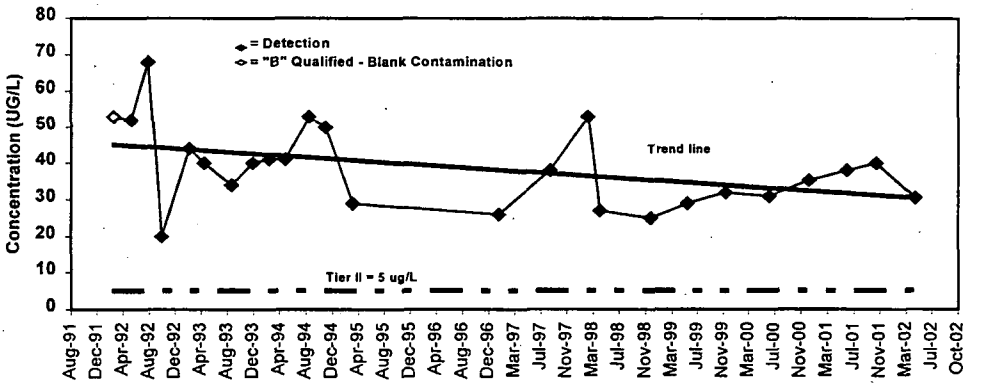


Figure 4.3-38 Probability Plot of PCE in Well 12191



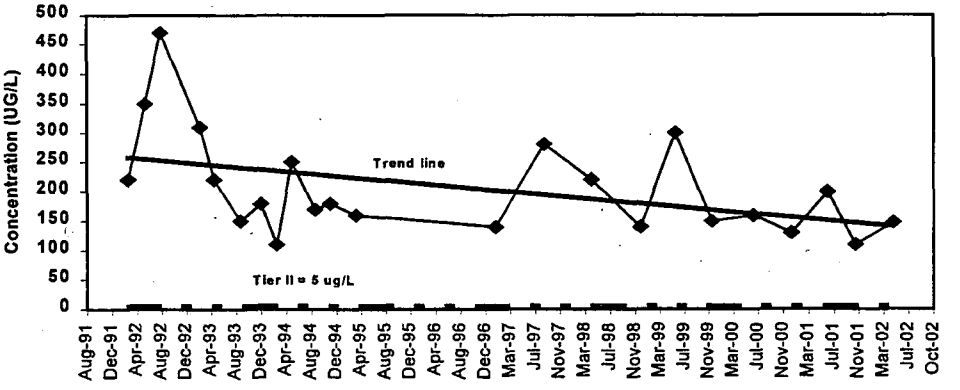
TCE concentrations range from 20 to 68 µg/L in Well 12191and exhibit temporal fluctuations similar to PCE (Figure 4.3-39). Trend analysis of these data indicates there has been a slight downward or negative slope to the TCE concentrations with time. Decreasing TCE concentrations in this well are most likely unrelated to removal of trench source material because the well is located upgradient from the T3 and T4 trenches. No outliers were identified during exploratory statistical analysis for these compounds.

Figure 4.3-39 Trichloroethene Trend Plot for Well 12191



Carbon tetrachloride concentrations in Well 12191 range from 1.10 to 470 µg/L and appear to be decreasing with time (Figure 4.3-40). A trend analysis of the data indicates there is slight downward slope that is statistically significant. This decline in carbon tetrachloride concentrations appears to be unrelated to removal of trench source material because the well is located upgradient of the trenches.

Figure 4.3-40 Carbon Tetrachloride Trend Plot for Well 12191



One low carbon tetrachloride data value was considered an outlier and removed from further analysis. Although this point fell between the lower inner and lower outer fences on the box and whisker plot (Figure 4.3-41), the value was deemed an outlier because it was detached from the main body of data on the histogram and departed significantly from the best-fit line on the normal probability plot (Figures 4.3-42 and 4.3-43).

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Figure 4.3-41 Box and Whisker Plot of Carbon Tetrachloride in Well 12191

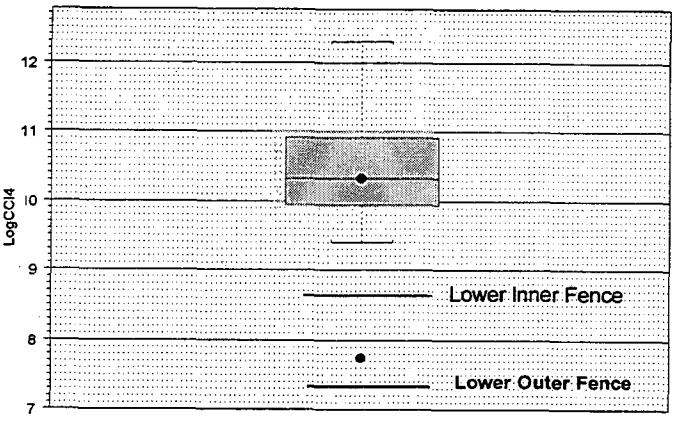


Figure 4.3-42 Histogram of Carbon Tetrachloride in Well 12191

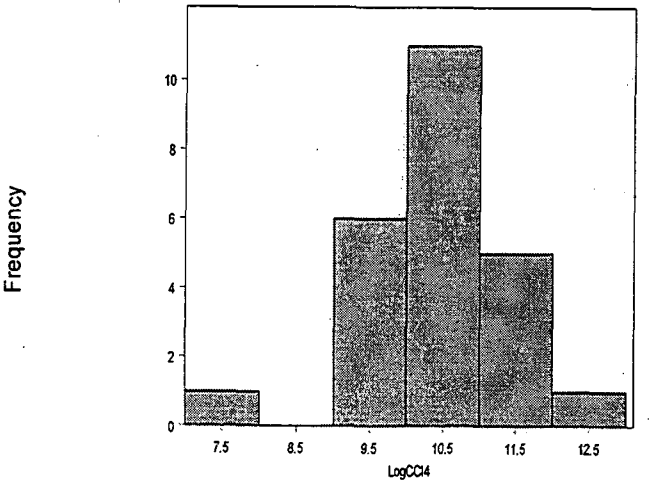
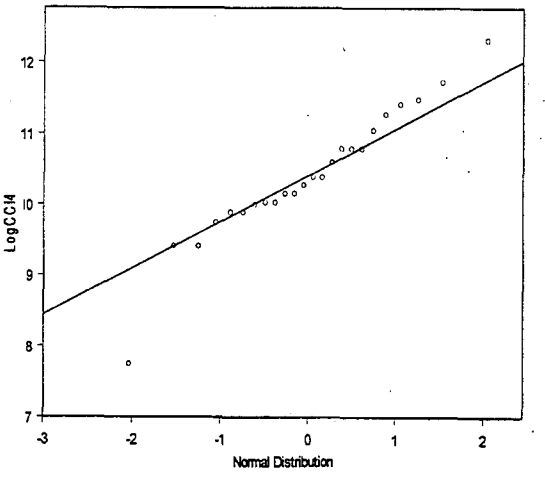


Figure 4.3-43 Probability Plot of Carbon Tetrachloride in Well 12191



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Methylene chloride in Well 12191 has either been undetected or has been found in the laboratory blank indicating that the sample concentration is an artifact of laboratory contamination.

In summary, concentrations of PCE, TCE, chloroform, and carbon tetrachloride downgradient of Trenches T3 and T4 in Wells 3687, 05691, 11891, and 12691 have remained essentially unchanged. Concentrations of PCE and TCE have either decreased slightly or remained the same in upgradient Well 12191. Monitoring of performance wells near trenches T3 and T4 will continue until VOC concentrations decrease to below Tier I action levels.

4.3.2 B-Ponds/East Trenches Plume

The East Trenches Plume is located north of Central Avenue and east of the IA. This groundwater plume contains VOC contamination, which is believed to originate from the East Trenches and the 903 Pad, and extends to the north and northeast to where the plume discharges as seeps and subsurface flow into the South Walnut Creek drainage. Recent exceedances of the Tier II and Tier I action levels in an IMP performance Monitoring Well (23296) near South Walnut Creek and recent detections of VOCs in the B-ponds indicate that contaminated groundwater was reaching surface water. Figure 4-4 presents the site location.

Most of the groundwater contamination in the East Trenches Plume is believed to derive from the trenches on the north side of the East Access Road, including Trenches T-3 and T-4 (RMRS, 1996c) (Plate 13). Upgradient monitoring wells indicate that a component of the contaminated groundwater in this area is derived from VOC contamination emanating from the 903 Pad. However, the VOC concentrations in groundwater increase by more than two orders of magnitude downgradient of Trenches T-3 and T-4, which reflects previous releases from the trenches.

The component of the East Trenches plume derived from VOC contamination at the 903 Pad and Lip areas is associated with drums containing plutonium and uranium contaminated solvents, which were stored in the area from the summer of 1958 to January 1967 (RMRS, 1996d and 1997).

Pre-remedial investigations were conducted in the fall of 1997 and the spring of 1998 to determine the extent and configuration of the distal end of the East Trenches Plume in the vicinity of South Walnut Creek and to collect sufficient data to design a remedial action for the plume. A total of 32 Geoprobe boreholes were advanced and 25 temporary monitoring wells installed. Wells that contained sufficient water were monitored for water table elevation and sampled for radionuclides and VOCs. Soil samples were collected from several boreholes and analyzed for VOCs and other analytes.

Groundwater flow in the vicinity of the East Trenches Plume is to the north and northeast and discharges primarily as seeps, springs, and baseflow to South Walnut Creek. This is particularly apparent where the creek incises the water-bearing strata. There is a spring and seep complex on the south bank of South Walnut Creek, above Ponds B-

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1 and B-2, where the Arapahoe No.1 Sandstone subcrops. Concentrations of VOCs above Tier I action levels were detected in this area during 1998. The presence of VOCs in the seep complex and Well 23296 indicates that contaminants have reached South Walnut Creek. The Arapahoe No.1 Sandstone is present beneath the East Trenches source area and constitutes a preferential groundwater flow pathway towards South Walnut Creek. This unit is continuous in the subsurface from the East Trenches to the northern end of the East Trenches plume; much of the groundwater flow and contaminant flux is through this material. In addition, contaminated groundwater from the East Trenches plume flows into the Qrf underlying South Walnut Creek. This deposit may also act as a preferential pathway for contaminated groundwater (RMRS, 1999g).

During 1999, installation of a capture system along the southern edge of South Walnut Creek to intercept East Trenches plume contaminated groundwater was completed. The 1,200 foot long collection system, along with two zero-valence iron treatment cells, was completed in September 1999 and is similar to the collection and treatment system installed for the Mound Plume (Section 4.1). This passive East Trenches Plume Treatment System (ETPTS) system is designed to treat VOC-contaminated groundwater from the East Trenches Plume and remove contaminants to below surface water action levels. The downgradient capture system was chosen as the best remediation method, following an evaluation of more traditional options, because it effectively treats the existing VOCs to below action levels at a lower life cycle cost than the other treatment options.

An impermeable barrier groundwater collection system was keyed into the underlying claystone or low permeability colluvium, depending on the elevation of the bedrock surface. The captured groundwater flows out of the collection system by gravity and into a series of cells containing zero-valence iron filings, which breaks down the VOCs. The treated water discharges to groundwater through an infiltration gallery; however, for added flexibility the system was designed to allow discharge directly to South Walnut Creek if necessary.

Effluent concentrations of the primary contaminants of interest, carbon tetrachloride, TCE, and PCE, collected and analyzed from the East Trenches plume treatment system during 2001 were mostly below Tier II action levels. Two PCE samples collected in October 2001 and April 2002 were slightly above Tier II action levels at concentrations of 5.3 µg/L and 12 µg/L, respectively. Methylene chloride was also detected in the effluent at 15 µg/L.

Four monitoring wells are currently being sampled as performance monitoring wells for the ETPTS. These wells are 23296, 95099, 95199, and 95299. Wells 95199, 95299, and 23296 are downgradient of the treatment system in the vicinity of the distal end of the East Trenches Plume.

TCE has been detected in well 95199 at concentrations above Tier II action levels. The maximum TCE concentration in well 95199 during 2001 was 65 µg/L. As shown on Figure 4.3-44, the upward trend line indicates an increase in TCE concentrations since sampling commenced. However, this upward trend is apparent and not statistically significant because the slope of the trend line cannot be distinguished from zero.

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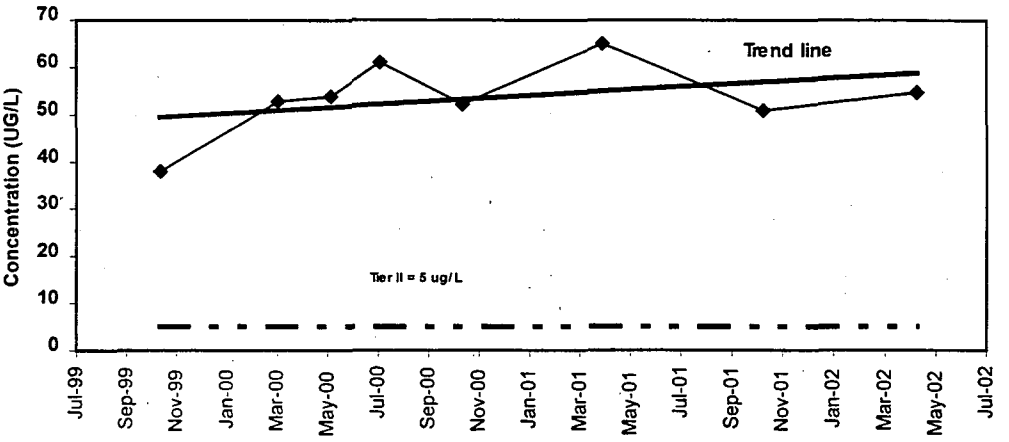
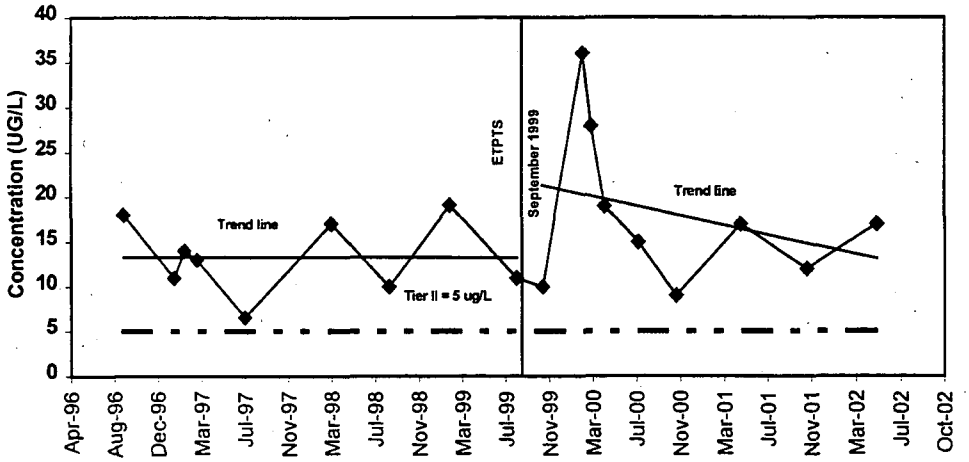
Figure 4.3-44 Trichloroethene Trend Plot for Well 95199



PCE concentrations in Well 23296 have been consistently above Tier II action levels as shown on Figure 4.3-45. Trend analysis of these data prior to and post installation of the ETPTS indicates there has been statistically no change in PCE concentrations with time. No outliers were detected during exploratory statistical analysis.

Figure 4.3-45 Tetrachloroethene Trend Plot for Well 23296



TCE concentrations in Well 23296 have been consistently above Tier II action levels and occasionally above Tier I action levels (Figure 4.3-46). The maximum TCE concentration in well 23296 between 2001 and the 2nd quarter 2002 was 700 µg/L. Trend analyses for these data show a flat slope both prior to and post installation of the ETPTS.

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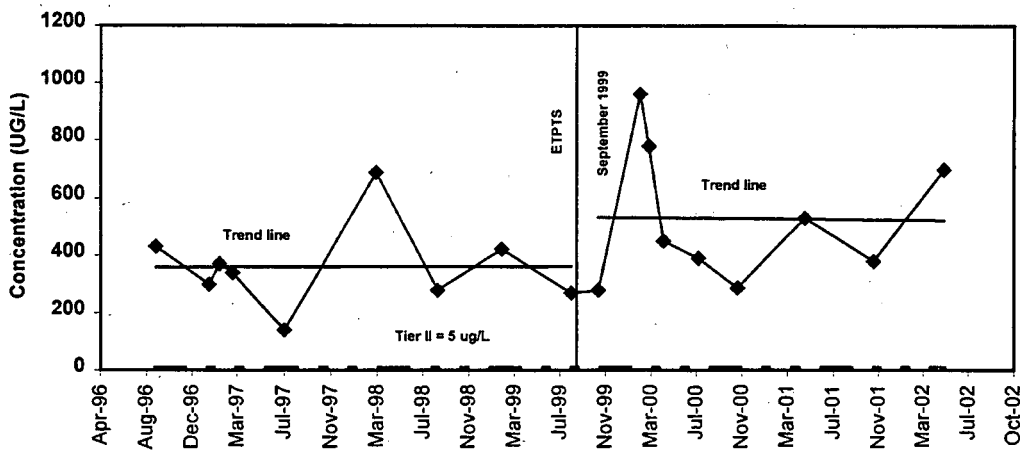
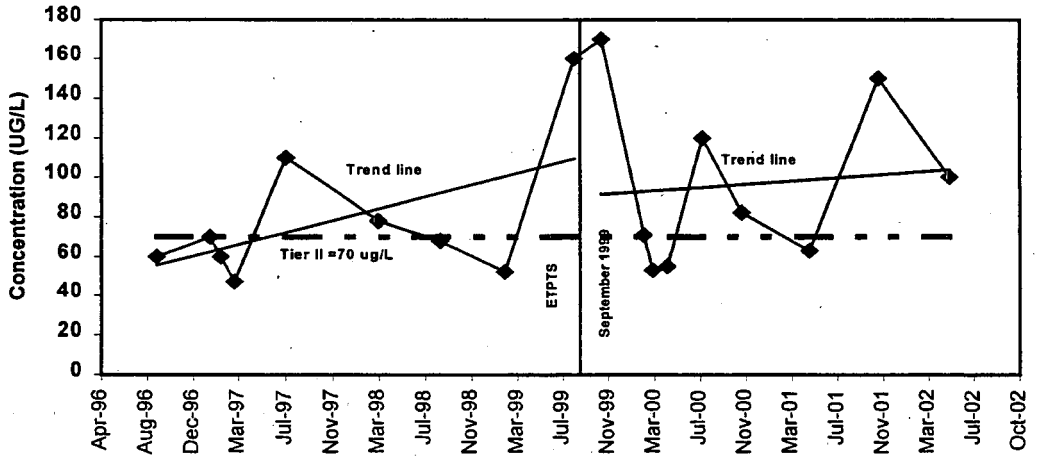
Statistically, these trends indicate that TCE concentrations have not changed significantly with time. No outliers were detected during summary statistical analysis.

Figure 4.3-46 Trichloroethene Trend Plot for Well 23296



The maximum concentration of cis-1,2-DCE in Well 23296 during 2001 and up to the 2nd quarter 2002 was 150 µg/L (Figure 4.3-47). Concentrations have been frequently above Tier II action levels during the entire period of sampling. Trend analysis indicates a slight increase in concentrations with time before and after installation of the ETPTS. However, these trends are apparent and statistically not significant indicating that cis-1,2-DCE concentrations have remained unchanged. No outliers were detected during exploratory statistical analysis.

Figure 4.3-47 Cis-1,2-Dichloroethene Trend Plot for Well 23296



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Concentrations of these contaminants in Wells 95199, 95299, and 23296 are expected to decrease over time because the upgradient portion of the plume, which constitutes the supply of these VOCs, has been intercepted.

Very low concentrations of carbon tetrachloride (less than 1 μg/L), qualified with a "J," have been detected in well 95099. During 2001 and up to the second quarter 2002 no other VOCs were detected. Well 95299 has been dry since it installation and, therefore, could not have been sampled.

Hydrographs of Wells 95099, 95199, and 23296, all of which are located downgradient of the interceptor trench for the ETPTS, are included in Appendix C. Water levels in 95099 and 95199 have remained relatively constant with time with no significant statistical trends present. A significant downward trend in water level has occurred in well 23296, which is strongly controlled by the water level in Pond B-2.

With the exception of two PCE and one methylene chloride samples that were slightly above Tier II action levels, the ETPTS is fully operational and treating contaminated groundwater to below the specified system performance requirements. Monthly sampling during CY 2002 will continue to verify the performance of the treatment system. A complete set of analytical data for CY 2001 can be found in the RFCA Groundwater Quarterly Reports.

4.4 881 Hillside French Drain

The former OU 1, also referred to as the 881 Hillside Area, is located just south and east of Building 881 and north of Woman Creek. Building 881 was used for enriched uranium operations and stainless steel manufacturing. The laboratories in Building 881 also performed analyses of the materials generated in production. Building 881, at an elevation of approximately 6000 feet, lies approximately 170 feet above Woman Creek. Woman Creek and the South Interceptor Ditch (SID) are the two surface drainages that occur in the former OU 1. The SID crosses the 881 Hillside flowing west to east just north of and parallel to Woman Creek. Figure 4-5 shows the site area.

The former OU 1 included 11 IHSSs that historical information suggests could exhibit contamination of soil, groundwater, and/or surface water (DOE, 1992b). The IAG, signed in January 1991, provided guidance and direction for investigating the OU 1 IHSSs. During 1992, as an IM/IRA, a 1435-foot long French drain was constructed across a significant portion of OU 1 north of the SID to protect Woman Creek from the contaminated alluvial groundwater present in the OU (Figure 4-5). The French drain, along with an upgradient extraction well (891COLWEL), constitutes the 881 Hillside groundwater collection and treatment system. The system collected VOC contaminated groundwater from within a plume that is potentially moving from OU 1 south towards Woman Creek. Groundwater collected from the 891COLWEL was transported, through CY 2000, to the Consolidated Water Treatment Facility (CWTF) that is located in Building 891. In July 1996, the final RFCA, which replaced the IAG, was signed. Pursuant to the Operable Unit Consolidation Plan, the OU is progressing through the Corrective Action Decision/Record of Decision (CAD/ROD) process with the EPA as the lead regulatory agency (DOE, 1997d).

The CAD/ROD presented the selected remedy for addressing contamination in subsurface soil at IHSS 119.1, a former drum and scrap metal storage area (DOE, 1992b) and part of the former OU 1. Groundwater occurrence in the IHSS 119.1 area is limited and primarily found in the unconsolidated surficial materials and in isolated northwest-southeast trending paleochannels incised into the bedrock. Recharge to the unconsolidated surficial material is minimal and occurs primarily through infiltration of precipitation during spring and summer. Discharge occurs largely through ET and also at seeps, Woman Creek, the SID, and the 881 Hillside French drain. Residual contamination from past releases has contaminated soils and groundwater in the southwest portion of the IHSS and contributed to the degradation of groundwater quality in the immediate vicinity of the IHSS.

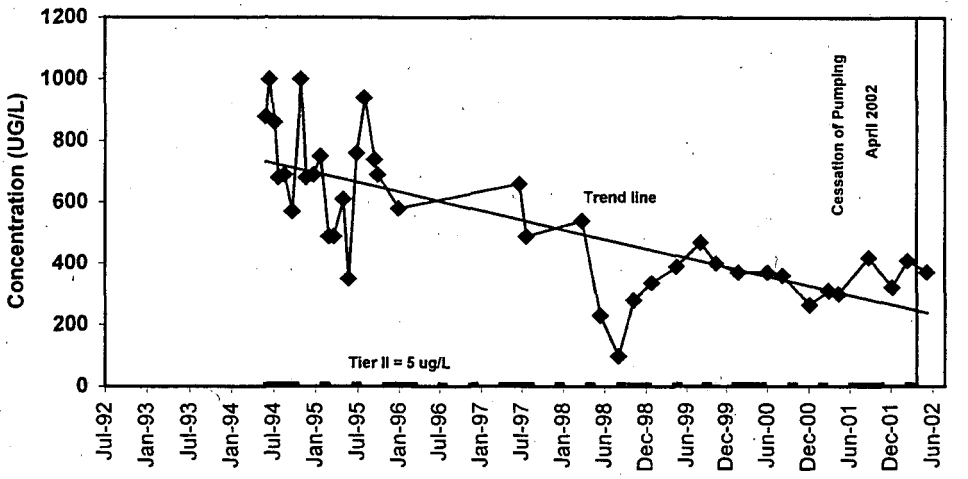
The selected remedial action presented in the CAD/ROD included excavation and treatment of VOC-contaminated soil by low temperature thermal desorption, extraction of groundwater entering the excavation, and treatment of the groundwater at the Building 891 treatment system (DOE, 1997d). Excavated soils were to be treated onsite and returned to the excavation. The contaminants of interest identified in the CAD/ROD at IHSS 119.1 are carbon tetrachloride; 1,1-DCE; PCE; 1,1,1-TCA; TCE; and selenium.

Since the signing of the CAD/ROD, new sampling and analysis results support the need to significantly alter the remedy that was originally selected. The results of these samples showed that the actual soil concentrations of the contaminants of interest were well below the Tier I subsurface soil action levels (DOE, 1996b). Thus, excavation and treatment of these soils was not warranted. Based on these new sampling data and utilizing applicable provisions in the RFCA, CERCLA, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), a modification to the CAD/ROD was prepared for OU 1. The CAD/ROD modification addresses and documents changes to the previous CAD/ROD declaration and presents the information gained since the time that declaration was signed, along with the rationale leading to the modification.

Decommissioning of the 881 Hillside French drain began on August 31, 2000 and was completed by September 30, 2000. The decommissioning resulted in the elimination of groundwater being sent from the collection system for treatment in the CWTF, and eliminated the Collection Gallery (891COLGAL) as an IMP sampling location. 891COLGAL was the collection sump at the 881 Hillside French drain downgradient of IHSS 119.1. As of April 2002, pumping from extraction well 891COLWELL was discontinued.

Plate 13, the VOCs and nitrate composite plume map, has been updated to reflect sampling results from 2001 and early 2002. Groundwater sample results from the 891COLWEL for 2001 indicate no Tier I exceedances for VOCs. However, VOCs, including TCE, PCE, and carbon tetrachloride, and metals such as selenium have been detected frequently above Tier II action levels. TCE has generally exhibited a steady decline in concentrations since July 1994, as illustrated on Figure 4.4-1, by the significant downward trend line. Current TCE concentrations are substantially above Tier II action levels.

Figure 4.4-1 Trichloroethene Trend Plot for 891COLWEL



Exploratory statistical analysis of the TCE data indicates the presence of five potential outliers. These data are shown below the lower outer fence on the box and whisker plot on Figure 4.4-2 and also displayed as suspect data on the histogram and probability plot (Figures 4.4-3 and 4.4-4).

Figure 4.4-2 Box and Whisker Plot of Trichloroethene in 891COLWEL

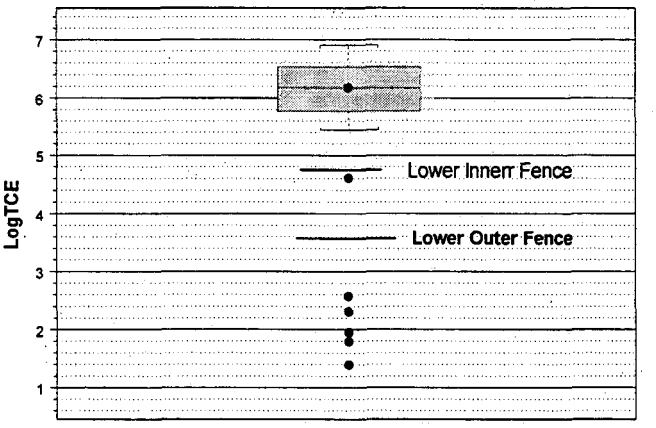


Figure 4.4-3 Histogram of Trichloroethene in 891COLWEL

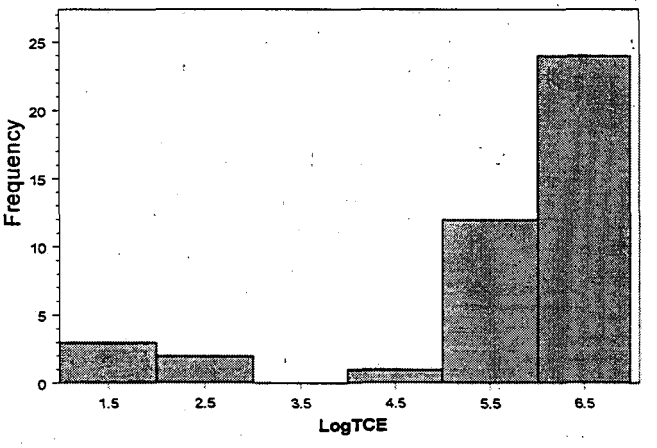


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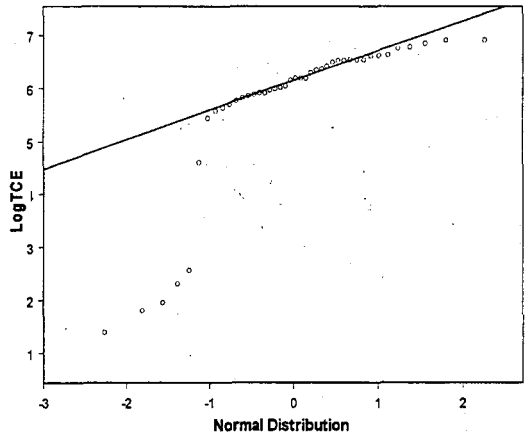
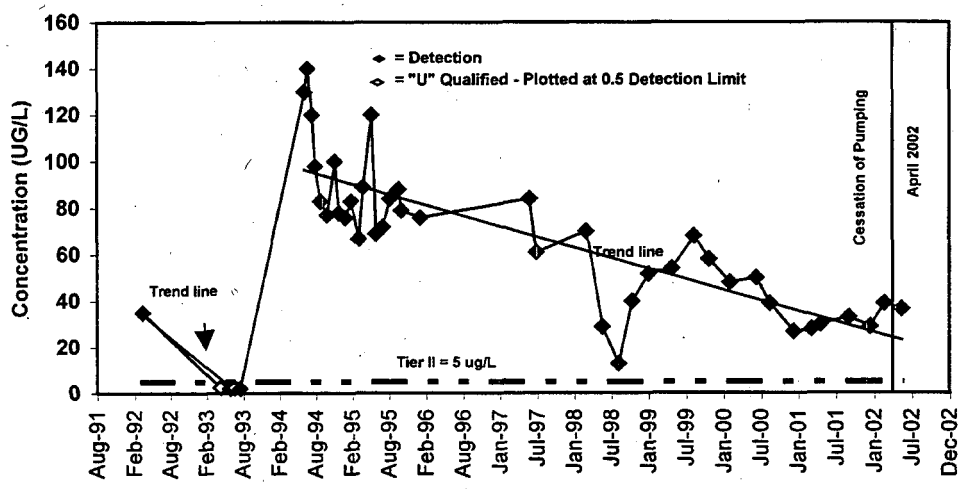
Figure 4.4-4 Probability Plot of Trichloroethene in 891COLWEL



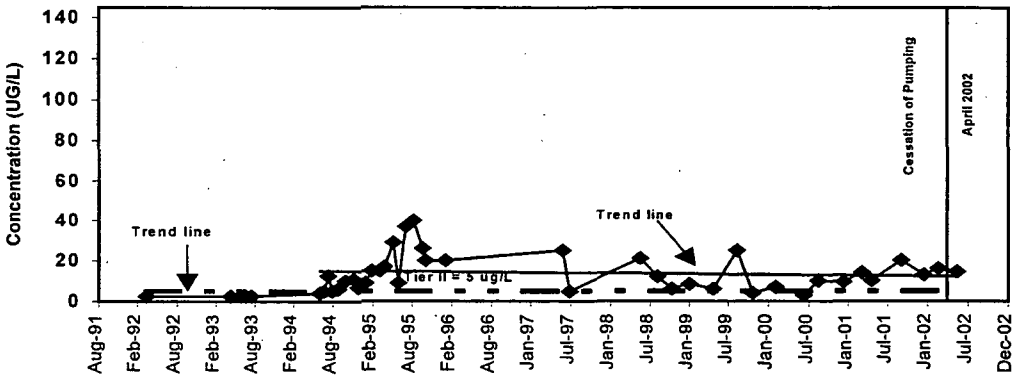
PCE in 891COLWEL has been consistently above Tier II action levels since June 1994. As shown on Figure 4.4-5, two trends appear to exist in the data set. Early data from the start of sampling until August 1993 exhibit one distinct trend while the later data appear to exhibit another. Based on the bi-modal nature of the data, two trend analyses were performed. These analyses indicate that statistically significant downward trends occur for both the early and latter data. No outliers were identified during statistical analysis of the PCE data.

Figure 4.4-5 Tetrachloroethene Trend Plot for 891COLWELL



Carbon tetrachloride concentrations in 891COLWEL (Figure 4.4-6) have generally been above Tier II action levels. However, current concentrations are only slightly above Tier II action levels. Based on the bi-modal nature of the data, two trend analyses were performed, one for data prior to August 1993 and the other for latter data. These analyses indicate no statistically significant trends have occurred.

Figure 4.4-6 Carbon Tetrachloride Trend Plot for 891COLWEL



One outlier was identified during statistical analysis and was excluded from the carbon tetrachloride data set. Although the low value fell between the lower inner and outer fences on the box and whisker plot (Figure 4.4-7), it was detached from the main data on the histogram (Figure 4.4-8) and lay a considerable distance from the best-fit line on the probability plot (Figure 4.4-9).

Figure 4.4-7 Box and Whisker Plot of Carbon Tetrachloride in 891COLWEL

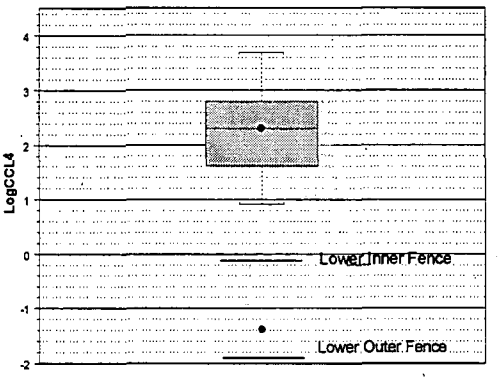


Figure 4.4-8 Histogram of Carbon Tetrachloride in 891COLWEL

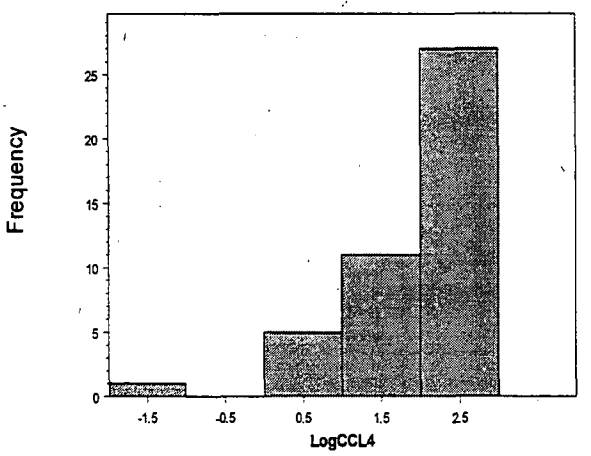


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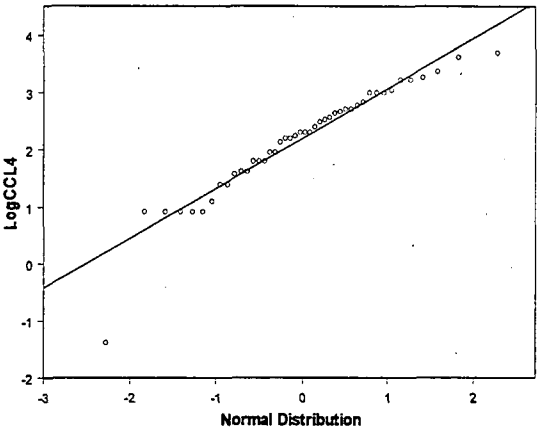
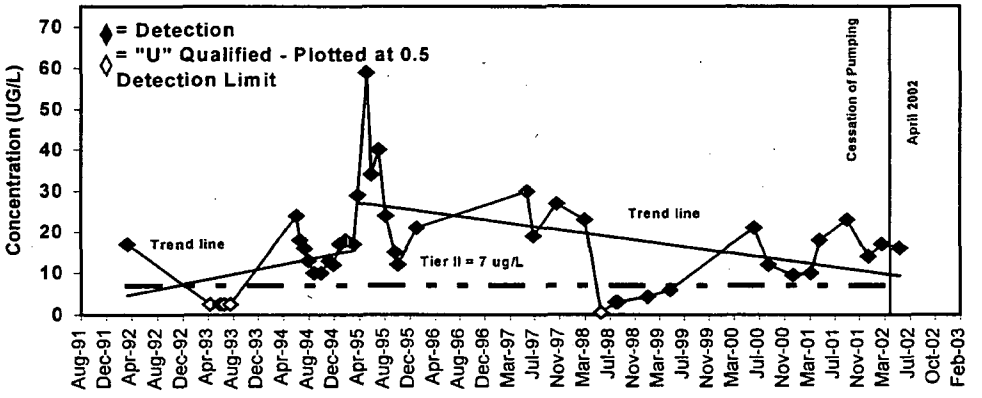
Figure 4.4-9 Probability Plot of Carbon Tetrachloride in 891COLWEL



891COLWELL samples collected during 2001 and the first half of 2002 showed slight Tier II exceedances of 1,1-DCE (Figure 4.4-10). Based on the bi-modal nature of the data, two trend analyses were performed, one for data prior to March 1995 and the other for latter data. These analyses indicate that a statistically significant downward trend occurs for the latter data. The early data exhibits an apparent upward trend, which is not statistically significant. No outliers were identified during exploratory statistical analysis of the 1,1-DCE data.

Figure 4.4-10 1,1-Dichloroethene Trend Plot for 891COLWEL



Except for several "J" values, methylene chloride in 891COLWEL has either been below the detection limit or has been qualified with a "B" indicating it was detected in the laboratory blank.

Selenium in 891COLWELL has been generally one order of magnitude above the Tier II action level (Figure 4.4-11). There has been no statistical trend to selenium concentrations with time. No outliers were identified during statistical analysis.

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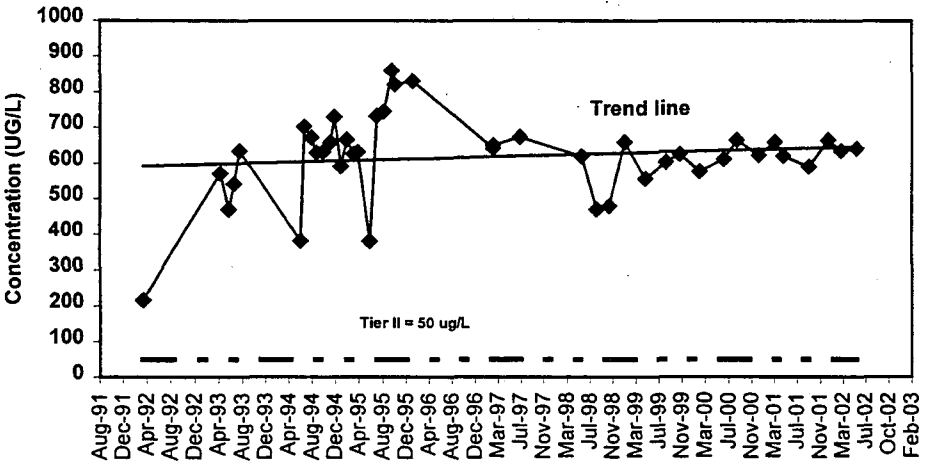
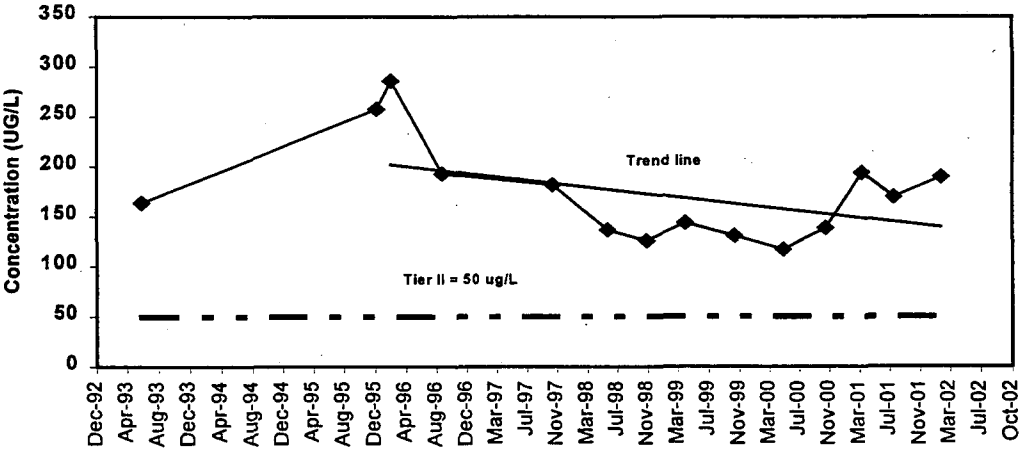
Figure 4.4-11 Selenium Trend Plot for 891COLWELL



No Tier II VOC exceedances for 881 Hillside French Drain Performance Monitoring Wells 10592, 10692, 10792, 10992, and 11092 occurred during 2001.

Selenium in Well 10592 has historically been above the Tier II action level but has been decreasing with time since February 1996, as shown by the downward trend line in Figure 4.4-12. The trend analysis was performed on data since February 1996 because prior to that time there was a considerable hiatus in sample collection. The one early data point from June 1993 would tend to skew the regression analysis. The downward trend is apparent and not statistically significant. No outliers are present in the selenium data.

Figure 4.4-12 Selenium Trend Plot for Well 10592



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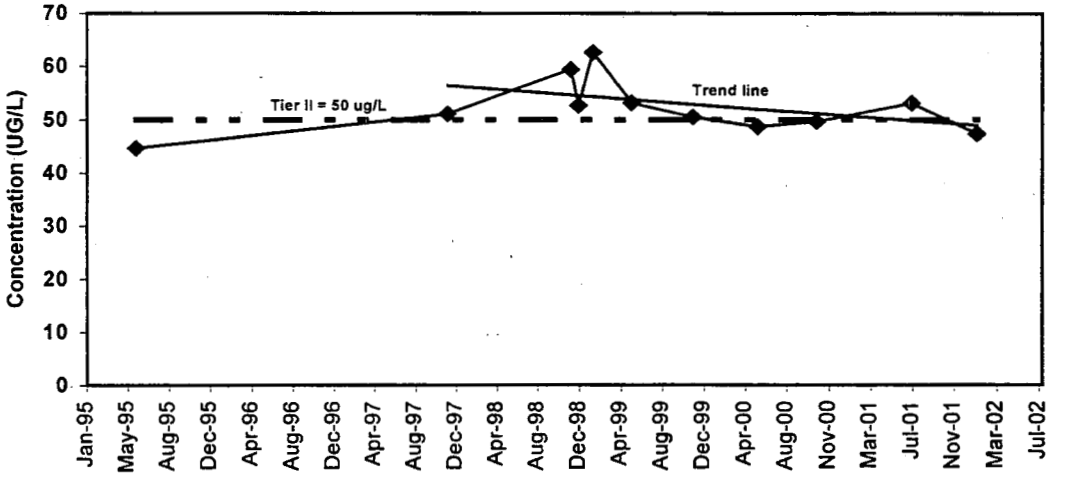
Selenium in Well 10792 has been decreasing since January 1999 and, as of January 2002, is below the Tier II action level (Figure 4.4-13). Although the trend analysis shows a slight increase in selenium concentrations, the slope of the trend line is statistically insignificant and cannot be differentiated from a zero slope.

Figure 4.4-13 Selenium Trend Plot for Well 10792



One highly suspect selenium data point for 10792 was identified as an outlier and was consequently dropped from further trend analysis. The high value fell above the upper outer fence on the box and whisker plot (Figure 4.4-14), was detached two class intervals on the histogram (Figure 4.4-15), and departed a significant distance from the best-fit line on the probability plot (Figure 4.4-16).

Figure 4.4-14 Box and Whisker Plot of Selenium in Well 10792

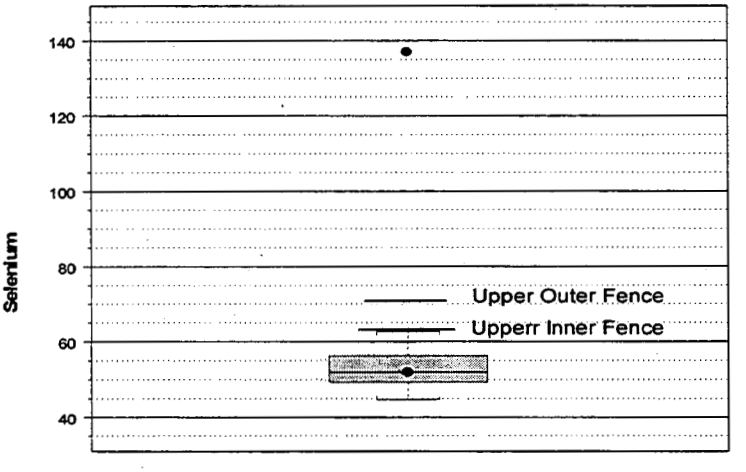


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Figure 4.4-15 Histogram of Selenium in Well 10792

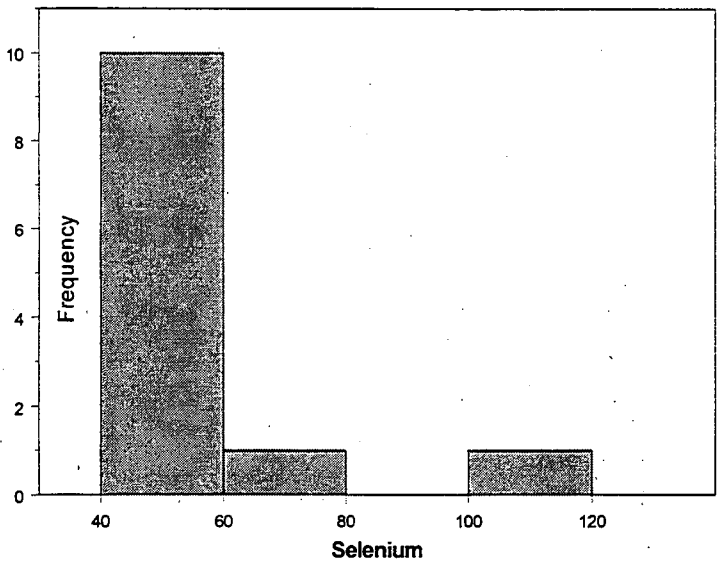
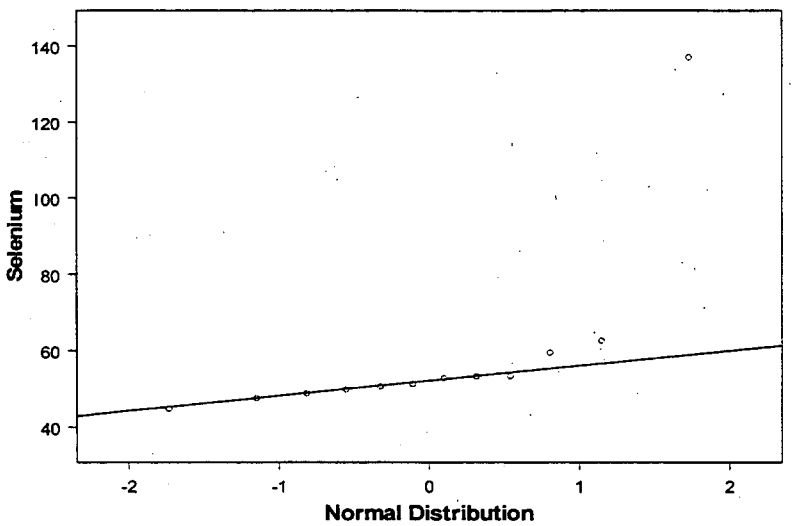


Figure 4.4-16 Probability Plot of Selenium in Well 10792



Selenium concentrations in Well 10992 have been approximately one order of magnitude above Tier II action levels since sampling began in September 1996 (Figure 4.4-17). Long-term trend analysis indicates a statistically significant downward or negative slope. No outliers are present in the selenium data set.

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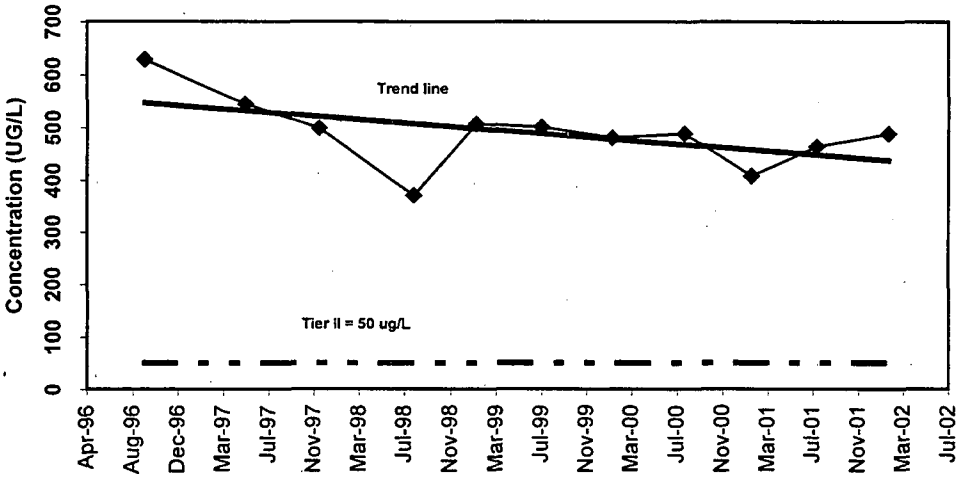
Figure 4.4-17 Selenium Trend Plot for Well 10992



Monitoring Wells 10592, 10692, and 10792, which were previously installed to monitor the Hillside French Drain and the western edge of the 881 hillside, are no longer necessary since the French Drain and collection system have been decommissioned. Although it is stipulated in the OU 1 CAD/ROD, that once groundwater pumping ceases from collection Well 891 COLWELL, Well 10992 will be retained as a Plume Definition Well in accordance with the IMP. However, Wells 10592, 10692, and 10792 have not been included as part of the plume monitoring and therefore, it is recommended that these wells be removed from the present monitoring program.

A complete set of analytical data for CY 2001 can be found in the RFCA Groundwater Quarterly Reports. Updated hydrographs for Downgradient Wells 10592, 10692, 10792, 10992, and 11092 are included in Appendix C. Water levels in Wells 10592 and 10992 have risen slightly as shown by the statistically significant upward trend line while water levels in Wells 10792 and 11092 have remained fairly constant since their installation in 1992. A slightly significant statistical downward trend has occurred in water levels in Well 10602.

4.5 Ryans Pit Source Removal

The Ryan's Pit (IHSS 109) source removal was the first accelerated source removal action to remediate contaminated soils, which were contributing to the degradation of groundwater in the area. This Section evaluates performance of the source removal action per RFCA (RFCA, 1996) with regard to groundwater. Ryan's Pit, also known as Trench T-2, is located directly south of the 903 Pad at RFETS (Figure 4-6). Ryan's Pit was ranked fourth on the IHSS Ranking and Prioritization List because of contaminant chemical concentrations in soil and a high potential for further release (RMRS, 1997a).

Ryan's Pit was approximately 20 feet long, 10 feet wide, and 5 feet deep. The source removal excavation was 32 feet long, 18 feet wide, and varied in depth from 5.5 to 8 feet (RMRS, 1997a). Ryan's Pit was used from approximately 1966 to 1970 for the disposal of liquid chemical wastes. The wastes were primarily solvents (PCE,

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TCE, and 1,1,1-TCA), paint thinners (toluene, ethylbenzene, and xylenes), diesel fuel, and other construction related chemicals. Radiation screening of the wastes was performed and, if identified as non-radioactive, the liquids were dumped in the trench.

The accelerated source removal action included the excavation and treatment of approximately 180 cubic yards of soil and debris contaminated with VOCs. The soil and debris was excavated in September 1995, treated in February 1996 using low temperature thermal desorption treatment technology to remove VOCs, and the project was completed in September 1996 with the replacement of treated soil. The primary contaminants of interest in subsurface soil from Ryan's Pit were PCE, TCE, and 1,1,1-TCA along with additional contaminants summarized in the PAM (RMRS, 1995c). The *Closeout Report for the Remediation of Individual Hazardous Substance Site 109, Ryan's Pit* (RMRS, 1997a) summarizes the source removal action. Excavation boundary samples identified VOC contamination in the south wall that was below the Programmatic Preliminary Remediation Goals for the source removal at that time (RMRS, 1995 and 1997a), but were above the current Tier I subsurface soil action levels (RFCA, 1996). These results are summarized in Table 4-1.

Table 4-1 Ryan's Pit Excavation Boundary Sample Results

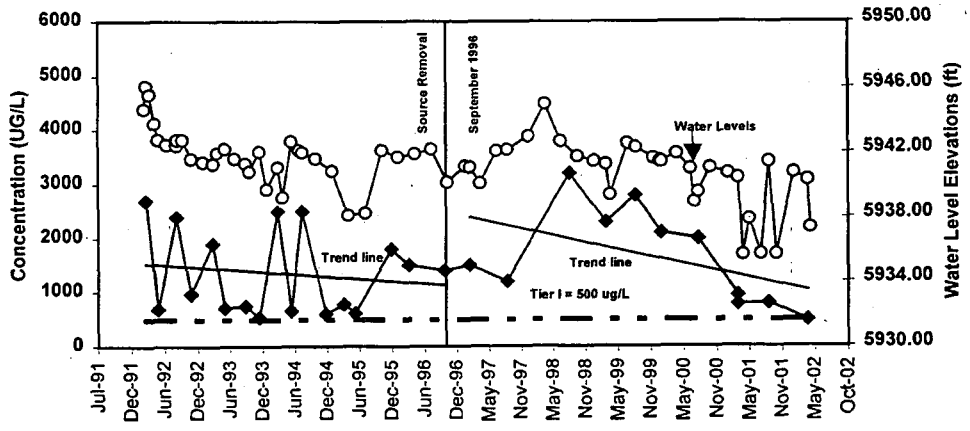
Location	Analyte	Result (mg/Kg)
10-S WALL (WEST) South Wall (West Side)	TCE	19
	4-methyl 2-pentanone	19
	PCE	250
	Toluene	100
	Ethylbenzene	28
	Xylene (total)	140

Reference: RMRS, 1997a

Well 07391 is part of the IMP and the closest downgradient well to the source removal area. Contaminants of interest that are monitored as part of the IMP are 1,1,1-TCA, PCE, TCE, chloroform, carbon tetrachloride, and methylene chloride. Carbon tetrachloride and methylene chloride are not discussed in this section because there were no detectable concentrations of these constituents observed in subsurface soils from Ryan's Pit. However, carbon tetrachloride and methylene chloride are contaminants that are known to have originated from the 903 Pad.

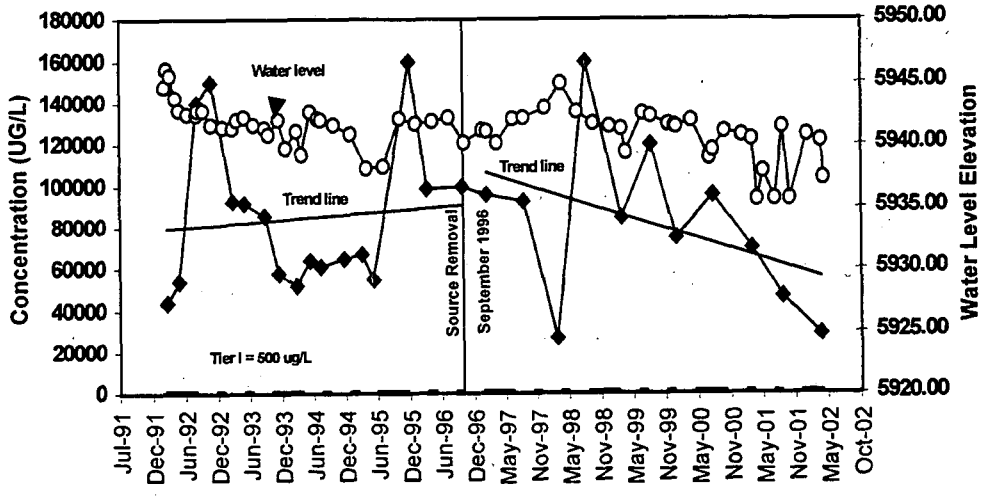
The concentration of PCE in Well 07391 has varied considerably since the well was first sampled in March 1992 (Figure 4.5-1). These temporal variations appear to be directly related to seasonal fluctuations in groundwater levels, which are also shown on Figure 4.5-1. Trend analysis of data collected prior the removal of contaminated soil and debris indicates that PCE concentrations have remained fairly constant with time. Although there is a downward slope to the trend line, the slope is statistically insignificant and cannot be distinguished from zero. Likewise, the trend line for data collected after source material was removed exhibits a downward trend but is statistically insignificant because of poor fit of the data. No outliers were identified during exploratory statistical analysis.

Figure 4.5-1 Tetrachloroethene Trend Plot for Well 07391



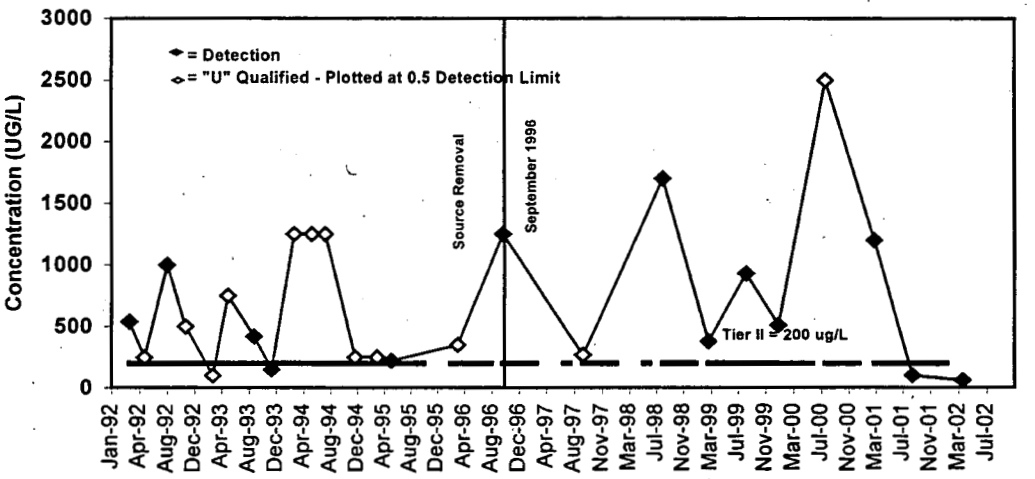
TCE concentrations in Well 07391 have varied significantly with time and have frequently been two orders of magnitude above Tier I action levels. Some of the extreme variation in TCE concentrations may also be related to groundwater level fluctuations. Groundwater fluctuations are shown on Figure 4.5-2. Sampling in 2001 indicates the TCE concentration is still above 20,000 µg/L. Although a slight upward trend in the data prior to source removal is discernible, the trend is apparent with no statistical significance. Similarly, the downward trend in the latter data is also apparent indicating that TCE concentrations have remained essentially unchanged with time. No outliers were detected in exploratory statistical analysis.

Figure 4.5-2 Trichloroethene Trend Plot for Well 07391



Detectable concentrations of 1,1,1-TCA in Well 07391 have fluctuated with a maximum of 1700 µg/L in September 1998 (Figure 4.5-3). Except for a non-detect in August 2000, concentrations have been consistently above the Tier II action level since August 1997. However, despite considerable fluctuations, 1,1,1-TCA concentrations appear to have remained constant. Because of the high proportion of non-detects (50 percent), a trend analysis was not conducted.

Figure 4.5-3 1,1,1-Trichloroethane Trend Plot for Well 07391



One 1,1,1-TCA value was identified as an outlier during statistical analysis and was excluded from further analysis. This suspect value is plotted beyond the lower outer fence on the box and whisker plot (Figure 4.5-4) and is also shown as anomalous point on the histogram and probability plot (Figures 4.5-5 and 4.5-6).

Figure 4.5-4 Box and Whisker Plot of 1,1,1-Trichloroethane for Well 07391

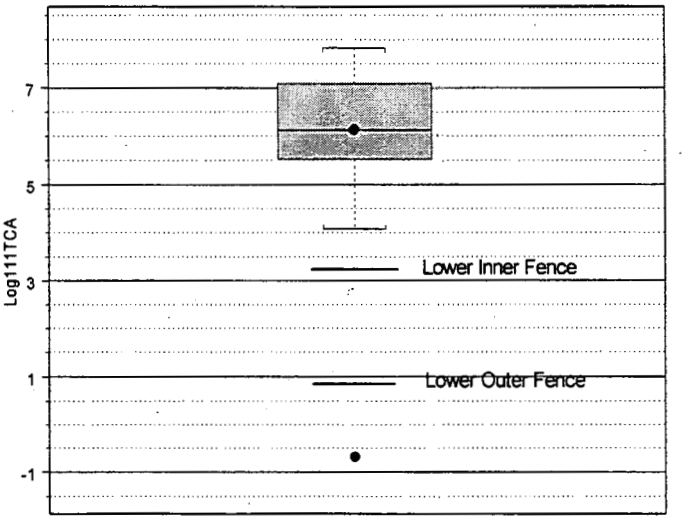


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Figure 4.5-5 Histogram of 1,1,1-Trichloroethane for Well 07391

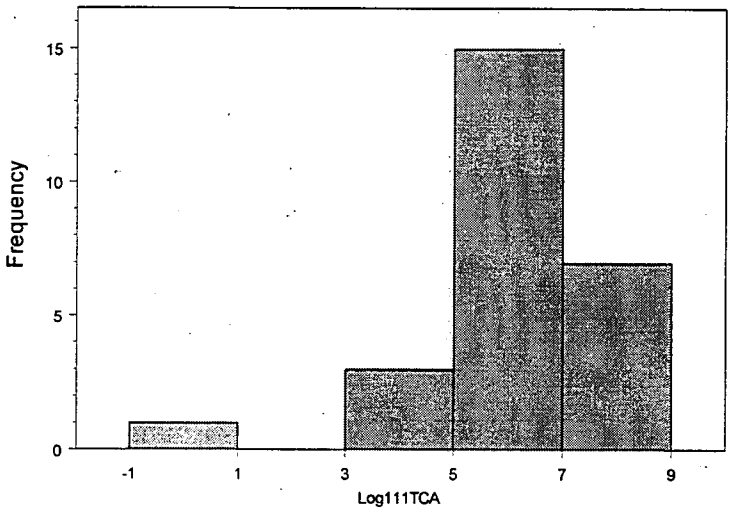
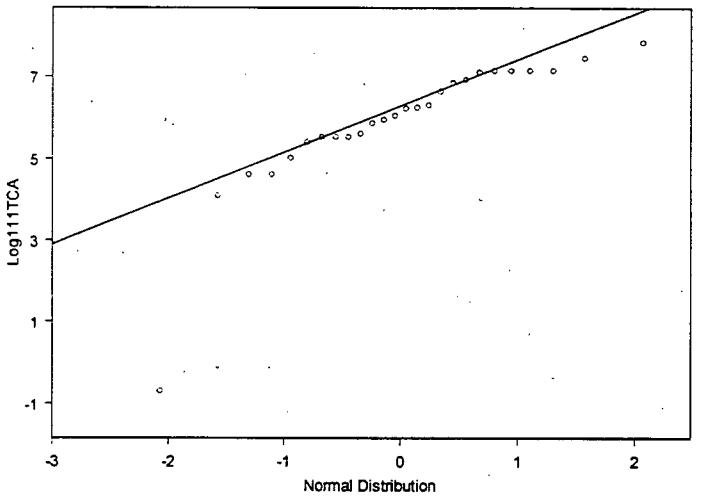


Figure 4.5-6 Probability Plot of 1,1,1-Trichloroethane for Well 07391



The chloroform concentration in Well 07391 has fluctuated substantially with time and has been consistently above the Tier II action level (Figure 4.5-7). Chloroform concentrations have remained fairly constant prior to and after the removal of source material from Ryan's Pit. The downward trend during both periods is apparent and statistically insignificant.

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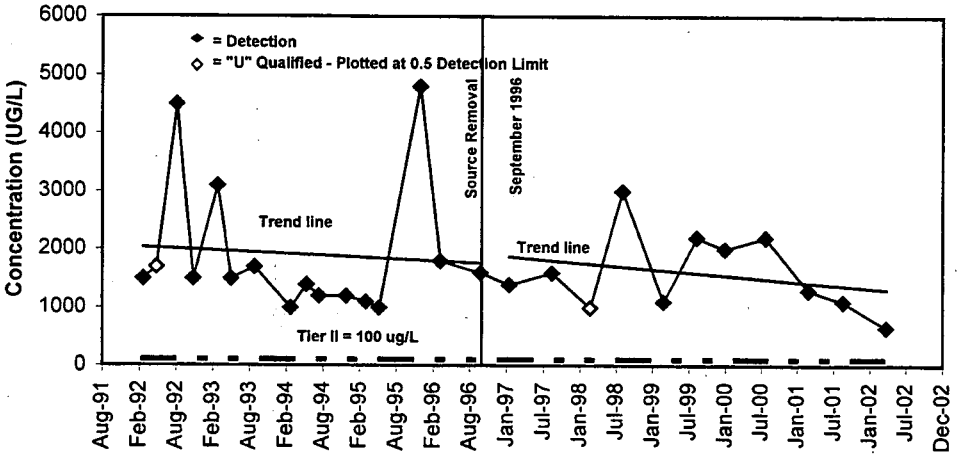
Figure 4.5-7 Chloroform Trend Plot for Well 07391



One outlier was identified during statistical analysis. The low value (non-detect) is shown on Figures 4.5-8 through 4.5-10.

Figure 4.5-8 Box and Whisker Plot of Chloroform for Well 07391

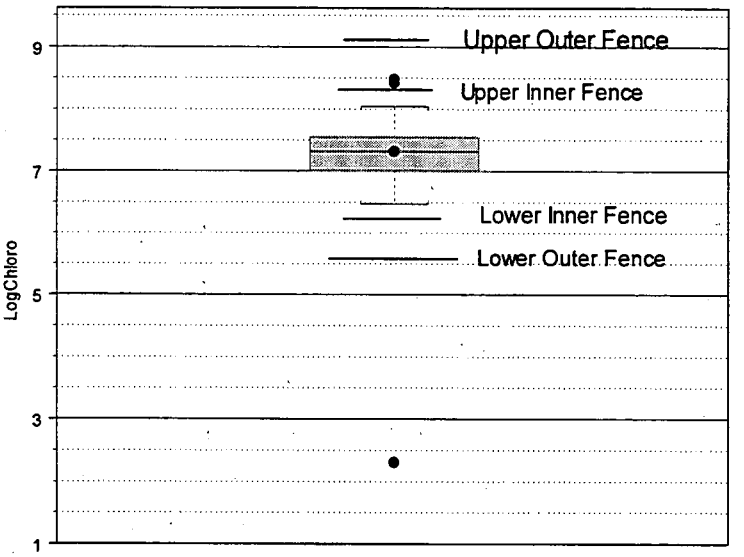


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Figure 4.5-9 Histogram of Chloroform for Well 07391

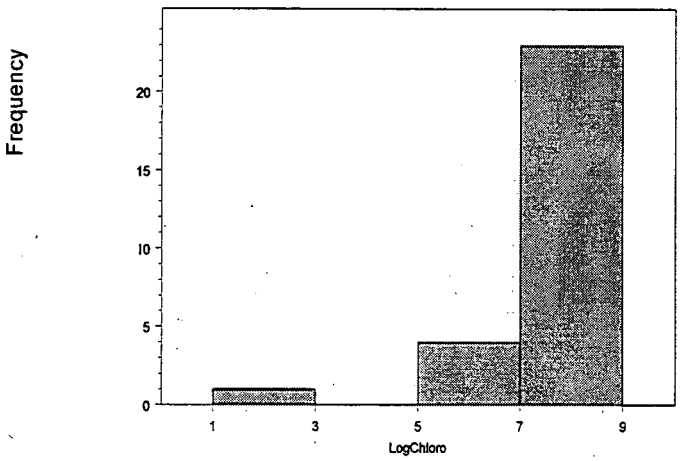
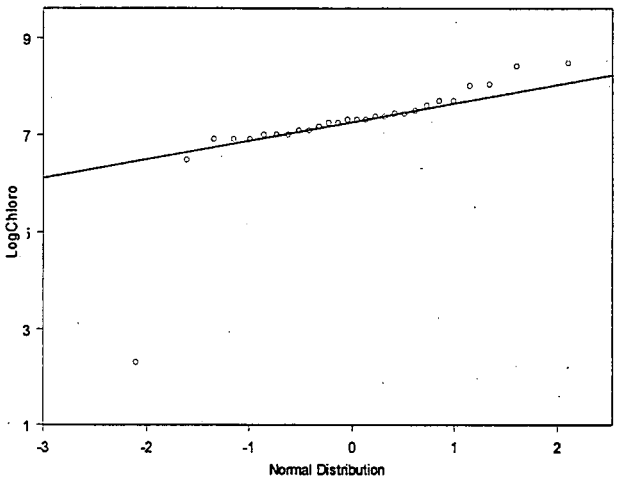


Figure 4.5-10 Probability Plot of Chloroform for Well 07391



In addition to the VOCs discussed above, elevated activities of U-235 (Figure 4.5-11) and U-238 (Figure 4.5-12) have been observed in Well 07391. Uranium-235 activities appear to exhibit a statistically significant downward trend up to September 1996 when the source material in Ryan's Pit was removed. However, post treatment data indicate increasing activities as illustrated by the statistically significant upward and positive slope to the trend line. Uranium-235 data collected in 2001 were below background activities (M2SD = 1.79 pCi/L). However, data collected in the 2nd quarter 2002 exceeded background values. Exploratory statistical analysis indicates there are no outliers in U-235 data.

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A similar trend occurs in the U-238 data where activities appear to decrease prior to the accelerated source removal action (Figure 4.5-11). However, the significance level (p value) for the slope of this trend line pre-source removal is greater than the prescribed error commonly set at 0.05 (i.e., equivalent to a 95% confidence level). Instead of being 95% confident that the slope is negative, the confidence level for this negative slope has been reduced to 90%^. With the exception of the first sample, U-238 activities during this time period have been below the U-238 background level.

Uranium-238 activities subsequent to the source removal action show an upward increasing trend that is statistically significant. In addition, activities during this time interval generally exceed U-238 background levels. No outliers were identified during statistical analysis.

Figure 4.5-11Uranium U-235 Trend Plot for Well 07391 With Error Bars (Note use of background M2SD for comparison-not Tier II action level)

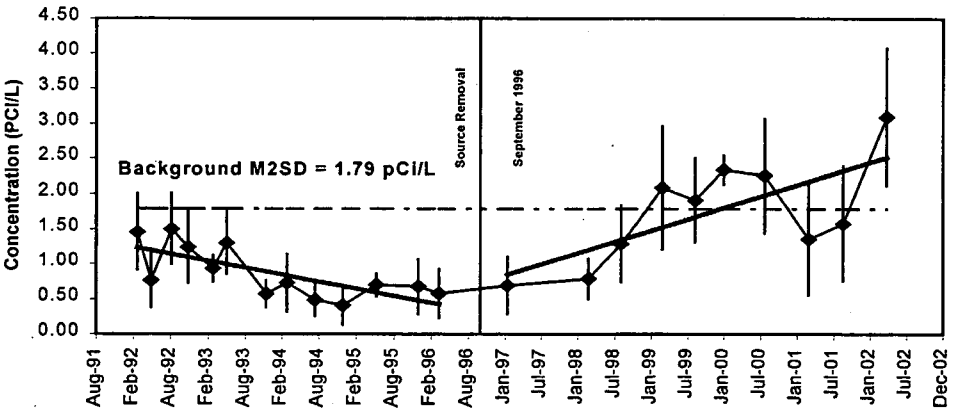
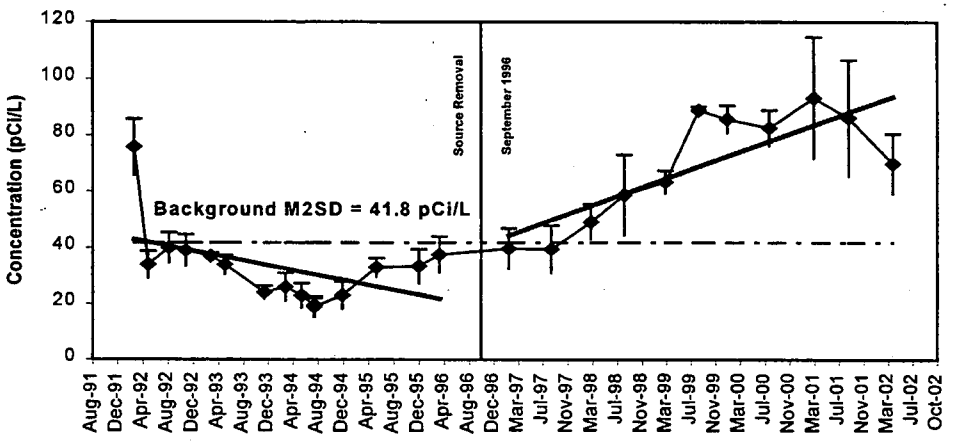


Figure 4.5-11 Uranium U-238 Trend Plot for Well 07391 With Error Bars (Note use of background M2SD for comparison-not Tier II action level)



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No activities above background levels were observed in well 07391 for U-233/234 and americium-241 isotopes. Plutonium-238/239 activities have been consistently below background levels since March 1995.

In summary, concentrations of VOCs emanating from Ryan's Pit and observed in downgradient well 07391 have generally remained constant with time. Statistical analysis of these contaminants indicates there has been no significant trend to the data either before or after removal of the contaminated source material. Monitoring of this well will continue until VOC concentrations decrease to acceptable levels. In contrast, sampling and analysis of uranium isotopes such as U-235 and U-238 indicates that uranium isotope activity concentrations have increased with a statistically significant upward trend.

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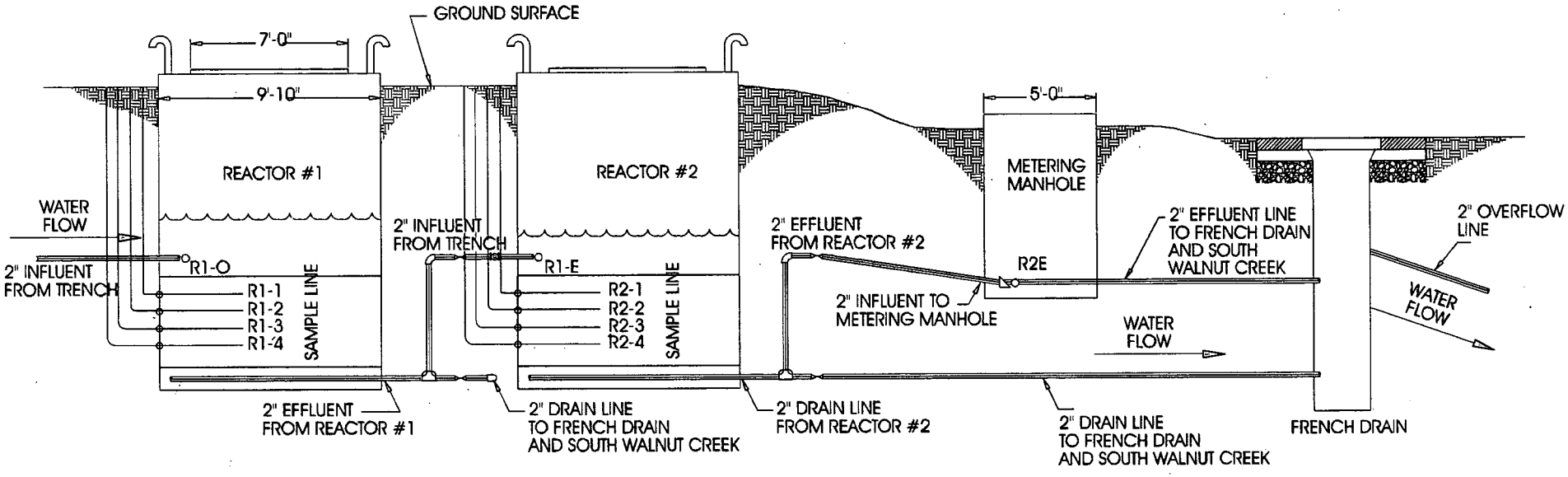

LEGEND

- REACTIVE IRON
- SAMPLE LOCATION
- WATER LINE

NOT TO SCALE

Figure 4-2
Mound Plume Sample locations within the Treatment Cells

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THE ART OF TECHNOLOGY

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Rocky Flats Environmental Technology Site
P.O. Box 464 Golden, CO 80402-0464

projects/fy2002/02-0768/MOUND_PLUME_TRT_CELLS.Cdr

5.0 BUILDING D&D MONITORING THROUGH 2001

The DOE D&D process is the sequence of events that occurs in the disposition of surplus DOE facilities. D&D is primarily concerned with decontamination and dismantling, removal, or entombment of the surplus facilities.

The primary tasks associated with D&D are:

- Surveillance and maintenance;
- Assessment and characterization;
- Environmental review; and
- Close out.

Building specific D&D activities involve three major steps:

- Deactivation of building processes;
- Demolition of building structures; and
- Remediation of building foundations and surroundings.

Activities associated with these tasks involve the removal of fixed materials (including residual constituents of concern), equipment, piping, tanks, ducts, ceilings and other internal building structures, and the buildings themselves. In general, implementation of D&D will be performed in phases, allowing alternative interim use of most buildings before the final decommissioning of the buildings (DOE, 1994b).

The IMP outlines the groundwater monitoring activities that have been established to determine whether building D&D activities inadvertently impact surface water by degrading groundwater beneath or in contact with the base of the demolished buildings. The required groundwater monitoring will provide the data necessary to determine if the precautions and actions taken during D&D have prevented or allowed migration of contaminants to groundwater. If existing information (generally a knowledge of historical building activity and use) regarding a proposed D&D activity indicates the potential to contaminate groundwater, then a pre-D&D groundwater baseline will be established for that building.

Based on the IMP, a minimum of four groundwater sample results (per analyte, pre-demolition) are required to enable determination of a unique groundwater chemistry baseline for each building that will undergo D&D groundwater monitoring. Historically, two D&D groundwater monitoring rounds have been attempted per year at each building or building complex. The D&D groundwater monitoring schedule for a specific building may become accelerated if it is determined that the D&D schedule for that building has become accelerated, or because the area encompassing a specific building is known to have thinly saturated or seasonally unsaturated conditions.

Baselines will be established for various analytes based on sampling results from individual D&D wells at specific buildings. Baselines will generally be calculated for downgradient D&D wells, but may be calculated for upgradient wells in areas where upgradient contaminant concentrations, with respect to flowpaths beneath a particular building are a concern. The downgradient baseline before building demolition will be compared to the downgradient results

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after demolition to ascertain whether building D&D may have caused any change in the downgradient water quality. Exceedance of a specific analyte baseline will be defined as a detected concentration greater than the mean plus two standard deviations (M2SD) above the baseline (K-H, 1998b). Depending on the location and the availability of groundwater, some buildings currently have more sample results for analytes that require a smaller sample aliquot (for example VOCs or nitrate) than for analytes which require a much larger sample volume (for example U-isotopes or Pu/Am). Even if the required four samples, or more, have previously been collected, baselines will only be calculated when the aboveground portion of the specific building has been demolished. If a baseline for a given analyte were calculated immediately upon the collection of four samples, the baseline value might change before the building comes down based on subsequent analytical results obtained prior to demolition, especially considering the dynamic schedule for building D&D. At the time of the submission of this 2001 Annual Report, Building 886 is the only building with calculated analyte baselines (see Section 5.4).

Monitoring is being accomplished by the installation of D&D monitoring wells adjacent to the specific buildings. These D&D specific wells, in conjunction with appropriately located and constructed preexisting wells, will provide the chemical data used to construct the baseline and will also be utilized for future D&D monitoring of the building specific impacts, if any, on downgradient groundwater quality. As long as time permits, baseline determination will be based on current and future data. If the D&D schedule for a given building becomes accelerated, preexisting monitoring wells in the vicinity of the building may be utilized, as the IM/IRA suggests, for determination of the baseline using sampling data from the previous three years. If D&D activities force abandonment of existing D&D monitoring wells, replacement wells will be installed or selected from existing wells in appropriate locations.

If a baseline cannot be established, water quality with respect to a given building will be evaluated in terms of an upgradient/downgradient comparison. Analytes will be screened in terms of concentrations relative to Tier I and Tier II groundwater action levels, which is an effective method for determining contaminants of concern. **The Tier I and Tier II levels are used only as a screening tool in this application and, with regard to building D&D, are not RFCA or compliance driven.** Occasionally, an analyte is discussed or listed in a table even though it has been detected in concentrations that are below Tier II action levels. This is done on a case by case basis for analytes that are contaminants of interest for specific buildings.

Building demolition is described in terms of the fiscal year (FY) that the demolition is projected to take place. Building 123 and Building 779 have previously been demolished. Building 886 was demolished in April/May of 2002.

Following is the current estimated schedule, based on a May 2002 building D&D update, for demolition of buildings discussed in this section:

- Building 444 – late FY 2004 to early FY 2005;
- Building 771 complex – late-FY 2003 (Building 774)-to-mid FY 2004 (Building 771);
- Building 707 – early FY 2005;
- Building 776/777 – mid FY 2004;

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- Building 371/374 – mid FY 2006;
- Building 865 – early FY 2003;
- Building 883 – mid FY 2003;
- Building 881 – late FY 2003 to early FY 2004;
- Building 991 – mid FY 2004 (vaults early FY 2004); and
- Building 559 – mid–to-late FY 2005.

Many additional buildings will undergo D&D prior to Site closure. However, the preceding list includes the buildings with substantial environmental concerns, based on available historical information.

Section 5.0 of the Annual RFCA Groundwater Monitoring Report is being expanded during each successive year to incorporate the additional buildings where D&D groundwater monitoring activities are taking place. The Section 5.0 subsections are organized by the particular buildings, as described in various CDPHE and EPA approved Sampling and Analysis Plans (SAPs) for Building D&D Groundwater Monitoring. The subsections below discuss historical D&D activities through 2001 for Building 123 (Section 5.1), Building 444 (Section 5.2), Building 771 (Section 5.3), Building 886 (Section 5.4), Building 779 (Section 5.5), Building 707 (Section 5.6), Building 776/777 (Section 5.7), Building 371/374 (Section 5.8), Building 865 (Section 5.9), Building 883 (Section 5.10), Building 881 (Section 5.11), Building 991 (Section 5.12), and Building 559 (Section 5.13).

5.1 Building 123

Building 123, used as a laboratory for bioassay, dosimetry, and water quality parameter analyses, was located on Central Avenue between Third and Fourth Streets at RFETS. The building underwent D&D activities and was ultimately demolished in 1998. Subsequent to the building demolition, six monitoring wells (10098-10598) were installed with a Geoprobe rig immediately adjacent to the concrete building foundation. During the spring of 2002, the concrete building foundation was removed.

Wells 10098 and 10198 are upgradient of the Building 123 location. The rest of the wells are downgradient except 10598. Based on the current potentiometric data (Plates 5 and 6), well 10598 is situated in a cross gradient location. The purpose of these wells was twofold: First, to assess the potential impact of D&D activities on local groundwater quality and, second, to prepare an IHSS ranking for prioritizing the Building 123 site on the ER ranking list. This investigation is only concerned with the first of these two purposes. Figure 5-1 presents the location of Building 123 and associated D&D monitoring wells.

As described above, four sampling events are required to collect a data set to be used for determination of a unique baseline for each building which will undergo D&D groundwater monitoring. Unfortunately, the schedule for Building 123 D&D became accelerated and it was not possible to install wells or collect the required amount of pre-demolition data to derive baseline values for the site D&D wells. In addition, there were not an appropriate number or distribution of existing monitoring wells in the vicinity of Building 123 to use for baseline determination utilizing historic sampling data. Through 2001, seven sampling rounds have been completed at the Building 123 D&D

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monitoring wells. One sampling round, post demolition, was completed at the Building 123 D&D monitoring wells during 1998. Two sampling rounds each, one in the 1st and 3rd quarters, were completed during 1999, 2000, and 2001.

Because a baseline cannot be established, water quality with respect to Building 123 must be evaluated in terms of an upgradient/downgradient comparison of water quality. Analytes at Building 123 have been screened in terms of concentrations relative to Tier I and Tier II groundwater action levels.

Linear groundwater flow velocities were calculated for two Well Pairs at Building 123 utilizing 2nd quarter 2001 water level data. Each of these Well Pairs lies in the same groundwater flowpath. Flow velocity was calculated between Well Pairs 10198/10498 and 10098/10298. Hydraulic conductivity for the Qrf and effective porosity values were used as described in Section 3.2 of this RFCA Annual Report. A linear groundwater flow velocity of 112 ft/yr (1.083E-04 cm/sec) was calculated between upgradient Well 10198 and downgradient Well 10498. A linear groundwater flow velocity of 149 ft/yr (1.442E-04 cm/sec) was calculated between Upgradient Well 10098 and Downgradient Well 10298. This flow velocity would allow groundwater to travel from Well 10198 to Well 10498 in approximately 1.6 years, and from Well 10098 to Well 10298 in approximately 1.3 years. Actual contaminant travel times can be expected to be slightly longer for weakly retarded contaminants, such as VOCs, U-isotopes, and nitrate.

The contaminants of interest for Building 123 are VOCs, metals, U-isotopes, Pu/Am, nitrate, cesium, and cyanide. Table 5-1 presents a summary of historical Building 123 D&D groundwater monitoring data. The only analyte concentrations greater than Tier II action levels for nitrate are in Downgradient Wells 10298 (3rd quarter 2001) and 10498 (3rd quarters 1998 and 2000, 2nd quarter 1999). Uranium isotope U-233/234 and U-238 activity concentrations are greater than the Tier II action level in Upgradient Well 10098 for all sampling quarters to date; downgradient Well 10498 has activity concentrations greater than Tier II for five out of the seven sampling rounds to date. The only other U-isotope concentrations greater than Tier II were U-233/234 at Well 10398 (3rd quarter of 1999 and 2001) and Well 10298 (3rd quarter 1998) and U-238 at Well 10398 (3rd quarter 1999) and Well 10298 (3rd quarter 1998). All of the downgradient wells and one upgradient well (10098) have at least one result concentration greater than the Tier II action levels but below background M2SDs for U-isotopes. A concentration greater than the Tier I action level for PCE in Downgradient Well 10498 during the first quarter 2001 was followed by a less than Tier II concentration during the 3rd quarter of 2001. The only concentrations greater than the Tier II action level for PCE at any Building 123 well (3rd quarter 1998 through 1st quarter 2001) occurred in downgradient monitoring well 10498. The results of the seven D&D groundwater sampling rounds completed at Building 123 to date indicate that prior to 2001, metals analyses have exhibited no results above Tier II action levels in any of the Building 123 wells. During 2001 there were some metals concentrations (thallium, cadmium) that exceeded Tier II levels.

There are no Building 123 upgradient PCE or nitrate concentrations which are greater than Tier II action levels. This is compared to downgradient PCE concentrations (Well 10498) that are greater than Tier I action levels (seasonally, in the 1st quarter of 2000 and 2001) and downgradient nitrate concentrations (Wells 10298 and 10498)

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greater than Tier II action levels. For uranium isotopes U-233/234 and U-238, there were activity concentrations above Tier II but below background M2SDs in Upgradient Well 10098 that are similar to activity concentrations for these analytes in Downgradient Wells 10398 and 10498. Downgradient Monitoring Well 10298 has not shown elevated U-isotope concentrations (with respect to Tier II) since 3rd quarter 1998. Monitoring Wells 10198 (upgradient) and 10598 (cross gradient) are unaffected to date by PCE, nitrate, and U-isotopes. Downgradient monitoring Well 10498 is the most impacted well to date at Building 123, although the 3rd quarter 2001 samples from this well had no analyte concentrations greater than Tier II levels.

Table 5-1 Historical Building 123 D&D Groundwater Monitoring Data

Well	Location	Dates	PCE (µg/L)	Nitrate (mg/L)	U-233/234 (pCi/L)	U-238 (pCi/L)
10098	Upgradient	8/98	U	1.4	**1.13**	**1.08**
		2/99	U	4.9	INSW	INSW
		8/99	U	4.3	**1.32**	**1.103**
		2/00	U	3.4	**1.19**	**0.999**
		8/00	0.1	2.9	**1.21**	**0.920**
		1/01	U	0.84	**1.31**	**0.95**
		7/01	U	2.8	**1.26**	**1.06**
10198	Upgradient	8/98	U	1.5	INSW	INSW
		2/99	U	0.97	INSW	INSW
		8/99	U	2.4	0.251	0.233
		2/00	U	1.7	0.393	0.351
		8/00	U	0.75	0.229	0.227
		1-02/01	U	0.86	0.544	0.422
		7/01	U	0.98	0.239	0.285
10298	Downgradient	8/98	U	0.61	**1.0**	**1.10**
		2/99	U	0.84	INSW	INSW
		8/99	U	3	0.40	0.568
		2/00	U	1.8	0.682	0.763
		8/00	U	3	0.976	0.69
		1/01	U	7.5	0.645	0.671
		7/01	U	**11**	0.79	0.52
10398	Downgradient	8/98	U	INSW	INSW	INSW
		2/99	U	INSW	INSW	INSW
		8/99	0.1	INSW	**1.264**	**1.007**
		2/00	U	5.1	INSW	INSW
		8/00	U	4.1	INSW	INSW
		1/01	0.1	3.8	INSW	INSW
		7/01	U	3.5	**1.19**	0.508
10498	Downgradient	8/98	**15**	**25**	**1.08**	**1.22**
		2/99	**58.9**	**17**	**2.02**	**1.51**
		8/99	**24**	6.8	0.964	0.522
		2/00	***1400***	6.9	**1.15**	**1.19**
		8-09/00	**15**	**10**	**1.14**	**1.10**
		1/01	***980***	7.2	**1.12**	**1.26**
		7/01	4.6	8.2	0.797	0.646
10598	Cross gradient	8/98	U	3.7	U	0.236
		3/99	U	2.6	U	U
		8/99	U	0.37	U	U
		2/00	U	3.3	U	U
		8/00	U	1.5	U	U
		1/01	U	1.8	U	0.275
		7/01	U	0.097	0.237	U

Notes: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, INSW = insufficient water available for sample collection, U = non detect

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A statistical comparison of upgradient versus downgradient wells has been undertaken for nitrate and U-233/234 analytes for which there are enough sample results to justify the comparison. Although there is nothing in the IMP that specifies the rationale for the upgradient versus downgradient comparison, there should be at least four sample results available for a comparison that utilizes statistics. The upgradient versus downgradient comparison will involve two wells that lie in the same flowpath, based on current potentiometric data, as opposed to pooling all upgradient results versus all downgradient results. Pooling the upgradient data and comparing it to pooled downgradient data is unacceptable in the case of this building because the two Building 123 upgradient wells vary greatly in their concentrations of U-isotopes. As noted above, the Well Pairs discussed are 10198/10498 and 10098/10298. Well 10598 is not considered because of its cross gradient location; Well 10398 is downgradient of Building 123, but, based on current potentiometric data, is not specifically in the flowpath of a Building 123 upgradient well.

Figures 5-1a and 5-1b show the upgradient versus downgradient comparison for well pair 10198/10498 for nitrate and U-233/234, respectively. The nitrate plot for this well pair (figure 5-1a) shows that all sampling results (including the mean) from downgradient Well 10498 are significantly higher than the M2SD (mean **plus** 2 standard deviations) of upgradient well 10198. This indicates that there is a statistical difference in the data and that the downgradient well is probably impacted from a source associated with the building. The same scenario is true for Figure 5-1b, a comparison of well pair 10198/10498 for U-233/234. All the sampling results (including the mean) for U-233/234 from downgradient Well 10498 are significantly higher than the M2SD of upgradient Well 10198; a statistically significant difference in the data exists and the downgradient well is probably impacted by a source associated with the building.

Figures 5-1c and 5-1d show the upgradient versus downgradient comparison for well pair 10098/10298 for the same two analytes. The nitrate plot for this well pair (Figure 5-1c) shows that initially there was no significant difference in the data; however, since approximately the 3rd quarter of 2000, the nitrate concentration in downgradient well 10298 has significantly exceeded the M2SD of the nitrate concentration of upgradient well 10098. Figure 5-1d compares U-233/234 data for well pair 10098/10298. This figure shows that the downgradient data are statistically less than the upgradient data, because none of the downgradient data is greater than the mean, much less the M2SD, of the upgradient data. This figure suggests that the U-233/234 contamination along this flowpath originate from an upgradient source.

5.2 Building 444

The Sampling and Analysis Plan for the D&D monitoring of the Building 444 cluster was initiated during late 1998. The Final SAP (RMRS, 1999o) was submitted to the Agencies in July 1999. The D&D monitoring wells associated with the building were installed before the end of 1999. The Building 444 complex is currently scheduled for demolition in late FY 2004 to early FY 2005. This will allow adequate time to collect enough samples for a

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groundwater quality baseline to be constructed for these facilities. Baselines for contaminants of interest will be calculated when the building is demolished.

Building 444 is located on the south side of Cottonwood Avenue between Fourth and Sixth Streets at RFETS. The Building 444 cluster was used for the manufacturing of depleted uranium and beryllium components, and did not handle plutonium or enriched uranium. Major processes conducted in the building included machining, welding, and cleaning. Building 444 also contained a foundry and a laboratory where parts could be etched, electroplated, and coated. Uranium and beryllium are the major constituents that were used in the building. In addition, solvents from machining and cleaning, and other wastes associated with electroplating were generated. Figure 5-2 presents the location of the Building 444 cluster and the D&D groundwater monitoring wells associated with it.

Six new D&D Monitoring Wells were installed at Building 444 during the fall of 1999 (40099, 40499, and 41299). Wells 40099 and 40199 are upgradient wells, and the rest, in addition to preexisting Well P419689, are downgradient wells. Except for monitoring well P419689, Building 444 D&D monitoring wells had been sampled generally five times through CY 2001. Preexisting Well P419689 had been sampled several times before the other Building 444 D&D wells were installed. Until a baseline is established for groundwater in the vicinity of Building 444, analytes will be screened in terms of concentrations relative to Tier I and Tier II groundwater action levels.

The contaminants of interest for Building 444 are VOCs, metals, U-isotopes, tritium, nitrate, PCBs, cyanide, and total petroleum hydrocarbons (TPH). Table 5-2 presents a summary of results of D&D groundwater monitoring at the Building 444 cluster to date. Earlier data from well P419689 are included for comparison to the recent D&D data. The historical results of the D&D sampling completed through 2001 indicate that the analyte most commonly detected in all the Building 444 D&D wells is PCE. Five wells (40099, 40299, 40499, 41299, and P419689) exhibited PCE concentrations greater than the Tier II action level for all five D&D sampling rounds completed to date. The concentration of PCE in downgradient well 41299 is an order of magnitude higher than the other wells listed. This well was also the only other Building 444 D&D well to exhibit at least one result with a concentration greater than the Tier II action level for every one of the VOCs listed in Table 5-2. Wells 40199 (upgradient) and 40399 (downgradient) had no detections of VOCs above Tier II action levels. All the VOC detections in these two wells were of very low concentrations.

There have been no concentrations of nitrate greater than Tier II action levels. There have been concentrations of metals (thallium and chromium), especially in samples from downgradient well 41299, that exceed Tier II action levels. Beryllium is generally not detected with very few low concentration detections scattered throughout the historical data. Monitoring Well 40099, which is an upgradient well, has concentrations of TCE that exceed the Tier I action level for all five D&D sampling rounds completed through CY 2001. This well also exhibits concentrations greater than the Tier II action level for 1,1-DCE; 1,2-DCE; and PCE for all five of the D&D sampling rounds completed to date.

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Wells 40199, 41299, and P419689 exhibited activity concentrations greater than Tier II action levels but below the Site M2SD of 60.7 pCi/L for U-233/234. In addition, U-238 was detected at concentrations of 1.047 pCi/L, 0.787 pCi/L, and 0.95 pCi/L in December 1999, May 2000, and July 2001, respectively at well 41299.

Table 5-2 Historical Building 444 D&D Groundwater Monitoring Data

Well and Location	Dates	1,1-DCE (µg/L)	1,2-DCE (µg/L)	PCE (µg/L)	TCE (µg/L)	Metals (above Tier II; µg/L)	U-233/234 (pCi/L)
40099	11/99	**240**	**780**	**28**	***830***	None	0.176 0.332
Upgradient	5/00	**190**	**650**	**18**	***500***	None	0.270
	12/00	**538**	**1310**	**41**	***1340***	Thallium **3.45**	0.268
	2/01	**299**	**741**	**24.8**	***726***	None	0.22
	8/01	**190**	**520**	**15**	***530***	None	INSW
40199	11/99	U	U	0.9	0.1	None	**1.224**
Upgradient	5/00	U	U	0.5	U	None	0.512
	11/00	U	U	0.74	U	Thallium **4.64**	**1.10**
	2/01	U	0.56	0.77	1.4	None	0.674
	8/01	U	U	1.2	U	None	**1.24**
40299	11/99	2	8	**34**	2	None	0.410
Downgradient	5/00	4	11	**37**	**13**	None	0.553
	12/00	3.6	10.5	**77.5**	2.1	None	0.250
	2/01	3	10	**78**	2	None	0.283
	7/01	2	8.2	**56**	3	None	0.47
40399	11/99	U	0.5	0.5	0.2	None	0.165
Downgradient	5/00	U	0.8	0.7	0.2	None	0.187
	12/00	U	0.92	0.69	1	None	0.20
	2/01	U	0.8	1	0.3	None	0.196
	8/01	U	0.7	U	1	None	U
40499	11/99	0.2	11	**13**	3	None	0.381
Downgradient	5/00	0.1	4	**7**	2	None	0.236
	11/00	U	4.9	**8.3**	1.9	None	0.091
	2/01	0.2	5	**7**	1	None	0.317
	8/01	1	5	**6.6**	1.6	None	0.21
41299	11/99	**16**	48	**290**	**33**	Chromium **213**	**1.797**
Downgradient	5/00	**9**	**89**	**280**	**77**	Chromium **370** Thallium **5.37**	**1.891**
	12/00	**10**	31.4	**216**	**27.2**	Chromium **470**	**1.30**
	2/01	**9.1**	44.3	**330**	**38.2**	Chromium **330**	**1.47**
	7/01	**11**	54	**260**	**54**	Chromium **260**	**2**
P419689	3-4/96	1	5	**17**	2	None	**1.315**
Downgradient	9/96	1	4	**12**	1	Thallium **6.3**	N/A
	12/96	N/A	N/A	N/A	N/A	Thallium **7.2**	**1.174**
	11/99	1	7	**16**	2	None	0.733
	5/00	1	6	**17**	2	None	0.888
	12/00	1	7.1	**18.5**	2.3	None	0.420
	2/01	1.1	7	**18.8**	1.7	None	0.759
	8/01	0.7	4.3	**10**	1.2	None	0.97

Notes: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, U = non detect, (B) = Analyte detected in the Method Blank, NA = Not Analyzed, INSW = Insufficient water

In conclusion, although upgradient Well 40099 contains TCE in concentrations which are greater than the Tier I action level, and relatively high levels of other VOCs, downgradient Well 41299 appears to be the most impacted D&D Monitoring Well at the Building 444 cluster. In addition to VOCs, metals and U-isotopes have impacted well

41299. Downgradient Monitoring Well 40399 is the only well without a concentration of any analyte that is greater than a Tier II action level. At this point in time, nitrate and beryllium do not appear to be contaminants of interest in groundwater at the Building 444 cluster.

5.3 Building 771

The Sampling and Analysis Plan for the D&D monitoring of the Building 771 complex was initiated during late 1998. The Final SAP (RMRS, 1999o) was submitted to the Agencies in July 1999. The D&D monitoring wells associated with the building were installed before the end of 1999. The Building 771 complex is currently scheduled for demolition in late FY 2003 (Building 774) to mid FY 2004 (Building 771). Depending on the availability of groundwater for sampling (see discussion below) this may not allow for construction of analyte baselines for the Building 771 complex.

The Building 771 complex is located in the former PA, at the northeast end of Sixth Street, immediately south of the PACS-3 entrance to the former PA. Building 771 was the plutonium component production facility at Rocky Flats from 1953 through 1957. After 1957 the building was used for the chemical recovery of plutonium and americium from manufacturing residues and scrap metal. The building also contained a laundry. Building 774 is part of the Building 771 complex and is located approximately 200 feet east of Building 771. Building 771C connects Buildings 771 and 774. Building 774 was used for the treatment of radioactive aqueous waste, waste oils, and non-radioactive photography solutions. Buildings 771C and 774 are to be decommissioned along with Building 771. Based on the research performed during completion of the SAP, plutonium, americium, and solvents are the major contaminants of concern. Figure 5-3 presents the location of Building 771, including Buildings 771C and 774, and the D&D groundwater monitoring wells associated with them.

Six new D&D Monitoring Wells (40599 through 40899, 41499, and 41599) were installed at the Building 771 area during the fall of 1999. Monitoring Well 40899 and preexisting Wells 18199 (associated with IHSS 118.1) and 20998 are upgradient D&D wells. Wells 40599, 40699, 40799, 41499, and 41599 are downgradient D&D Wells. In addition, preexisting well P219089 has been added to the Building 771 complex D&D Well List. This well, located on the north side of Building 774, will serve as an additional downgradient well; it was incorporated into the project as a D&D well through the IMP.

The alluvial deposits are very thin in the vicinity of the Building 771 complex. The northern portion of the Building 771 foundation is situated in weathered bedrock. In addition, a foundation drain encircles the entirety of Building 771 and most of Building 774. These circumstances combine to allow for very little available groundwater for sample collection. Future groundwater availability combined with the actual D&D date for the Building 771 complex will determine if analyte baselines are able to be calculated or if an upgradient versus downgradient well comparison will be the appropriate way to monitor building D&D impacts to groundwater, if any. Compounding this situation is the fact that, because of its unique location, the Building 771 complex D&D and regrading of the area surrounding the building is probably going to displace most of the currently utilized Building 771 D&D

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monitoring wells. These wells will need to be abandoned and relocated or, as discussed above, preexisting wells in appropriate locations may be utilized. The Groundwater Program has evaluated existing wells, located farther away from the Building 771 complex, that can be used for D&D monitoring. Based on this evaluation, the existing wells that can be problematic (primary wells) and their alternates are listed below. As of the 4th quarter of 2001, D&D samples have been collected from the alternate wells when it has been determined that the primary well will not yield sufficient water.

PRIMARY WELL	ALTERNATE WELL
40599	20798
40699	20498
40799	P219189
40899	P209289
41499	22796
41599	20298

Only preexisting Wells P219089 and 18199 (associated with IHSS 118.1) have produced enough samples through CY 2001 for any baselines to be calculated. These wells have produced enough samples for analyte baselines to be calculated for VOCs, metals, U-isotopes, Pu-Am, tritium, and neptunium. In addition, Well P219089 has produced enough samples for a nitrate baseline. Preexisting Well 20998 has produced enough samples for a VOC baseline only. The six D&D monitoring wells installed in the fall of 1999 at Building 771 have failed to produce enough water for any analyte baselines to be calculated for them to date except for VOCs at Wells 40799 and 41499. These sampling event results are further evidence of the lack of groundwater in the vicinity of Building 771. Baselines will only be calculated when the building is demolished.

The analytes of interest for the Building 771 complex are VOCs, metals, U-isotopes, Pu/Am, tritium, nitrate, neptunium, and PCBs. Table 5-3 presents a summary of Building 771 complex D&D monitoring results to date for analytes in which at least one D&D well has concentrations exceeding Tier II action levels. Until a baseline is established for groundwater in the vicinity of Building 771, analytes will be discussed in terms of concentrations relative to Tier I and Tier II groundwater action levels.

Eight sets of VOC samples have been collected from preexisting upgradient monitoring Well 18199 since spring 1999. The earlier sampling round data from Well 18199 is presented in Table 5-3 for comparison to the recent D&D data. This well has yielded carbon tetrachloride concentrations greater than the Tier I action level and chloroform concentrations greater than the Tier II action level for each of the eight sampling events. In addition, concentrations greater than the Tier II action level were observed for PCE in seven out of the eight events; the exception was a non-detect in March 2000. Other analytes detected above Tier II action levels at Well 18199 are listed in Table 5-3. There were no nitrate concentrations greater than the Tier II action level in any samples collected from Well 18199.

VOC results from preexisting upgradient Well 20998 indicate carbon tetrachloride concentrations greater than Tier II in all five sampling rounds that sufficient water has been available, as well as chloroform concentrations greater than the Tier II action level in September 1998 and June 2000. Enough groundwater was available for only the five

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VOC samples and one nitrate sample from this well. This well was replaced in 2002 with a larger diameter well that will assist in the collection of full sample suites. All VOC results for Well P219089 are below Tier II action levels.

The only concentrations greater than Tier II action levels in the six new Building 771 D&D wells and preexisting well P219089 are listed in the far right column of Table 5-3. Notable concentrations greater than Tier II action levels are TCE in all four samples collected to date from downgradient well 41499; 1,1-DCE in two of the three samples collected from downgradient Well 40699; and U-233/234 and U-238 in all four samples collected to date from downgradient Well P219089. These uranium results are below the U-233/234 and U-238 site M2SDs of 60.7 pCi/L and 41.8 pCi/L, respectively. There was also a tritium detection of 437 pCi/L (below Tier II) at Well 40799 in May 2000.

As stated above, upgradient monitoring Well 18199 contains carbon tetrachloride in concentrations that are greater than the Tier I action level, and relatively high levels of chloroform. The source for this contamination is IHSS 118.1, which is approximately sixty feet upgradient of Well 18199. This IHSS is also the source for the carbon tetrachloride reported in samples from Well 20998. Carbon tetrachloride is not reported in concentrations greater than the Tier II action level in downgradient wells at Building 771. These wells consistently contain very little groundwater. It can be assumed that the extensive foundation drain systems for Buildings 771 and 774 are intercepting a large amount of upgradient groundwater, and may be diverting a significant amount of VOC contamination.

Table 5-3 Historical Building 771 D&D Groundwater Monitoring Data

Well	Location	Dates	CCl_4 (µg/L)	PCE (µg/L)	Chloroform (µg/L)	Others above Tier II (µg/L, mg/L, or pCi/L)
18199	Upgradient	3/99	***15,400***	**37.6**	**2200(B)**	Hexachloroethane **12.6**
		9/99	***14,000***	**39**	**2400**	Hexachloroethane **17**
		12/99	***25,300***	**60.4**	**3790**	Vinyl Chloride **120**
		3/00	***39,000***	U	**5200**	None
		5/00	***17,000***	**91**	**3900**	None
		12/00	***27,300***	**63.7**	**4110**	Thallium **8.23**
		5/01	***18,000***	**65**	**3300**	TCE **6**; 1,1,2-TCA **63**
		10/01	***19,000***	**44**	**3300**	Thallium **2.3**
20998	Upgradient/ Cross gradient	9/98	**42**	U	**130**	None
		4/99	**48**	0.3	28	None
		6/00	**150**	U	**130**	None
		5/01	**190**	0.4	54	None
		7/01	**220**	0.49	70	None
40599	Downgradient	11/00	4	4	6.8	None
		4/01	2	2	7	Nitrate **26**
		7/01	4.5	1.9	6.3	None
40699	Downgradient	11/00	U	2	2	1,1-DCE **389**
		4/01	Dry	Dry	Dry	Dry
		7/01	U	U	1.7	1,1-DCE **200**
40799	Downgradient	5/00	U	0.1	0.1	None
		11/00	U	U	U	None
		4/01	U	U	U	None
		7/01	U	U	U	None
40899	Upgradient	All dry	Dry	Dry	Dry	Dry
		4/01	0.8	U	U	None

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Well	Location	Dates	CCl_4 (µg/L)	PCE (µg/L)	Chloroform (µg/L)	Others above Tier II (µg/L, mg/L, or pCi/L)
41499	Downgradient	5/00	U	U	U	TCE **53**
		11/00	U	4.5	0.42	TCE **74.4**
		4/01	U	2	0.4	Nitrate **19**, TCE **62**
		7/01	U	0.16	0.46	TCE **130**; 1,1-DCE **9.9**
41599	Downgradient	11/00	U	2.4	U	None
		4/01	Dry	Dry	Dry	Dry
		7/01	0.29	0.77	0.34	None
P219089	Downgradient	11/00	U	0.53	U	U-233/234 **9.10** U-238 **6.40**
		4/01	U	U	U	U-233/234 **9.6** U-238 **7.3**
		7/01	U	U	U	U-233/234 **5.43** U-238 **4.21**
		10/01	U	U	U	Thallium **2.7** U-233/234 **6.12** U-238 **3.32**

Notes: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, U = non detect, (B) = Analyte detected in the Method Blank, CCl_4 = carbon tetrachloride

In conclusion, if the Building 771 complex were demolished in the near future, there would only be enough D&D groundwater monitoring samples collected through CY 2001 to establish baseline concentrations for monitoring Wells 18199 and P219089 (most analytes), and VOCs only for Wells 20998, 40799, and 41499. Upgradient versus downgradient well comparisons are not warranted yet at Building 771 because the building has not yet been demolished. If there have been enough samples collected, baselines will be calculated after the building is demolished. The challenge for the Building 771 complex is going to be the production of sufficient downgradient water for large sample aliquot analytes in order to construct analyte baselines when the building is finally demolished. Based on available sample data, nitrate, Pu/Am, and PCBs do not appear to be contaminants of interest for Building 771.

5.3.1 Bowman's Pond Groundwater Characterization

The Bowman's Pond evaluation project was conducted in 1999 to evaluate the sediments in the pond for possible remediation (see the 1999 RFCA Annual Groundwater Monitoring Report). Surface water samples collected during the investigation from Bowman's Pond showed concentrations of carbon tetrachloride that ranged from 5 - 21 µg/L.

There are six outfall locations from Building 771/774 foundation drains (771 FD OUT #2, FD-774-1, FD-774-2, FD-774-4, FD-774-5, and FD-774-6). Efforts to determine the location and extent of the footing drains for Building 771/774 have only provided partial information on where they discharge or exactly where the samples have been collected. A literature review and walkdown of the Bowman's Pond area has determined that there are four outfalls in this area (Figure 5-3). Three of these outfalls are probably tied to Building 774 footing drains. The fourth outfall, which is the farthest west of the four, may receive contributions from Building 771 footing drains.

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One footing drain for Building 771, location 771 FD OUT #2, is a footing drain outfall located west of Building 771 (Figure 5-3) that produces minor amounts of water with relatively high levels of carbon tetrachloride (310 µg/L and 126 µg/L in May 2001 and 2002, respectively). Grab samples (for the same analyte of interest suite as the Building 771 complex) were collected from each of the footing drain outfalls, with the exception of FD-774-2 and FD-774-6, in May 2001, November 2001, and May 2002. The results of these samples showed carbon tetrachloride and uranium isotopes U-233/234 and U-238 in the westernmost footing drain outfall (FD-774-1) at concentrations/activities exceeding the Tier II action levels for those analytes. Location FD-774-4 had activity concentrations of U-233/234 and U-238 (May and November 2001 only) at concentrations greater than Tier II action levels. Location FD-774-5, which did not provide a November 2001 sample, had May 2001 nitrate, U-233/234, and U-238 results and May 2002 U-233/234 and U-238 results greater than the Tier II action levels. Given that these drains provide a direct conduit to surface water, and based on the results obtained from these locations, outfall 771 FD OUT #2 has been included in the IMP as a D&D monitoring location for the Building 771 complex. Foundation drain outfall FD-774-1 is proposed to be added to the IMP.

5.4 Building 886

The Sampling and Analysis Plan for the D&D monitoring of Building 886 was initiated during late 1998. The Final SAP (RMRS, 1999o) was submitted to the Agencies in July 1999. Three Building 886 D&D monitoring wells were installed during fall 1999 (40999, 41099, and 41199) and are utilized along with an existing well (22996) for D&D monitoring. Well 40999 is utilized as an upgradient D&D well; Wells 41099, 41199, and 22996 are utilized as downgradient D&D Wells. Building 886 has undergone D&D activities and was demolished in the spring of 2002. Monitoring Well 41199 was subsequently destroyed during the D&D of Building 886. This well was replaced during August 2002; the new well is designated 41102.

Building 886 is located on the south side of Central Avenue at RFETS, approximately 300 feet southeast of the PACS-1 entrance to the former PA. The building was first occupied in 1965 and housed the Critical Mass Laboratory that was used to conduct criticality experiments for nuclear safety research and development. Based on research of historical practices at the building, plutonium, uranium, and nitrate are considered to be the contaminants of interest. Figure 5-4 presents the location of Building 886 and the D&D groundwater monitoring wells associated with it.

There has been adequate time and groundwater available to collect enough samples to construct a groundwater baseline for most of the analytes of interest at this building with the exception of plutonium. Plutonium analyses through 2001 for Wells 40999 (1 sample collected) and 41099 (2 samples collected) are the only ones lacking from the analytes of interest for Building 886. At least four D&D sampling rounds were completed at Building 886 through CY 2001 for VOCs, metals, U-isotopes, and nitrate. Groundwater data have been collected from Well 22996 twelve times since the 3rd quarter of 1996. A geochemical baseline has been established for Building 886 and is contained in this section.

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The D&D sampling suite for Building 886 includes VOCs, metals, U-isotopes, Pu/Am, and nitrate. Table 5-4 presents a summary of Building 886 D&D groundwater monitoring data collected through CY 2001. Monitoring Well 22996 data collected before commencement of D&D sampling at Building 886 is also presented in Table 5-4 for comparison to the more recent D&D data.

The results of the D&D sampling rounds completed at Building 886 through CY 2001 indicate there were no concentrations of any analytes greater than Tier I action levels. Activity concentrations greater than Tier II action levels were observed for U-233/234 and U-238 for all four Building 886 D&D monitoring wells for every sampling round that has produced enough water for a U-isotope sample. All of the U-isotope results are below the U-233/234 and U-238 site background values (M2SDs) of 60.7 pCi/L and 41.8 pCi/L, respectively, although the concentrations in 41099 approach the M2SD values. In addition, U-235 activity concentrations greater than the Tier II action levels were reported in samples collected from Downgradient Well 41099 in 1999 and 2000. The U-235 activity concentration at well 41099 in November 1999 is above the site background M2SD value of 1.79 pCi/L. Pu/Am results for the Building 886 D&D Wells have generally been non-detect; any detections have been below Tier II action levels.

Samples from Downgradient Well 41099 contained nitrate concentrations greater than the Tier II action level for every D&D sampling round completed to date. No other Building 886 D&D well has nitrate concentrations that approach the Tier II action level. There have been no VOC detections above Tier II action levels at any Building 886 D&D wells, and most of the VOC results have been non-detect. Metals results indicate that downgradient well 41099 has been impacted by cadmium and thallium in concentrations greater than the Tier II action levels; Downgradient Well 22996 has been impacted by thallium in concentrations greater than the Tier II action levels.

Concentrations of VOCs and Pu/Am are below Tier II action levels and are therefore not baseline contaminants at Building 886. The most impacted well at the Building 886 site is Downgradient Well 41099. This well has the highest U-isotope activity concentrations, and is the only Building 886 D&D well with nitrate and cadmium concentrations above their Tier II action levels.

Based on the data presented in Table 5-4, analyte baselines have been calculated for the Building 886 downgradient D&D wells. Baselines were not calculated for any analyte that did not exhibit any concentrations greater than the Tier II action level. Should post-D&D monitoring results indicate, for example, that VOC concentrations have increased, then pre-D&D baselines will be constructed for the specific VOC(s) and it will be determined if a statistical increase in concentration has occurred. The pre-D&D analyte baselines are listed below in Table 5-4a. These means, standard deviations, and M2SDs will be used to compare to post-D&D Building 886 groundwater monitoring results. Should a post-D&D monitoring result for a specific analyte at a given well exceed the M2SD listed below, the appropriate parties will be notified, an attempt will be made to identify the source, and monitoring will continue as specified in the IMP.

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Table 5-4 Historical Building 886 D&D Groundwater Monitoring Data

Well	Location	Dates	U-233/234 (pCi/L)	U-238 (pCi/L)	Metals (µg/L)	Nitrate (mg/L)	Others (µg/L or pCi/L)
40999	Upgradient	11/99	**8.883**	**6.807**	Cadmium 4.1	U	VOCs U or <Tier II
		6/00	**10.70**	**7.83**	INSW	0.54	VOCs U or <Tier II
		11/00	**10.0**	**8.30**	INSW	INSW	VOCs U or <Tier II
		3/01	**9.7**	**7.8**	Cadmium 3.3	0.26	VOCs all <2
		7/01	**9.0**	**6.6**	Cadmium 0.3	0.47	VOCs all <2
		12/01	NS	NS	NS	NS	VOCs all U
41099	Downgradient	11/99	**51.65**	**33.77**	Cadmium 2.3	**47**	U-235 **2.316**
		6/00	**45.50**	**27.10**	Cadmium **5.4**	**47**	U-235 **1.41**
		11/00	**42.0**	**27.0**	Cadmium **5.43**	**36**	U-235 **1.40**
					Thallium **4.89**		VOCs U or <Tier II
		3/01	**27.4**	**17.7**	Cadmium 4.6	**30**	U-235 0.977
		7/01	**21.5**	**13.5**	Cadmium 2.3	**22**	U-235 0.783
41199	Downgradient	11/99	**10.74**	**3.997**	Cadmium 1.6	1.5	VOCs U or <Tier II
		6/00	**8.39**	**4.33 3.70**	Cadmium 0.68	5.6	VOCs U or <Tier II
		11/00	**8.60**	**3.34**	Cadmium 0.61	INSW	VOCs U or <Tier II
		3/01	**9.03**	**3.2**	Thallium 0.75	1.2	VOCs all <2
		7/01	**9.2**	INSW	Cadmium 0.71	0.79	VOCs all <2
22996	Downgradient	8/96	**2.335**	**2.13**	Cadmium 4.6	1.9	VOCs U or <Tier II
		11/96	**2.325**	**1.836**	Thallium **7.8**	0.65	VOCs U or <Tier II
		3/98	**3.01**	**2.68**	NA	NA	VOCs U or <Tier II
		8/98	**2.86**	**2.40**	NA	NA	VOCs U or <Tier II
		2/99	**3.573**	**3.011**	Cadmium 0.17	NA	VOCs U or <Tier II
		8/99	**3.38**	**2.48**	Cadmium 0.18	NA	VOCs U or <Tier II
		11/99	**3.58**	**2.399**		3.3	VOCs U or <Tier II
		2/00	**3.598**	**2.509**		INSW	VOCs U or <Tier II
		6/00	**4.62**	**3.02**	Cadmium 0.1	4.2	VOCs U or <Tier II
		12/00	**2.30**	**1.60**		0.9	VOCs U or <Tier II
		3/01	**2.42**	**1.87**		2.4	VOCs all <2
		8/01	**1.64**	**1.02**		0.77	VOCs all <2

Notes: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, U = non detect, (B) = Analyte detected in the Method Blank, NA = not analyzed, INSW = Insufficient water available for sample collection, NS = not sampled

Table 5-4a Building 886 D&D Analyte Baselines

Well	Analyte	Sampling Interval	Mean	Standard Deviation	M2SD	Number Samples	Min. = Max. / Range
41099	U-233/234	11/99-7/01	37.61	12.673	62.956	5	21.5-51.65 / 30.15
41099	U-238	11/99-7/01	23.814	8.1214	40.0568	5	13.5-33.77 / 20.27
41099	U-235	11/99-7/01	1.3772	0.5908	2.5588	5	0.783-2.316 / 1.533
41099	Nitrate	11/99-7/01	36.4	10.877	58.1532	5	22-47 / 25
41099	Cadmium	11/99-7/01	4.006	1.5925	7.191	5	2.3-5.43 / 3.13
41199	U-233/234	11/99-7/01	9.192	0.9242	11.0403	5	8.39-10.74 / 2.35
41199	U-238	11/99-7/01	3.7134	0.4647	4.6428	5	3.2-4.33 / 1.13
22996	U-233/234	8/96-8/01	2.9701	0.8188	4.6076	10	1.64-4.62 / 2.98
22996	U-238	8/96-8/01	2.246	0.5867	3.4197	10	1.02-3.02 / 2.0

5.5 Building 779

Building 779, placed into service in 1969, housed minor production and plutonium recovery operations but was primarily a research and development facility. Some metal parts were assembled in this building and bulk plutonium residues were recovered (DOE, 1992a). The remainder of the operations conducted in Building 779 were

research and development activities which included the following operations: pyrochemical technology, coatings, plutonium and non-plutonium physical metallurgy, chemical technology in support of plutonium recovery operations in Building 771, and product physical chemistry (DOE, 1992a). The building, located in the former PA approximately 200 feet south of the westernmost Solar Pond, was demolished in 1999. Figure 5-5 presents the building location and the associated D&D Monitoring Wells.

Three D&D Monitoring Wells, 02297, 02397, and 02497, were installed in 1997. Well 02397 is for upgradient D&D monitoring; Wells 02297 and 02497 were for downgradient D&D monitoring. However, during building D&D activities in late 1999, Monitoring Well 02297 was destroyed; it was replaced in 2000 with downgradient Monitoring Well 02500. Monitoring Well 02500 is similar in well construction to Well 02297 and, therefore, D&D monitoring data from that location includes previous data collected from Well 02297. In addition, at the request of CDPHE, another new D&D Well, 00100, was added to the program during 2000. This well, located near the northeast corner of Building 779, is a relatively deep well (approximately 32 feet below ground surface [bgs]) positioned to monitor groundwater quality downgradient of the Building 779 basement and sub-basement. The sub-basement is shown on Figure 5-5 as four small rectangular areas within the basement area.

The alluvial deposits are very thinly saturated in the vicinity of Building 779. In addition, a foundation drain dewaters the northwest and northern foundation of the former building. These circumstances combine at drier times of the year to allow only minimal amounts of groundwater to be available for sample collection. No sampling rounds were completed during 1997 at the Building 779 D&D Monitoring Wells because of lack of water. Monitoring Well 02397 produced no samples during 1999 and only one set of samples during each of 2000 and 2001. Sampling rounds were accomplished with varying success at the Building 779 D&D Monitoring Wells during the period of 1998 through 2000. Through CY 2001, Well 00100 had three complete sample sets. Wells 02397, 02497, and 02297/02500 had at least four sample sets for VOCs and nitrate; fewer rounds have been completed for the other analyte groups, although wells 02497 and 02297/02500 have four samples each of U-isotopes.

A minimum of four sampling events are required to collect a data set to be used for determination of a unique chemical baseline for each building that will undergo D&D. Unfortunately, in addition to the construction of replacement D&D Well 02500 and additional D&D Well 00100, the schedule for Building 779 D&D became accelerated and it was not possible to collect the required amount of pre-D&D data to derive baseline values for the analytes of interest. This situation was compounded by the fact that there were not an appropriate number or distribution of preexisting monitoring wells in the vicinity of Building 779 to sample for collection of baseline data utilizing the previous three years sampling data. Because a baseline cannot be established, water quality with respect to Building 779 will be evaluated in terms of an upgradient/downgradient comparison. Analytes at Building 779 have been screened in terms of concentrations relative to Tier I and Tier II groundwater action levels.

The D&D analytical suite for Building 779 consists of VOCs, metals, U-isotopes, Pu/Am, and nitrate. Table 5-5 presents summary results of all D&D groundwater sampling at Building 779 to date. These data indicate that there were no contaminant concentrations from any Building 779 D&D Monitoring Well greater than the Tier I action

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levels for the specific analytes. All four Building 779 D&D wells have at least one analyte concentration greater than a Tier II action level. Until 2001, upgradient Well 02397 had the only nitrate concentrations which were greater than Tier II action levels and downgradient Well 00100 was the only well that exhibited VOC concentrations (TCE and carbon tetrachloride) greater than Tier II action levels. During 2001, Well 02297/02500 exhibited first time TCE and nitrate concentrations greater than Tier II action levels. Generally, Building 779 downgradient monitoring wells have produced samples with concentrations of U-233/234 and U-238 that are greater than the Tier II action levels for all sampling rounds in which there was enough groundwater available for a U-isotope sample. There have been a few exceptions; U-238 at Well 00100 in December 2000, and U-233/234 and U-238 at Well 02497 in May 2001 were below Tier II action levels. Upgradient Well 02397 has not had any uranium isotope results above Tier II. All the uranium isotope results were below Site background M2SD values. Well 02497 had an americium result of 0.233 pCi/L in May 1999, and Well 00100 a plutonium result of 0.68 pCi/L in December 2000, which are greater than their Tier II action levels. There were no Pu/Am activity concentrations from Building 779 D&D wells greater than Tier II action levels during 2001. Each of the three downgradient wells has had at least one thallium result greater than the Tier II action level.

A linear groundwater flow velocity of 66.2 ft/yr (6.4E-05 cm/sec) was calculated between upgradient Well 02397 and downgradient Well 02500 utilizing 2nd quarter 2001 water level data. Hydraulic conductivity for the Qrf and effective porosity values were used as described in Section 3.2 of this Annual Report. This flow velocity would allow groundwater to travel from Well 02397 to well 02500 in approximately 5.6 years. Actual contaminant travel times can be expected to be much longer for highly retarded contaminants such as plutonium and americium, and slightly longer for weakly retarded contaminants, such as VOCs, U-isotopes, and nitrate. The groundwater travel time from the sub-basement to well 00100, a distance of approximately 210 feet, would be about 3.2 years.

In conclusion, nitrate concentrations upgradient of Building 779 and observed in Well 02397 are greater than Tier II action levels and are similar to first time (2001) nitrate concentrations observed in Downgradient D&D Well 02500. There are no upgradient U-isotope, VOC, metals, or Pu/Am concentrations to date that approach the concentrations of these analytes observed in downgradient Building 779 D&D wells.

An upgradient versus downgradient statistical analysis will be performed once there are at least 4 sets of analytical results for Upgradient Well 02397 and Downgradient Well 00100. This analysis will be similar to the one performed for Building 123 (Section 5.1 of this report) and is anticipated for inclusion in the 2002 Annual RFCA Groundwater Monitoring Report.

Table 5-5 Historical Building 779 D&D Groundwater Monitoring Data

Well	Location	Dates	CCl_4 (µg/L)	TCE (µg/L)	Nitrate (mg/L)	U-233/234 (pCi/L)	U-238 (pCi/L)	Others (µg/L or pCi/L)
02397	Upgradient	3/98	U	U	INSW	0.582	0.69	Pu/Am U
		11/98	U	1.0	**12**	INSW	INSW	Thallium 1.1
		5/00	U	U	**19**	INSW	INSW	INSW
		4/01	U	0.1	**11**	0.61	0.29	INSW
02497	Down-gradient	3/98	U	1.0	5.9	INSW	INSW	INSW
		6/98	U	0.6	6.2	INSW	INSW	INSW
		11/98	U	3	INSW	INSW	INSW	INSW
		5/99	0.5	2	INSW	**2.599**	**1.076**	Am **0.233**
		11/99	0.3	2	8.7	**1.842**	**0.918**	Cadmium 2.2
		5/00	0.4	4	4.7	**1.42**	**0.808**	Chloroform 12
		11/00	U	2.4	INSW	INSW	INSW	Cadmium **15.1** Thallium **5.33**
		5/01	0.2	3	7.5	1.05	0.421	Pu/Am U
		10/01	U	2.2	3.3	INSW	INSW	INSW
00100	Down-gradient	12/00	**14.8**	**61.8**	3.1	**1.10**	0.61	Pu **0.68** PCE 4.2
		5/01	**5**	**38**	4.2	**3.11**	**0.972**	Pu 0.113 Am 0.0167
		11/01	**5.7**	**55**	3.6	**2.3**	**1.08**	Pu 0.0501 Am 0.0653 Thallium **2.9**
02297/ 02500	Down-gradient	6/98	U	2	INSW	INSW	INSW	INSW
		5/99	0.8	2	8.2	**8.169**	**4.103**	INSW
		11/00	U	1.5	7.4	**4.20**	**2.10**	
		6/01	0.2	**18**	**11**	**6.01**	**3.02**	Pu 0.103 Am 0.0865
		10/01	U	**19**	**15.7**	**6.27**	**3.26**	Pu 0.0489 Am U Thallium **7.4**

Notes: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, U = non detect, (B) = Analyte detected in the Method Blank, NA = not analyzed, INSW = Insufficient water available for sample collection, CCl_4 = carbon tetrachloride.

SW085 Sampling

SW085 is the surface water sampling station that is located at the outfall of the Building 779 foundation drain. This outfall was sampled in May and August of 2001 and May of 2001. Currently this location is not sampled as part of the IMP requirements for D&D sampling at Building 779 but was part of the previously concluded sump and basement sampling project (see Section 5.5.1 of the 2000 RFCA Annual Groundwater Monitoring Report). The recent samples collected from this location could not be collected earlier because the location only produces water during or following significant precipitation events. In addition, there are some inherent problems with the outfall itself as the water collected at this location comes out of the hillside (soil around the pipe) and not out of the outfall pipe. This leads to the question of whether the sample that is collected at this location is water that the foundation drain collects, water from some other origin seeping out of the hillside at this location because of a preferential flowpath, or some combination of the two waters. It is possible that samples from this location may contain analytes that do not originate at Building 779.

The results of these three recent SW085 sample events indicate that carbon tetrachloride and TCE were not detected, nitrate results were all below the Tier II action level, and uranium isotopes U-233/234 and U-238 activity

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concentrations were all above Tier II action levels. The Pu/Am results for the May 2001 sampling event were above the Tier II action level for both analytes; the rest of the Pu/Am results were below the Tier II action levels. The three rounds of sampling have confirmed the results of historic surface water samples for this outfall. Additional sampling of this location is not planned.

5.6 Building 707

A Sampling and Analysis Plan for the D&D groundwater monitoring of Building 707 (RMRS, 2000c) was prepared early in CY 2000 and submitted to the CDPHE and EPA in April 2000. Comments were received from the Agencies in early July 2000, and a meeting was held at RFETS on July 19, 2000, to resolve issues pertaining to the investigation at this building. The Final SAP for this building was submitted to the Agencies in August 2000. Building 707 is currently scheduled for demolition in early FY 2005, which should provide adequate time to construct a chemical baseline for the D&D monitoring wells.

Building 707 is located on the north side of Central Avenue between Eighth and Ninth Streets in the former PA. It is just south of the Building 776/777 complex. Building 707 is a two-story building with a single story section on its eastside. The two-story portion is 72,240 square feet, while the single story section is 18,560 square feet. The main floor of the building is compartmentalized into eight modules (A through H). There is a small basement (referred to as the C-pit) under Module C with an area of 1,000 square feet. During its operation, no significant changes were made to the building design.

Construction of Building 707 began in 1967 to support production of the Part V weapons design that could not be fully accommodated in Building 776/777. Because of a major fire at Building 776/777 in 1969, Building 707 acquired additional plutonium foundry, casting, and machining functions that were moved from Building 776/777. After the fire in Building 776/777, Building 707 became the main plutonium components production facility at the plant. Plutonium manufacturing operations began in May 1970, and between 1970 and 1989, Building 707 provided metallurgical support for plutonium and was involved in final product assembly. Plutonium was cast into ingots in the foundry, then rolled and formed prior to being machined, cleaned, and assembled in various areas within the building. Plant operations involving radioactive and fissile material were discontinued in 1989. As of 1992, certain non-production operations had resumed in Building 707.

Monitoring wells 60499, 60599, and 60699, which were installed for the East Industrial Area Plume (EIAP) characterization project, are utilized as upgradient Building 707 D&D wells. During 2000, downgradient D&D Monitoring Wells 00200 and 00300 were installed and partially developed. EIAP Well 61499 and older Well P218089 are also utilized as downgradient D&D wells. Because P218089 was not sampled between May 1995 and December 2000, the previous three years of data is not available for baseline determination. Besides the monitoring wells, the Building 707 D&D SAP states that a VOC sample will be collected from the Building 707 foundation drain at FD-707-4, which is a manhole within Building 763 just southeast of the building. In addition, radionuclide and metals samples are routinely collected from a surface water location east of the 750 Pad, designated GS40,

where the outfall from the Building 707 foundation drain is located. Figure 5-6 presents the site location as well as the location of D&D Monitoring Wells and other sampling locations.

Except for downgradient Wells 00200 and P218089, there has been little groundwater available for sampling through CY 2001. The alluvial saturated thickness in this portion of the site is very thin. This is compounded by the fact that Building 707 contains an extensive foundation drain that encompasses the entire building except for the northwest corner. At certain times of the year UHSU groundwater flow may be restricted to the weathered bedrock. Before 2001, many of the Building 707 D&D wells only had enough water available for VOC analyses.

Based on the research performed in support of the Building 707 D&D SAP, the most abundant potential contaminants associated with Building 707 are Pu/Am, uranium isotopes, chlorinated solvents (TCE, TCA, and carbon tetrachloride), and a variety of metals including lead, chromium, and mercury. The D&D analytical suite for Building 707 is VOCs, metals, uranium isotopes, Pu/Am, and neptunium. Table 5-6 presents a summary of Building 707 D&D groundwater monitoring data collected through CY 2001. Until a baseline is established for Building 707, immediately after the aboveground portion of the building is demolished, analytes will be discussed in terms of concentrations relative to Tier I and Tier II groundwater action levels.

The results of the D&D sampling rounds through CY 2001 indicate that there are no concentrations of any analytes that are above Tier I action levels. Upgradient Well 60599 has been impacted by PCE in concentrations greater than the Tier II action level during all four D&D sampling events to date. Downgradient Wells 61499 (PCE) and 00300 (TCE) have been impacted by the listed VOCs at or slightly above Tier II action levels. There are no detections of TCA or carbon tetrachloride above Tier II action levels and most results are non-detect. Samples from all Building 707 upgradient D&D wells have activity concentrations of U-233/234 and U-238 greater than their Tier II action levels, and at Well 60699, these isotopes approach Tier I action levels during all quarters where sufficient water was available for uranium isotope samples. At Well 60699, the activity concentrations of all uranium isotopes (including U-235) exceed Site M2SD background values. U-233/234 and U-238 activity concentrations from downgradient wells P218089 and 00300 are all above Tier II action levels. All historical results of neptunium have been non-detect; nor have there been any activity concentrations of Pu/Am above Tier II action levels at Building 707. Metals results indicate there have been some concentrations of thallium, mostly at downgradient wells, which exceed the Tier II action level. There have been no detections of beryllium at Building 707. Upgradient Wells 60599 and 60699 and Downgradient Well 00300 appear to be the most impacted at this time. The impacts to the upgradient wells are probably not related to contamination from Building 707. Based on current potentiometric data, these three wells all lie in the same general flowpath.

There have been no concentrations of any analytes above Tier II action levels from manhole FD-707-4 during 2000 or 2001. Samples were collected at least monthly from surface water station GS40 during 2000 and 2001. The results of these analyses indicate that concentrations of U-233/234, U-238, and antimony are consistently found above their respective Tier II action levels in this water. The Tier II action level for antimony is 6 µg/L. There were no antimony detections greater than 1 µg/L from any the Building 707 D&D monitoring wells and most results were

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non-detect. No plutonium, americium, or beryllium was detected at concentrations above their respective Tier II action levels in samples from station GS40.

Table 5-6 Historical Building 707 D&D Groundwater Monitoring Data

Well	Location	Dates	U-233/234 (pCi/L)	U-238 (pCi/L)	PCE (µg/L)	TCE (µg/L)	Others (µg/L or pCi/L)
60499	Upgradient	1/00	INSW	INSW	0.3	0.8	Chloroform 11
		12/00	INSW	INSW	1.1	1.5	Chloroform 9.5
		5/01	**5.33**	**3.39**	0.6	2	Pu U/Am 0.0159
		10/01	**4.74**	**2.81**	0.72	1	Pu 0.028/Am 0.024
							Thallium **3.5**
60599	Upgradient	2/00	INSW	INSW	100	U	INSW
		12/00	INSW	INSW	111	U	INSW
		5/01	**16.3**	**13.2**	**260**	0.6	Pu 0.009/Am 0.009
		10/01	**16.5**	**10.5**	**170**	0.25	-------
60699	Upgradient	5/00	INSW	INSW	U	U	INSW
		3/01	**95**	**60.9**	0.1	U	U-235 **2.81**
		6/01	**70**	**48**	U	U	U-235 **2.1**
		11/01	INSW	INSW	U	U	CCl_4 U
61499	Downgradient	5/00	INSW	INSW	**5**	0.1	INSW
		12/00	INSW	INSW	U	U	INSW
		4/01	**8.11**	**6.72**	**5**	0.2	Cadmium 2.4
							Thallium 0.99
P218089	Downgradient	12/00	**3.30**	**2.30**	U	U	Pu 0.008/Am U
							Neptunium U
		4/01	**1.5**	**0.9**	U	U	Pu U/Am 0.007/Np U
		10/01	**4.13**	**2.04**	1.2	U	Thallium **4.5**
							Pu 0.017/Am U/Np U
00200	Downgradient	11/00	U	U	U	0.27	Cadmium **8.49**
							Thallium **3.78**
							PCBs U
							Pu/Am U
		4/01	0.16	0.1	0.1	U	Neptunium U
							Pu U/Am 0.00963
		10/01	0.0343	0.0911	U	U	Neptunium U
							Pu/Am U
							Thallium **3.9**
00300	Downgradient	11/00	Dry	Dry	Dry	Dry	Dry
		5/01	**27**	**19**	U	**17**	Pu/Am U
		10/01	**23.9**	**15.8**	U	**5.8**	Thallium **3.0**
							Pu 0.0191/Am U

Note: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, U = non detect, NA = not analyzed, INSW = Insufficient water available for sample collection, CCl_4 = carbon tetrachloride, Np = neptunium

5.7 Building 776/777

A Sampling and Analysis Plan for the D&D groundwater monitoring of Building 776/777 (RMRS, 2000c) was prepared early in CY 2000 and submitted to the CDPHE and EPA in April 2000. Comments were received from the Agencies in early July 2000, and a meeting was held at RFETS on July 19, 2000, to resolve issues pertaining to the investigation at this building. The Final SAP for this building was submitted to the Agencies in August 2000. Building 776/777 is scheduled for demolition in mid FY 2004. This should allow adequate time for construction of a chemical baseline for the D&D Monitoring Wells.

The Building 776/777 complex is located in the former PA, between Eighth and Ninth Streets, just north of Building 707. Buildings 776 and 777 share a common wall, utilities, and maintenance. All floors in the building are reinforced concrete slabs. The main floor has an area of 135,000 square feet. Metal processing facilities occupy 62,000 square feet and waste handling occupies 63,000 square feet. The second floor contains 88,000 square feet and is almost entirely occupied by utilities. There are two sub-basement areas: a four bay area of approximately 1,600 square feet and an elevator pit area which is adjacent to the tunnel connecting Buildings 776 and 771.

Building 776/777 began operations in 1957 and has undergone several major production changes since then. Beginning in 1958 and continuing through 1969, Building 776 was the main manufacturing facility for plutonium weapons components and housed a plutonium foundry and fabrication operations. The main function of Building 777 was assembly of parts. After a devastating fire in 1969, the majority of the Building 776/777 foundry and fabrication operations were transferred to Building 707. Limited production operations were resumed in Building 776/777 several months after the fire; however, the main focus of the building moved towards waste and residue handling, disassembly of site returns, and special projects. Processes included waste size reduction, pyrochemistry, coatings operations, machining, and product assembly and disassembly (including testing and inspection). Post-1989 activities included waste handling and maintenance activities in Building 776, and a tritium surveillance laboratory and container repackaging operations in Building 777 (DOE, 1994a).

During 2000, Upgradient Monitoring Well 00400, located between Building 778 and Building 777, and Downgradient Monitoring Wells 00500, 00600, and 00700, were installed and developed, and sampled during the 4th quarter. Preexisting Monitoring Well 60299, part of the EIAP investigation, is being utilized as a Building 776/777 upgradient D&D well. Figure 5-7 presents the building location along with the locations of the D&D monitoring wells.

Based on the research performed in support of the Building 776/777 D&D SAP, the most abundant potential contaminants associated with the building are plutonium, americium, uranium isotopes, tritium, chlorinated solvents, a variety of metals including beryllium, and potentially nitrate. The analytical suite for D&D wells at Building 776/777 includes VOCs, metals, uranium isotopes, Pu/Am, tritium, nitrate, and TPH. Table 5-7 presents summary Building 776/777 D&D groundwater monitoring data collected through CY 2001. Until a baseline is established for Building 776/777, immediately after the aboveground portion of the building is demolished, analytes will be discussed in terms of concentrations relative to Tier I and Tier II groundwater action levels.

Except for upgradient D&D well 60299, all of the Building 776/777 D&D wells produced full sample suites (VOCs, metals, uranium isotopes, Pu/Am, tritium, and nitrate) during the 2nd and 4th quarters of 2001. Monitoring well 60299 only produced enough water for VOC and nitrate samples during the 2nd quarter of 2001; the well was too dry to sample during the 4th quarter of 2001.

The results of the Building 776/777 D&D sampling to date indicate that the carbon tetrachloride concentration in Downgradient Well 00700 for the three sampling rounds completed to date is greater than the Tier I action level.

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There were no concentrations of any other analytes that were above Tier I action levels from Building 776/777 D&D wells. Well 00700 also contains chloroform; 1,1-DCE; 1,2-DCA; and PCE in concentrations greater than their respective Tier II action levels for all three sampling rounds to date. None of the other four Building 776/777 D&D monitoring wells has had any VOC detection above the Tier II action levels. Upgradient well 00400 has been impacted by uranium isotopes, cadmium, and thallium in concentrations greater than their Tier II action levels. No other Building 776/777 D&D well has exhibited activity concentrations of uranium isotopes above Tier II action levels. Downgradient Well 00500 exhibited manganese and thallium concentrations greater than their respective Tier II action levels. No other well has exhibited manganese concentrations greater than the Tier II action level, although downgradient well 00600 has relatively high manganese concentrations that are approaching the Tier II action level. Tritium was detected in Downgradient Well 00700 at an estimated activity concentration of 300 pCi/L in 4th quarter 2000 and at an activity concentration of 264 pCi/L in 4th quarter 2001 (both below Tier II); tritium was not detected at all other wells. Beryllium and nitrate were either not detected or detected at a concentration below its Tier II action level at all wells for all D&D sampling rounds to date.

Table 5-7 Historical Building 776/777 D&D Groundwater Monitoring Data

Well	Location	Dates	Pu/Am (pCi/L)	U-isotopes (pCi/L)	Metals (µg/L)	VOCs (µg/L)
60299	Upgradient	3/00	INSW	INSW	INSW	TCE 1.0 CCl_4, PCE <1 TCE 2.1
		11/00	INSW	INSW	INSW	CCl_4, PCE <1
		5/01	INSW	INSW	INSW	All U or <1
00400	Upgradient	11/00	Pu 0.012 Am U	U-233/234 **2.60** U-238 **1.20**	Cadmium **7.09** Thallium **4.95**	TCE 1.6 CCl_4, PCE U
		5/01	U	U-233/234 **3.2** U-238 **1.88**	Manganese 0.38	All U
		11/01	Pu 0.0173 Am 0.0142	U-233/234 **2.05** U-238 **1.01**	Manganese 1.2	All <1
00500	Downgradient	11/00	Pu 0.058 Am U	U-233/234 0.18 U-238 0.16	Thallium **3.82** Manganese **2540**	PCE U CCl_4, TCE <1
		5/01	Pu U Am 0.013	U-233/234 0.28 U-238 0.21	Manganese **4660**	All U or <2
		11/01	U	U-233/234 0.141 U-238 0.23	Manganese **2610** Thallium **2.4**	All U or <2
00600	Downgradient	11/00	Pu 0.016 Am U	U-233/234 0.19 U-238 0.20	Manganese 1150 Arsenic 11.6	All U
		6/01	U	U-233/234 0.563 U-238 0.429	Thallium **4.4** Manganese 1420	All U or <1
		11/01	U	U-233/234 0.288 U-238 U	Manganese 1180	All U or <1
00700	Downgradient	11/00	U	U-233/234 0.035 U-238 0.028	Manganese 88	CCl_4 ***3920*** Chloroform **244** 1,1-DCE **366** 1,2-DCA **8** PCE **9.9**
		5/01	Pu 0.0112 Am 0.0191	U-233/234 U U-238 U	Manganese 43.3	CCl_4 ***2900*** Chloroform **230** 1,1-DCE **330** 1,2-DCA U PCE **11** TCE **17**
		11/01	Pu 0.00811	U-233/234 0.216	Manganese 28.9	CCl_4 ***3000***

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Well	Location	Dates	Pu/Am (pCi/L)	U-isotopes (pCi/L)	Metals (µg/L)	VOCs (µg/L)
00700	Downgradient	11/01	Am U	U-238 U		Chloroform **340** 1,1-DCE **500** 1,2-DCA **7.9** PCE **11**

Notes: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, U = non detect, (B) = Analyte detected in the Method Blank, NA = not analyzed, INSW = Insufficient water available for sample collection, CCl_4 = carbon tetrachloride

5.8 Buildings 371/374

A Sampling and Analysis Plan for the D&D groundwater monitoring of Building 371/374 (RMRS, 2000c) was prepared early in CY 2000 and submitted to the CDPHE and EPA in April 2000. Comments were received from the Agencies in early July 2000, and a meeting was held at RFETS in July 2000 to resolve issues pertaining to the investigation at the Building 371/374 area. The Final SAP for this building was submitted to the Agencies in August 2000. It was anticipated that well installation and groundwater sampling activities would take place for this building during the summer and fall of 2000. D&D wells were not installed at Building 371/374 during CY 2000 because of D&D scheduling changes, which allowed for delay of well installation. Building 371/374 D&D wells were installed during the spring of 2001 and the first round of groundwater samples were collected during the 3rd quarter of 2001. Building 371/374 is scheduled for demolition in mid FY 2006, which will allow adequate time for construction of a chemical baseline for the D&D monitoring wells.

The Building 371/374 complex is located in the northwestern portion of the former PA at RFETS, and is the only building complex within the newly configured PA. The building is a four level, partially buried structure constructed of reinforced concrete. It contains approximately 186,000 square feet of floor space. The building contains a basement floor and a sub-basement floor beneath the ground floor. Building 371 contains a glovebox system, a large central storage area, office areas, maintenance shops, and outside loading docks. Building 374 contains office space and liquid waste processing facilities. Figure 5-8 presents a site location map of the Building 371/374 complex and surrounding area along with the locations of the D&D monitoring wells.

Building 371 was originally built to assume the plutonium recovery operations of Buildings 771 and 776 using advanced technology for plutonium handling, recovery, and safety. The projected operations for the building focused primarily on the recovery of plutonium from both solid and liquid wastes. Pilot scale recovery operations began in 1981 and continued until the mid-1980s when serious design and construction deficiencies were identified (DOE 1994a). The last recovery operations in the facility were terminated in 1986. Since that time, operations in Building 371 have focused mainly on waste and Special Nuclear Material (SNM) handling and storage and laboratory operations. The majority of Building 371 is used for handling and storing SNM and wastes. Wastes stored in the building include transuranic waste, transuranic mixed waste, low level waste, and low level mixed waste (DOE, 1994a).

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Building 374 was constructed for the purpose of handling process waste generated in Building 371 and high level waste from Building 771. It began waste treatment operations in 1978 and began handling radioactive wastes from Building 371 in 1980 (DOE, 1994a).

A complex foundation drain system is present beneath Building 371/374. The system operates by gravity flow. The perimeter portion of the drain is located at an approximate elevation of 5984 feet above msl. The inner, deeper, portion of the drain is located at an approximate elevation of 5967 feet above msl. The drain system impacts the localized water table in the immediate vicinity of Building 371/374, and creates convergence towards the building from all directions while the drains are in operation. The vicinity of Building 371/374 acts effectively as a groundwater sink as shown on Plates 5 and 6 and Figure 5-8.

Well installation and groundwater sampling activities that took place at this building during CY 2001 include the installation and development of 7 monitoring wells (37101 through 37701). Monitoring Well 37401 was subsequently destroyed by activities related to the removal of a cement silo and replaced in 2002 with Well 37402 (Figure 5-8). Because of the unique hydraulic scenario described in the preceding paragraph, monitoring wells at Building 371/374 are not currently described in terms of upgradient or downgradient locations. After D&D at this building complex, depending on the disposition and efficacy of the foundation drain system, wells may be assigned an upgradient or downgradient status.

Based on the research performed in support of the Building 371/374 D&D SAP, the most abundant potential contaminants associated with Building 371/374 are plutonium, americium, nitric acid, and chlorinated solvents. The D&D analytical suite for the Building 371/374 complex consists of VOCs, metals, uranium isotopes, Pu/Am, nitrate, and TPH. Table 5-8 presents a summary of Building 371/374 D&D groundwater monitoring data collected through CY 2001. Until a baseline is established for Building 371/374, analytes will be discussed in terms of concentrations relative to Tier I and Tier II groundwater action levels.

All of the Buildings 371/374 D&D monitoring wells produced full sample suites (VOCs, metals, uranium isotopes, Pu/Am, nitrate, and TPH) in the 3rd quarter of 2001. There were generally no detections of chlorinated solvents above Tier II action levels. The metals results of the 3rd quarter 2001 sampling round indicate that there was no beryllium (listed in the SAP as a potential metal of interest) in any samples. Manganese was observed above the Tier II level in well 37301 (8400 µg/L) and thallium was observed in Well 37201 (3.9 µg/L) at a concentration greater than the Tier II action level. Four wells (37201, 37401, 37601, and 37701), the basement, and subbasement all had U-233/234 and U-238 concentrations that were higher than the Tier II action level in the 3rd quarter of 2001. There were no 3rd quarter 2001 elevated concentrations of plutonium or americium; all results were non-detect except for americium in 37101 (0.019 pCi/L) and plutonium in 37401 (0.063 pCi/L). Nitrate was detected at concentrations less than the Tier II action level in all samples except those from Wells 37301 and 37701, the results of which were non-detect. Based on the limited sampling completed to date, uranium isotopes appear to be the contaminant of interest at Building 371/374.

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Table 5-8 Historical Building 371/374 D&D Groundwater Monitoring Data

Well	Dates	U-isotopes (pCi/L)	Pu/Am (pCi/L)	Nitrate (mg/L)	Metals (µg/L)
37101	8/01	U-233/234 U U-238 0.049	Pu U Am 0.019	3.6	-------
37201	8/01	U-233/234 **1.3** U-238 **1.08**	Pu U Am U	0.84	Thallium **3.9**
37301	8/01	U-233/234 0.323 U-238 0.328	Pu U Am U	U	Manganese **8400**
37401/37402	8/01	U-233/234 **27.5** U-238 **22**	Pu 0.063 Am U	1.3	-------
37501	8/01	U-233/234 0.84 U-238 0.49	Pu U Am U	9	-------
37601	8/01	U-233/234 **2.31** U-238 **1.5**	Pu U Am U	4.2	-------
37701	8/01	U-233/234 **7.3** U-238 **5.08**	Pu U Am U	U	-------
B371 Basement	8/01	U-233/234 **2.39** U-238 **1.4**	Pu U Am U	2.7	-------
B371 Sub Basement	8/01	U-233/234 **2.44** U-238 **1.68**	Pu U Am U	0.57	-------

Notes: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, U = non detect, (B) = Analyte detected in the Method Blank, NA = not analyzed, INSW = Insufficient water available for sample collection, CCl_4 = carbon tetrachloride

5.9 Building 865

A Sampling and Analysis Plan for the D&D groundwater monitoring of Building 865 (RMRS, 2000c) was prepared early in CY 2000 and submitted to the CDPHE and EPA in April 2000. Comments were received from the Agencies in early July 2000, and a meeting was held at RFETS in July 2000 to resolve issues pertaining to the investigation at the Building 865 area. The Final SAP for this building was submitted to the Agencies in August 2000. It was anticipated that well installation and groundwater sampling activities would take place at Building 865 during the summer and fall of 2000. D&D wells were not installed at the building during CY 2000 because of D&D scheduling changes, which allowed for delay of well installation. Building 865 wells were installed during the fall of 2001 and the first round of groundwater samples was collected during the 4th quarter of 2001. Building 865 is scheduled for demolition in early FY 2003. This may allow adequate time for construction of a chemical baseline for the D&D monitoring wells.

Building 865 is located immediately south of Central Avenue and east of Eighth Street in the south central portion of RFETS. The building is due south and across Central Avenue from the previously existing Portal 1 entrance to the PA. The southwest corner of Building 865 is approximately 100 feet due east of the northeast corner of Building 883.

Building 865 was placed into service in 1972. This building was used for material processing and development work that included fabrication, processing, and testing of metal parts. Depleted uranium and beryllium were processed in this building (DOE, 1992b). Beryllium powder was mixed with other metals, placed in molds, and compressed into shapes. In addition, from 1983 through 1986, ultra-pure beryllium metal was produced

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electrolytically (ChemRisk, 1992). There is little available literature regarding the historic configuration of the building or the description and time line of historical operations at this building.

Well installation and groundwater sampling activities that took place at this building during 2001 included the installation and development of upgradient monitoring Well 86501 and downgradient monitoring Wells 86601 and 86701. Preexisting monitoring Wells 40999 and P317989 will be utilized as additional downgradient monitoring wells. In addition, surface water station BS-865-2, a foundation drain outfall, will be sampled. Figure 5-9 presents the location of Building 865 and the locations of the associated D&D monitoring wells. Preexisting Well P317989 had no groundwater samples collected from it between 3/21/95 and 11/10/99; therefore, the previous three years of data are not available for D&D baseline consideration.

Based on the research performed in support of the Building 865 D&D SAP, the most abundant potential contaminants associated with Building 865 are uranium isotopes, beryllium, and nitric acid. The D&D analytical suite for Building 865 is VOCs, metals, uranium isotopes, and nitrate. Table 5-9 presents a summary of Building 865 D&D groundwater monitoring data collected through CY 2001. Until a baseline is established for Building 865, analytes will be discussed in terms of Tier I and Tier II action levels.

All of the monitoring wells used for D&D monitoring of Building 865 (except 86701) produced a full sample suite (VOCs, metals, uranium isotopes, and nitrate) for either the 3rd or 4th quarters of 2001. Well 86701 could not be developed during 2001. Wells 40999 and P317989 were sampled for Pu/Am in addition to the previously listed Building 865 analytes. The Pu/Am results for Well 40999, which is also an upgradient D&D well for Building 886, are available in Section 5.4.

The results of the 3rd/4th quarter 2001 sampling round indicate that there were almost no detections of VOCs; the exception being a result of 0.4 µg/L of TCE at foundation drain outfall BS-865-2. Metals results indicate that beryllium was not detected for all Building 865 D&D monitoring locations or historically in Wells 40999, P317989, or outfall BS-865-2. Lead, currently non-detect at all locations, has been observed historically above Tier II concentration at outfall BS-865-2; selenium is currently and historically found in Well P317989 at concentrations above the Tier II action level (but at no other Building 865 D&D locations above detection limits). Uranium isotopes U-233/234 and U-238 are found at concentrations above Tier II action levels at all sampling locations. Nitrate concentrations at all sampling locations are below The Tier II action level. Based on the limited sampling completed to date, uranium isotopes appear to be the contaminant of interest at Building 865.

Table 5-9 Historical Building 865 D&D Groundwater Monitoring Data

Well	Location	Dates	Metals (µg/L)	Nitrate (mg/L)	U-isotopes (pCi/L)	VOCs (µg/L)
86501	Upgradient	11/01	Beryllium U Lead U Selenium U	0.43	U-233/234 **37.2** U-235 **1.1** U-238 **26.5**	U
86601	Downgradient	11/01	Beryllium U Lead U Selenium U	U	U-233/234 **17.4** U-235 0.565 U-238 **12**	U
86701	Downgradient	NS	-------	-------	-------	-------
40999	Downgradient	7/01	Beryllium U* Lead U* Selenium 2.2*	0.47	U-233/234 **9** U-235 0.33 U-238 **6.6**	U
P317989	Downgradient	7/01	Beryllium U* Lead U* Selenium **96** (historical range **96-128**)	1.4 (historical range U-5.9)	U-233/234 **50.4** U-235 **2.3** U-238 **37.8**	U
BS-865-2	NE of B865	12/01	Beryllium U* Lead U (historical range U-**210**) Selenium U*	6.7 (historical range 3.13-6.7)	U-233/234 **4.2** U-235 0.242 U-238 **3.23**	TCE 0.4 (all others U)

Notes: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, U = non detect, (B) = Analyte detected in the Method Blank, NA = not analyzed, INSW = Insufficient water available for sample collection, * = all historical results are U, NS = not sampled

5.10 Building 883

A Sampling and Analysis Plan for the D&D groundwater monitoring of Building 883 (RMRS, 2000c) was prepared early in CY 2000 and submitted to the CDPHE and EPA in April 2000. Comments were received from the Agencies in early July 2000, and a meeting was held at RFETS in July 2000 to resolve issues pertaining to the investigation at the Building 883 area. The Final SAP for this building was submitted to the Agencies in August 2000. It was anticipated that well installation and groundwater sampling activities would take place at this building during the summer and fall of 2000. D&D Wells were not installed at Building 883 during CY 2000 because of D&D scheduling changes, which allowed for delay of well installation. However, the schedule was then accelerated and Building 883 wells were installed during the fall of 2001; the first round of groundwater samples was collected during the 4th quarter of 2001. Building 883 is scheduled for demolition in mid FY 2003. This may allow adequate time for construction of a chemical baseline for the D&D Monitoring Wells.

Building 883, located approximately 300 feet south of the southeast corner of the intersection of Central Avenue and Eighth Street in the south central portion of RFETS, is a two story steel framed building that is connected to Building 881 (located 150 feet due south) by a tunnel. The tunnel connects the northwest corner of the second floor of Building 881 to the southwest corner basement of Building 883. Building 883 has a partial basement containing approximately 7,600 square feet, and a small second floor on the north and south ends. The building consists of 76,500 square feet of space, most of which is taken up by a high bay metal working facility containing large equipment (DOE, 1994a).

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Building 883 was put into service in 1957. At that time there were two parallel uranium fabrication operations that involved the use of presses, rolling mills and annealing furnaces. One operation was for enriched uranium fabrication and the other was for depleted uranium fabrication. The enriched uranium work was discontinued in the mid 1960s. In addition, beryllium ingots were also rolled into sheet material and etched in this building. Beryllium machining occurred in this building from the mid 1960s through the mid 1970s. Later, Building 883 served as a metals preparation area where parts were cleaned, rolled, formed, swaged, sheared, bent, and grit blasted before they were further used by other machining and production processes at various locations at the plant (DOE, 1992b). A major addition to Building 883 was completed in 1985 to support manufacturing of armor plates containing depleted uranium for the M1A1 tank (DOE, 1994a).

Well installation and groundwater sampling activities that took place at this building during 2001 include the installation, development, and sampling of Downgradient Monitoring Wells 83101 and 83201. Preexisting Monitoring Wells 61099 and 61199 are utilized as Building 883 Upgradient D&D Wells. Figure 5-10 presents the building location along with the location of the D&D Monitoring Wells.

Based on the research performed in support of the Building 883 D&D SAP, the contaminants of interest associated with Building 883 are uranium isotopes, beryllium, and nitric acid. The D&D analytical suite for Building 883 consists of VOCs, metals, uranium isotopes, nitrate, PCBs, and TPH. Table 5-10 presents a summary of Building 883 D&D groundwater monitoring data collected through CY 2001. Until a baseline is established for Building 883, analytes will be discussed in terms of concentrations relative to Tier I and Tier II action levels.

New D&D Monitoring Wells 83101 and 83201, and existing Wells 61099 and 61199, produced full sample suites (VOCs, metals, uranium isotopes, nitrate, PCBs, and TPH) for the 4th quarter 2001. The results of the 4th quarter 2001 sampling indicate that V0Cs are observed in concentrations greater than Tier II action levels at all wells except Downgradient Well 83201. Uranium isotopes U-233/234 and U-238 are found in activity concentrations greater than Tier II action levels at Wells 61099, 61199, and 83101; and at activity concentrations greater than Tier I action levels at Well 83201. In addition, the U-235 activity concentration at Well 83201 was greater than the Tier II action level. All of the uranium isotope activity concentrations at Well 83201 are greater than the Site Background M2SD values for those analytes. Beryllium was not detected at any locations. Nitrate was detected at all locations at concentrations below the Tier II action level. A few metals concentrations above Tier II action levels were noted; most were observed at Downgradient Well 83201. There were no detections of PCBs at any well. TPH was detected in low concentrations at Wells 61099 and 83201; there is neither an RFETS action level nor a State of Colorado Drinking Water Standard for TPH. Given the low concentrations of TPH in Building 883 D&D wells, sampling for this analyte will be eliminated. Based on the limited sample results to date, uranium isotopes, PCE, and TCE appear to be the contaminants of interest at Building 883.

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Table 5-10 Historical Building 883 D&D Groundwater Monitoring Data

Well	Location	Dates	Beryllium (µg/L)	Nitrate (mg/L)	U-isotopes (pCi/L)	TCE (µg/L)	PCE (µg/L)	Metals (µg/L)
61099	Upgradient	12/99	NS	NS	NS	1	**27**	-------
		3/01	NS	NS	U-233/234 **1.33** U-235 0.067 U-238 **0.916**	2	**26**	-------
		12/01	U	5.9	U-233/234 **1.19** U-235 0.0527 U-238 **0.804**	0.92	**15**	-------
61199	Upgradient	12/99	NS	NS	NS	**12**	**220**	-------
		3/01	NS	NS	U-233/234 **2.75** U-235 0.14 U-238 **1.59**	**17**	**230**	-------
		12/01	U	4.9	U-233/234 **2.33** U-235 0.165 U-238 **1.17**	**12**	**160**	Thallium **2.2**
83101	Downgradient	12/01	U	4	U-233/234 **8.14** U-235 0.636 U-238 **7.56**	**8.6**	**29**	Cadmium **5.3**
83201	Downgradient	12/01	U	0.56	U-233/234 ***161*** U-235 **7.19** U-238 ***127***	0.62	0.63	Mercury **2.9** Selenium **58.3** Thallium **3.6**

Notes: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, U = non detect, (B) = Analyte detected in the Method Blank, NA = not analyzed, INSW = Insufficient water available for sample collection, • = all historical results are U, NS = not sampled

5.11 Building 881

A Sampling and Analysis Plan for the D&D groundwater monitoring of Building 881 (RMRS, 2001d) was prepared early in CY 2001 and submitted to the CDPHE and EPA in April 2001. Comments were received from the Agencies in May 2001 and DOE responses to Agency comments were submitted in late May 2001. The Final SAP for this building was submitted to the Agencies in July 2001. Well installation activities for this building took place during the fall of 2001, and the first round of groundwater samples were collected during the 4th quarter of 2001. Building 881 is scheduled for demolition in late FY 2003 to early FY 2004. This may allow adequate time for construction of a chemical baseline for the D&D Monitoring Wells.

Building 881, a three-story reinforced concrete structure, is located immediately south of Building 883 in the south central IA at RFETS. As stated above, the northwest corner of the second floor of Building 881 is connected by a tunnel to the southwest corner of the basement of Building 883. The tunnel was originally used to convey enriched uranium parts and other materials between the two buildings (DOE, 1994b). The total Building 881 floor area of 245,160 square feet generally consists of an 86,000 square foot first floor, an approximately 121,000 square foot second floor, and approximately 14,000 square foot second floor mezzanine, and an approximately 18,000 square foot basement (DOE, 1994b).

During the early 1950s, the United States adopted a nuclear weapons defense policy that called for at least two installations to have the capability to produce any of the nuclear components for the national stockpile. Rocky Flats

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Building 881was selected, along with the Oak Ridge Y-12 plant, to fabricate weapon parts from enriched uranium (ChemRisk, 1992). Operations producing uranium components began in the summer of 1952. The specific process operations involved in the fabrication of uranium components included heating and casting of parts, parts shaping and forming, machining, assembly and uranium recovery (ChemRisk, 1992).

Enriched uranium fabrication operations were moved to Oak Ridge between 1964 and 1966 when the U.S. Atomic Energy Commission adopted a single mission policy and made the production of plutonium components the focus of operations at Rocky Flats. From this time until 1984, Building 881 housed the manufacturing process for precision stainless steel parts that were used in plutonium based weapons. After stainless steel manufacturing was moved to Building 460 in 1984, the role of Building 881 was expanded to a multipurpose facility for research and development, analytical support, and administrative and computer functions (DOE, 1994b).

During the period of uranium and stainless steel production, most of the production related operations occurred on the second floor. Floors in the process areas were covered with stainless steel sheeting with welded seams to contain spills and facilitate cleaning (DOE, 1994b). In addition, some floors were covered with stainless steel sheeting to cover historic spills. Support functions such as laboratories, utilities, and maintenance were located on the first floor and in the basement (ChemRisk, 1992).

Building 881 has a gravity flow foundation drain system at approximate elevations that range from 5973 feet above mean sea level (msl) at the north end of the building to 5949 feet above msl at the south end of the building. The drain is located around the exterior of the foundation at elevations that impact localized potentiometric contours based on the potentiometric surface of permeable units of the UHSU presented in Plates 5 and 6. The foundation drain outfall, originally designated as sampling station FD-881-1 and currently referred to as surface water station SW13494, is located immediately south of the security fence on the south side of Building 881. The potential exists that the foundation drains of Buildings 881 and 883 are connected. This may be a concern because, if true, it may allow passage of contaminants from Building 883 to surface water station SW13494.

Well installation and groundwater sampling activities that took place at this building during 2001 include the installation and partial development of downgradient Well 88101. Preexisting Monitoring Wells 37791 and 39691 will be utilized as upgradient D&D monitoring wells. Preexisting well 5187 will be utilized as a downgradient D&D monitoring well for Building 881. In addition, data from surface water station SW13494 (the outfall from the Building 881 foundation drain system), currently sampled quarterly, will be reviewed as part of the Building 881 D&D groundwater monitoring. Figure 5-11 presents the location of Building 881 along with the D&D monitoring locations.

Based on the research performed in support of the Building 881 D&D SAP, the contaminants of interest associated with Building 881 are uranium isotopes and chlorinated solvents. The D&D analytical suite for Building 881 consists of VOCs, metals, uranium isotopes, Pu/Am, nitrate, PCBs, and TPH. Table 5-11 presents a summary of Building 881 D&D groundwater monitoring data collected through CY 2001. Until a baseline is established for

Building 881, analytes will be discussed in terms of concentrations relative to Tier I and Tier II groundwater action levels.

New Building 881 D&D well 88101 did not have any samples collected from it during the 4th quarter of 2001 because it was still being developed. Existing Wells 39691 and 5187 were dry during the 4th quarter 2001. Existing Well 37791 produced a full sample suite during the 4th quarter 2001. Well 83101 also produced a full sample suite except that Pu/Am was mistakenly omitted during 4th quarter 2001 sampling. The limited 4th quarter 2001 results indicate that new upgradient D&D Well 83101 (also associated with Building 883) is impacted with VOCs (PCE and TCE), uranium isotopes (U-233/234 and U-238), and cadmium at concentrations greater than their Tier II action levels. Existing upgradient D&D Well 37791 had U-233/234, U-238, and thallium at concentrations greater than their Tier II action levels. Surface water sampling station SW13494 had PCE, U-233/234, and U-238 at concentrations greater than their Tier II action levels. Beryllium, PCBs, and TPH were not detected at the three locations. There were no samples collected from any downgradient locations at Building 881 during the 4th quarter of 2001. Based on the limited sample results to date, uranium isotopes, PCE, and TCE may be the analytes of interest at Building 881.

Table 5-11 Historical Building 881 D&D Groundwater Monitoring Data

Well	Location	Dates	Pu/Am (pCi/L)	Nitrate (mg/L)	U-isotopes (pCi/L)	VOCs (µg/L)	Metals (µg/L)
37791	Upgradient	12/01	Pu U Am 0.0376	1.1	U-233/234 **7.36** U-235 0.461 U-238 **5.87**	TCE U PCE U TCA U*	Thallium **2.3**
39691	Upgradient	12/01	Dry	Dry	Dry	Dry	Dry
83101	Upgradient	12/01	NS	4	U-233/234 **8.14** U-235 0.636 U-238 **7.56**	TCE **8.6** PCE **29** TCA U	Cadmium **5.3**
5187	Downgradient	12/01	Dry	Dry	Dry	Dry	Dry
88101	Downgradient	12/01	NS	NS	NS	NS	NS
SW13494	South of B881 Footing Drain Sump	12/01	Pu U Am 0.034	5.4	U-233/234 **3.17** U-235 0.203 U-238 **2.53**	TCE 2 PCE **27** TCA U*	-------

Notes: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, U = non detect, (B) = Analyte detected in the Method Blank, NA = not analyzed, CCl_4 = carbon tetrachloride, * = all historical results are U, NS = not sampled

5.12 Building 991

A Sampling and Analysis Plan for the D&D groundwater monitoring of Building 991 (RMRS, 2001d) was prepared early in CY 2001 and submitted to the CDPHE and EPA in April 2001. Comments were received from the Agencies in May 2001 and DOE responses to Agency comments were submitted in late May 2001. The Final SAP for this building was submitted to the Agencies in July 2001. Well installation activities for this building took place during the fall of 2001 and the first round of groundwater samples was collected during the 4th quarter of 2001. Building 991 is scheduled for demolition in mid FY 2004. This may allow adequate time for construction of a chemical baseline for the D&D monitoring wells.

Building 991 is located in the southeast corner of the former PA at RFETS. Building 991 is the center of a complex that includes a series of four underground storage vaults connected by tunnels. The vaults, scheduled for demolition in early FY 2004, are referred to as Buildings 996, 997, 998, and 999. Building 991 encompasses 37,880 square feet on a first floor and basement. The four underground vaults have a total area of 20,940 square feet. The north half of Building 991 was used for shipping, receiving, final assembly, storage of classified material and SNM, laboratories, and housing of the PA alarm maintenance system. Offices occupy the south side of the building (DOE, 1994b).

Building 991 was the first production building to be completed at the Rocky Flats Plant and was constructed between 1951 and 1952. At that time the building was designated as the "D" Plant and was used for shipping and receiving, and for the final assembly of plutonium, enriched uranium, and depleted uranium components received from onsite fabrication operations. In addition, components from Oak Ridge and Hanford were assembled into final products (ChemRisk, 1992). Building 991 also served to house Rocky Flats Plant administrative functions until Building 111 was completed. During 1957, when new weapon design began, final pit assembly took place in newly constructed Building 777. It is believed that assembly of the older uranium based weapon continued in Building 991 until 1960. However, after 1957, the mission of Building 991 increasingly became one of a shipping, receiving, and storage facility. As of 1994, this building had the only shipping/receiving dock at the plant capable of handling offsite shipments of SNM and classified materials (DOE, 1994b).

The current contamination status and ultimate disposition of the tunnels and vaults associated with Building 991 is not known at this time. It is known that radioactive waste has historically been stored in the vaults, and that the vaults have been characterized (or reported) as generally free of radioactive contamination with the exception of Building 996, which exhibits slight uranium contamination. Currently, the thinking is that the vaults and tunnels will either be filled with bentonite or grout, or imploded and filled with demolition debris (personal communication with Vern Guthrie, February 2001).

Well installation and groundwater sampling activities that took place at this building during 2001 include the installation of Upgradient Monitoring Wells 99101 and 99201 and Downgradient Monitoring Wells 99301 and 99401. Only Monitoring Well 99301 could be fully developed during 2001. The SAP specified a D&D sampling location for the foundation drain for Building 991 (FD-991-1) as a manhole approximately 35 feet south of the northeast corner of the building. The exact location of this manhole could not be identified and therefore it was not sampled; this D&D sampling location has been removed from the IMP. Figure 5-12 presents the building location as well as the locations of the D&D Monitoring Wells.

Based on the research performed in support of the Building 991 D&D SAP, the contaminants of interest associated with Building 991 are uranium isotopes and various chlorinated solvents. The D&D analytical suite for Building 991 consists of VOCs, metals, uranium isotopes, Pu/Am, nitrate, and TPH. Table 5-12 presents a summary of Building 991 D&D groundwater monitoring data collected through CY 2001. Until a baseline is established for Building 991, analytes will be discussed in terms of concentrations relative to Tier I and Tier II groundwater action levels.

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Only well 99301 had a relatively full sample suite (VOCs, metals, uranium isotopes, Pu/Am, nitrate, and TDS; all of the SAP specified analytes except TPH) in the 4th quarter of 2001. Monitoring Well 99101 was dry; Monitoring Wells 99201 and 99401 were in the process of being developed and were not able to be sampled during the 4th quarter 2001. Results of analyses performed on samples from well 99301 during the 4th quarter of 2001 exhibit concentrations of U-233/234, U-238, TCE, and selenium that are above the Tier II action levels for those analytes. The limited results from the 4th quarter of 2001 indicate that uranium isotopes and TCE may be the contaminants of interest at Building 991.

Table 5-12 Historical Building 991 D&D Groundwater Monitoring Data

Well	Location	Dates	Metals (µg/L)	Nitrate (mg/L)	U-isotopes (pCi/L)	PCE (µg/L)	TCE (µg/L)	Pu/Am (pCi/L)
99101	Upgradient	12/01	Dry	Dry	Dry	Dry	Dry	Dry
99201	Upgradient	12/01	NS	NS	NS	NS	NS	NS
99301	Downgradient	12/01	Beryllium U Selenium **164**	0.23	U-233/234 ***21.4*** U-238 **16.2**	1.8	**55**	Pu 0.0123 Am 0.0445
99401	Downgradient	12/01	NS	NS	NS	NS	NS	NS

Notes: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, U = non detect, (B) = Analyte detected in the Method Blank, NA = not analyzed, INSW = Insufficient water available for sample collection, * = all historical results are U, NS = not sampled

5.13 Building 559

A Sampling and Analysis Plan for the D&D groundwater monitoring of Building 559 (RMRS, 2001d) was prepared early in CY 2001 and submitted to the CDPHE and EPA in April 2001. Comments were received from the Agencies in May 2001 and DOE responses to Agency comments were submitted in late May 2001. The Final SAP for this building was submitted to the Agencies in July 2001. Well installation activities for this building took place during the fall of 2001 and the first round of groundwater samples were collected during the 4th quarter of 2001. Building 559 is scheduled for demolition in mid to late FY 2005. This should allow adequate time for construction of a chemical baseline for the D&D monitoring wells.

Building 559 is located approximately 190 feet west of Building 707 and 175 feet southwest of Building 776/777. Building 559 was placed into service in 1968. The building contains laboratory facilities used to perform analyses of samples from production processes and products from all areas of the Rocky Flats Plant. Specific analytical techniques include mass spectrometry, residual gas analysis, gas chromatography, thermal analysis, x-ray fluorescence, infrared analysis, emissions spectroscopy, isotopic analysis, gamma ray spectroscopy, plutonium assay, carbon analysis, gallium analysis, uranium analysis, titration, specific ion electrode analysis, and Raschig ring analysis (DOE, 1992a). Analytical procedures performed on a non-routine basis include ion chromatography, plutonium oxide analysis, and iron and silicon analysis in plutonium metal (DOE, 1992a). Miscellaneous analyses, sample receiving and cutting, maintenance, utilities, and custodial operations are also conducted in the building. Building 561, located immediately south of Building 559, houses all of the ventilation and air filtering systems associated with Building 559.

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ChemRisk (1992) provides the following description of Building 559. The Building 559 Laboratory (the Plutonium Analytical Laboratory) was one of the four original service laboratories at Rocky Flats. The laboratory conducted analyses to determine the purity of plutonium, what the impurities were and in what concentrations; and the concentrations of plutonium alloys, whether in metal, liquid, or oxide form. The laboratory also analyzed gases and organics. The primary purpose of the laboratory was to sample incoming plutonium site returns and feed material, and that which was recovered and/or purified and cast at the Rocky Flats Plant site for the production of weapons.

Well installation and groundwater sampling activities that took place at Building 559 during 2001 include the installation, development, and sampling of Upgradient D&D Wells 56201 and 56301; the installation, development, and sampling of Downgradient D&D Well 56901; and the installation of Downgradient D&D Wells 56001 and 56101. Monitoring Well 56001 could not be fully developed during the 4th quarter of 2001; Monitoring Well 56101 was dry during the 4th quarter of 2001. Figure 5-13 presents the building location and the locations of the D&D monitoring wells.

Based on the research performed in support of the Building 559 D&D SAP, the contaminants of interest associated with Building 559 are plutonium and chloroform. The D&D analytical suite for Building 559 consists of VOCs, metals, uranium isotopes, Pu/Am, nitrate, and PCBs. Table 5-13 presents a summary of Building 559 D&D groundwater monitoring data collected through CY 2001. Until a baseline is established for Building 559, analytes will be discussed in terms of concentrations relative to Tier I and Tier II groundwater action levels.

Three of the new D&D Monitoring Wells (55901, 56201, and 56301) produced full sample suites in the 4th quarter of 2001. The results of limited sampling completed to date at Building 559 indicate that plutonium and chloroform may not, as suggested in the SAP, be the contaminants of interest at Building 559. Chloroform was detected at each location that samples were collected, but at concentrations well below the Tier II action level. Plutonium was not detected at Wells 56201 and 55901, and detected at low concentrations at the other locations that samples were collected. Beryllium was not detected at any locations. VOCs including carbon tetrachloride; 1,1-DCE; and TCE were detected at concentrations greater than their Tier II action levels. PCE was also detected at all locations at concentrations greater than the Tier II action level, except well 56201. Uranium isotopes U-233/234 and U-238 were detected at concentrations above the Tier II action level in upgradient well 56301.

Table 5-13 Historical Building 559 D&D Groundwater Monitoring Data

Well	Location	Dates	Nitrate (mg/L)	Pu/Am (pCi/L)	U-isotopes (pCi/L)	VOCs (µg/L)
56201	Upgradient	12/01	3.7	Pu U Am 0.0237	U-233/234 0.334 U-238 0.152	Chloroform 9.6 1,1-DCE **8.2** CCl_4 **37** PCE 3.6 TCE **20**
56301	Upgradient	12/01	2	Pu 0.0361 Am 0.00668	U-233/234 **2.37** U-238 **1.43**	Chloroform 23 1,1-DCE **21** CCl_4 **44** PCE **9.7** TCE **16**

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Well	Location	Dates	Nitrate (mg/L)	Pu/Am (pCi/L)	U-isotopes (pCi/L)	VOCs (µg/L)
55901	Downgradient	12/01	5.8	Pu U Am 0.0211	U-233/234 0.446 U-238 0.454	Chloroform 24 1,1-DCE **13** CCl_4 **49** PCE **5.5** TCE **14**
56001	Downgradient	12/01	NS	NS	NS	NS
56101	Downgradient	12/01	Dry	Dry	Dry	Dry
FD-559-561	Not applicable	12/01	3.8	Pu 0.00927 Am 0.0205	U-233/234 **1.35** U-238 0.628	Chloroform 5.5 1,1-DCE **14** CCl_4 **100** PCE **5.5** TCE **270**

Notes: Concentrations greater than Tier II shown in Bold, Concentrations greater than Tier I shown in Italicized Bold, U = non detect, (B) = Analyte detected in the Method Blank, NA = not analyzed, INSW = Insufficient water available for sample collection, CCl_4 = carbon tetrachloride, NS = not sampled

Figure 5-1a

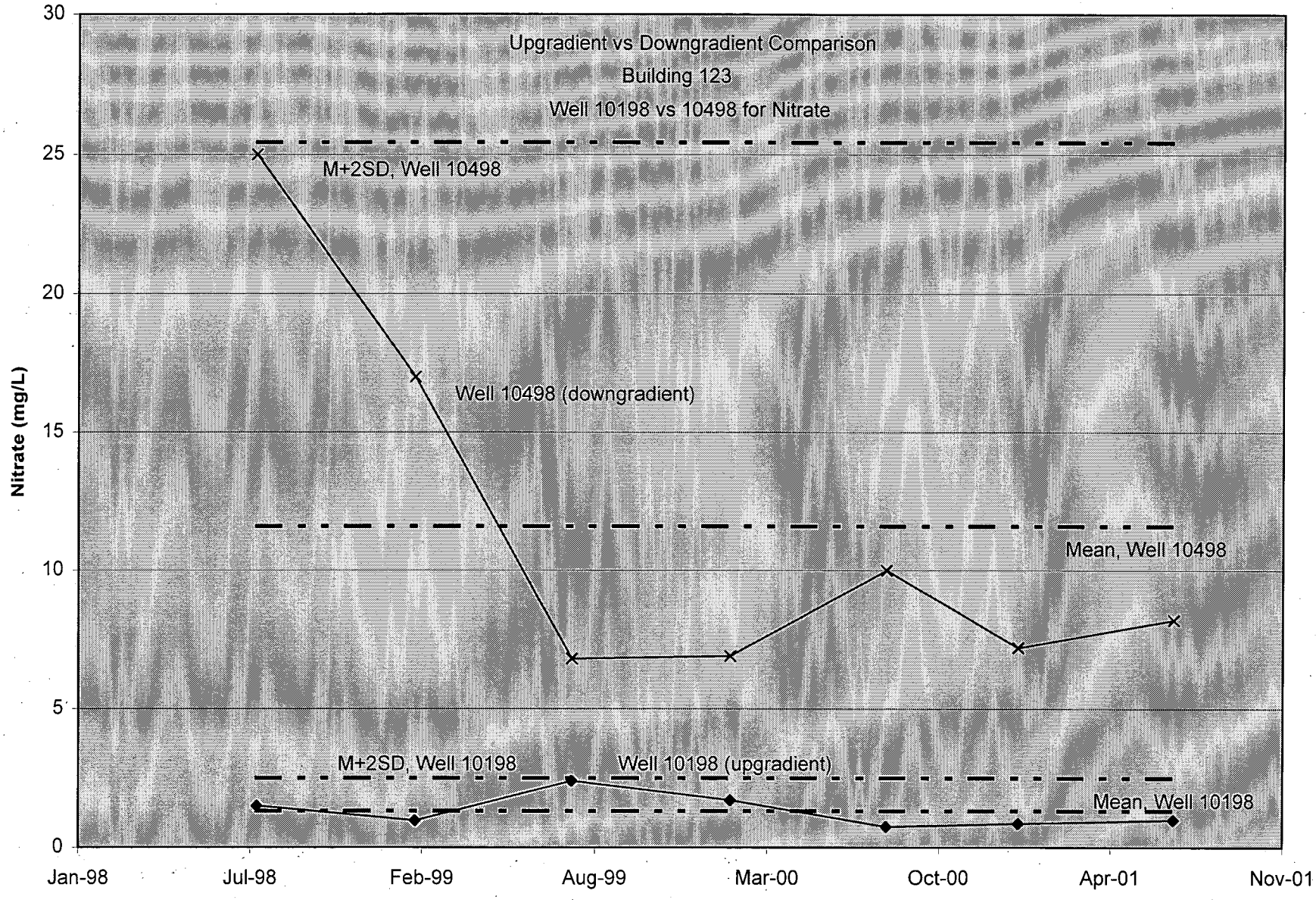
Upgradient vs Downgradient Comparison
Building 123
Well 10198 vs 10498 for Nitrate
M+2SD, Well 10498
Well 10498 (downgradient)
Mean, Well 10498
M+2SD, Well 10198
Well 10198 (upgradient)
Mean, Well 10198
Nitrate (mg/L)
30
25
20
15
10
5
0
Jan-98
Jul-98
Feb-99
Aug-99
Mar-00
Oct-00
Apr-01
Nov-01

Figure 5-1b

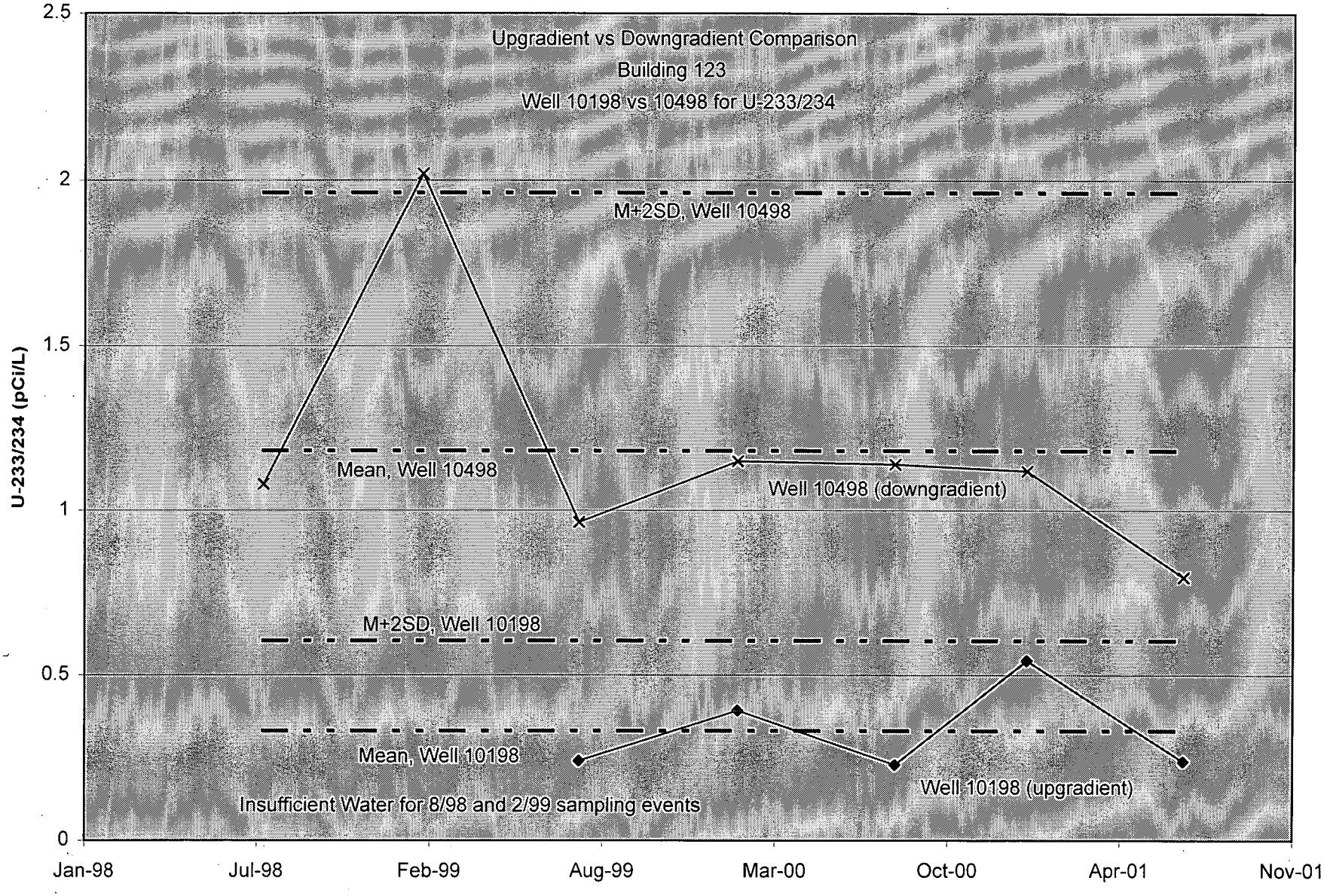
Upgradient vs Downgradient Comparison
Building 123
Well 10198 vs 10498 for U-233/234
U-233/234 (pCi/L)
2.5
2
1.5
1
0.5
0
M+2SD, Well 10498
Mean, Well 10498
Well 10498 (downgradient)
M+2SD, Well 10198
Mean, Well 10198
Well 10198 (upgradient)
Insufficient Water for 8/98 and 2/99 sampling events
Jan-98
Jul-98
Feb-99
Aug-99
Mar-00
Oct-00
Apr-01
Nov-01

Figure 5-1c

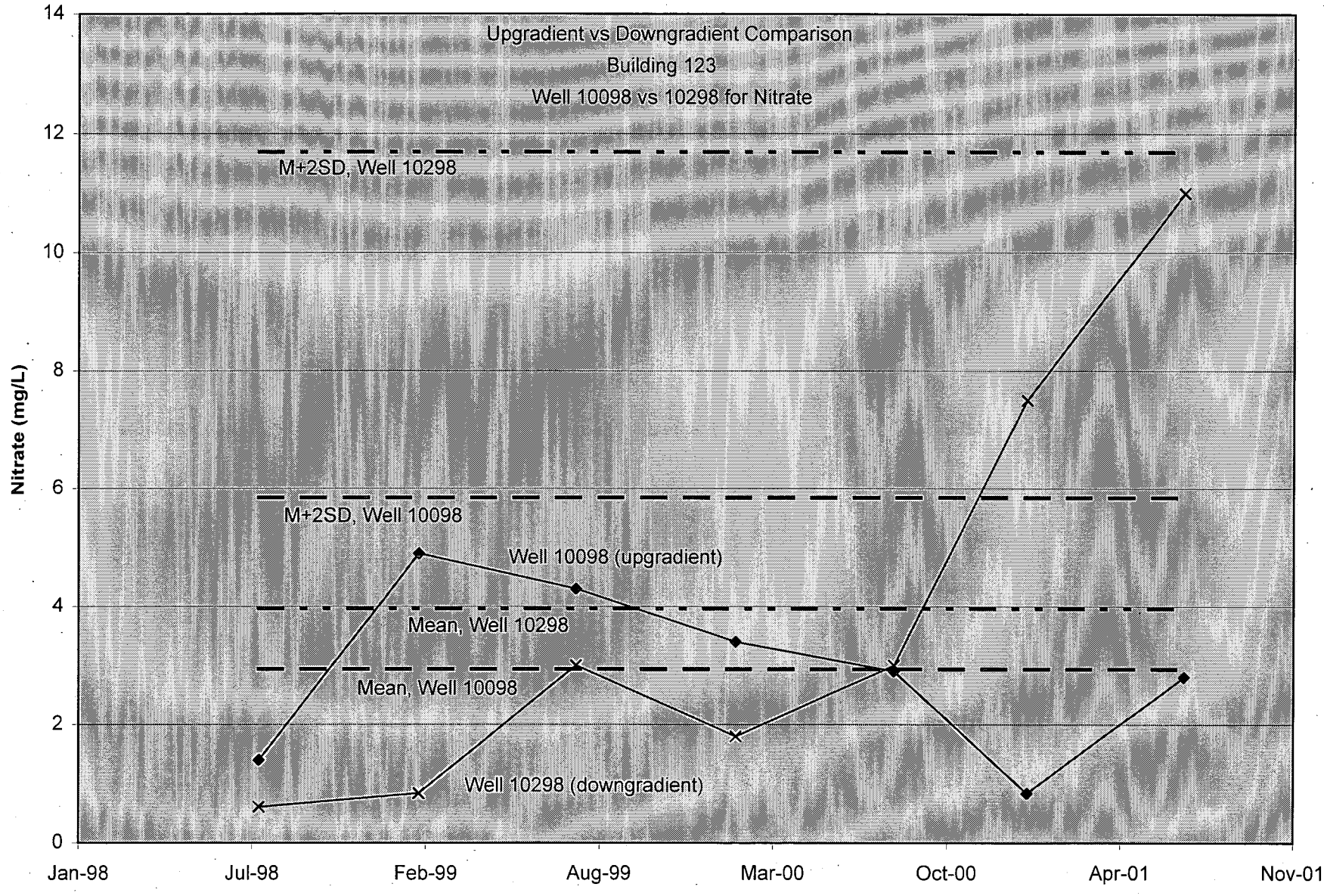

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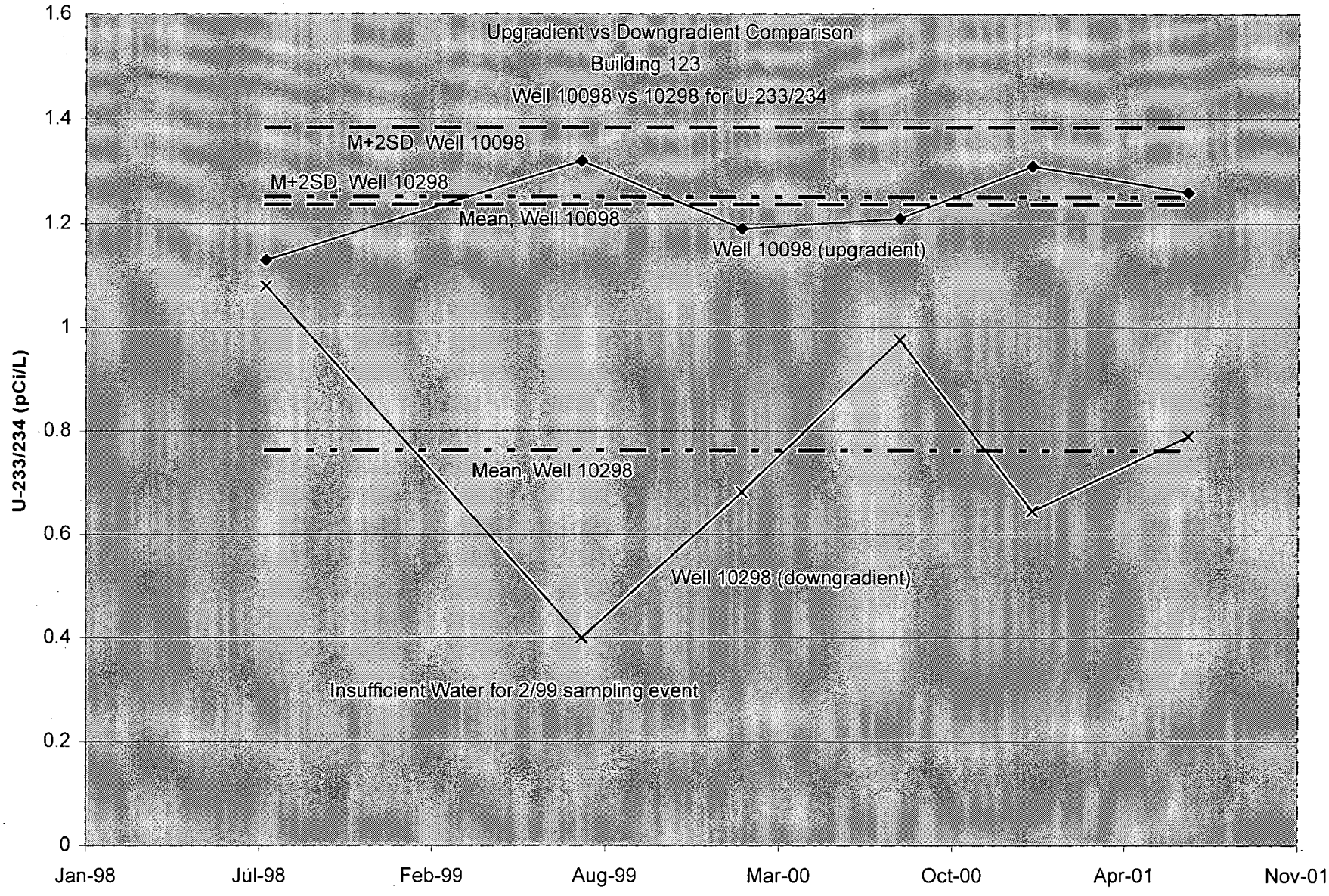
Figure 5-1d



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6.0 PRESENT SANITARY LANDFILL – 2001 UPDATE

This section presents the CY 2001 groundwater quality data for the Present Sanitary Landfill (Landfill), previously known as OU 7, which is located in the Buffer Zone north of the IA. Throughout 2001, groundwater monitoring was conducted in accordance with the requirements of the RFCA (RFCA, 1996) as set forth in the IMP (K-H, 2000a). The Present Sanitary Landfill occupies approximately 44 acres (including the Landfill and East Landfill Pond) at the western end of the No Name Gulch drainage (Figure 6-1). It utilizes a surface and subsurface water intercept and diversion system to route surface run-on and upgradient groundwater around the facility, and a leachate collection and treatment system to improve the water quality of leachate exiting the toe of the Landfill near the west end of the East Landfill Pond. The Landfill served as a former solid waste disposal facility for RFETS and is currently scheduled for cover and final closure beginning in March 2003 with completion estimated to occur in late 2003.

6.1 Operating History of the Present Sanitary Landfill

The Present Sanitary Landfill began operating in August 1968 for the disposal of Rocky Flats sanitary waste. However, records indicate that, prior to 1986, some hazardous waste was disposed of at the Landfill. Therefore, in 1986, the Landfill was classified as an RCRA-regulated unit and disposal of hazardous constituents in the Landfill was halted. The Landfill remained in operation, accepting only sanitary waste until March 1998. At that time the Landfill was placed in contingent operational status because it was nearing capacity and was seeded to stabilize soils and control erosion. Currently, all RFETS sanitary waste is transferred to an offsite Subtitle D sanitary waste landfill for disposal. The following paragraphs provide a brief summary of historical Present Sanitary Landfill operations.

In September 1973, tritium was detected in leachate draining from the Landfill. In response to this detection, a sampling program was initiated to determine the location of the tritium source. In addition, monitoring of waste prior to burial was initiated to prevent further disposal of radioactive material, and interim-response measures were undertaken to control the generation and migration of Landfill leachate. Interim-response measures included the construction of two ponds (the East and West Landfill Ponds) immediately east of the Landfill, and the installation of a subsurface leachate-collection system and subsurface intercept system for diverting groundwater around the Landfill. Ditches were also constructed to control surface water. Groundwater diverted from the Landfill by the intercept system is directed eastward around waste materials and discharges either to the East Landfill Pond or east of the East Landfill Pond dam at surface water monitoring locations SW099 and SW100.

Between 1977 and 1981, the leachate-collection trench was buried beneath waste during Landfill expansion (DOE, 1996c). The west embankment and West Landfill Pond were removed in 1981, and two slurry walls were constructed, extending from the ends of the north and south groundwater-interceptor ditches. These slurry walls, ranging in depth from 10 to 25 feet, were reportedly keyed into bedrock.

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In 1995, a gravity flow treatment system was constructed to collect contaminated groundwater and leachate flowing from the eastern end of the Present Sanitary Landfill. The Passive Seep Interception and Treatment System (PSITS) became operational in early 1996 and was designed to treat Landfill leachate to eliminate F039-listed wastes prior to discharge into the East Landfill Pond.

The Annual RCRA Groundwater Monitoring Reports for RFETS (DOE, 1990; 1991a, 1992d, 1993c, 1994c, 1995, and 1996a) describe chemical and physical aspects of groundwater for 1989 through 1995 at the Present Sanitary Landfill. The *Phase I RCRA Facility Investigation/Remedial Investigation Work Plan for Operable Unit 7: Present Sanitary Landfill* (DOE, 1991b) presents additional information regarding construction, operation, regulatory history, and site characterization. Subsequent groundwater monitoring activities conducted under the RFCA during calendar years 1996, 1997, 1998, and 1999 are presented in annual Present Sanitary Landfill Groundwater Monitoring Reports (DOE, 1997b; 1998a, 1999, and 2000).

A closure plan for the Present Sanitary Landfill was developed in the IM/IRA decision document (DOE, 1996b), in accordance with the RFCA and applicable Colorado hazardous-waste regulations. Post-closure groundwater monitoring of the Landfill will be performed in accordance with the requirements of the IMP.

6.2 Summary of Previous Investigations

In 1992, groundwater from surficial deposits within and around the Present Sanitary Landfill had concentrations of major anions, total dissolved solids (TDS), dissolved metals, and radionuclides that were elevated relative to mean background concentrations/activities. Some VOCs were also detected. The infrequent occurrence of VOCs in UHSU bedrock indicated that, at that time, the Landfill had not adversely impacted groundwater in UHSU bedrock, even though some contamination of groundwater had occurred in surficial materials overlying the bedrock.

In 1993, the groundwater chemistry at the Present Sanitary Landfill was generally consistent with conditions of 1992 (DOE, 1994c). The 1993 statistical comparisons of upgradient versus downgradient UHSU groundwater at the Landfill indicated statistically significant increases in downgradient concentrations of dissolved metals and major anions. Neither radionuclides nor VOCs showed a statistically significant difference in upgradient versus downgradient activities or concentrations, respectively.

Analysis of 1994 data by ANOVA indicated statistically significant differences in upgradient versus downgradient groundwater quality in the UHSU for radionuclides, dissolved metals, anions, and TDS (DOE, 1995). In the UHSU bedrock, there were statistically significant differences in upgradient versus downgradient groundwater quality for dissolved metals, anions, and TDS. For 1995 data, statistical comparisons of upgradient versus downgradient UHSU groundwater at the Landfill indicated statistically significant increases in levels of dissolved metals, uranium isotopes, anions, and TDS. Activities of total americium-241, plutonium-239/240, and tritium did not show statistically significant differences between upgradient and downgradient UHSU groundwater.

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Analysis of the 1996 data tended to confirm the results of previous sampling (DOE, 1997f). Detected analytes and concentration ranges during 1996 were generally consistent with corresponding data from prior years. Nitrate and tritium were evaluated using ANOVA techniques and were determined to be statistically similar in upgradient versus downgradient samples. As in prior investigations, there was no indication of VOC contamination in downgradient wells. For 1997, statistical analyses of groundwater data indicated that the trends of potential contaminants detected in the downgradient wells did not appear to be increasing with time, resulting in no reportable exceedances for 1997 (DOE, 1998b).

Results of hydrogeologic investigations of the Present Sanitary Landfill suggest that the groundwater-intercept system may not completely isolate the Landfill from the surrounding groundwater. Hydraulic assessments for specific areas on the north, west, and south sides of the groundwater-intercept system indicate that groundwater may flow into the Landfill on the north side where the leachate collection system may not have been completely keyed into bedrock (DOE, 1996b). In addition, previous reports indicate that the leachate collection trench was buried beneath waste during Landfill expansion (DOE, 1996b). Therefore, the clay cutoff wall no longer extends to the surface of the Landfill; this would allow groundwater to flow across the clay cutoff wall if the water table were to rise sufficiently. Landfill wastes do not extend to the surface-water interceptor ditch.

6.3 Current Groundwater Monitoring Program

The Present Sanitary Landfill at RFETS currently operates under CDPHE and EPA guidelines for solid waste disposal sites and facilities. The current groundwater-monitoring program was instituted in accordance with the RFCA, as further defined for RCRA units in the IMP. RCRA groundwater monitoring is conducted to detect potential releases of contamination beyond an established point of compliance based on comparisons of upgradient to downgradient groundwater quality. Under the IMP, if significant impacts to groundwater quality are detected in downgradient RCRA wells and contaminant concentrations are observed to increase with time, then the results are reported to EPA and CDPHE and an investigation into possible causes is initiated. Special attention is given to groundwater contaminants listed in the ALF for Surface Water, Groundwater, and Soils document, Attachment 5 (RFCA, 1996), which if exceeded trigger an evaluation, remedial action, and/or management action. Non-ALF constituents, such as the major cation metals sodium, potassium, calcium, and magnesium, are not reportable under RFCA, and therefore not emphasized in this report. Figure 6-1 illustrates the location of existing and abandoned monitoring wells in relationship to relevant surface and subsurface features at the Landfill.

Changes to the Site groundwater monitoring program implemented in 2001 are outlined in the IMP (K-H, 2001a). This Plan specifies the monitoring and reporting requirements for the Present Sanitary Landfill, including well identification, sampling frequency, analytical requirements, and reporting.

For the CY 2001 reporting period, Upgradient Wells 5887, 70193, 70393, and 70493, and Downgradient Wells 4087, 52894, 52994, and B206989 were sampled on a quarterly basis to determine compliance with RFCA, as set forth in the IMP. Table 6-1 summarizes sampling activities and shows the hydrostratigraphic unit monitored and

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material screened for these wells. The limited number and position of these wells makes it infeasible to construct potentiometric surface maps and concentration isopleth maps, thus current and future reports will only assess impacts to or from the landfill at the upgradient and downgradient landfill boundaries.

Table 6-1 Well Completion Information and CY 2001 Sampling Summary for Present Sanitary Landfill Wells

Well	Hydro-Stratigraphic Unit	Screened Material	Quarterly Sampling Summary			
			Q1	Q2	Q3	Q4
Upgradient Wells						
5887	UPPER	ALLUVIUM	V,W,N,M,T,U	V,W,N,M,T,U	V,W,N,M,T,U	V,W,N,M,T,U
70193	UPPER	BEDROCK	V,W,N,M,T,U	V,W,N,M,T,U	V,W,N,M,T,U	V,W,N,M,T,U
70393	UPPER	ALLUVIUM	V,W,N,M,T,U	V,W,N,M,T,U	V,W,N,M,T,U	V,W,N,M,T,U
70493	UPPER	BEDROCK	V,W,N,M,T,U	V,W,N,M,T,U	V,W,N,M,T,U	V,W,N,M,T,U
Downgradient Wells						
4087	UPPER	ALLUVIUM	V,W,N,M,T,U	V,W,N,M,T,U	V,N,M,T,U	Dry
52894	UPPER	ALLUVIUM	Dry	Dry	V,W,N,M,T,U	Dry
52994	UPPER	BEDROCK	V	V	V	V
B206989	UPPER	BEDROCK	V,N,M,T	V	V,W,N,M,T,U	V,W,N,M.T,U

Notes: V=Volatile organic compounds, W=Water quality parameters, N=Nitrate/nitrite, M=Metals, T=Tritium, U=Uranium isotopes

Groundwater elevations for active wells were measured quarterly as directed in the IMP. Quarterly groundwater samples were analyzed for radionuclides (tritium [liquid scintillation counting] and uranium isotopes [alpha spectroscopy]), VOCs (EPA 524.2), metals (CLP-SOW), and major anions (TDS [EPA 160.1], sulfate [SW846], fluoride [EPA 300.0], and nitrate/nitrite [EPA 353.1]), in accordance with Appendix E-2 of the IMP. The absence of complete analyte suites in most quarters for the downgradient wells listed in Table 6-1 is caused by sample volume limitations (see dry and lacked water [LW] codes in Figures 6-2 through 6-5) imposed by slow recharge and/or thin saturation conditions. The alluvium and weathered bedrock at these localities are frequently dry or thinly saturated because the dam for the East Landfill Pond acts as a barrier to alluvial groundwater flow from the west. In addition, ET through valley bottom vegetation consumes much of the available shallow groundwater in the No Name Gulch drainage during the summer months. For these reasons, it is normally not possible to collect complete sample sets for each quarterly sampling period during the year.

Some historical potential contaminants-of-concern (PCOCs), such as semivolatile organic compounds (SVOCs), were not included in the sampling program as a result of PCOC screening conducted during the IMP DQO process and acceptance of the plan by EPA and CDPHE. Table 6-2 lists the constituents monitored for in wells within and near the Present Sanitary Landfill. The records of analyses and evaluations are currently maintained in compliance with Code of Colorado Regulations *6 CCR 1007-2*.

Table 6-2 Chemical and Radiological Constituents Monitored at the Present Sanitary Landfill

Volatile Organic Compounds	Volatile Organic Compounds	Metals
1,1,1,2-Tetrachloroethane	Cis-1,2-Dichloroethene	Cadmium
1,1,1-Trichloroethane	Cis-1,3-Dichloropropene	Calcium
1,1,2,2-Tetrachloroethane	Dibromochloromethane	Chromium
1,1,2-Trichloroethane	Dibromomethane	Cobalt
1,1-Dichloroethane	Dichlorodifluoromethane	Copper
1,1-Dichloroethene	Ethylbenzene	Iron
1,1-Dichloropropene	Hexachlorobutadiene	Lead
1,2,3-Trichlorobenzene	Isopropylbenzene	Lithium
1,2,3-Trichloropropane	Methylene Chloride	Magnesium
1,2,4-Trichlorobenzene	Naphthalene	Manganese
1,2,4-Trimethylbenzene	n-Butylbenzene	Mercury
1,2-Dibromo-3-chloropropane	n-Propylbenzene	Molybdenum
1,2-Dibromoethane	o-Chlorotoluene	Nickel
1,2-Dichlorobenzene	p-Chlorotoluene	Potassium
1,2-Dichloroethane	4-Isopropyltoluene	Selenium
1,2-Dichloropropane	sec-Butylbenzene	Silver
1,3,5-Trimethylbenzene	Styrene	Sodium
1,3-Dichlorobenzene	tert-Butylbenzene	Strontium
1,3-Dichloropropane	Tetrachloroethene	Thallium
1,4-Dichlorobenzene	Toluene	Tin
Bromobenzene	Trans-1,3-Dichloropropene	**Water Quality Parameters**
Bromochloromethane	Trichloroethene	Fluoride
Bromodichloromethane	Trichlorofluoromethane	Nitrate/Nitrite
Bromoform	Vinyl Chloride	Sulfate
Bromomethane	**Metals**	Total Dissolved Solids
Carbon Tetrachloride	Aluminum	**Radionuclides**
Chlorobenzene	Antimony	Tritium
Chloroethane	Arsenic	Uranium-233/234
Chloroform	Barium	Uranium-235
Chloromethane	Beryllium	Uranium-238

6.4 Physical Characteristics of the Groundwater System

6.4.1 Description of the "Uppermost Aquifer"

The "uppermost aquifer" is equivalent to the UHSU as described in Section 1.0 and in previous RFETS reports (EG&G, 1995a; 1995b, and 1995c). At most of RFETS, including the area of the Present Sanitary Landfill, the UHSU is composed of unconsolidated surficial deposits and weathered bedrock. The unconsolidated deposits consist of Qrf, Qc, Qvf, and artificial fill. The Qrf and artificial fill (landfilled wastes and soil-cover materials) are present upgradient of and within the Landfill; Qc and Qvf are present downgradient of the Landfill. Weathered claystones and weathered sandstones (where present) that are in direct hydraulic communication with the overlying surficial deposits are also considered part of the "uppermost aquifer". The weathered claystones are generally more permeable than unweathered bedrock. Unweathered claystones are not considered as part of the uppermost aquifer, rather they are included as part of the LHSU. Bedrock wells were assigned to a hydrostratigraphic unit based on

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geochemical data from the well, hydraulic conductivity measurements (where available), and geological information from borehole logs.

The Qrf is 25 to 30 feet thick on the northwest, west, and southwest sides of the Landfill, and 10 to 15 feet thick on the divides north and south of the East Landfill Pond. Qc is 1 to 5 feet thick on the slopes around the East Landfill Pond and below the dam. The Qvf ranges in thickness from 3 to 8 feet in the Landfill area and becomes thicker downstream (to the east). The thickness of artificial fill increases from about 5 feet at the perimeter of the Landfill to about 45 feet near the centerline of the valley (DOE, 1996c). Weathered bedrock thickness varies considerably in the vicinity of the Landfill, ranging from approximately 4 to 35 feet, as indicated by weathered bedrock isopach mapping of the area (EG&G, 1995a).

In the past, the average depth to groundwater ranged from 5 to 15 feet in surficial deposits, excluding artificial fill (EG&G, 1995b). Within the Landfill, groundwater was found at approximately 20 feet at the western end, 16 feet in the middle, and 33 feet at the eastern end (DOE, 1996c). The depth to groundwater in weathered bedrock is generally greater than in the overlying surficial deposits because of steep downward vertical gradients in bedrock materials. The saturated thickness of UHSU deposits varies widely across the Landfill, with the thickest sections found in the Qrf at the western end. The thinnest saturated sections are found in Qc and Qvf deposits east of the East Landfill Pond and in the Qrf along the south divide. EG&G (1995b) reported saturated thickness ranging from 0 to 20 feet for surficial deposits at the Landfill.

Geometric mean hydraulic conductivities, calculated from field tests of the different geologic units, are given in Section 6.4.4.

6.4.2 Potentiometric Surface

Groundwater is present in surficial deposits and artificial fill, and in bedrock sandstones and claystones in the area of the Present Sanitary Landfill. Groundwater flow patterns in the UHSU tend to mimic the surface topography. Within Landfill wastes, groundwater flows toward the center of the Landfill, then flows eastward toward the East Landfill Pond. Outside the Landfill, groundwater generally flows eastward within saturated UHSU surficial deposits, except near stream valleys, which disrupt UHSU flow patterns and function as drains for UHSU groundwater. For example, near the East Landfill Pond, groundwater flows from the north, west, and south toward the pond because of its topographically low position in the No Name Gulch drainage. Groundwater entering the pond mixes with surface water and is discharged by evaporation or is pumped to Pond A-3. To a limited extent, pond waters percolate downward into underlying bedrock materials or laterally through the dam. Any groundwater seepage past the dam into the lower drainage would flow eastward along the stream course until discharged via ET, surface water, or as lateral subsurface flow at the east RFETS boundary.

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Groundwater elevations in monitoring wells are measured at least quarterly. Water levels in the surficial deposits of the UHSU are characterized by seasonal variations of as much as 10 feet. The water table elevation is generally lowest in late winter and early spring, prior to recharge by snowmelt, and highest during June and July. Groundwater elevations in the weathered bedrock of the UHSU typically show seasonal variations of as much as 15 feet.

6.4.3 Vertical Hydraulic Gradients

The vertical hydraulic gradient is the ratio of the differences in water levels measured concurrently in two adjacent wells with different screened intervals, and the vertical distance between the two measuring points, which are specified here as the midpoint of each screened interval. Vertical hydraulic gradient calculations provide a means to evaluate whether groundwater flow has a potential for movement either downward or upward through geologic media.

Most of the Present Sanitary Landfill Well Pairs have been abandoned or deactivated in recent years in preparation for landfill closure. Consequently, current water level data are unavailable for calculation of vertical gradients. The results of historical vertical hydraulic gradient calculations at eight Landfill Monitoring Well Pairs (70093/70193, 70193/70293, 70493/70593, 70693/70893, 72393/72093, 1086/0986, 0786/0886, and B206989/B207089) monitored through 1995 (DOE, 1996a) provide information relevant to understanding groundwater conditions at the Landfill. The calculated vertical hydraulic gradients for all Well Pairs, except 72393/72093, indicate a downward (recharging) component of flow, with values ranging from 0.022 to 1.099 ft/ft. The significance of downward gradients at Well Pairs 0786/0886 and B206989/B207089, located near the bottom of No Name Gulch, are, however, potentially invalid considering that the water levels in the bedrock wells at these locations recharge slowly and never fully recover between sampling episodes. At well pair 72393/72093, situated within the center of the Landfill, groundwater had an upward (discharging) vertical gradient ranging from 0.020 to 0.026 ft/ft. Historical data from all Well Pairs indicate that vertical hydraulic gradients have generally remained constant over time. This condition may exist because disturbances to the Landfill hydrologic system have been minimal in recent years. In addition, groundwater flow within the deeper portions of the UHSU and in LHSU bedrock is relatively insensitive to fluctuations in seasonal water levels and other short-term transient effects because of the prevalent low permeability character of bedrock materials.

6.4.4 Average Linear Groundwater-Flow Velocities

The average linear groundwater flow velocity has historically been calculated for three flowpaths in UHSU surficial deposits and three flowpaths in UHSU bedrock in the vicinity of the Present Sanitary Landfill (DOE, 1996b). Most of the Well Pairs were deactivated in 1995 in preparation for Landfill closure. However, the variables used in calculating flow velocities (hydraulic conductivity, porosity, and hydraulic gradient) have effectively remained constant over time. Hence, the following discussion summarized from the 1995 RCRA Groundwater Monitoring report is considered indicative of current conditions in the Present Sanitary Landfill.

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Migration rates for conservative, dissolved constituents approximate the average linear groundwater flow velocity; however, attenuated, volatile, biodegradable, or redox-sensitive species can exhibit migration rates much lower than the average linear groundwater flow velocity. The values of hydraulic conductivity used for surficial deposits and bedrock of the UHSU are the geometric means of hydraulic-conductivity values for each unit at the Landfill, and include results of historic slug tests (DOE, 1994c). Values of hydraulic conductivity used for flow velocity calculations are 1.1×10^{-4} centimeters/second (cm/sec) for surficial deposits (including landfill wastes) and 5.3×10^{-7} cm/sec for UHSU bedrock materials. The assumed effective porosity for all units is 0.1 (DOE, 1991b).

Using these data, the calculated average linear groundwater flow velocities in fill materials range from approximately 1 foot per year at the west end of the Landfill to approximately 160 feet per year at the eastern face of the Landfill. Calculated average linear groundwater flow velocities in UHSU bedrock at the Landfill ranged from approximately 0.20 feet to 0.22 feet per year beneath the Landfill, to approximately 0.07 feet to 0.41 feet per year downgradient of the Landfill (DOE, 1996a). The calculated average linear groundwater flow velocities for UHSU bedrock in 1995 were similar to those reported in the *1994 Annual RCRA Groundwater Monitoring Report* (DOE, 1995).

6.5 Groundwater Quality at the Present Sanitary Landfill

The assessment of groundwater chemistry at the Present Sanitary Landfill includes an evaluation of the spatial distribution of groundwater constituents in and around the Landfill, and a statistical evaluation of the chemistry of downgradient groundwater with respect to upgradient groundwater, as specified in *6 CCR 1007-2* and the IMP. Statistical comparisons between downgradient and upgradient groundwater data were made using the methodology described in the *1995 Annual RCRA Groundwater Monitoring Report* (DOE, 1996a) and *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities* (EPA, 1992b).

Figures 6-2 through 6-5 depict the analytical results for each well in individual box-plots. To show as much data as possible without overcrowding, box-plots for VOCs and metals include only those analytes that were detected above the contract required detection limit (CRDL) in upgradient and downgradient wells. Analytes that were not detected during the entire sampling year have been omitted from the box plots. All data for radionuclides and water quality parameters are presented.

6.5.1 Spatial Distribution of Groundwater Constituents

6.5.1.1 Upgradient Wells

Currently, four wells (5887, 70193, 70393, and 70493) monitor groundwater chemistry in the UHSU immediately upgradient of the Present Sanitary Landfill. Wells 5887 and 70393 are completed in UHSU alluvial materials and wells 70193 and 70493 are completed in UHSU bedrock. All four wells yielded complete quarterly sample sets for a total of 16 upgradient samples per analyte.

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As shown in Figure 6-2, concentrations of the water quality parameters (fluoride, nitrate/nitrite, sulfate, and TDS) fall below background concentrations reported for these analytes in the *1993 Background Geochemical Characterization Report* (EG&G, 1993a). A similar situation exists for all of the metal and radionuclide analytes detected in these wells (see Figures 6-3 and 6-4, respectively). Except for the major cations (calcium, magnesium, sodium, potassium, and strontium), the concentrations of most metal analytes were undetected or were reported below the CRDL.

During 2001, alluvial Well 70393 yielded detections of seven chlorinated VOCs, including TCE (22.6 µg/L maximum), PCE (7 µg/L maximum), carbon tetrachloride (0.54 µg/L maximum); 1,1,1-TCA (19.4 µg/L maximum); 1,1-DCE (15.2 µg/L maximum), cis-1,2-DCE (0.1 µg/L maximum), and chloroform (0.26 µg/L maximum). Weathered Bedrock Well 70493, paired with Alluvial Well 70393, contained generally lower concentrations and less consistent detections of the types of VOCs found in the overlying alluvium. VOCs found in this well included TCE (1.3 µg/L maximum), PCE (0.2 µg/L maximum); 1,1,1-TCA (0.54 µg/L maximum); 1,1-DCE (0.3 µg/L maximum), and a single detection of methylene chloride (0.2 µg/L). Alluvial well 5887 contained only methylene chloride (0.32 µg/L maximum). Weathered Bedrock Well 70193 contained only PCE (0.1 µg/L maximum). These results are generally consistent with the results of previous monitoring (DOE, 1998), which determined that the PU&D Yard was the source of this contamination. Results for all other VOC constituents monitored in upgradient wells were below detection.

6.5.1.2 Downgradient Wells

Four wells located east of the East Landfill Pond embankment are used to monitor the chemistry of downgradient groundwater in the UHSU (Wells 4087, 52894, 52994, and B206989). Wells 52994 and B206989 monitor groundwater in the UHSU bedrock and Wells 4087 and 52894 monitor the quality of alluvial groundwater. All of the well locations are consistent with *6 CCR 1007-2*, which allows alternate placement of monitoring wells downgradient of an interim status facility where existing physical obstacles prevent installation of wells at the boundary.

In general, the sampling conditions experienced at downgradient well locations during 2001 were not characteristic of previous years, with groundwater availability limited by extremely dry conditions. Complete sample suites could only be collected from Wells 4087 (3 quarters collected; except for water quality parameters [WQPs] in 3rd quarter), 52894 (1 quarter collected), and B206989 (2 quarters collected). Despite repeated visits to the well to obtain additional sample aliquots, no samples besides VOCs could be collected from Well 52994 (4 quarters of VOCs). Dry well conditions were prevalent at all wells during the remaining quarters. The statistical significance of these data relative to upgradient groundwater quality will be evaluated in Section 6.5.2.

As shown in Figure 6-2, concentrations of some WQPs (fluoride, nitrate/nitrite, sulfate, and TDS) exceed the background concentrations of these analytes. Fluoride was above background concentrations in Wells 4087 (2 mg/L maximum) and 52894 (2.1 mg/L maximum). Nitrate/nitrate exceeded background levels in B206989 (60 mg/L

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maximum) along with sulfate (2800 mg/L maximum) and TDS (5200 mg/L). TDS was also above background in well 4087.

The majority of the metals were detected with a "U" or "B" qualifier, signifying that the concentration of these metals were low enough to occur below the instrument detection limit (IDL) or between the CRDL and IDL, respectively. These metals were also commonly reported at low concentrations in many upgradient samples. However, several metals were detected above background concentrations in two downgradient wells. Chromium (44.5 µg/L) and lithium (148 µg/L) were detected in well 4087; copper (16 µg/L), iron (390 µg/L), lithium (2140 µg/L), selenium (303 µg/L), and strontium (6470 µg/L maximum) were detected in B206989 (Figure 6-3). Although several metals, including molybdenum, nickel, and vanadium are not shown on Figure 6-3, statistical comparisons were performed for these analytes in upgradient and downgradient wells. These metals are not shown on Figure 6-3 because they are mostly "B" qualified data. Elevated concentrations of the non-hazardous metals sodium, potassium, calcium, and magnesium were also detected in downgradient wells. These metals have no ALF groundwater action levels and, consequently, are not shown in Figure 6-3.

Radionuclide analytes were all detected below background activities in downgradient monitoring wells (Figure 6-4). One VOC, methylene chloride, was detected in downgradient well 52894 at a very low concentration (0.93 µg/L) (Figure 6-5).

6.5.2 Statistical Evaluation of Groundwater Constituents

According to the IMP, the decision logic for RCRA designated wells requires the performance of a comparison of pooled upgradient groundwater sample means to individual downgradient well sample means in order to evaluate potential contaminant releases from the regulated unit into the "uppermost aquifer". This type of comparison is usually accomplished using statistical analysis procedures such as described in *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities* (EPA, 1992b). An assessment of the 1999 individual downgradient well data sets indicated that the number of sample analyses in all sets (maximum three samples) were insufficient for performing nonparametric analysis (minimum four samples) on an individual well basis. This situation was due to dry conditions in all of the downgradient wells for at least one sampling quarter. To provide adequate data for nonparametric statistical analysis, which applies to the majority of analytes based on normality testing results of the data sets, it was necessary to pool the 1999 downgradient well data for comparison to the upgradient data. Because of the lack of groundwater availability during 2001, this same approach to pooling downgradient well data had to be utilized.

Table 6-3 presents a sampling and detection summary for groundwater analytes that were detected at least once during 2001. Statistical comparisons were not performed for analytes with upgradient sample means that were equal to or greater than downgradient sample means; analytes with less than 10 percent quantifiable results; or analytes with less than four quantifiable results, as recommended by EPA guidance (EPA, 1992b) for nonparametric analysis. A sufficient number of samples were collected from upgradient and downgradient well groups to perform pooled

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statistical comparisons for all analytes with more than a 10 percent detection rate. VOCs were excluded from statistical analysis because it has been shown that upgradient Landfill groundwater is contaminated relative to downgradient Landfill groundwater (Figure 6-5) because of the PU&D Yard VOC plume. Data for antimony, arsenic, barium, beryllium, cobalt, lead, silver, thallium, tin, zinc, tritium, and fluoride met the sample volume criteria, but either less than four quantifiable results were present or the upgradient sample means were equal to or greater than downgradient means. Mercury was not detected in any upgradient or downgradient wells. Thus, these analytes were excluded from statistical evaluation. Conclusions concerning these analytes are described following the discussion of statistical comparisons.

For analytes with greater than 10 percent quantifiable results, parametric ANOVA or nonparametric Wilcoxon Rank-Sum testing was performed, depending on the percentage of non-detections present in the sample groups and sample distribution characteristics. All UHSU results (alluvial and bedrock) were grouped by analyte into upgradient and downgradient data sets to simplify analyses and provide adequate data to perform statistical testing. This approach is justifiable because all downgradient wells are closely located in a well defined, narrow drainage that defines the sole groundwater flowpath leading from the Landfill. Based on EPA guidance for statistical evaluations involving two data groups (EPA, 1992a), the Wilcoxon Rank-Sum test (also known as the Mann-Whitney U test) was selected to perform nonparametric comparisons in place of the Kruskall-Wallis test. The reader is referred to the EPA guidance document for further description of the statistical methods and parameters used in this section.

Table 6-3 Groundwater Sample Summary for Detected Analytes in Landfill Wells – CY2001

Parameter	Number of Samples		Number of Detections[1]		Percent Detections		Sample Mean	
	Up-Gradient	Down-Gradient	Up-Gradient	Down-Gradient	Up-Gradient	Down-Gradient	Up-Gradient	Down-Gradient
Water Quality (mg/L)								
Fluoride	16	5	16	3	100.0	60.0	0.404375	1.36
Nitrate/Nitrite, as N	16	7	16	7	100.0	100.0	3.275	17.93857
Sulfate	16	5	16	5	100.0	100.0	23.1	1211.24
Total Dissolved Solids	16	6	16	6	100.0	100.0	167	2216.333
Metals (µg/L)								
Aluminum	14	7	10	6	71.43%	85.71%	25.91	31.60
Antimony	15	7	2	4	13.33%	57.14%	.78	1.27
Arsenic	17	7	5	3	29.41%	42.86%	1.12	1.46
Barium	16	7	16	7	100.00%	100.00%	77.77	29.23
Beryllium	16	7	5	2	31.25%	28.57%	0.17	0.54
Cadmium	16	7	8	6	50.00%	85.71%	0.24	0.58
Calcium	16	7	16	7	100.00%	100.00%	24287.50	248371.43
Chromium	17	7	10	7	58.82%	100.00%	0.76	10.59
Cobalt	16	7	0	1	0.00%	14.29%	0.87	0.68
Copper	17	7	15	7	88.24%	100.00%	1.73	5.46
Iron	16	7	12	5	75.00%	71.43%	26.12	68.83
Lead	17	7	5	3	29.41%	42.86%	0.70	0.76
Lithium	16	7	15	7	93.75%	100.00%	8.00	693.57
Magnesium	16	7	16	7	100.00%	100.00%	5291.88	96285.71
Manganese	16	7	15	6	93.75%	85.71%	1.50	6.97
Mercury	13	6	0	0	0.00%	0.00%	0.05	0.05
Molybdenum	16	7	9	6	56.25%	85.71%	1.28	4.83

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Parameter	Number of Samples		Number of Detections[1]		Percent Detections		Sample Mean	
	Up-Gradient	Down-Gradient	Up-Gradient	Down-Gradient	Up-Gradient	Down-Gradient	Up-Gradient	Down-Gradient
Nickel	16	7	10	7	62.50%	100.00%	2.28	5.74
Potassium	16	7	14	7	87.50%	100.00%	984.06	7716.71
Selenium	17	7	14	7	82.35%	100.00%	4.18	126.99
Silver	15	7	4	1	26.67%	14.29%	0.44	0.24
Sodium	16	7	16	7	100.00%	100.00%	12931.25	421542.86
Strontium	16	7	16	7	100.00%	100.00%	158.56	3067.43
Thallium	15	7	3	4	20.00%	57.14%	1.27	1.54
Tin	16	7	1	1	6.25%	14.29%	1.88	2.54
Vanadium	16	7	10	4	62.50%	57.14%	1.06	1.24
Zinc	16	7	12	6	75.00%	85.71%	7.74	7.21
Radionuclides (pCi/L)								
Tritium	16	7	2	2	12.50%	28.57%	-211.44	-52.60
U-233/234	16	6	8	6	50.00%	100.00%	0.44	29.02
U-235	16	6	5	6	31.25%	100.00%	0.05	0.89
U-238	16	6	8	6	50.00%	100.00%	0.24	19.00
Volatile Organic Compounds (µg/L)								
1,1,1-Trichloroethane	16	7	8	0	50.00%	0.00%	N/D	N/D
1,1-Dichloroethene	16	7	6	0	37.50%	0.00%	N/D	N/D
Carbon Tetrachloride	16	7	3	0	18.75%	0.00%	N/D	N/D
Chloroform	16	7	2	0	12.50%	0.00%	N/D	N/D
Cis-1,2-Dichloroethene	16	7	1	0	6.25%	0.00%	N/D	N/D
Methylene Chloride	16	7	2	1	12.50%	14.29%	N/D	N/D
Tetrachloroethene	16	7	6	0	37.50%	0.00%	N/D	N/D
Trichloroethene	16	7	8	0	50.00%	0.00%	N/D	N/D

[1] - No corrections made for non-detects, N/D = Not determined for VOCs because most detections are estimated ("J" qualified) values

Downgradient groundwater quality monitored at Wells 4087, 52894, and B206989 indicates that concentrations of several WQPs and selected hazardous trace metals exceed concentrations reported for Upgradient Wells 5887, 70193, 70393, and 70493 (Figure 6-2 and 6-3). All other non-radioactive ALF groundwater constituents in downgradient groundwater, including VOCs, were detected at or below upgradient concentration levels.

Table 6-4 summarizes the results of statistical comparisons for the upgradient and downgradient data groups. Statistically significant differences (at the 1 percent significance level) in upgradient versus downgradient groundwater quality were found for sulfate, TDS, calcium, copper, lithium, magnesium, molybdenum, selenium, vanadium, U-233/234, U-235, and U-238. These results are similar to those reported in previous RCRA and Present Sanitary Landfill groundwater monitoring reports (see Section 6.2).

Table 6-4 Comparative Statistics for Groundwater Analytes with <90% Sample Non-Detections, Downgradient Sample Means Greater than Upgradient Sample Means, and More Than Four Quantifiable Results – CY 2001

Parameter	Shapiro-Wilk Normality Test				ANOVA		Wilcoxon Rank-Sum Test	
	W_x	$W_{Ln\,x}$	$W_{0.05}$	Distribution Type	p-value	Significant Difference	p-value	Significant Difference
Water Quality (mg/L)								
Nitrate/Nitrite (as N)	0.593	0.900	0.916	Non Parametric			0.6159	No
Sulfate	0.510	0.774	0.916	Non Parametric			**0.0011**	**Yes**
TDS	0.519	0.761	0.914	Non Parametric			**0.0011**	**Yes**
Metals (ug/L)								
Aluminum	0.286	0.781	0.914	Non Parametric			0.5135	No
Cadmium	N/A	N/A	N/A	Non Parametric			0.0704	No
Calcium	0.554	0.742	0.916	Non Parametric			**0.0002**	**Yes**
Chromium	N/A	N/A	N/A	Non Parametric			0.651	No
Copper	N/A	N/A	N/A	Non Parametric			**0.0072**	**Yes**
Iron	N/A	N/A	N/A	Non Parametric			0.792	No
Lithium	0.549	0.830	0.916	Non Parametric			**0.0009**	**Yes**
Magnesium	0.549	0.766	0.916	Non Parametric			**0.0002**	**Yes**
Manganese	N/A	N/A	N/A	Non Parametric			0.2585	No
Molybdenum	N/A	N/A	N/A	Non Parametric			**0.0046**	**Yes**
Nickel	N/A	N/A	N/A	Non Parametric			0.028	No
Potassium	0.549	0.815	0.916	Non Parametric			0.0169	No
Selenium	N/A	N/A	N/A	Non Parametric			**0.0085**	**Yes**
Sodium	0.634	0.763	0.916	Non Parametric			**0**	**Yes**
Strontium	0.536	0.778	0.916	Non Parametric			0.094	No
Vanadium	0.678	0.928	0.916	Lognormal			**0.0088**	**Yes**
Radionuclides (pCi/L)								
U-233/234	N/A	N/A	N/A	Non Parametric		Unknown	**0.0007**	**Yes**
U-235	N/A	N/A	N/A	Non Parametric		Unknown	**0.0043**	**Yes**
U-238	N/A	N/A	N/A	Non Parametric		Unknown	**0.0007**	**Yes**

N/A = not applicable
Significant difference in downgradient to upgradient sample groups shown in bold typeface

Antimony, arsenic, beryllium, cobalt, lead, molybdenum, silver, tin, vanadium, and zinc were all "B" qualified indicating they were detected at low concentrations between the IDL and CRDL. Mercury was not detected in either upgradient or downgradient wells. Aluminum (46.2 µg/L), barium (14 µg/L), cadmium (1.3 µg/L), manganese (30.9 µg/L), and thallium (4.5 µg/L) were detected in B206989 below background levels.

6.5.3 Trend Plots and Data Interpretation

Concentration plots of analytes in downgradient wells that exceed upgradient concentrations are presented on pages A-68 through A-71 at the end of Appendix A of this Annual Report. Trend lines (least square regression analysis) have been added for analytes that exhibit a noticeable upward trend. Concentration trends for most of the other analytes tend to fluctuate somewhat, but are generally flat or declining with no obvious trend. These concentration plots generally indicate that potentially contaminated groundwater from the Landfill is not currently migrating eastward past the East Landfill Pond dam at concentrations greater than in the past. Specifically, sulfate, TDS, calcium, copper, lithium, magnesium, molybdenum, selenium, U-235, and U-238 concentrations in all downgradient wells do not appear to be increasing. Although concentrations of calcium, lithium, selenium and U-238 appear to be increasing, statistical analyses of the trend lines indicate the upward slope is apparent and cannot be differentiated from zero. However, vanadium and U-233/234 concentrations in Well B206989 show evidence of a statistically

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significant upward trend, making these analytes reportable occurrences under RFCA. The magnesium concentration in well B206989 also appears to be rising; however, this constituent is non-hazardous and lacks RFCA groundwater action levels.

Just because downgradient analyte concentrations do not appear to be increasing statistically over upgradient analyte concentrations, and upgradient versus downgradient analyte concentrations currently appear to be in a steady-state condition, does not mean that contaminated groundwater is no longer migrating past the East Landfill Pond dam. There is still a hydraulic gradient in the downgradient direction.

The elevated concentrations of inorganic and radiological analytes in downgradient groundwater can be caused by several factors. Some potential causes include:

- Lateral underflow of Landfill leachate beneath the pond and dam through UHSU bedrock materials, and
- a secondary contaminant source that is upgradient of the well, but is not associated with the Landfill or pond.

Concentrations of several analytes in the Landfill leachate and pond water have historically been relatively low and as such do not appear to be Landfill related. For example, the mean concentrations of lithium (55 µg/L), and selenium (1.97 µg/L) at surface water monitoring station SW097 (Landfill leachate), and lithium (82 µg/L) at SW098 (East Landfill Pond) (DOE, 1996a; Tables 2-2 and 2-3), are significantly lower than concentrations found in well B206989 groundwater. In addition, concentrations of calcium, sulfate, TDS, U-233/234, U-235, and U-238 are also significantly lower in surface water monitoring stations SW097 and SW098 than concentrations of these analytes detected in B206989. However, concentrations of copper, magnesium, molybdenum, and vanadium are significantly higher at these surface water-monitoring locations than in groundwater samples collected from B206989. These results suggest that these constituents may be due to Landfill leachate migrating beneath the pond and dam to downgradient areas.

In addition, elevated concentrations of lithium (199 µg/L), selenium (504 µg/L), sulfate (1517 mg/l), TDS (3633 mg/l), U-233/234, U235, and U-238 have been detected in samples from UHSU bedrock well B206889, located to the south and upgradient of well B206989. Concentrations of these constituents are significantly above the concentrations in B206989. Elevated concentrations of some or all of these constituents have been found in other contaminant plumes, including the SPP and IHSS 119.1.

As suggested above and reported in *1998 Groundwater Monitoring at the Present Sanitary Landfill* (DOE, 1999), in addition to the Landfill, the most likely cause for anomalous groundwater quality at well B206989 is an unknown secondary contaminant source located upgradient of well B206889. Regardless of their source, the absence of certain contaminants at high concentrations in Landfill groundwater and surface water indicate the presence of potential non-Landfill interference in interpreting downgradient weathered bedrock groundwater quality.

6.6 Conclusions

Groundwater conditions at the Present Sanitary Landfill in 2001 appear to be generally consistent with the results of previous monitoring. Statistical comparisons of upgradient versus downgradient UHSU groundwater at the Landfill were performed for analytes meeting the minimum evaluation criteria of <90 percent non-detections and at least four samples per upgradient and downgradient data set. Significant differences (at the 1 percent level) in upgradient compared to downgradient groundwater quality were found for sulfate, TDS, calcium, copper, lithium, magnesium, molybdenum, selenium, vanadium, U-233/234, U-235, and U-238. VOCs were not evaluated statistically because the percentage of non-detections exceeded 90 percent or because contaminants were found only in upgradient samples.

Although most analytes for which trend plots were constructed appear to be increasing in concentration in Downgradient Well B206989, these trends are apparent and not statistically significant. Only analytes U-233/234 and vanadium have statistically significant increasing concentration trends calculated for Well B206989. No other downgradient wells have produced samples with increasing concentrations of the analytes discussed in this section.

The increasing trends of vanadium and U-233/234 in Well B206989 represent groundwater quality exceedances that are reportable under the IMP. A more complete review of available groundwater and soils data associated with potential upgradient, non-Landfill contaminant sources appears to be warranted to investigate the elevated occurrences of these analytes in Downgradient Well B206989. The geochemistry of the specific analytes and their spatial distribution with regard to mobility and retardation potential must be evaluated as part of this review.

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7.0 PLUME DEGRADATION MONITORING

7.1 Plume Degradation

Plume degradation is defined as an observed reduction in contaminant concentrations as contaminants migrate from the source in groundwater. This reduction in concentration can be a result of a number of fate and transport processes in groundwater including dilution, dispersion, sorption, volatilization, and biotic and abiotic transformations. Biodegradation or bioremediation is used to describe the portion of plume degradation that is brought about by biological degradation mechanisms. Biological degradation typically involves bacteria that occur naturally in soil and groundwater. Under the right conditions these bacteria can break down certain fuel hydrocarbons and certain chlorinated organic compounds.

The main mechanism for the biological breakdown of chlorinated organics is through reductive dechlorination reactions. Under reductive dechlorination, a chlorinated organic compound such as carbon tetrachloride is an electron acceptor, causing the compound to gain a hydrogen atom at the expense of a chlorine atom. The successive dechlorination of carbon tetrachloride would form chloroform, methylene chloride, and chloromethane as chlorine atoms are progressively removed from the original carbon tetrachloride molecule.

For biodegradation to occur there must be an electron acceptor, a source of carbon to serve as an electron donor, an appropriate bacterial community, and a favorable environment for the metabolic reactions to take place. The sampling programs at IHSS 118.1, the 903 Pad/Ryan's Pit Plume, and the PU&D Yard Plume were designed to investigate whether these processes are taking place. These investigations employ the method described by Wiedemeier et al (1996), which determines whether biodegradation is occurring to a significant degree at a site based on applying scores to certain chemical parameters. The criteria used are summarized in Table 7-2. A score of 0 to 5 points suggests that there is inadequate evidence of biodegradation. A score of 6 to 14 suggests that there is limited evidence of biodegradation, a score of 15 to 20 shows that there is adequate evidence and scores above 20 show strong evidence of biodegradation.

7.1.1 Electron Donors

The main mechanism that would degrade chlorinated organic compounds such as carbon tetrachloride is reductive dechlorination. Reductive dechlorination is the substitution of hydrogen for chlorine atoms within the chlorinated organic compound, which causes it to progressively break down into daughter products. This process requires that there be a source of electron donors, which is typically organic carbon. Carbon can be utilized either as natural carbon in the aquifer, or can be acquired from the breakdown of petroleum hydrocarbons. Total organic carbon (TOC) samples were collected to ascertain the availability of carbon in the environment, which could then serve as an energy source for reductive dechlorination.

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7.1.2 Electron Acceptors

VOC species were analyzed to determine if daughter products were being formed by reductive dechlorination. In order to undergo reductive dechlorination, chlorinated organic solvents must be potential electron acceptors. This reaction mechanism occurs when there is a sufficient electron donor source present, the proper chemical environment exists, and there is a relative lack of competing electron acceptors. Dissolved oxygen (DO), rather than solvents, is the favored electron acceptor used by bacteria for the biodegradation process. Anaerobic bacteria cannot function at DO concentrations above 0.5 mg/L and hence, reductive dechlorination cannot occur (Wiedemeier et al, 1999). Nitrate and sulfate were analyzed because these species, along with dissolved oxygen, can compete with chlorinated solvents as electron acceptors. If high levels of nitrate and/or sulfate were to exist in the groundwater in the vicinity of the plume source, the reductive dechlorination of carbon tetrachloride and its by-products could be retarded.

7.1.3 Metabolic By-Products

Measurement of the metabolic by-products of biodegradation is a valuable indication of the predominant microbial and chemical processes occurring during contaminant transformation. Ferric iron (Fe^{3+}) is reduced to ferrous iron (Fe^{2+}) during anaerobic biodegradation of organic compounds. Therefore, an increase in ferrous iron concentration in the source area can suggest that biodegradation is occurring. The production of hydrogen sulfide occurs during sulfate reduction and verifies that sulfate is acting as an electron acceptor during biodegradation. The presence of methane in groundwater is indicative of strongly reducing conditions. Methane can be produced through the biodegradation of petroleum hydrocarbons. The presence of methane in groundwater containing chlorinated solvents suggests that the chemistry of the groundwater is favorable for reductive dechlorination. The presence of elevated concentrations of chloride in groundwater relative to upgradient locations suggests that reductive dechlorination of organic solvents is taking place. This is because the replacement of hydrogen for chlorine in the chemical structure of the chlorinated organic compound during reductive dechlorination releases chlorine in the process.

7.2 Carbon Tetrachloride Plume (IHSS 118.1)

This section summarizes the 2001 results of the IHSS 118.1 carbon tetrachloride plume degradation monitoring program. Additional sampling data from CY 2001 have been added to the data collected since CY 1999. The object of this report is to provide sample results for the suite of parameters that were specifically collected to determine whether plume degradation is occurring given the results obtained. The overall goal of the project is to characterize the potential for plume degradation as a significant factor in the remediation strategy for the IHSS 118.1 dense non-aqueous phase liquid (DNAPL) source.

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Carbon tetrachloride is the main contaminant of concern at IHSS 118.1 and is the result of spills related to a below ground carbon tetrachloride storage tank, which has been subsequently removed. Characterization work was initiated in 1997 to identify the extent of the DNAPL source and determine the feasibility of extracting the DNAPL through pumping or excavation. Source removal was postponed because it is presently not feasible to excavate the source due to the number of active process pipes and utilities that run through the source area. The decision was then made to evaluate the potential for the carbon tetrachloride plume to be undergoing plume degradation processes.

A drilling and sampling program was designed to collect the data necessary for decision making with respect to plume degradation. Eight wells were installed in a pattern so as to have the following: two wells upgradient (south) of the DNAPL source (18799 and 18899); three wells along an east-west line with two wells in the source and one well located cross gradient to the source (18499, 18599, and 18699); and three wells in an east-west line, approximately 60 –70 feet downgradient (north) of the source (18199, 18299, and 18399). The wells were installed in February 1999 and samples were collected in March and September of 1999. In addition, data from Well 21098 was added to the evaluation because of the probable relationship between carbon tetrachloride in this well and the location of IHSS 118.1 that was identified in the 1998 RFCA Annual Groundwater Monitoring Report. Figure 7-1 shows the location of the wells and sampling locations.

Dedicated bladder pumps were installed in the 1999 wells so samples could be collected with minimal aeration of the sample. This is important when collecting VOC samples and when measuring DO and oxidation-reduction potential (redox) parameters. A flow through cell containing the field parameter measurement probes was used to measure temperature, DO, redox, alkalinity, specific conductance, and pH. A spectrophotometer was used to measure ferrous iron. VOC and other analytical samples were sent to off-site laboratories for analysis.

The 1999 RFCA Annual Groundwater Monitoring Report recommended a reduction in the number of wells used for determination of plume degradation at IHSS 118.1. Based on the approval of these recommendations, the monitoring project now samples Upgradient Well 18799, near Source Well 18499 and Downgradient Wells 18199 and 21098, which provide a reasonable cross section of the IHSS 118.1 area. Table 7-1 presents a summary of data from these wells.

Table 7-1 Summary of Sample Results for Plume Degradation Wells: IHSS 118.1

1st Qtr 99	DATE	CARBON TETRACHLORIDE	CHLORO-FORM	METHYLENE CHLORIDE	CHLOROMETHANE	METHANE		
18799	3/17/99	927	511	12.3	50	3.1		
18499	3/17/99	57800	8750	83.5	8.9	210		
18199	3/17/99	15400	2200	12.6	2.5	7.4		
21098	3/17/99	1200	110	0.09	U	NA		
1st Qtr 99	**DATE**	**SULFATE mg/L**	**SULFIDE mg/L**	**DISSOLVED OXYGEN mg/L**	**CHLORIDE mg/L**	**FERROUS IRON mg/L**	**TOC mg/L**	**NITRATE mg/L**
18799	3/17/99	46	0.02	5.19	63	0.01	3.051	2.2
18499	3/17/99	21	0.05	0.7	64	1.6	4	U
18199	3/17/99	35	0.041	2.15	69	0.11	3	3
3rd Qtr 99	**DATE**	**CARBON TETRACHLORIDE**	**CHLORO-FORM**	**METHYLENE CHLORIDE**	**CHLOROMETHANE**	**METHANE**		
18799	9/20/99	220	590	21	18	2.5		
18499	9/20/99	16000	4900	380	5	50		
18199	9/13/99	14000	2400	130	5	12		
3rd Qtr 99	**DATE**	**SULFATE mg/L**	**SULFIDE mg/L**	**DISSOLVED OXYGEN mg/L**	**CHLORIDE mg/L**	**FERROUS IRON mg/L**	**TOC mg/L**	**NITRATE mg/L**
18799	9/20/99	53	0.026	2.6	72	1.67	3	U
18499	9/20/99	31	0.003	0.5	90	0.84	5	0.14
18199	9/13/99	33	0.011	3	72	0.01	3	3.3
1st Qtr 00	**DATE**	**CARBON TETRACHLORIDE**	**CHLORO-FORM**	**METHYLENE CHLORIDE**	**CHLOROMETHANE**	**METHANE**		
18799	Dry	Dry	Dry	Dry	Dry	Dry		
18499	3/14/00	22000	4600	2400	U	240		
18199	5/30/00	35000	5500	94	U	84		
1st Qtr 00	**DATE**	**SULFATE mg/L**	**SULFIDE mg/L**	**DISSOLVED OXYGEN mg/L**	**CHLORIDE mg/L**	**FERROUS IRON mg/L**	**TOC mg/L**	**NITRATE mg/L**
18799	Dry	Dry	Dry	Dry	Dry	0.01	Dry	Dry
18499	3/14/00	38	0.88	NA	71	3.03	4	6.8
18199	3/14/00	29	0.004	NA	54	0.07	3	3
4th Qtr 00	**Date**	**CARBON TETRACHLORIDE**	**CHLORO-FORM**	**METHYLENE CHLORIDE**	**CHLOROMETHANE**	**METHANE**		
18799	12/5/00	825	546	7.3	U	U		
18499	12/5/00	24200	7080	U	U	195		
18199	12/5/00	27300	3820	219	U	190		
21098	12/5/00	959	348	22.4	U	U		
4th Qtr 00	**DATE**	**SULFATE mg/L**	**SULFIDE mg/L**	**DISSOLVED OXYGEN mg/L**	**CHLORIDE mg/L**	**FERROUS IRON mg/L**	**TOC mg/L**	**NITRATE mg/L**
18799	12/5/00	51	0.026	4.7	110	0.24	2	0.45
18499	12/5/00	35	0.013	0.85	100	NA	4	U
18199	12/5/00	27	U	0.45	69	0.01	3	0.74
21098	12/5/00	24	0.02	NA	190	NA	2	1.6
2nd Qtr 01	**DATE**	**CARBON TETRACHLORIDE**	**CHLORO FORM**	**METHYLENE CHLORIDE**	**CHLOROMETHANE**	**METHANE**		
18799	5/10/01	460	410	40	U	U		
18499	5/9/01	17000	3500	660	U	U		
18199	5/9/01	18000	3300	200	U	U		
21098	5/701	2300	290	86	U	U		

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2nd Qtr 01	DATE	SULFATE mg/L	SULFIDE mg/L	DISSOLVED OXYGEN mg/L	CHLORIDE mg/L	FERROUS IRON mg/L	TOC mg/L	NITRATE mg/L
18799	5/10/01	38	0.036	5.8	450	0.44	2	4.8
18499	5/9/01	28	0.007	6.9	64	0.27	4	1.6
18199	5/9/01	25	0.002	1.85	69	0.06	3	1.1
21098	5/701	28	0.027	5.56	150	0.12	2	3.2
4th Qtr 01	**DATE**	**CARBON TETRACHLORIDE**	**CHLORO FORM**	**METHYLENE CHLORIDE**	**CHLOROMETHANE**	**METHANE**		
18799	10/30/01	850	520	U	U	U		
18499	10/30/01	24000	5500	100	U	U		
18199	10/29/01	850	3300	U	U	U		
21098	11/1/01	4300	230	U	U	U		
4th Qtr 01	**DATE**	**SULFATE mg/L**	**SULFIDE mg/L**	**DISSOLVED OXYGEN mg/L**	**CHLORIDE mg/L**	**FERROUS IRON mg/L**	**TOC mg/L**	**NITRATE mg/L**
18799	10/30/01	41.8	0.029	3.83	251	0.13	2.1	2.3
18499	10/30/01	30.6	0.035	2.74	144	0.23	4.5	U
18199	10/29/01	24.2	0.0094	2.98	79.6	0.02	3.2	0.94
21098	11/1/01	24.3	0.14	5.21	209	0.16	2.1	2

NA = not analyzed, U = non-detect, All VOCs in µg/L

7.2.1 Electron Donors

Figure 7-2 shows results for total organic carbon for the 6 quarters of measurement. In general, TOC has remained in the 2-5 mg/L range in the area of IHSS 118.1 with a consistent value of 4 mg/L in the source area. Wiedemeier et al (1996) suggest that TOC values above 20 mg/L ensures that enough carbon is present to drive dechlorination. Therefore the limited amount of carbon in groundwater may be retarding the rate of reductive dechlorination at IHSS 118.1.

7.2.2 Electron Acceptors

Carbon tetrachloride is the dominant organic compound present in groundwater at IHSS 118.1. If biodegradation were occurring by reductive dechlorination, carbon tetrachloride would break down progressively to chloroform, dichloromethane, chloromethane, and ultimately to carbon dioxide and water. If reductive dechlorination were occurring, carbon tetrachloride would be seen to progressively decrease in concentration with time and distance from the source as the breakdown products increased in concentration. Downgradient wells would also reflect an increase in breakdown products relative to carbon tetrachloride. Figures 7-3 and 7-4 show the trends in carbon tetrachloride and daughter species. The data from well 21098 is also included. In Figure 7-3 carbon tetrachloride can be seen to decrease in concentration from the source to downgradient well 21098. This would be expected if biodegradation was occurring. However, the trends in chloroform and chloromethane do not increase in downgradient wells 18199 and 21098. Methylene chloride exhibits a similar behavior, but must be viewed with caution because it is a common laboratory contaminant and was reported in the laboratory blank in most samples.

The data suggest that there are daughter products from reductive dechlorination of carbon tetrachloride in the source area, but increased breakdown downgradient of the source is not readily apparent. By looking at the ratio of daughter products to carbon tetrachloride, with time, a better indication of in-source biodegradation would be obtained. Therefore, it is suggested that sampling for these compounds continue for a sufficient time period to establish a rate of breakdown at the source.

Nitrate and sulfate were analyzed because these species, along with dissolved oxygen, can compete with chlorinated solvents as electron acceptors. If high levels of nitrate and/or sulfate were to exist in the groundwater in the vicinity of IHSS 118.1, the reductive dechlorination of carbon tetrachloride and its by-products could be retarded. The graph on Figure 7-2 shows the concentrations of nitrate along the three-well cross section at IHSS 118.1. The nitrate concentration in Upgradient Well 18799 is 2.3 to 4.8 mg/L, which is above the RFETS background mean of 1.4 mg/L for Qrf (DOE, 1993b). In Figure 7-2, the nitrate concentration for CY01 data is seen to decrease at the source and then increase away from the source. Though nitrate values have been variable over time this trend is consistent with past findings. Low nitrate values in the source would favor biodegradation, whereas high values would tend to retard dechlorination. The Wiedemeier et al (1996) scoring system for determining the potential for biodegradation suggests that a concentration of nitrate above 1 mg/L may retard biodegradation of chlorinated organics. Given the

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typically low concentration of nitrate in the vicinity of the IHSS (currently around 1 mg/L at source well 18499), it appears nitrate is being removed locally but may be hampering the biodegradation process away from the source. Because nitrate is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

The current sulfate concentration in Upgradient Well 18799 ranges from 38 to 42 mg/L (Figure 7-2), which is above the RFETS background mean of 22 mg/L (DOE, 1993b), and slightly higher than previous values. Figure 7-5 shows the current concentrations of sulfate dropping near source well 18499, and remaining steady in downgradient wells. Because sulfate and nitrate behave similarly with respect to their electron acceptance, this trend would be expected if biodegradation was occurring in the source area.

Wiedemeier et al (1996) suggest that sulfate above 20 mg/L could compete with the chlorinated solvents as an electron acceptor and thus retard the biodegradation process of the latter. Given that sulfate has averaged 48 mg/L in the source well over time, and levels higher than the 20 mg/L level away from the source, it can be deduced that sulfate may be retarding the biodegradation of carbon tetrachloride occurring at IHSS 118.1. Because sulfate is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

Dissolved oxygen is the favored electron acceptor used by bacteria for the biodegradation process. Anaerobic bacteria cannot function at DO concentrations above 0.5 mg/L and hence, reductive dechlorination cannot occur (Wiedemeier et al, 1999). Figure 7-6 shows that upgradient DO concentration at Well 18799 averages 4.8 mg/L and decreases to below 2.4 mg/L in Source Well 18499. The DO value for the first sample round for Well 18499 is discounted as it looks high, given historic DO concentrations at the Site. DO values remain at similar levels in the source well, and in downgradient well 18199, and rise to approximately 5 mg/L in Well 21098. Taking the data at face value, it would appear that DO levels are detrimental for anaerobic degradation of organic compounds in the source area and downgradient of the plume. DO was measured using a DO probe housed inside a flow through cell. Accurate DO measurements have been difficult to attain due to the rigor that must be employed in collecting field samples.

7.2.3 Metabolic By-Products

Ferric iron (Fe^{3+}) is reduced to ferrous iron (Fe^{2+}) during anaerobic biodegradation of organic hydrocarbons. Therefore, an increase in ferrous iron concentration in the source area can suggest the amount of biodegradation that is occurring. Figure 7-6 shows that the 2001 samples for ferrous iron are generally lower in concentration than previous measurements. Values for Fe^{2+} data average 0.25 mg/L in the source well and are similar in concentration for background Well 18799. Values tend to decrease in downgradient wells. Wiedemeier et al (1996) believe that ferrous iron above 1 mg/L would suggest that reductive dechlorination is taking place. Given the low concentrations obtained in the two 2001 sampling rounds it is possible that reductive dechlorination is not occurring at the source, but the variability in concentrations over time makes conclusive determination difficult. Because ferrous iron is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

The production of hydrogen sulfide occurs during sulfate reduction and verifies that sulfate is acting as an electron acceptor during biodegradation. Figure 7-2 shows that sulfide is very low in background well 18799 and does not change in concentration in the source and downgradient wells. Wiedemeier et al (1996) believe that sulfide above 1 mg/L would allow reductive dechlorination to take place. These results suggest that though sulfate was decreasing in concentration in the source area, the amount of hydrogen sulfide generated was insufficient to support reductive dechlorination. Because of the conflicting evidence for biodegradation given by sulfate/sulfide analyses, and because sulfide is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

The presence of methane in groundwater is indicative of strongly reducing conditions. Methane can be produced through the biodegradation of petroleum hydrocarbons. The presence of methane in groundwater containing chlorinated solvents suggests that the chemistry of the groundwater is favorable for reductive dechlorination. Figure 7-4 shows that methane was undetected in samples collected in 2001 given a detection limit of .002 mg/L. This is a decrease from previous sampling results which ranged from approximately 0.003 mg/L to 0.20 mg/L in the source area, then decreased to very low values in downgradient wells. Wiedemeier et al (1996) believe that methane above 0.1 mg/L would allow reductive dechlorination to take place. Methane values at IHSS 118.1 are currently low, suggesting that there is little methane production in groundwater. However, the minor increase in methane production in the source relative to the upgradient well suggests that some reductive dechlorination is occurring. Because methane is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

The presence of elevated concentrations of chloride in downgradient and source area groundwater relative to upgradient locations would suggest that reductive dechlorination of organic solvents is taking place. This is because the replacement of hydrogen for chlorine in the chemical structure of the chlorinated organic compound during reductive dechlorination releases chlorine in the process. However, available data do not show a clear trend. Figure 7-5 shows the concentrations of chloride seen in the vicinity of IHSS 118.1. Chloride concentrations of 251 and 450 mg/L were reported in the samples from 2001 for Upgradient Well 18799. These values are significantly higher than previous samples, which range from 50 to 100 mg/L. Values for the source and downgradient wells tend to be similar to historic results. The RFETS background mean concentrations for chloride in alluvial materials is 8 to 18 mg/L (DOE, 1993b). The Groundwater Geochemistry Report for RFETS (EG&G, 1995c) shows that chloride concentration increases from west to east at RFETS and that chloride concentrations in the IA range from 25 to 100 mg/L. Given the inconsistencies of the data and the lack of dramatic change in chloride concentration at IHSS 118.1 relative to both source and downgradient wells and the surrounding IA, it may be that only limited reductive dechlorination is occurring at the IHSS. Because chloride values on Site can be affected by the use of salt on the roadways during the winter, the data may be suspect as a key indicator of the efficacy of biodegradation on chlorinated solvents.

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7.2.4 Conclusions and Recommendations

The 2001 results are similar in most respects to the data collected at IHSS 118.1 in 2000. There is evidence of biodegradation at the IHSS 118.1 source. If the assumption is made that the breakdown products found at IHSS 118.1 are not part of the original free product composition, then based on the scoring system discussed in Wiedemeier et al (1996), the source area rates a score of 9 (see Table 7-2). A previous score for the source area has been 18. The upgradient and downgradient wells rate a score of 3, which suggests that the subsurface environment away from the source may be hostile to biodegradation. These scores are derived using data from the three wells used for the cross section discussed above. Given the downgradient score with respect to biodegradation, the decrease in composition of organic solvents away from the source must be partly attributed to physical processes such as dilution and dispersion rather than strictly to biodegradation. These preliminary results suggest that some reduction in carbon tetrachloride is occurring at the source, but the persistence of carbon tetrachloride above Tier I action levels at Downgradient Wells 18199 and 21098 suggests that plume degradation is not completely restricting the plume from migrating towards surface water in this area. Additional monitoring will help determine the rate at which biodegradation is occurring.

Given the probable involvement of the Building 771 and Building 774 foundation drains with carbon tetrachloride plume capture, efforts should be made to ascertain the exact nature of the outfalls from this system. Initial evaluation has shown that carbon tetrachloride has occurred in water in Bowman's Pond, and it is believed that some of the foundation drains from the buildings mentioned above exit at this location. An initial evaluation of these drains was performed in 2001; results are discussed in the Building 776/777 D&D monitoring section (Section 5-7).

At the time of print of this 2001 RFCA Annual Report, the two CY 2002 plume degradation sampling events for IHSS 118.1 had been completed. Should the results of the CY 2002 sampling verify the previous results for IHSS 118.1, then the plume degradation monitoring at this location will be reduced in 2003 to the collection of VOC species only. At such time as IHSS 118.1 is remediated, an evaluation will be conducted to determine the analytes of interest and location(s) for performance monitoring of this location.

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Table 7-2 Checklist for Determination of Biodegradation: IHSS 118.1

Analyte	Concentration in most Contaminated zone	Significance	Points	118.1 in Source	Outside source
Oxygen	< 0.5 mg/L	Tolerated at this concentration	3	0	0
Oxygen	> 1.0 mg/L	Prohibits reductive dechlorination	-3	-3	-3
Nitrate	< 1.0 mg/L	Competes with reductive pathway at higher concentrations	2	2	0
Ferrous Iron	> 1.0 mg/L	Reductive pathway possible	3	0	0
Sulfate	< 20 mg/L	Competes with reductive pathway at higher concentrations	2	0	0
Sulfide	> 1.0 mg/L	Reductive pathway possible	3	0	0
Methane	> 0.1 mg/L	Ultimate reductive daughter product	2	2	0
Redox	< 50 mV	Reductive pathway possible	1	1	0
Redox	< -100 mV	Reductive pathway more possible	2	0	0
TOC	> 20 mg/L	Carbon and energy source – drives dechlorination	2	0	0
Temperature	> 20 degrees C	Biochemical process accelerated	1	0	0
Carbon Dioxide	> 2x background	Ultimate oxidative daughter product	1	NA	NA
Alkalinity	> 2x background	Results from interaction of CO2 with aquifer	1	1	0
Chloride	> 2x background	Daughter product of organic chlorine	2	0	0
Hydrogen	> 2 nM	Reductive pathway possible	3	NA	NA
Chloroform	Present	Daughter product of Carbon Tetrachloride	2	2	2
Methlyene Chloride	Present	Daughter product of Chloroform.	2	2	2
Chloromethane	Present	Daughter product of Methylene Chloride	2	2	2
		NA = not analyzed	Score	9	3

7.3 903 Pad/Ryan's Pit Plume

The 903 Pad/Ryan's Pit Plume is located south and southeast of the 903 Pad, north of Woman Creek at RFETS. Two sources, the 903 Pad and Ryan's Pit, contribute to this plume of contaminated groundwater. The primary analytes comprising the 903 Pad/Ryan's Pit Plume are carbon tetrachloride, TCE, and PCE. The nearest receiving streams for the plume are the South Interceptor Ditch (SID), located approximately 150 feet north of Woman Creek and approximately 700 feet south of Ryan's Pit, and Woman Creek. Characterizing the 903 Pad/Ryan's Pit Plume groundwater, in order to protect surface water quality in Woman Creek, was a 1999 compliance milestone.

The Ryan's Pit source removal began in September 1995 with the removal of contaminated soil. The soil was treated in February 1996, and the project was completed in August 1996, with the replacement of treated soil. The 903 Pad VOC source removal is scheduled for 2003. See Section 4.5 of this report for more information regarding the Ryan's Pit source removal. Figure 7-7 presents the location of the 903 Pad/Ryan's Pit Plume area.

In 1999, four permanent Downgradient Monitoring Wells (90099 through 90399) were installed to monitor VOCs. One of these new wells, 90099, twinned 1998 Geoprobe Well 01298, which had the highest VOC concentrations found in that area in a 1998 study. The other three wells are downgradient of the 1998 Geoprobe Wells and

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upgradient of the SID. These wells were installed to provide the necessary information to establish a trend in downgradient VOC concentrations.

The results of the 1999 monitoring program were that VOCs, primarily TCE and carbon tetrachloride, were present in concentrations above Tier II action levels. Given the results of monitoring the new downgradient wells, the decision was made to collect additional samples in 2001 to further investigate plume degradation. Well 07391 is nearest the Ryan's Pit Source Area and Wells 1187, 90099, and 90399 were chosen to provide a downgradient cross section of the contaminant plume. Well 0987 was selected in mid-2001 to represent upgradient conditions. Well 11791 was also sampled for plume degradation parameters as it may be representative of the portion of the plume coming from the 903 Pad. The sample suite is similar to that collected for IHSS 118.1, discussed above. The results will be presented and discussed in a similar format.

Table 7-3 Sample Results for Plume Degradation Wells: 903 Pad / Ryan's Pit Wells

Well	Date	CARBON TETRACHLORIDE	CHLOROFORM	METHYLENE CHLORIDE	CHLORO-METHANE	METHANE		
07391	3/6/01	130	1400	3800B	U	U		
1187	3/9/01	65	84	46B	U	3		
90099	3/8/01	360	75	43B	U	U		
90399	3/8/01	130	23	2B	U	U		
11791	3/9/01	250	68	22B	U	22		
Well	**Date**	**1,1,1-TRICHLOROETHANE**	**1,1-DICHLORO-ETHANE**	**CHLOROETHANE**	**ETHENE**			
07391	3/6/01	380	88	U	U			
1187	3/9/01	U	U	U	U			
90099	3/8/01	0.54J	U	U	U			
90399	3/8/01	0.32J	U	U	U			
11791	3/9/01	0.3J	0.3	U	NA			
Well	**Date**	**TETRACHLOROETHENE**	**TRICHLORO-ETHENE**	**Cis-1,2-DICHLOROETHENE**	**VINYL CHLORIDE**	**ETHENE**		
07391	3/6/01	1200	67000	100	U	U		
1187	3/9/01	30	2300	U	U	U		
90099	3/8/01	24	880	10	U	U		
90399	3/8/01	4	110	2	U	U		
11791	3/9/01	79	54	40	U	U		
Well	**Date**	**SULFATE mg/L**	**SULFIDE Mg/L**	**DISSOLVED OXYGEN mg/L**	**CHLORIDE mg/L**	**FERROUS IRON mg/L**	**TOC mg/L**	**NITRATE mg/L**
07391	3/6/01	200	0.024	5.4	470	NA	13.1	67
1187	3/9/01	67	0.029	4.2	62	NA	1.6	1.2
90099	3/8/01	62	0.028	NA	59	NA	2.1	3.8
90399	3/8/01	62	0.029	5.3	34	NA	1.1	2.7
11791	3/9/01	18	0.097	NA	57	NA	1.3	2
Well	**Date**	**CARBON TETRACHLORIDE**	**CHLOROFORM**	**METHYLENE CHLORIDE**	**CHLORO-METHANE**	**METHANE**		
07391	8/23/01	0.5J	1100	U	U	U		
1187	8/27/01	340	80	U	U	U		
90099	8/22/01	780	100	U	U	U		
90399	8/27/01	290	35	U	U	U		
11791	8/22/01	390	72	U	U	U		

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Well	Date	TETRACHLOROETHENE	TRICHLORO-ETHENE	Cis-1,2-DICHLOROETHENE	VINYL CHLORIDE	ETHENE		
07391	8/23/01	800	47000	U	U	1		
1187	8/27/01	U	3400	U	U	1		
90099	8/22/01	40	1400	20	U	1		
90399	8/27/01	U	220	U	U	1		
11791	8/22/01	9.3	61	46	U	1		
Well	**Date**	**SULFATE mg/L**	**SULFIDE mg/L**	**DISSOLVED OXYGEN m/L**	**CHLORIDE mg/L**	**FERROUS IRON mg/L**	**TOC mg/L**	**NITRATE mg/L**
07391	8/23/01	210	0.005	4	370	0.29	11	65
1187	8/27/01	71	0.035	8.4	68	0.46	2.3	1.6
90099	8/22/01	64	0.08	8	45	0.03	1.5	3.2
90399	8/27/01	57	0.007	4.53	64	0.00	1.3	2.8
11791	8/22/01	19	0.009	6.7	71	0.03	1.2	0.85

NA = not analyzed, U = non-detect, J = estimated value, B = blank contaminated, All VOCs in µg/L

7.3.1 Electron Donors

Figure 7-8 shows results for TOC for 2001. TOC averages 12 mg/L near well 07391 but decreases to the 1-2 mg/L range in the downgradient wells. Wiedemeier et al (1996) suggest that TOC values above 20 mg/L ensure that enough carbon is present to drive dechlorination. Therefore, the limited amount of carbon in groundwater may be retarding the rate of reductive dechlorination in the Ryan's Pit area.

7.3.2 Electron Acceptors

Carbon tetrachloride is the dominant organic compound present in groundwater at the 903 Pad source, whereas TCE is most abundant at the Ryan's Pit source. Figure 7-9 shows the carbon tetrachloride breakdown chain products, in order, and Figure 7-10 shows the likely PCE breakdown chain products. Figure 7-9 shows that carbon tetrachloride, in Well 07391 near the Ryan's Pit Source, was present at a concentration of 130 µg/L while Downgradient Wells 90099 and 90399 showed higher concentrations, as did side gradient well 11791. This confirms that the carbon tetrachloride source is not at Ryan's Pit. However, the daughter products of carbon tetrachloride biodegradation, most notably chloroform and methylene chloride, have very high concentrations at Well 07391 (1400 µg/L for chloroform and 3800 µg/L for methylene chloride). Unfortunately, methylene chloride blank contamination was ubiquitous in samples from 07391 and additional blank contamination occurred during large dilutions of the samples. But the chloroform values are not associated with blank contamination and suggest either that chloroform was disposed in Ryan's Pit or there is significant dechlorination of carbon tetrachloride in the vicinity of the source area. The other carbon tetrachloride breakdown chain compounds, chloromethane and methane, were present in very low concentrations in the Ryan's Pit area. If biodegradation is occurring by reductive dechlorination, carbon tetrachloride would break down progressively to chloroform, methylene chloride, chloromethane, and ultimately to methane.

Figure 7-10 shows PCE was present in concentrations averaging1000 µg/L at Well 07391, decreasing in a downgradient direction to just below Tier II action levels (5 µg/L) in Well 90399. However, TCE occurs at an

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average concentration of 57,000 µg/L at Well 07391 and steadily decreases in concentration downgradient to reach an average concentration of 165 µg/L at Well 90399. Without process knowledge of the chemicals used at RFETS it would be easy to conclude that the PCE is breaking down to a daughter product much like carbon tetrachloride appears to be doing near Well 07391. However, there was extensive use of TCE at RFETS and the high concentration of TCE is probably because of its disposal in Ryan's Pit. Additional evidence for this is the relatively low concentrations of the other PCE daughter products, cis-1,2-DCE, vinyl chloride, and ethene in the source area.

The data suggest that there are daughter products from reductive dechlorination of carbon tetrachloride in the source area, but increased breakdown downgradient of the source is not readily apparent. By looking at the ratio of daughter products to carbon tetrachloride with time, a better indication of in-source biodegradation would be obtained. Therefore, it is suggested that sampling for these compounds continue for a sufficient time period to establish a rate of breakdown at the source.

Nitrate and sulfate were analyzed because these species, along with dissolved oxygen, can compete with chlorinated solvents as electron acceptors. If high levels of nitrate and/or sulfate were to exist in the groundwater in the vicinity of 903 Pad/ Ryan's Pit, the reductive dechlorination of carbon tetrachloride and its by-products could be retarded. The graph on Figure 7-8 shows the concentrations of nitrate along the four well cross section, and for well 11791. The nitrate concentration in source area Well 07391 averages 66 mg/L, which is far above the RFETS background mean of 1.4 mg/L for Rocky Flats Alluvium (DOE, 1993b). In Figure 7-8, nitrate concentration is seen to decrease in concentration away from the source to a range of 1-4 mg/L. Low nitrate values in the source would favor biodegradation, whereas high values would tend to retard dechlorination. Wiedemeier et al (1996) suggests that a concentration of nitrate above 1 mg/L may impact biodegradation of chlorinated organics. Given the typically high concentration of nitrate in the vicinity of Well 07391 near Ryan's Pit, it appears nitrate could be hampering the biodegradation process. Because nitrate is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

The sulfate concentration in Well 07391 averaged 205 mg/L, which is substantially above the RFETS background mean of 22 mg/L (DOE, 1993b). Figure 7-8 shows the concentration of sulfate leveling off downgradient of well 07391 to the 60 mg/L range. Because sulfate and nitrate behave similarly with respect to their electron acceptance, lower values would be expected near the source if biodegradation was occurring in the source area.

Wiedemeier et al (1996) suggest that sulfate above 20 mg/L could compete with the chlorinated solvents as an electron acceptor and thus retard the biodegradation process of the latter. Given that sulfate was found at 200 mg/L in the source area and at high levels away from the source, it can be deduced that sulfate may be retarding the biodegradation of volatile organics occurring at 903 Pad/Ryan's Pit. Because sulfate is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

Figure 7-8 shows that DO concentrations at Well 07391 were approximately 4.5 mg/L and decreases to 4.2 mg/L in Well 1187. The DO readings for the second sample round for wells 1187 and 90099 were discounted because they

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appear high compared to typical DO readings at the Site. The DO concentration at Well 90399 averaged 4.9 mg/L. Taking the data at face value, it would appear that DO levels are detrimental for anaerobic degradation of organic compounds in this area. DO was measured using a DO probe housed inside a flow-through cell. Accurate DO measurement have been difficult to attain due to the rigor that must be employed in collecting field samples.

7.3.3 Metabolic By-Products

Ferric iron (Fe^{3+}) is reduced to ferrous iron (Fe^{2+}) during anaerobic biodegradation of organic hydrocarbons. Therefore, an increase in ferrous iron concentration in the source area can suggest the amount of biodegradation that is occurring. Unfortunately ferrous iron was not collected from the 903 Pad/Ryan's Pit area wells in the first quarter of 2001 because of a sampling oversight. The fourth quarter sample shows ferrous iron at 0.29 mg/L at source well 07391, increasing to 0.46 mg/L in Well 1187 and decreasing to very low concentrations in wells farther downgradient. Wiedemeier et al (1996) believe that a ferrous iron concentration above 1 mg/L indicates that reductive dechlorination is taking place. Given the low concentrations obtained in the single 2001 sampling round it is possible that reductive dechlorination is not occurring at the source. Because ferrous iron is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

The production of hydrogen sulfide occurs during sulfate reduction and verifies that sulfate is acting as an electron acceptor during biodegradation. Figure 7-8 shows that sulfide is fairly consistent in the wells along the plume cross section at approximately .028 mg/L in the first round of sampling. The second sample round shows different results whereas sulfide is at .035 mg/L in Well 1187 and decreases to very low levels downgradient. Wiedemeier et al (1996) believe that sulfide above 1 mg/L would allow reductive dechlorination to take place. The low amount of hydrogen sulfide generated is suggestive of insufficient reductive dechlorination.

The presence of methane in groundwater is indicative of strongly reducing conditions. Methane can be produced through the biodegradation of petroleum hydrocarbons. The presence of methane in groundwater containing chlorinated solvents suggests that the chemistry of the groundwater is favorable for reductive dechlorination. Figure 7-9 shows that methane in the first sample round decreases from approximately 0.003 mg/L in Well 07391 to non-detect in Downgradient Wells. Well 11791 shows the highest methane measurement at .022 mg/L. The second sample round shows all non-detects for methane. Wiedemeier et al (1996) believes that methane above 0.1 mg/L would allow reductive dechlorination to take place. Except for Well 11791, methane values along the plume cross section are fairly low, suggesting that the chemistry of the groundwater is not favorable for reductive dechlorination; or at least not the complete breakdown of solvents to the methane end product. The high methane reading at well 11791 is suspect given the low reading in the second sample round. Because methane is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

The presence of elevated concentrations of chloride in downgradient groundwater relative to upgradient locations suggests that reductive dechlorination of organic solvents is taking place. This is because the replacement of hydrogen for chlorine in the chemical structure of the chlorinated organic compound during reductive dechlorination

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releases chlorine in the process. Figure 7-8 shows that the concentrations of chloride seen in well 07391 are very high (average 420 mg/L). Chloride concentrations drop in Downgradient Well 1187 to the 30-60 mg/L range. Well 11791 has similar values, averaging 64 mg/L. The RFETS background mean concentrations for chloride in alluvial materials is 8 to 18 mg/L (DOE, 1993b). The Groundwater Geochemistry Report for RFETS (EG&G, 1995c) shows that chloride concentration increases from west to east at RFETS and that chloride concentrations in the Industrial Area range from 25 to 100 mg/L. Given the dramatic change in chloride concentration from Well 07391 relative to downgradient wells, it may be that some reductive dechlorination is occurring at the Ryan's Pit Plume. The area is not in a location prone to salt application in the winter.

7.3.4 Conclusions and Recommendations

The results from the sampling in 2001 suggest that, in general, conditions downgradient of the 903 Pad/Ryan's Pit source areas may not be favorable to biodegradation of VOCs. Table 7-4 shows the score for determining whether biodegradation is feasible in the area of the 903 Pad/ Ryan's Pit Plume. Wiedemeier et al (1996) suggests a score of 0 to 5 points indicates that there may be minimal biodegradation occurring. This is the case for the two rounds of sampling data available for the 903 Pad/Ryan's Pit Plume Wells.

Table 7-4 Checklist for Determination of Biodegradation: 903 Pad/Ryan's Pit

Analyte	Concentration in most Contaminated Zone	Significance	Points	903Pad/Ryans Pit Near Source	903Pad Ryan's Pit Outside Source
Oxygen	< 0.5 mg/L	Tolerated at this concentration	3	0	0
Oxygen	> 1.0 mg/L	Prohibits reductive dechlorination	-3	-3	-3
Nitrate	< 1.0 mg/L	Competes with reductive pathway at higher concentrations	2	0	0
Ferrous Iron	> 1.0 mg/L	Reductive pathway possible	3	NA	NA
Sulfate	< 20 mg/L	Competes with reductive pathway at higher concentrations	2	0	0
Sulfide	> 1.0 mg/L	Reductive pathway possible	3	0	0
Methane	> 0.1 mg/L	Ultimate reductive daughter product	2	0	0
Redox	< 50 mV	Reductive pathway possible	1	1	0
Redox	< -100 mV	Reductive pathway more possible	2	0	1
TOC	> 20 mg/L	Carbon and energy source – drives dechlorination	2	0	0
Temperature	> 20 degrees C	Biochemical process accelerated	1	0	0
Carbon Dioxide	> 2x background	Ultimate oxidative daughter product	1	NA	NA
Alkalinity	> 2x background	Results from interaction of CO2 with aquifer	1	1	0
Chloride	> 2x background	Daughter product of organic chlorine	2	2	0
Hydrogen	> 2 nM	Reductive pathway possible	3	NA	NA
Chloroform	Present	Daughter product of Carbon Tetrachloride	2	2	2
Methlyene Chloride	Present	Daughter product of Chloroform.	2	2	2
Chloromethane	Present	Daughter product of Methylene Chloride	2	0	0
		NA = not analyzed	Score	5	2

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Well 07391 does contain significant concentrations of potential breakdown products in the form of TCE, which could be a daughter product of PCE, and chloroform, which could be a breakdown product of carbon tetrachloride. However, process knowledge of organic solvents used at the Site refutes the PCE-TCE transition as an explanation in this case because large amounts of TCE were used at RFETS. Questions remain as to how much chloroform was used at the Site. The history of Ryan's Pit involves the dumping of many liquid wastes, the actual make-up of which is not well documented.

Monitoring is proposed to continue along the Ryan's Pit Plume cross section. It is recommended that a well upgradient of the source areas, or at least a well unaffected by the sources be monitored for establishing background water quality.

7.4 PU&D Yard Plume Investigations

In 2001, The Water Programs Group expanded upon a field investigation initiated in 1997 to evaluate the nature and extent of VOC groundwater contamination in the PU&D Yard area. Section 8.4 of the 2000 Annual RFCA Groundwater Monitoring Report (SSOC, 2001a) discusses the groundwater evaluation project that was conducted. A map showing the location of the plume and the wells discussed can be found on Figure 7-13.

An additional component of the PU&D Yard Plume investigation was the identification of wells suitable for evaluating plume degradation. As with other plume degradation projects, wells were chosen so as to be located along the contaminant migration pathway. This cross section along the plume was defined by Well 01097, which is upgradient of the known source; Well 30900, which is in the source; and Wells 01497, 70693, and 02097, which are located in the plume, downgradient of the source. Plume degradation parameters were collected from these wells and are listed in Table 7-5.

In 2001, the source area for the PU&D Yard received an application of Hydrogen Release Compound® (HRC®) to enhance the breakdown of the VOCs in source materials. The effects of this treatment would be manifested initially in well 30900, which is at the source. The compound was applied after the January sample round and before the second sample round found in Table 7-5. Therefore, differences seen in data between these two rounds should reflect the effects of the application. Section 7.4.5 provides detailed discussion of this in-situ treatability study at the PU&D Yard source.

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Table 7-5 PU&D Yard Sample Results

WELL	DATE	CARBON TETRACHLORIDE	CHLOROFORM	METHYLENE CHLORIDE	CHLOROMETHANE	METHANE		
01097	1/24/01	U	U	0.88	U	U		
30900	1/17/01	0.3J	U	U	U	5		
01497	1/24/01	7	U	0.1	U	U		
70693	1/24/01	2	0.8J	U	U	U		
02097	1/24/01	U	0.9J	0.2	U	17000		
WELL	DATE	1,1,1-TRICHLOROETHANE	1,1-DICHLORO-ETHANE	CHLORO-ETHANE	ETHANE			
01097	1/24/01	U	U	U	U			
30900	1/17/01	U	U	U	2.5			
01497	1/24/01	0.7J	0.7J	U	U			
70693	1/24/01	38	0.3J	U	U			
02097	1/24/01	13	4	U	U			
WELL	DATE	TETRACHLORO-ETHENE	TRICHLORO-ETHENE	cis-1,2-DICHLORO-ETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE	ETHANE	
01097	1/24/01	U	U	U	U	U	U	
30900	1/17/01	120	9	1.2	U	U	U	
01497	1/24/01	15	33	2	79	U	U	
70693	1/24/01	5	9	0.3	25	U	U	
02097	1/24/01	5	30	0.3	9	0.9J	U	
WELL	DATE	SULFATE mg/L	SULFIDE mg/L	DISSOLVED OXYGEN mg/L	CHLORIDE mg/L	FERROUS IRON mg/L	TOC mg/L	NITRATE mg/L
01097	1/24/01	16	0.079	3.5	7.3	NA	0.649	2.5
30900	1/17/01	15	0.056	NA	6.4	NA	1.4	0.05
01497	1/24/01	23	0.08	5	11	NA	0.5	0.05
70693	1/24/01	24	0.031	NA	11	NA	0.62	0.05
02097	1/24/01	32	0.002	NA	16	NA	8.2	0.5
WELL	DATE	TETRACHLORO-ETHENE	TRICHLORO-ETHENE	cis-1,2-DICHLORO-ETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE	ETHANE	METHANE
01097	8/29/01	U	U	U	U	U	U	U
30900	8/28/01	120	15	100	10	10	U	U
01497	9/4/01	5.8	20	0.5	32	2	U	U
70693	9/.5/01	3.2	8.8	0.5	15	0.5	U	U
02097	9/6/06	2.9	22	1.3	4	0.4	U	240
WELL	DATE	SULFATE mg/L	SULFIDE mg/L	DISSOLVED OXYGEN mg/L	CHLORIDE mg/L	FERROUS IRON mg/L	TOC mg/L	NITRATE mg/L
01097	8/29/01	19	0.11	4.58	7.9	0.01	0.5	3.0
30900	8/28/01	55	0.19	1.58	13	3.25	6.5	0.37
01497	9/4/01	24	0.021	5.41	12	0.02	0.5	6.9
70693	9/.5/01	24	0.001	6.68	29	0.00	0.5	8
02097	9/6/06	30	0.008	2.67	13	0.01	1.1	4.5

NA = not analyzed, U = non-detect, J = estimated value, All VOCs in µg/L

7.4.1 Electron Donors

Figure 7-14 shows results for TOC for 2001. The TOC concentration is approximately 0.57 mg/L in upgradient well 01097. The TOC concentration increases from 1.4 to 6.5 mg/L in Source Well 30900 from the first to the second sample round. The TOC values then decrease to approximately 0.5 – 0.6 mg/L in Wells 01497and 70693, then rise

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to a high of 8.2 mg/L in Well 02097. Wiedemeier et al (1996) suggest that TOC values above 20 mg/L ensure that enough carbon is present to drive dechlorination. Therefore, the limited amount of carbon in groundwater may not be aiding the rate of reductive dechlorination in the PU&D Yard Plume.

7.4.2 Electron Acceptors

Tetrachloroethene is the predominant chlorinated organic compound found in the PU&D Yard source along with trichloroethene. Figure 7-12 shows that there is no PCE or TCE in Upgradient Well 01097 and that PCE dropped in concentration in January 2001 from 120 µg/L at the Source Well (30900) to 5 µg/L downgradient along the flowpath of the plume. There is only minor variation in PCE content in the second sample round, which took place approximately six months after HRC® application. Figure 7-12 also shows that TCE and 1,1-DCE increase in concentration downgradient of the source in Well 01497. This is also consistent with the second round of sampling. Downgradient of Well 01497; 1,1-DCE decreases in concentration to approximately 6 µg/L at well 02097. Though the 1,1-DCE concentration in Well 30900 did increase in the second round, it decreased in downgradient wells. It is not thought that downgradient wells would be effected given the long distance and short time duration after the HRC® application. TCE does not show much change in concentration between sample rounds, except for decreased concentrations at Wells 70693 and 02097. Again the short time period after the HRC® application would probably not explain these fluctuations because the distance between the point of application and these wells is too great for groundwater to travel in six months. Significant differences can be seen in the values for cis-1,2-DCE and vinyl chloride between the two sample rounds. Cis-1,2-DCE increased from 1.2 µg/L in Well 30900 in the first round to 100 µg/L in the second round. Vinyl chloride increased from non-detect to 10 µg/L in the second round.

Given the data available, it would appear that there is reductive dechlorination occurring in the vicinity of Well 01497, which is causing the TCE and 1,1-DCE daughter products to be formed from the PCE found in the source. However, process knowledge of organic solvents used at the Site complicates the PCE-TCE transition because large amounts of TCE were used at RFETS and even if reductive dechlorination were occurring, one would expect to see more at the source well. Questions remain as to whether 1,1-DCE was used as a process chemical at the Site. Also, the plume maps in Section 8 of the 2000 RFCA Annual Groundwater Monitoring Report show that in addition to TCE and 1,1-DCE, carbon tetrachloride and 1,1,1-TCA increase downgradient of the source well. Since carbon tetrachloride and 1,1,1-TCA are not breakdown products of PCE or TCE, there is good evidence that there is a different source contributing to the plume in the area of 01497. If this is true, then the occurrence of TCE and 1,1-DCE is also suspect given that 1,1-DCA, not 1,1-DCE, is predominantly a breakdown product of 1,1,1-TCA. Future evaluation of natural attenuation at the PU&D Yard will have to involve ascertaining the effects of the application of HRC® to the source area. Clearly, Well 30900 is showing the effects of its application (see Section 7.4.5) and it is probable that the downgradient portion of the plume will be affected to some extent. It will be important to document these changes and it is suggested that sampling for these compounds continue for a sufficient time period to establish a rate of breakdown or transformation occurring as a result of treatment of the source, and to determine whether the application of HRC® released a slug of contamination that is now migrating downgradient.

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Nitrate and sulfate were analyzed because these species, along with dissolved oxygen, can compete with chlorinated solvents as electron acceptors. If high levels of nitrate and/or sulfate were to exist in the groundwater in the vicinity of PU&D Yard source, the reductive dechlorination of PCE, TCE, carbon tetrachloride, and other chlorinated solvents and their by-products could be retarded. The graph on Figure 7-11 shows the concentrations of nitrate along the five well cross section. The nitrate concentration in upgradient Well 01097 is approximately 3 mg/L, which is slightly above the RFETS background mean of 1.4 mg/L for Qrf (DOE, 1993b). In Figure 7-16, the nitrate concentration is seen to decrease in concentration downgradient of the source to non-detect in the first round, and increase in concentration relative to the source in the second round. It is not known why nitrate increased between the two sample rounds. Low nitrate values in the source would favor biodegradation whereas high values would tend to retard dechlorination. Wiedemeier et al (1996) suggests that a concentration of nitrate above 1 mg/L may impact biodegradation of chlorinated organics. Given the low nitrate values in this plume it appears that nitrate would not hamper the biodegradation process. Because nitrate is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

The sulfate concentration in Well 01097 is approximately 18 mg/L, which is below the RFETS background mean of 22 mg/L (DOE, 1993b). Figure 7-11 shows the concentration of sulfate at the source well to be similar for the first round of sampling but significantly higher in the second round. Downgradient of the source, the nitrate concentration remains in the 20 – 30 mg/L range for both sample events. Because sulfate and nitrate behave similarly with respect to their electron acceptance, lower values would be expected near the source if biodegradation was occurring in the source area. Wiedemeier et al (1996) suggest that sulfate above 20 mg/L could compete with the chlorinated solvents as an electron acceptor and thus retard the biodegradation process of the latter. Given that sulfate was found at 15 mg/L in the source area and at slightly higher levels away from the source, it can be deduced that sulfate may not affect the biodegradation of VOCs occurring at the source, but could inhibit the process in the downgradient PU&D Yard Plume. Because sulfate is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

Figure 7-11 shows that DO concentrations at Well 01097 are approximately 4 mg/L. Methane is 5.8 mg/L in the source well, decreasing to 1.58 mg/L in the second round. DO values generally occur at values around 5 mg/L in downgradient wells. Taking the data at face value, it would appear that DO levels are unfavorable to anaerobic degradation of organic compounds upgradient and downgradient of the source. The change in DO values in source well 30900 may be reflecting treatment with HRC®, in which case conditions are becoming more favorable for biodegradation. Collecting accurate DO measurements has always been a problem due to the ease with which oxygen can get into the field sample.

7.4.3 Metabolic By-Products

An increase in ferrous iron concentration in the source area can suggest the amount of biodegradation that is occurring. Unfortunately, ferrous iron measurements were not collected from the PU&D Yard area wells in the first round because of a sampling oversight. Ferrous iron analysis was performed in the second round with a result of

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3.25 mg/L at the source area well. Wiedemeier et al (1996) believe that ferrous iron above 1 mg/L would suggest that reductive dechlorination is taking place. Given the concentrations obtained in the single 2001 (post HRC® application) sampling round, it is probable that reductive dechlorination is occurring at the source. Because ferrous iron is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

The production of hydrogen sulfide occurs during sulfate reduction and verifies that sulfate is acting as an electron acceptor during biodegradation. Figure 7-11 shows that sulfide concentration averages 0.90 mg/L in Upgradient Well 01097. In Source Well 30900, the concentration increases from .05 in the first round to .19 mg/L in the second sample round. Sulfide concentrations are quite low in downgradient wells. Wiedemeier et al (1996) believe that sulfide above 1 mg/L would allow reductive dechlorination to take place. The low amount of hydrogen sulfide generated does not support reductive dechlorination.

The presence of methane in groundwater is indicative of strongly reducing conditions. Methane can be produced as the final breakdown product of carbon tetrachloride biodegradation. The presence of methane in groundwater containing chlorinated solvents suggests that the chemistry of the groundwater is favorable for reductive dechlorination. Table 7-5 shows that methane is undetected in Upgradient Well 01097, is 0.005 mg/L in Well 30900 in the first sample round and undetected in the second round. Methane is undetected in Wells 01497 and 70693. Well 02097 shows a very high methane concentration in the first sample round (17 mg/L) and a much lower concentration (0.24 mg/L) in the second round. Wiedemeier et al (1996) believe that methane above 0.1 mg/L would allow reductive dechlorination to take place. Except for Well 02097, methane values along the plume cross section are fairly low, suggesting that the chemistry of the groundwater is not favorable for reductive dechlorination, or at least not the complete breakdown of solvents to the methane end product. The high methane reading at Well 02097 is interesting given that most other biodegradation parameters are generally unfavorable for biodegradation at this well. One possibility is that methane generated from the Present Sanitary Landfill is migrating into the area of Well 02097. The 1995 Geologic Characterization Report (EG&G, 1995a) suggests that a hypothesized bedrock fault trends near Well 02097. It is possible that methane from the landfill could migrate along the fault to this location; however, additional investigation would be required to confirm this possibility. Because methane is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

Figure 7-11 shows that chloride concentrations are approximately 7.5 mg/L at upgradient Well 01097. Values in source well 30900 range from 6 to 13 mg/L and values in downgradient wells range from 11 to 13 mg/L. The RFETS background mean concentrations for chloride in alluvial materials is 8 to 18 mg/L (DOE, 1993b). The chloride concentration is, therefore, increasing slightly downgradient, which might suggest that biodegradation may be occurring. However, the values obtained are within the range of normal upgradient background concentrations for the Site and may not suggest increased biological activity. Because chloride values on Site can be affected by the use of salt on the roadways during the winter, these data may be suspect as a key indicator of the efficacy of biodegradation on chlorinated solvents.

7.4.4 Conclusions and Recommendations

The results from the sampling in 2001 suggest that, in general, conditions at and downgradient of the PU&D Yard source areas may not be favorable to biodegradation of VOCs. Table 7-6 shows the score for determining whether biodegradation is feasible in the area of the PU&D Yard Plume. In general, because these scores are between 0 and 5, conditions appear to be unfavorable for biodegradation to take place in both the source and in the downgradient plume. Complications arise in evaluating the data with respect to the TCE and 1,1-DCE daughter products and whether these compounds are associated with another plume source downgradient of the known source. The high methane value found in Well 02097 should be verified by additional sampling.

Table 7-6 Checklist for Determination of Biodegradation: PU&D Yard Plume

Analyte	Concentration in most contaminated zone	Significance	Points	PU &D Yard Near Source	PU&D Yard Outside Source
Oxygen	< 0.5 mg/L	Tolerated at this concentration	3	0	0
Oxygen	> 1.0 mg/L	Prohibits reductive dechlorination	-3	-3	-3
Nitrate	< 1.0 mg/L	Competes with reductive pathway at higher concentrations	2	2	2
Ferrous Iron	> 1.0 mg/L	Reductive pathway possible	3	NA	NA
Sulfate	< 20 mg/L	Competes with reductive pathway at higher concentrations	2	2	0
Sulfide	> 1.0 mg/L	Reductive pathway possible	3	0	0
Methane	> 0.1 mg/L	Ultimate reductive daughter product	2	0	0
Redox	< 50 mV	Reductive pathway possible	1	0	0
Redox	< -100 mV	Reductive pathway more possible	2	0	0
TOC	> 20 mg/L	Carbon and energy source – drives dechlorination	2	0	0
Temperature	> 20 degrees C	Biochemical process accelerated	1	0	0
Carbon Dioxide	> 2x background	Ultimate oxidative daughter product	1	NA	NA
Alkalinity	> 2x background	Results from interaction of CO2 with aquifer	1	0	0
Chloride	> 2x background	Daughter product of organic chlorine	2	0	0
Hydrogen	> 2 nM	Reductive pathway possible	3	NA	NA
Trichloroethene	Present	Daughter product of Tetrachloroethene	2	2	2
1,1, Dichloroethene	Present	Daughter product of Chloroform.	2	0	2
Vinyl Chloride	Present	Daughter product of Methylene Chloride	2	0	0
		NA = not analyzed	Score	3	3

7.4.5 PU&D Yard Plume Treatability Study

A plume of VOC-contaminated groundwater is derived from a contaminant source located in the PU&D Yard at RFETS. Previous characterization results indicate that subsurface VOC contamination is present in only a few locations and that the primary contaminant is PCE (K-H, 2001a).

A treatability study was begun in 2001 to evaluate the effectiveness of HRC® for enhancing natural attenuation of the VOCs in the groundwater and soil at the PU&D Yard. HRC® is a proprietary, environmentally safe, food quality, polylactate ester formulated for slow release of lactic acid upon hydration. The HRC® is expected to

stimulate rapid degradation of chlorinated VOCs found in groundwater and soil at this location by making low concentrations of hydrogen available to the resident microbes to use for dechlorination. The HRC® is expected to be a one-time application. According to Regenesis, the manufacturer of the product, the material is expected to stimulate contaminant degradation at the project site for approximately a year and a half.

The product has been used at other sites to stimulate rapid degradation of chlorinated VOCs in groundwater and soil. This study is evaluating the effectiveness of HRC® in the low-flow groundwater regimes common at RFETS (K-H, 2001a). This project is a cooperative effort between RFETS and the DOE Subsurface Contaminant Focus Area (SCFA).

7.4.5.1 Project Events

The treatability study is located within the source area and that portion of the PU&D Yard Plume exhibiting the highest PCE concentrations (Figure 7-13). Monitoring Well 30900 was installed in this area immediately adjacent to borehole 17497, where the highest concentrations of VOCs in soils were detected in a 1997 characterization effort. An additional Monitoring Well (31001) was installed slightly downgradient of the source area in January 2001 as part of this study. Baseline samples were collected from these two monitoring wells prior to insertion of the HRC®.

Beginning in February 2001, a Geoprobe was used to create 16 boreholes in a 10-foot by 6-foot grid immediately surrounding Borehole 17497 (Figure 7-14). These boreholes were used as material insertion points (MIPs) in the placement of over 800 pounds of HRC® into the subsurface. HRC® insertion was completed on March 1, 2001. Subsurface conditions were allowed to stabilize for two months and monthly groundwater sampling was initiated April 30, 2001.

Groundwater samples were to be collected from the northwest and southwest corners of the insertion grid, if possible, prior to material insertion (K-H, 2001a). Sufficient groundwater was present at the southwest corner (MIP3), but not the northwest corner (MIP1), for a groundwater sample.

7.4.5.2 Treatment Effectiveness

Results from the initial baseline samples and the monthly sampling events through late November 2001 are reported in Table 7-7. For completeness, the previous samples from the pre-existing monitoring well (30900) in the source area and results from the groundwater sample from MIP3 are also included.

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Table 7-7 Preliminary Treatability Study Results

Location	Sample Date	PCE	TCE	Cis 1,2-DCE	Trans 1,2-DCE	1,1-DCE	Vinyl Chloride
MIP3	2/20/01	4.9	ND	ND	ND	ND	ND
30900	10/21/00	96	7.4	53.1	ND	ND	ND
	2/7/01	120	7	78	0.5	0.5	ND
	4/30/01	180	11	110	0.1	0.4	ND
	5/30/01	350	23	210	ND	ND	ND
	6/27/01	240	15	140	0.2	0.5	ND
	7/31/01	93.6	10.6	91.4	0.19	0.31	0.21
	8/28/01	116	15	100	ND	0.39	ND
	10/1/01	50	5	77	ND	ND	ND
	10/31/01	34	3.1	36	ND	ND	ND
	11/29/01	30	3.6	45	ND	0.28	ND
	1/7/02	18.5	2.92	88.6	0.212J	ND	ND
31001	2/7/01	18	5.5	1.2	ND	2.6	ND
	4/30/01	130	20	52	0.1	4	ND
	5/30/01	41	18	4	ND	ND	ND
	6/27/01	120	25	38	ND	1	ND
	7/31/01	105	16.3	189	0.13	1.49	0.12
	8/29/01	81	22	93	ND	ND	ND
	10/1/01	67	7.7	71	ND	0.6	ND
	11/1/01	18	4.8	30	ND	0.65	ND
	11/30/01	15	3.7	24	ND	0.47	ND
	1/07/02	12	3.78	12.1	ND	0.88	ND
Tier I Action Level		500	500	700 (total 1,2-DCE)	700 (total 1,2-DCE)	700	200
Tier II Action Level		5	5	7	7	7	2

ND = not detected; results in µg/L

As shown in Table 7-7 and on Figure 7-15, concentrations of PCE, TCE, and cis-1,2-DCE in the source area well (30900) increased after insertion of the HRC®, then decreased. TCE and cis-1,2-DCE are common degradation products of PCE. According to Regenesis, approximately 70% to 80% of project sites see an initial increase in VOC concentrations before a downward trend is observed. As shown on Figure 7-15, this downward trend appears to be continuing. Additional sampling will be performed to monitor VOC concentrations in this well.

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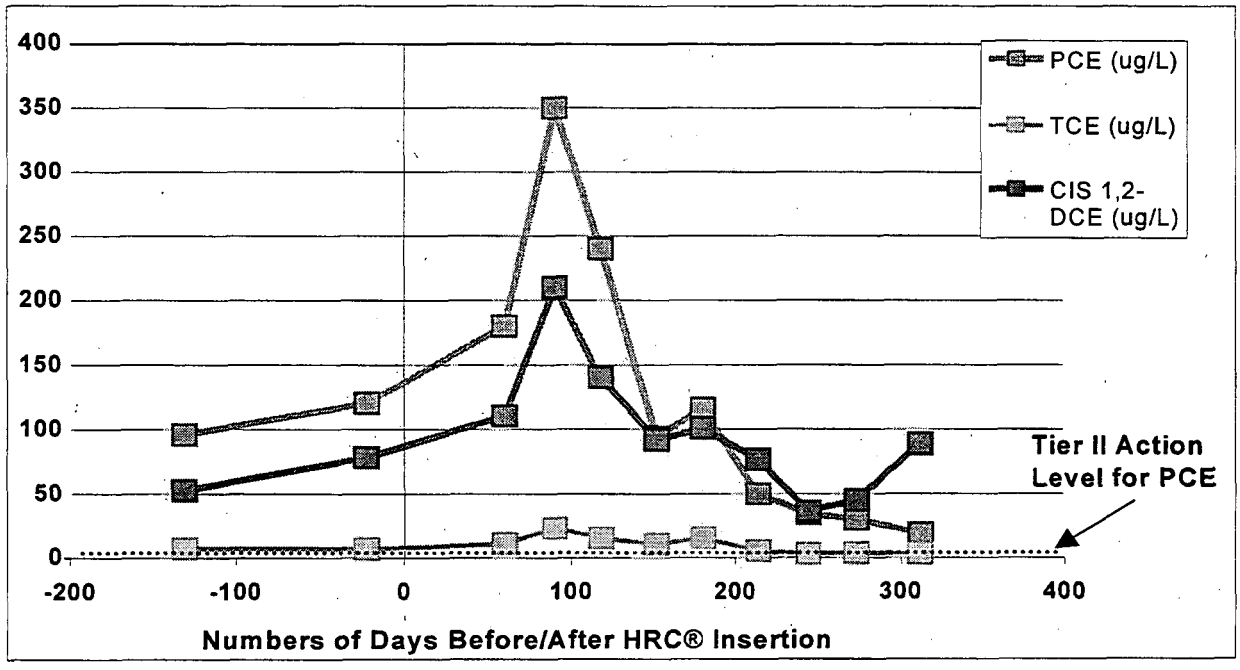
Figure 7-15 Concentration of PCE and degradation products versus time in 30900



Data from well 31001 (Figure 7-16) show a similar pattern with the exception of the sample taken on May 30, 2001 (Day 90), which had lower than anticipated volatile organic concentrations. The initial increases in groundwater concentrations of PCE at Wells 30900 and 31001 were most likely the result of one or a combination of the following conditions:

- A change in the surface tension of free phase solvents in the pores that would cause more solvent to be released from the pores.
- A change in the relative solubility of the individual VOCs because of the presence of the lactic acid in the aqueous phase that would allow more VOCs to go into solution.
- Other changes in liquid and organic phases caused by changes in pH, temperature, oxidation-reduction potential, etc. that occurred as a result of the addition of lactic acid, increases in biological activity, and/or the physical disturbances of the subsurface related to the 16 closely spaced boreholes (localized aeration, increased permeability, etc.).
- A seasonal increase because of the rising water table and release of additional contaminants from the vadose zone.

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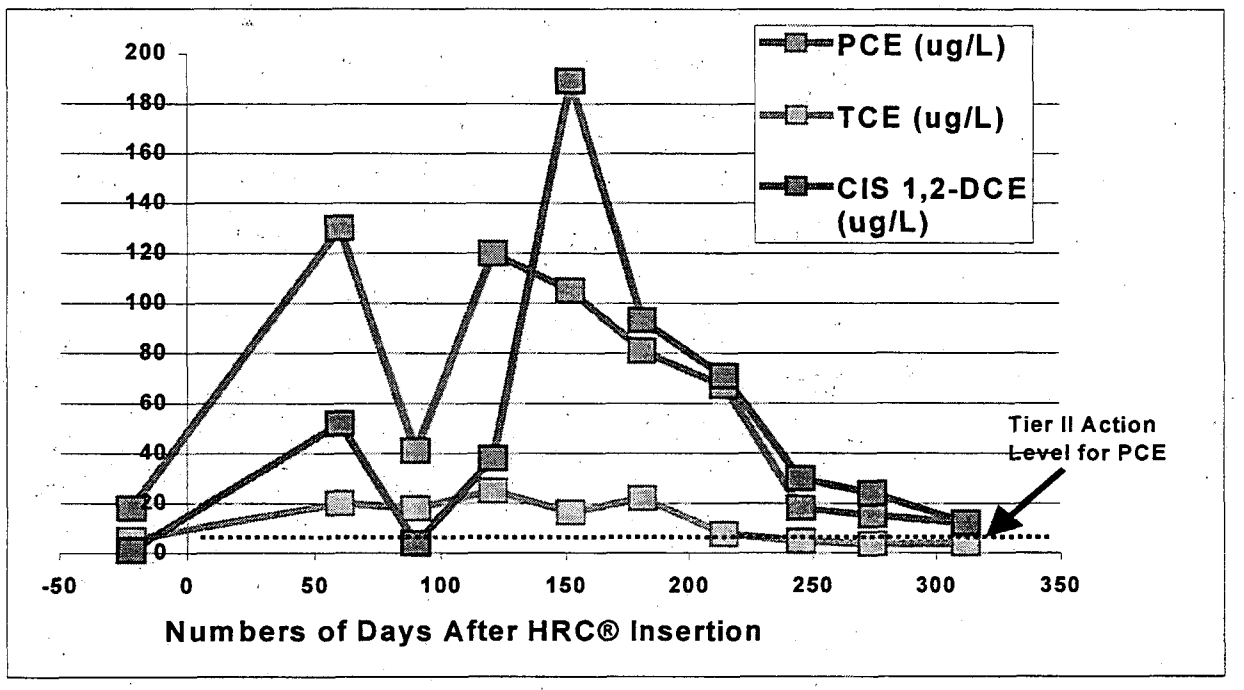
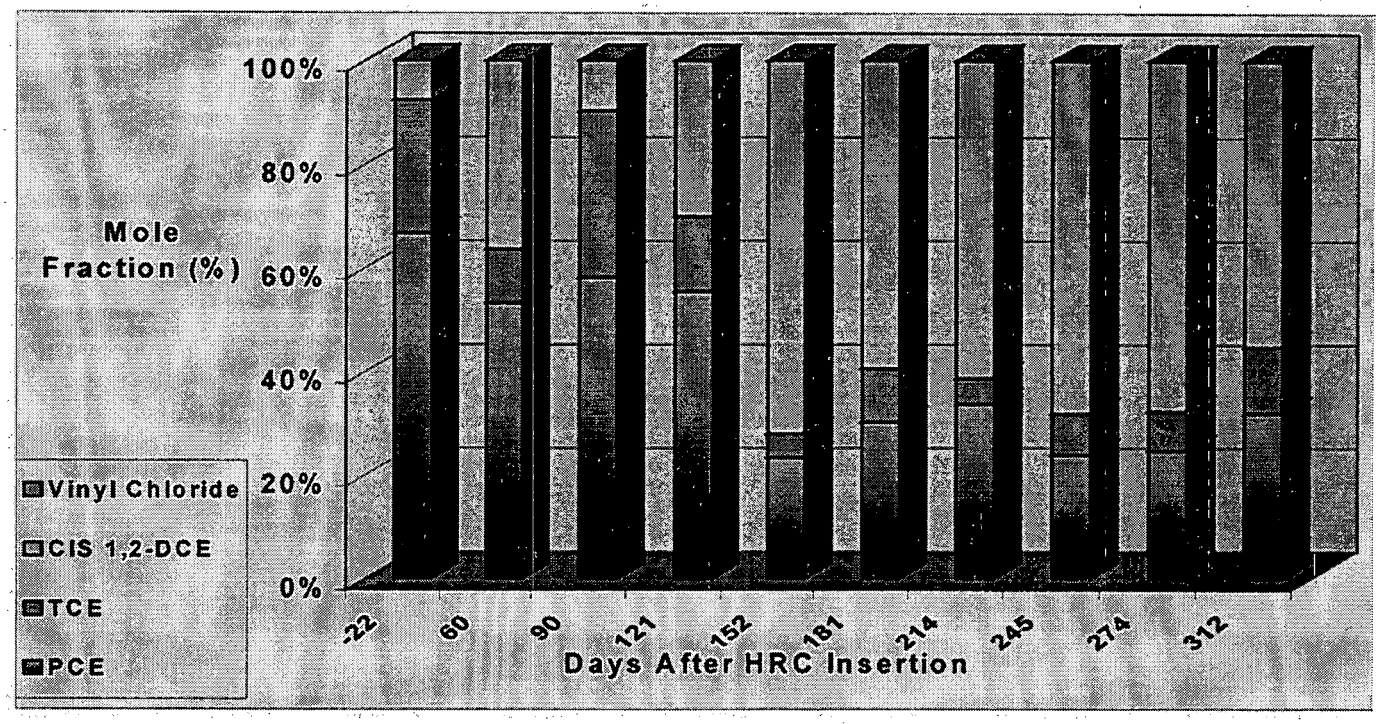
Figure 7-16 Concentration of PCE and degradation products versus time in 31001



As shown in Table 7-7, the presence of other degradation products such as trans-1,2-DCE; 1,1-DCE, and vinyl chloride demonstrates that degradation is occurring; these contaminants were not associated with releases at the PU&D Yard. Vinyl chloride is the last degradation product generated prior to its degradation to ethene. Although ethene is an analyte in samples from these wells, the small quantities of ethene produced are expected to offgas rather than be detected.

The increase in the ratio of degradation products relative to PCE concentrations confirms that degradation is occurring. Figure 7-17 shows the relative changes of mole fractions of PCE and its degradation products in 31001. This trend, in combination with the overall reduction of PCE, indicates that even though additional PCE was liberated to the aquifer, much of this has been degraded. Sampling will continue to determine if there is a further decrease in these degradation products as well.

Figure 7-17 Mole fraction of PCE in well 31001 relative to its degradation products over time



7.4.5.3 Conclusions and Work Planned

The initial increases in VOC concentrations indicate that VOCs are being transferred from the soil to an aqueous phase, potentially accelerating both soil and water remediation. Typically, the VOCs trapped in the saturated zone have been the most difficult phase to remediate and continue to act as a contaminant source. If these are being mobilized and then biologically degraded along with the dissolved phase, this will prove to be a much more robust treatment methodology than simply biologically degrading the dissolved fraction.

Alternatively, VOCs may be mobilized and not degraded; wells located downgradient will continue to be monitored to determine whether this is occurring.

The continued decrease in PCE concentrations and concurrent increasing concentrations of its byproducts provides direct evidence that the contaminant plume is being degraded. Monitoring was reduced to quarterly after the May 2002 sampling event, and will continue until sufficient data are collected to establish the effectiveness of HRC® as a component of groundwater treatment. Evaluation will also continue to assess whether these VOCs are being fully degraded or are merely being transformed into chlorinated daughter products.

A treatability study report was completed in October 2001 and provides additional information on the treatability study (K-H, 2001b)

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Figure 7- 2
Nitrate, TOC and, Sulfide Concentrations at IHSS 118.1

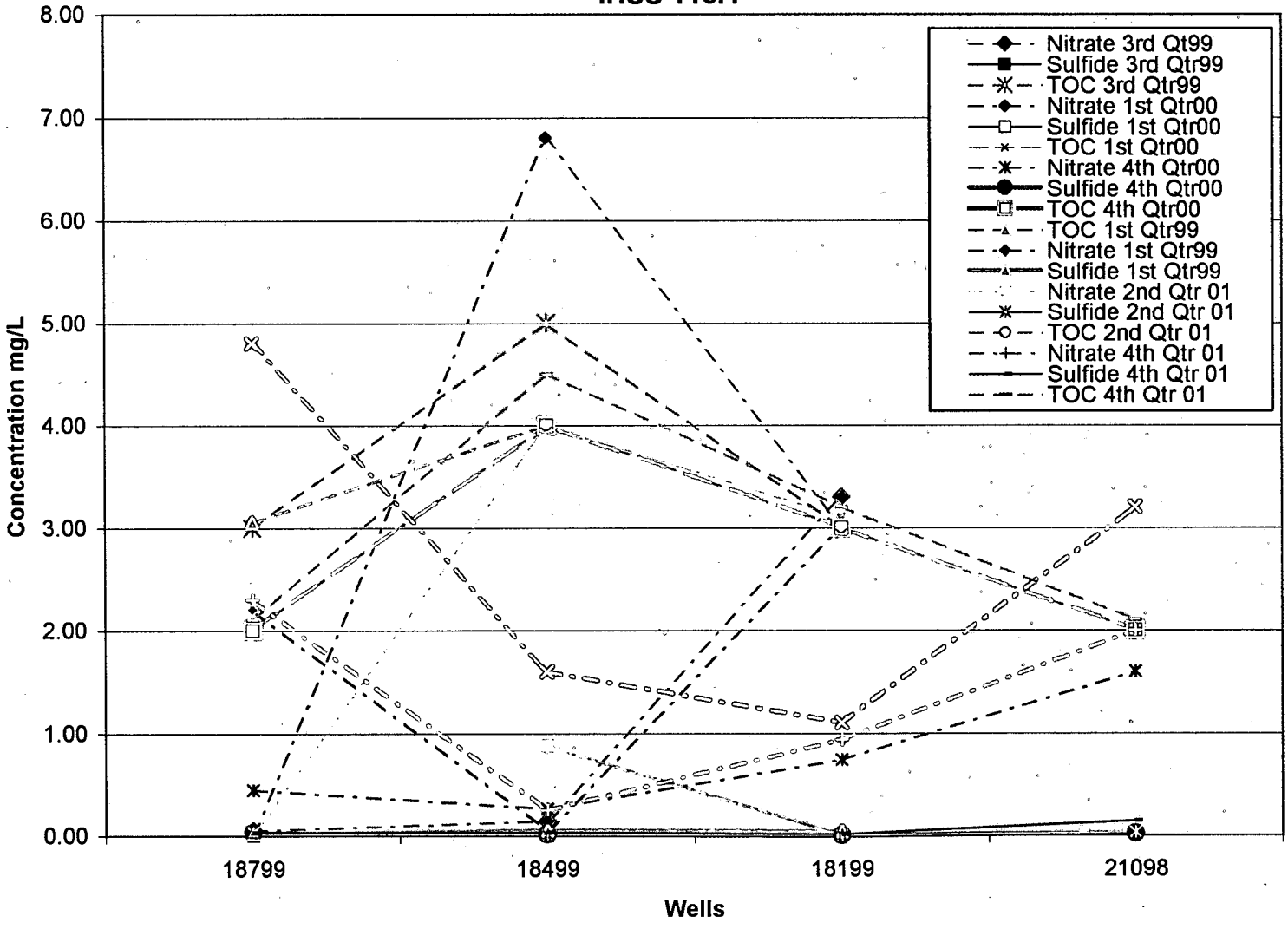


Figure 7- 3
Carbon Tetrachloride and Chloroform Concentrations at IHSS 118.1

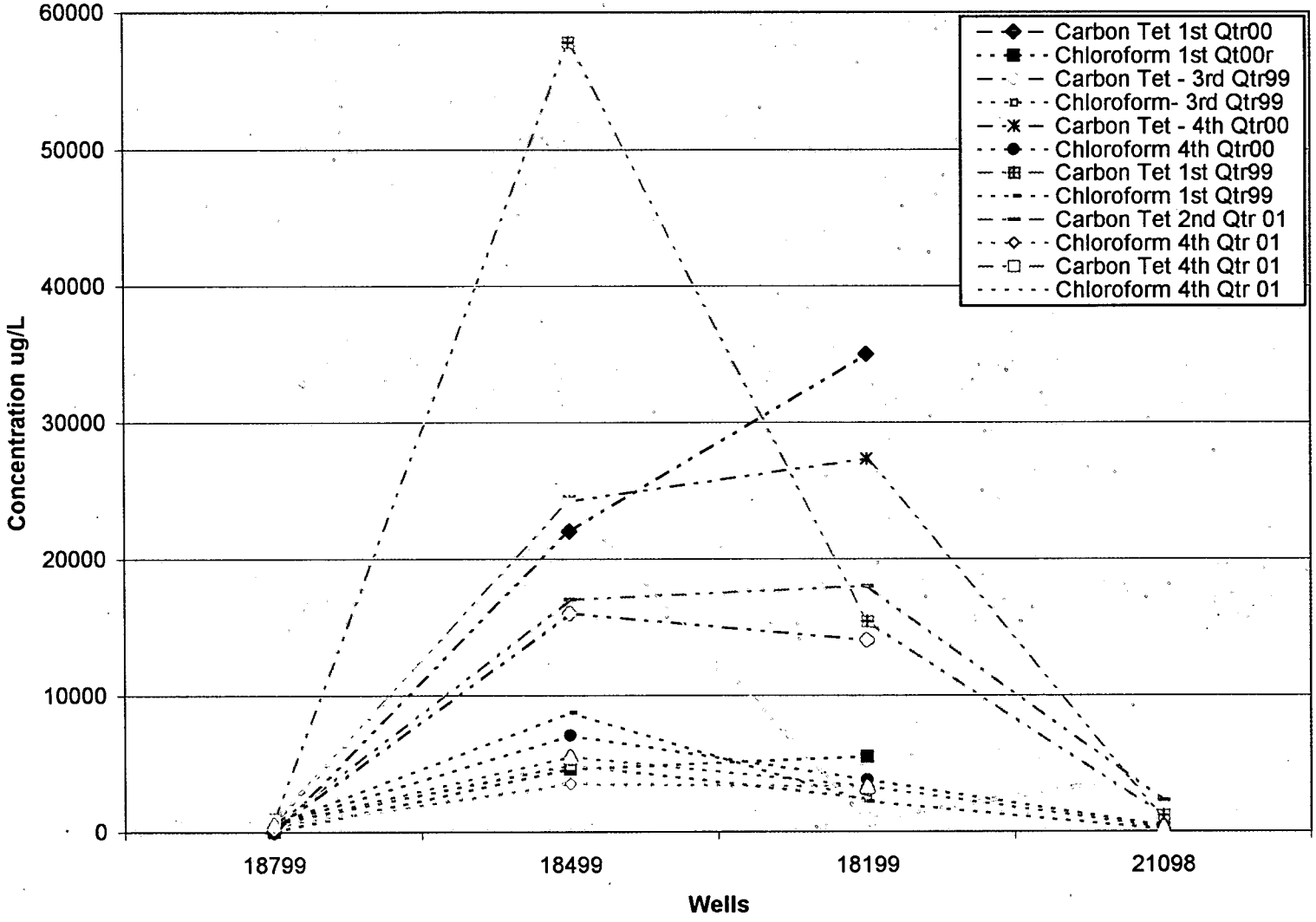


Figure 7- 4
Methylene Chloride, Chloromethane and Methane Concentrations at IHSS 118.1

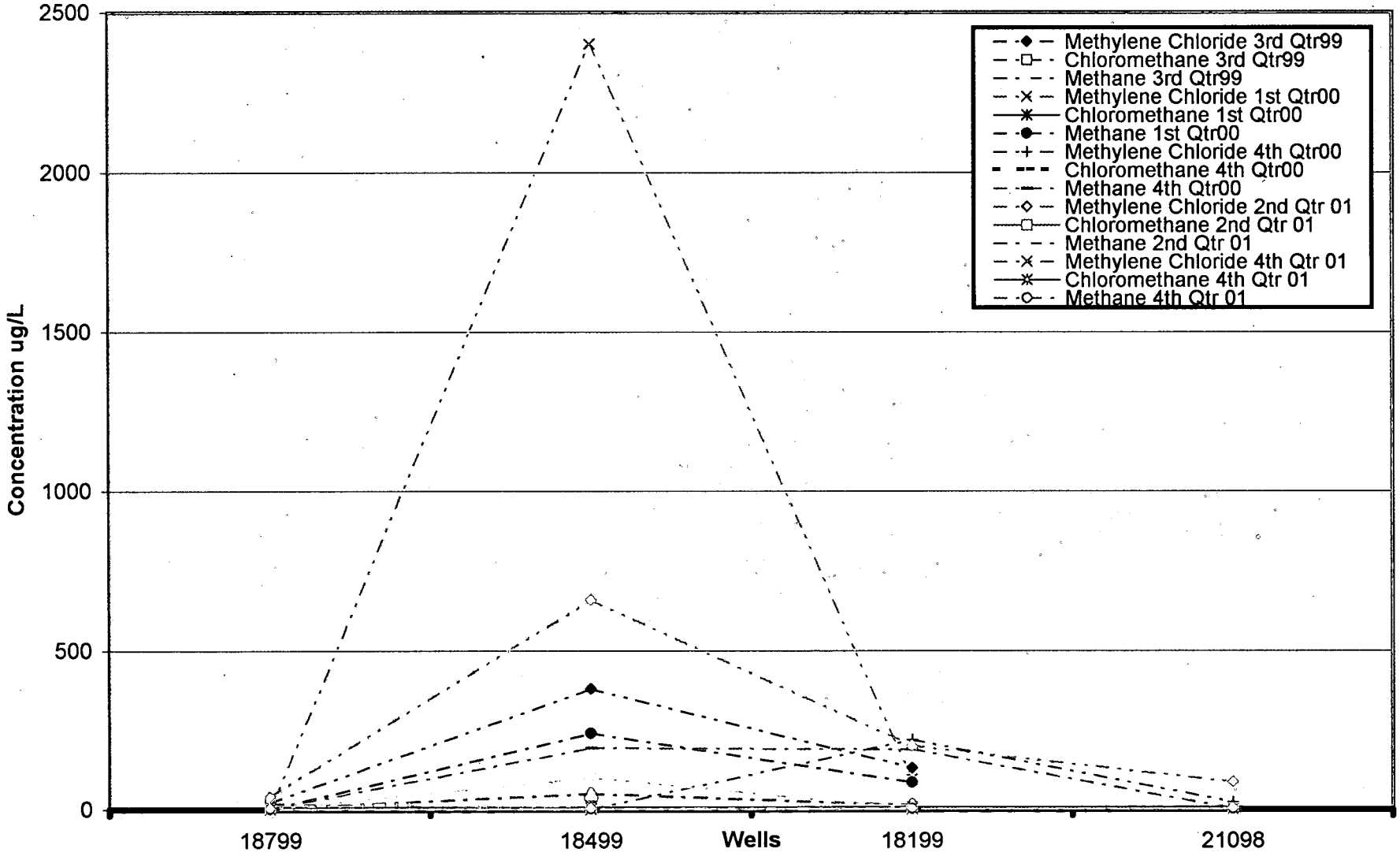


Figure 7- 5
Chloride and Sulfate Concentrations at IHSS 118.1

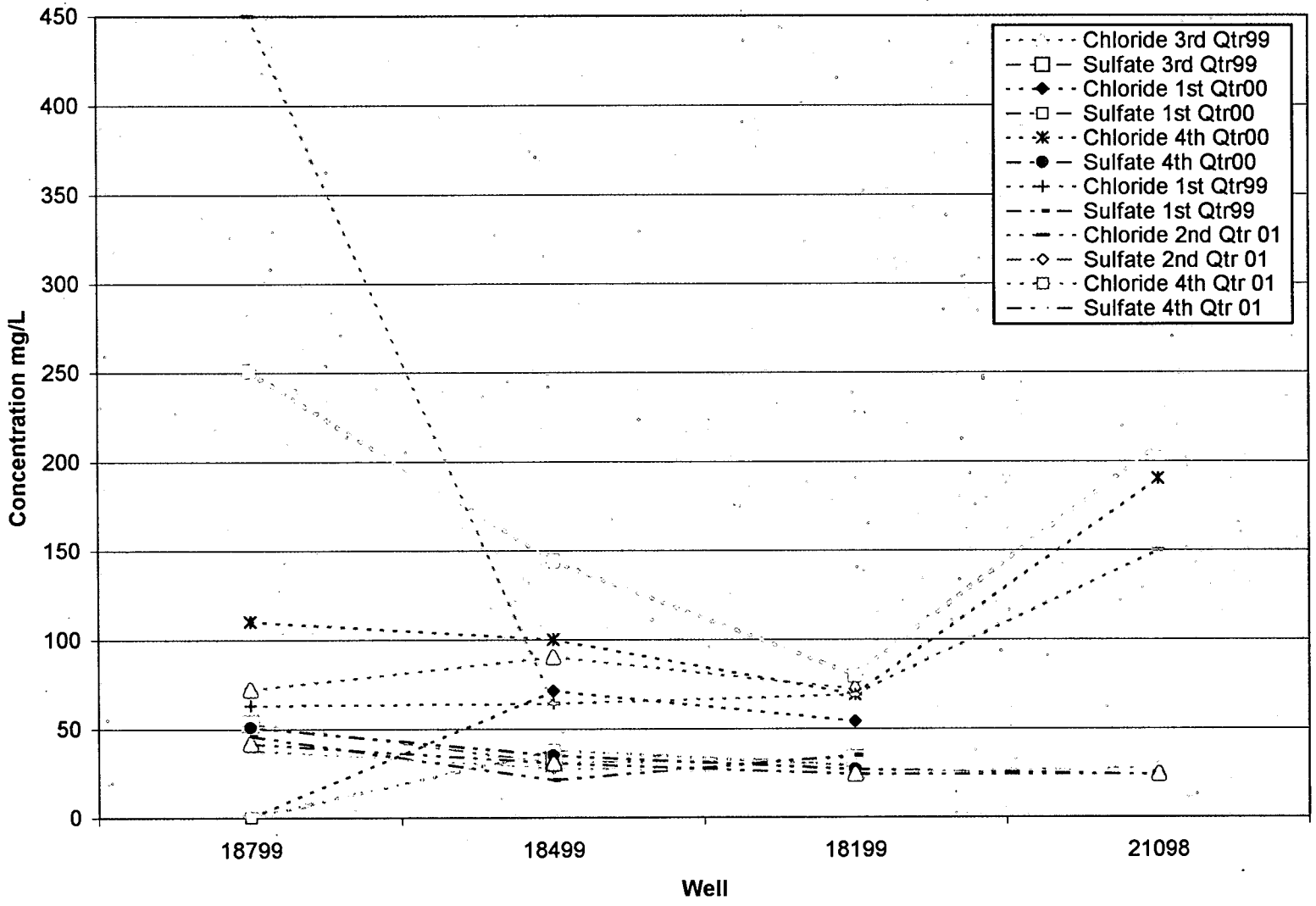


Figure 7- 6
Dissolved Oxygen and Ferrous Iron at IHSS 118.1

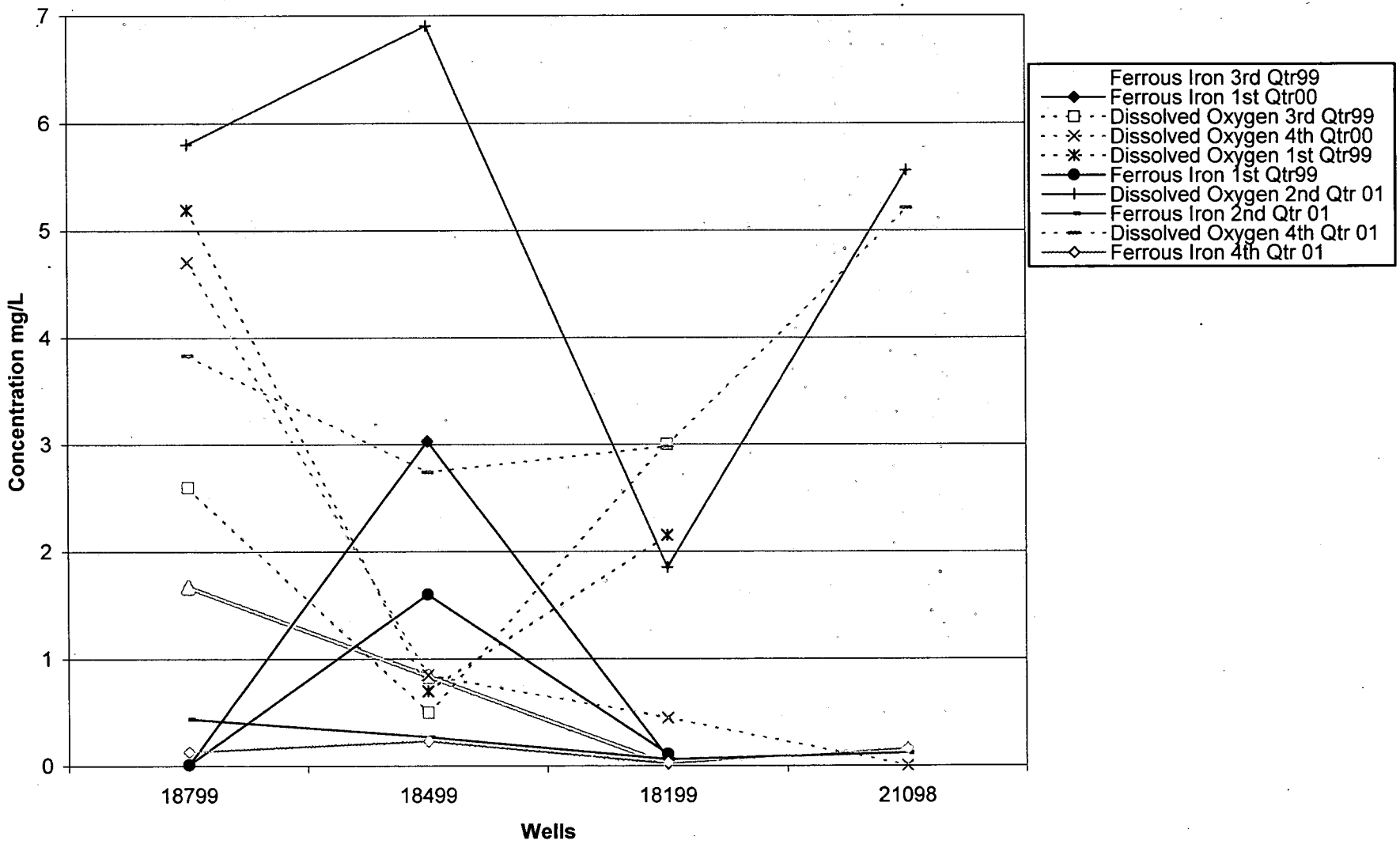


FIGURE 7- 8
Sulfate, Sulfide, Nitrate, Chloride, TOC and Dissolved Oxygen for Ryan's Pit Plume Degradation

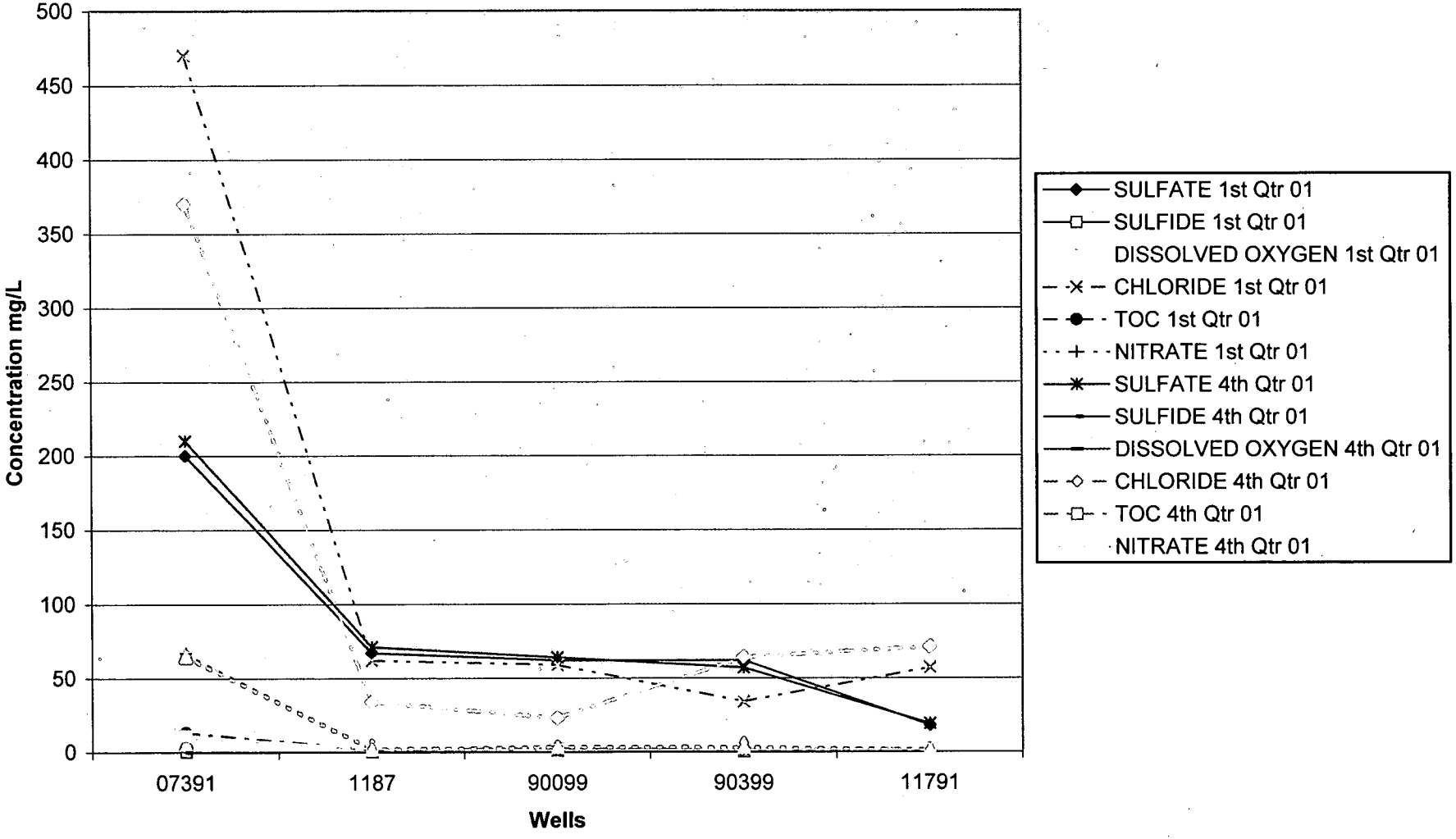


FIGURE 7 - 9
Carbon Tetrachloride Breakdown Chain, Ryans Pit Plume Degradation

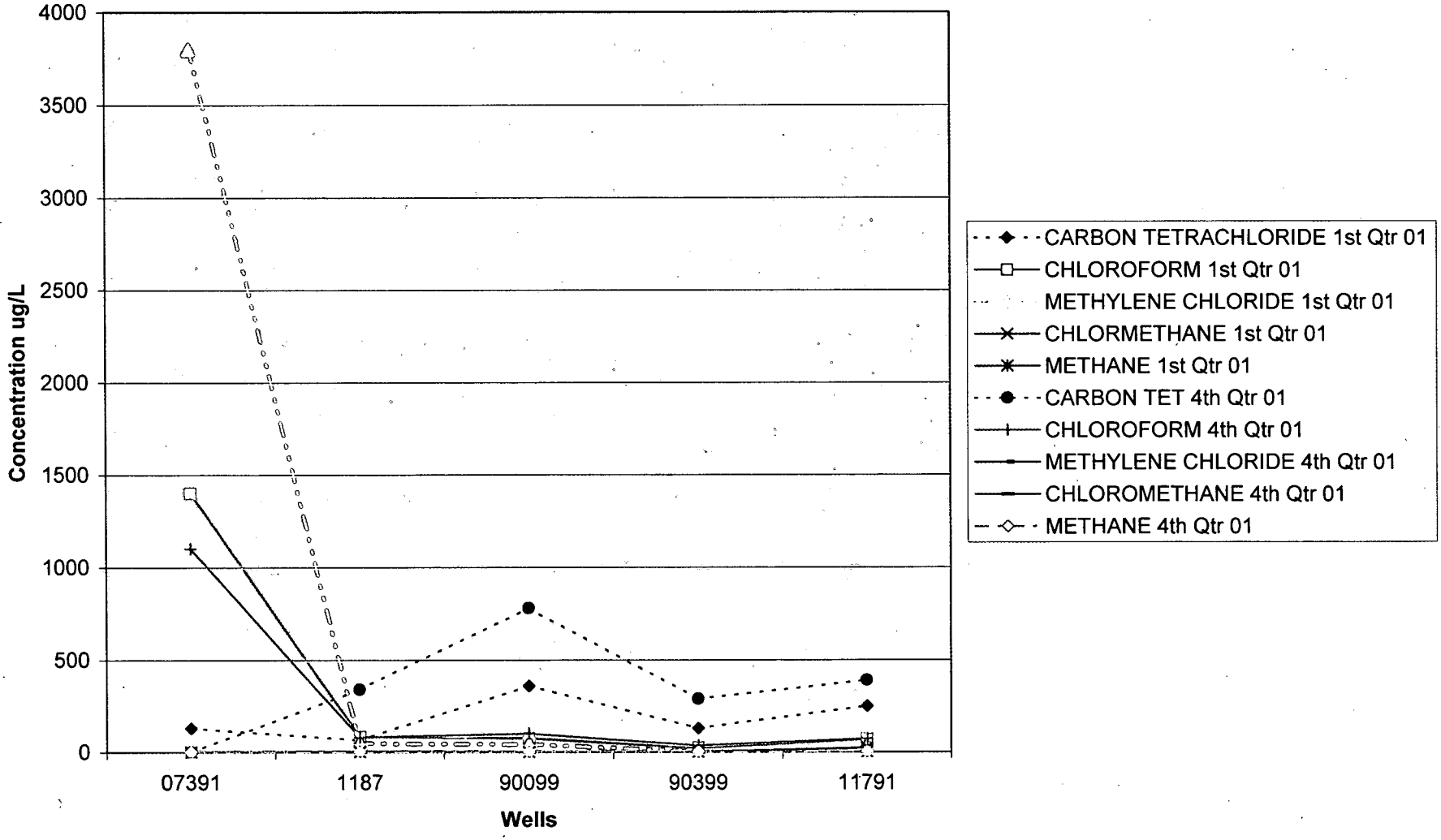


FIGURE 7 - 10
Tetrachloroethene breakdown chain, Ryan's Pit Plume Degradation

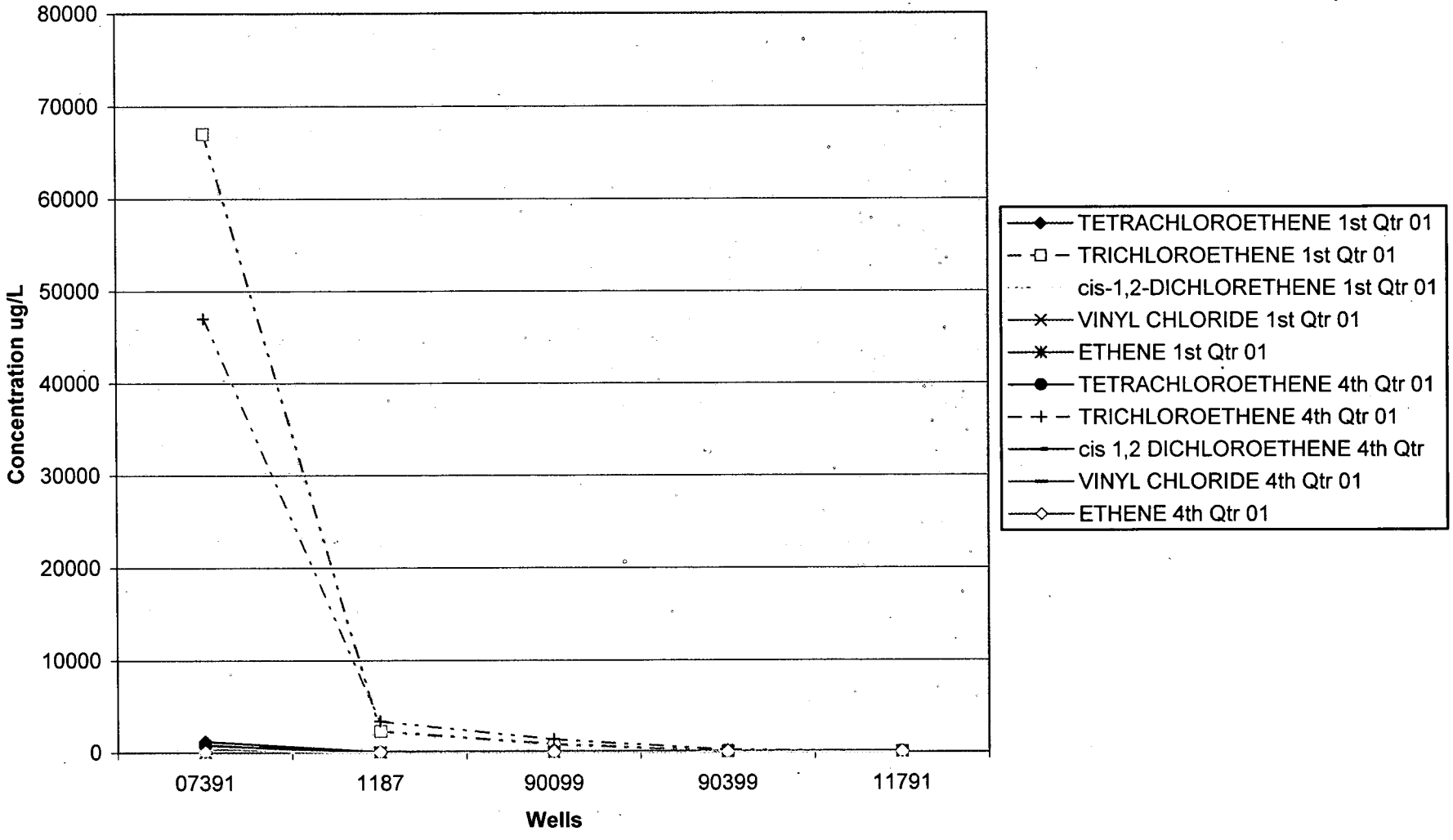


FIGURE 7 - 11
Sulfate, Sulfide, Nitrate, Chloride, TOC and Dissolved Oxygen: PU&D Yard Plume Degradation

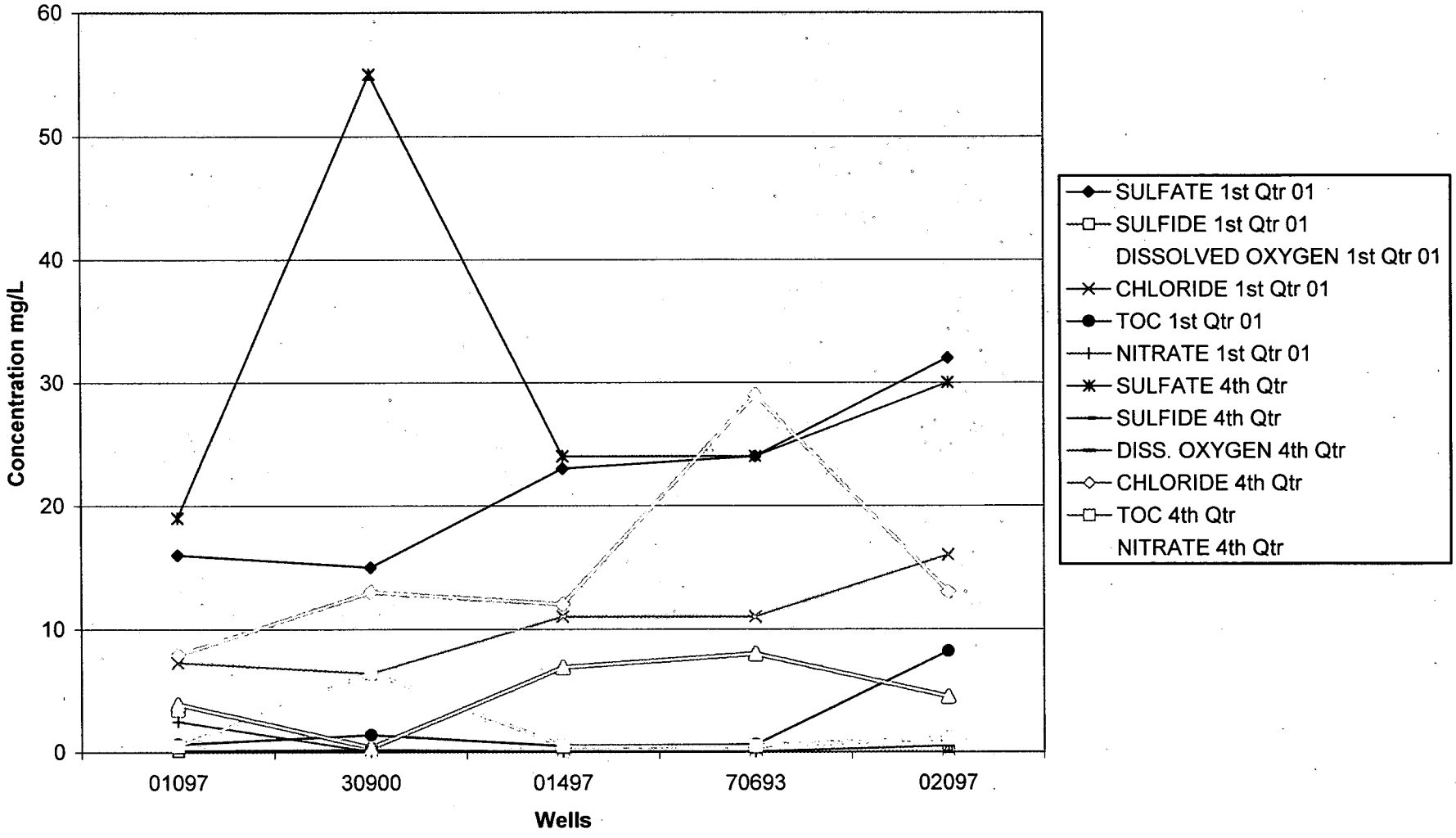
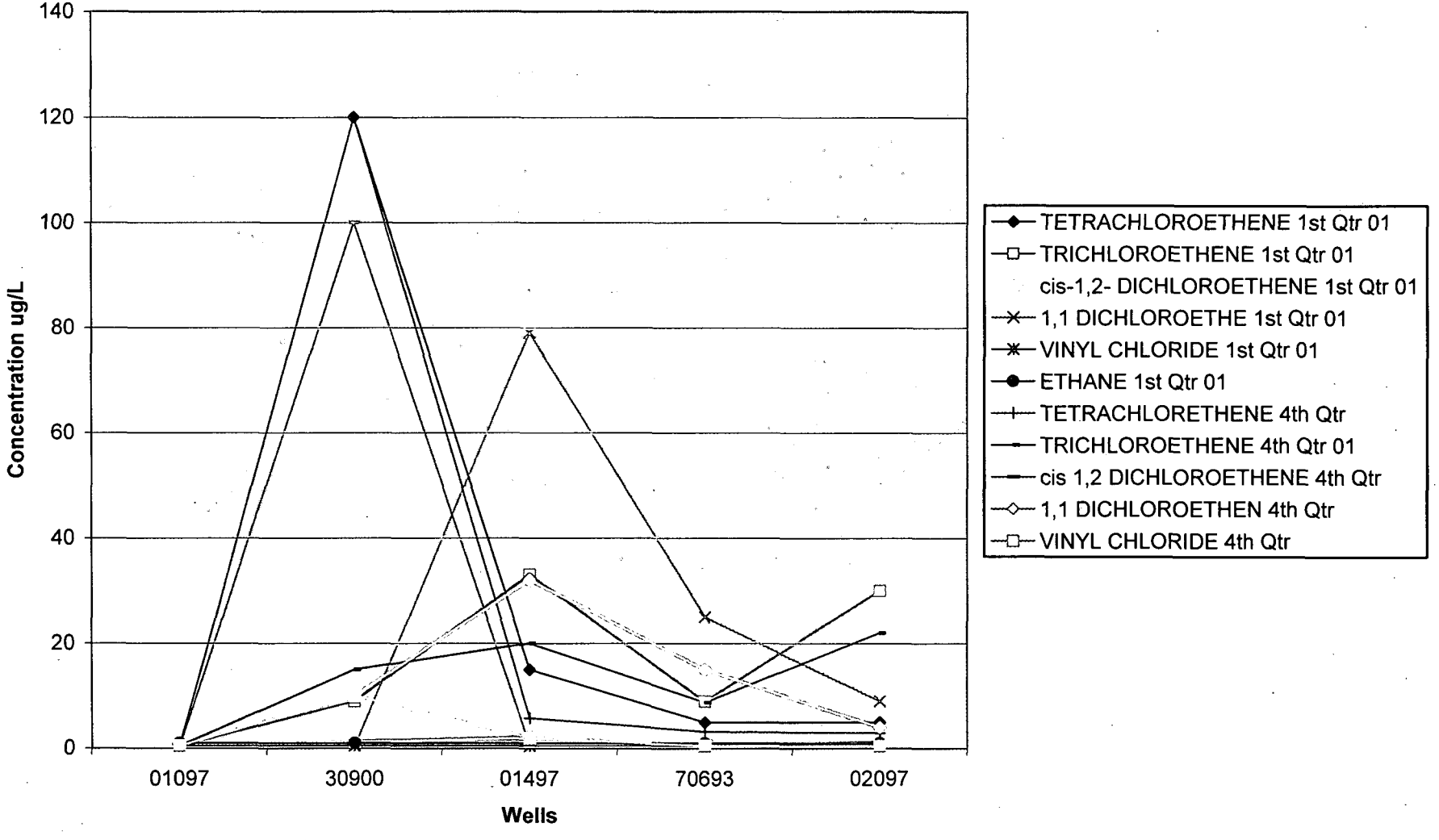


FIGURE 7 - 12
Tetrachloroethene Breakdown Chain: PU&D Yard Plume Degradation



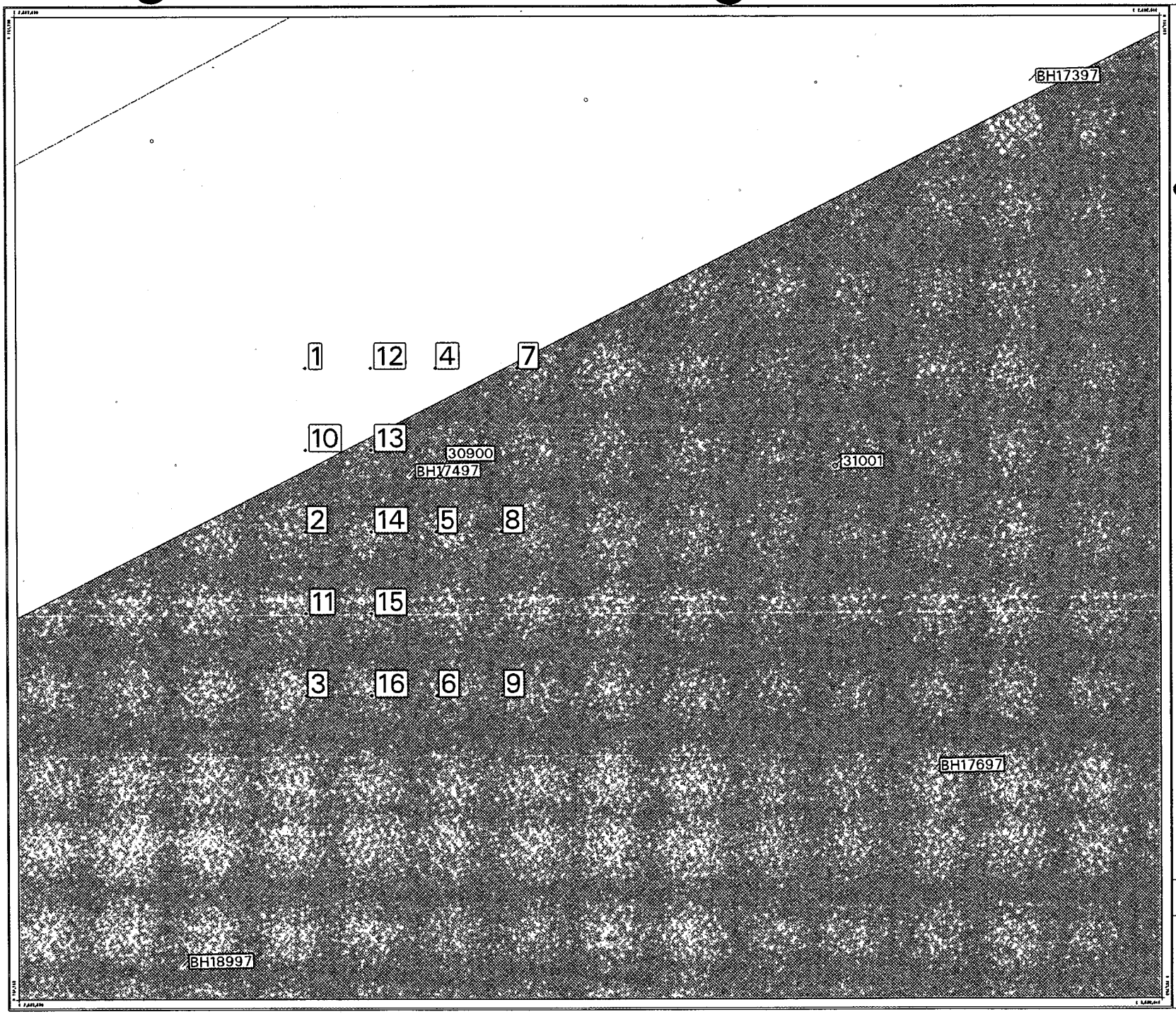


Figure 7-14

PU&D Yard Groundwater VOC Plume Material Insertion Point Configuration

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- PU&D Yard Monitoring Well
- Groundwater Monitor Well UHSU Surficial Material
- Groundwater Monitor Well UHSU Bedrock
- Groundwater Monitor Well LHSU Bedrock
- Borehole Locations
- Abandoned Monitor Well
- Material Insertion Point
- Composite VOC Groundwater Plume (concentration = MCL)
- PU&D Yard IHSS

Standard Map Features

- Buildings and other structures
- Landfill Pond
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

NOTES:
Source of GIS data available upon request.

DISCLAIMER:
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Scale = 1 : 50
1 inch represents approximately 4 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KAISER-HILL COMPANY

September 09, 2002

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8.0 GROUNDWATER EVALUATIONS

8.1 Groundwater ICP/MS Sampling Project

The ICP/MS project is a joint venture between CDPHE and RFETS to accurately determine the concentration of uranium isotopic species for areas with relatively high uranium at the Site. The project is an outgrowth of a smaller investigation done as part of the SPP investigation, which was completed in 1998 (RMRS, 1999f). The ICP/MS analysis is more accurate in determining uranium species than the standard alpha spectrometry analysis done at RFETS. ICP/MS calculates an isotopic mass as opposed to an activity, which is measured by alpha spectrometry, and is therefore less influenced by count time and masking effects. The goal of the ICP/MS sampling is to determine where anthropogenic uranium contamination is occurring at RFETS as opposed to natural uranium.

The 2000 Annual RFCA Groundwater Monitoring Report discusses the results from Uranium ICP/MS analyses that were received from July 1999 through August 2000. Table 8-1 in that report lists the wells that were sampled and the concentration of isotope species. Sample locations were chosen based on the known areas with high uranium concentrations as plotted on plume maps in the 1996 RFCA Annual Groundwater Monitoring Report (RMRS, 1997e)

Figures 8-1 and Figures 8-2a–c have been updated with the new ICP/MS sample results. Figure 8-1 is a plot of U-235/U-238 vs. U-236/U-238. A horizontal line denotes the .0072 ratio point for U-235/U-238. The vertical line denotes the zero point for U-236/U-238. As can be seen from the Figure, most wells plot near the .0072 point and suggest that natural uranium is represented in the majority of wells sampled. The ratios that occur to the right of the zero point for U-236/U-238 suggest that some U-236 may occur in these wells. Those wells that occur in the northeast or southeast quadrants of the Figure also show the effects of either enriched or depleted uranium. Figure 8-2a shows the locations of the wells sampled along with symbols that denote whether an enriched/depleted signature is present, and/or the presence of U-236. Figure 8-2b focuses in on the areas of the Site with anomalous U-236/U-238 ratios. Figure 8-2c shows anomalous U-236/U-238 ratios for the same area.

In 2002, twenty-seven additional wells and the discharge gallery from the Solar Ponds Plume Treatment System were sampled. These new locations received one round of sampling and are listed in Table 8-1. Figure 8-1 shows the new locations with anomalous signatures for U-235/U-238 and/or U-236/U-238 in red. Well 05193 showed a relatively strong enriched signature with a U-235/U-238 ratio of .0118. Well 41099 was near the mean +1 standard deviation line, suggesting a slight enriched uranium signature at .0081. Well 01791 was very close to the mean – 1 standard deviation line and suggests a slight depleted uranium signature of .0060. Well 05093 showed a U-235/U-238 ratio that was near the normal signature at .7646, but had a relatively strong U-236/U-238 signature at .000065. This is one of the highest U-236/U-238 values recorded from the ICP/MS sampling done to date. The Solar Ponds Treatment Discharge Gallery showed a minor signature for U-236/U-238 with was just above the mean + 1 standard deviation line and had a value of .000024.

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Wells 05193 and 05093 are located in the vicinity of the Solar Ponds and the signatures are consistent with other wells in the area, which may show either enriched or depleted uranium affinities. The Solar Ponds Plume Discharge location is where the results from the Solar Ponds Plume Treatment System discharge to the Walnut Cr. Drainage. Well 01791 is near Trench T1 (IHSS 108) and the Mound Site (IHSS 113). Trench T1 had drums of depleted uranium buried in it and may be the reason for the slightly depleted U-235/U-238 value in this well.

In conclusion, it appears that the resent results from the ICP/MS sampling are consistent with previous sampling events and the anomalous U235/U238 and U236/U238 signatures are reasonable given their location with respect to known IHSSs that have contained anthropogenic uranium. Also similar to previous results some wells that had high total uranium concentrations did not necessarily show anthropogenic uranium signatures. Wells 99401 (650 µg/L uranium), 83201 (400 µg/L uranium), and 86501 (123 µg/L uranium) were wells that had high uranium concentrations and were near former uranium production buildings. Well 99401 is adjacent to Building 991, Well 83201 is adjacent to Building 883 and Well 86501 is adjacent to Building 865. These wells all had natural uranium signatures even though they appeared to be likely candidates for anthropogenic uranium contamination.

Table 8-1 Additional ICP/MS Sample Locations

Sample	Sample	U-234	U-235	U-236	U-238		234/238*	235/238	236/238**
Single Value	05193	0.019499	1.968382	0.012352	168.084	170.084	0.000118	0.011860	0.000073
Single Value	05093	0.016061	1.696796	0.014593	224.749	226.476	0.000073	0.007646	0.000065
Single Value	P209689	0.003692	0.354454	<0.000032	47.100	47.458	0.000080	0.007622	0.000000
Single Value	B208189	0.002408	0.199829	<0.000035	26.918	27.435	0.000091	0.007271	-0.000001
Single Value	B210389	0.012457	0.998600	<0.000084	141.721	142.732	0.000089	0.007136	-0.000001
Single Value	P210189	0.000294	0.027021	0.000023	3.622	3.649	0.000083	0.007556	0.000006
Single Value	20098	0.006929	0.639021	<0.000063	91.707	92.353	0.000077	0.007057	0.000000
Single Value	0586	0.010959	0.621125	0.000089	91.162	91.794	0.000122	0.006901	0.000001
Single Value	70099	0.016887	1.581724	<0.000147	220.406	222.005	0.000078	0.007268	0.000000
Single Value	60699	0.009111	0.870028	<0.000176	121.067	121.947	0.000077	0.007280	0.000001
Single Value	41099	0.003019	0.289762	0.000042	36.630	36.623	0.000085	0.008078	0.000002
Single Value	88101	0.012644	1.058151	<0.000114	146.984	146.856	0.000088	0.007351	0.000001
Single Value	83201	0.028120	2.846510	<0.000309	400.109	399.719	0.000072	0.007264	0.000001
Single Value	5187	0.001031	0.094171	0.000020	13.143	13.131	0.000080	0.007316	0.000003
Single Value	10492	0.002170	0.197373	<0.000041	26.636	26.607	0.000084	0.007564	0.000001
Single Value	59793	0.003938	0.400361	<0.000042	56.864	56.805	0.000071	0.007189	0.000000
Single Value	59093	0.002900	0.242009	<0.000024	33.423	33.397	0.000089	0.007393	0.000000
Single Value	01791	0.000429	0.041389	0.000046	6.950	6.992	0.000063	0.006031	0.000007
Single Value	09691	0.002565	0.213451	<0.000022	30.274	30.490	0.000085	0.007141	0.000001
Single Value	12191	0.000352	0.031043	<0.000004	4.282	4.313	0.000083	0.007343	0.000001
Single Value	4386	0.000165	0.016834	<0.000004	2.367	2.384	0.000072	0.007204	0.000000
Single Value	4387	0.001302	0.135446	0.000027	19.121	19.257	0.000069	0.007174	0.000002
Single Value	99401	0.049657	4.718953	<0.000475	647.972	652.737	0.000077	0.007376	0.000001
Single Value	00897	0.000643	0.050728	0.000013	7.087	7.138	0.000091	0.007250	0.000003
Single Value	02291	0.000624	0.051671	<0.000005	7.199	7.251	0.000087	0.007269	0.000001
Single Value	86701	0.005921	0.648954	<0.000078	90.430	91.083	0.000067	0.007268	0.000001
Single Value	86501	0.008801	0.875186	<0.000100	121.927	122.809	0.000073	0.007270	0.000002
Single Value	SPP DIS GALLERY	0.003066	0.310715	0.000962	40.200	40.515	0.000078	0.007828	0.000024

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8.2 Industrial Area Plume Investigation

The Industrial Area Plume (IAP) is a broad area of chlorinated hydrocarbon contamination that has been previously identified and delineated from sampling data collected during the 1990s. The constituent organic compounds that comprise the plume include PCE, TCE, cis-1,2-DCE, carbon tetrachloride, and vinyl chloride. Existing sampling data were insufficient to accurately define the lateral extent of the interior regions of the plume and whether the highest concentration areas were related to single or multiple sources.

A groundwater evaluation was proposed in the early part of 2001 to identify potential source areas of groundwater contamination in the IAP and to refine the definition of the interior and higher concentration portions of the plume. This evaluation was designed to help assess future monitoring needs, to evaluate the potential for plume degradation, and to provide data for possible remediation of the IAP. The proposed investigation is described in a SAP (RMRS, 2001f) that was submitted to state and federal regulatory agencies for review and comments. The SAP was reviewed by the CDPHE and the EPA and was approved in October 2001. The SAP incorporates information and data interpretation from previous investigations conducted in this area.

The hydrogeologic site evaluation proposed in the SAP encompasses most of the area in the IAP and is bounded approximately by Cactus Avenue on the south, the former PA on the north, Eighth Street on the east, and Fourth Street on the west. The SAP proposed installing 14 wells to monitor groundwater quality in the IAP area and utilizing existing wells within the area that have not been sampled since the mid-1990s. Proposed monitoring well locations were selected along groundwater flowpath(s) associated with higher concentration areas to determine whether these areas have impacted downgradient portions of RFETS, and whether a uniform concentration gradient exists along the flowpath(s).

8.2.1 Industrial Area Plume Investigation Results

Monitoring wells proposed in the SAP in 2001 were installed in the early part of 2002. These wells were sampled in the 2nd quarter 2002 along with existing wells that have not been sampled since the mid-1990s. The data used to generate Figures 8-3 through 8-7 are the most recent data available in SWD from 1997 to 2002. The reader is referred to Plates 5 and 6 of this Annual Report for most currently mapped (through CY 2001) IA potentiometric data. Based on these plates, the configuration and direction of flow in the IA, as shown, appears to be consistent with the spatial distribution and configuration of the IA VOC plumes.

PCE Plume

Sampling data collected as part of the IAP investigation indicates that the lateral extent and configuration of the PCE plume has changed considerably from the configuration depicted in the October 2001 SAP (RMRS, 2001f). This earlier version of the PCE plume map assumed there was lateral continuity in PCE concentrations over interior portions of the plume emanating from four major "hot spot" areas (i.e., having a concentration greater than Tier I action levels). However, while recent data suggest that the hot spot areas are essentially the same, these data also

show these potential source areas have caused the formation of two separate non-contiguous plumes (Figure 8-3). Recent (July 2002) data indicate that the larger of the two PCE plumes, elongate and north-south in orientation on Figure 8-3, eliminates a previously uncontaminated area along Cottonwood Avenue at Well 40199 (a D&D Well for Building 444).

The source area for the northern portion of the elongate north-south PCE plume appears to be centered near the west side of Building 551. The spatial distribution and configuration of this elevated concentration area suggests that the PCE is probably migrating from the area around Wells P115589 and 84702 toward the northeast. PCE data from 10 years ago appear to support this conclusion since PCE concentrations were substantially higher then than they are now. The northernmost edge of this high concentration area does not extend much farther to the north-northeast, as wells in that area show PCE concentrations only slightly above Tier II action levels. The apparent source for the southern portion of this plume is located at the southeast corner of Building 444 (Well 41299).

A similar phenomenon may also be occurring in the southeast portion of the IAP in an area west of Building 883. Data presented on the SAP plume map indicated that PCE concentrations are approximately two orders of magnitude greater in well P320089 than current values. The highest concentrations presently exist farther east in Well 61199. These temporal and spatial changes suggest that the center of contaminant mass is migrating toward Building 883, possibly because of the groundwater sink created by the drain system around this building. Recently installed Well 84202, located between Wells P320089 and 61199, confirms the lateral continuity of this plume area from the area around P320089 toward Building 883.

Another area where significant change appears to have occurred is along the western edge of the plume in the area of Building 123. In this area, PCE concentrations in Well 10498 have decreased markedly from an average value of 255 µg/L as shown on Figure 2-3 of the SAP to 4.6 µg/L (Figure 8-3). While there is no known explanation or reason for this change, it should be noted that PCE concentrations in this well have exhibited unusual variation (with a range of 4.6 µg/L to 1400 µg/L) from the time of initial sampling in 1998 to the present. These periods of PCE variation appear to be inversely related to water level fluctuations; high PCE values appear to coincide with low water levels. Conversely, low PCE concentrations appear to occur when water levels are at there highest. This phenomenon suggests that dilution and the amount of groundwater available for mixing with contaminant concentrations are impacting concentrations.

The lateral extent of the plume along the northeastern edge in the area of Building 681 has also changed. Previously, the 5 µg/L contour line extended to the east of Well P215789. Data from newly installed Wells 84502 and 84402 and previously existing wells show that PCE concentrations are below Tier II levels in this area.

TCE Plume

Recent data presented on Figure 8-4 indicate that the lateral extent and configuration of the TCE plume has also changed in a similar manner to the PCE plume. Although concentrations have increased in several known hot spot

areas, the overall size of the plume has diminished substantially. In addition, an extensive uncontaminated area occurs along Cottonwood Avenue that divides the larger northern TCE plume from the smaller TCE plume centered on the west side of Building 444. In the SAP, this smaller plume area was shown as coalescing with TCE concentrations present in the northern areas near Building 551.

Data from newly installed Monitoring Wells 84002, 84102, and 84302 indicate that the lateral extent of TCE concentrations to the south of the B551 plume is limited and isolated, as illustrated by concentrations slightly above Tier II in the area of Wells 84202 and 61199. While the overall shape and configuration of the TCE plume has changed, the apparent source areas have remained the same. One of these areas is located on the west side of Building 444 in the vicinity of Well 40099. Recent TCE concentrations have declined in comparison to values shown on the earlier SAP plume map. TCE concentrations have also decreased in the hot spot area located at well P215789 from 758 µg/L to 512 µg/L.

The most noticeable change in concentrations has occurred in the area of newly installed well 85002 located north/northeast of Building 552. TCE was detected in this well at 1120 µg/L, indicating that this area may be a previously unknown contaminant source. Justification for placing Well 85002 in this location was to delineate the northernmost extent of contamination that presumably originated on the west side of Building 551. While the area on the west side of Building 551 may be the source of localized contamination, historical concentrations of TCE in Well P115589 have been significantly less than the concentration in Well 85002. Hence, contamination of the area around Building 551 is not a likely source of the TCE contamination found farther to the north.

In addition to the hot spot at Well 85002, current sampling at Building 559 D&D Wells has revealed that the extent of the TCE contamination is continuous to the northeast through Wells 22896 and 60299. Wells 55901, 56201, and 56301 (Building 559), all exhibit TCE concentrations greater than the Tier II action level.

Cis 1,2 DCE Plume

Recent data from the IAP investigation indicate that the cis-1,2-DCE contamination (Figure 8-5) is not as widespread as previously depicted on the SAP plume map (RMRS, 2001f). While an area of relatively elevated concentrations appears to exist in the area of Building 551, its western extent is limited by the low concentration (much less than Tier II) detected in new well 85102. A low concentration in Well 84802 also indicates that the plume does not extend continuously to the contaminated area in the vicinity of P114889 as was previously thought. Cis-1,2-DCE concentrations in this well appear to be appreciably less than the values noted on the SAP plume map. A potential source area located on the west side of Building 444 has not changed except that the cis-1,2-DCE concentration has decreased from 913 µg/L to 520 µg/L.

Vinyl Chloride

The configuration of the vinyl chloride plume, as drawn on Figure 8-6, is similar to the shape of the plume in the SAP (RMRS, 2001f). However, new monitoring Wells 85102 and 84602 indicate that the size of the plume is

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significantly smaller than that previously mapped. The plume does not extend as far to the west and also appears to be confined to the southern portion of Building 551, as noted by the lack of contamination found in Well 84602. Recent data show that vinyl chloride has increased in Well P115689 from 70 µg/L to 108 µg/L.

Carbon Tetrachloride

The carbon tetrachloride plume as shown on Figure 8-7 is also considerably smaller and focused more to the northeast than the plume drawn in the SAP. The present plume appears to be rather localized and confined to the area centered around Well P114689. Previously, the plume extended as far south as Well P115589.

Conclusions

The results of the IAP investigation indicate that VOCs such as PCE, TCE, and cis-1,2-DCE are not as prevalent and widespread as previously thought, and that multiple source areas have created several individual plumes that are not necessarily continuous with each other. With the exception of two areas, most of the source areas shown in the SAP are retained on Figures 8-3 to 8-7.

A new source area is located just north of Building 552 and west of Building 223A. A high concentration of TCE was detected in newly installed Well 85002. The magnitude of this concentration indicates that it cannot entirely be attributed to sources further south, specifically in the vicinity of Building 551 (near Well P115589). If contaminant transport of TCE occurred from this area in the past, the concentration of TCE or its parent product PCE here would have had to exceed the current TCE concentration in Well 85002. Instead, TCE concentrations in Well P115589 are more than one order of magnitude less than the level found in 85002. Historical data from Well P115589 also indicate that TCE and PCE concentrations have always been significantly lower than TCE levels reported in new Well 85002. However, a portion of the high TCE concentration noted in 85002 may be attributed to TCE, as a daughter product of PCE, migrating from a potential source in the area of Well 84702 or Building 552, which manages compressed gasses for the Site. This possibility is based on the configuration of the PCE plume centered around Well 84702 that shows PCE may be migrating to the northeast toward Well 85002.

Another area, which displays a noticeable change from the SAP plume map, is near Building 123. This area previously exhibited rather high concentrations of PCE, extending the plume farther west. The most recent sampling data indicate that PCE concentrations are below Tier II levels and the western edge of the plume has receded eastward toward Building 443.

Both the vinyl chloride and carbon tetrachloride plumes have also decreased in size and tend to be confined to relatively small and localized areas.

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8.3 Discussion of Volatile Organic Compound and Nitrate Plumes

Composite VOC and nitrate plume maps have been included in each previous Annual RFCA Groundwater Monitoring Report. These are most accurately considered "distribution" maps rather than true "plume" maps. This is because the different VOCs that are included in the map are grouped together and contoured, regardless of differing contaminant sources. "Plume" outlines depicted in the composite VOC map may therefore group multiple discrete analyte plumes into a single contoured shape on the map.

It is critical that the reader view the maps with this in mind, and that these maps not be used improperly. The purpose of the composite VOC/nitrate plume maps (such as the current Plate 13) is to define areas impacted by VOC contamination in order to assist in the definition of the RFETS groundwater monitoring program. This map may not be appropriate for other purposes. For example, it would not be appropriate to use this map to support decisions such as the design and location of groundwater intercept/treatment systems, except in a general sense. The composite map could be used to identify areas with VOC contamination in groundwater, but more detailed and compound-specific maps should be constructed to support the objectives and requirements for the planning and design of a groundwater intercept/treatment system.

The current composite plume map, Plate 13, does not reflect soil data, borehole data, soil gas data, etc. It is based solely on groundwater data. Those data are obtained predominantly from groundwater monitoring wells; however, data are also collected from footing drain outfalls, temporary well points, and occasionally from opportunistic grab samples (e.g., of groundwater that may be intercepted via borings through the foundation of a building).

Finally, it should be noted that Plate 13 reflects subjective interpretation of groundwater data and other information. The predominant forms of information used to construct this map include analytical VOC data, groundwater levels, building designs, geologic conditions, and Site history.

8.3.1 Composite VOC Plumes

For the 2001 Annual RFCA Groundwater Monitoring Report, new methods have been developed in an attempt to more accurately reflect the current configuration of the composite VOC and nitrate plumes and to show how the understanding of these plumes has changed over time. In previous Annual RFCA Groundwater Monitoring Reports from the 1990s (e.g., RMRS, 1997e; DOE, 1998a; RMRS, 1999m; and RMRS, 2000d), the composite VOC and nitrate plumes were based on averaged data. In most cases, data from 1991 through the reporting year were averaged, then contoured. In some instances (e.g., RMRS, 1997e), contours that would result from averaged data were modified using data from the reporting year; in such cases, modifications predominantly refined plume edges.

For the 2000 Annual Report (SSOC, 2001a), no data were averaged. Instead, the most recent data for each well were considered. This presented problems for some readers because data from wells that had not been sampled since the mid-1990s were posted and contoured alongside data from nearby wells generated during the reporting year. Changing programmatic and financial objectives brought this situation about; the groundwater sampling

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program was sharply reduced in the years after 1995 and targeted pathways to surface water, resulting in many VOC contaminated wells not being sampled after 1995.

The use of these older data along with the newer data to create the composite plume map in the 2000 Annual RFCA Groundwater Monitoring Report may allow some readers to draw erroneous conclusions from the map. The methodology used to create the composite plume map was therefore changed again, both to improve the product and decrease the potential for erroneous conclusions.

8.3.2 Methodology Used in the 2001 Annual Report

To rectify issues resulting from the methodology employed in previous Annual Reports, and to illustrate how knowledge and the configuration of the VOC and nitrate plumes has evolved, the 2001 Annual RFCA Groundwater Monitoring Report treats available data differently from previous Annual Reports while not excluding valid results gathered in previous years. The averaged data used to produce the VOC and nitrate plume maps included in the 1997 Annual RFCA Groundwater Monitoring Report (DOE, 1998a) were selected for inclusion as a background on the current composite plume map. That 1997 map was chosen because it represented the earliest RFCA Report that included a map based solely on averaged data; the previous Annual Report (1996) contained plumes based on averaged 1991-1995 data but which were then modified to reflect the 1996 reporting year.

Modification of 1997 Plume Map

The outlines of the 1997 composite VOC plumes published in the 1997 Annual RFCA Report (DOE, 1998a) were not changed or reinterpreted for this report, with two minor exceptions.

While the 1997 Annual Report used five VOCs to map the plumes, the 2001 Annual Report includes ten VOCs (Table 8-3). The five additional VOCs are included to be consistent with the box plot map (Plate 8), which addresses the same ten VOCs. Another reason for including additional VOCs is that the group of VOCs mapped in the 1997 Report omitted 1,1,1-TCA and its degradation products. Because this compound has been detected in monitoring wells at RFETS, inclusion of it and/or some of its degradation products is critical to obtaining a more complete understanding of groundwater contamination at the Site.

Table 8-3 VOCs Used for Composite Plume Maps and their RFCA Action Levels

1997 List of VOCs	2001 List of VOCs	Tier I (µg/l)	Tier II (µg/l)
1,2-DCE	1,2-DCE	7000	70
Carbon tetrachloride	Carbon tetrachloride	500	5
PCE	PCE	500	5
TCE	TCE	500	5
Vinyl chloride	Vinyl chloride	200	2
	1,1-DCE	700	7
	1,1,1-TCA	20,000	200
	1,1,2-TCA	500	5
	Chloroform	10,000	100
	Methylene chloride	500	5

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The 1997 map was reviewed along with the data for the five omitted VOCs to determine whether the plumes would have been different had all ten VOCs been mapped. Results for the compound 1,1-DCE from two Wells, P219189 and P115589, did cause minor adjustment of the plume outlines. At P219189, located north of the B771/774 complex, 1,1-DCE was consistently detected above Tier II; therefore, the plume contours were expanded to include this well. At P115589, which is adjacent to the main Site warehouse, this VOC was consistently reported above Tier I; therefore, the Tier I portion of the plume was enlarged to include that well. In both cases, the affected plume boundaries underwent only minor changes.

Boundaries from the nitrate plumes presented in the 1997 Annual Report were included without change. The 1997 plumes, modified as discussed above, are shown on Plate 13 in outline form. The contours represent RFCA Tier II and Tier I Action Levels.

Apart from the exception noted above, no modifications to the 1997 plume map were made. This is a critical point: if it is not fully understood, erroneous conclusions and interpretations may result from inspection of Plate 13. To clarify, the 1997 plume outlines were not modified to indicate areas in which those plume outlines were inferred. The 1997 plume outlines were not modified where later data contradicted the 1997 contours, nor were they adjusted where a reinterpretation was warranted, or for any other reason. The 1997 plumes were left as published except where the additional VOCs forced the changes described above. Data from 1998 through early 2002 were used to provide a second, updated set of plumes as described below. In areas lacking such later data, the older (1997) plume outlines were honored because there are no groundwater data supporting a change. Different well symbols are used on Plate 13 to indicate data availability, and show areas in which the lack of post-1997 data was a factor.

Use of Current Data in the Plume Map

Plate 13 includes color-filled plume outlines that are shown as overlays on the 1997 base map. These plumes are based on averaged data from 1998 through early 2002. By comparing the outlines of the 1997 plumes with those based on more current data, changes in the groundwater conditions and the understanding of groundwater contamination at RFETS can be appreciated. Changes in groundwater conditions may result from source removal actions, the installation of groundwater treatment systems, and degradation of VOCs. The understanding of groundwater conditions has improved mainly through the installation of additional wells, but also through additional research into products historically used at the Site and their storage and disposal.

Wells monitoring the LHSU were not considered for this evaluation because previous studies have shown the LHSU to be unimpacted by VOCs or nitrates (EG&G, 1994a).

Analytical data were handled as follows. Results for the ten VOCs listed in Table 8-3 from 1998 to 2002 were extracted from SWD for the entire Site. The following criteria were used to develop the VOC data set:

- Invalid data (qualified with "R") were not used nor were QA/QC data such as matrix spikes and matrix spike duplicates.VOCs that were not detected at least once were eliminated from the data set by comparing the total number of samples collected to the total number of detected results;

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- Duplicate data were found by running a duplicate query;
- Duplicate data were manually removed from the data set;
- For VOCs with at least one detected value, non-detect results qualified with "U" were replaced with one half the detection limit; and
- For instances where "real" and "field duplicate" data were reported, the highest of the two was retained in the data set and the lower result was omitted.

The remaining data were used to calculate the minimum, maximum, average, and ratio of the average to Tier II levels at every sampling location for each of the ten VOCs.

Finally, the highest average concentrations, with respect to their corresponding Tier I and Tier II levels, were plotted and contoured to create the current composite VOC plume map (Plate 13).

8.3.3 Discussion of VOC Plumes

The collection of additional data in 2001 and early 2002 has improved the quality of Plate 13. Specifically, sampling of the southern IAP in 2001, the main body of the IAP in early 2002 (which included many new wells), and wells around the SEPs in early 2002 generated useful data for areas that had not been thoroughly sampled for several years. Sampling of wells on and adjacent to the 903 Pad, which were subsequently abandoned, occurred too late in 2002 for data to be received and included in this Annual Report.

Expanding the list of VOCs to ten compounds did not result in large-scale changes to the map. The VOCs that were most commonly detected above Tier II levels continue to be TCE, PCE, and carbon tetrachloride. However, the additional analytes did affect plume configuration in a few localized areas of the Site.

As with previous composite VOC plume maps, three main plumes and several smaller plumes are evident on Plate 13. The three dominant plumes are the IAP, 903 Pad/Ryan's Pit/East Trenches/Mound Plume (for convenience, referred to collectively as the OU2 Plume), and the PU&D Yard/Present Landfill Plume. These plumes are discussed in that order below; discussion of the smaller plumes is presented last.

8.3.3.1 Industrial Area Plume

The IAP shows significant changes between the new interpretation and that presented in previous Annual Reports. These changes are due to the combination of samples from additional wells (both newly installed and pre-existing), the addition of analytes to the composite plume map (Plate 13), and perhaps to some extent the revised methodology. The IAP is now shown as three separate plumes; there is a larger northern plume, a smaller southern plume, and a Solar Ponds area VOC plume.

A line of wells, each of which reported below Tier II average concentrations of the ten VOCs mapped, separates the northern and southern portions of the IAP. Only one of these wells (84302) is newly installed to investigate the IAP; the other four (10598, 40199, P218289, and P414189) have been in place longer, but the latter two were not routinely sampled. The strip of land separating the two plume components, based on averaged data, runs along

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Cottonwood Avenue on the west and then trends slightly north of east to the intersection of Central Avenue and 8th Avenue.

Southern Component of the IAP

The southern component of the IAP includes part of the southern 400 Area, Building 664 and much of the 600 Area, part of Building 883, and extends south almost to Woman Creek. This plume contains only one well that consistently exceeds Tier I concentrations: well 40099, located upgradient (west) of the Building 444 complex. Samples from this well consistently exceed the Tier I action level for TCE and Tier II action levels for 1,1-DCE; 1,2-DCE; and PCE. This well is located within or in the immediate vicinity of several IHSSs that may explain these contaminants. In particular, as discussed in the HRR (DOE, 1992a), the location now occupied by Building 460 was identified in aerial photographs from 1965 as a drum storage area (part of IHSS 157.2); a cooling tower pond was present in an area immediately west of the well (IHSS 136.1); spills and leaks with possible soil and groundwater impacts occurred immediately south of the well (IHSS 116.1); and a drum storage area immediately east of the well (IHSS 182) showed an area of heavy dark staining in 1982 aerial photographs.

Wells in the 1997 Tier I portion of the plume that extends into this southern component of the IAP did not produce samples averaging Tier I concentrations for the 1998-2002 data.

The Tier II plume contours have been modified with respect to those presented in 1997, largely due to data from wells installed after that Annual Report was issued. Well 40099, on the western margin of the plume, is discussed above. Wells installed in 1999 as part of the EIAP investigation (61099 and 61199), together with wells installed in support of the D&D of Building 883 (83101) and the IAP investigation (84102), have produced samples supporting slight adjustments to the eastern margin of this plume. The southern and southwestern margins are unchanged. Results from the mid-2001 sampling of numerous wells around the southern tip of this plume, in the Woman Creek valley, did not support changes to the plume configuration in this area.

Several sampling locations have reported elevated concentrations of VOCs that may be related to the southern IAP. In particular, the Building 881 foundation drain sump, SW13494, is shown as an isolated location exceeding Tier II. Most likely, the source of this contamination (mostly PCE) is that portion of the southern IAP that extends to Building 883. Foundation drains for Building 883, for the tunnel between Building 883 and Building 881, and for Building 881 overlap and may be connected, providing a pathway for contaminants to reach sampling location SW13494.

Well 86701, located on the southern side of B865, produces samples that exceed the Tier II concentration for TCE. Because that portion of the IAP that is closest to this well is predominantly composed of PCE, the contamination at well 86701 is drawn as isolated from the plume.

Two wells (60993 and 61093) on the hillside south of B460 are shown as exceeding Tier II in the 1997 plume outline. More recent data (i.e., from the 1998-2002 time period) are not available to confirm or deny this condition.

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Northern Component of the IAP

The northern component of the IAP includes part of the northern 400 Area, the 500 Area, and IHSS 118.1, and extends northeastward to include the western portion of Building 771. Several wells, in three separate areas of this northern component, produce samples exceeding Tier I concentrations of one or more of the ten VOCs examined for this section.

The largest Tier I area is in the southern part of this component of the plume, and includes three wells (85002, P114689, and P215789). Although grouped together, the contamination in these three wells varies from TCE in wells 85002 and P215789 to carbon tetrachloride in P114689. The extent of this Tier I area is sharply reduced relative to that published in the 1997 Annual Report. The change is almost entirely due to wells installed in 1999, 2001, and 2002, along with newer data from some wells previously mapped within the Tier I boundary causing them to be excluded from the current Tier I boundary.

Average concentrations from two wells (84702 and P115589) near the western and southwestern margin of the Tier I contour approach Tier I action levels. One new well (84602) located just south of this Tier I area produces samples with VOC concentrations below Tier II action levels.

Another area of groundwater contamination exceeding Tier I concentrations is located in the vicinity of IHSS 118.1, once the site of a carbon tetrachloride tank with documented spills. The primary contaminant here is carbon tetrachloride. Investigations and well installations in 1997 through 2000 support significant change to the configuration of this area of Tier I contamination relative to that mapped in the 1997 Annual Report, including separation of the Solar Ponds area VOC plume as discussed below.

Investigation of IHSS 118.1 and well installations within and immediately adjacent to it have produced groundwater samples having the highest VOC concentrations to date at RFETS. DNAPL is present in wells in the source area (the IHSS and locations just to the east), with carbon tetrachloride concentrations as high as 69 percent (690,000,000 µg/l) obtained from some samples. A well installed in 1998 (21098) shows Tier I concentrations of carbon tetrachloride are present in groundwater northwest of the IHSS, and a well installed in 2000 (00700) indicates Tier I levels of this compound are present at the northern side of Building 776. (Well 21098 was replaced in mid-2002 with a 2-inch diameter well, the identification of which is 21002, and which will be reported on in the 2002 Annual Report.) Migration of the carbon tetrachloride plume is strongly affected by the B771 foundation drain north of IHSS 118.1. Wells installed east of the IHSS do not contain Tier II concentrations of carbon tetrachloride or any other of the ten VOCs examined for this section.

A third Tier I area focuses on well 22896, which is located between the Building 559 laboratory and Building 566 laundry facilities. TCE is the primary groundwater contaminant at this location. TCE concentrations were routinely measured in the thousands of µg/L here until after July of 2000; the next sample event, in January 2001, produced samples with 1550 µg/L; and the following events, which were in September 2001 and March 2002, have been

under 200 µg/L. The cause of this decrease is unknown, but may relate to the ongoing closure of the Building 559 laboratory or increasingly dry conditions. Note that because averaged data are mapped, rather than most recent concentrations, this well is still shown as exceeding Tier I action levels.

The western margin of the northern component of the IAP is significantly different from the 1997 version. Installation and sampling of wells 84902 and 10498 on the western edge of the plume have caused slight adjustment to these margins. Installation and sampling of the North Protected Area Plume (NPAP) line of wells along Sixth Street west of the 700 Area and the North Patrol Road north of the Building 771 complex has shown that Tier II concentrations of various VOCs (predominantly TCE and carbon tetrachloride, with vinyl chloride in two wells and 1,1-DCE in another) extend west and north beyond the previously mapped plume boundary. Installation and sampling of wells supporting the D&D of the Building 771 complex have allowed the eastern portion of the Building 771 complex to be omitted from this plume. The western portion of Building 771 is retained within the plume, however, based on data from groundwater samples collected through penetrations of the building floor. Installation and sampling of wells supporting the EIAP investigation and D&D of Building 776/777 and Building 707 have reduced the size of this portion of the northern IAP.

One well, 00300, is contaminated with Tier II levels of TCE but is shown separate of the northern component of the IAP. This well is located on the southeastern corner of Building 707. While the contaminant characteristics support linking this well with the Tier II area near well 84502 to the southwest, other factors suggest it is a separate area of contamination. In particular, wells between 84502 and 00300 (most notably 60699 and 60799) are below Tier II action levels. Subsurface conditions, especially a narrow strip of deeper bedrock and correspondingly deeper water levels extending in a line from Well P215789 to Well 61399 and farther northeast (RMRS, 1999c), and the presence of foundation drains at Building 707, and many utility corridors between Wells 84502 and 00300, further support separation of Well 00300 from the main plume.

Solar Ponds Area VOC Plume

As noted above, installation and sampling of wells east of IHSS 118.1 support the display of VOC contamination in groundwater at the Solar Ponds area as a separate plume. Samples from the two easternmost IHSS 118.1 wells (18699 and 18899) and from Building 776/777 D&D Wells 00500 and 00600, produce data that average below Tier II for all ten VOCs examined for this section. These wells are directly between the carbon tetrachloride plume source (IHSS 118.1) and the well showing highest levels of VOC contamination at the Solar Ponds (Well P210189). Well P210189, which is not in the routine monitoring program but was sampled in early 2002 to support the Solar Ponds investigation (see Section 9.3), produces groundwater samples with Tier I concentrations of carbon tetrachloride and TCE (6600 µg/L and 3000 µg/L, respectively, in March 2002). Wells in IHSS 118.1 do not contain similarly high concentrations of TCE, further supporting separation of the Solar Ponds area VOC plume from the IAP. Other wells within the Solar Ponds area VOC plume from which data are available for 1998 through early 2002 are all contaminated with Tier II levels of TCE.

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Causes for the high VOC concentrations reported at location P210189 are not known, and can only be theorized at this time. One possible explanation is that this contamination relates to the fact that this well is installed in a location that was once occupied by the original, unlined evaporation ponds (the predecessors of the current Solar Ponds), which were situated in the general area now occupied by Pond 207C and the Building 779 slab. Unlined ponds probably would have leaked, and could have received a large variety of liquid wastes that might cause the elevated concentrations of VOCs present in groundwater at this well. While only low concentrations of VOCs are reported to have been disposed in these original ponds, the possibility remains that higher concentration liquids may have been inadvertently dumped there.

While this is a simple explanation, other wells in the area once occupied by the unlined ponds do not show similar levels of VOCs, nor do soil samples collected during Solar Pond characterization activities. If liquid wastes dumped in unlined ponds were the reason for the high concentrations at P210189, one might expect to find similar levels in the soils and at nearby Wells 02497 and 00100, both of which are less than 100 feet south of Well P210189 (within the general area of the original ponds), and are represented by data from the 1998 through early 2002 timeframe. Instead, samples from Well 02497 do not exceed Tier II and those from 00100 are in the low Tier II range (average 40.9 µg/l TCE).

An alternate source for the contamination detected in samples from P210189 is leaking lines (such as process waste lines) or the buildings in the vicinity. However, one might reasonably expect such a source to have more of an impact on other nearby wells. At this point, the source for the contamination detected in P210189 is not known.

One possible factor in the contamination detected here is that the screened intervals and materials are different for these three wells. Well P210189 is screened in shallow bedrock, 02497 is screened almost entirely in alluvium, and 00100 screened in the lower alluvium and upper bedrock. The bedrock screened by Well P210189 is described as sandstone, while that at 00100 is predominantly siltstone with minor sandstone. But the bedrock contact at Well P210189 is significantly deeper than at the wells immediately south. The deeper bedrock may indicate the presence of a bedrock scour or paleochannel that exposed subcropping sandstone at this location. Neither the original topography at and around well P210189 nor the extent of the apparent bedrock scour at this location are known. (Aerial photographs that predate the Site indicate the area was probably relatively flat.) None of wells west, south, and east of P210189 appear to be affected by such high concentrations of VOCs as Well P210189, so if a scour is present and exerts a control on these elevated concentrations it may extend to the north (currently occupied by Pond 207-C). Newly installed wells along the northern side of the Solar Ponds may assist in determining the northern extent of the Tier I contamination, and will be included in the 2002 Annual Report.

The configuration of the Solar Ponds area VOC plume, aside from its separation from the IAP, is different from that shown in the 1997 contours in that it extends farther towards the east to include Wells 41693 (in the berm separating Pond 207A and Pond 207B-North) and 05193 (at the base of the eastern berm of Pond 207B-South). The Tier I core of this plume is reduced to include only well P210189.

The Solar Ponds are currently undergoing closure activities. In support of those activities, numerous wells on and adjacent to the berms were abandoned during the summer of 2002. While pre-abandonment sampling for selected analytes was performed, those data are not yet available and will represent the last data for the affected wells. Also in support of closure activities, several new wells were installed as mentioned above along the northern and eastern sides of the Solar Ponds and, together with two pre-existing wells, will be monitored routinely. Results of the pre-abandonment and new monitoring will be presented in the 2002 Annual Report. Because routine sampling in the vicinity of the Solar Ponds has been sharply reduced over the past several years, results of this monitoring combined with pre-existing data should provide additional information on the Solar Ponds area VOC plume.

8.3.3.2 OU2 Plume

As noted above, the term "OU2 Plume" is used to refer to the 903 Pad/Ryan's Pit/East Trenches/Mound Plumes.

While outlines of the Tier I portions of the OU2 Plume have changed somewhat, the overall configuration of this plume shows few changes between the newer (1998 through early 2002) plume outlines and the older (pre-1998) outlines. This is largely due to a lack of new data for the vast majority of wells in this area, as is evident from well symbols used on Plate 13. Components of this plume will be discussed in the order listed in the previous paragraph.

903 Pad

Sampling of 903 Pad wells (those on and immediately adjacent to the 903 Pad) in 1998 provided new data on this source area. According to these data, the Tier I portion of the plume at the 903 Pad is smaller, excluding several wells previously enclosed within the Tier I contour. Data from additional pre-abandonment sampling of 903 Pad wells conducted in summer 2002 are not yet available, but will add to the clarification of groundwater conditions at the 903 Pad that will be presented in the 2002 Annual Report. Data more recent than 1997 are not available to indicate whether the Tier I core still exists east and northeast of the 903 Pad to merge with the East Trenches portion or the SID portion of the Ryan's Pit Plume. However, VOC data from well 11791, which is located on the hillside east of the 903 Pad and is primarily contaminated with carbon tetrachloride, do not exceed Tier I concentrations, causing adjustment of the Tier I contours in this area.

Groundwater contamination in 903 Pad wells is predominantly in the form of carbon tetrachloride and, in some wells, PCE. TCE is occasionally present but in significantly lower concentrations (only in Well 06691 does it exceed Tier I concentrations; in some wells where it is detected, it is below Tier II concentrations). Methylene chloride and/or 1,2-DCE are also present in some wells.

Two wells were installed in 2002 that, together with four pre-existing wells, will be monitored in support of closure activities at the 903 Pad. Data from those wells and from the pre-abandonment sampling of wells removed prior to the start of these closure activities will assist in the evaluation of 903 Pad groundwater contamination in the 2002 Annual Report.

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Ryan's Pit

Routine sampling of wells in the vicinity and downgradient of the Ryan's Pit source area, together with the installation and routine sampling of several additional wells in 1999 along the SID, has provided data for this area in the 1998 through early 2002 timeframe.

The Tier I core of the Ryan's Pit portion of the OU2 Plume has been enlarged to include two wells near the SID (1487 and 90099). This link is somewhat tenuous, and is based in large part on the contaminant characteristics of samples from Wells 1487 and 90099. However, those characteristics also support linkage to the southward-extending tongue of 903 Pad Tier I contamination.

Wells nearest the Ryan's Pit source area (Wells 07391, 1287, 09691, and 1187) produce groundwater samples with greater than Tier I concentrations of TCE. Wells 1287 and 09691 contain no other VOCs (of the ten examined for this section) at concentrations above Tier II. Well 07391 also produces Tier I concentrations of PCE, chloroform, and 1,1,1-TCA; Well 1187 also produces Tier II concentrations of carbon tetrachloride and PCE. This "chemical fingerprint", loosely defined as predominantly TCE and minimal carbon tetrachloride, distinguishes Ryan's Pit groundwater contamination from the predominantly carbon tetrachloride and secondary PCE groundwater contamination seen in 903 Pad wells.

Wells 90099 and 1487 at the SID appear to reflect mixing of these two differing plumes. Samples from Well 90099 exceed Tier I for TCE, indicating a Ryan's Pit source. However, samples are high in carbon tetrachloride also, generally in the Tier II range but on occasion exceeding the Tier I level. Low Tier II concentrations of PCE are also reported from this well. This indicates some component of 903 Pad groundwater contamination. Conditions at well 1487, which has only been sampled once in the 1998-2002 timeframe, are reversed; results exceed Tier I for carbon tetrachloride, indicating a potential 903 Pad source, and are slightly less than Tier I for TCE, indicating potential Ryan's Pit contribution. The east-west line of wells installed in 1998 along the SID has not been resampled and therefore contributes little to the analysis of groundwater chemistry in this area.

The chemical fingerprint data may be taken as evidence, but does not establish proof for the mixing of 903 Pad and Ryan's Pit groundwater. There is a potential for degradation products to be at least partly responsible for the observed contamination. Even so, the evidence for mixing was used to support the linkage of the 903 Pad and Ryan's Pit Tier I plumes in the 2000 Annual Report. But because there are no wells or data to conclusively support changing the 1997 Tier I contour, this link is not drawn on Plate 13.

The Tier II outline of this portion of the OU2 Plume has been updated in several areas. First, it is expanded to include Well 6286, which has produced groundwater with Tier II average concentrations of carbon tetrachloride. It is also expanded to include Wells 90099 and 90399, and is adjusted to reflect one-time sampling data from the line of Geoprobe wells installed in 1998. It is adjusted to exclude wells farther east along the SID (east of Well 90199) and the eastern members of the 1998 line because average VOC data from those wells do not exceed Tier II.

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East Trenches

Interpretation of groundwater conditions around the East Trenches area of OU2 is strongly hampered by a lack of data (Plate 13). As a result, few updates to the 1997 contours can be made.

The 1998-2002 Tier I portion of this area of the plume is adjusted to exclude several wells previously included within the Tier I contours. Wells 12191, 11891, 12691, and 05691 are all represented by Tier II average VOC concentrations. In the case of Wells 11891 and 12691, both occasionally exceed Tier I for carbon tetrachloride but the average values are below the Tier I concentration of 500 µg/l. The Tier I contour still encloses Well 3687 because averaged data exceed Tier I for TCE.

Wells 95199 and 23296, north and downgradient of the ETPTS, produced samples that averaged less than Tier I for the ten VOCs of interest for this section, and therefore the northernmost extent of the Tier I contour has been adjusted to end at the ETPTS.

Because of a lack of data, updates to the Tier II contours in the East Trenches area are not supported by 1998-2002 data. Wells east and south of the eastern lobe of the East Trenches portion of the OU2 Plume continue to produce samples that are below Tier II for the ten VOCs examined for this section. Wells within the Tier II contours are not sampled. Well 95099, located near the eastern end of the ETPTS, produced samples that were below Tier II for the ten VOCs, causing the Tier II contour in this area to be updated to exclude that well.

Mound

Post-1997 VOC data support few updates to the 1997 contours of the VOC plume at the Mound area. This is due in part to a lack of data, and in part to unchanged geochemical conditions. The Tier I portion of the plume is still shown as extending northward from wells 1987 and 2087, south of well 00897, even though the source, which was in the same area, has been removed. Because those wells have not been sampled in the 1998-2002 timeframe, it is not known whether concentrations have decreased below Tier I levels here.

The northern tip of the Tier I contour has been updated based on data generated since the installation of the MSPTS, which captures waters that had emanated from seep SW059. The seep, which was responsible for the western curl to the 1997 portion of the Tier I contour, no longer exists. The well closest to the seep, 15599, produces groundwater samples that do not exceed Tier I for the ten VOCs of interest to this section. However, the next well to the east, 15699, produces samples with average concentrations of TCE and PCE that exceed Tier I action levels.

Of the seven MSPTS wells (15199 through 15799), only those located downgradient of the MSPTS intercept trench (15599 through 15799) are monitored, so contours on the upgradient side of the trench are unchanged.

The Tier II contour is only slightly modified by the inclusion of data from 1998 and later. Because groundwater samples from MSPTS well 15799 average below Tier II action levels, the contour was updated to exclude this well and the easternmost limit of the MSPTS trench area.

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8.3.3.3 PU&D Yard/Present Sanitary Landfill Plume

Study of the PU&D Yard/Present Sanitary Landfill Plume has continued since the 1997 plume map was issued. The source area and margins of the plume were studied in 1997 via collection of soil samples and installation of monitoring wells, and associated investigations continued in 2000 and 2001. Additional wells were installed in two source areas and along the perimeter of the plume in 2000, and a treatability study of one source area was launched in 2001. (See Section 7.4.5 for a discussion of the treatability study.)

Contamination in the PU&D Yard area appears to take on different contaminant characteristics along the southern margin of the Landfill. In the PU&D Yard source area (wells 30900, 31001), contamination is predominantly PCE. As the groundwater flows eastward, its characteristics change; at wells 01497 and 70693, the main contaminant is 1,1-DCE; and in the distal, eastern end the main contaminant is TCE. While plume degradation may account for some of the changing character, it is an unlikely that this is the only cause, as discussed in the 2000 Annual Report (SSOC, 2001a).

The general outline of the PU&D Yard/Present Sanitary Landfill Plume is smaller, based on available post-1997 VOC data, than the outline presented in 1997. UpgradientWell 01297 and near Source Well 01397 are now excluded from the plume contours. The 1997 plume shows a Tier I area at Wells 30900 and 31001, those wells, installed since the plume was so mapped, show that post-1997 average concentrations of VOCs are below Tier II. Therefore, the 1997 Tier I contour is not reflected in the post-1997 contours.

Tier II conditions within the Landfill cannot be confirmed because wells no longer exist in that area. However, VOC data from Well 00597 on the southern margin of the Landfill shows VOCs in groundwater there average below Tier II concentrations, causing the contour to be adjusted here. The easternmost portion of this plume is reduced relative to that shown in 1997 due to the addition of new wells in 2000 and because average VOC concentrations in Well 77392 have decreased to below Tier II levels.

Additional wells and data along the southern margin of the PU&D Yard/Present Sanitary Landfill Plume support expansion of the plume to the south. The Tier II contour now includes Wells 01697, 61595, and 30100. A new well was installed in 2002, southeast of Well 30100, to monitor the pathway to surface water; analytical data for this well should be available for the 2002 Annual Report.

The treatability study at the PU&D Yard source area may be partially responsible for the decreasing concentrations shown at Wells 30900 and 31001. As noted in Section 7.4.5, groundwater contaminant levels in these wells increased sharply immediately following initiation of the study, then decreased. It has not been determined whether this represented liberation of contaminants followed by degradation, or liberation of a slug of contaminated groundwater that has since moved downgradient (to the east). The nearest well (01497) is monitored routinely and if the latter is the case, it should be evident in future sampling data.

8.3.3.4 Other Small VOC Plumes and Point Sources

As described above in the discussion of the IAP, isolated plumes exist at SW13494 south of Building 881, well 86701 south of Building 865, and Well 00300 southeast of Building 707. Each of these was reviewed in the discussion of the IAP and will not be addressed here. Similarly, there will be no further discussion of potential plumes within the Present Sanitary Landfill; see the preceding discussion of the PU&D Yard/Present Sanitary Landfill Plume.

The configuration of the 881 Hillside Plume, located in the IHSS 119.1 area, has changed to some degree from its 1997 depiction. The Tier I portion has shrunk considerably due to decreasing concentrations of VOCs in the collection well, 891COLWEL. However, Tier I VOC contamination has not been eliminated, as confirmatory sampling conducted in 2002 at Wells 32591 (located about 90 feet southeast of 891COLWEL) and 4387 (located about 20 feet northeast of 891COLWEL) has shown. Those two wells each produced samples with VOCs exceeding Tier I action levels. At Well 32591, TCE exceeds Tier I. At Well 4387; 1,1-DCE; PCE; and TCE exceed Tier I; and 1,1,1-TCA; 1,1,2-TCA; and 1,2-DCE exceed Tier II concentrations.

Contaminants at 891COLWEL that exceed Tier II levels include TCE and lesser amounts of PCE, carbon tetrachloride, and 1,1-DCE. Because 1,1,1-TCA and 1,1,2-TCA are part of a separate degradation chain, that is, they are not related to degradation of PCE, TCE, or carbon tetrachloride, it implies the presence of a source other than that monitored by 891COLWEL. Sampling of other wells in the immediate area has not been conducted. Even so, well 0487, located less than 150 feet downgradient of Wells 891COLWEL, 32591, and 4387, and routinely monitored, does not indicate this contamination is migrating toward surface water.

Isolated contamination is indicated by samples from Building 991 monitoring well 99301 (TCE at Tier II levels) and from drain outfall SW056 located south of Building 991 (Tier II concentrations of 1,2-DCE; TCE; PCE; and vinyl chloride). Contamination at Well 99391 is most likely a result of Building 991 operations, although there is a possibility it is from the Solar Ponds area VOC plume via the extensive foundation drain system supporting Building 991. Hampering a conclusive determination as to the source of this contamination is the lack of data from wells between 99301 and the Solar Ponds area VOC plume. The source of the contamination observed at SW056 is not known.

8.3.4 Recommendations

As more and more wells are abandoned across the Site, the ability to address questions about the configuration and sources of plumes is reduced. Rather than install many new wells to serve this purpose, it would be much more efficient to sample wells already in place before they are abandoned, and if necessary, install only a few new wells in critical locations. However, it is critical that these evaluations be based on sampling that is conducted within a relatively short time frame for each plume area; having data from different wells stretch across months or years and across varying potentiometric conditions will only hamper efforts to understand the groundwater quality in a given area. As part of this requirement, the seasonal behavior of wells in the various areas discussed below should be

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accounted for such that areas that are typically dry are sampled in the wettest times and areas that generally produce more groundwater can be sampled when other wells are not producing.

The OU2 Plume is represented predominantly by data from the early to mid 1990s. As noted in the discussion of this plume above, sampling of the 903 Pad area wells was recently conducted and should improve knowledge of that portion of the plume. More work at the Ryan's Pit portion of the OU2 Plume needs to be done. Specifically, installation of two to three temporary wells, equally spaced from a point between Wells 1187 and 90099 eastward to a point slightly west of Well 00491, would assist in the determination of whether the 903 Pad contamination and Ryan's Pit contamination mix as postulated earlier. Assisting this determination would be opportunistic sampling (i.e., during wetter conditions) of the line of wells installed in 1998 along the SID and the well points in the vicinity of Well 11791, together with the several wells located generally west of Well 07391. Also helpful in this evaluation will be data from newly installed well 90402, located a short distance southeast of the 903 Pad, and other 903 Pad Performance Monitoring wells.

Additional sampling of wells in the Mound and MSPTS area would assist in the understanding of that portion of the OU2 Plume. Those wells include 01791, 1987, 2087, 02091, 02491, and wells and well points around and upgradient of the MSPTS.

The East Trenches area is the most poorly understood component of the OU2 Plume. Dozens of wells exist in this area and could contribute greatly to understanding of this plume, yet only five within the main body of the plume are routinely sampled. It is therefore recommended that all UHSU wells within and adjacent to the East Trenches portion of the OU2 Plume be evaluated for viability and then be sampled for VOCs. As it is possible that all the wells not in the routine monitoring program will all be abandoned within the next year or two, it is critical that a thorough resampling of these wells be conducted in the near future.

In contrast to the OU2 Plume, the IAP and PU&D Yard/Present Sanitary Landfill Plume have been fairly well characterized in recent years. For the most part these plumes are represented by recent data. An exception to this statement concerns the Solar Ponds. Though investigated in early 2002 (see Section 9.3), this effort was very selective and focused on uranium and nitrate, not VOCs. The Solar Ponds are currently undergoing closure, which has included abandonment of many wells. Additional abandonments will be scheduled within the next year or two. Therefore, before these wells are eliminated a more thorough evaluation of the Solar Ponds VOC contamination should be undertaken. It is recommended that all UHSU monitoring wells and well points at the Solar Ponds that are not part of the routine monitoring program be evaluated for viability and then be sampled for VOCs. And because many of the monitoring wells shown at the Solar Ponds are actually well points that are typically 0.25 inches in diameter, there may be a need to install temporary wells to fill data gaps.

Another area in which understanding of groundwater contamination could be improved is the 881 Hillside. Though contaminant transport appears to be limited, numerous wells around the source area have not been sampled in many years. To confirm this condition, the wells should be evaluated for viability and a selection should be sampled to

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allow the configuration and components of this plume to be understood better. As with previous recommendations, sampling should be conducted within a short time frame.

Finally, wells in and around the Old Landfill (IHSSs 115 and 196) should be sampled for VOCs and other analytes as necessary. There are three main reasons to sample these wells. First, the single well (7086) that is routinely sampled in this area is insufficient to adequately characterize groundwater quality in and around the Old Landfill. Second, conditions shown as representing the 1991-1997 average concentrations at this location (Plate 13) need to be confirmed. The outline of one of the 1997 plumes is within IHSS 115. The 2000 plume map (SSOC, 2001a) includes a VOC plume that encompasses the same wells plus two others. However, with the exception of well 7086, no post-1997 data are available for these wells or any others in the vicinity of IHSS 115 or IHSS 196 to confirm current conditions. Third, the proposed closure strategy for the Old Landfill, which includes capping the landfilled materials, would presumably require removal of all the wells in the area of the proposed cap. Many of these wells are represented by little or no groundwater data and, as groundwater quality in and around the Old Landfill is poorly understood, this may be the best and final opportunity to collect the necessary groundwater data.

8.3.5 Nitrate Plumes

Nitrate plumes have also been redrawn using the methodology described above. As noted, no changes were made to the 1997 contours. Instead, as with VOCs, post-1997 data are used to show how and where conditions have changed. In areas lacking post-1997 data, the 1997 contours are assumed to be representative of post-1997 groundwater conditions.

Plate 13 shows the estimated extent of Tier I (1000 mg/L) and Tier II (10 mg/L) nitrate contamination in groundwater. For comparison, the background concentration of nitrate in groundwater at RFETS is 4.7 mg/l (DOE, 1993b). As with previous nitrate plume maps, the Solar Ponds are the source of the main nitrate plume at RFETS, with isolated occurrences elsewhere.

Solar Ponds Nitrate Plume

The 2001 Solar Ponds Nitrate Plume is similar in extent and configuration to that depicted in previous plume maps, with some notable adjustments. The Tier I portion of the Solar Ponds Nitrate Plume is reduced on its southeastern side but enlarged on its southwestern side relative to that shown in the 1997 contours. The reduction is due to a single 2002 result for Well 05093 and the enlargement is due to a single 1998 result for Well 42993; these results comprise the entire data set for those wells over the time period from 1998 through early 2002.

On the northern side of the Tier I contour, nitrate concentrations in Well 3086 have decreased below Tier I due to a single result from early 2002. The lobe extending to the northeast cannot be updated because of a lack of data.

Tier II contours have been updated in several areas across the Solar Ponds. On the southwest, the contour was extended to include Well 02397, though it is arguable whether the elevated average nitrate concentrations in this

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well are continuous with wells at the Solar Ponds as drawn. The contours were adjusted to omit Wells 2586 and P207589 on the south of the Solar Ponds and several wells and sumps in the Building 783 foundation located southwest of the SEPs. Wells on the southwest corner and farther west and northwest of Pond 207C caused some adjustment of the contour mainly to reduce the size of the plume. Most of the wells on the immediate western edge of this pond are not represented by data over the 1998 through early 2002 timeframe.

North of the Solar Ponds, a well point within the ITS and wells farther north in the North Walnut Creek drainage were represented by data below Tier II concentrations for nitrate, supporting a small reduction in the size of the plume in this area. Farther east, available data from 1998 through early 2002 support the 1997 contour, though data are sparse in some areas.

903 Pad/Ryan's Pit

Four wells at the 903 Pad and one well at Ryan's Pit produced groundwater with elevated average concentrations of nitrate. Though not shown on the 1997 map, this distribution is similar to that shown on the 2000 plume map except that two distinct localized areas of elevated nitrate are apparent this year, as opposed to the connected plume presented in the 2000 Annual Report.

Isolated Occurrences of Elevated Nitrate

Several isolated occurrences of nitrate exceeding Tier II concentrations are scattered across the Site. Three occur in the general area of the PU&D Yard/Present Sanitary Landfill, at Well 01697 on the south side of the PU&D Yard; at well 00597 on the south side of the Landfill; and at Well B206989, east of the East Landfill Pond.

Six isolated occurrences of elevated average nitrate concentrations in groundwater are seen in the general IA area. Causes for each can be attributed to an adjacent facility, though this is by no means definite. One location, including wells 40599 and 41499, is on the northwestern corner of Building 771 and presumably is related to operations in the Building 771 complex. Another is at Well 22896, between the Building 559 laboratory and the laundry, and could reasonably be associated with operations in Building 559. Elevated nitrate has also been reported in samples from well 10598, on the southeast side of Building 123, another (now demolished) laboratory facility. In the case of well 10598, the elevated nitrate may be attributed to Vault 18, located a short distance upgradient, which has been the source of nitrate contamination in the past (RMRS, 1998g). Well P115489, near the Fire Department and RFETS gas station, also reported average concentrations of nitrate above Tier II, as did well P215789 near an electrical substation, and well 41099 on the north side of Building 886.

Elsewhere, Wells 10994 in the Woman Creek drainage south of the now demolished Building 850 and 10992 south of the 881 Hillside Plume show average concentrations of nitrate exceeding Tier II. The 881 Hillside occurrence may be explained by activities in the vicinity, such as in IHSS 119.1, though one would expect other wells in this area to reflect similar concentrations of nitrate. The reason for the elevated concentrations in well 10994 is not known.

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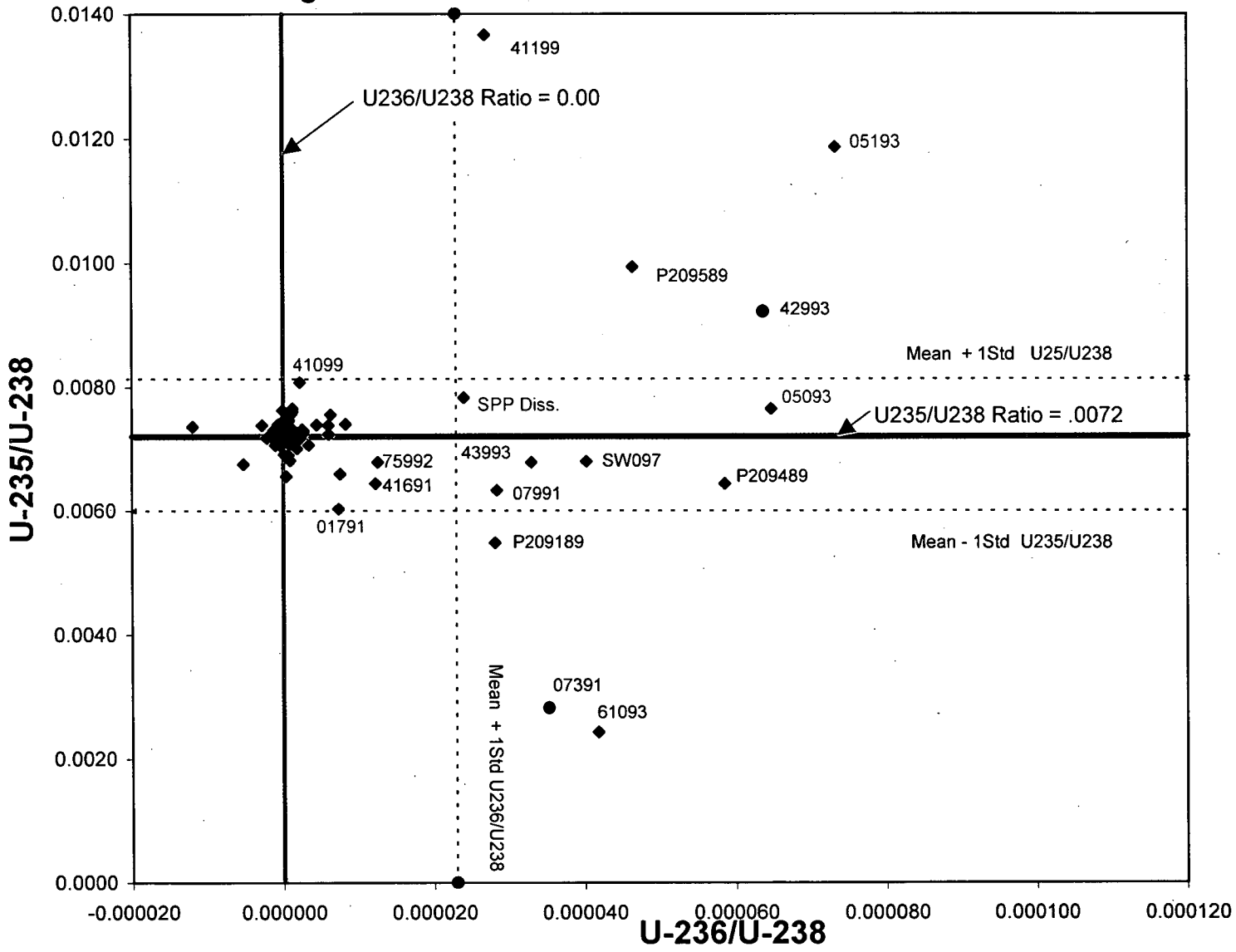
Figure 8-1 U-235/U-238 Ratio vs. U-236/U-238 Ratio



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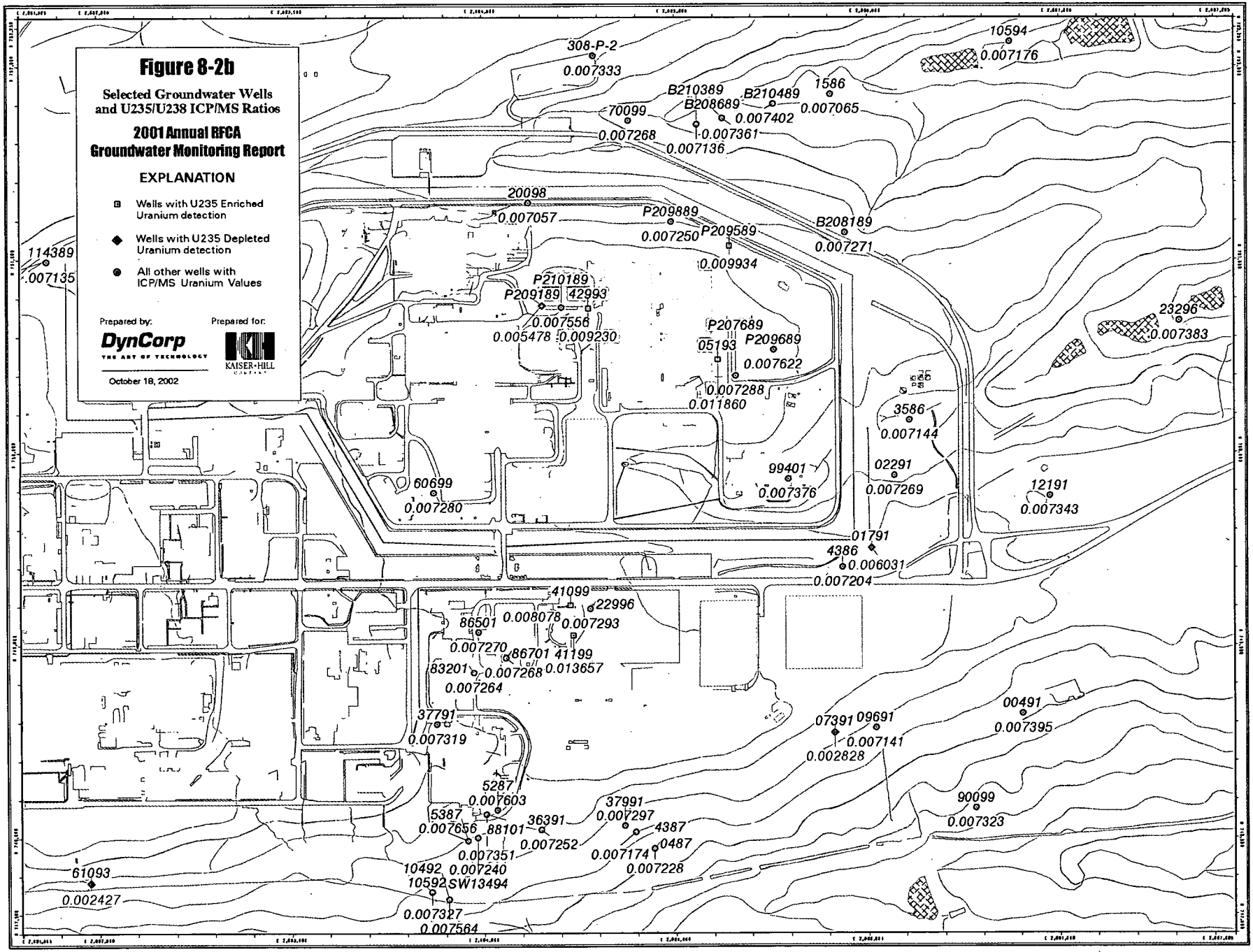
234



NT_Svr w:/projects/fy2003/03-0027/icpms235.aml

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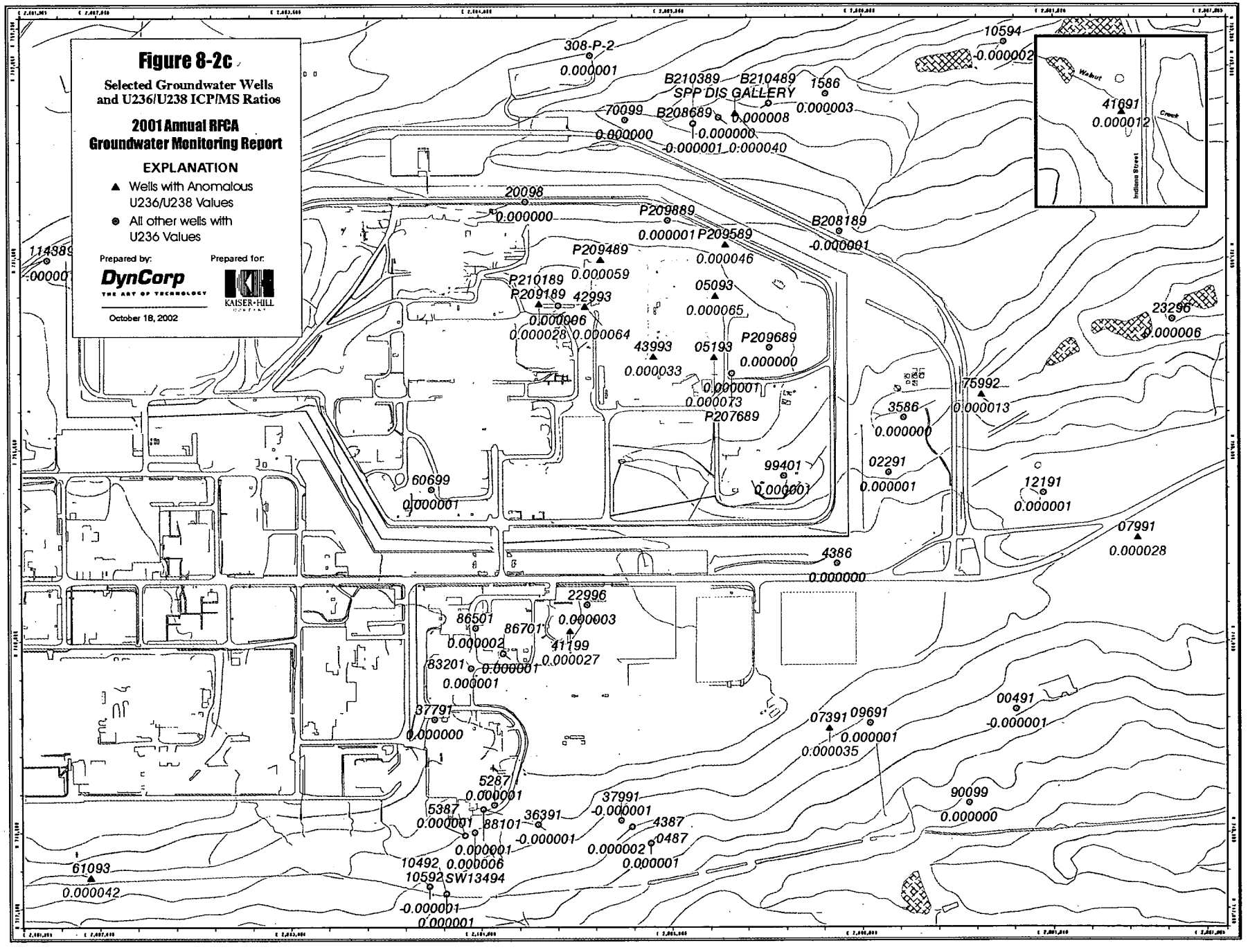

NT_Svr w:/projects/fy2003/03-0027/iopms236.aml

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9.0 GROUNDWATER CHARACTERIZATION ACTIVITIES

9.1 Actinide Migration

9.1.1 Introduction

During CY 2001, work continued on the Actinide Migration Evaluation (AME) pathway analysis with the evaluation and interpretation of data from actinide transport pathways (air, biological, surface water, and groundwater) at RFETS. In April 2002, two final documents were issued: the Actinide Migration Evaluation Pathway Analysis Summary Report (K-H, 2002a) and the Actinide Migration Evaluation Pathway Analysis Report Technical Appendix (K-H, 2002b). This section summarizes the portion of the AME project that pertains to the groundwater transport pathway.

9.1.2 Background

The effects of the potential for the migration of plutonium and americium from surface soils to groundwater have been considered by DOE, the K-H Team, and the AME group in the long-term remedial strategy for Site closure. Existing data on actinide migration at RFETS was summarized for the development of a conceptual model designed to gain an understanding of active actinide transport pathways at the Site (DOE, 1997a). Over 30 monitoring wells at RFETS have had groundwater Pu-239/240 and Am-241 activity-concentrations that exceeded RFCA Tier II action levels (0.15 pCi/L and 0.145 pCi/L, respectively) for these contaminants (DOE, 1997a). Groundwater interactions with surface water at RFETS are inevitable as virtually all shallow groundwater flows toward the major drainages and is eventually discharged to surface water via seeps, streams, and reservoirs. Consequently, groundwater was characterized as representing a potential long-term threat to surface water based on a preliminary review of the available data.

The presence of Pu-239/240 and Am-241 in groundwater samples at RFETS has been the subject of much speculation and study (EG&G, 1995e; CDPHE, 1996; DOE, 1997a; Harnish et al, 1994 and 1996; and Litaor et al, 1996). These contaminants are usually considered to be relatively immobile in the soil and groundwater environment because of their low aqueous solubility and tendency to strongly sorb on soil media (Cleveland et al, 1976; and Honeyman and Santschi, 1997). Most wells with exceedances of these actinides are located near potential source areas, such as the 903 Pad, but some are located at great distances from sources, including monitoring wells located at the east Site boundary along Walnut Creek. Colloid facilitated transport of radionuclides in groundwater has been reported in the literature as being a potentially important mechanism for radionuclide mobility in the subsurface. Alternatively, it has been speculated that well completion zones may have been cross contaminated when drilling through radionuclide bearing surface soils or sediments found near source areas. In addition, sample handling in the field and laboratory contamination have been raised as possible mechanisms of cross contamination.

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Because a significant disparity exists between observed versus expected Pu-239/240 and Am-241 groundwater contaminant distributions, further evaluation of historical groundwater Pu-239/240 and Am-241 data and potential transport pathways was undertaken in 1998 to assess the significance of groundwater action level exceedances reported for RFETS monitoring wells (RMRS, 1998f). This analysis concluded that much, if not all, of the Pu-239/240 and Am-241 contamination detected in groundwater probably occurs from residual surface soil contamination introduced to the borehole during drilling and well installation operations (drilling-artifact contamination). Groundwater samples collected from these wells using historical RFETS sampling techniques (i.e., bailing) have the unavoidable effect of suspending contaminated drilling-artifact soil materials, thus creating artificially high contaminant levels. Under these circumstances, existing groundwater sampling results are unreliable indicators of groundwater contaminant concentration and transport.

Well drilling and installation using special surface isolation casing (aseptic) techniques offer a means to minimize drilling-artifact contamination as a source for Pu-239/240 and Am-241 detections in groundwater samples. When paired with existing monitoring wells containing Pu-239/240 and Am-241 contamination, monitoring wells installed with aseptic surface casing techniques can 1) provide a basis for assessing the effects, if any, of drilling-artifact contamination on groundwater sample quality, and 2) allow for the collection of groundwater samples that more accurately represent contaminant concentrations and transport conditions. Aseptic monitoring wells were installed in 1994 to evaluate elevated Pu-239/240 and Am-241 activity-concentrations in the lower Walnut Creek drainage and to upgrade boundary monitoring well integrity in other RFETS drainages (EG&G, 1995e). No Pu-239/240 and Am-241 contamination above Tier II groundwater action levels was detected in any of the wells installed under this program. Until 1999, monitoring wells installed with aseptic surface casing techniques were not paired with existing monitoring wells to validate or invalidate radionuclide detections found in the original well.

Four monitoring well locations (50099, 50199, 50299, and 50399) were chosen to evaluate actinide groundwater quality associated with Pu-239/240 and Am-241 surface soil contamination areas. These locations are adjacent to existing wells 1587, 06991, 11791, and P313489, respectively, all of which have a history of elevated groundwater Pu-239/240 and Am-241 activity-concentrations. Three of these wells (1587, 06991, and 11791) are associated with wind-blown soil contamination from the 903 Pad and Lip Area. The fourth well is associated with surface soil contamination in the IHSS 160 area (Building 444 parking lot). A detailed description of drilling techniques, well installation activities, and sampling results can be found in the 2000 Annual RFCA Groundwater Monitoring Report (SSOC, 2001a) and additional details on project approach and sampling strategy and methodology were presented in the Actinide Drilling-Artifact Contamination Project Sampling and Analysis Plan (RMRS, 1999c).

9.1.3 Methodology for Quantifying Actinide Transport

Calculating actinide quantities transported offsite each year in shallow groundwater requires quantifying 1) the volume of shallow groundwater flowing offsite, and 2) the concentrations of different actinides in the shallow

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groundwater. The volume of shallow groundwater flowing offsite, or shallow groundwater flux, was calculated using the Site-wide Water Balance (see Section 9.2) model that utilizes the "MIKE SHE" computer code. This hydrologic model simulates all of the significant integrated hydrologic flow processes including overland flow, channel flow, and subsurface flow in the saturated and vadose zones. Lateral offsite shallow groundwater flow was computed for saturated conditions within the unconsolidated alluvial and weathered bedrock lithologies. For actinide transport analysis, offsite shallow groundwater flux volumes were estimated for water year 2000 (October 1999 through September 2000) for the Walnut Creek and Woman Creek groundwater basins. In addition to using model results for a normal precipitation year, shallow groundwater flux was estimated using precipitation data from the first half of 1995 when approximately twice the normal amount of precipitation fell. The model results using the 1995 data provide insight into shallow groundwater flows during wet conditions.

Shallow groundwater actinide measurements, collected from alluvial wells near Walnut Creek and Woman Creek at the eastern boundary of RFETS, were used to determine the concentration of actinides in shallow groundwater leaving the Site. The estimated annual shallow groundwater flux volumes for the Walnut and Woman Creek basins were multiplied by the average actinide concentrations within each basin to estimate the actinide loads transported offsite in shallow groundwater.

9.1.4 Plutonium and Americium in Shallow Groundwater

Soil samples collected near the soil surface (3 to 4 inches below original grade) at locations 50099 through 50399 confirm that shallow soils were contaminated with actinides (2.8632 to 489.2946 pCi/g Pu-239/240 and 0.6885 to 104.5068 pCi/g Am-241). Soil activity-concentrations at the base of the aseptic casing were below the target activity-concentration of 1 pCi/g in Wells 50199, 50299, and 50399, but exceeded the criteria at Well 50099 (6.0409 pCi/g Pu-239/240 and 1.0666 pCi/g Am-241). The presence of above target Pu-239/240 and Am-241 concentrations in this sample indicate that some shallow soil contamination was present when drilling was initiated through the aseptic casing. For this reason, the deeper soil samples collected from soil cores in this borehole were subsequently submitted for analysis. These cores represented undisturbed subsurface soils more closely than borehole wall or soil cutting materials. In all of the deeper soil samples, Pu-239/240 was not detected. While these core data imply that relatively clean drilling conditions were maintained below the base of the aseptic casing, there remains a potential for contaminated cuttings to have been brought downhole by the auger bit and/or flights. Therefore, although the Pu-239/240 or Am-241 contamination detected in groundwater samples collected from these wells may be the result of contamination by natural processes, the drilling and well installation processes continue to be potential contributors to contamination, as well as sample handling and laboratory procedures.

The results of 3rd/4th quarter 1999 groundwater sampling for all paired wells and 903 Pad Hillside wells are summarized below. Pu-239/240 activity-concentrations in groundwater ranged from below detection to 0.0601 pCi/L in the new wells and from below detection to 0.1067 pCi/L in the existing wells. Am-241 activity-

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concentrations were lower than Pu-239/240 in all wells except well 06991. Generally, Pu-239/240 and Am-241 activity-concentrations were lower for the new wells compared to the existing wells. From these results, it is clear that the actinide activity-concentrations at these locations are significantly lower than found in previous years, as reported in DOE (1997d). The results of groundwater sampling for the 2nd quarter 2000 event indicate that, generally, the data for bailed samples are consistent with the results of the 3rd/4th quarter 1999 bailed sample data. However, Pu-239/240 and Am-241 activity-concentrations detected in the new wells compared with the existing wells are more similar. Of the bailed samples, Pu-239/240 activity-concentrations in groundwater ranged from below detection to 0.148 pCi/L in the new wells and from 0.0217 pCi/L to 0.176 pCi/L in the existing wells. The difference in initial sample (0.148 pCi/L) versus duplicate sample (0.0179 pCi/L) Pu-239/240 values reported for well 50099 indicates that a potential for sample heterogeneity or analytical error or sample contamination (field or laboratory) exists in the data. Am-241 activity-concentrations were lower than Pu-239/240 in only a few bailed samples; the majority had either equivalent or slightly higher values with a maximum result of 0.126 pCi/L reported for well 1587.

9.1.5 Uranium in Shallow Groundwater

Samples collected at Site wells from July 1999 to August 2000 were analyzed using ICP/MS. Most samples indicated that uranium that was detected was from natural sources. However, alluvial groundwater samples collected near the Site boundary in both the Walnut and Woman Creek groundwater basins had U-235/U-238 mass ratios slightly less than the 0.0072 ratio found naturally. In addition, the same Walnut Creek boundary location had detectable levels of U-236, an isotope that only comes from a man-made uranium source. The presence of U-236 and the small variation from the natural ratio, though potentially related to analytical uncertainty, indicates that the shallow groundwater found in these basins may have a small fraction of man-made (depleted) uranium as part of the total uranium concentration.

9.1.6 Summary of Groundwater Pathway Analysis

Pu-239/240 and Am-241 are relatively immobile in unsaturated soils. Soil profile data collected at the 903 Pad over the past three decades demonstrate that movement is limited mainly to the uppermost 20 cm of soil. Small amounts of these actinides have penetrated deeper into soil presumably via macropores, which occur to a depth of about 100 cm below ground surface. Considering that over three decades have passed since these actinides were first released to 903 Pad area soils, the low activity-concentrations (<1 pCi/g) in soil and groundwater at and below 70 cm indicate that the actinide flux to shallow groundwater is expected to be greatly attenuated and therefore very small.

Pu-239/240 and Am-241 are found in low activity-concentrations (<0.15 pCi/L) in UHSU wells associated with surface and near-surface soil contamination areas. Pu-239/240 and Am-241 groundwater contamination is not generally found in areas outside of surface soil contamination areas, including the RFETS IA. This situation indicates that contamination from potential underground IA actinide sources, such as process waste lines and

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buildings, is not present in the UHSU. The only contamination found that was not attributable to surface soil contamination occurs at the Present Sanitary Landfill, where low level radioactive wastes were buried soon after landfilling operations began (see Section 6.0). Additional areas of localized contamination may still be discovered as environmental remediation activities and D&D monitoring programs for individual building closures are implemented during Site closure.

Recent sampling results from the actinide drilling-artifact contamination investigation indicate that trace activity-concentrations of these actinides found in UHSU groundwater are associated with locations of surface-contaminated soils. However, the Pu to Am ratios and presence of contamination in old and new wells does not totally tie the contamination to drilling artifacts. These results are generally below Tier II action levels and are significantly lower than activity-concentrations previously reported for older, paired, monitoring wells. The significance of these detections is still subject to uncertainty until analytical and/or sampling variations are better quantified and understood. Consequently, further investigation may be necessary to refine analytical and sampling techniques for the reliable measurement of low activity-concentrations of these actinides.

On the basis of uranium isotope high resolution ICP/MS analyses, anthropogenic uranium isotope contamination associated with Site activities has been detected in UHSU groundwater at various areas in the IA. However, much of the high uranium isotope activity concentrations observed are natural and not associated with contamination. Naturally occurring uranium isotope activity concentrations are observed to increase by approximately an order of magnitude from the west Site boundary to the east Site boundary. This trend indicates that a natural concentration gradient exists across RFETS, which must be considered when evaluating groundwater uranium isotope data. Other than anthropogenic uranium isotope levels in the SPP, the highest uranium isotope activity concentrations at the Site occur in background areas. Except for a few locations in the IA, anthropogenic groundwater uranium isotope contamination has not been detected in the UHSU.

9.2 Site-Wide Water Balance

9.2.1 Introduction and Objectives

During CY 2001, work continued on the SWWB project and culminated in spring 2002 with the completion of The Site-wide Water Balance Model Report for the Rocky Flats Environmental Technology Site (K-H, 2002c).

The RFETS is being closed and will eventually be converted into a National Wildlife Refuge. Anticipated closure activities will involve reconfiguring portions of the existing Site. These modifications will impact the current Site surface and subsurface hydrology. A comprehensive approach, incorporating mechanisms that govern the current Site hydrology, was required to understand and predict the potential hydrologic changes caused by anticipated closure activities. The hydrologic system is strongly influenced by surface water-groundwater interactions because

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of the semiarid climate that exists in the Front Range of Colorado. This complex regional hydrologic system is complicated locally by man-made modifications within the IA that impact both surface and subsurface flows.

The primary objective of the SWWB study was to create a decision tool to quantitatively assess the integrated hydrologic conditions at the RFETS. This section of the Annual Report summarizes the development and application of a fully integrated hydrologic model that was developed as a management tool. Specifically, this integrated model was used to: (1) comprehend and simulate current Site hydrologic conditions; and (2) assess the hydrologic impacts caused by hypothetical modifications to the current Site configuration during closure activities.

The integrated model was designed to simulate important drainage-basin scale processes that control RFETS hydrology. It was not designed to simulate localized flows in features such as individual pipes or culverts, nor to model contaminant transport or evaluate engineering designs. However, the model was developed so that its input and output could be used to facilitate contaminant transport evaluations or engineering design calculations.

9.2.2 General Approach and Conceptual Flow Model

To achieve the SWWB objectives, the following tasks were identified and conducted:

- Site-specific data were collected to support development of the conceptual and numerical hydrologic models (data included hydrologic, surface and subsurface IA, structural, topographic, geologic, soil, and vegetative);
- The conceptual hydrologic model was developed based on existing and collected Site knowledge;
- The modeling approach appropriate for the Site (including code selection and verification) was developed;
- The numerical model was developed based on a selected computer code;
- Model performance (including calibration, validation and sensitivity analysis) was evaluated;
- The model was applied to two hypothetical Site closure scenarios; and
- The model results were assessed for implications to Site closure.

In order to develop the numerical model framework, a conceptual model was developed for the flow system at the Site. The RFETS conceptual model considered the relevant surface and subsurface flow processes and their interactions, and Site features affecting flows. Separate conceptual flow models were developed for the IA and Buffer Zone. This was necessary to assess the different observed flow responses in each area. The fully integrated hydrologic model simulates the combined flow characteristics of both areas. Analyzing available Site information, including (1) past studies; (2) hydrologic and geologic data; and (3) engineering plans and details supported the conceptual model development.

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9.2.3 Numerical Model Approach and Design

The complex surface water-groundwater interactions within the RFETS hydrologic flow system required using a fully integrated computer code to create a flexible, yet comprehensive, management tool. After a detailed comparison of available integrated models, the MIKE SHE computer code was selected for the SWWB modeling. Details of the code selection process are presented in the Model Code and Scenario Selection Report (K-H, 2001c).

Semiarid conditions also compound the complexity of the Site hydrology, which requires using a transient modeling approach within this fully integrated system. Steady state models cannot reliably replicate the observed conditions at the Site, nor could a combination of non-integrated, media-specific transient model codes. Subregional scale models of hydrologic processes were developed to understand basic flow processes prior to simulating the fully integrated site-wide model. Model code verification results showed MIKE SHE was the most appropriate code for this application, capable of simulating the important RFETS hydrologic processes and their complex interactions.

Specific parameters and targets were identified and prioritized for the model calibration. Specific focus areas were specified where key decisions or Site hydrology would likely change in response to the hypothetical Site reclamation scenarios. Focus areas included: (1) the regional flow system; (2) major surface water drainages; (3) detention ponds; (4) specific contamination areas including the 903 Pad and Lip Area, the Original Landfill, and the Present Sanitary Landfill; (5) in situ groundwater treatment/collection systems; and (6) vegetation and animal habitat areas. Within the focus areas, additional effort was made to minimize the difference between model-simulated results and field measurements of the hydrologic system. The highest priority was given to accurately simulating surface water discharge from the IA to Woman and Walnut Creeks and from those drainages to the eastern Site boundary.

The integrated numerical model consisted of surface flow, vadose zone, and saturated zone components at discrete points on a grid. A 200 x 200-foot (approximately 61 x 61-meter) regularly spaced model grid was selected as the most suitable compromise between numerical efficiency and the solution accuracy required to meet the project objectives. In addition, time step ranges were used in the model to capture the rapid dynamics of the surface hydrologic system (0.5 minute time step) and slower response of the groundwater flow system (six hour maximum time step). Spatial precipitation distributions were specified from ten Site gauging stations every fifteen minutes, while potential evapotranspiration (PET) was specified every two hours based on a calculation from observed Site meteorological data.

The surface flow model simulates two-dimensional overland flow and one-dimensional channel flow. The channel flow network included both Walnut and Woman Creeks and most tributary branches. The A, B, and C series ponds and the East Landfill Pond were also incorporated into the channel network. Both channel flow and pond water interact directly with saturated zone flow. Drainage basin boundaries were used to define overland flow areas within the model, and detailed cross sections defined the channel flow network.

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The subsurface model simulates one-dimensional unsaturated zone flow and three-dimensional saturated zone flow. The unsaturated zone model accounted for the spatial distribution of soil types. Effects of the time varying, spatially distributed vegetation were simulated through the unsaturated zone as ET. The saturated zone model uses four model layers to describe flow within unconsolidated material and weathered bedrock units. The top two layers simulate the unconsolidated material, allowing for separate specification of building basements and subsurface utilities. The bottom two layers simulate the weathered bedrock material, allowing for separate specification of Arapahoe Sandstone features. Average hydraulic characteristics and properties of subsurface remediation systems, utility trenches and drains, water supply lines, and building basements in the IA were incorporated into the saturated zone model.

9.2.4 Model Performance and Scenario Evaluations

After completing the numerical model design, the fully integrated model was calibrated. Calibration was achieved by adjusting model parameters (within reasonable natural ranges) until the simulated model results compared well with observed data. The calibration data set period was water year 2000 (October 1999 through September 2000). Observed site-wide flow conditions at RFETS were well simulated by model results. Key findings of the calibrated model included:

- For the current Site configuration, the water balance differs greatly in the IA as compared to the Buffer Zone. For the water year 2000 climate, roughly 90 percent of the Buffer Zone precipitation was lost through ET, with less than 1 percent running off to streams. In contrast, for the IA, roughly 60 percent of the precipitation was lost to ET, with 15 percent running off to streams;
- ET dominated groundwater levels adjacent to streams, which in turn strongly affected streamflows. During high ET, groundwater levels declined near Walnut and Woman Creeks at the eastern Site boundary. In Woman Creek, this effectively eliminated stream flow in late spring and summer. During times of the year with low ET, groundwater levels increased. This causes increased baseflow contributions to Woman Creek with resulting increases in the total flow and peak flow rates in that drainage;
- In Walnut Creek, flows were dominated by pond releases. However, during periods with no pond discharges, precipitation events rarely caused streamflow in Walnut Creek because of high soil infiltration rates and low groundwater levels adjacent to streams;
- Groundwater level changes were affected most by vertical processes, such as ET and direct recharge from precipitation, and to a lesser extent by lateral groundwater flow. Groundwater flow directions were strongly influenced by local topographic and bedrock surfaces; and
- IA surface flows were comprised of fast runoff, baseflow, and drain inflows. The fast runoff causes rapid hydrograph peaks, while baseflow and drain inflows produced continuous low flow rates exiting the IA as surface water.

The performance of the calibrated model was further assessed through a sensitivity analysis and model validation. The purpose of the sensitivity analysis was to identify key parameters to which the model was most responsive. The most sensitive modeling parameter was saturated hydraulic conductivity. The largest component of the water balance was ET. The model validation performance was demonstrated using pre- and post-calibration climatic

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conditions. These simulations showed that the model performed well in simulating the hydrologic conditions of spring 1995 and water year 2001.

Model simulations were conducted for two hypothetical Site scenarios to evaluate changes based on water year 2000 hydrologic conditions. In the first scenario, the No Imported Water Scenario, imported water from offsite was discontinued. The Site normally purchases an average of approximately 420,000 cubic meters (110 million gallons or 340 acre-feet) of water annually from the Denver Water Board. The second scenario, the Land Configuration Scenario, also discontinued imported water and included the hypothetical regrading of topography in the IA, the Present Sanitary Landfill, and the Original Landfill. In the second scenario, IA changes included removal of all paved surfaces and foundation drains. Basement walls and slabs were left in place, with the exception of Building 771. Subsurface utilities were simulated as grouted, leaving backfill material in place; however, backfill material was simulated as removed for a subset of the process waste lines identified as having failed pressure tests.

For each hypothetical scenario, three climate conditions were applied to develop a range of simulated hydrologic responses. The three climate conditions represent average, wet, and dry years of precipitation for the Site. Finally, a Monte Carlo type of uncertainty analysis was conducted on the second scenario to assess the range of uncertainty in predicted output given uncertainty in sensitive model input parameters.

Several key findings about the change in hydrologic conditions from the present to the hypothetical Land Configuration Scenario were identified. These are summarized as follows:

- Regionally, most of the hydrologic system changes occurred within the regraded IA, the two modified landfill areas (Original and Present Sanitary Landfills) and to Walnut Creek, east of the IA;
- Surface discharge in Walnut Creek was substantially reduced, while flows in Woman Creek were largely unaffected;
- Walnut Creek discharges decreased for the following three reasons: (1) Waste Water Treatment Plant contributions to Walnut Creek were eliminated; (2) impervious surfaces in the IA were removed, thereby eliminating fast runoff; and (3) drain discharges to IA streams were eliminated;
- The number of required terminal pond discharges decreased in the hypothetical Land Configuration Scenario because of decreased flow from the IA;
- Average groundwater levels in the IA rose. Removing drain discharges and impervious areas caused groundwater to rise, whereas removing leaky water supply lines caused groundwater levels to decrease. The net effect of these changes was to increase IA groundwater levels; and
- Simulated discharges from groundwater remediation systems slightly decreased.

9.2.5 Implications to Site Closure and Potential Applications

Modeling results suggested that significant impacts to Site hydrology will occur for the hypothetical scenarios tested. These modeling results provide valuable insight into Site hydrology that will influence the RFETS closure

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strategy and long-term stewardship. Implications based on the simulated scenario results are summarized as follows:

- Surface and subsurface flows in Woman Creek will be largely unaffected. Therefore, vegetation along Woman Creek will generally not be affected by the Site reconfiguration. (Note: the SID was not altered or removed in the scenarios.) An exception to this may occur in the area south of the Original Landfill. This area may experience some localized diminished flows from hypothetical covers and cutoff walls. A more detailed analysis of this area should be performed; and
- Surface and subsurface flows in Walnut Creek will be substantially reduced. As a result of the diminished surface flows, future hydrologic conditions in Walnut Creek downstream of the IA will be dominated by pond operating protocols and any pond discharge routing or structural modifications. An additional effect of reduced flows in Walnut Creek is the possible impact to vegetation downstream of the ponds caused by lower groundwater levels along the stream channel.

Additional applications of the fully integrated hydrologic model developed for RFETS may include evaluating additional Site configuration scenarios. Other model uses could involve local scale modeling, contaminant transport evaluations or more detailed assessments of potential hydrologic impacts to vegetation and wildlife habitat (K-H, 2002c).

9.3 Current Solar Ponds Plume Investigation

In early 2002, Water Programs supported an investigation of the groundwater plume at the Solar Ponds. The objective of this investigation was to determine the current configuration of the uranium and nitrate plume in that area, and to collect additional data on metals.

The 2001 IMP includes several routinely sampled monitoring wells in the general area of the Solar Ponds, but because of their geographic separation, data from these wells are insufficient to determine the plume configuration. Therefore, to support the upcoming closure of the Solar Ponds, a more detailed survey of groundwater contamination was desired that would allow a "snapshot" of groundwater conditions, including an up-to-date plume map.

This section describes the investigation and summarizes its results. Because the topic of nitrates in groundwater is addressed in Section 8.3 (which includes Solar Ponds groundwater data), it will not be repeated here.

9.3.1 Description of Investigation

The Water Programs group supported the needs of the Environmental Remediation (ER) group to perform this study. Those needs were driven by data needs supporting decisions on Solar Ponds remediation and closure.

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A list of wells to sample was developed that comprised a selection of wells from the immediate vicinity of the Solar Ponds, the nearby surroundings, and more distal portions of the known groundwater plume. The ER group determined the analytical suite and the priority of the various analytes within the suite, based on their closure decision needs.

Table 9-1 lists the wells that were selected for sampling and summarizes the results of sample collection efforts. The analytical suite was as follows, with the sampling priority in the order listed:

1. Filtered Uranium;
2. Filtered Metals;
3. Nitrate/Nitrite;
4. Unfiltered Uranium ; and
5. Unfiltered Metals.

Table 9-1 Solar Ponds Investigation Sample Collection Summary

Well	VOA 524.2	Filtered Metals	Unfiltered Metals	Nitrate/ Nitrite	Filtered Uranium Isotopes	Unfiltered Uranium Isotopes
54494	X	X	X	X	X	X
P208989	X	X	X	X	X	X
3086	X	X	X	X	X	X
3186	X	X	X	X	X	X
3887	X	X	X	X	X	X
P207589	X	X	X	X	X	X
P210189	X	X	X	X	X	X
P209089	X	X	X	X	X	X
41693	X	X	X	X	X	X
42993	X	X	X	X	X	X
41993	X	X	X	X	X	X
05093	X	X	X	X	X	X
05193	X	X	X	X	X	X
P209689	X	X	X	X	X	X
P209589	X	X	X	X	X	X
22298	--	X	X	X	X	X
45693	X	X	X	X	X	X
P210089	--	X	X	X	X	X
B210389	--	X	X	X	X	X
B208689	--	X	X	X	X	X
B210489	--	X	X	X	X	X
1886	--	X	X	X	X	X
B208189	X	X	X	X	X	X
02691	X	X	X	X	X	X

X Sample requested but there was insufficient water to collect it.
X Sample requested and successfully collected.
-- Sample not requested.

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The list of wells sampled for the current investigation purposely omitted wells in the current sampling program as well as some that had been more recently sampled (e.g., since 2000), instead focusing on wells that had not been sampled in years. Analytical results from this study were then grouped with data from those recently sampled wells to provide a more complete data set for the plume.

The focus of this section is on uranium, one of the main components of the SPP. Due to its much more complete data coverage, as explained below, only filtered uranium samples will be addressed. Metals results are discussed briefly at the end of this section. Nitrate and VOC data generated through this Solar Ponds investigation are part of the discussion in Section 8.3.

9.3.2 Data Handling

Uranium

Uranium data for wells in the area of the Solar Ponds were retrieved from the SWD. Only data from 1997 and later were retrieved. This is because an extensive nitrate/uranium sampling effort at the Solar Ponds was conducted in 1997 and 1998, including as many wells and well points as was then feasible. The current investigation was much more limited in scope. Therefore, in order to maximize the data coverage, results from this earlier sampling effort were included in the current evaluation.

Similarly, because samples for the analysis of uranium and metals are typically field-filtered, more data are available for filtered samples than for unfiltered samples. Current data from unfiltered samples typically do not exist for routinely sampled wells, except those few that are sampled using micropurging techniques. Therefore, to make the most of the available (and comparable) data, this section focuses on data from filtered samples. (The reason for filtering these samples is to generate data that more accurately represent groundwater conditions. Analytical results for unfiltered samples collected using bailer methods can be strongly affected by sediments contained within the sample, which are not actually part of the groundwater regime. The effect of sediments can be especially important in a high background-uranium environment such as RFETS, or for areas such as the Solar Ponds that may exhibit metals contamination in soils. Using such unfiltered sample data for groundwater evaluations can lead to an incorrect understanding of groundwater conditions and to erroneous conclusions.)

For a given well, uranium isotopic data were managed as follows. Any rejected data were deleted from the data set. At wells reporting both filtered and unfiltered data for a particular date, the unfiltered data were deleted. At wells from which multiple results were available for each isotope on a given date (e.g., both "Real" and "Duplicate" samples were collected and analyzed), the highest value for each isotope was retained in the data set, the others for that date were deleted.

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Following these procedures, the data set contained a single result for each routinely analyzed isotope (U-233/234, U-235, and U-238), on each sampling date after 1/1/1997, at each well for which data exist over that time frame. The remaining data were then grouped into two data sets: 1997 through 2000, and 2001 to the most recent 2002 data available. Within each group, and for a given well, the results from each individual sampling event for U-233/234, U-235, and U-238 were summed. All the date-specific sums for that well were then averaged. This process gave an estimate of the average total uranium at the given well for the given time period. (This is only an estimate because the listed isotopes are not the only uranium isotopes that exist. However, these isotopes are by far the most predominant uranium isotopes, and therefore the averaged value is essentially equal to the total uranium.)

These average total uranium values were posted and contoured (Figure 4-3b) for each time period so that any major trends that might exist could be detected. Contour intervals were selected to reflect RFCA and background levels: the 2.847 pCi/L and 284.7 pCi/L values correspond, respectively, to a sum of the Tier II and Tier I activity-concentrations for the isotopes analyzed in groundwater (as listed above). The 50 pCi/L contour is used for display. The 104.29 pCi/L contour represents a sum of the background activity concentrations for these isotopes.

Metals

Because the most prominent groundwater contamination at the Solar Ponds consists of uranium and nitrate, other analytes have received less scrutiny in recent years. Sampling around the Solar Ponds for metals in groundwater has not taken place except at the few routine program wells in the area, and the 1997-1998 investigation omitted metals from the analytical suite. As a result, the amount of data available for metals at the Solar Ponds is greatly reduced compared to that for uranium and nitrate.

Further reducing the data set, available groundwater data for metals of interest from the early to mid-1990s, when the Solar Ponds still contained sludge, are of questionable relevance to current groundwater conditions. These older data were therefore removed from the data set. (To review those older metals data, see the RCRA Reports issued in the 1990s: DOE 1990, 1991a, 1992d, 1993c, 1994c, 1995, 1996a.)

After evaluating available data, those predating 2001 were eliminated and only 2001 through early 2002 data exceeding Tier II for metals were posted. These metals data are not conducive to contouring. Instead, these data are presented as a box-plot map rather than a contour map. Both filtered and unfiltered samples are represented in box plots. Where both forms of sample data exceeded Tier II at a well, the highest value was selected for inclusion on the map.

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9.3.3 Results and Discussion

Uranium

Lack of data for the vast majority of groundwater monitoring locations in this area (Figure 4-3b) hampers a thorough, detailed understanding of uranium groundwater contamination in the vicinity of the Solar Ponds. Regardless, some general conclusions may be drawn.

As shown on Figure 4-3b, the uranium content of groundwater at the Solar Ponds has changed somewhat between the two time periods depicted on the figure. However, many of these changes are slight and are not readily apparent on the figure. Table 9-2 presents a summary of data from wells that are represented by averaged "total" uranium results (sum of filtered U-233/234, U-235, and U-238) for both periods of time.

The highest activity concentrations of uranium in groundwater continue to exist at and immediately adjacent to the Solar Ponds. Isotopic signatures indicate an anthropogenic source for this contamination (see Section 8.1). Levels of uranium are also elevated downgradient of the Solar Ponds, particularly in the area of the SPPTS discharge and the now obsolete pump house that received ITS waters, but these locations show natural uranium isotopic signatures. These downgradient levels may start to decrease due to modifications made to the SPPTS in late 2002. (The modifications are designed to minimize the potential for contaminated groundwater to bypass the treatment system, said bypass being one possible explanation for the elevated uranium activity concentrations in this downgradient area).

Table 9-2 Comparison of Averaged Total Uranium Results in Groundwater

Well	Location	1997-2000		2001-early 2002	
		Average Total Uranium (pCi/L)	Standard Deviation / Number of Sample Events	Average Total Uranium (pCi/L)	Standard Deviation / Number of Sample Events
05093	Source area	657.38	0 / 1	190.29	0 / 1
05193	Source area	241.72	0 / 1	206.48	0 / 1
41693	Source area	1157.90	0 / 1	572.20	0 / 1
43993	Source area	35.71	0 / 1	28.32	0 / 1
P209089	Source area	40.42	0 / 1	38.24	0 / 1
P209489	Source area	40.36	12.96 / 8	57.43	7.21 / 3
P210189	Source area	3.08	0 / 1	2.35	0 / 1
02691	Downgradient	5.62	0 / 1	13.51	0 / 1
1386	Downgradient	14.48	2.85 / 7	17.94	6.51 / 3
1786	Downgradient	62.27	5.75 / 5	62.38	2.93 / 2
3086	Downgradient*	171.05	0 / 1	136.37	0 / 1
45693	Downgradient*	103.74	0 / 1	239.35	0 / 1
B208689	Downgradient	139.95	0 / 1	111.67	0 / 1
B208789	Downgradient	18.90	5.44 / 6	14.96	2.83 / 3

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Well	Location	1997-2000		2001-early 2002	
		Average Total Uranium (pCi/L)	Standard Deviation / Number of Sample Events	Average Total Uranium (pCi/L)	Standard Deviation / Number of Sample Events
B210389	Downgradient	104.73	0 / 1	114.24	0 / 1
B210489	Downgradient	53.67	0 / 1	44.56	0 / 1
P208989	Downgradient*	62.05	0 / 1	98.40	0 / 1
P209589	Downgradient*	368.96	0 / 1	392.90	0 / 1
P210089	Downgradient	6.54	0 / 1	7.50	0 / 1
P218389	Downgradient	2.88	1.46 / 2	1.03	0 / 1
P219489	Downgradient	9.58	0.53 / 2	8.03	1.46 / 2
P219089	Downgradient**	15.76	0 / 1	13.87	3.82 / 5
P219189	Downgradient**	104.10	4.42 / 4	95.41	4.37 / 2
00100	Upgradient	1.71	0 / 1	2.86	1.17 / 4
00500	Upgradient	0.34	0 / 1	1.31	1.58 / 3
00600	Upgradient	0.39	0 / 1	0.65	0.33 / 3
02397	Upgradient	1.27	0 / 1	1.56	0 / 1
02497	Upgradient	2.93	0.74 / 3	1.49	0 / 1
02500	Upgradient	6.40	0 / 1	9.82	0.59 / 3
P209289	Upgradient	2.23	0.12 / 2	1.23	0.30 / 2
P209389	Upgradient	1.46	0.37 / 8	1.70	0.20 / 3

* These wells are both downgradient of and near the source area (i.e., within about 250 feet). Other downgradient wells are farther from the source area.

**These locations are not strictly downgradient, but are grouped with downgradient wells for convenience.

Total uranium activity concentrations have decreased significantly in many wells in the source area (i.e., installed within the berms or immediately adjacent to the Solar Ponds) that were monitored for both time periods of interest. For example, the highest uranium activity concentrations in both the 1997-2000 and 2001-early 2002 data sets are from well 41693, located in the berm between Pond 207A and Pond 207B-North. In the earlier data set, the average total uranium was 1157.9 pCi/L; in the later data, it is 572.2 pCi/L. (Well 42993 showed average total uranium of 1011 pCi/L in the later time period, but is not represented by data in the earlier time period.)

Conversely, many wells that are downgradient of the source area, especially those closest to it, show an increase in average total uranium. Perhaps the best example of this is from well 45693, which is north of Pond 207C and near a small seep area. The average total uranium over the 1997-2000 time period at this well was 103.74 pCi/L. This increased more than two-fold to 239.35 pCi/L in the 2001-early 2002 data set.

The simplest explanation for the decreasing activity concentrations in the source area and increasing activity concentrations a short distance downgradient is that now that the source (the Solar Ponds fluids and sludge) has been removed, uranium is being flushed from the area. Under this scenario, a slug of water with elevated uranium activity concentrations is moving downgradient and the downgradient wells nearest the source are reflecting this.

Uranium is relatively mobile in groundwater, especially compared to other actinides found at RFETS (in particular, plutonium and americium), so this would be expected. However, more data and a more thorough evaluation are

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required before such an explanation can be definitively concluded. One problem with this conclusion is the paucity of data upon which it is based; because most of the wells in this area are not routinely sampled, many wells – including those used as examples above – are represented by only one or two sample events in either data set. In addition, the standard deviations for locations represented by several samples (Table 9-2) generally show there is significant overlap in the averaged values from the two time periods. Finally, wells located farther downgradient from the source area vary in an apparently random fashion. Data gaps also exist here; for example, well 10594 is only represented by data during the early (1997-2000) time period.

Metals

Given the small data set representing current metals concentrations in groundwater, as discussed above, few conclusions can be derived and most of those that are evident are to be expected. However, some aspects of the data, as presented on Figure 9-1, warrant discussion.

The most notable feature of Figure 9-1 is the frequency with which thallium is reported above its Tier II concentration (2 µg/L). An increase in thallium concentrations has been reported for a large number of wells in the routine monitoring program, and does not seem to relate to any source. The Water Programs group is currently investigating the large increase in results reported above Tier II. Possible explanations include recent changes in laboratories analyzing metals samples; a detection limit of 4 µg/L, well above the Tier II action level; and the fact that the background concentration of thallium is reported as 4.9 µg/L (EG&G, 1993a).

Aside from thallium, selenium, lithium, and cadmium appear to exceed Tier II concentrations most frequently. Samples from wells in the vicinity of the Solar Ponds generally contain more Tier II concentrations of metals than those from distal wells.

Well 41693 appears most affected by elevated metals in groundwater. This well is located in one of the berms, and as noted in the preceding discussion on uranium, it also consistently contains the most elevated uranium activity concentrations. A sample collected in early 2002 from well 41693 shows Tier II levels are exceeded here for aluminum, beryllium, cadmium, lead, lithium, manganese, and nickel. None of these are present at Tier I concentrations.

Distal wells – those in the North Walnut Creek drainage – also have produced samples with metals concentrations above Tier II. Aside from thallium, elevated concentrations of lithium and selenium are each present in groundwater in this area.

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9.3.4 Recommendations

Further examination of uranium activity concentrations is warranted for the Solar Ponds area to determine whether contamination inventory or mobile contaminant levels are truly decreasing at the source area, with a slug of groundwater containing elevated uranium activity concentrations moving downgradient. This has implications for the SPPTS, given the difficulties reported for that system (K-H, 2002d), and remedial actions for the Solar Ponds.

The quality of the groundwater at the Solar Ponds with respect to metals remains poorly understood. Similar to recommendations in Section 8.3, additional sampling is necessary from UHSU wells around the Solar Ponds in order to address uranium and metals questions. Samples should be collected even from wells represented by plentiful data, especially for evaluation of contamination and migration of uranium. If possible, sampling should be scheduled to occur during a period of higher water levels so that as many data gaps as possible may be filled. Attempting to sample during periods of lower water levels has met with minimal sampling success in the past, so it may not be worth repeating these attempts.

Finally, it should be noted that many of the "wells" mapped around the Solar Ponds are actually 0.25-inch diameter tubing installed in a small diameter borehole and used in the early 1990s for potentiometric data. While attempts to collect samples from these may be made, the probability that they will be able to supply sufficient volume to satisfy all sample needs is low. Sample needs may include a 1-liter bottle each for metals and uranium, several 40-ml vials for the analysis of VOCs, and potentially other analytical samples. A backup plan may need to be implemented to either accept the existing monitoring well coverage as sufficient (which may be warranted, especially given the additional wells installed in 2002 downgradient of the Solar Ponds) or install a number of temporary wells to collect the required analytical samples where well coverage and/or design is determined to be insufficient to meet the objectives of the study.

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10.0 OTHER GROUNDWATER PROGRAM ACTIVITIES

10.1 Well Abandonment and Installation

Two RFETS wells were abandoned in 2001. These wells are identified in Table 10-1 and displayed on Figure 10-1. These abandonments were performed in support of Building 776/777 D&D activities. Both wells were abandoned in place. Casings were cut three feet below grade and the remaining casing was filled with bentonite grout. The casing was then capped and buried in granulated bentonite prior to backfilling the remaining hole with clean soil. The area of these wells was then paved to support Building 776/777 D&D activities (movement and storage of D&D wastes).

A third well, which was installed in the spring of 2001 and destroyed a few months later as a result of D&D efforts at Building 371/374, could not be located in order to be abandoned. That well was replaced in January 2002.

During calendar year 2001, 22 monitoring wells were installed at RFETS. Table 10-2 lists these wells and summarizes their purpose. Figure 10-1 presents the locations of the 2001 monitoring well installations. Boring logs and well construction diagrams for these wells are presented in Appendix D. More detailed discussion of the purpose of these wells and sampling locations is presented elsewhere in this Annual Report.

An extensive WARP project began in FY02 and is anticipated to continue through CY06. During the WARP, most of the wells currently in place at RFETS will be abandoned. A few wells will be abandoned because of D&D activities and replaced immediately or as soon as possible after those activities have concluded. Additional wells will be installed to fill gaps in the network or replace wells that are not located or designed appropriately for their post-Closure purpose. These efforts will culminate with the final, post-Closure network of groundwater monitoring wells.

Activities performed as part of the WARP during calendar year 2001 consisted of planning and other support work; actual abandonments and replacements were not performed under the WARP in 2001.

Table 10-1 Calendar Year 2001 Monitoring Well Abandonments

Well No.	Abandonment Method and Comments
2386	In-place abandonment
2486	In-place abandonment
37401	Destroyed during D&D for Building 371/374; unable to locate to abandon

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Table 10-2 Calendar Year 2001 Monitoring Well Installations

Well No.	Purpose of Well
37101	D&D monitoring for Building 371/374
37201	D&D monitoring for Building 371/374
37301	D&D monitoring for Building 371/374
37401	D&D monitoring for Building 371/374
37501	D&D monitoring for Building 371/374
37601	D&D monitoring for Building 371/374
37701	D&D monitoring for Building 371/374
37402*	Replacement D&D monitoring well for Building 371 (replaces well 37401, destroyed during D&D activities)
55901	D&D monitoring for Building 559
56001	D&D monitoring for Building 559
56101	D&D monitoring for Building 559
56201	D&D monitoring for Building 559
56301	D&D monitoring for Building 559
86501	D&D monitoring for Building 865
86601	D&D monitoring for Building 865
86701	D&D monitoring for Building 865
88101	D&D monitoring for Building 881
83101	D&D monitoring for Building 883
83201	D&D monitoring for Building 883
99101	D&D monitoring for Building 991
99201	D&D monitoring for Building 991
99301	D&D monitoring for Building 991
99401	D&D monitoring for Building 991

* Well was installed in CY 2002, but because of its relevance to 2001 projects and activities it is listed here.

10.2 Potential Residential Use of Shallow Groundwater at RFETS

This section presents the text and figures from a White Paper that was published by the Water Programs Group during 2001. The text and graphs have been edited slightly to better mimic the format of this Annual Report. The original paper is titled Potential Residential Use of Shallow Groundwater at RFETS (RMRS, 2001e).

Introduction

The feasibility of using shallow groundwater for residential water supply was evaluated as part of an overall risk assessment associated with future land use and redevelopment of RFETS. The evaluation included a drawdown analysis of site groundwater data to determine whether a hypothetical domestic well, completed in the unconsolidated surficial and upper weathered bedrock deposits at RFETS, could sustain a well yield great enough to support a family of four persons. The analysis was conducted using an analytical groundwater model that simulates drawdown in a pumped well. These simulations were performed independently on 140 existing monitoring wells at RFETS that are completed in the Quaternary alluvium/colluvium and/or the upper Cretaceous sandstone of the Arapahoe and Laramie Formations. These wells, shown on Figure 10-2, had previously been tested (by pumping or

slug tests) for their hydraulic properties. Simulated drawdown was compared to the actual measured saturated thickness at the monitoring wells to ascertain whether it was physically possible to lower water levels to a reasonable fraction of the existing saturated thickness.

Residential Water Requirements

Drawdown simulations for a hypothetical residential well were based on the premise that indoor water use for a family of four is 260 gallons per day (gpd). This value was obtained via oral communication from the Denver Water Department and was determined from a study conducted in 1997 by the American Water Works Association. The study concluded that the average daily per capita water usage in the Denver Metro area is 65 gallons. The value was calculated from a total per capita water usage of 176.88 gallons (that includes both indoor and outdoor use) minus an outdoor water usage of 111.88 gallons.

The discharge rate used in the model simulations was based on the average pumping rate of nine monitoring wells that were pump tested at RFETS and which were completed in the Quaternary surficial deposits and/or the upper Arapahoe and Laramie sandstone. Nine wells fit these criteria and were used to calculate the average pumping rate. Pumping rates for these wells varied significantly from 0.07 to 12.06 gallons per minute (gpm). Histograms of the pumping rates were generated as part of a descriptive statistical analysis to ascertain which distribution best fit the data and also to indicate if any outliers were present. Both the raw data (Graph 1) and the natural log-transformed data (Graph 2) were plotted. Although discharge rates from only nine wells were used in this analysis, the data appear to more closely fit a lognormal distribution than a normal distribution. The histogram of the log-transformed data also indicated that the low value (0.07) was probably an outlier with respect to those wells that had pump tests performed. Thus, this value was excluded from further analysis.

Based on the lognormal nature of the data, the geometric mean was used to estimate the mean of the pumping rates. The geometric mean of the pumping rates was calculated to be 2.03 gpm. To conservatively estimate pumping rates at the Site, the lowest rate that statistically fell within the 95 percent confidence limit of the mean was used. This rate (1.83 gpm) was calculated using a one-sided lower confidence limit for a lognormal distribution (Land, 1971 in Gilbert, 1987). The equation used to calculate this limit and the summary statistics for the pumping rates is presented below:

$$LL_{\alpha} = \exp(\bar{y} + 0.5S^2y + \frac{S_y H_{\alpha}}{\sqrt{n-1}})$$

where:

LL_{α} = Lower confidence limit
$\bar{y}$ = Mean
S^2y = Sample variance
Sy = Standard deviation
H_{α} = 1.633 (Statistic from Table A13 in Gilbert, 1987)
n = Number of samples = 8

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Model Input Parameters

The length of time of pumping was calculated to be 2.4 hours which was the time required to pump 260 gpd at a rate of 1.83 gpm. The specific yield was assumed to be 0.20 and was based on information presented in the Hydrogeologic Characterization Report for the RFETS (EG&G, 1995b) for the unconsolidated surficial deposits. The radial distance from the pumping well was assumed to be 1.0 foot.

The hydraulic conductivity (K) was obtained from a database file of 140 wells that were previously pump or slug tested at the site. K values ranged from 4E-08 to 5E-02 cm/sec. Many of the wells that were field tested for K were analyzed using several different techniques. For example, wells that were slug tested were analyzed with Bouwer and Rice, and Hvorslev methods. Wells that were pump tested were analyzed using Theis, Cooper/Jacob, Neumann, and Thiem techniques. K values from each of these analyses were averaged for each well.

Transmissivity (T) values for each well were calculated from the average hydraulic conductivity and from the average saturated thickness. The average saturated thickness was calculated from depth to water measurements that have been historically recorded during periodic monitoring events and from the total depth of casing data recorded during well construction. Water level measurements were obtained from the SWD and were average for the total record of measurement. Total depth data were obtained from a master database file and were joined in database query with the average water level depth to calculate the average saturated thickness for each of the 140 wells.

Drawdown Calculations

Drawdown in each well was simulated in an Excel spreadsheet (see Appendix F) using the Theis equation. Due to the limitations of the Theis equation for low T values (<8.5 gpd/ft) which equates to a K value of 4E-05 cm/sec for 10 feet of saturated thickness, drawdown in wells with this T value or less were assumed to exceed the total depth of the well. At T values <8.5 gpd/ft, the corresponding well function value, W(u) becomes small enough to cause the drawdown value to decrease. This phenomenon is illustrated in Graph 3, which shows that as T values decrease, drawdown increases up to a point. It is at this inflection point, where T = 8.5 gpd/ft, that drawdown begins to decrease and the equation can no longer realistically predict drawdown in a well.

A reasonable amount of drawdown was assumed to be 1/3 of the available saturated thickness at each well. This value was considered reasonable in light of limitations in the Theis equation and potential well losses attributable to well inefficiencies. Without compensating for these well losses, the Theis analysis would tend to underestimate actual drawdown values. Available drawdown is also reduced by the depth at which the pump is set and by inaccuracies and limitations in the theoretical Theis equation when it is applied to an unconfined groundwater system. A relatively large drawdown with respect to a thin water-bearing zone implies that flow is not horizontal, thus violating a primary assumption inherent in this equation.

Although the Theis equation was developed primarily for confined groundwater conditions, under certain limitations it may also be used for unconfined systems. These limitations are related to the percentage of drawdown in the well

compared to the total thickness of the aquifer. Generally, if the drawdown exceeds 25 percent of the total thickness, the equation should not be used. However, in this analysis, a drawdown of 1/3 of the available saturated thickness at each well was considered a threshold value and physical limit to pumping a water supply well. In almost all wells that could sustain pumping, drawdown was less than 25 percent.

To account for inaccuracies in using the Theis equation for unconfined conditions, a correction factor was applied to calculated drawdown values. The correction factor was derived by C.E. Jacob and is usually used to modifying pumping test data. However, in this situation, it was necessary to predict the actual or observed drawdown that would occur in a well. Hence, the above equation was solved for "s". The equation is as follows:

$$s'=s-s^2/2M$$

where: s' = corrected drawdown from pump test data (ft)
s = observed drawdown (ft)
M= saturated thickness (ft)

The results of the simulation indicated that 46 wells, or 33 percent of the total of 140 wells, could sustain pumping and supply a family of four persons with water. The spatial distribution of these 46 wells is shown in blue on Figure 10-2. The figure indicates that the wells are uniformly distributed over a wide area at RFETS and do not appear to be clustered in any one location. The wells used for this evaluation represent approximately 13 percent of the total number of monitoring wells installed at RFETS.

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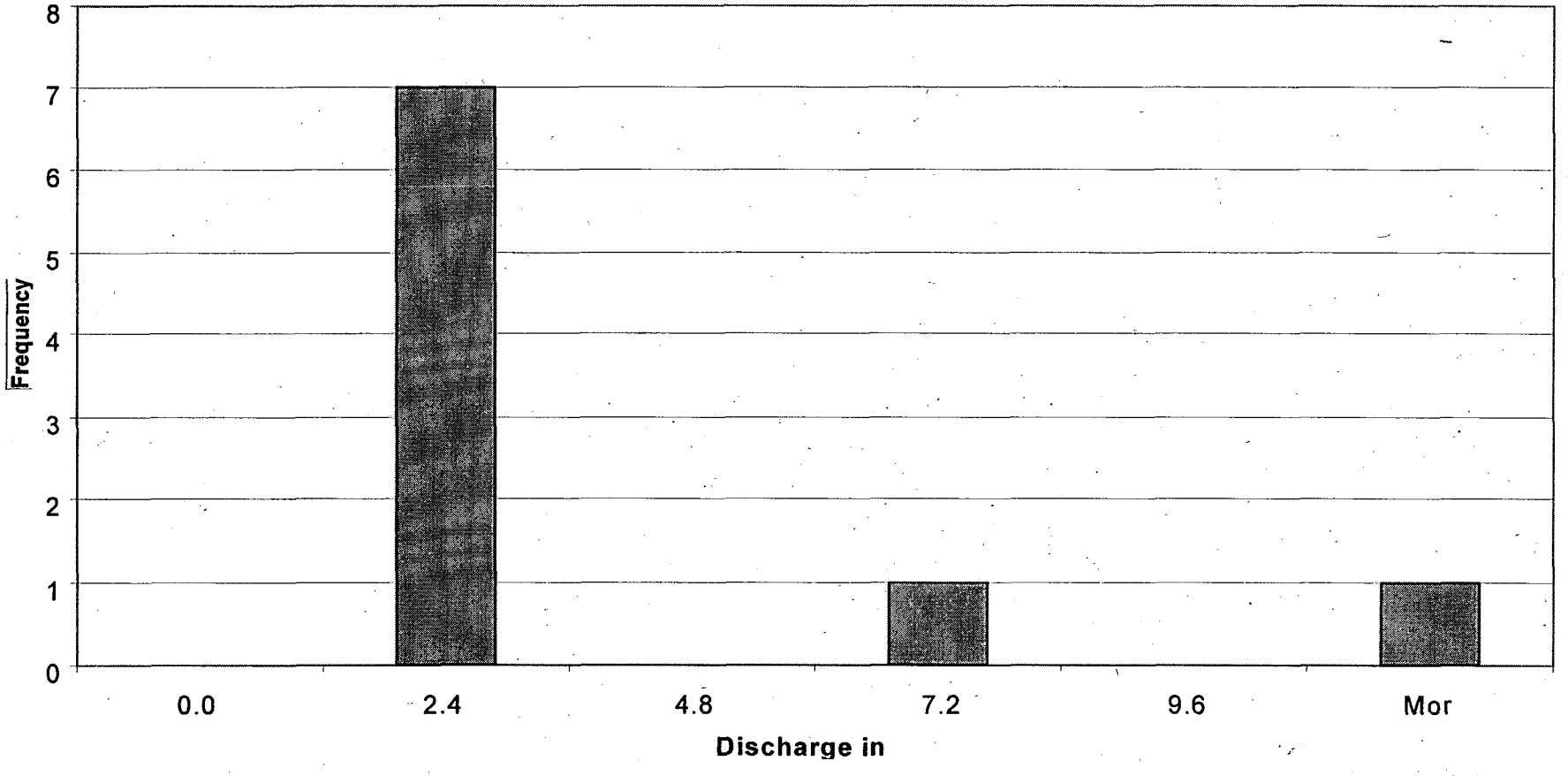
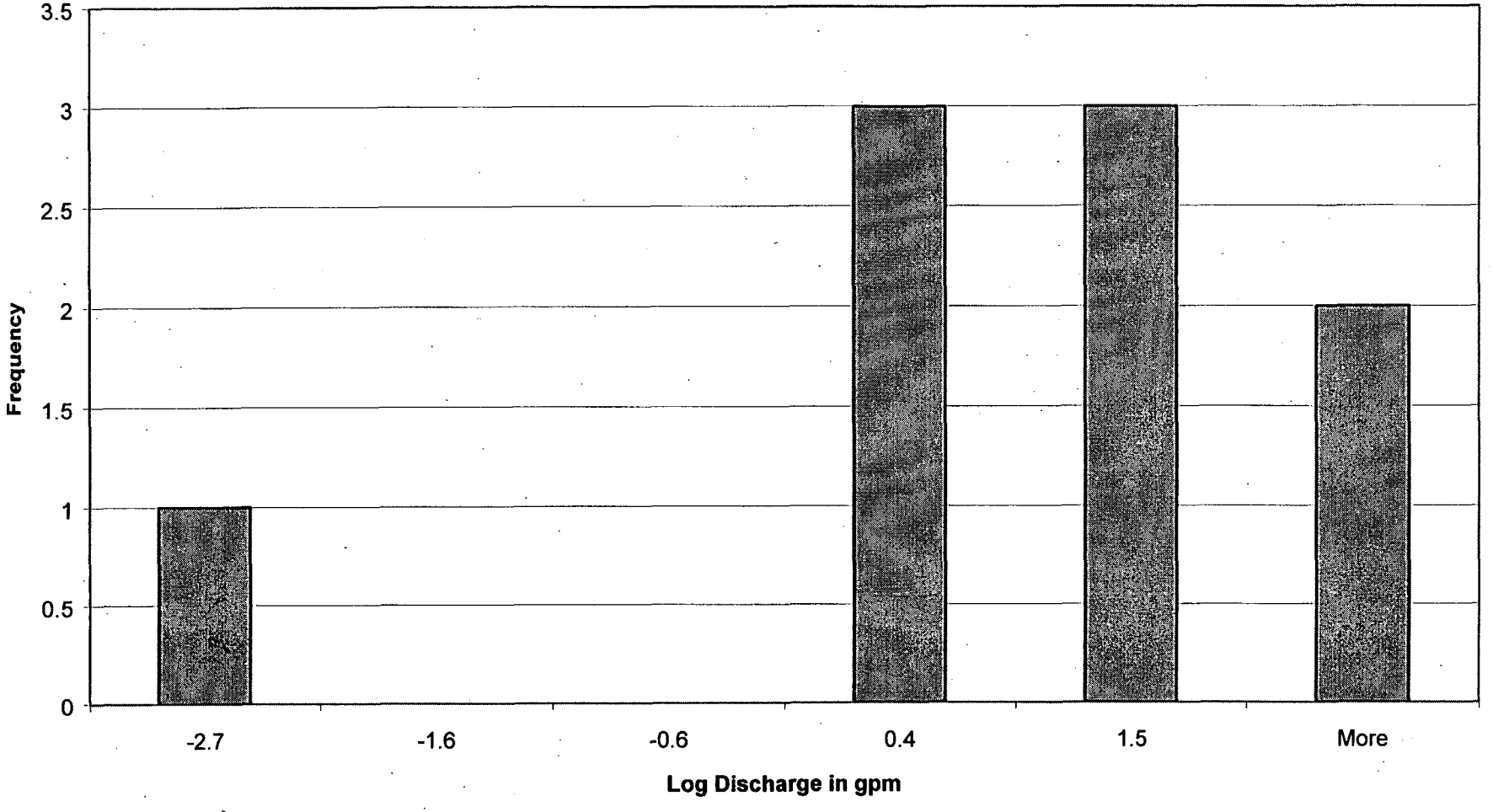
Graph 1
Histogram of Well Yields From Quaternary Surficial Deposits and Ka No. 1 Sandstone



Graph 2
Histogram of Well Yields From Quaternary Surficial Deposits and Ka No. 1 Sandstone



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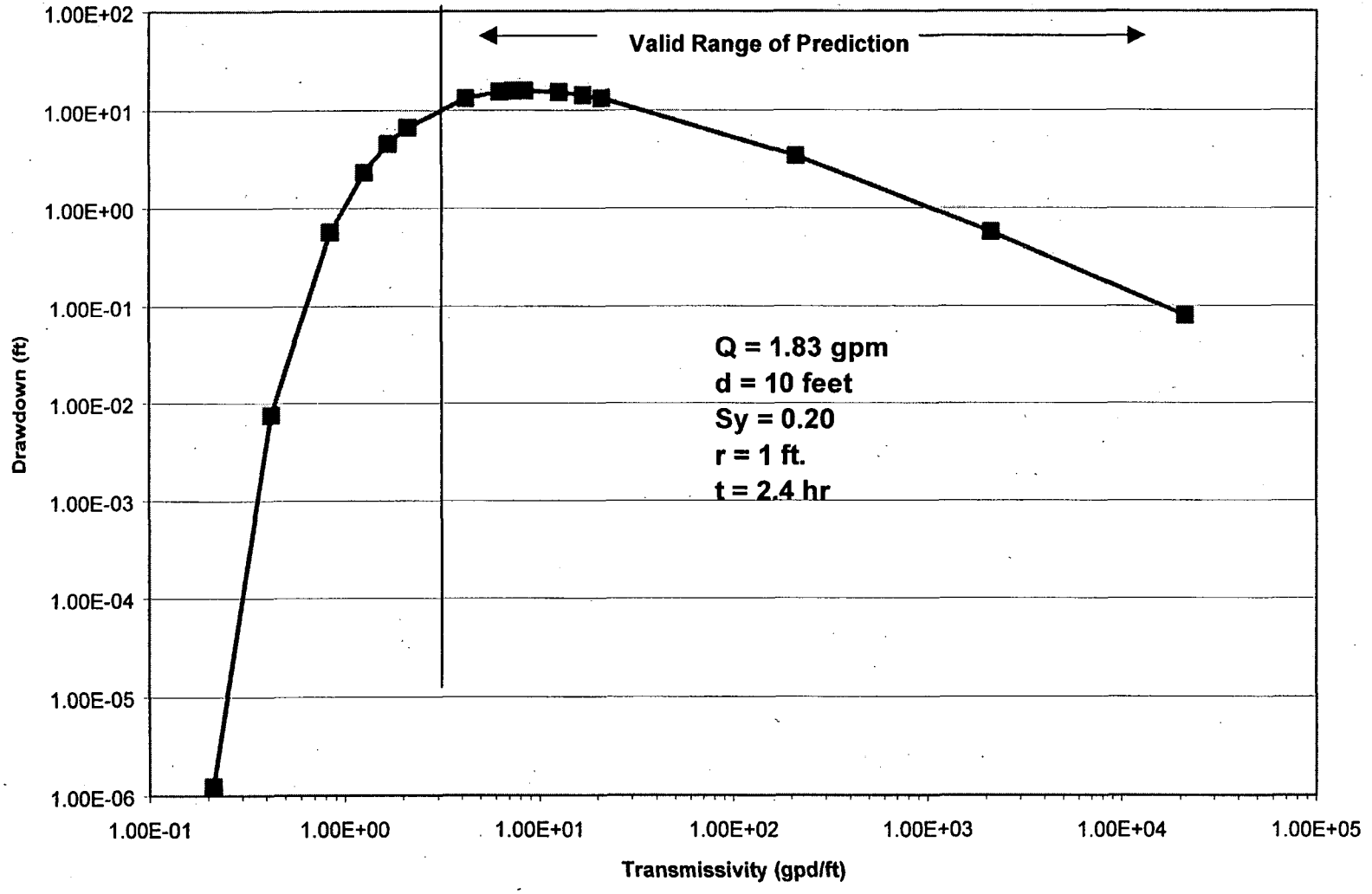
Graph 3
Drawdown Versus Transmissivity Using Theis Equation



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10.3 Evaluation of Mining Potential at RFETS

This section presents the text and plates from a White Paper that was published by the Water Programs Group during 2002. The text has been edited slightly to better mimic the format of this Annual Report. The original paper is titled Evaluation of Mining Potential on Rocky Flats Environmental Technology Site Property (Safe Sites, 2002a). Plates 16 and 17 are associated with this section of the Annual Report.

Introduction

An investigation has been performed regarding the potential for future mining on land owned by the DOE that could be transferred to the U.S. Fish and Wildlife Service in the future. A literature search was performed, as well as an evaluation of borehole and well logs to determine the thickness of alluvial deposits. The Lafarge Gravel Mine was visited and the Mine Supervisor, Mr. Kunkel, was interviewed. The clay workings in Section 16, which is adjacent to RFETS and owned by the State of Colorado, were also visited. There are three commodities that exist on RFETS land that will be discussed: coal, clay, and sand & gravel. In addition to a brief description of each resource, a rough estimate was performed of the amount of each resource available.

Coal

Coal seams occur in the base of the Cretaceous Laramie Formation. The coal is of sub-bituminous grade and is associated with the clay deposits that will be discussed later. The base of the Laramie Formation subcrops within the Site boundaries where the rocks are steeply dipping at an angle of approximately 50° or more to the east. The area of coal corresponds closely with the line of clay pits that extend from T2S, R70W, Section 16 (owned by the State of Colorado) through Sections 9 and 4 (partially owned by DOE). The coal seams occur very close to the contact between the Laramie Formation and Fox Hills Sandstone.

Only general information is known about the coal seams in this area. The Capitol Mine (also referred to as the Caprock Mine) was a coal mine that occurs in Section 16 and appears to have worked a 14-foot thick seam that occurred at the contact between the Fox Hills Sandstone and the Laramie Formation. Smaller seams ranging in thickness from 1 to 4 feet may also be present in this zone. The coal at the Capitol Mine was worked for 630 feet down-dip and for approximately 2600 feet along the strike of the seam. This mined area extends from Rocky Flats Lake due north to within 100 feet of the Site boundary. The mine shut down in 1953. Based on a mine map of the Caprock Mine, the mined workings were limited to the area where the coal seam was steeply dipping in Section 16, and did not extend under the Site boundary.

There is reference to another location where mining was attempted that is in the NW ¼ of the SW ¼ of Section 4, on DOE property, in the area of the Lafarge gravel pits. Little information exists about the coal in the area other than a verbal reference to a 4-foot seam that was worked and a 14-foot seam that was found in borings.

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The general conclusion is that a 14-foot coal seam that subcrops near the surface exists for approximately 8000 feet along strike on DOE property. The coal seams are steeply dipping at these near surface locations and would probably preclude open pit mining. The seams would extend down-dip and become sub-horizontal at a depth of approximately 800 feet and continue below the rest of the Site. This depth would also preclude any attempts at open pit mining.

As a simple estimation of the available tonnage of coal available for mining, the following computation was performed:

- Length of coal seam on DOE property: 8000 feet;
- Width of coal seam: 14 feet;
- Depth of mining: 100 feet;
- Total volume of coal = 1.12E7 cubic feet;
- Tonnage factor: 22.85 cubic feet/ton using a specific gravity for coal of 1.4 g/cm^3; and
- Estimated short tons of coal available: 1.12E7/22.85 = 490,000 tons of coal.

Clay

Clay deposits occur in the lower part of the Laramie Formation in close association with the coal beds discussed earlier. The clay overlies and underlies a sandstone bed in the Laramie near its contact with the underlying Fox Hills Sandstone and dips approximately 50° to the east. The clay is predominantly kaolinite and is used in manufacturing building brick or refractory brick products, depending on the quality. Two clay layers appear to exist in the zone that has been mined and the layers appear to be about 25 feet thick. Three areas have been mined on or near the Site.

There is a clay pit in Section 16, which appears to have been most extensively mined. The pit extends approximately 2000 feet along strike, is approximately 30-40 feet wide, and 30-50 feet deep. The strike of the mined clay bed is N5-15°E, it dips 30-50°E, and underlies a moderately silicified sandstone bed in the lower Laramie. Discontinuous three- to ten-foot wide clay stringers also occur in the overlying sandstone but do not appear to be the primary mining target. A northwest undulation of the clay bed can be mapped in the hanging wall stringers along the northern half of the pit. The actual mined clay seam is currently underwater and the water elevation in the pit is consistent with the local potentiometric surface.

There is reference to another clay pit that occurs in the NE ¼ of the SW ¼ of Section 4 on RFETS property. The second clay pit at RFETS occurs just north of the West Access Road in Section 9. The pit is approximately 1500 feet long and is actively being mined. The sign on the access road suggests that Lakewood Brick and Tile may be the lessee, but Charlie Mckay is believed to be the mineral rights holder. In addition, there were two small pits, one approximately 100 x 25 feet and the other 150 x 50 feet, which occur in the area of active gravel mining by Lafarge. The deepest pit was 25 feet deep. In terms of future mining potential, the clay beds are currently being mined,

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which suggests that the resource occurs in economic quantities and is of acceptable quality to be mined profitably. The literature suggests that these clay beds can be discontinuous and that the quality varies along strike, making a valuation of both tonnage and grade difficult. For resource estimation purposes, it is assumed that the clay zone is continuous over an 8000-foot strike length on DOE property. Historic mining for clay in the Front Range area has tended to occur on hogbacks where the clay could be obtained without significant layback of overburden. Given the approximate 60-foot thickness of Qrf covering much of the clay beds and the need to lay back the bedrock to mine the clay to deeper levels, future mining would probably be limited to shallow surface cuts in areas where gravel mining may have already removed the overburden.

As a simple estimation of the available tonnage of clay available for mining, the following computation was performed:

- Length of clay layer on DOE property: 8000 feet;
- Width of clay seam: 25 feet;
- Depth of mining: 100 feet;
- Total volume of clay = 2.0E7 cubic feet;
- Tonnage factor: 13.3 Cubic feet/ton using a specific gravity for clay of 2.4 g/cm^3; and
- Estimated short tons of clay available = 2.0E7/13.3 = 1,503,759 tons of clay.

Gravel

Gravel mining has occurred historically in Section 16, (owned by the State of Colorado) and Sections 9 and 4 (partially owned by DOE). The gravel mining occurs in the Qrf, which is an unconsolidated formation that was deposited on top of the bedrock formations at RFETS. In Section 16, the gravel mining may have been incidental to the clay mining that was conducted there, as the gravel pit dimensions closely approximate that of the clay layers. The gravel pits that occur just north of the West Access Road, in Section 9, are currently being mined for clay, but it appears that past gravel mining has also occurred in the area.

The most substantial gravel mining activity is the Lafarge 'Bluestone' operation with occurs in the SW ¼ of Section 4 on DOE property. The Lafarge operation occurs in the area where clay and possibly coal mining have taken place historically. Lafarge is only interested in exploiting the gravel resources at present. The Lafarge lease is part of a larger lease parcel that is called the Spicer Lease. According Mr. Kunkel, there is apparently a twenty-year moratorium on gravel expansion to the east of the current operation. The next area that the company plans to mine, in the western part of Section 9, is on DOE property and lies west of the clay mining operation on the Al Frei Lease from McKay. Mr. Kunkel also stated that they have the lease for Section 16, which will be mined at a later date.

Based on additional discussion with Mr. Kunkel, the gravel pits are approximately 20 to 25 feet deep because the mining permit does not allow excavation below the water table. The Site's limited well coverage in the area confirms that the water table is about 25 feet below ground surface in this area. The mined products from the pits

range from sand to boulders less than 10 inches in diameter. Mr. Kunkel said that an average price for the gravel products would be about $8.00 per ton.

Plate 16 is an isopach map of gravel thickness, which was updated from the 1995 Geologic Characterization Report. This map shows the total alluvial thickness on Site. However, the areas with mineable gravel are those areas delineated by the solid line denoting the extent of the Qrf. Using the information from the Lafarge visit, Plate 17 was created showing the areas at RFETS that would be potentially mineable for sand and gravel. One assumption that was made with this map is that the IA would never be mined because the gravel is thin in this area (it averages 10-20 feet thick) and there would be building basements and other utilities still buried in this area after Site closure. The other key assumption is that future mining activities would be under the same constraints as current mining, and that the water table could not be encountered. As such, the Qrf was contoured using a twenty-foot contour interval, which would show all areas that could be mined to a depth comparable to what is being done at Lafarge. Based on these assumptions, there is a significant portion of the west side of the Site that would be amenable to gravel mining. In addition, the long plateau to the north of the IA may also be attractive to mining. The area in the former OU2 may also be of interest for mining; however, the presence of IHSSs in the vicinity suggests that administrative controls may be advisable in this area. Because there are no wells or boreholes in Section 4, an accurate mineable thickness can only be postulated as similar to that found to the south in Section 9.

As a simple estimation of the available tonnage of gravel available for mining, the following computation was performed:

- Area of gravel: 20 foot mining depth: 34,498,292 ft^2 X 20 feet deep = 689,965,840 cubic feet;
- Area of gravel: 40 foot mining depth: 13,652,085 ft^2 X 40 feet deep = 546,083,400 cubic feet;
- Area of gravel: 60 foot mining depth: 4,601,128 ft^2 X 60 feet deep = 276,067,680 cubic feet;
- Total volume of gravel = 1,512,116,920 cubic feet;
- Tonnage factor: 17.78 cubic feet/ton using a specific gravity for gravel of 1.8 g/cm^3;
- Estimated short tons of gravel available: 1,512,116,920/17.78 = 85,045,945 short tons of gravel; and
- Estimated resource using $8/ton (FOB) of gravel: $680,367,560.

This estimate does not take into account the waste silt and clay that occurs in the gravel deposit, which is variable but could be as high as 25%. As such it was not factored into the estimate.

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11.0 GROUNDWATER DATA QUALITY ASSESSMENT FOR 2001

This section evaluates the quality of the groundwater data collected in 2001. Tables associated with Section 11.0 are found in Appendix E. Tables 2-1, 2-2, and 2-3 also provide information that is pertinent to this discussion.

11.1 General Sampling Summary

The RFETS Groundwater Monitoring Program, as established in the 2001 IMP (K-H, 2000a and 2000b), consists of 188 locations that are sampled on a quarterly or semi-annual frequency. Included in this discussion are data from 21 D&D wells installed in 2001 (after publication of the IMP list) and 6 building footing drains used as D&D sampling sites. Analytical results for drain location SW085 (not in the IMP) are included because they aid evaluation of the Building 779 and SPP area. Rinsate analyses from well 31001 (not in the IMP) are also considered here because they are associated with sampling events at IMP wells. Table 2-1 presents a summary of sample collection and well disposition. Table 11-8 gives a summary of sampling success by well throughout the year.

There were 383 sampling events required in CY 2001, (Table 11-8), many of which entailed multiple visits due to dry conditions or limited recharge. All samples specified in the IMP were collected unless the well was dry or went dry during sampling. During 2001, 2651 samples were scheduled for collection; the actual number collected was 1923, two of which represented sampling errors.

11.2 Quality Control Assessment

Analytical data are assessed in this section in terms of the five data-quality PARCC parameters: precision, accuracy (bias), representativeness, completeness, and comparability as outlined in the *Quality Assurance Program Plan For The Groundwater Monitoring Program Rocky Flats Environmental Technology Site* (RMRS, 2001c). Precision and accuracy are quantitative measures. Representativeness and comparability are qualitative measures. Completeness is a combination of both quantitative and qualitative measures. Section 11.0 summarizes the types of data available to assess the PARCC parameters. Groundwater data evaluated via the PARCC parameters are presented in the Quarterly Groundwater Monitoring Reports (RMRS, 2001f; SSOC, 2001b; and SSOC, 2002a and 2002b).

The K-H Analytical Services Division (ASD) performs its own data quality assessment prior to the evaluations made in the Quarterly Groundwater Reports. They evaluate metals, radionuclide, VOC, PCB, and WQP results that are derived from groundwater at RFETS. Dissolved gases are not evaluated because they are analyzed under specially written contracts. The scope of what are termed verification or validation activities (defined below) are based upon program and customer specified requirements and requirements of K-H ASD to evaluate contract laboratory performance against Statement of Work (SOW) requirements. Verification/validation criteria are generally based on government published standards and guidelines,

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primarily EPA Contract Laboratory Procedures (CLP) and SW-846 method guidelines for organic and inorganic data evaluation and review. Verification/validation are graded processes to assess both compliance of the data package with the SOW and acceptability of the data using parameter specific guidelines. Verification is an assessment process used to ensure that data meet certain specified criteria; it is a check of the data based on a review of the summary sheets provided by the laboratory. Validation provides the same review with the addition of an examination of the raw data and calculations that go into the summary sheets; it is a more thorough assessment process than verification.

Laboratory generated components of this PARCC evaluation (such as matrix spikes, laboratory control samples, and detection limits) are also considered in generating the verification and validation qualifiers. The quality of the verification/validation process exerts a major influence on the quality of the PARCC assessment.

11.2.1 Quality Control Samples

Quality Control (QC) samples consisting of real/duplicate pairs were collected from 20 locations and real/rinsate pairs were collected from 19 locations. The frequency for field duplicate sampling of 1 in 9.4 (10.6%) locations exceeded the target rate of 1 in 20 (5%) locations for the 2001 sampling program. Similarly, the frequency for field rinsate sampling of 1 in 9.9 (10.0%) locations exceeded the target rate of 1 in 20 (5%) for 2001. The reason for the more than required frequency of quality control samples is that these samples are assigned assuming all wells will contain enough water to produce the required analytical suite. In calculating the ratios of duplicate and rinsate samples to actually sampled locations, uncollected samples due to dry wells or wells with poor recharge are not counted; this acts to increase the frequency of quality control samples.

11.2.2 PARCC Parameters

Analysis of 2001 groundwater data in terms of the PARCC parameters is presented in the following sections.

Precision

The precision of a measurement is an expression of the mutual agreement between duplicate measurements of the same property taken under similar conditions. Precision can be expressed quantitatively by the relative percent difference (RPD) between real and duplicate field samples for metals, VOCs, PCBs, and WQPs as defined by the following equation:

$$RPD = \frac{|(S-D)|}{(S+D)/2} \times 100(\%)$$

where S = Concentration of analyte in Real Sample
D = Concentration of analyte in Duplicate Sample

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The following Duplicate Error Ratio (DER) equation can be used to express the precision of radionuclide analyses.

$$DER = \frac{|S-D|}{\sqrt{(TPU_S^2 + TPU_D^2)}}$$

Where S = Activity of the Real Sample
D = Activity of the Duplicate Sample
TPU_S = Total Propagated Uncertainty of the Real Sample
TPU_D = Total Propagated Uncertainty of the Duplicate Sample

Because total propagated uncertainty (TPU) is seldom reported for radionuclides in the laboratory data records, the 2-Sigma Error or random counting error has been substituted for TPU in the uranium, americium/plutonium, strontium, and tritium DER calculations completed for this report.

A compilation of RPD/DER calculations for 2001 can be found in Tables 11-1 (RPDs) and 11-2 (DERs). The overall QC criterion for groundwater RPDs is ≤30%; for DERs the QC criterion is ≤1.96. Table 11-3 gives a summary of the Overall Precision Compliance for RPDs and DERs for each quarter and the year as a whole.

Accuracy

Accuracy is the degree of agreement of a measurement with an accepted reference or true value, and is a measure of the bias in a system. The closer the measurement to the true value, the more accurate the measurement. The validation/verification process, by assigning a qualifier, is the principal means by which the accuracy of analytical results is evaluated.

For this PARCC evaluation, the accuracy assessment is based on the *Evaluation of Data for Usability in Final Reports* (RMRS, 1998e). The PARCC analysis compares the actual analytical methods used to the required analytical methods and compares the CRDLs for each analyte to the achieved detection limits. Table 11-4 gives the CRDLs for the various analytes. With respect to analytical results retrieved from electronic files (and the few hand entered ones), detection limits are readily available.

Additional information on the accuracy of laboratory analyses is given by matrix spike and laboratory control samples (LCS). Matrix spike recovery data for metals, VOCs, PCBs, and WQPs are given in Table 11-5 and LCS recoveries for radionuclides are given in Table 11-6. These tables include all matrix spike and LCS data for 2001.

Criteria for evaluation of matrix spikes and LCSs were modified in the 4th quarter of 2000. Matrix spikes were acceptable within a range of 80-120% recovery (RMRS, 2001c). K-H ASD pointed out that matrix spike recoveries are acceptable over a wider range depending on the analyte, method, and individual laboratory. Currently matrix spikes are considered acceptable if they are within the 75-125% range used in

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validation/verification process. If they are outside this range, they are discussed briefly in the 2001 Quarterly Reports.

Acceptable LCS criteria were also broadened from those in the Quality Assurance Project Plan (QAPP) (80-120% recovery) to those used in validation/verification (75-125% recovery). According to K-H ASD, laboratories will occasionally accept LCS values in the range of 70-130 %. LCS percent recoveries between the 70-130 % laboratory range and the 75-125 % QC range required by the K-H ASD laboratory contracts are examined by the validators for acceptability on an analyte by analyte basis. K-H ASD believes that this is an acceptable practice. Results outside the QC range are mentioned but the focus of this discussion is on whether the results meet the QC range criterion.

Representativeness

Representativeness in this section is limited to an evaluation of whether analytical results for field samples are truly representative of environmental concentrations or whether they may have been influenced by the introduction of contamination during their collection and handling. The potential introduction of contamination is evaluated by examination of the analytical results for equipment rinsates or field blanks (Table 11-7). Equipment rinsates are used to determine the efficacy of the decontamination process and assess possible cross contamination between environmental samples. They are samples collected of distilled or deionized water that has been poured over and/or through decontaminated sampling equipment and subsequently handled in the same manner as environmental samples. Rinsate collection is performed in the field at the sampling location, immediately following decontamination of the sampling equipment.

Although rinsates are used specifically as indicators of cross contamination during decontamination of equipment, they are carried through the entire sampling, shipping, and laboratory process. Therefore, they are also good indicators of potential contamination introduced during any of these steps. Because rinsate samples have been deemed adequate to assess potential introduced contamination, the groundwater program does not use trip blanks.

Other aspects of representativeness, such as numbers of samples and spatial distribution, are fixed in the IMP (K-H, 2000a and 2000b). All well visits that were required by the IMP were completed in 2001. Plate 1 presents the locations sampled thereby indicating the spatial distribution of the samples.

Completeness

In part, completeness is measured by the relative ability to draw water from a location and collect samples from it. Table 11-8 compares the actual number of samples collected in 2001 to the required number of samples. Because of locations that were dry or had low water production, the completeness goal of 90% was only met by analyte groups with relatively low numbers of required samples (dissolved gases, ^{137}cesium, alkalinity, chloride, total cyanide, nitrite or nitrate [versus nitrate/nitrate combined as nitrogen], sulfide, and TPH).

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Completeness is also a quantitative measure of data quality expressed as the percentage of valid or acceptable data obtained from a measurement system. Table 11-9 summarizes the validation completeness evaluation. Detailed validation and verification data for all analytes and samples are provided in the 2001 Quarterly Reports (RMRS, 2001f; SSOC, 2001b; and SSOC, 2002a and 2002b). A completeness metric was calculated using the following formula:

Completeness = $Dp_u = \frac{DP_t - DP_n}{DP_t} \times 100\ (\%)$ (The completeness criterion is $\geq$ 90%)

Where:
Dp_u = Percentage of usable data points
DP_n = Non-usable data points
DP_t = Total number of data points

Comparability

Comparability is a qualitative parameter. During 2001, planned analytical methods for metals, radionuclides, dissolved gases, PCBs, and WQPs remained consistent over the entire year. Refer to the discussion below for VOCs and the description of a nomenclature change for metals. Laboratory analyses were performed according to standard CLP protocols and results should be comparable to data produced by similar methods. Consistency in the acquisition, handling, and analysis of samples is necessary for comparing results. Table 11-4 lists the required analytical methods for the various analytes. Samples for the groundwater program are collected, preserved, and handled in accordance with RFETS standard operating procedures (SOPs), transported following both RFETS SOPs and US Department of Transportation (DOT) shipping regulations, and analyzed using standard EPA or nationally recognized analytical methods to ensure comparability of results with other analyses performed in a similar manner.

Based on a suggestion by the CDPHE at the start of the 2nd Quarter 2001, the technique for the analysis of VOCs was changed from the EPA 524.2 Drinking Water to the EPA SW-846, 8260 method. The change was made because the SW-846 method requires a pre-screening analytical run that helps laboratories determine appropriate levels of dilution, when needed. The list of analytes for SW-846 includes all analytes in the EPA 524.2 list with the addition of (detection limits are in parentheses in µg/l) 1,1,2-trichloro-1,2,2-trifluoroethane (1), acetone (10), carbon disulfide (1), 2-butanone (10), 2-hexanone (10), and 4-methyl-2-pentanone (10). The detection limit for the remaining VOCs (1 µg/l) is unchanged. Because both the EPA 524.2 and SW-846 methods use gas chromatography as the basic analytical method, and detection limits have not changed, results gathered using either method should be comparable to one another.

A change in nomenclature for metal analyses was initiated at the start of the 3rd quarter of 2001. The nomenclature for the test method was changed from CLP-SOW to EPA 600. Because only the name that is entered into the SWD has changed (and not the method), all past, current, and future analytical results should remain comparable.

11.3 Discussion of Analyte Groups

11.3.1 Metals

Precision

There were 25 duplicate sampling events compared with 244 real sampling events in the data set for metals in 2001 (1 in 9.8, 10.2%). For the 25 duplicate sampling events, there were 691 analytical records. Relative percent differences for metals are displayed in Table 11-1; criteria for display are given in Table 11-3. Of the 691 records, 593 of the calculated RPDs were within the RPD-QC criterion of $\leq$30% (Table 11-3). With 85.8% of the RPDs meeting the QC criterion, precision for metal analyses was just above the goal of 85% and is, therefore, acceptable.

The recommended frequency for duplicate samples is 1 in 20 on a per-well basis. In 2001, 18 of 169 wells sampled were analyzed for metals as real/duplicate pairs, a ratio of 1 in 9.4 (10.6%). Thus, duplicate sample frequency was within the requirements on both a per-well and per-analyte basis.

Accuracy

All metal analyses were performed using contract required methods during 2001. The contract required methods, as indicated in Table 11-4, stipulate that the CLP-SOW (EPA 600) method be used for analysis of dissolved and total metals. Total metals analyses were run as necessary in support of various groundwater evaluations, and to analyze samples collected with dedicated pumps using low flow (micropurging) techniques. Based on the requirements summarized in Table 11-4, the methods used during 2001 for analysis of metals meet or exceed the criteria described in *Evaluation of Data for Usability in Final Reports* (RMRS, 1998e).

Table 11-4 also presents a summary of the CRDLs for metals analyses. Detection limits for 19 of 28 metals met criteria for CRDLs for all the analyses performed in 2001 (see thallium subsection below). Nine metals had detection limits for which some analyses were above CRDLs. These metals were aluminum, with acceptable detection limits in 99% of the analyses, antimony (99%), arsenic (99%), beryllium (98%), chromium (99%), copper (98%), lead (89%), selenium (99%), and vanadium (99%). In 52 analyses that did not meet CRDL requirements 44 were non-detections and only one result was above Tier II. Selenium in 891COLWEL was 590 µg/L in the 3rd quarter (Tier II = 50 µg/L), which is typical for the location. Discussion and data accuracy evaluations for specific samples and analyses are available in the quarterly reports.

Table 11-5 gives matrix spike results for metals analyses in 2001. There are 2932 matrix spike records in the table; 71 records are below a percent recovery of 75% and 37 records are above 125%. Thus, 3.7% of the matrix spikes for metals were outside the quality control criteria. In general, these matrix spike results were well outside the 75-125% acceptable range. Instances where metal matrix spike analyses had low percent recoveries and were not covered by a duplicate analysis within the matrix spike quality control

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criteria included, aluminum (2), barium (2), calcium (2), iron (3), magnesium (2), manganese (1), mercury (2), potassium (2), silver (2), sodium (3), and vanadium (1). Metal matrix spike analyses with high percent recovery and no duplicate within the criteria included, aluminum (5), iron (1), lead (2), lithium (6) and selenium (1). The cases where a second acceptable matrix spike was not present indicate where matrix spike criteria were not met. Metal matrix spike analyses did meet the quality control criterion in 96.3% of the records. This and the lack of a consistent pattern of analytes falling outside the QC criterion indicate that there is no matrix interference problem for metals in groundwater for 2001. Also note that metal analyses were not rejected in validation/verifications due to matrix spike analyses (see below). Metals analyses for 2001 are accurate with respect to matrix interference.

Thallium Accuracy

The accuracy of thallium analyses and presence of thallium as a contaminant at RFETS in 2001 warrant a special discussion. In the past, thallium has not been a contaminant of concern in groundwater at RFETS and has not regularly detected above Tier II Action Levels. In 2001, numerous wells had their first ever thallium detections or first ever thallium detections at concentrations greater than Tier II. The Groundwater Program is concerned that many of these thallium detections reported by laboratories in 2001 may be inaccurate.

The presence of thallium at levels greater than Tier II is suspect because according to the K-H ASD measuring small concentrations (for example 2.0-4.0 µg/l, see below) of thallium in RFETS samples is technically difficult. (The practical quantitation limit listed for thallium in the ALF table is 12 µg/l.)

A complicating factor in thallium measurement occurs for the following reason. The Tier II Action Level for thallium is 2.0 µg/l. The Basic Ordering Agreement (BOA), the contract that specifies what is expected of an analytical laboratory, has a CRDL of 4.0 µg/l for thallium. Because the CRDL was greater than the Tier II Action Level many thallium analyses have detection limits above the Tier II. This mean that the CRDLs for thallium analyses could be met, but that accurate measurement of low concentrations of thallium at or above Tier II may be questionable. Thallium accuracy in 2001 depended on laboratory skill and the laboratories adherence to contractual agreements or whether they were able to achieve, at the request of the K-H ASD, detection limits below those stipulated in the BOA. The range of detection limits from various laboratories for thallium was 0.013 µg/l to 3.88 µg/l.

Thallium trend plots for several wells displayed in Appendix A illustrate the problem caused by attempting to measure small concentrations of thallium and the conflict between CRDLs and Tier II action level measurement criteria. The trend plots have a similar thallium pattern that extends from mid-2000 through mid-2002. These trend plots typically show multiple consistently low (below Tier II) thallium analyses prior to mid-2000. This is followed by a single high value (above Tier II) in mid to late-2000, then a single low value (below Tier II) in early to mid-2001, another single intermediate to high value in mid to late-2001 (above Tier II), and finally another low value (below Tier II) in early to mid-2002. This pattern may

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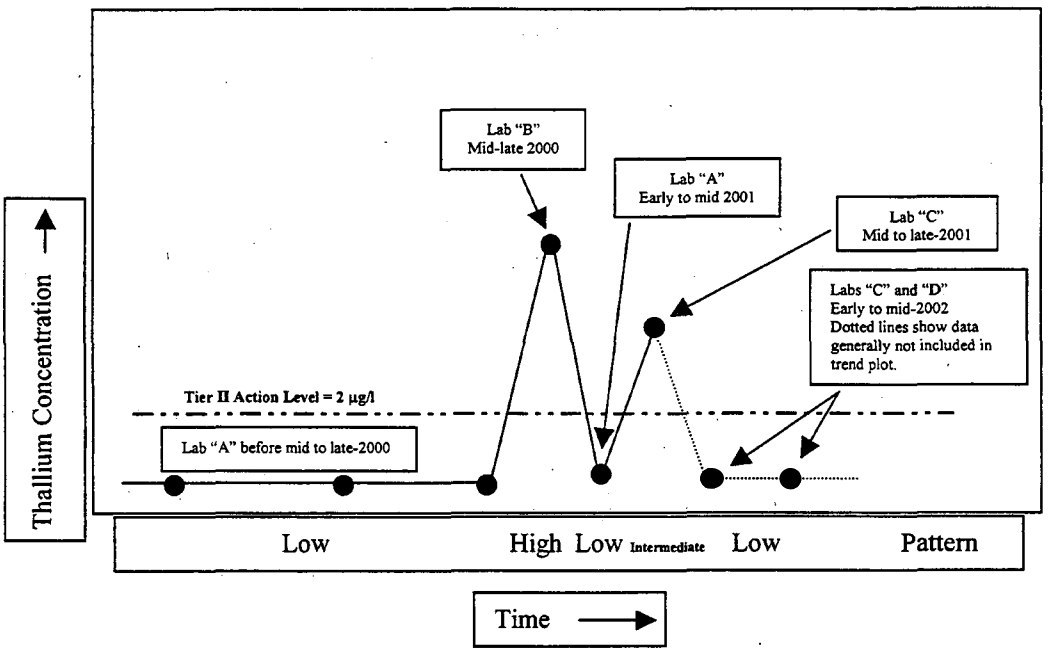
not reflect true thallium concentrations and may be an artifact of the particular laboratories that analyzed the sample.

In many cases, Laboratory "A" performed metal analyses prior to the middle of 2000 (see sketch below). Laboratory "B" was brought into the BOA program and reported high mid- to late-2000 values. Largely because of data package reporting problems and in secondarily because of the high thallium values, Laboratory "B" was dropped from the program. Samples collected in early to mid-2001 were again sent to Laboratory "A" and thallium concentrations returned to levels similar to those reported prior to the middle of 2000 by laboratory "A". In mid to late-2001, Laboratory "C" was added to the BOA program and reported another group of thallium concentrations greater than Tier II. These are generally intermediate between those reported by Laboratories "A" and "B". The early to mid-2002 data that is available was processed by Laboratories "C" and "D", laboratory "D" being a fourth laboratory added to the BOA. Data values from this time interval are generally low and similar to those reported by Laboratory "A". Initially it was assumed that data from Laboratory "B" was unreliable, especially after subsequent samples sent to Laboratory "A" came back with values similar to ones initially reported by Laboratory "A". Based on the concentrations reported by Laboratory "C", the Groundwater Program is closely scrutinizing all thallium data to ascertain whether the low values from Laboratory "A" may in fact be spurious and the higher values from Laboratories "B" and "C" may reflect actual thallium concentrations.

The following sketch depicts the recent general thallium concentration trend in groundwater at RFETS.



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Representativeness

There were 664 rinsate records versus 5229 real and duplicate sample records combined for metals in 2001 (1 in 10.6, 9.4%). Most metals rinsate results were either "U" (non-detect) or "B" qualified (the result was less than the CRDL but greater than the IDL), indicating that in general no metal contamination was introduced during sampling and/or shipping activities. Table 11-7 presents 164 metal rinse results during 2001 that were not U-qualified. Of these 157 were "B" qualified by the laboratories. In general these results are two or more orders of magnitude less than the associated Tier II action levels indicating little introduced contamination. One aluminum detection at 19.4 µg/l was well below Tier II (36500 µg/l). Two aluminum results were "N" qualified indicating associated that matrix spike results were outside of control limits. These results were verified as "J1" estimates were also well below Tier II (61 and 58 µg/l). One silver result deserves the "B" laboratory qualifier based on the CRDL from Table 11-4 (1 µg/l) and the reported detection limit (0.01 µg/l). The only results greater that Tier II were four thallium analyses and the accuracy of these is questionable, as discussed above. In general, 2001 rinsate detections for metals were well below both Tier II and Background M2SD levels.

Completeness

The 2001 IMP (K-H, 2000a and 2000b) required that 334 samples be collected for metals. Sampling was attempted at all required locations during 2001 (Table 11-8). Ninety-three locations were dry or went dry during sampling, such that metals samples could not be collected. Of the 334 metal sample events required by the IMP, 241 were successfully completed during 2001, a success rate of 72.2% (Table 11-8). The goal, which assumes adequate groundwater production from the monitoring locations, is to have at least 90% of the wells successfully sampled.

All metals sampling records were either validated or verified in 2001. Updated validation/verification results are presented in Table 11-9. Of 8079 metals analyses, 153 were rejected (1.9%). Therefore, 7926 analyses (98.1%) were judged acceptable. The rejections were related to laboratory activities, primarily outdated instrument calibrations and calibration blank errors. Details of the rejections are contained in the Quarterly Reports (RMRS, 2001f; SSOC, 2001b; SSOC, 2002a and 2002b).

Validation (as opposed to verification) of metals records was performed on 10.0% (807 of 8081 analyses) which falls below the 25% criterion defined in the IMP. The K-H ASD group measures the 25% validation criteria against the total number of RINs they process at RFETS (individual RINs from all groups collecting samples are selected randomly). By this process, 15.1% of 2001 RINs for metals in the Groundwater Program were validated, which is still below the 25% criteria.

Comparability

No changes were made to analytical procedures during 2001. Thus, analyses from 2001 are comparable to previous analyses.

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11.3.2 Radonuclides

Precision

The data set for radionuclides (americium-241, cesium-137, neptunium-237, plutonium-239/240, uranium isotopes [U-233/234, U-235, and U-238], tritium, and strontium-89/90) contains 75 duplicate sampling events versus 708 real events (1 in 9.4). Duplicate samples were collected at 19 of 106 locations sampled for radionuclides (1 in 5.5). Duplicate Error Ratios for real/duplicate analytical record pairs from analyses qualified by the laboratories as detections are shown in Table 11-2. Table 11-3 presents the display criteria for Table 11-2. Duplicate Error Ratios for 123 of the 125 real/duplicate analytical pairs were acceptable (DER $\leq$ 1.96). One plutonium-239/240 from the first quarter (well 22996) and one from the second quarter (well 00100) exceeded the $\leq$ 1.96 criterion. As shown in Table 11-3, the precision metric was met in 98.4% of radionuclide real/duplicate samples.

Accuracy

All radionuclide analyses were performed using the proper contract required methods during 2001 (Table 11-4). Required detection limits for the 1460 radionuclide analyses performed during 2001 were met except for 14 analyses; six americium-241, six plutonium-239/240 and two strontium-89/90 were performed with detection limits greater than those specified in the contract. Four of the americium-241 and two plutonium-239/240 results were non-detections where the CRDL was barely exceeded. Two of the remaining plutonium analyses were associated ("B" lab qualified) with method blank activity that exceeded the minimum detectable amount. This indicates that there may have been laboratory contamination of the method blank and the samples. The remaining 2 americium and 2 plutonium analyses simply failed to meet the CRDL criteria. The strontium detection limits unlike the 4 americium and 2 plutonium samples above were significantly higher than their CRDL although the results were below their reported detection limits and the laboratory should have "U" qualified these results. Including the six "U" qualified americium and plutonium analyses discussed above 1452 of 1460 (99.4%) analyses were performed within the required detection limits in 2001. The accuracy of radionuclide analyses was good in 2001.

Table 11-6 presents LCS results for radionuclide analyses performed in 2001. One U-235 (0% recovery) failed to meet the 75-125% recovery LCS criterion. Although permitted, there is no second LCS analysis associated with this result the analysis fails the LCS criterion. Four sample results associated with the 0% recovery U-235 were assigned "J" qualifiers (estimated quantifications) by the laboratory and were verified as fully acceptable values. All of the remaining 275 LCS results are within the 75-125% recovery QC criterion. Except as noted, each combination of RIN and analytical method sent out has a corresponding LCS analysis that is within the criteria. With respect to LCS samples, radionuclide analyses in 2001 are accurate.

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Representativeness

Rinsate samples were collected at 18 different locations in 2001 (1 in 5.9). There were 118 rinsate records for radionuclides compared to 1344 real and duplicate records in 2001 (1 in 11.4, 8.8%). Fourteen rinsate analyses yielded detectable values (Table 11-7), eleven of which were estimates ("J" laboratory qualified). Detections included four americium-241, five plutonium-239/240, one U-233/234, two U-235, and two U-238 samples. All of these results were valid and were below Tier II action levels. One hundred four of 118 (88.1%) rinsate results were non-detections. While there is little indication that introduced contamination during sampling activities is a concern for 2001 radionuclide data, sampling crews have been cautioned to make sure that established procedures are followed during equipment decontamination.

Note: Nine additional rinsate analyses had results that were less than or equal to stated detection limits but did not have the "U" laboratory qualifier. This was assumed an error on the laboratory's part. Because the detection limits were below the CRDLs and no problems were detected in validation/verification these results were considered to be "U" non-detections.

Completeness

As shown in Table 11-8, 234 Pu/Am, 346 U-isotope, 134 tritium, 12 cesium-137, 46 strontium-89/90, and 47 neptunium-237 samples were scheduled for collection and analysis. All the required samples were collected or attempted. The success rate varied because of dry wells or wells that went dry during sampling. The percentages of successful sample collection were 67.5% for Pu/Am, 72.5% for U-isotopes, 65.7% for tritium, 100% for cesium-137, 54.3% for strontium-89/90, and 34.0% for neptunium-237. The goal is 90%, groundwater availability permitting.

Of the 1462 radionuclide results 1460 were either validated or verified; the exceptions were 2 cesium-137 samples. Of the 1460 validated/verified results, 24.9% (364) were validated and 75.1% (1096) were verified. The percentage for validation is essentially equal to the 25% QC criterion required for compliance.

As shown in Table 11-9, 100% of the americium, plutonium, uranium, tritium, strontium-89/90, and neptunium-237 radionuclide analyses are usable and therefore meet the 90% quality control criterion. Eighty-three percent of the cesium analyses are usable which failed to meet the 90% QC criterion.

Comparability

No changes were made to analytical procedures during 2001. Thus, the radionuclide analyses presented here are comparable to previous analyses.

11.3.3 Volatile Organic Compounds and Dissolved Gases

Precision

For VOCs and dissolved gases (methane, ethane and ethene), there were 27 duplicate sampling events and 333 real sampling events. This represents a ratio of 1 in 12.3 events (8.1%), which is greater than the required 1 in 20. For VOCs alone, there were 26 duplicate sampling event compared to 305 real sampling events (1 in 11.7). Relative percent differences for 1585 of the 1616 real/duplicate analytical record pairs (98.1%) met the QC criterion of 30%. Table 11-1 lists those pairs with detections as defined in Table 11-3. Sixteen RPD record pair were less than the QC criterion of 30% (Table 11-1) and another 15 were rejected in validation. The rejected values are most commonly due to problems with instrument calibration. The analyses of VOCs for 2001 meet the overall precision compliance goal of 85%.

Accuracy

All VOC and dissolved gas analyses performed in 2001 employed contract-required methods. In the First Quarter the methods used were EPA 524.2 for VOCs and SW-846 Method 8015 for dissolved gases (Table 11-4). As discussed above, results from each method should be comparable.

For VOCs in 2001 there were 52 analyses (not counting dilution runs) out of 358 real/duplicate/rinse analyses (1 in 6.9) that did not meet the 1 µg/L CRDL. (There were no dilution problems associated with dissolved gas analyses.) These 52 analyses represent 31 different sampling locations. Four locations (4 analyses) contained little or no evidence of contaminants of concern and did not warrant detection limits in excess of the CRDL (concentrations were less than 50 µg/L). Fourteen locations (20 analyses) contained concentrations of contaminants (principally carbon tetrachloride, PCE and TCE) that, while elevated, may not warrant detection limits set in excess of the CRDL. In general, concentrations in these sampling locations were under 800 µg/L. Nine locations (15 analyses) contained concentrations of contaminants that probably did warrant exceeding the CRDL; concentrations in these cases were between 800 and 6800 µg/L. Six locations (13 analyses) had contaminants with concentrations greater than 10,000 µg/L. Meeting the CRDL in these six locations is essentially impossible. The following table summarizes the figures discussed here.

Number of Locations Exceeding CRDL*		Number of Analyses (Total =52)		Concentration Range of Principal Analyte (carbon tetrachloride, PCE, TCE)	Was Excess Detection Limit/Dilution Warranted?
4	(CY 2000 = 5)	4	(CY 2000 = 5)	< 50 µg/L	Definitely No
14	(CY 2000 = 17)	20	(CY 2000 = 37)	50-800 µg/L	Probably Not
9	(CY 2000 = 4)	15	(CY 2000 = 6)	800-6800 µg/L	Probably
6	(CY 2000 = 11)	13	(CY 2000 = 21)	> 10000 µg/L	Definitely Yes

***31 locations considered, total is 33. 2 wells are counted twice because each was sampled twice through during the year . Each sampling had a CRDL problem.**

Switching to the SW-846 Method 8260 which requires a pre-screening run to aid in the determination of the appropriate dilution in early 2001 (see Section 11.2.2 Comparability above) appears to have helped reduce the number of excessive dilutions in CY 2001 compared to CY 2000.

Despite some problems with dilutions and detection limits, VOC and dissolved gas analyses in 2001 are acceptable with respect to accuracy.

Matrix spike data for VOC and dissolved gas analyses for 2001 are presented in Table 11-5. Of the 956 VOC results in Table 11-5, 26 matrix spike records were below and 14 were above the 75-125% recovery criteria. Thus, 4.2 % of VOC matrix spikes do not meet the QC criterion of 75-125% recovery and 95.8% did meet the criterion. Only three analytical results were rejected in validation/verification because they did not meet the criterion, none were contaminants of concern. Examination of Table 11-5 indicates that no one compound dominates results outside the QC criterion. Sixteen different compounds had either one or both the Matrix Spike (MS1) and Matrix Spike Duplicate (MD1) record out of compliance. Eight of the 16 compounds that do not meet the criterion are not contaminants of concern. There were 10 pairs of MS1-MD1 records for these 8 analytes and in 9 pairs only the MS1 or MD1 (not both) is out of compliance.

TCE was the most common compound out of compliance. There were 8 pairs of MS1-MD1 records for TCE and a single MS1 record. At least six of the paired matrix spikes were associated with contamination in the sampled well (one spike location was not reported by the laboratory). Three TCE matrix spike records out of compliance were paired with a MS1 or MD1 that was within compliance. There were 5 pairs of TCE MS1-MD1 records where both were out of compliance plus the single MS1.

Where the analyte was one of the following contaminants of concern: 1,1-dichloroethene, carbon tetrachloride or PCE, contamination of the host well may have caused the matrix spike analysis to be outside the QC criterion. There does not appear to be matrix spike interference for VOC analyses in 2001. Accuracy of VOC analyses with respect to matrix spikes is good. Further discussion and additional data are provided in the Quarterly Reports (RMRS, 2001f; SSOC, 2001b; SSOC, 2002a and 2002b).

For the 56 dissolved-gas matrix-spike analytical records shown in Table 11-5, 12 (21.4%) were out of compliance with the 75-125% recovery criterion. The 12 analyses represent 9 MS1-MD1 pairs. In 6 of the pairs either the MS1 or the MD1 was out of compliance not both. The pair therefore meets the recovery criterion. The three pairs where the MS1 and MD1 failed to meet the criterion were for ethane (1) and ethene (2). This is less critical because the reason dissolved gas analyses are performed is to gather methane data for use in the Plume Degradation evaluations found in Section 7. All pairs of matrix spike analyses for methane met the recovery criterion. Therefore, there does not appear to be matrix interference for dissolved gas analyses in 2001.

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Representativeness

There were 27 rinsate-sampling events from 19 wells for VOCs and one for dissolved gases in 2001. Of the 1799 resulting records (1796 for VOCs), 10 rinsate analyses contained VOCs at detectable concentrations are shown in Table 11-7. Table 11-7 includes only the actual rinse detections for the year. The majority of 2001 VOC rinsate results are not shown in Table 11-7 because they do not indicate contamination due to inadequate decontamination of sampling equipment. Records for 1746 non-detections (97.0% of the VOC rinsate records), including three dissolved gas analyses are not shown in Table 11-7. One detection-record was rejected in validation is not shown. Twenty-four laboratory qualified "J" analyses in which the result and detection limit for the analysis were equal to or less than 1 µg/l, the Contract Required Detection Limit (10 µg/l in the case of 2-butanone and acetone) are not shown. These estimated results imply no induced contamination due to decontamination activities. Eighteen analyses with "JB" or "JB1" validation/verification codes and where the Validation Reason Code indicated that the method blank contamination was significant are not included. Except in one case these analyses are also lab qualified as "JB". The blank contamination compromises these results as indicators of induced contamination. ("J" laboratory or validation/verification codes indicate the result is estimated. "B" codes indicate method blank contamination.)

In Table 11-7, rinsate results for five chloromethane analyses were detections below Tier II action levels. The associated real and duplicate samples for these records do not contain chloromethane. This implies that the chloromethane in the rinse is due to laboratory contamination. (These results are not "B" qualified which would indicate method blank contamination at the lab.) Chloromethane is not a primary contaminant of concern. It is a degradation product of carbon tetrachloride.

Tetrachloroethene and trichloroethene rinsate results in Table 11-7 containing significant contamination came from two wells on four occasions. These results indicate that decontamination of sampling equipment was not effective. The tetrachloroethene and trichloroethene results were discussed with the sampling crews at the time the data arrived from the laboratories. The crews are making a special effort to perform thorough decontamination of their sampling equipment. This effort was noted in the first through third 2001 Quarterly Reports (RMRS, 2001; SSOC, 2001; and SSOC, 2002a).

Considering that more than 97.0% of 2001 VOC (and dissolved gas) rinsate results from 17 of 19 locations yielded non-detects (1746 of 1799), in general, analyses are representative of environmental conditions. The 56 VOC results that were not classified as non-detections included 24 where the result was less than 1µg/l and 18-22 that were compromised by lab contamination. Extra care in decontamination at all locations, not just those with known contamination, has been taken by sampling crews since the discovery of contamination of rinsate samples beginning in the first quarter 2001.

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Completeness

During 2001, the required 383 VOC and 28 dissolved gas sample sites were visited (Table 11-8). From these, 305 VOC and 28 dissolved gas samples were collected and analyzed. The sampling success rate for VOCs was 79.6% and for dissolved gases 100%. Dry well conditions precluded VOCs meeting the completeness goal of 90.0%.

There were 22592 VOC analytical records returned in 2001 (Table 11-9). All VOC records were either validated or verified. Based on a count of sampling events, 29.5% of 2001 analyses were validated and 70.5% were verified. These percentages meet the required criterion for a minimum of 25% validation.

Of the 22592 analyses, 1.2% (274) were rejected (validation/verification code = R or R1) and are considered unusable data. The rejected compounds are not contaminants of concern at RFETS, 1,2-dibromoethane (10 rejections), 2-butanone (94), acetone (83), bromochloromethane (10), dibromomethane (10) and 1,2-dibromo-3-chloropropane (67). Rejection of records was due to laboratory problems. One or both of the following validation reason codes applied to all rejected VOC analyses. Requirements for independent calibration verification were not met, or continuing calibration verification criteria were not met. Overall, 98.8% of VOC analyses are usable. VOC analyses are complete with respect to validation and verification.

Because dissolved gas analyses are performed under special contracts, they are not validated or verified at this time.

Comparability

At the start of the 2nd Quarter 2001, the technique for the analysis of VOCs was changed from the EPA 524.2 Drinking Water to the EPA SW-846, 8260 method. The change was made because the SW-846 method requires a pre-screening analytical run that helps laboratories determine appropriate levels of dilution, when needed. Because both the EPA 524.2 and SW-846 methods use gas chromatography as the basic analytical method, and detection limits have not changed, results gathered using either method should be comparable to one another.

Analysis of dissolved gases remained consistent throughout the year. VOC and dissolved gas analyses for 2001 are comparable to previous analyses.

11.3.4 Water Quality Parameters

Precision

The following WQPs were collected in 2001: alkalinity, chloride, total cyanide, fluoride, nitrate, nitrate/nitrite, TOC, TDS, TPH, sulfate, and sulfide.

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There were 67 duplicate sample records versus 751 real sample records collected during 2001 (1 in 11.2, 8.9%). All 67 of the RPDs calculated from the real/duplicate pairs were less than the QC criterion of 30% and, are therefore, acceptable (Tables 11-1 and 11-3). Overall, the data indicate good precision for water quality parameter analyses.

Accuracy

All water quality parameter analyses were performed using the proper contract required analytical methods (Table 11-4). Analytical data indicate that the CRDLs were met for 97.3% (796 of 818 records) of water quality parameter analyses (Table 11-3). Those analyses that did not meet CRDL requirements included, 6 chloride, 1 fluoride, 1 nitrate, 4 nitrate/nitrite, 8 sulfate, 1 sulfide, and 1 TDS. Except in the case of the fluoride (see below), all analyses were detections and presumably warranted a detection limit/dilution above the CRDL. Chloride, sulfide, and TDS do not have Tier II action levels. The sulfide result, noted above, was rejected in validation because it did not meet matrix spike requirements. The fluoride was above the Tier II action level (4 mg/L) at the detection limit (5 mg/L). The nitrate and nitrate/nitrite analyses were all above the Tier II level (10 mg/L). One of the eight sulfate analyses (2760 mg/L, detection limit = 10 mg/L, dilution = 100) was above Tier II (500 mg/L). Except for the sulfide analysis, the other 21 analyses in this group were verified as either estimates (J1 qualified, 2 records) or as usable with no problems (V1 qualified, 19 records). In general, with respect to methods and detection limits, water quality parameter results for 2001 are accurate.

Matrix spike sample results for alkalinity, chloride, total cyanide, fluoride, nitrate, nitrate/nitrite, sulfate, sulfide, and TOC are given in Table 11-5. Of 301 records, 9 are outside the 75-125% recovery range. All records for alkalinity (3 records), total cyanide (16), sulfate (68), and TOC (16) were within the 75-125% QC range. Chloride (23 records total, 1 outside the range), fluoride (35/1), nitrate (23/1), and nitrite/nitrate (104/4) had paired matrix spike results (MS1-MD1) where one member was outside the criteria but the second result was acceptable. For sulfides there were 13 matrix-spike records (including one MS1-MD1 pair). Five of the single matrix spikes (MS1) failed the criteria 75-125% recovery criterion. Five sulfide analyses associated with the failed matrix spike analyses discussed here were rejected in validation due to low predigestion, matrix-spike recoveries. Except for sulfide, there does not appear to be any matrix interference affecting WQPs.

Representativeness

There were 60 equipment rinsate analyses for water quality parameters in 2001: chloride (1), total cyanide (2), fluoride (4), nitrate (1), nitrate/nitrite (23), sulfate (3), sulfide (1), TDS (23) and TPH (2). Forty-nine of the analyses (81.7%) were non-detects. As shown in Table 11-7, 1 total cyanide, 1 nitrate, and 9 nitrate/nitrite rinsate analyses had detectable concentrations. The results for these analyses are low and none of the results exceeded a Tier II action level. Introduced contamination is not indicated by these results.

2900
3600

Completeness

As shown in Table 11-8, 8-alkalinity, 28-chloride, 26-total cyanide, 80-fluoride, 28-nitrate, 310-nitrate/nitrite, 148-sulfate, 28-sulfide, 342-TDS, 28-TOC, and 23-TPH samples were to have been collected for analysis. All of the required visits for sampling were made. The success rate varied because of dry wells or wells that went dry during sampling. Two TDS samples were missed because of errors in labeling and chain of custody (Table 11-8). The percentages of successful sample collection were 100% for alkalinity, 100% chloride, 100% total cyanide, 58.8% fluoride, 100% nitrate, 76.5% nitrate/nitrite, 68.2% sulfate, 100% sulfide, 69% TDS, 100% TOC, and 65.2% for TPH. The QC goal is 90%, groundwater conditions permitting.

All of the 915 water quality parameter records from 2001 were validated or verified (Table 11-9). Validation was done on 16.5% of the results (151 records) and verification was done on 83.5% (764 records). Based on counting records the number of CY2001 validations is less than the desired annual 25%. Note that the K-H ASD keeps track of the percent of validations versus verifications based on a site-wide count of the number of Report Identification Numbers sent out. "RINs" essentially represent batches of samples sent out for analysis. As defined in the Groundwater Quality Assurance Program Plan (RMRS, 2001c) the K-H ASD is responsible for validation of 25% of the RINs sent out for analysis.

As shown in Table 11-9, only six of 915 WQP analyses failed to provide usable data points. Five sulfide analyses and one nitrate/nitrite analysis were rejected because of low, predigestion matrix-spike recoveries.

Comparability

As stated above, no changes were made to analytical procedures for WQPs during 2001. Water quality parameter analyses for 2001 are comparable to previous analyses.

11.3.5 Polychlorinated Biphenyls

Precision

A duplicate sample for polychlorinated biphenyls (PCBs) was collected from one of the sixteen PCB sampling locations in 2001. There are seven different PCB constituents analyzed for. Because all duplicate and real analyses were non-detections at the detection limits, all seven RPDs are equal to zero. Therefore, there are no PCB-RPD results shown in Table 11-1. PCB analyses are included in summary Table 11-3. PCB analyses are acceptable with respect to precision during 2001.

Accuracy

Contract required detection limits were met for all PCB analyses in 2001, except in one case (Table 11-4). Due to a lack of recharge in the well, the sample container at well 56301 was not completely filled, and it was not possible for the laboratory to meet the CRDL on that sample. All PCB analyses carried out in 2001 utilized the SW-846 Method 8082 as required. With respect to detection limits and analytical methods, PCB analyses in 2001 are acceptable.

3601

As in 2000, no matrix spike analyses were performed for PCBs during 2001. While accuracy quantification for PCB analyses could have been better, analyses for PCBs are judged accurate for 2001 because all the results were non-detects.

Representativeness

A rinsate sample was collected at one of the sixteen sampling locations. The seven rinsate results for PCBs were all non-detects. There is no evidence of introduced PCB contamination because of the sampling procedures in 2001. Real and duplicate analyses are considered to be representative for 2001.

Completeness

Because of a lack of water, only 16 of 38 wells could be sampled for PCBs (42.1%). All of the 126 results returned were classified as usable data points. Validations were made on 38.9% (7 of 18 records) of the records and verifications were made on the remaining 61.1% of the records. Sampling was incomplete because of dry conditions; however, it was complete with respect to gathering usable data.

Comparability

Calendar year 2001 PCB analyses are comparable to previous analyses (1999 and 2000). Analytical methods and sampling procedures have remained the same over the sampling period.

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12.0 CONCLUSIONS AND FUTURE ACTIVITIES

The Groundwater Program experienced a number of improvements during 2001 and set projects in motion that will be accomplished in 2002. The following conclusions can be made with respect to the Groundwater Program based on the detailed discussions found elsewhere in the report.

Data collection and data quality for groundwater samples collected in 2001 have maintained good results based on the PARCC summary presented in Section 11.0. Almost all of the data were available electronically, and the data validation percentages generally exceeded the 25 percent required. In addition, improvements were made in 2000 that will help correct the arbitrary dilutions that occurred in some analyses by changing the analytical method for VOCs from Method 524.2 to SW846. The results of this change were reflected in samples analyzed in 2001.

With respect to groundwater reporting, the changes implemented for the 1999 Annual RFCA Groundwater Report have been maintained in this 2001 Annual Report. This report now focuses on data evaluation as opposed to data presentation. Individual wells have been discussed more completely and the results of groundwater evaluations have been expanded. The actual data used in the current Annual Report will be provided in the four RFCA Quarterly Reports and not reproduced here. The RFCA Quarterly Reports have stayed the same except for some changes in the format of the report. The Quarterly Reports and this Annual Report can be accessed through the RFETS Environmental Data Dynamic Information Exchange (EDDIE) Web Pages.

The Building D&D monitoring program was expanded with the addition of monitoring wells around Buildings 371/374, 883, 865, 881, 991 and 559. With these additions, all major buildings with the potential to impact groundwater quality have monitoring networks in place.

The largest programmatic improvement for groundwater has been in the characterization and quantification of groundwater plume nature and extent. Evaluation of the Industrial Area Plume involved the installation of wells in the interior of the plume to identify potential source areas of groundwater contamination such that multiple plumes may be identified. The results of this evaluation are reflected in the Composite VOC Plume Map for the Site (Plate 13).

An evaluation was performed in 2002 to determine if the Site Composite VOC map should be constructed differently than it had been previously. Concerns focused on the presentation of a combination of new data and historic data. The decision that was made was to present the new plume configuration and a representative plume configuration from 1997. These changes are reflected in the 2001 Composite Plume Map and should aid in denoting those areas where changes have occurred based on newer data.

Given the large amount of new data with respect to the nature and extent of groundwater contamination at RFETS, a partial review of the groundwater monitoring network will be done in FY 2002. The evaluation will be part of the WARP, which began in FY 2002. This project will help focus the abandonment of wells no longer necessary for monitoring purposes at RFETS. It is anticipated that some changes will be proposed to the monitoring program based on this evaluation.

Also, as part of the WARP, several hundred wells will be abandoned in CY 2002, and a small number of wells may be installed. This yearly acceleration of the WARP scope is necessary in order to meet the objectives of Site Closure.

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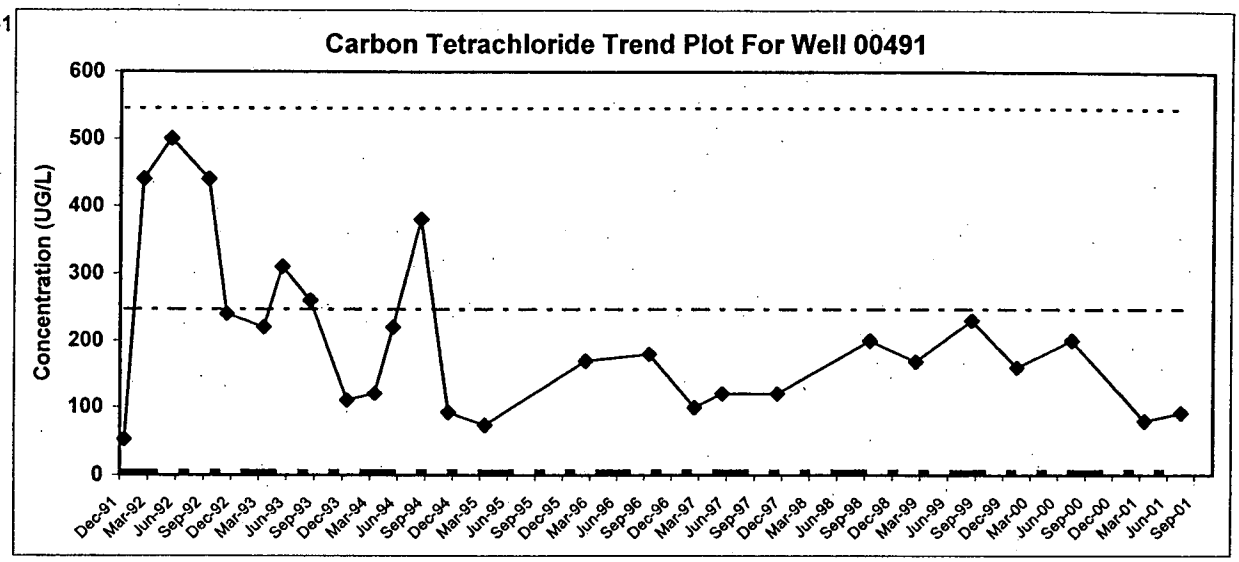

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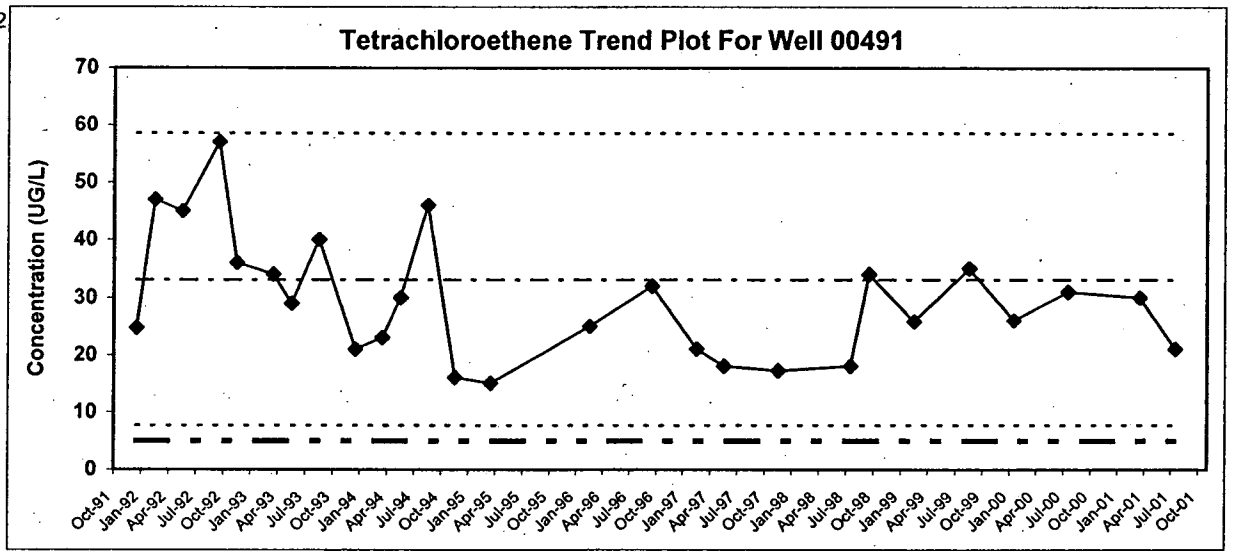

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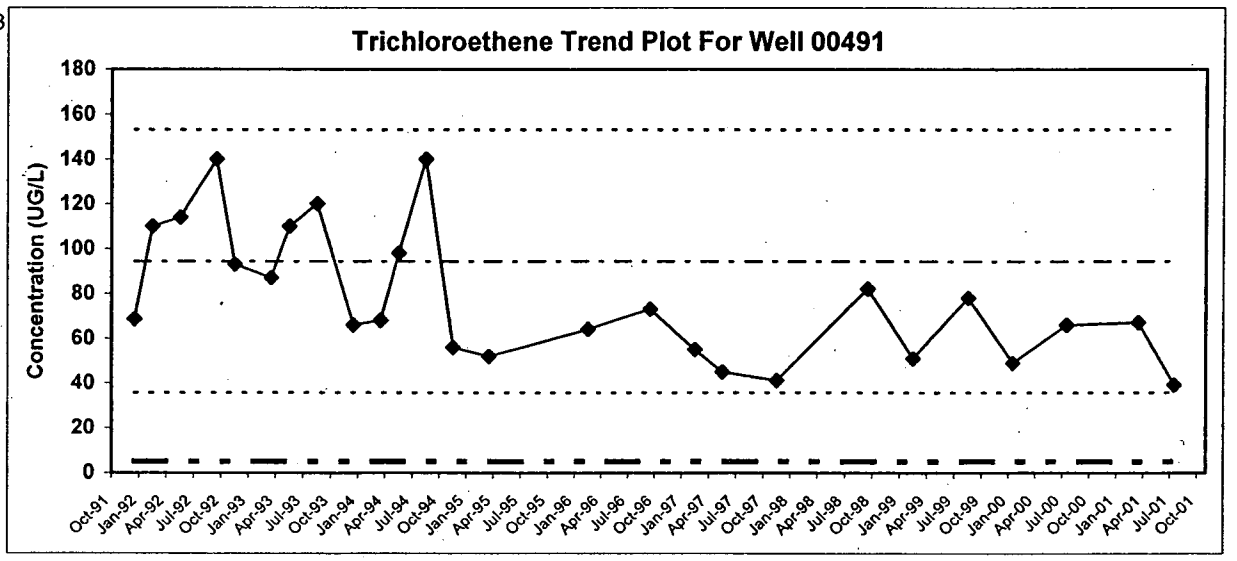

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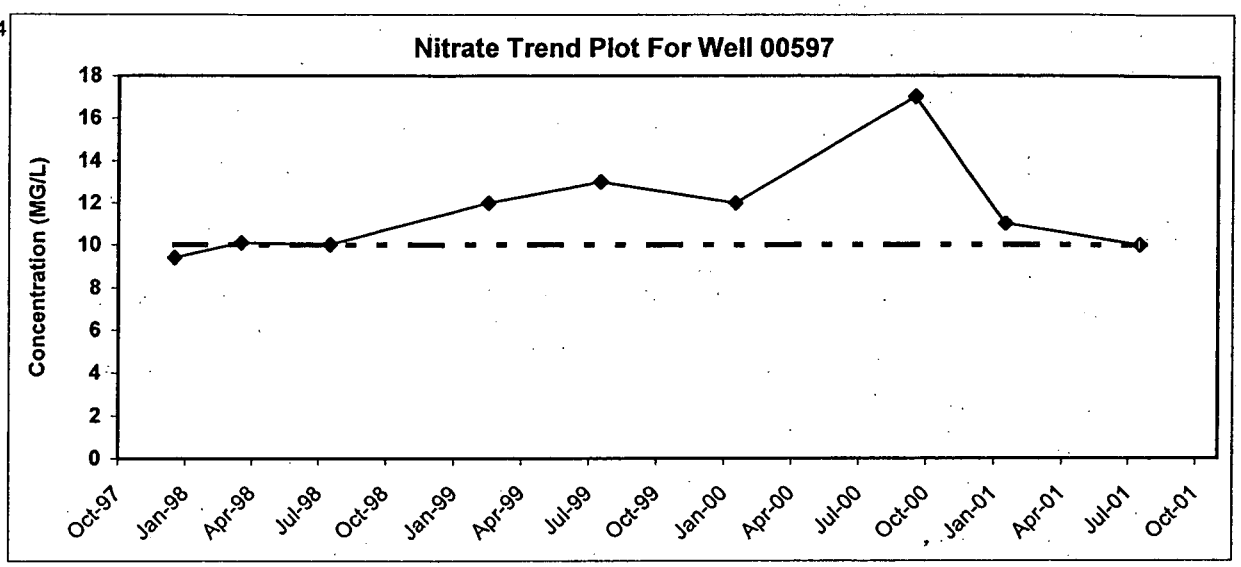

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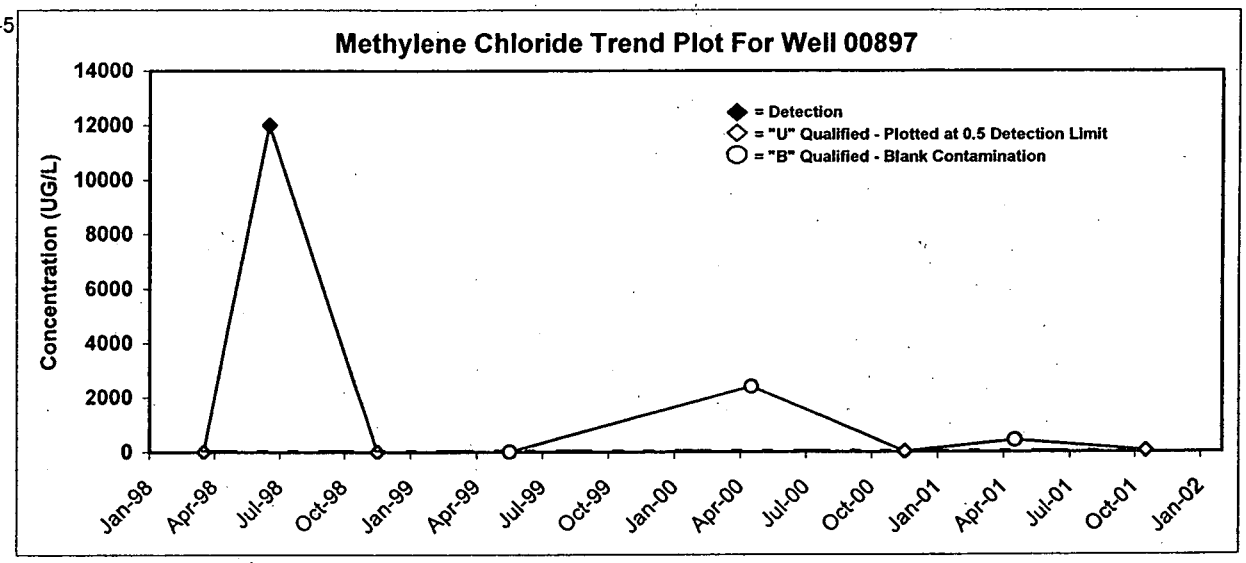

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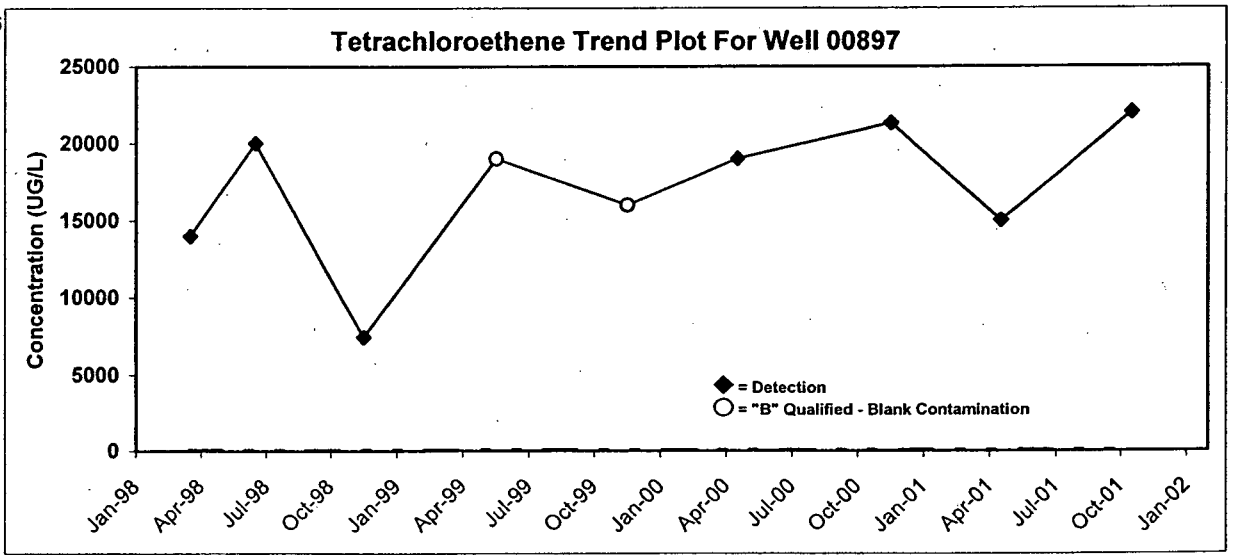

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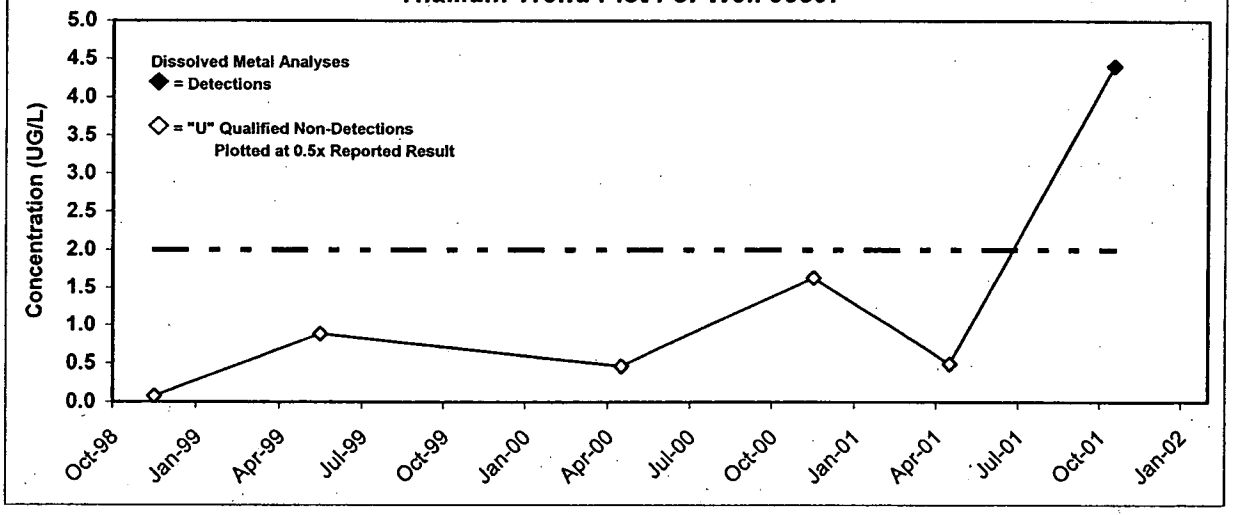
Thallium Trend Plot For Well 00897



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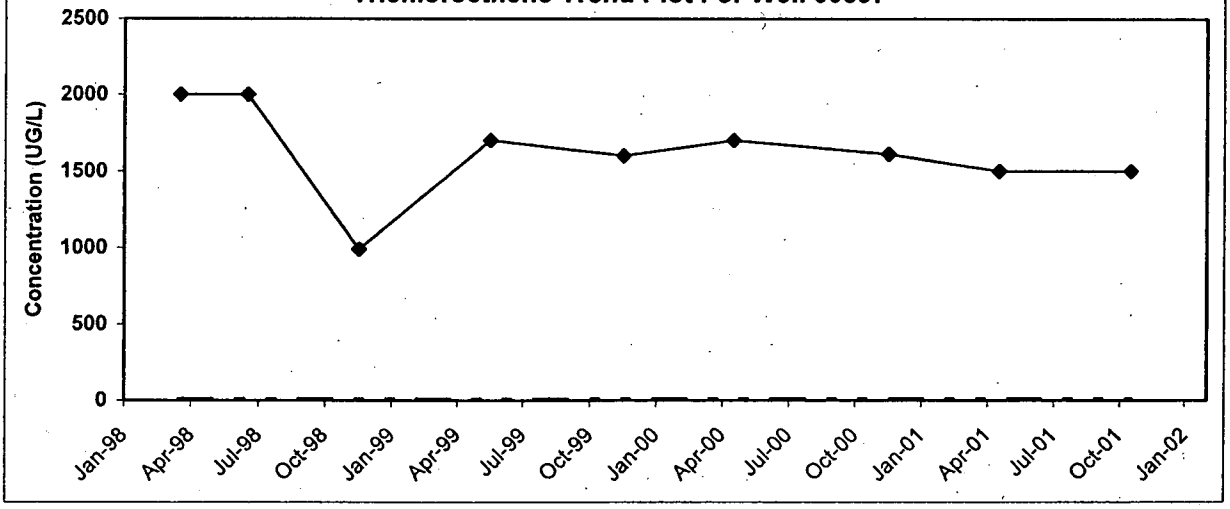
Trichloroethene Trend Plot For Well 00897



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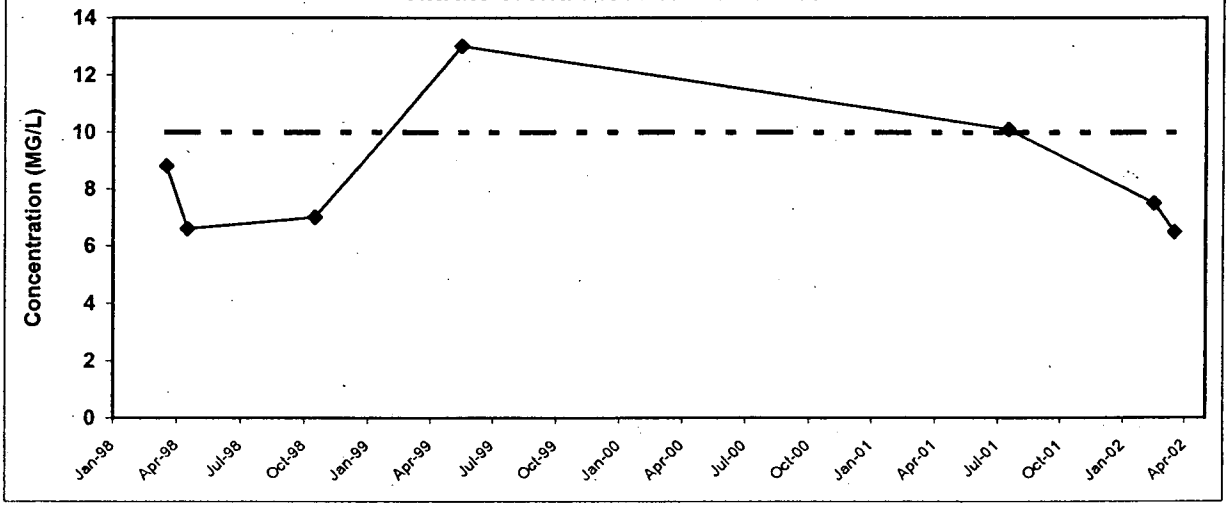
Nitrate Trend Plot For Well 02197



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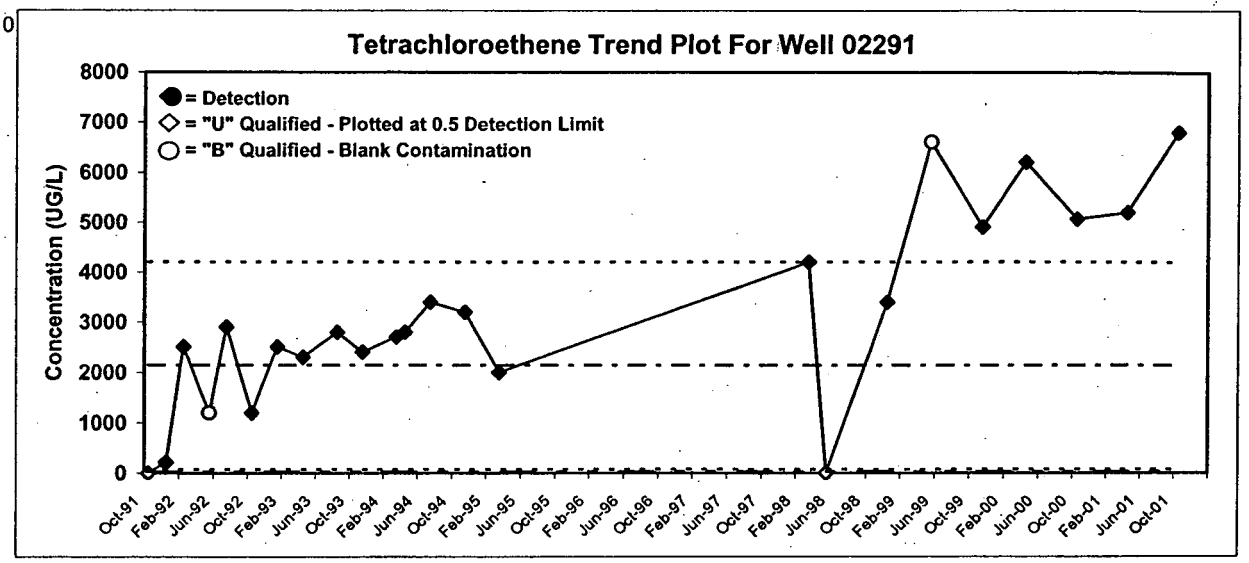

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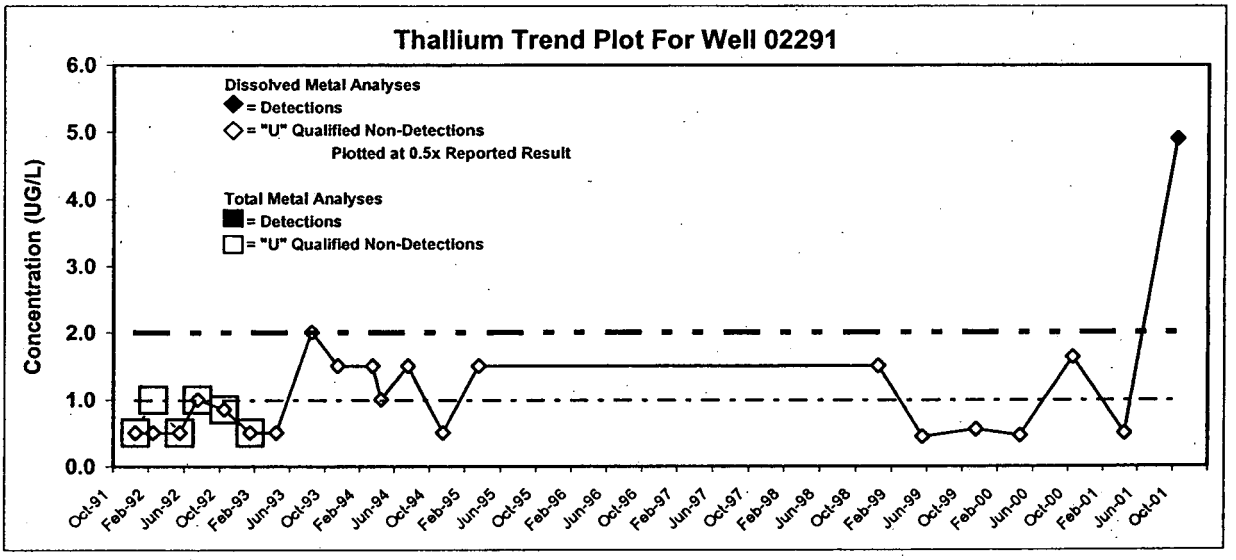

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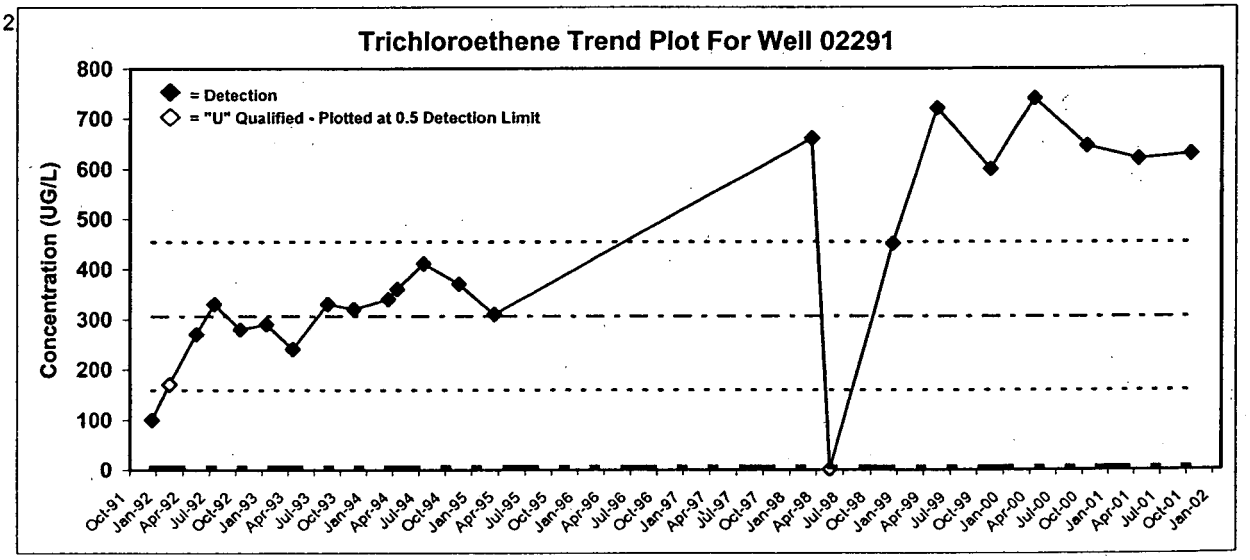

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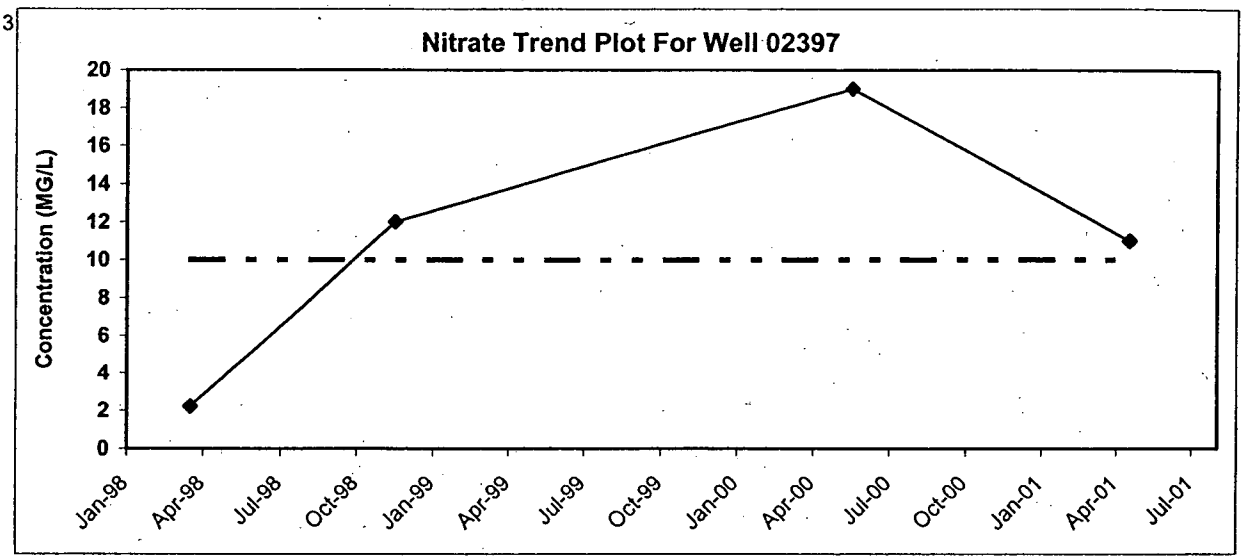

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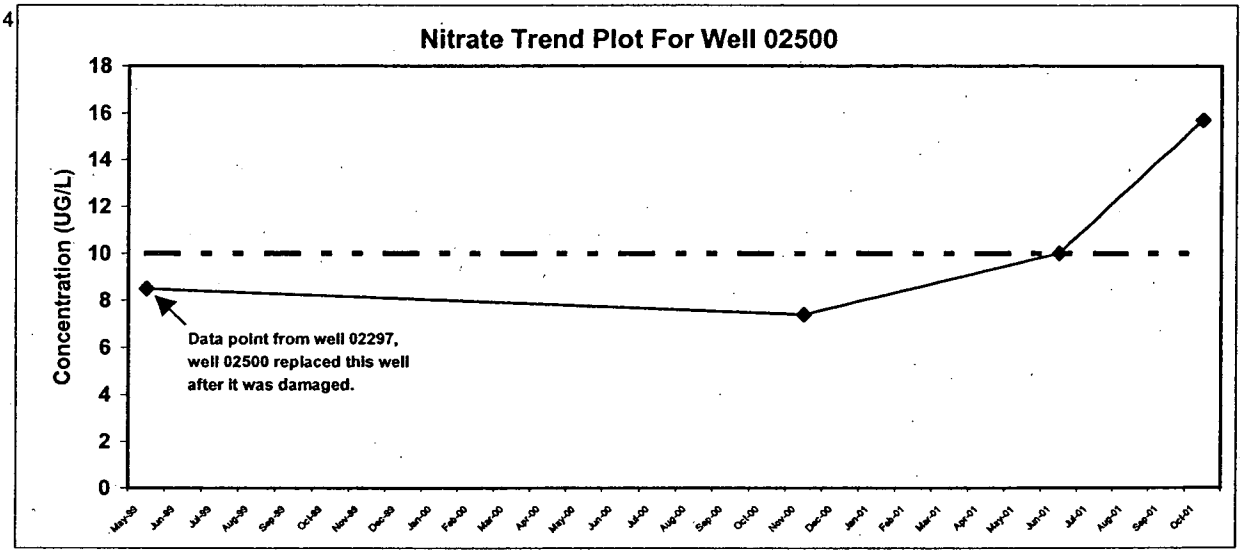

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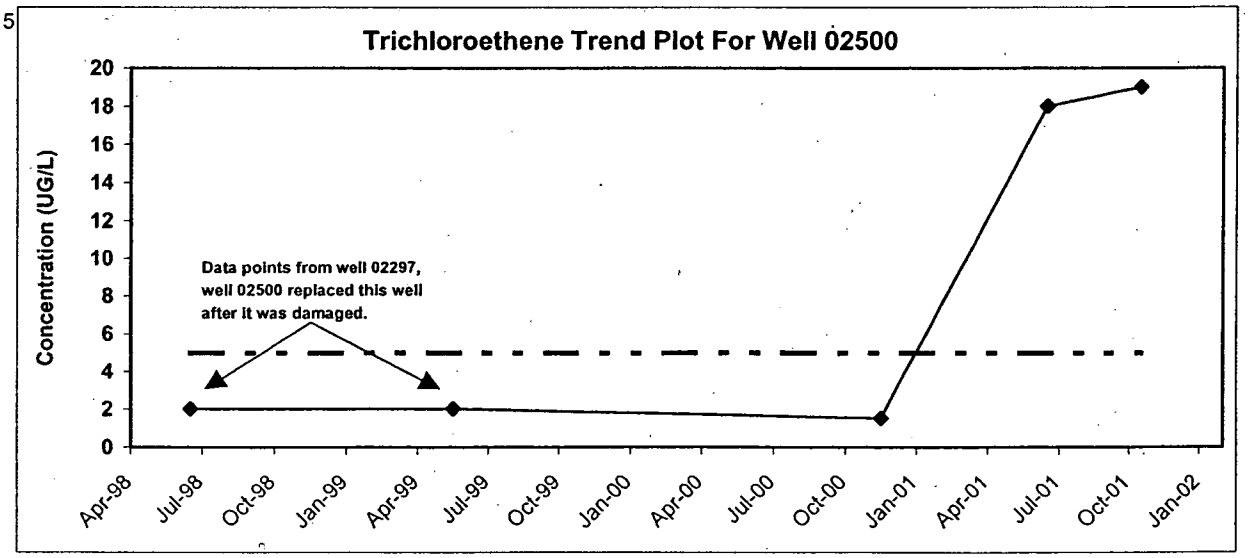

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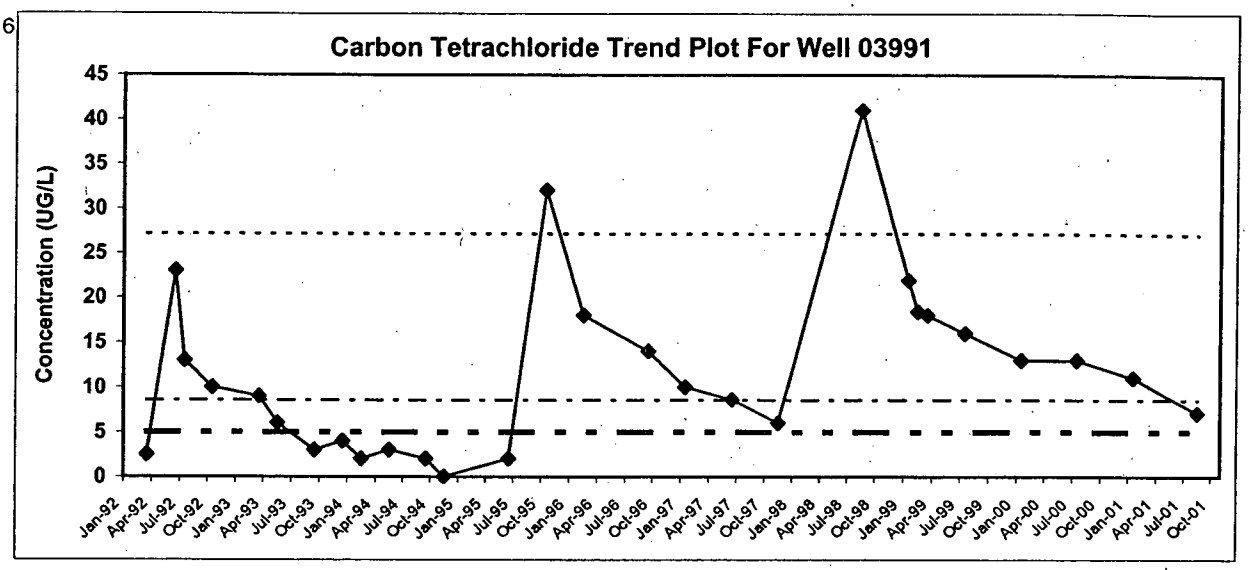

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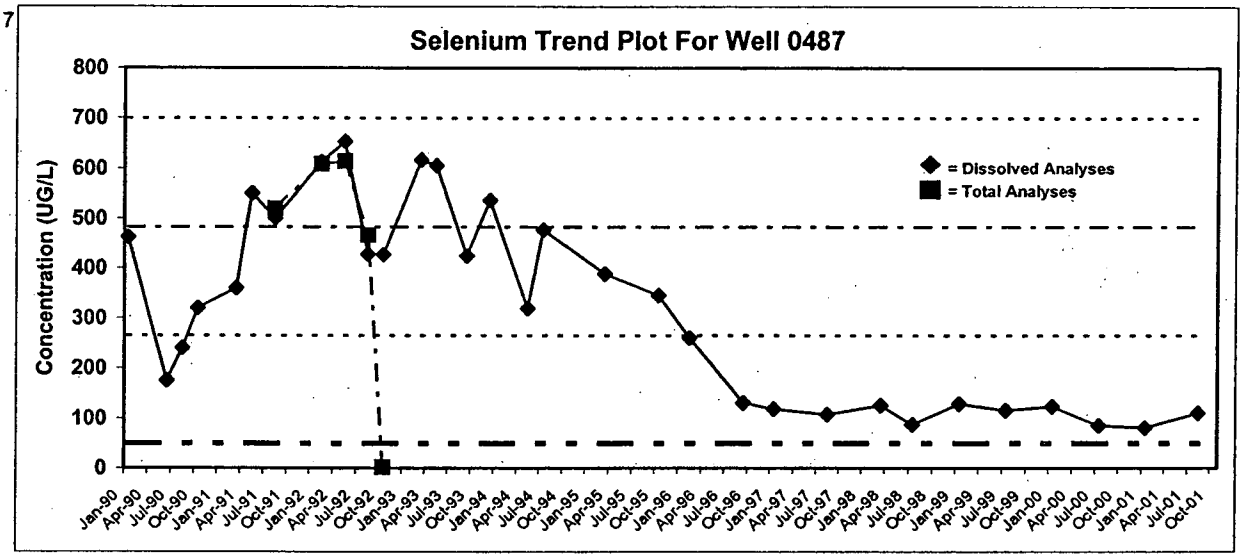

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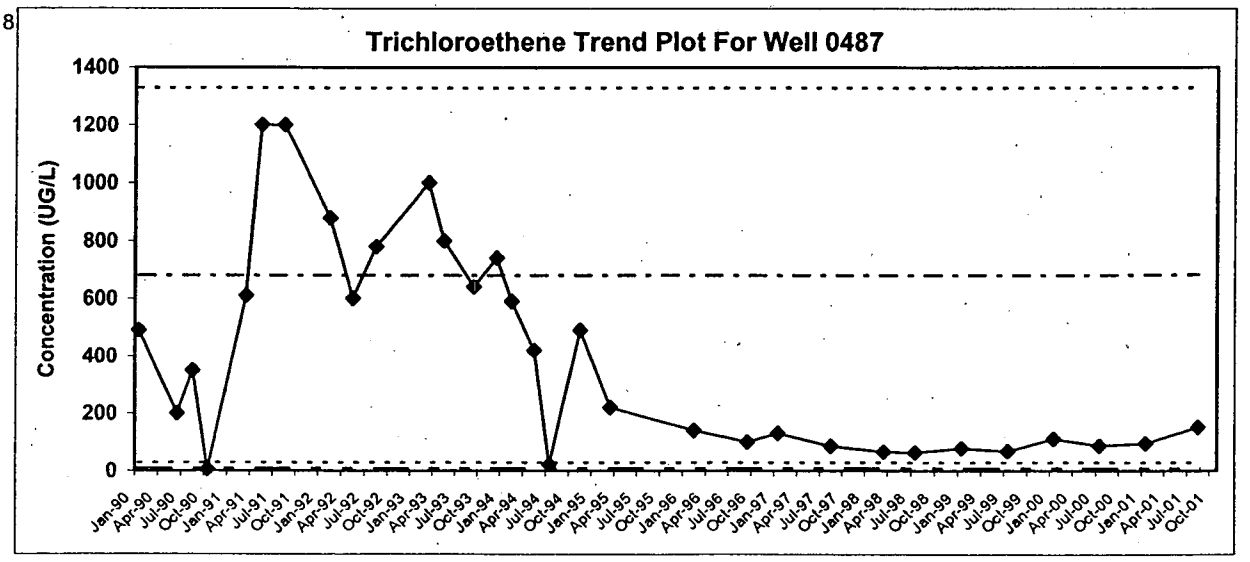

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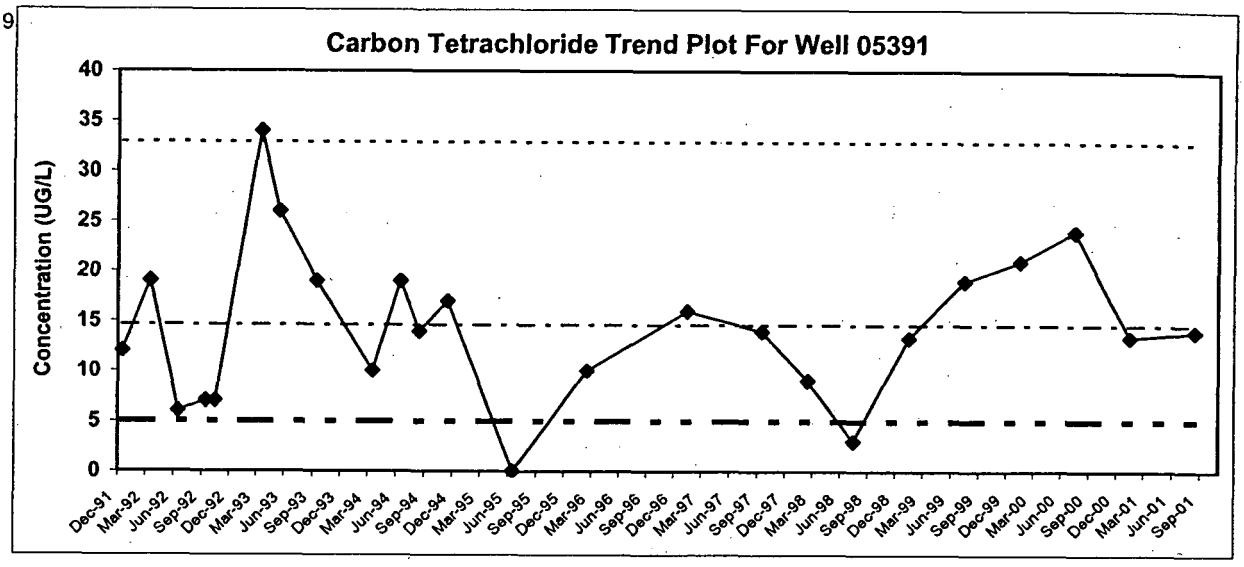

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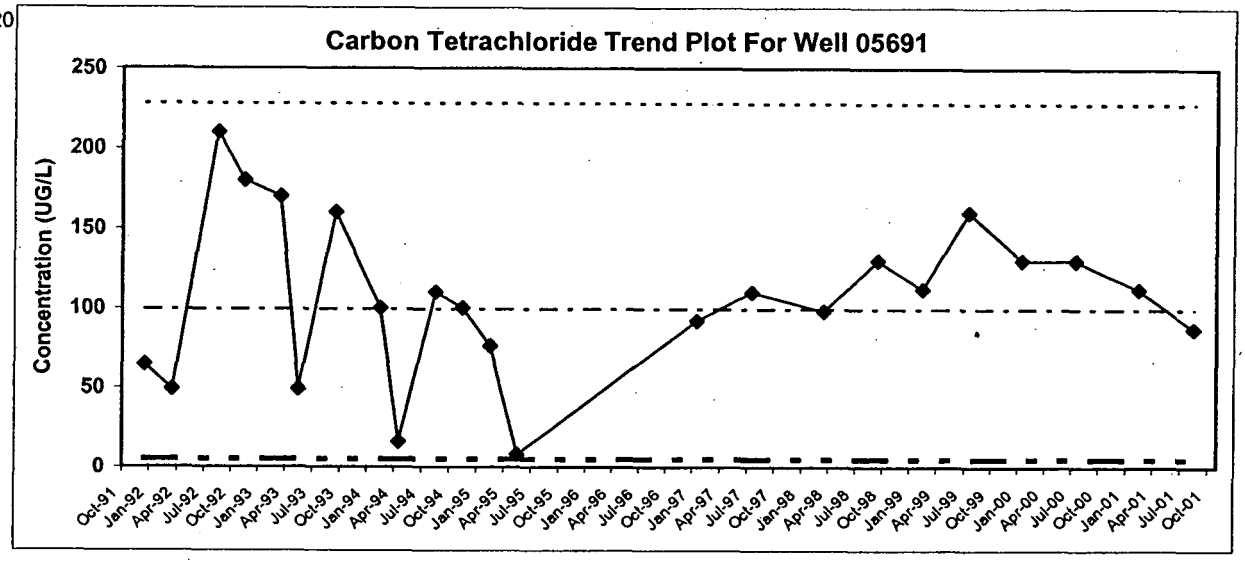

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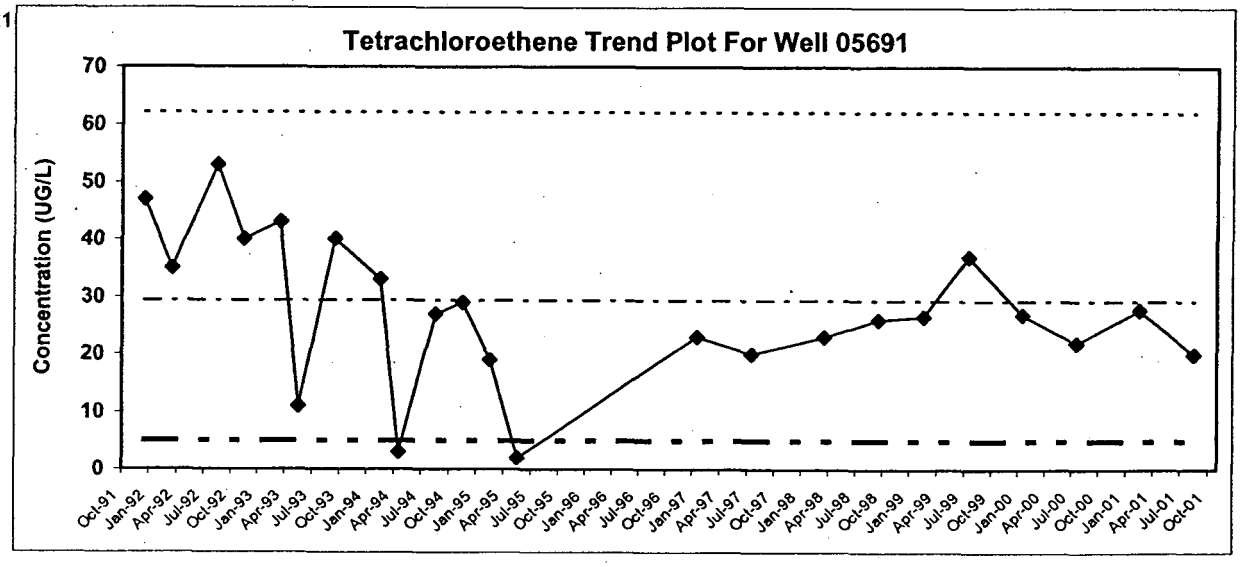

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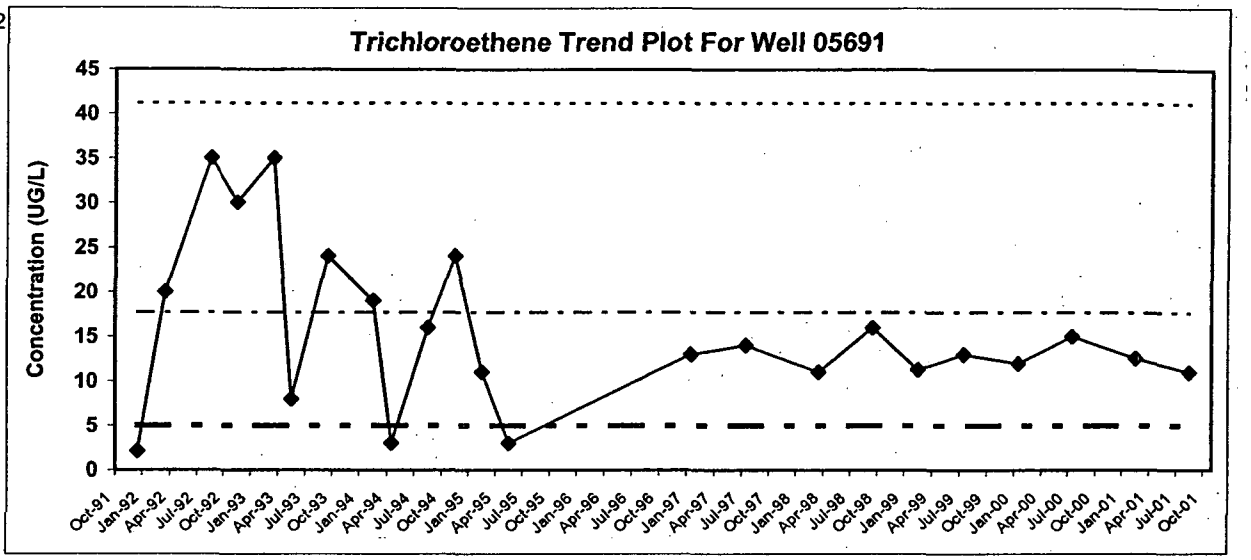

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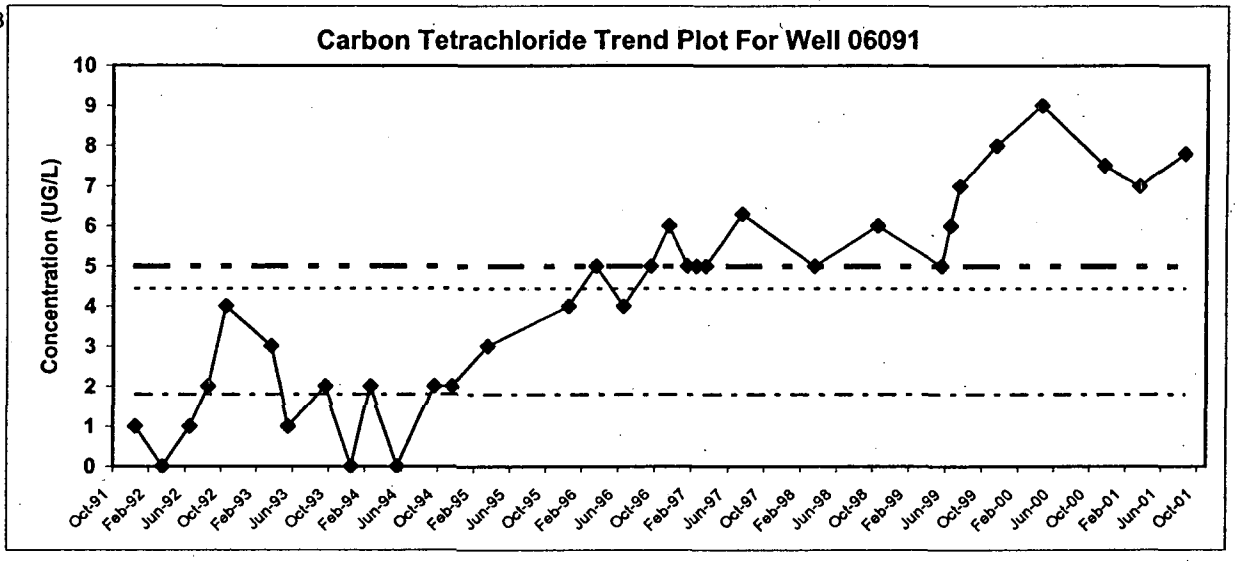

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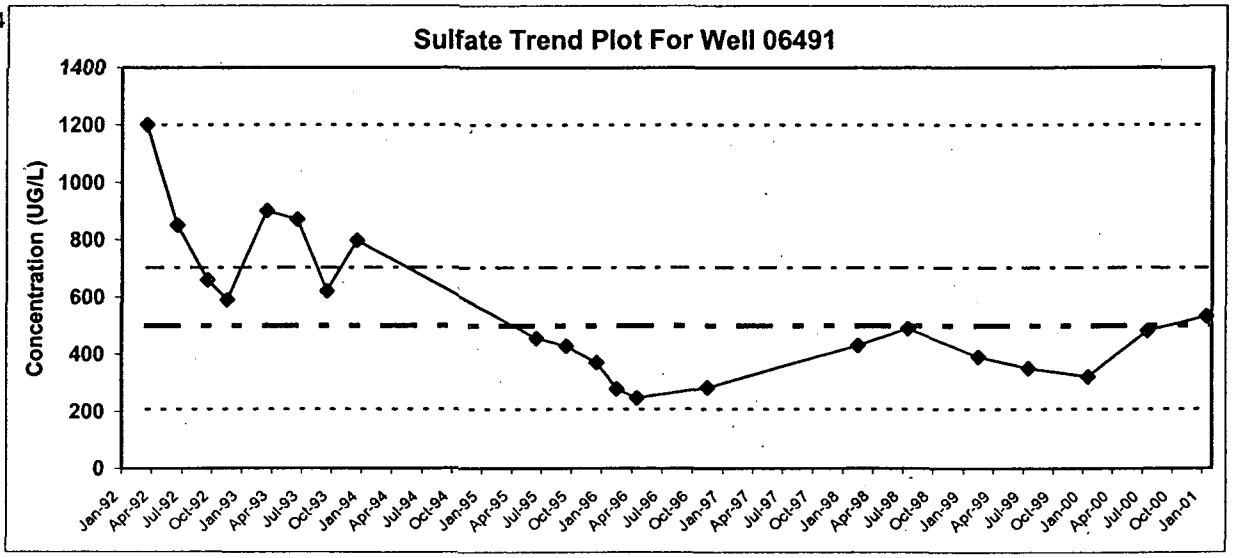

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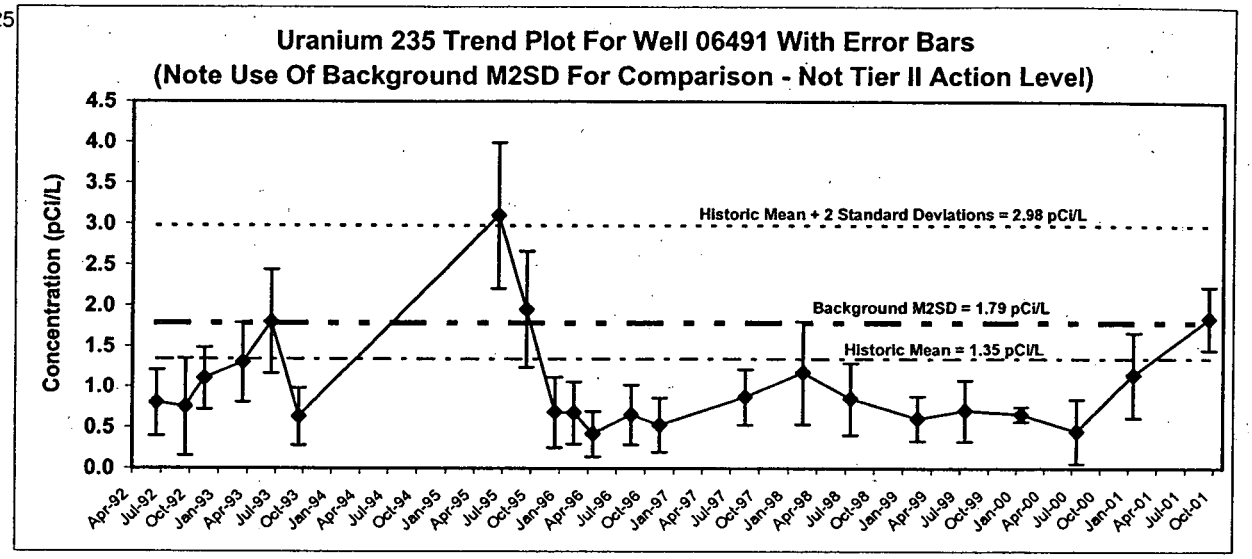

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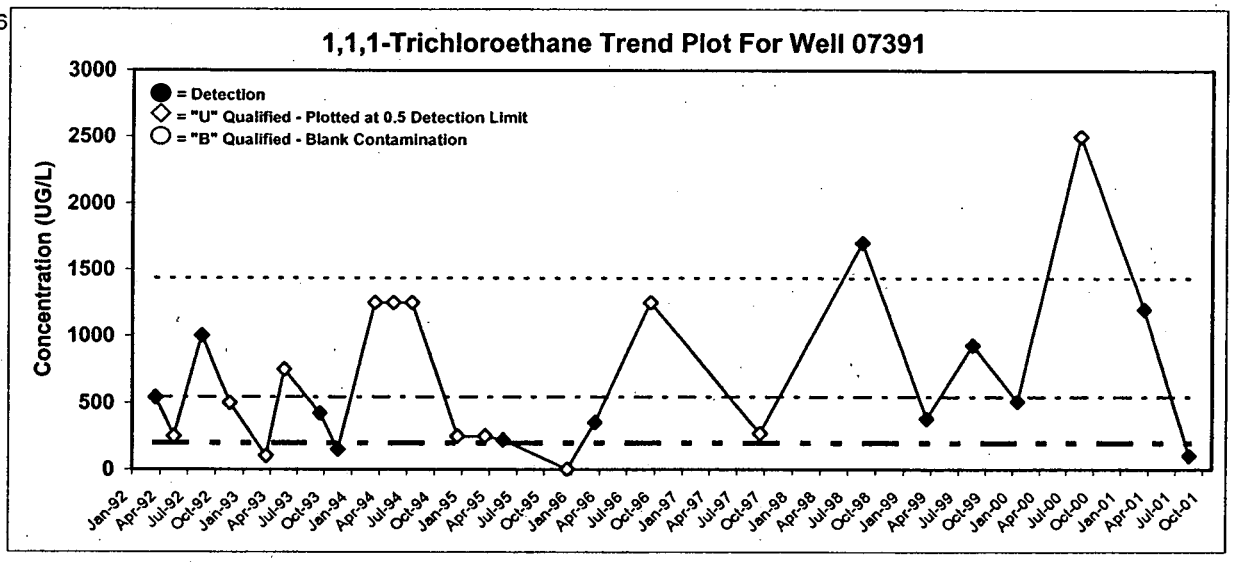

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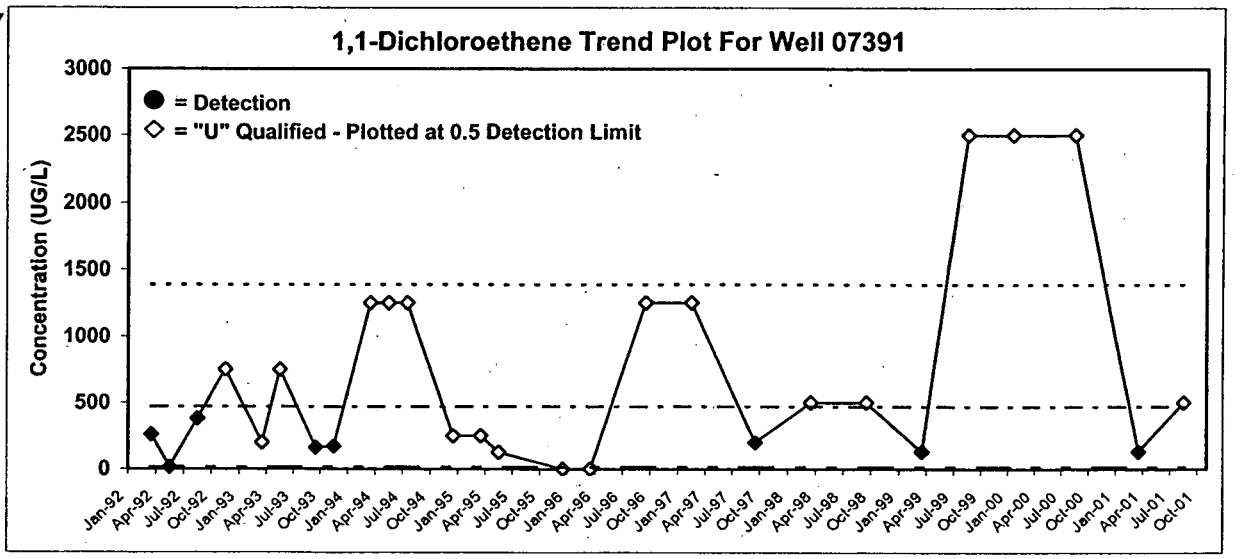

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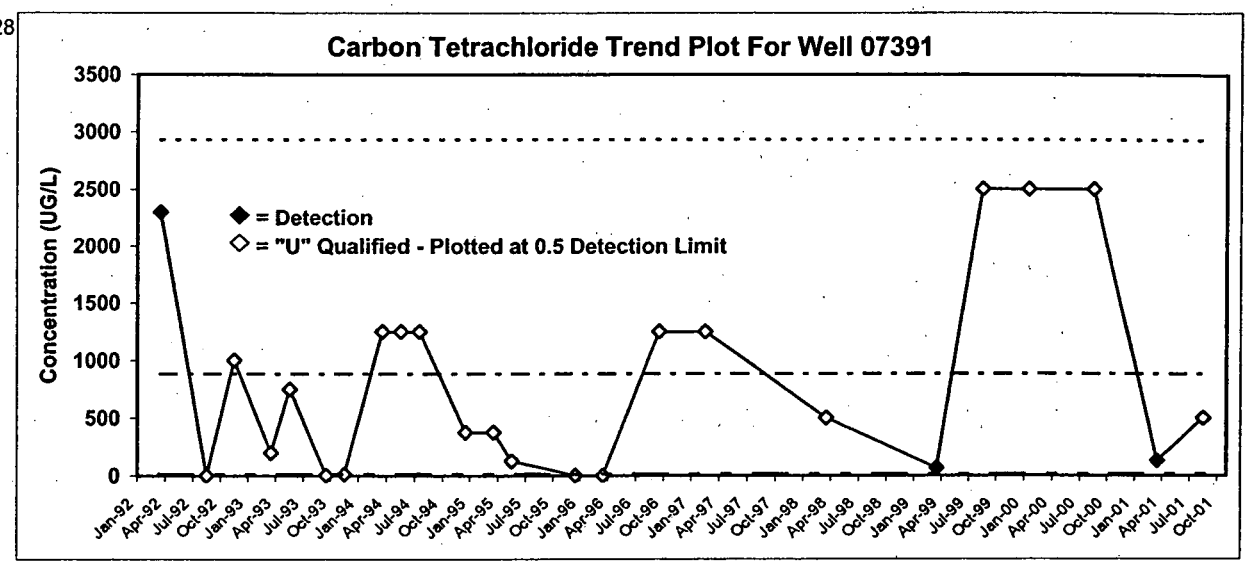

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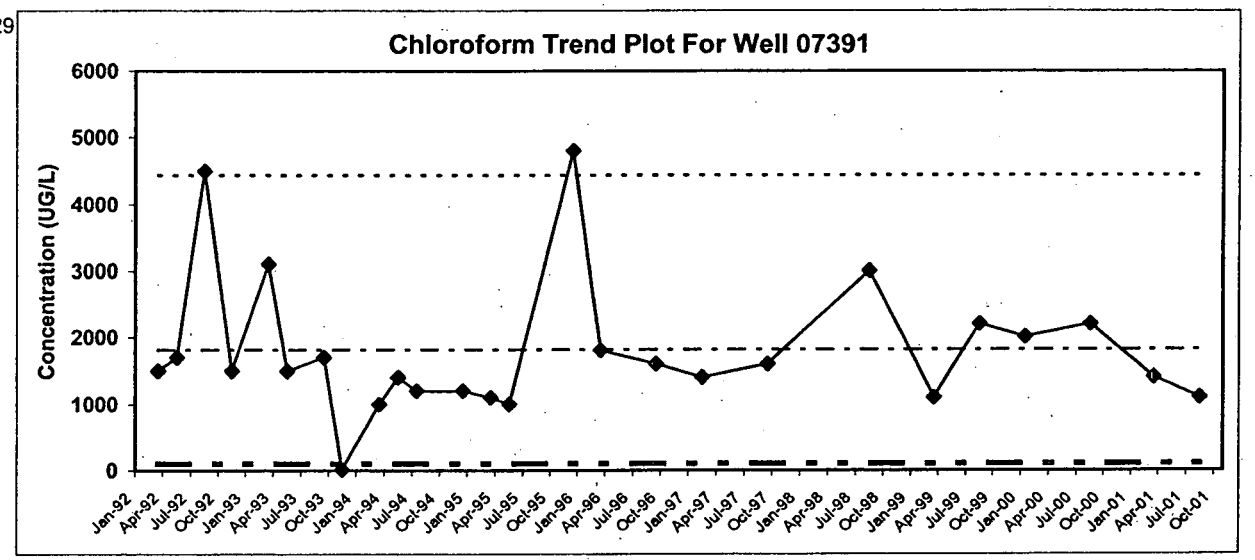

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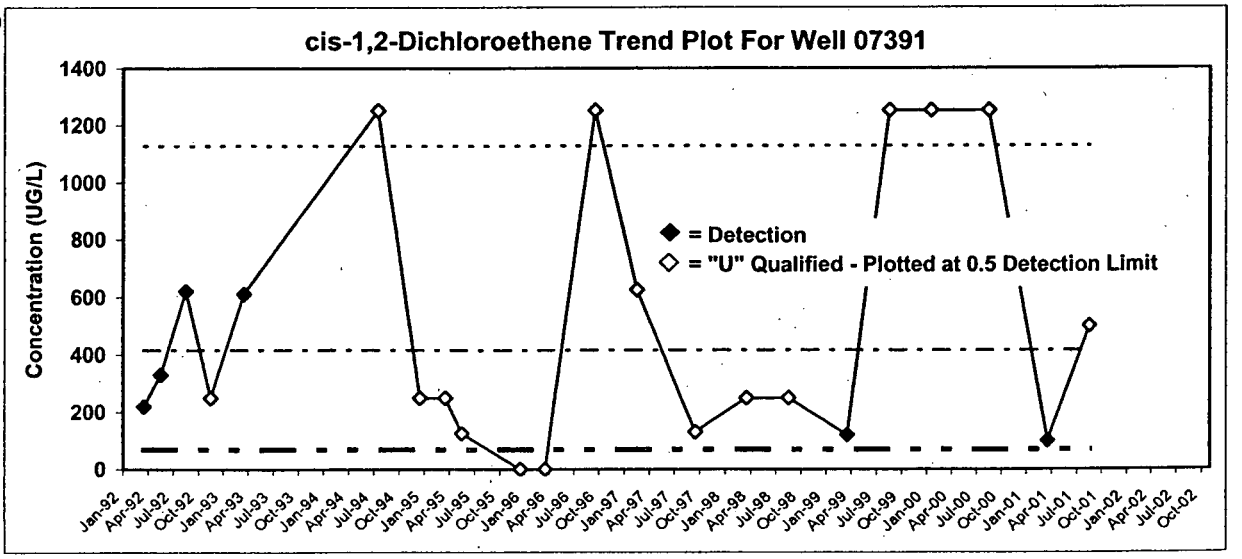

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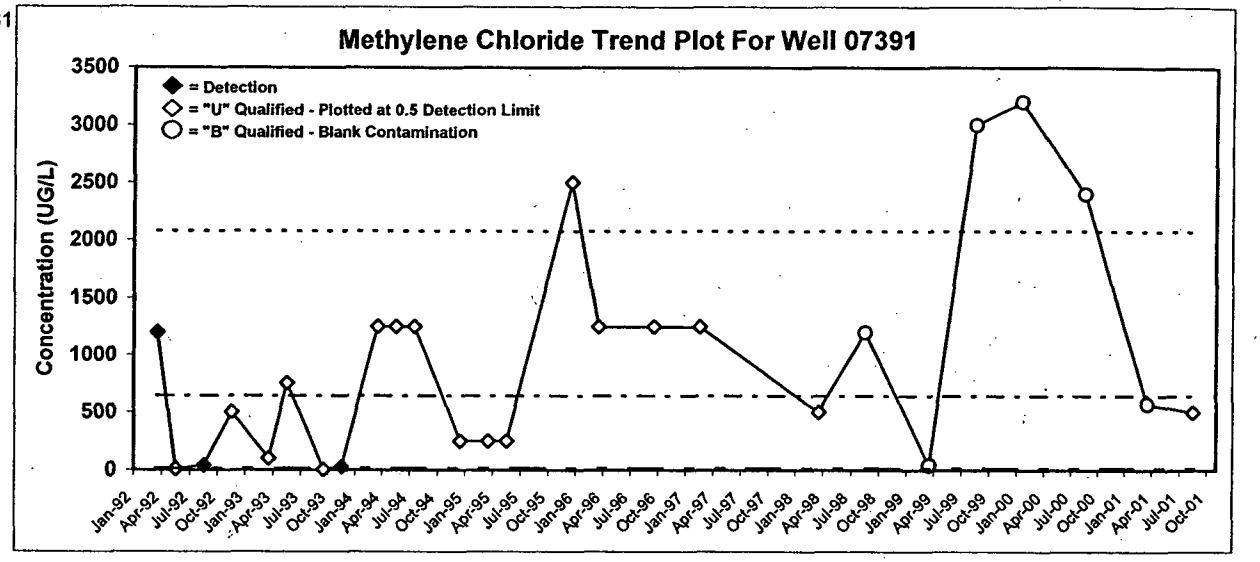

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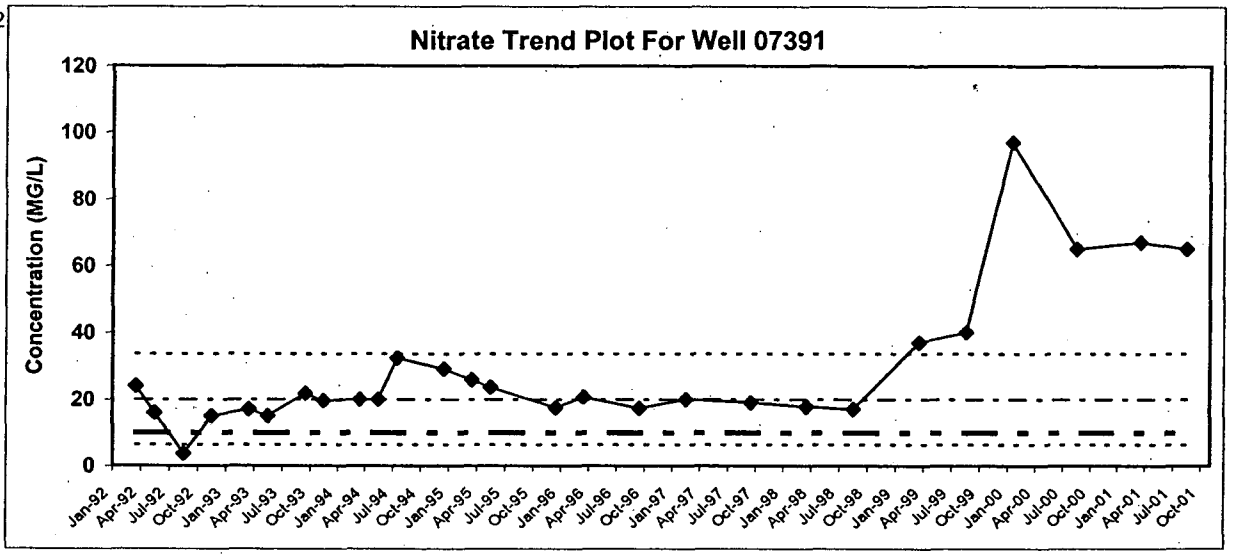

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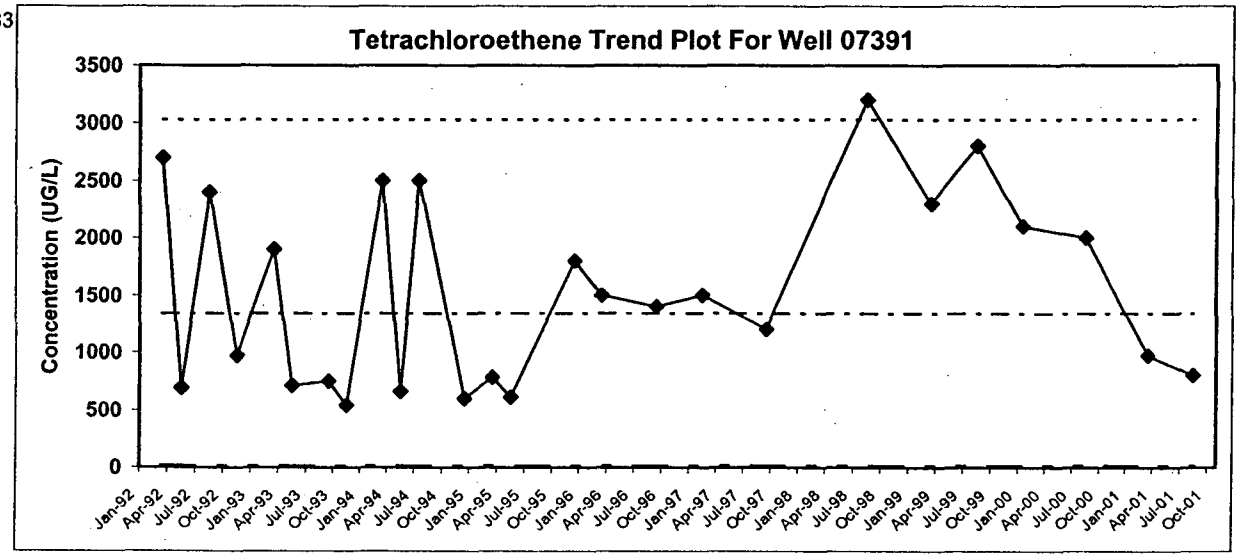
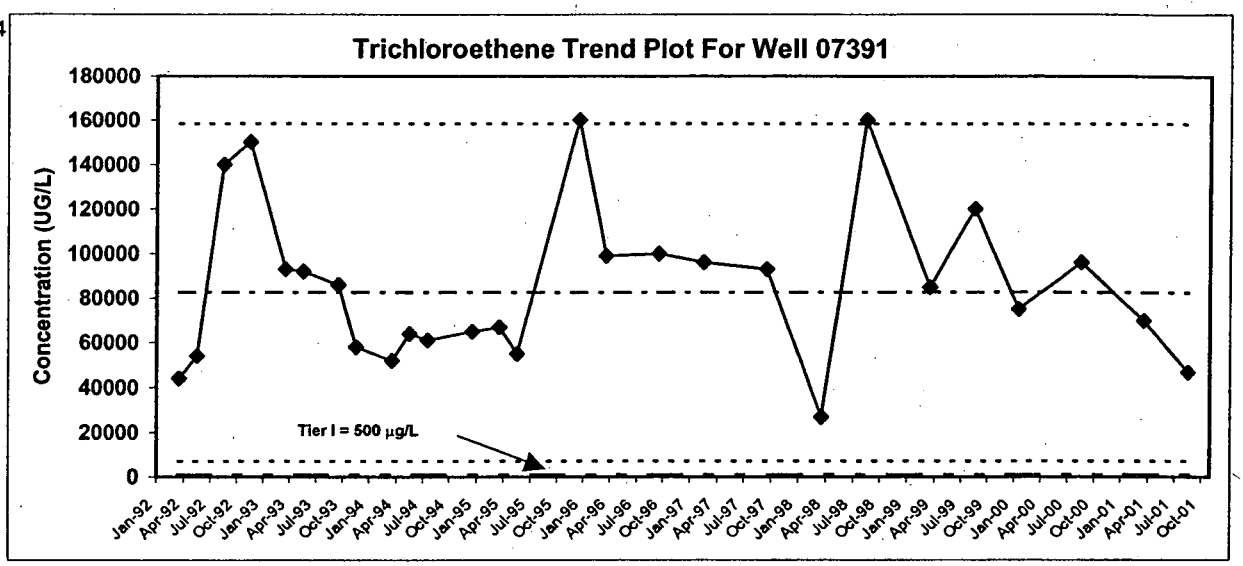
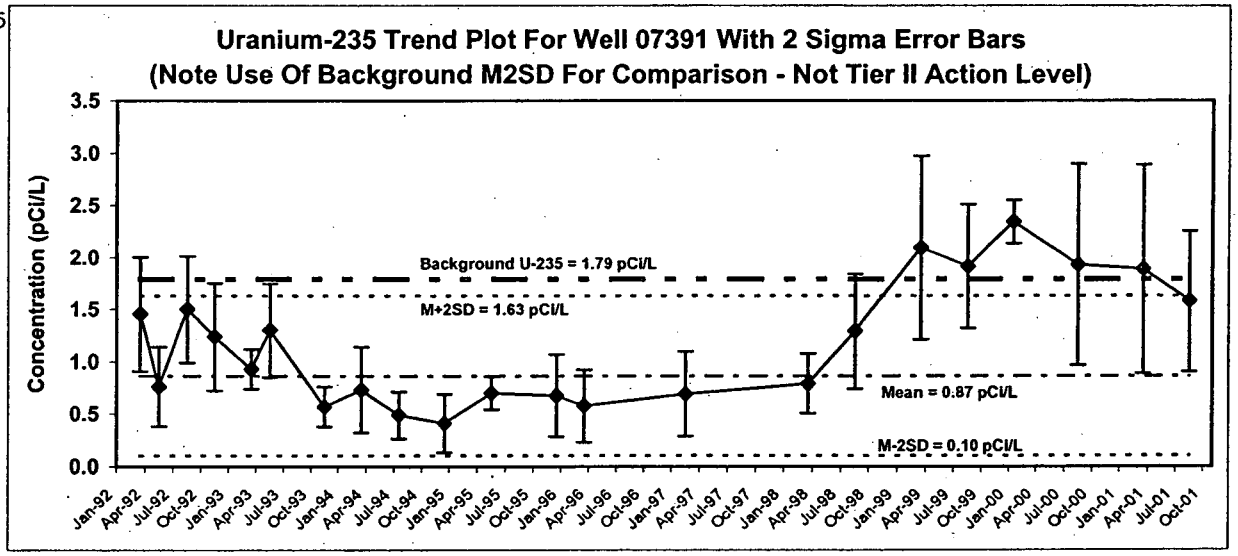


317382

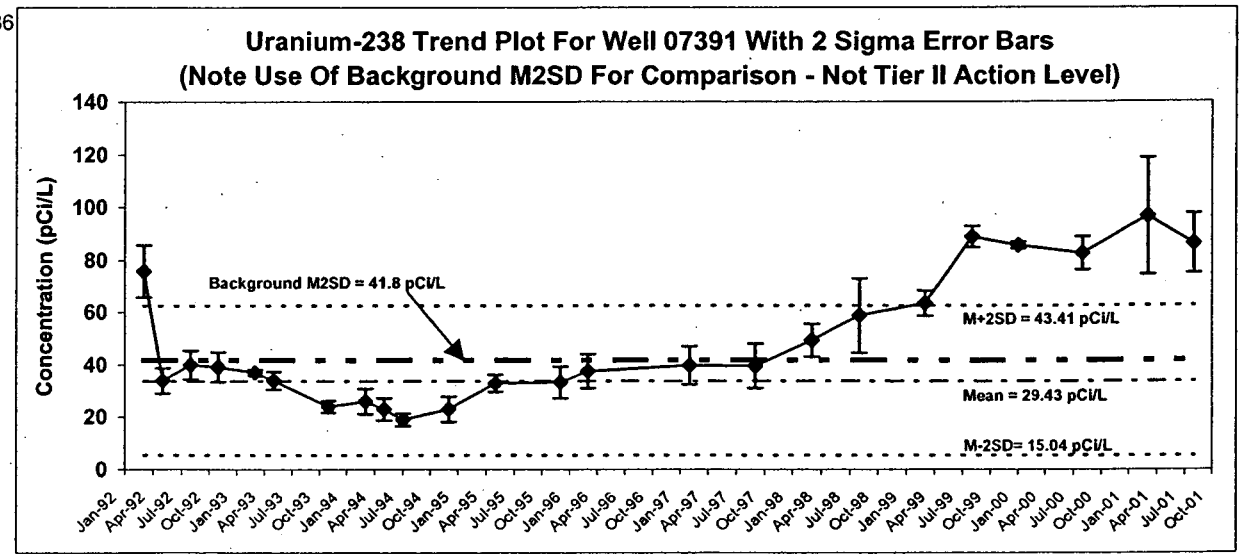
A-34



A-35

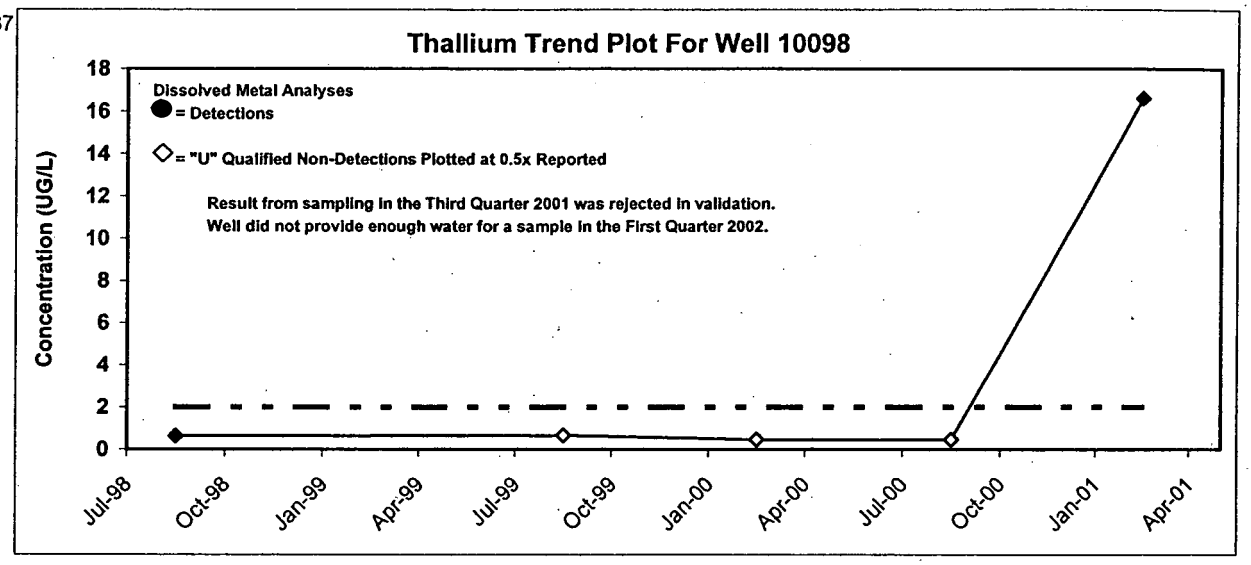


A-36

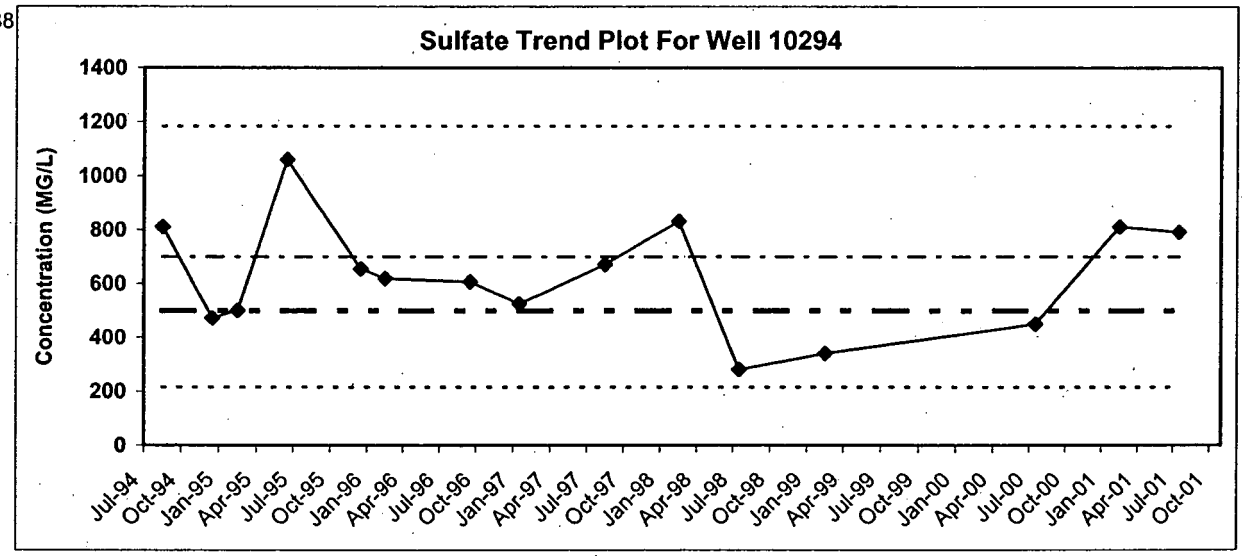


383

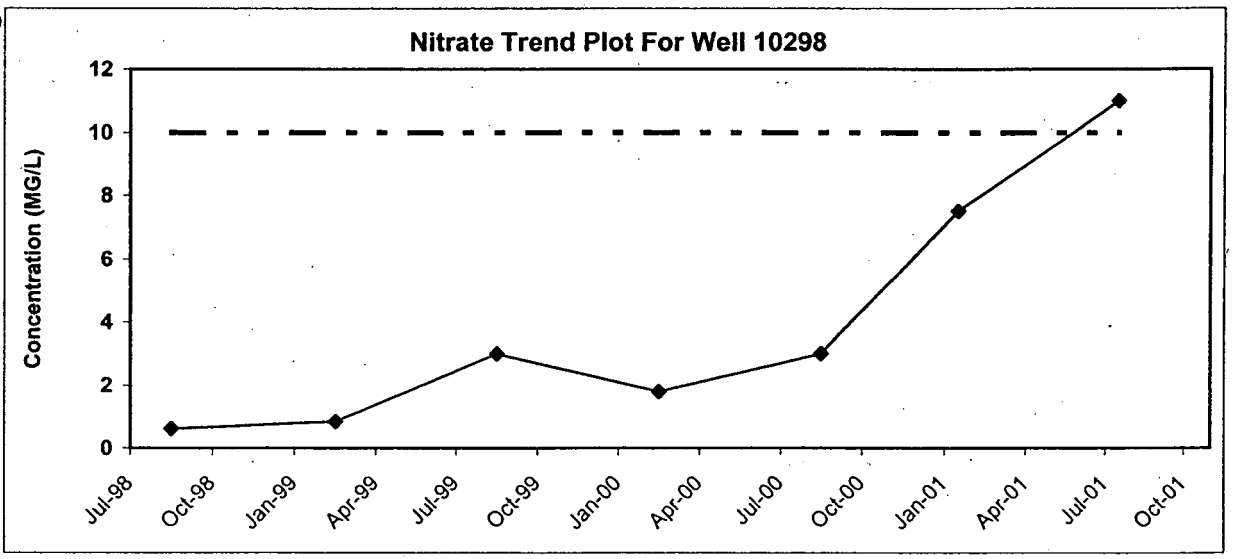
A-37



A-38

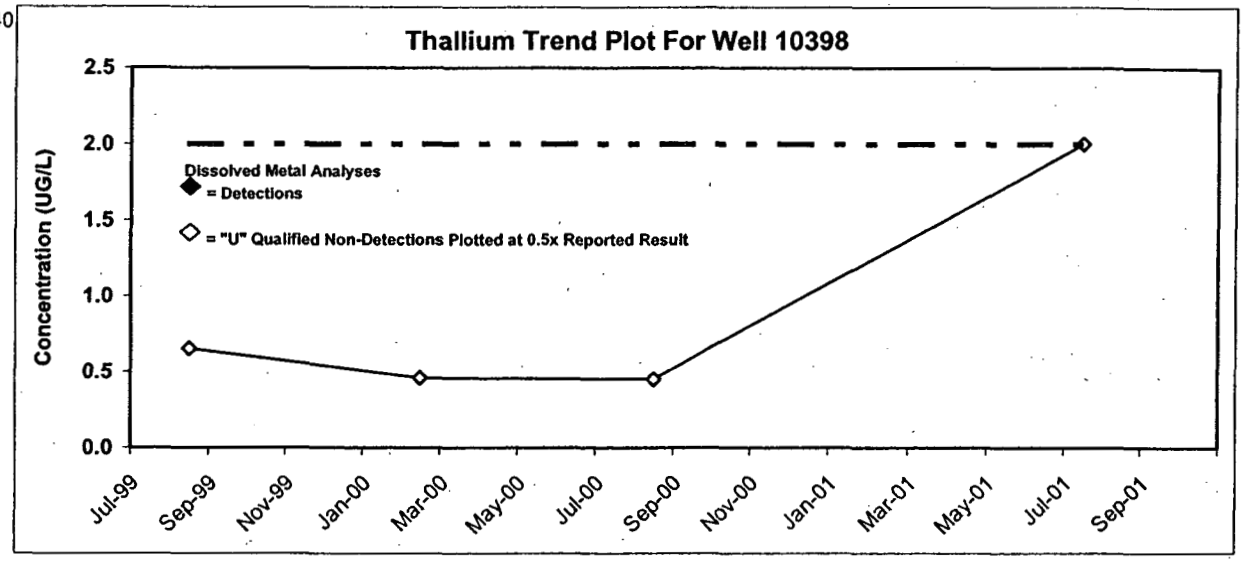


A-39

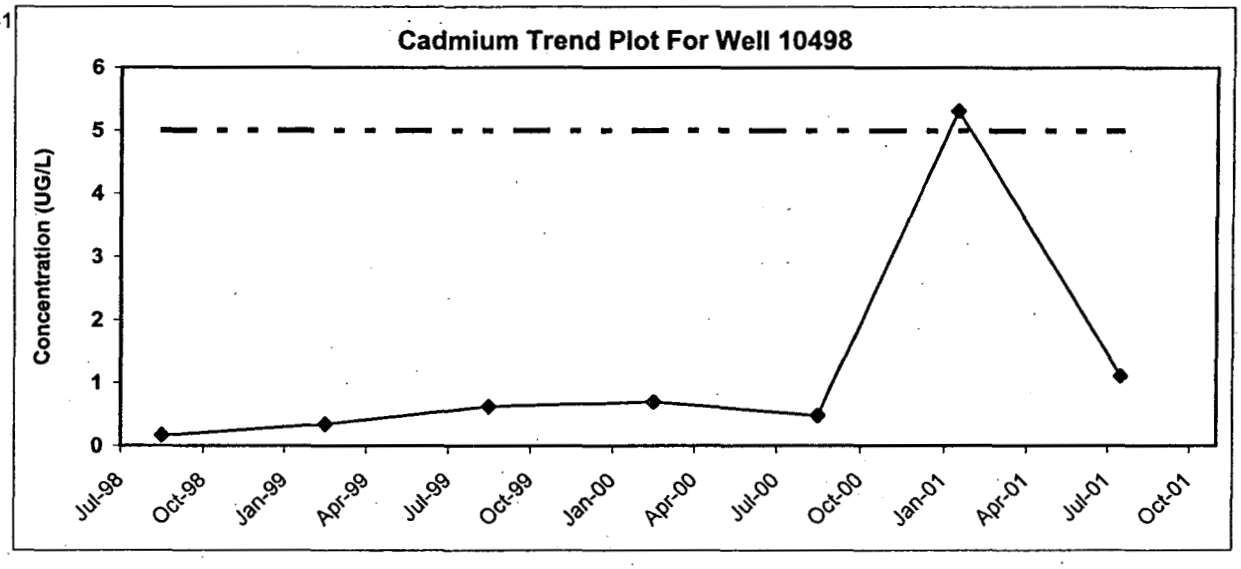


2/4
384

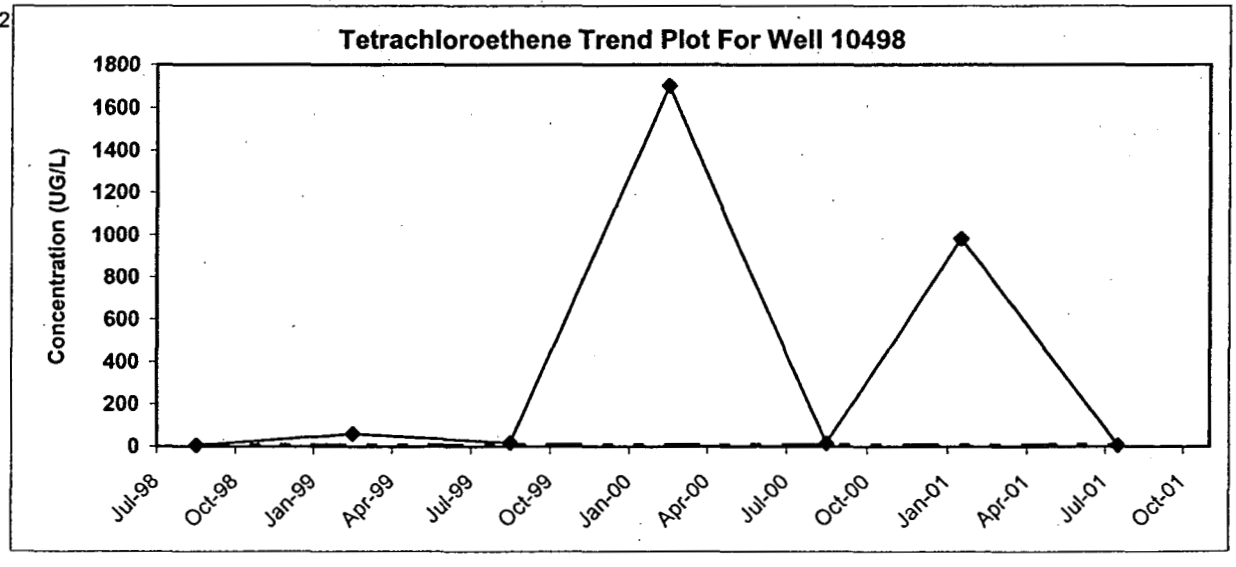
A-40


Thallium Trend Plot For Well 10398
Concentration (UG/L)
2.5
2.0
1.5
1.0
0.5
0.0
Dissolved Metal Analyses
= Detections
= "U" Qualified Non-Detections Plotted at 0.5x Reported Result
Jul-99
Sep-99
Nov-99
Jan-00
Mar-00
May-00
Jul-00
Sep-00
Nov-00
Jan-01
Mar-01
May-01
Jul-01
Sep-01

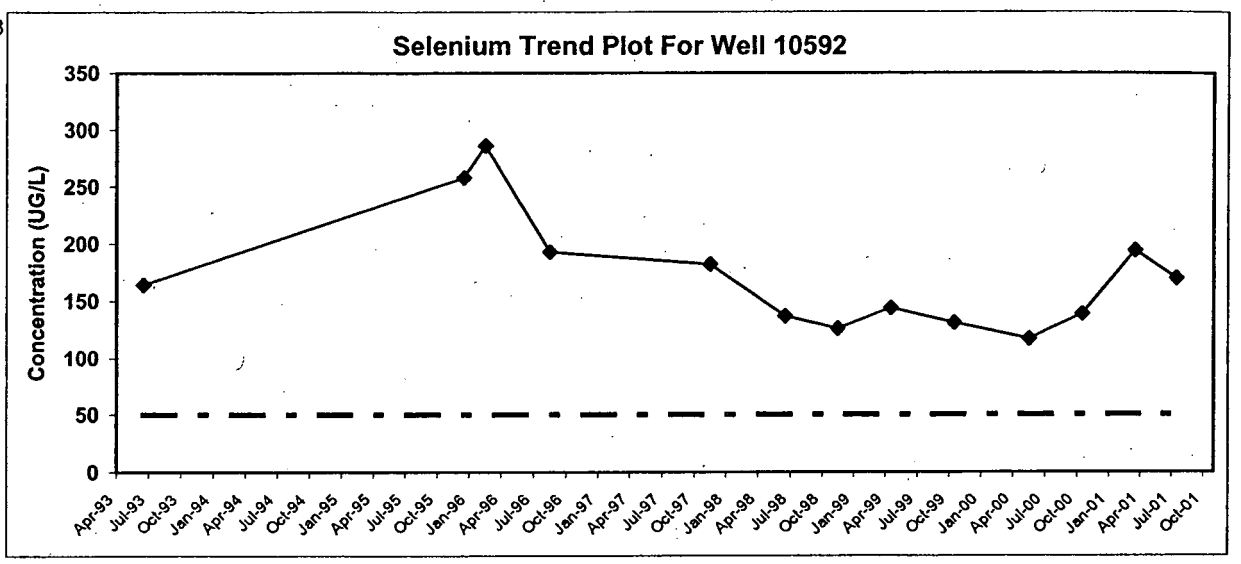
A-41


Cadmium Trend Plot For Well 10498
Concentration (UG/L)
6
5
4
3
2
1
0
Jul-98
Oct-98
Jan-99
Apr-99
Jul-99
Oct-99
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01

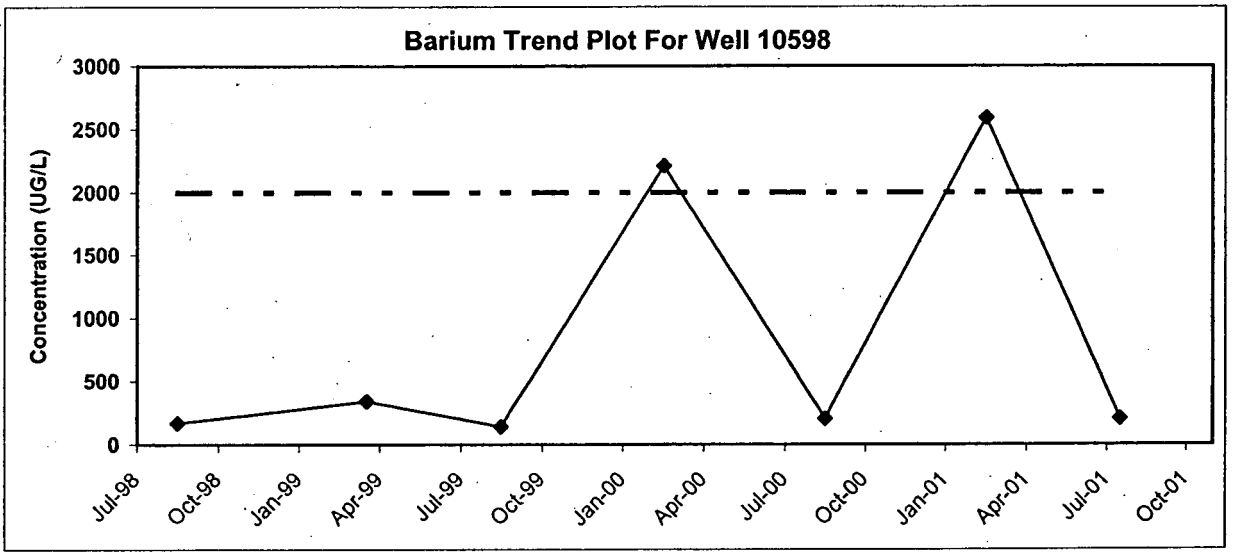
A-42


Tetrachloroethene Trend Plot For Well 10498
Concentration (UG/L)
1800
1600
1400
1200
1000
800
600
400
200
0
Jul-98
Oct-98
Jan-99
Apr-99
Jul-99
Oct-99
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01

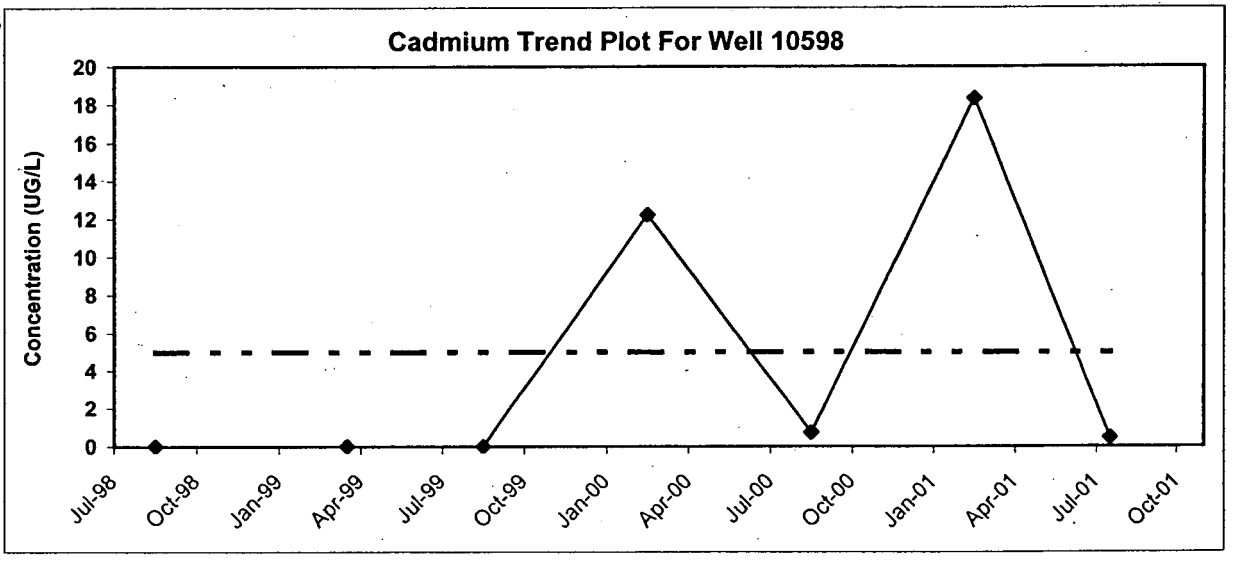
A-43



A-44



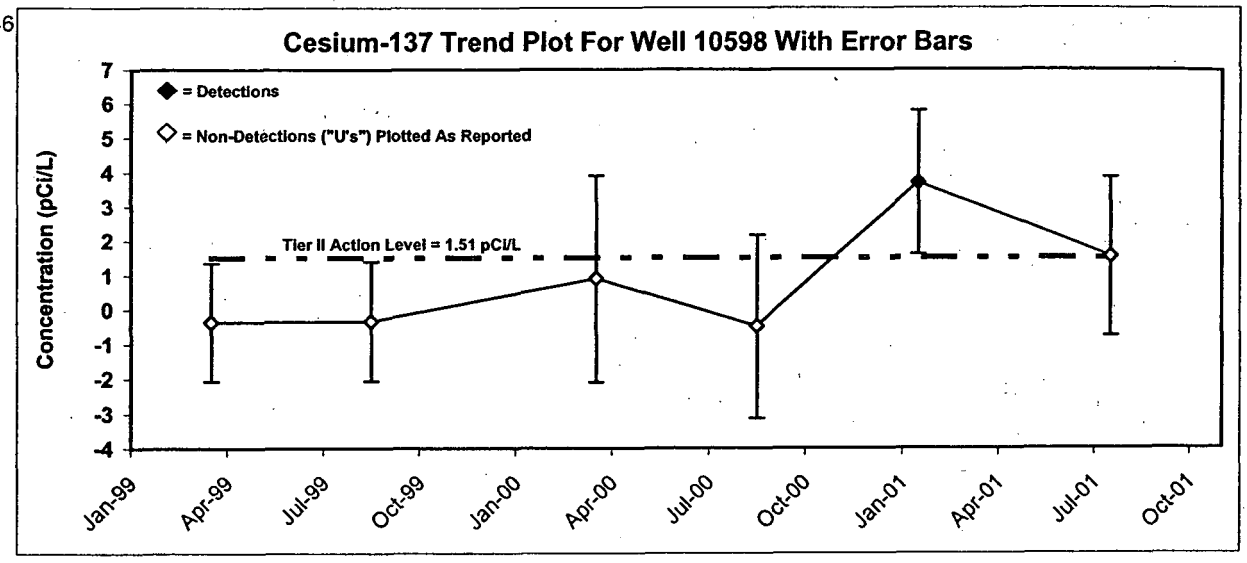
A-45



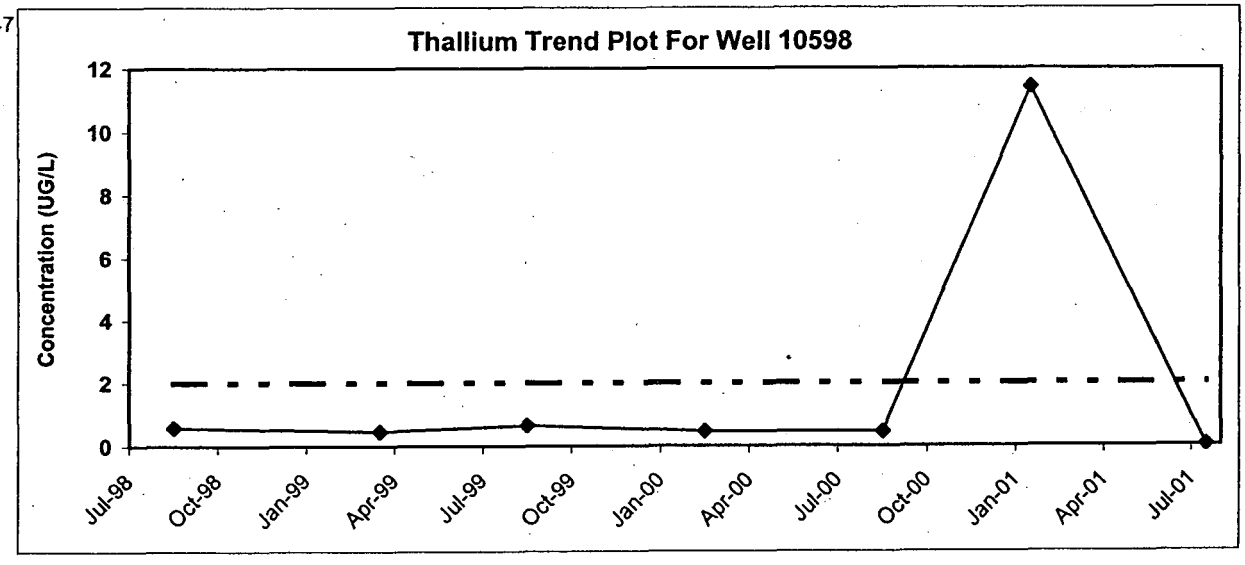
Heavy Horizontal Dashed Line = Tier II Action Level
Light Horizontal Dashed Lines = 1991-1995 Historic Mean and +/- 2 Standard Deviations (+/-M2SDs)

3H6
386

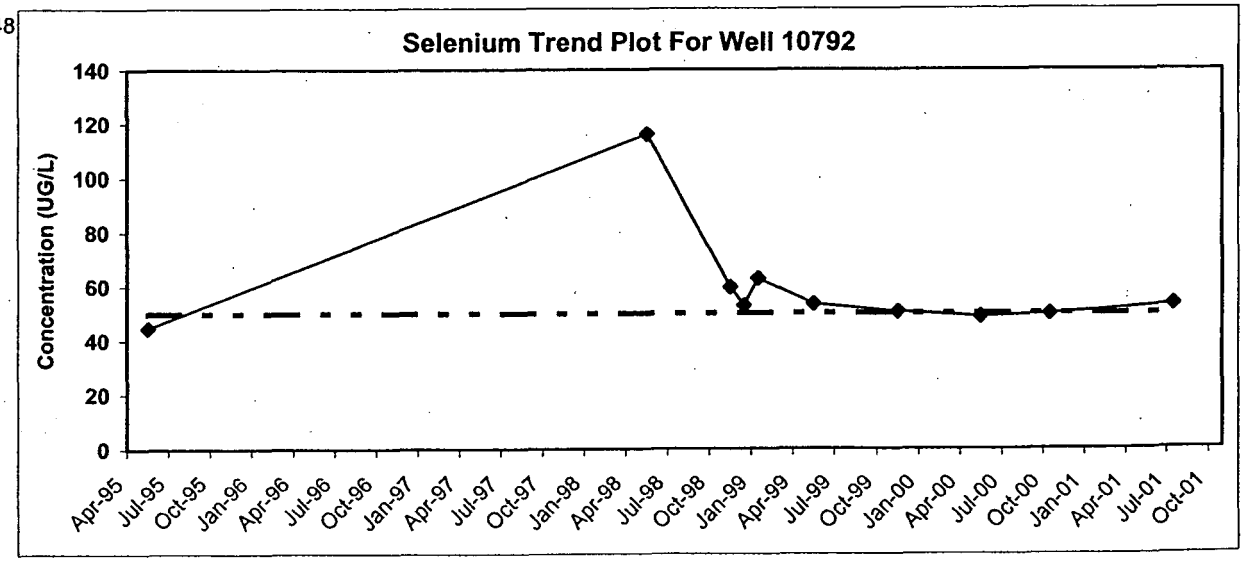
A-46



A-47

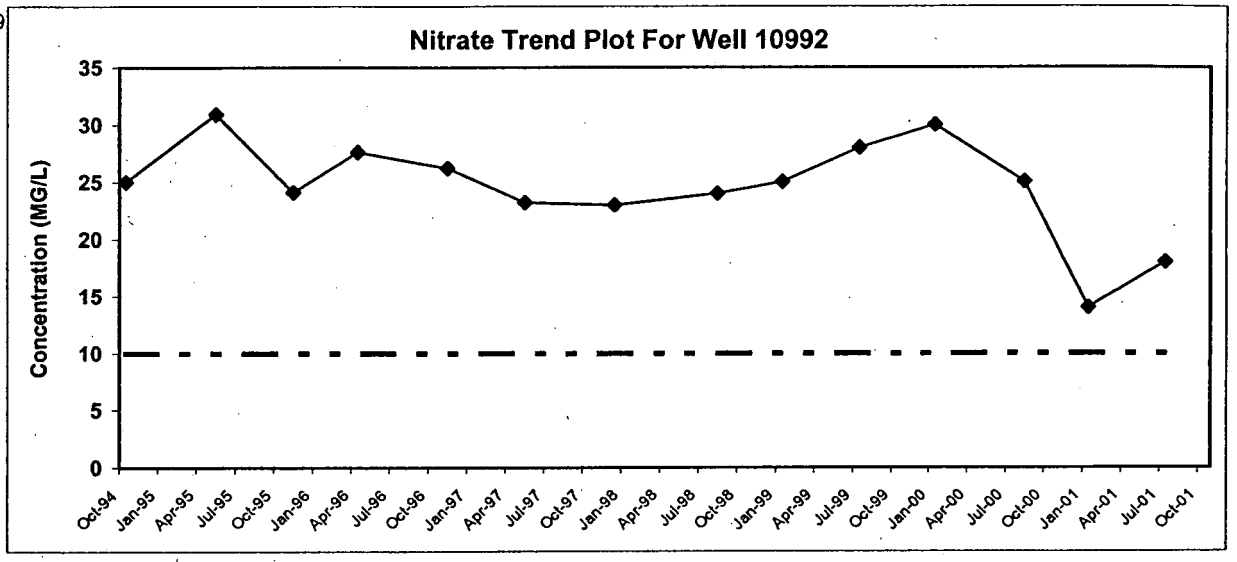


A-48

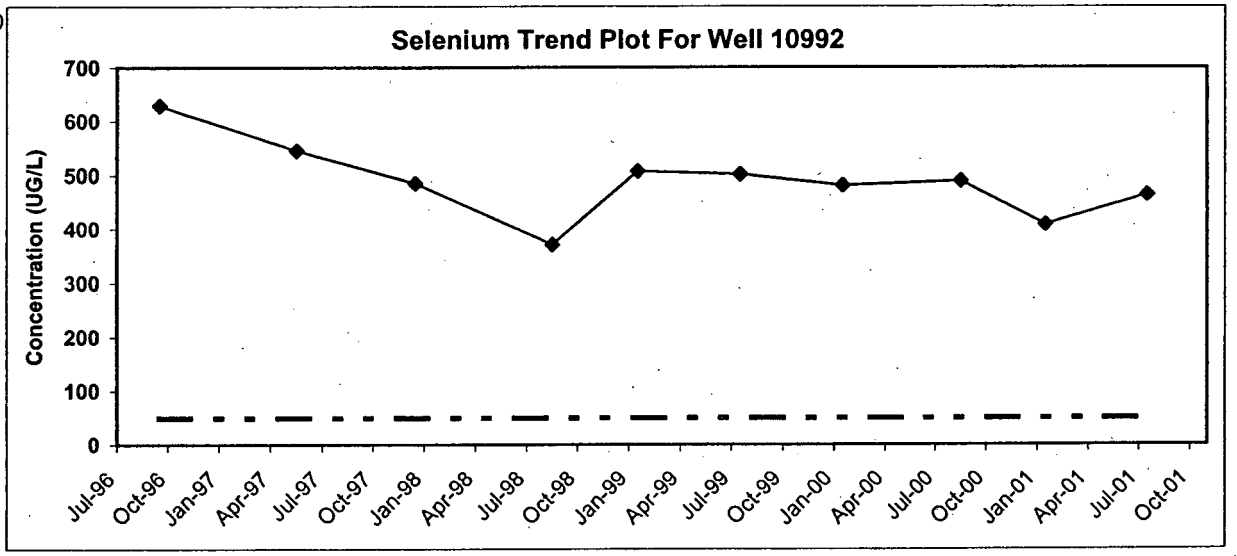


387

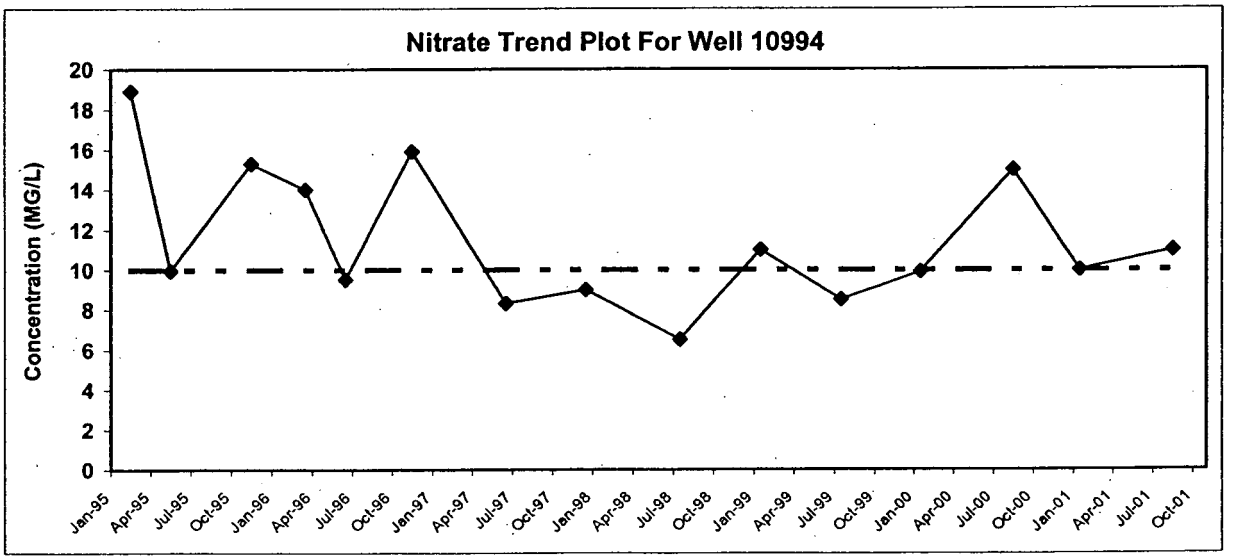
A-49



A-50

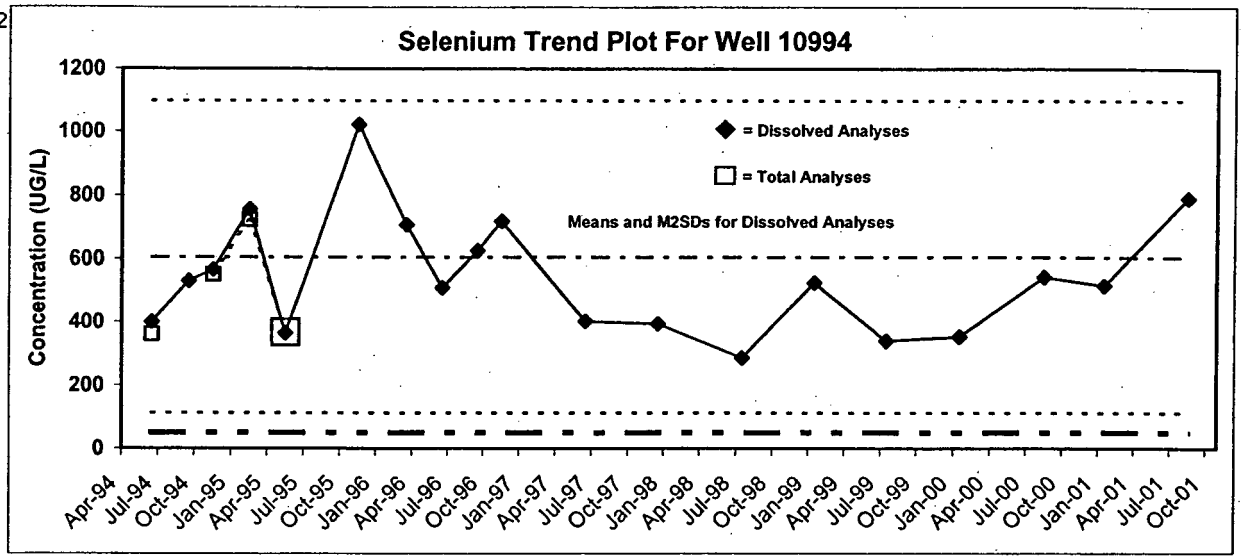


A-51

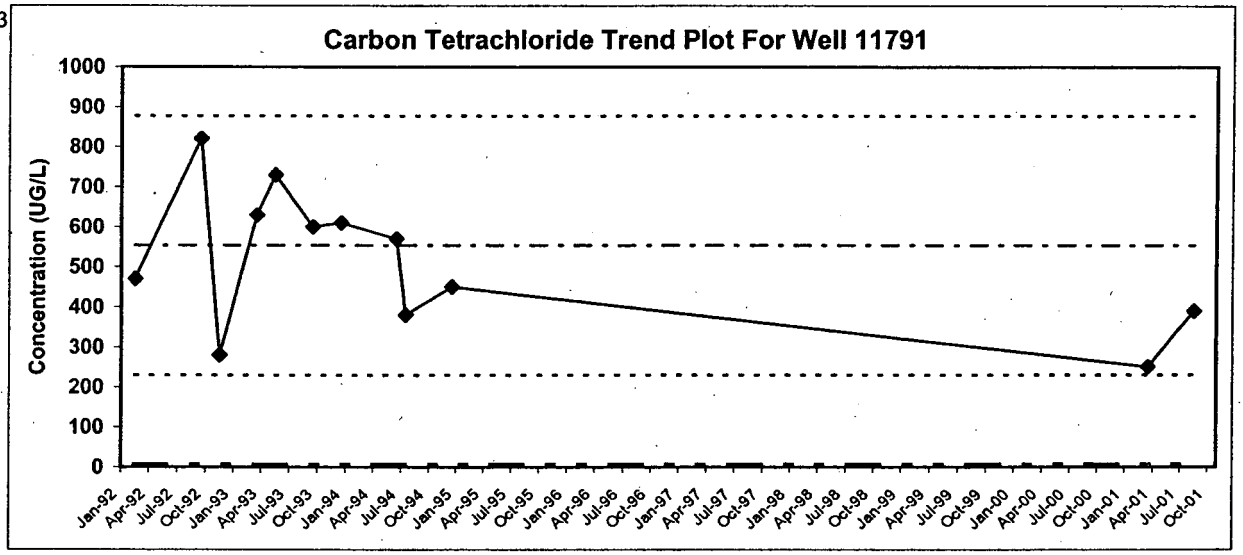


318
388

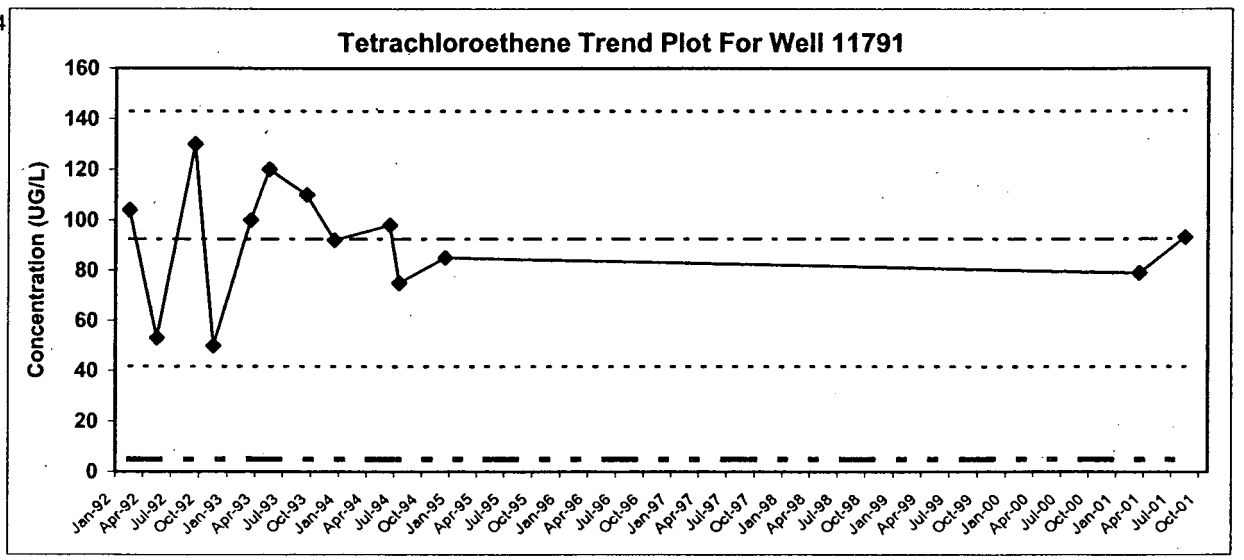
A-52



A-53

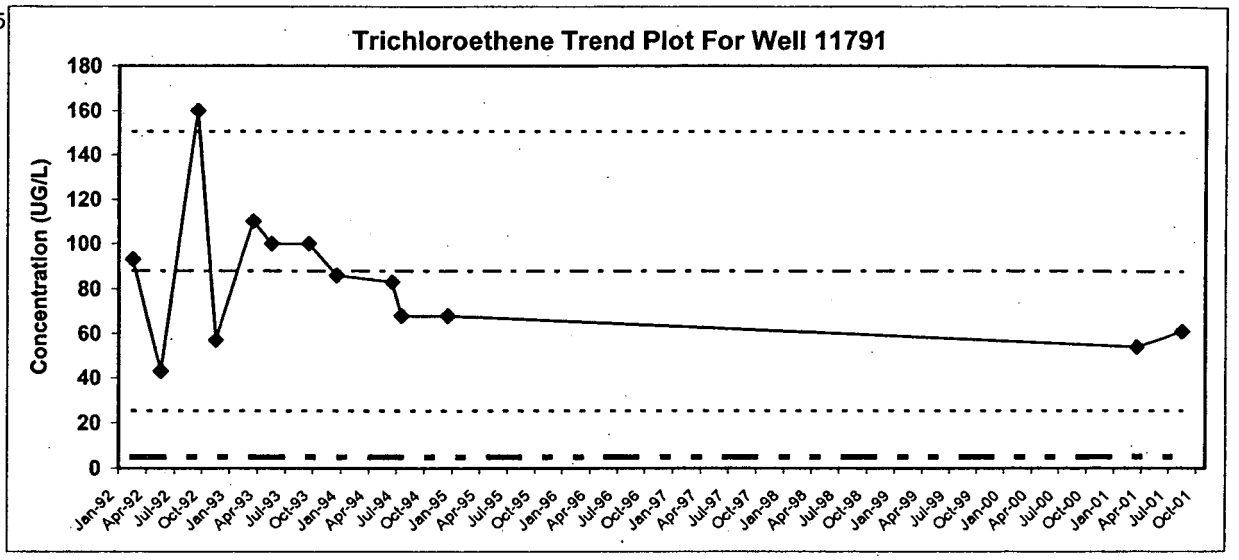


A-54

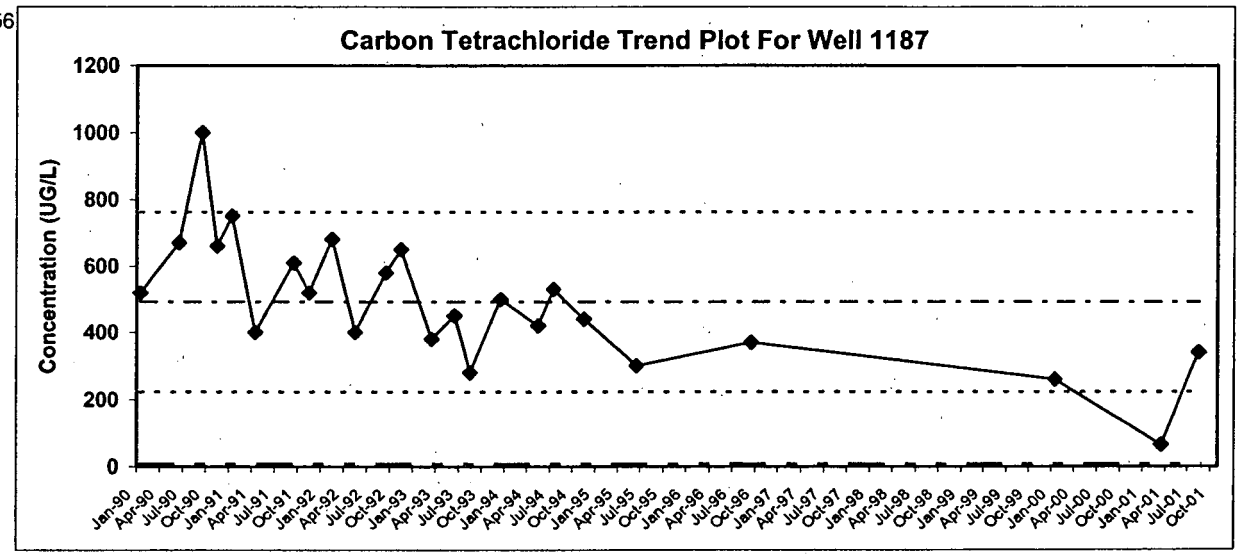


2-9
389

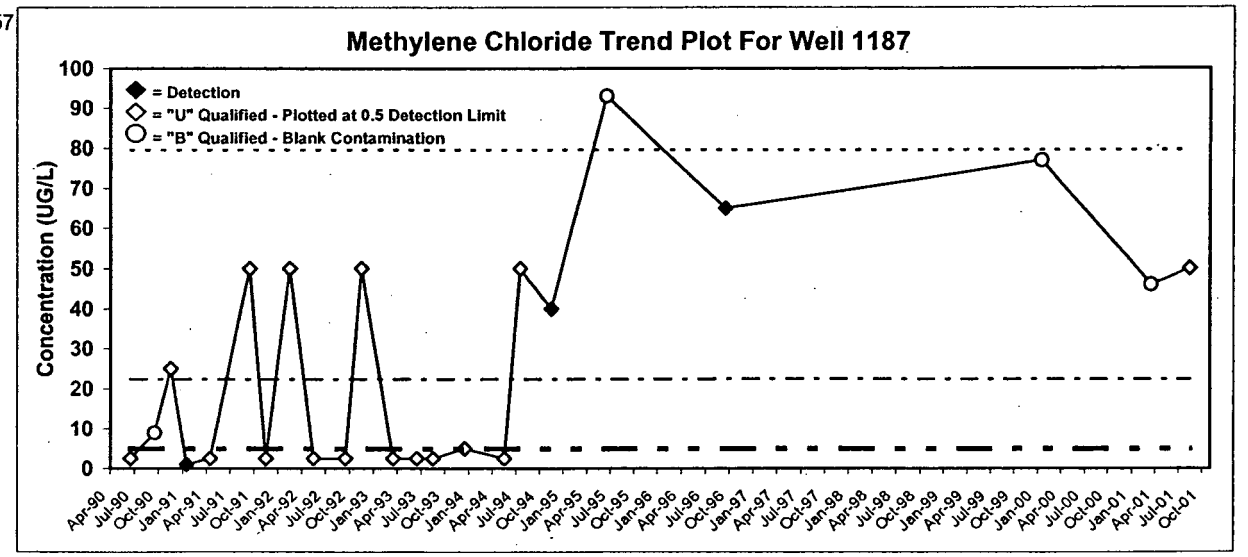
A-55



A-56

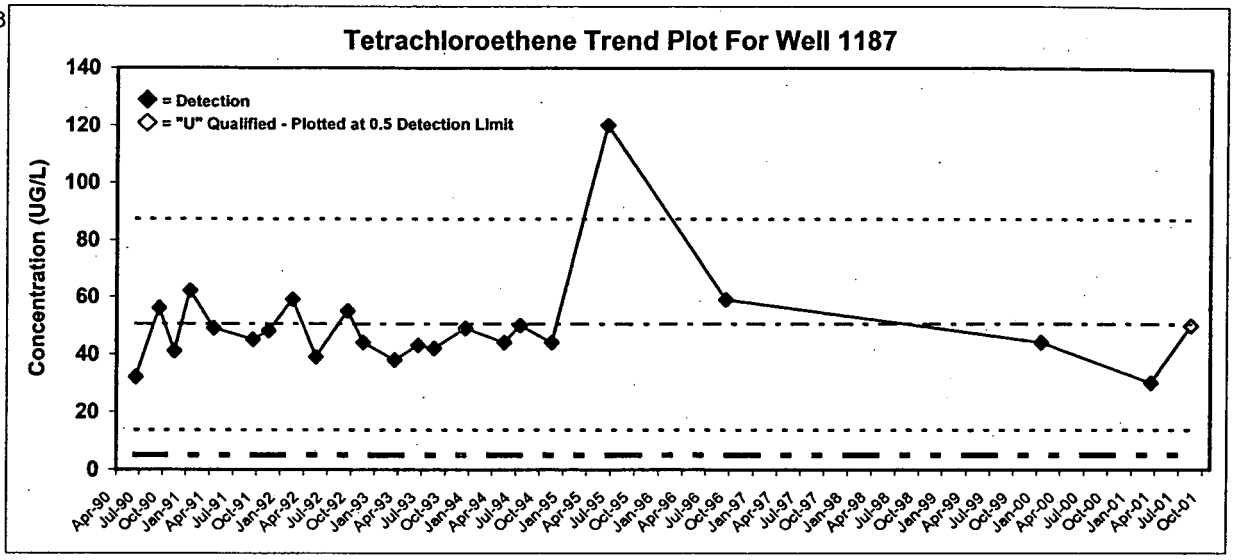


A-57

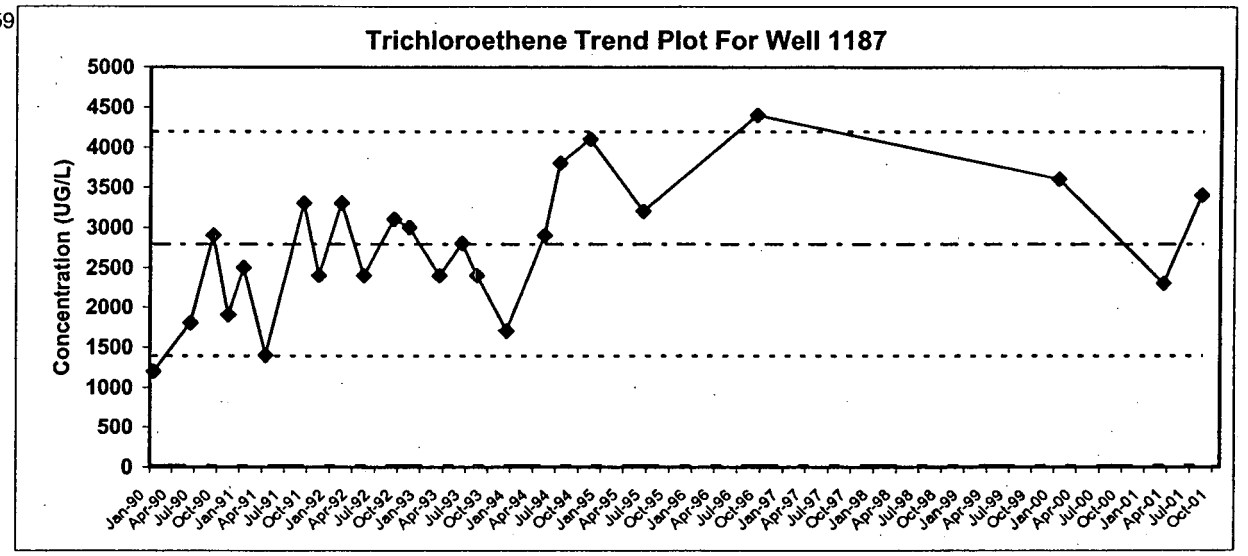


370
390

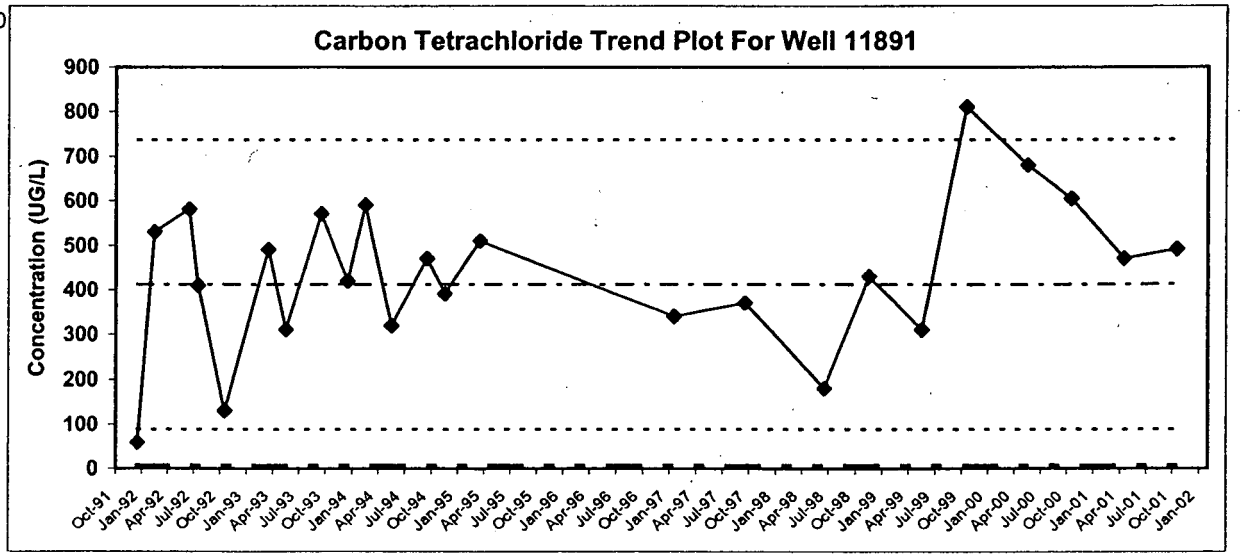
A-58



A-59



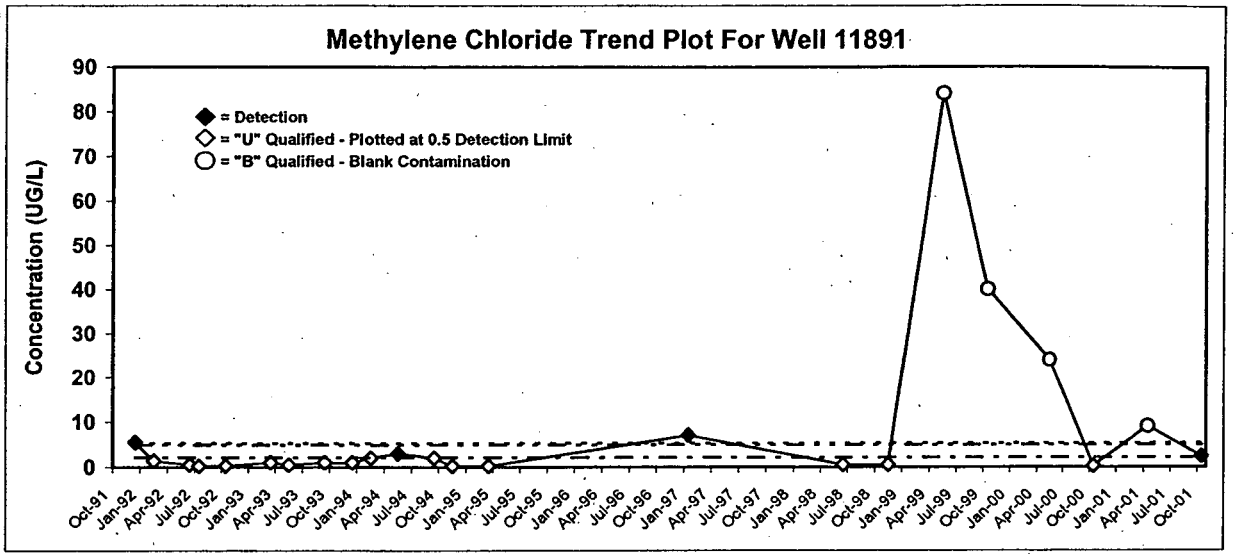
A-60



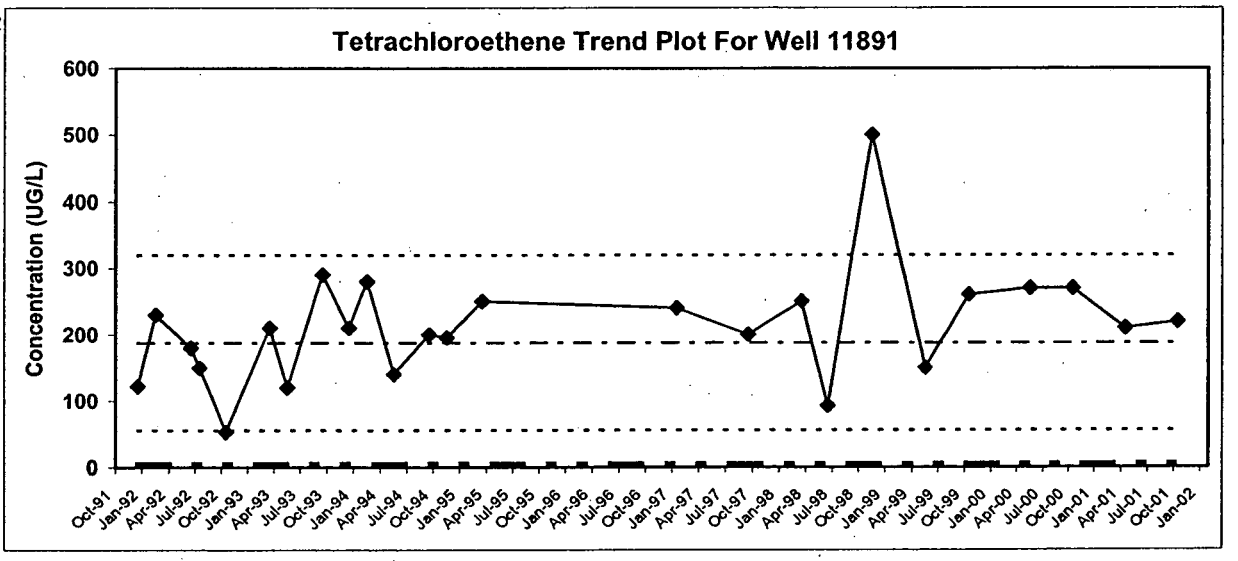
Heavy Horizontal Dashed Line = Tier II Action Level
Light Horizontal Dashed Lines = 1991-1995 Historic Mean and +/- 2 Standard Deviations (+/-M2SDs)

391

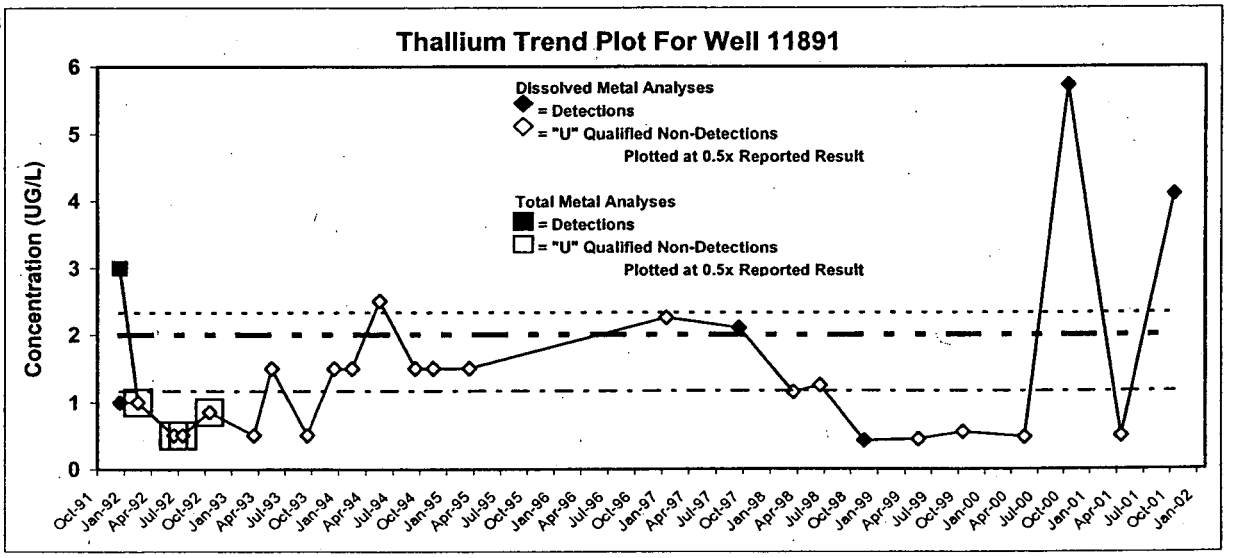
A-61



A-62

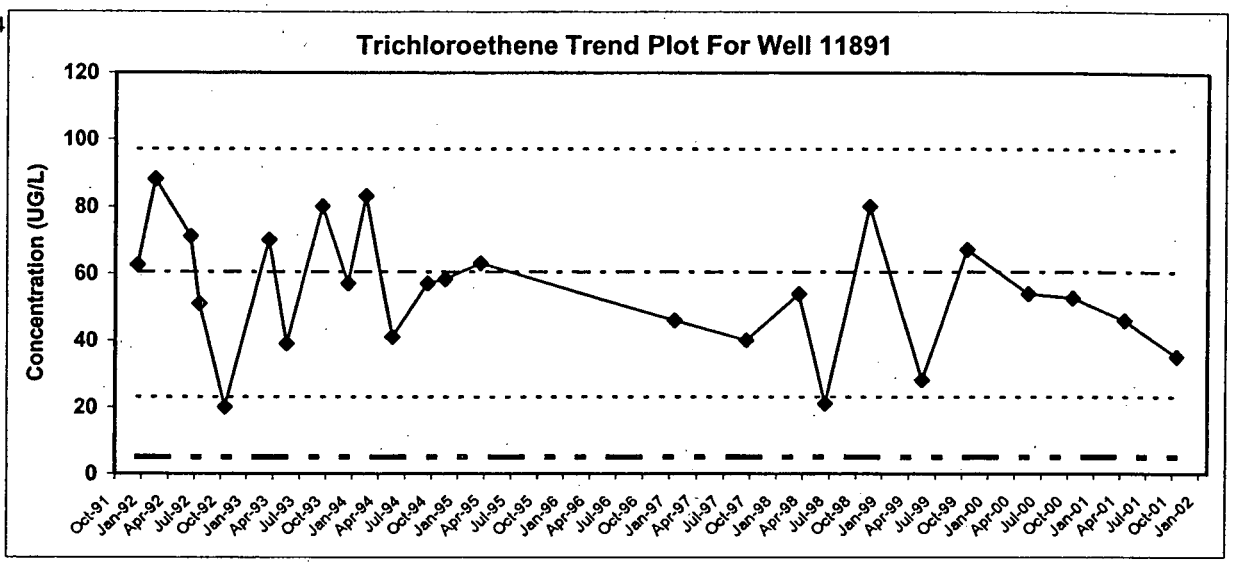


A-63

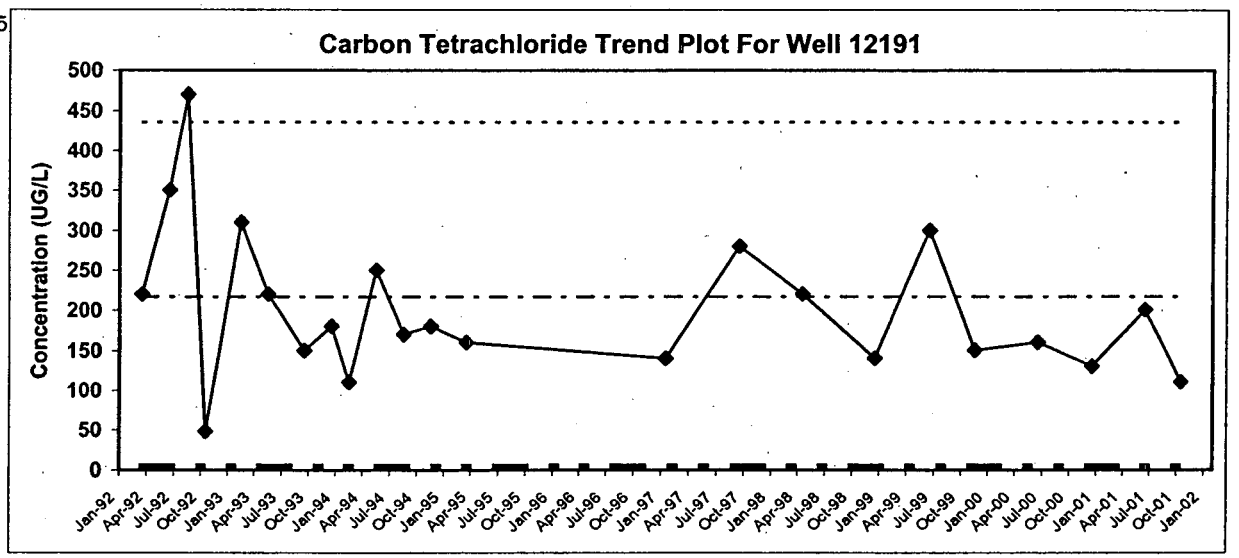


~~328~~ 392

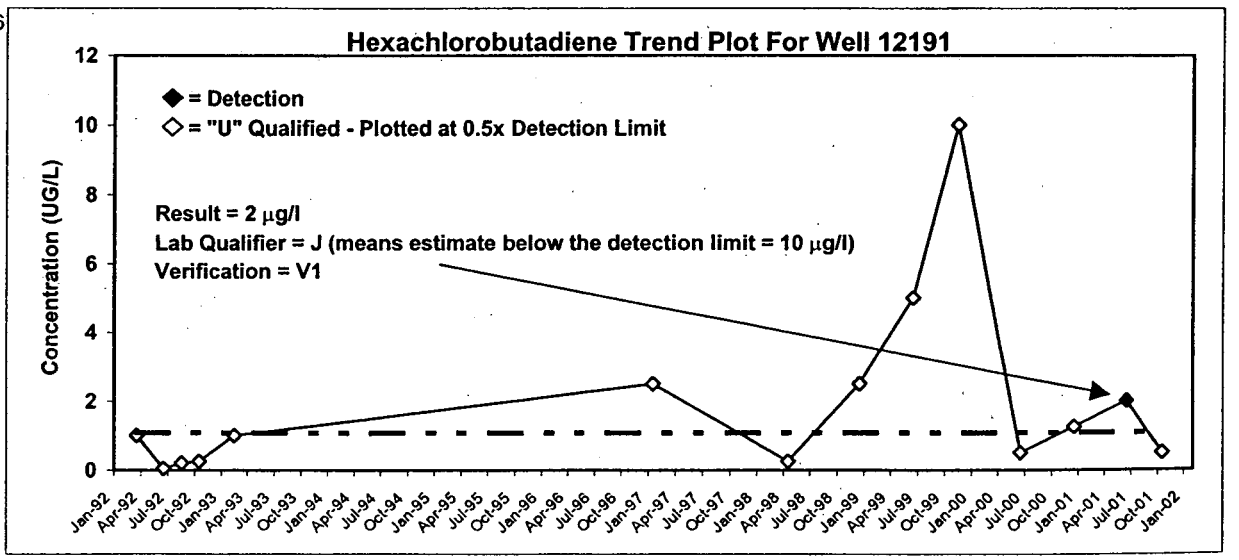
A-64



A-65



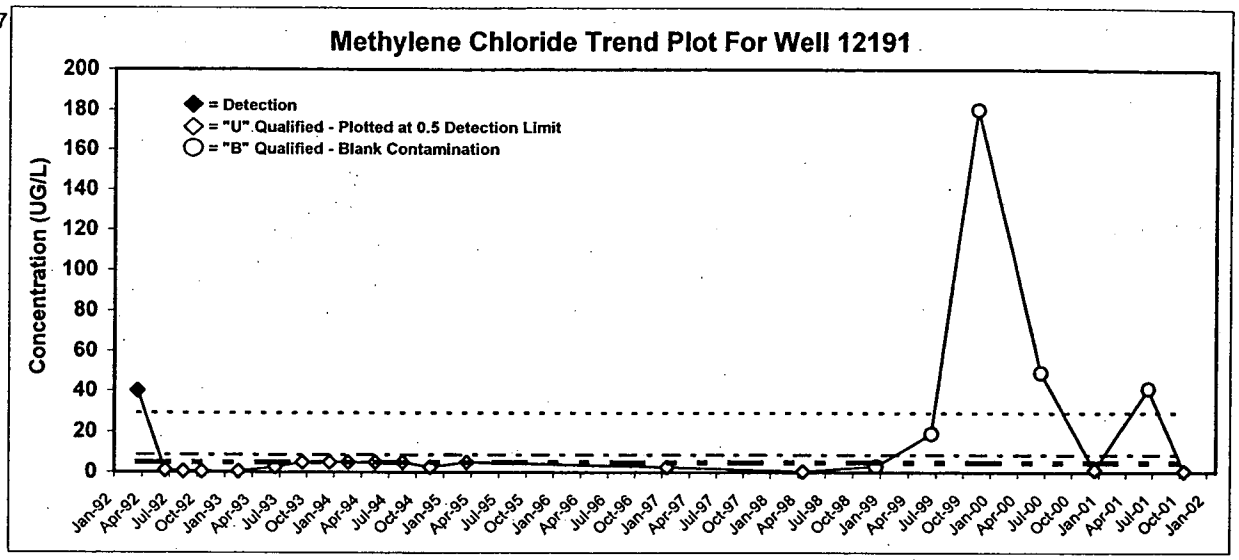
A-66



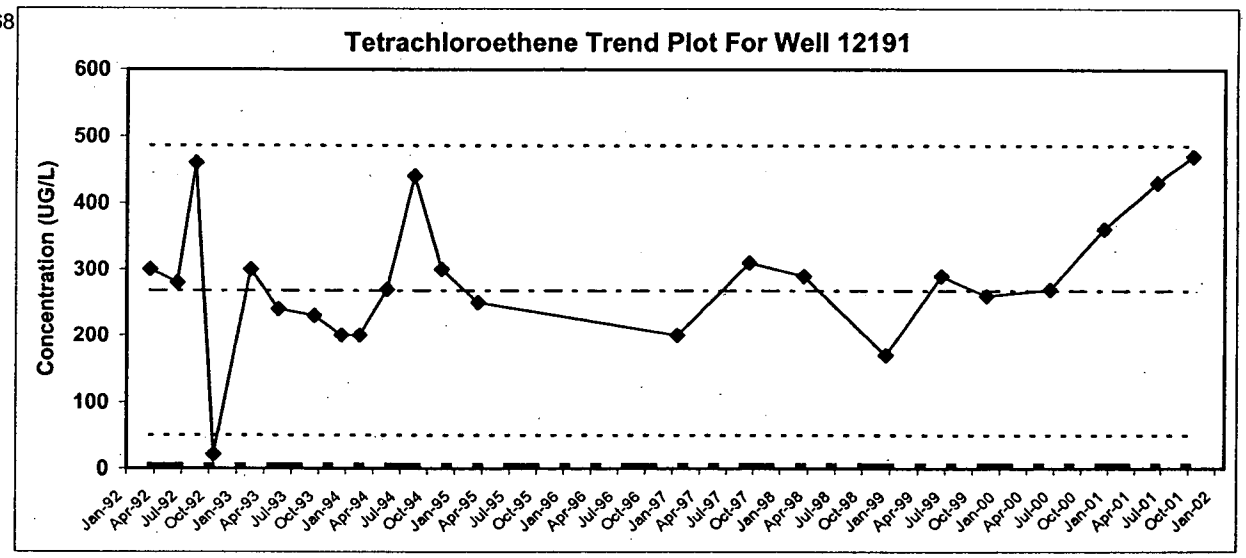
Heavy Horizontal Dashed Line = Tier II Action Level
Light Horizontal Dashed Lines = 1991-1995 Historic Mean and +/- 2 Standard Deviations (+/-M2SDs)

A-22
393

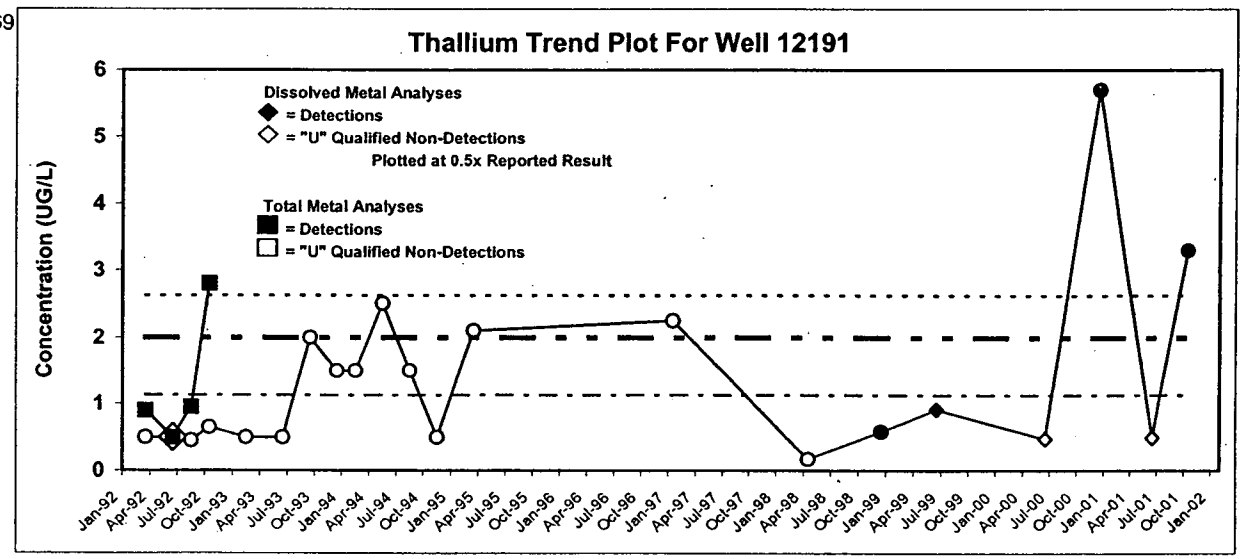
A-67



A-68

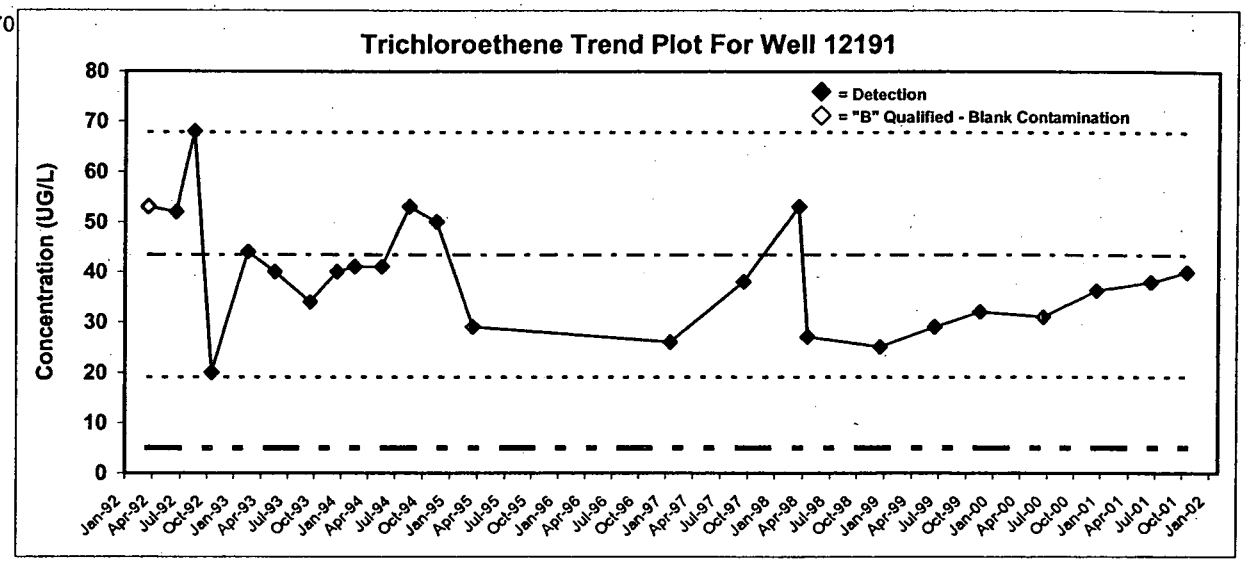


A-69

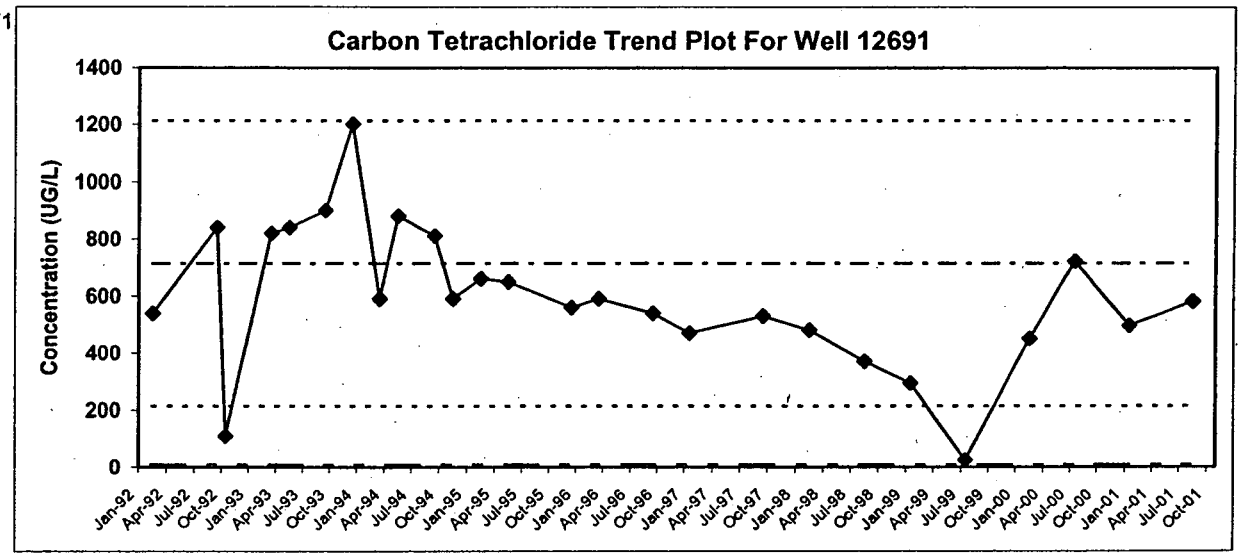


324
384

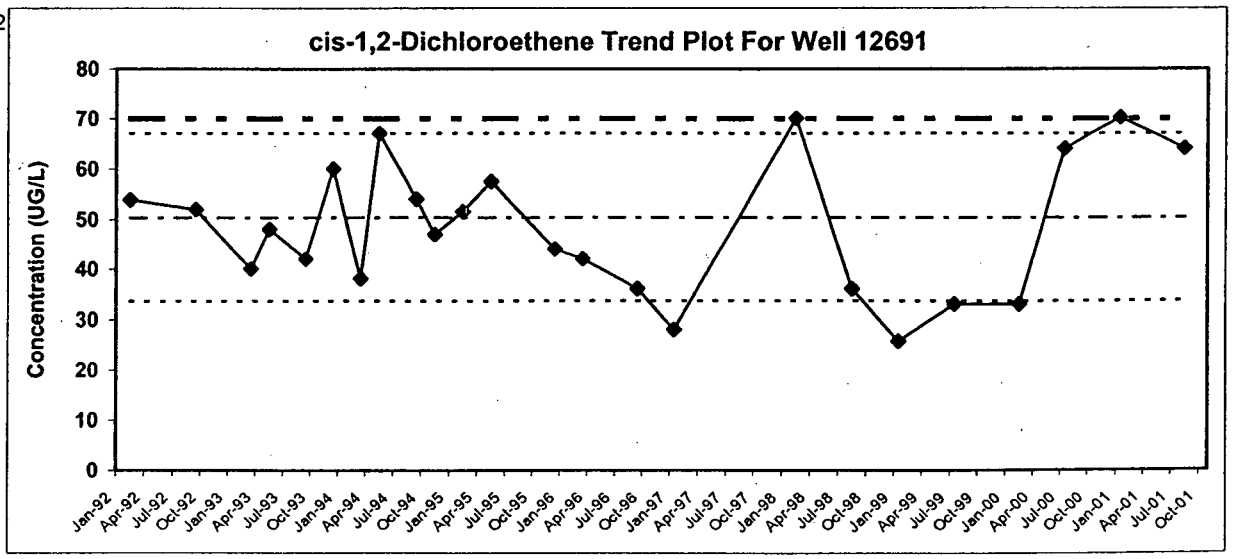
A-70


Trichloroethene Trend Plot For Well 12191
◆ = Detection
◇ = "B" Qualified - Blank Contamination
Concentration (UG/L)
0
10
20
30
40
50
60
70
80
Jan-92 Apr-92 Jul-92 Oct-92 Jan-93 Apr-93 Jul-93 Oct-93 Jan-94 Apr-94 Jul-94 Oct-94 Jan-95 Apr-95 Jul-95 Oct-95 Jan-96 Apr-96 Jul-96 Oct-96 Jan-97 Apr-97 Jul-97 Oct-97 Jan-98 Apr-98 Jul-98 Oct-98 Jan-99 Apr-99 Jul-99 Oct-99 Jan-00 Apr-00 Jul-00 Oct-00 Jan-01 Apr-01 Jul-01 Oct-01 Jan-02

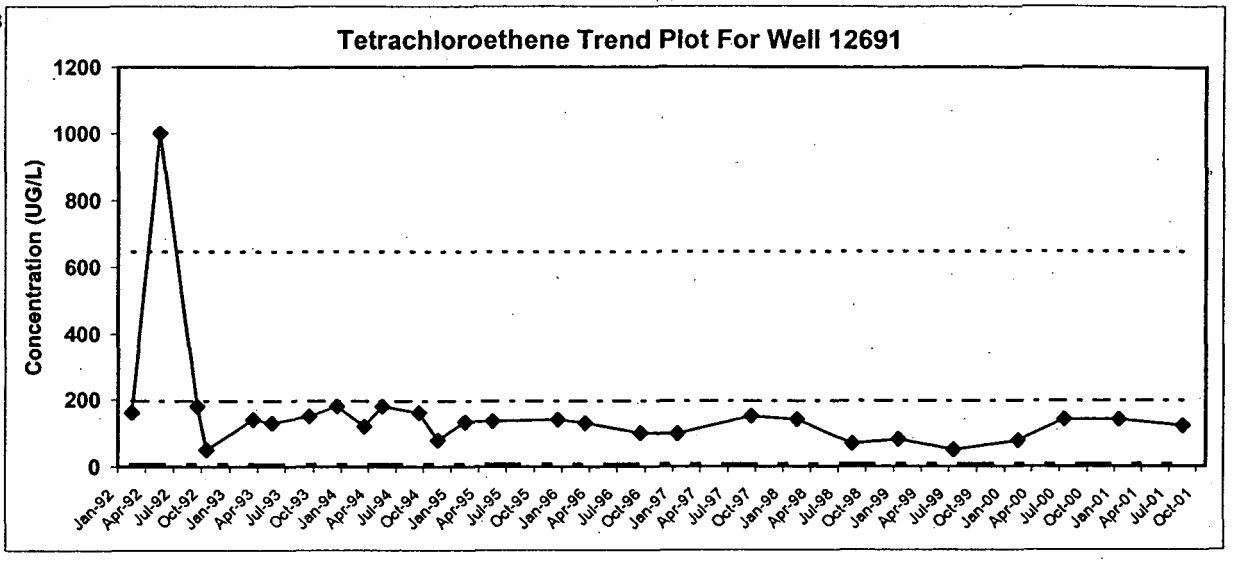
A-71


Carbon Tetrachloride Trend Plot For Well 12691
Concentration (UG/L)
0
200
400
600
800
1000
1200
1400
Jan-92 Apr-92 Jul-92 Oct-92 Jan-93 Apr-93 Jul-93 Oct-93 Jan-94 Apr-94 Jul-94 Oct-94 Jan-95 Apr-95 Jul-95 Oct-95 Jan-96 Apr-96 Jul-96 Oct-96 Jan-97 Apr-97 Jul-97 Oct-97 Jan-98 Apr-98 Jul-98 Oct-98 Jan-99 Apr-99 Jul-99 Oct-99 Jan-00 Apr-00 Jul-00 Oct-00 Jan-01 Apr-01 Jul-01 Oct-01

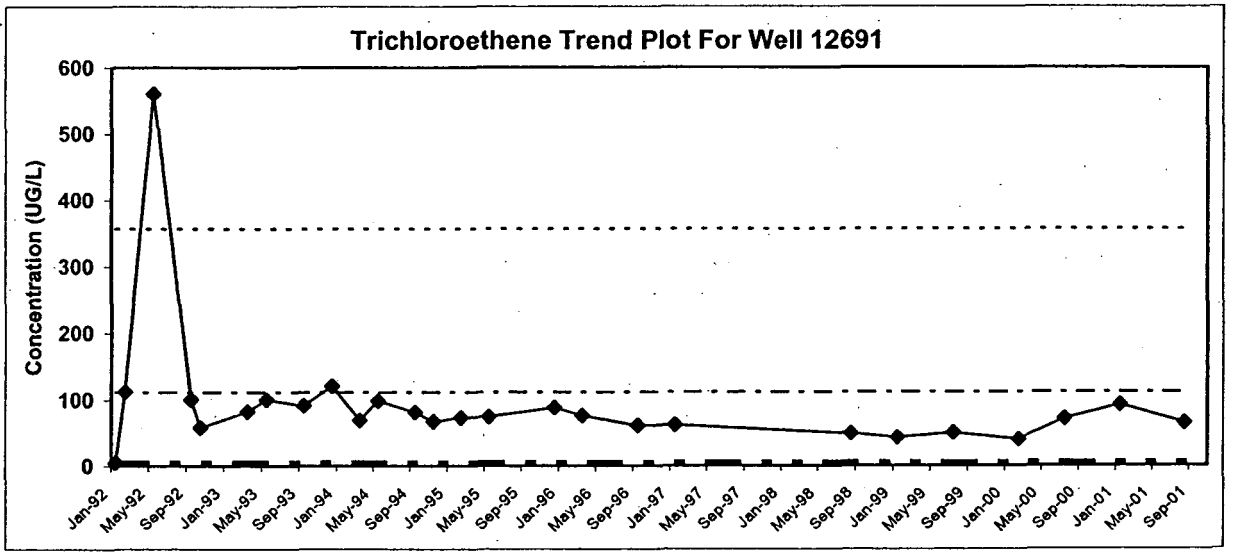
A-72


cis-1,2-Dichloroethene Trend Plot For Well 12691
Concentration (UG/L)
0
10
20
30
40
50
60
70
80
Jan-92 Apr-92 Jul-92 Oct-92 Jan-93 Apr-93 Jul-93 Oct-93 Jan-94 Apr-94 Jul-94 Oct-94 Jan-95 Apr-95 Jul-95 Oct-95 Jan-96 Apr-96 Jul-96 Oct-96 Jan-97 Apr-97 Jul-97 Oct-97 Jan-98 Apr-98 Jul-98 Oct-98 Jan-99 Apr-99 Jul-99 Oct-99 Jan-00 Apr-00 Jul-00 Oct-00 Jan-01 Apr-01 Jul-01 Oct-01

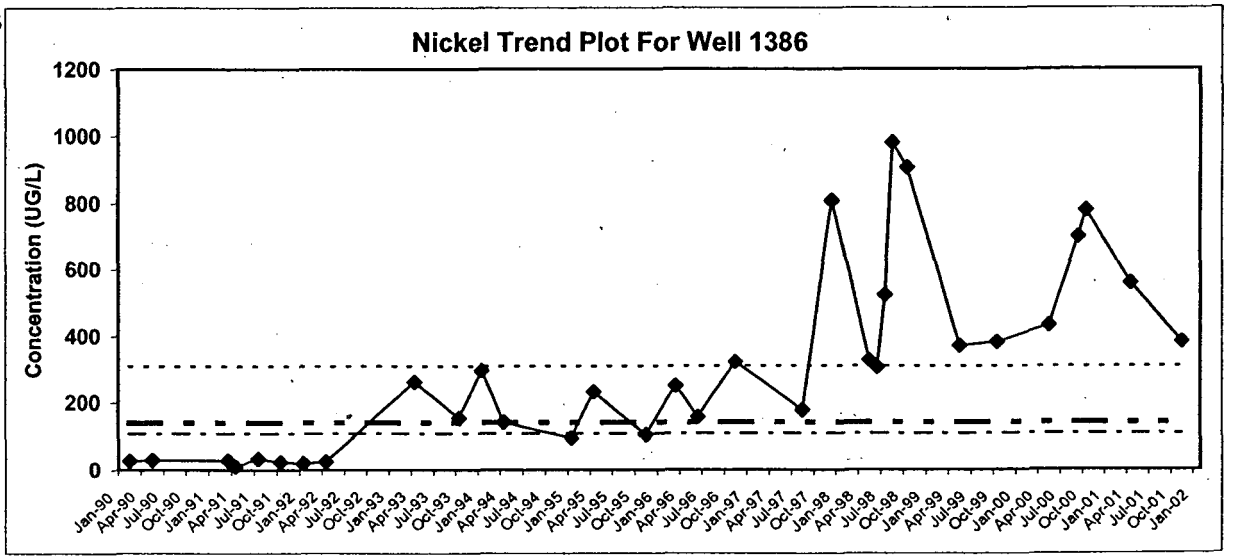
A-73



A-74

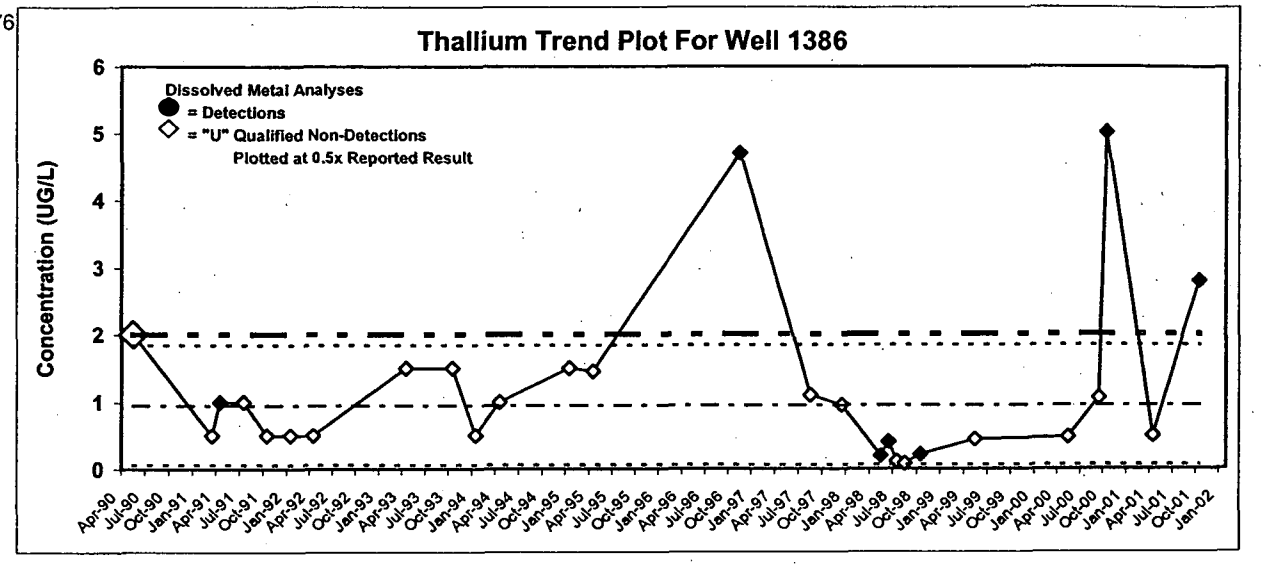


A-75

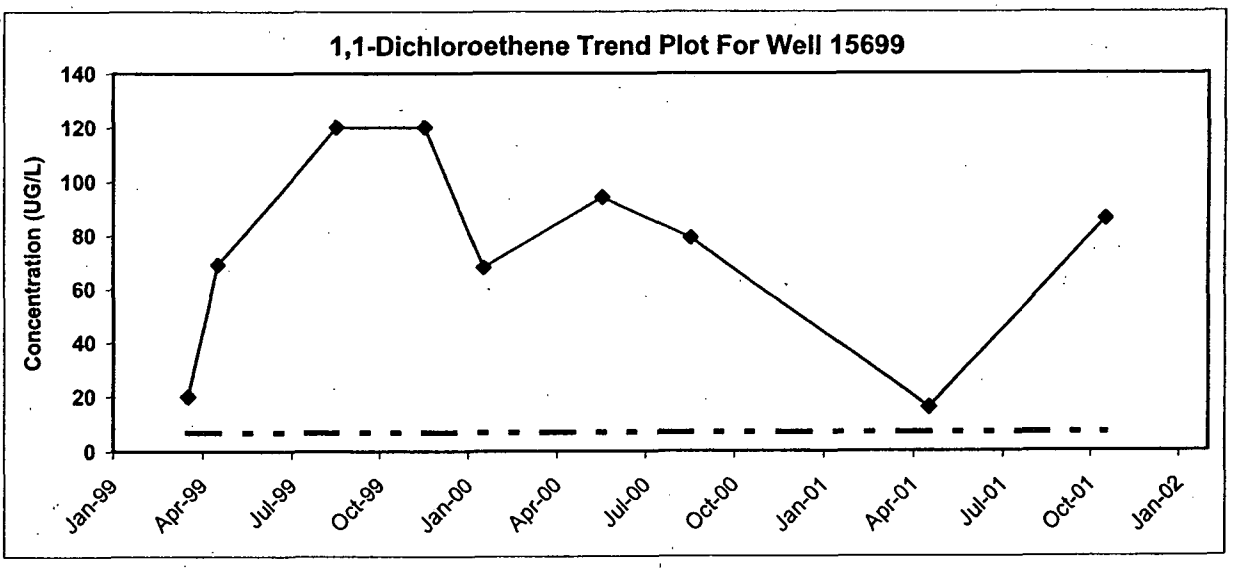


376
386

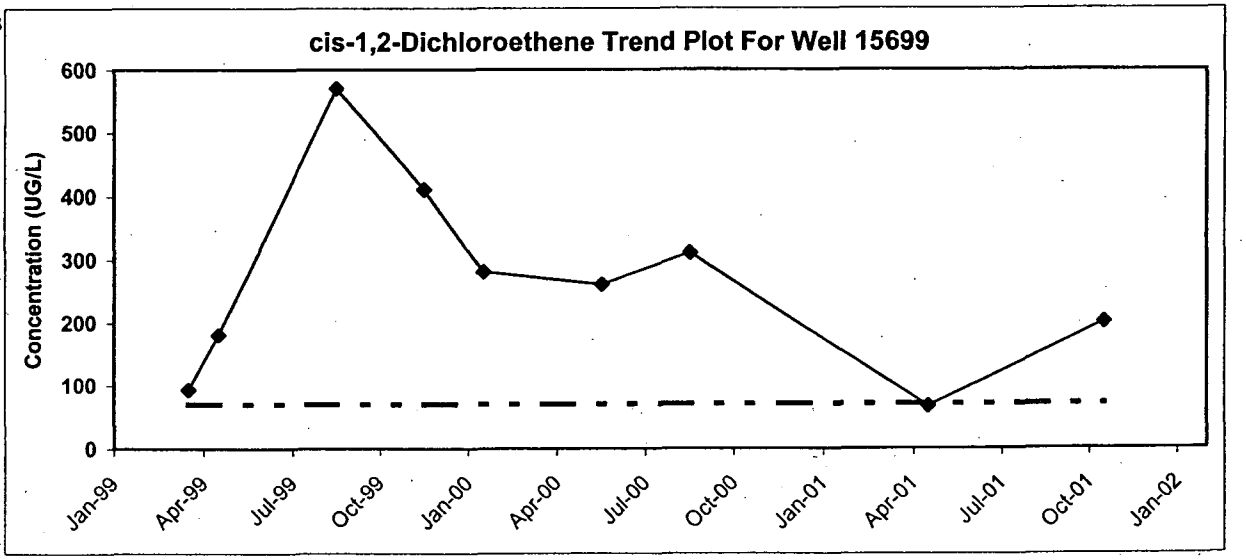
A-76


Thallium Trend Plot For Well 1386
Dissolved Metal Analyses
= Detections
= "U" Qualified Non-Detections
Plotted at 0.5x Reported Result
Concentration (UG/L)
0
1
2
3
4
5
6
Apr-90
Jul-90
Oct-90
Jan-91
Apr-91
Jul-91
Oct-91
Jan-92
Apr-92
Jul-92
Oct-92
Jan-93
Apr-93
Jul-93
Oct-93
Jan-94
Apr-94
Jul-94
Oct-94
Jan-95
Apr-95
Jul-95
Oct-95
Jan-96
Apr-96
Jul-96
Oct-96
Jan-97
Apr-97
Jul-97
Oct-97
Jan-98
Apr-98
Jul-98
Oct-98
Jan-99
Apr-99
Jul-99
Oct-99
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01
Jan-02

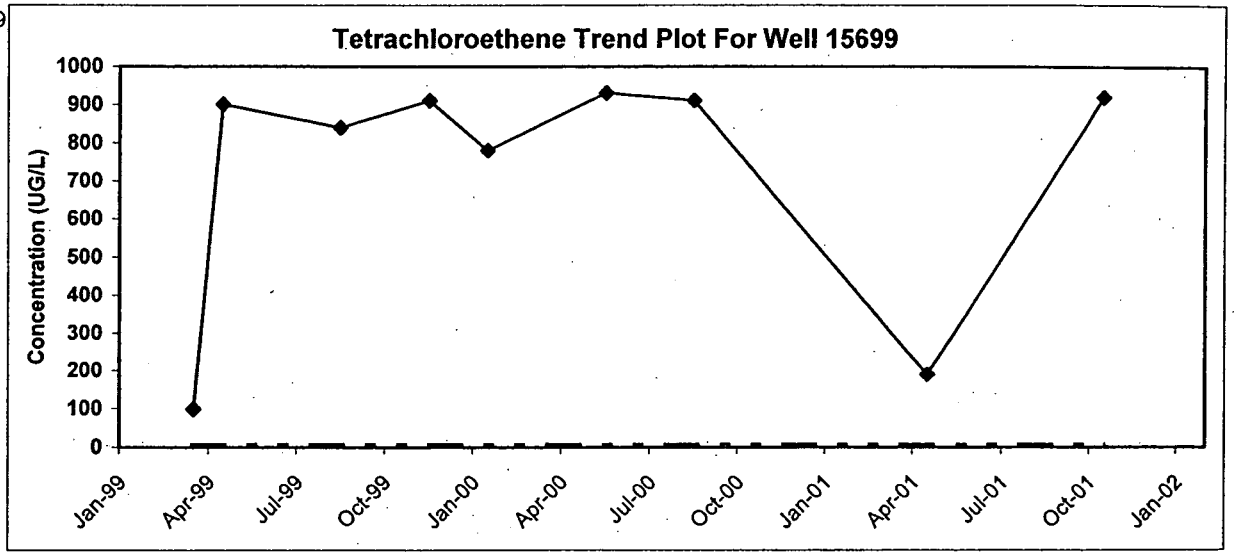
A-77


1,1-Dichloroethene Trend Plot For Well 15699
Concentration (UG/L)
0
20
40
60
80
100
120
140
Jan-99
Apr-99
Jul-99
Oct-99
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01
Jan-02

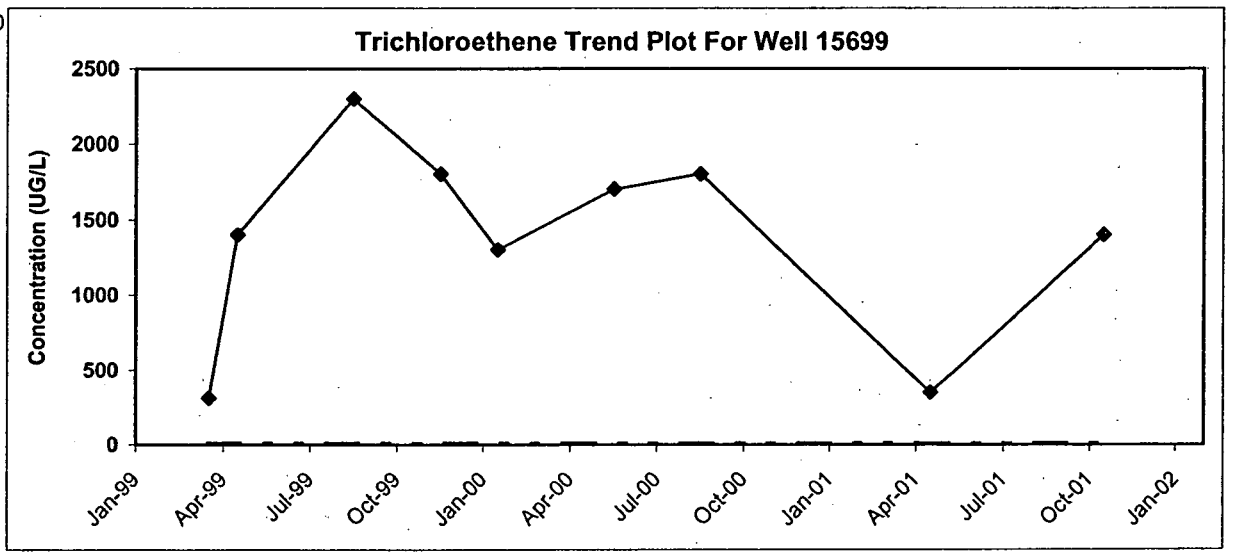
A-78


cis-1,2-Dichloroethene Trend Plot For Well 15699
Concentration (UG/L)
0
100
200
300
400
500
600
Jan-99
Apr-99
Jul-99
Oct-99
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01
Jan-02

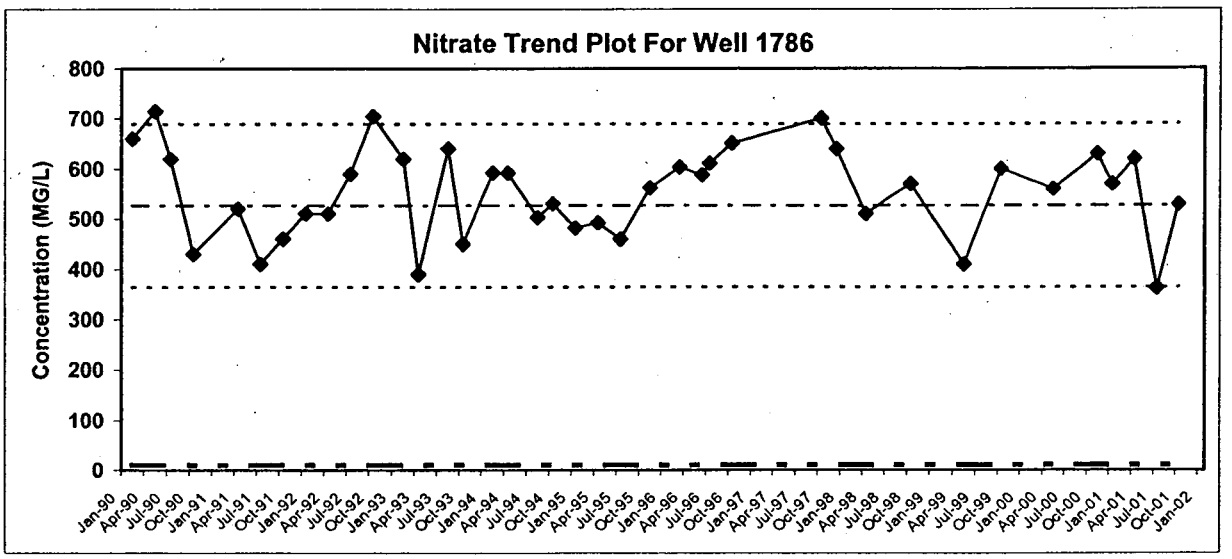
A-79



A-80



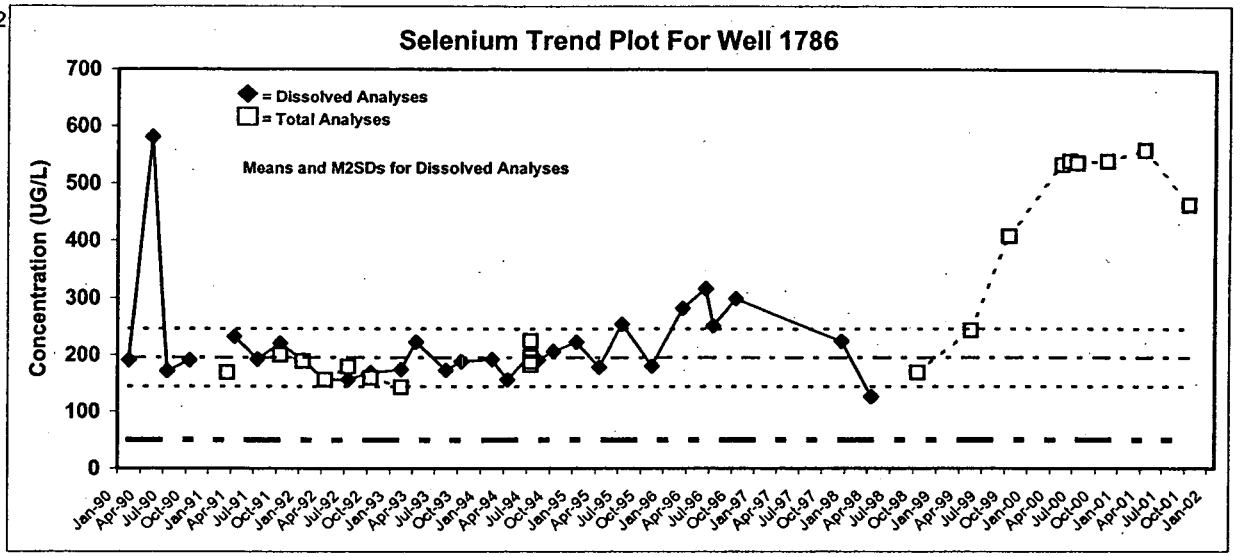
A-81



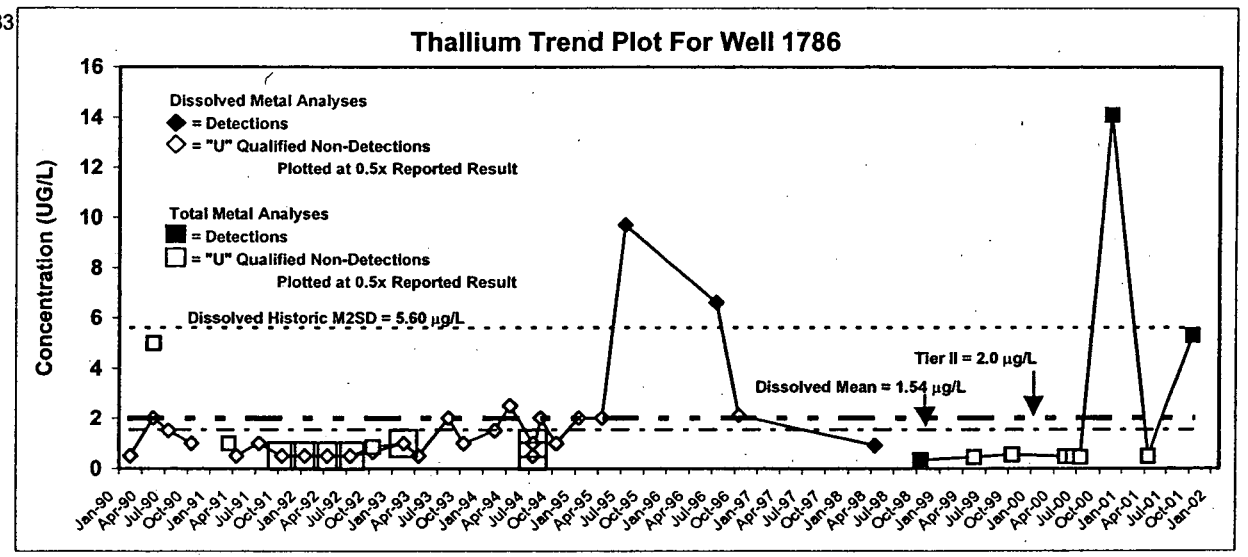
Heavy Horizontal Dashed Line = Tier II Action Level
Light Horizontal Dashed Lines = 1991-1995 Historic Mean and +/- 2 Standard Deviations (+/-M2SDs)

326
328

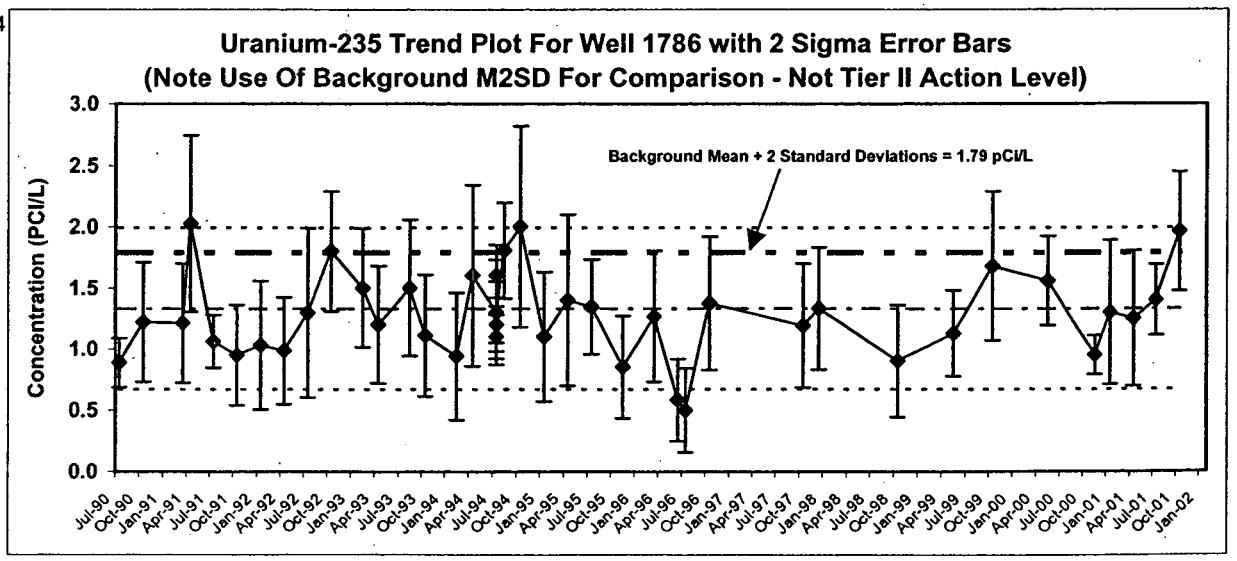
A-82


Selenium Trend Plot For Well 1786
= Dissolved Analyses
= Total Analyses
Means and M2SDs for Dissolved Analyses
Concentration (UG/L)
700
600
500
400
300
200
100
0
Jan-90 Apr-90 Jul-90 Oct-90 Jan-91 Apr-91 Jul-91 Oct-91 Jan-92 Apr-92 Jul-92 Oct-92 Jan-93 Apr-93 Jul-93 Oct-93 Jan-94 Apr-94 Jul-94 Oct-94 Jan-95 Apr-95 Jul-95 Oct-95 Jan-96 Apr-96 Jul-96 Oct-96 Jan-97 Apr-97 Jul-97 Oct-97 Jan-98 Apr-98 Jul-98 Oct-98 Jan-99 Apr-99 Jul-99 Oct-99 Jan-00 Apr-00 Jul-00 Oct-00 Jan-01 Apr-01 Jul-01 Oct-01 Jan-02

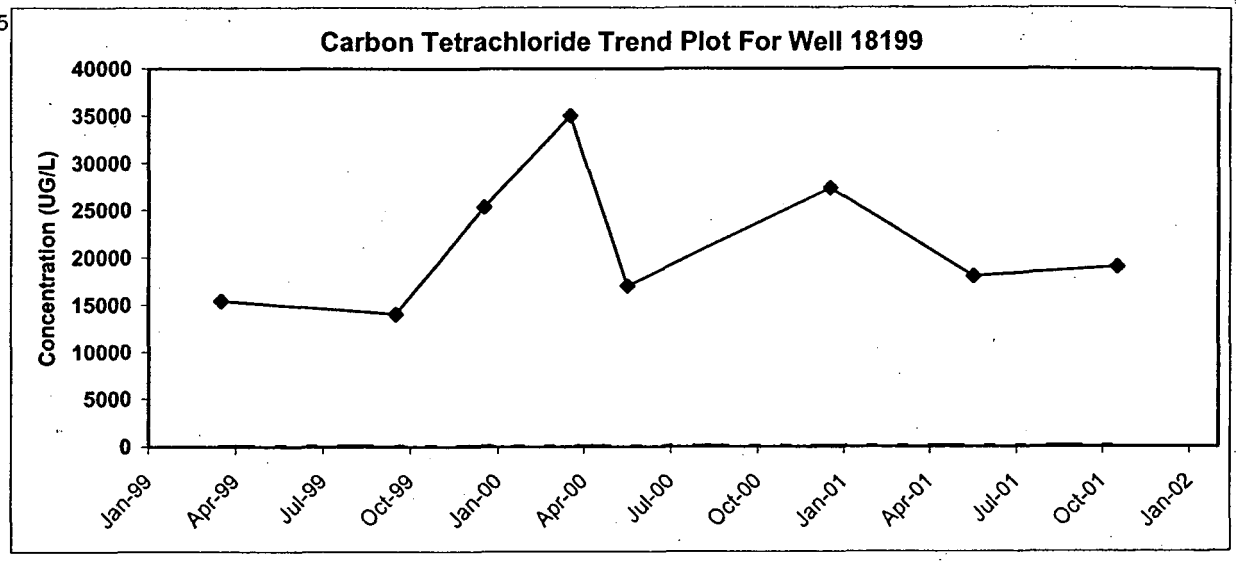
A-83


Thallium Trend Plot For Well 1786
Dissolved Metal Analyses
= Detections
= "U" Qualified Non-Detections
Plotted at 0.5x Reported Result
Total Metal Analyses
= Detections
= "U" Qualified Non-Detections
Plotted at 0.5x Reported Result
Dissolved Historic M2SD = 5.60 µg/L
Tier II = 2.0 µg/L
Dissolved Mean = 1.54 µg/L
Concentration (UG/L)
16
14
12
10
8
6
4
2
0
Jan-90 Apr-90 Jul-90 Oct-90 Jan-91 Apr-91 Jul-91 Oct-91 Jan-92 Apr-92 Jul-92 Oct-92 Jan-93 Apr-93 Jul-93 Oct-93 Jan-94 Apr-94 Jul-94 Oct-94 Jan-95 Apr-95 Jul-95 Oct-95 Jan-96 Apr-96 Jul-96 Oct-96 Jan-97 Apr-97 Jul-97 Oct-97 Jan-98 Apr-98 Jul-98 Oct-98 Jan-99 Apr-99 Jul-99 Oct-99 Jan-00 Apr-00 Jul-00 Oct-00 Jan-01 Apr-01 Jul-01 Oct-01 Jan-02

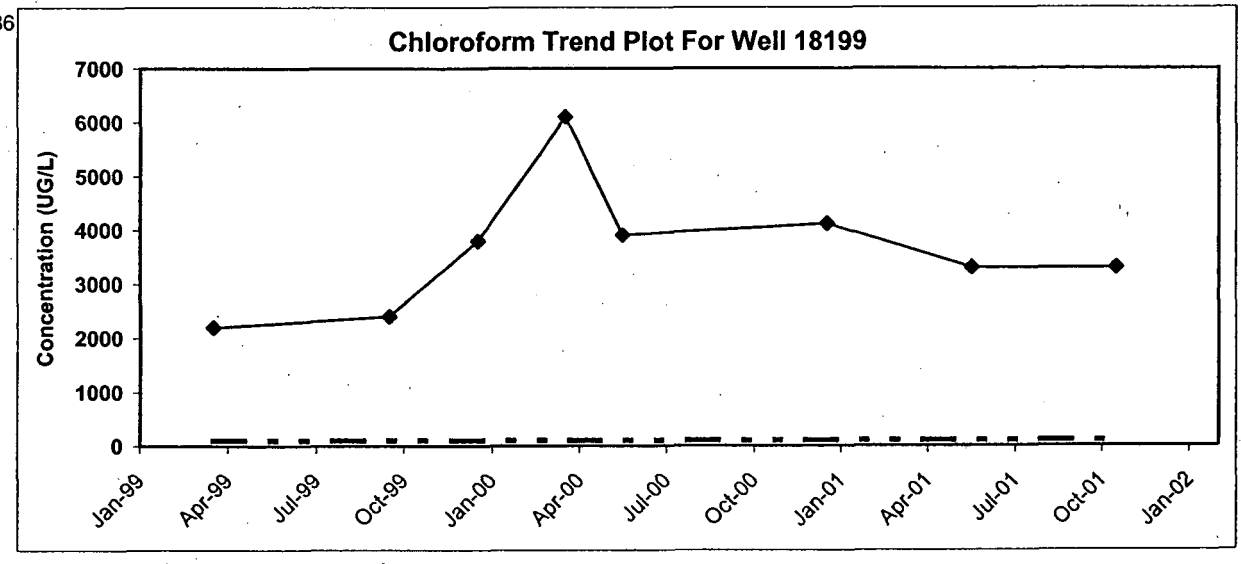
A-84


Uranium-235 Trend Plot For Well 1786 with 2 Sigma Error Bars
(Note Use Of Background M2SD For Comparison - Not Tier II Action Level)
Background Mean + 2 Standard Deviations = 1.79 pCi/L
Concentration (PCi/L)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Jul-90 Oct-90 Jan-91 Apr-91 Jul-91 Oct-91 Jan-92 Apr-92 Jul-92 Oct-92 Jan-93 Apr-93 Jul-93 Oct-93 Jan-94 Apr-94 Jul-94 Oct-94 Jan-95 Apr-95 Jul-95 Oct-95 Jan-96 Apr-96 Jul-96 Oct-96 Jan-97 Apr-97 Jul-97 Oct-97 Jan-98 Apr-98 Jul-98 Oct-98 Jan-99 Apr-99 Jul-99 Oct-99 Jan-00 Apr-00 Jul-00 Oct-00 Jan-01 Apr-01 Jul-01 Oct-01 Jan-02

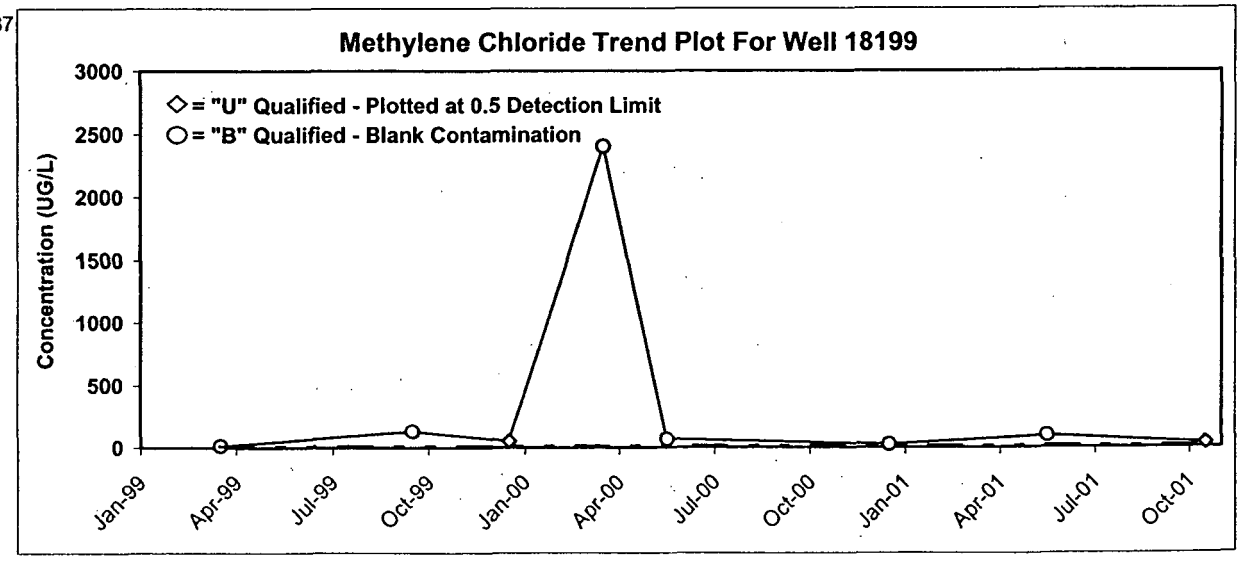
A-85



A-86

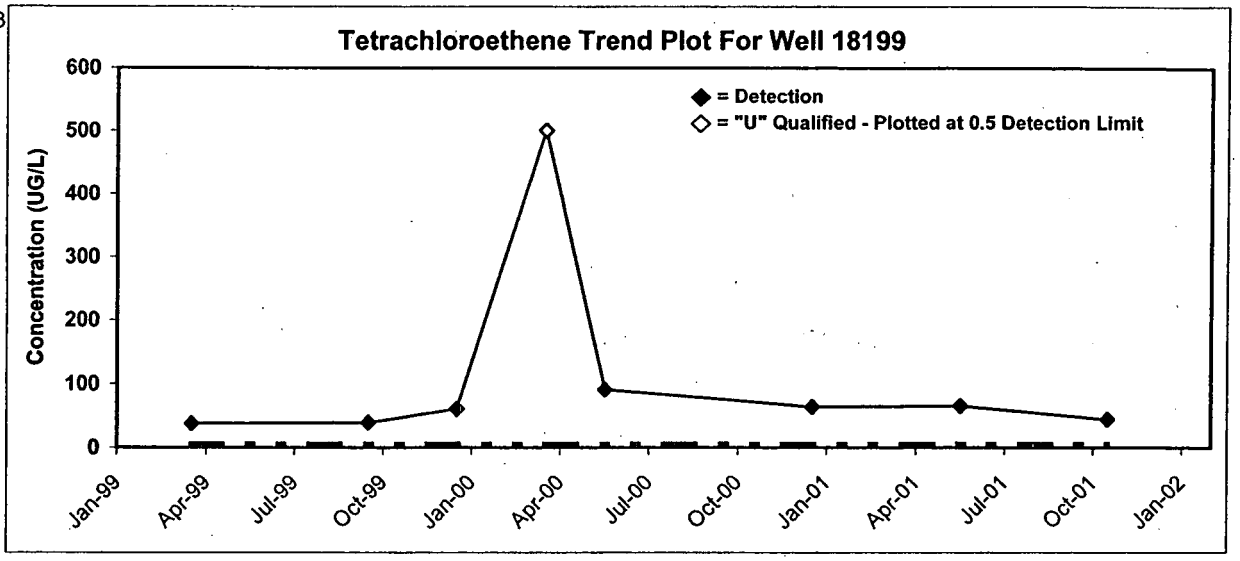


A-87

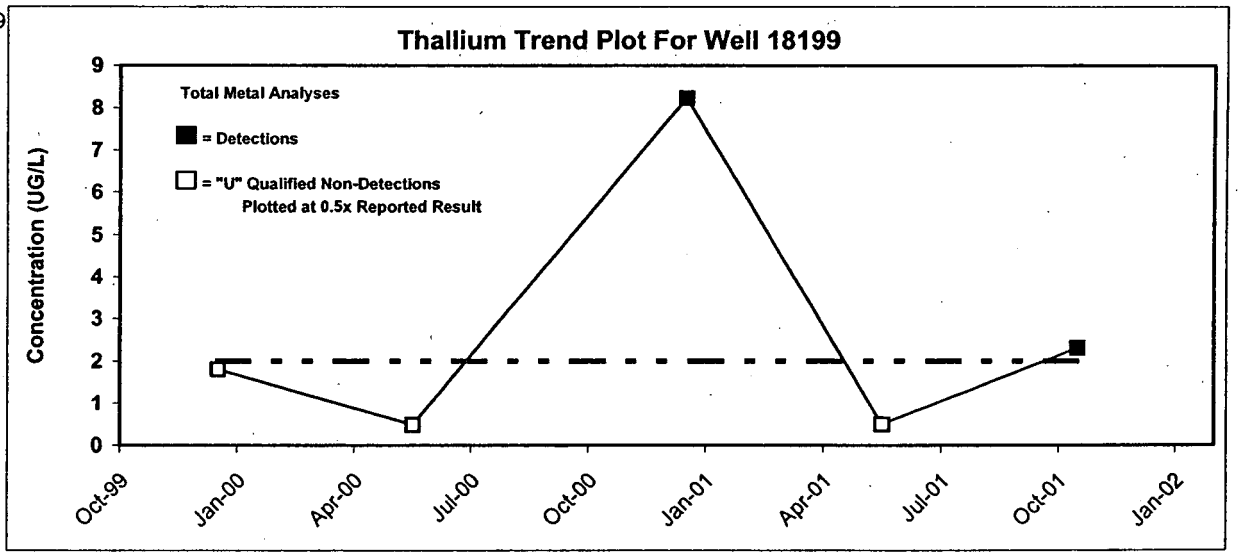


330
400

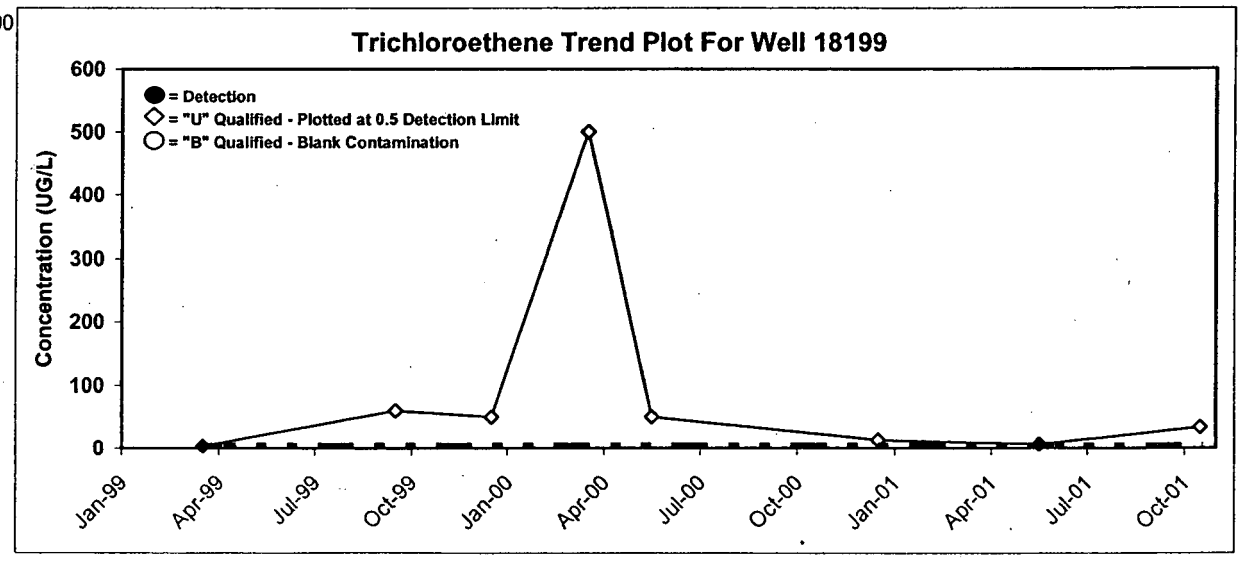
A-88


Tetrachloroethene Trend Plot For Well 18199
= Detection
= "U" Qualified - Plotted at 0.5 Detection Limit
Concentration (UG/L)
600
500
400
300
200
100
0
Jan-99
Apr-99
Jul-99
Oct-99
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01
Jan-02

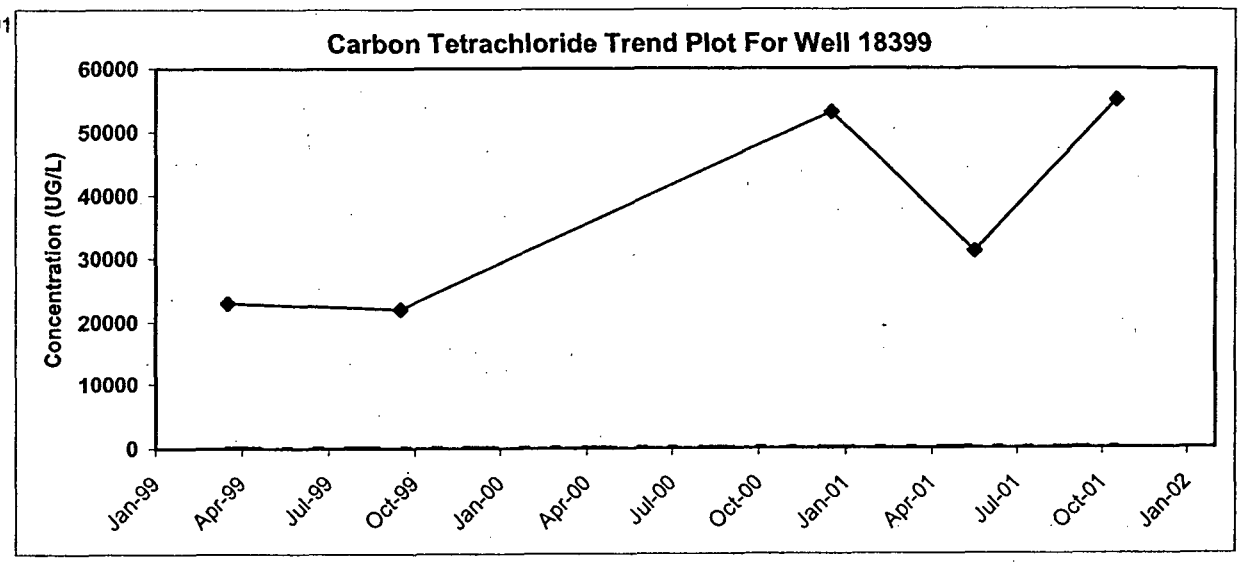
A-89


Thallium Trend Plot For Well 18199
Total Metal Analyses
= Detections
= "U" Qualified Non-Detections
Plotted at 0.5x Reported Result
Concentration (UG/L)
9
8
7
6
5
4
3
2
1
0
Oct-99
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01
Jan-02

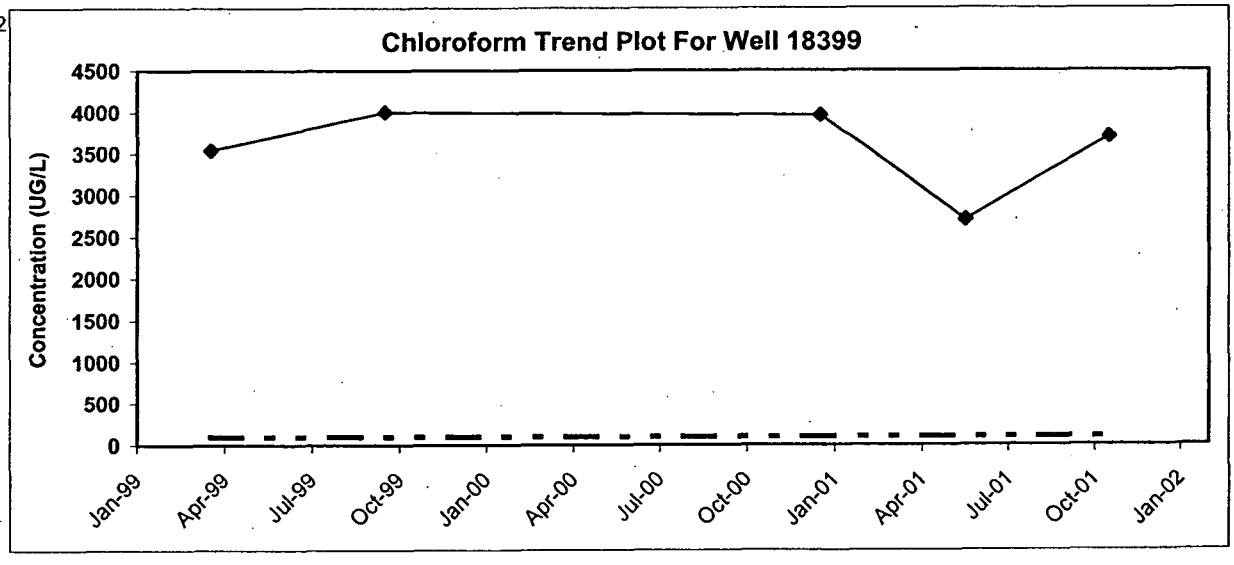
A-90


Trichloroethene Trend Plot For Well 18199
= Detection
= "U" Qualified - Plotted at 0.5 Detection Limit
= "B" Qualified - Blank Contamination
Concentration (UG/L)
600
500
400
300
200
100
0
Jan-99
Apr-99
Jul-99
Oct-99
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01

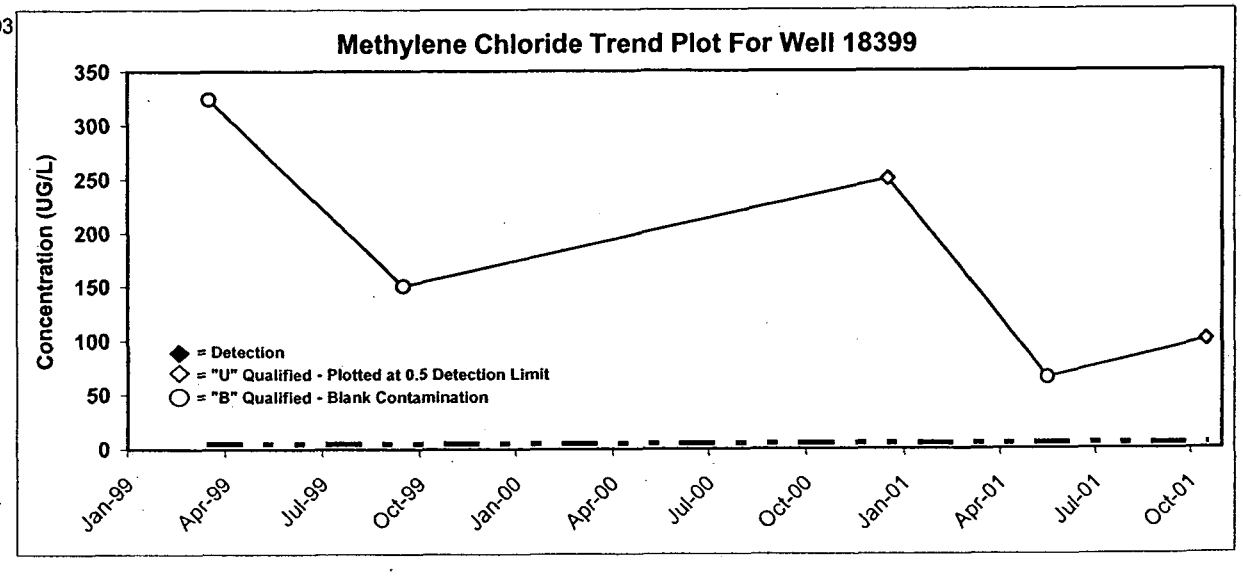
A-91



A-92

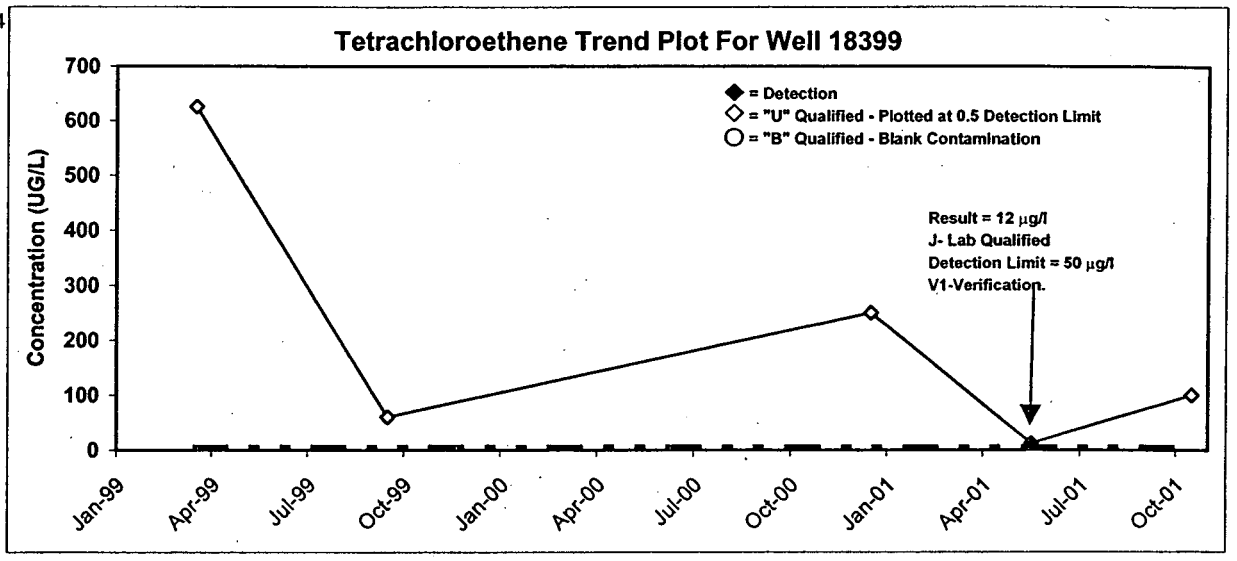


A-93

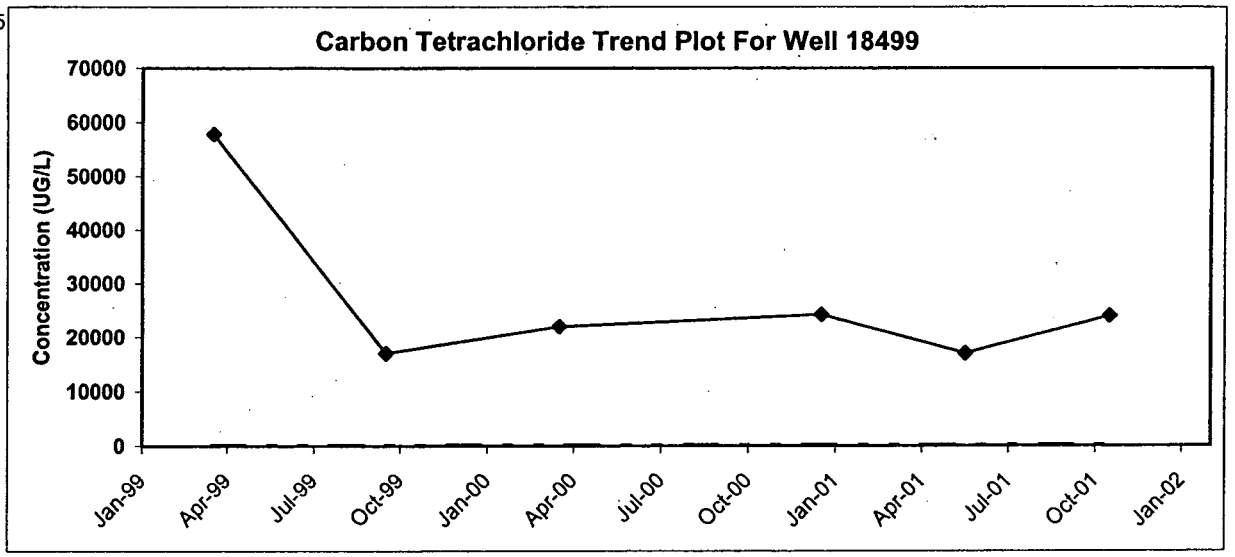


332
402

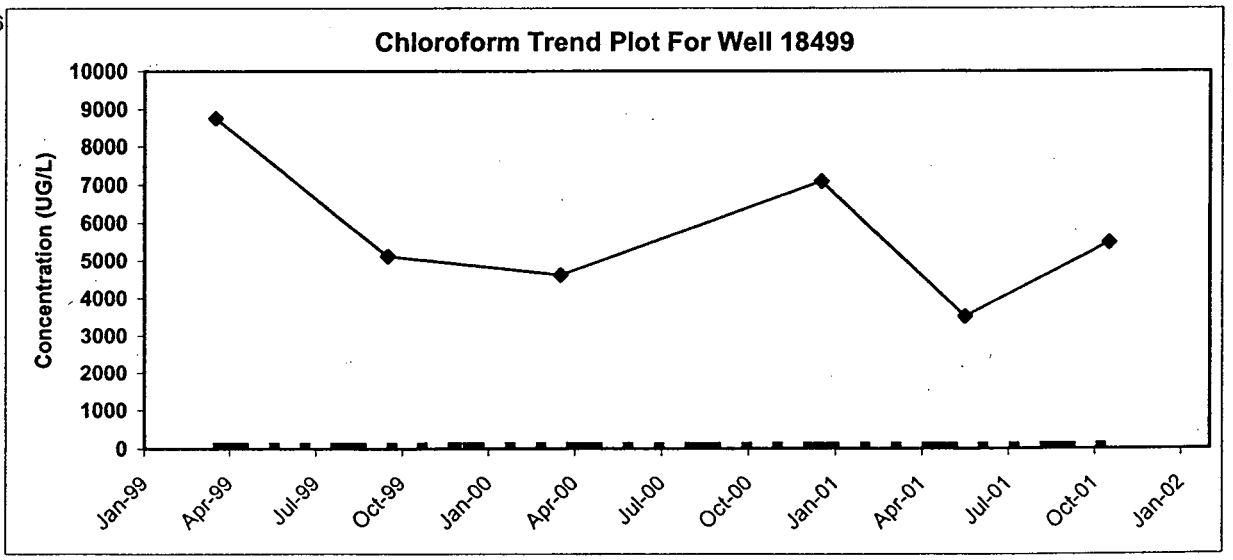
A-94


Tetrachloroethene Trend Plot For Well 18399
= Detection
= "U" Qualified - Plotted at 0.5 Detection Limit
= "B" Qualified - Blank Contamination
Result = 12 µg/l
J- Lab Qualified
Detection Limit = 50 µg/l
V1-Verification.
Concentration (UG/L)
700
600
500
400
300
200
100
0
Jan-99
Apr-99
Jul-99
Oct-99
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01

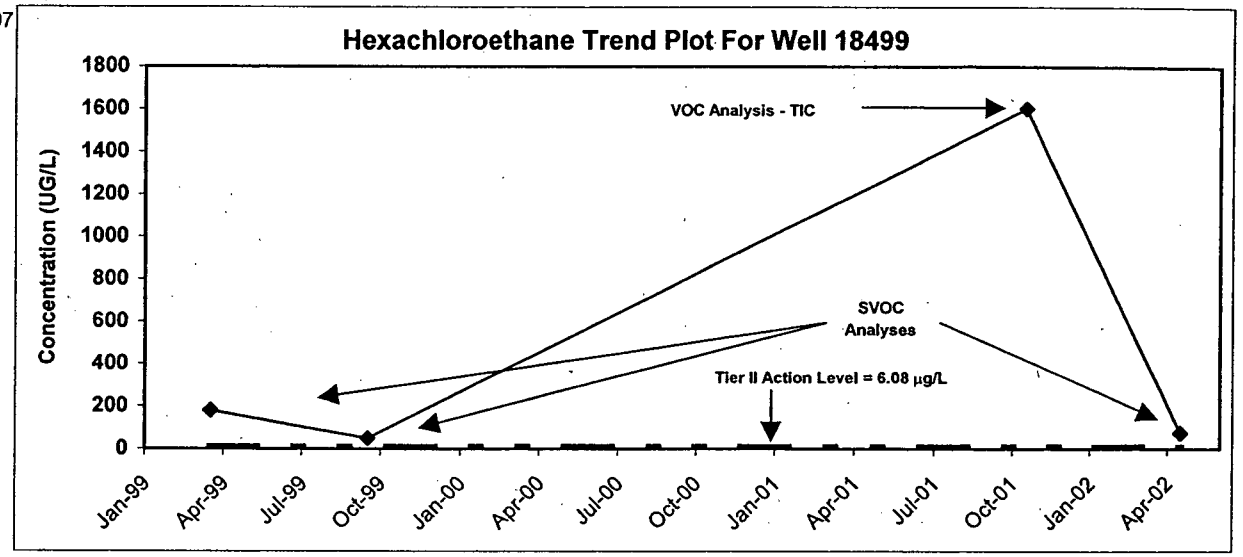
A-95


Carbon Tetrachloride Trend Plot For Well 18499
Concentration (UG/L)
70000
60000
50000
40000
30000
20000
10000
0
Jan-99
Apr-99
Jul-99
Oct-99
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01
Jan-02

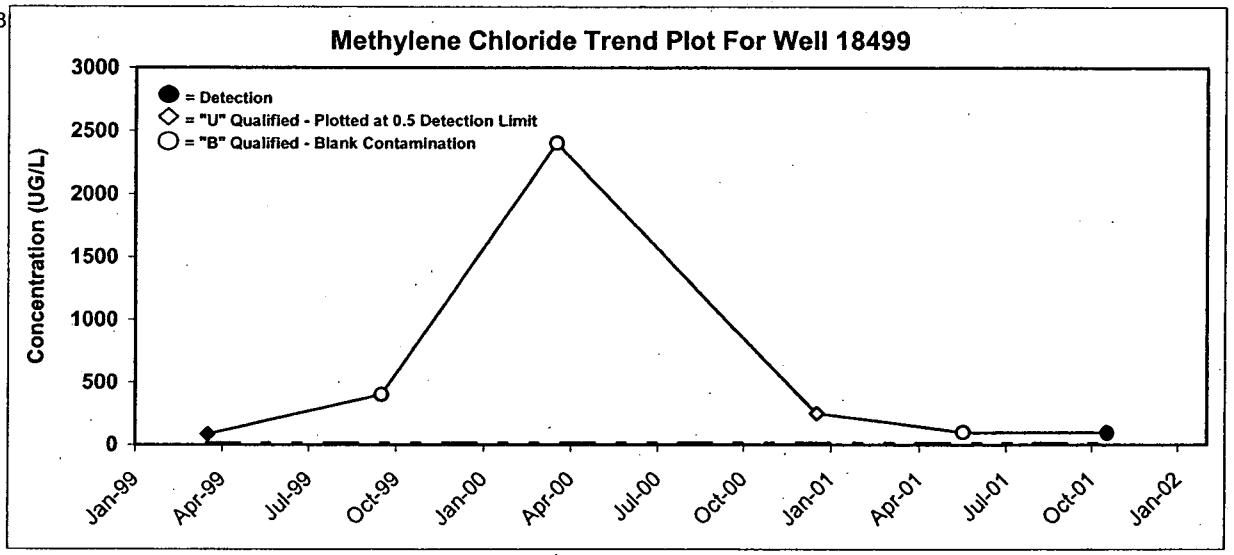
A-96


Chloroform Trend Plot For Well 18499
Concentration (UG/L)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Jan-99
Apr-99
Jul-99
Oct-99
Jan-00
Apr-00
Jul-00
Oct-00
Jan-01
Apr-01
Jul-01
Oct-01
Jan-02

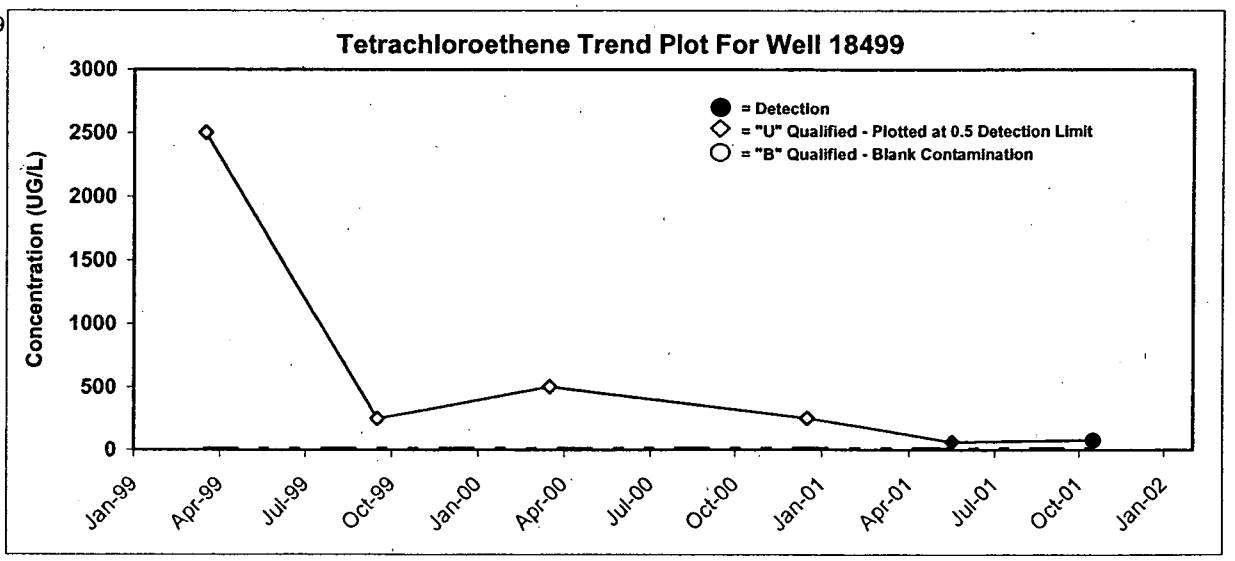
A-97



A-98

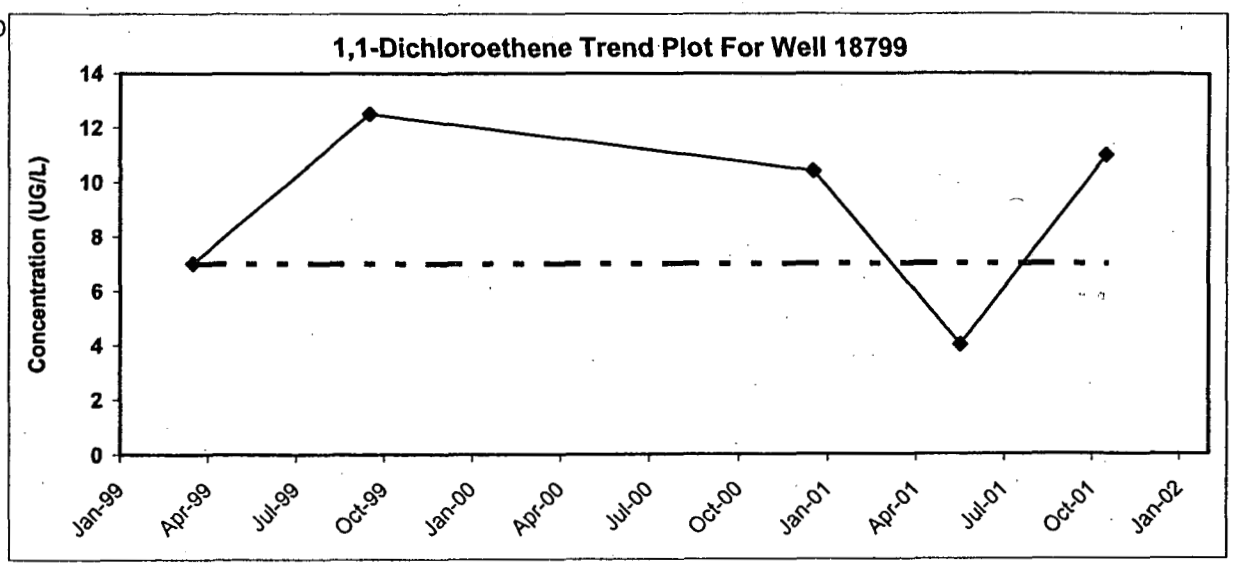


A-99

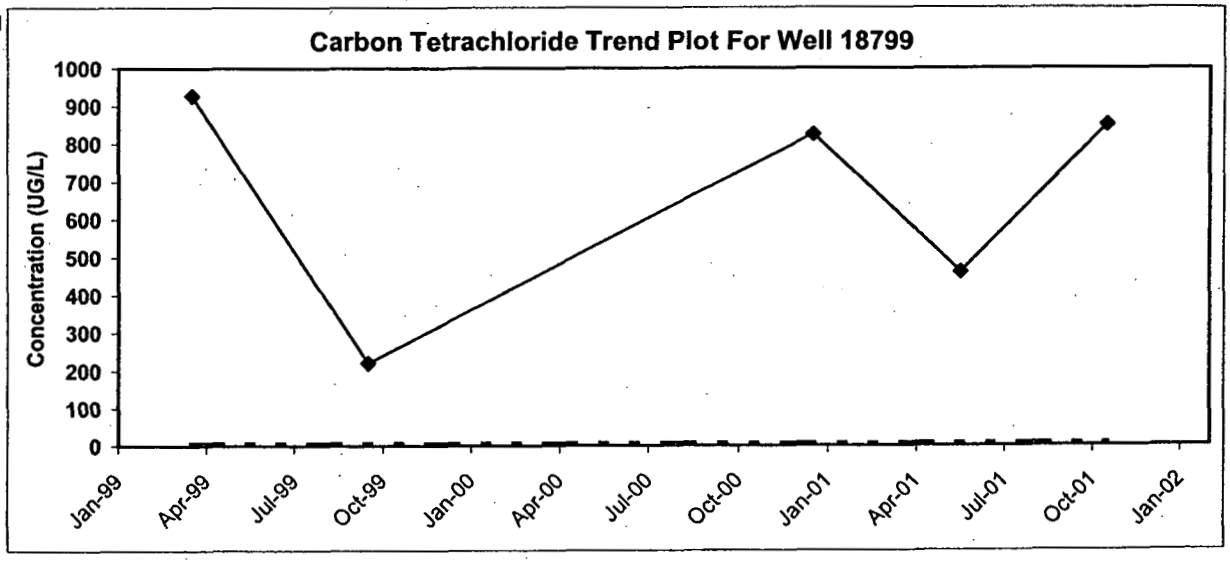


331
404

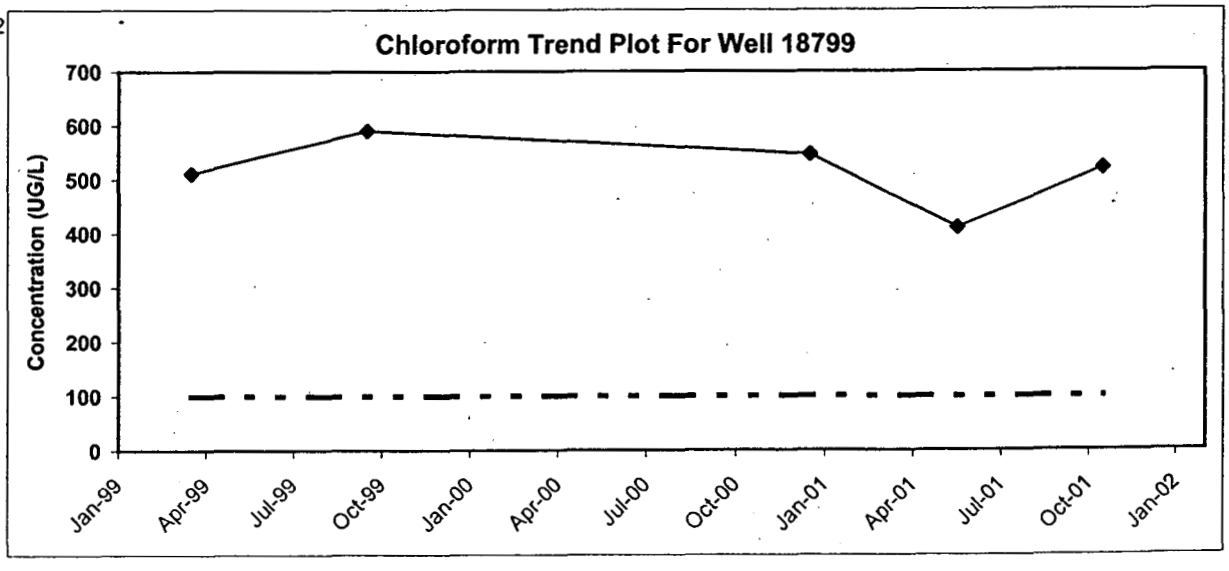
A-100



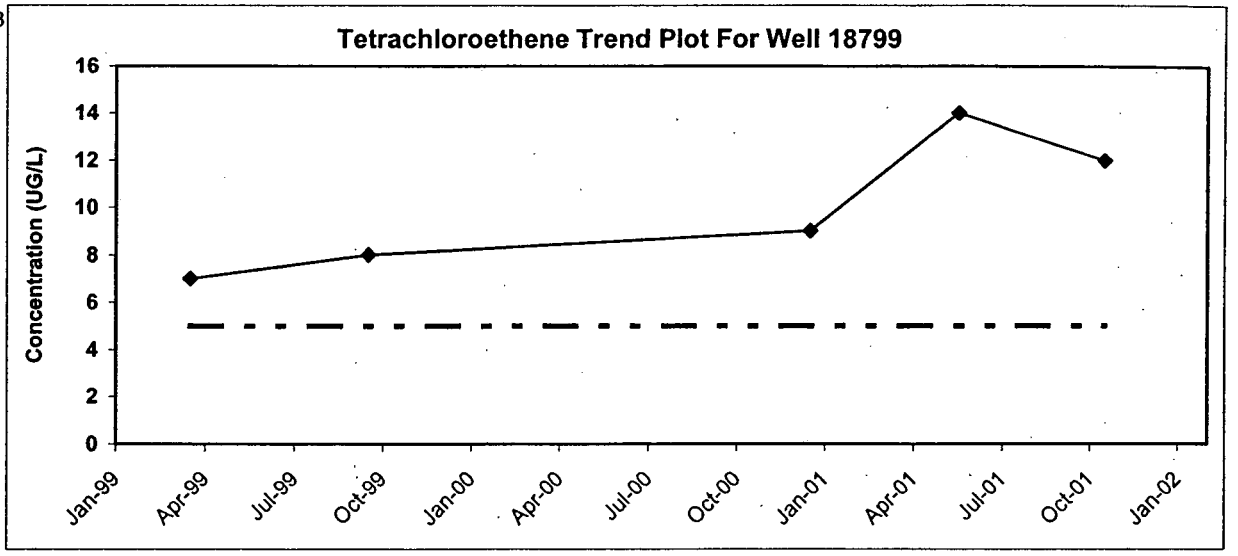
A-101



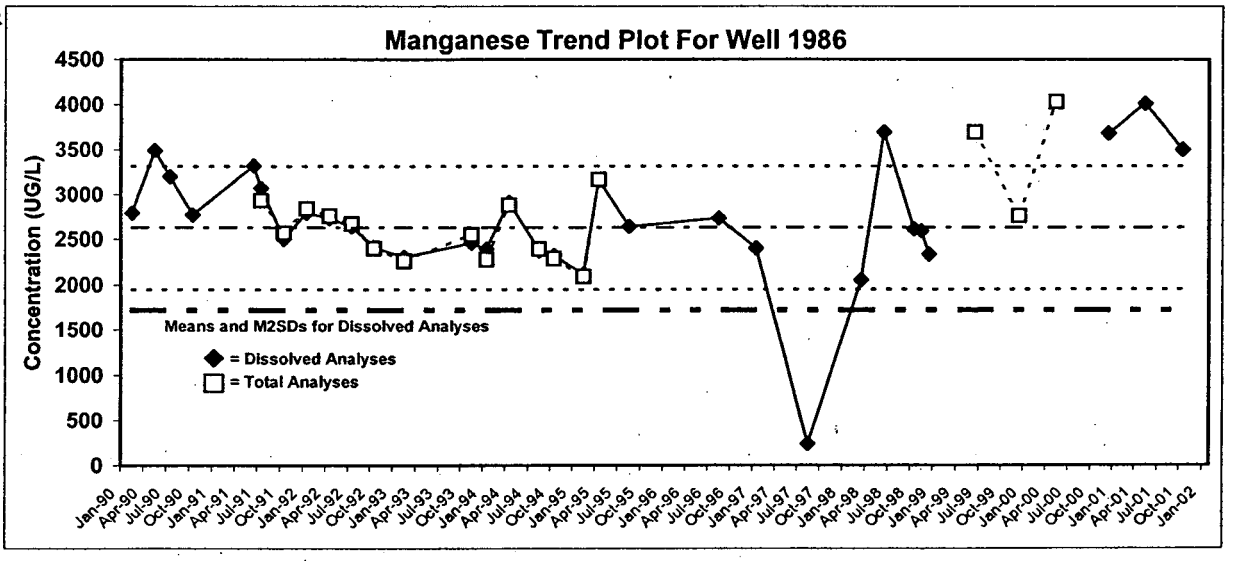
A-102



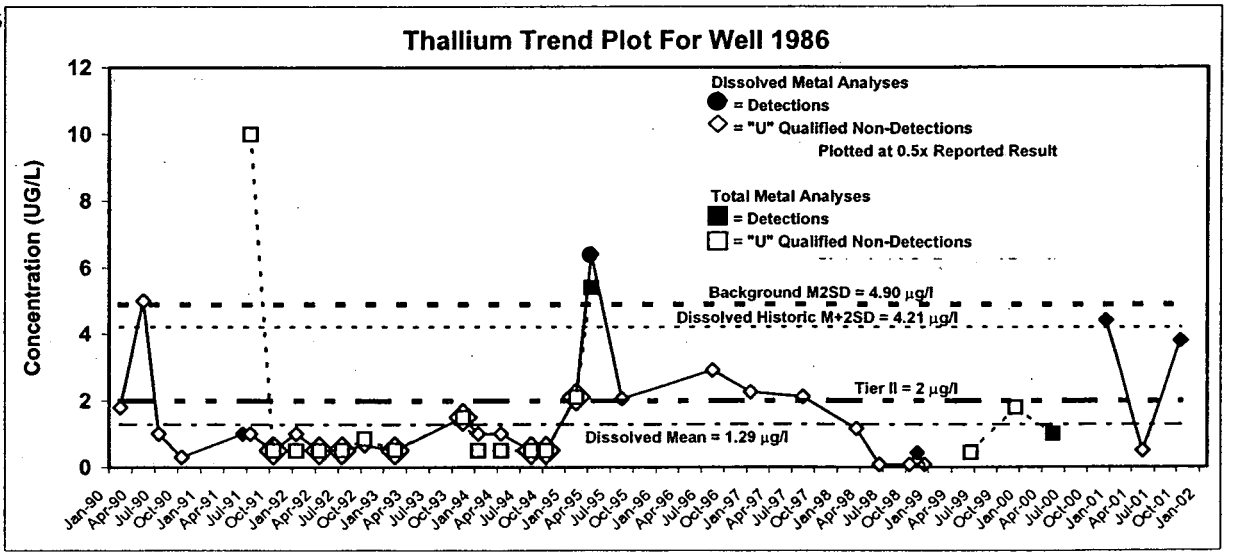
A-103



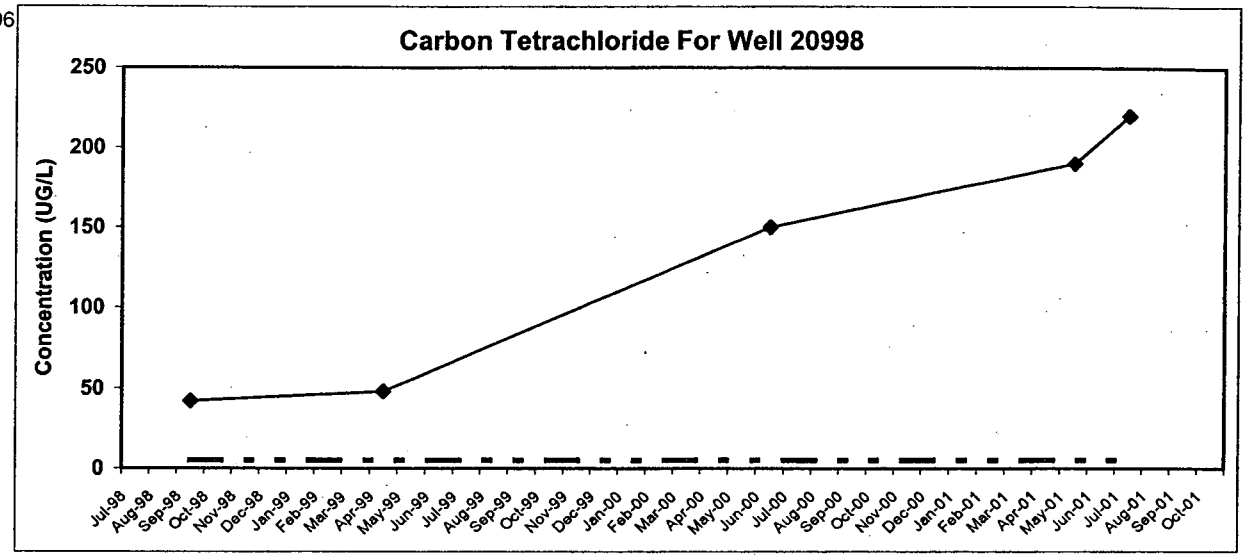
A-104



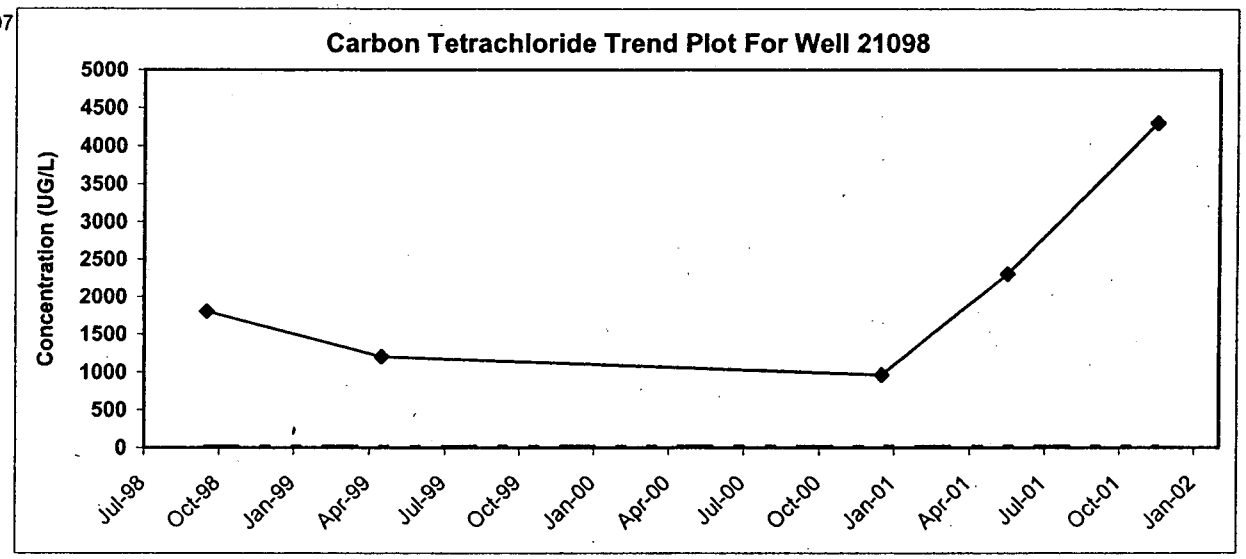
A-105



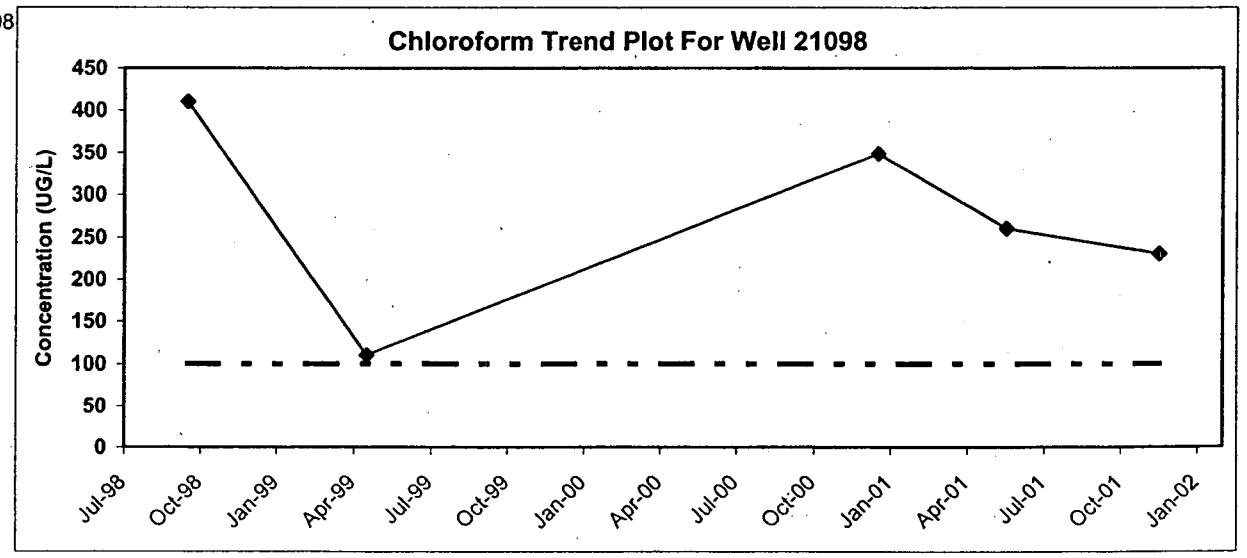
A-106



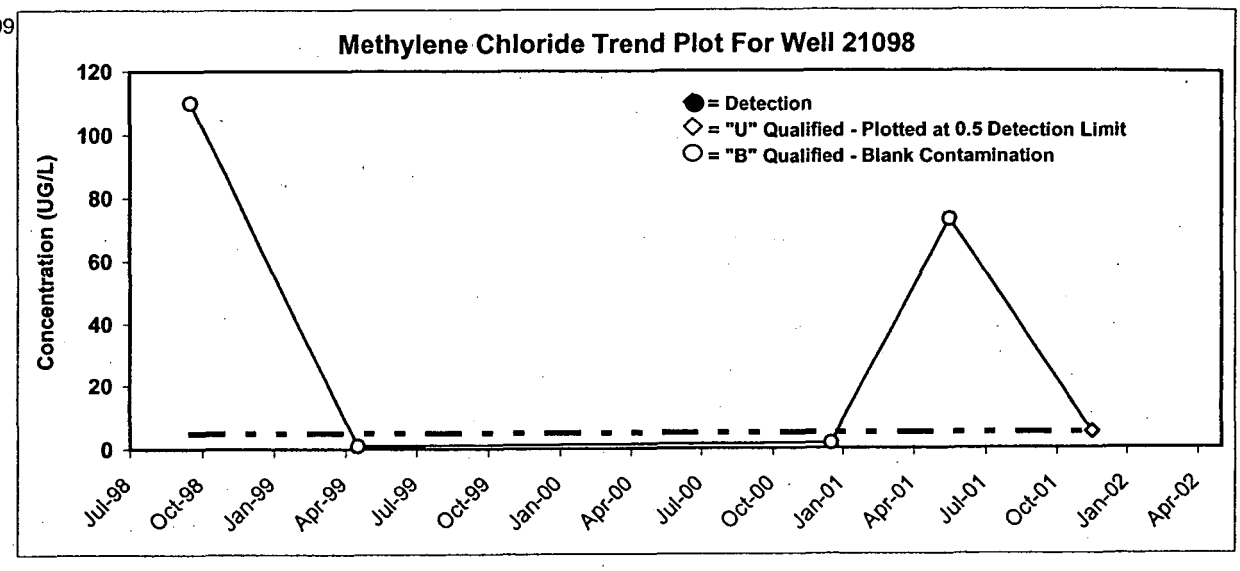
A-107



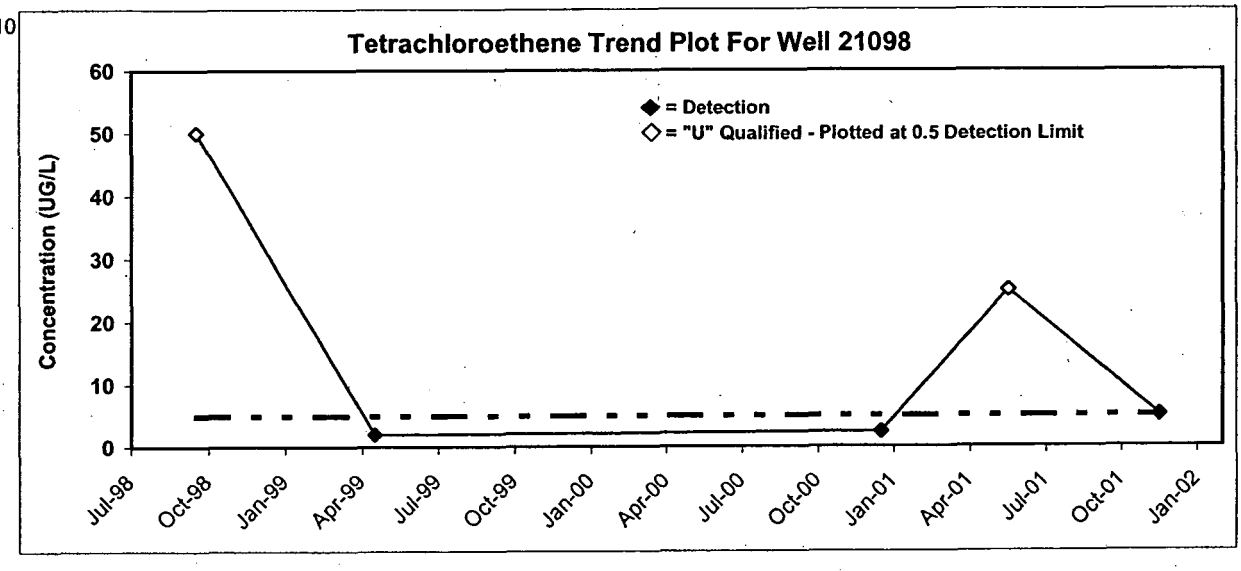
A-108



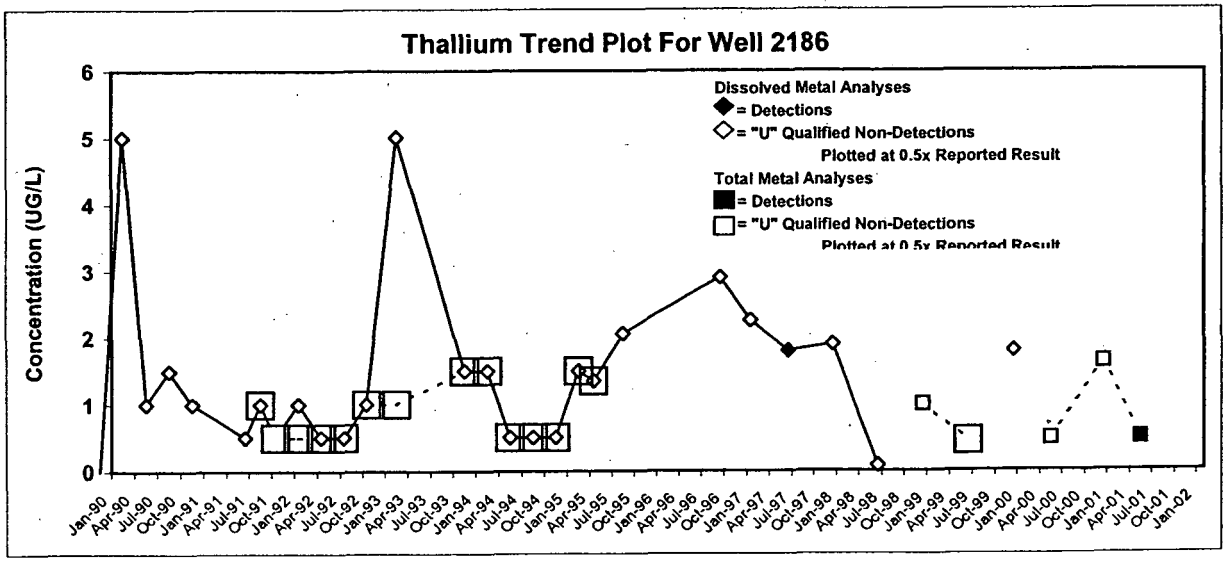
A-109



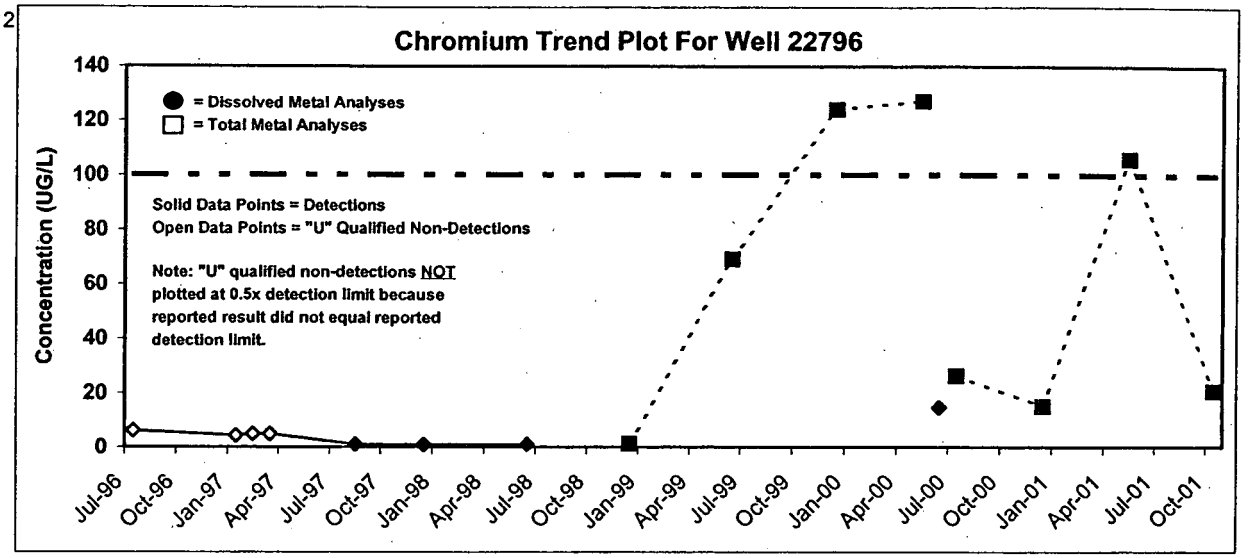
A-110



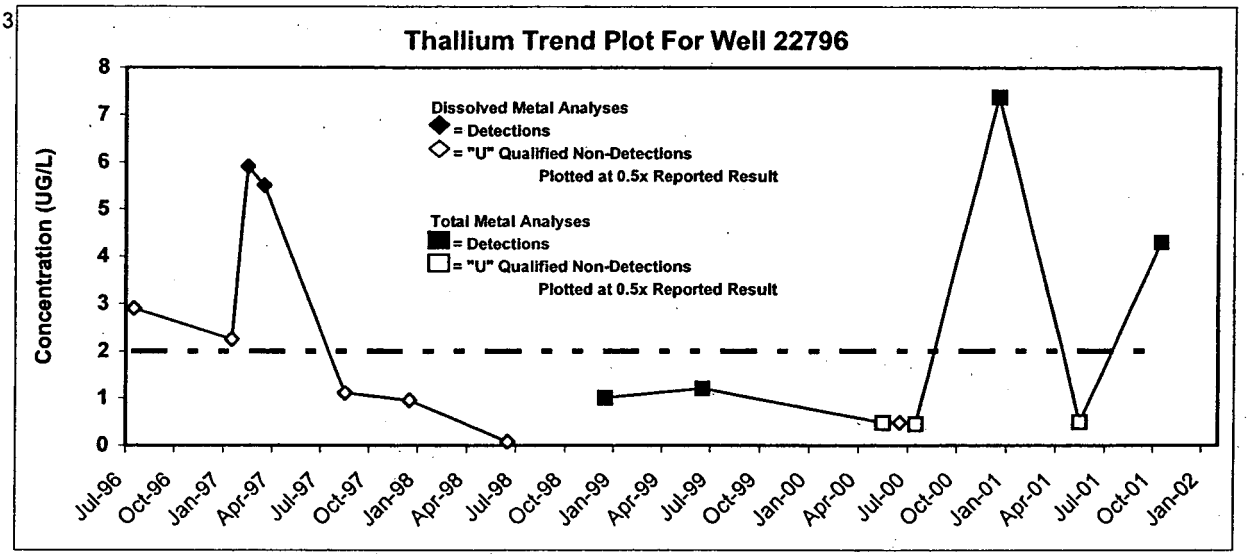
A-111



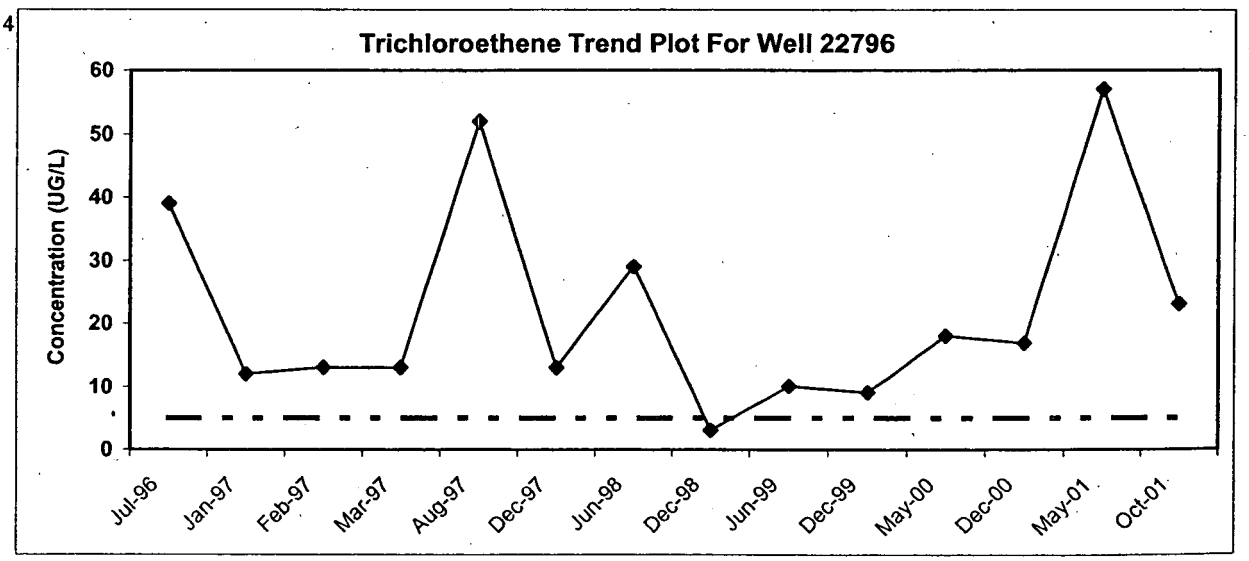
A-112



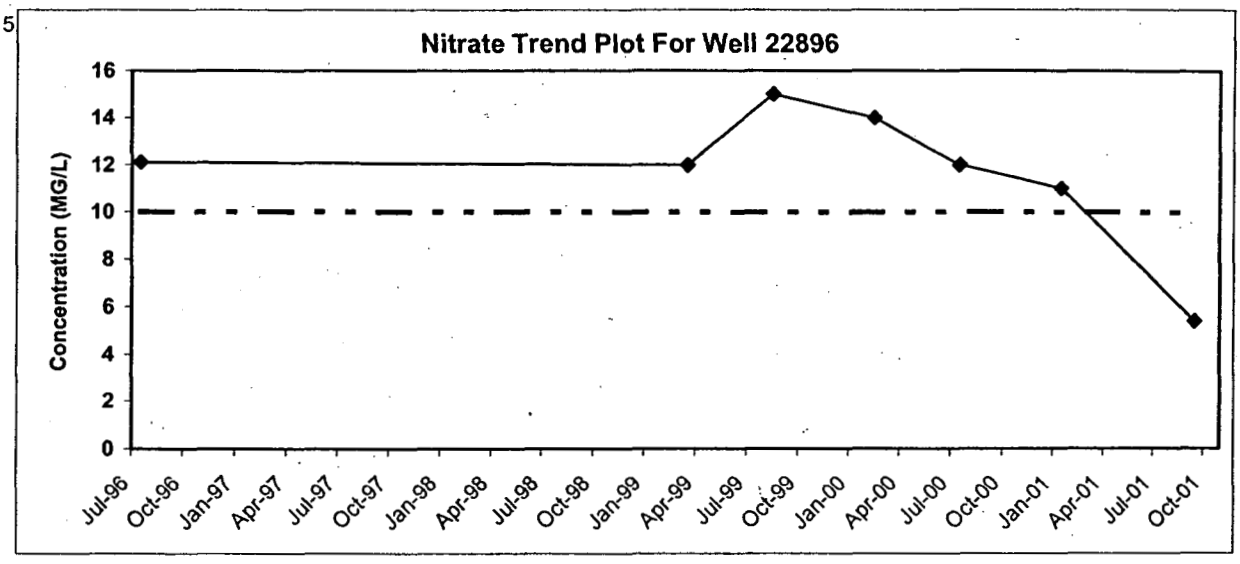
A-113



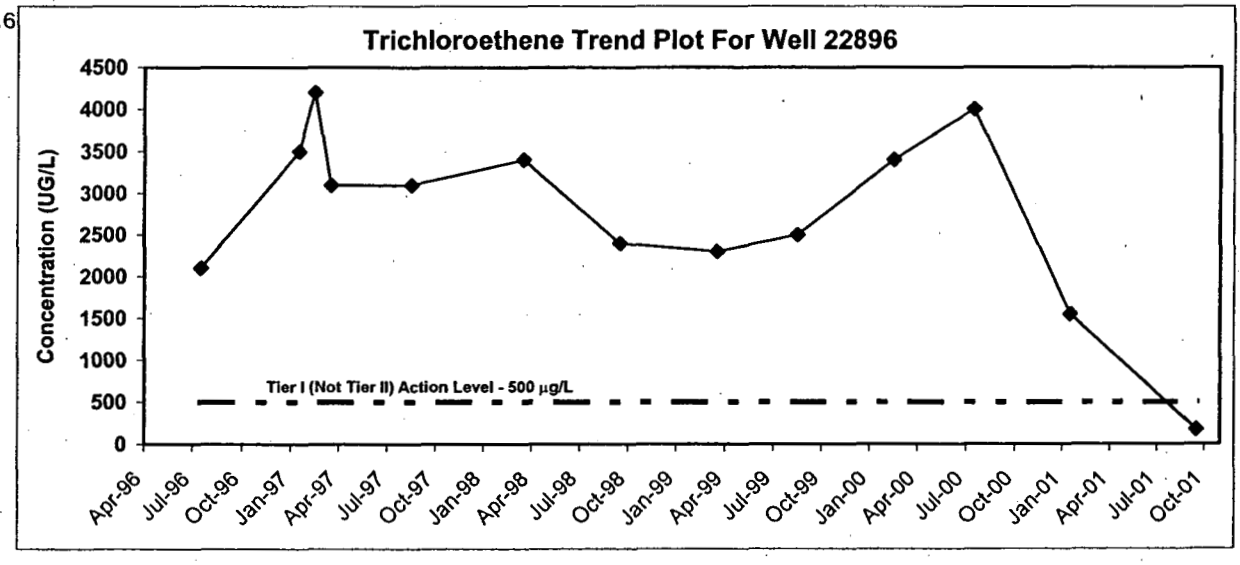
A-114



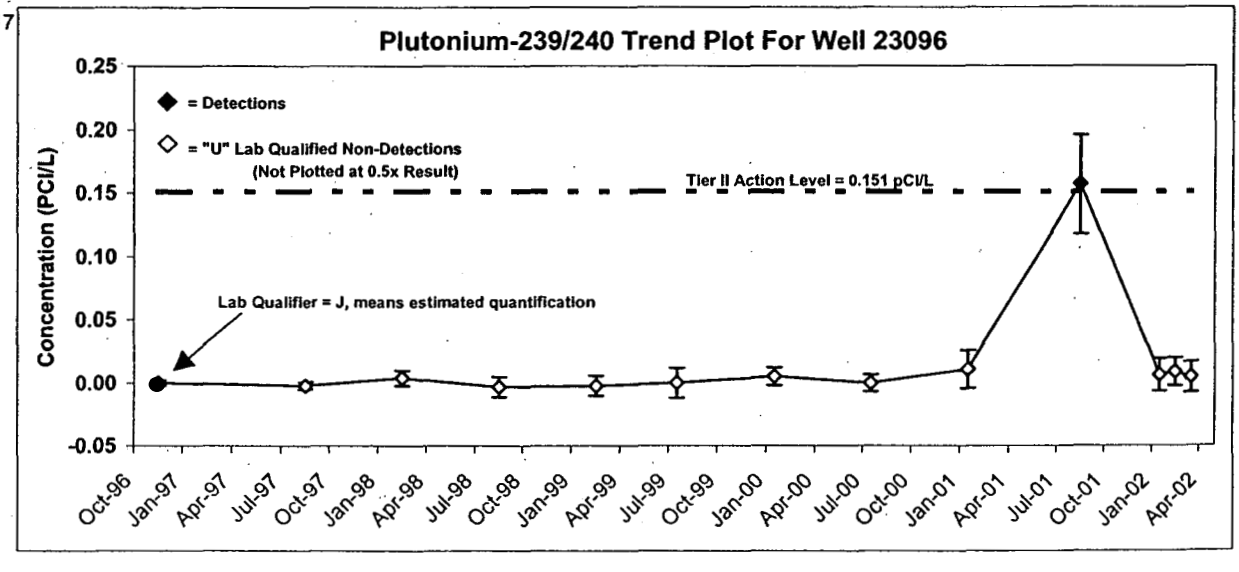
A-115



A-116

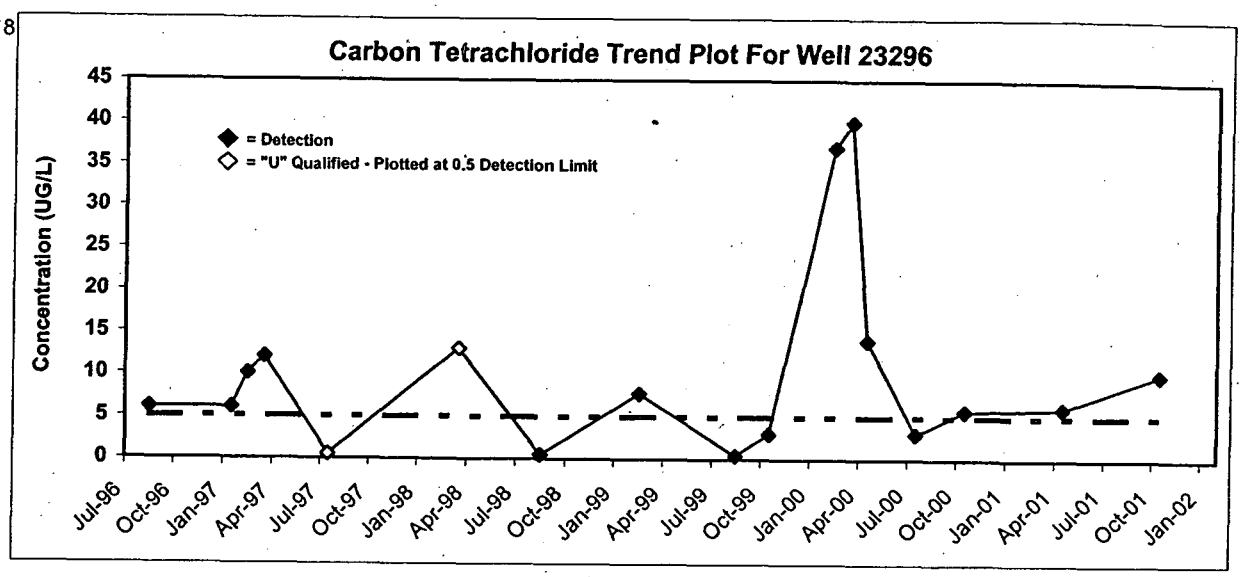


A-117

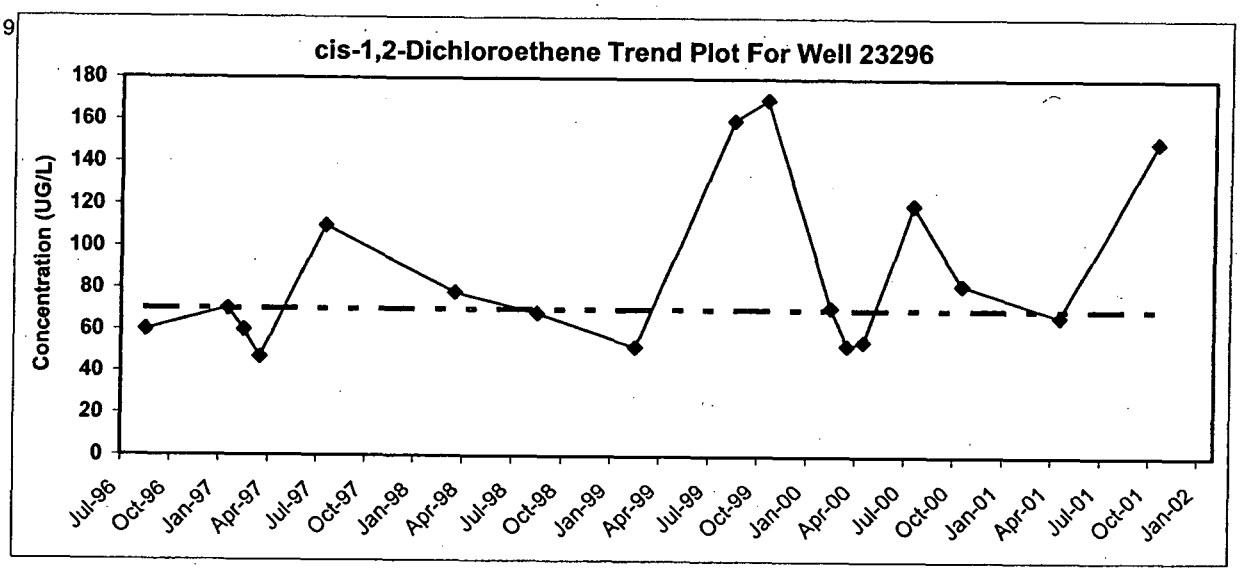


340
410

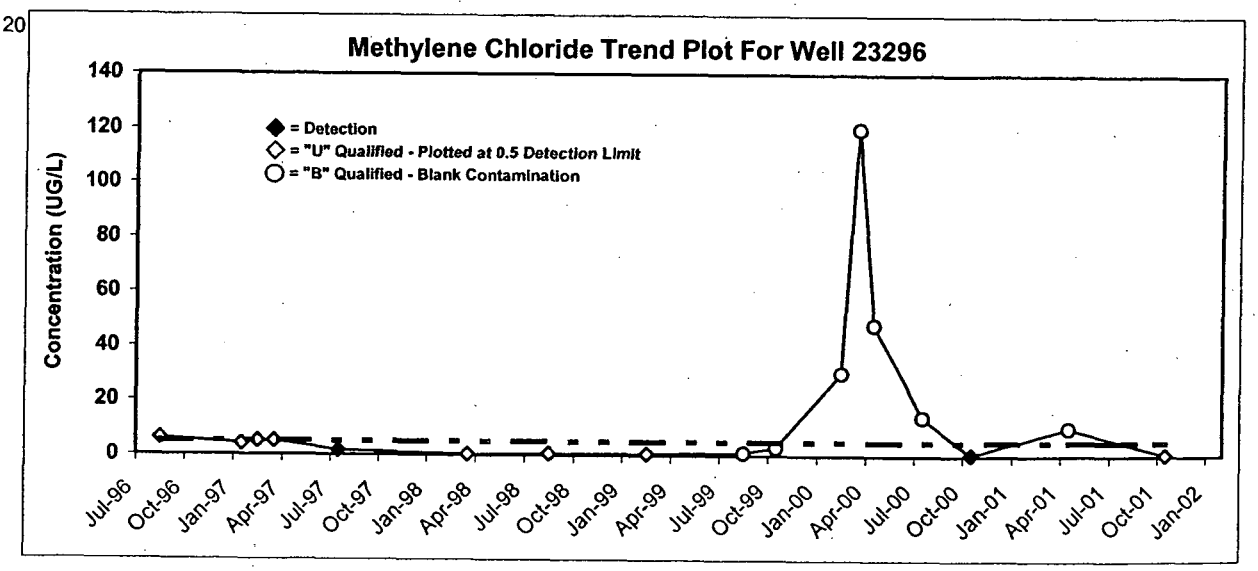
A-118



A-119

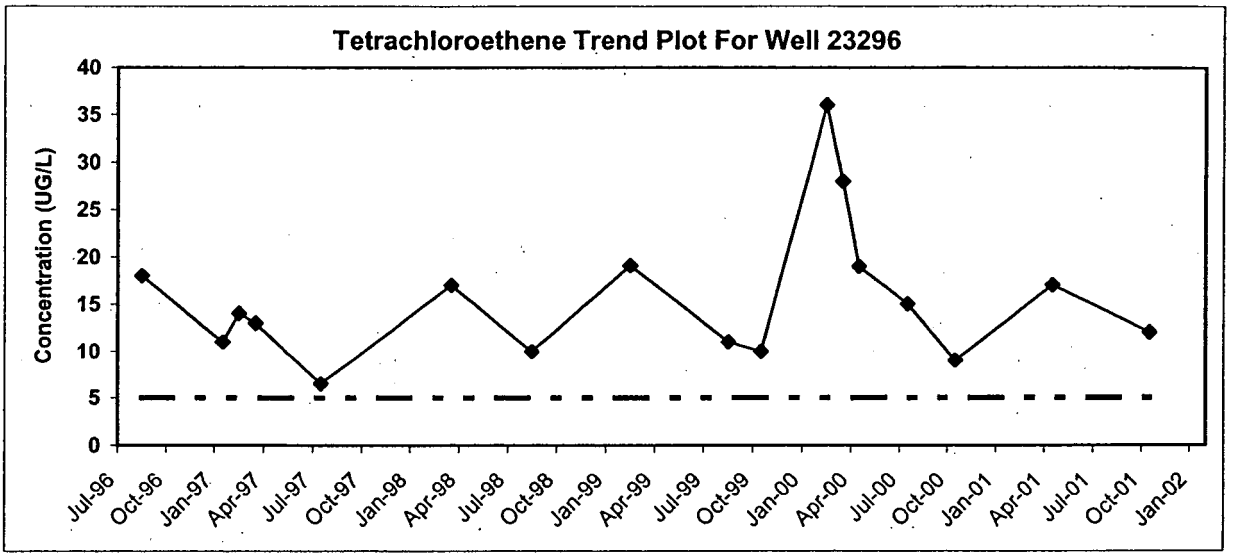


A-120

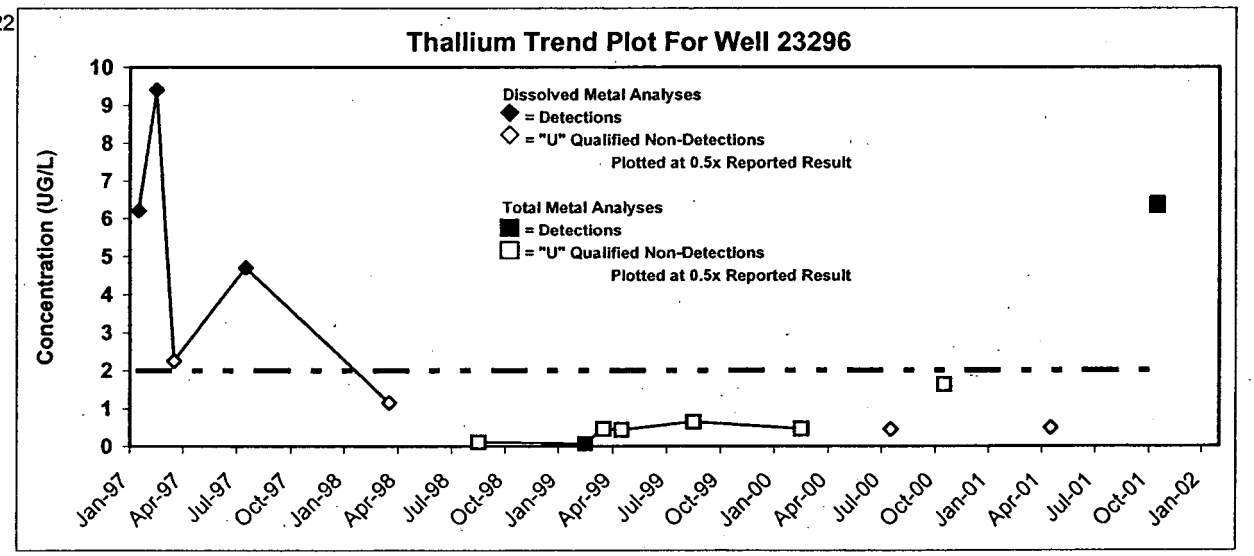


3411

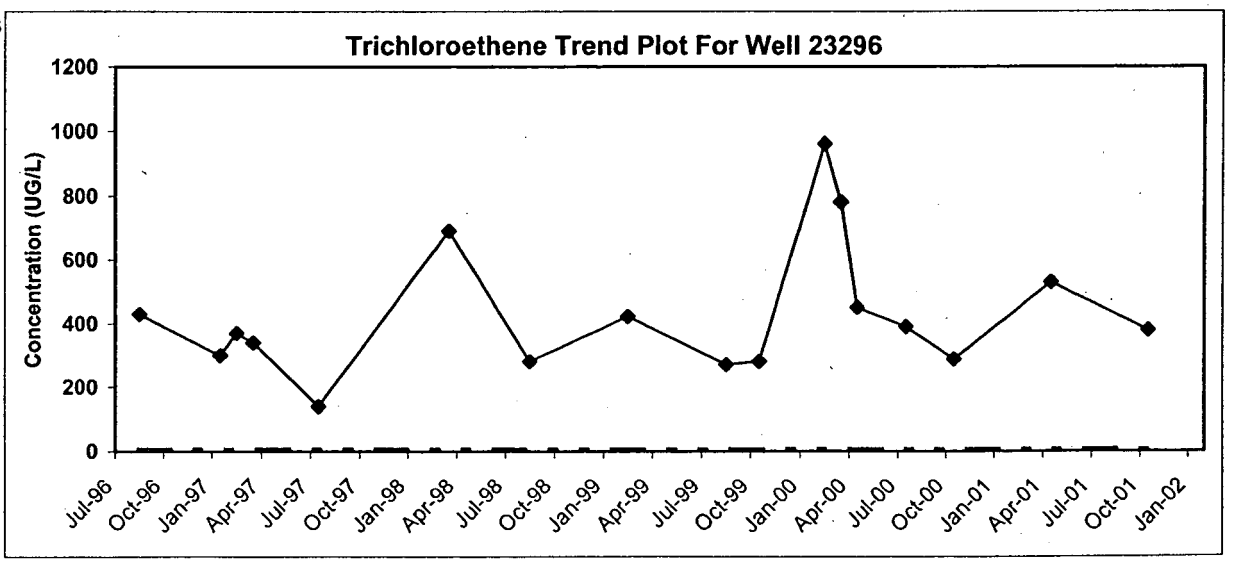
A-121



A-122

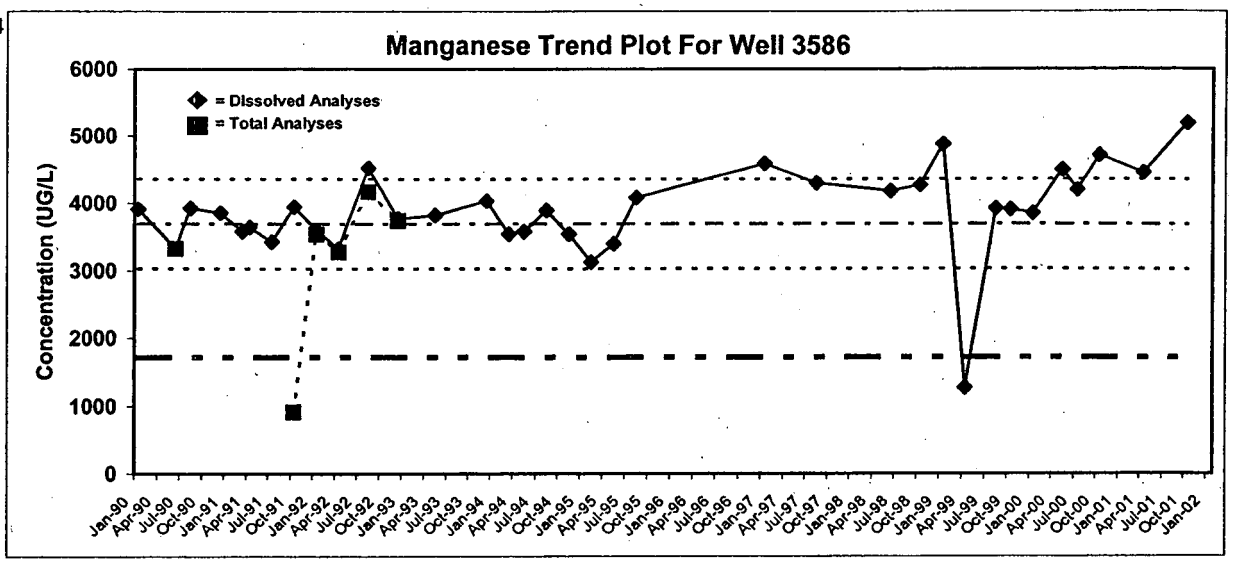


A-123

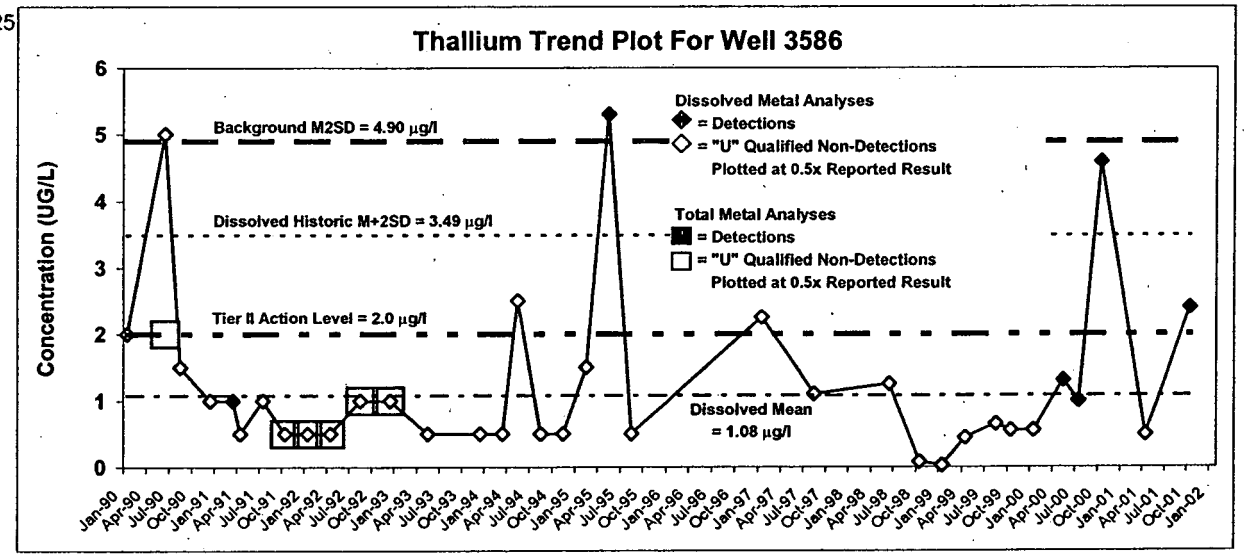


342
412

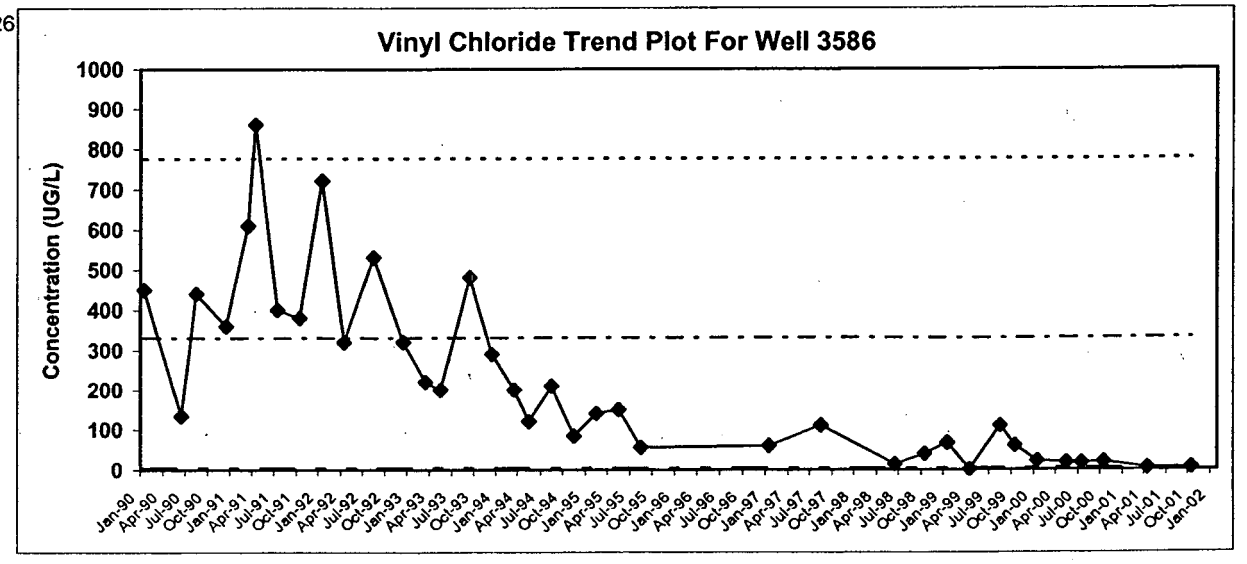
A-124



A-125

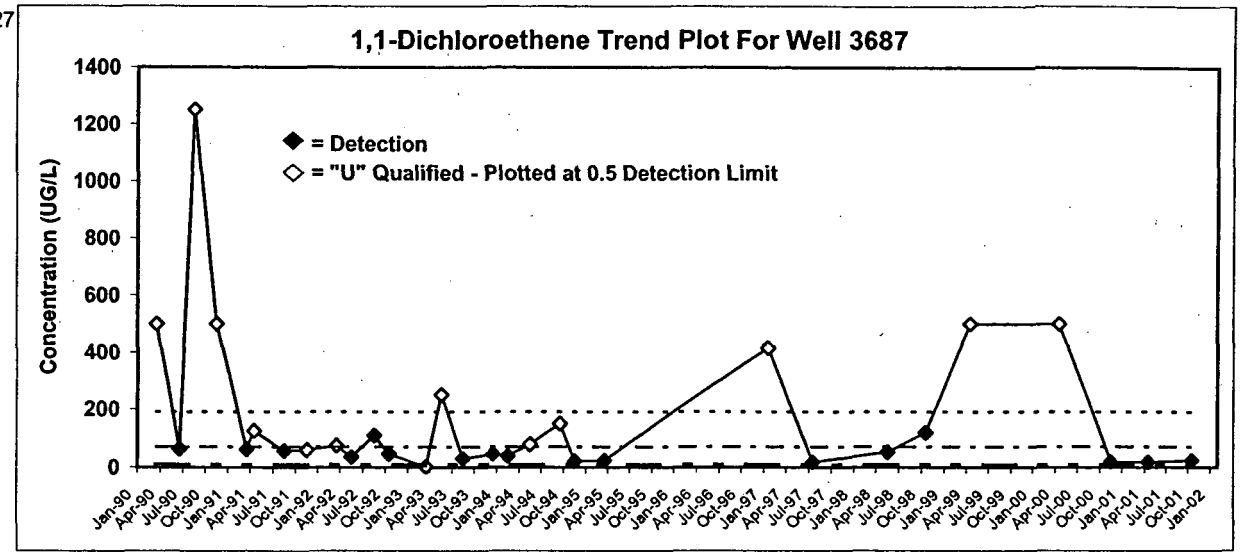


A-126

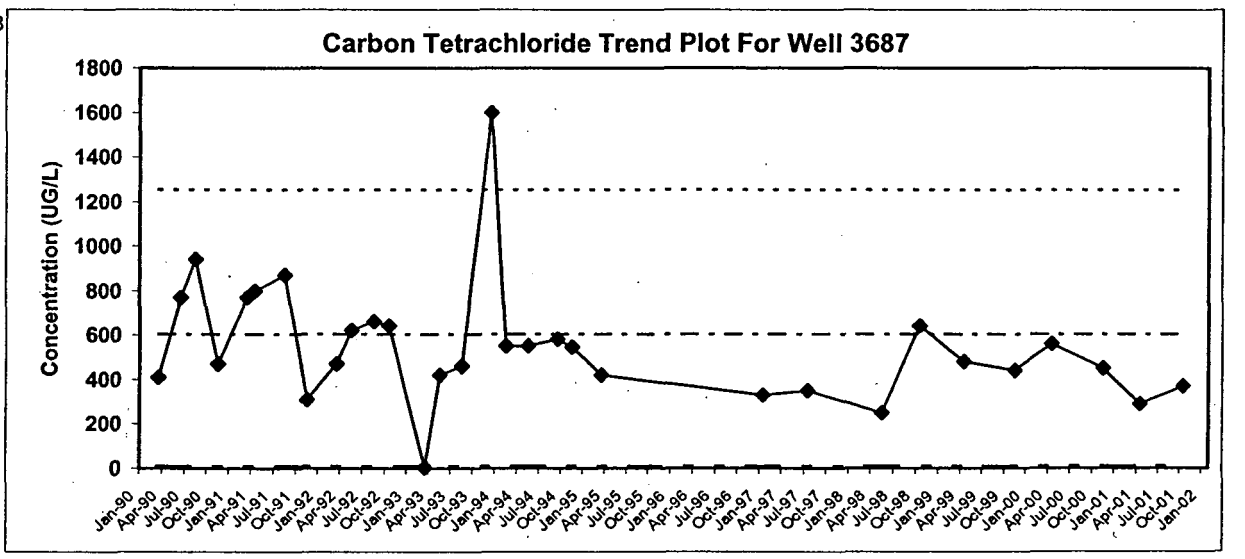


2413

A-127



A-128



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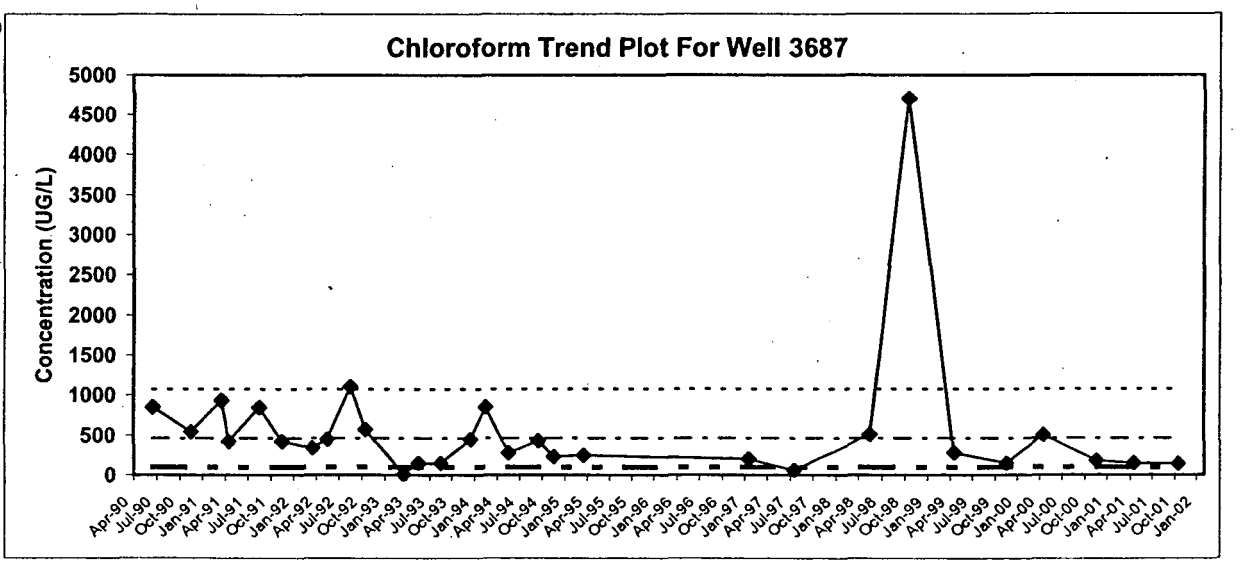
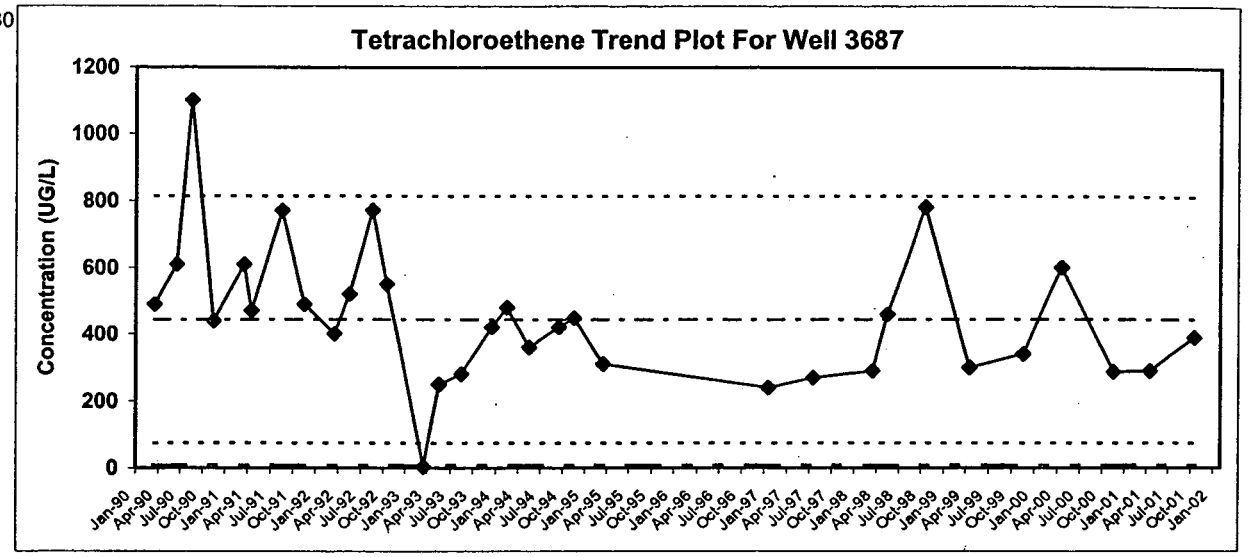
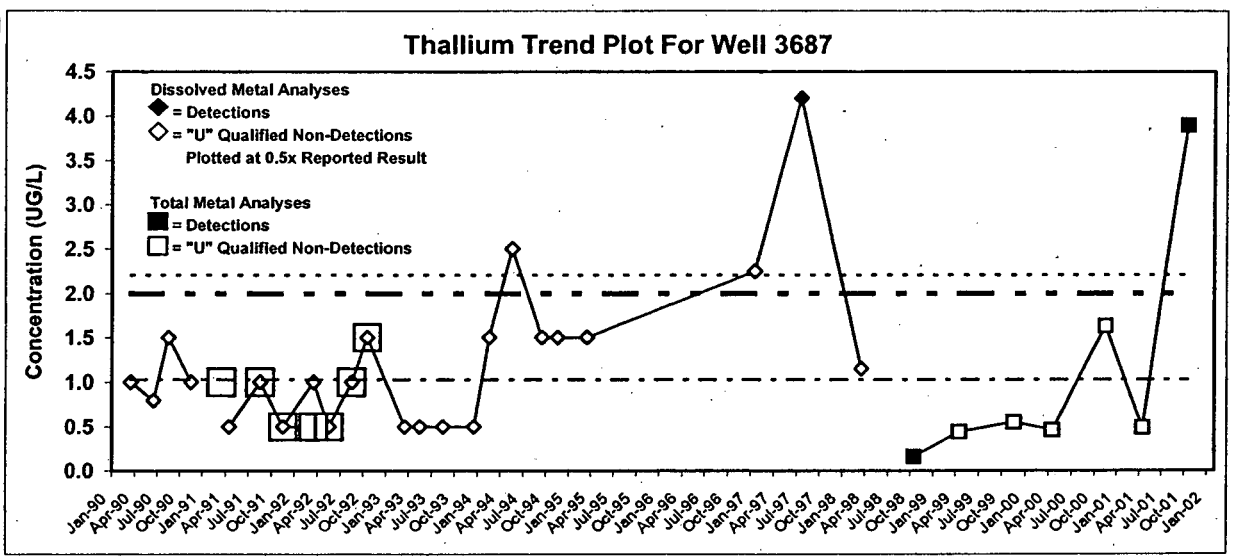


3144
4141

A-130



A-131



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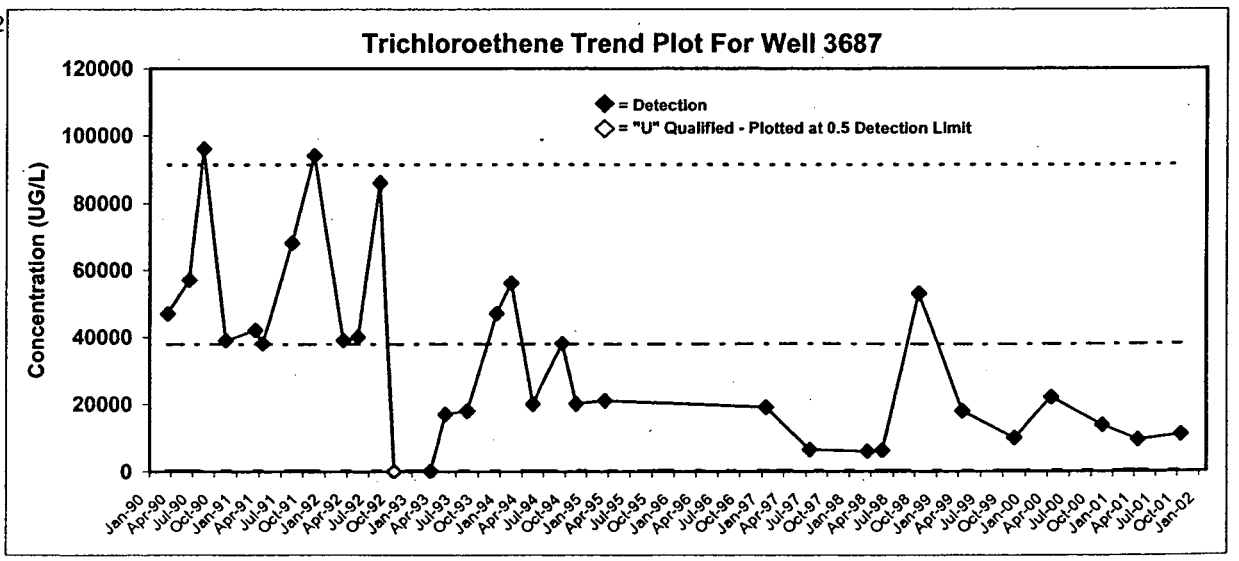

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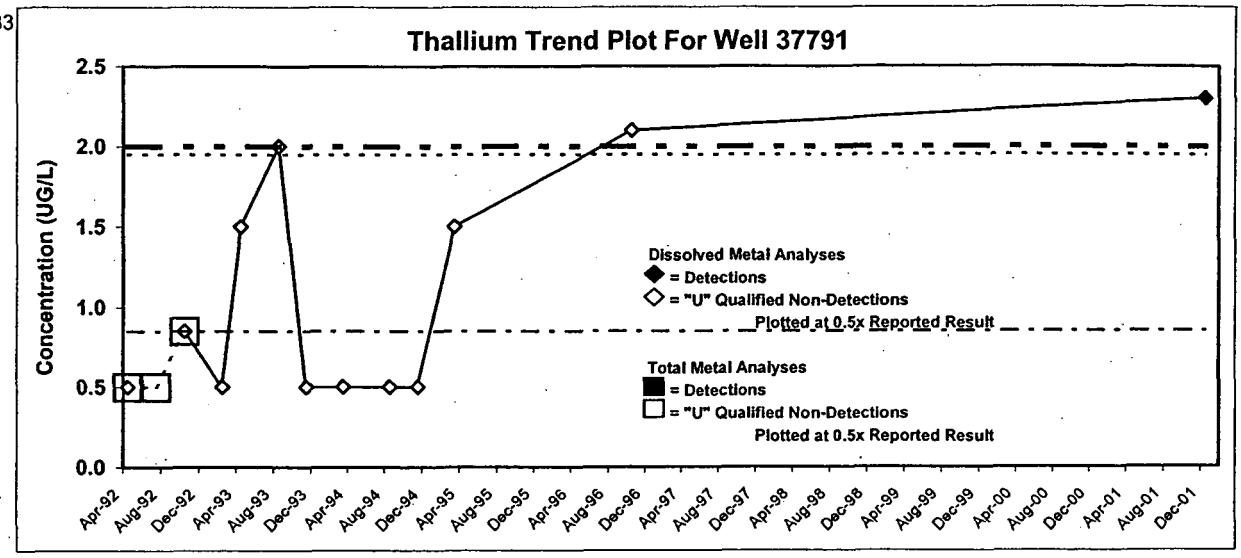
A-133



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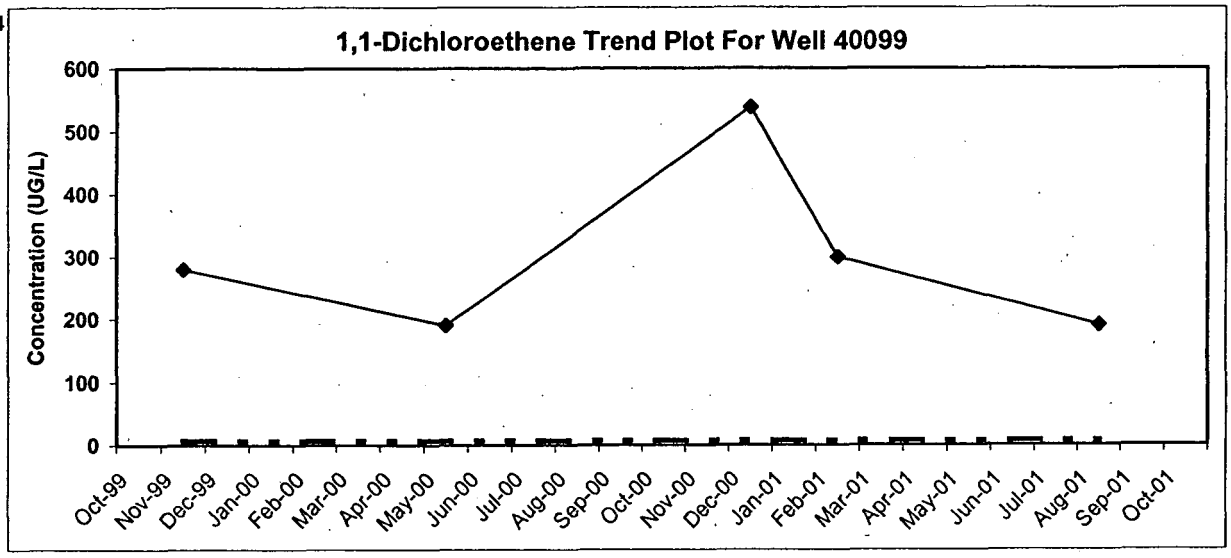

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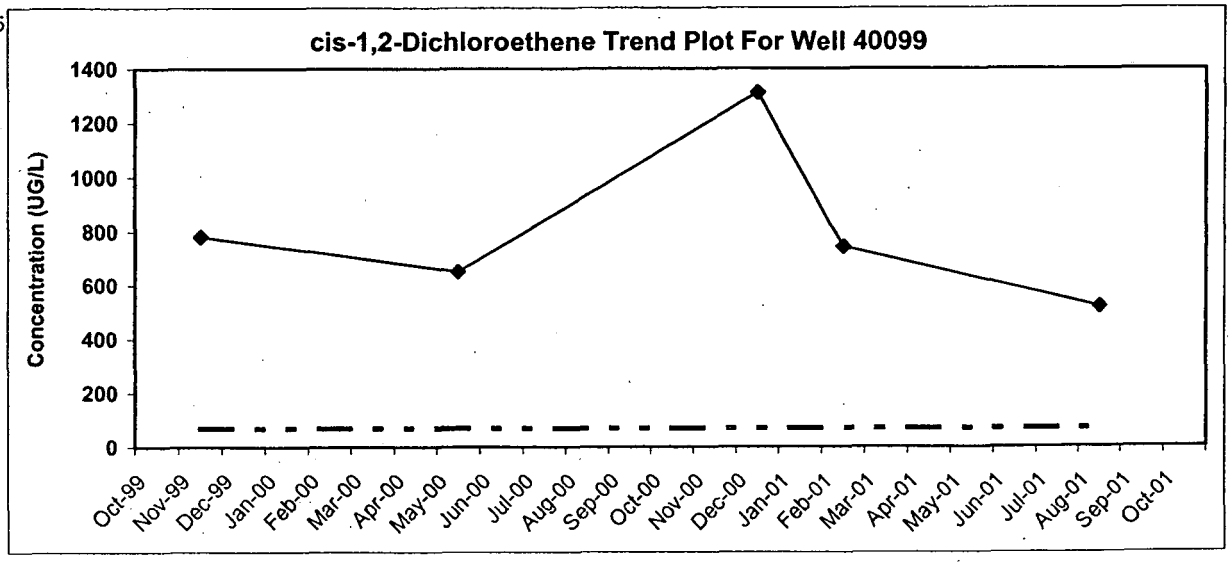
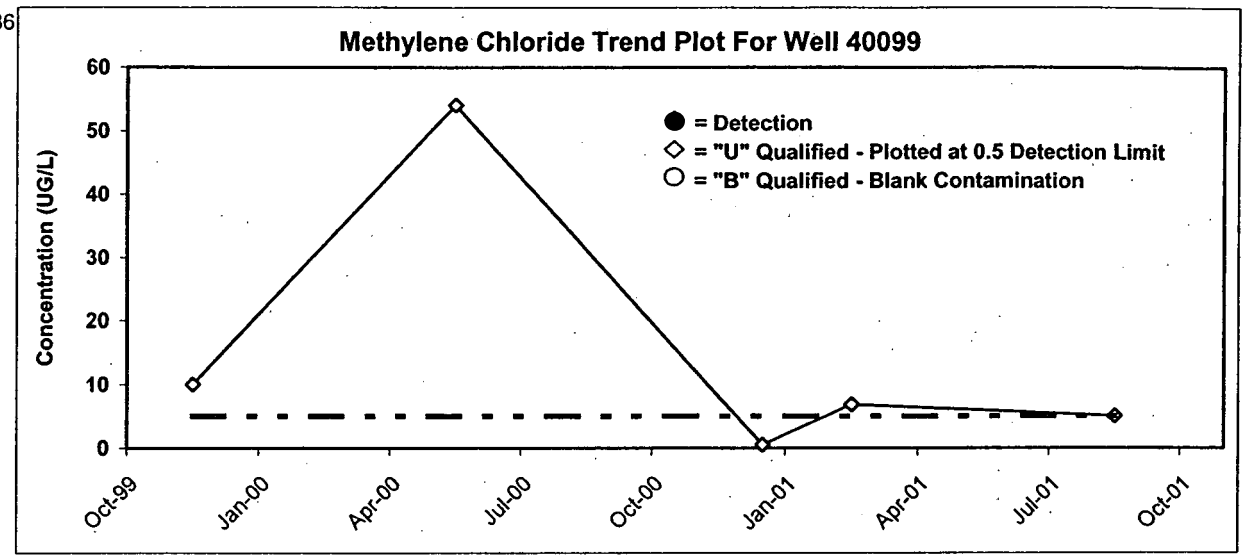


346
416

A-136



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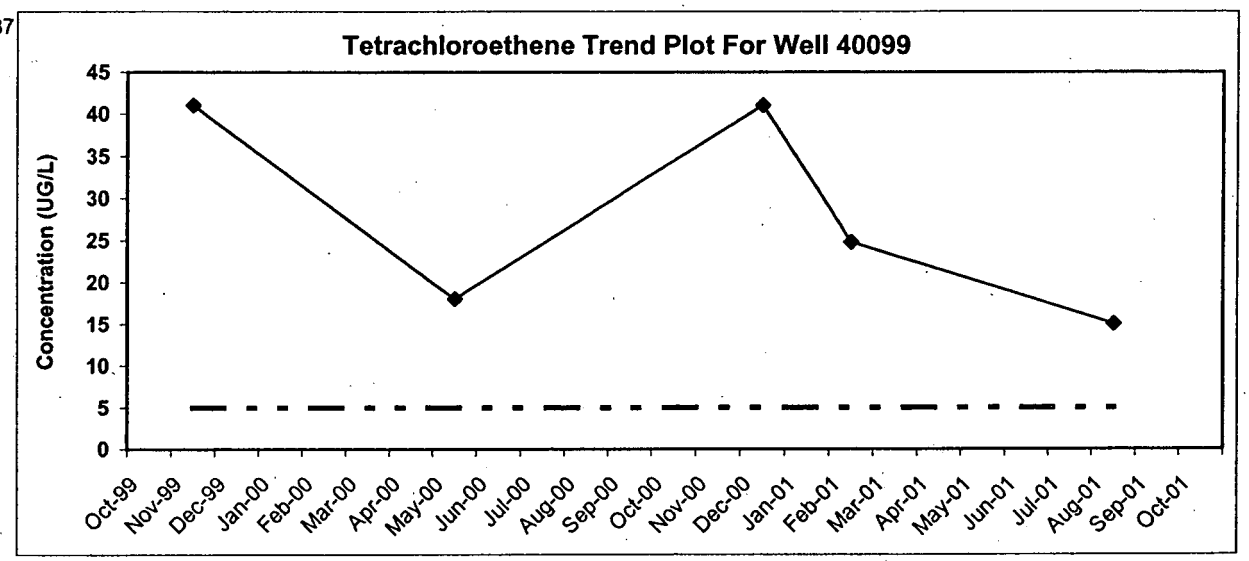
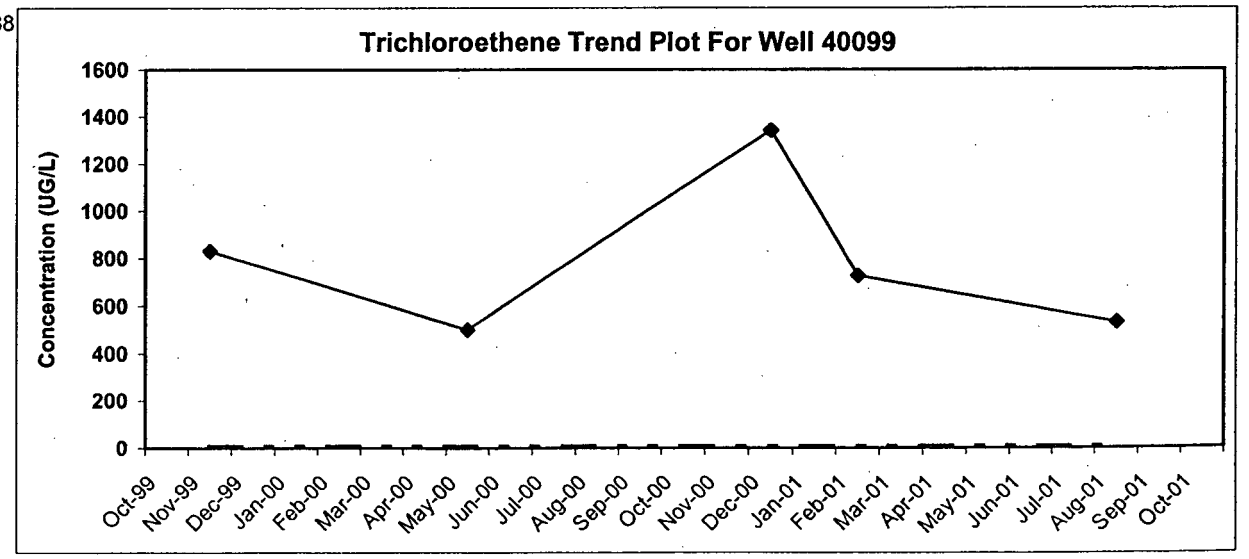
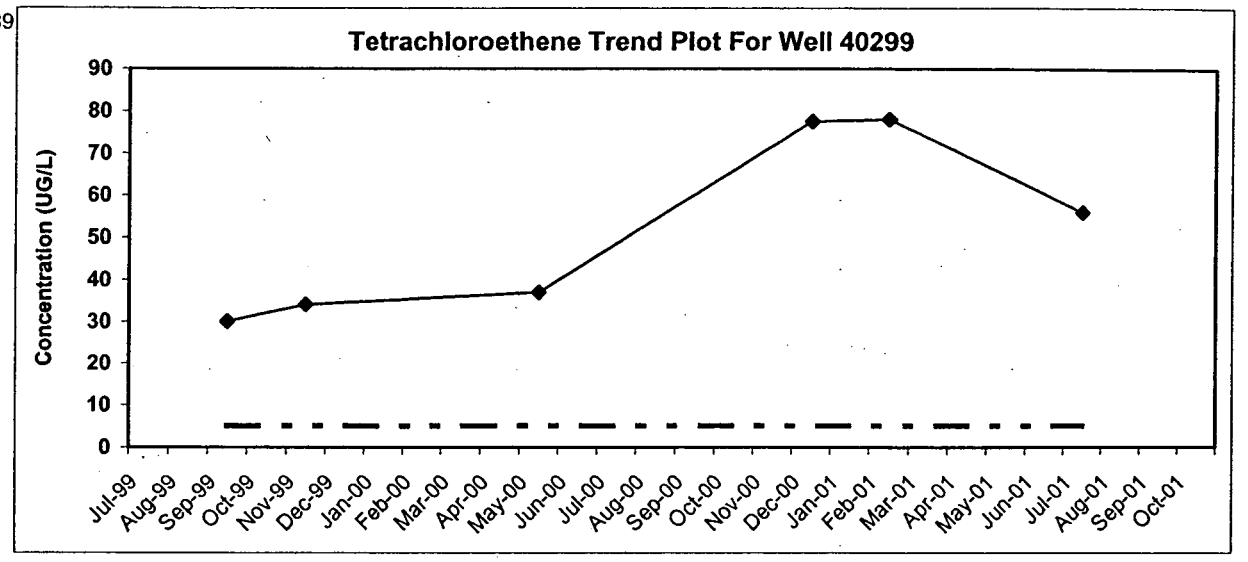


A-138



247
417

A-139



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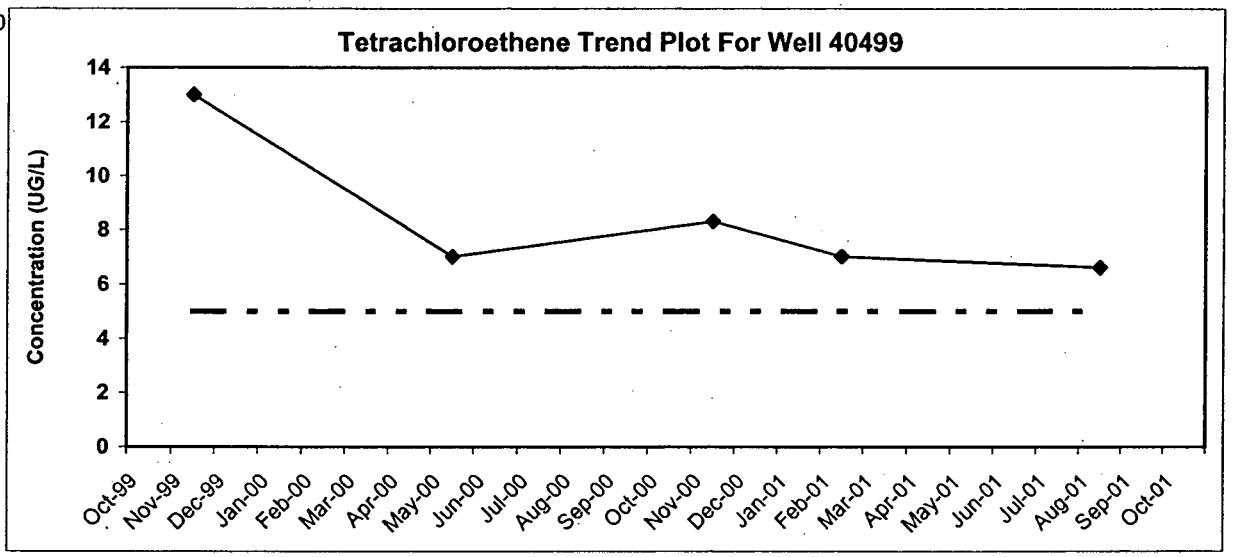

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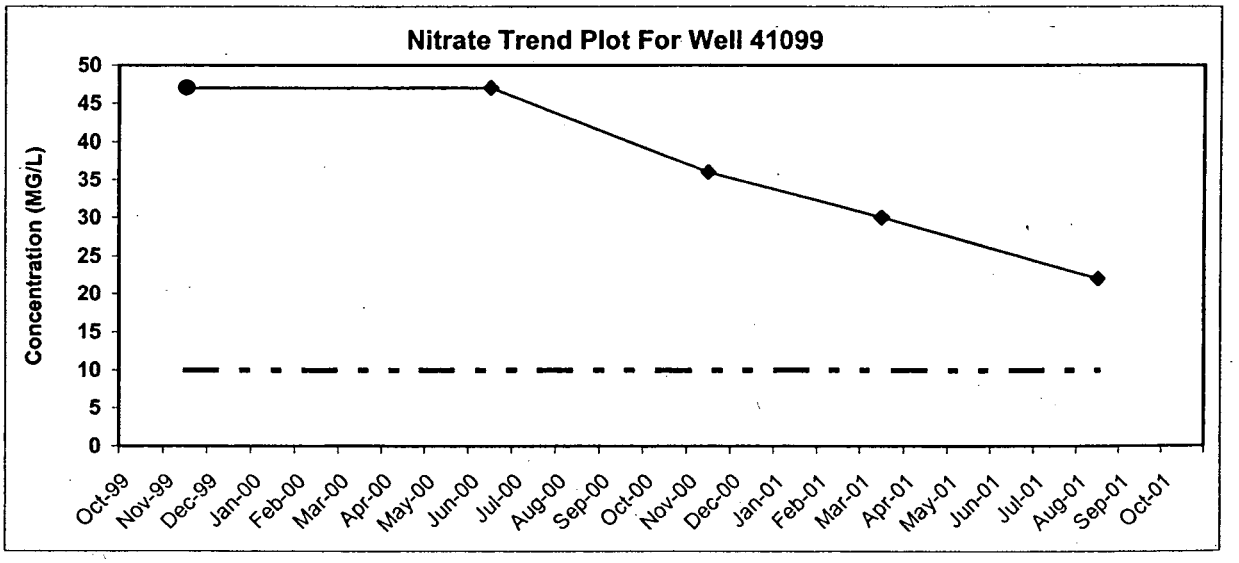
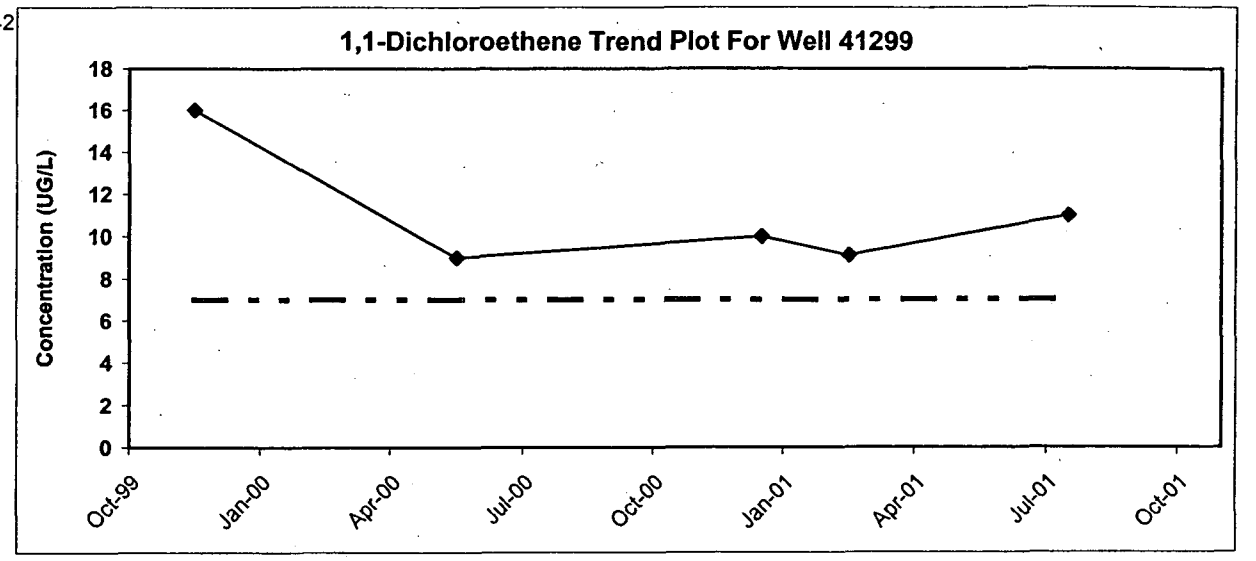


348
418

A-142



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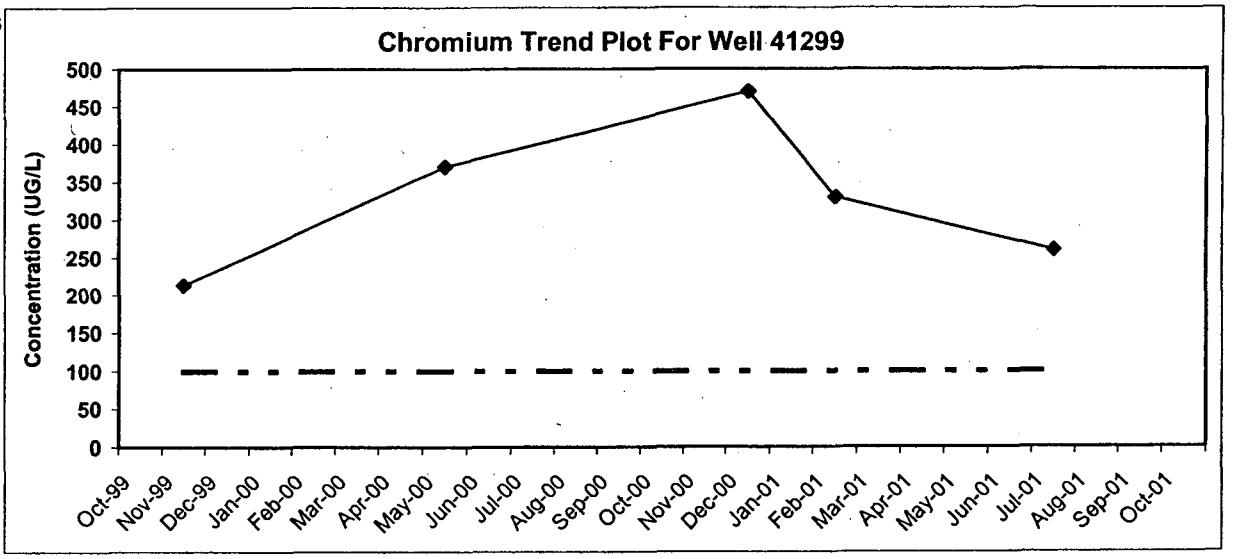

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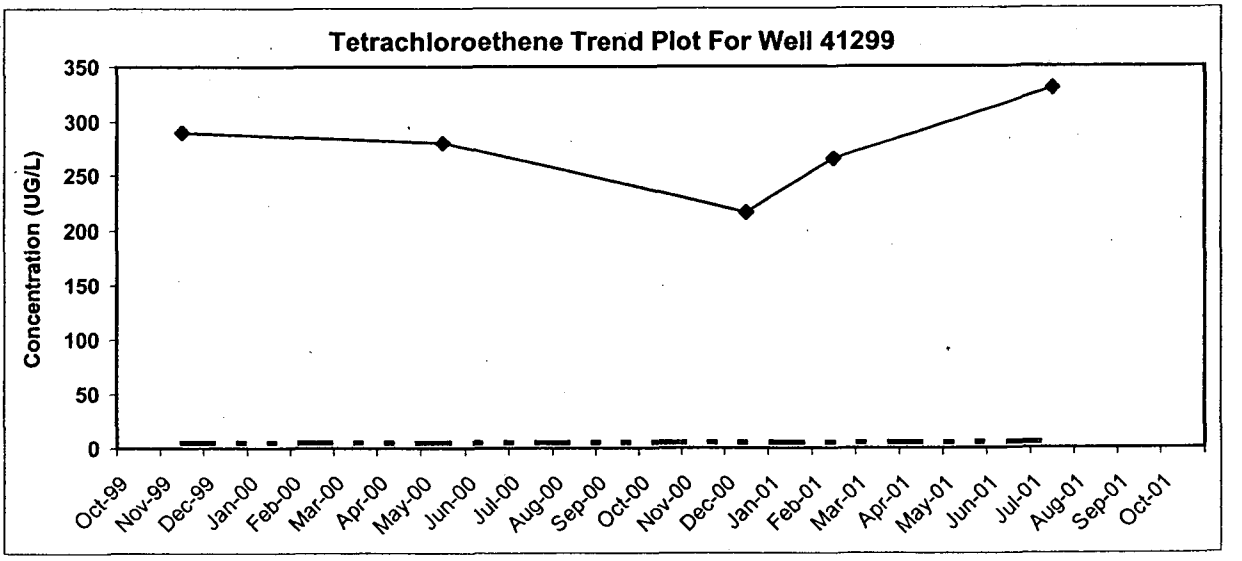
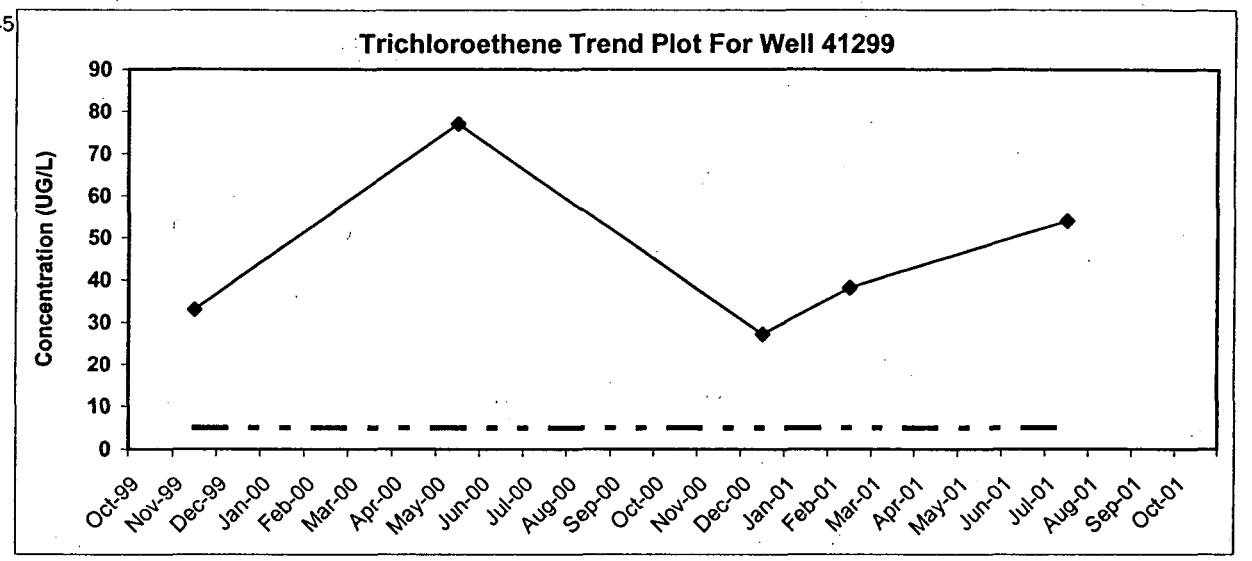


3419
4/19

A-145



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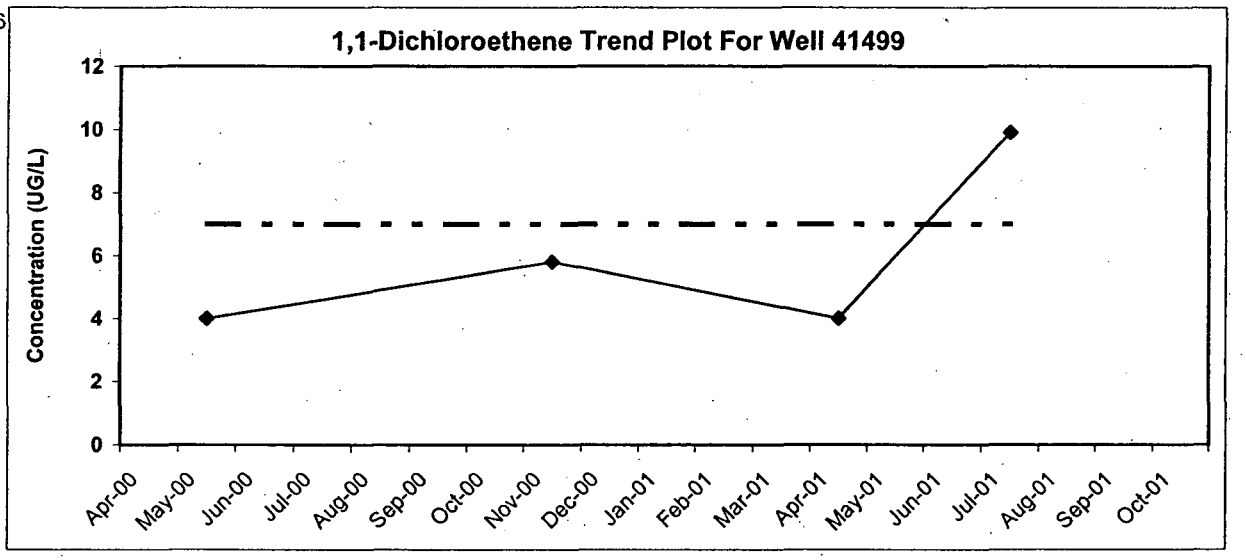

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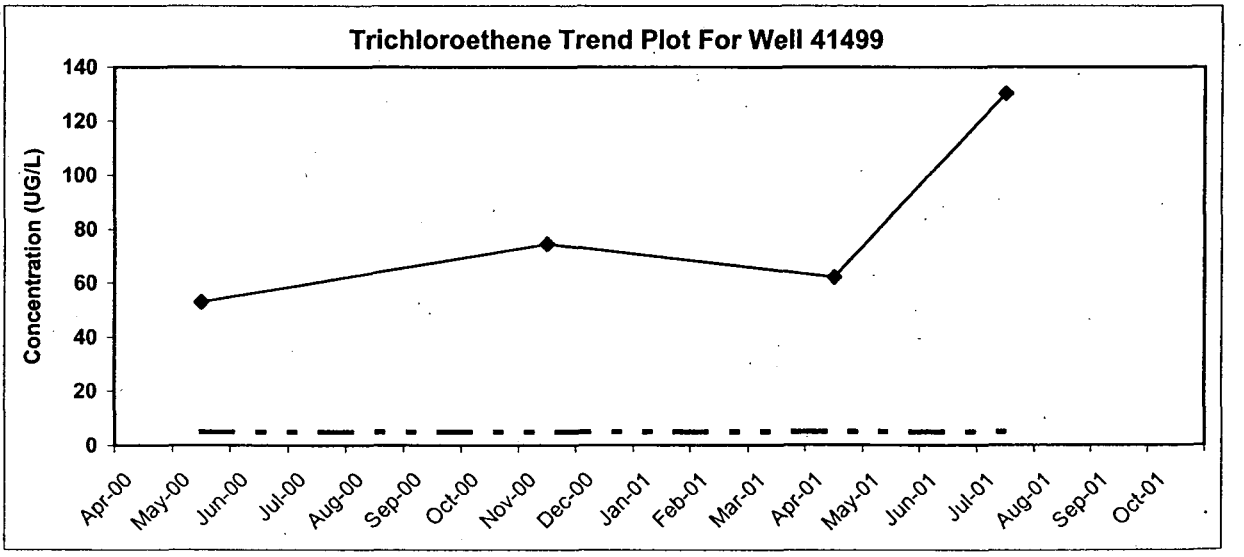
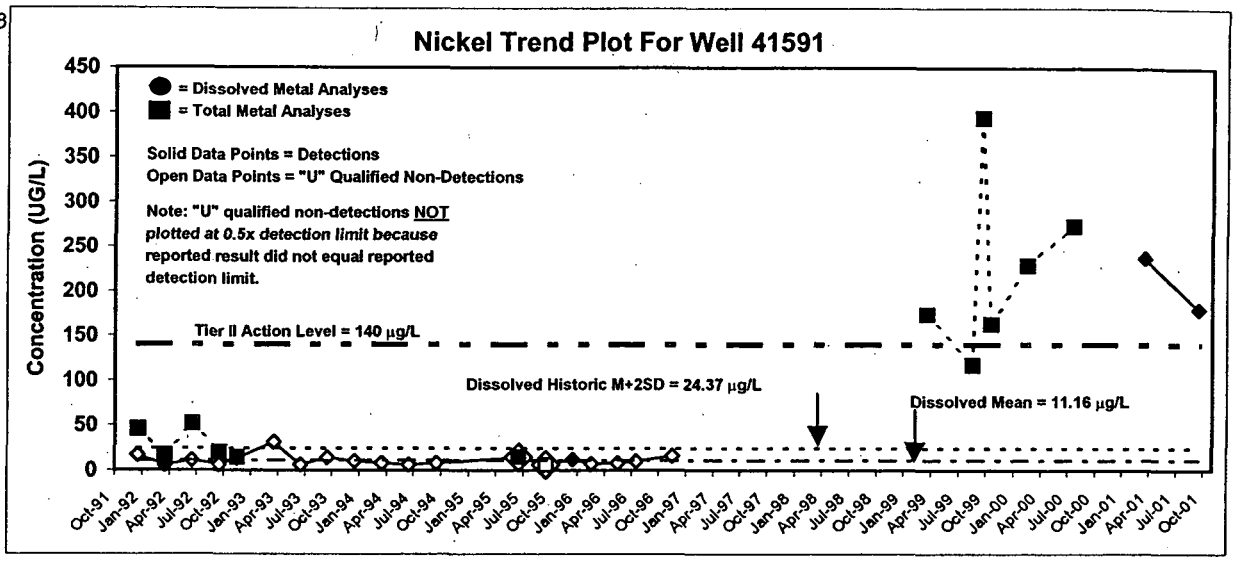


350
420

A-148



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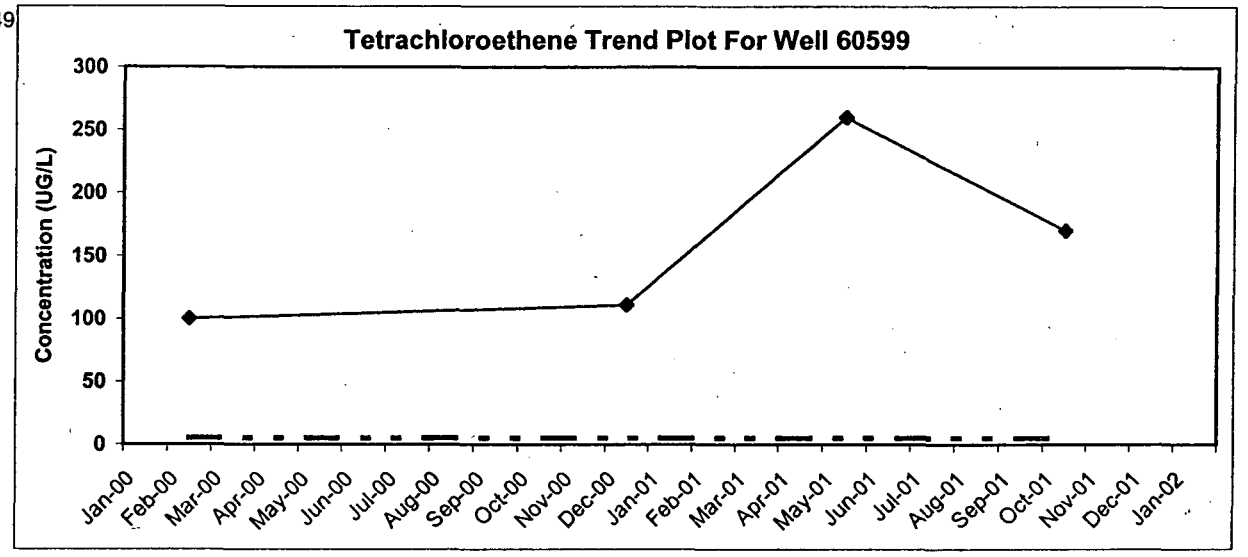

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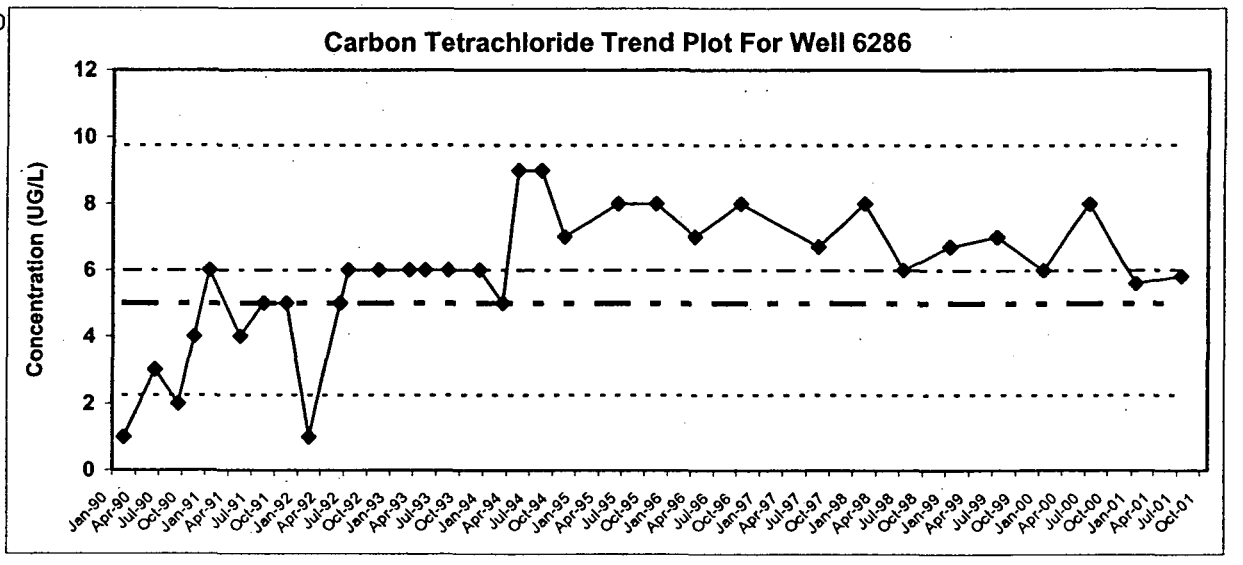
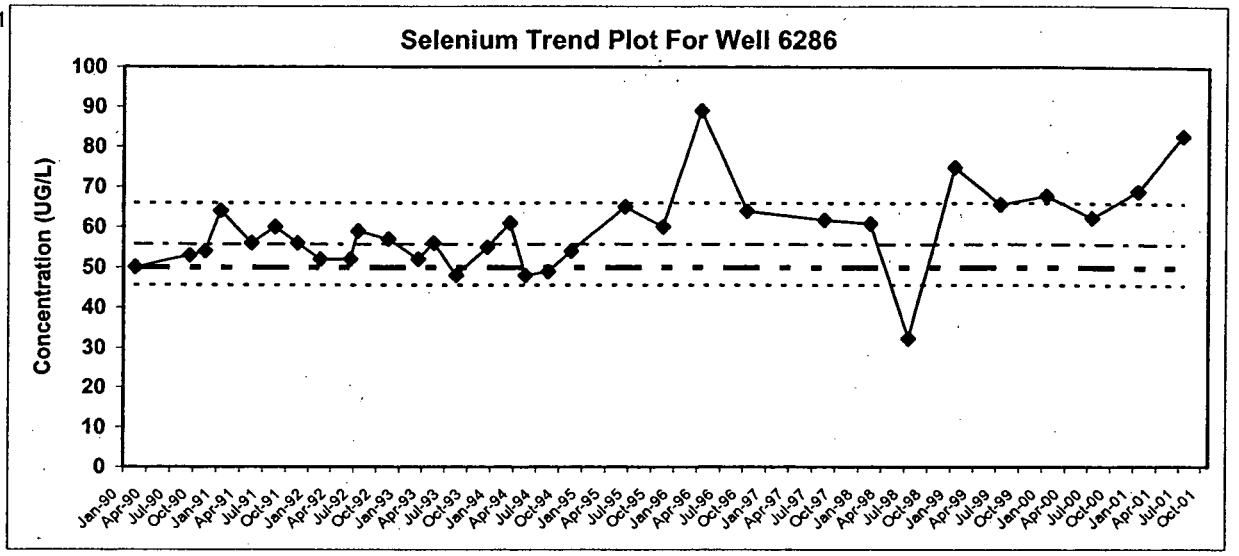


351
421

A-151



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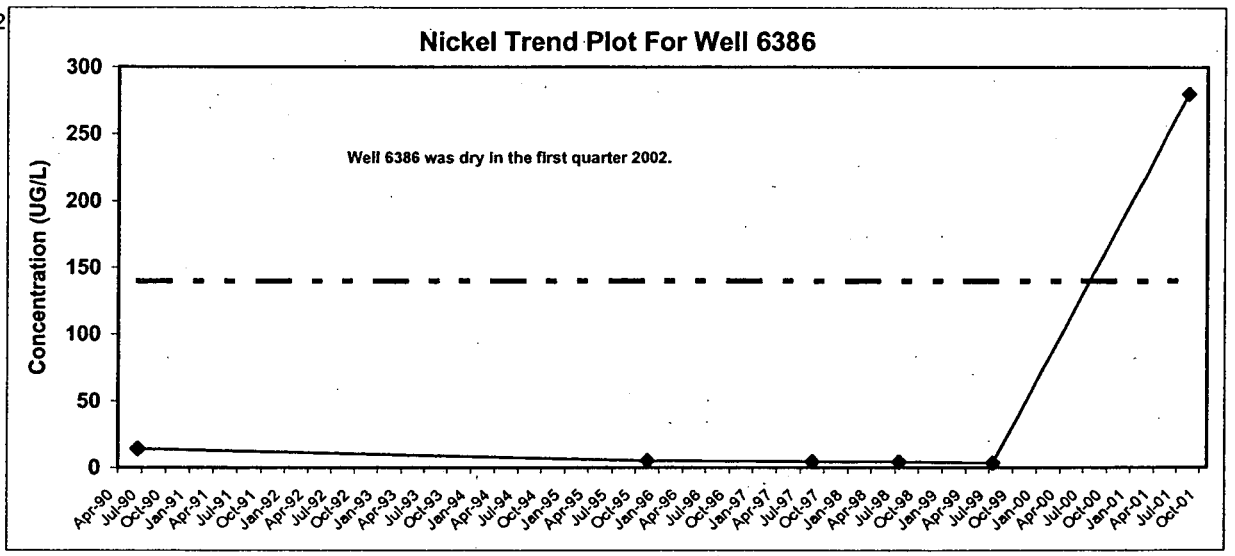

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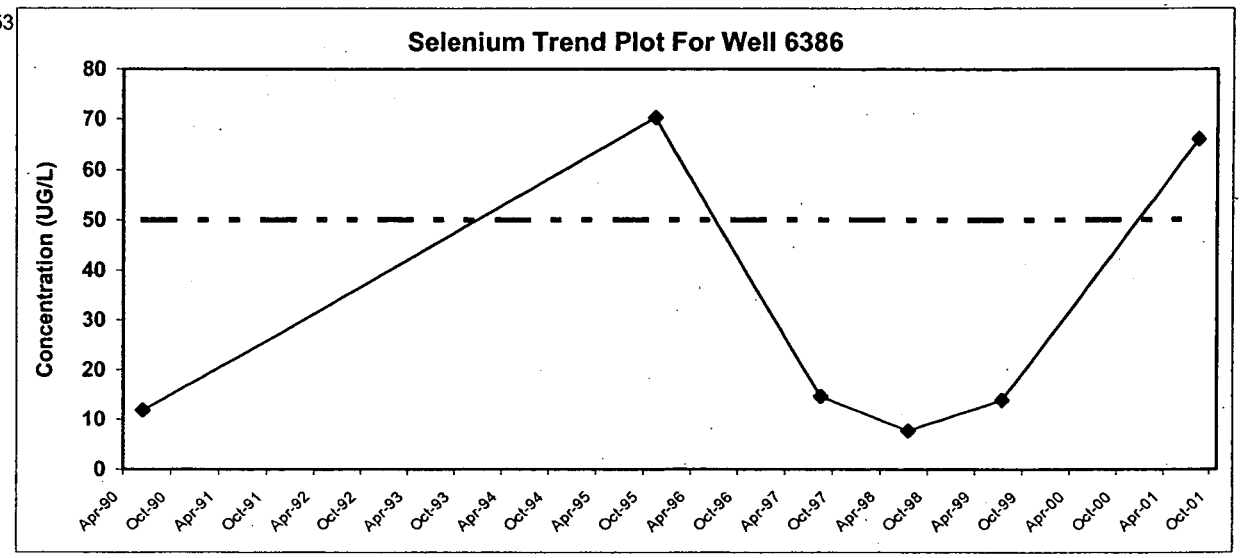

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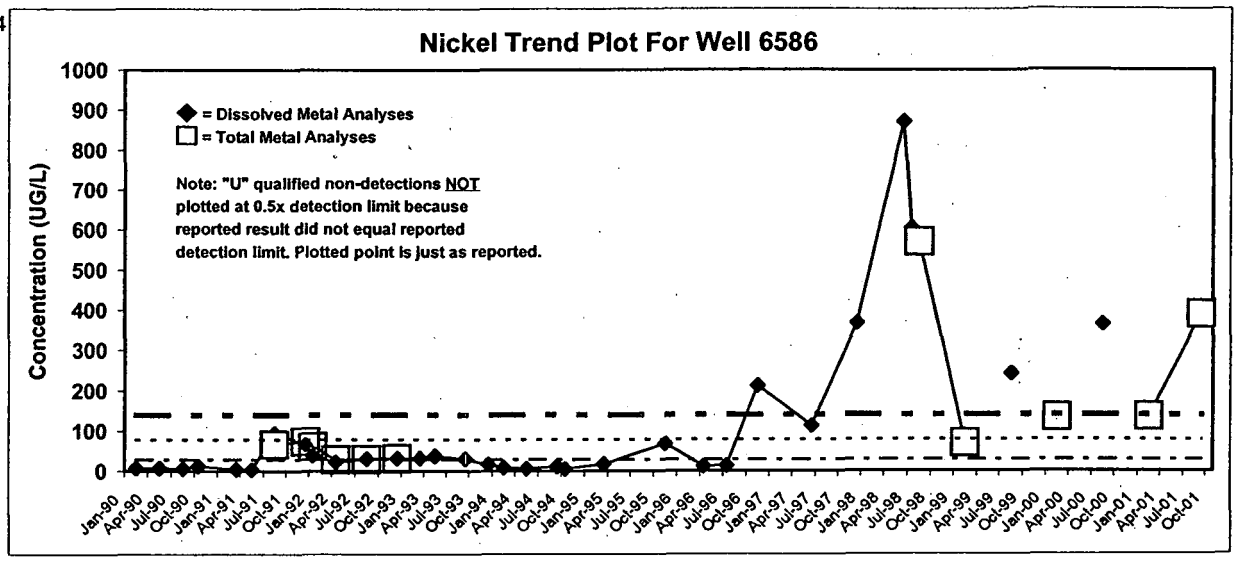
A-154



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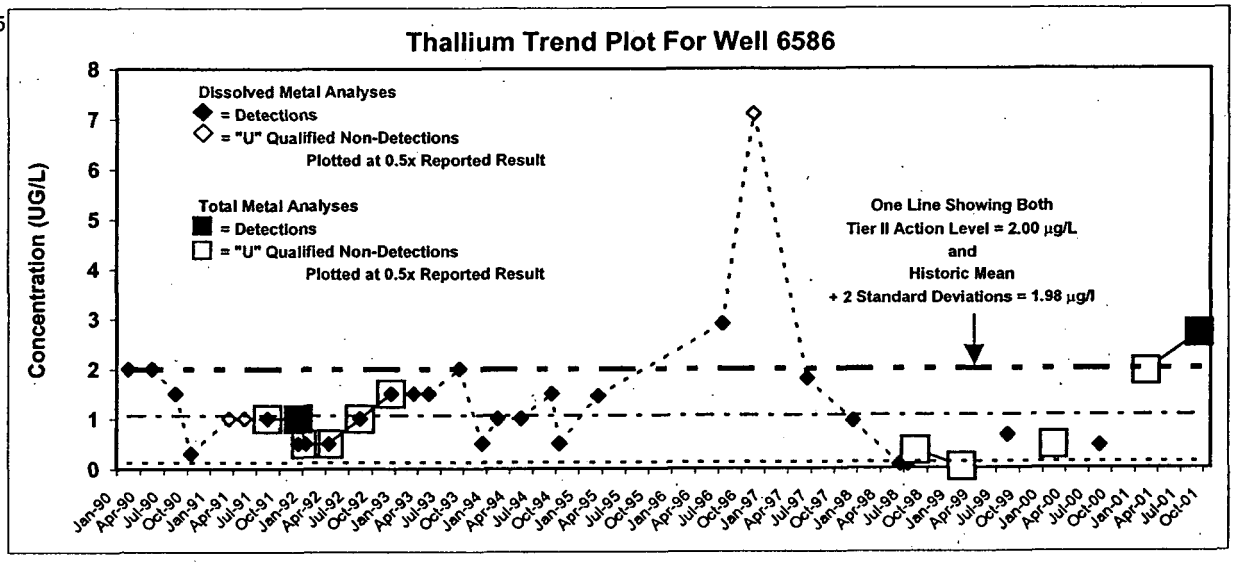

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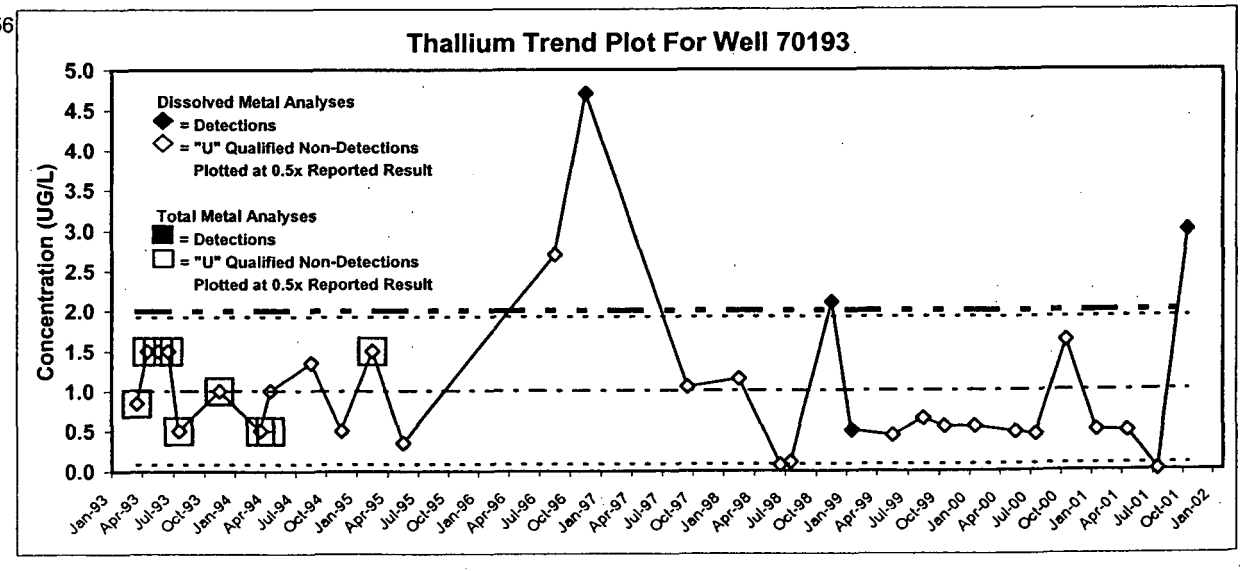
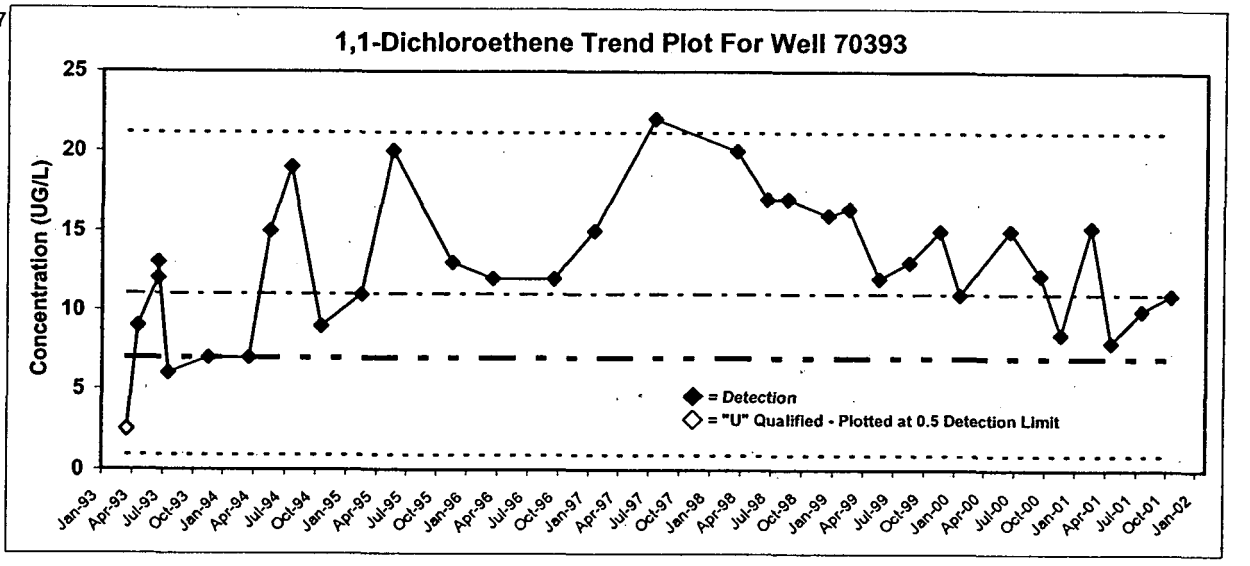


423

A-157



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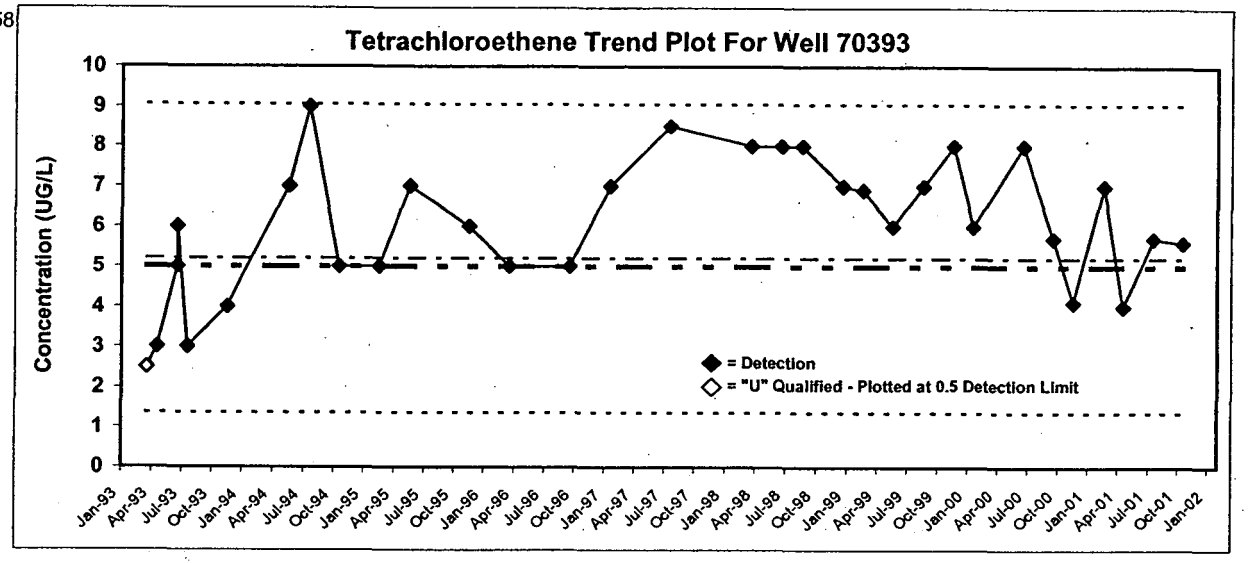

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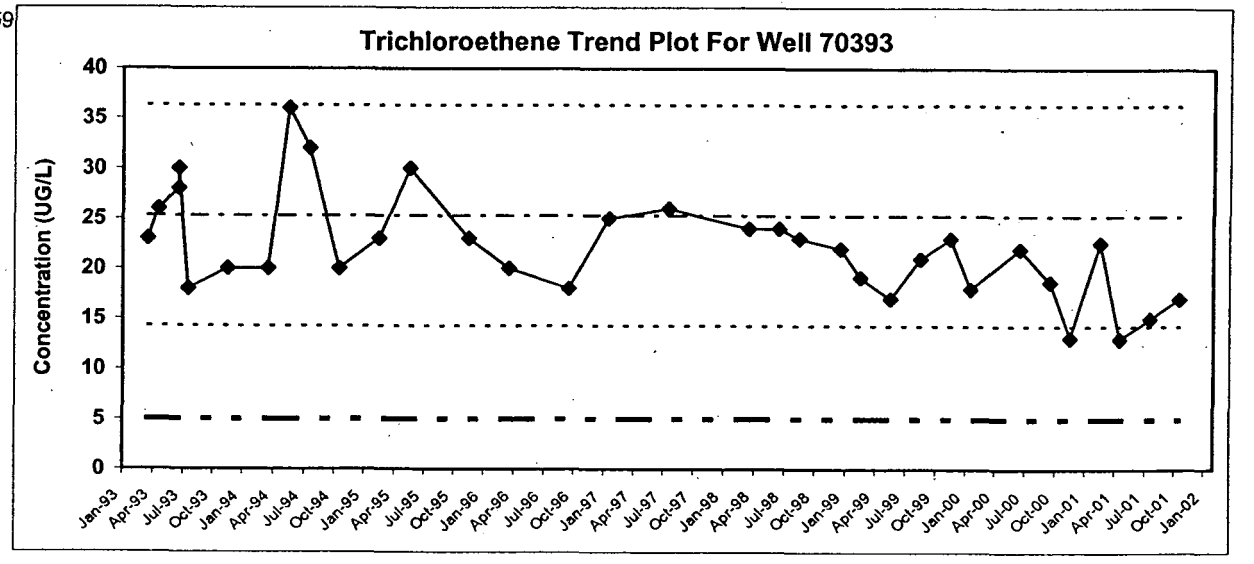
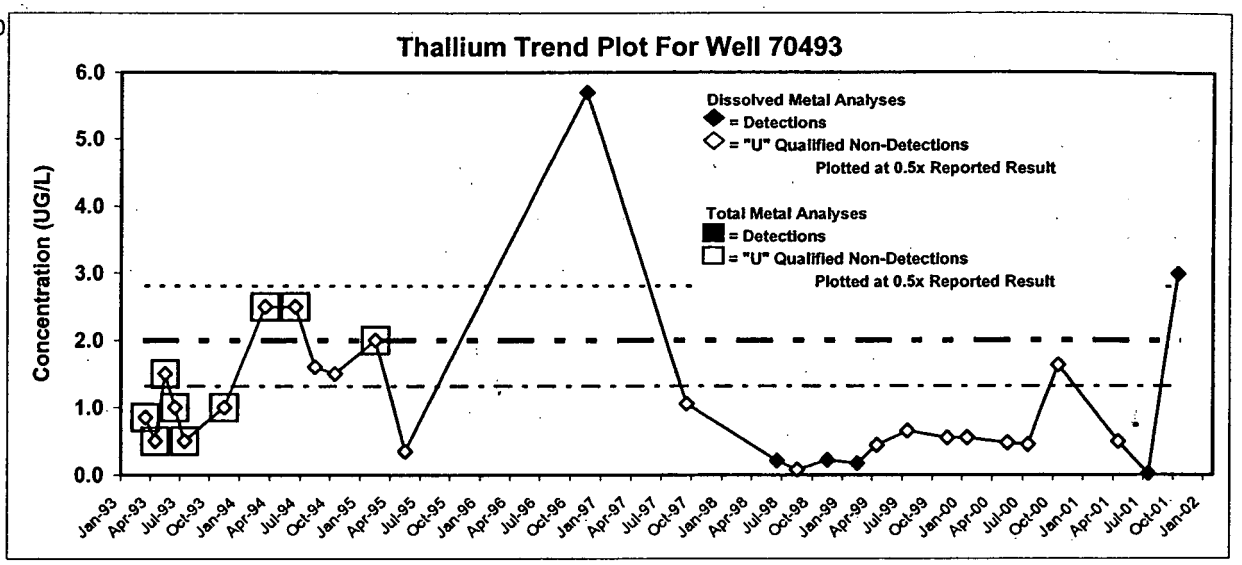


Heavy Horizontal Dashed Line = Tier II Action Level
Light Horizontal Dashed Lines = 1991-1995 Historic Mean and +/- 2 Standard Deviations (+/-M2SDs)

354
424

A-160



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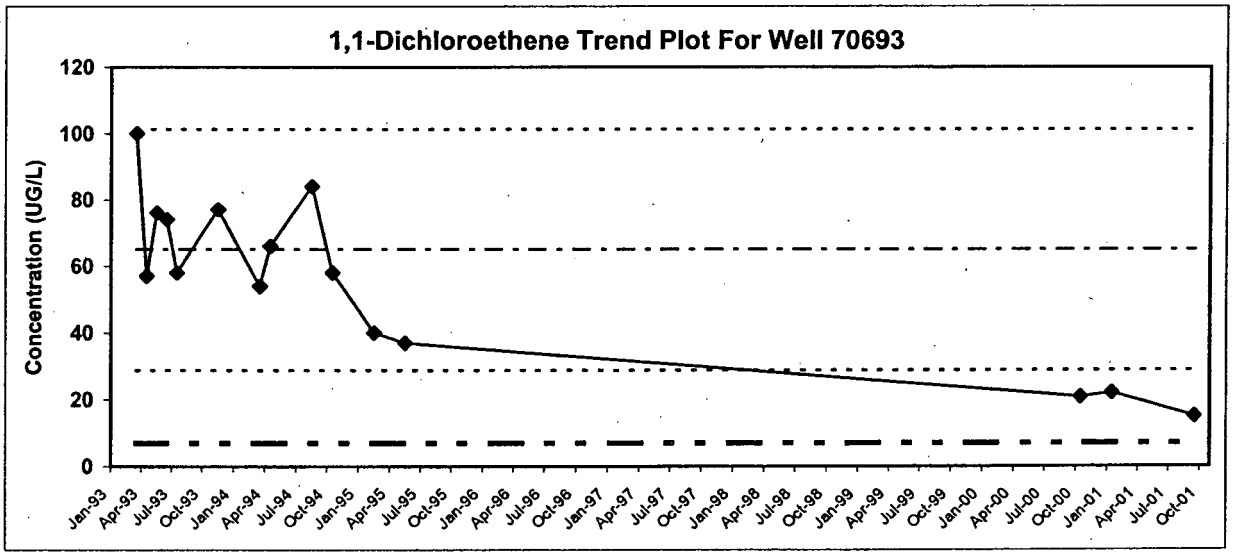

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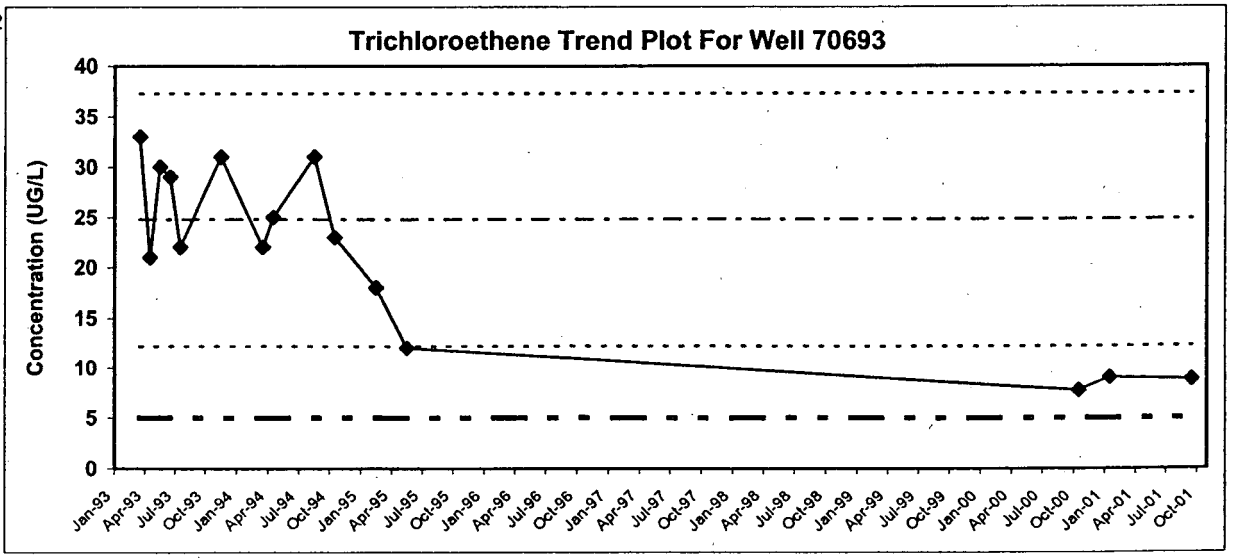
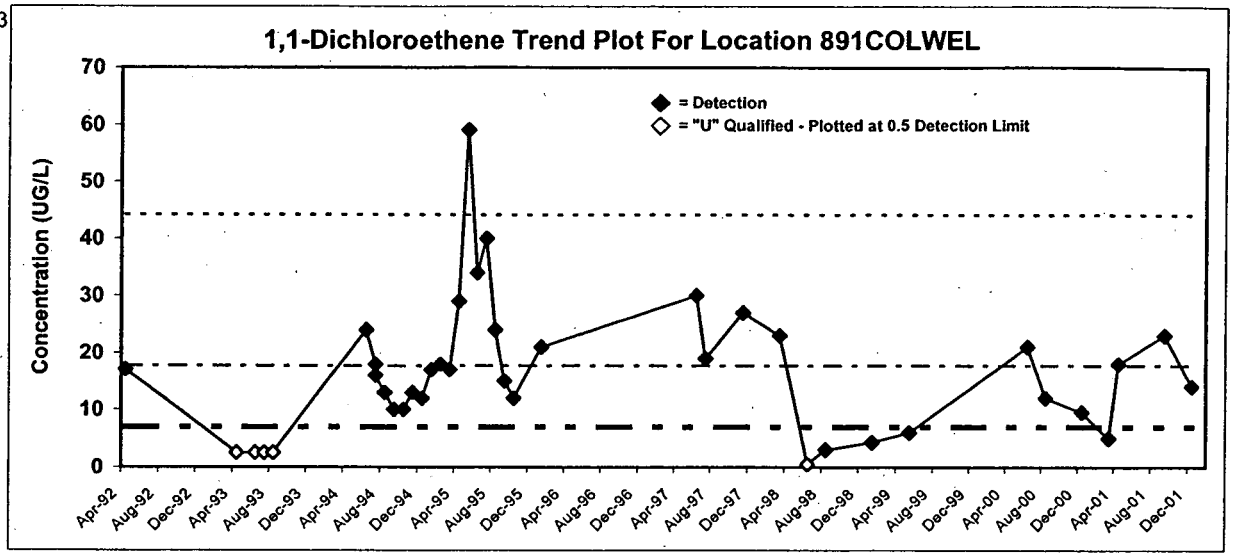


355
425

A-163



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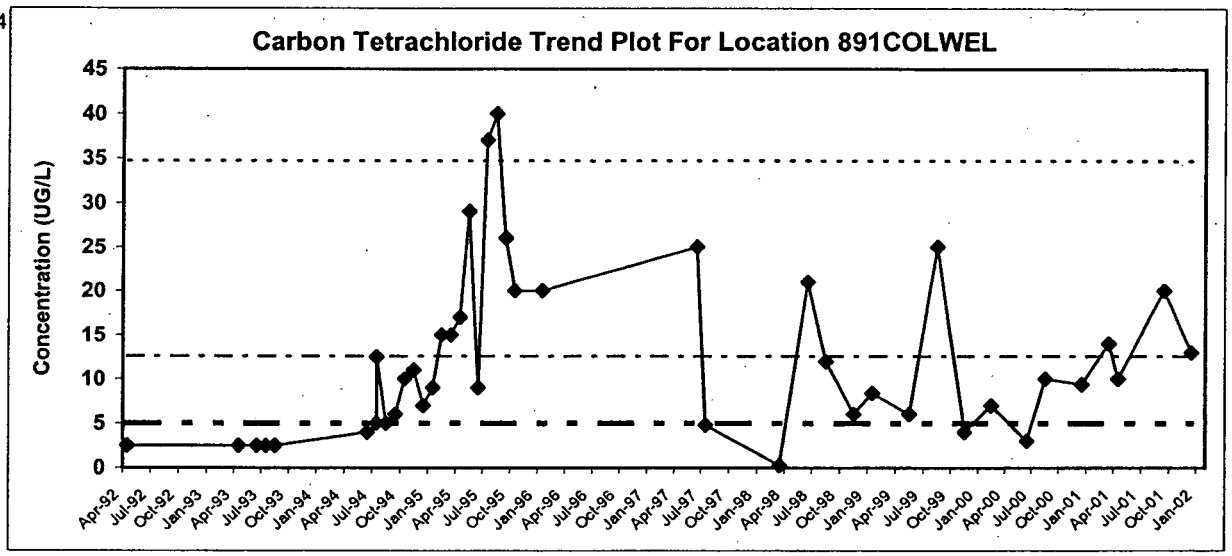

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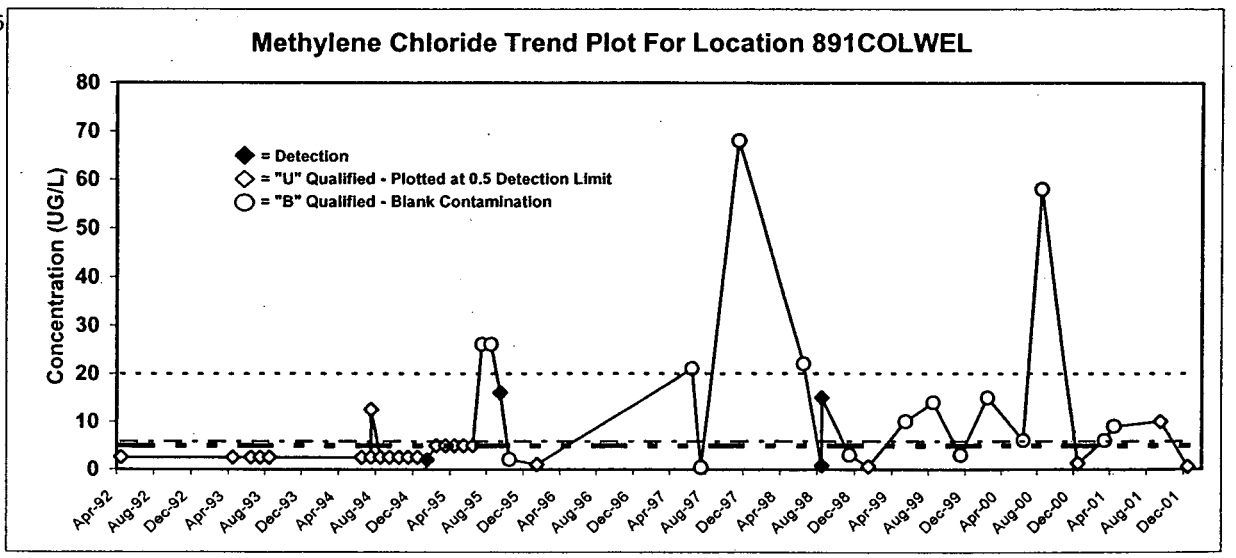
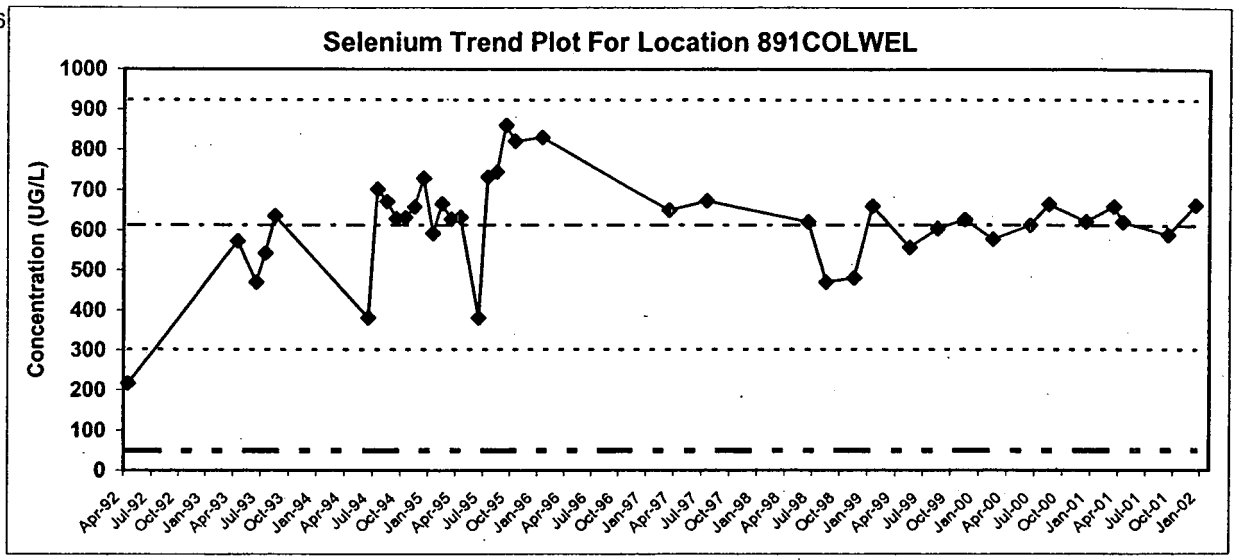


356
426

A-166



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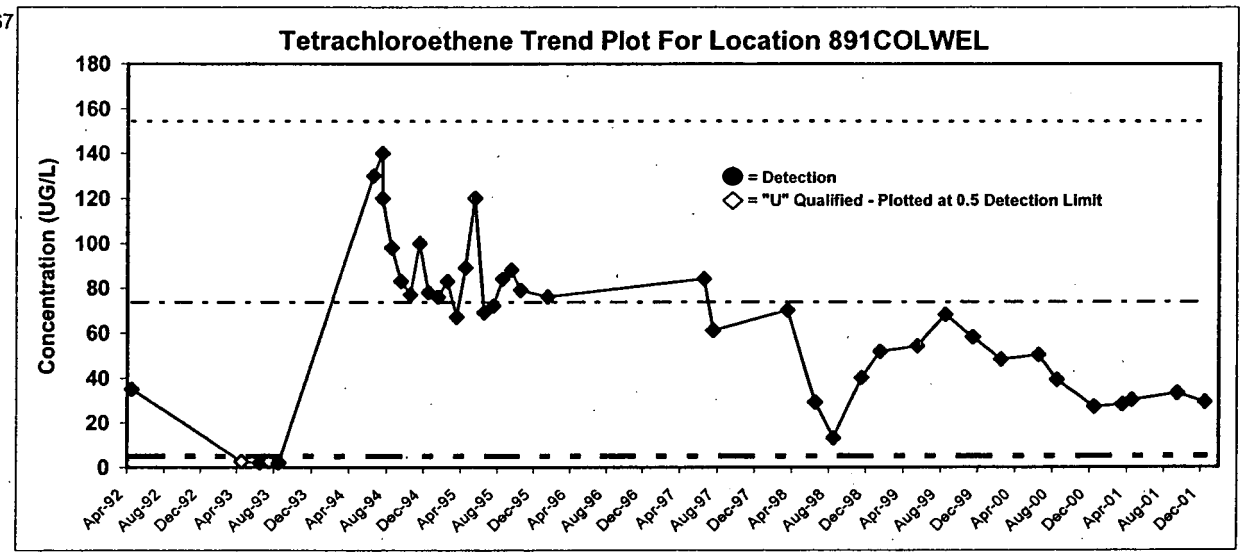

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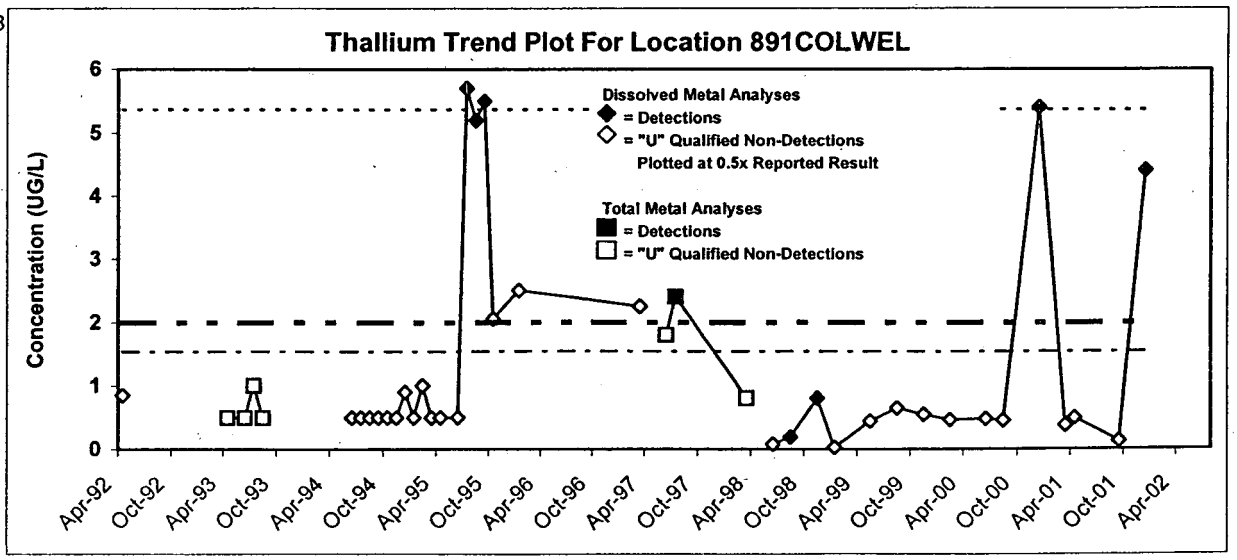
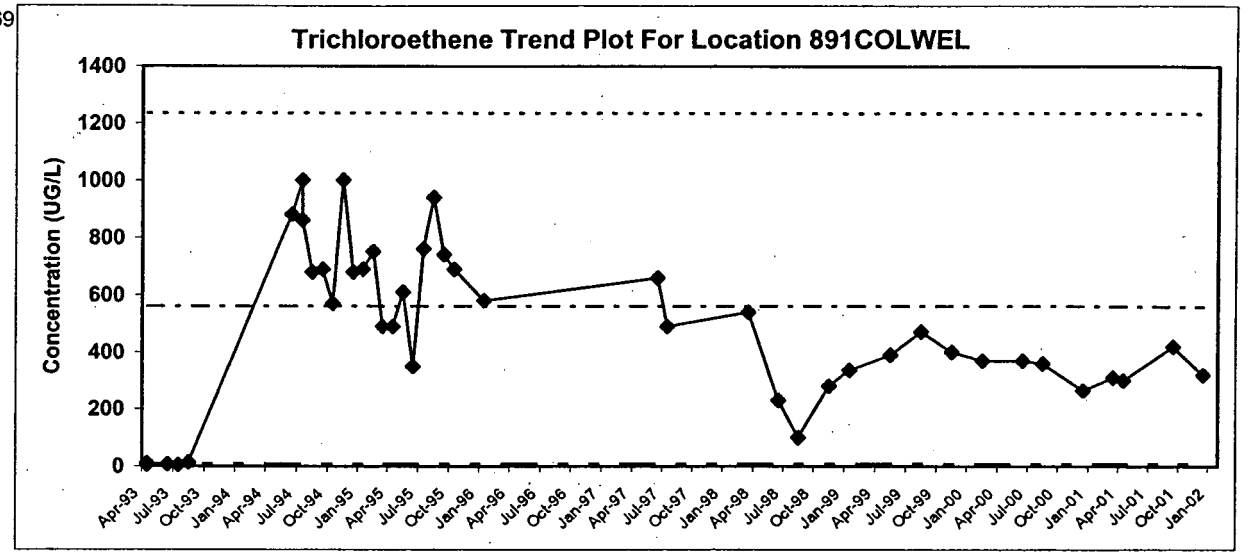
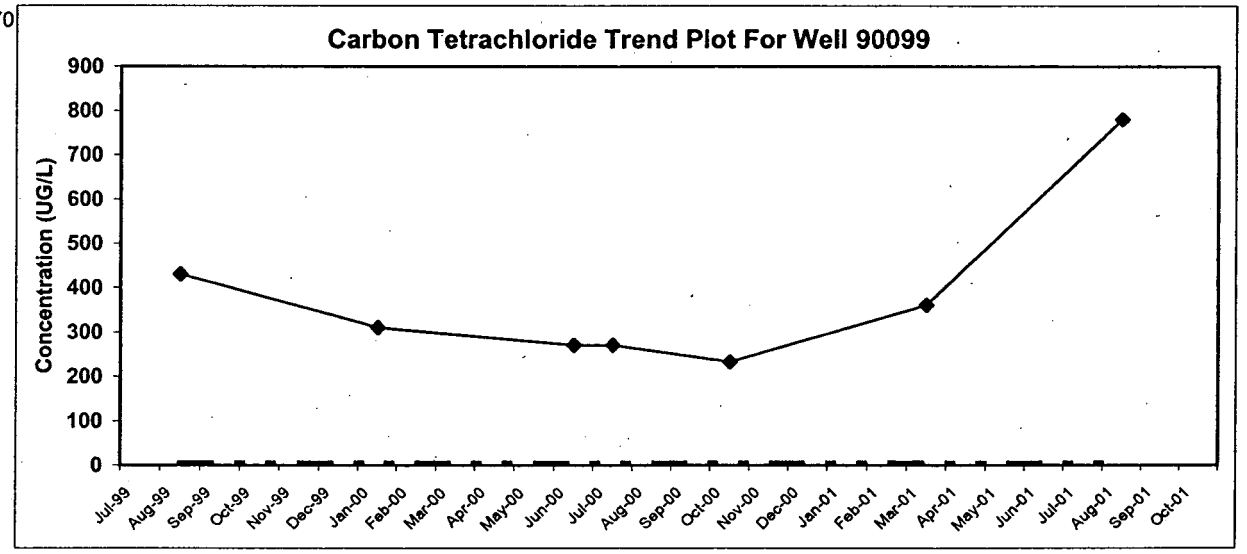


5427

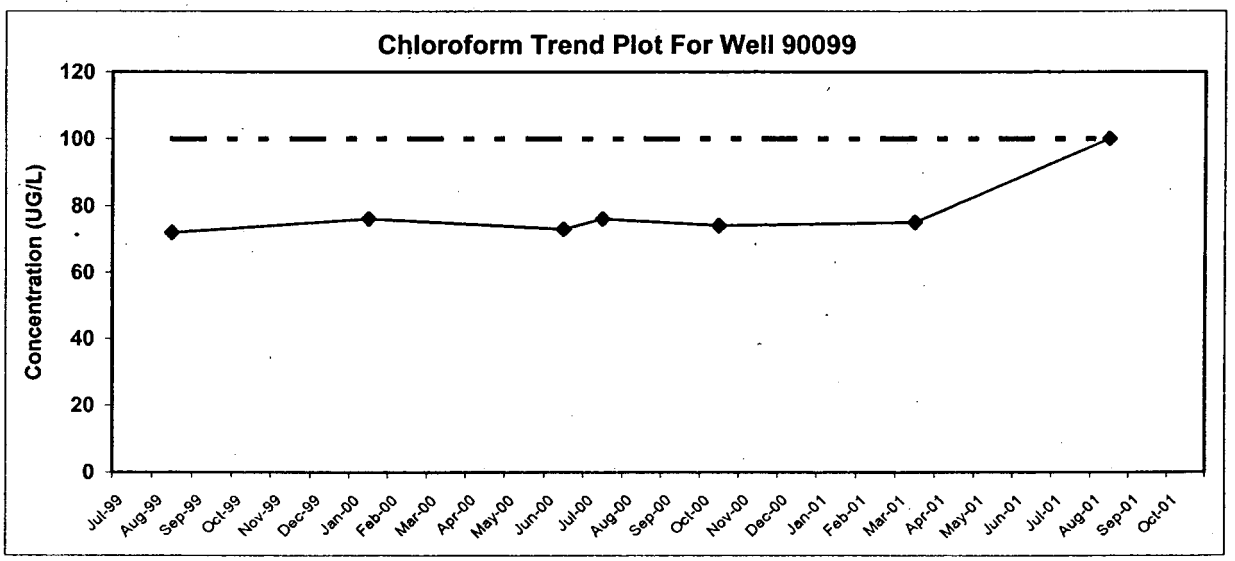
A-169



A-170

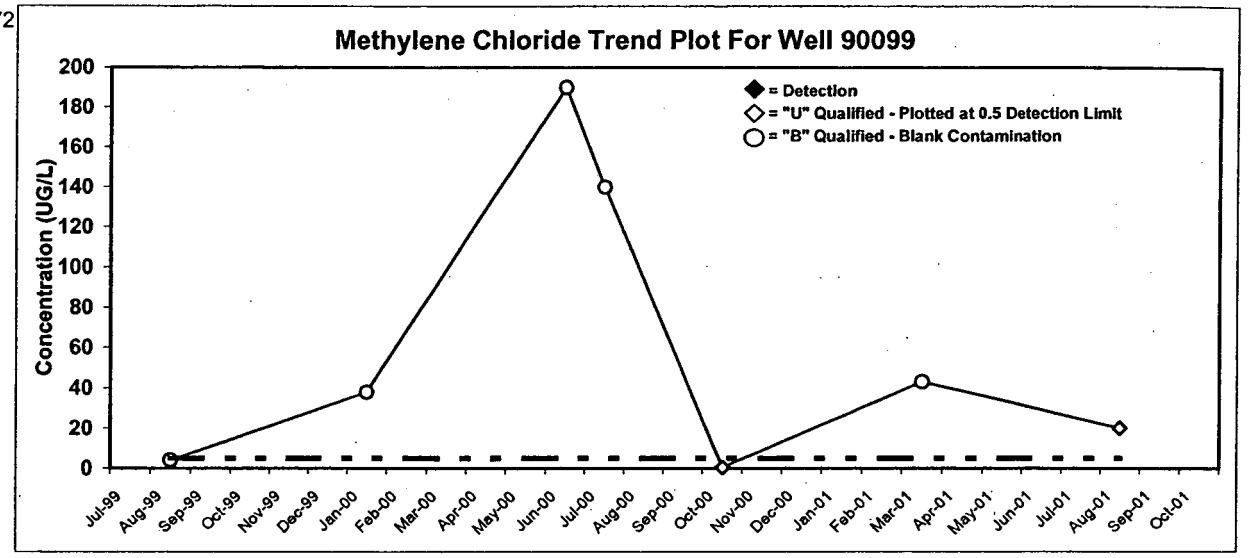


A-171

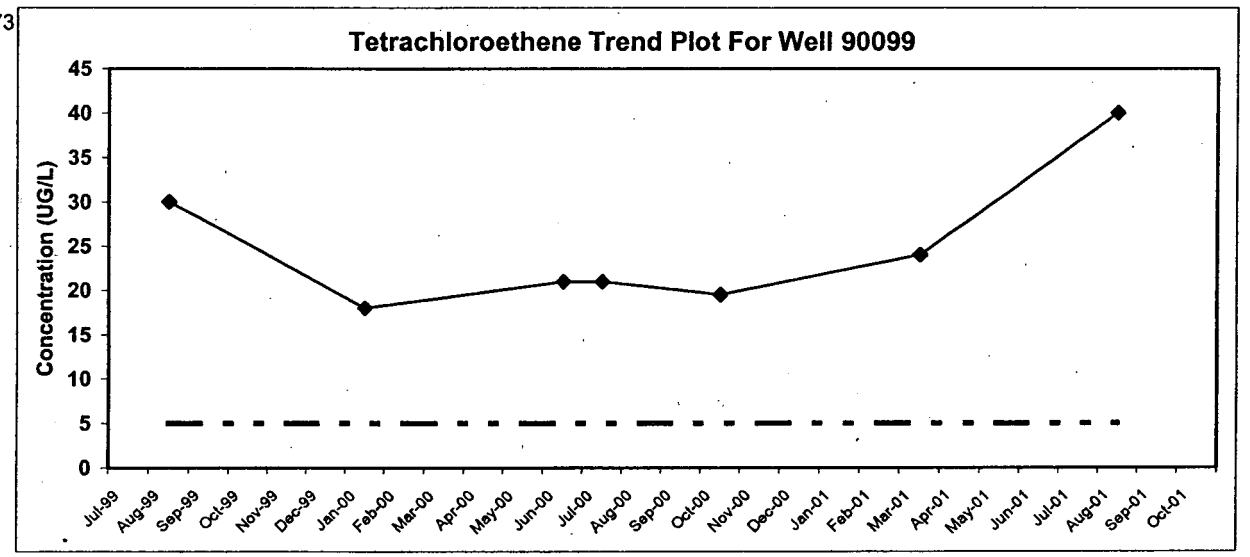


258
42R

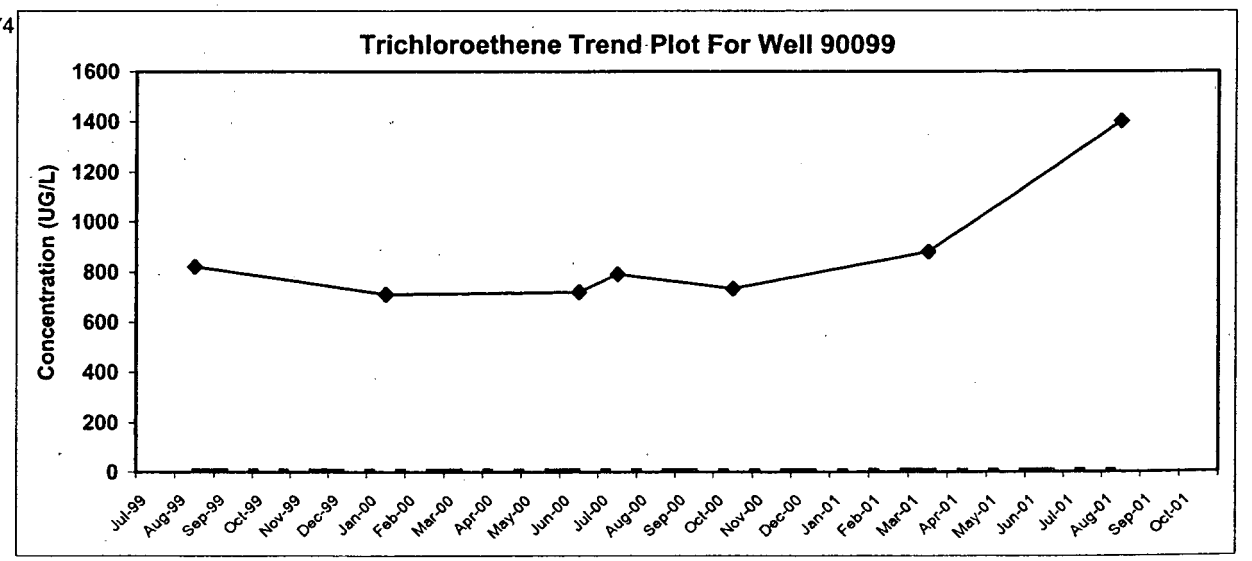
A-172



A-173



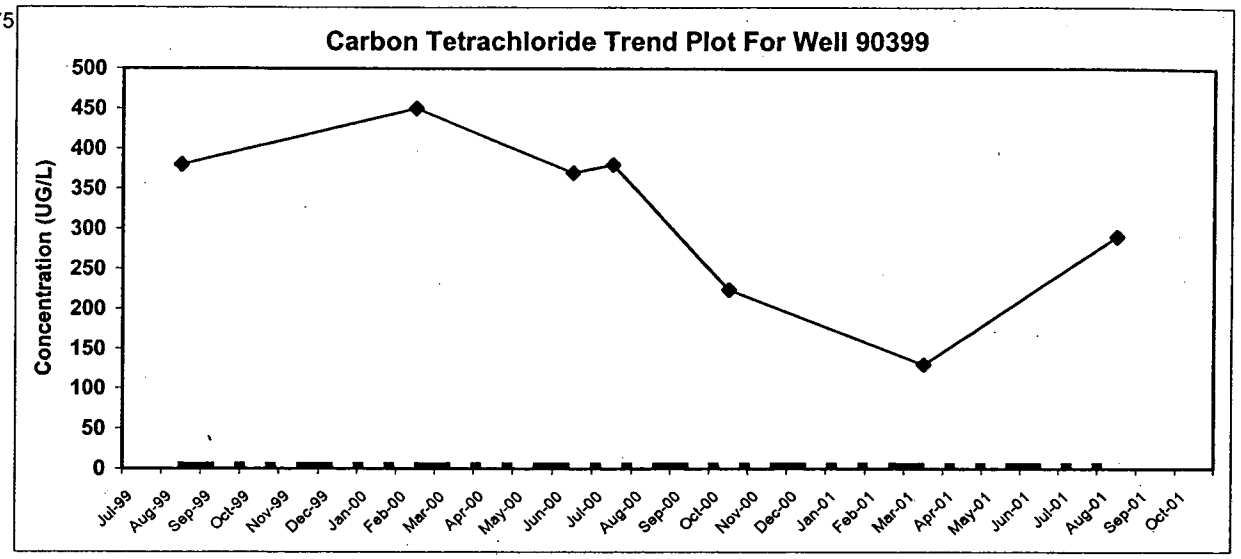
A-174



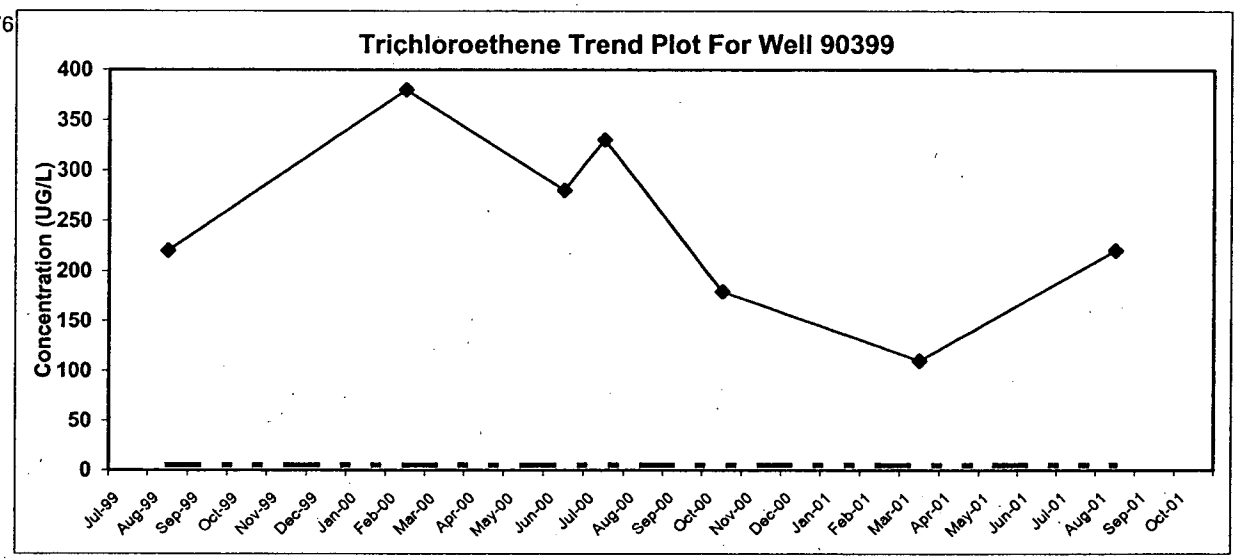
Heavy Horizontal Dashed Line = Tier II Action Level
Light Horizontal Dashed Lines = 1991-1995 Historic Mean and +/- 2 Standard Deviations (+/-M2SDs)

429

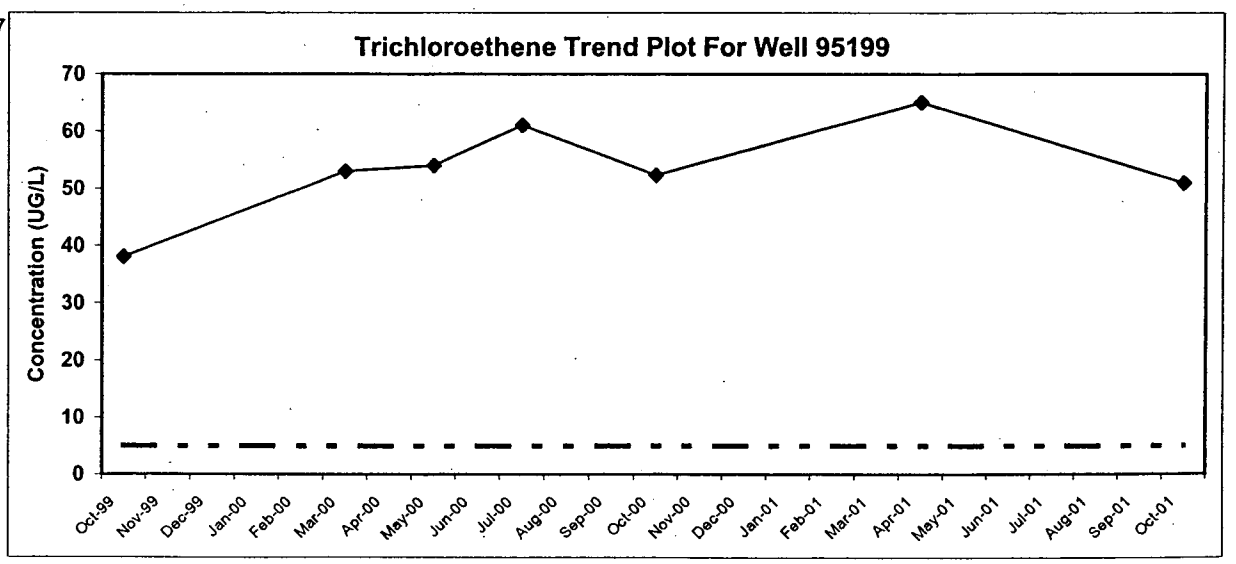
A-175



A-176

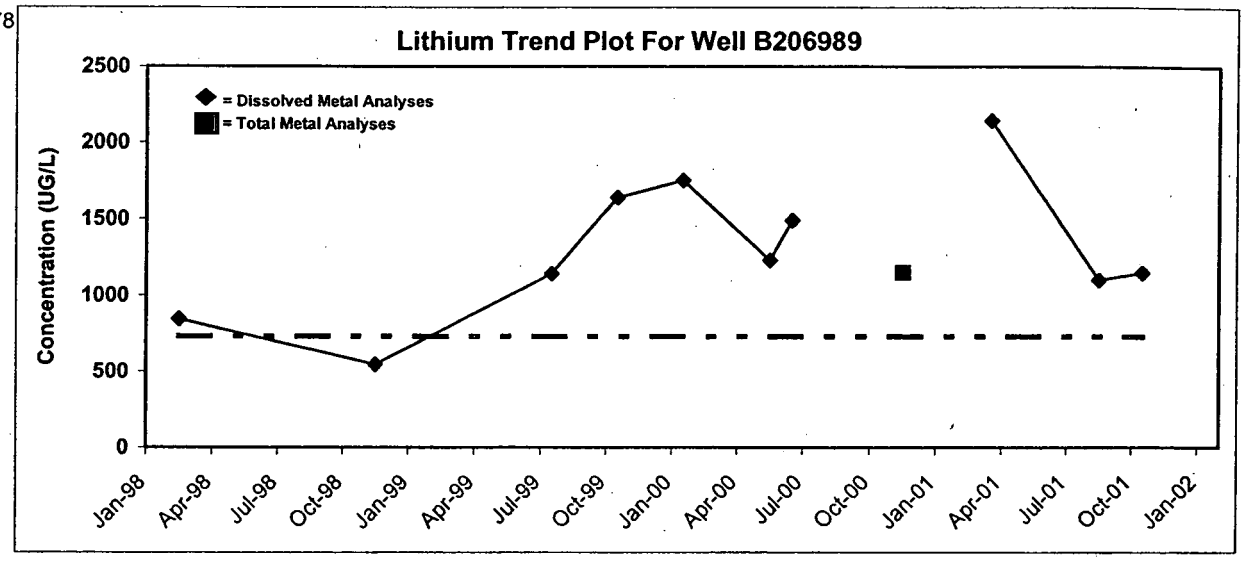


A-177

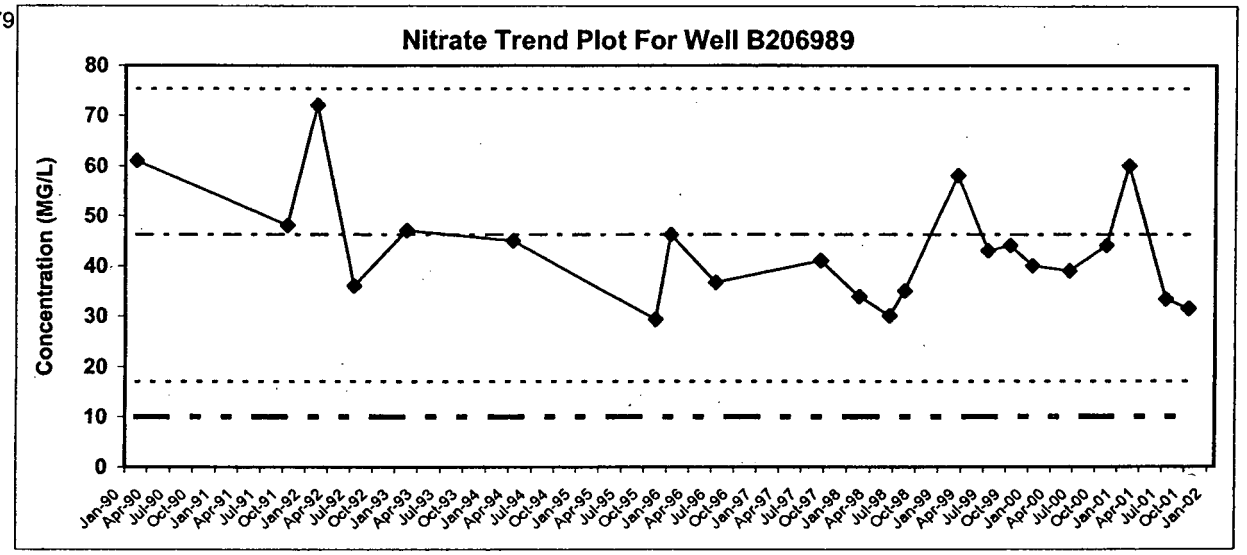


360
430

A-178



A-179



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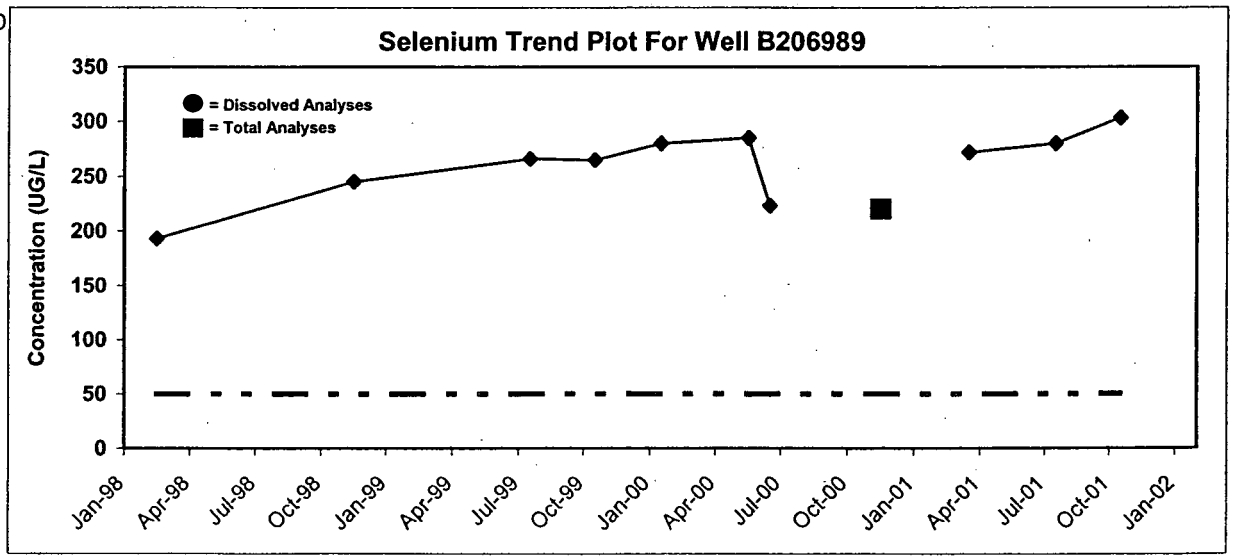

Heavy Horizontal Dashed Line = Tier II Action Level
Light Horizontal Dashed Lines = 1991-1995 Historic Mean and +/- 2 Standard Deviations (+/-M2SDs)

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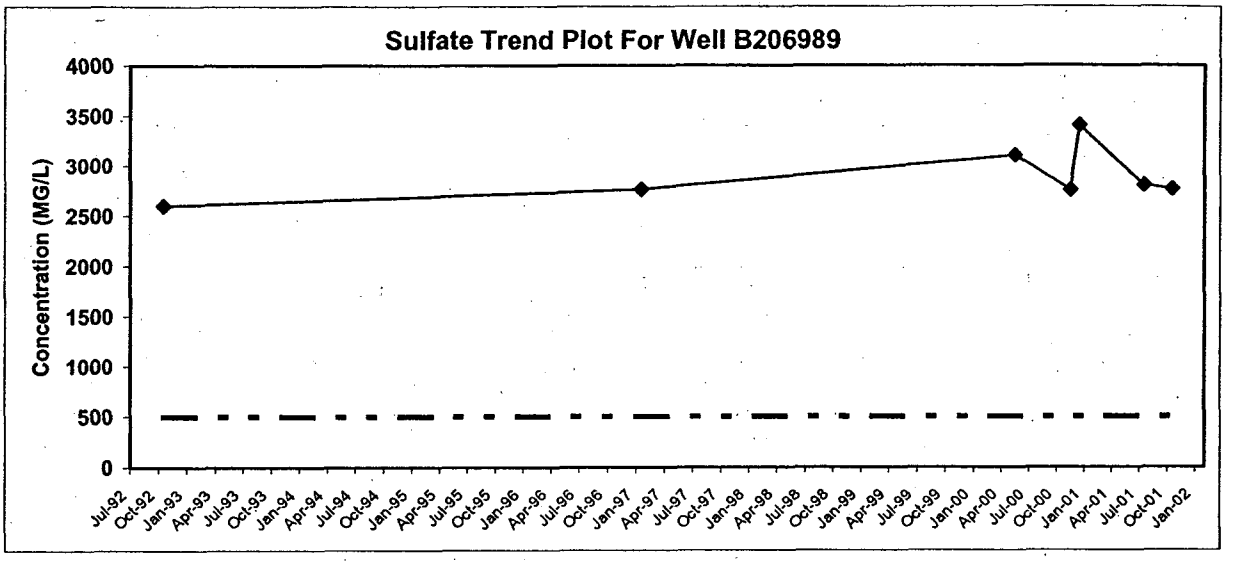
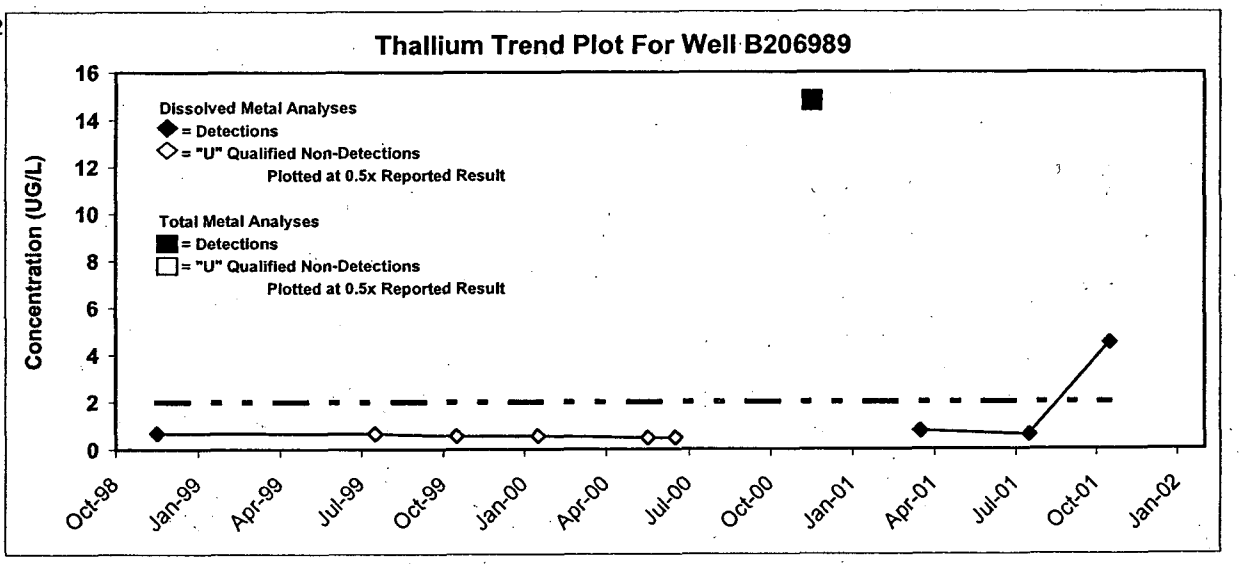
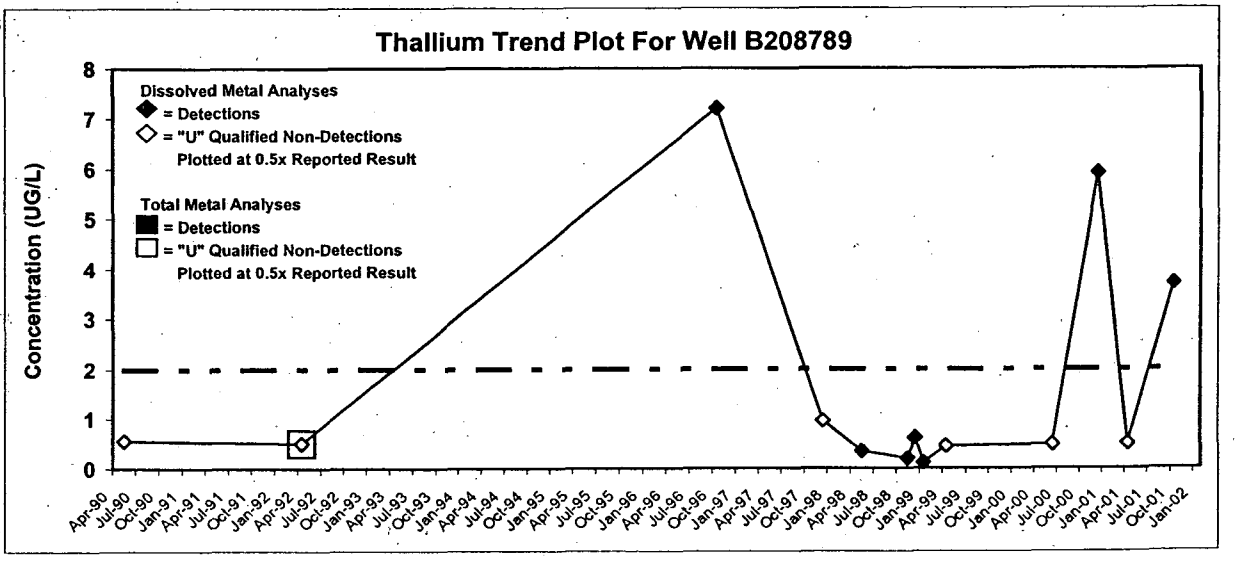
A-181



A-182

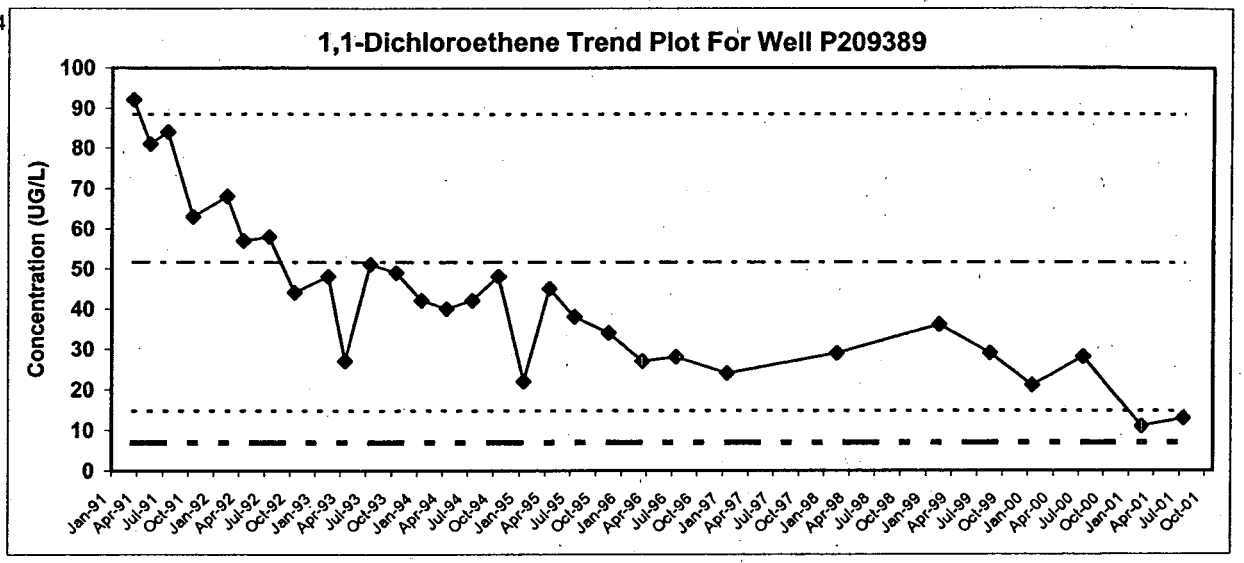


A-183

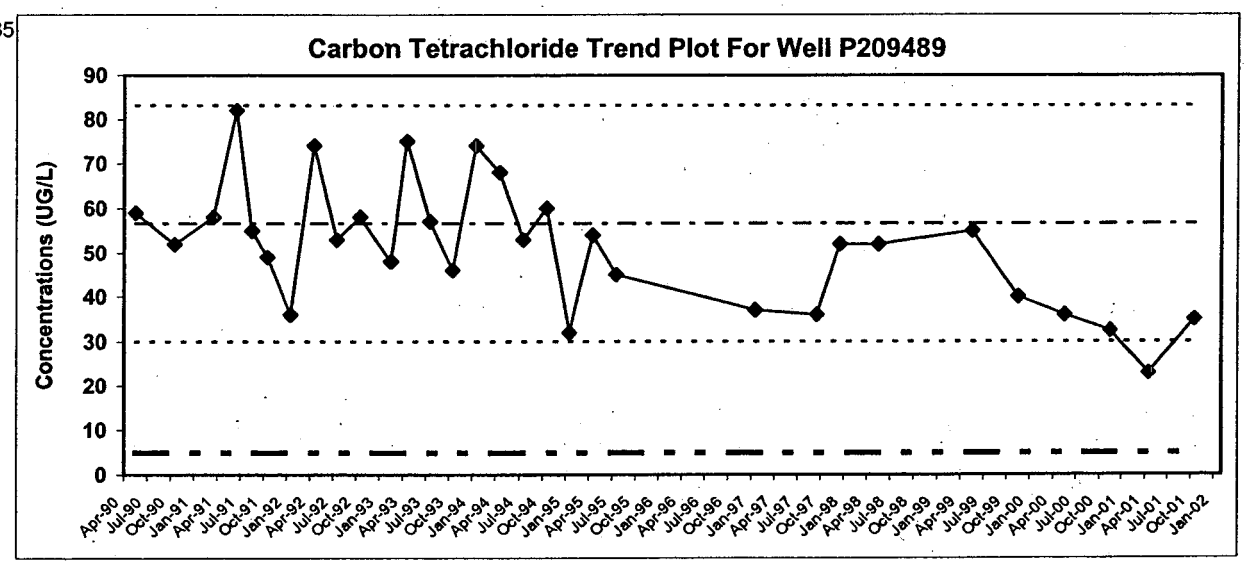


367
432

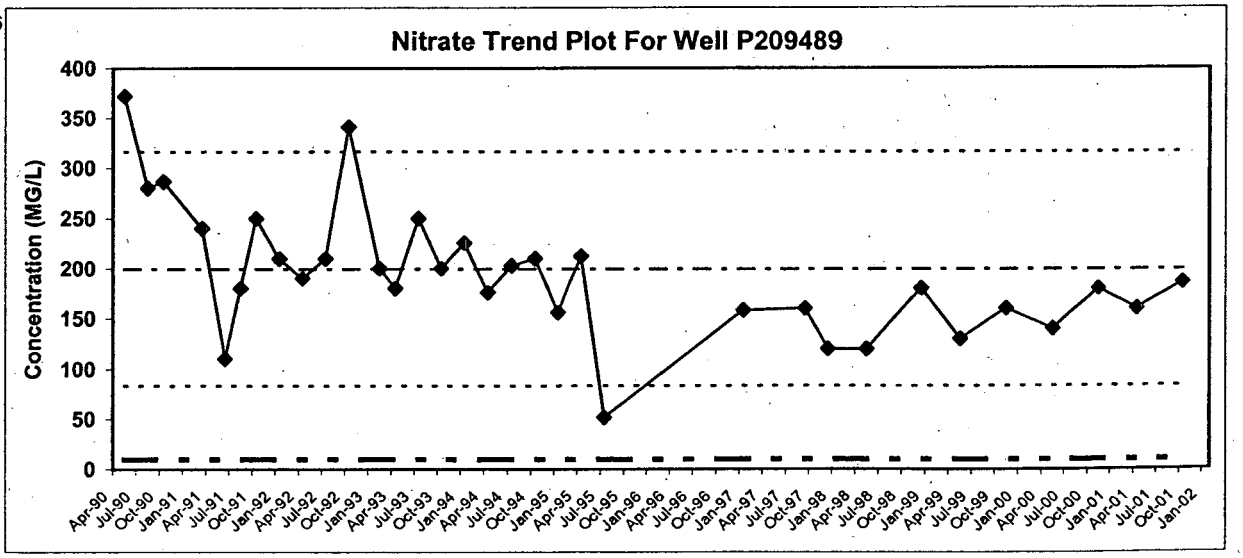
A-184



A-185



A-186



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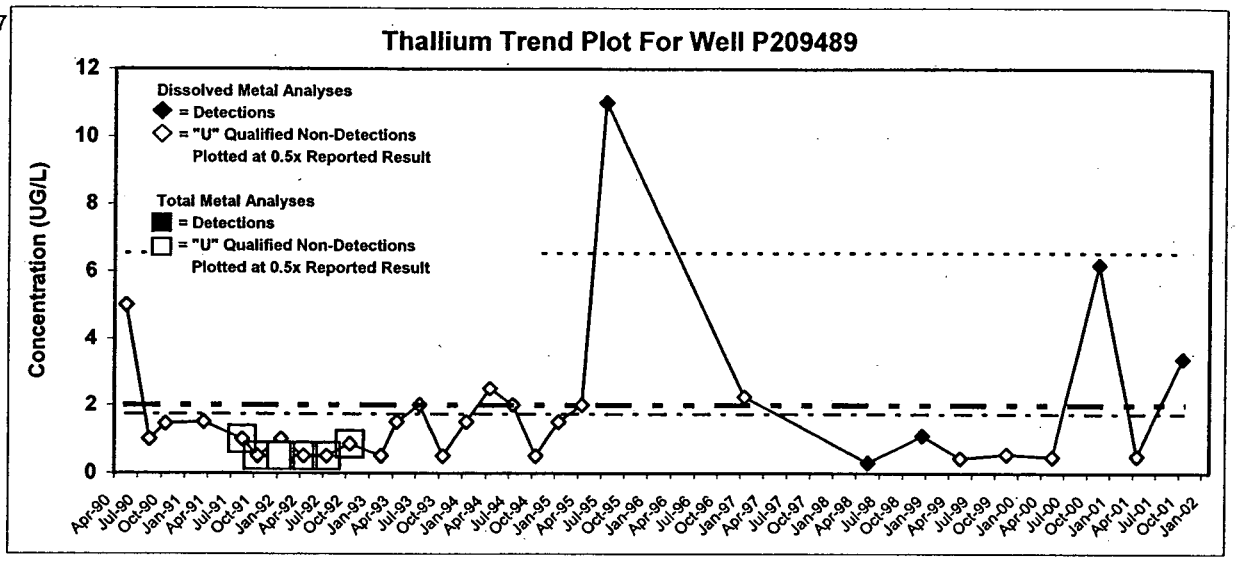
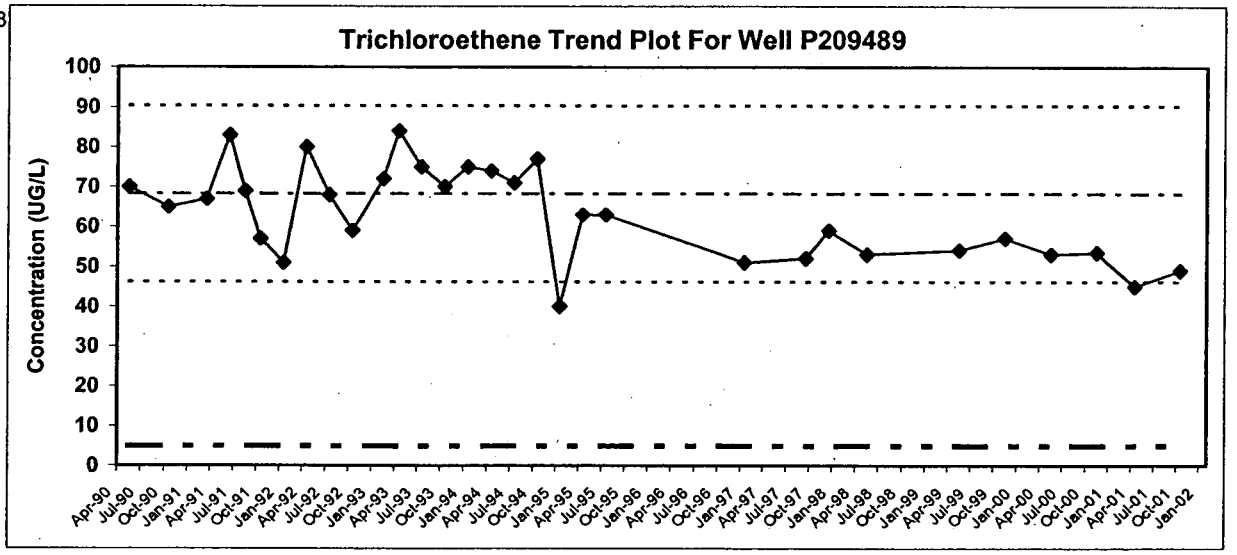
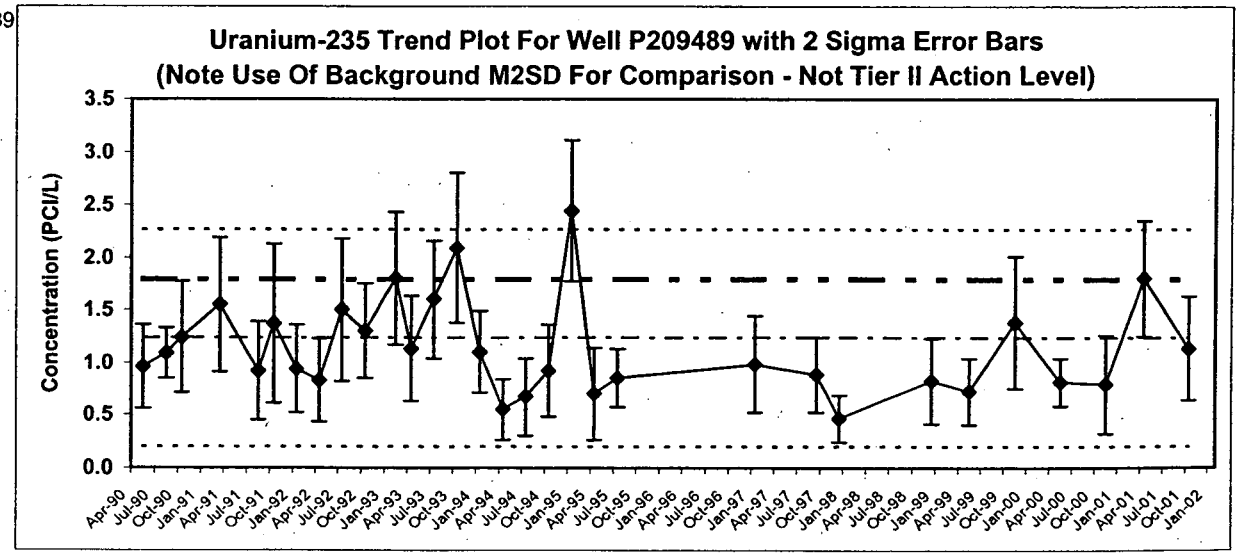
A-187



A-188



A-189



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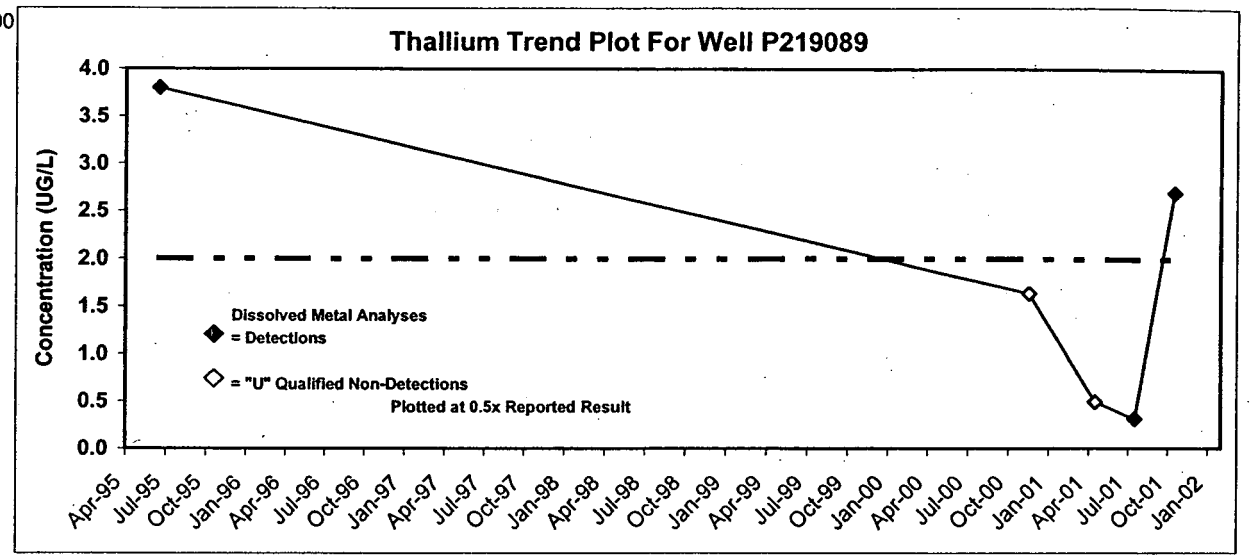
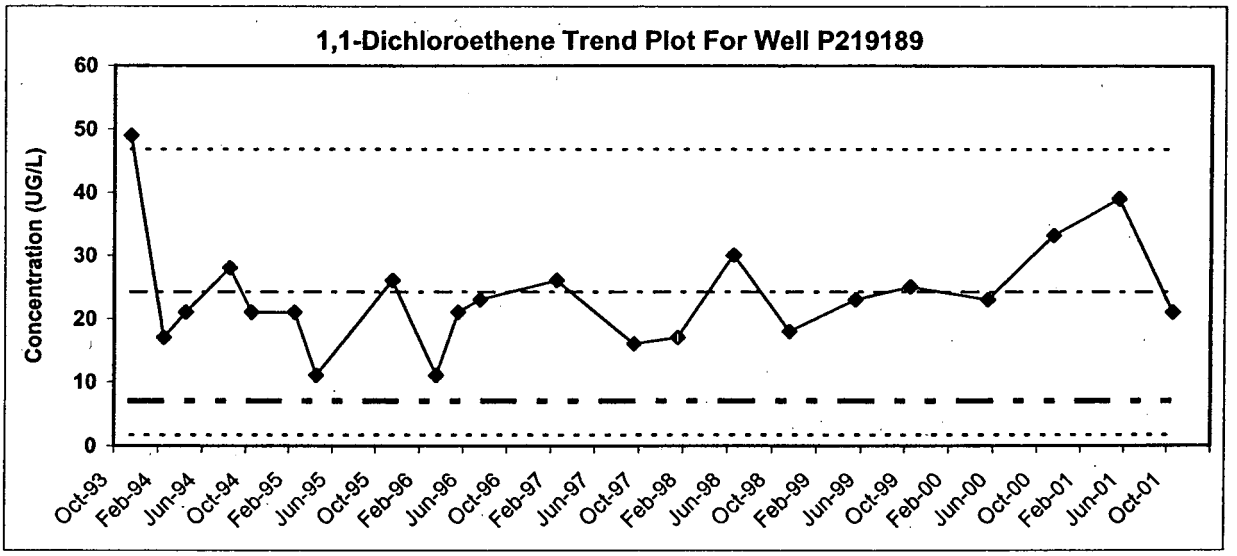
434

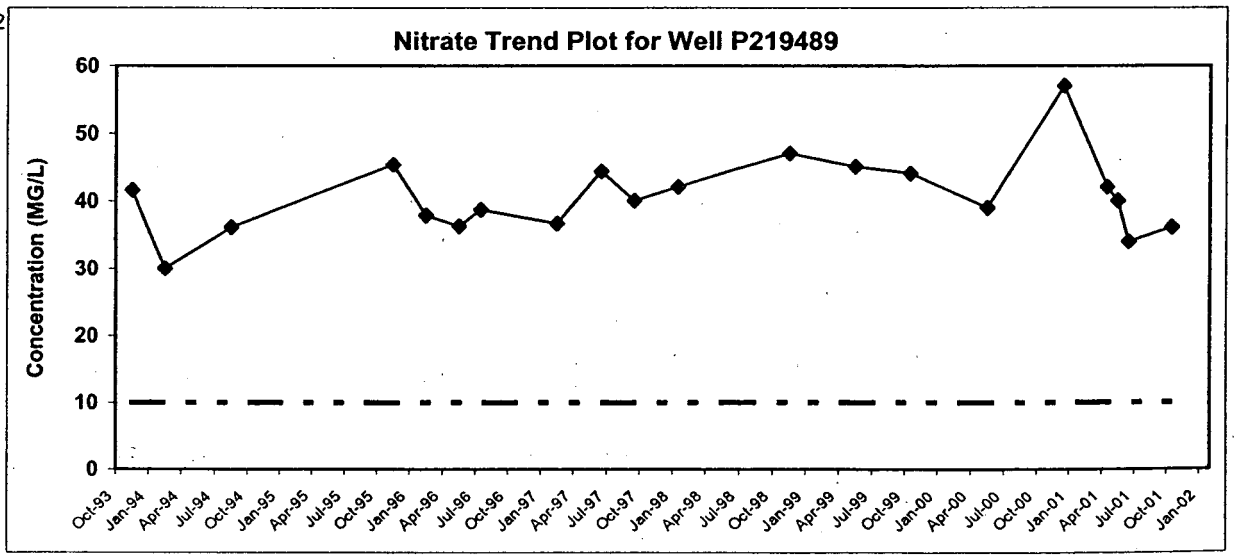
A-190



A-191

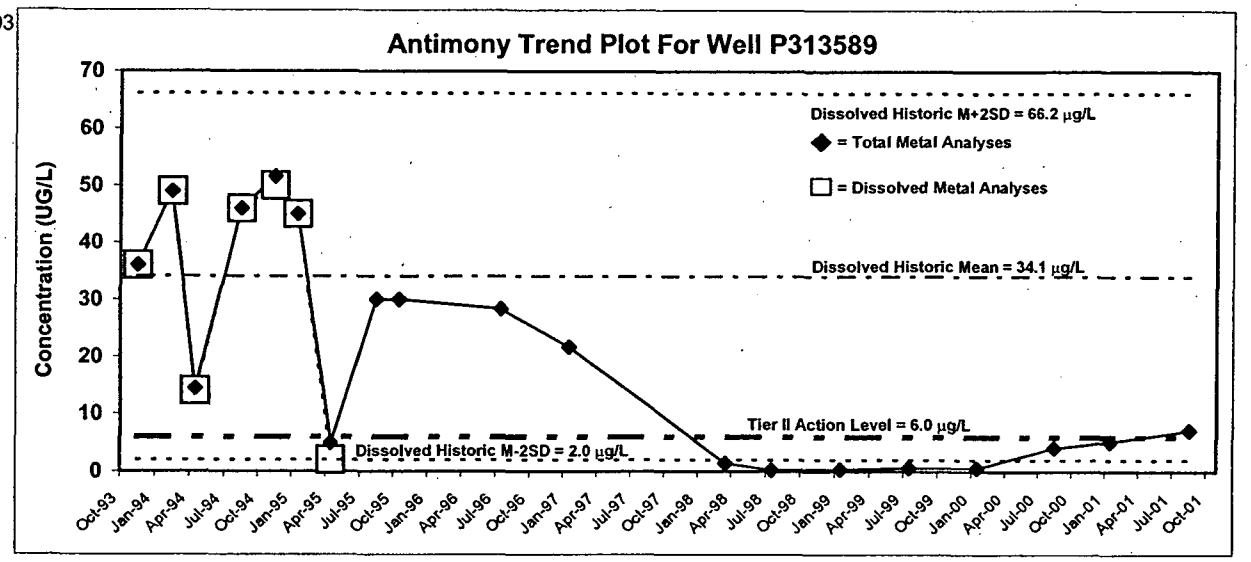


A-192

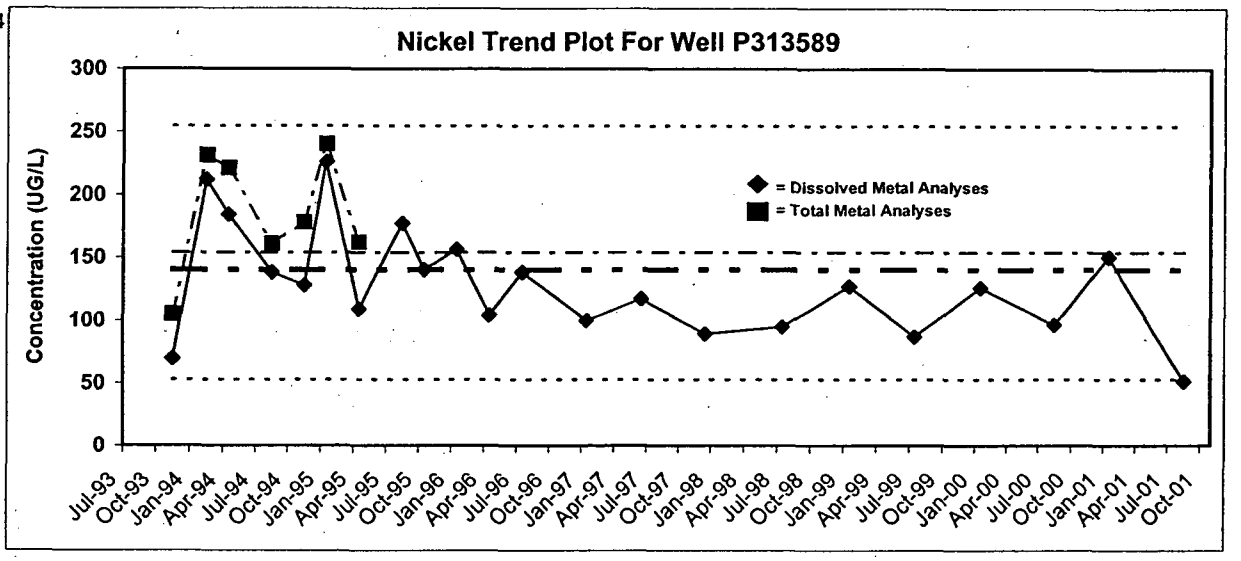


435

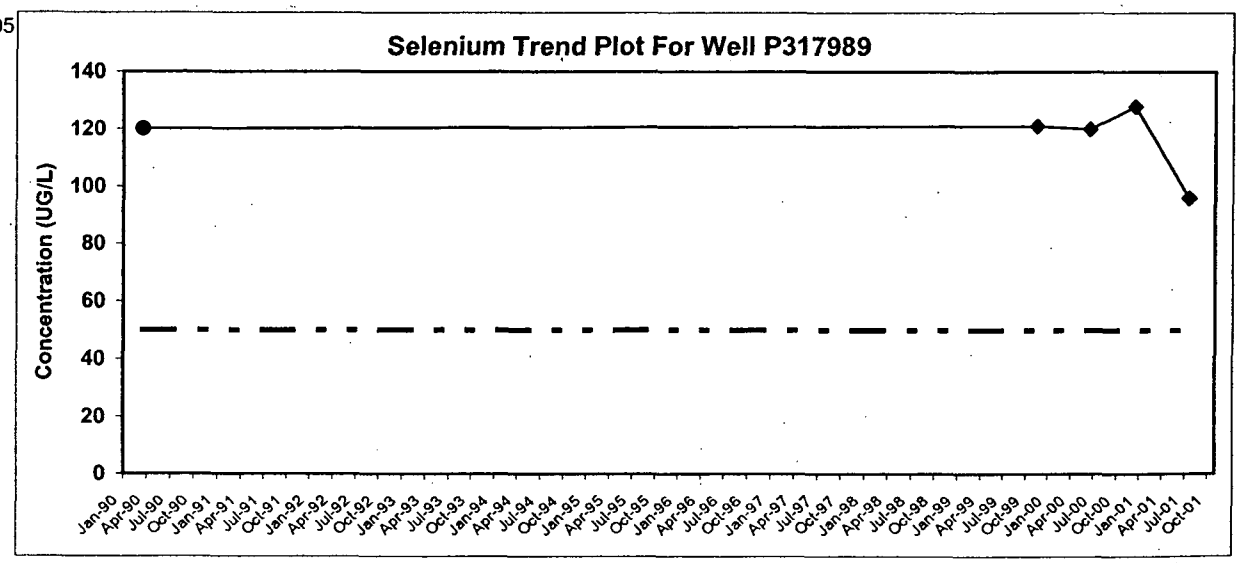
A-193



A-194

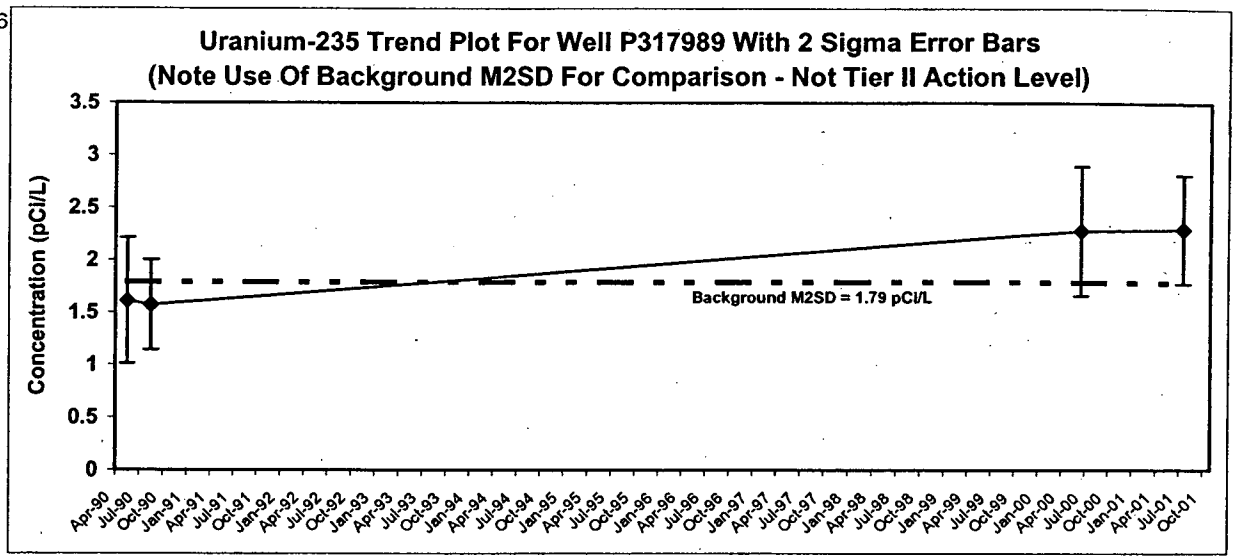


A-195

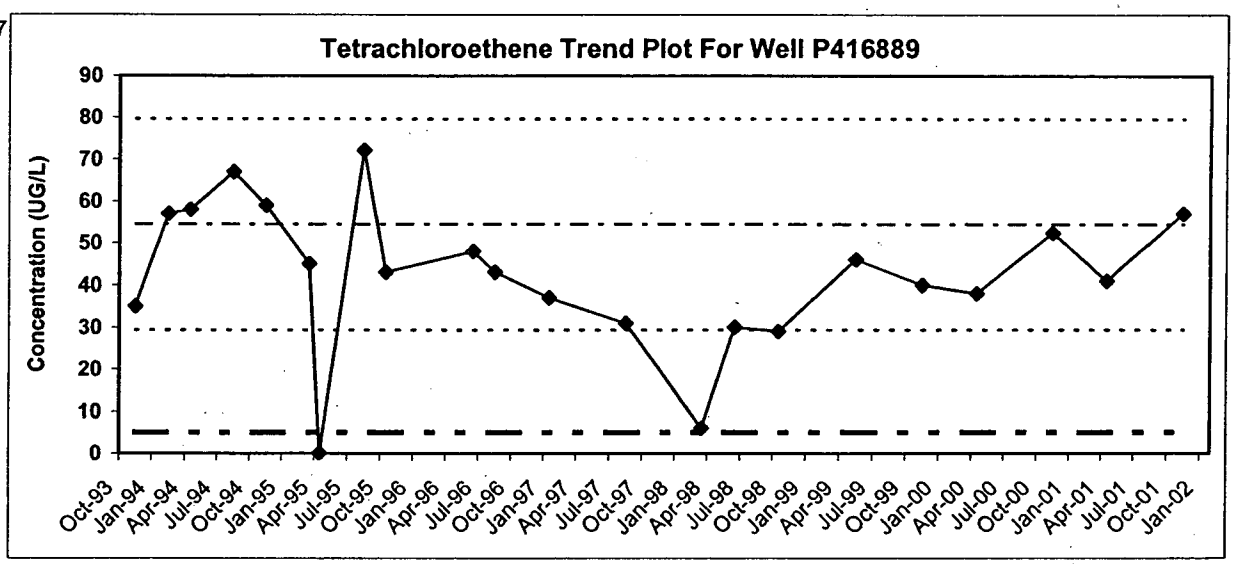


Heavy Horizontal Dashed Line = Tier II Action Level
Light Horizontal Dashed Lines = 1991-1995 Historic Mean and +/- 2 Standard Deviations (+/-M2SDs)

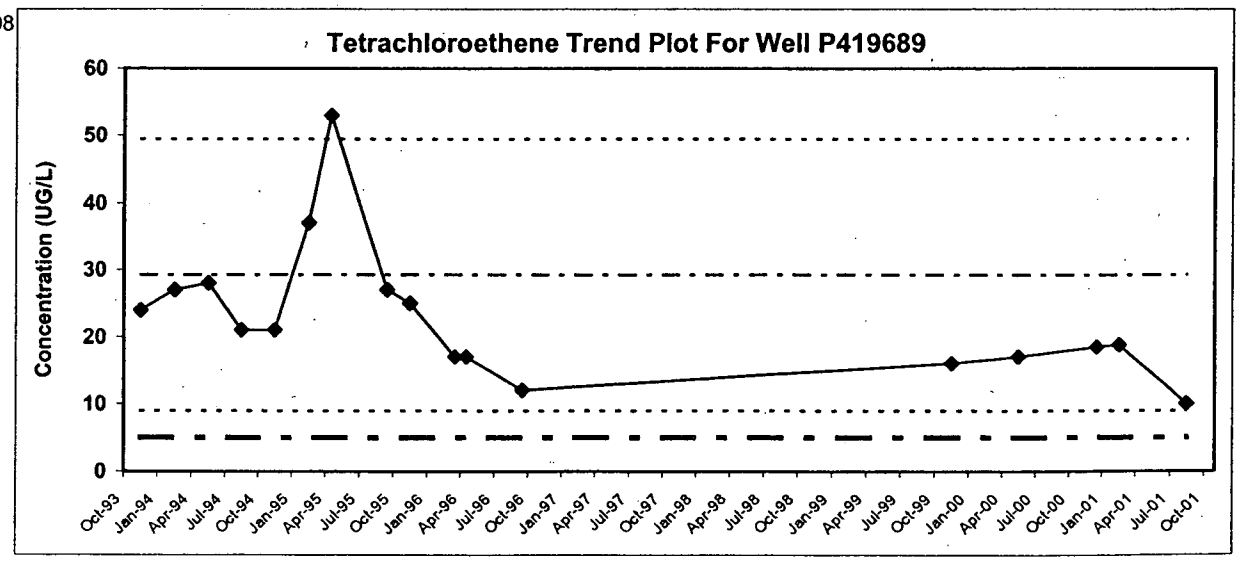
A-196



A-197



A-198



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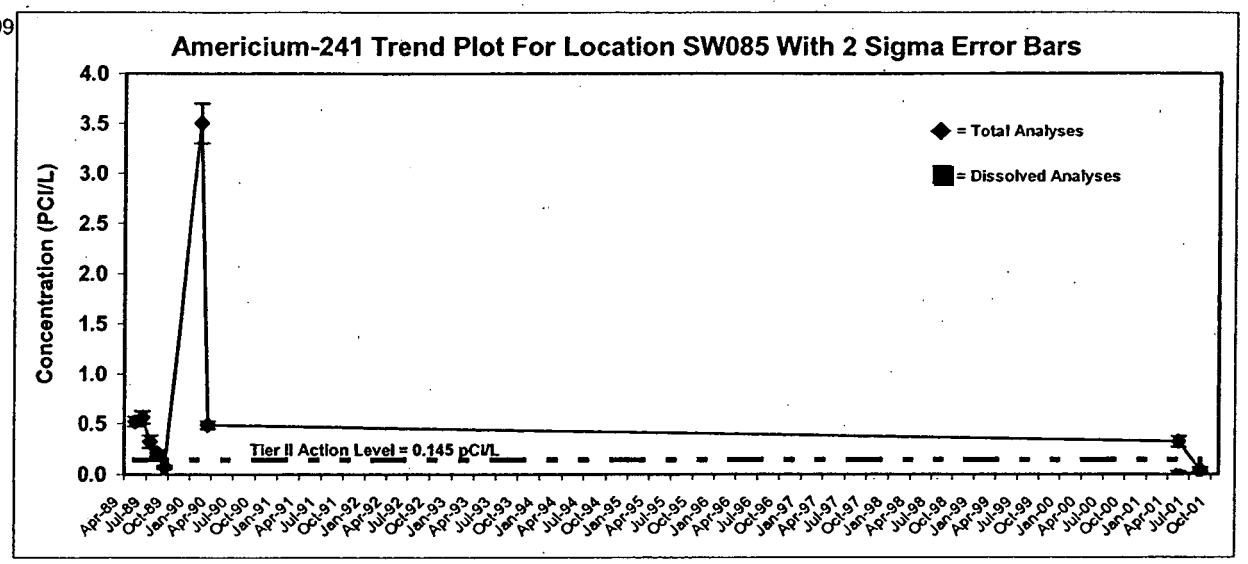
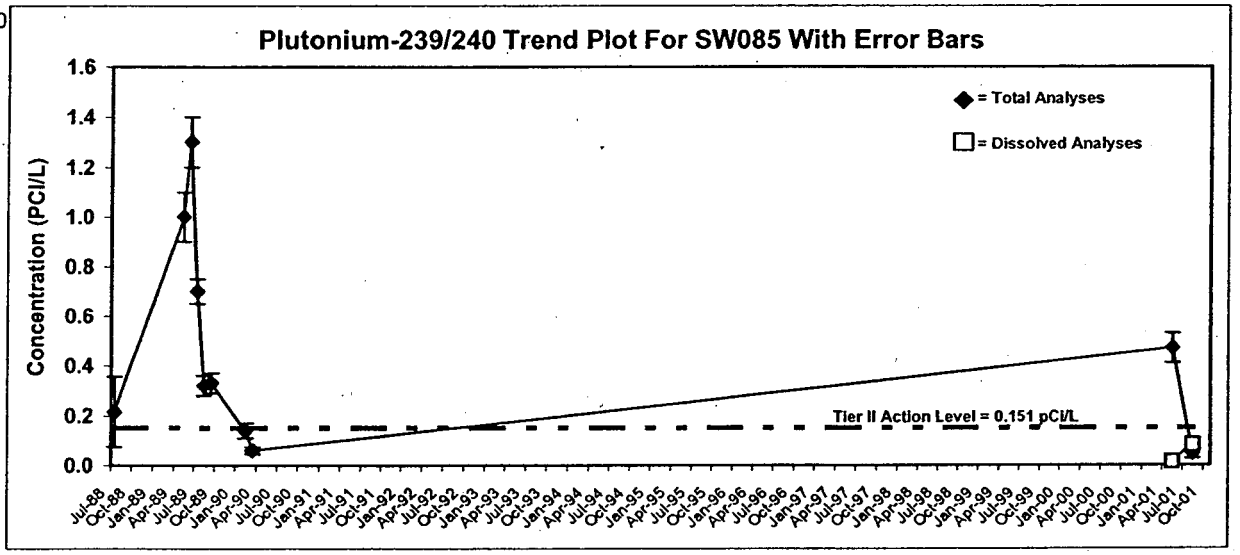
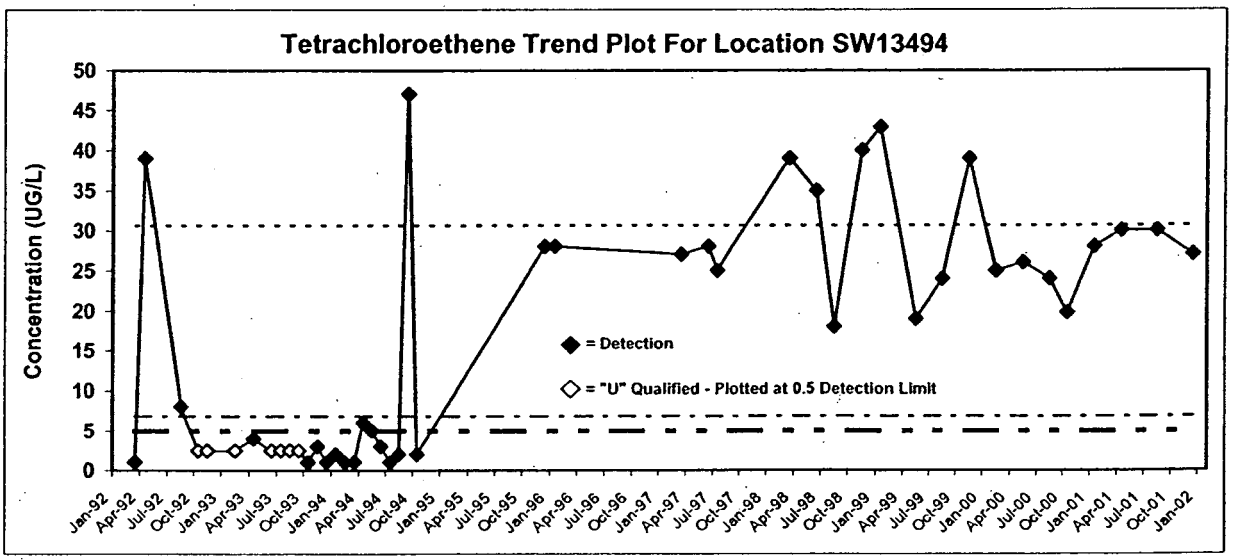
A-199



A-200



A-201



Heavy Horizontal Dashed Line = Tier II Action Level
Light Horizontal Dashed Lines = 1991-1995 Historic Mean and +/- 2 Standard Deviations (+/-M2SDs)

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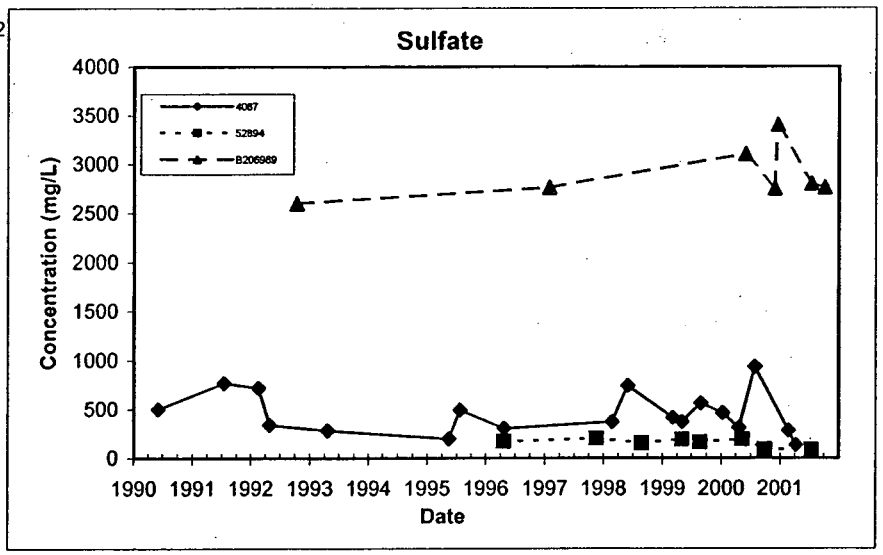
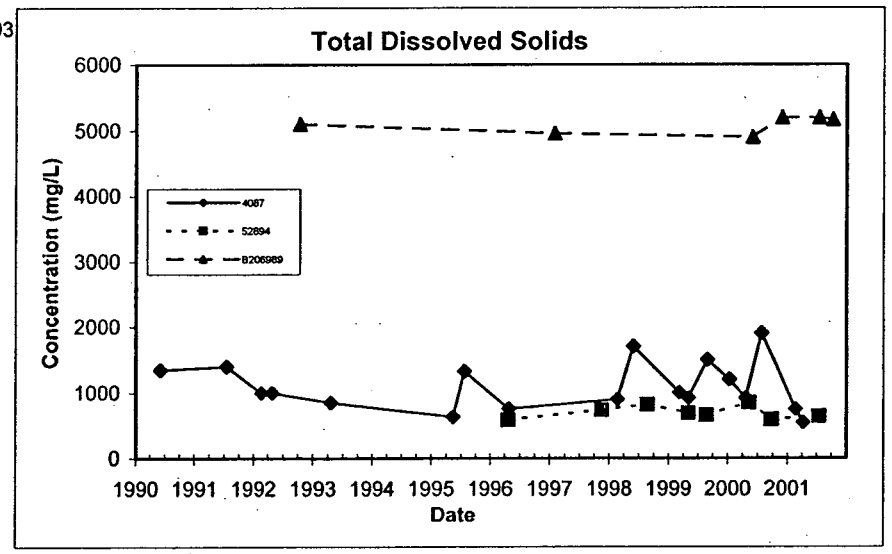
Appendix A:
2001 Landfill Trend Plots A-202 to A-213

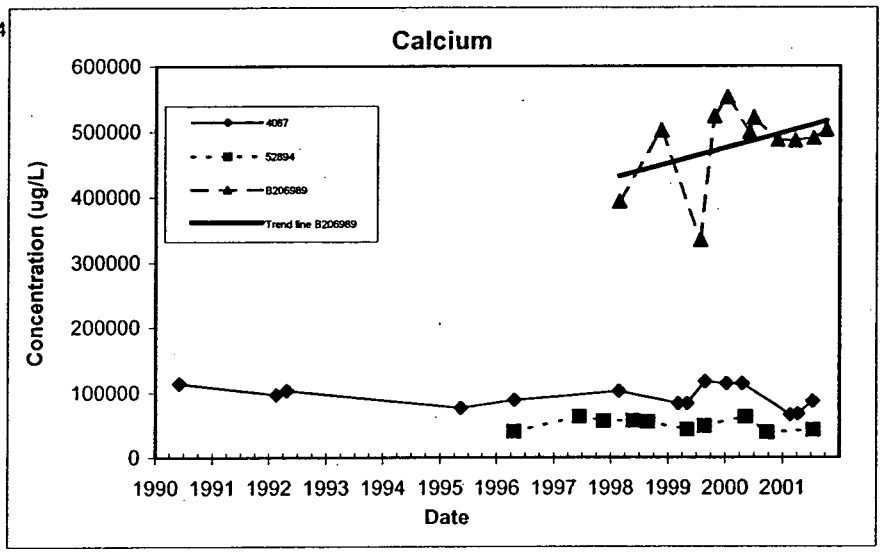
A-202



A-203



A-204



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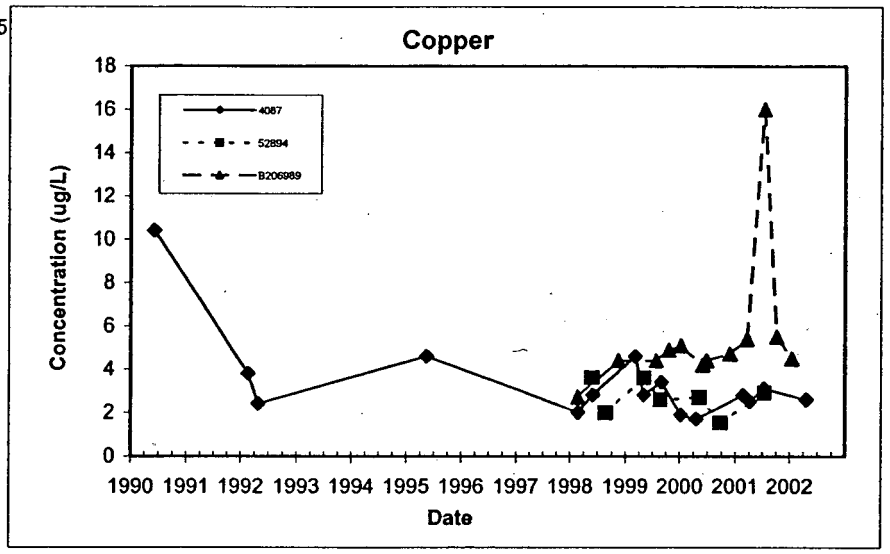
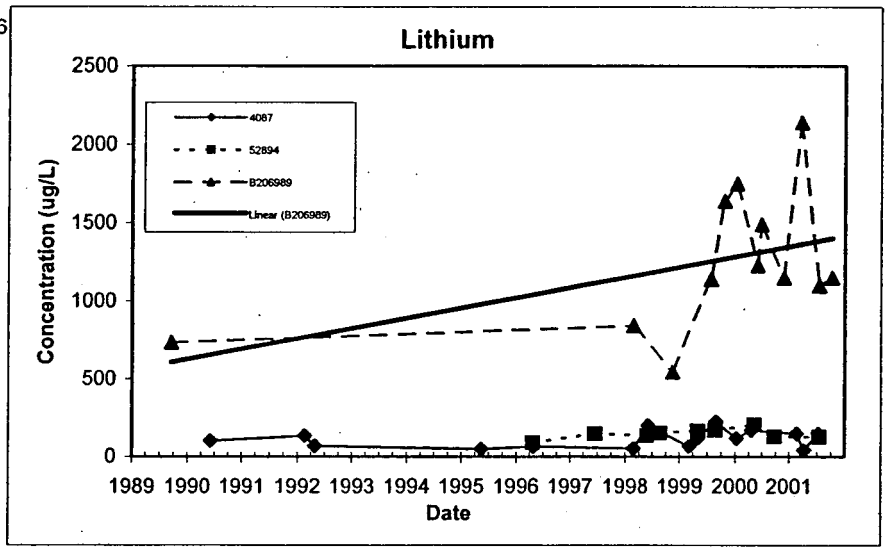
Appendix A:
2001 Landfill Trend Plots A-202 to A-213

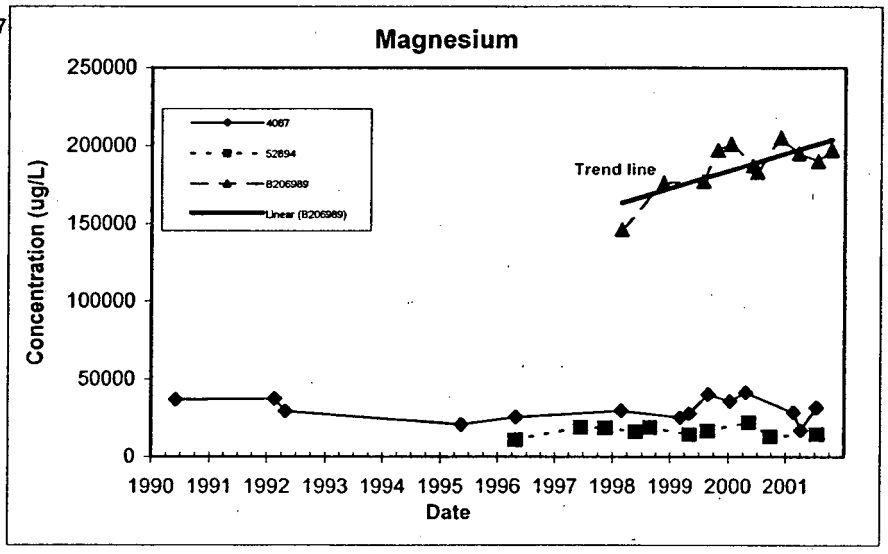
A-205



A-206



A-207



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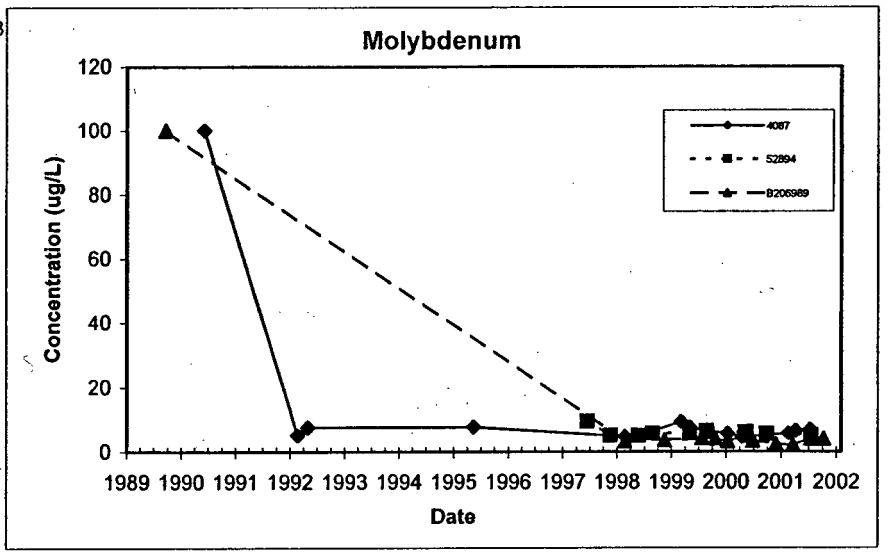
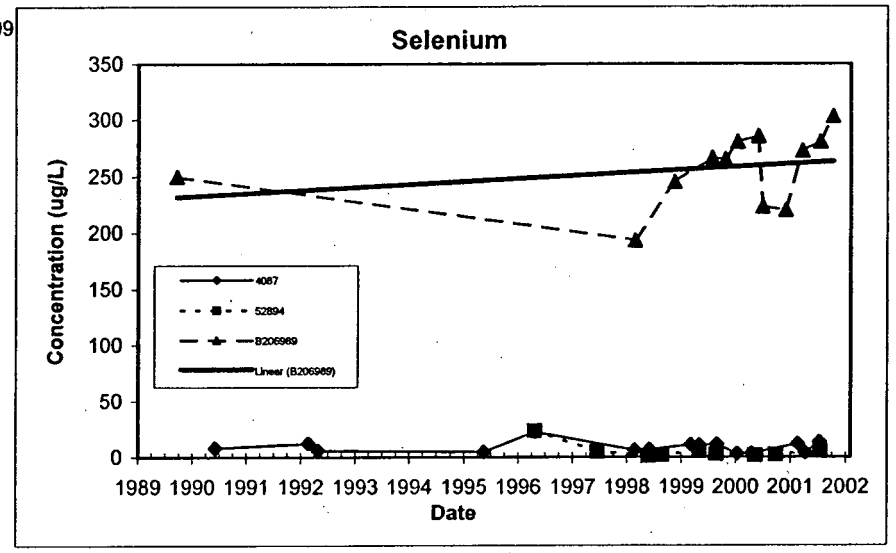
Appendix A:
2001 Landfill Trend Plots A-202 to A-213

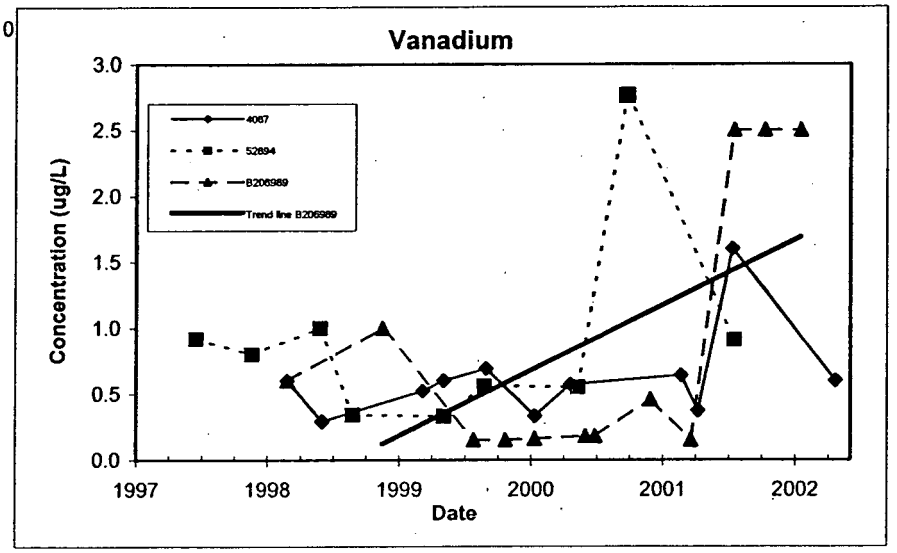
A-208



A-209

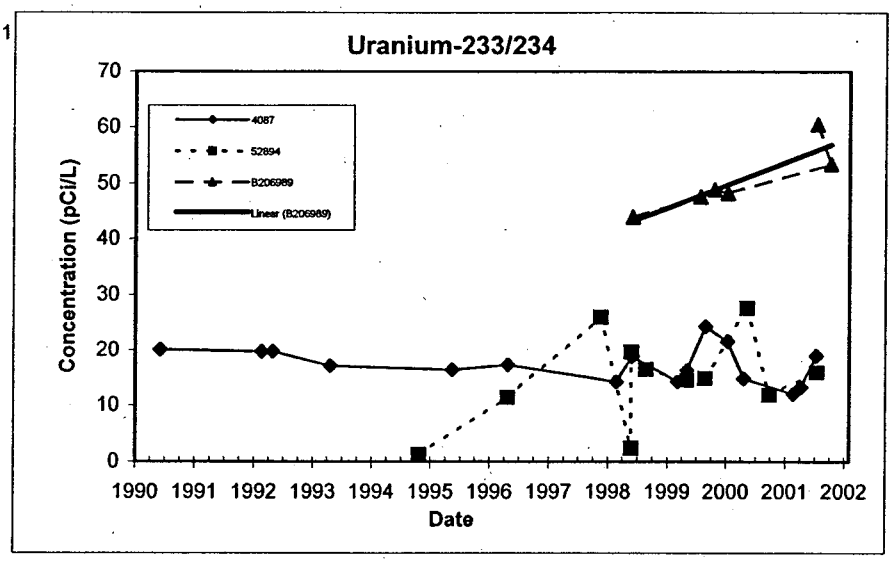


A-210

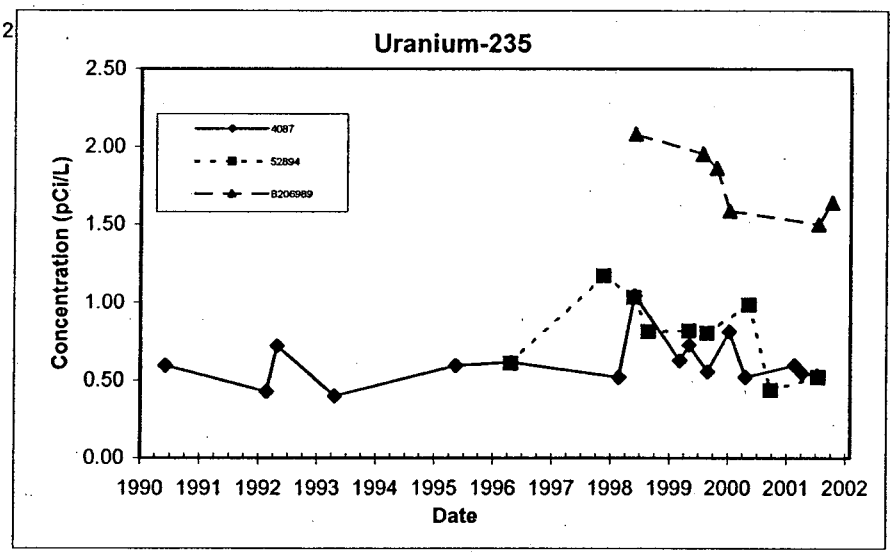


Appendix A:
2001 Landfill Trend Plots A-202 to A-213

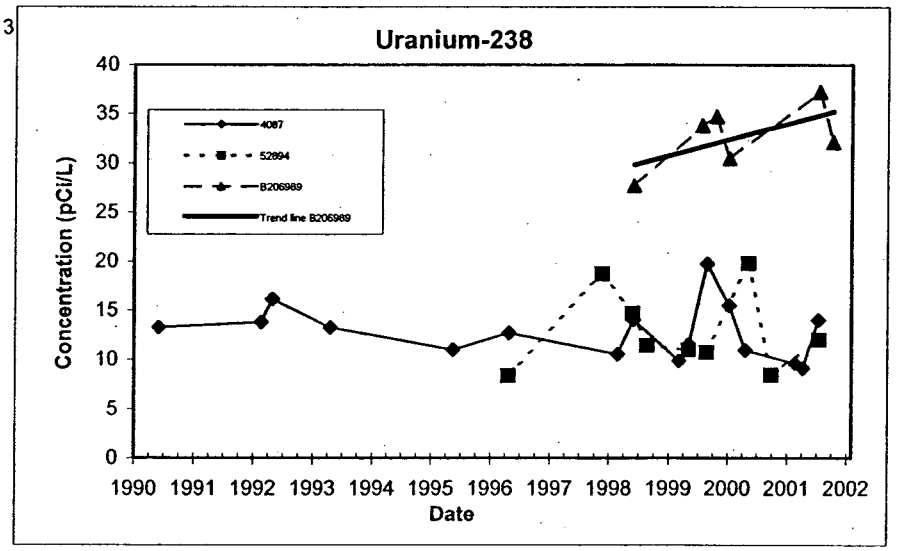
A-211



A-212



A213



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Appendix B: Water Level Data - Groundwater 2001

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
00100	1/8/01	7.95	5969.52		5946.18	5946.28
00100	4/2/01	6.74	5970.73		5946.18	5946.28
00100	7/9/01	5.05	5972.42		5946.18	5946.28
00100	10/1/01	5.37	5972.1		5946.18	5946.28
00191	4/4/01	20.46	5949.98		5943.86	5941.86
00191	10/4/01	19.26	5951.18		5943.86	5941.86
00197	1/3/01	-1	5928.5	Dry	5917.6	5917.6
00197	4/2/01	-1	5928.5	Dry	5917.6	5917.6
00197	4/6/01	-1	5928.5	Dry	5917.6	5917.6
00197	7/2/01	-1	5928.5	Dry	5917.6	5917.6
00197	10/1/01	-1	5928.5	Dry	5917.6	5917.6
00200	1/8/01	10.95	5975.84		5967.32	5967.22
00200	2/1/01	10.58	5976.21		5967.32	5967.22
00200	3/6/01	10.73	5976.06		5967.32	5967.22
00200	4/2/01	10.01	5976.78		5967.32	5967.22
00200	7/10/01	10.21	5976.58		5967.32	5967.22
00200	10/1/01	10.44	5976.35		5967.32	5967.22
00297	1/9/01	-1	5975.92	Dry	5964.7	5962.7
00297	4/2/01	-1	5975.92	Dry	5964.7	5962.7
00297	7/2/01	10.36	5964.56		5964.7	5962.7
00297	10/2/01	11.62	5963.3	Technically Dry	5964.7	5962.7
00300	1/8/01	14.82	5970.84		5966.03	5965.93
00300	2/1/01	8.49	5977.17		5966.03	5965.93
00300	3/6/01	6.76	5978.9		5966.03	5965.93
00300	4/4/01	6.33	5979.33		5966.03	5965.93
00300	7/2/01	6.25	5979.41		5966.03	5965.93
00300	10/1/01	6.83	5978.83		5966.03	5965.93
00397	1/2/01	-1	5939.03	Dry	5928	5926
00397	4/3/01	11.78	5926.25	Technically Dry	5928	5926
00397	4/5/01	11.78	5926.25		5928	5926
00397	7/10/01	-1	5939.03	Dry	5928	5926
00397	10/2/01	-1	5939.03	Dry	5928	5926
00400	1/8/01	10.8	5976.67		5968.18	5968.08
00400	2/1/01	10.85	5976.62		5968.18	5968.08
00400	3/6/01	10.63	5976.84		5968.18	5968.08
00400	4/2/01	8.34	5979.13		5968.18	5968.08
00400	7/10/01	8.68	5978.79		5968.18	5968.08
00400	10/1/01	9.18	5978.29		5968.18	5968.08
00491	1/4/01	-1	5905.97	Dry to top Pump	5885.97	5883.97
00491	4/4/01	-1	5905.97	Dry to top Pump	5885.97	5883.97
00491	7/10/01	16.16	5888.81		5885.97	5883.97
00491	10/3/01	-1	5905.97	Dry to top Pump	5885.97	5883.97
00500	1/8/01	10.94	5970.95		5962.2	5962.1
00500	4/2/01	8.04	5973.85		5962.2	5962.1
00500	7/9/01	8.88	5973.01		5962.2	5962.1
00500	10/1/01	8.11	5973.78		5962.2	5962.1
00597	1/2/01	14.75	5969.78		5962.1	5960.1
00597	4/5/01	13.63	5970.9		5962.1	5960.1
00597	7/3/01	11.31	5973.22		5962.1	5960.1
00597	10/4/01	12.74	5971.79		5962.1	5960.1
00600	1/8/01	8.91	5975.01		5964.67	5964.52
00600	4/2/01	3.86	5980.06		5964.67	5964.52

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Appendix B: Water Level Data - Groundwater 2001

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
00600	7/10/01	6.62	5977.3		5964.67	5964.52
00600	10/1/01	6.33	5977.59		5964.67	5964.52
00697	1/3/01	11.67	5964.37	Technically Dry	5966	5964
00697	4/2/01	-1	5977.04	Dry	5966	5964
00697	7/2/01	-1	5977.04	Dry	5966	5964
00697	10/1/01	-1	5977.04	Dry	5966	5964
00700	1/8/01	9.71	5974.83		5954.12	5954.02
00700	4/2/01	9.22	5975.32		5954.12	5954.02
00700	7/10/01	8.54	5976		5954.12	5954.02
00700	10/1/01	8.82	5975.72		5954.12	5954.02
00797	1/4/01	17.77	5923.23		5912.2	5910.2
00797	4/2/01	20.93	5920.07		5912.2	5910.2
00797	7/3/01	15.54	5925.46		5912.2	5910.2
00797	10/3/01	23.77	5917.23		5912.2	5910.2
00797	12/6/01	19.85	5921.15		5912.2	5910.2
00897	1/4/01	23.91	5943.69		5937.5	5935.5
00897	4/3/01	23.44	5944.16		5937.5	5935.5
00897	7/5/01	20.17	5947.43		5937.5	5935.5
00897	10/4/01	20.63	5946.97		5937.5	5935.5
00997	1/3/01	6.57	5795.33		5789.6	5787.6
00997	2/5/01	8.57	5793.33		5789.6	5787.6
00997	3/5/01	7.18	5794.72		5789.6	5787.6
00997	4/5/01	6.67	5795.23		5789.6	5787.6
00997	5/7/01	2.62	5799.28		5789.6	5787.6
00997	6/1/01	6.25	5795.65		5789.6	5787.6
00997	7/10/01	6.31	5795.59		5789.6	5787.6
00997	8/2/01	8.97	5792.93		5789.6	5787.6
00997	9/4/01	7.28	5794.62		5789.6	5787.6
00997	10/2/01	6.02	5795.88		5789.6	5787.6
00997	11/2/01	6.53	5795.37		5789.6	5787.6
00997	12/3/01	6.56	5795.34		5789.6	5787.6
01097	1/8/01	25.86	6003.14		5987.2	5984.5
01097	4/4/01	25.99	6003.01		5987.2	5984.5
01097	7/3/01	22	6007		5987.2	5984.5
01097	10/4/01			No meas., TROL	5987.2	5984.5
01197	1/8/01	18.77	5996.51		5985	5983
01197	4/4/01	17.41	5997.87		5985	5983
01197	7/3/01	12.2	6003.08		5985	5983
01197	10/4/01	15.6	5999.68		5985	5983
01291	4/2/01	15.53	5837.32	Technically Dry	5837.91	5835.91
01291	10/1/01	15.54	5837.31	Technically Dry	5837.91	5835.91
01297	1/8/01	16.29	5999.81		5980	5978
01297	4/5/01	15.98	6000.12		5980	5978
01297	7/10/01	11.28	6004.82		5980	5978
01297	10/2/01	13.99	6002.11		5980	5978
01391	1/4/01	11.65	5963.65		5959.7	5957.7
01391	2/6/01	11.97	5963.33		5959.7	5957.7
01391	3/6/01	11.76	5963.54		5959.7	5957.7
01391	4/3/01	11.17	5964.13		5959.7	5957.7
01391	5/2/01	10.5	5964.8		5959.7	5957.7
01391	6/4/01	10.08	5965.22		5959.7	5957.7
01391	7/5/01	10.66	5964.64		5959.7	5957.7

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
01391	8/6/01	11.06	5964.24		5959.7	5957.7
01391	9/5/01	11.31	5963.99		5959.7	5957.7
01391	10/4/01	11.51	5963.79		5959.7	5957.7
01391	11/5/01	11.76	5963.54		5959.7	5957.7
01391	12/10/01	11.95	5963.35		5959.7	5957.7
01397	1/8/01	14.05	5992.89		5982.8	5980.8
01397	4/5/01	12.95	5993.99		5982.8	5980.8
01397	7/10/01	7.19	5999.75		5982.8	5980.8
01397	10/2/01	10.53	5996.41		5982.8	5980.8
01497	1/8/01	16.46	5987.44		5978.9	5977
01497	4/5/01	15.84	5988.06		5978.9	5977
01497	7/10/01	10.26	5993.64		5978.9	5977
01497	10/4/01	13.57	5990.33		5978.9	5977
01597	1/8/01	20.8	5985.56		5974.4	5972.4
01597	4/5/01	20.15	5986.21		5974.4	5972.4
01597	7/10/01	14.51	5991.85		5974.4	5972.4
01597	10/2/01	18.12	5988.24		5974.4	5972.4
01697	1/8/01	26.85	5972.11		5969.8	5969.65
01697	4/4/01	25.63	5973.33		5969.8	5969.65
01697	7/3/01	23.13	5975.83		5969.8	5969.65
01697	10/4/01	24.42	5974.54		5969.8	5969.65
01797	1/8/01	24.58	5972.42	Technically Dry	5973	5971
01797	4/5/01	24.89	5972.11	Technically Dry	5973	5971
01797	7/10/01	19.84	5977.16		5973	5971
01797	10/2/01	21.32	5975.68		5973	5971
0187	3/7/01	-1	5995.08	Dry to top Pump	5980.66	5980.41
0187	11/26/01	13.08	5981		5980.66	5980.41
0187	12/6/01	-1	5995.08	Dry to top Pump	5980.66	5980.41
01897	1/8/01	20.02	5970.48		5967.2	5967
01897	4/4/01	18.95	5971.55		5967.2	5967
01897	7/3/01	16.65	5973.85		5967.2	5967
01897	10/4/01	17.9	5972.6		5967.2	5967
0190	1/2/01	39.04	6006.84		5999.8	5994.8
0190	2/6/01	39.16	6006.72		5999.8	5994.8
0190	3/7/01	39.39	6006.49		5999.8	5994.8
0190	4/2/01	39.15	6006.73		5999.8	5994.8
0190	5/3/01	37.03	6008.85		5999.8	5994.8
0190	6/4/01	34.16	6011.72		5999.8	5994.8
0190	7/2/01	35.42	6010.46		5999.8	5994.8
0190	8/6/01	36.42	6009.46		5999.8	5994.8
0190	9/4/01	36.92	6008.96		5999.8	5994.8
0190	10/3/01	37.3	6008.58		5999.8	5994.8
0190	11/5/01	37.98	6007.9		5999.8	5994.8
0190	12/6/01	38.45	6007.43		5999.8	5994.8
01997	1/8/01	15.28	5970.62	Technically Dry	5972	5970
01997	4/5/01	15.59	5970.31	Technically Dry	5972	5970
01997	7/3/01	13.42	5972.48		5972	5970
01997	10/4/01	14.15	5971.75	Technically Dry	5972	5970
02097	1/8/01	8.64	5966.69		5963.07	5962.91
02097	4/4/01	8	5967.33		5963.07	5962.91
02097	7/3/01	7.09	5968.24		5963.07	5962.91
02097	10/4/01	7.97	5967.36		5963.07	5962.91

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Appendix B: Water Level Data - Groundwater 2001

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
02197	1/2/01	13.97	5946.73	Technically Dry	5948.1	5946.1
02197	4/5/01	14.17	5946.53	Technically Dry	5948.1	5946.1
02197	7/3/01	10.87	5949.83		5948.1	5946.1
02197	10/4/01	12.94	5947.76	Technically Dry	5948.1	5946.1
02291	1/4/01	15.08	5923.18		5920.16	5918.16
02291	4/3/01	15.38	5922.88		5920.16	5918.16
02291	7/5/01	13.07	5925.19		5920.16	5918.16
02291	10/3/01	14.55	5923.71		5920.16	5918.16
02397	1/8/01	-1	5987.81	Dry	5975.03	5974.88
02397	2/1/01	-1	5987.81	Dry	5975.03	5974.88
02397	3/5/01	-1	5987.81	Dry	5975.03	5974.88
02397	4/2/01	9.51	5977.3		5975.03	5974.88
02397	7/10/01	10.57	5976.24		5975.03	5974.88
02397	10/1/01	10.63	5976.18		5975.03	5974.88
02497	1/8/01	9.36	5970.06		5968.05	5967.9
02497	4/4/01	8.11	5971.31		5968.05	5967.9
02497	7/9/01	7.16	5972.26		5968.05	5967.9
02497	10/1/01	7.24	5972.18		5968.05	5967.9
02500	1/8/01	6.81	5970.74		5963.2	5963.1
02500	4/2/01	5.94	5971.61		5963.2	5963.1
02500	7/9/01	4.27	5973.28		5963.2	5963.1
02500	10/1/01	4.67	5972.88		5963.2	5963.1
02591	1/3/01	41.11	5884.23		5874.47	5872.47
0290	1/2/01	48.32	6002.33		5990.8	5985.8
0290	2/6/01	48.33	6002.32		5990.8	5985.8
0290	3/7/01	48.46	6002.19		5990.8	5985.8
0290	4/2/01	48.42	6002.23		5990.8	5985.8
0290	5/2/01	48.28	6002.37		5990.8	5985.8
0290	6/4/01	46.74	6003.91		5990.8	5985.8
0290	7/2/01	46.54	6004.11		5990.8	5985.8
0290	8/6/01	46.77	6003.88		5990.8	5985.8
0290	9/4/01	46.9	6003.75		5990.8	5985.8
0290	10/3/01	47.02	6003.63		5990.8	5985.8
0290	11/2/01	47.33	6003.32		5990.8	5985.8
0290	12/6/01	47.57	6003.08		5990.8	5985.8
03191	4/3/01	23.37	5928.65		5929.15	5927.15
03191	10/3/01	23.42	5928.6	Technically Dry	5929.15	5927.15
03198	12/5/01	4.86	5924.64		5917	5917
0386	1/4/01	17.12	5660.74		5652.57	5652.57
0386	2/5/01	17.18	5660.68		5652.57	5652.57
0386	3/1/01	17.22	5660.64		5652.57	5652.57
0386	4/4/01	17.28	5660.58		5652.57	5652.57
0386	5/3/01	17.31	5660.55		5652.57	5652.57
0386	6/5/01	17.21	5660.65		5652.57	5652.57
0386	7/10/01	17.29	5660.57		5652.57	5652.57
0386	8/2/01	17.32	5660.54		5652.57	5652.57
0386	9/4/01	17.35	5660.51		5652.57	5652.57
0386	10/3/01	17.34	5660.52		5652.57	5652.57
0386	11/5/01	17.39	5660.47		5652.57	5652.57
0386	12/10/01	17.42	5660.44		5652.57	5652.57
0390	1/2/01	55.8	6023.33		6010.4	6005.4
0390	2/6/01	55.64	6023.49		6010.4	6005.4

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
0390	3/7/01	55.81	6023.32		6010.4	6005.4
0390	4/2/01	55.65	6023.48		6010.4	6005.4
0390	5/3/01	56.09	6023.04		6010.4	6005.4
0390	6/4/01	55.18	6023.95		6010.4	6005.4
0390	7/2/01	54.92	6024.21		6010.4	6005.4
0390	8/6/01	54.83	6024.3		6010.4	6005.4
0390	9/4/01	54.63	6024.5		6010.4	6005.4
0390	10/3/01	54.43	6024.7		6010.4	6005.4
0390	11/5/01	54.61	6024.52		6010.4	6005.4
0390	12/6/01	54.45	6024.68		6010.4	6005.4
03991	1/3/01	36.52	5900.35		5897.77	5895.77
03991	4/3/01	36.66	5900.21		5897.77	5895.77
03991	7/3/01	35.57	5901.3		5897.77	5895.77
03991	10/3/01	35.81	5901.06		5897.77	5895.77
04091	1/3/01	37.54	5892.6		5892.52	5890.52
04091	4/3/01	37.58	5892.56		5892.52	5890.52
04091	7/3/01	37.35	5892.79		5892.52	5890.52
04091	10/3/01	37.37	5892.77		5892.52	5890.52
04191	4/5/01	18.25	5938.74		5938.48	5936.48
04191	10/8/01	18.38	5938.61		5938.48	5936.48
04591	4/5/01	45.25	5905		5904.59	5902.59
04591	7/12/01	44.96	5905.29		5904.59	5902.59
04591	10/8/01	45.18	5905.07		5904.59	5902.59
0487	1/3/01	16.59	5894.99		5890.65	5890.42
0487	2/5/01	17.5	5894.08		5890.65	5890.42
0487	3/1/01	18.09	5893.49		5890.65	5890.42
0487	4/2/01	17.97	5893.61		5890.65	5890.42
0487	5/1/01	14.48	5897.1		5890.65	5890.42
0487	6/1/01	13.3	5898.28		5890.65	5890.42
0487	7/3/01	14.12	5897.46		5890.65	5890.42
0487	8/2/01	14.75	5896.83		5890.65	5890.42
0487	9/4/01	15.34	5896.24		5890.65	5890.42
0487	10/1/01	15.99	5895.59		5890.65	5890.42
0487	11/2/01	17.2	5894.38		5890.65	5890.42
0487	12/6/01	18.3	5893.28		5890.65	5890.42
04991	1/4/01	42.12	5896.51		5896.64	5894.64
04991	4/2/01	43.81	5894.82		5896.64	5894.64
04991	7/3/01	42.36	5896.27		5896.64	5894.64
04991	10/1/01	42.15	5896.48		5896.64	5894.64
05091	1/4/01	44.36	5894.88		5893.63	5891.63
05091	4/2/01	44.52	5894.72		5893.63	5891.63
05091	7/3/01	43.4	5895.84		5893.63	5891.63
05091	10/1/01	43.59	5895.65		5893.63	5891.63
05193	1/9/01	13.02	5957.56		5957	5955
05193	3/5/01	13.16	5957.42		5957	5955
05193	4/2/01	12.98	5957.6		5957	5955
05193	5/3/01	11.4	5959.18		5957	5955
05193	6/5/01	9.45	5961.13		5957	5955
05193	7/2/01	10.34	5960.24		5957	5955
05193	8/1/01	11.09	5959.49		5957	5955
05193	9/4/01	11.57	5959.01		5957	5955
05193	10/2/01	11.82	5958.76		5957	5955

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
05193	11/2/01	12.21	5958.37		5957	5955
05193	12/3/01	12.55	5958.03		5957	5955
05291	4/5/01	37.08	5905.92		5906.13	5904.13
05291	10/8/01	36.8	5906.2		5906.13	5904.13
05391	1/3/01	36.14	5905.53		5905.09	5903.09
05391	4/3/01	36.36	5905.31		5905.09	5903.09
05391	7/3/01	34.13	5907.54		5905.09	5903.09
05391	10/3/01	34.9	5906.77		5905.09	5903.09
05691	1/3/01	33.36	5915.63		5912.51	5910.51
05691	4/3/01	33.11	5915.88		5912.51	5910.51
05691	7/3/01	29.63	5919.36		5912.51	5910.51
05691	10/3/01	30.37	5918.62		5912.51	5910.51
06091	1/3/01	38.2	5893.4		5889.38	5887.38
06091	2/6/01	38.26	5893.34		5889.38	5887.38
06091	3/1/01	38.34	5893.26		5889.38	5887.38
06091	4/3/01	38.37	5893.23		5889.38	5887.38
06091	5/3/01	38.33	5893.27		5889.38	5887.38
06091	6/5/01	37.65	5893.95		5889.38	5887.38
06091	7/3/01	37.37	5894.23		5889.38	5887.38
06091	8/2/01	37.28	5894.32		5889.38	5887.38
06091	9/4/01	37.31	5894.29		5889.38	5887.38
06091	10/3/01	37.4	5894.2		5889.38	5887.38
06091	11/2/01	37.57	5894.03		5889.38	5887.38
06091	12/10/01	37.79	5893.81		5889.38	5887.38
06191	4/3/01	34.1	5886.62		5887.11	5885.11
06191	10/3/01	33.78	5886.94		5887.11	5885.11
06291	1/4/01	31.66	5867.62		5865	5863
06291	2/6/01	31.26	5868.02		5865	5863
06291	3/1/01	31	5868.28		5865	5863
06291	4/3/01	30.71	5868.57		5865	5863
06291	5/3/01	30.54	5868.74		5865	5863
06291	6/5/01	30.28	5869		5865	5863
06291	7/3/01	30.11	5869.17		5865	5863
06291	8/2/01	29.94	5869.34		5865	5863
06291	9/4/01	29.62	5869.66		5865	5863
06291	10/3/01	28.66	5870.62		5865	5863
06291	11/2/01	27.95	5871.33		5865	5863
06291	12/10/01	27.03	5872.25		5865	5863
06491	1/4/01	15.17	5658.08		5655.55	5653.55
06491	4/4/01	17.73	5655.52		5655.55	5653.55
06491	7/10/01	17.11	5656.14		5655.55	5653.55
06491	10/3/01	19.34	5653.91	Technically Dry	5655.55	5653.55
06591	1/10/01	20.53	5959.25		5930.28	5928.28
06991	4/4/01	18.41	5956.16		5943.91	5941.91
06991	10/4/01	19.29	5955.28		5943.91	5941.91
07291	1/10/01	21.15	5957.65		5956.67	5954.67
07291	2/5/01	17.27	5961.53		5956.67	5954.67
07291	3/1/01	21.35	5957.45		5956.67	5954.67
07291	4/4/01	21.42	5957.38	Technically Dry	5956.67	5954.67
07291	5/7/01	15.82	5962.98		5956.67	5954.67
07291	6/6/01	18.6	5960.2		5956.67	5954.67
07291	7/12/01	20.27	5958.53		5956.67	5954.67

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
07291	8/7/01	20.53	5958.27		5956.67	5954.67
07291	9/6/01	20.64	5958.16		5956.67	5954.67
07291	10/4/01	20.78	5958.02		5956.67	5954.67
07291	11/6/01	20.96	5957.84		5956.67	5954.67
07291	12/10/01	21.14	5957.66		5956.67	5954.67
07391	1/10/01	9.9	5940.71		5937.74	5935.74
07391	4/4/01	14.95	5935.66	Technically Dry	5937.74	5935.74
07391	5/7/01	12.73	5937.88		5937.74	5935.74
07391	7/12/01	-1	5951.61	Dry to top Troll	5937.74	5935.74
07391	10/4/01			No meas., TROL	5937.74	5935.74
08091	1/10/01	19.98	5929.53	Technically Dry	5931.6	5929.6
08091	4/5/01	19.98	5929.53	Technically Dry	5931.6	5929.6
08091	7/12/01	20	5929.51	Technically Dry	5931.6	5929.6
08091	10/8/01	19.98	5929.53	Technically Dry	5931.6	5929.6
0990	1/2/01	7.95	6075.53		6045.5	6040.2
0990	2/5/01	7.93	6075.55		6045.5	6040.2
0990	3/1/01	8.01	6075.47		6045.5	6040.2
0990	4/2/01	6.98	6076.5		6045.5	6040.2
0990	5/1/01	3.81	6079.67		6045.5	6040.2
0990	6/1/01	4.41	6079.07		6045.5	6040.2
0990	7/2/01	6.82	6076.66		6045.5	6040.2
0990	8/1/01	7.91	6075.57		6045.5	6040.2
0990	9/4/01	8.41	6075.07		6045.5	6040.2
0990	10/1/01	8.74	6074.74		6045.5	6040.2
0990	11/2/01	9.15	6074.33		6045.5	6040.2
0990	12/6/01	9.39	6074.09		6045.5	6040.2
10098	1/4/01	6.72	6028.78		6027.3	6027.2
10098	2/6/01	6.9	6028.6		6027.3	6027.2
10098	3/5/01	6.05	6029.45		6027.3	6027.2
10098	4/4/01	4.02	6031.48		6027.3	6027.2
10098	5/2/01	3.14	6032.36		6027.3	6027.2
10098	6/4/01	3.96	6031.54		6027.3	6027.2
10098	7/10/01	4.51	6030.99		6027.3	6027.2
10098	8/6/01	5.53	6029.97		6027.3	6027.2
10098	9/5/01	5.61	6029.89		6027.3	6027.2
10098	10/4/01	5.48	6030.02		6027.3	6027.2
10098	11/5/01	6.5	6029		6027.3	6027.2
10098	12/10/01	6.21	6029.29		6027.3	6027.2
10192	12/6/01	-1	5925.3	Dry	5905.82	5903.95
10194	1/4/01	39.27	5901.11		5897.5	5895.3
10194	4/4/01	39.34	5901.04		5897.5	5895.3
10194	7/10/01	38.86	5901.52		5897.5	5895.3
10194	10/3/01	39.03	5901.35		5897.5	5895.3
10198	1/4/01	5.16	6030.34		6022.9	6022.8
10198	4/4/01	3.5	6032		6022.9	6022.8
10198	7/10/01	4.21	6031.29		6022.9	6022.8
10198	10/4/01	4.59	6030.91		6022.9	6022.8
10292	12/6/01	-1	5926.46	Dry	5901.08	5899.47
10294	1/3/01	6.47	5599.73		5589.4	5587
10294	4/3/01	4.8	5601.4		5589.4	5587
10294	7/10/01	6.95	5599.25		5589.4	5587
10294	10/3/01	7.4	5598.8		5589.4	5587

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
10298	1/4/01	4.65	6024.75		6014.4	6014.3
10298	4/4/01	4.8	6024.6		6014.4	6014.3
10298	7/10/01	4.07	6025.33		6014.4	6014.3
10298	10/5/01	5.3	6024.1		6014.4	6014.3
10392	12/6/01	-1	5933.05	Dry	5905.03	5903.47
10394	1/3/01	4.88	5628.25		5621.8	5619.5
10394	4/3/01	4.65	5628.48		5621.8	5619.5
10394	7/10/01	6.93	5626.2		5621.8	5619.5
10394	10/3/01	-1	5634.13	Dry to top Pump	5621.8	5619.5
10398	1/4/01	5.1	6025.4		6019.9	6019.7
10398	4/4/01	6.04	6024.46		6019.9	6019.7
10398	7/10/01	5.12	6025.38		6019.9	6019.7
10398	10/4/01	5.62	6024.88		6019.9	6019.7
10492	12/6/01	30.4	5902.41		5900.5	5898.9
10498	1/4/01	7.37	6025.13		6021.1	6020.9
10498	4/4/01	5.2	6027.3		6021.1	6020.9
10498	7/10/01	5.15	6027.35		6021.1	6020.9
10498	10/4/01	5.48	6027.02		6021.1	6020.9
10592	1/4/01	24.93	5913		5912.15	5910.33
10592	4/2/01	27.57	5910.36		5912.15	5910.33
10592	7/3/01	23.91	5914.02		5912.15	5910.33
10592	10/3/01	24.22	5913.71		5912.15	5910.33
10592	12/6/01	22.7	5915.23		5912.15	5910.33
10594	4/5/01	12.99	5807.96	Technically Dry	5810.12	5807.57
10594	10/2/01	10.43	5810.52		5810.12	5807.57
10598	1/4/01	6.23	6027.17		6025.9	6025.8
10598	4/4/01	3.51	6029.89		6025.9	6025.8
10598	7/10/01	3.7	6029.7		6025.9	6025.8
10598	10/4/01	4.93	6028.47		6025.9	6025.8
10692	1/1/01	8.42	5935.18		5922.1	5920.23
10692	4/2/01	5.53	5938.07		5922.1	5920.23
10692	7/3/01	6.46	5937.14		5922.1	5920.23
10692	10/3/01	8.53	5935.07		5922.1	5920.23
10692	12/6/01	9.19	5934.41		5922.1	5920.23
10694	4/5/01	4.76	5755.47		5751.59	5749.29
10694	10/2/01	6.17	5754.06		5751.59	5749.29
10792	1/3/01	24.33	5892.77		5892.61	5891.03
10792	4/2/01	25.61	5891.49		5892.61	5891.03
10792	7/3/01	24.02	5893.08		5892.61	5891.03
10792	10/3/01	24.55	5892.55		5892.61	5891.03
10792	12/6/01	24.11	5892.99		5892.61	5891.03
1087	4/6/01	-1	5984.52	Dry	5969.95	5969.95
1087	10/4/01	-1	5984.52	Dry	5969.95	5969.95
10892	12/6/01	-1	5930.2	Dry	5904.71	5903.13
10894	4/4/01	5.91	5663		5658.75	5656.55
10894	10/3/01	5.27	5663.64		5658.75	5656.55
10991	1/4/01	44.86	5896.78		5889.01	5887.01
10992	1/3/01	21.92	5876.64		5867.41	5865.57
10992	4/2/01	29.31	5869.25		5867.41	5865.57
10992	7/3/01	26.1	5872.46		5867.41	5865.57
10992	10/1/01	30.33	5868.23		5867.41	5865.57
10994	1/3/01	16.29	5901.19		5898.21	5895.71

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
10994	4/2/01	16.06	5901.42		5898.21	5895.71
10994	7/2/01	16.15	5901.33		5898.21	5895.71
10994	10/1/01	16.66	5900.82		5898.21	5895.71
11092	1/3/01	21.6	5873.71		5874.33	5872.82
11092	4/2/01	21.73	5873.58		5874.33	5872.82
11092	7/3/01	21.9	5873.41	Technically Dry	5874.33	5872.82
11092	10/1/01	21.98	5873.33	Technically Dry	5874.33	5872.82
11294	1/2/01	23.19	6150.31		6095.2	6092.9
11294	2/6/01	23.37	6150.13		6095.2	6092.9
11294	3/7/01	23.75	6149.75		6095.2	6092.9
11294	4/2/01	23.11	6150.39		6095.2	6092.9
11294	5/2/01	21.57	6151.93		6095.2	6092.9
11294	6/4/01	20.17	6153.33		6095.2	6092.9
11294	7/2/01	20.89	6152.61		6095.2	6092.9
11294	8/2/01	21.2	6152.3		6095.2	6092.9
11294	9/4/01	21.42	6152.08		6095.2	6092.9
11294	10/3/01	21.73	6151.77		6095.2	6092.9
11294	11/2/01	22.38	6151.12		6095.2	6092.9
11294	12/6/01	22.97	6150.53		6095.2	6092.9
11594	1/2/01	60.35	6055.98		6049.98	6047.68
11594	3/7/01	60.37	6055.96		6049.98	6047.68
11594	4/2/01	60.36	6055.97		6049.98	6047.68
11594	5/2/01	60.44	6055.89		6049.98	6047.68
11594	6/4/01	60.12	6056.21		6049.98	6047.68
11594	7/2/01	59.45	6056.88		6049.98	6047.68
11594	8/2/01	59.42	6056.91		6049.98	6047.68
11594	9/4/01	59.66	6056.67		6049.98	6047.68
11594	10/3/01	59.71	6056.62		6049.98	6047.68
11594	11/2/01	59.8	6056.53		6049.98	6047.68
11594	12/6/01	59.9	6056.43		6049.98	6047.68
1187	4/2/01	20.9	5894.22		5893.35	5893.1
1187	7/3/01	-1	5916.12	Dry to top Troll	5893.35	5893.1
1187	10/1/01	-1	5916.12	Dry to top Troll	5893.35	5893.1
11891	1/3/01	26.93	5920.51		5917.51	5915.51
11891	4/3/01	27.07	5920.37		5917.51	5915.51
11891	7/3/01	25.43	5922.01		5917.51	5915.51
11891	10/3/01	26.03	5921.41		5917.51	5915.51
12094	1/3/01	11.25	5751.82		5749.99	5747.99
12191	1/10/01	29.39	5928.8		5923.49	5921.49
12191	4/5/01	30.3	5927.89		5923.49	5921.49
12191	7/12/01	25.1	5933.09		5923.49	5921.49
12191	10/8/01	26.7	5931.49		5923.49	5921.49
12391	1/3/01	52.37	5889.33		5871.67	5869.67
12691	1/3/01	37.43	5913.65		5886.58	5884.58
12691	4/3/01	38	5913.08		5886.58	5884.58
12691	7/3/01	34.64	5916.44		5886.58	5884.58
12691	10/3/01	34.98	5916.1		5886.58	5884.58
1290	1/2/01	27.56	5987.31		5977.4	5972.4
1290	4/3/01	27.7	5987.17		5977.4	5972.4
1290	10/3/01	25.59	5989.28		5977.4	5972.4
13091	4/4/01	20.15	5955.05		5952.38	5950.38
13091	9/6/01	19.98	5955.22		5952.38	5950.38

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Appendix B: Water Level Data - Groundwater 2001

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
13091	10/4/01	20.53	5954.67		5952.38	5950.38
13291	1/10/01	17.67	5962.3	Technically Dry	5962.78	5960.78
13391	4/3/01	38.74	5886.61		5884.83	5882.83
13391	10/3/01	38.37	5886.98		5884.83	5882.83
13491	4/3/01	-1	5964.42	Dry	5932.92	5932.42
13491	10/3/01	22.86	5940.56		5932.92	5932.42
13591	4/5/01	-1	5968.55	Dry	5949.92	5947.92
13591	10/8/01	-1	5968.55	Dry	5949.92	5947.92
1386	1/2/01	5.62	5836.97		5830.97	5830.97
1386	2/5/01	5.3	5837.29		5830.97	5830.97
1386	3/5/01	5.51	5837.08		5830.97	5830.97
1386	4/5/01	5.55	5837.04		5830.97	5830.97
1386	5/1/01	5.49	5837.1		5830.97	5830.97
1386	6/5/01	5.75	5836.84		5830.97	5830.97
1386	7/12/01	6.94	5835.65		5830.97	5830.97
1386	8/2/01	7.26	5835.33		5830.97	5830.97
1386	9/4/01	11.42	5831.17		5830.97	5830.97
1386	10/2/01	10.77	5831.82		5830.97	5830.97
1386	11/2/01	8.71	5833.88		5830.97	5830.97
1386	12/3/01	8.87	5833.72		5830.97	5830.97
1390	1/2/01	31.22	5989.4		5978.5	5973.2
1390	4/3/01	31.41	5989.21		5978.5	5973.2
1390	10/3/01	29.56	5991.06		5978.5	5973.2
1490	1/2/01	55.13	6016.15		6009.4	6004.4
1490	2/6/01	55.07	6016.21		6009.4	6004.4
1490	3/7/01	55.37	6015.91		6009.4	6004.4
1490	4/2/01	55.3	6015.98		6009.4	6004.4
1490	5/2/01	55.46	6015.82		6009.4	6004.4
1490	6/4/01	53.53	6017.75		6009.4	6004.4
1490	7/2/01	53.35	6017.93		6009.4	6004.4
1490	8/6/01	53.56	6017.72		6009.4	6004.4
1490	9/4/01	53.56	6017.72		6009.4	6004.4
1490	10/3/01	53.58	6017.7		6009.4	6004.4
1490	11/2/01	54.07	6017.21		6009.4	6004.4
1490	12/6/01	54.34	6016.94		6009.4	6004.4
15199	1/4/01	10.99	5917.01		5916.7	5914.7
15199	4/2/01	10.52	5917.48		5916.7	5914.7
15199	7/5/01	8.19	5919.81		5916.7	5914.7
15199	10/3/01	10.37	5917.63		5916.7	5914.7
15299	1/4/01	12.8	5915.2	Technically Dry	5917	5915
15299	4/2/01	9.22	5918.78		5917	5915
15299	7/5/01	10.48	5917.52		5917	5915
15299	10/3/01	12.2	5915.8	Technically Dry	5917	5915
15399	1/4/01	6.52	5917.48		5914.7	5912.7
15399	4/2/01	6.43	5917.57		5914.7	5912.7
15399	7/5/01	5.81	5918.19		5914.7	5912.7
15399	10/3/01	7.2	5916.8		5914.7	5912.7
15499	1/4/01	5.95	5918.05		5911.5	5909.5
15499	4/2/01	5.72	5918.28		5911.5	5909.5
15499	7/5/01	5.12	5918.88		5911.5	5909.5
15499	10/3/01	6	5918		5911.5	5909.5
15599	1/4/01	-1	5918.9	Dry	5909	5907

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
15599	4/2/01	-1	5918.9	Dry	5909	5907
15599	7/5/01	-1	5918.9	Dry	5909	5907
15599	10/3/01	-1	5918.9	Dry	5909	5907
15699	1/4/01	11.5	5907.5	Technically Dry	5908.1	5906.1
15699	4/2/01	11.33	5907.67		5908.1	5906.1
15699	7/5/01	10.34	5908.66		5908.1	5906.1
15699	10/3/01	10.76	5908.24		5908.1	5906.1
15799	1/4/01	-1	5923	Dry	5911.6	5909.6
15799	4/2/01	-1	5923	Dry	5911.6	5909.6
15799	7/5/01	11.28	5910.72	Technically Dry	5911.6	5909.6
15799	10/3/01	12.01	5909.99	Technically Dry	5911.6	5909.6
16199	1/4/01	-1		Dry		
16199	4/2/01	-1		Dry		
16199	7/5/01	-1		Dry		
16199	10/3/01	-1		Dry		
16299	1/4/01	12.02				
16299	4/2/01	12.03				
16299	7/5/01	12.02				
16299	10/3/01	12.03				
16399	1/4/01	9.45				
16399	4/2/01	9.45				
16399	7/5/01	9.44				
16399	10/3/01	9.42				
16499	1/4/01	9.19				
16499	4/2/01	9.19				
16499	7/5/01	9.16				
16499	10/3/01	9.14				
16599	1/4/01	12.29				
16599	4/2/01	12.29				
16599	7/5/01	12.27				
16599	10/3/01	12.26				
1786	1/2/01	5.77	5863.8		5854.45	5854.45
1786	2/5/01	5.78	5863.79		5854.45	5854.45
1786	3/5/01	5.91	5863.66		5854.45	5854.45
1786	4/5/01	5.71	5863.86		5854.45	5854.45
1786	5/1/01	5.05	5864.52		5854.45	5854.45
1786	6/5/01	4.62	5864.95		5854.45	5854.45
1786	7/11/01	5.16	5864.41		5854.45	5854.45
1786	8/2/01	5.12	5864.45		5854.45	5854.45
1786	9/4/01	5.38	5864.19		5854.45	5854.45
1786	10/2/01	5.34	5864.23		5854.45	5854.45
1786	11/2/01	5.39	5864.18		5854.45	5854.45
1786	12/3/01	8.47	5861.1		5854.45	5854.45
18199	1/9/01	14.37	5973.19		5964.66	5962.66
18199	4/3/01	13.51	5974.05		5964.66	5962.66
18199	7/2/01	11.95	5975.61		5964.66	5962.66
18199	10/2/01	13.12	5974.44		5964.66	5962.66
18299	4/3/01	12.38	5975.12		5966.1	5964.1
18299	7/2/01	10.36	5977.14		5966.1	5964.1
18299	10/2/01	11.86	5975.64		5966.1	5964.1
18399	4/3/01	-1	5985.86	Dry to top Pump	5972.06	5969.46
18399	7/2/01	8.83	5976.03		5972.06	5969.46

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Appendix B: Water Level Data - Groundwater 2001

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
18399	10/3/01	-1	5985.86	Dry to top Pump	5972.06	5969.46
18499	1/9/01	11.7	5974.25		5964.45	5964.15
18499	4/2/01	10.89	5975.06		5964.45	5964.15
18499	7/10/01	9.3	5976.65		5964.45	5964.15
18499	10/1/01	10.37	5975.58		5964.45	5964.15
18599	1/9/01	11.28	5974.28		5964.26	5963.96
18599	4/2/01	10.46	5975.1		5964.26	5963.96
18599	7/10/01	8.88	5976.68		5964.26	5963.96
18599	10/1/01	9.95	5975.61		5964.26	5963.96
18699	1/8/01	10.94	5974.69		5969.93	5967.93
18699	4/2/01	6.06	5979.57		5969.93	5967.93
18699	7/10/01	8.24	5977.39		5969.93	5967.93
18699	10/1/01	8.88	5976.75		5969.93	5967.93
18799	1/8/01	-1	5986.41	Dry to top Pump	5975.01	5973.01
18799	4/2/01	-1	5986.41	Dry to top Pump	5975.01	5973.01
18799	7/9/01	6.92	5978.49		5975.01	5973.01
18799	10/1/01	7.71	5977.7		5975.01	5973.01
1886	4/5/01	9.46	5878.51		5878.25	5878.25
1886	10/2/01	-1	5888.97	Dry	5878.25	5878.25
18899	1/8/01	10.28	5975.29	Technically Dry	5976.97	5974.97
18899	4/2/01	9.86	5975.71	Technically Dry	5976.97	5974.97
18899	7/9/01	6.69	5978.88		5976.97	5974.97
18899	10/1/01	7	5978.57		5976.97	5974.97
1986	1/8/01	2.87	5940.99		5930.83	5930.83
1986	2/1/01	2.94	5940.92		5930.83	5930.83
1986	3/5/01	2.9	5940.96		5930.83	5930.83
1986	4/3/01	2.61	5941.25		5930.83	5930.83
1986	5/3/01	2.02	5941.84		5930.83	5930.83
1986	6/5/01	2.83	5941.03		5930.83	5930.83
1986	7/2/01	3.71	5940.15		5930.83	5930.83
1986	8/1/01	3.71	5940.15		5930.83	5930.83
1986	9/4/01	3.57	5940.29		5930.83	5930.83
1986	10/1/01	3.62	5940.24		5930.83	5930.83
1986	11/2/01	3.21	5940.65		5930.83	5930.83
1986	12/3/01	2.94	5940.92		5930.83	5930.83
1987	4/3/01	12.38	5957.53		5956.79	5956.55
1987	10/4/01	11.21	5958.7		5956.79	5956.55
20098	1/8/01	8.32	5924.23		5911	5910.7
20196	1/2/01	43.1	5997.99		5973.66	5970.42
20196	4/3/01	43.26	5997.83		5973.66	5970.42
20196	10/3/01	41.88	5999.21		5973.66	5970.42
20197	4/9/01	-1	5940.61	Dry	5932.41	5932.21
20291	1/3/01	33.21	5915.37		5914.19	5913.89
20291	2/6/01	33.45	5915.13		5914.19	5913.89
20291	3/1/01	33.63	5914.95		5914.19	5913.89
20291	4/3/01	32.96	5915.62		5914.19	5913.89
20291	5/3/01	30.44	5918.14		5914.19	5913.89
20291	6/5/01	29.48	5919.1		5914.19	5913.89
20291	7/3/01	29.48	5919.1		5914.19	5913.89
20291	8/2/01	29.61	5918.97		5914.19	5913.89
20291	9/4/01	29.83	5918.75		5914.19	5913.89
20291	10/3/01	30.22	5918.36		5914.19	5913.89

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
20291	11/2/01	30.74	5917.84		5914.19	5913.89
20291	12/10/01	31.34	5917.24		5914.19	5913.89
20296	1/2/01	37.9	5998.31		5978.59	5975.35
20296	4/2/01	38	5998.21		5978.59	5975.35
20296	10/3/01	36.72	5999.49		5978.59	5975.35
20298	1/8/01	7.91	5927.67		5924.8	5924.5
20396	1/2/01	35.35	6001.75		5984.27	5981
20396	4/2/01	35.45	6001.65		5984.27	5981
20396	10/3/01	33.77	6003.33		5984.27	5981
20397	4/9/01	6.07	5934.57		5933.4	5933.2
20496	1/2/01	47.71	6018.17		5999.5	5996.6
20496	4/2/01	47.95	6017.93		5999.5	5996.6
20496	10/3/01	46.1	6019.78		5999.5	5996.6
20498	1/9/01	12.92	5926.55		5918	5917.7
20596	1/2/01	35.36	6045.8		6007.9	6004.9
20596	4/2/01	56.42	6024.74		6007.9	6004.9
20596	10/3/01	54.93	6026.23		6007.9	6004.9
20597	4/9/01	10.45	5934.05		5933.8	5933.59
20696	1/2/01	45.69	6010.33		5983.56	5980.37
20696	2/6/01	45.81	6010.21		5983.56	5980.37
20696	3/7/01	46.06	6009.96		5983.56	5980.37
20696	4/2/01	45.99	6010.03		5983.56	5980.37
20696	5/2/01	45.06	6010.96		5983.56	5980.37
20696	6/4/01	42.36	6013.66		5983.56	5980.37
20696	7/2/01	43	6013.02		5983.56	5980.37
20696	8/6/01	43.54	6012.48		5983.56	5980.37
20696	9/4/01	43.84	6012.18		5983.56	5980.37
20696	10/3/01	44.12	6011.9		5983.56	5980.37
20696	11/2/01	44.64	6011.38		5983.56	5980.37
20696	12/6/01	45.05	6010.97		5983.56	5980.37
20697	4/9/01	5.46	5961.34		5956.16	5956
20698	1/9/01	19.38	5923.32		5921.4	5921.1
20791	1/4/01	20.91	5948.58		5933.4	5931.4
20796	1/2/01	47.11	6008.99		5974	5971
20796	4/2/01	47.27	6008.83		5974	5971
20796	10/3/01	45.51	6010.59		5974	5971
20797	4/9/01	4.93	5943.59		5939.4	5939.2
20898	1/8/01	6.46	5939.04		5930.2	5929.9
20998	1/8/01	-1	5955.9	Dry	5943.4	5943.1
20998	4/3/01	-1	5955.9	Dry	5943.4	5943.1
20998	7/2/01	10.45	5944.45		5943.4	5943.1
20998	10/1/01	11.15	5943.75		5943.4	5943.1
21097	4/9/01	3.79	5958.19		5953.04	5952.88
21098	1/8/01	12.96	5946.04		5939.1	5938.8
21098	4/3/01	10.98	5948.02		5939.1	5938.8
21098	7/2/01	11.42	5947.58		5939.1	5938.8
21098	10/1/01	11.68	5947.32		5939.1	5938.8
21197	4/5/01	4.21	5933.26		5929.69	5926.65
21197	7/10/01	6.75	5930.72		5929.69	5926.65
21197	10/2/01	7.79	5929.68	Technically Dry	5929.69	5926.65
21298	1/8/01	12.31	5946.39		5939.3	5939
21498	1/4/01	3.91	5960.69		5954.3	5954

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

386455

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
21498	4/3/01	2.38	5962.22		5954.3	5954
21498	7/9/01	3.92	5960.68		5954.3	5954
21498	10/2/01	4.19	5960.41		5954.3	5954
21498	10/3/01	4.24	5960.36		5954.3	5954
21597	4/5/01	2.58	5963.09		5959.86	5959.7
21597	7/10/01	4.32	5961.35		5959.86	5959.7
21597	10/2/01	4.55	5961.12		5959.86	5959.7
21698	1/4/01	8.64	5965.26		5957.5	5957.2
21698	4/3/01	4.39	5969.51		5957.5	5957.2
21698	7/9/01	7.19	5966.71		5957.5	5957.2
21698	10/2/01	8.38	5965.52		5957.5	5957.2
21698	10/3/01	8.41	5965.49		5957.5	5957.2
21798	8/9/01	14.19	5967.31		5956.3	5956
2186	1/4/01	32.1	5973.86		5937.52	5937.51
2186	4/2/01	32.21	5973.75		5937.52	5937.51
2186	7/9/01	32.43	5973.53		5937.52	5937.51
2186	8/1/01	32.71	5973.25		5937.52	5937.51
2186	10/4/01	33.17	5972.79		5937.52	5937.51
2187	4/2/01	3.17	5926.52		5918.025	5917.875
2187	10/2/01	3.34	5926.35		5918.025	5917.875
2187	12/5/01	2.81	5926.88		5918.025	5917.875
21898	1/4/01	18.52	5970.08		5967.3	5967
21898	4/3/01	17.55	5971.05		5967.3	5967
21898	7/9/01	18.03	5970.57		5967.3	5967
21898	8/9/01	17.55	5971.05		5967.3	5967
21898	10/3/01	18.08	5970.52		5967.3	5967
21998	8/9/01	9.04	5985.56		5975.3	5975
22098	1/4/01	12.3	5987.3		5975.3	5975
22098	4/3/01	11.16	5988.44		5975.3	5975
22098	7/9/01	11.03	5988.57		5975.3	5975
22098	8/9/01	11.2	5988.4		5975.3	5975
22098	10/3/01	11	5988.6		5975.3	5975
22197	4/5/01	4.31	5940.19		5937.7	5937.5
22197	7/10/01	6.47	5938.03		5937.7	5937.5
22197	10/4/01	-1	5945.5	Kinked, Dry to 7'	5937.7	5937.5
22298	1/9/01	11.45	5919.15		5914.9	5914.6
22596	1/4/01	-1	6010.8	Dry to top Pump	5981	5979
22596	2/1/01	-1	6010.8	Dry to top Pump	5981	5979
22596	3/5/01	-1	6010.8	Dry to top Pump	5981	5979
22596	4/2/01	-1	6010.8	Dry to top Pump	5981	5979
22596	5/4/01	24.39	5985.41		5981	5979
22596	6/5/01	25.05	5984.75		5981	5979
22596	7/9/01	-1	6010.8	Dry to top Pump	5981	5979
22596	8/1/01	24.95	5984.85		5981	5979
22596	8/9/01	25.51	5984.29		5981	5979
22596	9/4/01	25.75	5984.05		5981	5979
22596	10/4/01	25.73	5984.07		5981	5979
22596	11/2/01	-1	6010.8	Dry to top Pump	5981	5979
22596	12/3/01	-1	6010.8	Dry to top Pump	5981	5979
22696	1/8/01	19.57	5963.01		5962.5	5960.5
22696	4/3/01	20.75	5961.83	Technically Dry	5962.5	5960.5
22696	7/2/01	16.49	5966.09		5962.5	5960.5

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

3886456

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
22696	10/1/01	19.62	5962.96		5962.5	5960.5
22796	1/9/01	15.05	5929.45		5925	5923
22796	4/3/01	13.93	5930.57		5925	5923
22796	7/2/01	13.9	5930.6		5925	5923
22796	10/2/01	14.81	5929.69		5925	5923
2286	1/8/01	-1	5980.55	Dry to top Pump	5967.57	5967.57
2286	2/1/01	-1	5980.55	Dry to top Pump	5967.57	5967.57
2286	3/5/01	-1	5980.55	Dry to top Pump	5967.57	5967.57
2286	4/2/01	-1	5980.55	Dry to top Pump	5967.57	5967.57
2286	5/3/01	2.18	5977.37		5967.57	5967.57
2286	6/5/01	7.36	5972.19		5967.57	5967.57
2286	7/9/01	8.6	5970.95		5967.57	5967.57
2286	8/1/01	8.24	5971.31		5967.57	5967.57
2286	9/4/01	8.58	5970.97		5967.57	5967.57
2286	10/1/01	8.72	5970.83		5967.57	5967.57
2286	11/2/01	-1	5980.55	Dry to top Pump	5967.57	5967.57
2286	12/3/01	-1	5980.55	Dry to top Pump	5967.57	5967.57
22896	1/4/01	19.27	5982.15		5975.7	5972.8
22896	4/3/01	18.31	5983.11		5975.7	5972.8
22896	7/9/01	19.5	5981.92		5975.7	5972.8
22896	10/2/01	19.07	5982.35		5975.7	5972.8
22896	10/3/01	19.11	5982.31		5975.7	5972.8
22896	12/6/01	19.82	5981.6		5975.7	5972.8
22996	1/4/01	-1	5989.5	Dry to top Pump	5977.5	5974.5
22996	2/6/01	-1	5989.5	Dry to top Pump	5977.5	5974.5
22996	3/6/01	-1	5989.5	Dry to top Pump	5977.5	5974.5
22996	4/4/01	5.51	5982.99		5977.5	5974.5
22996	5/2/01	4.98	5983.52		5977.5	5974.5
22996	6/4/01	5.56	5982.94		5977.5	5974.5
22996	7/10/01	-1	5989.5	Dry to top Pump	5977.5	5974.5
22996	8/6/01	-1	5989.5	Dry to top Pump	5977.5	5974.5
22996	9/5/01	-1	5989.5	Dry to top Pump	5977.5	5974.5
22996	10/4/01	-1	5989.5	Dry to top Pump	5977.5	5974.5
22996	11/5/01	-1	5989.5	Dry to top Pump	5977.5	5974.5
22996	12/10/01	-1	5989.5	Dry to top Pump	5977.5	5974.5
23096	1/3/01	13.63	5824.17		5822	5820
23096	4/2/01	9.7	5828.1		5822	5820
23096	7/3/01	14.2	5823.6		5822	5820
23096	10/1/01	12.64	5825.16		5822	5820
23196	1/3/01	28.47	5788.2	Technically Dry	5790	5787.5
23296	1/3/01	5.64	5852.36		5848	5845.7
23296	2/5/01	5.5	5852.5		5848	5845.7
23296	3/5/01	5.55	5852.45		5848	5845.7
23296	4/5/01	5.43	5852.57		5848	5845.7
23296	5/1/01	5.07	5852.93		5848	5845.7
23296	6/1/01	5.05	5852.95		5848	5845.7
23296	7/13/01	6.04	5851.96		5848	5845.7
23296	8/2/01	6.64	5851.36		5848	5845.7
23296	9/5/01	6.97	5851.03		5848	5845.7
23296	10/2/01	6.77	5851.23		5848	5845.7
23296	11/2/01	6.14	5851.86		5848	5845.7
23296	12/3/01	5.91	5852.09		5848	5845.7

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
24095	12/6/01	-1	5950.6	Dry	5938.6	5938.6
24295	12/6/01	-1	5945	Dry	5937	5937
2486	2/1/01	-1	5984.56	Dry	5975	5975
2486	3/6/01	-1	5984.56	Dry	5975	5975
2486	4/2/01	-1	5984.56	Dry	5975	5975
2486	10/1/01	-1	5984.56	Dry	5975	5975
2487	4/3/01	-1	5960.69	Dry	5944.69	5944.44
2487	10/3/01	-1	5960.69	Dry	5944.69	5944.44
2686	4/2/01	12.67	5964.5		5964.42	5964.42
2686	10/2/01	12.3	5964.87		5964.42	5964.42
2687	4/5/01	-1	5956.9	Dry	5940.83	5940.58
2687	10/8/01	-1	5956.9	Dry	5940.83	5940.58
2986	4/2/01	-1	5961.68	Dry	5950.81	5950.81
2986	10/2/01	-1	5961.68	Dry	5950.81	5950.81
30100	1/2/01	8.61	5954.59		5936.38	5936.28
30100	4/4/01	8.39	5954.81		5936.38	5936.28
30100	7/3/01	7.99	5955.21		5936.38	5936.28
30100	10/4/01	8.53	5954.67		5936.38	5936.28
30200	1/2/01	4.93	5955.15		5931.18	5931.08
30200	4/4/01	4.7	5955.38		5931.18	5931.08
30200	7/3/01	5.58	5954.5		5931.18	5931.08
30200	10/4/01	5.84	5954.24		5931.18	5931.08
30300	1/2/01	7.28	5950.62		5937.16	5937.06
30300	4/4/01	6.59	5951.31		5937.16	5937.06
30300	7/3/01	7.44	5950.46		5937.16	5937.06
30300	10/4/01	9.62	5948.28		5937.16	5937.06
30400	1/2/01	21.85	5945.38		5936.36	5936.26
30400	4/4/01	19.69	5947.54		5936.36	5936.26
30400	7/3/01	16.3	5950.93		5936.36	5936.26
30400	10/4/01	19.41	5947.82		5936.36	5936.26
30500	1/2/01	26.31	5937.44		5931.81	5931.71
30500	4/4/01	17.96	5945.79		5931.81	5931.71
30500	7/3/01	7.01	5956.74		5931.81	5931.71
30500	10/4/01	9	5954.75		5931.81	5931.71
30600	1/2/01	23.75	5922.61		5914.46	5914.36
30600	4/5/01	19.75	5926.61		5914.46	5914.36
30600	7/3/01	18.7	5927.66		5914.46	5914.36
30600	10/4/01	16.67	5929.69		5914.46	5914.36
30700	1/2/01	21.47	5914.8		5907.34	5907.24
30700	4/5/01	14.91	5921.36		5907.34	5907.24
30700	7/3/01	9.47	5926.8		5907.34	5907.24
30700	10/4/01	10.49	5925.78		5907.34	5907.24
30800	1/2/01	7.22	5964.76		5949.17	5949.07
30800	4/4/01	5.27	5966.71		5949.17	5949.07
30800	7/3/01	6.02	5965.96		5949.17	5949.07
30800	10/4/01	6.92	5965.06		5949.17	5949.07
3087	1/3/01	26.67	5785.1		5715.77	5715.77
308-P-1	1/8/01	24.48	5919.63		5902.07	5902.07
308-P-1	4/5/01	24.51	5919.6		5902.07	5902.07
308-P-1	7/10/01	24.83	5919.28		5902.07	5902.07
308-P-1	10/2/01	24.75	5919.36		5902.07	5902.07
308-P-2	4/5/01	28.39	5915.63		5901.97	5901.97

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

3580
458

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
308-P-2	7/10/01	27.69	5916.33		5901.97	5901.97
308-P-2	10/2/01	27.02	5917		5901.97	5901.97
30900	1/2/01	15.08	5991.68		5974.81	5974.71
30900	4/5/01	13.89	5992.87		5974.81	5974.71
30900	7/10/01	7.89	5998.87		5974.81	5974.71
30900	10/1/01	11.42	5995.34		5974.81	5974.71
31001	4/5/01	12.83	5992.75		5982.97	5982.97
31001	7/10/01	6.8	5998.78		5982.97	5982.97
31001	10/1/01	10.31	5995.27		5982.97	5982.97
3287	4/5/01	48.01	5899.96		5899.8	5899.55
3287	10/8/01	47.99	5899.98		5899.8	5899.55
3386	12/5/01	-1	5953.42	Dry to top Troll	5944.06	5944.06
3387	4/5/01	-1	5948.22	Dry	5925.78	5925.53
3387	10/8/01	-1	5948.22	Dry	5925.78	5925.53
34791	4/4/01	12.54	5941.37		5943.39	5940.97
34791	10/4/01	6.51	5947.4		5943.39	5940.97
35391	11/26/01	9.39	5953.64		5952.62	5950.23
35391	12/6/01	9.48	5953.55		5952.62	5950.23
3586	1/4/01	8.52	5904.24		5899.15	5899.15
3586	2/6/01	8.4	5904.36		5899.15	5899.15
3586	3/6/01	8.43	5904.33		5899.15	5899.15
3586	4/2/01	7.89	5904.87		5899.15	5899.15
3586	5/2/01	7.74	5905.02		5899.15	5899.15
3586	6/4/01	7.65	5905.11		5899.15	5899.15
3586	7/5/01	8.09	5904.67		5899.15	5899.15
3586	8/6/01	8.23	5904.53		5899.15	5899.15
3586	9/5/01	8.24	5904.52		5899.15	5899.15
3586	10/3/01	8.2	5904.56		5899.15	5899.15
3586	11/5/01	8.24	5904.52		5899.15	5899.15
3586	12/10/01	8.27	5904.49		5899.15	5899.15
35991	1/4/01	16.92	5959.53		5959.55	5957.15
35991	11/26/01	16.91	5959.54		5959.55	5957.15
35991	12/6/01	16.91	5959.54		5959.55	5957.15
3687	1/3/01	38.45	5912.66		5886.32	5886.08
3687	4/3/01	38.88	5912.23		5886.32	5886.08
3687	7/3/01	36.51	5914.6		5886.32	5886.08
3687	10/3/01	36.58	5914.53		5886.32	5886.08
36991	11/26/01	8.83	5963.48		5960.86	5958.86
37101	7/9/01	4.73	6007.65		5992.93	5992.76
37101	8/1/01	4.48	6007.9		5992.93	5992.76
37101	10/4/01	5.04	6007.34		5992.93	5992.76
37191	4/4/01	12.02	5936.27		5924.84	5922.84
37191	10/4/01	12.68	5935.61		5924.84	5922.84
37201	7/9/01	6.36	6001.62		5979.02	5978.85
37201	8/1/01	6.61	6001.37		5979.02	5978.85
37201	10/4/01	7.07	6000.91		5979.02	5978.85
37301	7/9/01	17.19	5990.5		5984.26	5984.09
37301	8/1/01	17.16	5990.53		5984.26	5984.09
37301	10/4/01	17.09	5990.6		5984.26	5984.09
37401	7/9/01	21.66	5985.1		5966.91	5966.74
37401	8/1/01	15.88	5990.88		5966.91	5966.74
37401	10/4/01	19.25	5987.51		5966.91	5966.74

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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4579

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
37501	7/9/01	10.77	5996.05		5970.51	5970.34
37501	8/1/01	6.66	6000.16		5970.51	5970.34
37501	10/4/01	5.95	6000.87		5970.51	5970.34
37601	7/9/01	12.81	5997.12		5972.77	5972.62
37601	8/1/01	9.83	6000.1		5972.77	5972.62
37601	10/4/01	10.17	5999.76		5972.77	5972.62
37691	4/4/01	18.37	5966.87		5967.96	5965.96
37691	10/3/01	17.08	5968.16		5967.96	5965.96
37701	7/9/01	11.67	5965.47		5957.52	5957.42
37701	8/1/01	10.45	5966.69		5957.52	5957.42
37701	10/3/01	11.25	5965.89		5957.52	5957.42
37791	4/2/01	19.53	5984.65		5981.56	5979.56
37791	10/4/01	18.38	5985.8		5981.56	5979.56
37791	11/26/01	18.48	5985.7		5981.56	5979.56
38591	1/3/01	8.93	5857.69		5857.06	5855.06
38591	4/2/01	8.33	5858.29		5857.06	5855.06
38591	7/2/01	9.73	5856.89		5857.06	5855.06
38591	10/1/01	10.08	5856.54	Technically Dry	5857.06	5855.06
39691	1/4/01	11.87	5996.5	Technically Dry	5997.26	5995.26
39691	3/7/01	10.94	5997.43		5997.26	5995.26
39691	4/2/01	10.93	5997.44		5997.26	5995.26
39691	7/12/01	10.87	5997.5		5997.26	5995.26
39691	10/4/01	10.91	5997.46		5997.26	5995.26
40099	1/8/01	18.72	6007.25		5998.18	5998.03
40099	4/4/01	17.39	6008.58		5998.18	5998.03
40099	7/12/01	17.28	6008.69		5998.18	5998.03
40099	10/4/01	17.62	6008.35		5998.18	5998.03
40199	1/8/01	16.65	6006.77		5996.02	5995.87
40199	4/4/01	13.63	6009.79		5996.02	5995.87
40199	7/11/01	14.95	6008.47		5996.02	5995.87
40199	10/4/01	14.72	6008.7		5996.02	5995.87
40299	1/8/01	19.7	6004.46		5997.09	5996.94
40299	4/4/01	18.83	6005.33		5997.09	5996.94
40299	7/12/01	19.05	6005.11		5997.09	5996.94
40299	10/4/01	19.17	6004.99		5997.09	5996.94
40399	1/8/01	14.52	6005.39		5996.08	5995.63
40399	4/4/01	12.28	6007.63		5996.08	5995.63
40399	7/12/01	13.15	6006.76		5996.08	5995.63
40399	10/4/01	14.25	6005.66		5996.08	5995.63
40499	1/8/01	15.35	6005.23		5996.31	5996.11
40499	4/4/01	13.38	6007.2		5996.31	5996.11
40499	7/12/01	13.99	6006.59		5996.31	5996.11
40499	10/4/01	13.99	6006.59		5996.31	5996.11
40599	1/9/01	9.2	5935.34		5934.21	5933.86
40599	4/3/01	7.28	5937.26		5934.21	5933.86
40599	7/2/01	8.02	5936.52		5934.21	5933.86
40599	10/2/01	9	5935.54		5934.21	5933.86
40699	1/9/01	12.9	5928.94		5928.48	5927.83
40699	4/3/01	13.05	5928.79		5928.48	5927.83
40699	7/2/01	10.74	5931.1		5928.48	5927.83
40699	10/2/01	11.94	5929.9		5928.48	5927.83
40799	1/9/01	8.18	5936.45		5935.08	5934.93

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
40799	4/3/01	3.35	5941.28		5935.08	5934.93
40799	7/2/01	4.91	5939.72		5935.08	5934.93
40799	10/2/01	7.56	5937.07		5935.08	5934.93
4087	1/2/01	-1	5885.61	Dry	5876.54	5876.3
4087	2/5/01	-1	5885.61	Dry	5876.54	5876.3
4087	3/5/01	4.76	5879.85		5876.54	5876.3
4087	4/5/01	4.52	5880.09		5876.54	5876.3
4087	5/1/01	3.13	5881.48		5876.54	5876.3
4087	6/4/01	4.59	5880.02		5876.54	5876.3
4087	7/10/01	6.46	5878.15		5876.54	5876.3
4087	8/2/01	-1	5885.61	Dry	5876.54	5876.3
4087	9/4/01	-1	5885.61	Dry	5876.54	5876.3
4087	10/4/01	-1	5885.61	Dry	5876.54	5876.3
4087	11/2/01	-1	5885.61	Dry	5876.54	5876.3
4087	12/3/01	-1	5885.61	Dry	5876.54	5876.3
40899	1/9/01	-1	5980.24	Dry	5965.28	5964.73
40899	4/3/01	-1	5980.24	Dry	5965.28	5964.73
40899	7/2/01	-1	5980.24	Dry	5965.28	5964.73
40899	10/2/01	14.18	5965.06		5965.28	5964.73
40999	1/4/01	6.3	5982.48		5981.41	5979.09
40999	4/4/01	5.2	5983.58		5981.41	5979.09
40999	7/10/01	6.01	5982.77		5981.41	5979.09
40999	10/4/01	7.99	5980.79		5981.41	5979.09
41091	1/3/01	9.29	5712.56		5709.56	5707.26
41091	2/5/01	9.78	5712.07		5709.56	5707.26
41091	3/5/01	9.95	5711.9		5709.56	5707.26
41091	4/5/01	9.66	5712.19		5709.56	5707.26
41091	6/4/01	8.92	5712.93		5709.56	5707.26
41091	7/10/01	10.21	5711.64		5709.56	5707.26
41091	8/2/01	10.31	5711.54		5709.56	5707.26
41091	9/4/01	8.53	5713.32		5709.56	5707.26
41091	10/2/01	9.95	5711.9		5709.56	5707.26
41091	11/2/01	10.2	5711.65		5709.56	5707.26
41091	12/3/01	10.42	5711.43		5709.56	5707.26
41099	1/4/01	5.5	5980.94		5974.59	5976.44
41099	4/4/01	4.35	5982.09		5974.59	5976.44
41099	7/10/01	5.35	5981.09		5974.59	5976.44
41099	10/4/01	5.9	5980.54		5974.59	5976.44
41099	11/26/01	6.2	5980.24		5974.59	5976.44
41199	1/4/01	6.01	5981.5		5975.86	5975.71
41199	4/4/01	4.57	5982.94		5975.86	5975.71
41199	7/10/01	4.91	5982.6		5975.86	5975.71
41199	10/3/01	6.25	5981.26		5975.86	5975.71
41199	11/26/01	6.81	5980.7		5975.86	5975.71
41299	1/8/01	15.3	6004.38		5995.62	5995.47
41299	4/4/01	13.81	6005.87		5995.62	5995.47
41299	7/12/01	14.34	6005.34		5995.62	5995.47
41299	10/4/01	14.6	6005.08		5995.62	5995.47
41499	1/9/01	11.85	5931.72		5930.17	5927.07
41499	4/3/01	9.9	5933.67		5930.17	5927.07
41499	7/2/01	10.64	5932.93		5930.17	5927.07
41499	10/2/01	12.66	5930.91		5930.17	5927.07

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Appendix B: Water Level Data - Groundwater 2001

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
41591	1/3/01	-1	5728.27	Dry to top Pump	5714.54	5712.04
41591	2/5/01	-1	5728.27	Dry to top Pump	5714.54	5712.04
41591	3/1/01	-1	5728.27	Dry to top Pump	5714.54	5712.04
41591	4/3/01	9.17	5718.1		5714.54	5712.04
41591	5/3/01	9.45	5717.82		5714.54	5712.04
41591	6/5/01	7.29	5719.98		5714.54	5712.04
41591	7/10/01	9.27	5718		5714.54	5712.04
41591	8/2/01	9.23	5718.04		5714.54	5712.04
41591	9/4/01	-1	5728.27	Dry to top Pump	5714.54	5712.04
41591	10/3/01	-1	5728.27	Dry to top Pump	5714.54	5712.04
41591	11/5/01	-1	5728.27	Dry to top Pump	5714.54	5712.04
41591	12/6/01	-1	5728.27	Dry to top Pump	5714.54	5712.04
41599	1/9/01	13.17	5933.96		5932.79	5932.69
41599	4/3/01	12.36	5934.77		5932.79	5932.69
41599	7/2/01	12.51	5934.62		5932.79	5932.69
41599	10/2/01	12.53	5934.6		5932.79	5932.69
41691	1/4/01	9.91	5635.97		5629.25	5626.84
41691	2/5/01	8.67	5637.21		5629.25	5626.84
41691	3/1/01	9.66	5636.22		5629.25	5626.84
41691	4/4/01	8.26	5637.62		5629.25	5626.84
41691	5/3/01	8.09	5637.79		5629.25	5626.84
41691	6/5/01	7.81	5638.07		5629.25	5626.84
41691	7/10/01	7.9	5637.98		5629.25	5626.84
41691	8/2/01	9.46	5636.42		5629.25	5626.84
41691	9/4/01	9.23	5636.65		5629.25	5626.84
41691	10/3/01	10.28	5635.6		5629.25	5626.84
41691	11/5/01	9.58	5636.3		5629.25	5626.84
41691	12/10/01	7.91	5637.97		5629.25	5626.84
4286	1/8/01	27.15	5930.72		5926.57	5926.57
4286	2/6/01	28.02	5929.85		5926.57	5926.57
4286	4/3/01	28.06	5929.81		5926.57	5926.57
4286	5/7/01	17.94	5939.93		5926.57	5926.57
4286	6/5/01	18.58	5939.29		5926.57	5926.57
4286	7/12/01	20.73	5937.14		5926.57	5926.57
4286	8/2/01	21.3	5936.57		5926.57	5926.57
4286	9/5/01	22.27	5935.6		5926.57	5926.57
4286	10/3/01	23.04	5934.83		5926.57	5926.57
4286	11/2/01	23.82	5934.05		5926.57	5926.57
4286	12/10/01	25.63	5932.24		5926.57	5926.57
42993	1/9/01	13.63	5967.12		5962.05	5960.05
43392	1/10/01	31.45	6011.99		6011.61	6009.06
43392	4/5/01	31.65	6011.79		6011.61	6009.06
43392	7/12/01	29.71	6013.73		6011.61	6009.06
43392	10/4/01	30.66	6012.78		6011.61	6009.06
43593	1/8/01	9.37	5970.57		5967	5965
4386	1/4/01	-1	5975.46	Dry	5956.16	5956.16
4386	2/6/01	-1	5975.46	Dry	5956.16	5956.16
4386	3/6/01	-1	5975.46	Dry	5956.16	5956.16
4386	4/3/01	17.82	5956.64		5956.16	5956.16
4386	5/2/01	14.95	5959.51		5956.16	5956.16
4386	6/4/01	15.02	5959.44		5956.16	5956.16
4386	7/5/01	16.94	5957.52		5956.16	5956.16

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
4386	8/6/01	17.56	5956.9		5956.16	5956.16
4386	9/5/01	18.06	5956.4		5956.16	5956.16
4386	10/4/01	18.39	5956.07		5956.16	5956.16
4386	11/5/01	-1	5975.46	Dry	5956.16	5956.16
4386	12/10/01	-1	5975.46	Dry	5956.16	5956.16
4387	4/4/01	12.19	5914.22		5912.81	5912.56
4387	10/4/01	12.02	5914.39		5912.81	5912.56
4486	4/4/01	6.74	6015.22		5993.68	5993.68
4486	10/4/01	7.44	6014.52		5993.68	5993.68
45793	4/2/01	7.2	5945.92	Technically Dry	5946.4	5944.4
45793	10/2/01	7.22	5945.9	Technically Dry	5946.4	5944.4
46292	1/2/01	54.81	6042.43		6004.8	6002
46292	4/2/01	55.17	6042.07		6004.8	6002
46292	10/3/01	54.06	6043.18		6004.8	6002
46392	1/2/01	34.08	6030.95		5983.7	5980.9
46492	1/2/01	29.33	6027.48		6011.5	6008.7
46492	4/2/01	29.68	6027.13		6011.5	6008.7
46492	10/3/01	27.22	6029.59		6011.5	6008.7
4787	1/3/01	-1	5885.64	Dry	5875.51	5875.26
4787	4/2/01	-1	5885.64	Dry	5875.51	5875.26
4787	7/3/01	8.61	5876.03		5875.51	5875.26
4787	10/1/01	-1	5885.64	Dry	5875.51	5875.26
4887	1/3/01	-1	5912.41	Dry	5899.62	5899.37
4887	4/2/01	-1	5912.41	Dry	5899.62	5899.37
4887	7/3/01	-1	5912.41	Dry	5899.62	5899.37
4887	10/1/01	-1	5912.41	Dry	5899.62	5899.37
50494	1/2/01	-1	6095.34	Dry	6070.6	6068.3
50494	4/2/01	-1	6095.34	Dry	6070.6	6068.3
50494	10/3/01	-1	6095.34	Dry	6070.6	6068.3
50694	1/2/01	21.76	6065.74		6058.7	6056.4
50694	4/2/01	22.61	6064.89		6058.7	6056.4
50694	10/3/01	20.22	6067.28		6058.7	6056.4
51094	1/2/01	45.07	6048.18		6033.5	6031.2
51094	4/2/01	45.65	6047.6		6033.5	6031.2
51094	10/3/01	44.23	6049.02		6033.5	6031.2
51194	1/2/01	39.06	6034.25		6021.4	6019.4
51194	4/2/01	40.08	6033.23		6021.4	6019.4
51194	10/3/01	37.86	6035.45		6021.4	6019.4
51294	1/2/01	23.83	6040.85		6027.8	6025.5
51294	2/6/01	24.11	6040.57		6027.8	6025.5
51294	3/7/01	39.56	6025.12		6027.8	6025.5
51294	4/2/01	24.22	6040.46		6027.8	6025.5
51294	5/2/01	23.57	6041.11		6027.8	6025.5
51294	6/4/01	21.28	6043.4		6027.8	6025.5
51294	7/2/01	21.43	6043.25		6027.8	6025.5
51294	8/2/01	21.66	6043.02		6027.8	6025.5
51294	9/4/01	21.86	6042.82		6027.8	6025.5
51294	10/3/01	22.18	6042.5		6027.8	6025.5
51294	11/2/01	23.07	6041.61		6027.8	6025.5
51294	12/6/01	23.79	6040.89		6027.8	6025.5
51493	7/30/01	-1	6003.1	Dry	5999.86	5999.86
51594	1/2/01	13.05	6086.44		6077.5	6077.5

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
51594	2/6/01	14.06	6085.43		6077.5	6077.5
51594	3/7/01	14.89	6084.6		6077.5	6077.5
51594	4/2/01	15.29	6084.2		6077.5	6077.5
51594	5/2/01	13.88	6085.61		6077.5	6077.5
51594	6/4/01	9.4	6090.09		6077.5	6077.5
51594	7/2/01	9.31	6090.18		6077.5	6077.5
51594	8/2/01	9.71	6089.78		6077.5	6077.5
51594	9/4/01	10.38	6089.11		6077.5	6077.5
51594	10/3/01	11.17	6088.32		6077.5	6077.5
51594	11/2/01	12.28	6087.21		6077.5	6077.5
51594	12/6/01	13.13	6086.36		6077.5	6077.5
5187	1/4/01	15.7	5949.52		5949.43	5949.27
5187	12/6/01	15.7	5949.52		5949.43	5949.27
52193	8/6/01	8.05	5998.45		5995.2	5995.2
5287	1/4/01	10.17	5959.4		5947.6	5947.35
5287	2/6/01	9.85	5959.72		5947.6	5947.35
5287	3/6/01	9.96	5959.61		5947.6	5947.35
5287	4/2/01	9.64	5959.93		5947.6	5947.35
5287	5/2/01	9.67	5959.9		5947.6	5947.35
5287	6/4/01	9.7	5959.87		5947.6	5947.35
5287	7/12/01	9.87	5959.7		5947.6	5947.35
5287	8/6/01	10.17	5959.4		5947.6	5947.35
5287	9/4/01	10.36	5959.21		5947.6	5947.35
5287	10/4/01	10.37	5959.2		5947.6	5947.35
5287	11/5/01	10.48	5959.09		5947.6	5947.35
5287	11/26/01	10.25	5959.32		5947.6	5947.35
5287	12/6/01	10.18	5959.39		5947.6	5947.35
52894	1/2/01	-1	5871.75	Dry	5866.18	5864.18
52894	4/5/01	-1	5871.75	Dry	5866.18	5864.18
52894	7/10/01	6.9	5863.85	Technically Dry	5866.18	5864.18
52894	10/4/01	6.94	5863.81	Technically Dry	5866.18	5864.18
52994	1/2/01	-1	5874.81	Dry	5857.94	5855.94
52994	4/5/01	-1	5874.81	Dry	5857.94	5855.94
52994	7/10/01	-1	5874.81	Dry	5857.94	5855.94
52994	10/4/01	-1	5874.81	Dry	5857.94	5855.94
53393	4/6/01	1.19	5916.51		5914.48	5914.48
5387	1/4/01	8.6	5953.21		5950.94	5950.69
5387	4/2/01	6.38	5955.43		5950.94	5950.69
5387	7/3/01	8	5953.81		5950.94	5950.69
5387	10/3/01	-1	5962.81	Dry	5950.94	5950.69
5387	11/26/01	10.49	5951.32		5950.94	5950.69
5387	12/6/01	10.33	5951.48		5950.94	5950.69
5487	11/26/01	4.9	5952.72		5951.32	5951.17
5487	12/6/01	5.1	5952.52		5951.32	5951.17
55194	7/30/01	14.74	6033.95		6027.1	6027.1
55594	7/30/01	-1	6034.8	Dry	6024.4	6024.4
5587	1/3/01	-1	5861.09	Dry	5851.04	5850.89
5587	2/5/01	-1	5861.09	Dry	5851.04	5850.89
5587	3/1/01	-1	5861.09	Dry	5851.04	5850.89
5587	4/2/01	-1	5861.09	Dry	5851.04	5850.89
5587	5/1/01	-1	5861.09	Dry	5851.04	5850.89
5587	6/1/01	-1	5861.09	Dry	5851.04	5850.89

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
5587	7/2/01	-1	5861.09	Dry	5851.04	5850.89
5587	8/1/01	-1	5861.09	Dry	5851.04	5850.89
5587	9/4/01	-1	5861.09	Dry	5851.04	5850.89
5587	10/1/01	-1	5861.09	Dry	5851.04	5850.89
5587	11/2/01	-1	5861.09	Dry	5851.04	5850.89
5587	12/3/01	-1	5861.09	Dry	5851.04	5850.89
56294	7/30/01	10.77	6007.72		6001.3	6001.3
5686	1/2/01	7.25	5981.68		5977.86	5977.86
5686	2/5/01	7.16	5981.77		5977.86	5977.86
5686	3/1/01	7.09	5981.84		5977.86	5977.86
5686	4/2/01	6.36	5982.57		5977.86	5977.86
5686	5/1/01	6.19	5982.74		5977.86	5977.86
5686	6/1/01	6.77	5982.16		5977.86	5977.86
5686	7/2/01	7.82	5981.11		5977.86	5977.86
5686	7/30/01	8.87	5980.06		5977.86	5977.86
5686	8/1/01	9.38	5979.55		5977.86	5977.86
5686	9/4/01	10.96	5977.97		5977.86	5977.86
5686	10/1/01	10.44	5978.49		5977.86	5977.86
5686	11/2/01	6.72	5982.21		5977.86	5977.86
5686	12/6/01	6.91	5982.02		5977.86	5977.86
56994	4/5/01	18.56	6003.07		5995.3	5993.3
56994	10/4/01	17.6	6004.03		5995.3	5993.3
57094	4/2/01	33.83	5938.29		5936.2	5934.2
57094	4/6/01	33.8	5938.32		5936.2	5934.2
57094	7/2/01	36.21	5935.91	Technically Dry	5936.2	5934.2
57094	10/1/01	35.32	5936.8		5936.2	5934.2
57594	4/9/01	5.99	5942.44		5856.3	5854
57994	4/9/01	5.85	5935.42		5932.8	5932.8
58094	4/9/01	4.12	5926.79		5918.6	5918.6
58194	4/9/01	6.02	5924.61		5920.6	5920.6
58294	4/9/01	-1	5949.81	Dry	5942.1	5942.1
58494	4/6/01	4.97	5991.41		5984.8	5984.8
58594	4/6/01	4.85	5915.29		5911.9	5909.9
58694	4/9/01	-1	5960.96	Dry	5953.5	5953.5
58793	4/2/01	15.17	5999.03		5987.8	5985.3
58793	7/2/01	12.2	6002		5987.8	5985.3
58793	7/30/01	12.89	6001.31		5987.8	5985.3
58793	10/1/01	14.62	5999.58		5987.8	5985.3
5887	1/2/01	15.2	5981.57		5973.2	5972.96
5887	4/5/01	12.03	5984.74		5973.2	5972.96
5887	7/10/01	10.05	5986.72		5973.2	5972.96
5887	10/4/01	12.12	5984.65		5973.2	5972.96
59093	7/30/01	10.55	6014.15		6008.55	6005.7
59493	4/5/01	5.58	5986.82		5977.86	5975.01
59493	10/4/01	10.03	5982.37		5977.86	5975.01
59594	4/5/01	32.23	6016.68		6009.1	6007.1
59594	10/4/01	31.74	6017.17		6009.1	6007.1
59793	4/9/01	9.51	5936.29		5931.15	5928.3
59893	4/4/01	13.25	5933.15		5931.66	5931.66
59893	10/3/01	13.83	5932.57		5931.66	5931.66
59993	4/9/01	8.1	5936.2		5927.9	5927.9
60099	1/8/01	-1	5983.75	Dry	5973.5	5973.3

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

4465

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
60099	3/8/01	-1	5983.75	Dry	5973.5	5973.3
60099	4/2/01	-1	5983.75	Dry	5973.5	5973.3
60099	7/2/01	-1	5983.75	Dry	5973.5	5973.3
60099	10/1/01	-1	5983.75	Dry	5973.5	5973.3
60195	1/3/01	-1	5901	Dry	5888.5	5888.5
60195	2/5/01	-1	5901	Dry	5888.5	5888.5
60195	3/5/01	-1	5901	Dry	5888.5	5888.5
60195	4/5/01	-1	5901	Dry	5888.5	5888.5
60195	5/1/01	-1	5901	Dry	5888.5	5888.5
60195	6/1/01	-1	5901	Dry	5888.5	5888.5
60195	7/13/01	-1	5901	Dry	5888.5	5888.5
60195	8/2/01	-1	5901	Dry	5888.5	5888.5
60195	9/4/01	-1	5901	Dry	5888.5	5888.5
60195	10/2/01	-1	5901	Dry	5888.5	5888.5
60195	11/2/01	-1	5901	Dry	5888.5	5888.5
60195	12/3/01	-1	5901	Dry	5888.5	5888.5
60199	1/4/01	5.97	5980.71		5977.48	5977.28
60199	3/8/01	5.61	5981.07		5977.48	5977.28
60199	4/2/01	4.95	5981.73		5977.48	5977.28
60199	7/2/01	5.28	5981.4		5977.48	5977.28
60199	10/1/01	5.91	5980.77		5977.48	5977.28
60294	4/5/01	-1	5922.83	Dry		5911.87
60294	10/8/01	-1	5922.83	Dry		5911.87
60299	1/4/01	8.88	5978		5977.68	5977.48
60299	4/2/01	7.63	5979.25		5977.68	5977.48
60299	7/2/01	8.11	5978.77		5977.68	5977.48
60299	10/1/01	7.94	5978.94		5977.68	5977.48
60299	12/6/01	8.62	5978.26		5977.68	5977.48
60395	4/5/01	-1	5888	Dry	5878.1	5878.1
60395	10/2/01	-1	5888	Dry	5878.1	5878.1
60399	1/4/01	5.65	5980.58		5975.65	5975.5
60399	3/8/01	5.66	5980.57		5975.65	5975.5
60399	4/4/01	8.05	5978.18		5975.65	5975.5
60399	7/2/01	5.53	5980.7		5975.65	5975.5
60399	10/1/01	5.51	5980.72		5975.65	5975.5
60399	12/6/01	5.31	5980.92		5975.65	5975.5
60499	1/4/01	9.7	5981.32		5976.81	5976.66
60499	4/4/01	9.05	5981.97		5976.81	5976.66
60499	7/2/01	7.29	5983.73		5976.81	5976.66
60499	10/1/01	8.15	5982.87		5976.81	5976.66
60499	12/6/01	10.48	5980.54		5976.81	5976.66
60599	1/4/01	8.32	5979.59		5978.61	5978.46
60599	4/4/01	3.78	5984.13		5978.61	5978.46
60599	7/2/01	4.82	5983.09		5978.61	5978.46
60599	10/2/01	4.2	5983.71		5978.61	5978.46
60599	12/6/01	8.88	5979.03		5978.61	5978.46
60693	4/6/01	17.56	6006.14		6005.81	6005.81
60693	10/4/01	16.09	6007.61		6005.81	6005.81
60695	4/3/01	10.15	5874.85		5871.1	5871.1
60695	10/3/01	10.06	5874.94		5871.1	5871.1
60699	1/4/01	4.09	5982.83		5977.35	5977.21
60699	3/8/01	1.89	5985.03		5977.35	5977.21

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

4606

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
60699	4/4/01	1.82	5985.1		5977.35	5977.21
60699	7/2/01	8.03	5978.89		5977.35	5977.21
60699	10/1/01	3.25	5983.67		5977.35	5977.21
60795	4/3/01	-1	5843	Dry	5833.9	5833.9
60795	10/3/01	-1	5843	Dry	5833.9	5833.9
60799	1/4/01	8.66	5984.48		5984.01	5983.86
60799	3/8/01	8.37	5984.77		5984.01	5983.86
60799	4/3/01	6.37	5986.77		5984.01	5983.86
60799	7/2/01	5.3	5987.84		5984.01	5983.86
60799	10/1/01	5.61	5987.53		5984.01	5983.86
6086	12/6/01			Could not find.		
6087	4/5/01	11.75	5974.21		5956.97	5956.74
6087	10/4/01	12.46	5973.5		5956.97	5956.74
60899	1/4/01	9.12	5986.55		5983.89	5983.79
60899	3/7/01	8.45	5987.22		5983.89	5983.79
60899	4/4/01	7.93	5987.74		5983.89	5983.79
60899	7/11/01	7.9	5987.77		5983.89	5983.79
60899	10/4/01	8.68	5986.99		5983.89	5983.79
60994	4/5/01	11.03	5921.04		5919.88	5919.47
60994	10/8/01	8.71	5923.36		5919.88	5919.47
61099	1/4/01	10.1	5991.71		5986.34	5986.19
61099	3/7/01	9.88	5991.93		5986.34	5986.19
61099	4/4/01	9.09	5992.72		5986.34	5986.19
61099	7/11/01	9.2	5992.61		5986.34	5986.19
61099	10/4/01	9.87	5991.94		5986.34	5986.19
61199	1/4/01	10.26	5992.54		5984.01	5983.81
61199	3/7/01	9.93	5992.87		5984.01	5983.81
61199	4/4/01	9.21	5993.59		5984.01	5983.81
61199	7/11/01	9.46	5993.34		5984.01	5983.81
61199	10/4/01	9.99	5992.81		5984.01	5983.81
61293	4/10/01	3.23	5983.47		5977.03	5974.18
61293	7/2/01	6.39	5980.31		5977.03	5974.18
61293	10/1/01	9.05	5977.65		5977.03	5974.18
61295	4/2/01	3.45	5863.55		5856.6	5856.6
61295	10/1/01	4.49	5862.51		5856.6	5856.6
61299	1/9/01	8.31	5995.17		5991.87	5991.72
61299	3/7/01	-1	6004.48	Dry	5991.87	5991.72
61299	4/4/01	6.33	5997.15		5991.87	5991.72
61299	7/11/01	7.54	5995.94		5991.87	5991.72
61299	10/4/01	7.79	5995.69		5991.87	5991.72
61299	11/26/01	7.43	5996.05		5991.87	5991.72
61399	1/4/01	4.9	5978.99		5974.59	5974.44
61399	3/8/01	4.2	5979.69		5974.59	5974.44
61399	4/3/01	3.15	5980.74		5974.59	5974.44
61399	7/2/01	3.82	5980.07		5974.59	5974.44
61399	10/1/01	4.05	5979.84		5974.59	5974.44
61495	1/8/01	8.37	5969.63		5965.3	5965.3
61495	4/4/01	8.07	5969.93		5965.3	5965.3
61495	7/3/01	6.26	5971.74		5965.3	5965.3
61495	10/4/01	7.05	5970.95		5965.3	5965.3
61499	1/8/01	8.41	5977.92		5976.94	5976.79
61499	2/1/01	8.54	5977.79		5976.94	5976.79

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
61499	3/5/01	8.55	5977.78		5976.94	5976.79
61499	4/2/01	7.58	5978.75		5976.94	5976.79
61499	7/2/01	7.07	5979.26		5976.94	5976.79
61499	10/1/01	7.76	5978.57		5976.94	5976.79
61595	1/8/01	5.04	5967.96		5961.7	5961.7
61595	4/14/01	5.05	5967.95		5961.7	5961.7
61595	7/3/01	4.14	5968.86		5961.7	5961.7
61595	10/4/01	5.07	5967.93		5961.7	5961.7
61695	1/8/01	5.71	5982.29		5973.1	5973.1
61695	4/4/01	5.25	5982.75		5973.1	5973.1
61695	7/3/01	3.87	5984.13		5973.1	5973.1
61695	10/4/01	4.99	5983.01		5973.1	5973.1
6186	1/4/01	10.65	5989.95		5987.47	5987.22
6186	3/7/01	10.32	5990.28		5987.47	5987.22
6186	4/4/01	9.7	5990.9		5987.47	5987.22
6186	7/11/01	9.7	5990.9		5987.47	5987.22
6186	10/4/01	10.44	5990.16		5987.47	5987.22
6186	11/26/01	9.86	5990.74		5987.47	5987.22
62393	1/8/01	0.17	6063.93	Frozen at 0.17'	6058.23	6058.23
62395	1/4/01	-1		Dry		
62395	2/6/01	-1		Dry		
62395	3/1/01	-1		Dry		
62395	4/3/01	-1		Dry		
62395	5/3/01	-1		Dry		
62395	6/5/01	-1		Dry		
62395	7/3/01	-1		Dry		
62395	8/2/01	-1		Dry		
62395	9/4/01	-1		Dry		
62395	10/3/01	-1		Dry		
62395	11/2/01	-1		Dry		
62395	12/3/01	-1		Dry		
62495	1/4/01	7.72				
62593	1/10/01	6.17	6041.63		6039.18	6039.18
62593	2/5/01	6.51	6041.29		6039.18	6039.18
62593	3/1/01	6.87	6040.93		6039.18	6039.18
62593	4/5/01	6.54	6041.26		6039.18	6039.18
62593	5/7/01	0.63	6047.17		6039.18	6039.18
62593	6/6/01	2.1	6045.7		6039.18	6039.18
62593	7/11/01	4.25	6043.55		6039.18	6039.18
62593	8/7/01	5.51	6042.29		6039.18	6039.18
62593	9/4/01	4.93	6042.87		6039.18	6039.18
62593	10/4/01	6.74	6041.06		6039.18	6039.18
62593	11/5/01	8	6039.8		6039.18	6039.18
62593	12/10/01	7.68	6040.12		6039.18	6039.18
62693	1/10/01	6.42	6035.38		6033	6033
62693	2/5/01	6.71	6035.09		6033	6033
62693	3/1/01	6.72	6035.08		6033	6033
62693	4/5/01	4.5	6037.3		6033	6033
62693	5/7/01	0	6041.8		6033	6033
62693	6/6/01	1	6040.8		6033	6033
62693	7/11/01	5.48	6036.32		6033	6033
62693	8/7/01	5.83	6035.97		6033	6033

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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4168

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
62693	9/4/01	6.67	6035.13		6033	6033
62693	10/4/01	6.54	6035.26		6033	6033
62693	11/5/01	7.09	6034.71		6033	6033
62693	12/10/01	-1	6042.8	Dry	6033	6033
62793	4/9/01	4.25	5935.25		5927.63	5927.63
6286	1/3/01	29.7	5873.48		5866.82	5866.82
6286	4/2/01	29.81	5873.37		5866.82	5866.82
6286	7/3/01	30.17	5873.01		5866.82	5866.82
6286	10/1/01	30.28	5872.9		5866.82	5866.82
62893	4/4/01	0.64	5994.56		5980.23	5980.23
62893	10/3/01	1.55	5993.65		5980.23	5980.23
63093	8/7/01	20.76	5998.44		5995.09	5992.29
63193	4/6/01	9.15	5960.85		5947.44	5947.44
63395	1/3/01	-1	5901	Dry	5891.5	5891.5
63395	4/5/01	-1	5901	Dry	5891.5	5891.5
63395	7/13/01	8.09	5891.91		5891.5	5891.5
63395	10/2/01	8.09	5891.91		5891.5	5891.5
63495	4/4/01	3.3	6007.7		6002.6	6002.6
63495	7/3/01	3.72	6007.28		6002.6	6002.6
63495	10/4/01	4.55	6006.45		6002.6	6002.6
63795	1/2/01	9				
63795	2/6/01	8.93				
63795	3/7/01	9.16				
63795	4/2/01	8.81				
63795	5/3/01	5.68				
63795	6/4/01	5.4				
63795	7/2/01	7.13				
63795	8/6/01	8.49				
63795	9/4/01	9.3				
63795	10/3/01	9.87				
63795	11/5/01	10.37				
63795	12/6/01	11.57				
6386	1/3/01	-1	5903.01	Dry	5885.84	5885.59
6386	4/2/01	-1	5903.01	Dry	5885.84	5885.59
6386	7/3/01	14.05	5887.96		5885.84	5885.59
6386	10/1/01	-1	5903.01	Dry	5885.84	5885.59
63895	1/2/01	5.98				
63895	2/6/01	5.95				
63895	3/7/01	6.01				
63895	4/2/01	5.94				
63895	5/3/01	5.64				
63895	6/4/01	5.3				
63895	7/2/01	5.68				
63895	8/6/01	5.75				
63895	9/4/01	5.85				
63895	10/3/01	5.76				
63895	11/5/01	5.75				
63895	12/6/01	5.84				
64595	1/3/01	-1	5799	Dry		
64695	1/3/01	-1		Dry		
64795	1/4/01	13.46				
6486	1/3/01	7.48	5833.57		5830.06	5830.06

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

299
4609

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
6486	2/5/01	7.42	5833.63		5830.06	5830.06
6486	3/1/01	7.23	5833.82		5830.06	5830.06
6486	4/2/01	6.73	5834.32		5830.06	5830.06
6486	5/1/01	6.8	5834.25		5830.06	5830.06
6486	6/1/01	7.17	5833.88		5830.06	5830.06
6486	7/3/01	9.27	5831.78		5830.06	5830.06
6486	8/1/01	11.17	5829.88		5830.06	5830.06
6486	9/4/01	-1	5842.05	Dry	5830.06	5830.06
6486	10/1/01	-1	5842.05	Dry	5830.06	5830.06
6486	11/2/01	-1	5842.05	Dry	5830.06	5830.06
6486	12/3/01	7.21	5833.84		5830.06	5830.06
65195	1/4/01	-1		Dry		
65395	1/3/01	-1		Dry		
65495	1/3/01	10.17				
6586	1/3/01	6.4	5781.87		5778.66	5778.66
6586	2/5/01	6.2	5782.07		5778.66	5778.66
6586	3/1/01	6.29	5781.98		5778.66	5778.66
6586	4/2/01	6.2	5782.07		5778.66	5778.66
6586	5/2/01	6.44	5781.83		5778.66	5778.66
6586	6/1/01	-1	5789.27	Dry to top Pump	5778.66	5778.66
6586	7/3/01	-1	5789.27	Dry to top Pump	5778.66	5778.66
6586	8/1/01	-1	5789.27	Dry to top Pump	5778.66	5778.66
6586	9/4/01	-1	5789.27	Dry to top Pump	5778.66	5778.66
6586	10/1/01	-1	5789.27	Dry to top Pump	5778.66	5778.66
6586	11/2/01	6.51	5781.76		5778.66	5778.66
6586	12/3/01	6.28	5781.99		5778.66	5778.66
65895	1/4/01	13.38				
66195	1/4/01	-1		Dry		
66695	1/4/01	7.13				
66795	1/4/01	12.38				
6686	1/3/01	4.64	5689.56		5686.07	5686.07
6686	2/5/01	4.36	5689.84		5686.07	5686.07
6686	3/1/01	4.38	5689.82		5686.07	5686.07
6686	4/3/01	-1	5695.2	Dry	5686.07	5686.07
6686	5/3/01	4.67	5689.53		5686.07	5686.07
6686	6/5/01	5.01	5689.19		5686.07	5686.07
6686	7/10/01	7.17	5687.03		5686.07	5686.07
6686	8/2/01	7.45	5686.75		5686.07	5686.07
6686	9/4/01	7.97	5686.23		5686.07	5686.07
6686	10/3/01	-1	5695.2	Dry	5686.07	5686.07
6686	11/5/01	-1	5695.2	Dry	5686.07	5686.07
6686	12/6/01	4.99	5689.21		5686.07	5686.07
66895	1/4/01	13.35				
67095	1/3/01	9.93				
67195	1/4/01	15.35				
67295	1/3/01			Destroyed		
67395	1/3/01	5.24				
67495	1/3/01	5.89				
67595	1/3/01	6.3				
6786	4/3/01	-1	5804.97	Dry	5787.58	5787.58
6786	10/3/01	-1	5804.97	Dry	5787.58	5787.58
68194	1/4/01	8.2	6018.9		6009.11	6018.49

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

400
470

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
70099	1/3/01	20.62	5876.53		5874.51	5873.21
70099	2/5/01	22.55	5874.6		5874.51	5873.21
70099	3/5/01	22.15	5875		5874.51	5873.21
70099	4/5/01	21.45	5875.7		5874.51	5873.21
70099	5/1/01	22.49	5874.66		5874.51	5873.21
70099	6/1/01	21.26	5875.89		5874.51	5873.21
70099	7/10/01	19.79	5877.36		5874.51	5873.21
70099	8/2/01	18.94	5878.21		5874.51	5873.21
70099	9/4/01	22.06	5875.09		5874.51	5873.21
70099	10/2/01	22	5875.15		5874.51	5873.21
70099	11/2/01	22.31	5874.84		5874.51	5873.21
70099	12/3/01	21.38	5875.77		5874.51	5873.21
70193	1/2/01	15.04	5976.96		5952.7	5950.7
70193	4/5/01	13.99	5978.01		5952.7	5950.7
70193	7/10/01	10.38	5981.62		5952.7	5950.7
70193	10/4/01	13.32	5978.68		5952.7	5950.7
70299	1/3/01	19.76	5877.42		5858.76	5857.36
70299	2/5/01	20.45	5876.73		5858.76	5857.36
70299	3/5/01	20.31	5876.87		5858.76	5857.36
70299	4/5/01	20.27	5876.91		5858.76	5857.36
70299	5/1/01	21.19	5875.99		5858.76	5857.36
70299	6/1/01	20.31	5876.87		5858.76	5857.36
70299	7/10/01	20.35	5876.83		5858.76	5857.36
70299	8/2/01	20.39	5876.79		5858.76	5857.36
70299	9/4/01	20.86	5876.32		5858.76	5857.36
70299	10/2/01	20.2	5876.98		5858.76	5857.36
70299	11/2/01	20.65	5876.53		5858.76	5857.36
70299	12/3/01	19.86	5877.32		5858.76	5857.36
70393	1/2/01	14.58	5985.52		5975.1	5973.1
70393	4/5/01	13.47	5986.63		5975.1	5973.1
70393	7/10/01	9.31	5990.79		5975.1	5973.1
70393	10/4/01	11.83	5988.27		5975.1	5973.1
70493	1/2/01	14.79	5985.21		5954	5952
70493	4/5/01	14.93	5985.07		5954	5952
70493	7/10/01	9.89	5990.11		5954	5952
70493	10/4/01	11.43	5988.57		5954	5952
70693	1/8/01	21.68	5971.02		5962.8	5960.7
70693	4/5/01	19.35	5973.35		5962.8	5960.7
70693	7/10/01	16.78	5975.92		5962.8	5960.7
70693	10/4/01	18.51	5974.19		5962.8	5960.7
70799	1/3/01	-1	5902.07	Dry		
70799	2/5/01	19.03	5882.04			
70799	3/5/01	-1	5902.07	Dry		
70799	4/5/01	14.87	5886.2			
70799	5/1/01	13.7	5887.37			
70799	6/1/01	13.88	5887.19			
70799	7/10/01	16.87	5884.2			
70799	8/2/01	16.51	5884.56			
70799	9/4/01	17.45	5883.62			
70799	10/2/01	17.52	5883.55			
70799	11/2/01	-1	5902.07	Dry		
70799	12/3/01	18.57	5882.5			

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

40 471

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
7086	1/3/01	3.27	5936.12		5929.79	5929.79
7086	4/2/01	3.02	5936.37		5929.79	5929.79
7086	7/2/01	-1	5940.39	Dry to top Pump	5929.79	5929.79
7086	10/1/01	-1	5940.39	Dry to top Pump	5929.79	5929.79
70899	1/3/01	-1	5902.59	Dry		
70899	2/5/01	-1	5902.59	Dry		
70899	3/5/01	18.11	5883.48			
70899	4/5/01	16.75	5884.84			
70899	5/1/01	15.41	5886.18			
70899	6/1/01	15.54	5886.05			
70899	7/10/01	18.51	5883.08			
70899	8/2/01	-1	5902.59	Dry		
70899	9/4/01	19.17	5882.42			
70899	10/2/01	19.29	5882.3			
70899	11/2/01	-1	5902.59	Dry		
70899	12/3/01	20.38	5881.21			
70999	1/3/01	-1	5921.72	Dry		
70999	2/5/01	-1	5921.72	Dry		
70999	3/5/01	-1	5921.72	Dry		
70999	4/5/01	20.8	5899.92			
70999	5/1/01	20.15	5900.57			
70999	6/1/01	20.25	5900.47			
70999	7/10/01	20.94	5899.78			
70999	8/2/01	20.84	5899.88			
70999	9/4/01	20.98	5899.74			
70999	10/2/01	20.96	5899.76			
70999	11/2/01	-1	5921.72	Dry		
70999	12/3/01	-1	5921.72	Dry		
71099	1/3/01	21.24	5880.7			
71099	2/5/01	21.06	5880.88			
71099	3/5/01	18.49	5883.45			
71099	4/5/01	17.13	5884.81			
71099	5/1/01	15.92	5886.02			
71099	6/1/01	16.07	5885.87			
71099	7/13/01	17.69	5884.25			
71099	8/2/01	18.57	5883.37			
71099	9/4/01	19.55	5882.39			
71099	10/2/01	19.64	5882.3			
71099	11/2/01	21.88	5880.06			
71099	12/3/01	20.75	5881.19			
71494	1/10/01	26.72	5973.08		5957.7	5955.7
7187	4/5/01	6.97	5958.52		5950.38	5950.04
7187	10/4/01	8.59	5956.9		5950.38	5950.04
75092	1/3/01	11.83	5713.57		5708.7	5706.7
75292	1/3/01	8.02	5748.88		5747.3	5745.3
75292	2/5/01	6.68	5750.22		5747.3	5745.3
75292	3/5/01	6.71	5750.19		5747.3	5745.3
75292	4/5/01	5.71	5751.19		5747.3	5745.3
75292	5/1/01	5.36	5751.54		5747.3	5745.3
75292	6/1/01	6.61	5750.29		5747.3	5745.3
75292	7/10/01	6.05	5750.85		5747.3	5745.3
75292	8/2/01	7.41	5749.49		5747.3	5745.3

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

4D2 477

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
75292	9/4/01	8.82	5748.08		5747.3	5745.3
75292	10/2/01	8.95	5747.95		5747.3	5745.3
75292	11/2/01	7.3	5749.6		5747.3	5745.3
75292	12/3/01	4.67	5752.23		5747.3	5745.3
75992	1/3/01	9.46	5889.64		5887.1	5885.1
75992	4/5/01	7.04	5892.06		5887.1	5885.1
75992	7/12/01	9.1	5890		5887.1	5885.1
75992	10/2/01	13.57	5885.53	Technically Dry	5887.1	5885.1
76792	4/5/01	7.22	5938.28		5938	5935.7
76792	10/4/01	7.16	5938.34		5938	5935.7
76992	1/2/01	13.59	5944.41	Technically Dry	5945.6	5943.6
76992	4/5/01	13.61	5944.39	Technically Dry	5945.6	5943.6
76992	7/10/01	10.18	5947.82		5945.6	5943.6
76992	10/4/01	-1	5959	Dry	5945.6	5943.6
77392	1/2/01	10.18	5955.32	Technically Dry	5955.6	5953.6
77392	4/4/01	10.19	5955.31	Technically Dry	5955.6	5953.6
77392	7/3/01	9.73	5955.77		5955.6	5953.6
77392	10/4/01	10.13	5955.37		5955.6	5953.6
779 NE	1/10/01	-1		Dry		
779 NW	1/10/01	-1		Dry		
779 SE	1/10/01	-1		Dry		
779 SW	1/10/01	16.41				
782 SUMP	1/10/01	8.7				
783 M	1/10/01	7.5				
783 N	1/10/01	7.5				
783 S	1/10/01	9.28				
83101	11/2/01	4.9	5994.12			
83201	11/2/01	8.9	5988.14			
86501	11/2/01	22.68	5973.56			
86601	11/2/01	22.77	5968.85			
86701	11/2/01	-1	5993.43	Dry		
88101	11/2/01	-1	5965.86	Dry		
88101	12/6/01	29.4	5935.46			
90099	1/3/01	17.32	5838.5		5836.45	5834.05
90099	4/2/01	17.41	5838.41		5836.45	5834.05
90099	7/3/01	17.51	5838.31		5836.45	5834.05
90099	10/1/01	17.49	5838.33		5836.45	5834.05
90199	1/3/01	-1	5835.62	Dry	5820.72	5818.42
90199	4/2/01	-1	5835.62	Dry	5820.72	5818.42
90199	7/3/01	-1	5835.62	Dry	5820.72	5818.42
90199	10/1/01	-1	5835.62	Dry	5820.72	5818.42
90299	1/3/01	18.1	5807.12		5804.93	5802.63
90299	4/2/01	17.86	5807.36		5804.93	5802.63
90299	7/3/01	16.41	5808.81		5804.93	5802.63
90299	10/1/01	19.71	5805.51		5804.93	5802.63
90399	1/3/01	19.29	5821.34		5819.53	5817.23
90399	4/2/01	14.16	5826.47		5819.53	5817.23
90399	7/3/01	-1	5841.63	Dry to top Troll	5819.53	5817.23
90399	10/1/01	-1	5841.63	Dry to top Pump	5819.53	5817.23
95099	1/3/01	14.39	5848.93		5840.07	5838.07
95099	2/5/01	14.06	5849.26		5840.07	5838.07
95099	3/5/01	14.13	5849.19		5840.07	5838.07

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

#03 473

Appendix B: Water Level Data - Groundwater 2001

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
95099	4/5/01	14.13	5849.19		5840.07	5838.07
95099	5/1/01	20.18	5843.14		5840.07	5838.07
95099	6/1/01	16.03	5847.29		5840.07	5838.07
95099	7/13/01	14.18	5849.14		5840.07	5838.07
95099	8/2/01	14.04	5849.28		5840.07	5838.07
95099	9/4/01	13.87	5849.45		5840.07	5838.07
95099	10/2/01	13.71	5849.61		5840.07	5838.07
95099	11/2/01	21.34	5841.98		5840.07	5838.07
95099	12/3/01	17.3	5846.02		5840.07	5838.07
95199	1/3/01	11.35	5870.55		5856.86	5854.86
95199	2/5/01	11.6	5870.3		5856.86	5854.86
95199	3/5/01	11.82	5870.08		5856.86	5854.86
95199	4/5/01	11.75	5870.15		5856.86	5854.86
95199	5/1/01	12.4	5869.5		5856.86	5854.86
95199	6/1/01	10.83	5871.07		5856.86	5854.86
95199	7/13/01	11.84	5870.06		5856.86	5854.86
95199	8/2/01	11.91	5869.99		5856.86	5854.86
95199	9/4/01	11.91	5869.99		5856.86	5854.86
95199	10/2/01	11.69	5870.21		5856.86	5854.86
95199	11/2/01	16.04	5865.86		5856.86	5854.86
95199	12/3/01	11.22	5870.68		5856.86	5854.86
95299	1/3/01	-1	5905.85	Dry	5888.8	5886.8
95299	2/5/01	-1	5905.85	Dry	5888.8	5886.8
95299	3/5/01	-1	5905.85	Dry	5888.8	5886.8
95299	4/5/01	-1	5905.85	Dry	5888.8	5886.8
95299	5/1/01	-1	5905.85	Dry	5888.8	5886.8
95299	6/1/01	-1	5905.85	Dry	5888.8	5886.8
95299	7/13/01	-1	5905.85	Dry	5888.8	5886.8
95299	8/2/01	-1	5905.85	Dry	5888.8	5886.8
95299	9/4/01	-1	5905.85	Dry	5888.8	5886.8
95299	10/2/01	-1	5905.85	Dry	5888.8	5886.8
95299	11/2/01	-1	5905.85	Dry	5888.8	5886.8
95299	12/3/01	-1	5905.85	Dry	5888.8	5886.8
95699	1/3/01	-1	5881.1	Dry		5866.36
95699	2/5/01	-1	5881.1	Dry		5866.36
95699	3/5/01	-1	5881.1	Dry		5866.36
95699	4/5/01	-1	5881.1	Dry		5866.36
95699	5/1/01	-1	5881.1	Dry		5866.36
95699	6/1/01	-1	5881.1	Dry		5866.36
95699	7/13/01	-1	5881.1	Dry		5866.36
95699	8/2/01	-1	5881.1	Dry		5866.36
95699	9/4/01	-1	5881.1	Dry		5866.36
95699	10/2/01	-1	5881.1	Dry		5866.36
95699	11/2/01	-1	5881.1	Dry		5866.36
95699	12/3/01	-1	5881.1	Dry		5866.36
95799	1/3/01	13.48	5877.14			
95799	2/5/01	13.6	5877.02			
95799	3/5/01	13.96	5876.66			
95799	4/5/01	13.35	5877.27			
95799	5/1/01	10.8	5879.82			
95799	6/1/01	9.22	5881.4			
95799	7/13/01	10.5	5880.12			

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
95799	8/2/01	10.56	5880.06			
95799	9/4/01	11.21	5879.41			
95799	10/2/01	11.45	5879.17			
95799	11/2/01	11.89	5878.73			
95799	12/3/01	11.52	5879.1			
95899	1/3/01	20.87	5888.51			
95899	2/5/01	20.88	5888.5			
95899	3/5/01	20.85	5888.53			
95899	4/5/01	20.86	5888.52			
95899	5/1/01	20.83	5888.55			
95899	6/1/01	20.8	5888.58			
95899	7/13/01	20.76	5888.62			
95899	8/2/01	20.76	5888.62			
95899	9/4/01	-1	5910.38	Dry		
95899	10/3/01	20.76	5888.62			
95899	11/2/01	20.67	5888.71			
95899	12/3/01	20.76	5888.62			
99101	11/6/01	-1	5942.99	Dry		
99201	11/6/01	-1	5952.5	Dry		
99301	11/2/01	-1	5934.42	Dry		
99401	11/2/01	-1	5931.36	Dry		
B102289	1/2/01	2.9	5977.16		5965.83	5964.08
B102289	4/2/01	3.08	5976.98		5965.83	5964.08
B102289	10/3/01	3.11	5976.95		5965.83	5964.08
B102389	1/2/01	5.6	5935.58		5928.6	5926.89
B102389	4/2/01	5.27	5935.91		5928.6	5926.89
B102389	10/3/01	7.3	5933.88		5928.6	5926.89
B110889	1/2/01	37.31	6040.46		6010.82	6009.83
B110889	4/2/01	37.81	6039.96		6010.82	6009.83
B110889	10/3/01	35.97	6041.8		6010.82	6009.83
B110989	1/2/01	49.19	6035.17		6016.69	6015.45
B110989	2/6/01	49.22	6035.14		6016.69	6015.45
B110989	3/7/01	49.81	6034.55		6016.69	6015.45
B110989	4/2/01	49.6	6034.76		6016.69	6015.45
B110989	5/2/01	49.74	6034.62		6016.69	6015.45
B110989	6/4/01	47.93	6036.43		6016.69	6015.45
B110989	7/2/01	47.88	6036.48		6016.69	6015.45
B110989	8/2/01	47.83	6036.53		6016.69	6015.45
B110989	9/4/01	47.87	6036.49		6016.69	6015.45
B110989	10/3/01	47.93	6036.43		6016.69	6015.45
B110989	11/2/01	48.45	6035.91		6016.69	6015.45
B110989	12/6/01	48.87	6035.49		6016.69	6015.45
B111189	1/2/01	57.97	6049.55		6033.12	6031.88
B111189	2/6/01	57.62	6049.9		6033.12	6031.88
B111189	3/7/01	58	6049.52		6033.12	6031.88
B111189	4/2/01	57.72	6049.8		6033.12	6031.88
B111189	5/2/01	58.16	6049.36		6033.12	6031.88
B111189	6/4/01	57.81	6049.71		6033.12	6031.88
B111189	7/2/01	58.05	6049.47		6033.12	6031.88
B111189	8/2/01	58.05	6049.47		6033.12	6031.88
B111189	9/4/01	57.86	6049.66		6033.12	6031.88
B111189	10/3/01	57.66	6049.86		6033.12	6031.88

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
B111189	11/2/01	57.8	6049.72		6033.12	6031.88
B111189	12/6/01	57.75	6049.77		6033.12	6031.88
B203189	1/2/01	24.49	5945.63		5923.3	5921.53
B206689	1/2/01	12.41	5948.79		5941.14	5939.9
B206689	4/5/01	13.27	5947.93		5941.14	5939.9
B206689	7/10/01	9.4	5951.8		5941.14	5939.9
B206689	10/4/01	11.05	5950.15		5941.14	5939.9
B206989	1/2/01	23.89	5860.43	Technically Dry	5861.12	5859.92
B206989	4/5/01	-1	5885.32	Dry	5861.12	5859.92
B206989	7/10/01	22.08	5862.24		5861.12	5859.92
B206989	10/4/01	22.98	5861.34		5861.12	5859.92
B208089	1/2/01	14.48	5922.59		5922.5	5921.24
B208089	2/5/01	14.66	5922.41		5922.5	5921.24
B208089	3/5/01	14.8	5922.27	Technically Dry	5922.5	5921.24
B208089	4/5/01	14.91	5922.16	Technically Dry	5922.5	5921.24
B208089	5/1/01	13.58	5923.49		5922.5	5921.24
B208089	6/5/01	12.6	5924.47		5922.5	5921.24
B208089	7/10/01	13.1	5923.97		5922.5	5921.24
B208089	8/2/01	13.23	5923.84		5922.5	5921.24
B208089	9/4/01	13.38	5923.69		5922.5	5921.24
B208089	10/2/01	13.54	5923.53		5922.5	5921.24
B208089	11/2/01	13.83	5923.24		5922.5	5921.24
B208089	12/3/01	14.1	5922.97		5922.5	5921.24
B208289	1/2/01	17.58	5835.37	Technically Dry	5835.28	5834.54
B208289	4/5/01	17.55	5835.4	Technically Dry	5835.28	5834.54
B208289	7/10/01	17.67	5835.28	Technically Dry	5835.28	5834.54
B208289	10/2/01	17.56	5835.39	Technically Dry	5835.28	5834.54
B208689	1/2/01	6.42	5863.18		5845.8	5844.53
B208789	1/2/01	13.91	5895.12	Technically Dry	5896.17	5894.78
B208789	4/5/01	3.61	5905.42		5896.17	5894.78
B208789	7/10/01	5.48	5903.55		5896.17	5894.78
B208789	10/2/01	6.49	5902.54		5896.17	5894.78
B304789	1/3/01	24.71	5844.85		5830.23	5828.66
B304889	1/3/01	9.8	5722.76		5706.46	5704.7
B400389	1/2/01	26.83	6097.17		6073	6071.7
B400389	2/5/01	27.48	6096.52		6073	6071.7
B400389	3/1/01	27.97	6096.03		6073	6071.7
B400389	4/2/01	27.85	6096.15		6073	6071.7
B400389	5/1/01	22.64	6101.36		6073	6071.7
B400389	6/1/01	22.74	6101.26		6073	6071.7
B400389	7/2/01	25.28	6098.72		6073	6071.7
B400389	8/1/01	27.12	6096.88		6073	6071.7
B400389	9/4/01	28.18	6095.82		6073	6071.7
B400389	10/1/01	28.99	6095.01		6073	6071.7
B400389	11/2/01	29.88	6094.12		6073	6071.7
B400389	12/6/01	30.58	6093.42		6073	6071.7
B405889	1/2/01	11.6	6015.27		5979.4	5978.15
B405989	1/2/01	7.21	6018.85		6016.9	6015.1
B410589	1/2/01	54.37	6059.43		6051.76	6050.49
B410589	2/6/01	54.32	6059.48		6051.76	6050.49
B410589	4/2/01	54.72	6059.08		6051.76	6050.49
B410589	5/2/01	55.12	6058.68		6051.76	6050.49

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
B410589	6/4/01	54.49	6059.31		6051.76	6050.49
B410589	7/2/01	54.37	6059.43		6051.76	6050.49
B410589	8/2/01	54.35	6059.45		6051.76	6050.49
B410589	9/4/01	54.33	6059.47		6051.76	6050.49
B410589	10/3/01	54.25	6059.55		6051.76	6050.49
B410589	11/2/01	54.55	6059.25		6051.76	6050.49
B410589	12/6/01	54.74	6059.06		6051.76	6050.49
B410689	1/2/01	44.4	6049.31		6041.65	6040.37
B410689	4/2/01	45.15	6048.56		6041.65	6040.37
B410689	10/3/01	43.77	6049.94		6041.65	6040.37
B410789	1/2/01	38.61	6045.05		6037.07	6035.8
B410789	4/2/01	39.13	6044.53		6037.07	6035.8
B410789	10/3/01	37.5	6046.16		6037.07	6035.8
B411289	1/2/01	62.31	6064.99		6057.01	6055.75
B411289	2/6/01	62.15	6065.15		6057.01	6055.75
B411289	3/7/01	72.86	6054.44		6057.01	6055.75
B411289	4/2/01	62.29	6065.01		6057.01	6055.75
B411289	5/2/01	62.73	6064.57		6057.01	6055.75
B411289	6/4/01	62.58	6064.72		6057.01	6055.75
B411289	7/2/01	62.99	6064.31		6057.01	6055.75
B411289	8/2/01	62.98	6064.32		6057.01	6055.75
B411289	9/4/01	62.8	6064.5		6057.01	6055.75
B411289	10/3/01	62.65	6064.65		6057.01	6055.75
B411289	11/2/01	62.67	6064.63		6057.01	6055.75
B411289	12/6/01	62.66	6064.64		6057.01	6055.75
P114389	2/6/01	7.8	5985.37		5976.7	5975.43
P114389	3/5/01	7.55	5985.62		5976.7	5975.43
P114389	4/4/01	6.82	5986.35		5976.7	5975.43
P114389	5/2/01	6.66	5986.51		5976.7	5975.43
P114389	6/4/01	6.79	5986.38		5976.7	5975.43
P114389	7/3/01	7.53	5985.64		5976.7	5975.43
P114389	8/1/01	7.78	5985.39		5976.7	5975.43
P114389	9/4/01	8.01	5985.16		5976.7	5975.43
P114389	10/4/01	7.68	5985.49		5976.7	5975.43
P114389	11/5/01	8.02	5985.15		5976.7	5975.43
P114389	12/10/01	7.78	5985.39		5976.7	5975.43
P114489	4/5/01	15.97	6019.46		5984.6	5983.3
P114489	10/4/01	15.21	6020.22		5984.6	5983.3
P114589	4/5/01	8.63	6017.27		5987.6	5986.5
P114589	10/4/01	7.03	6018.87		5987.6	5986.5
P114689	1/8/01	14.05	5991.71		5981.76	5980.5
P114689	4/5/01	10.45	5995.31		5981.76	5980.5
P114689	10/4/01	12.35	5993.41		5981.76	5980.5
P114689	12/6/01	13.13	5992.63		5981.76	5980.5
P114789	1/8/01	10.67	6001.73		5984.47	5983
P114789	4/5/01	10.65	6001.75		5984.47	5983
P114789	10/4/01	9.68	6002.72		5984.47	5983
P114989	4/5/01	15.28	6016.56		5991.8	5990.5
P114989	10/4/01	12.51	6019.33		5991.8	5990.5
P115089	1/4/01	18.21	6021.89		5997.4	5996.09
P115089	2/6/01	18.71	6021.39		5997.4	5996.09
P115089	3/5/01	18.8	6021.3		5997.4	5996.09

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
P115089	4/3/01	17.19	6022.91		5997.4	5996.09
P115089	5/2/01	13.83	6026.27		5997.4	5996.09
P115089	6/4/01	12.34	6027.76		5997.4	5996.09
P115089	7/13/01	14.57	6025.53		5997.4	5996.09
P115089	8/1/01	15.02	6025.08		5997.4	5996.09
P115089	9/4/01	15.92	6024.18		5997.4	5996.09
P115089	10/4/01	16.57	6023.53		5997.4	5996.09
P115089	11/5/01	17.8	6022.3		5997.4	5996.09
P115089	12/10/01	18.34	6021.76		5997.4	5996.09
P115589	1/8/01	9.43	6006.34		5984.62	5983.4
P115589	4/5/01	6.46	6009.31		5984.62	5983.4
P115589	10/4/01	7.89	6007.88		5984.62	5983.4
P115689	1/8/01	13.98	5994.73		5986.7	5985.59
P115689	4/4/01	10	5998.71		5986.7	5985.59
P115689	10/4/01	13.16	5995.55		5986.7	5985.59
P119389	5/4/01	4.47	6008.71		5994.8	5993.49
P119389	8/1/01	3.75	6009.43		5994.8	5993.49
P119389	8/9/01	3.87	6009.31		5994.8	5993.49
P207389	1/8/01	8.4	5974.37		5965.84	5964.76
P207689	4/2/01	7.99	5959.89		5953.22	5951.96
P207689	10/2/01	11.15	5956.73		5953.22	5951.96
P207889	4/2/01	10.28	5954.62	Technically Dry	5955.12	5953.87
P207889	10/2/01	8.35	5956.55		5955.12	5953.87
P209289	1/8/01	10.99	5972.43		5968.93	5968.19
P209289	4/2/01	8.52	5974.9		5968.93	5968.19
P209289	7/9/01	14.7	5968.72	Technically Dry	5968.93	5968.19
P209289	10/1/01	12.28	5971.14		5968.93	5968.19
P209389	1/8/01	15.63	5967.76		5952.67	5951.42
P209389	4/2/01	14.18	5969.21		5952.67	5951.42
P209389	7/9/01	18.39	5965		5952.67	5951.42
P209389	10/1/01	17.33	5966.06		5952.67	5951.42
P209489	1/9/01	30.03	5950.07		5942.98	5941.73
P209489	4/2/01	29.99	5950.11		5942.98	5941.73
P209489	7/2/01	29.06	5951.04		5942.98	5941.73
P209489	10/2/01	29.28	5950.82		5942.98	5941.73
P209689	1/9/01	15.68	5948.75		5935.96	5934.7
P209789	4/2/01	15.11	5949.83	Technically Dry	5950.32	5949.07
P209789	10/2/01	12.74	5952.2		5950.32	5949.07
P215789	1/8/01	16.91	5986.75		5983.5	5982.41
P215789	4/4/01	15.65	5988.01		5983.5	5982.41
P215789	10/4/01	16.5	5987.16		5983.5	5982.41
P218089	1/8/01	6.28	5981.27		5978.37	5977.11
P218089	2/1/01	5.33	5982.22		5978.37	5977.11
P218089	3/6/01	5.87	5981.68		5978.37	5977.11
P218089	4/4/01	5.18	5982.37		5978.37	5977.11
P218089	7/2/01	6.86	5980.69		5978.37	5977.11
P218089	10/1/01	8.27	5979.28		5978.37	5977.11
P218289	4/4/01	8.22	6009.98		5993.4	5992.18
P218289	10/4/01	9.99	6008.21		5993.4	5992.18
P218389	1/9/01	14.8	5943.65	Technically Dry	5943.7	5942.43
P218389	2/1/01	14.82	5943.63	Technically Dry	5943.7	5942.43
P218389	3/5/01	14.83	5943.62		5943.7	5942.43

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
P218389	4/2/01	14.83	5943.62	Technically Dry	5943.7	5942.43
P218389	5/3/01	10.9	5947.55		5943.7	5942.43
P218389	6/5/01	12.63	5945.82		5943.7	5942.43
P218389	7/2/01	13.8	5944.65		5943.7	5942.43
P218389	8/1/01	14.15	5944.3	Technically Dry	5943.7	5942.43
P218389	9/4/01	14.58	5943.87		5943.7	5942.43
P218389	10/2/01	14.79	5943.66	Technically Dry	5943.7	5942.43
P218389	11/2/01	14.78	5943.67	Technically Dry	5943.7	5942.43
P218389	12/3/01	14.8	5943.65		5943.7	5942.43
P219089	1/9/01	10.38	5939.52		5934.66	5933.4
P219089	4/3/01	9.07	5940.83		5934.66	5933.4
P219089	7/2/01	9.16	5940.74		5934.66	5933.4
P219089	10/2/01	9.26	5940.64		5934.66	5933.4
P219189	1/8/01	13.29	5929.86		5929.7	5928.43
P219189	2/1/01	13	5930.15		5929.7	5928.43
P219189	3/5/01	12.67	5930.48		5929.7	5928.43
P219189	4/2/01	12.22	5930.93		5929.7	5928.43
P219189	5/3/01	11.66	5931.49		5929.7	5928.43
P219189	6/5/01	13.1	5930.05		5929.7	5928.43
P219189	7/2/01	-1	5944.15	Dry	5929.7	5928.43
P219189	8/1/01	13.27	5929.88		5929.7	5928.43
P219189	9/4/01	12.77	5930.38		5929.7	5928.43
P219189	10/2/01	12.36	5930.79		5929.7	5928.43
P219189	11/2/01	14.16	5928.99	Technically Dry	5929.7	5928.43
P219189	12/3/01	14.41	5928.74		5929.7	5928.43
P219489	1/9/01	24.5	5936.65		5936.6	5935.3
P219489	4/2/01	23.67	5937.48		5936.6	5935.3
P219489	7/2/01	24.45	5936.7		5936.6	5935.3
P219489	10/2/01	23.25	5937.9		5936.6	5935.3
P219589	12/5/01	20.31	5945.39		5938.1	5936.81
P313489	1/8/01	16.49	5997.09		5990.6	5989.33
P313489	4/4/01	14.01	5999.57		5990.6	5989.33
P313489	10/4/01	16.07	5997.51		5990.6	5989.33
P313589	1/4/01	10.71	5999.4		5996	5994.74
P313589	2/6/01	11.03	5999.08		5996	5994.74
P313589	3/1/01	10.49	5999.62		5996	5994.74
P313589	4/2/01	9.02	6001.09		5996	5994.74
P313589	5/2/01	7.98	6002.13		5996	5994.74
P313589	6/4/01	8.26	6001.85		5996	5994.74
P313589	7/11/01	9.18	6000.93		5996	5994.74
P313589	8/6/01	9.76	6000.35		5996	5994.74
P313589	9/5/01	9.63	6000.48		5996	5994.74
P313589	10/4/01	9.49	6000.62		5996	5994.74
P313589	11/5/01	9.75	6000.36		5996	5994.74
P313589	11/26/01	9.4	6000.71		5996	5994.74
P313589	12/10/01	9.49	6000.62		5996	5994.74
P314089	1/4/01	10.27	5988.22		5986.91	5985.64
P314289	1/4/01	14.95	5996.82		5996.59	5995.3
P314289	1/8/01	15.04	5996.73		5996.59	5995.3
P314289	2/6/01	-1	6012.77	Dry	5996.59	5995.3
P314289	3/1/01	-1	6012.77	Dry	5996.59	5995.3
P314289	4/2/01	-1	6012.77	Dry	5996.59	5995.3

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

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Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
P314289	5/2/01	15.18	5996.59		5996.59	5995.3
P314289	6/4/01	13.99	5997.78		5996.59	5995.3
P314289	7/12/01	14.2	5997.57		5996.59	5995.3
P314289	8/6/01	14.45	5997.32		5996.59	5995.3
P314289	9/4/01	14.76	5997.01		5996.59	5995.3
P314289	10/4/01	-1	6012.77	Dry	5996.59	5995.3
P314289	11/5/01	-1	6012.77	Dry	5996.59	5995.3
P314289	12/10/01	-1	6012.77	Dry	5996.59	5995.3
P317989	1/4/01	10.37	5982.47		5983.41	5982.17
P317989	4/4/01	9.66	5983.18		5983.41	5982.17
P317989	7/10/01	7.12	5985.72		5983.41	5982.17
P317989	10/4/01	-1	5993.84	Dry	5983.41	5982.17
P320089	1/8/01	16.1	5995.77		5991.09	5989.82
P320089	4/4/01	13.91	5997.96		5991.09	5989.82
P320089	10/4/01	15.65	5996.22		5991.09	5989.82
P415989	4/5/01	9.56	6037.15		6018.17	6016.9
P415989	10/4/01	10.88	6035.83		6018.17	6016.9
P416089	1/4/01	17.83	6036.12		6017.7	6016.31
P416089	2/6/01	19.5	6034.45		6017.7	6016.31
P416089	3/5/01	18.24	6035.71		6017.7	6016.31
P416089	4/5/01	11.65	6042.3		6017.7	6016.31
P416089	5/2/01	6.22	6047.73		6017.7	6016.31
P416089	6/4/01	6.24	6047.71		6017.7	6016.31
P416089	7/13/01	10.04	6043.91		6017.7	6016.31
P416089	8/6/01	11.99	6041.96		6017.7	6016.31
P416089	9/4/01	13.32	6040.63		6017.7	6016.31
P416089	10/4/01	14.86	6039.09		6017.7	6016.31
P416089	11/5/01	18.12	6035.83		6017.7	6016.31
P416089	12/10/01	18.8	6035.15		6017.7	6016.31
P416189	10/4/01			No meas., HERM	6015.94	6014.66
P416289	4/4/01	16.08	6024.14		6015.1	6013.83
P416289	10/4/01	15.87	6024.35		6015.1	6013.83
P416389	4/2/01	17.6	6039.54		6025.3	6024
P416389	10/4/01	19.41	6037.73		6025.3	6024
P416489	1/4/01	23.32	6026.83		6022.8	6021.52
P416489	2/6/01	24.52	6025.63		6022.8	6021.52
P416489	3/5/01	23.73	6026.42		6022.8	6021.52
P416489	4/2/01	20.05	6030.1		6022.8	6021.52
P416489	5/2/01	13.4	6036.75		6022.8	6021.52
P416489	6/4/01	13.69	6036.46		6022.8	6021.52
P416489	7/13/01	18.9	6031.25		6022.8	6021.52
P416489	8/6/01	19.35	6030.8		6022.8	6021.52
P416489	9/4/01	20.22	6029.93		6022.8	6021.52
P416489	10/4/01	21.33	6028.82		6022.8	6021.52
P416489	11/5/01	-1	6051.15	Dry	6022.8	6021.52
P416489	12/10/01	24.22	6025.93		6022.8	6021.52
P416689	1/4/01	34.09	6002.46		6002.5	6001.24
P416689	2/6/01	32.28	6004.27		6002.5	6001.24
P416689	3/5/01	31.59	6004.96		6002.5	6001.24
P416689	4/2/01	31.07	6005.48		6002.5	6001.24
P416689	5/2/01	34.05	6002.5		6002.5	6001.24
P416689	6/4/01	29.09	6007.46		6002.5	6001.24

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

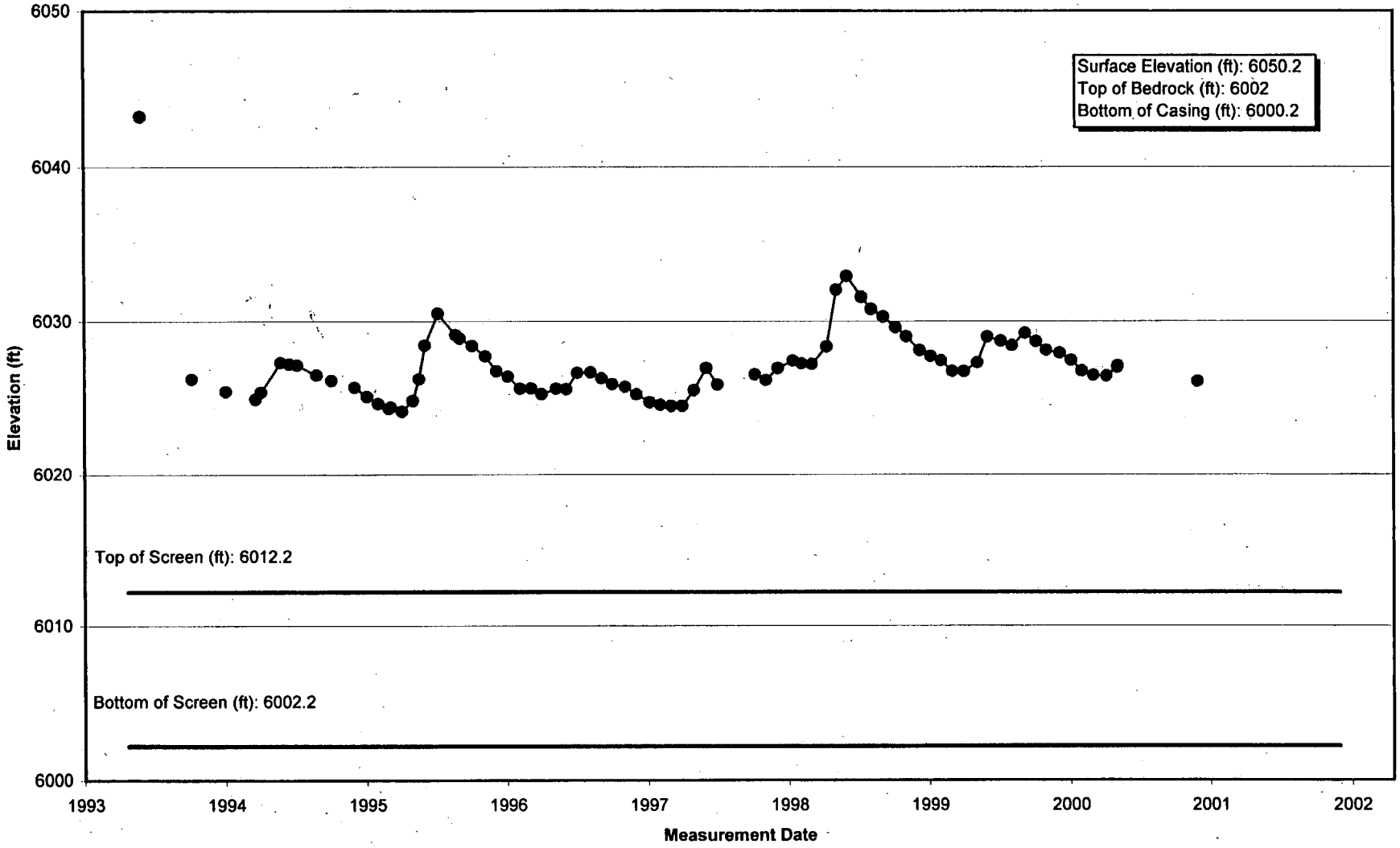
410
480

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. Below Screen)	Bottom Screen Elevation (ft.)	Bottom Casing Elevation (TD, ft.)
P416689	7/13/01	29.84	6006.71		6002.5	6001.24
P416689	8/6/01	29.82	6006.73		6002.5	6001.24
P416689	9/4/01	29.84	6006.71		6002.5	6001.24
P416689	10/4/01	29.86	6006.69		6002.5	6001.24
P416689	11/5/01	30.22	6006.33		6002.5	6001.24
P416689	12/10/01	34.1	6002.45		6002.5	6001.24
P416789	1/4/01	29.74	5999.53	Technically Dry	6000.9	5999.6
P416789	2/6/01	29.48	5999.79		6000.9	5999.6
P416789	3/5/01	29.25	6000.02		6000.9	5999.6
P416789	4/2/01	27.91	6001.36		6000.9	5999.6
P416789	5/2/01	25.29	6003.98		6000.9	5999.6
P416789	6/4/01	25.77	6003.5		6000.9	5999.6
P416789	7/16/01	26.91	6002.36		6000.9	5999.6
P416789	8/6/01	27.34	6001.93		6000.9	5999.6
P416789	9/4/01	27.48	6001.79		6000.9	5999.6
P416789	10/4/01	27.61	6001.66		6000.9	5999.6
P416789	11/5/01	-1	6030.27	Dry	6000.9	5999.6
P416789	12/10/01	29.87	5999.4	Technically Dry	6000.9	5999.6
P416889	1/4/01	-1	6019.79	Dry to top Pump	5997.13	5995.88
P416889	2/6/01	-1	6019.79	Dry to top Pump	5997.13	5995.88
P416889	3/5/01	-1	6019.79	Dry to top Pump	5997.13	5995.88
P416889	4/2/01	17.54	6001.25		5997.13	5995.88
P416889	5/2/01	15.92	6002.87		5997.13	5995.88
P416889	6/4/01	16.51	6002.28		5997.13	5995.88
P416889	7/16/01	17.46	6001.33		5997.13	5995.88
P416889	8/6/01	18.3	6000.49		5997.13	5995.88
P416889	9/4/01	18.43	6000.36		5997.13	5995.88
P416889	10/4/01	18.71	6000.08		5997.13	5995.88
P416889	11/5/01	-1	6019.79	Dry to top Pump	5997.13	5995.88
P416889	12/10/01	-1	6019.79	Dry to top Pump	5997.13	5995.88
P416989	4/5/01	38.02	6009.53		5889.59	5887.25
P416989	10/4/01	37.82	6009.73		5889.59	5887.25
P419689	1/8/01	20.5	6002.92		5998.9	5997.63
P419689	4/4/01	18.13	6005.29		5998.9	5997.63
P419689	7/12/01	19.37	6004.05		5998.9	5997.63
P419689	10/4/01	20.03	6003.39		5998.9	5997.63
SW00495	1/8/01	3.22				

TROLL or HERMIT = automated WL measuring devices.
"Dry to top Pump", WL elevation = measured elevation at top pump.
"Dry", WL elevation = measured elevation at bottom of casing (= TD).

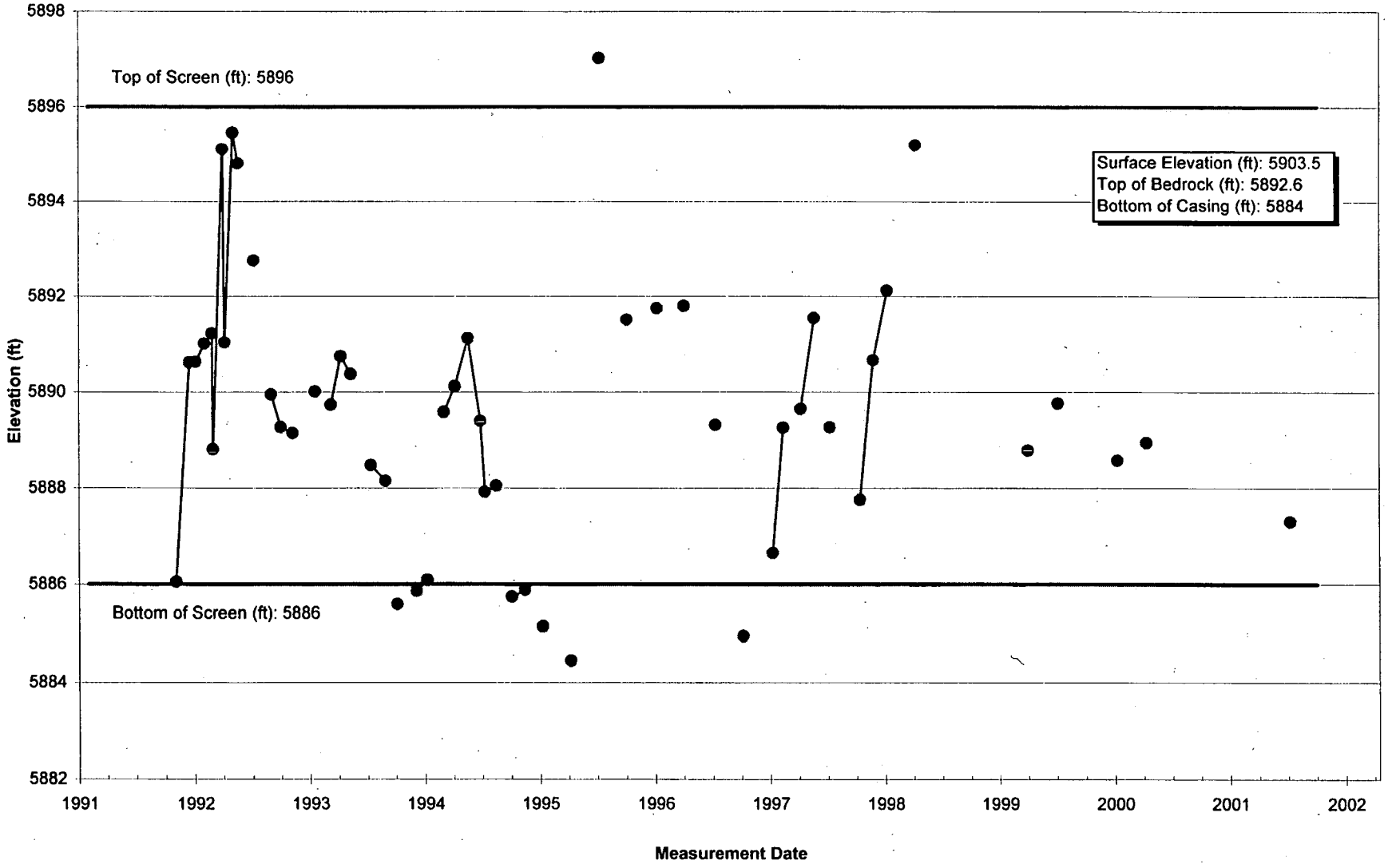
4 01

Hydrograph 00293

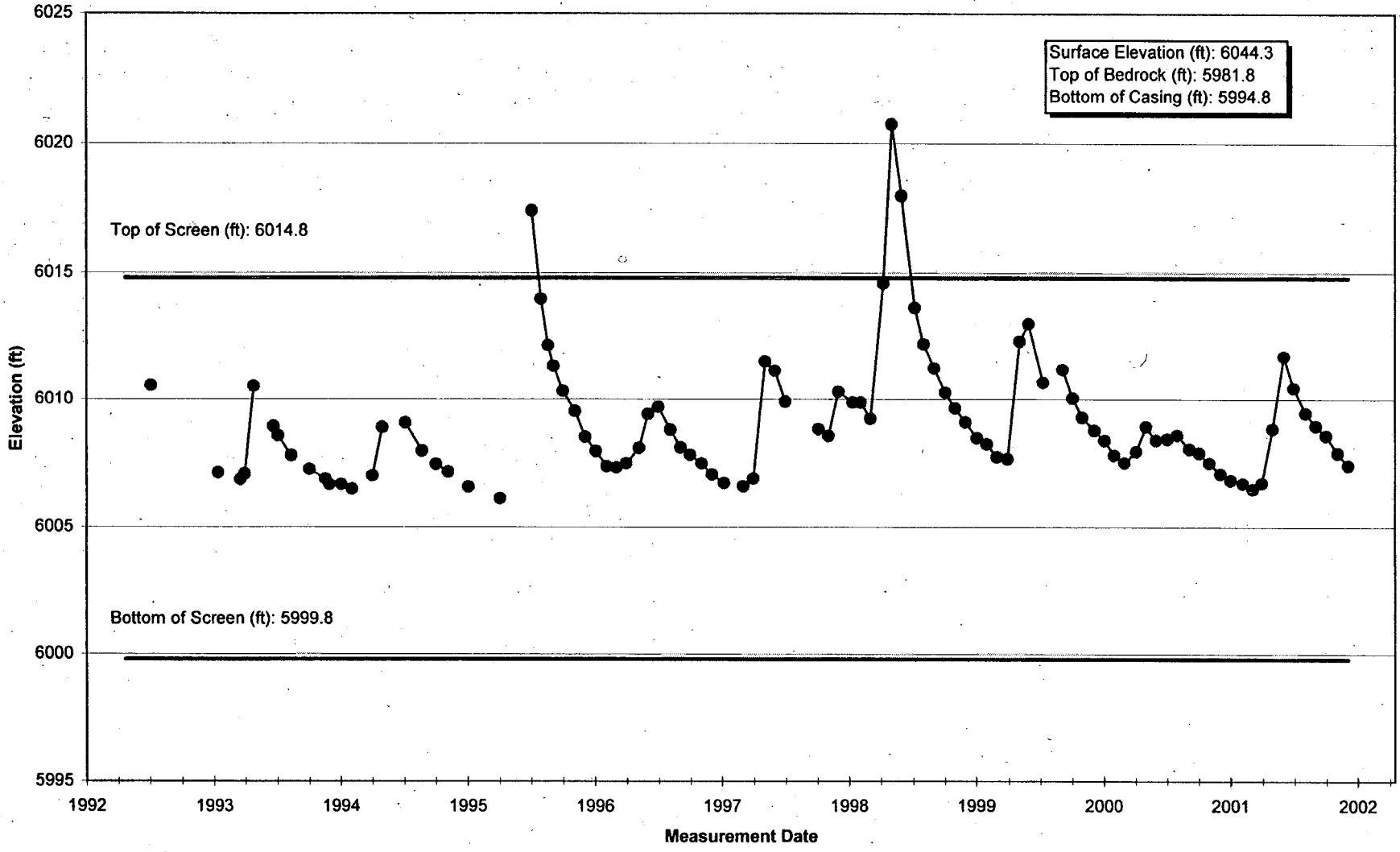


412
482

Hydrograph 00491



Hydrograph 0190



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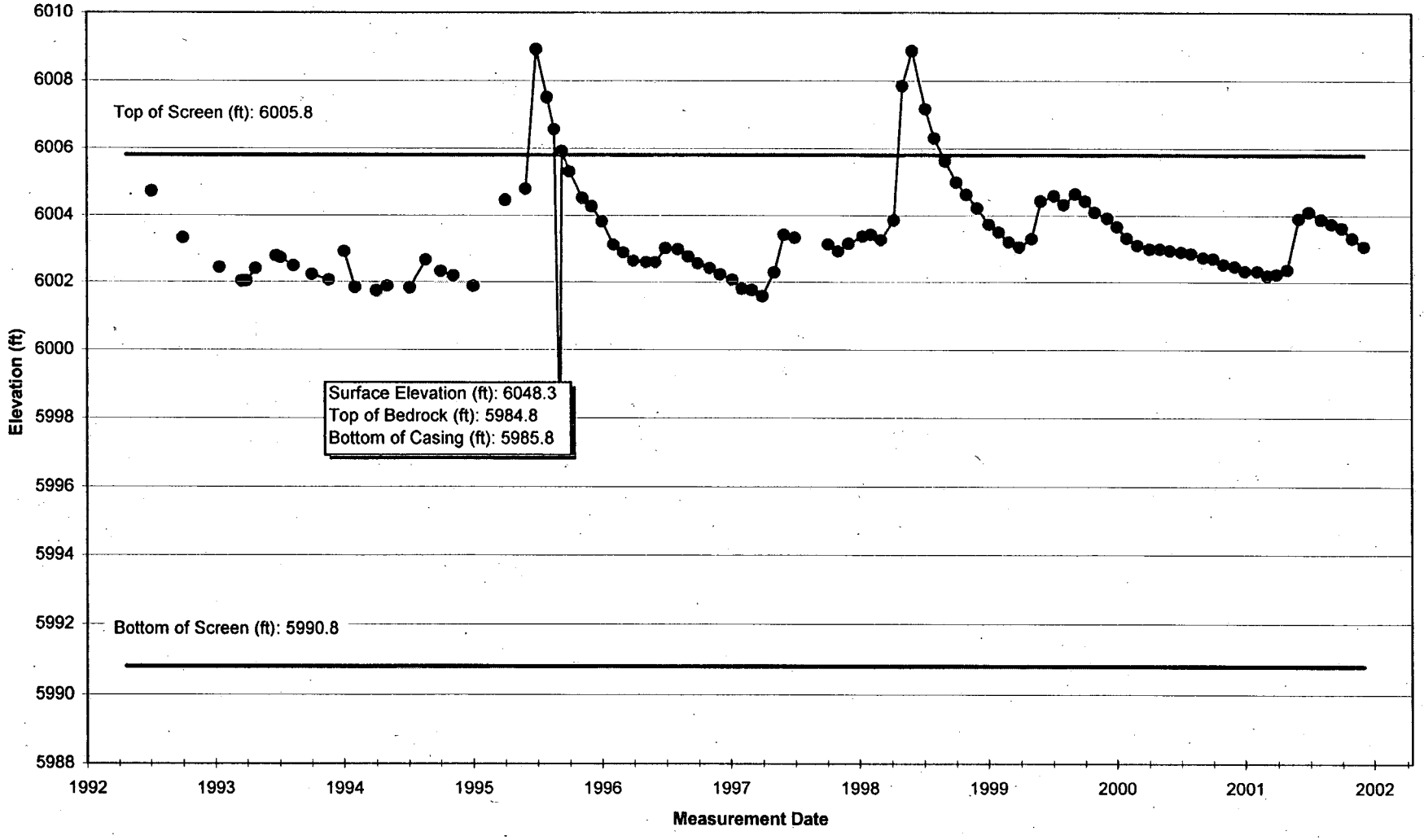
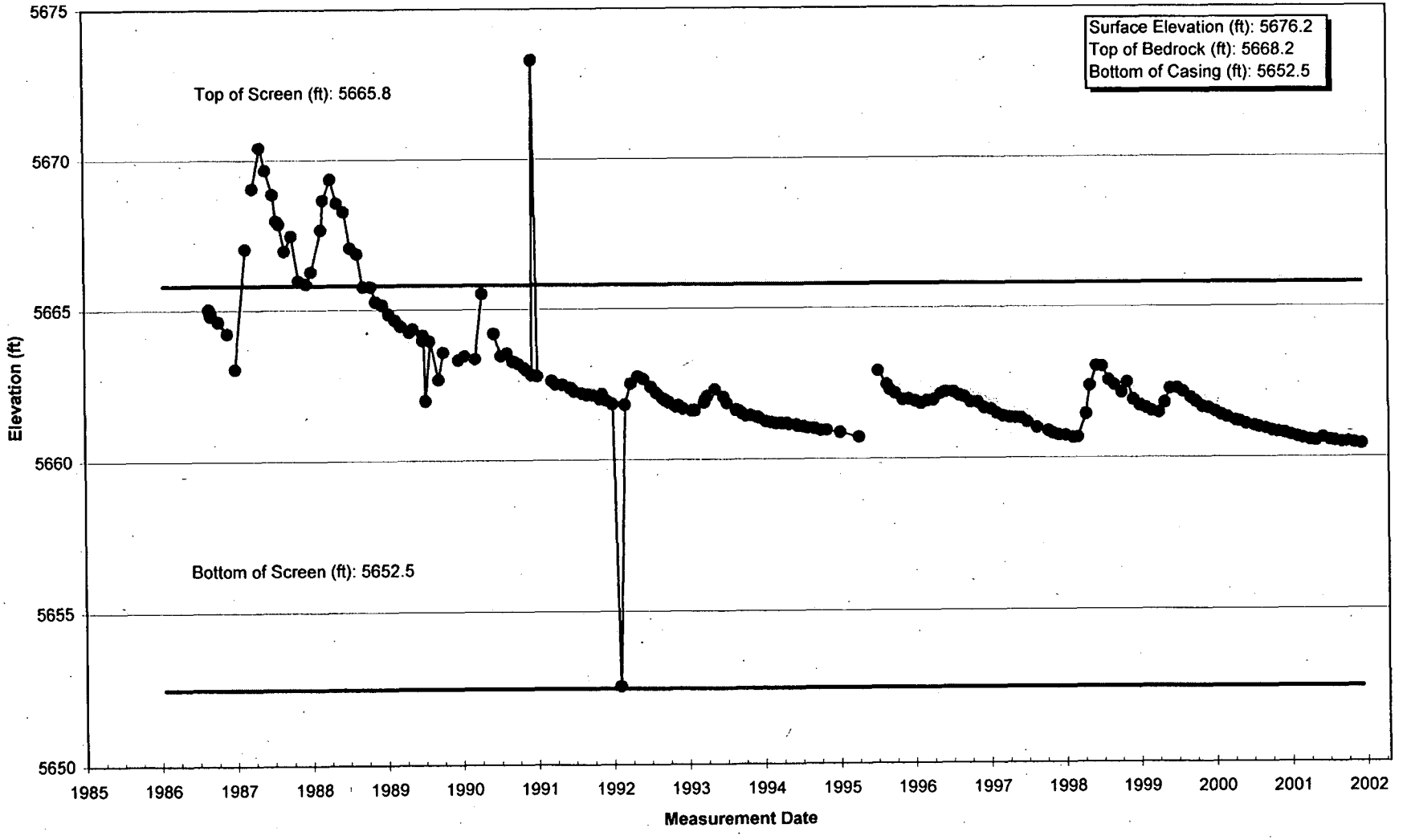
Hydrograph 0290



Hydrograph 0386



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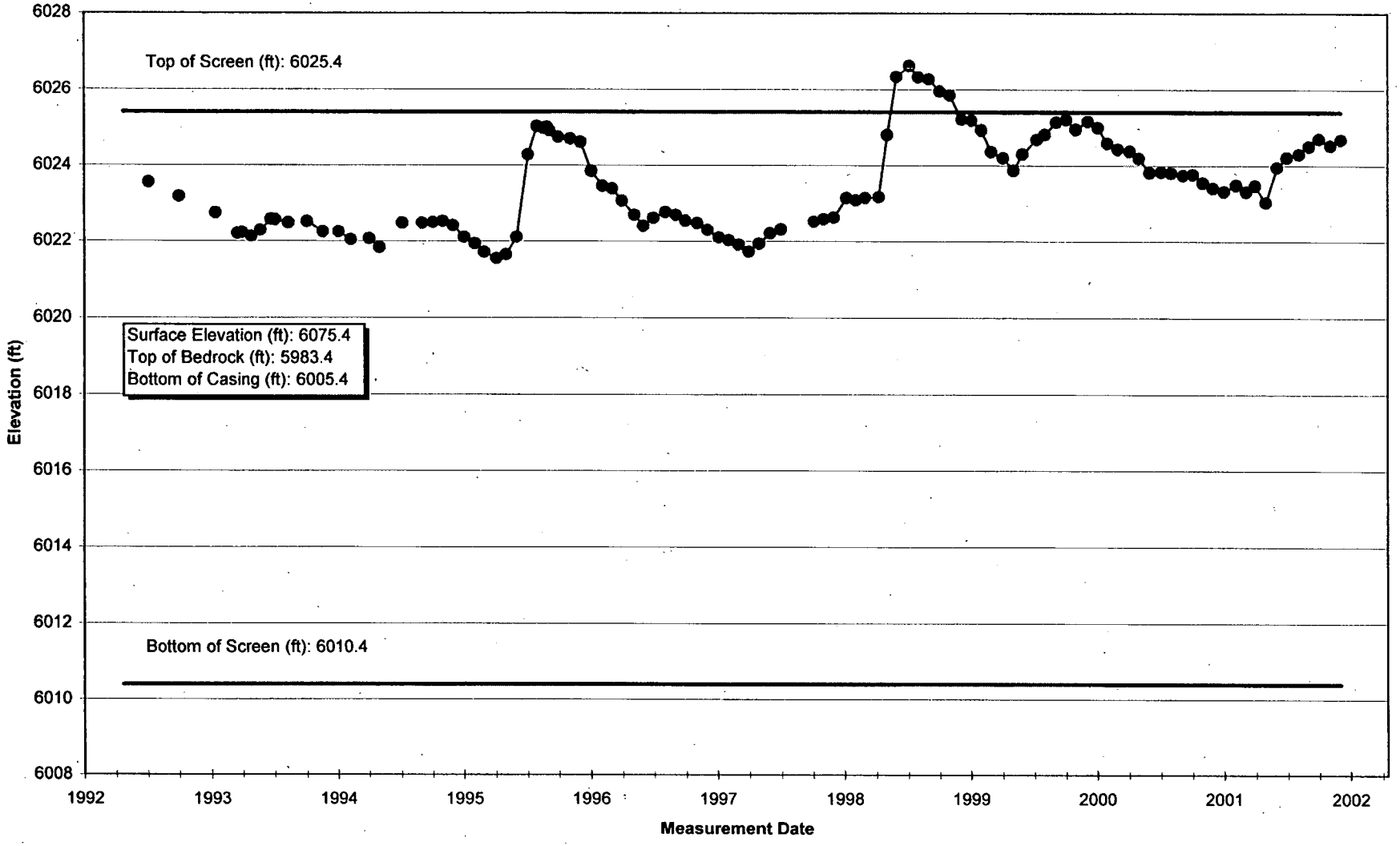
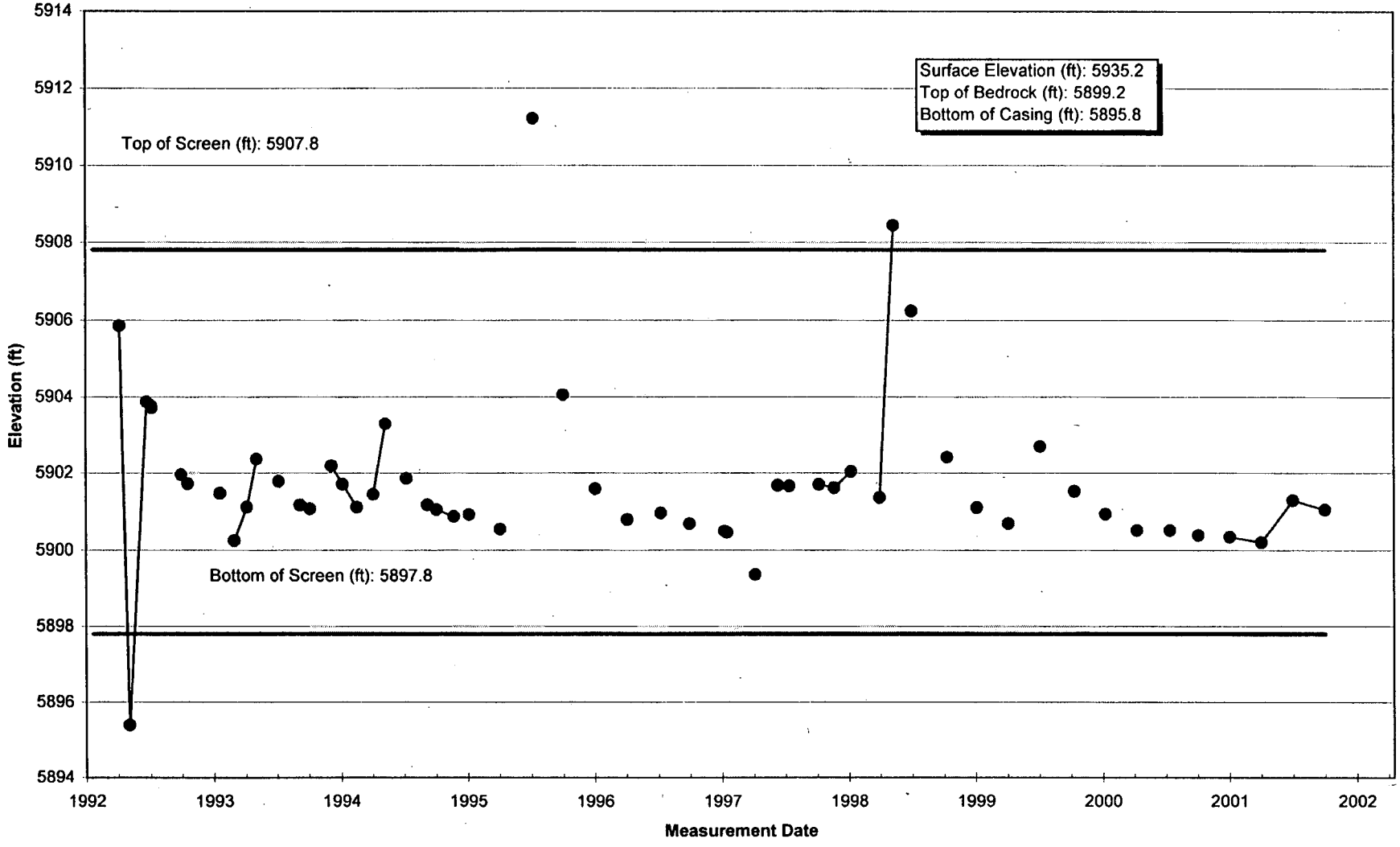
Hydrograph 0390



Hydrograph 03991



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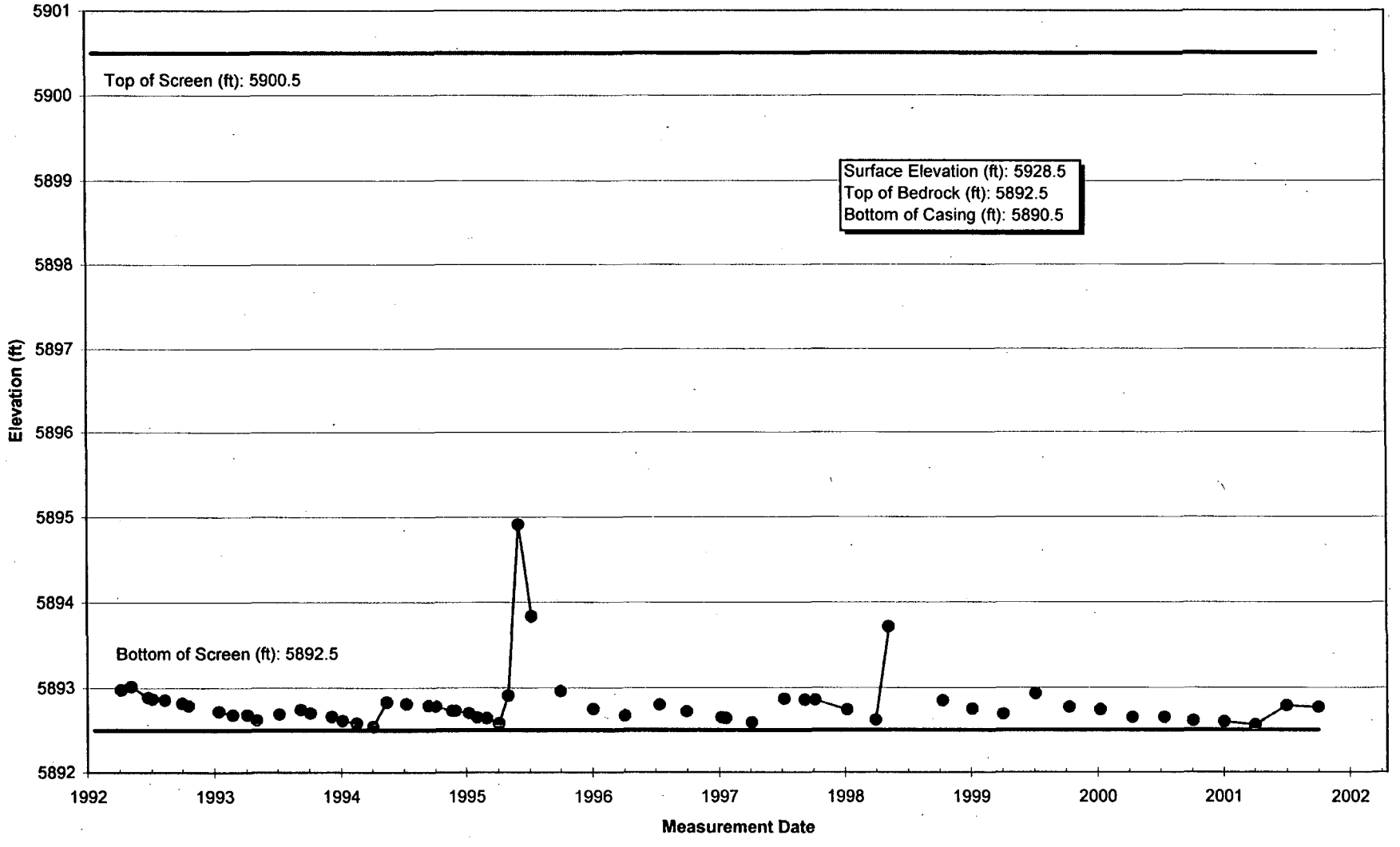

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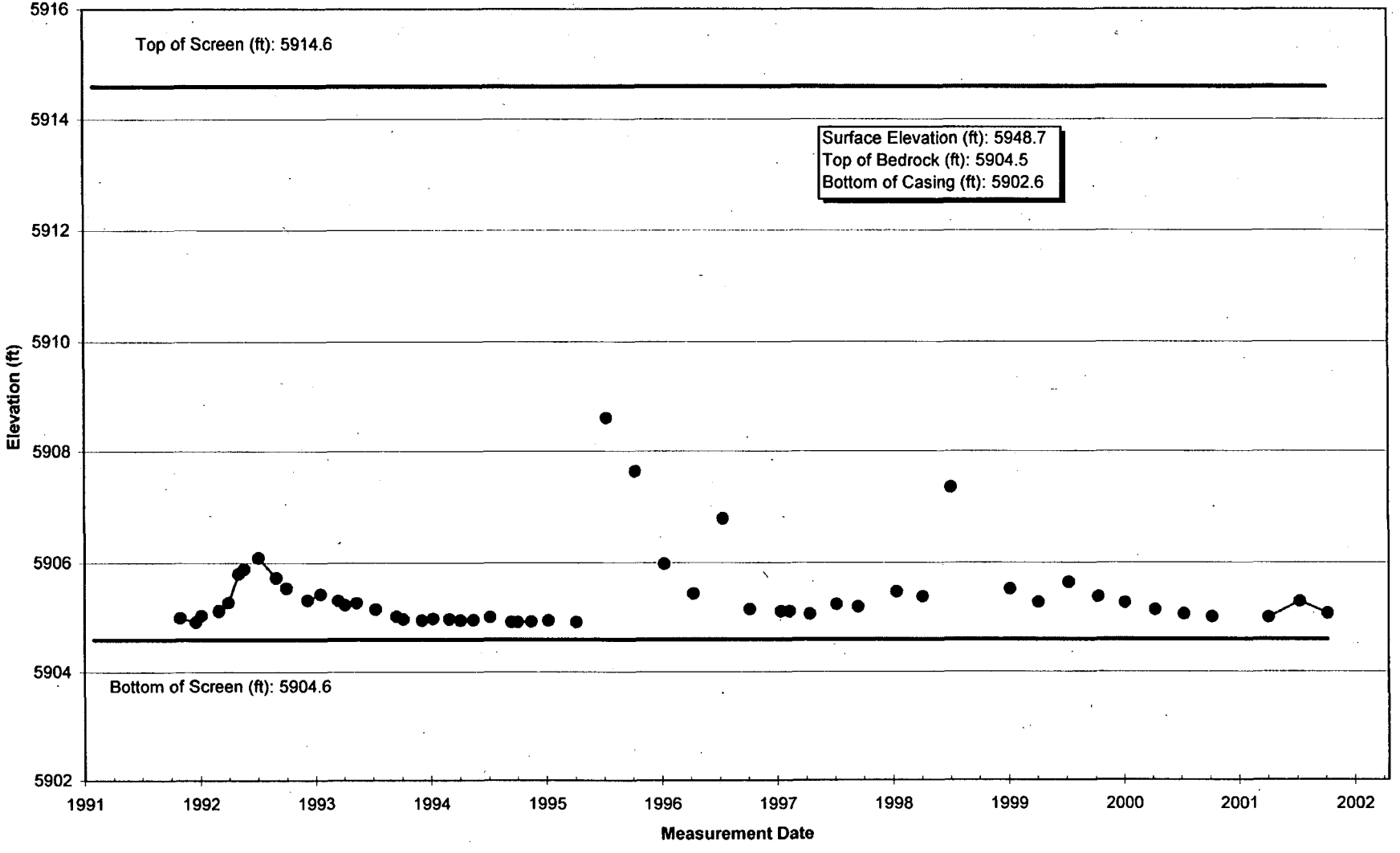
489

Hydrograph 04591



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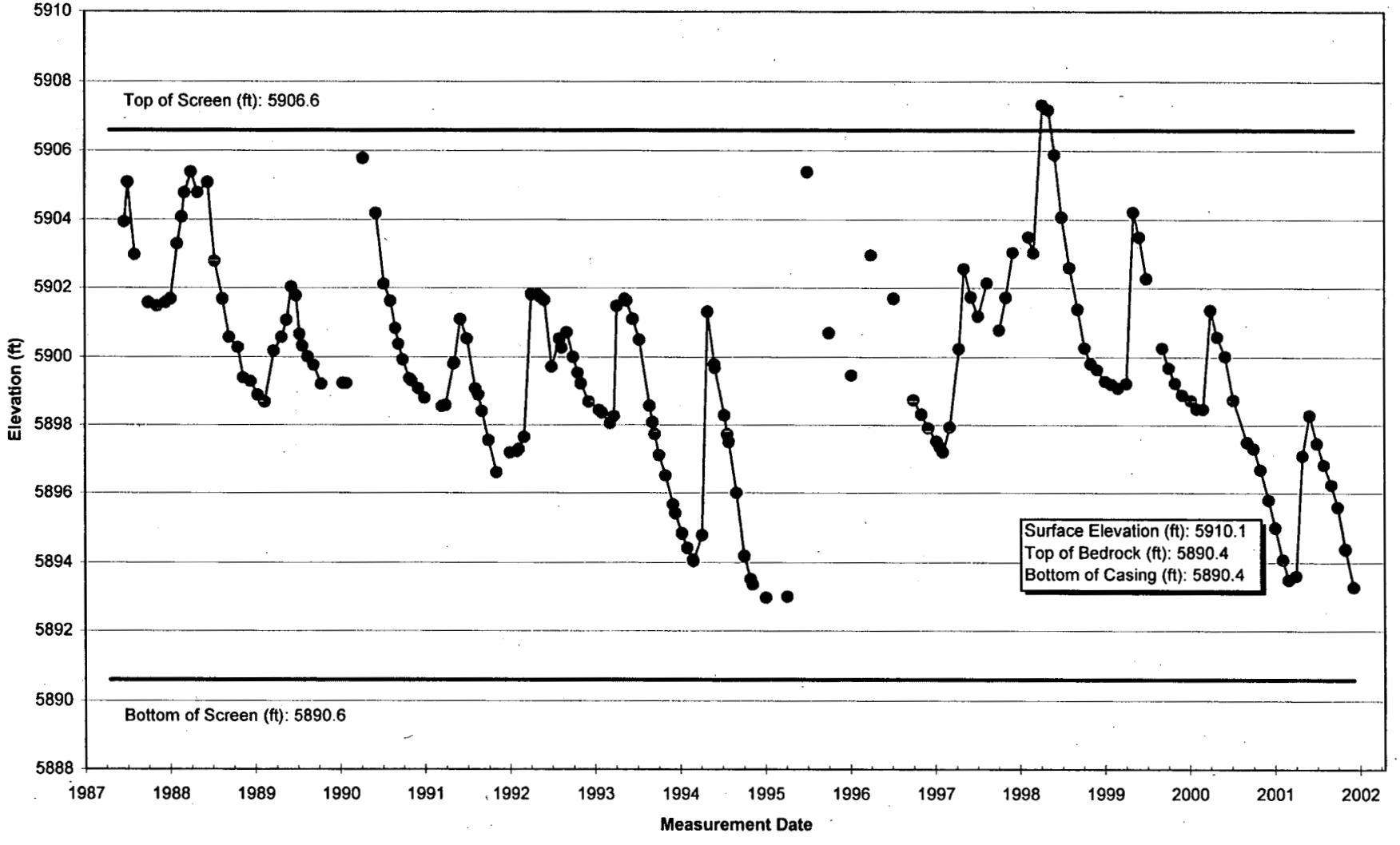
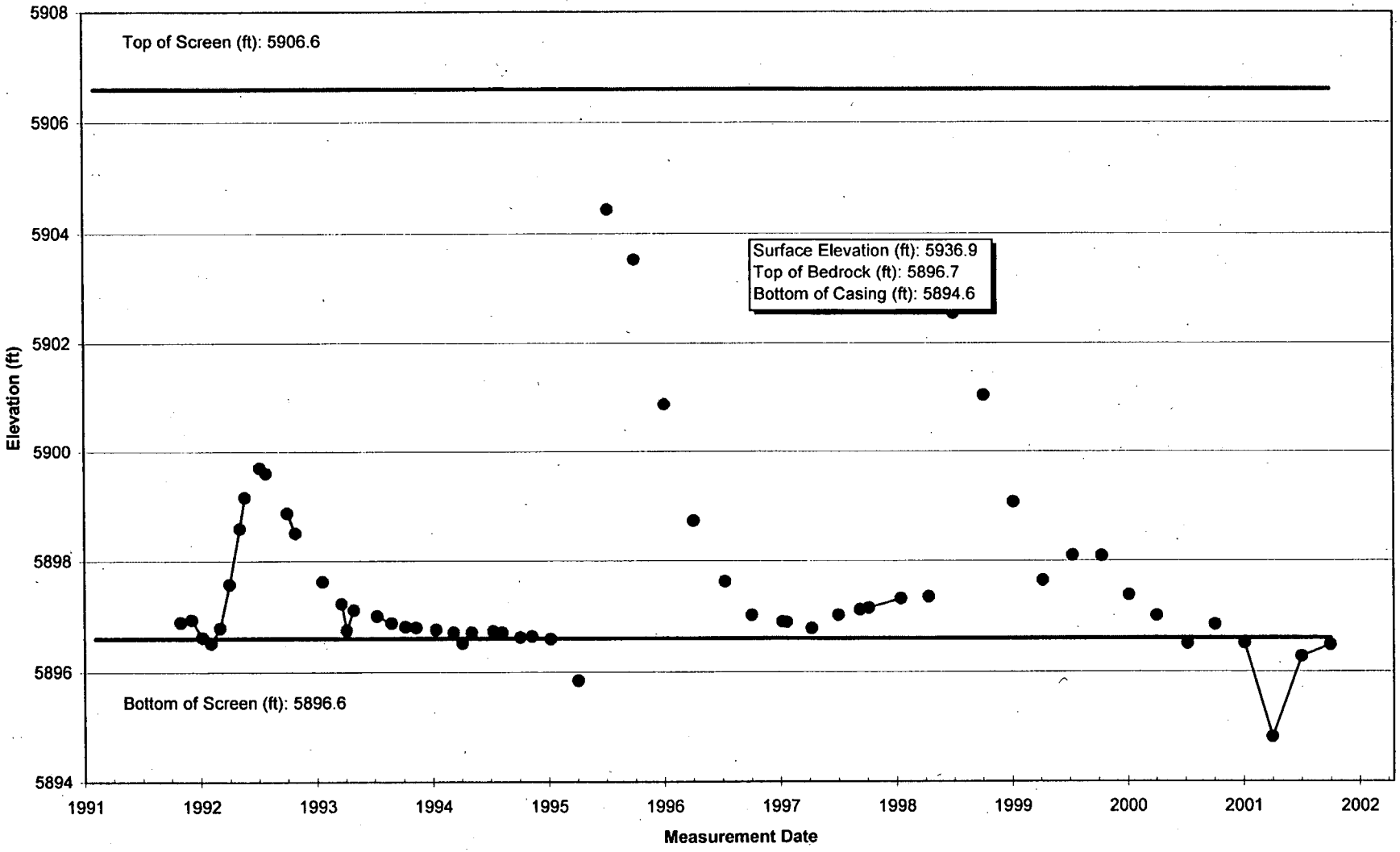
Hydrograph 0487



Hydrograph 04991



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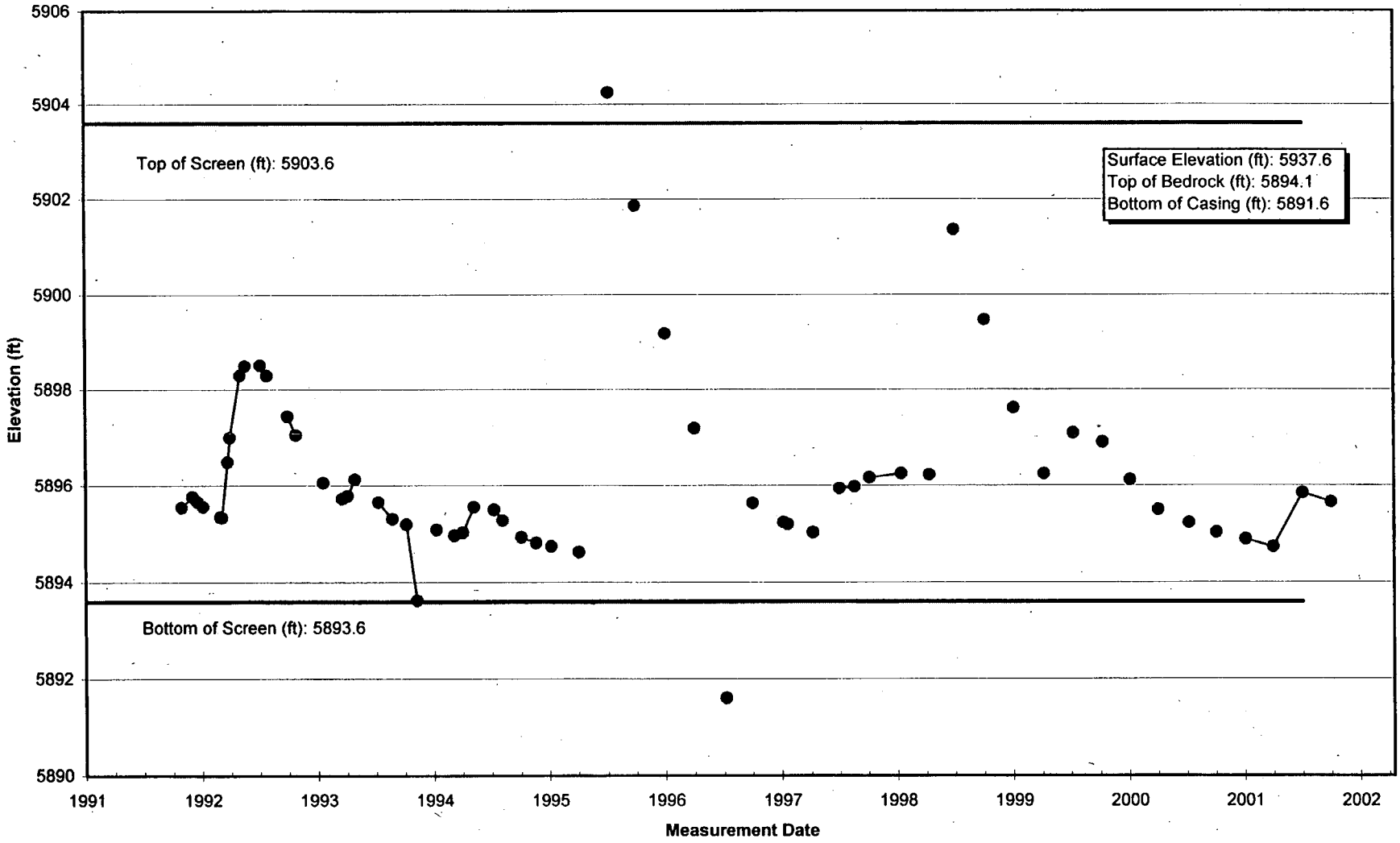
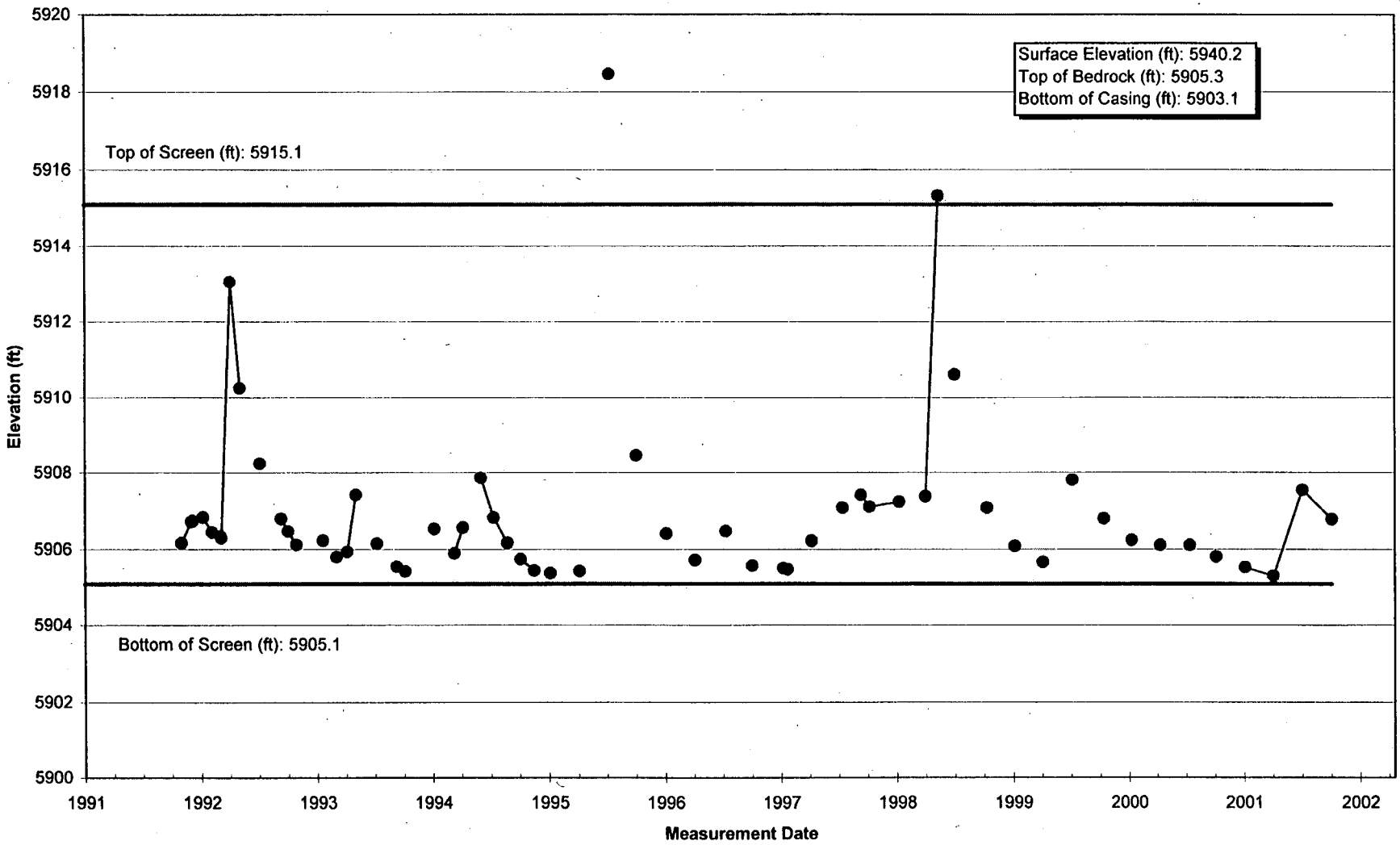
492

Hydrograph 05091



Hydrograph 05391



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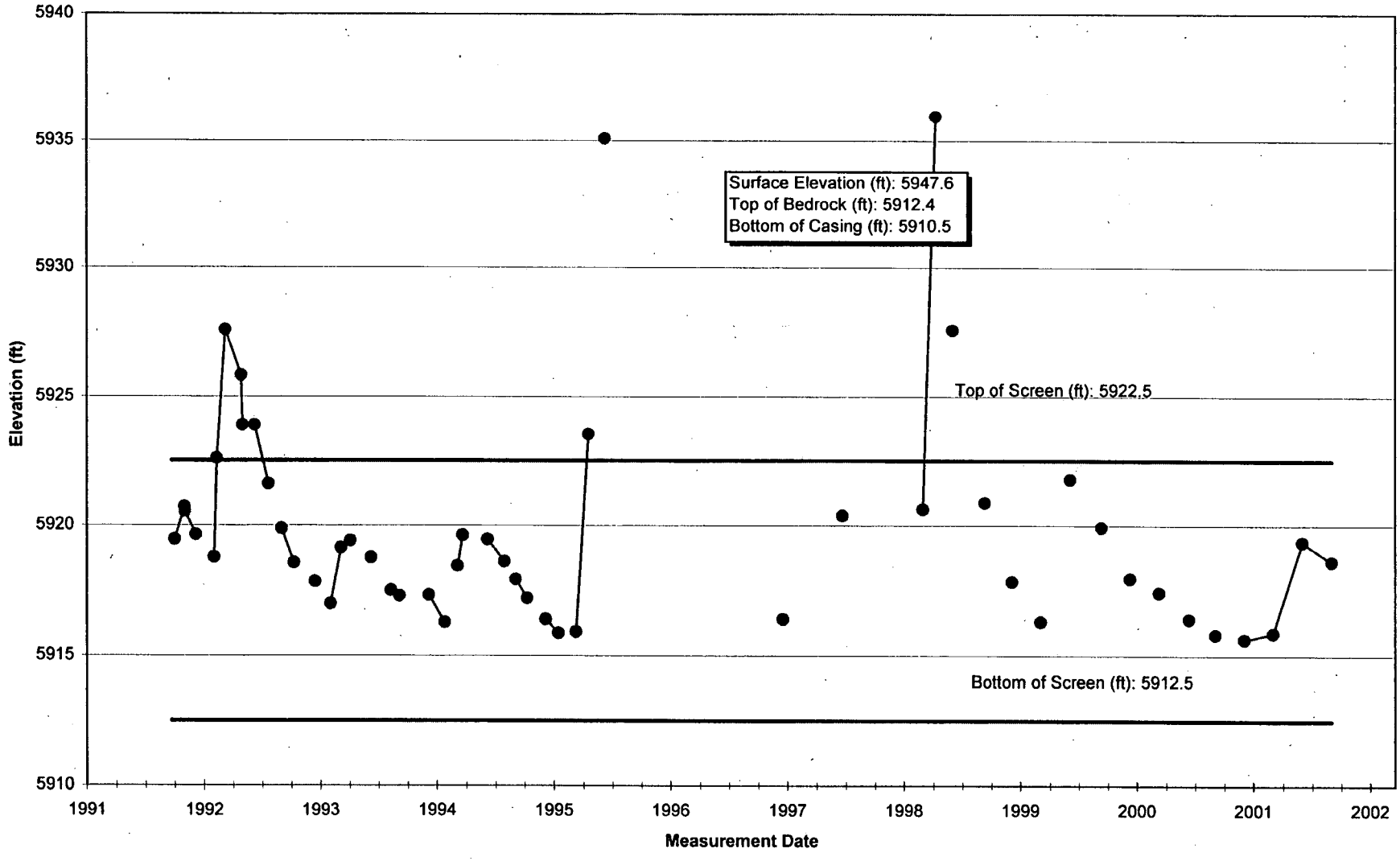
Hydrograph 05691



425
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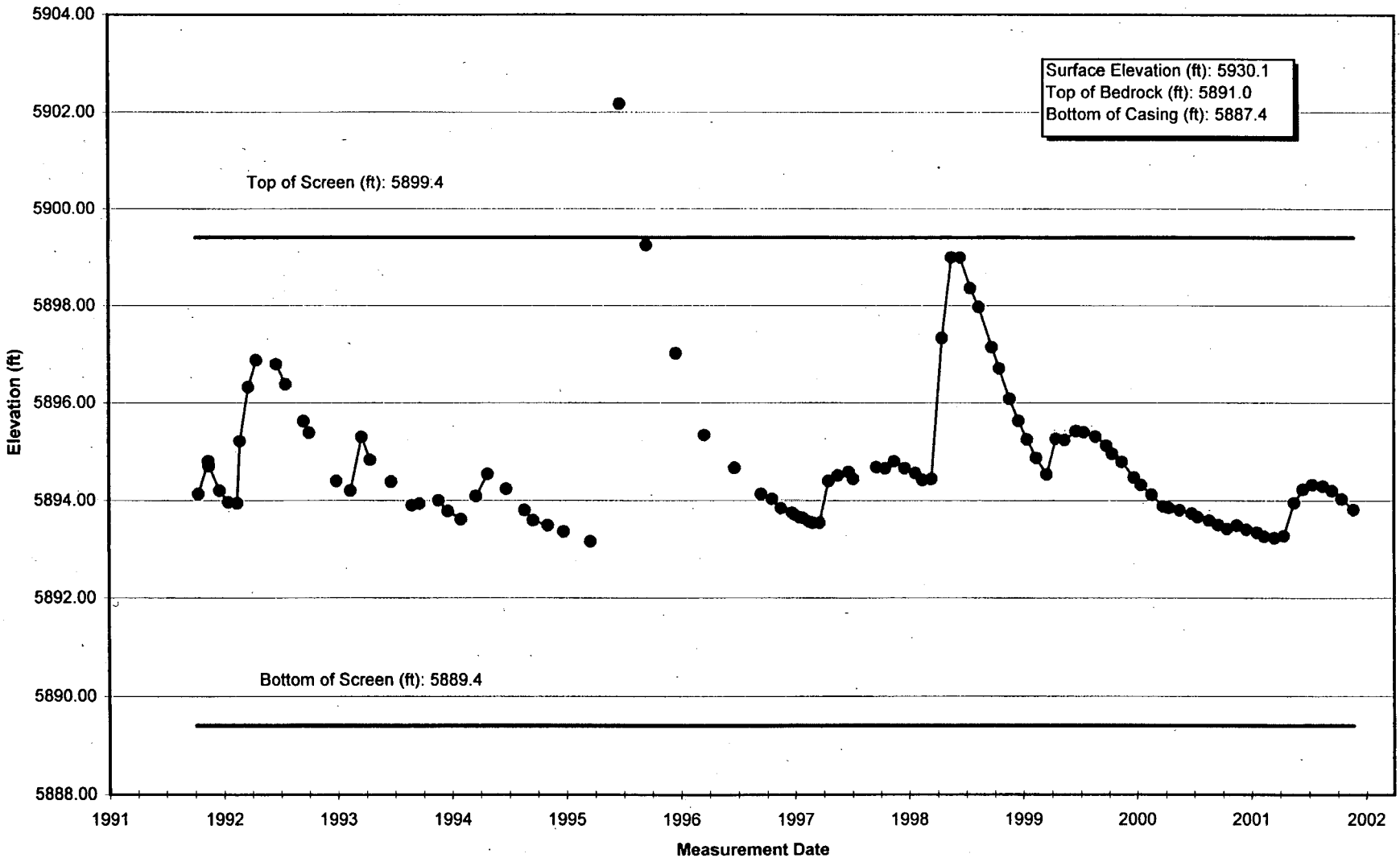
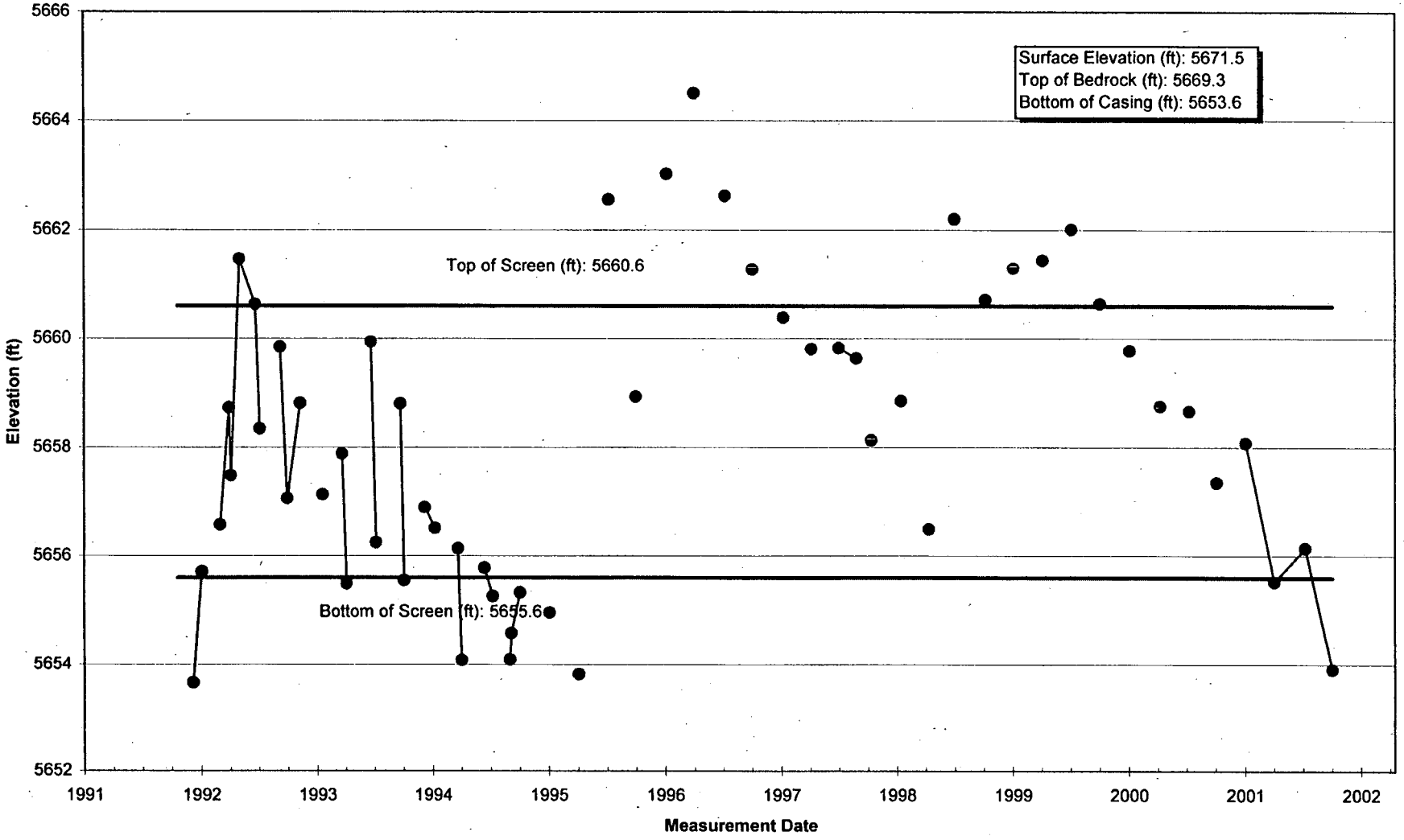
Hydrograph 06091

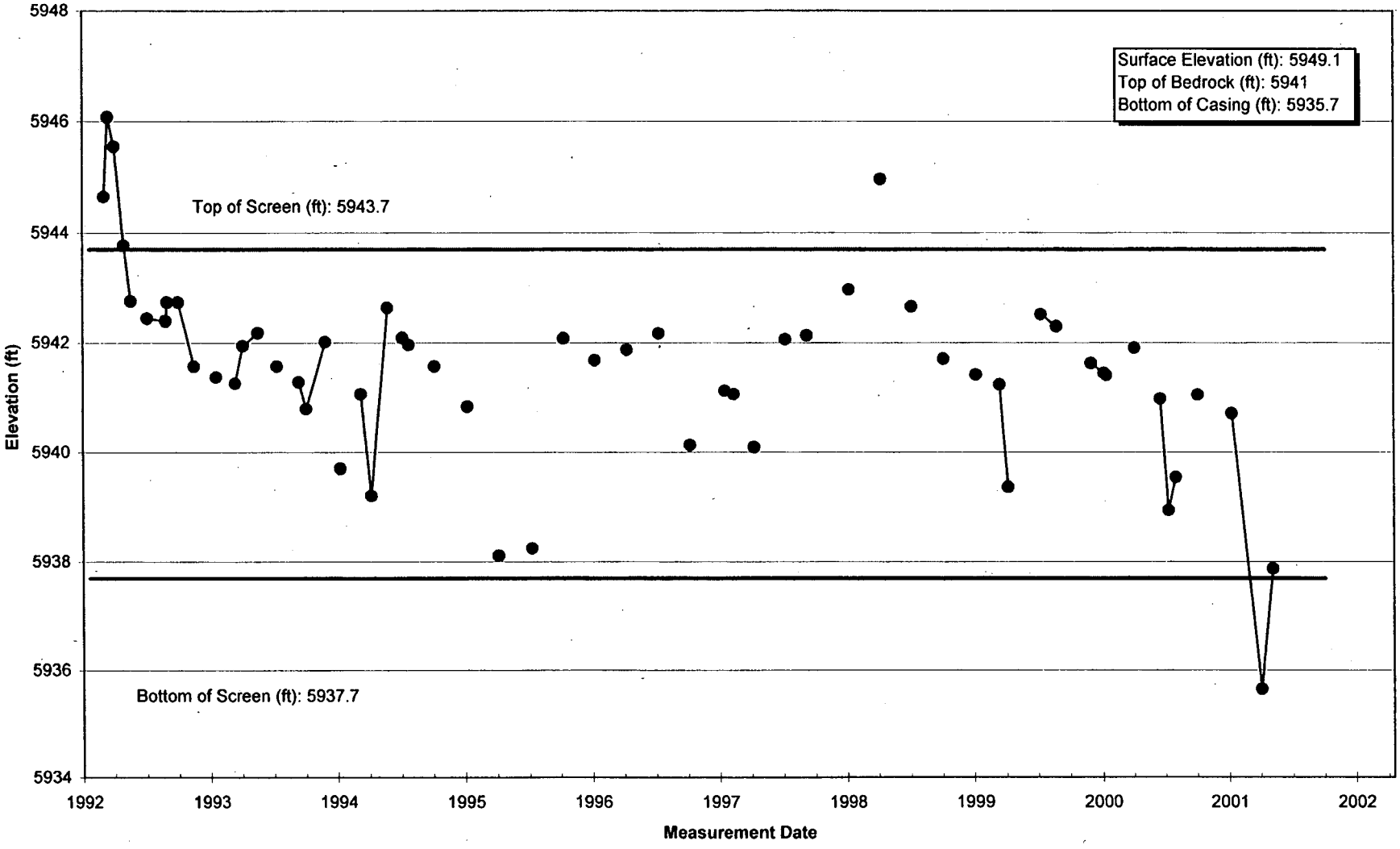


49 6

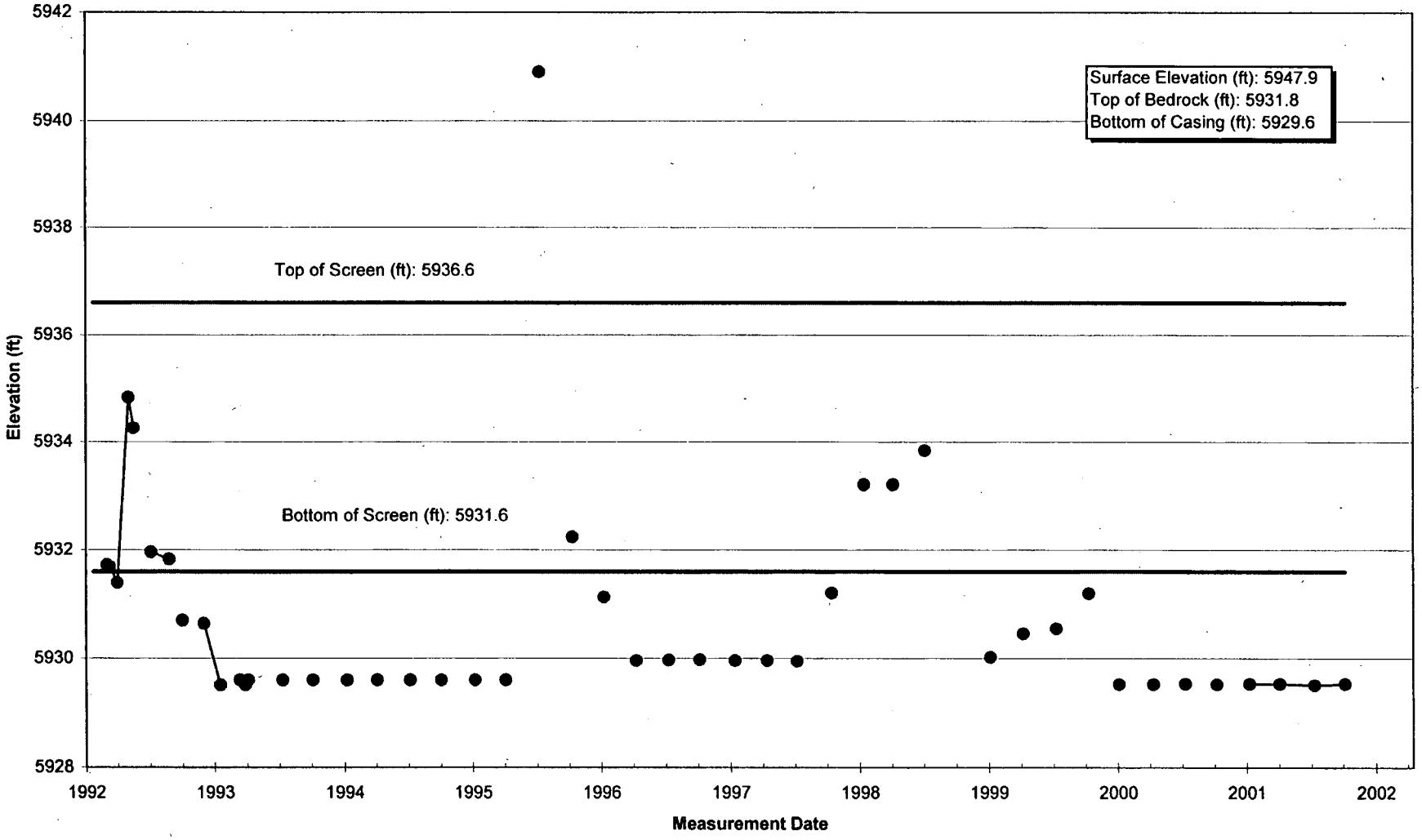
Hydrograph 06491



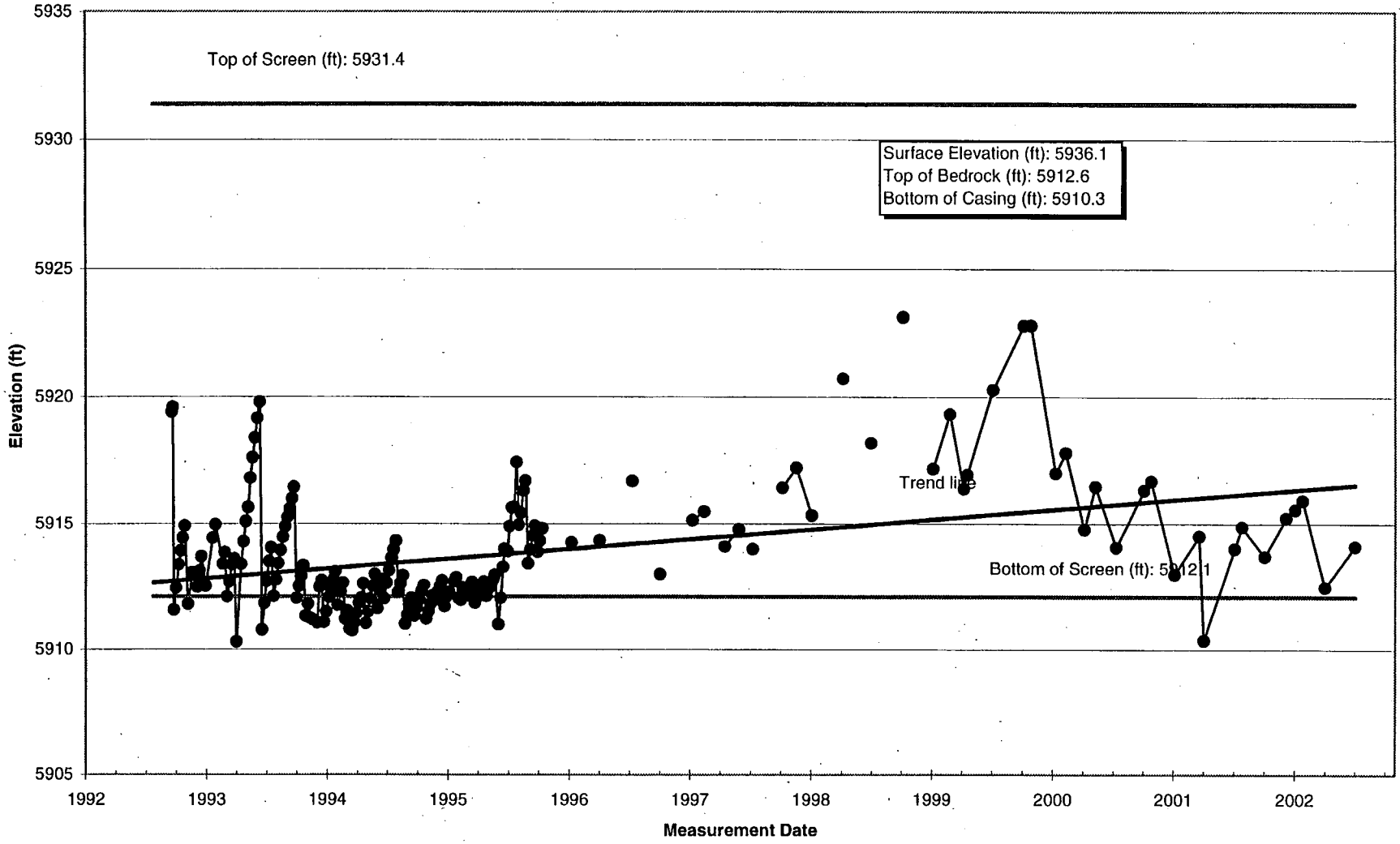
Hydrograph 07391



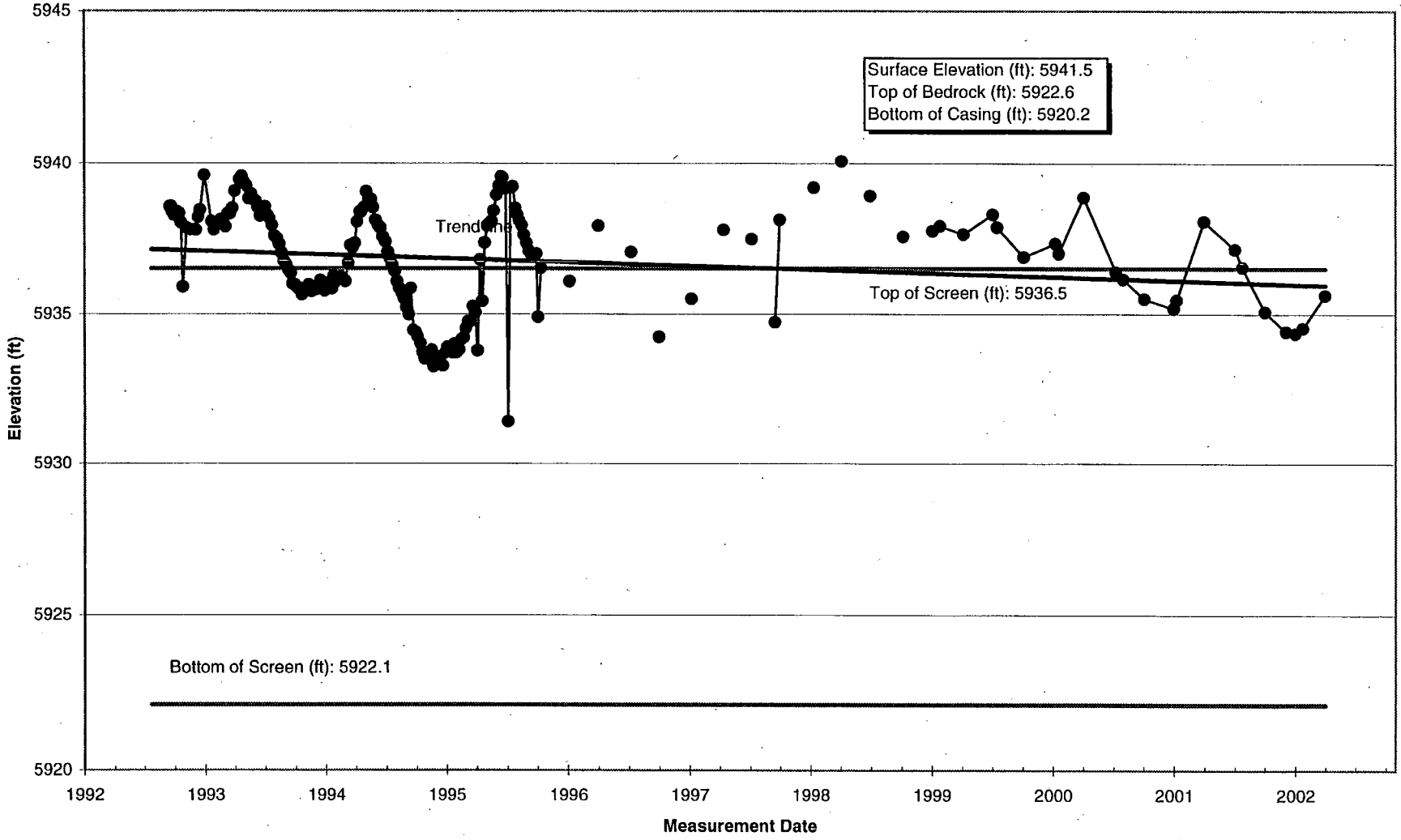
Hydrograph 08091



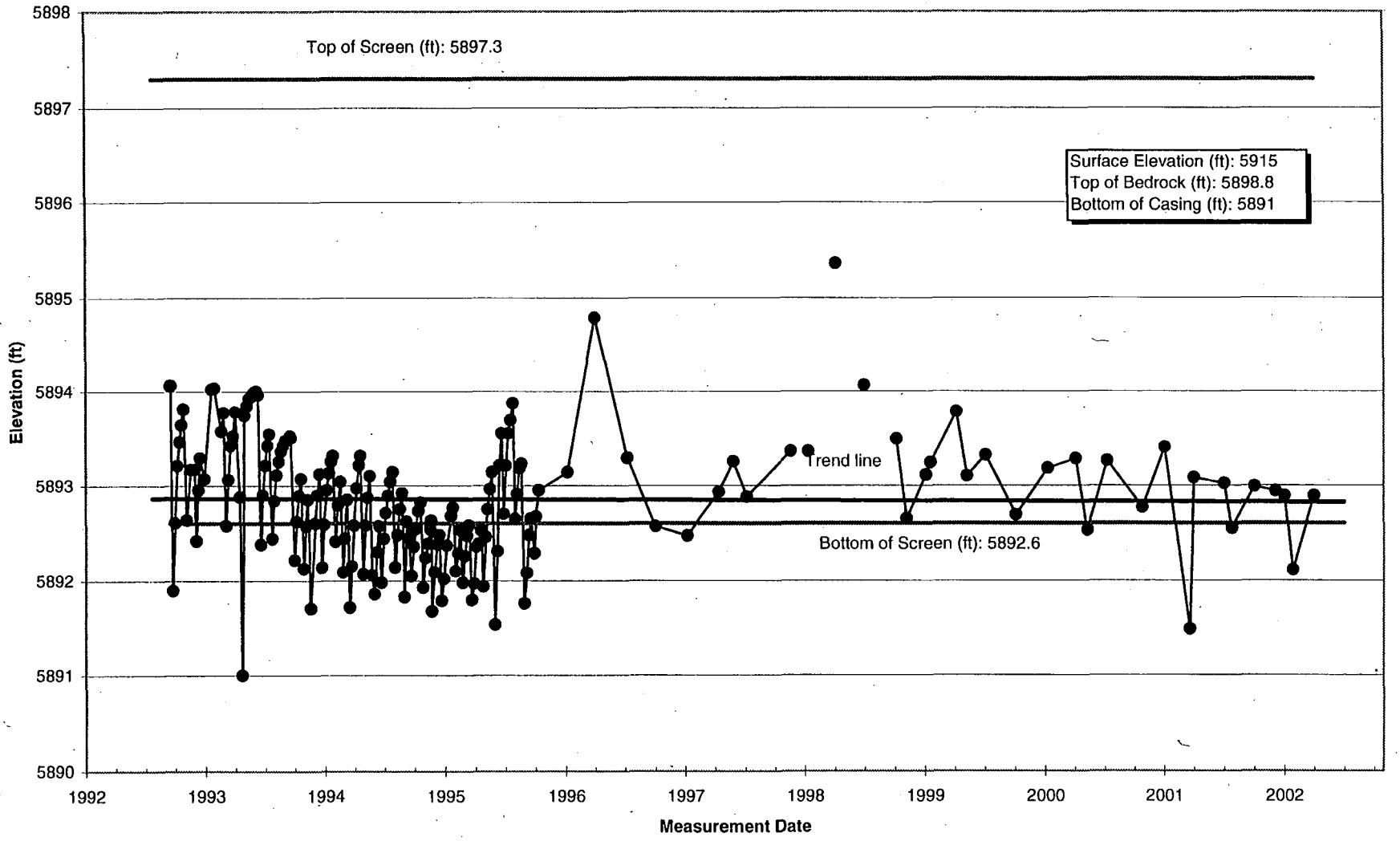
Hydrograph 10592



Hydrograph 10692



Hydrograph 10792



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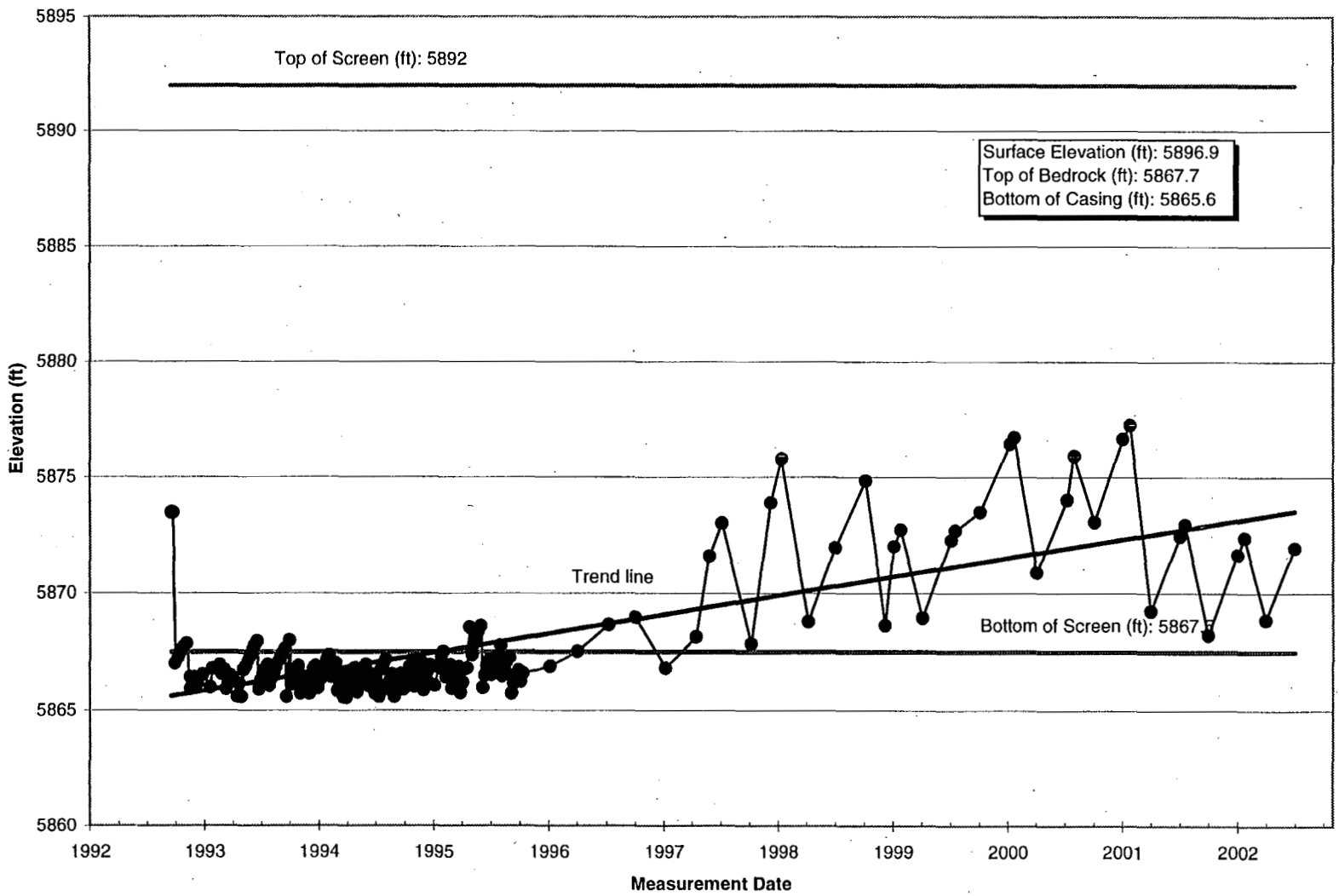
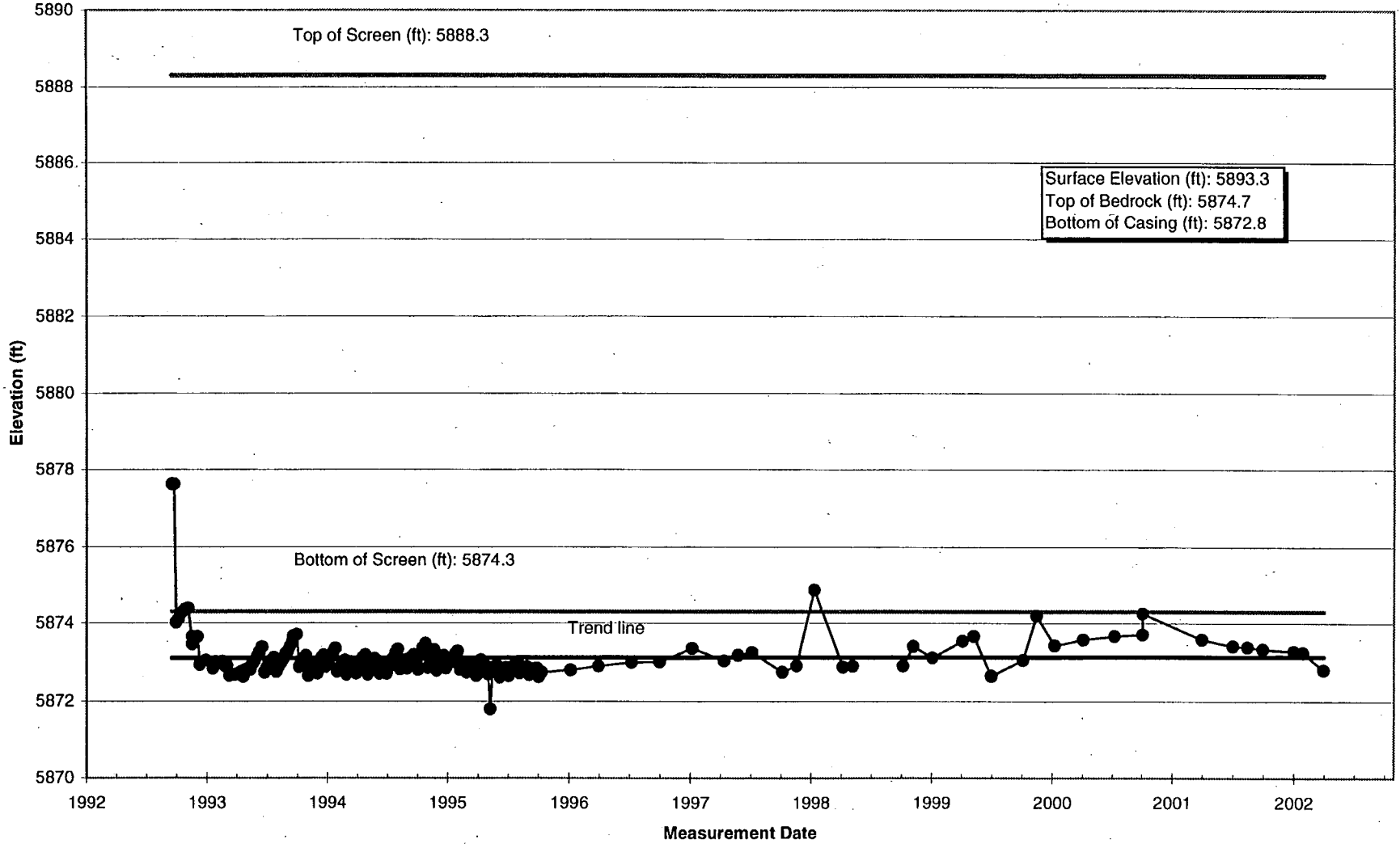
Hydrograph 10992



433
503

Hydrograph 11092



434
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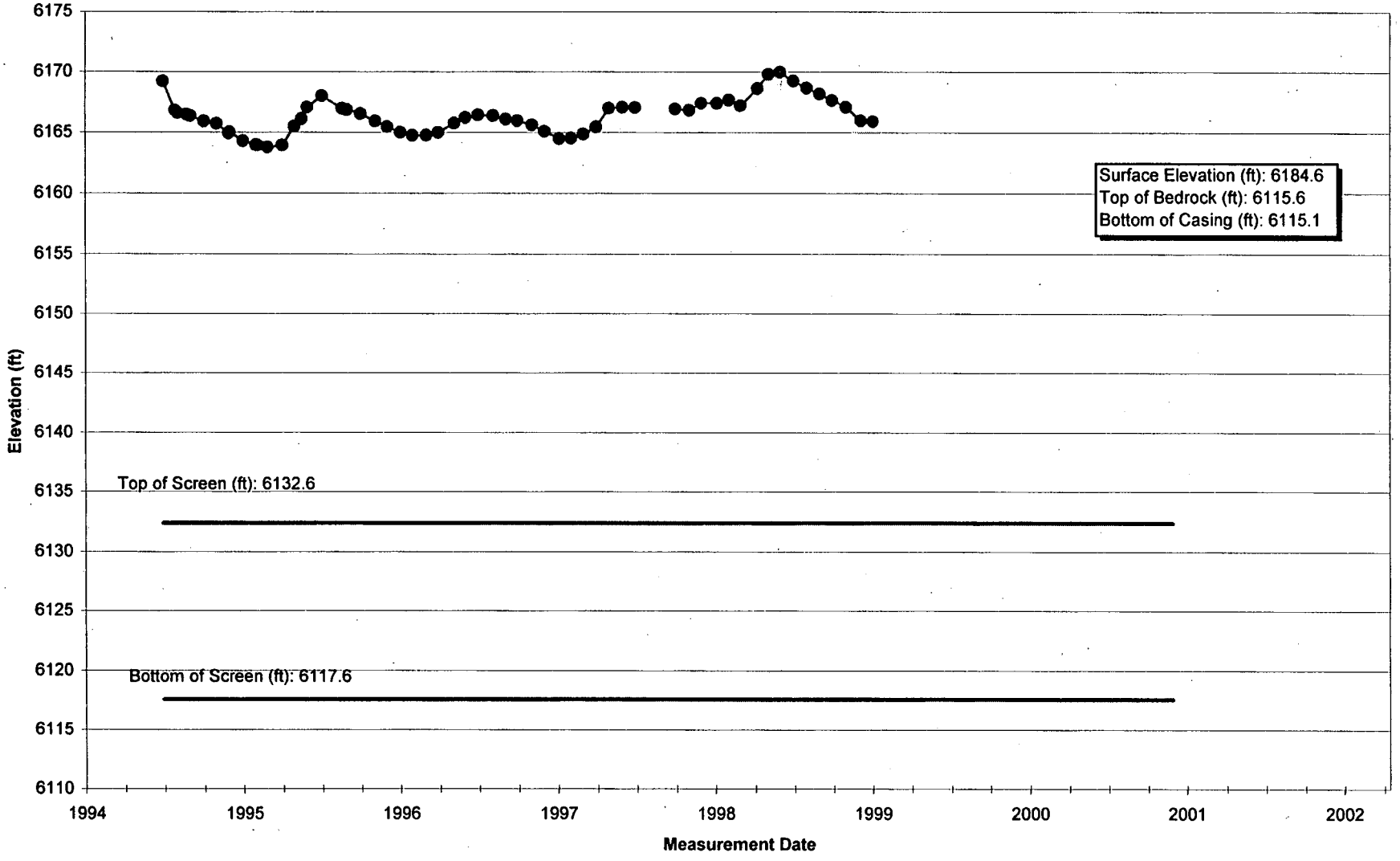
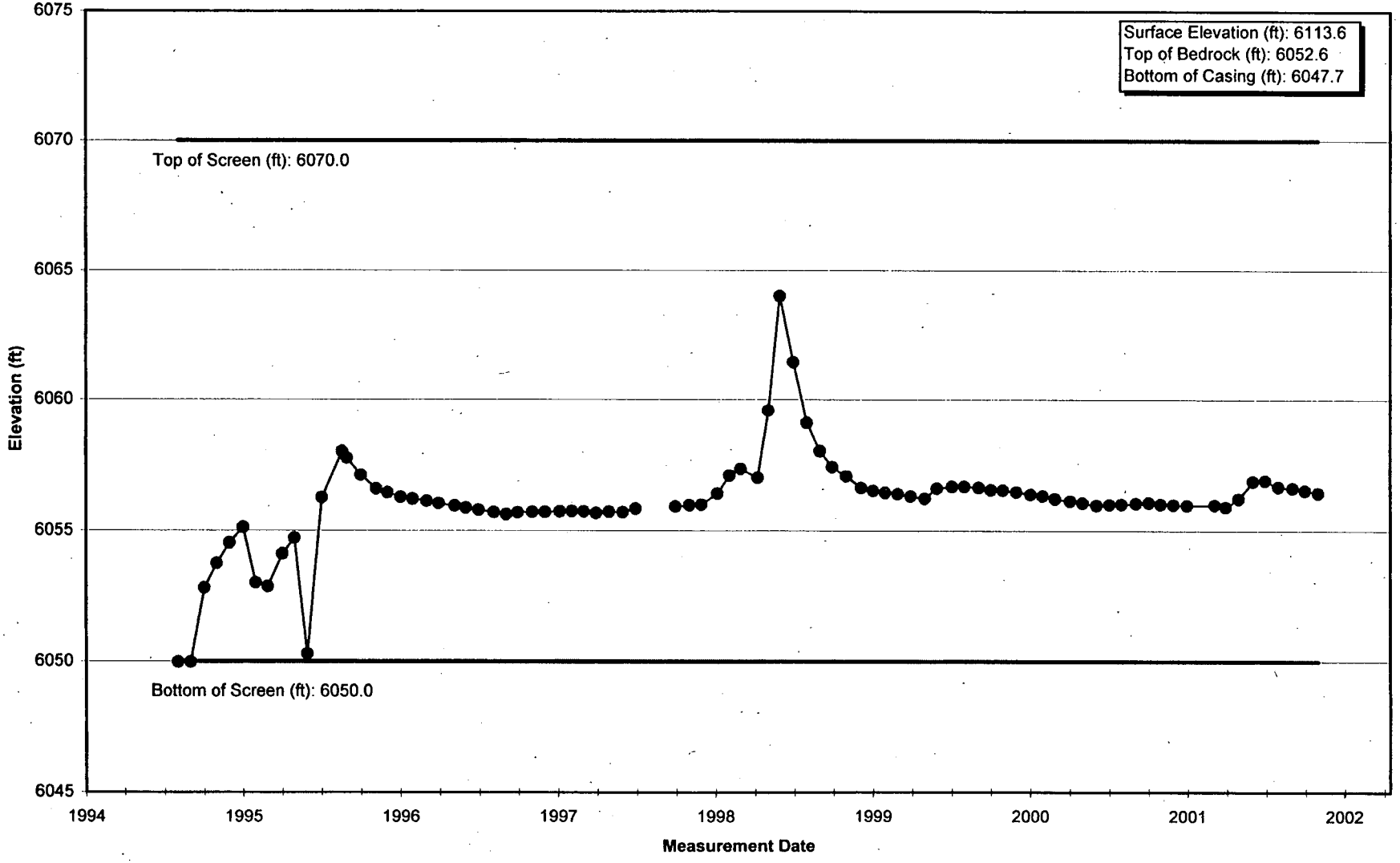
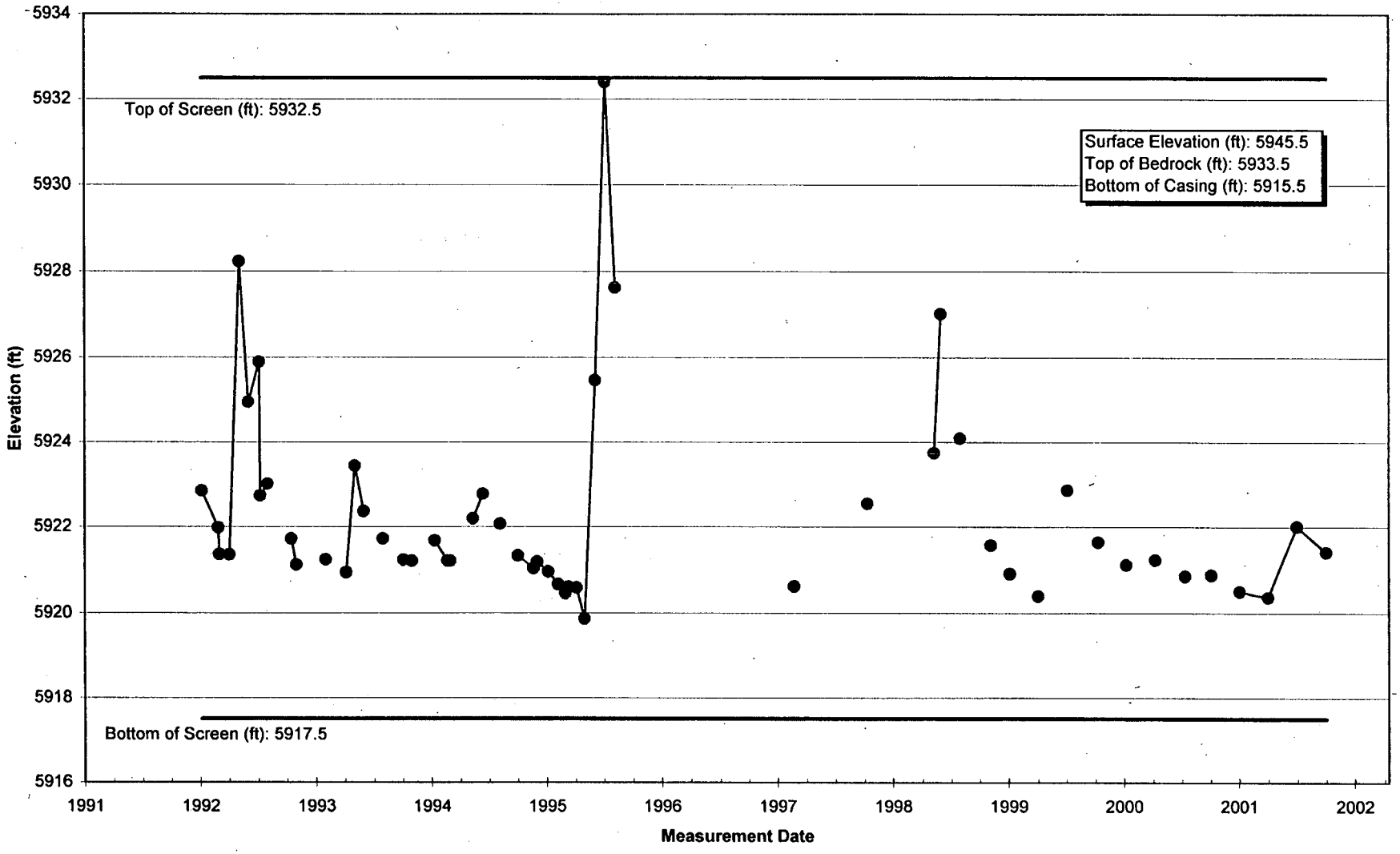
Hydrograph 11494



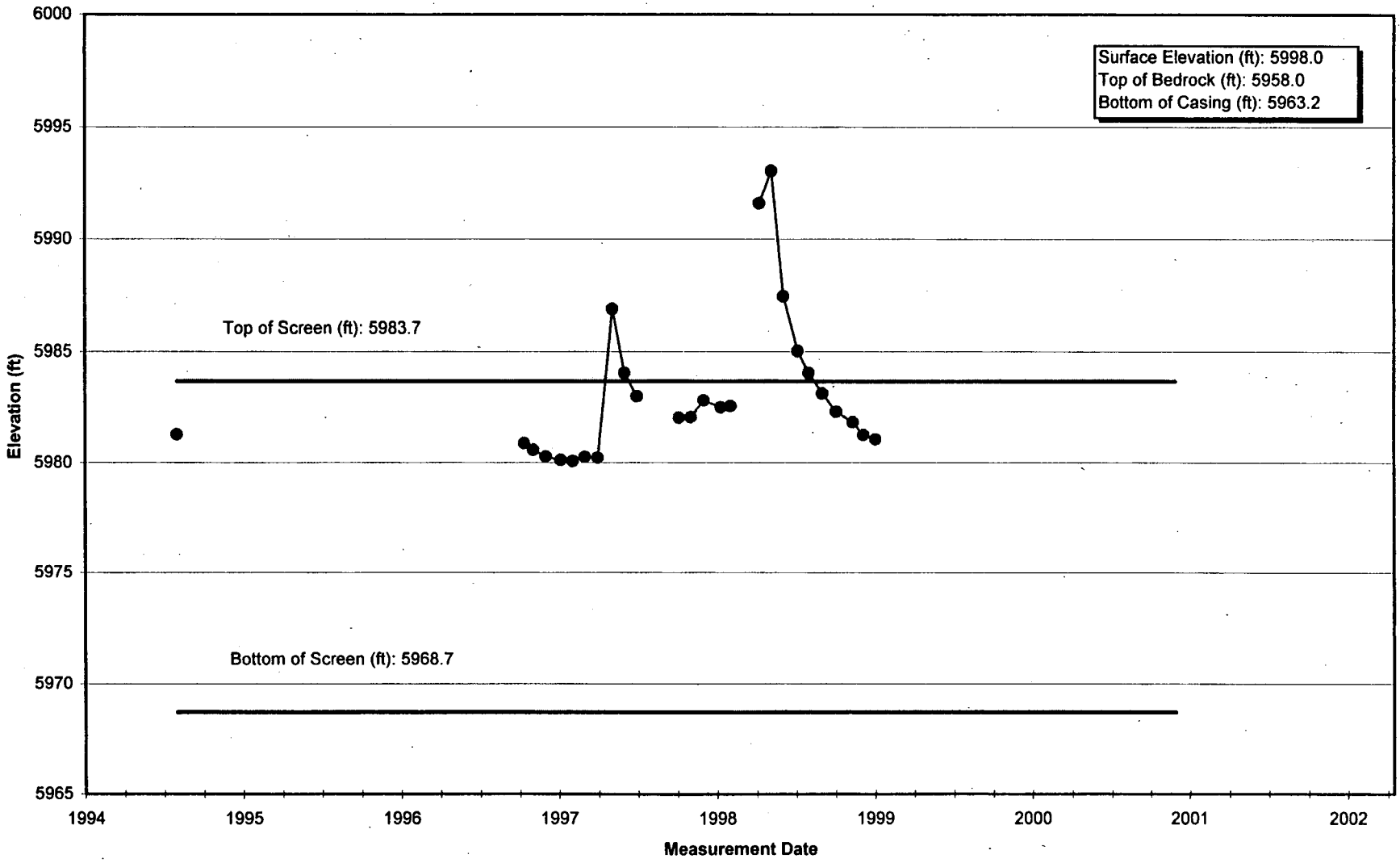
Hydrograph 11594



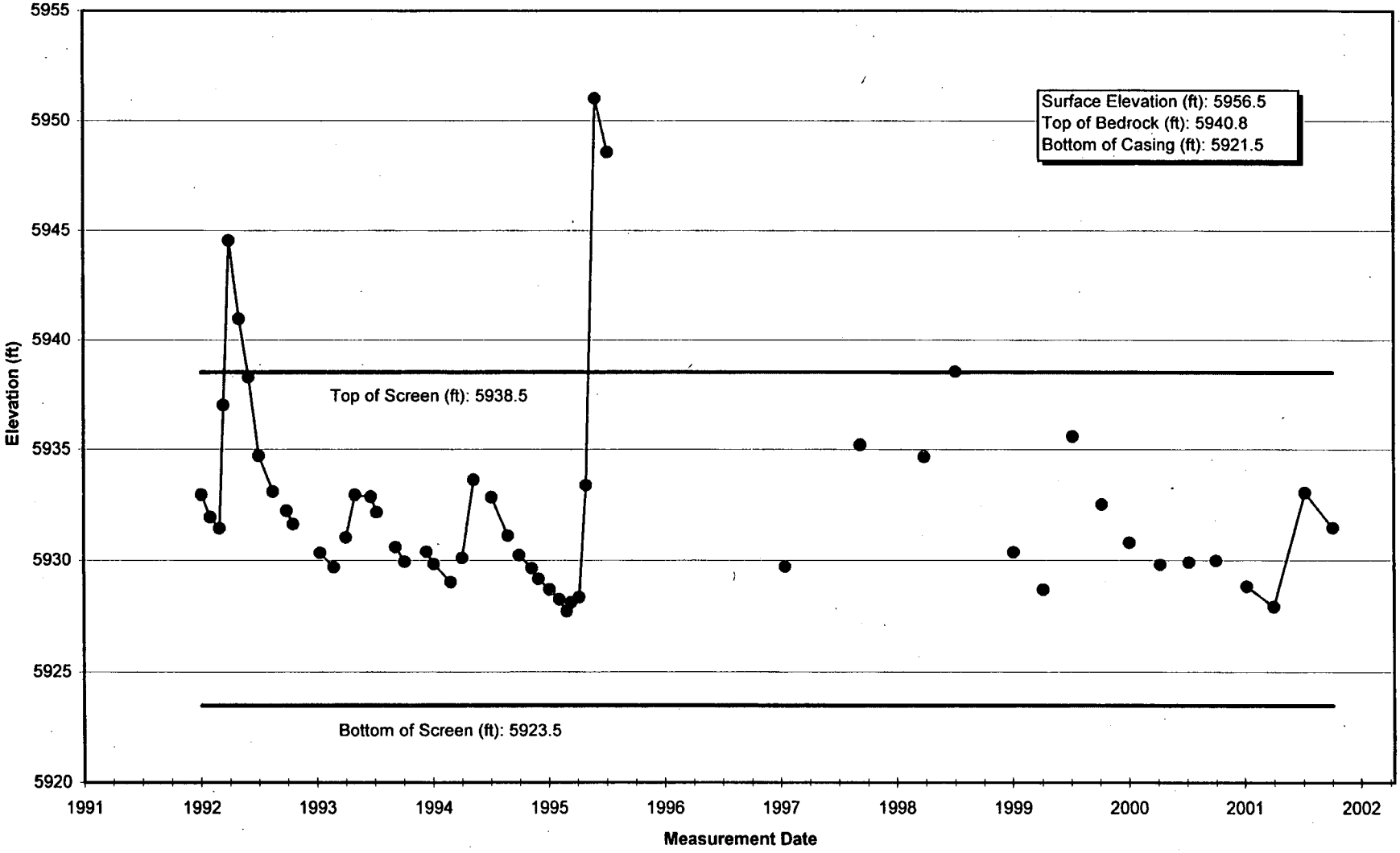
Hydrograph 11891



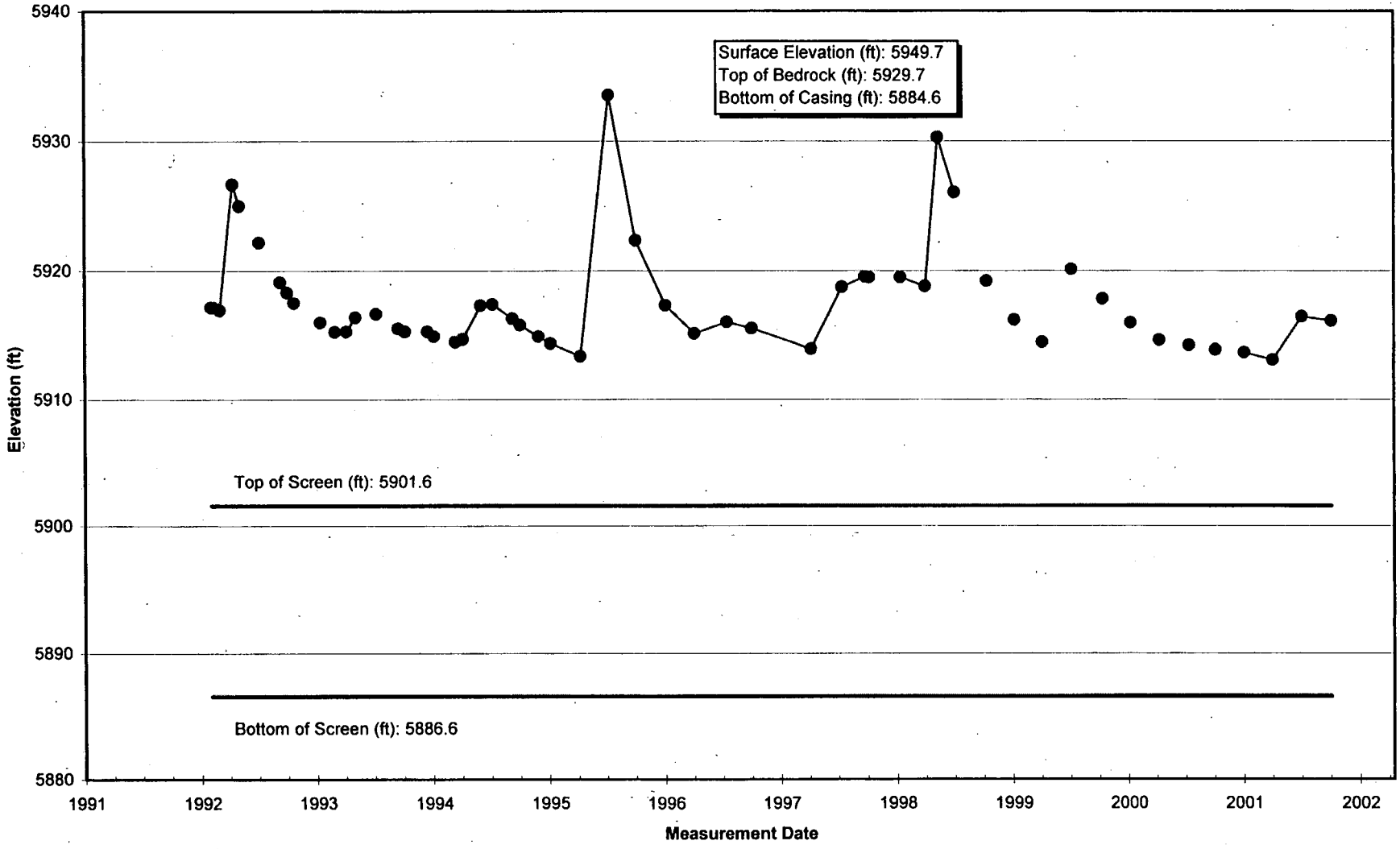
Hydrograph 1190



Hydrograph 12191

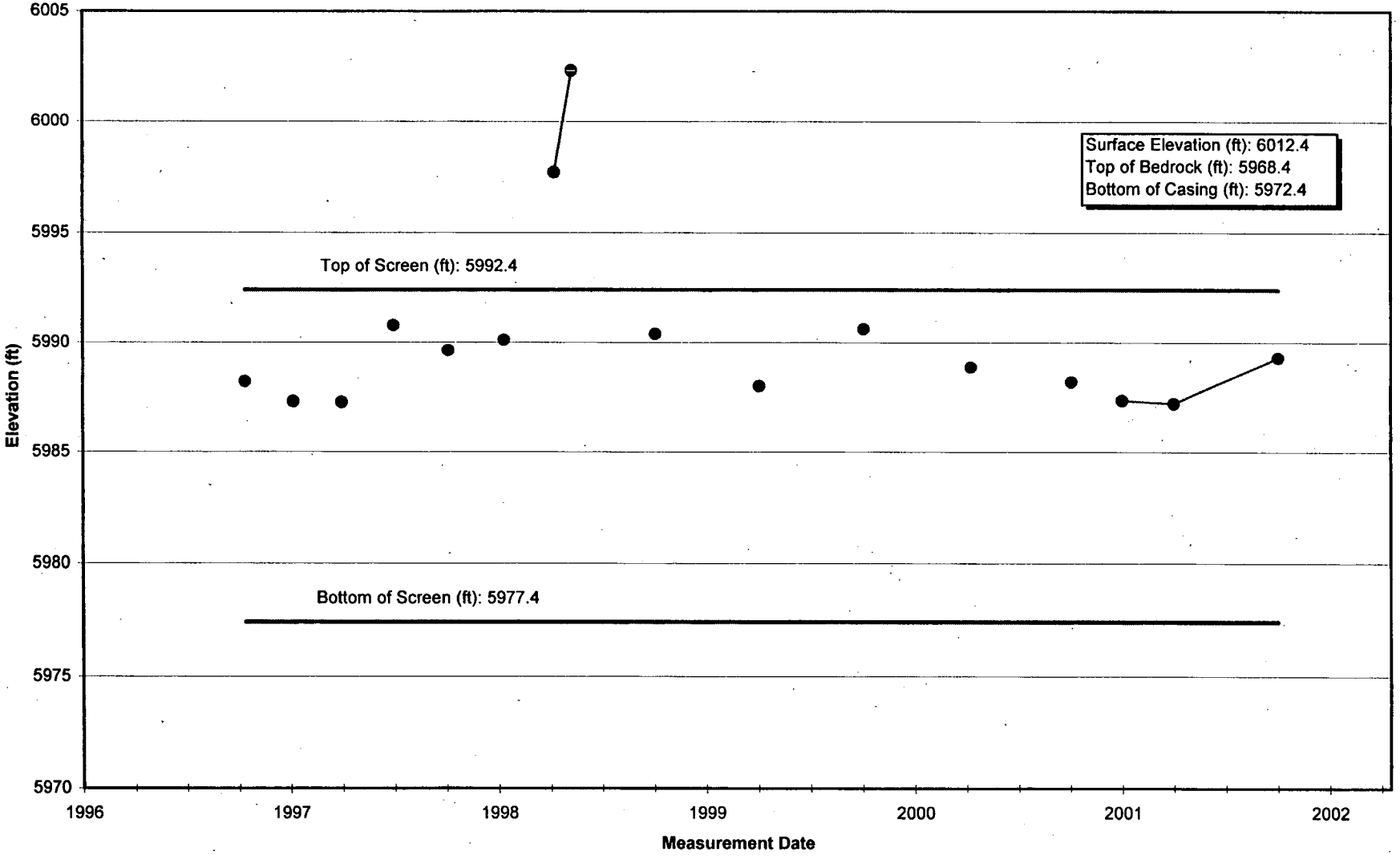


Hydrograph 12691

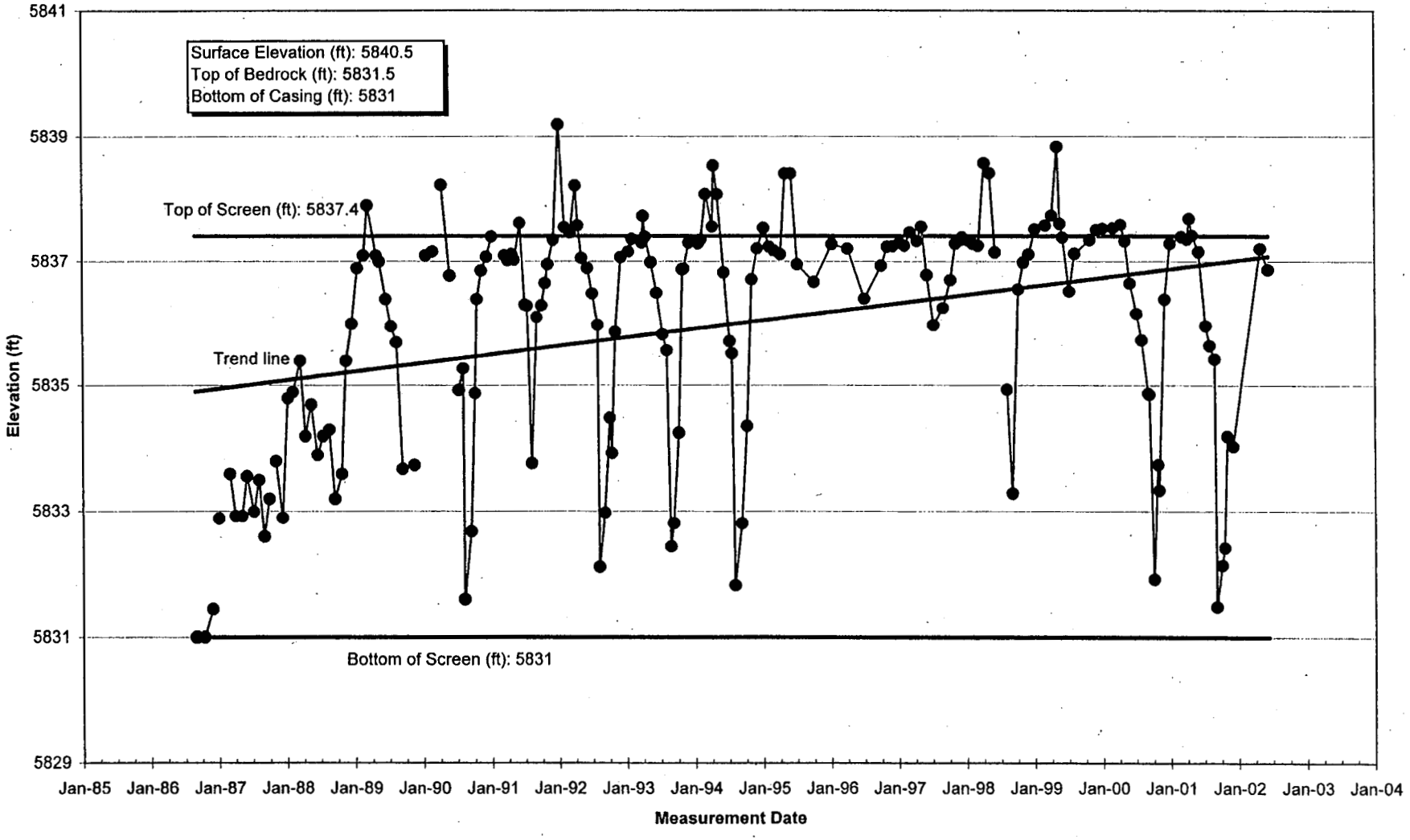


HG-Master S06_wjb2001 12691 8/28/02

Hydrograph 1290



Hydrograph 1386



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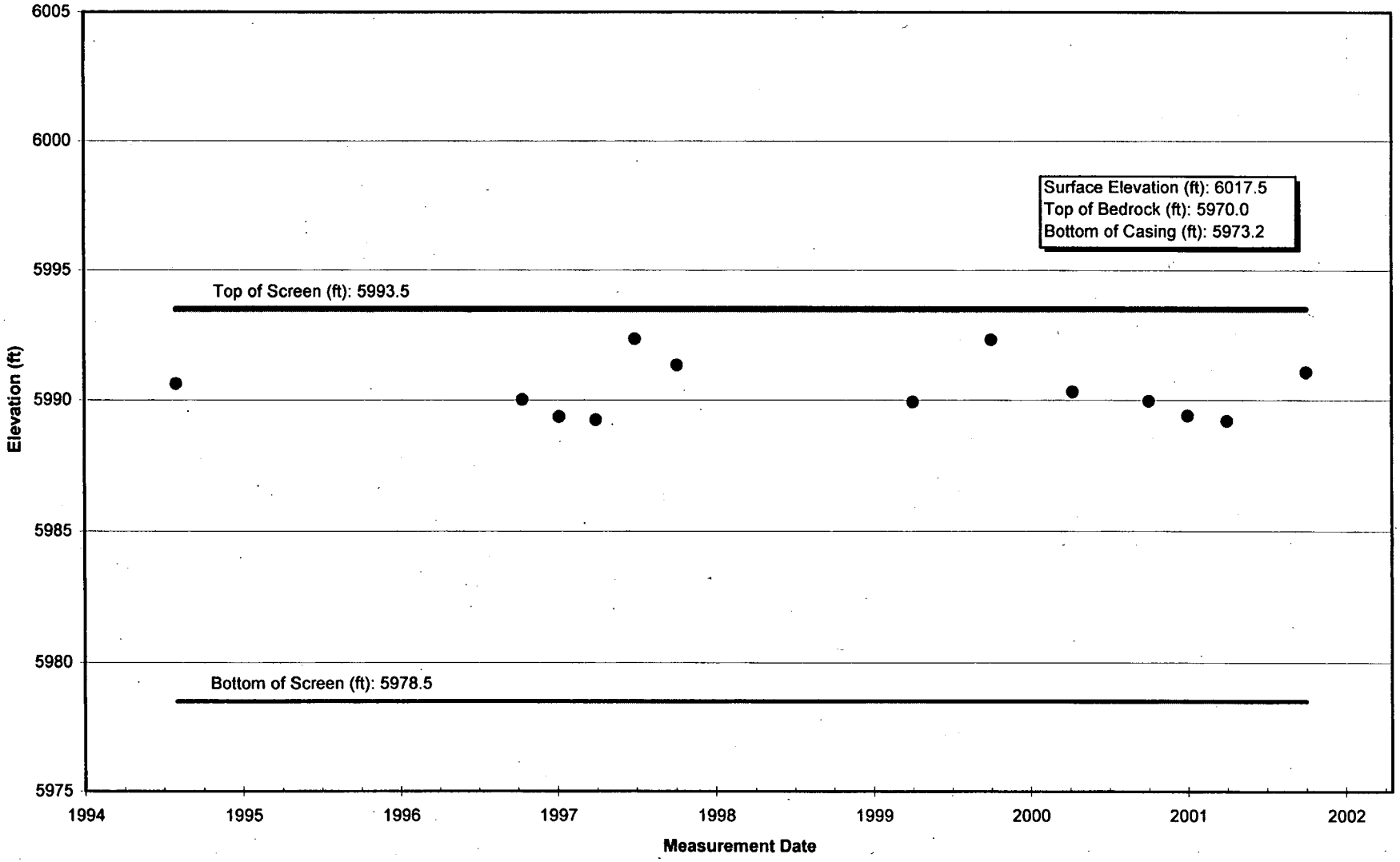
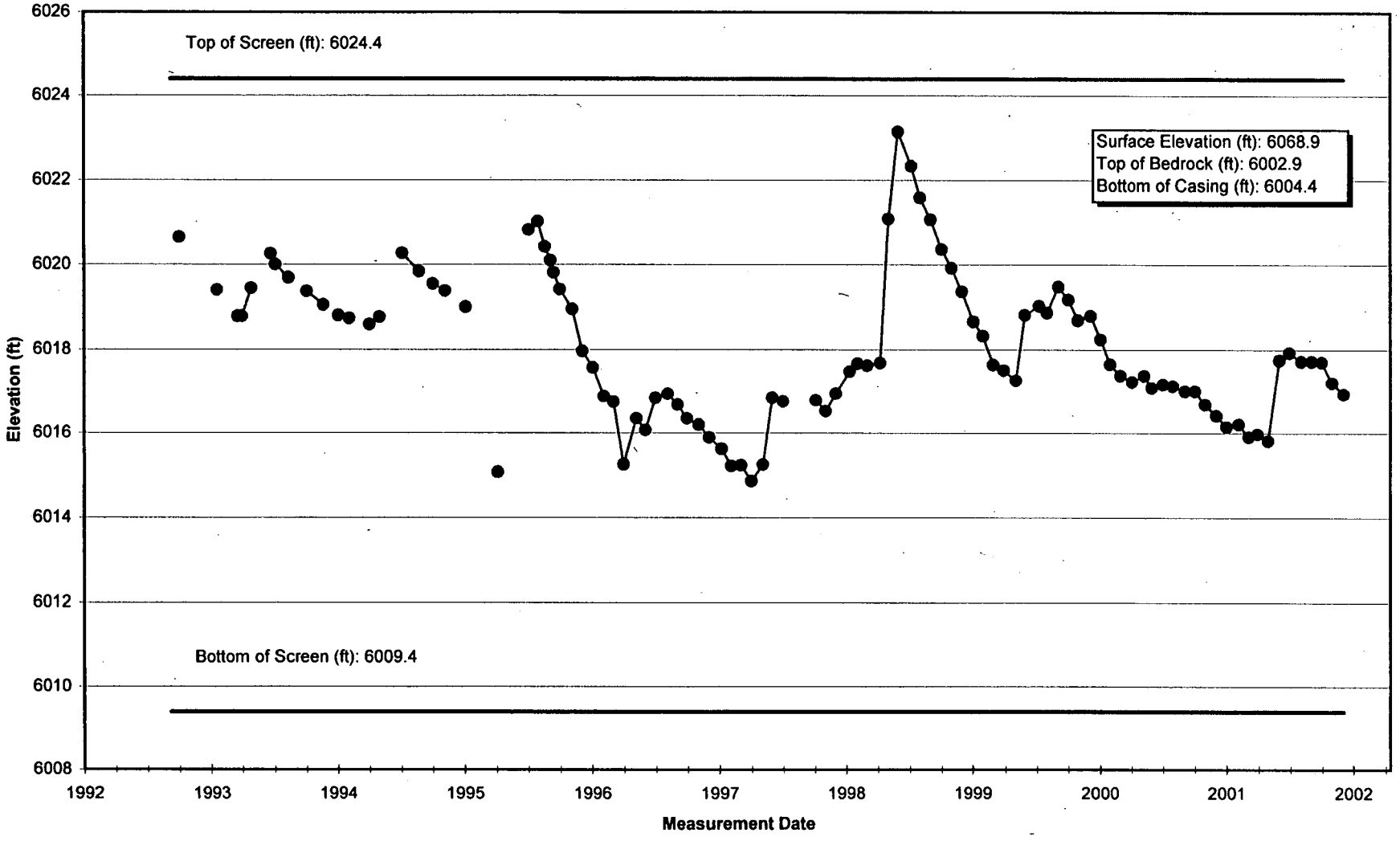
Hydrograph 1390

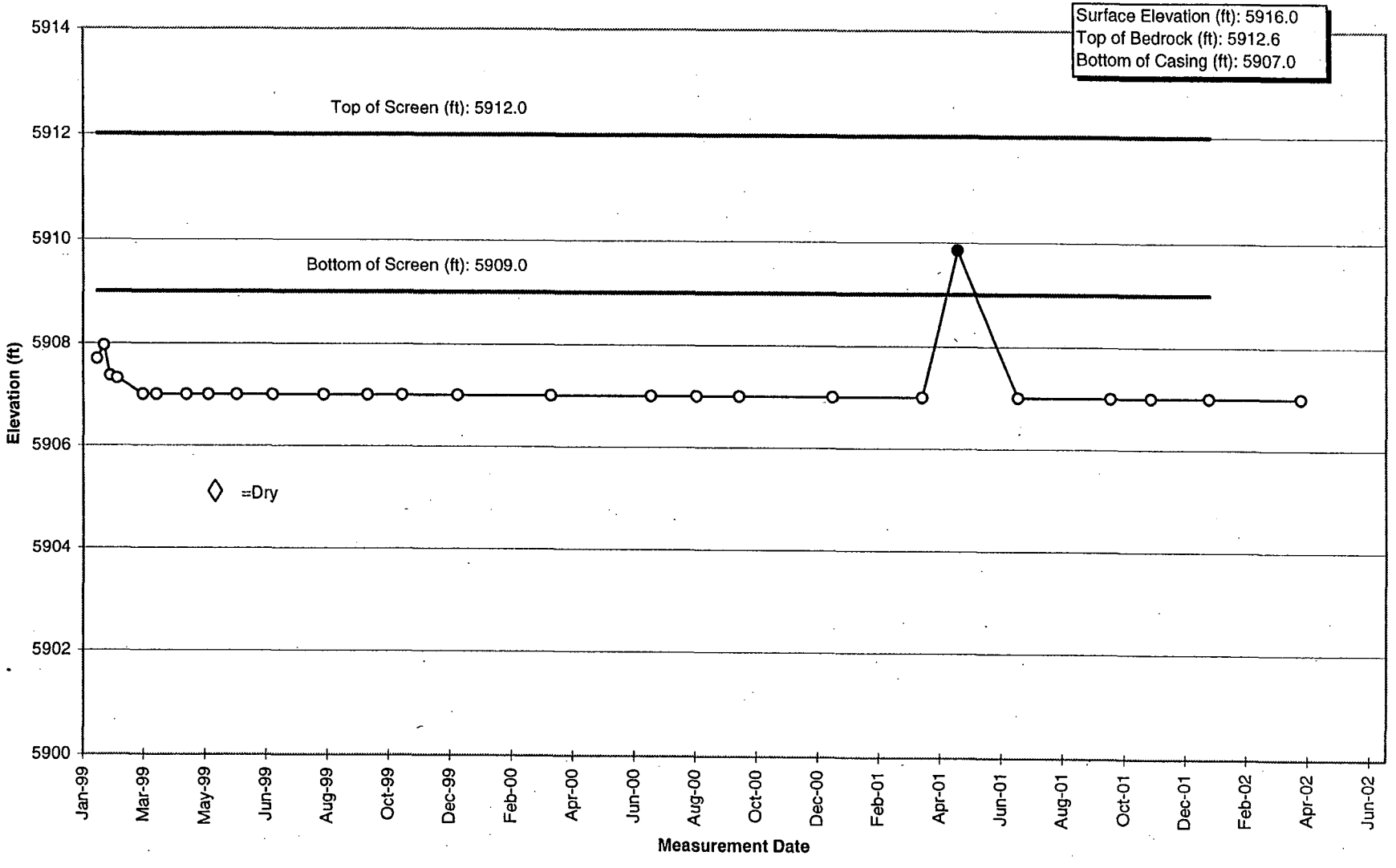


Hydrograph 1490

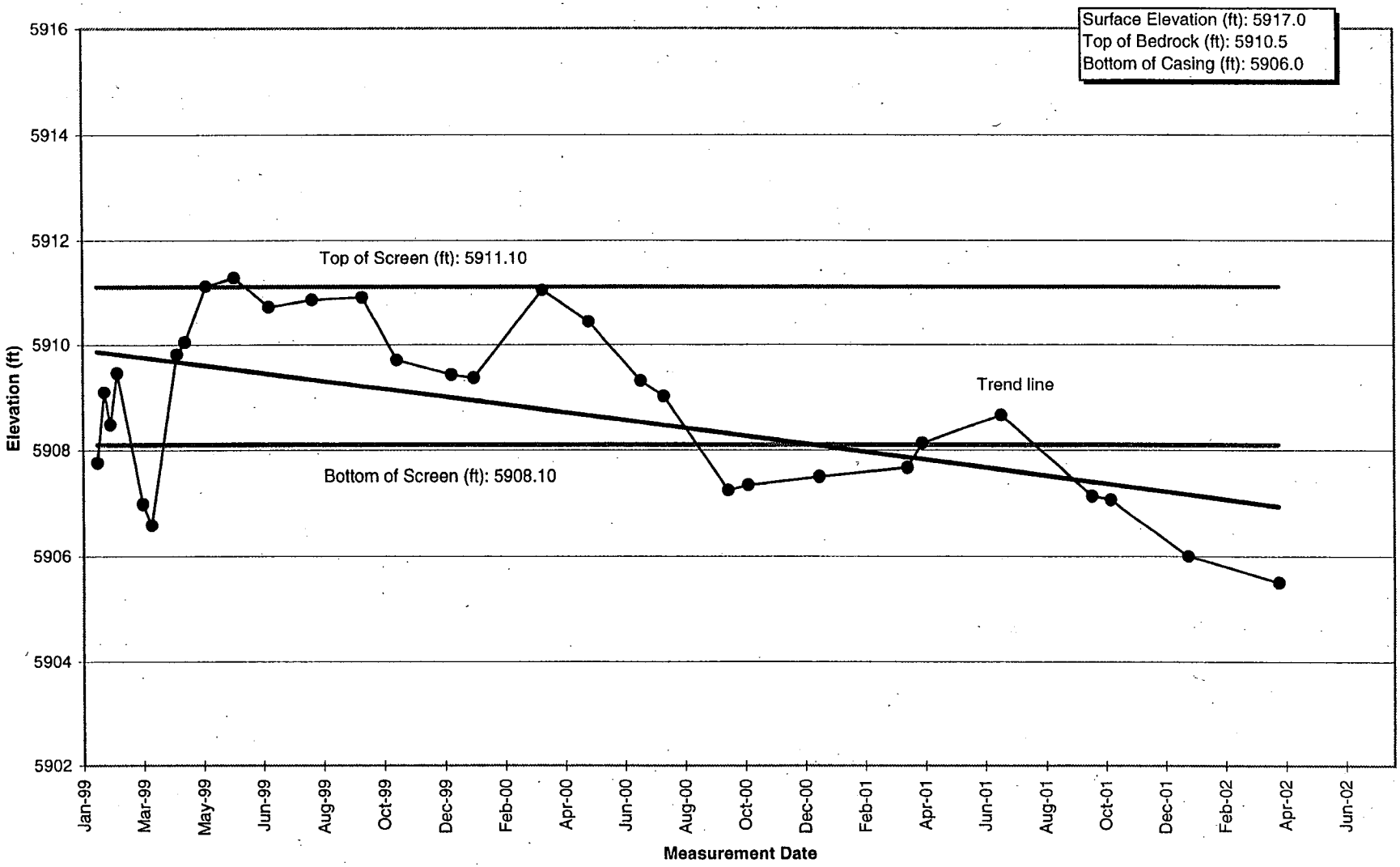


514

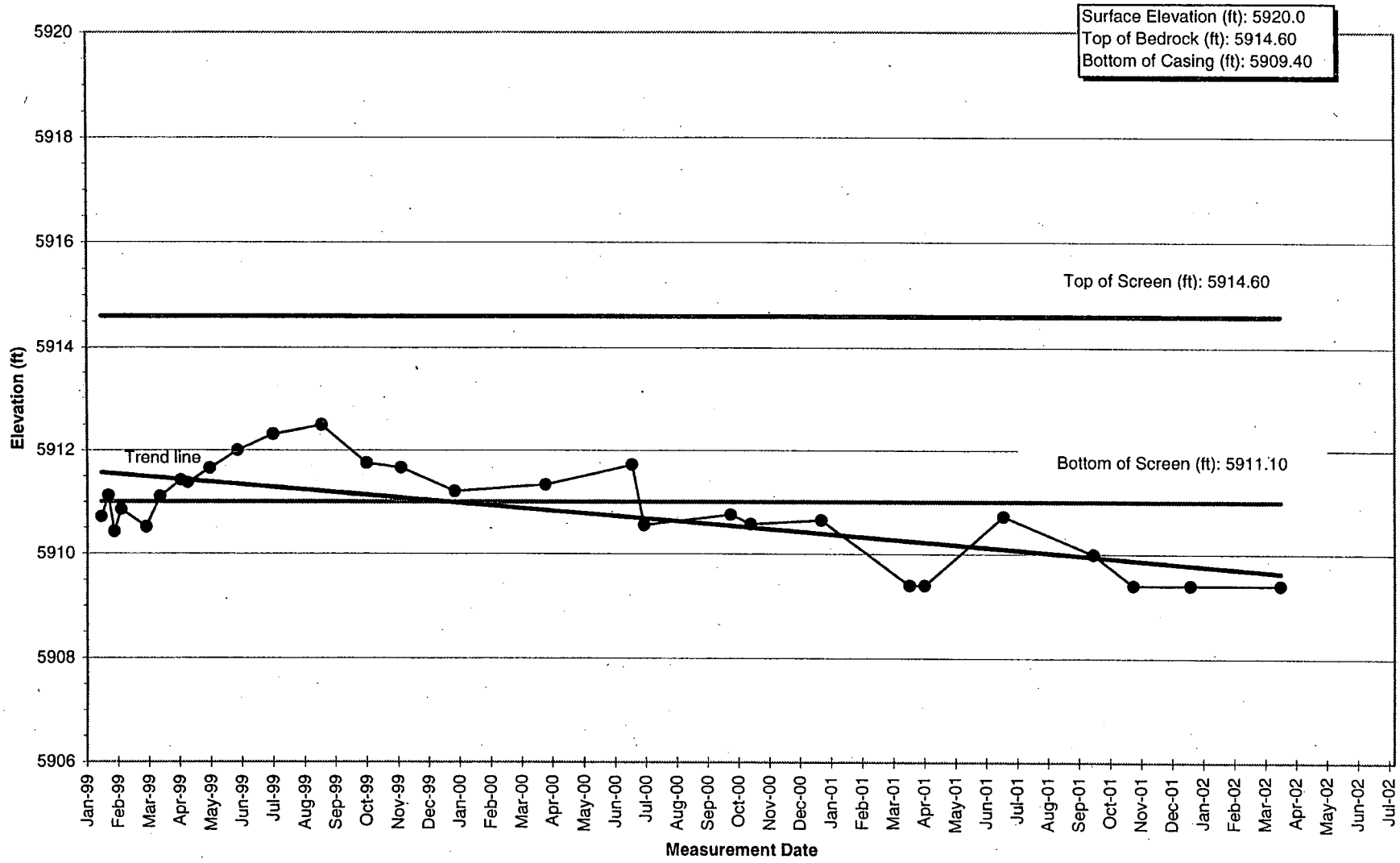
Hydrograph 15599



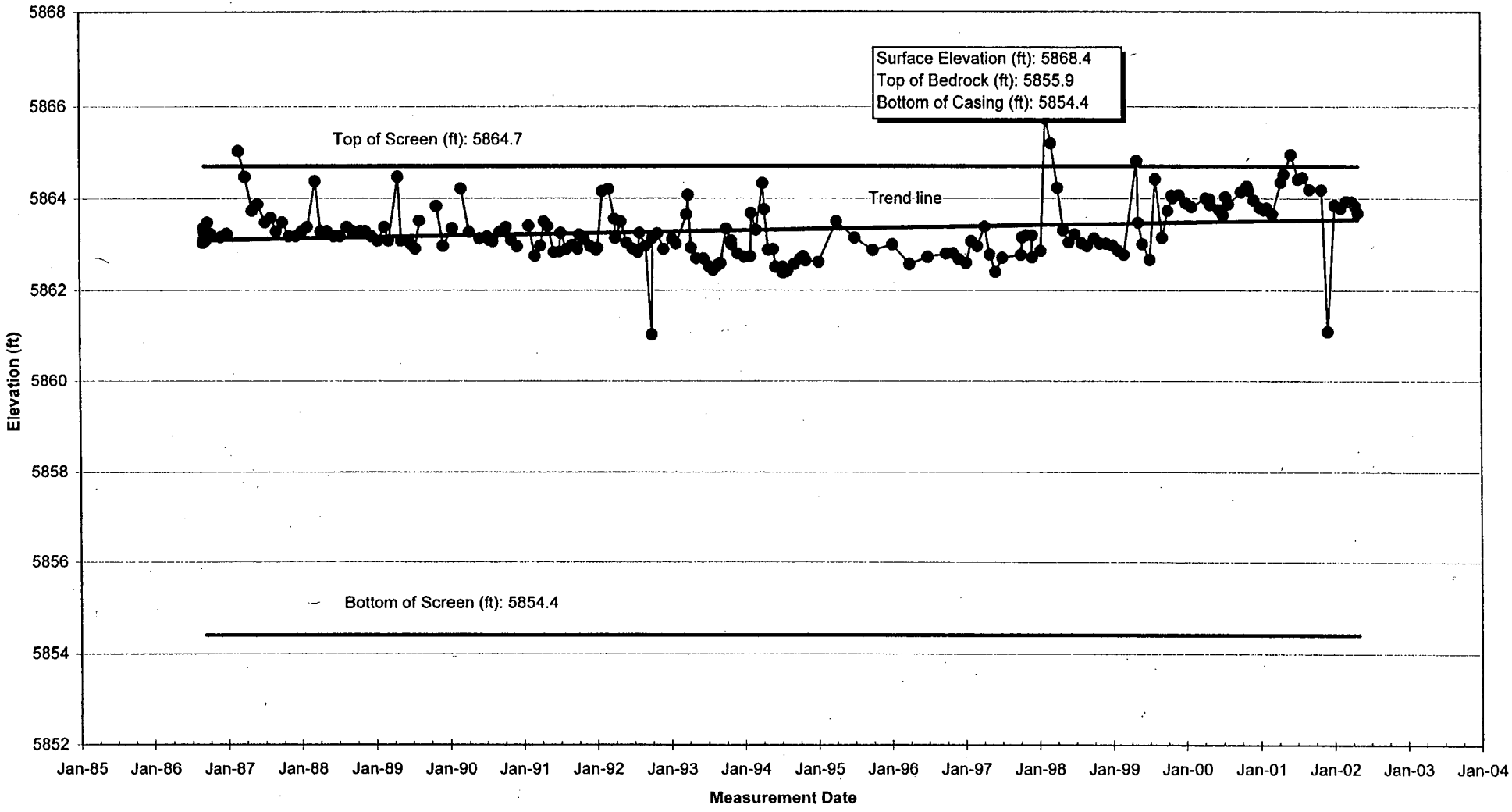
Hydrograph 15699



Hydrograph 15799

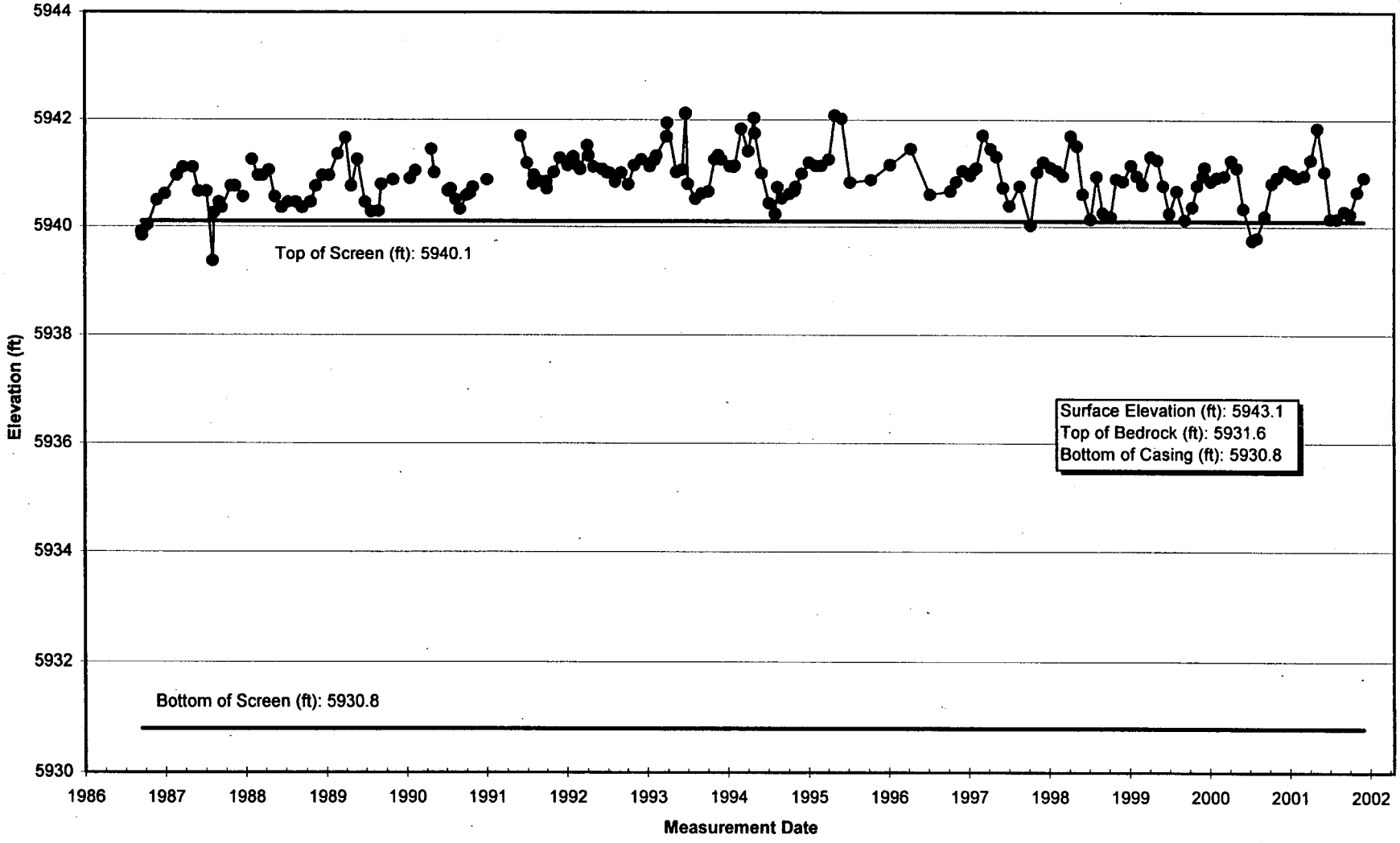


Hydrograph 1786

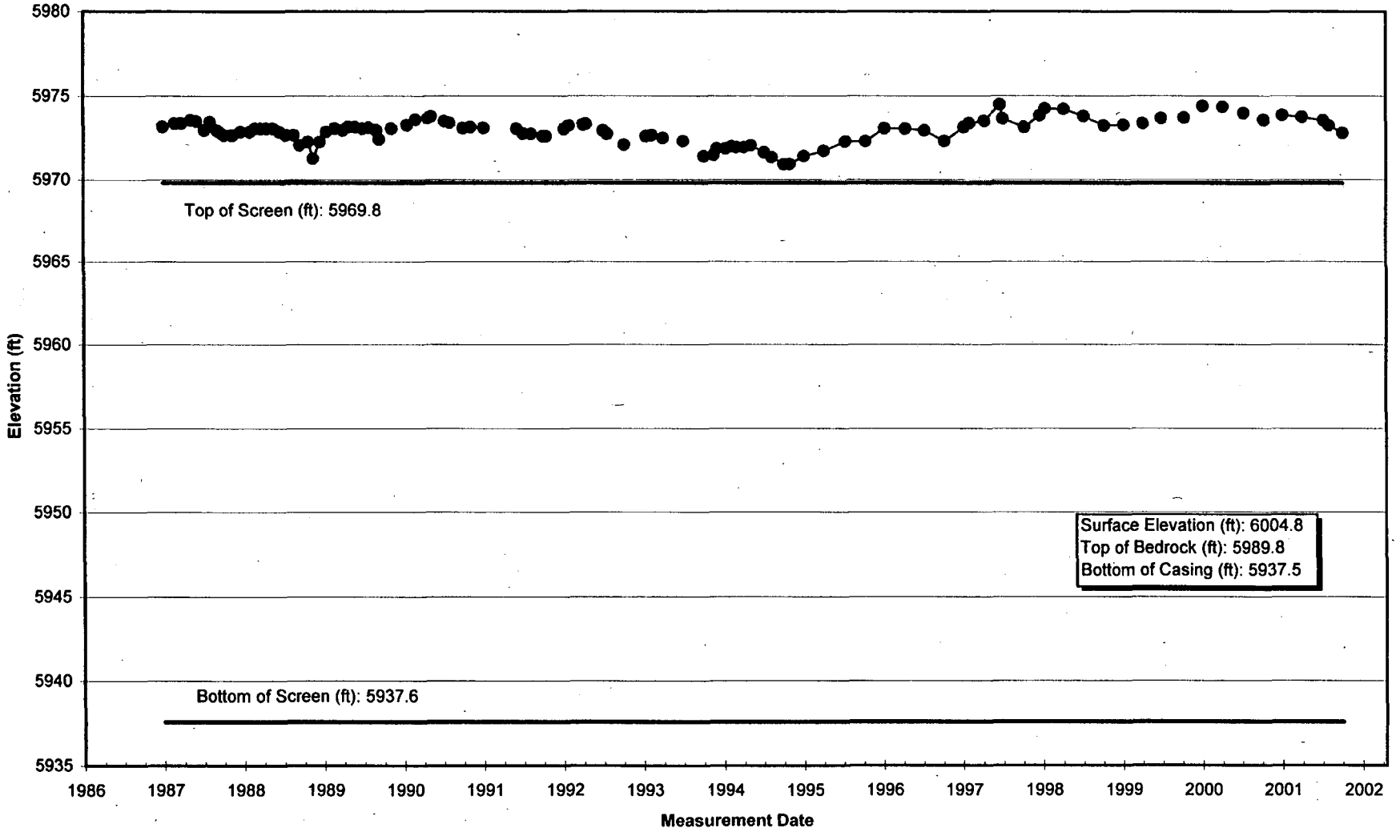


447
518

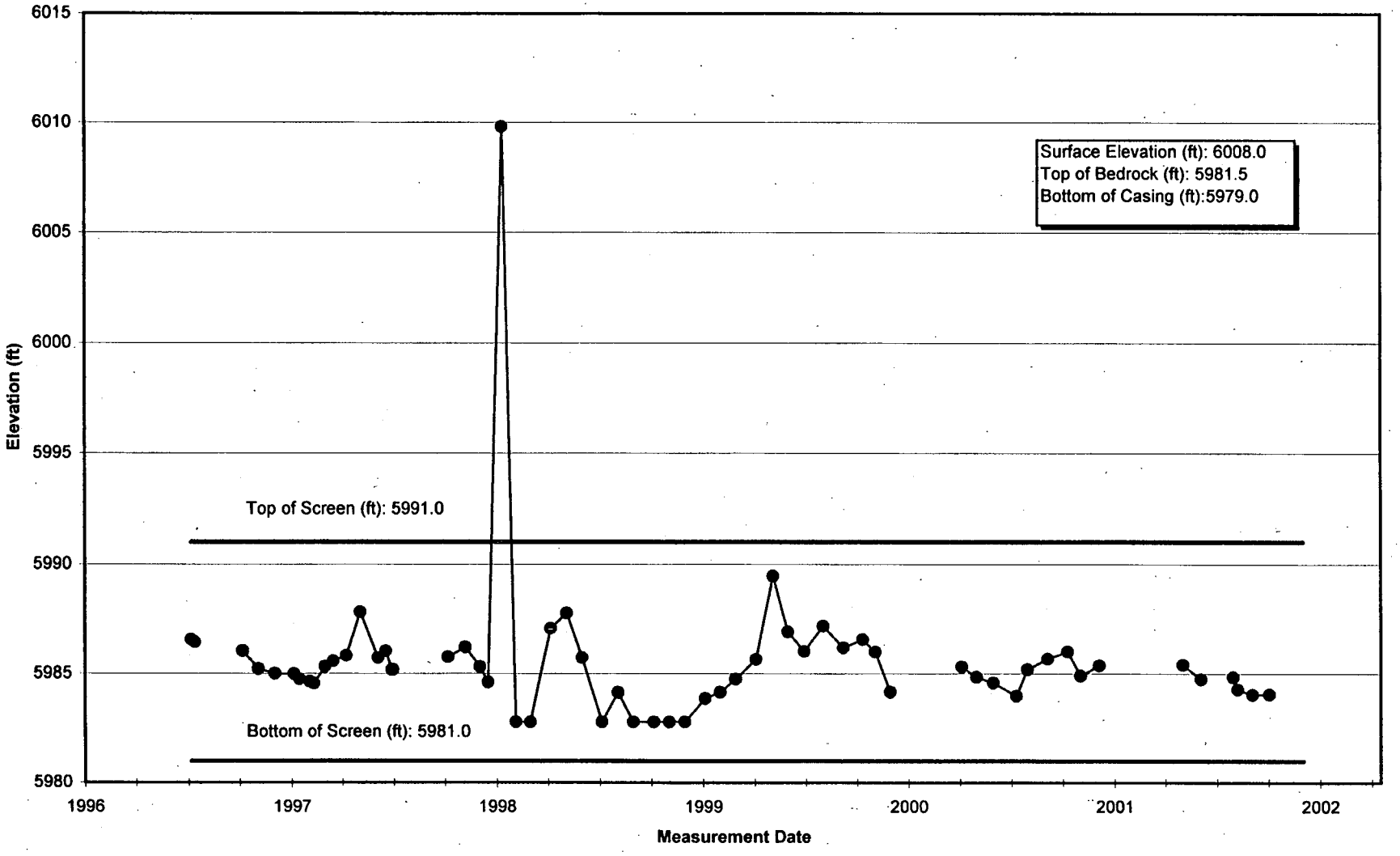
Hydrograph 1986



Hydrograph 2186



Hydrograph 22596



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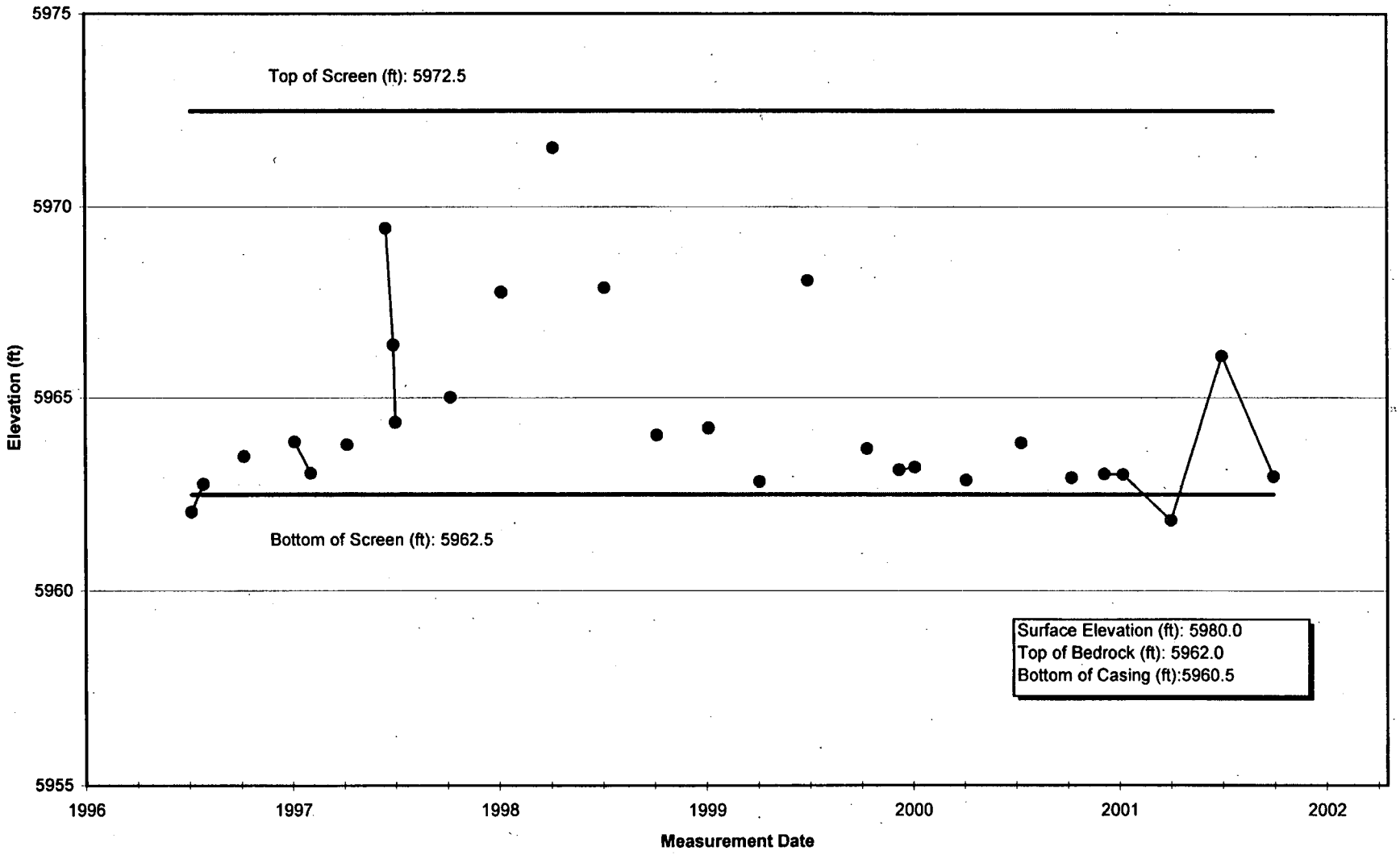

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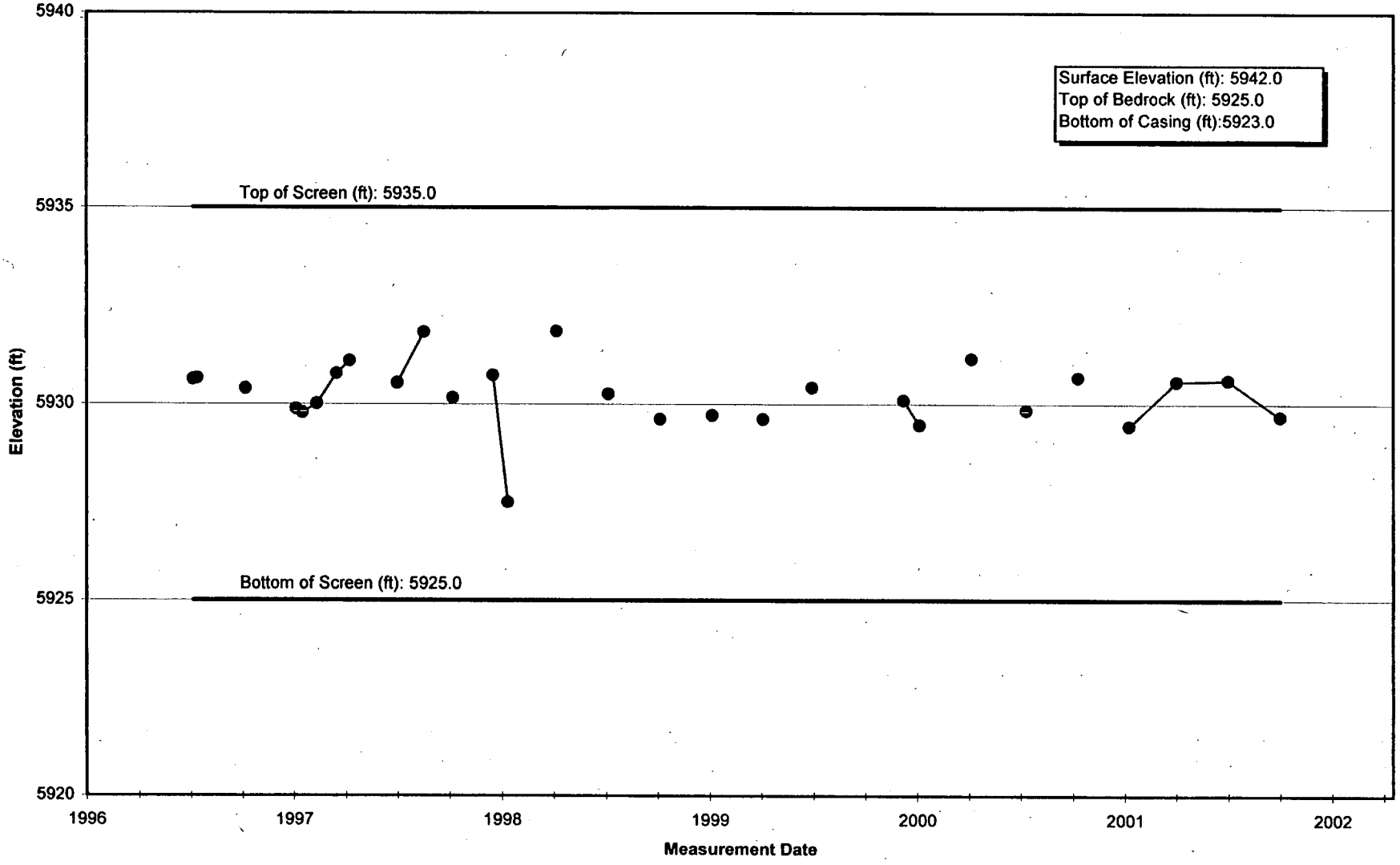

452
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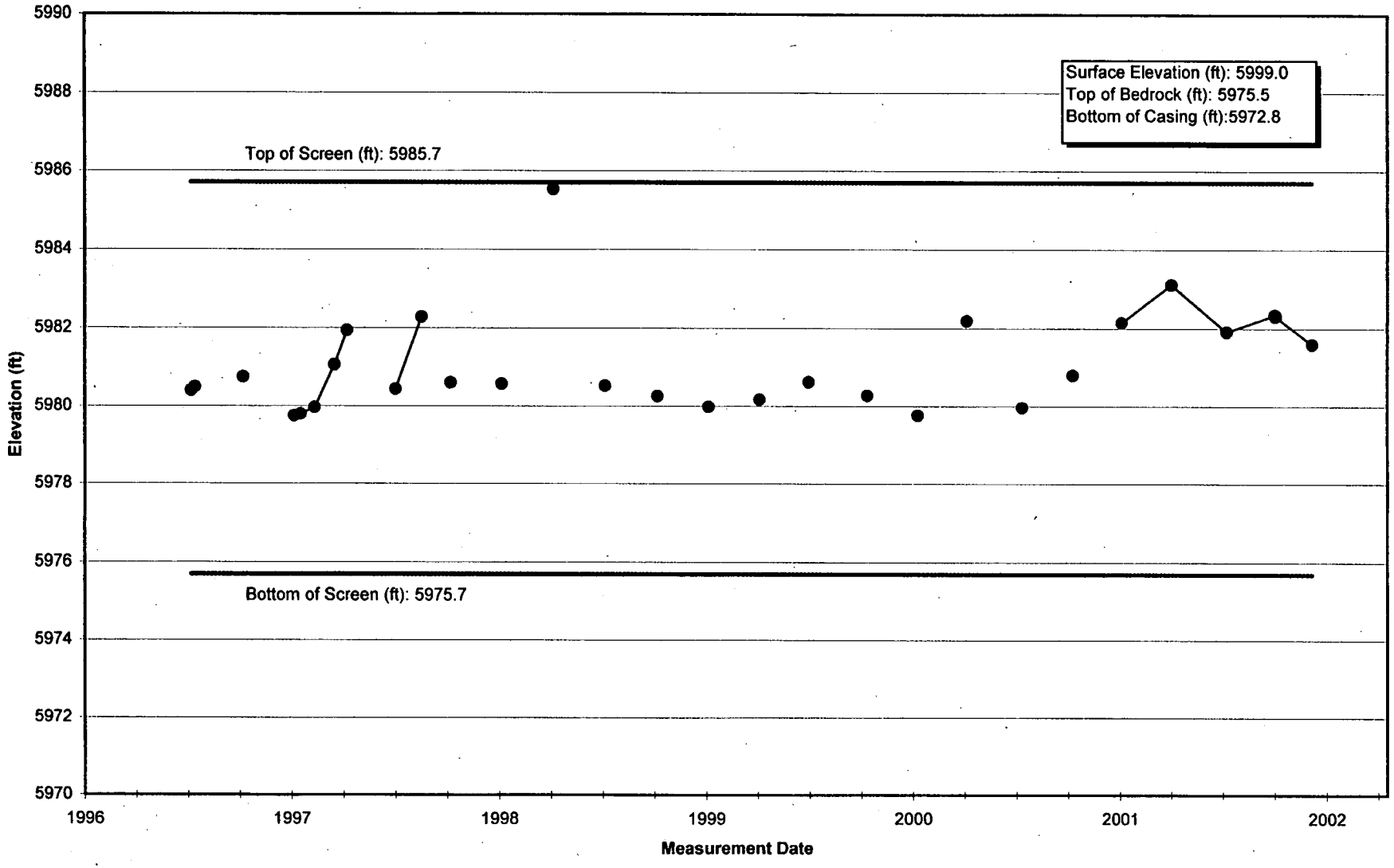

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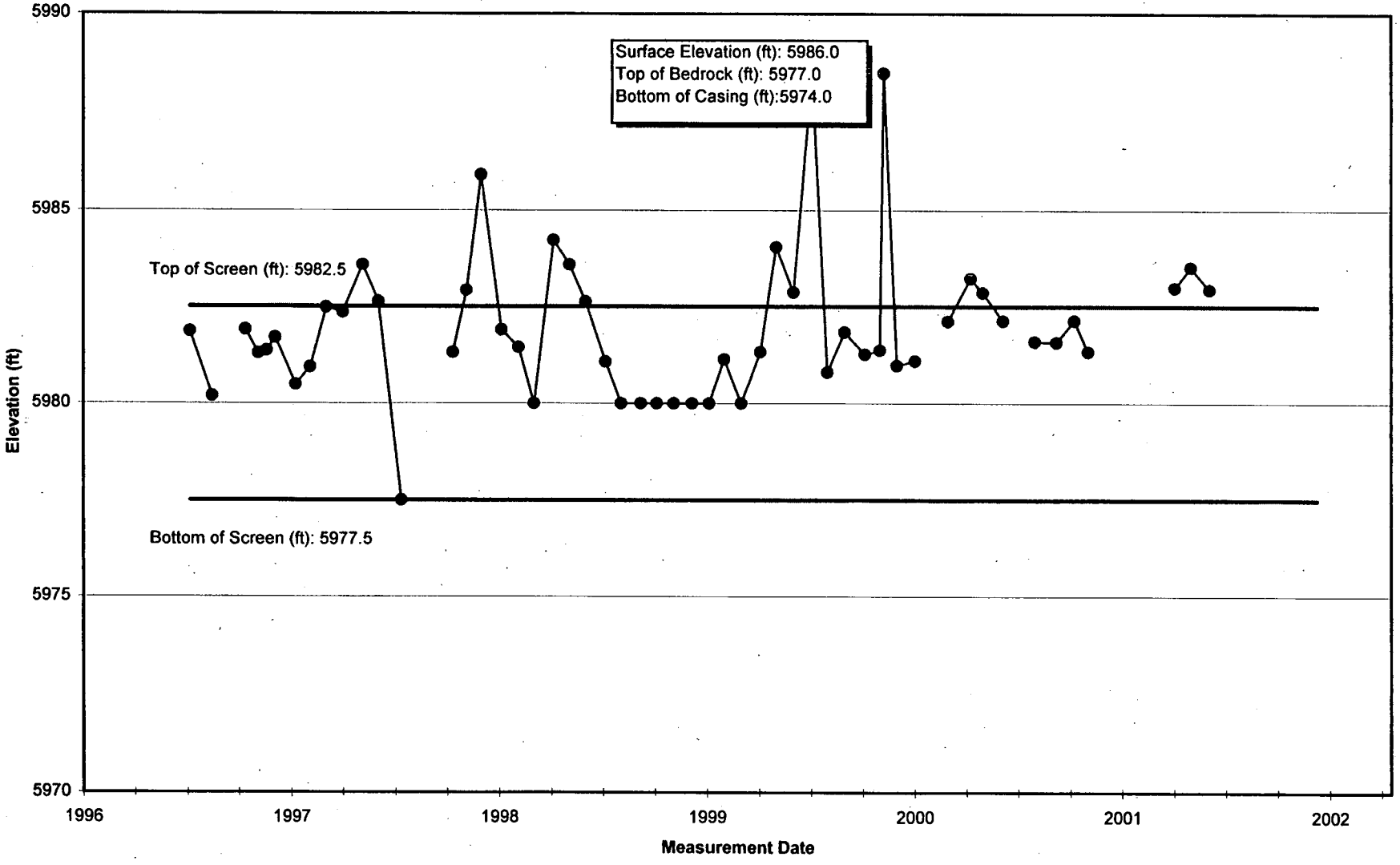

HSL
525

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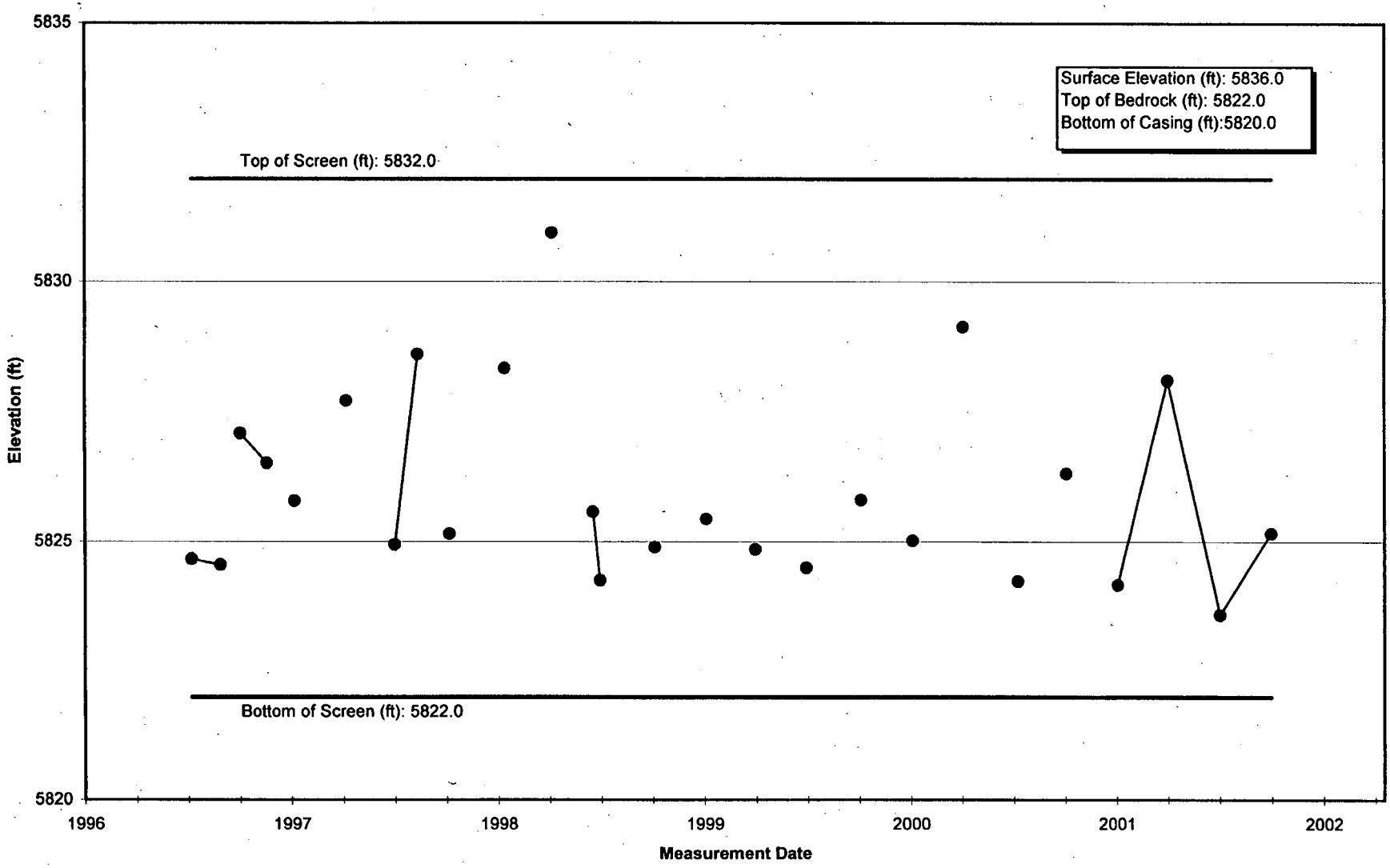

2/55
1/7
526

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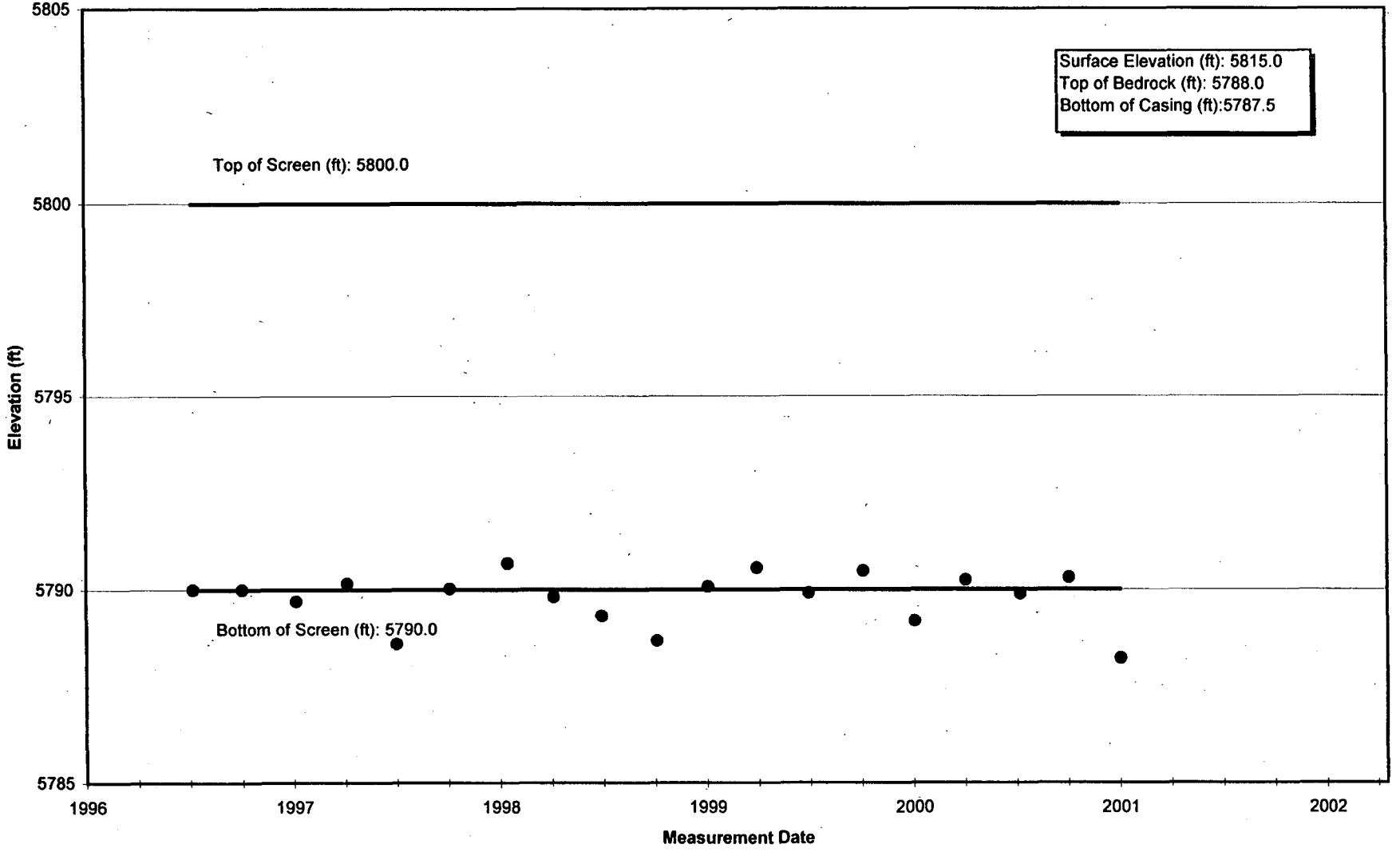

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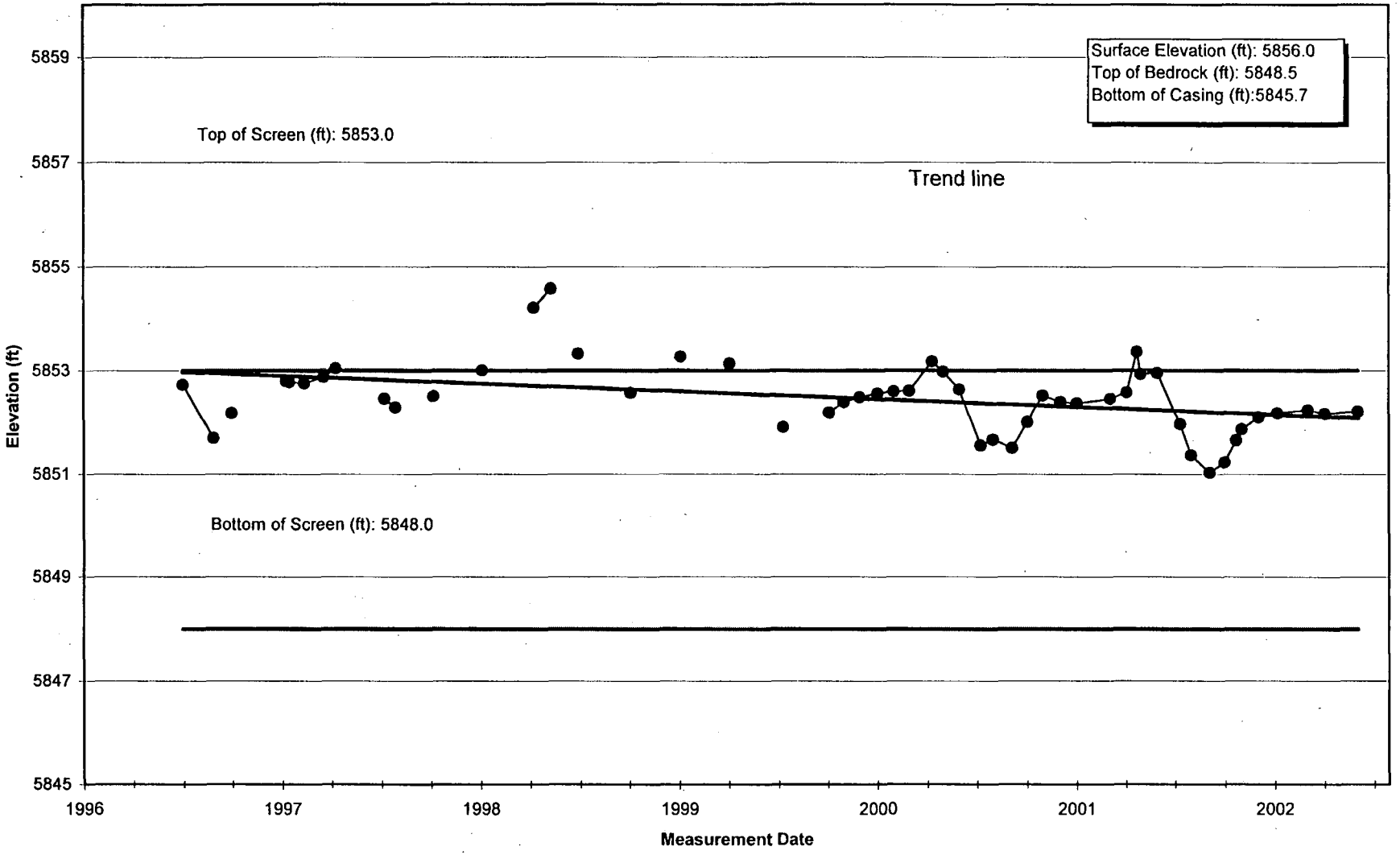
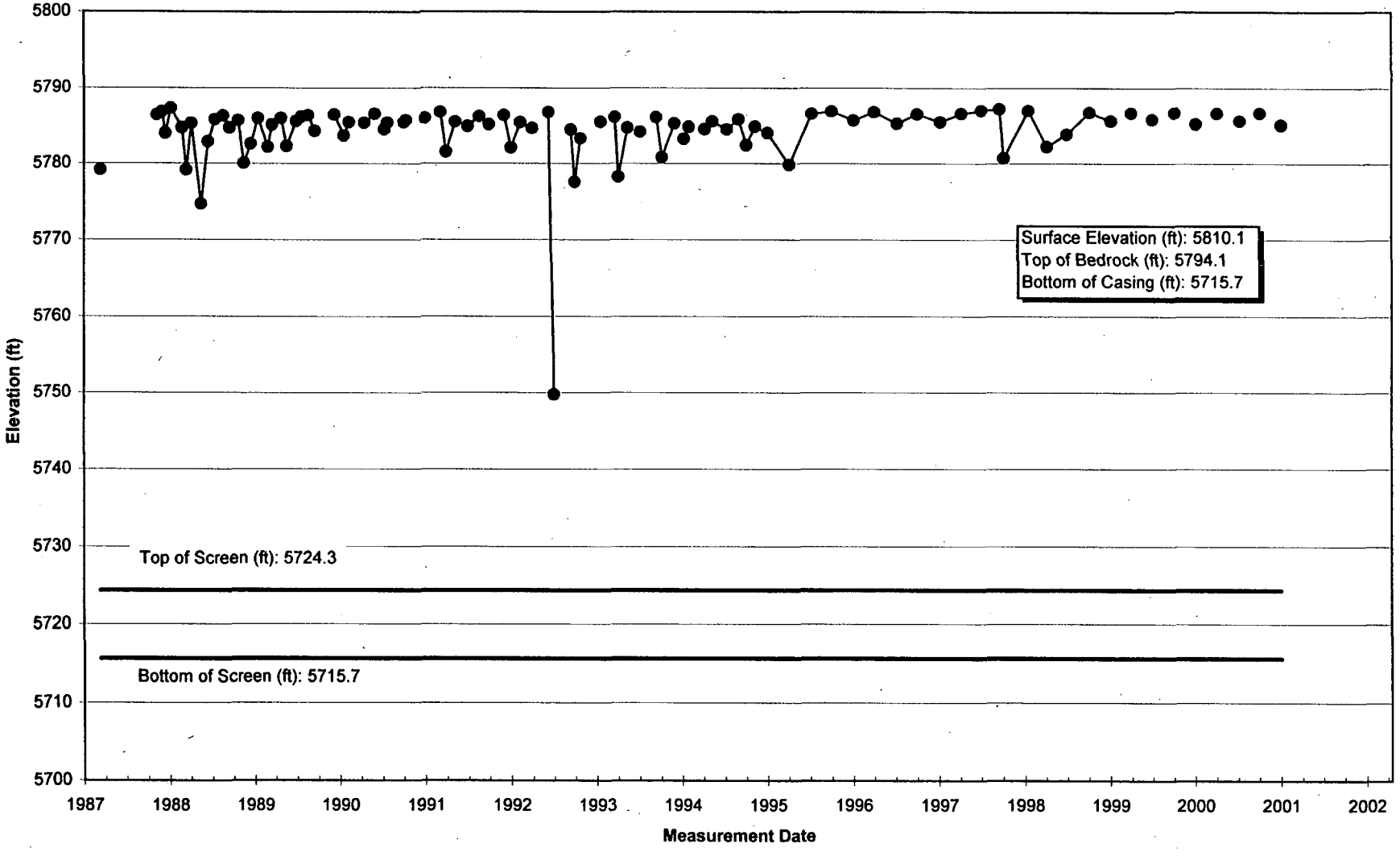


457
528

Hydrograph 3087



468
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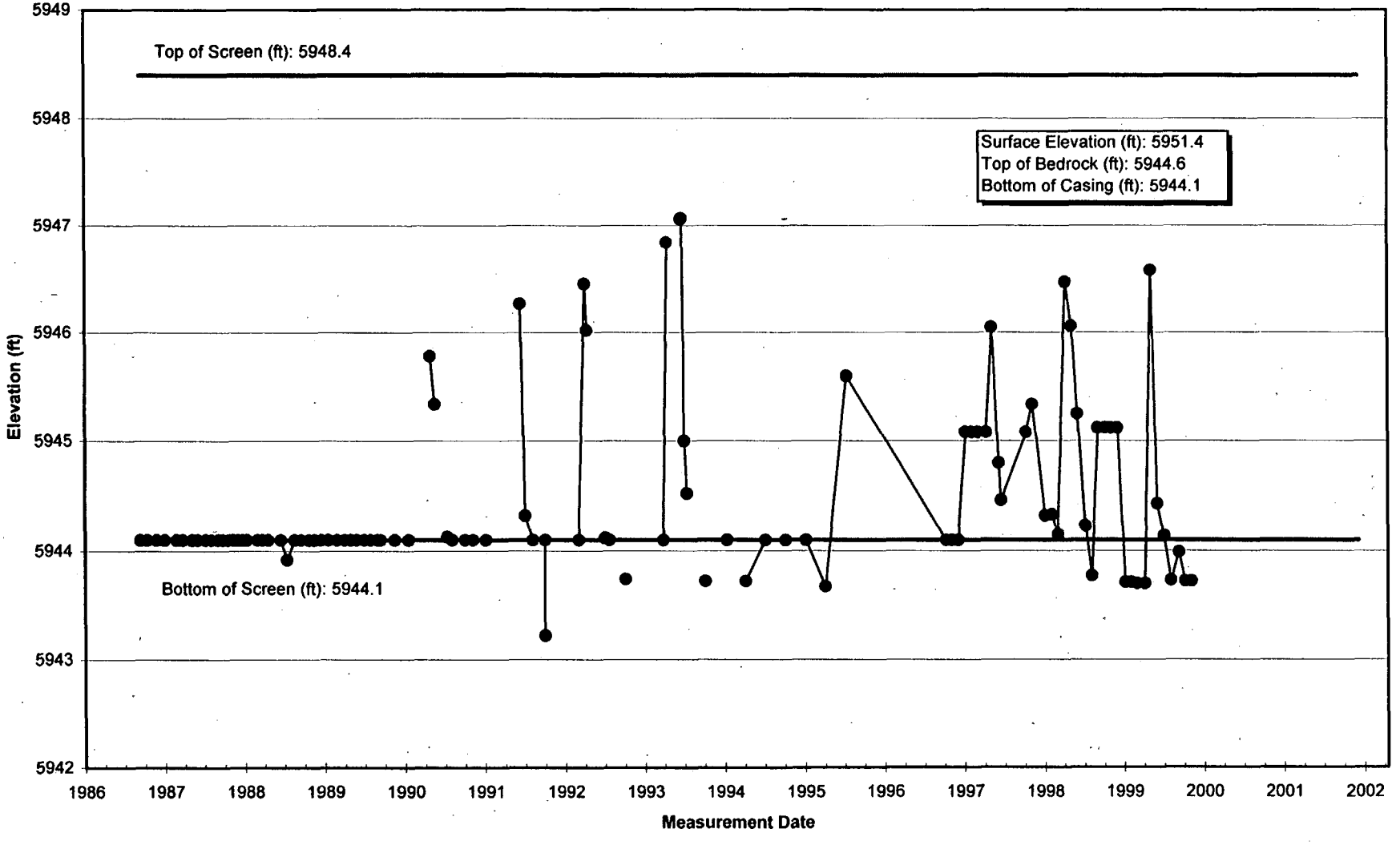

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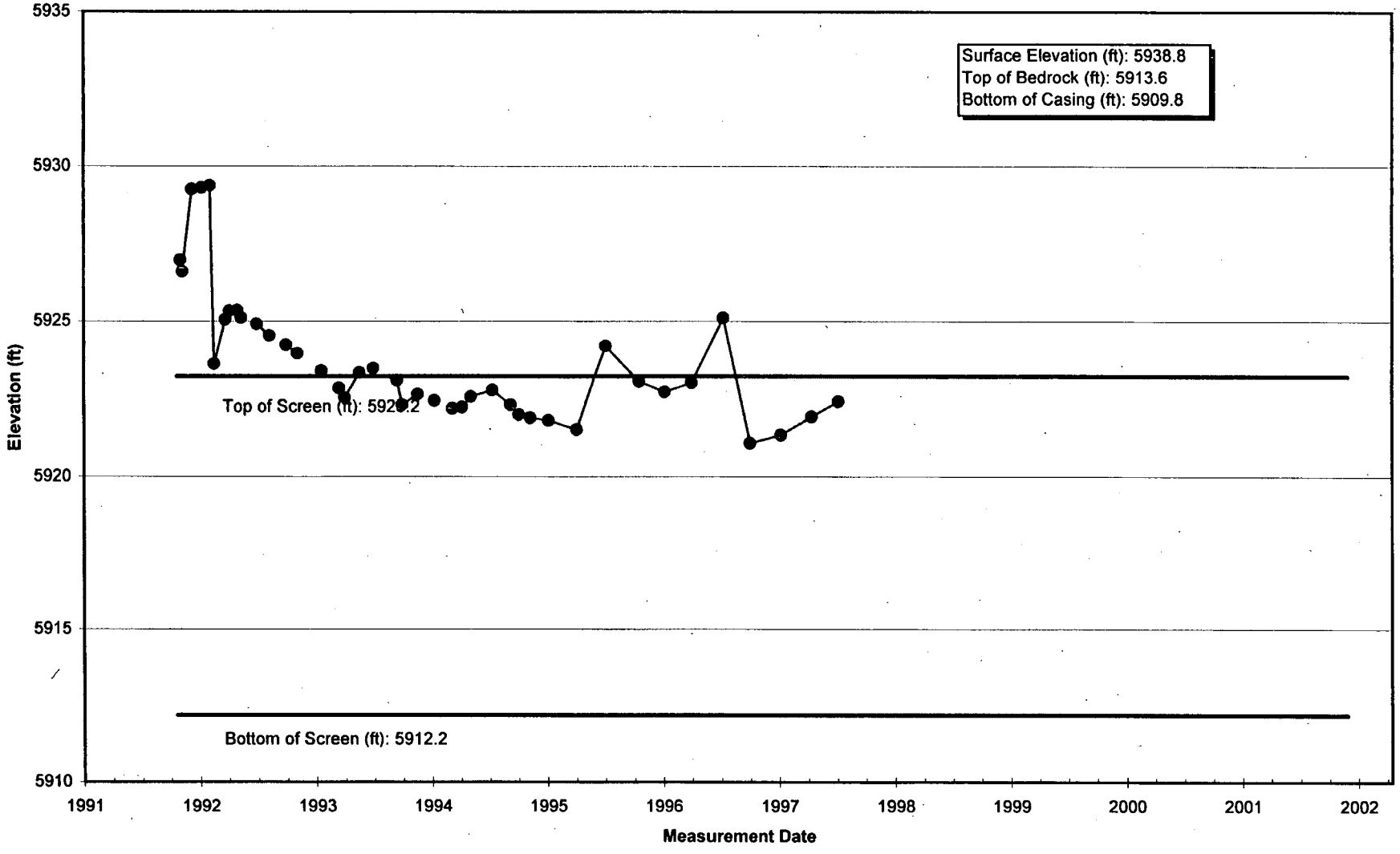
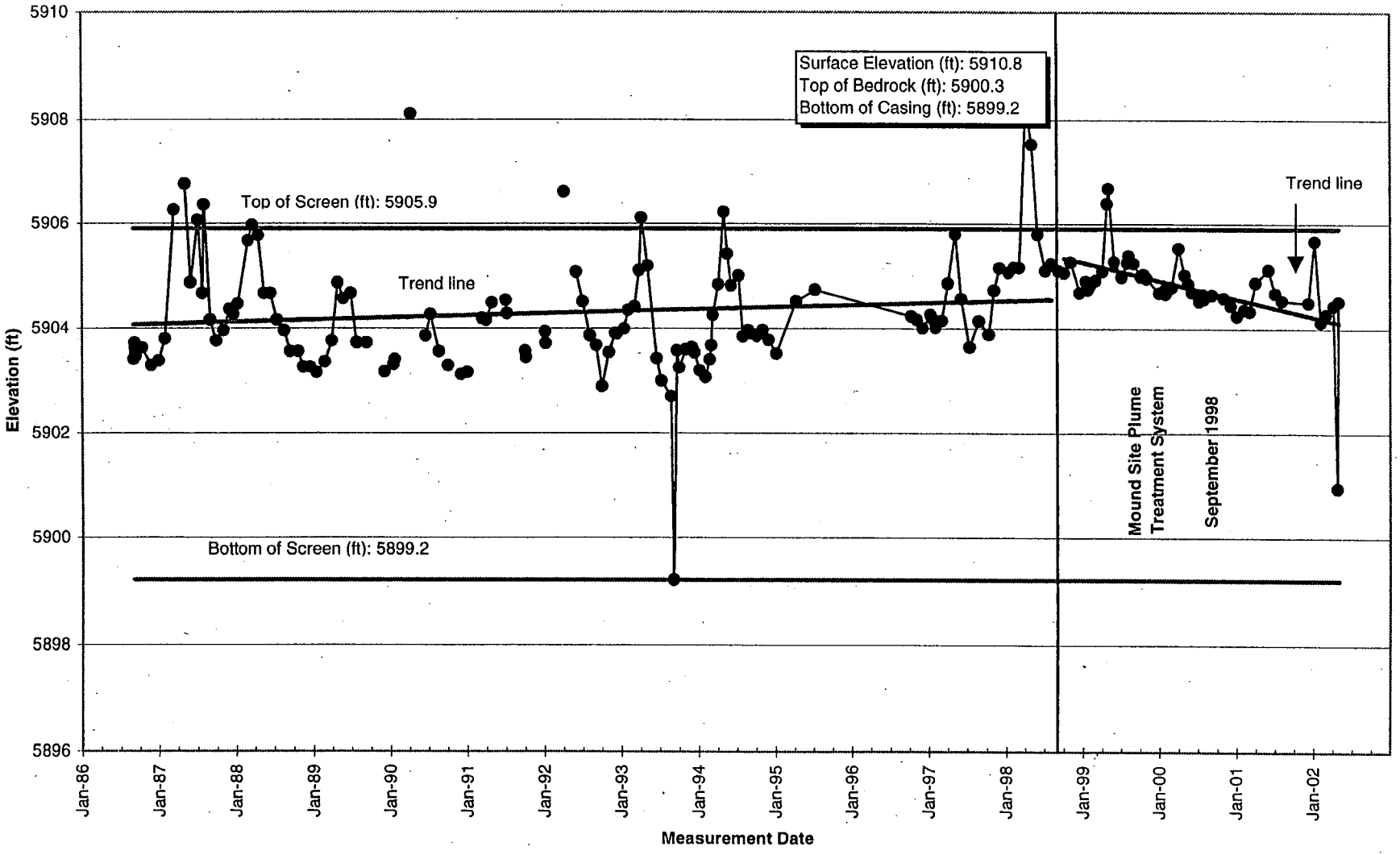
459
530

Hydrograph 35691



Hydrograph 3586



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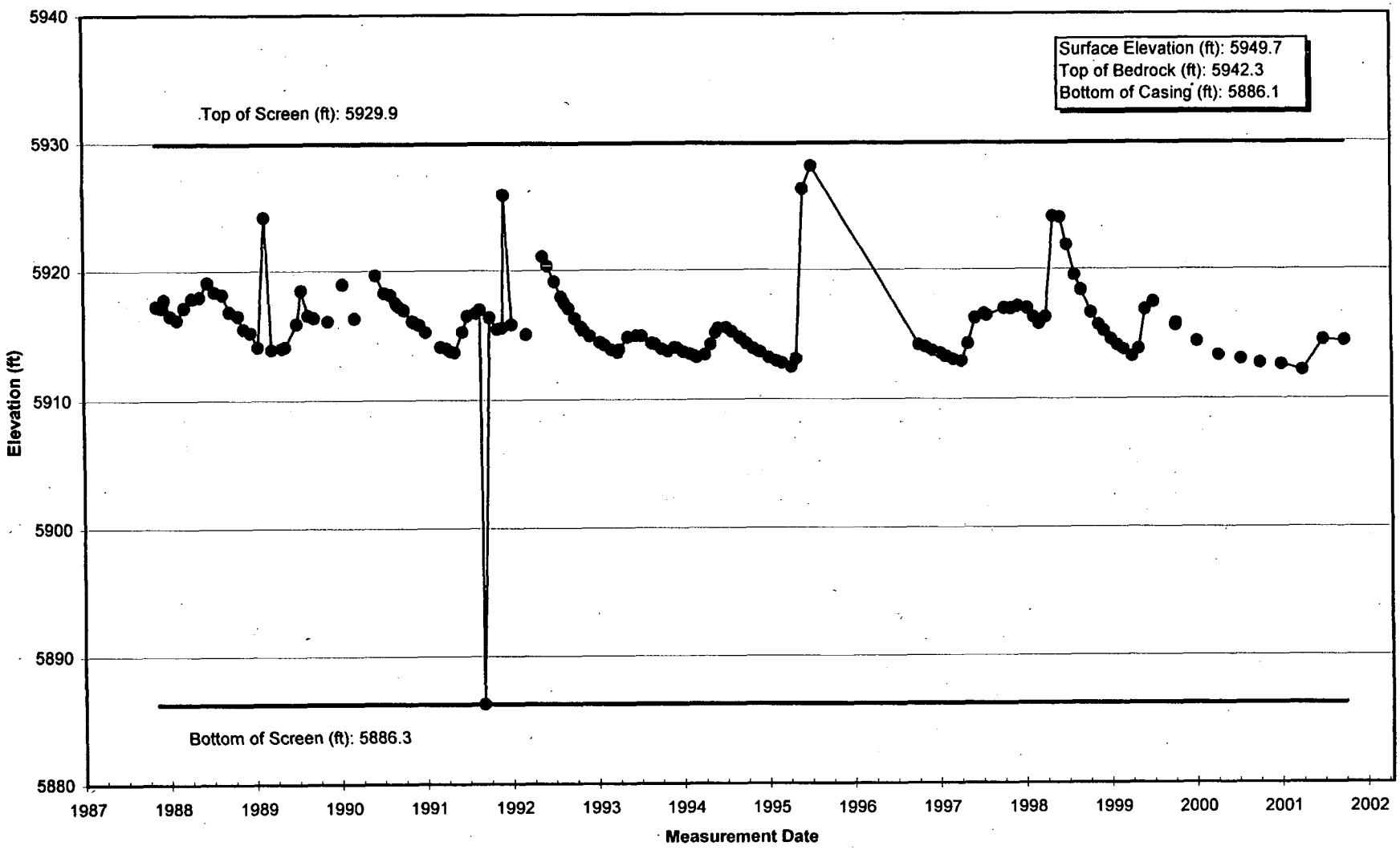

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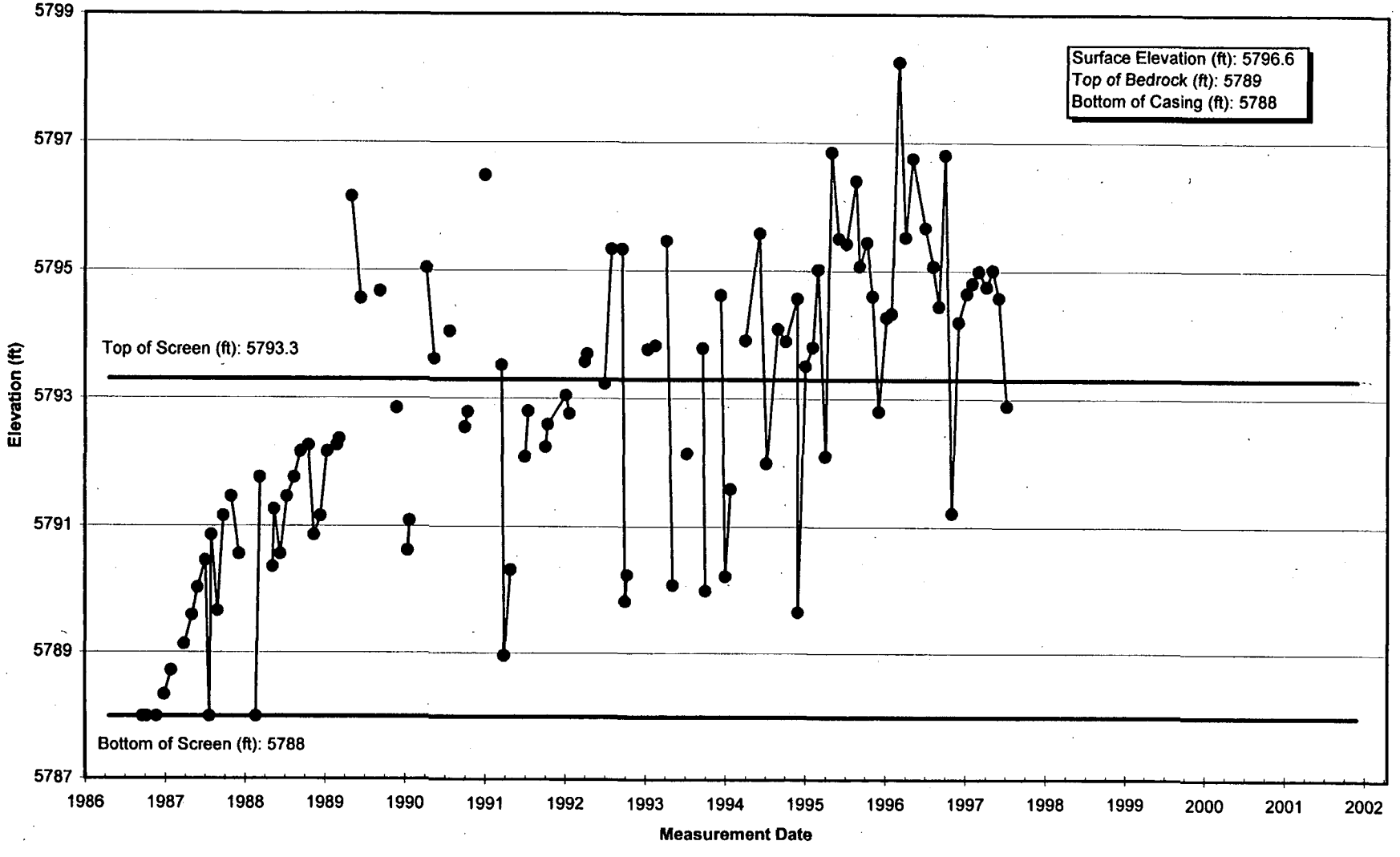
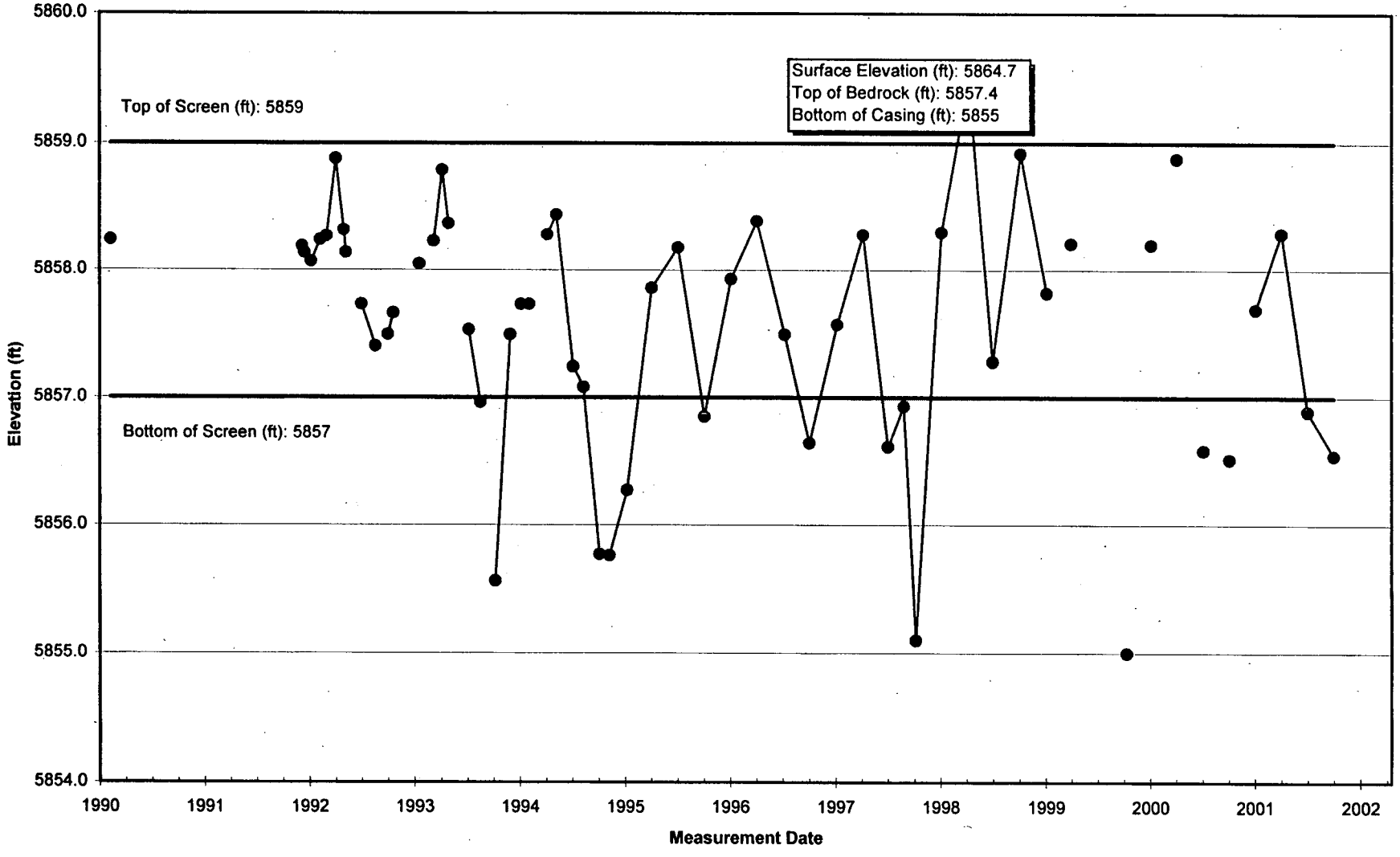


Hydrograph 38591



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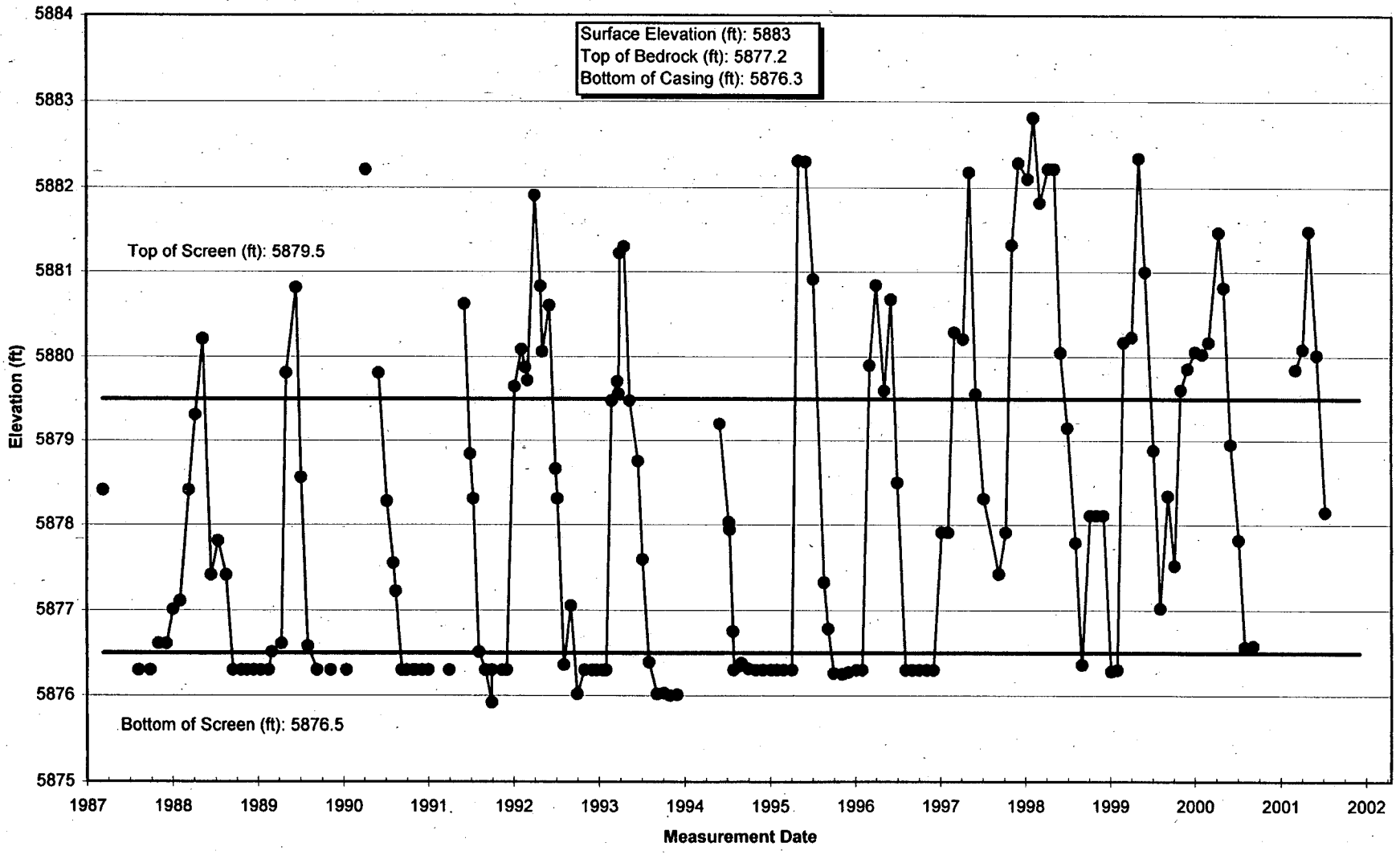
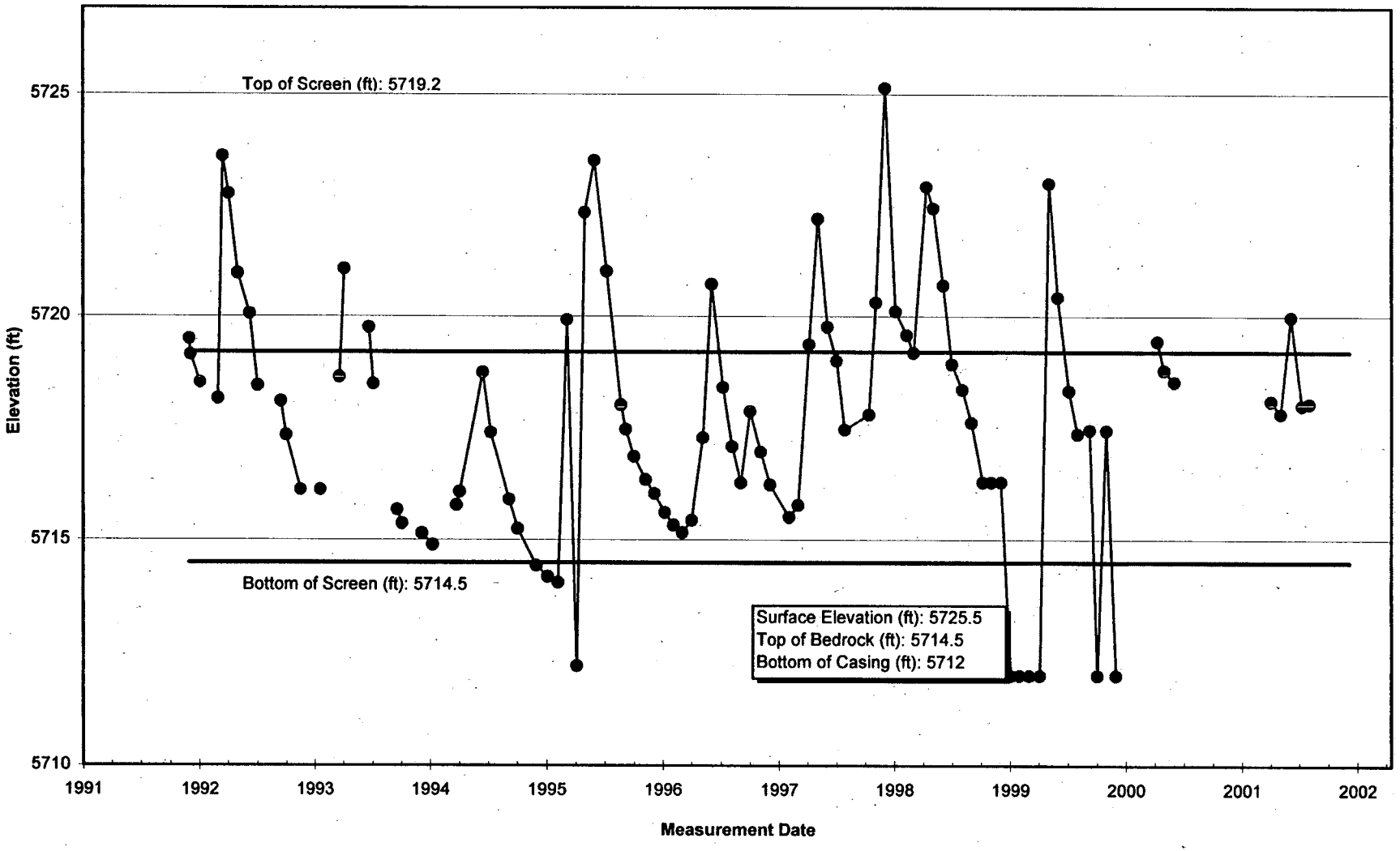


465
530

Hydrograph 41591



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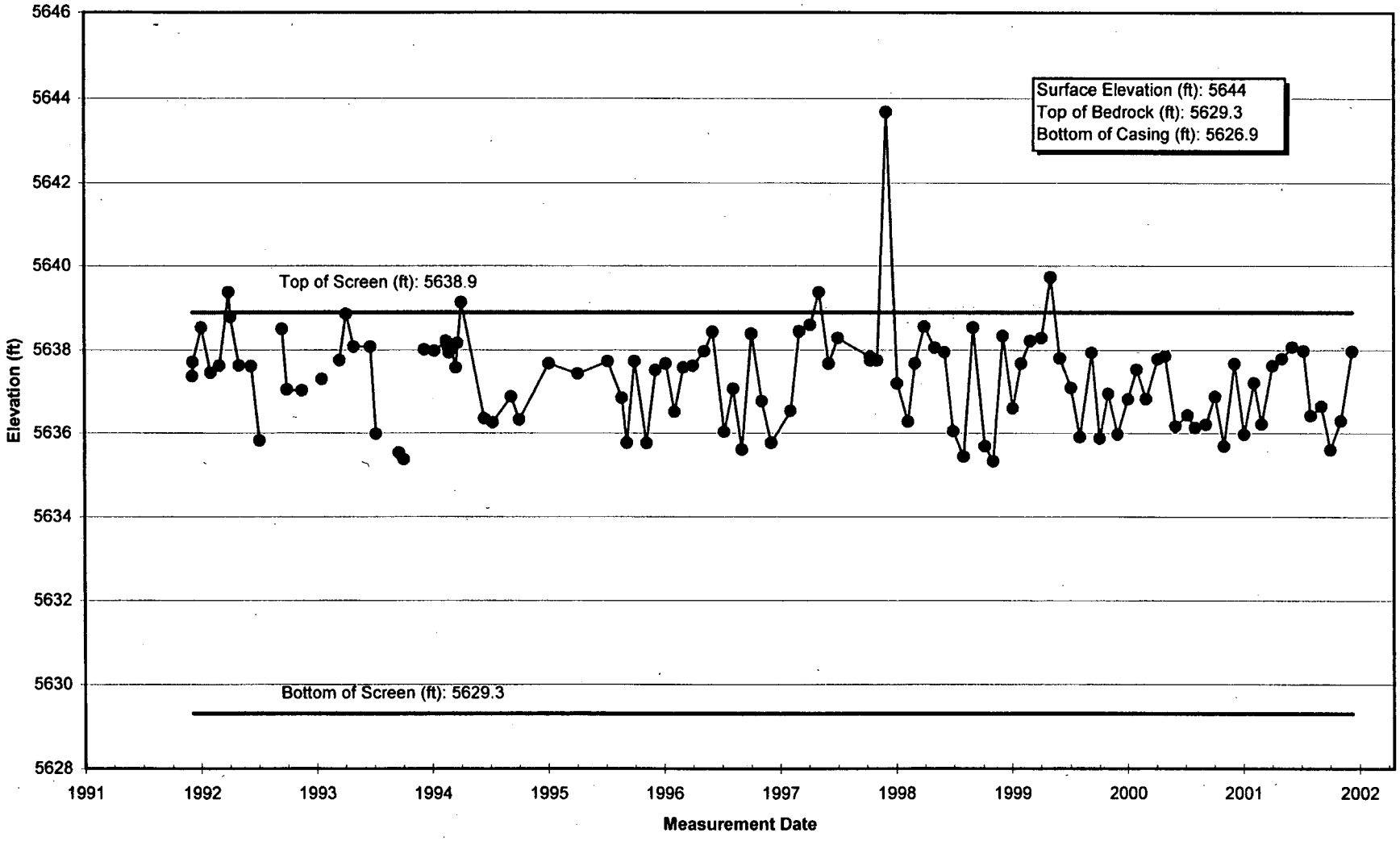

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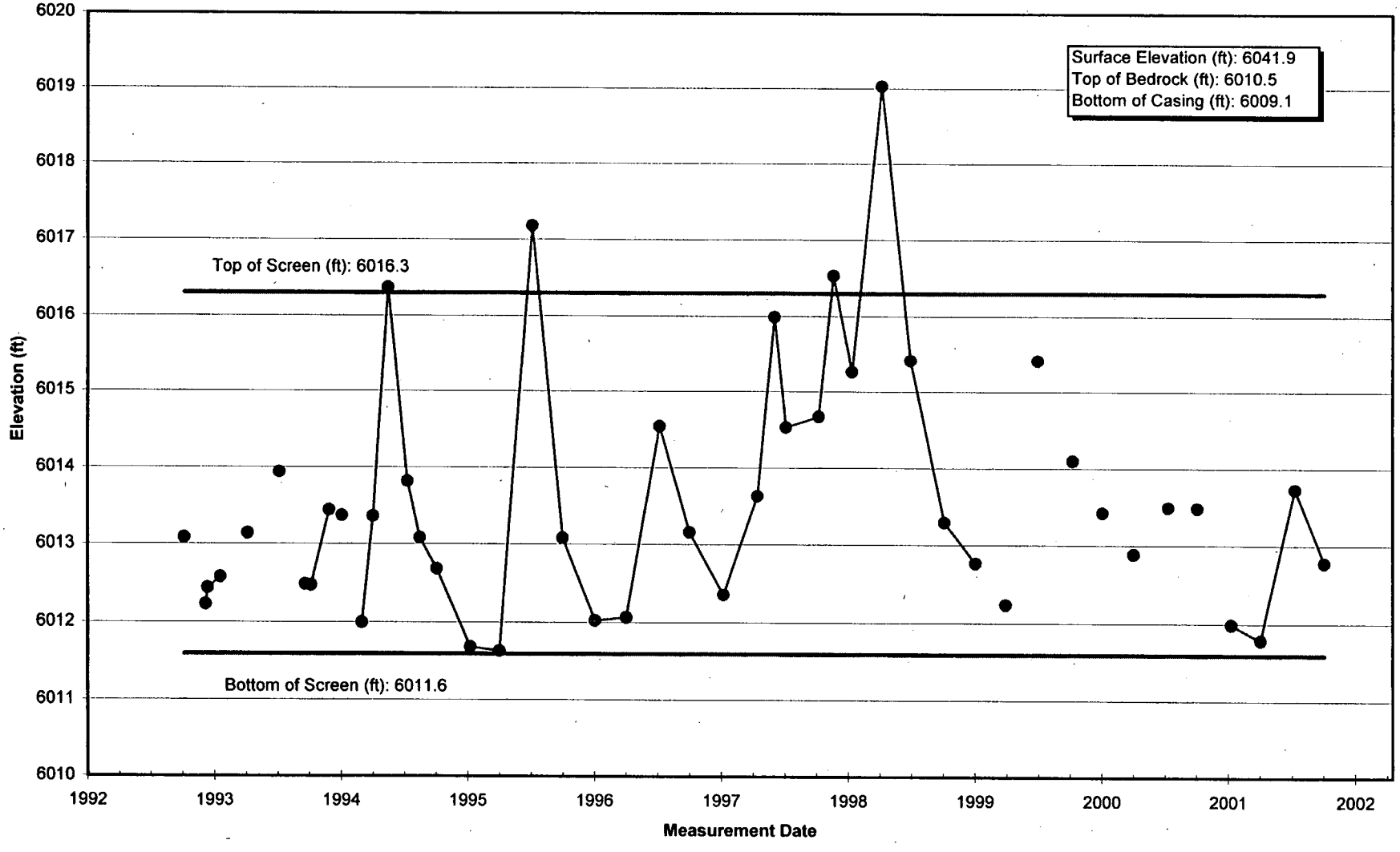

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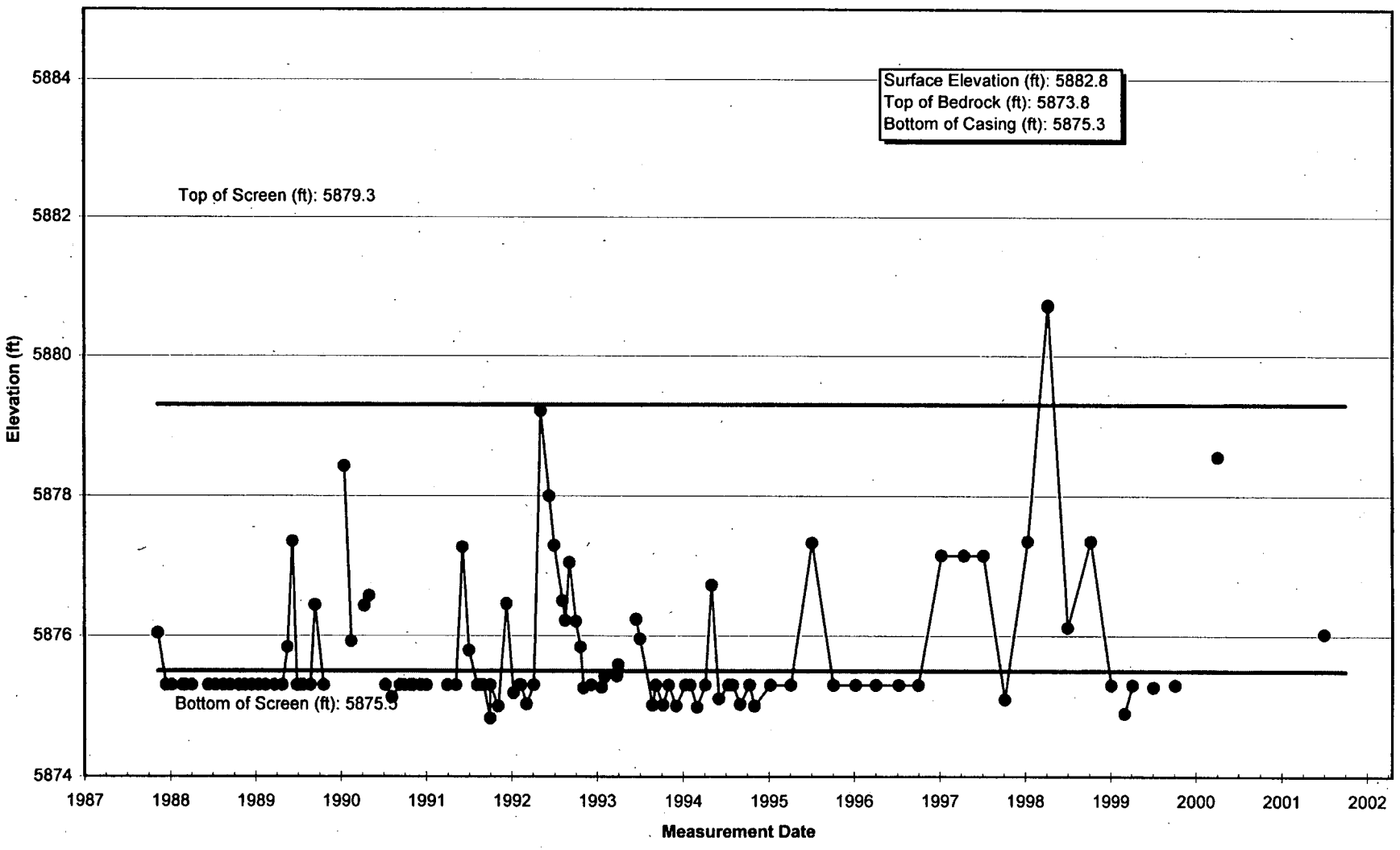
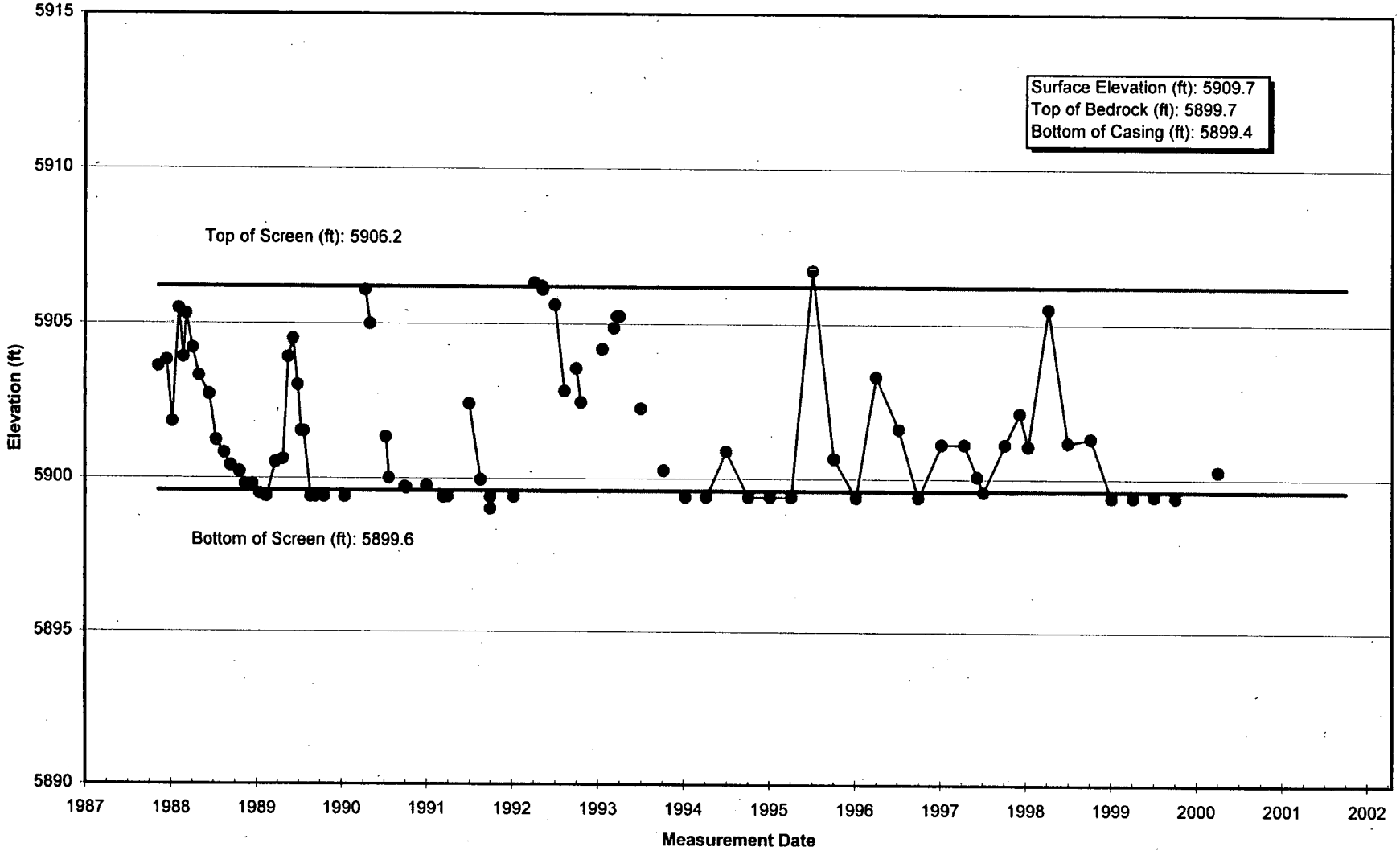
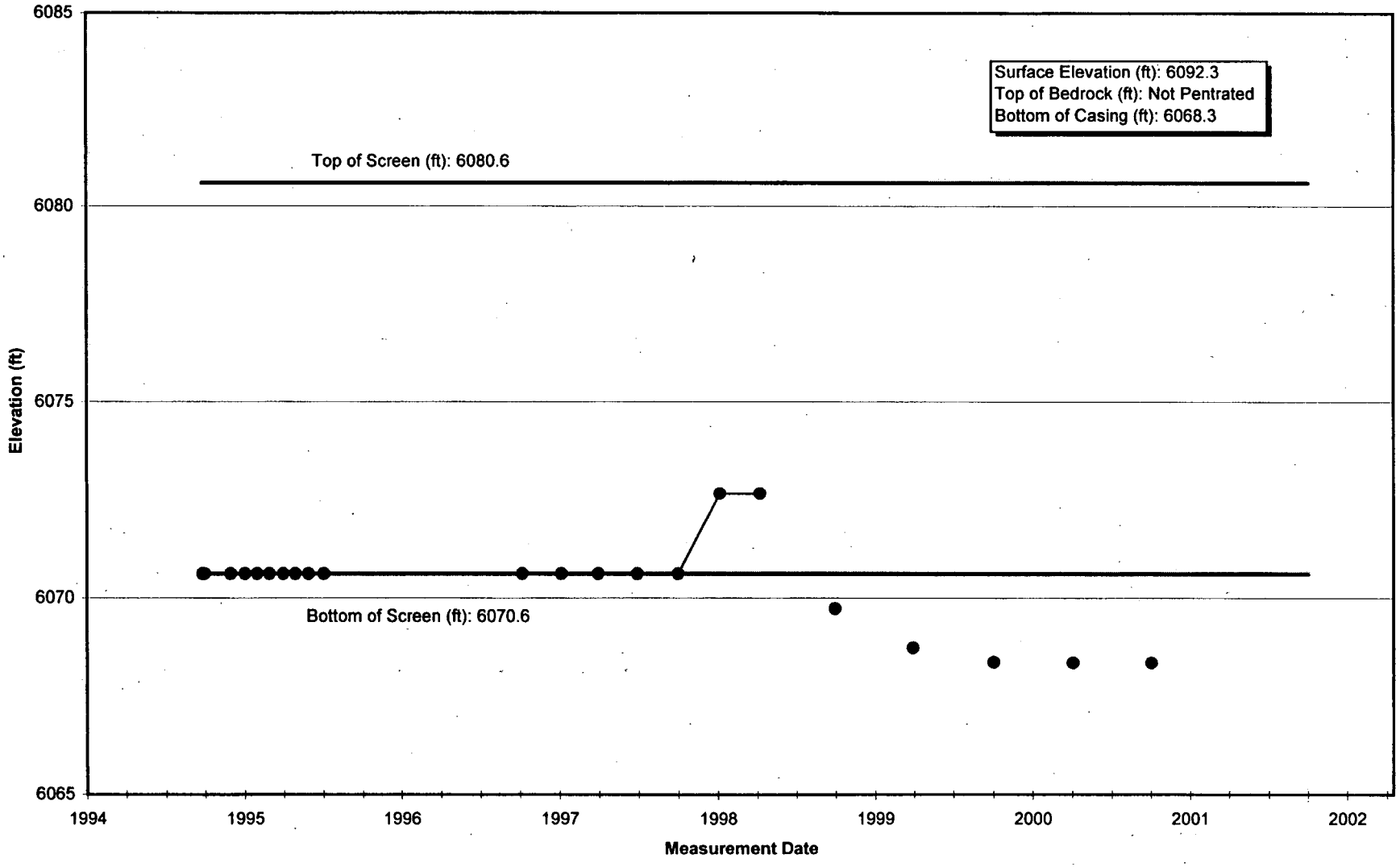


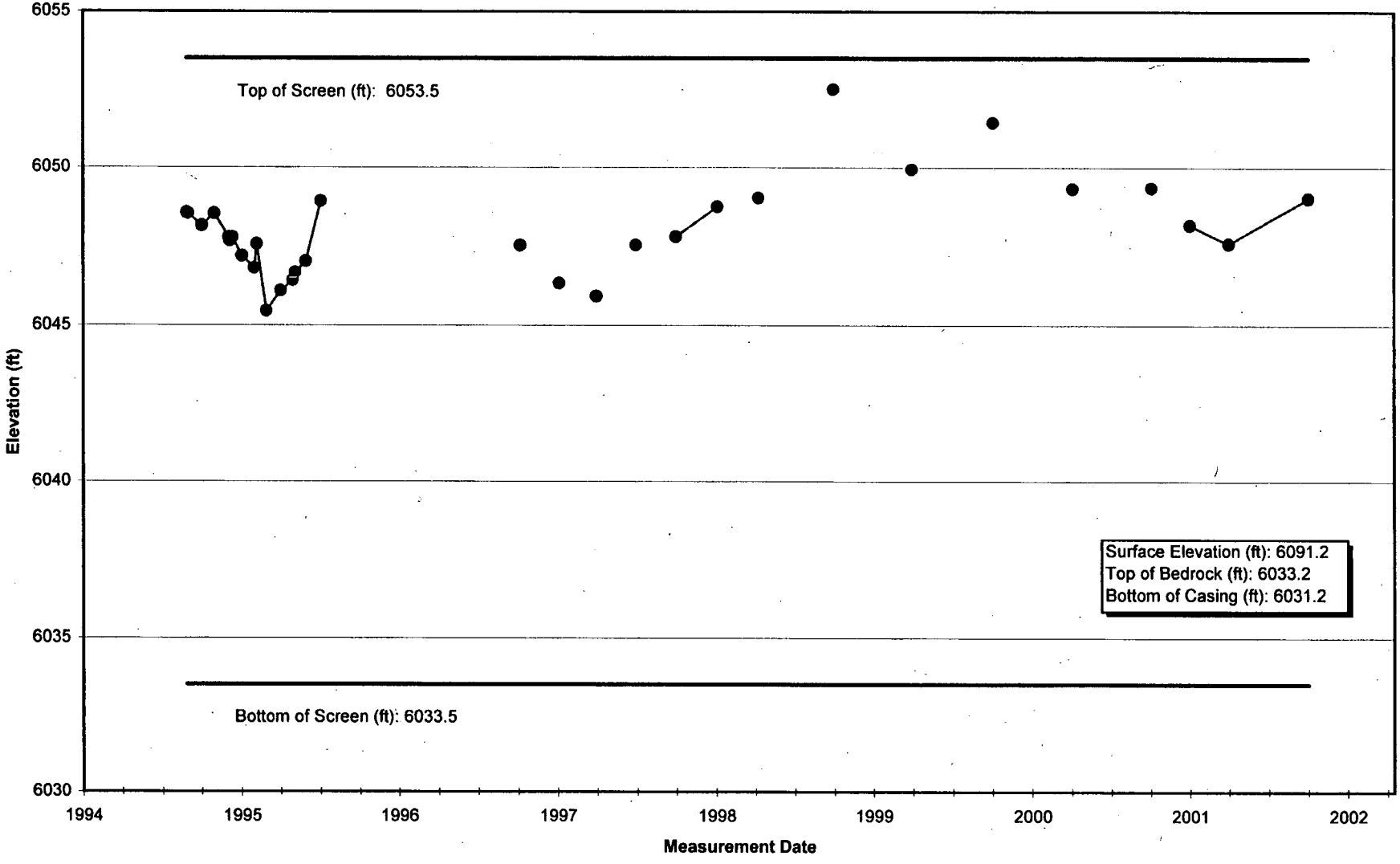
Hydrograph 4887



Hydrograph 50494



Hydrograph 51094



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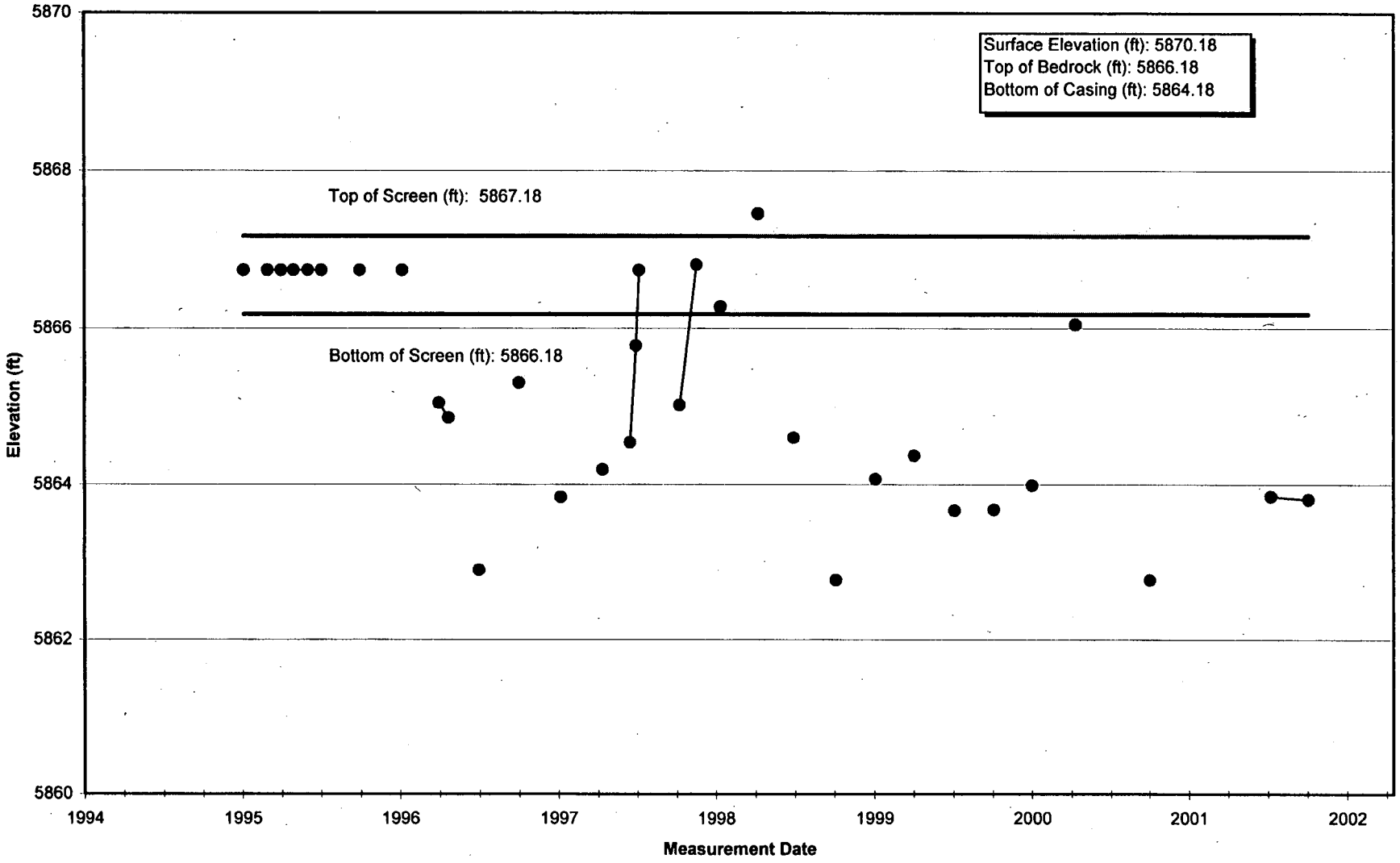

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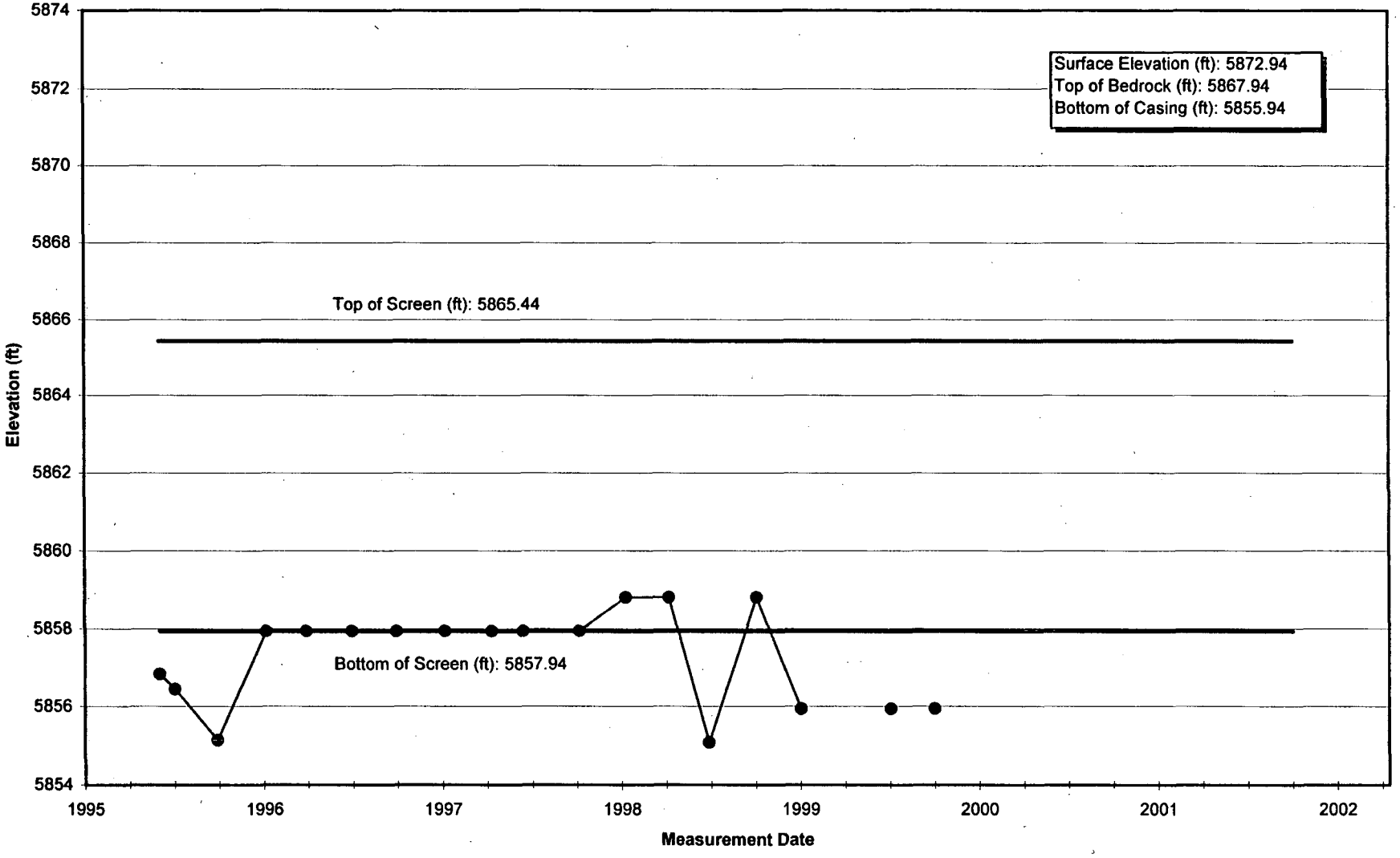

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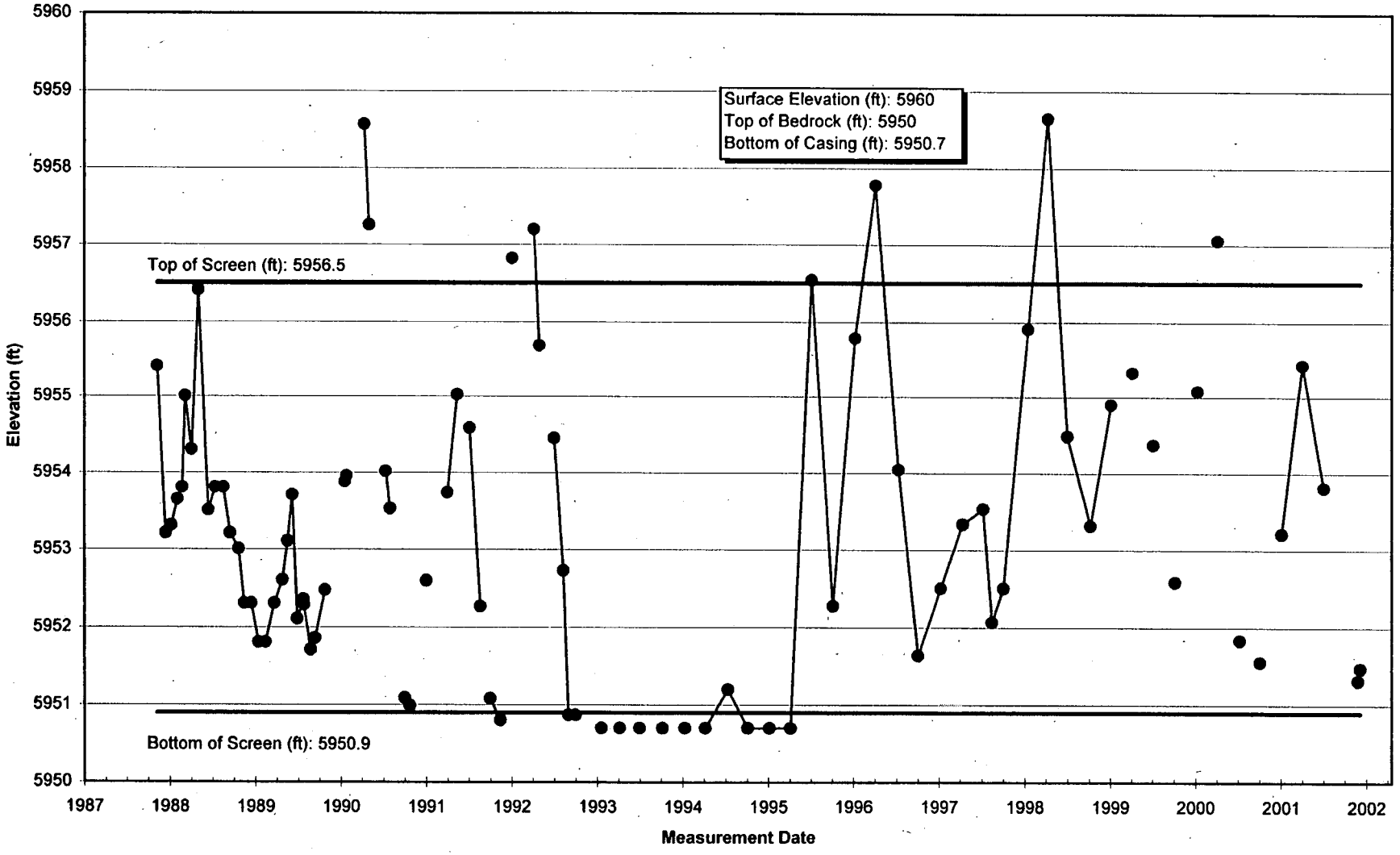

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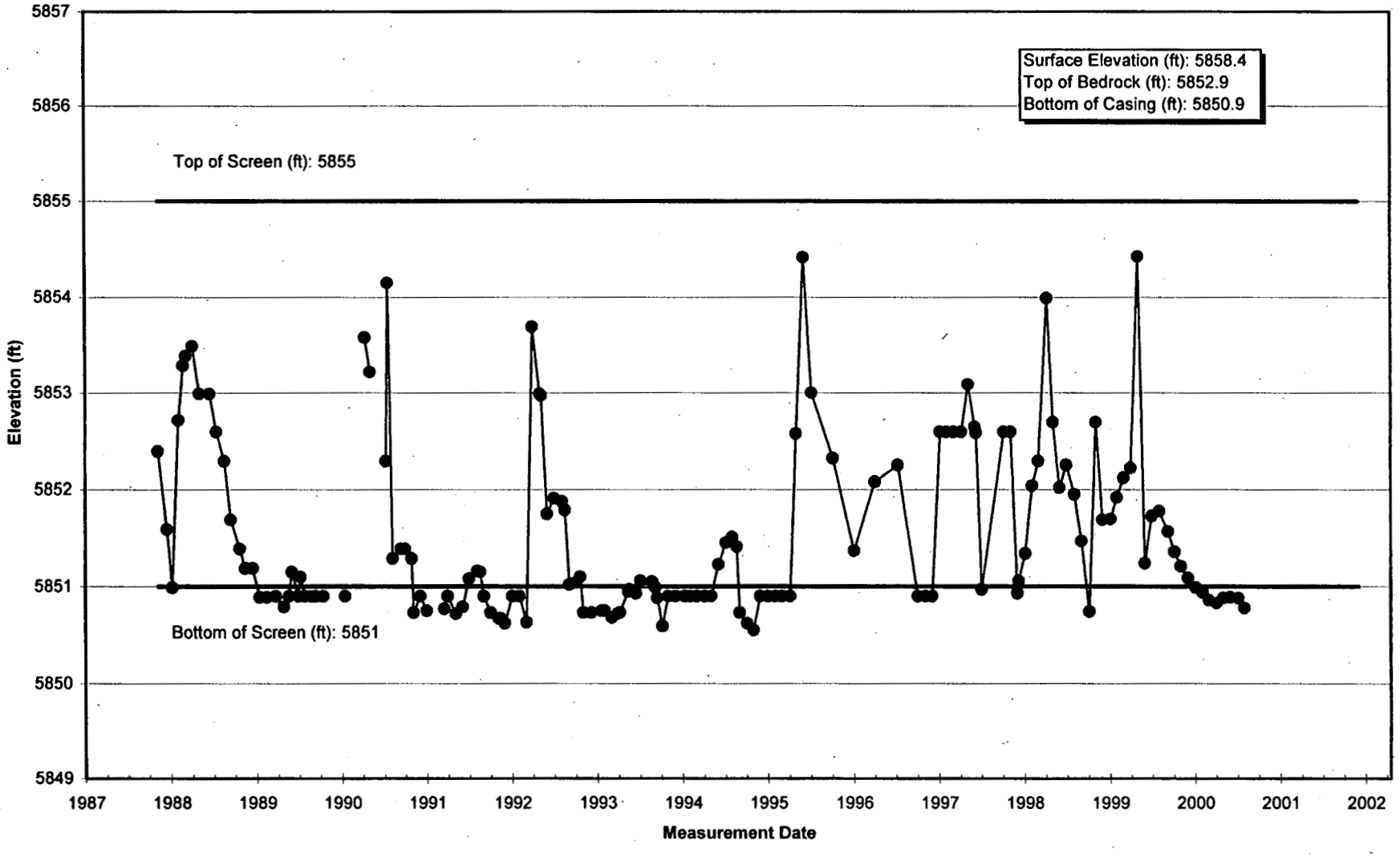
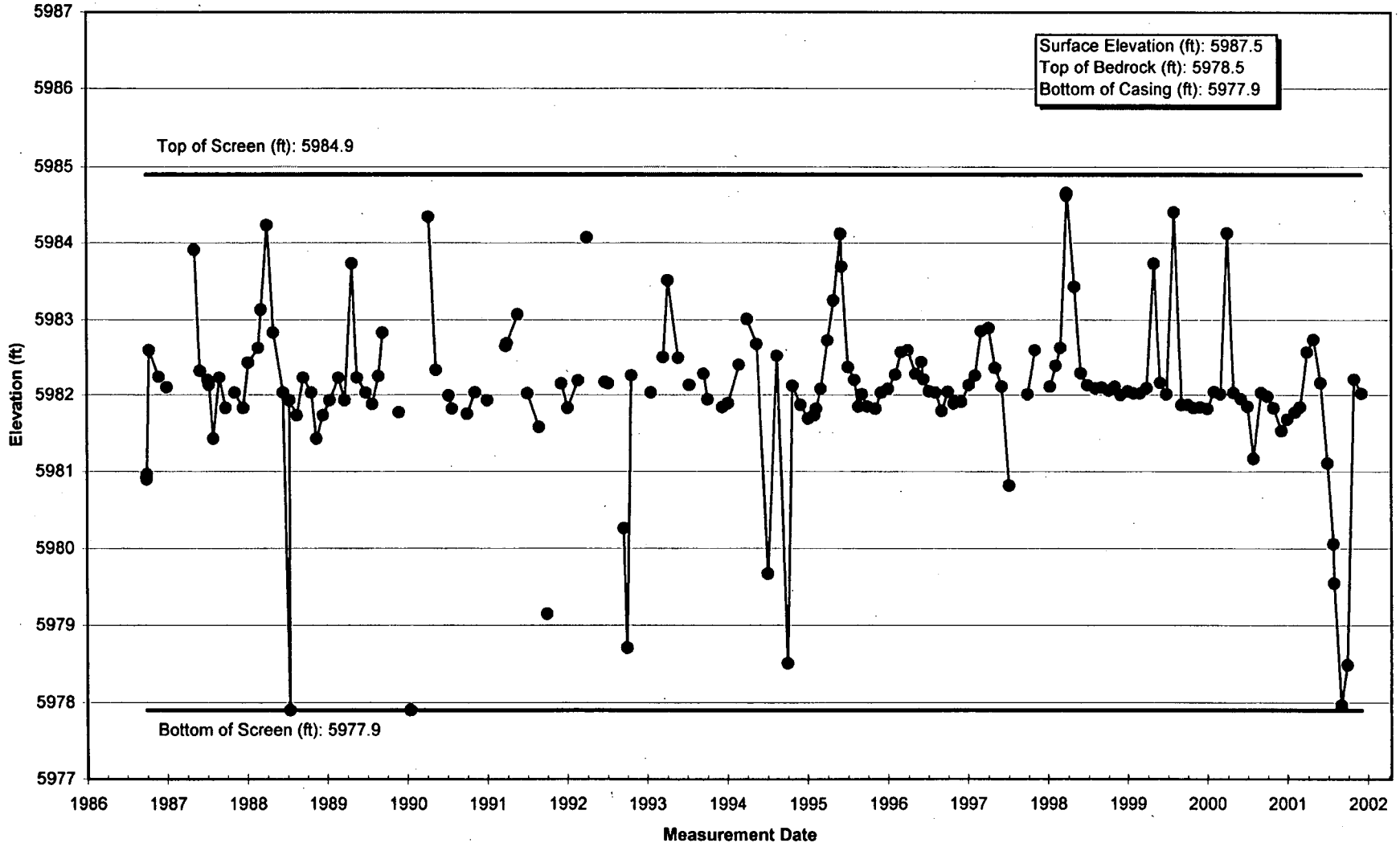


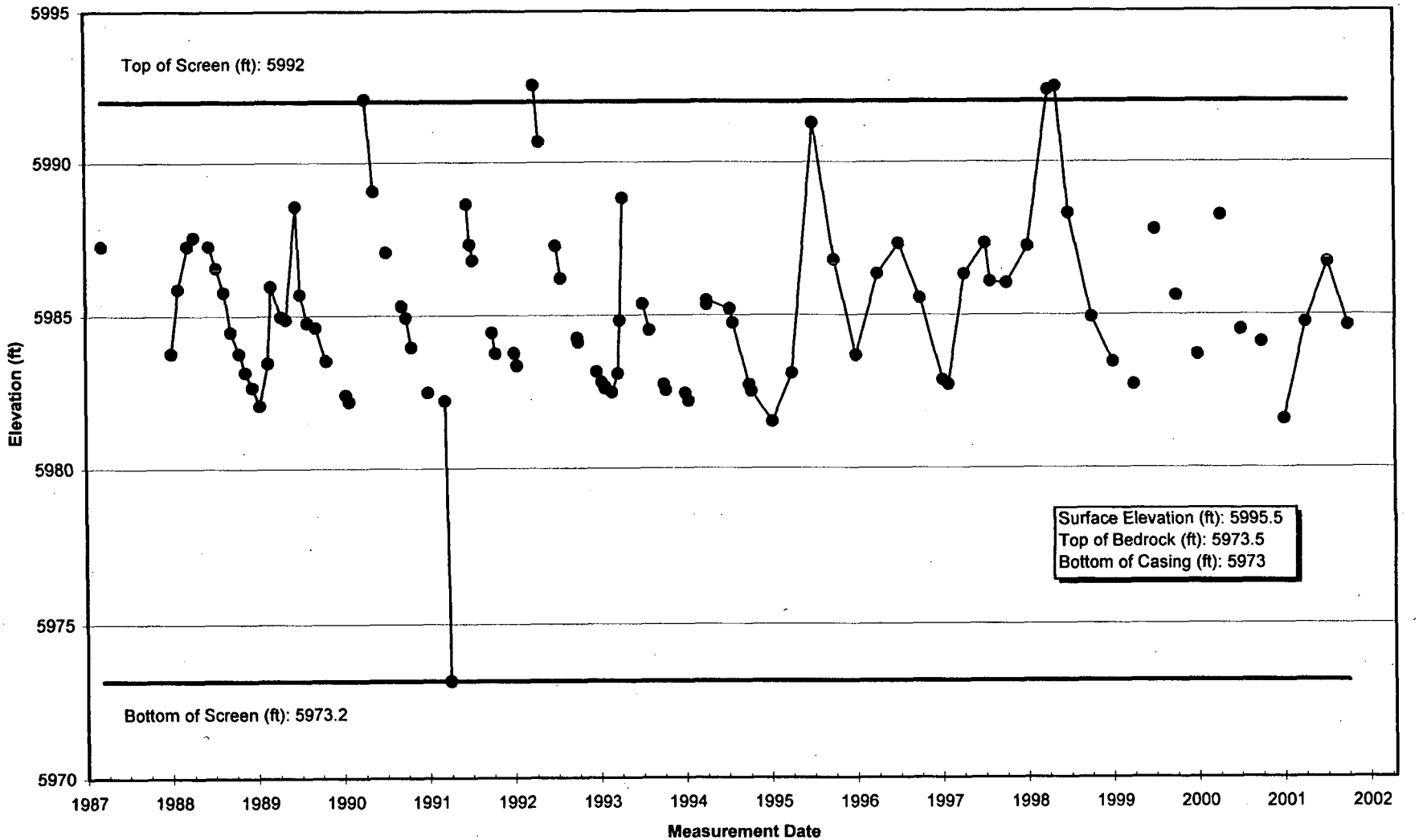
4776547

Hydrograph 5686



477
648

Hydrograph 5887



478
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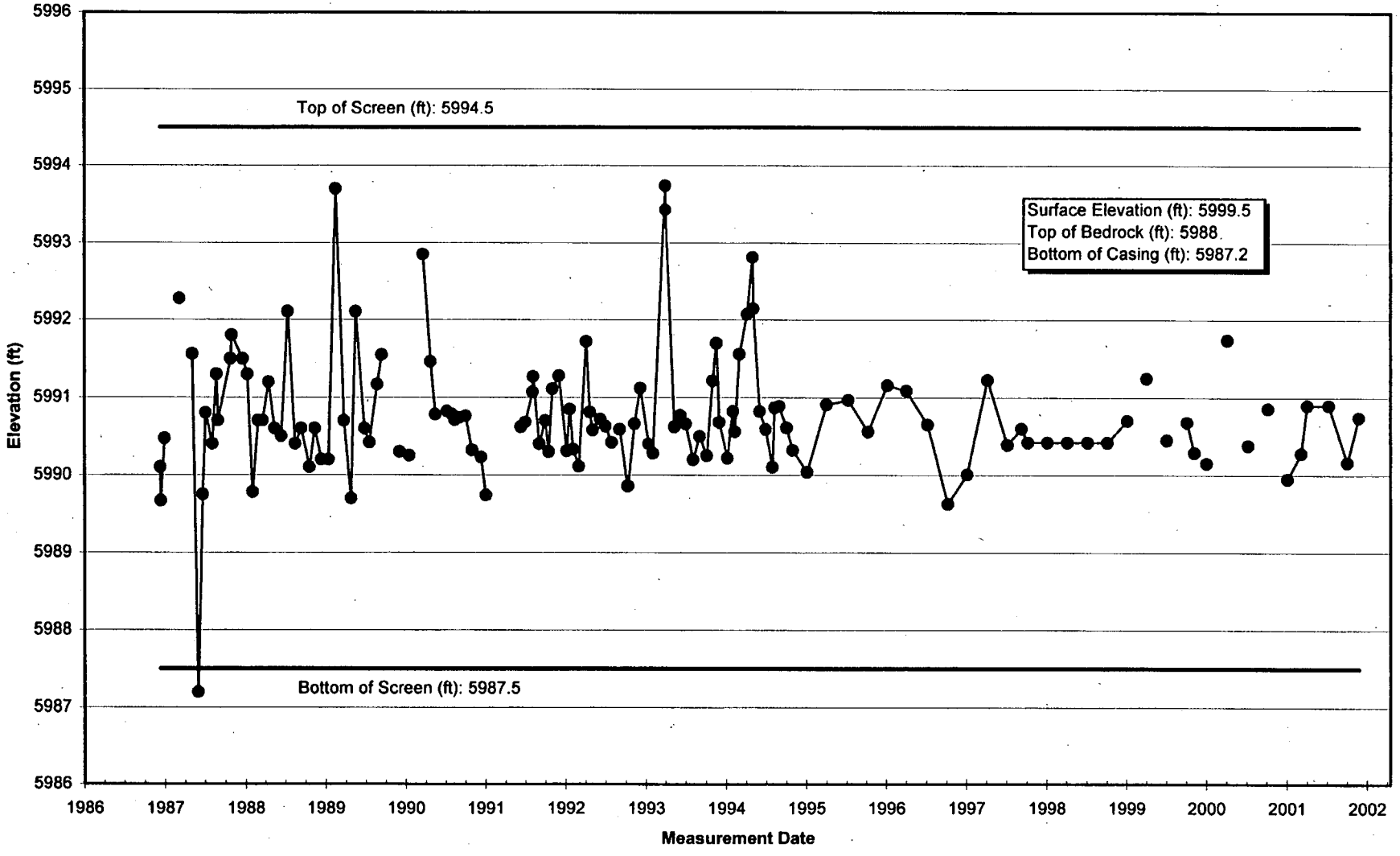
Hydrograph 6186



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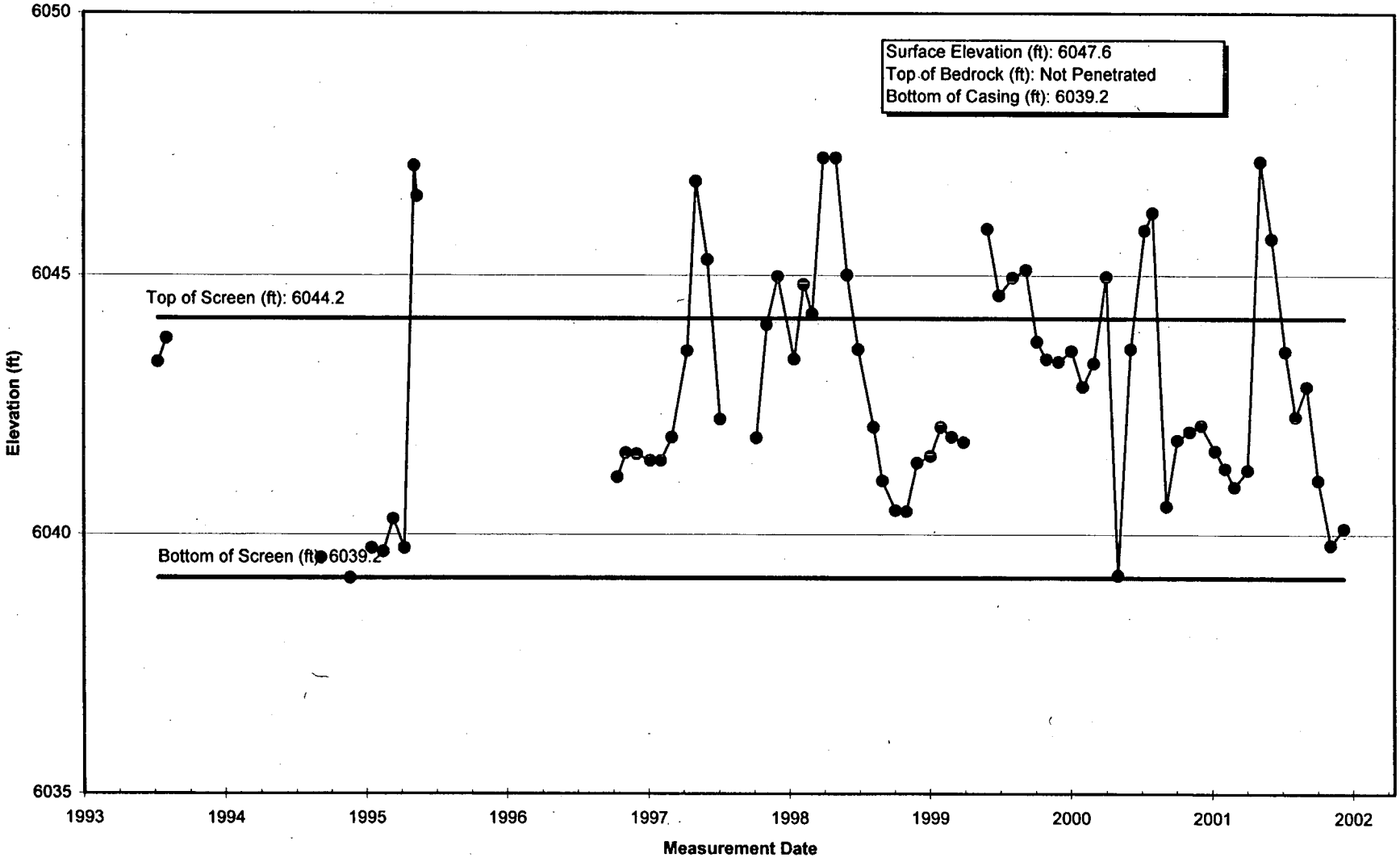

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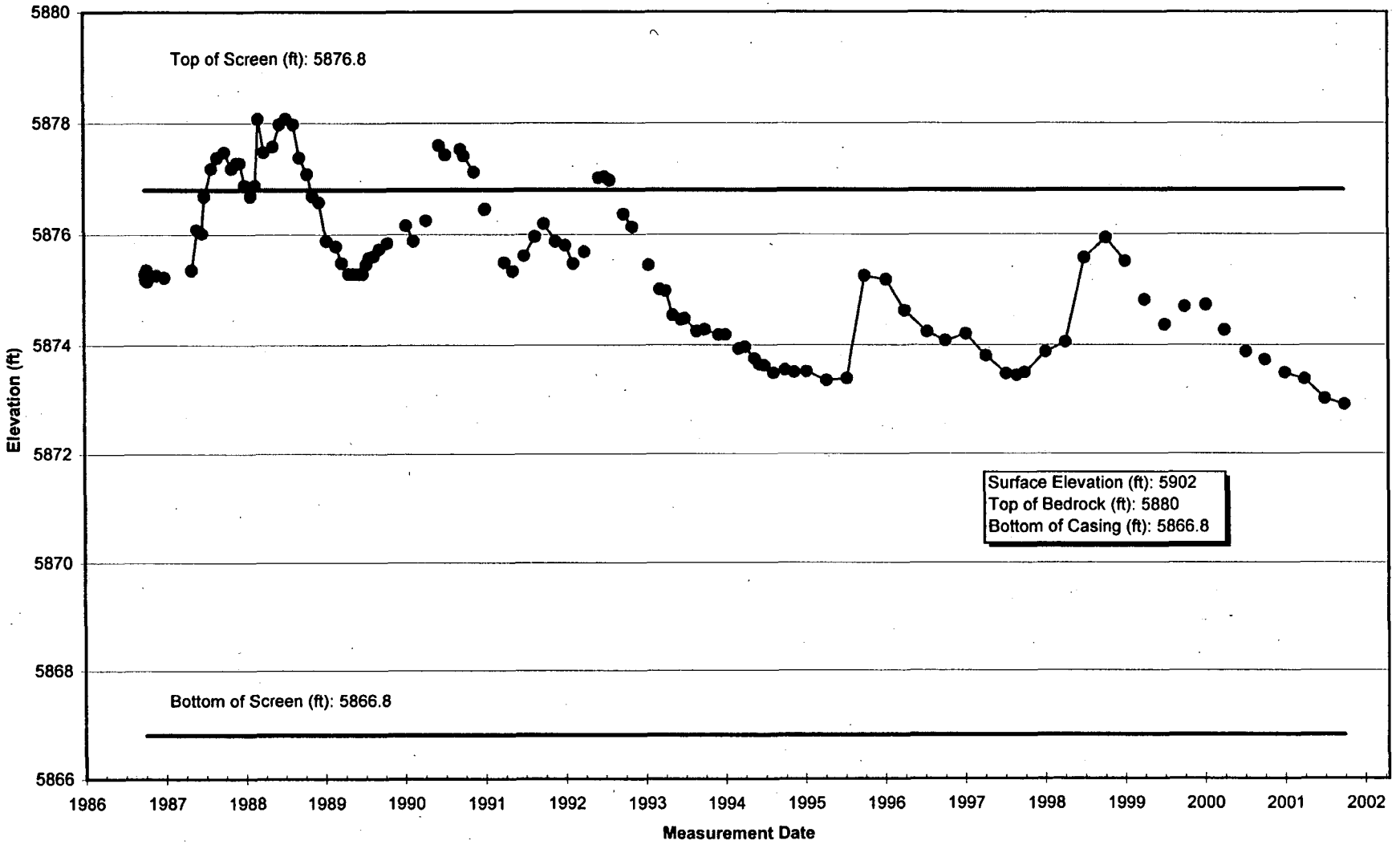

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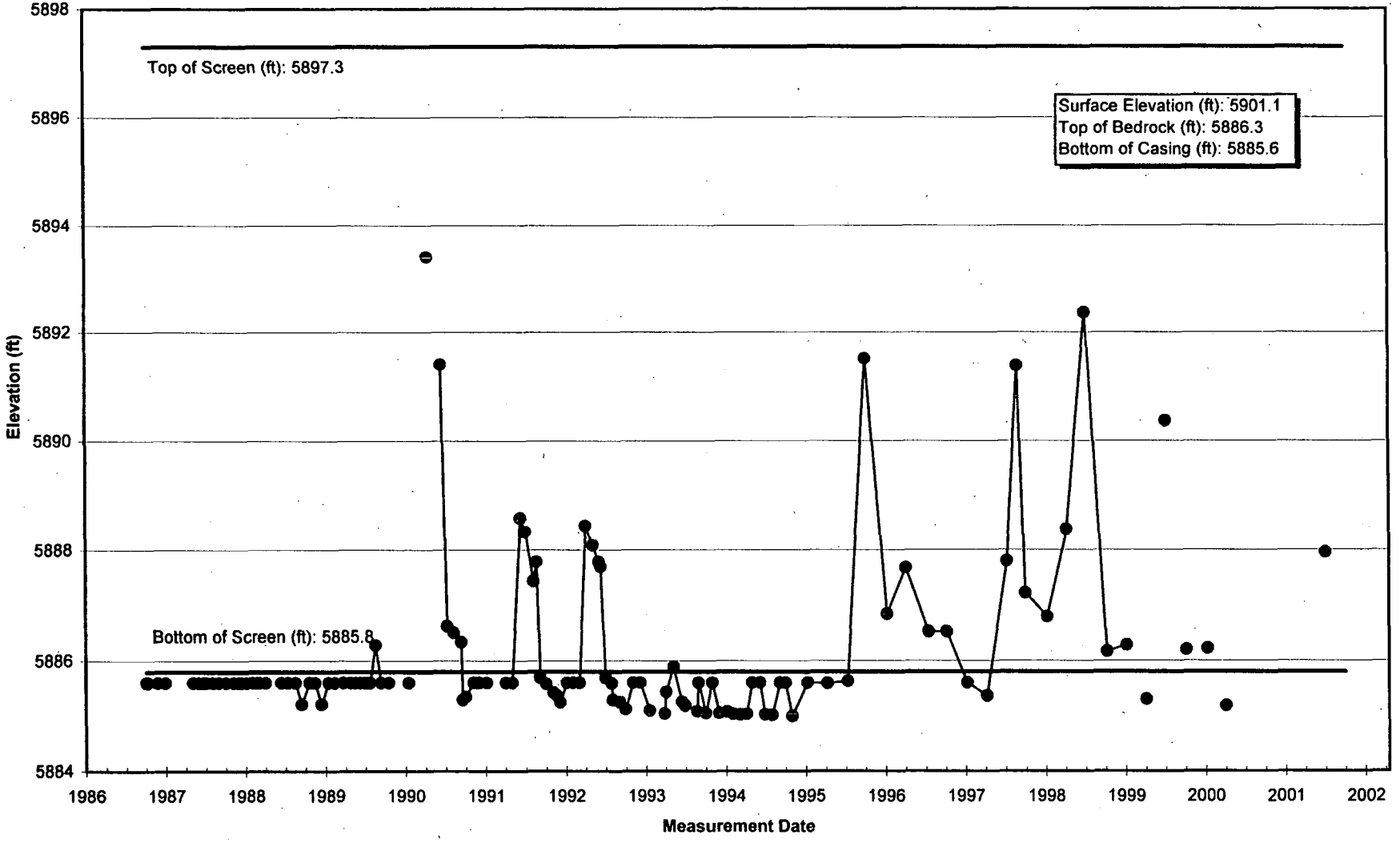

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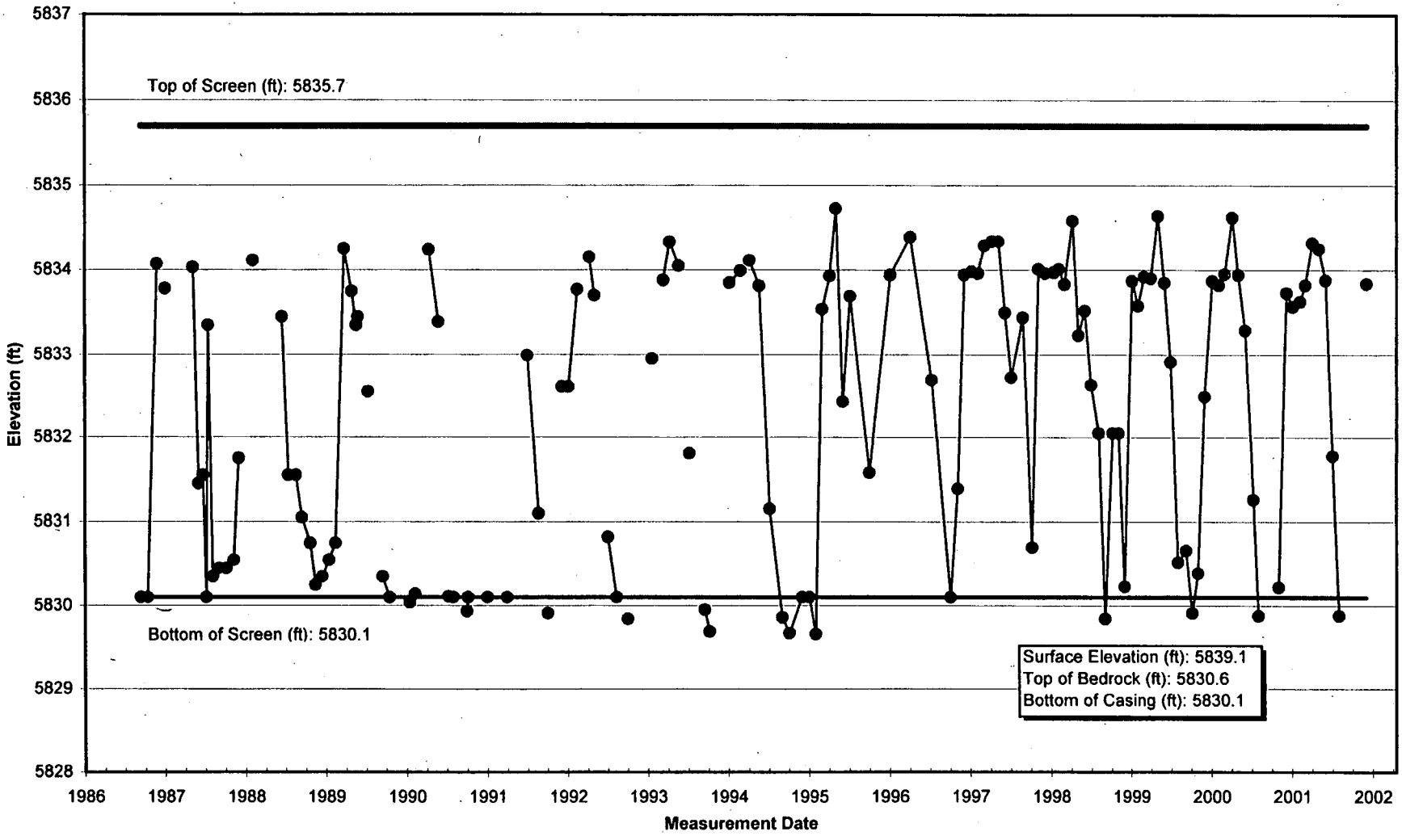
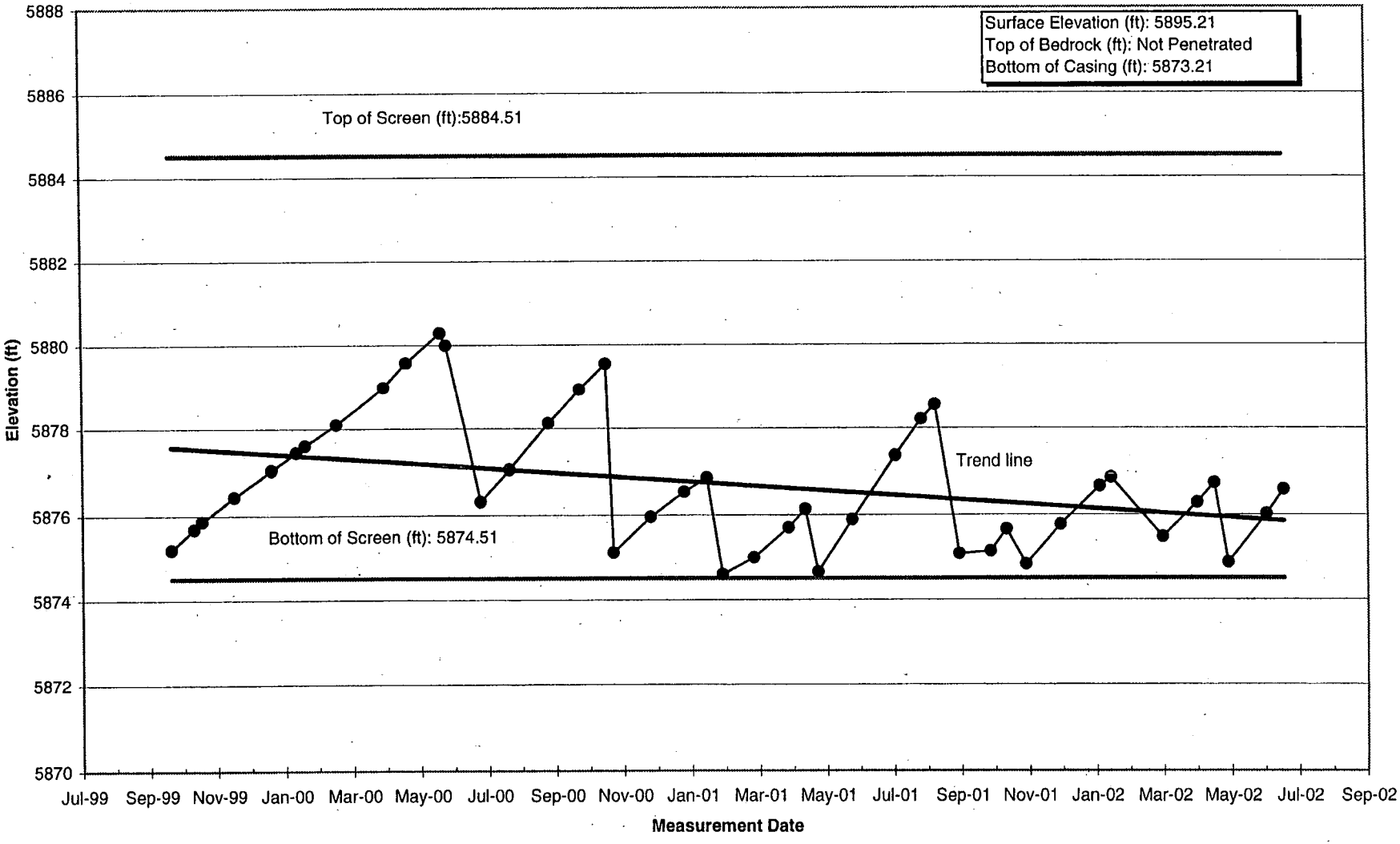
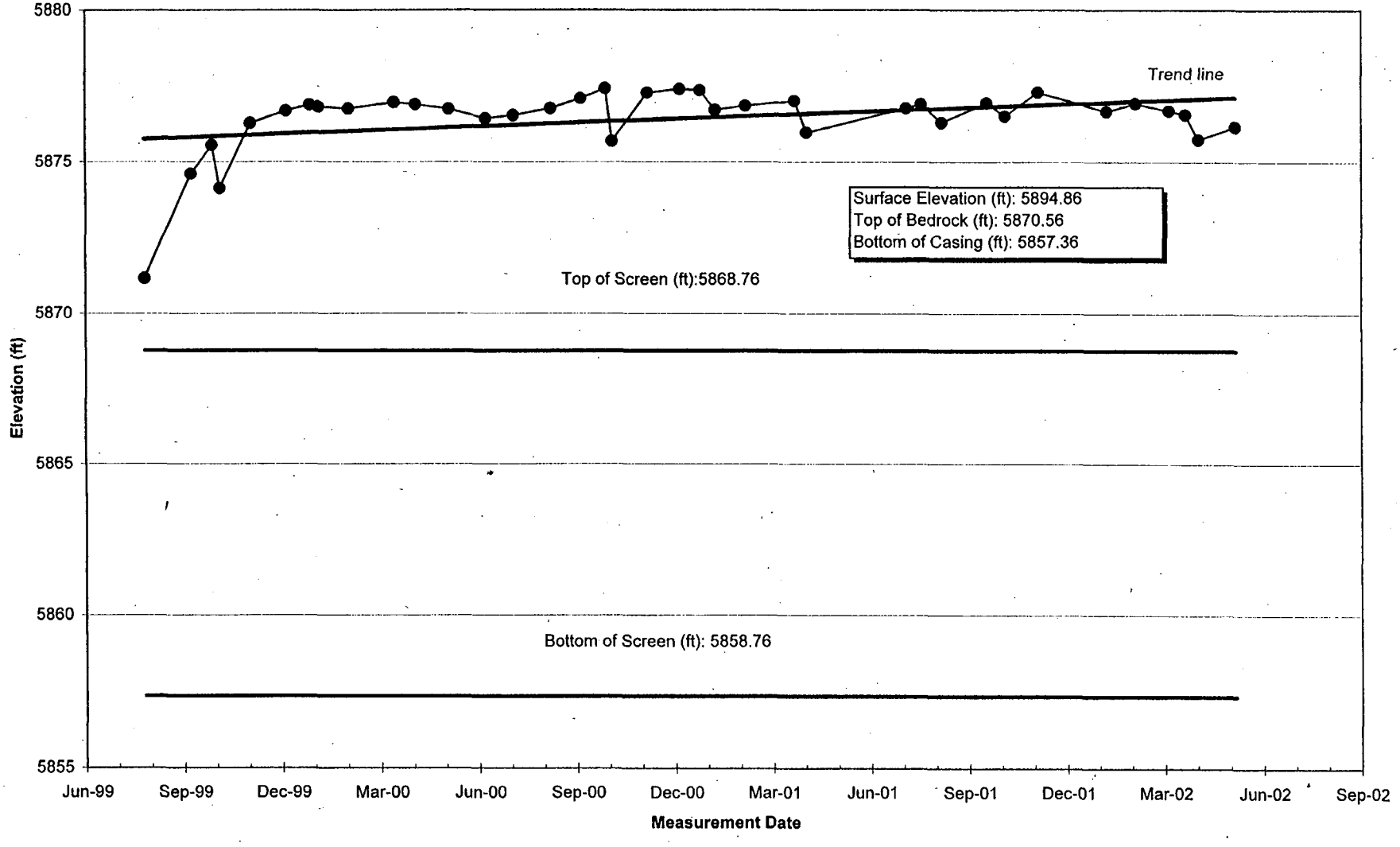


Hydrograph 70099



Hydrograph 70299



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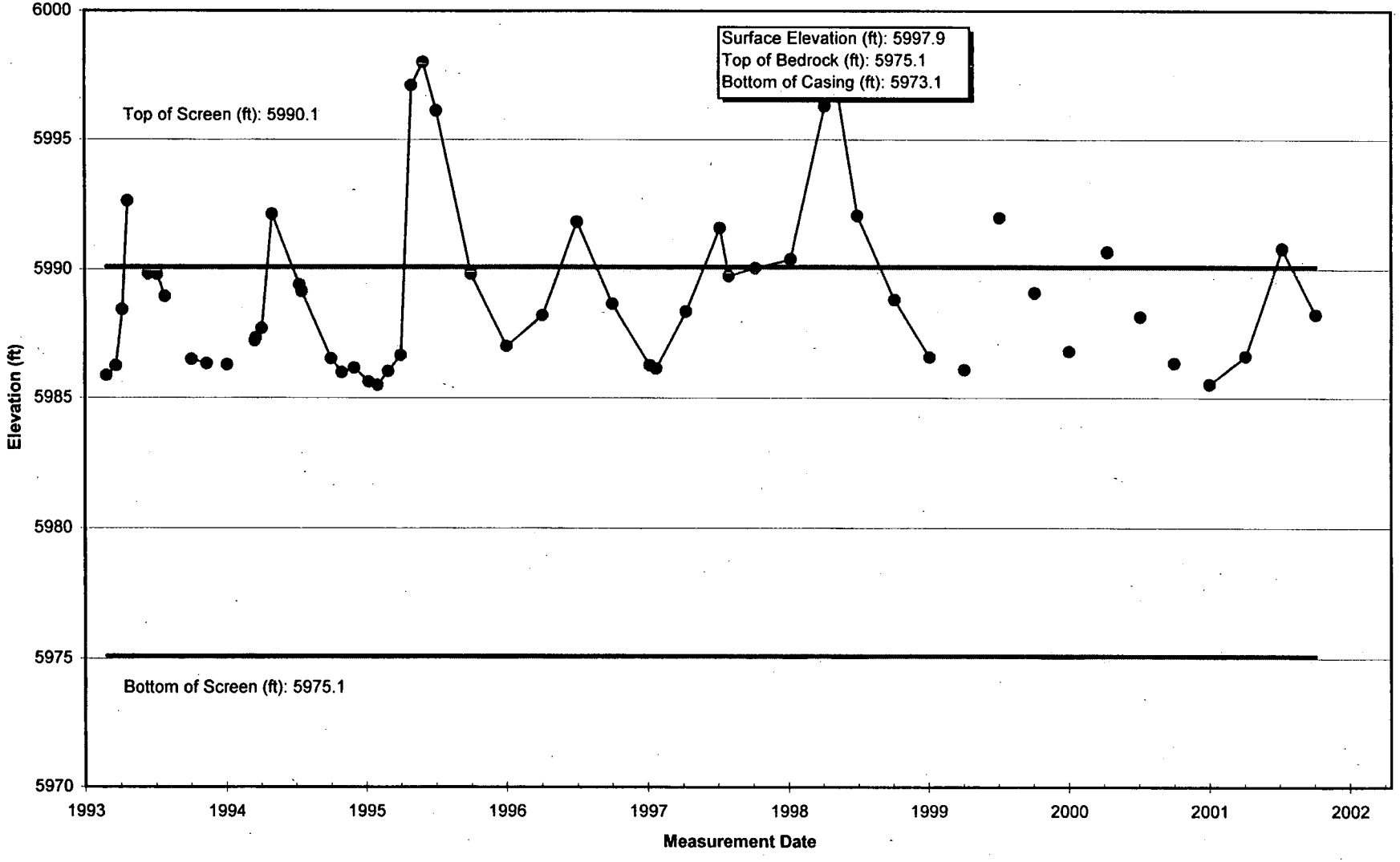

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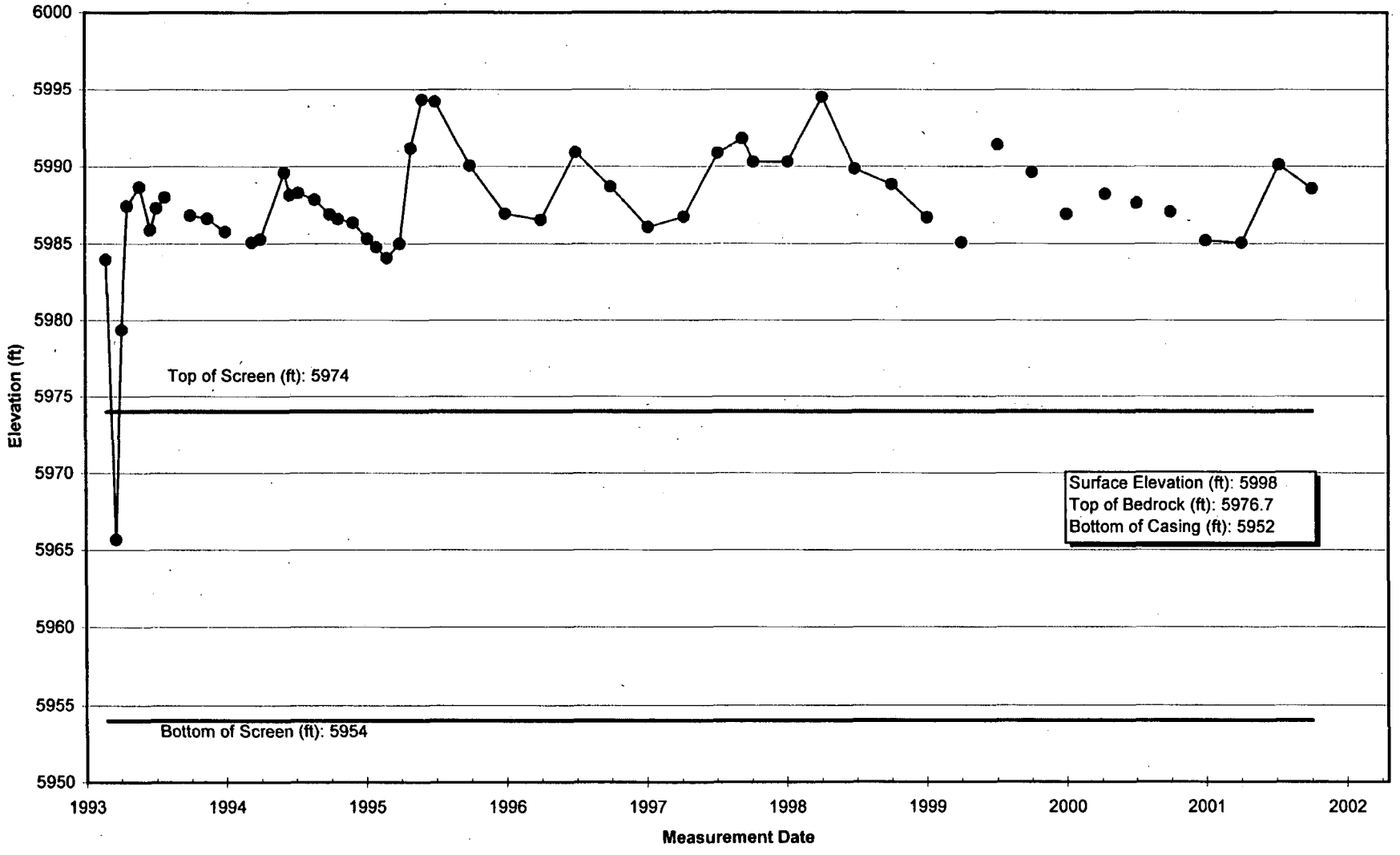

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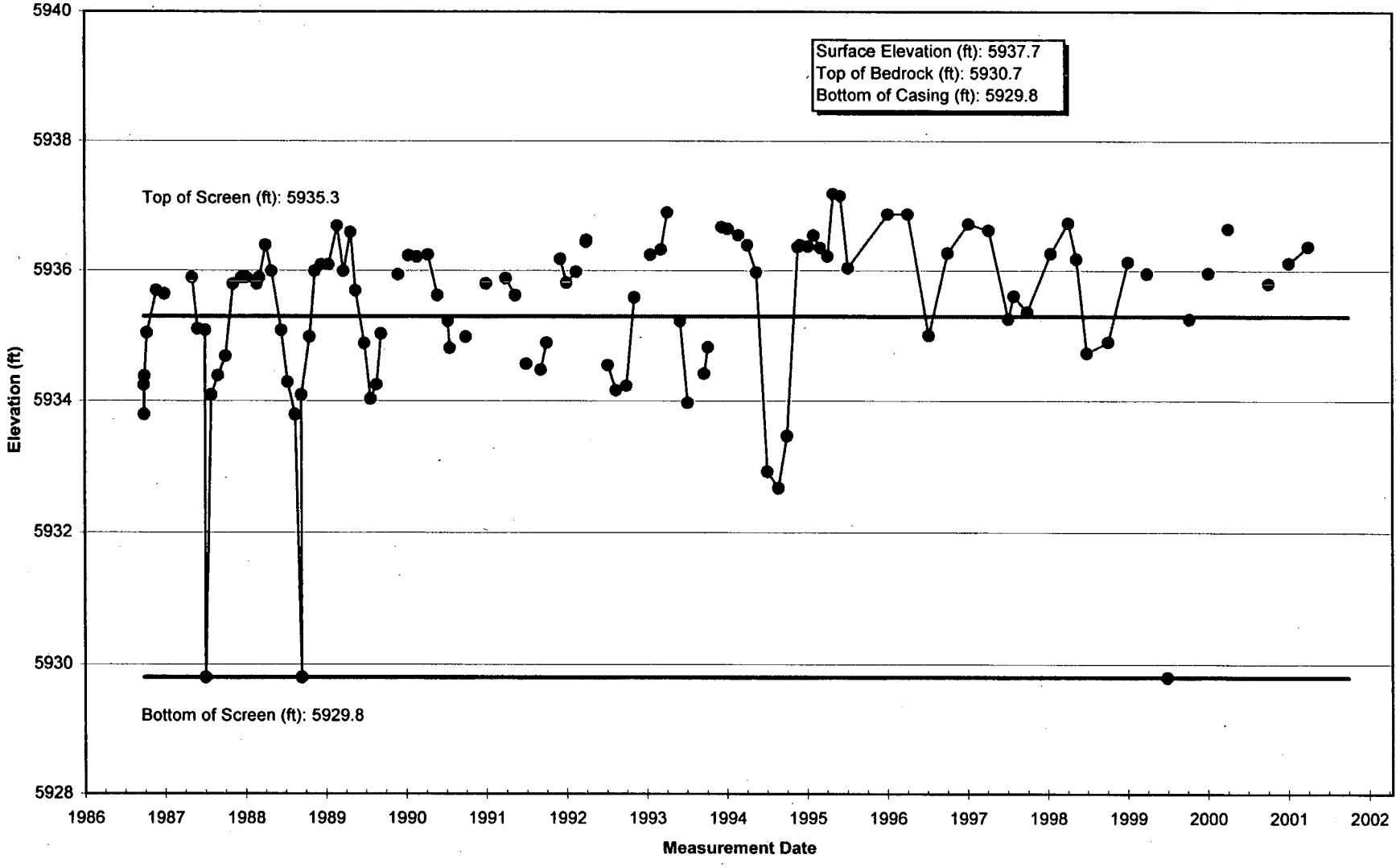

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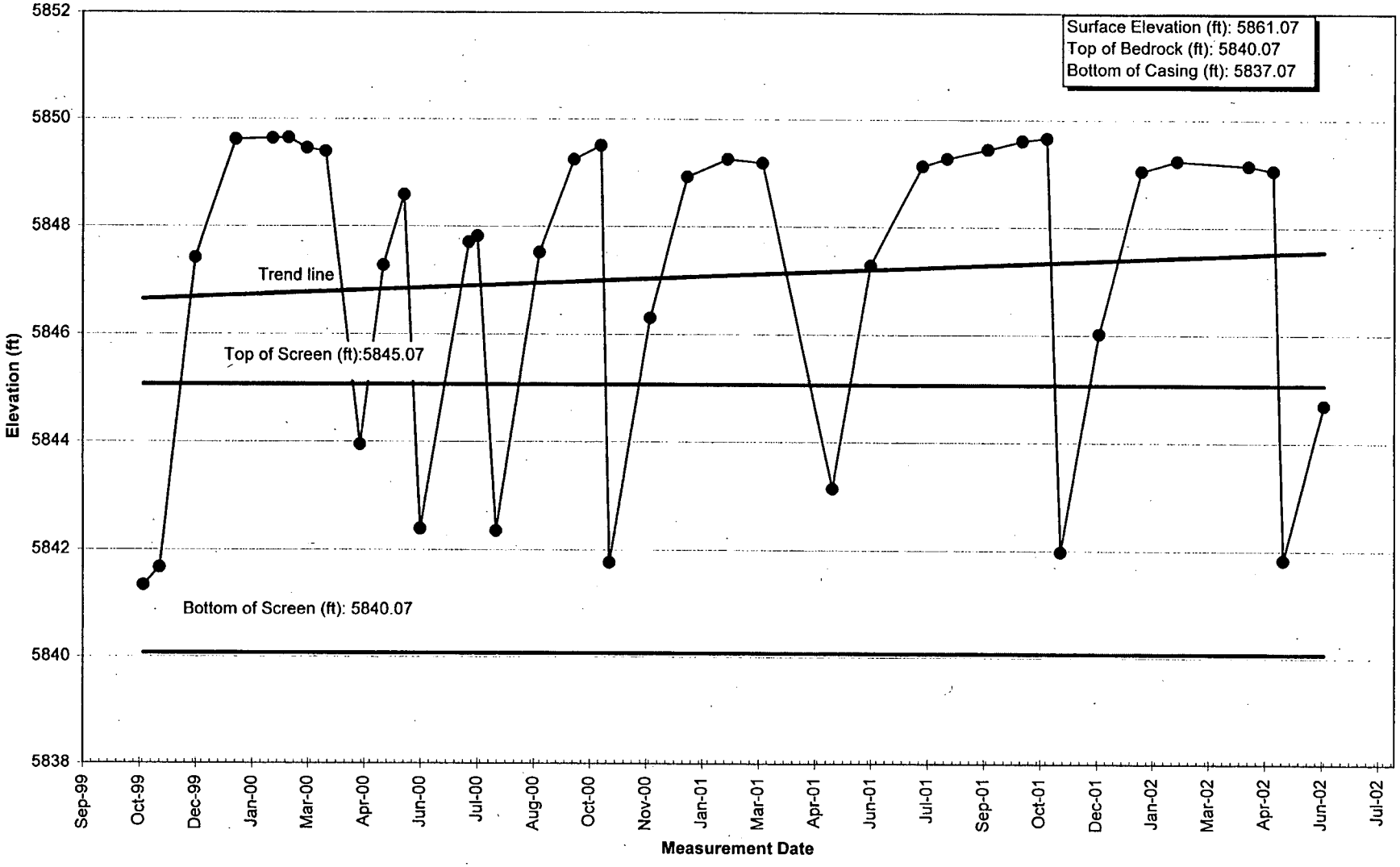

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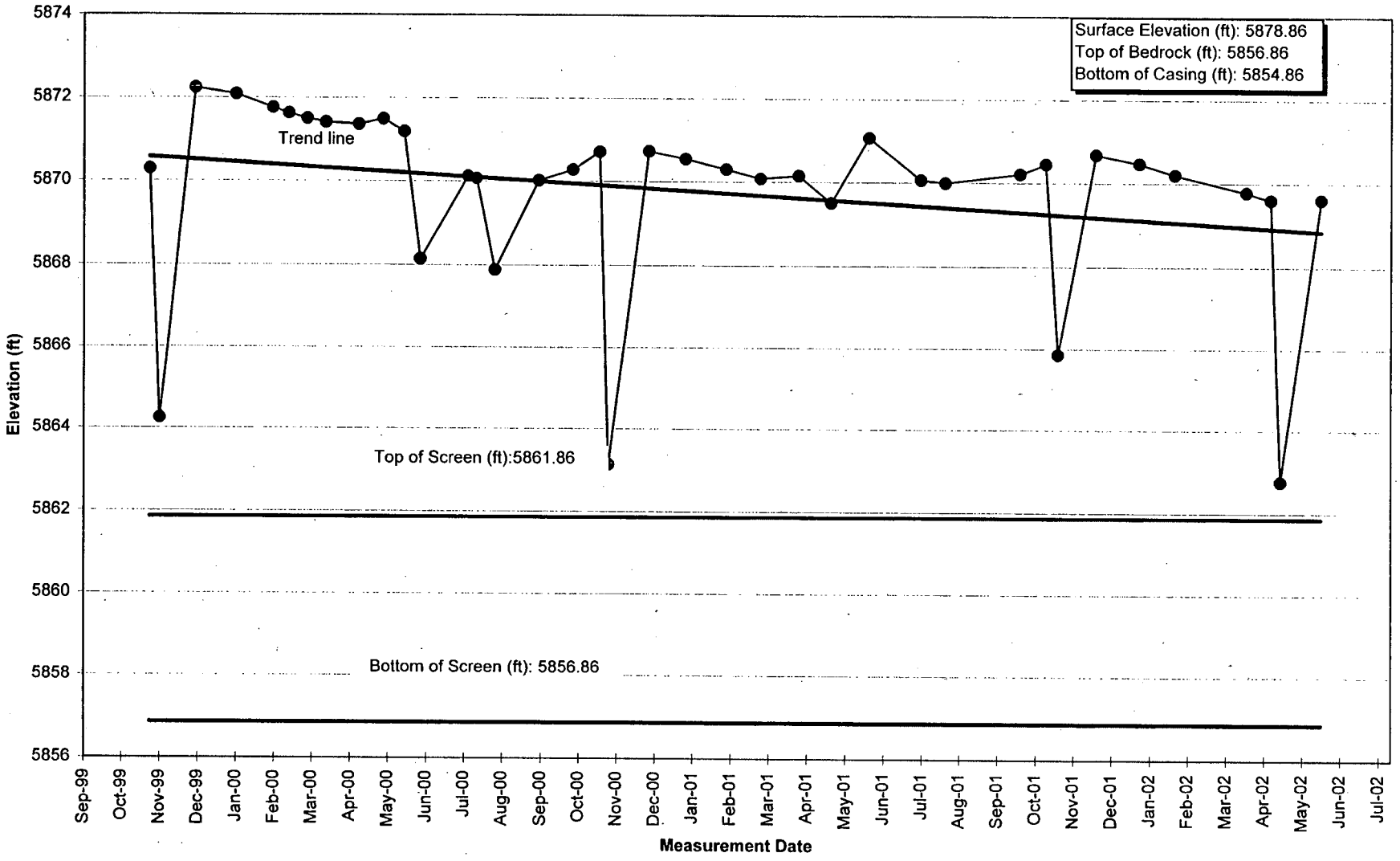

561

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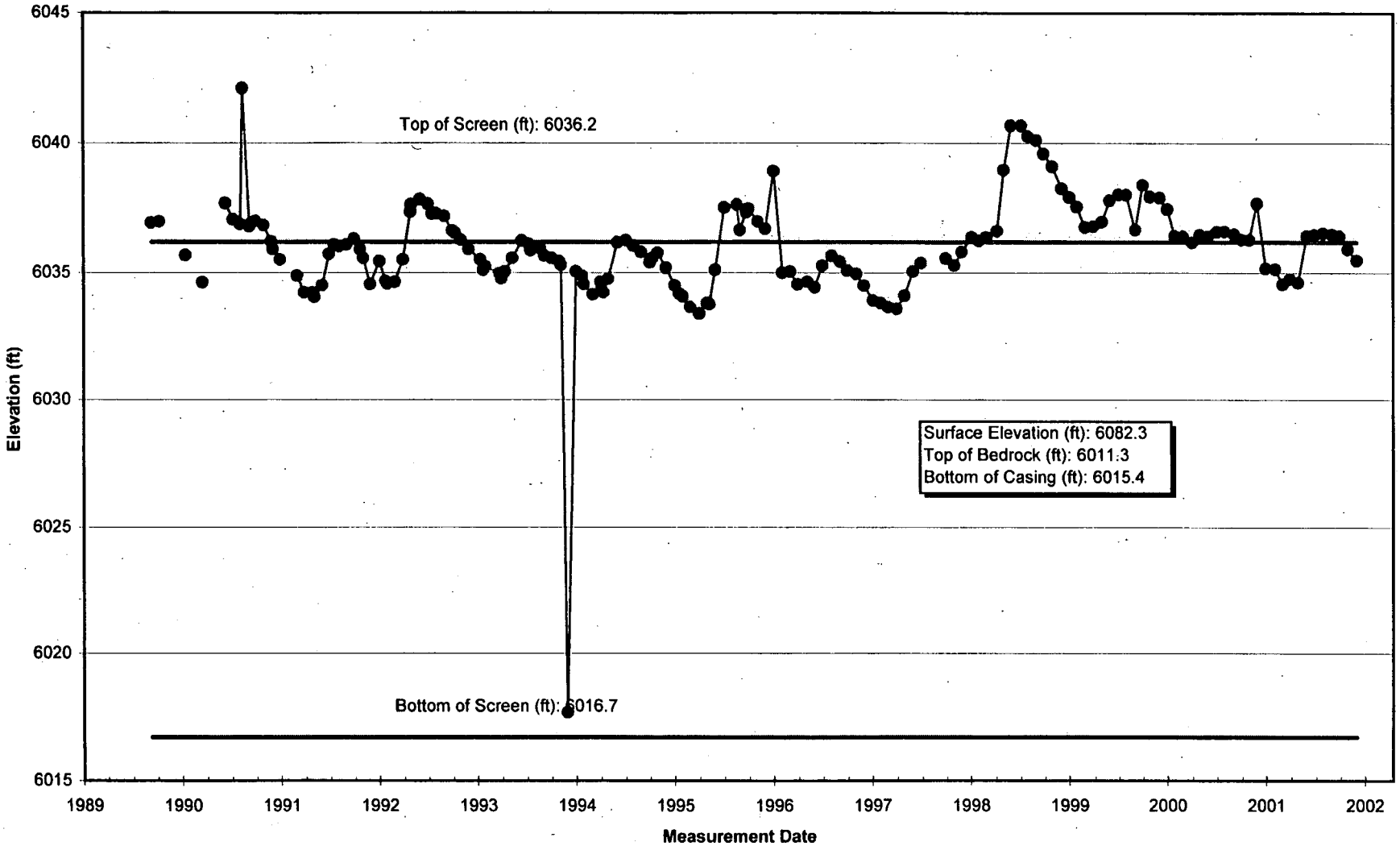
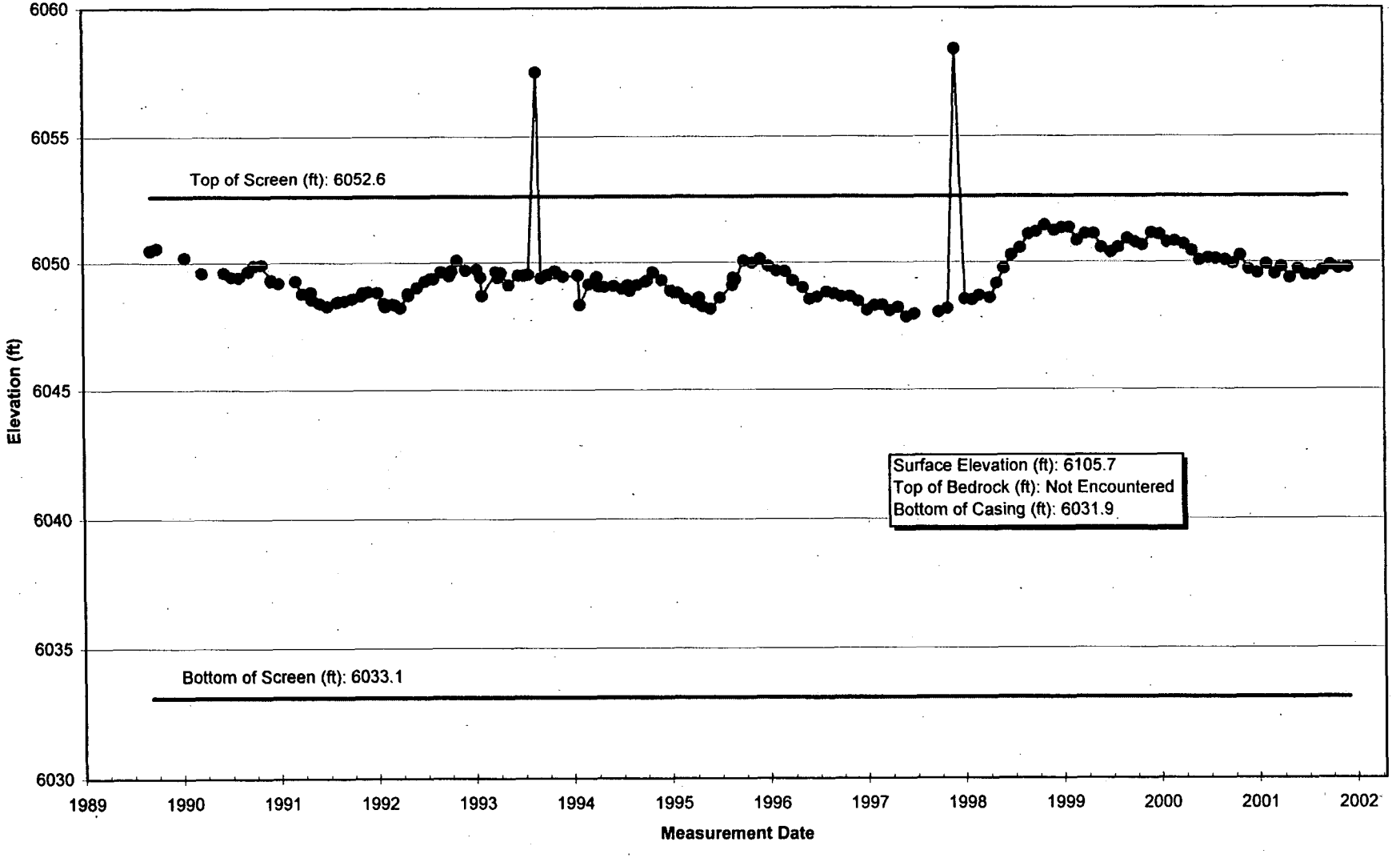


491
562

Hydrograph B111189



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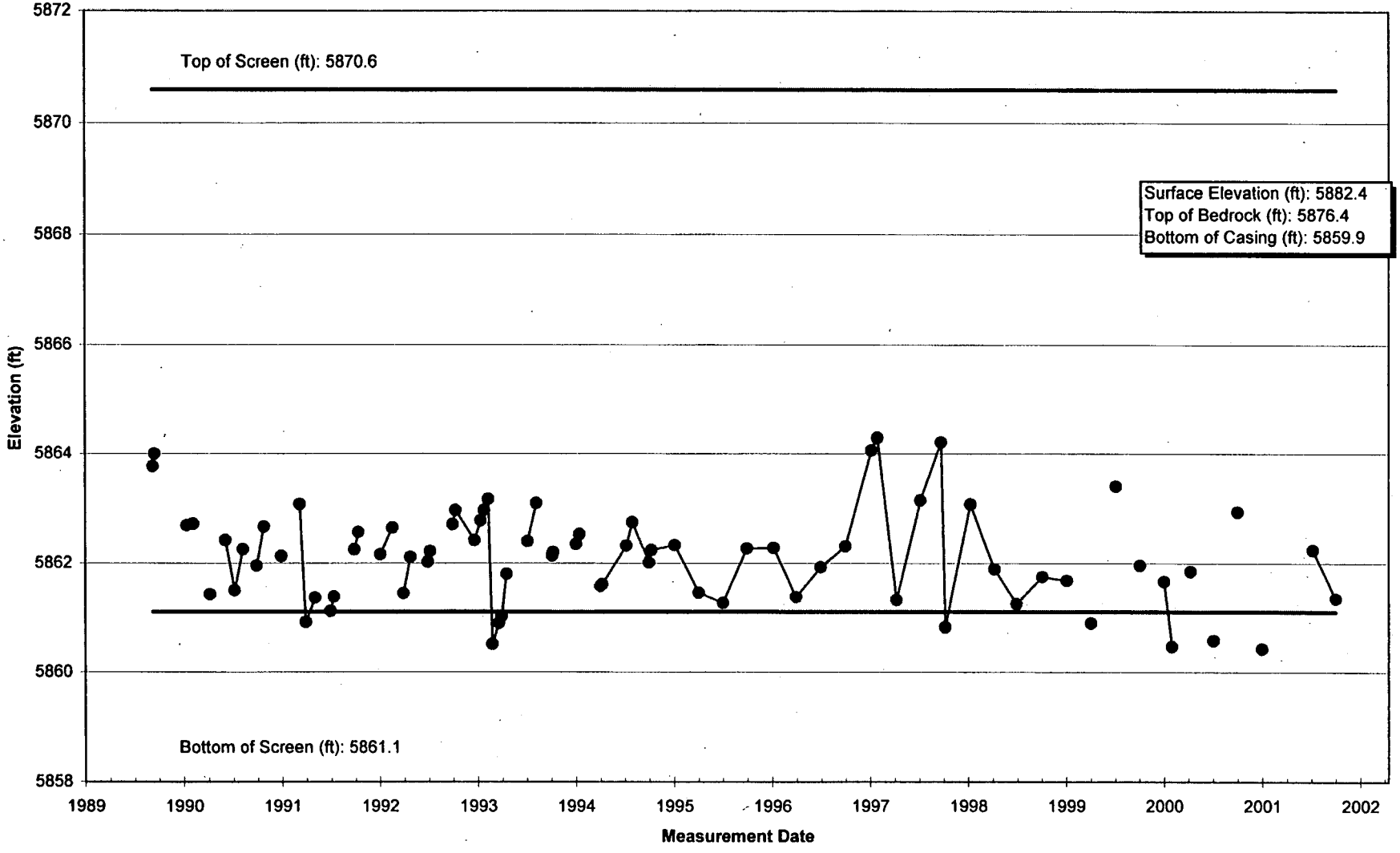
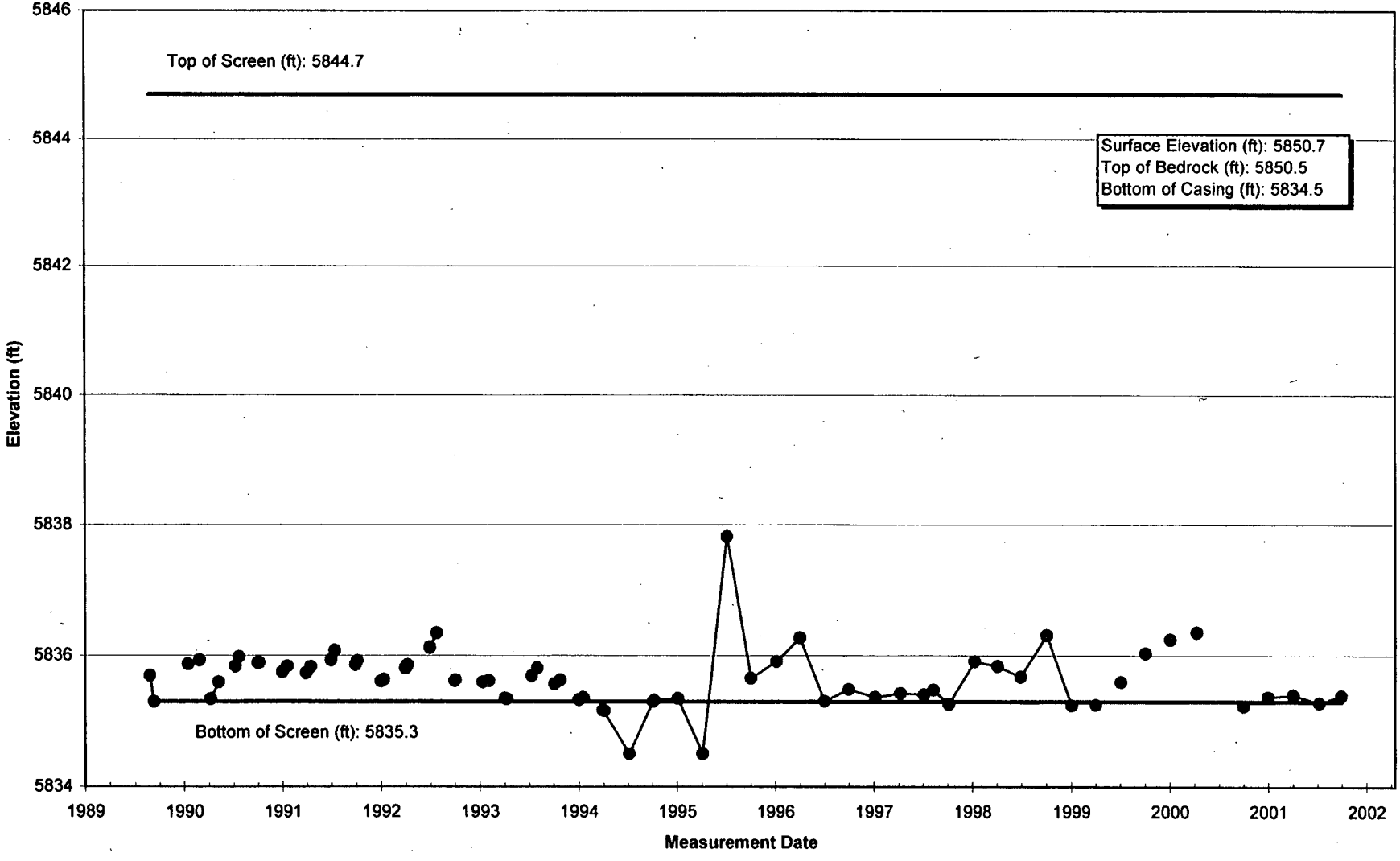
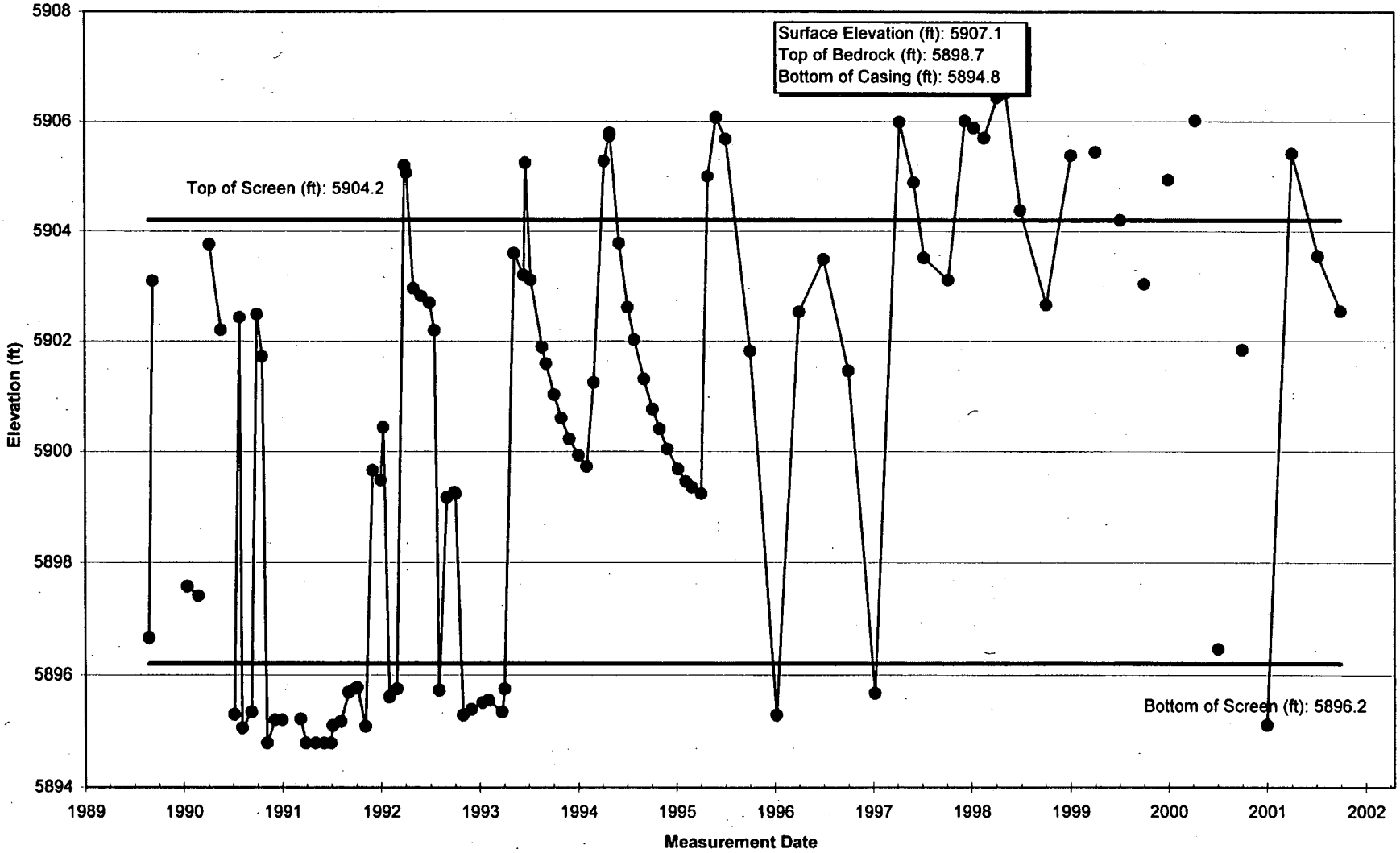


493
564

Hydrograph B208289



Hydrograph B208789



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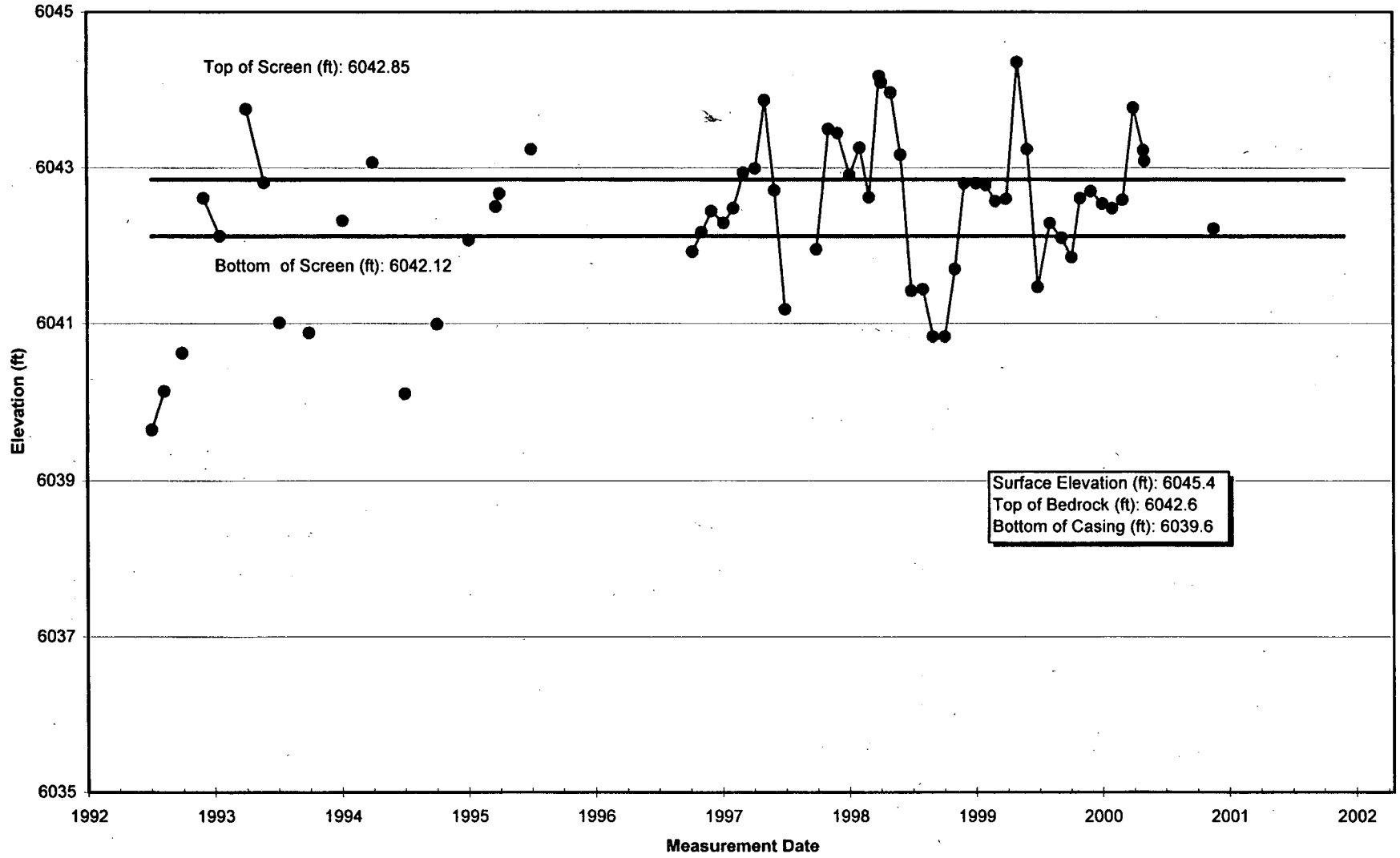
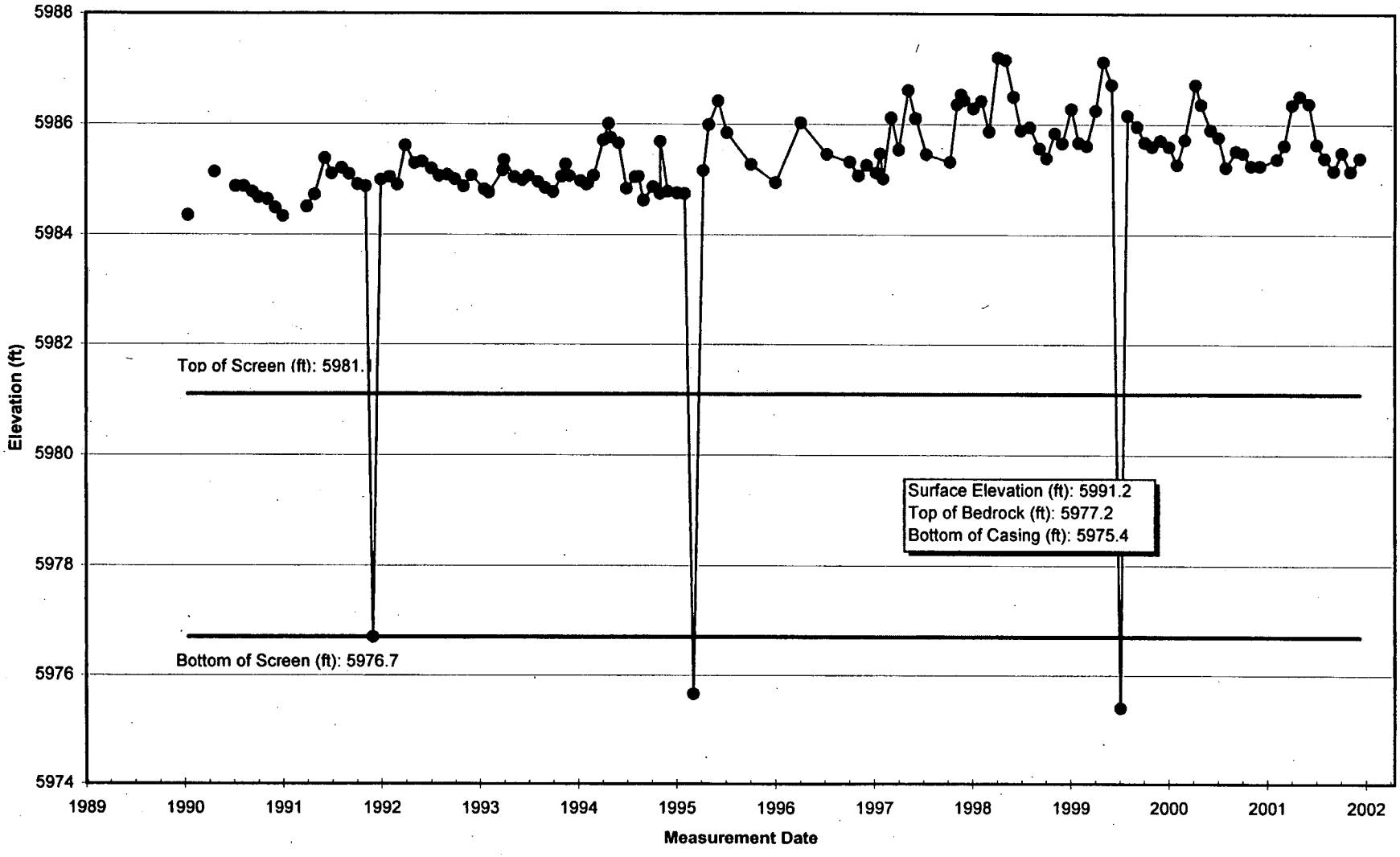
495
564

Hydrograph B402689

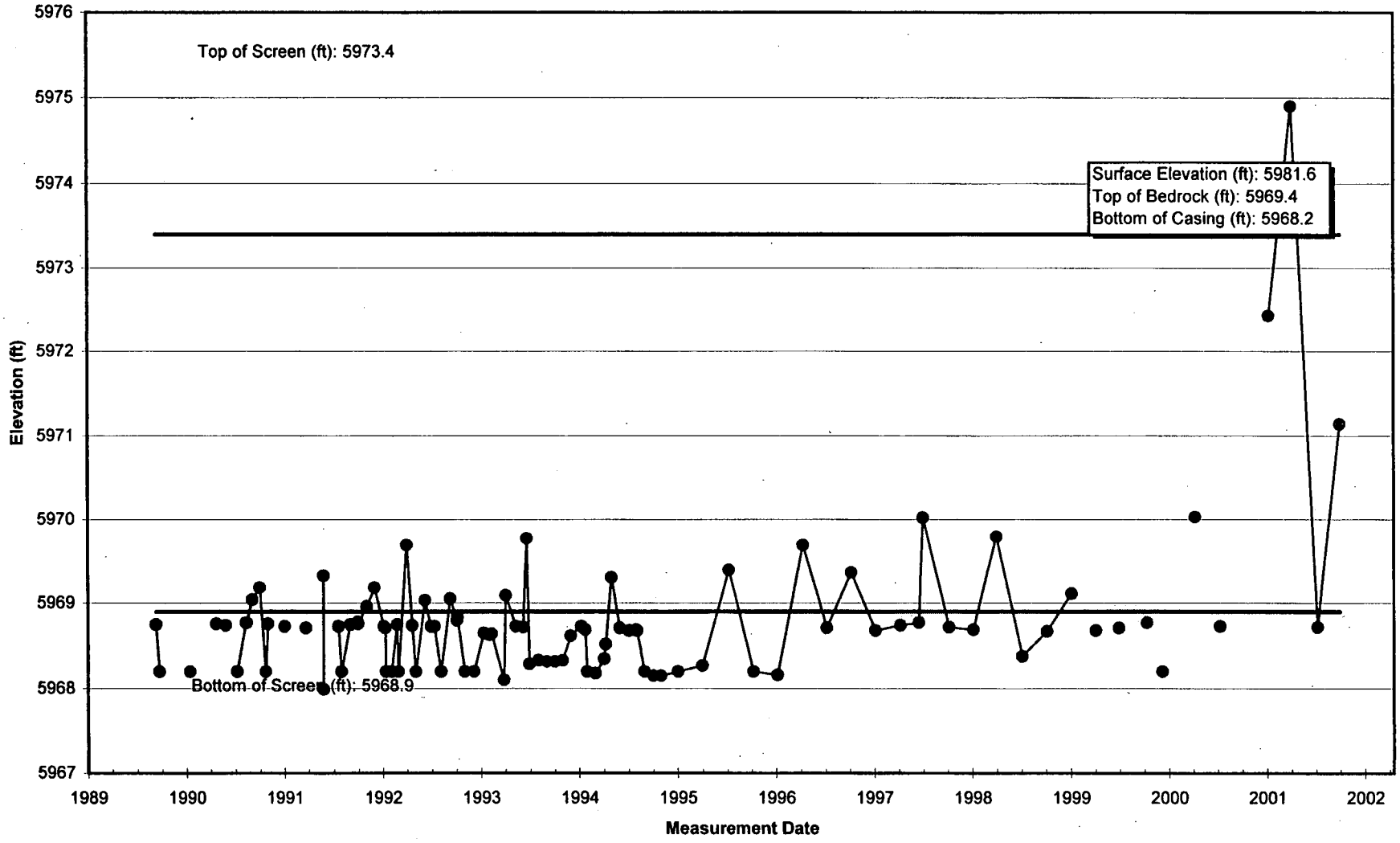


496

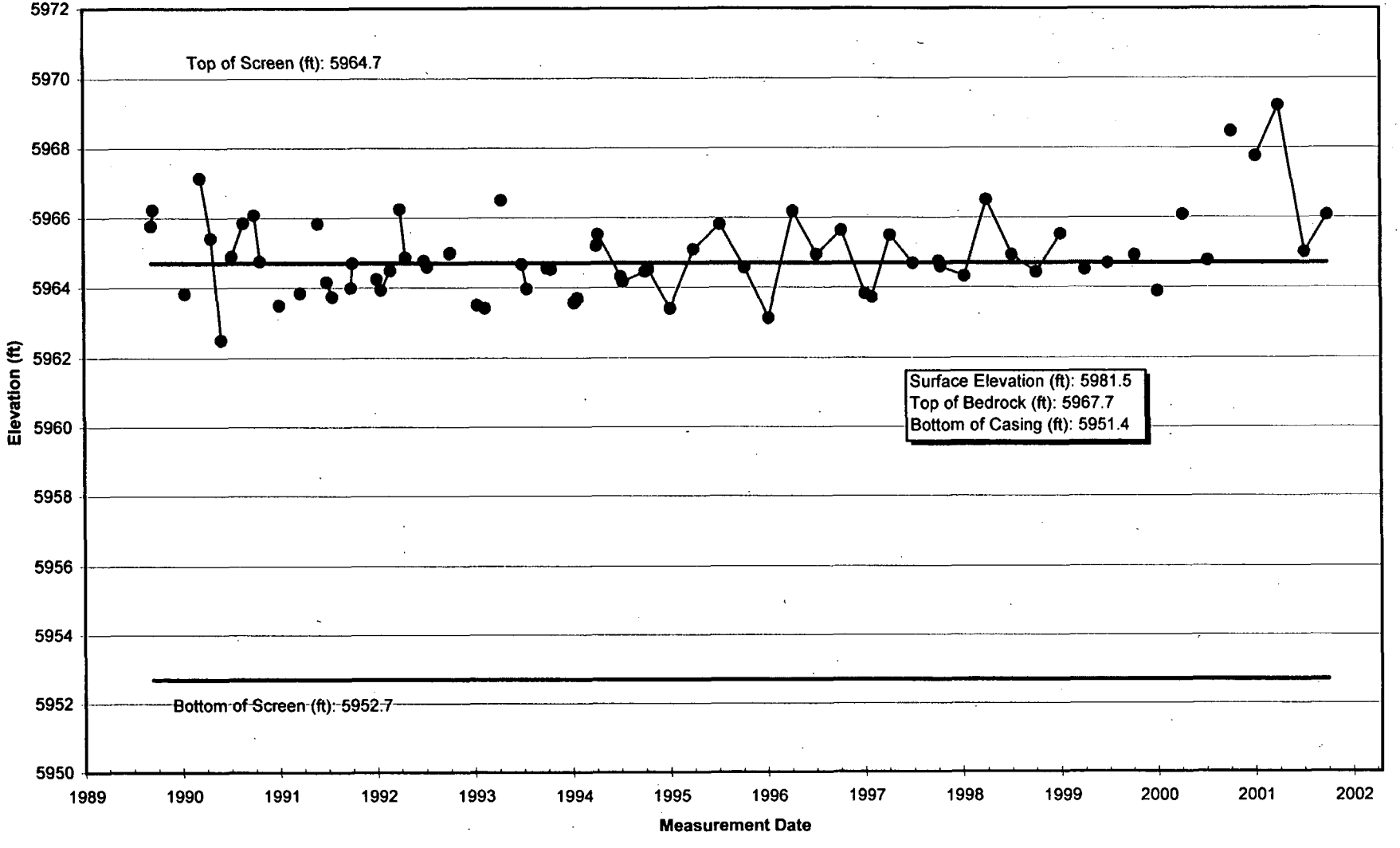
Hydrograph P114389



Hydrograph P209289



Hydrograph P209389



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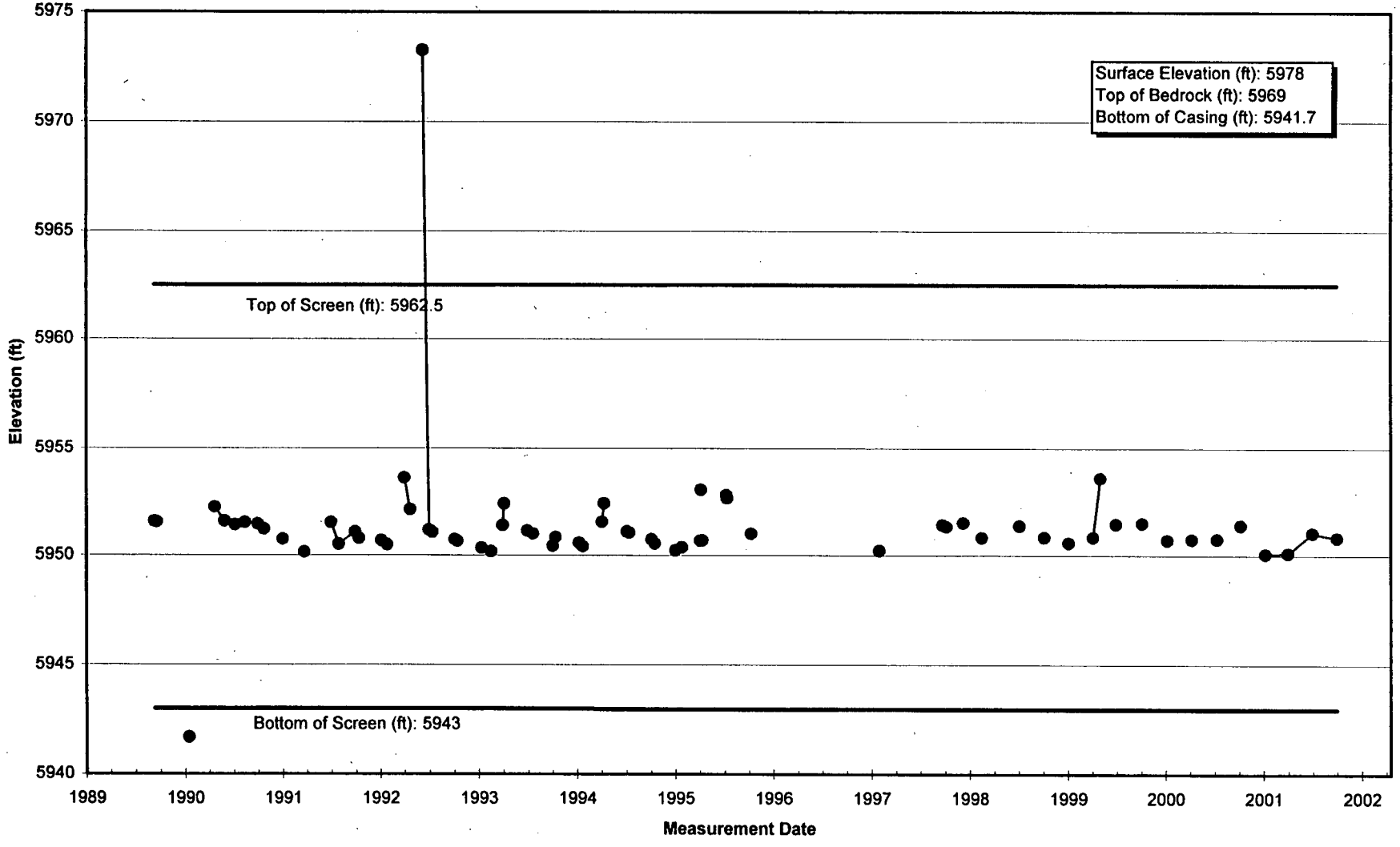
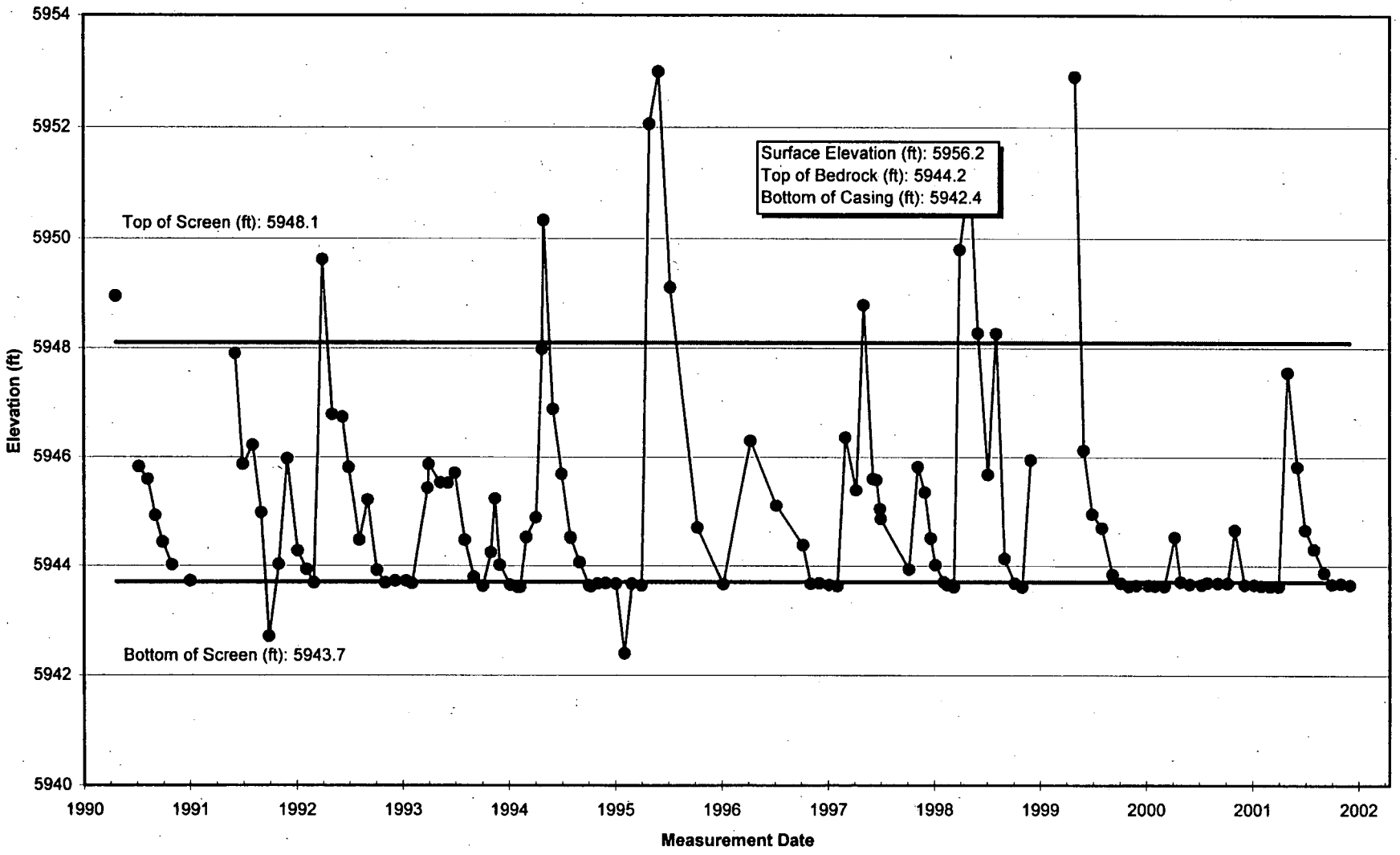


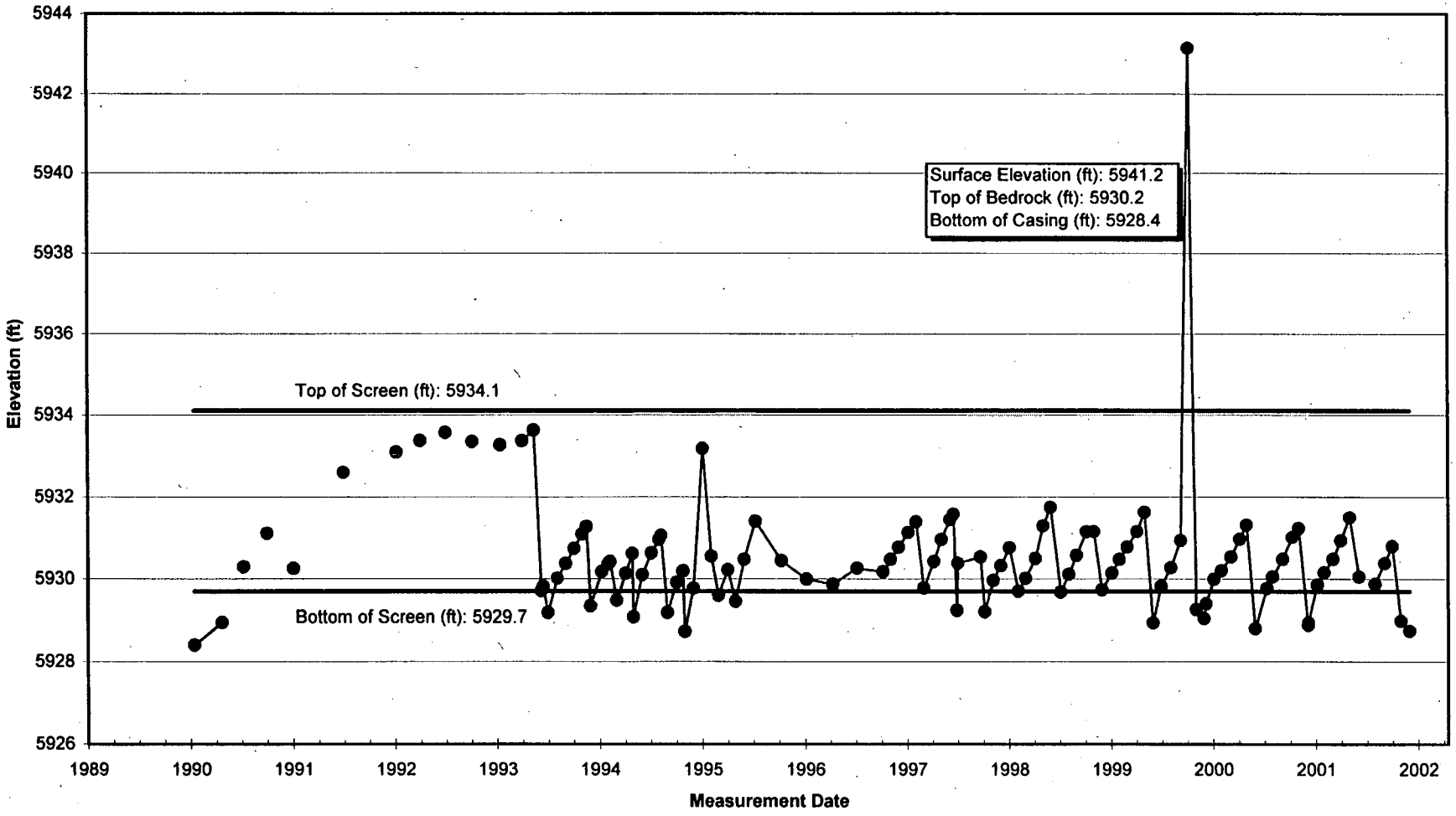
571

Hydrograph P218389

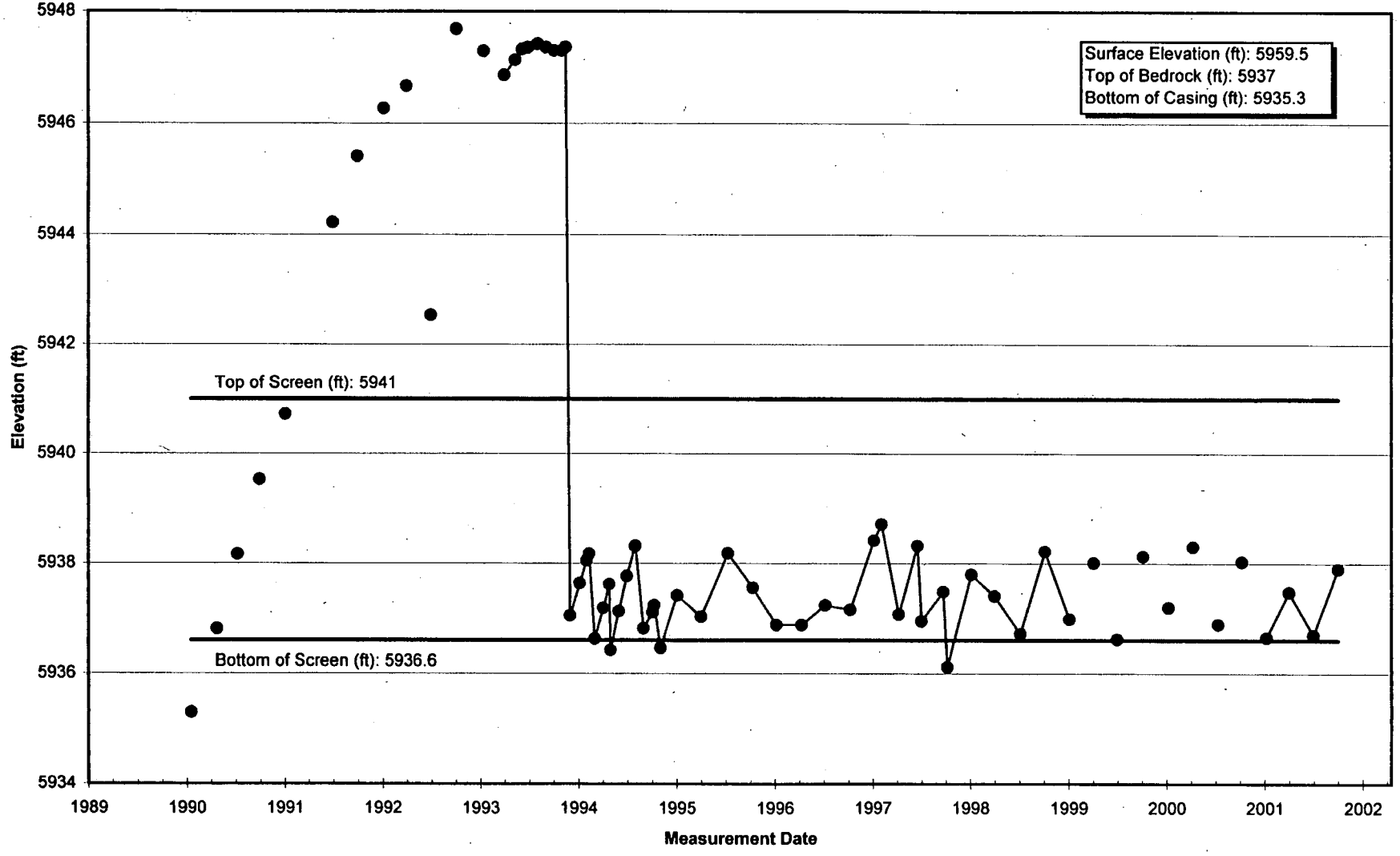


501
572

Hydrograph P219189



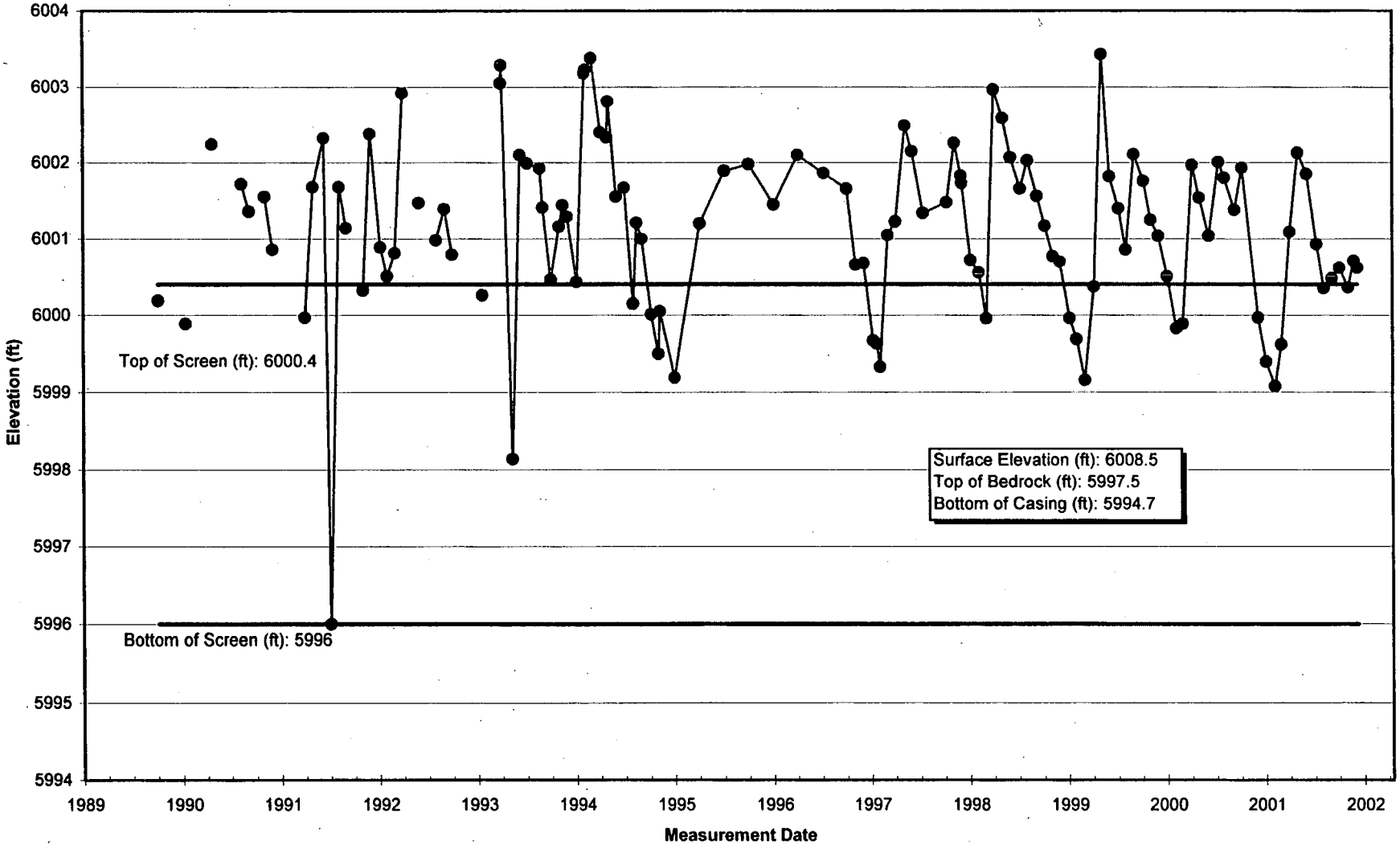
Hydrograph P219489



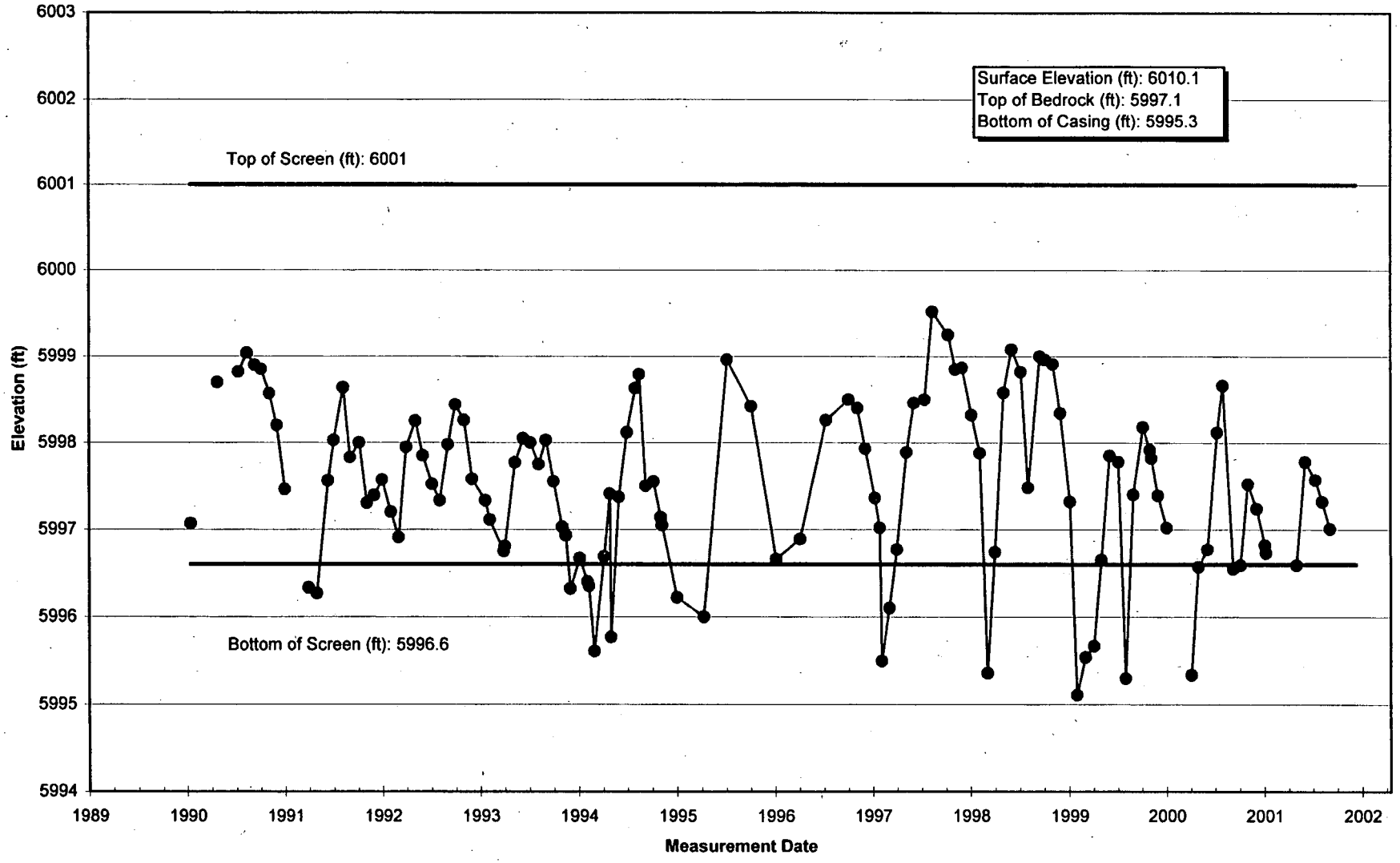
~~503~~
574

HG-Master S22_wjb2001 P219489

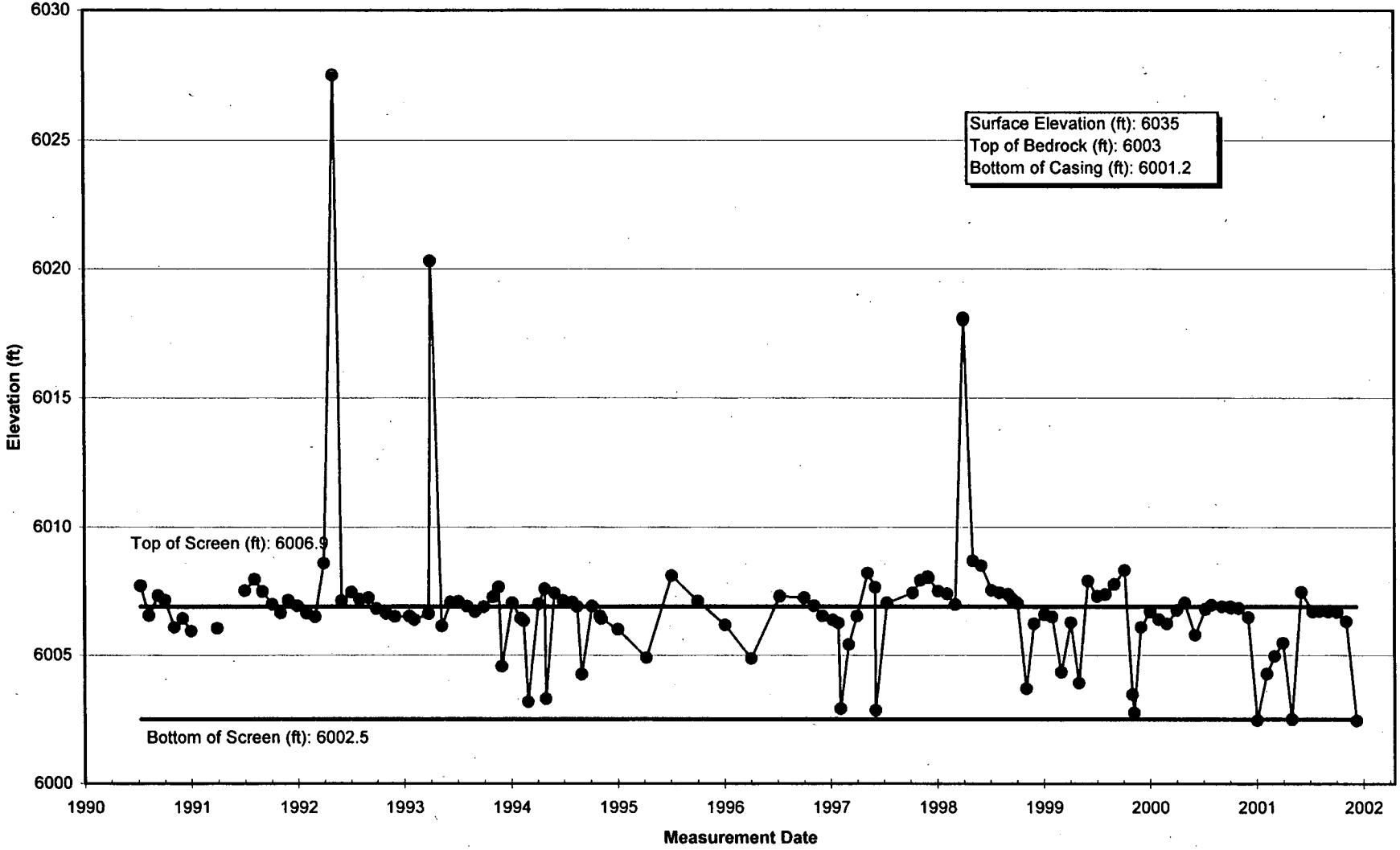
Hydrograph P313589



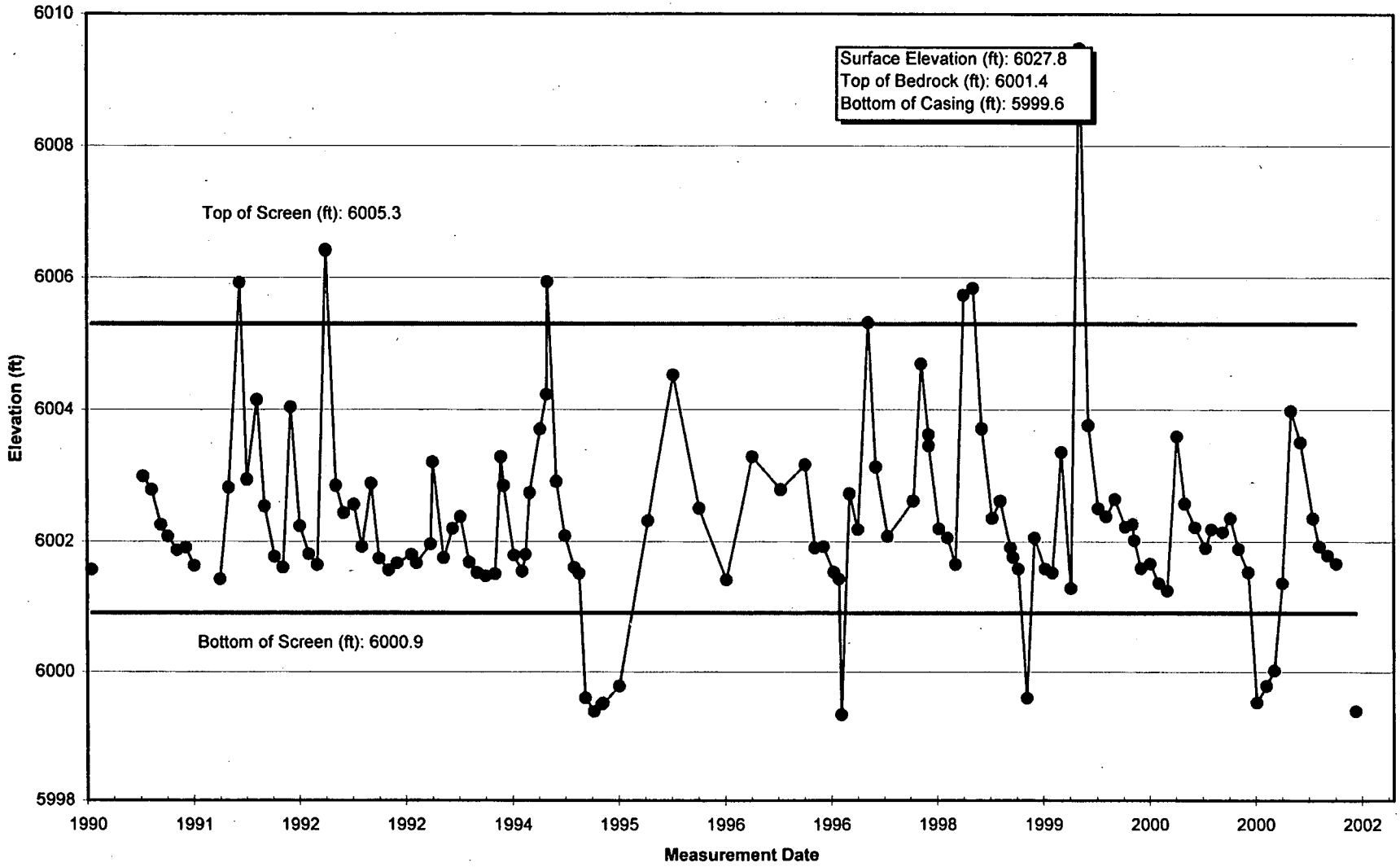
Hydrograph P314289



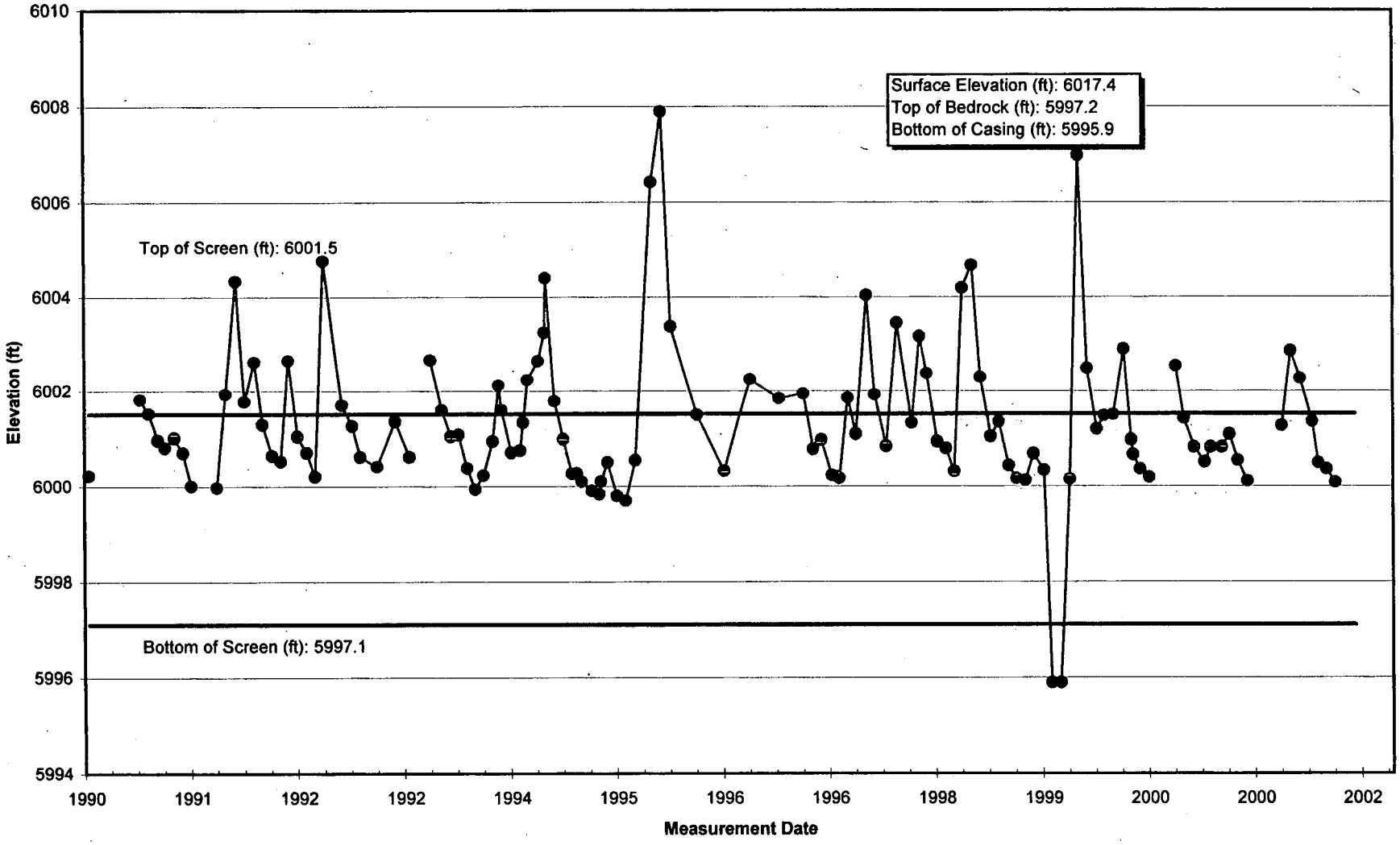
Hydrograph P416689



Hydrograph P416789

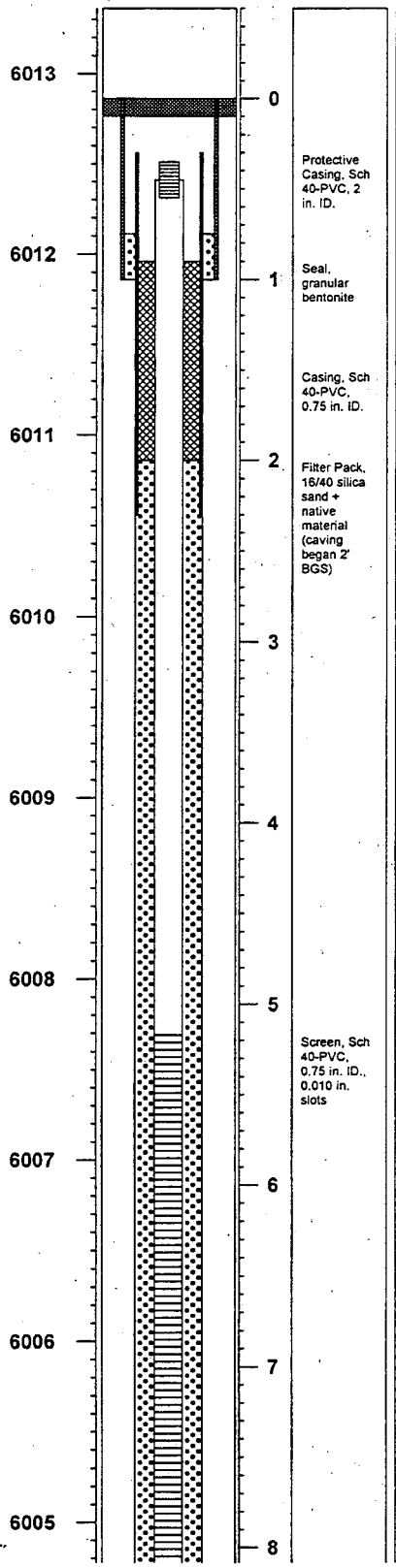


Hydrograph P416889



STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 6012.86	CASING DIA (IN):
NORTH: 750495.61	TOTAL DEPTH (FT): 21.00	BH DIA. (IN):
EAST: 2081935.09	COMPLETION DATE: 5/10/01	GRID LOCATOR:
PROJECT:	GEOLOGIST: Brian Walsh/E. A. Francisco	
REMARKS:		

LOG OF BORING NUMBER: 37101



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.0 No Recovery, flushmount hole, sand and gravel
		ML: 1.0-1.2 Clayey SILT, brown (7.5YR4/4), soft, moist, 40% clay, 20% sand, 40% gravel, road base
		GM: 1.2-3.8, 60% sandy GRAVEL, light gray (GLEY1 7/-) quartzite fragments to 1.25", sharp angular (broken fragments), some sandy matrix. 40% silty SAND, strong brown (7.5YR5/6), fine-coarse grained, subangular, poorly sorted, well graded, some clayey matrix, slightly moist.
		SP: 3.8-4.0 SAND, pale brown (10YR6/3), loose, fine grained, subangular, well sorted, poorly graded.
		NO RECOVERY: 4.0-5.0 No Recovery
		SM: 5.0-6.0 Silty SAND, strong brown (7.5YR5/8), fine-coarse grained, 10% gravel, poorly sorted, well graded, iron-oxide stained, some silty matrix, slightlyl moist.
		CL: 6.1-7.3 CLAY, reddish brown (2.5YR5/3)-pale olive (5Y6/3), soft-slightly firm, smooth texture, slightly sandy, slightly moist, trace caliche toward base.
		GM: 7.3-9.0, 50% GRAVEL, light gray (GLEY! 7/-), quartzite fragments to 1.5", predominantly broken angular fragments of quartzite. 50% CLAY, light olive gray (5Y6/2), soft-slightly firm, smooth-waxy texture, the above mentioned gravel is dispersed

Draft

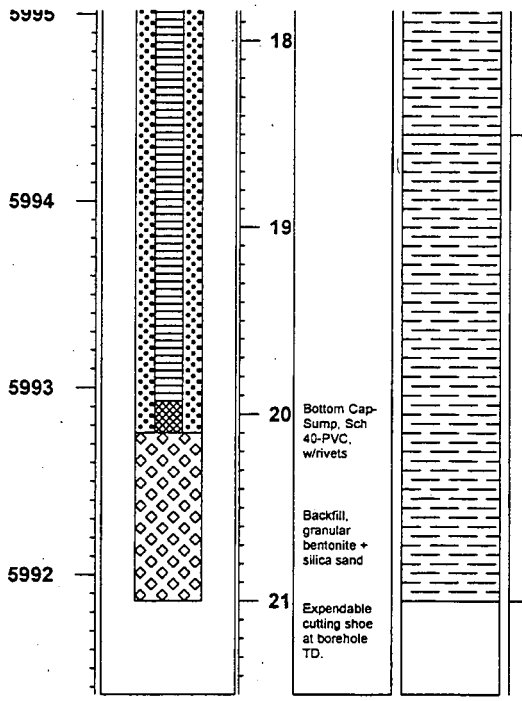
509
580

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37101 Lithologic Description	Page 2 of 3
6004		9				
					CL: 9.0-10.4 Gravelly CLAY, light olive gray (5Y6/2), soft, 20% quartzite gravel to 1.25", occasional iron-oxide zones, some white caliche inclusions, slightly moist, slightly sandy.	
6003		10				
					GM: 10.4-11.0 Sandy GRAVEL, w/traces of silt, white (2.5Y8/-), quartzite fragments up to 0.1ft. Predominantly broken/angular fragments. Some fine-medium grained sand, subangular to subround, slightly moist.	
6002		11				
					CL: 11.0-11.9 Sandy CLAY, pale olive (5Y6/3), slightly firm, gritty texture, 20% fine-medium grained sand dispersed throughout. Trace white caliche inclusions. Trace fine gravel, slightly moist.	
6001		12				
					SM: 11.9-15.9 Gravelly-silty-clayey SAND, strong brown (7.5YR5/8), fine-coarse grained, 10-20% gravel. Poorly sorted, well graded, 20-30% silt and clay matrix, iron-oxide stained, slightly moist. 15.6-15.9' prob. rwrkd bdrck: sdy-grvlly CLAY, p.olive (5Y6/3). Below about 13.0', silty-clayey-gravelly SAND, strong brown (7.5YR5/8), fine-crs grained, subangular, poorly sorted, well graded. 20-30% gravel (increasing toward base). 30%+/- silty mtrx. Fe-oxide stained, tr/wht caliche inclusions, slightly moist-moist.	
6000		13				
5999		14				
5998		15				
5997		16				
					CLAYSTONE: 15.9-16.8 CLAYSTONE, light olive gray (5Y6/2)-yellowish brown (10YR5/6). Firm, smooth texture. Moderately crumbly/friable. Slightly moist. Partially weathered. Dense. TOP OF BEDROCK at 15.9 ft.	
5996		17				
					NO RECOVERY: 16.8-17.0 No Recovery.	
					CLAYSTONE: 17.0-18.5 CLAYSTONE, light olive gray (5Y6/2)-light gray (5Y7/2)-yellowish brown (10YR5/6). Firm. Smooth texture. Moderately crumbly/friable. Slightly moist. Partially weathered. Dense	

LOT

510
281

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37101 Lithologic Description	Page 3 of 3



CLAYSTONE: 18.5-21.0 CLAYSTONE, light yellowish brown (2.5Y6/4). Firm. Rough-smooth texture. Dense. Trace black carbonaceous inclusions and streaks. Trace iron-oxide stain on fracture surfaces; slightly moist.

Draft

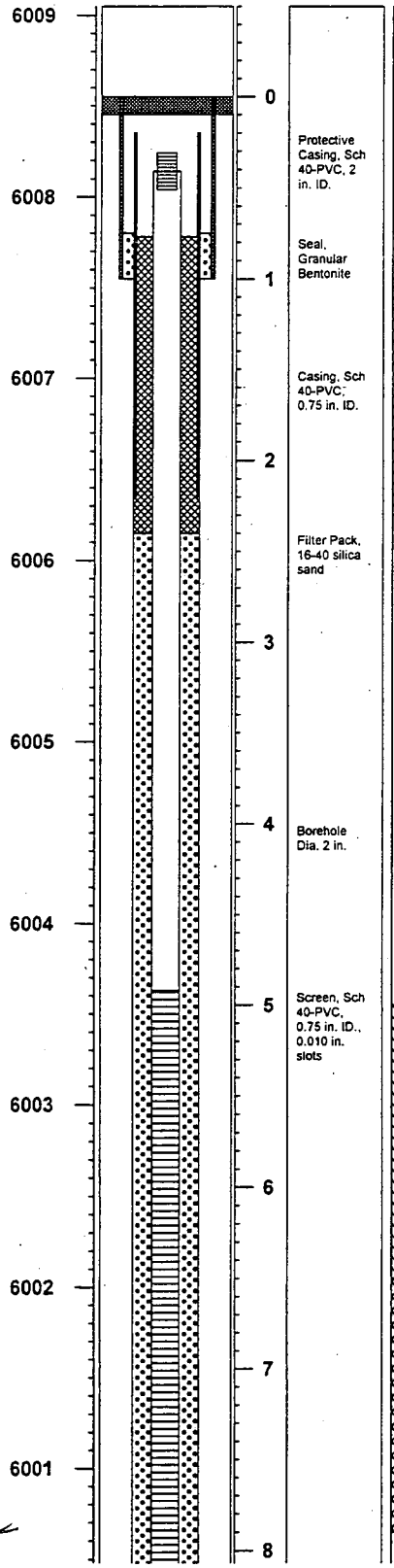
5H
582

STATE PLANE COORDINATES AREA:
NORTH:750306.44
EAST: 2082351.51
PROJECT:
REMARKS:

GRND ELEV. (FT):6008.55
TOTAL DEPTH (FT): 31.00
COMPLETION DATE: 5/15/01
GEOLOGIST: Brian Walsh

CASING DIA (IN):
BH DIA. (IN):
GRID LOCATOR:

LOG OF BORING NUMBER:
37201



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.0 No Recovery, hole for flushmount.
		CL: 1.0-2.3 CLAY, yellowish brown (10YR5/4)-reddish yellow (7.5YR6/8). Soft. Plastic. Occasionally slightly silty, <10% light gray quartzite gravel to 1". Trace fine-grained sand. Moist.
		NO RECOVERY: 2.3-5.0 No Recovery.
		CL: 5.0-6.5 CLAY, pale brown (10YR6/3)-brownish yellow (10YR6/6). Occasionally mottled gray-light gray. Soft. Moist to wet at 6.3 ft. Trace gravel to 0.75". Some orange-yellow iron staining on fracture surfaces and inclusions.
		SW: 6.5-7.9 SAND, varicolored: light gray (GLEY1 7/-)-clear-red (2.5YR5/6). Trace black. Predominantly quartz and feldspar grains. Medium-coarse grained. Some fine grained. Poorly sorted-well graded. Subangular-subround. Loose-unconsolidated. Wet "flowing sand".

Draft

5/7
583

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37201 Lithologic Description	Page 2 of 4
6000						
		9			NO RECOVERY: 9.0-11.5 No Recovery. Probing with solid point to get through flowing sand.	
5999						
		10				
5998						
		11				
5997					CL: 11.5-12.2 Silty-sandy CLAY, brown (7.5YR5/3)-greenish gray (GLEY1 5/1). Soft. Very moist. 10-20% sand and silt scattered throughout. <10% gravel.	
		12			GC: 12.2-12.9 Clayey GRAVEL, gray (GLEY1 5/-)-dark gray (GLEY1 4/1) quartzite fragments to 1.25". Angular broken fragments. 40-50% silty-sandy CLAY matrix as above 11.5-12.2 ft.	
5996						
		13			CL: 12.9-13.6 Gravelly CLAY, dark greenish gray (GLEY1 4/1). Mottled brown (7.4YR4/2). Soft. Moist. 30-40% quartzite gravel to 1.5". Some scattered silt and sand.	
5995						
		14			GM: 13.6-13.9 Silty GRAVEL, oveall black appearance (10YR10/-). 70% reddish brown (2.5YR4/3) quartzite gravel. Predominantly angular broken fragments to 1.0". 30% black (10YR2/-) clayey SILT matrix. Possibly organic, very moist-wet.	
5994					NO RECOVERY: 13.9-15.5 No Recovery.	
		15				
5993					GM: 15.5-16.3 Silty GRAVEL, as above 13.6-13.9, some gravel is gray (GLEY1 5/-)-dark gray (GLEY1 4/-) quartzite.	
		16				
5992					CL: 16.3-17.4 Gravelly CLAY, dark greenish gray (GLEY1 4/1). Soft-slightly firm. Smooth-gritty texture. Moist. 10-30% quartzite gravel to 1.25". 10% sand-silt throughout.	
		17				
5991					NO RECOVERY: 17.4-19.5 No Recovery.	

573
584

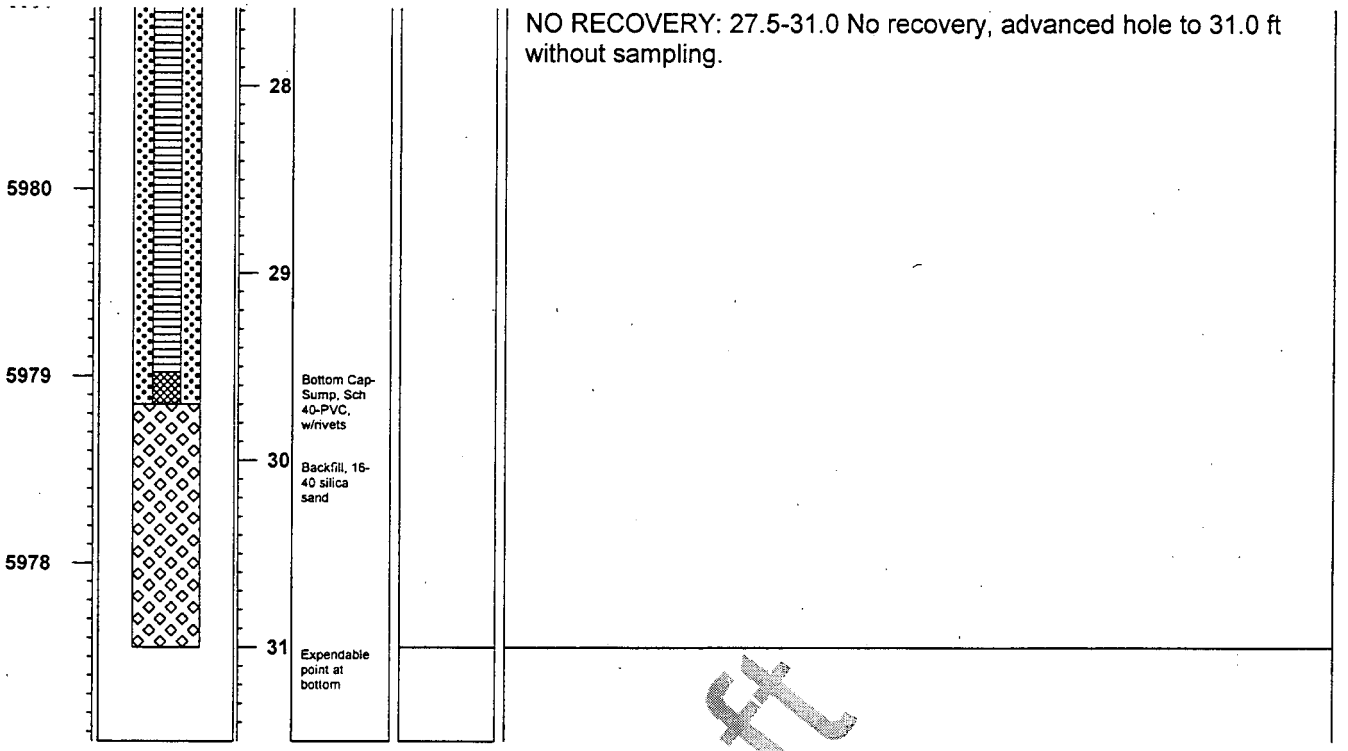
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37201 Lithologic Description	Page 3 of 4
5990		18				
		19				
5989					CL: 19.5-20.3 Gravelly CLAY, as above 16.3-17.4 ft. Increase in gravel.	
		20				
5988					CL: 20.3-21.8 Sandy CLAY, reddish brown (5YR4/4). Occasionally mottled dark grayish green (GLEY1 3/2). 30-50% fn-crs grained sand. 10% gravel to 1.25". Sand and gravel are varigated quartzite-quartz-feldspar-granitic. Soft. Moist.	
		21				
5987						
		22			NO RECOVERY: 21.8-23.5 No Recovery.	
5986						
		23				
5985					CL: 23.5-23.6 Gravelly-sandy CLAY, brown (7.5YR5/2), some mottled green-red-orange. Soft. 20% gravel to 1.25", 10-20% sand. Very moist.	
		24			CLAYSTONE: 23.6-26.4 CLAYSTONE, yellowish brown (10YR5/8)-brownish yellow (10YR6/6). Occssionally mottled/laminated greenish gray (GLEY1 6/1). Ironstone at 24.4 ft. and 26 ft. Smooth-gritty texture. A dark grayish brown (10YR4/2) organic/carbonaceous(?) inclusion at 25.7 ft. Some iron-oxide staining on fracture surfaces. Predominantly weathered. Firm. Slightly moist. TOP OF BEDROCK at 23.6 ft.	
5984						
		25				
5983						
		26				
5982					NO RECOVERY: 26.4-27.5 No Recovery.	
		27				
5981						

Draft

5H 585

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description

LOG OF BORING NUMBER:
37201

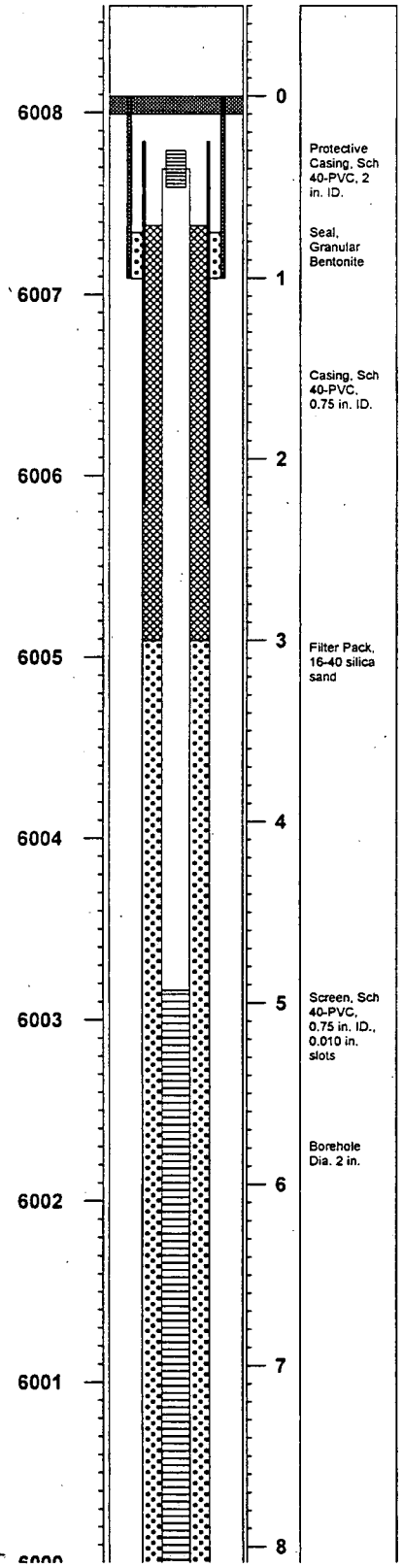


NO RECOVERY: 27.5-31.0 No recovery, advanced hole to 31.0 ft without sampling.

Draft

5/6
586

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 6008.09	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 750360.04	TOTAL DEPTH (FT): 24.00	BH DIA. (IN):	37301
EAST: 2082509.66	COMPLETION DATE: 5/16/01	GRID LOCATOR:	
PROJECT: RFETS Geological Db	GEOLOGIST: Brian Walsh		
REMARKS:			



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.1 No Recovery. Hole for flushmount (asphalt and road base).
		CL: 1.1-2.2 CLAY, yellowish brown (10YR5/8), soft, occasionally mottled light-medium gray. 5-10% quartzite gravel to 1.5". Occasional scattered sand and silt. Slightly moist. Some orange iron-oxide stained areas.
		NO RECOVERY: 2.2-5.0 No Recovery.
		CL: 5.0-8.0 CLAY, yellowish brown (10YR5/8)-occasionally grayish brown (2.5Y5/2). Some light-medium gray mottling. Predominantly smooth texture. Soft-slightly firm. Moist. Some scattered quartzite gravel to 1.25" at: 6.2 ft., 7.7 ft., and 8.0 ft. 7.9-8.1 ft. is slightly sandy and iron-oxide stained yellowish red (5YR5/6). Occasional iron-oxide stained fracture surfaces. Slightly silty at 7.4 ft.

Draft

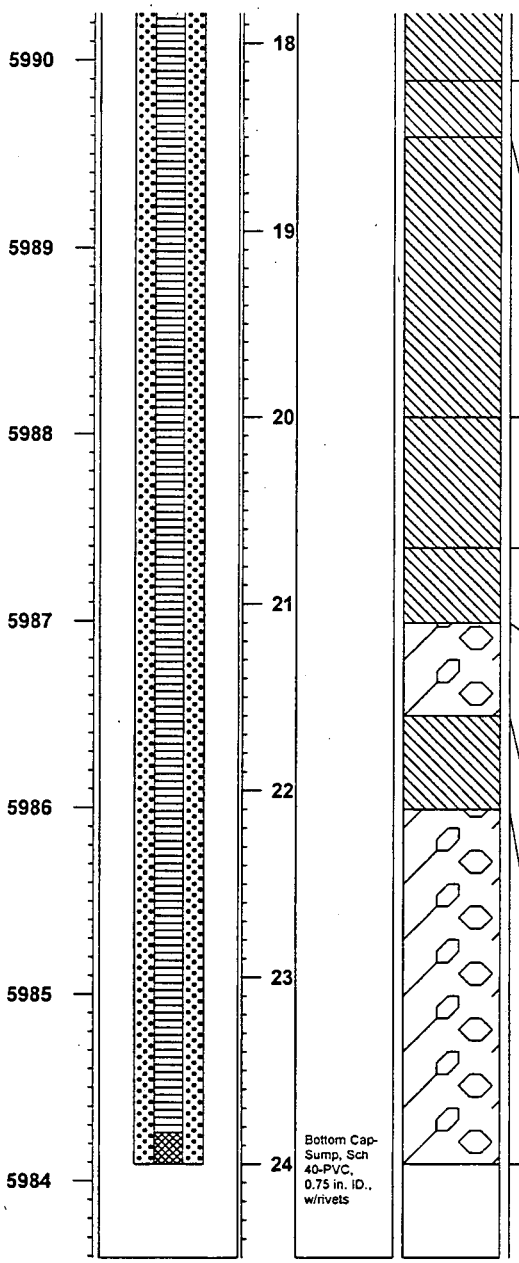
5/16
587

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37301 Lithologic Description	Page 2 of 3
6000						
5999		9			CL: 8.0-10.0 CLAY, as above 5.0-8.0 ft.	
5998		10			CL: 10.0-13.0 CLAY, yellowish brown (10YR5/8), some mottled light-medium gray. Predominantly smooth texture. Moist. Some scattered quartzite gravel to 0.75" at 10.7 ft., 11.0ft., 12.1 ft. and 12.3 ft. Thin slightly sandy iron-oxide zone at 10.7 ft. and 12.7 ft. Some gray-dark gray carbonaceous(?) inclusions.	
5997		11				
5996		12				
5995		13			CL: 13.0-16.0 CLAY, as above 10.0-13.0 ft. Quartzite gravel to 1.25" at 14.5 ft. and 15.3 ft.. Granitic gravel to 0.75" at 16.8 ft.. Thin silty layer at 14.5 ft. Some scattered sand grains. Moist.	
5994		14				
5993		15				
5992		16			CL: 16.0-18.2 CLAY, as above 13.0-16.0 ft., quartzite gravel to 1.0" at 16.8 ft.	
5991		17				

Draft

5988

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37301 Lithologic Description	Page 3 of 3



CL: 18.2-18.5 Sandy-silty CLAY, yellowish red (5YR5/6), slightly firm. Gritty texture. Weathered/ iron-oxide stained. 25-30% sand and silt throughout. Moist.

CL: 18.5-20.0 CLAY, yellowish brown (5YR5/6)-brown (10YR5/3)-gray (10YR6/1). Soft-slightly firm. <3% scattered sand and fine gravel. Occasionally mottled dark gray (10YR4/1). Trace red and orange-yellow iron-oxide zones, moist-wet at 19.9 ft.

CL: 20.0-20.7 CLAY, pale brown (10YR6/3), occasionally mottled light gray. Soft, wet, sticky. Thin silty layer at 20.0 ft. A well cemented sand/gravel pebble at 20.1 ft.

CL: 20.7-21.1 Sandy CLAY, brown (7.5YR5/4). Soft. Very moist to wet. 30% sand and fine grained gravel throughout.

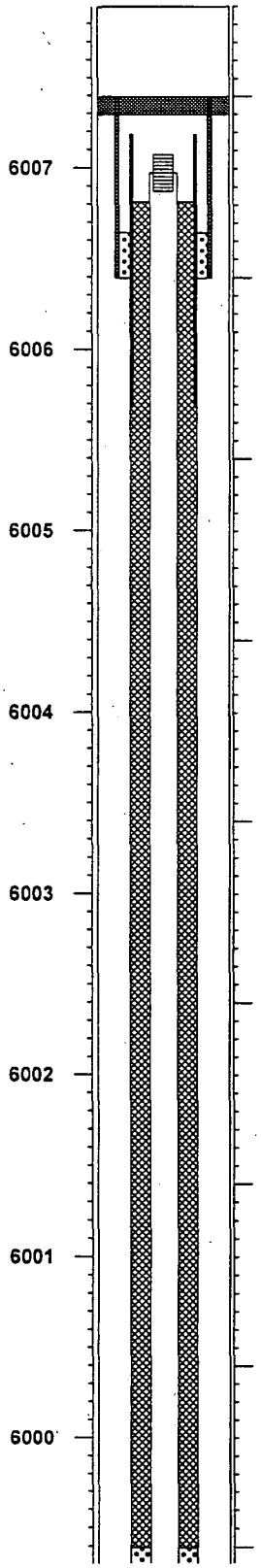
GC: 21.1-21.6 Clayey-sandy GRAVEL, gray overall (7.5YR6/1). Light-dark gray quartzite gravel to 1.5". A biotite gneiss gravel observed. Predominantly angular broken fragments. 20% clay/sand matrix, very moist.

CL: 21.6-22.0 Sandy CLAY, yellowish brown (10YR5/6)-light brownish gray (10YR6/2). Soft. Gritty texture. 20-30% scattered sand. Trace fine gravel.

GC: 22.1-22.7 Clayey-sandy GRAVEL, light brownish gray (10YR6/2). Granitic-quartzite-siltstone gravel to 1.5". Some "encased" in well cemented (caliche) sand. Angular (broken) fragments to subround. 30-40% sandy clay matrix. Wet. Loose.

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 6007.39	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 750664.83	TOTAL DEPTH (FT): 41.00	BH DIA. (IN):	37401
EAST: 2082592.78	COMPLETION DATE: 5/21/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Brian Walsh		

REMARKS:
Well destroyed by D&D activities at Building 371. Replaced b



Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
Protective Casing, Sch 40-PVC, 2 in. ID.	0 to 1			NO RECOVERY: 0.0-1.1 No Recovery. Hole for flushmount, sand and gravel fill.
Seal, Granular Bentonite	1 to 3			CL: 1.1-3.1 Sandy-gravelly CLAY, reddish brown (5YR5/4)-red (2.5YR4/6) near base. Soft, moist. Gritty texture. 20% fine-coarse grained sand. 10% quartzite gravel to 1.0".
	3 to 3.6			GC: 3.1-3.6 Clayey GRAVEL, gray (GLEY1 6/-), quartzite gravel to 1.0". Angular (broken)-subround. 30-40% sandy-silty clay matrix. Moist. Clayey matrix is reddish brown-red.
Borehole Dia. 2 in.	3.6 to 5			NO RECOVERY: 3.6-5.0 No Recovery.
Casing, Sch 40-PVC, 0.75 in. ID.	5 to 5.5			CL: 5.0-5.5 Gravelly CLAY, reddish brown (5YR5/4)-red (2.5YR4/6). Soft. Smooth-gritty texture. 25% gray (GLEY1 5/-) quartzite gravel to 0.75". Moist.
	5.5 to 7.6			GC: 5.5-7.6 Clayey-sandy GRAVEL. Varicolored: gray (GLEY1 5/-)-light gray (GLEY1 7/-) quartzite gravel to 1.25". Predominantly angular to subangular (broken) fragments. 20-30% pale yellow (2.5Y8/4)-light yellowish brown (2.5Y6/4) sandy-silty clay matrix. Moist. Some iron-oxide staining.
	7.6 to 9			NO RECOVERY: 7.6-9.0 No Recovery.

Draft

5/9
5 90

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37401 Lithologic Description	Page 2 of 5
5999						
		9			GC: 9.0-9.7 Clayey-sandy GRAVEL, as above 5.5-7.6 ft. 10-20% clayey matrix. Some white caliche.	
5998	Filter Pack, 16-40 silica sand					
					CL: 9.7-10.0 CLAY, see below 10.0-10.2 ft.	
		10			CL: 10.0-10.2 CLAY, strong brown (7.5YR5/8). Soft. Moist. Weathered/iron-oxide stained. Slightly sandy. Trace quartzite gravel to 0.5".	
5997	Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots				CL: 10.2-11.3 Gravelly CLAY, greenish gray (GLEY1 6/1). Occasionally red (10R5/8) and yellowish red (5YR5/8). Soft. Moist. Trace white caliche inclusions. 30% gray quartzite gravel to 0.75". Sandy and iron-oxide stained at bottom.	
		11				
5996					NO RECOVERY: 11.3-13.0 No Recovery	
		12				
5995						
		13			CL: 13.0-13.6 Sandy-gravelly CLAY, reddish yellow (7.5YR5/6). Soft. gritty texture. Weathered/iron-oxide stained. 20% sand, 10% fine gravel.	
5994						
					GC: 13.6-14.1 Clayey-sandy GRAVEL, reddish yellow (7.5YR6/6). Clayey matrix with 10% scattered sand. 60-70% gray quarzite gravel to 1.0". Angular (broken fragments)-subround. Moist.	
		14			CL: 14.1-15.0 CLAY, light yellowish brown (10YR6/4). Soft-slightly firm. Smooth-waxy texture. Occasionally mottled light gray. Trace black inclusions. Very moist.	
5993						
		15			CL: 15.0-15.7 CLAY, reddish brown (5YR5/4). Soft-slightly firm. Smooth-gritty texture. Occasional sandy-silty zones and laminations. Very moist.	
5992						
					NO RECOVERY: 15.7-17.0 No Recovery.	
		16				
5991						
		17			CL: 17.0-19.3 CLAY, reddish brown (5YR5/4). Some mottled light gray. Predominantly smooth-waxy texture. Trace black carbonaceous(?) inclusions. Trace slightly silty-sandy zones. Moist. Firm.	
5990						

Draft

5990
591

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37401 Lithologic Description	Page 3 of 5
5989		18				
		19				
5988					CL: 19.3-22.9 Sandy CLAY, yellowish red (5YR5/6). Occasionally mottled light gray. Firm. Gritty texture. Trace black inclusions. 20% scattered fine-very fine grained sand. Moist.	
		20				
5987						
		21				
5986						
		22				
5985						
		23			SC: 22.9-24.1 Clayey SAND, yellowish red (5YR5/8). Mottled light greenish gray (GLEY1 7/1) at 23.4ft. Fine-very fine grained sand. Subangular. Well sorted-poorly graded. 40% clayey-silty matrix. Moist.	
5984						
		24				
5983					SC: 24.1-26.0 Gravelly-clayey SAND, yellowish red (5YR5/8)-strong brown (7.5YR5/8). Fine-medium grained. Occasionally very fine grained. Subangular. 5% gravel to 1.0". Gravel is quartzite, quartz and siltstone (red). 30% clayey-silty matrix. Moist.	
		25				
5982						
		26			CLAYSTONE: 26.0-27.1 CLAYSTONE, brownish yellow (10YR6/6), mottled light greenish gray (GLEY1 7/1). Firm. Rough texture. Trace black inclusions. Moist. Ironstone nodules to 0.75" at 26.2 ft. Iron-oxide stained zones/fracture surfaces at 27.9 ft. and 28.2 ft. TOP BEDROCK at 26.0 ft.	
5981						
		27				
5980					NO RECOVERY: 27.1-28.3 No Recovery.	

Draft

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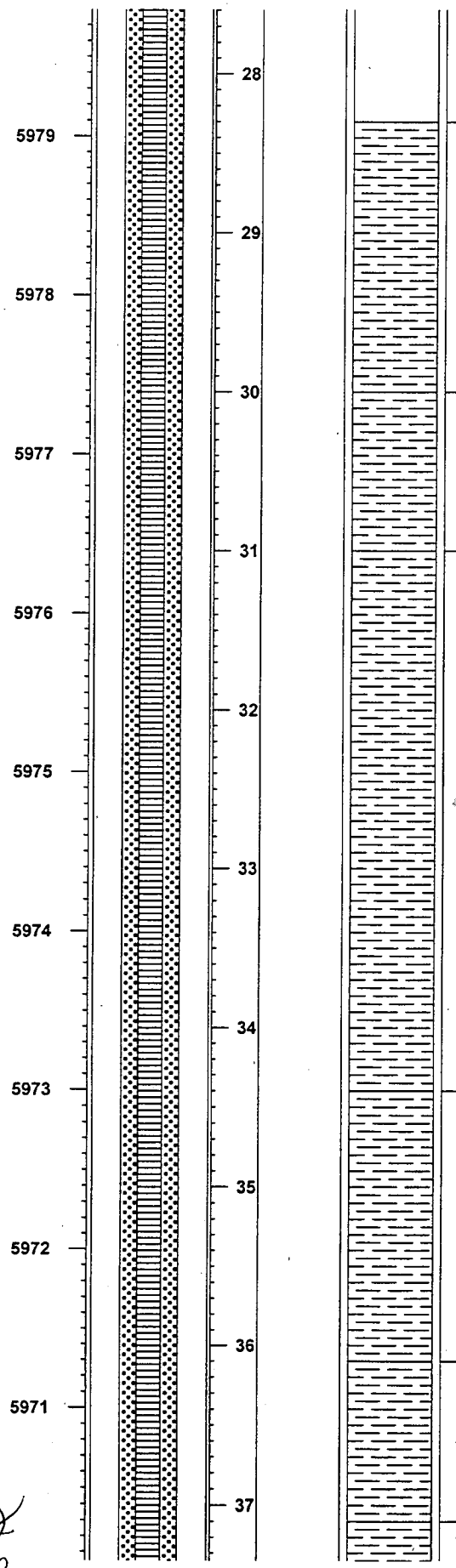
592

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37401 Lithologic Description	Page 4 of 5



CLAYSTONE: 28.3-30.0 CLAYSTONE, brownish yellow (10YR6/6)-light brownish gray (10YR6/2). Firm. Rough texture. Horizontal beds are distorted by coring. Slightly moist. Trace black inclusions. Iron-oxide zones/fractures surfaces at 29.7 ft. and 29.9 ft.

CLAYSTONE: 30.0-31.0 CLAYSTONE, light yellowish brown (10YR6/4). Occasionally mottled light gray (10YR7/1). Firm. Rough texture. Trace black inclusions. Iron-oxide staining (strong brown: 7.5YR5/8) zones/fracture surfaces at 30.3 ft. and 30.9 ft. Small ironstone nodule at 31.0 ft. Slightly moist.

CLAYSTONE: 31.0-34.4 CLAYSTONE, as above 30.0-31.0. Iron-oxide staining on fracture surfaces/zones at 32.0 ft. and 33.1 ft. Small ironstone nodule at 32.0 ft.

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CLAYSTONE: 34.4-36.1 CLAYSTONE, gray (7.5YR6/1). Some light yellowish brown zones (iron-oxide/weathered). Firm. Slightly moist. Rough-occasionally gritty texture. Ironstone nodules at 34.7 ft. Iron-oxide zones at 34.5, 34.7, 35.0 and 35.5 ft. Slightly silty 35.0-35.2 ft.

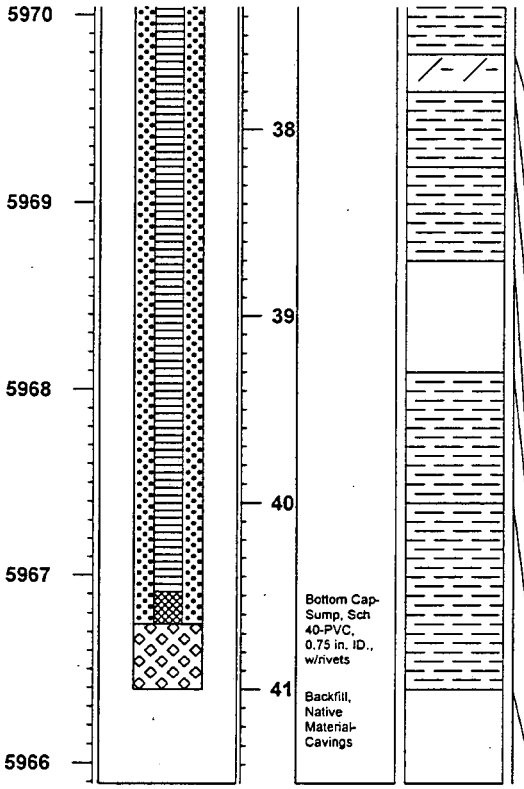
CLAYSTONE: 36.1-37.1 CLAYSTONE, pale olive (5Y6/3)-olive (5Y5/3). Occasionally mottled gray (5Y6/1). Firm. Rough texture. Ironstone nodule at 36.3 ft. Slightly moist.

CLAYSTONE: 37.1-37.6 CLAYSTONE, yellowish brown (10YR5/8).

593

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description

LOG OF BORING NUMBER: **37401**



Occasionally mottled gray-light gray. Firm. Rough texture. Some black carbonaceous inclusions up to 0.33". Ironstone nodule at 37.5 ft. Slightly moist.

CLAYEY SILTSTONE: 37.6-37.8 Clayey SILTSTONE, light gray (10YR7/2). Soft-poorly consolidated. Clayey matrix. Slightly moist. Trace black carbonaceous inclusions.

CLAYSTONE: 37.8-38.2 CLAYSTONE, as above 37.1-37.6 ft. 0.75" carbonaceous inclusion 37.8-37.7 ft.

CLAYSTONE: 38.2-38.7 CLAYSTONE, dark gray (10YR4/1)-olive gray (5Y5/2). Firm. Rough texture. Trace white calcareous(?) inclusions. Unweathered. Trace iron-oxide stain on fracture surfaces.

NO RECOVERY: 38.7-39.3 No Recovery.

CLAYSTONE: 39.3-40.0 CLAYSTONE, dark gray (10YR4/1)-brownish yellow (10YR6/6). Firm. Slightly moist. Trace white calcareous(?) inclusions. Trace iron-oxide stained fracture surfaces.

CLAYSTONE: 40.0-41.0 CLAYSTONE, brownish yellow (10YR6/6). Occasional gray mottling and thin beds (distorted). Firm. Slightly moist. Trace white calcareous(?) inclusions. Becoming silty at 40.4 ft. Weathered. Occasional iron-oxide stained zones and surfaces.

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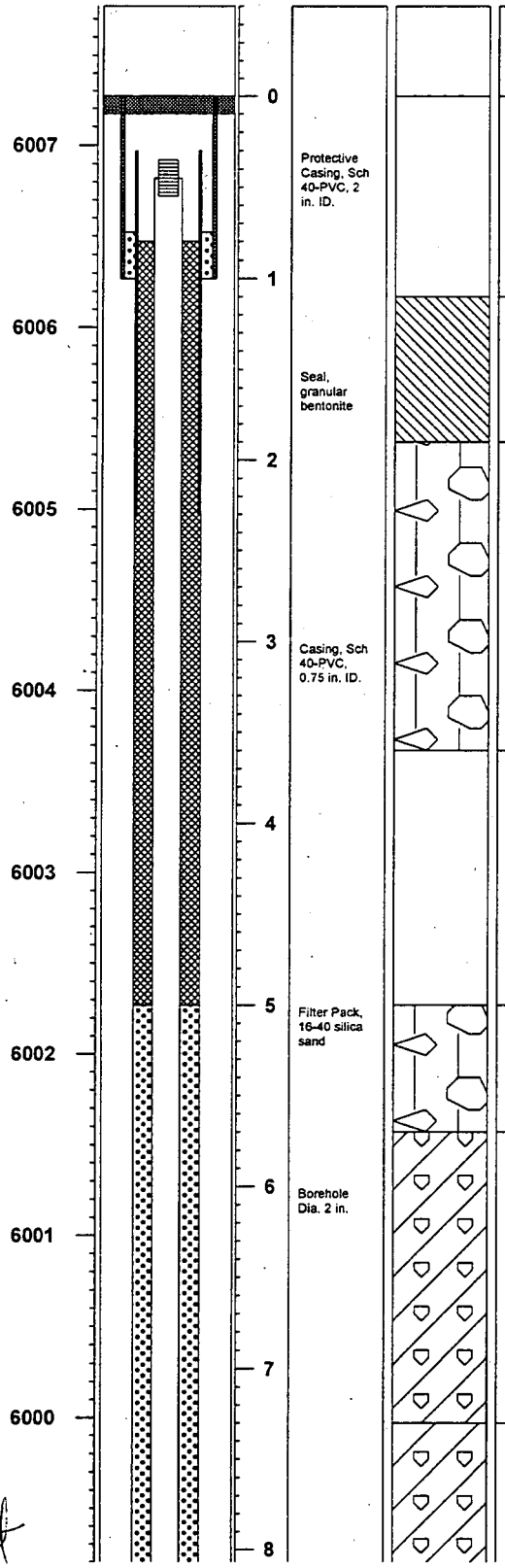
STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 6007.27	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 750697.01	TOTAL DEPTH (FT): 38.00	BH DIA. (IN):	37501
EAST: 2082412.87	COMPLETION DATE: 5/23/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Brian Walsh		

REMARKS:
Native material and 16-40 silica sand comprise backfill up t



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.1 No Recovery. Hole for flushmount, asphalt; sand-gravel-clay.
		CL: 1.0-1.9 Gravelly CLAY, dark greenish gray (GLEY1 4/1)-olive brown (2.5Y4/4). Soft. Smooth texture. Moist. 10-15% quartzite gravel to 0.5". Trace sand and silt throughout.
		GM: 1.9-3.6 Sandy GRAVEL, light gray (GLEY1 7/-)-gray (GLEY1 6/-). Predominantly angular (broken) quartzite to 1.25". Some subround. Light reddish brown (2.5YR7/4) sandy-silty matrix (possibly pulverized feldspar pebbles). Occasional olive gray clay.
		NO RECOVERY: 3.6-5.0 No Recovery.
		GM: 5.0-5.7 Sandy GRAVEL, as above 1.9-3.6 ft.
		SC: 5.7-7.3 Gravelly-clayey SAND, reddish brown (5YR5/4) , fine-coarse grained sand. Subangular-subround. 20% quartzite gravel to 0.75". 20-30% clayey matrix. Poorly sorted-well graded. Moist.
		SC: 7.3-8.1 Gravelly-clayey SAND, as above 5.7-7.3 ft. Reddish yellow (7.5YR6/6).

Draft

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595

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					LOG OF BORING NUMBER: 37501
					Page 2 of 5
5999					NO RECOVERY: 8.1-9.0 No Recovery.
5998		9			GC: 9.0-12.5 CLAY/GRAVEL mixture. Sandy-silty CLAY, pale yellow (5Y7/3). Soft. 20-35% sand-silt scattered throughout. Moist. Clayey GRAVEL, light gray (GLEY1 7/-)-dark gray (GLEY1 4/-). Predominantly angular (broken) quartzite fragments to 1.5". 30% clayey matrix (see clay above).
5997	Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots	10			
5996		11			
5995		12			
					NO RECOVERY: 12.5-13.0 No Recovery.
5994		13			GC: 13.0-16.2 SAND/CLAY/GRAVEL. Clayey SAND, strong brown (7.5YR5/8). Fine-coarse grained. Subangular-subround. Poorly sorted-well graded.30+% clayey matrix. Moist. CLAY, pale yellow (5Y7/3)-greenish gray (GLEY1 6/1). Soft. Smooth-gritty texture. Slightly-moderately sandy. Moist. Probably as (strong brown) matrix in gravel. Weathered 15.2-16.2 ft. Clayey GRAVEL, light gray (GLEY1 7/-)-gray (GLEY1 5/-). Angular-subround quartzite fragments to 1.25".
5993		14			
5992		15			
5991		16			
					NO RECOVERY: 16.2-17.0 No Recovery.
5990		17			CL: 17.0-17.3 Gravelly CLAY, strong brown (7.5YR5/8)-reddish yellow (7.5YR6/8). Soft. Gritty texture. Moist. 30% quartzite and granite gravel to 1.0".
					CL: 17.3-17.7 CLAY, reddish brown (5YR5/4), occasionally mottled

Draft

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37501 Lithologic Description	Page 3 of 5
5989		18			light greenish gray (GLEY1 7/1). Soft. Smooth texture. Moist. Plastic. NO RECOVERY: 17.7-21.0 No Recovery.	
5988		19				
5987		20				
5986		21			CL: 21.0-21.8 CLAY, yellowish brown (10YR5/4)-yellowish red (5YR4/6). Soft. Smooth-gritty texture. Sandy-silty 21.0-21.3 ft. Moist. A 1.0" light gray quartzite fragment at 21.8 ft. Poor sample recovery; core liner partially blocked by gravel while sampling.	
5985		22			NO RECOVERY: 21.8-25.5 No Recovery.	
5984		23				
5983		24				
5982		25				
5981		26			CL: 25.5-25.9 CLAY, strong brown (7.5YR5/8). Occasionally mottled light greenish gray (GLEY1 7/1). Soft-slightly firm. Moist. 5-10% quartzite and granite gravel to 0.75", (reworked bedrock). CLAYSTONE: 25.9-27.3 CLAYSTONE, strong brown (7.5YR5/8). Trace mottled light greenish gray (GLEY1 7/1). Firm. Occasional iron-oxide stained fracture surfaces (near horizontal). Some black surfaces and inclusions. Moist. Weathered. TOP OF BEDROCK at 25.9 ft.	
5980		27			CLAYSTONE: 27.3-28.0 CLAYSTONE, light yellowish brown	

Draft

596
597

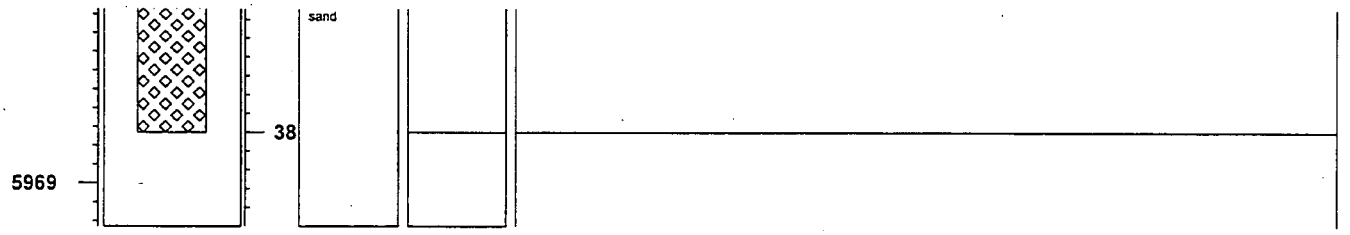
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37501 Lithologic Description	Page 4 of 5
		28			(10YR6/4) with some light greenish gray (GLEY1 7/1) mottling. Firm. Trace black inclusions and fracture surfaces. Slightly moist.	
5979					CLAYSTONE: 28.0-29.0 CLAYSTONE, light browning gray (2.5Y6/3). Firm-very firm. Rough texture. Up to 30% silt throughout. Slightly moist. Trace black inclusions. Trace iron-oxide staining.	
		29			NO RECOVERY: 29.0-30.0 No Recovery.	
5978						
		30			SILTSTONE: 30.0-31.7 60% SILTSTONE, brownish yellow (10YR6/6)-light yellowish brown (2.5Y6/3). Firm. Gritty texture. Minor clayey matrix. Slightly moist. 40% CLAYSTONE, light olive brown (2.5Y5/4)-strong brown (7.5YR5/8) (oxidized). Firm. Smooth-gritty texture. Slightly moist. Trace iron stained surfaces and inclusions. Friable.	
5977						
		31				
5976						
		32			SILTSTONE: 31.7-33.7 SILTSTONE, light yellowish brown (2.5Y6/3)-yellow (2.5Y7/6). Friable. Slightly moist. 5-25% clayey matrix. A few thin (0.2 ft.) claystone layers (gray, very firm).	
5975	Filter Pack, caved native material +16-40 silica sand					
		33				
5974						
		34			SILTSTONE: 33.7-36.1 50% SILTSTONE, yellowish brown (10YR6/8)-pale yellow (2.5Y7/4). Firm. Moderately consolidated-friable. Gritty texture. Slightly moist. 10-40% clayey matrix. Weathered. 50% CLAYSTONE, brownish yellow (10YR6/6)-very pale brown (10YR7/3). Firm. Smooth-gritty texture. Slightly moist. 10-30% silt throughout. Some iron-oxide stained zones and fracture surfaces. Weathered.	
5973						
		35				
5972						
		36				
5971					CLAYSTONE: 36.1-37.0 CLAYSTONE, dark gray (GLEY1 4/-)-gray (GLEY1 5/1), occasional reddish yellow (7.5YR6/8) iron-oxide staining on fracture surfaces and bedding planes. Very firm. Rough-smooth-gritty texture. Some silty zones. Dense. Slightly moist. Predominantly un-weathered.	
	Sump, Sch 40-PVC, 0.75 in. ID., w/rivets					
		37			NO RECOVERY: 37.0-38.0 No Recovery. Hole advanced without	
	Backfill, native material & 16-40 silica					
5970						

Draft

527
E98

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description

LOG OF BORING NUMBER:
37501



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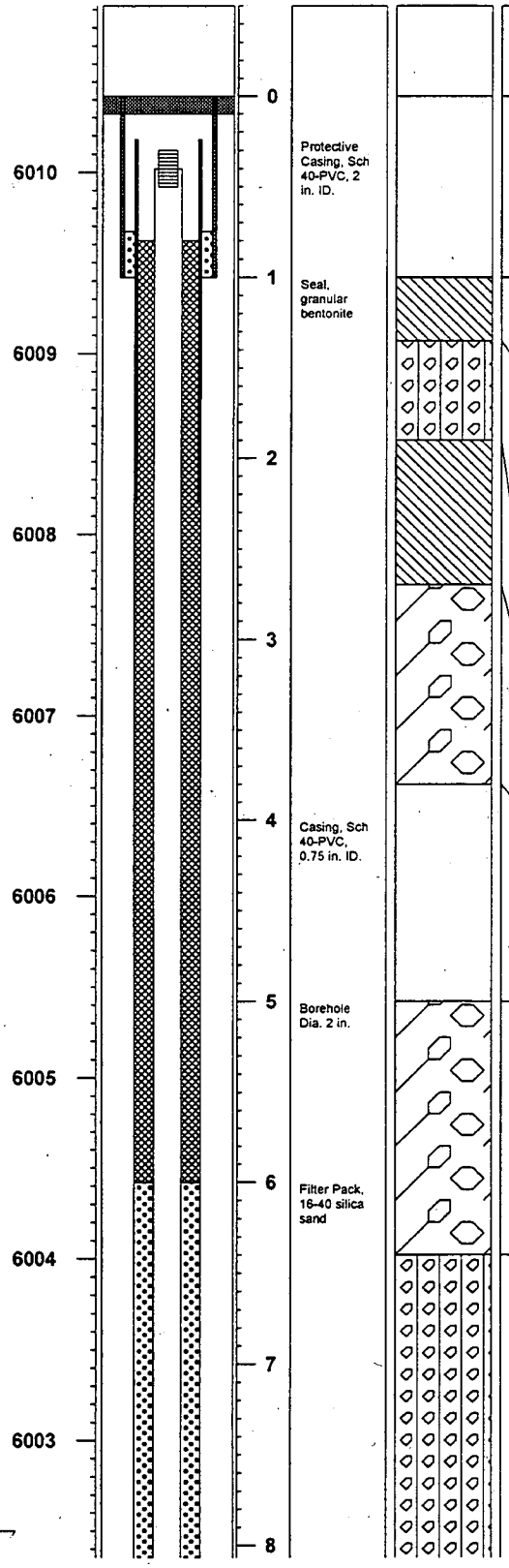
528
599

STATE PLANE COORDINATES AREA:
NORTH:750697.3
EAST: 2082205.17
PROJECT:
REMARKS:
16-40 silica sand used for backfill 39.0 to 38.0 ft. Upon pu

GRND ELEV. (FT):6010.42
TOTAL DEPTH (FT): 39.00
COMPLETION DATE: 5/8/01
GEOLOGIST: Ellen Warp/Brian Walsh

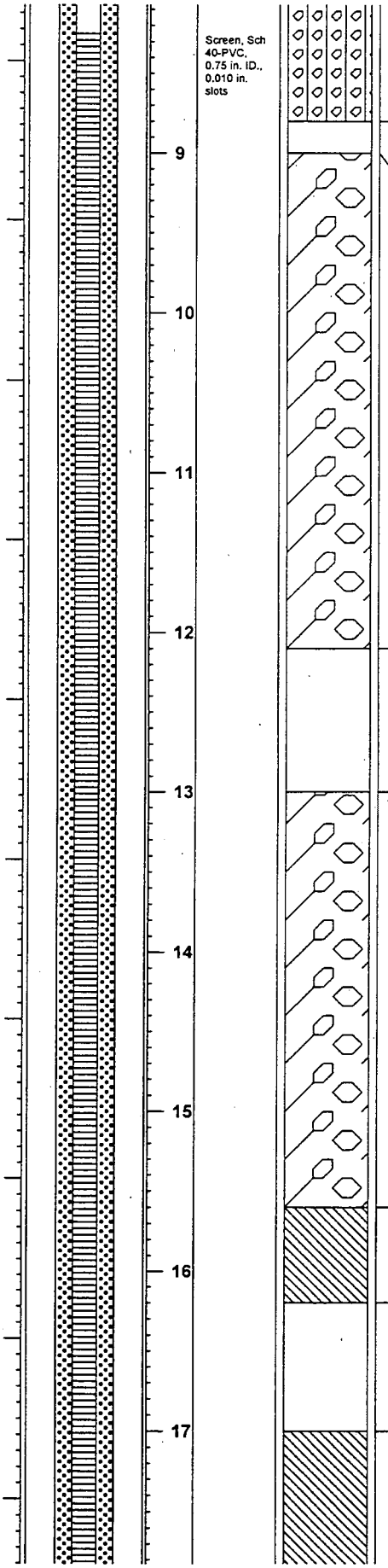
CASING DIA (IN):
BH DIA. (IN):
GRID LOCATOR:

LOG OF BORING NUMBER: 37601



Unified Soils Classification or Rock Type	Lithologic Description
	NO RECOVERY: 0.0-1.0 No Recovery, hand dug for flushmount installation.
	CL: 1.0-1.35 CLAY, with trace sand and trace silt, light olive brown (2.5Y5/4) grading to grayish brown (2.5Y5.2).
	SM: 1.35-1.90 Silty SAND, light gray (10YR7/2) to brown (10YR4/3) at base of interval. Sand is subrounded to subangular, fine to coarse grained with some gravel and trace cobbles. Both gravel and cobbles coated with white caliche. Cobbles (quartzitez). Interval is well graded. Slightly moist.
	CL: 1.9-2.70 CLAY, with some sand and trace-some gravel, very dark grayish brown (10YR3/2). Sand is medium to coarse grained, sub-rounded to angular. Gravel is sub-rounded. Slightly moist.
	GC: 2.7-3.8 Clayey GRAVEL, with some sand. Dark grayish brown (10YR3/2) grading to olive gray (5Y4/2) at 2.90 ft. Sub-angular quartzitic gravel with some feldspar and granitic(?), medium to coarse grained sand, subangular. 3.5-3.8 ft - cobble zone - 0.5-1.0" diameter. Subangular quartzite cobbles.
	NO RECOVERY: 3.8-5.0 No Recovery.
	GC: 5.0-6.4 GRAVEL with abundant cobbles, some silt and sand. Light brownish gray (2.5Y6/2). Gravel and cobbles are subangular to subrounded. Sand is medium to coarse grained. Well graded. Slightly moist. (Cobbles are 0.5-1.0" diameter.)
	SM: 6.4-8.8 Silty SAND, with some gravel, some cobbles and trace clay. Light yellowsh brown (2.5Y6/3)mottled with pale olive (5Y6/3). Sand is fine to coarse grained, subangular to subrounded, gravel and cobbles are subrounded to subangular. Iron-oxide mottled throughout interval and on clast surfaces. Interval is well graded and slightly moist.

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					LOG OF BORING NUMBER: 37601



NO RECOVERY: 8.8-9.0 No Recovery.

GC: 9.0-12.1 Sandy-silty GRAVEL, with some clay. Light yellowish brown (2.5Y6/3). Some iron-oxidized clay from 9.35-9.8 ft. Some subangular to subrounded quartzite cobbles, 0.5-1.0" diameter, throughout interval. Pervasive iron-oxidized zone from 11.8-12.1 ft. Gravel is predominantly quartzite, subangular to subrounded with medium to coarse grained sand, well graded. Carbonaceous/manganese oxide coated inclusion (0.125") at 10.5 ft. Slightly moist throughout interval.

Draft

NO RECOVERY: 12.1-13.0 No Recovery.

GC: 13.0-15.6 Sandy GRAVEL, with some silt and clay. Light yellowsh brown (2.5Y6/3) to yellowish brown (10YR5/4). Quartzite and feldspathic gravel (sub-rounded), with fine to coarse grained, subrounded to subangular sand. Well graded. Slightly moist. Entire interval is pulverized. NOTE THE FOLLOWING INTERVALS (broken boulders/cobbles?): 13.1-13.4 ft. clean qrtzite cobbles, ang. to subang. 13.7-13.9 ft. clean wht translucent, pegmatitic cryptocryst qtz. 14.7-15.1ft. pulverized, clean K-spar pegmatite/granite.

CL: 15.6-16.2 Silty CLAY, dark yellowish brown

NO RECOVERY: 16.2-17.0 No Recovery.

CL: 17.0-20.8 Sandy CLAY, with trace silt and some gravel and cobbles. Dark yellowish brown (10YR4/6). Pervasive iron-oxide. Fine to coarse grained, subangular to subrounded sand. Well graded. Slightly moist. Gravel/cobble zones at 17.0-17.3 and 19.6-20.3 ft.

5300
601

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37601 Lithologic Description	Page 3 of 5
5992		18				
5991		19				
5990		20				
5989		21			CL: 20.8-22.3 CLAY, with trace silt. Dark yellowish brown (10YR4/6) mottled with light olive brown (2.5Y5/3). Trace carbonaceous stringers.	
5988		22			CL: 21.4-22.3 Reworked CLAYSTONE bedrock interval. Slightly moist. Zone with some sand, gravel and cobbles (mainly quartzite). Interval is fractured/broken with some iron-oxide. Inclusions coated with iron and manganese oxides.	
5987		23			CLAYSTONE: 22.3-26.0 CLAYSTONE, dark yellowish brown (10YR4/6) iron-oxidization, mottled with less oxidized claystone-light olive gray (5Y6/2). Trace carbonaceous stringers. Friable, massive, slightly moist. TOP OF BEDROCK at 22.3 ft.	
5986		24				
5985		25				
5984		26			CLAYSTONE: 26.0-26.7 CLAYSTONE with IRONSTONE; strong brown (7.5YR5/5). Iron stained claystone with 30% dark reddish brown (5YR3/4) ironstone inclusions. Claystone is smooth and slightly moist. Ironstone is firm and brittle, angular dry fragments and inclusions.	
5983		27			CLAYSTONE: 26.7-27.7 CLAYSTONE, yellowish brown (10YR5/6), 30-40% mottled grayish brown (10YR5/2), trace reddish yellow (7.5YR6/8). Iron-oxide inclusions. Soft to slightly firm. Smooth texture. Slightly moist. Weathered.	

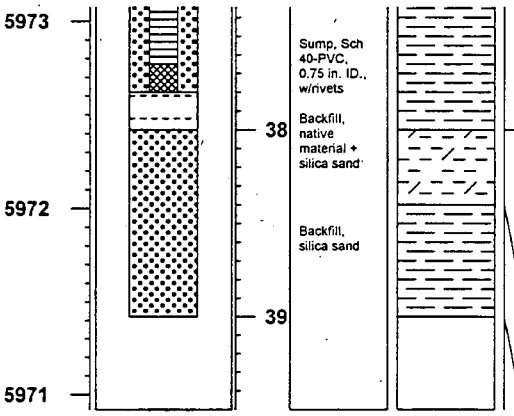
531
602

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					LOG OF BORING NUMBER: **37601**
					Page 4 of 5
5982		28			CLAYSTONE: 27.7-29.2 CLAYSTONE, grayish brown (2.5Y5/2), occasionally olive gray (5Y5/2). Firm. Trace black carbonaceous inclusions and streaks. Trace iron-oxide on fracture surfaces. Predominantly unweathered.
5981		29			CLAYEY SILTSTONE: 29.2-30.4 CLAYEY SILTSTONE, light grayish brown (2.5Y6/2)-light yellowish brown (10YR6/4). Moderately friable. 50% clayey matrix. Trace black carbonaceous inclusions. Slightly moist.
5980		30			CLAYSTONE: 30.4-33.3 CLAYSTONE, light yellowish brown (2.5Y6/4). 20% mottled light brownish gray (2.5Y6/2). Firm. Smooth texture. Weathered. Slightly moist. Silty zone from 31.0-32.0 ft. with some strong brown (7.5YR5/8) iron-oxide fracture surfaces.
5979		31			
5978		32			
5977		33			CLAYEY SILTSTONE: 33.3-34.2 CLAYEY SILTSTONE, brownish yellow (10YR6/6), brittle/friable. 40-50% clayey matrix, weathered (iron-oxide stained). Trace light gray laminations and inclusions, slightly moist.
5976		34			CLAYSTONE: 34.2-37.9 CLAYSTONE, gray (2.5Y6/1), slightly firm, crumbly, smooth-gritty texture, slightly moist. 35.0-36.1 ft. some brownish yellow (10YR6/6) iron-oxide mottling. Trace slightly silty. Predominantly unweathered. Trace black inclusions. Trace iron-oxide staining on fracture surfaces. Some silty zones.
5975		35			
5974		36			
		37			

Draft

532
603

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37601 Lithologic Description	Page 5 of 5



SILTY CLAYSTONE: 37.9-38.4 SILTY CLAYSTONE, light yellowish brown (10YR6/4), 20-30% silt. Moderately friable-crumbly. Slightly moist. Trace iron-oxide stain on fracture surfaces; trace light gray laminations/inclusions.

CLAYSTONE: 38.4-39.0 CLAYSTONE, light yellowish brown (10YR6/4) to strong brown (7.5YR5/8) at 39.0 ft. Firm. Smooth-gritty texture. Some silty zones. Weathered. Slightly moist.

Draft

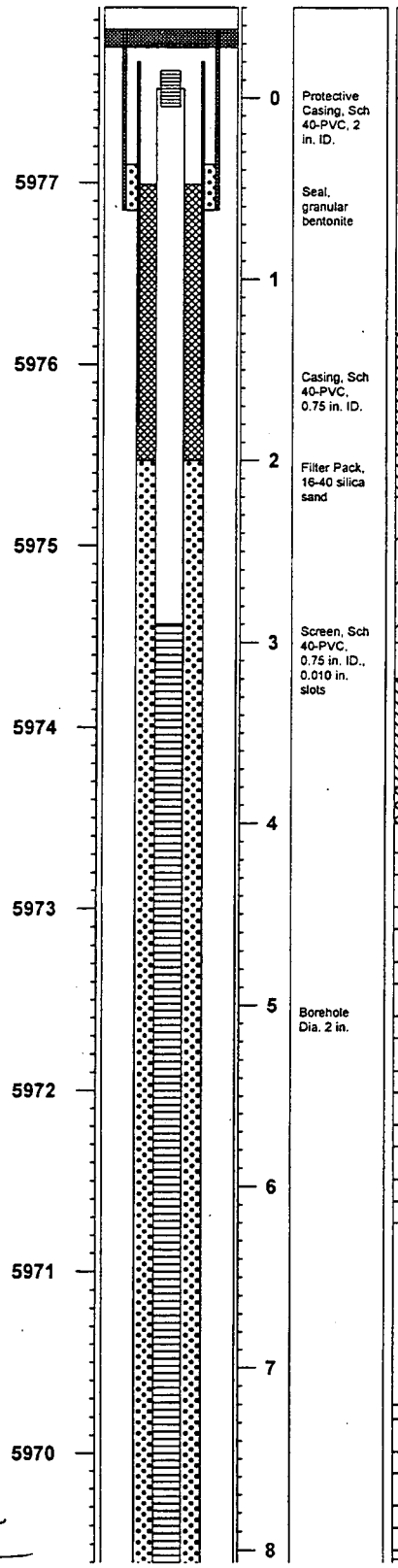
F33
6.04

STATE PLANE COORDINATES AREA:
NORTH: 750523.33
EAST: 2082841.55
PROJECT:
REMARKS:
Note: This well was offset 1 ft to the south-lithology logge

GRND ELEV. (FT): 5977.47
TOTAL DEPTH (FT): 20.05
COMPLETION DATE: 5/1/01
GEOLOGIST: E. Andrew Francisco/Ellen Warp

CASING DIA (IN):
BH DIA. (IN):
GRID LOCATOR:

LOG OF BORING NUMBER: 37701



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.3 No Recovery. Hand-dug excavation for flush mount.
		CL: 1.3-2.2 CLAY, with trace to some sand, olive brown (2.5Y4/3) to dark gray (10YR5/1). Medium to coarse grained sand, subangular to subround, well graded, some moisture. 2 cm cobble at 2.2 ft.- iron-oxidized, manganese oxide coated inclusion at 1.6 ft.
		SC: 2.2-3.0 Clayey SAND, dark gray (10YR5/1) to dark yellowish brown (10YR4/4). Sand same as above from 1.3-2.2 ft. Basal quartzite cobbles. Iron-oxide staining increasing with depth.
		NO RECOVERY: 3.0-3.2 No Recovery.
		CL: 3.2-3.8 CLAY trending to SANDY CLAY at 3.8 ft. Dark gray (10YR5/1). Feldspar and quartzitic (inclusions) cobbles/gravel up to 1 cm.
		SW: 3.8-4.0 SAND. Fine to coarse grained, angular to subrounded, trending to very clean, well graded from 3.85-4.0 ft. Trace of silt and clay.
		SILTY CLAYSTONE: 4.0-6.2 SILTY CLAYSTONE, yellowish brown (10YR5/4) to unweathered dark gray (10YR4/1). CLAYSTONE at 5.1 ft. Iron-oxide and carbonaceous (manganese-oxide?) stringers throughout interval. Moderately friable. TOP OF BEDROCK at 4.0 ft.
		NO RECOVERY: 6.2-7.2 No Recovery.
		SILTY CLAYSTONE: 7.2-8.0 SILTY CLAYSTONE, same as above 4.0-6.2 ft. with more iron-oxide staining throughout interval. Carbonaceous inclusion at 8.8 ft. and significant iron staining on fractures at 9.6 ft. Moderately friable. Moist.

534
605

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37701 Lithologic Description	Page 2 of 3
5969		9			CLAYSTONE: 8.0-8.75 CLAYSTONE, olive brown (2.5Y4/3), trace iron-oxide stringers, moderately friable, moist. Moderate to strong fracturing at 8.27-8.30 ft with strong iron-oxide on fractures and fracture surfaces.	
5968		10			CLAYSTONE: 8.75-9.45 CLAYSTONE, light olive brown (2.5Y5/4). Increased pervasive iron-oxidation, trace manganese oxide (carbonaceous?) stringers.	
5967		11			CLAYSTONE: 9.45-10.75 CLAYSTONE, very dark grayish brown (10YR3/2) grading to dark yellowish brown (10YR4/4) at 10.35 ft. Lighter color due to increased pervasive iron-oxidation. Trace to some iron-oxide stringers and laminations throughout interval. Friable, moist. 2-5mm lamination of black carbonaceous material at 10.0 ft.	
5966		12			NO RECOVERY: 10.75-13.0 No Recovery.	
5965		13			CLAYSTONE: 13.0-14.9 CLAYSTONE, dark grayish brown (10YR4/2) grading to dark yellowish brown (10YR3/4) at 13.8 ft. Iron-oxide mottled throughout until 13.8 ft where iron-oxidation is pervasive. With dark brown iron-oxide (goethite?) on fracture surfaces. Friable. Moist.	
5964		14				
5963		15			CLAYEY SILTSTONE: 14.9-17.0 CLAYEY SILTSTONE with trace to some very fine grained sand, dark yellowish brown (10YR4/4) grading to gray (2.5Y5/1) at 15.6 ft. Moderate to strong iron-oxidation on fracture surfaces from 14.9-15.6 ft. With trace caliche stringers, trace to some black carbonaceous stringers throughout interval. Moist. 15.6-17.0 ft. unoxidized CLAYEY SILTSTONE, basal 2" is laminated. Wet on bottom of cutting shoe.	
5962		16				
5961		17			SILTY CLAYSTONE: 17.0-18.2 SILTY CLAYSTONE, with trace very fine grained sand. Dark grayish brown (10YR4/2), friable, wet.	
5960						

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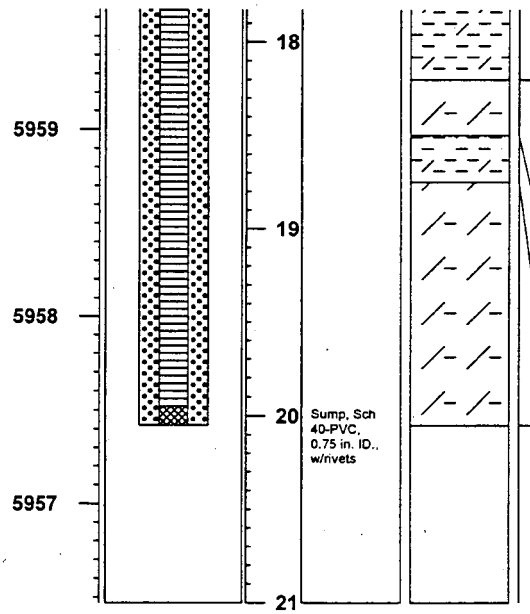
606

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 37701 Lithologic Description	Page 3 of 3



CLAYEY SILTSTONE: 18.2-18.5 CLAYEY SILTSTONE, gray (2.5Y5/1), with trace very fine grained sand, trace black carbonaceous stringers.

SILTY CLAYSTONE: 18.5-18.75 SILTY CLAYSTONE, as above 17.0-18.2 ft.

CLAYEY SILTSTONE: 18.75-20.05 CLAYEY SILTSTONE, as above 18.2-18.5 ft.

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534
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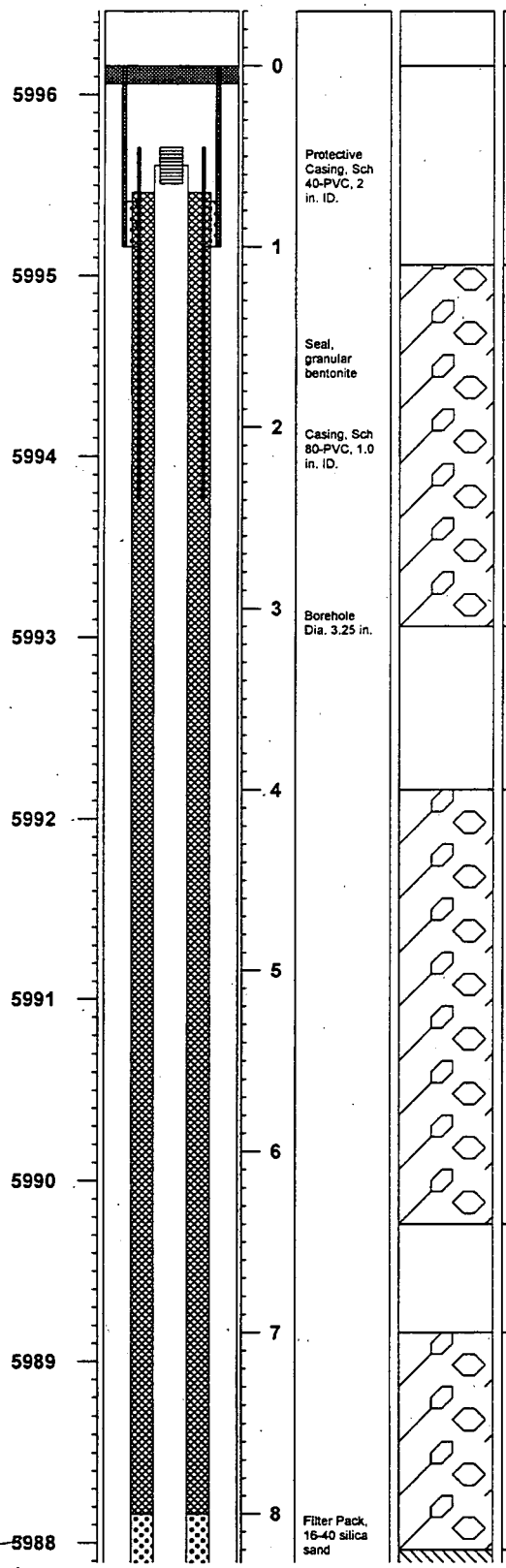
STATE PLANE COORDINATES AREA:	GRND ELEV. (FT):5996.16	CASING DIA (IN):
NORTH:750292.39	TOTAL DEPTH (FT): 27.50	BH DIA. (IN):
EAST: 2083344.78	COMPLETION DATE:11/8/01	GRID LOCATOR:
PROJECT:	GEOLOGIST: Brian Walsh/Joel Sobol	
REMARKS:		

LOG OF BORING NUMBER: 55901



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.1 No Recovery. Flushmount hole.
		GC: 1.1-3.1 Sandy GRAVEL, light reddish brown (5YR6/4)-gray (5YR6/1). Quartzite gravel to 2". Gravel is round-angular (broken fragments). Up to 40% medium-coarse grained sand. Sand is angular-subround. Some silty matrix. Some asphalt fragments at 2.3 ft. Dry.
		NO RECOVERY: 3.1-4.0 No Recovery.
		GC: 4.0-6.4 SAND/GRAVEL/CLAY mixture: 40% GRAVEL-gray quartzite to 2". Some rounded, some angular broken fragments. 40% CLAY-varicolored. Containing some gravel and sand. Slightly moist. 20% SAND-predominantly medium-coarse grained. Some silty matrix. Dry.
		NO RECOVERY: 6.4-7.0 No Recovery.
		GC: 7.0-8.2 CLAY/GRAVEL/SAND mixture as above 4.0-6.4: 10% SAND; 50% CLAY; 40% GRAVEL. Some silt. [Note: Probable fill 0.0-8.2]

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608

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 55901 Lithologic Description	Page 2 of 3
5987		9			CL: 8.2-10.0 Gravelly CLAY-varicolored: yellowish red (5YR5/8)-light greenish gray (GLEY1 7/1; 5G)-reddish yellow (7.5YR6/3). Soft. Smooth-gritty texture. 10% quartzite gravel to 2.0". Occasional scattered sand and silt. Moist.	
5986	Screen, Sch 80-PVC, 1.0 in. ID., 0.010 in. slots	10			CL: 10.0-12.4 Sandy-gravelly CLAY-yellowish red (5YR5/8). Soft. Friable. 30-40% scattered sand (predominantly medium grained and subangular). 5% gravel to 1.5". Trace white caliche inclusions. Slightly moist.	
5985		11				
5984		12				
5983		13			CL: 12.4-13.8 CLAY-reddish brown (2.5YR5/4), mottled light olive gray (5Y6/2). Firm. Smooth texture on cut surface. Dense, tight. Slightly moist. Some gravel to 2" near top.	
5982		14			CL: 13.8-14.9 Sandy-gravelly CLAY as above 10.0-12.4 ft.	
5981		15			CL: 14.9-16.8 Gravelly CLAY-reddish brown (5YR5/4)-light brown (7.5YR6/3). Soft-firm. 20-25% gray quartzite gravel to 1.5". Some sand and silt scattered throughout. Occasional orange and yellow oxidized zones. Slightly moist.	
5980		16				
5979		17			CL: 168.-17.2 CLAY-as above 12.4-13.8 ft., trace gravel.	
		18			CL: 17.2-19.6 Sandy-gravelly CLAY-yellowish red (5YR5/8)-strong brown (7.5YR5/8)-reddish yellow (5R6/6). Oxidized. 20% gravel to 1.5". 20-25% medium-coarse grained sand. WET at 18.7 ft.	

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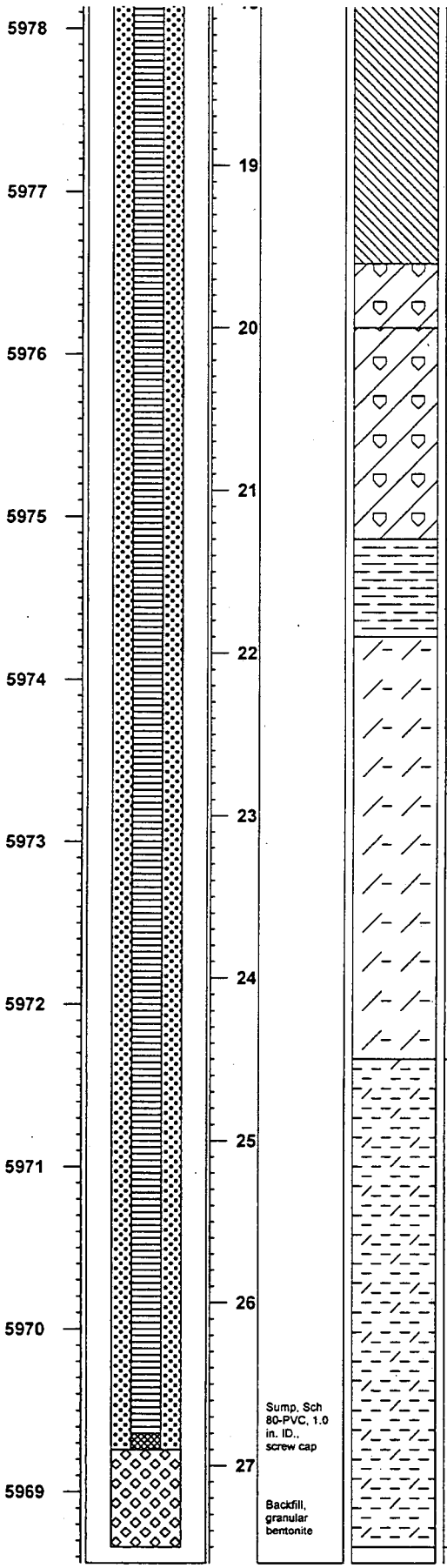
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 55901 Lithologic Description	Page 3 of 3



SC: 19.6-20.0 Clayey-SAND-light brown (7.YR6/4)-reddish yellow (5YR6/6). Predominantly medium grained. Subangular. Some clayey-silty matrix. Occasional gravel to 1.0". Moderately-well graded. WET.

SC: 20.0-21.3 Clayey SAND, as above 19.6-20.0 ft. Sand becoming coarser 21.0-21.3 ft. WET.

CLAYSTONE: 21.3-21.9 CLAYSTONE-brownish yellow (10YR6/8). Very firm. Rough-gritty texture. Trace black inclusions and laminations. Slightly moist. TOP OF BEDROCK at 21.3 ft.

CLAYEY SILTSTONE: 21.9-24.5 Clayey SILTSTONE-pale yellow (2.5Y8/3)-occasionally light gray (10YR7/2). Friable-crumbly. Some clayey matrix (20-30%). Some bright orange iron-oxide stain on small fracture surfaces. Slightly moist-dry.

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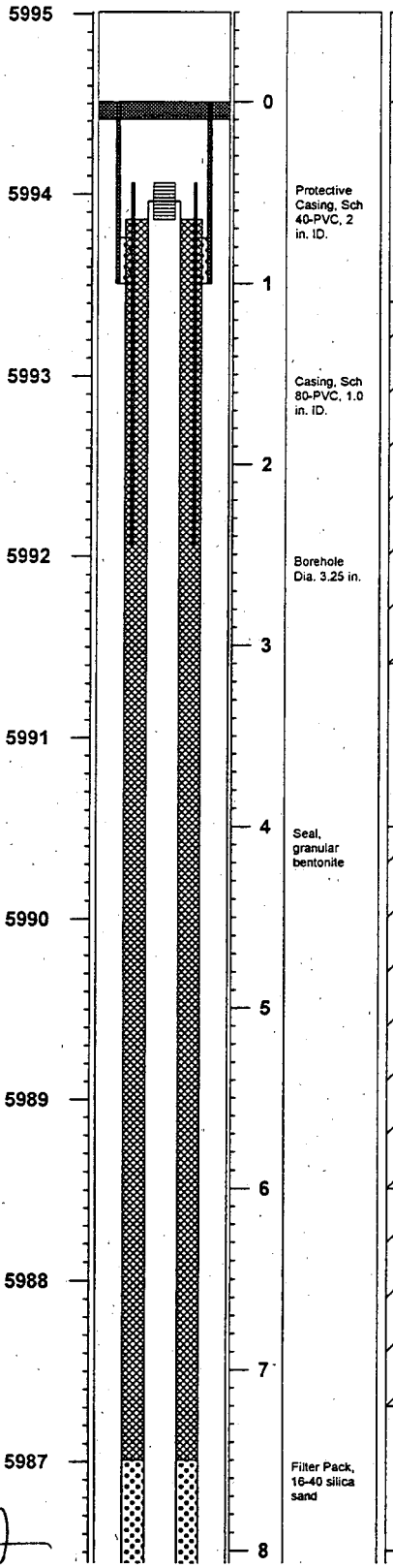
SILTY CLAYSTONE: 24.5-26.9 Silty CLAYSTONE-pale yellow (2.5Y7/4). Occasionally mottled reddish yellow (7.5YR6/6). Crumbly. Stiff. Rough-gritty texture. Moderately silty. Vertical fracture from 24.8-25.5 ft. appears open and lined with white and black non-calcareous material. Slightly moist.

5/29/10

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT):5994.51	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH:750210.38	TOTAL DEPTH (FT): 24.50	BH DIA. (IN):	56001
EAST: 2083574.64	COMPLETION DATE:11/13/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Brian Walsh		
REMARKS:			



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.1 No Recovery. Flushmount hole.
		GC: 1.1-3.1 GRAVEL-SAND-CLAY mixture: 50% GRAVEL-predominantly light gray quartzite fragments (GLEY1 7/N) to 2.0". Rounded angular (broken) fragments. Silty. Organic matrix 1.1-1.3 ft. 40% CLAY-dark red (10R3/6). Soft. Rough-smooth texture. As matrix in gravel. Slightly moist. 10% SAND, medium-coarse grains scattered in clay.
		NO RECOVERY: 3.1-4.0 No Recovery.
		GC: 4.0-6.0 CLAY-GRAVEL-SAND mixture: 50% CLAY-red (10YR4/6). Mottled greenish gray (GLEY1 5/1) 4.0-5.3 ft. Becoming pale olive (5Y6/3) at 5.3 ft. Soft. Some scattered sang grains. As matrix for gravel. Slightly moist. 40% GRAVEL-as above 1.1-3.1 ft. 10% SAND as above 1.1-3.1 ft.
		GC: 6.0-7.2 Clayey GRAVEL-light gray (GLEY1 7/-; N)-gray (GLEY1 5/-;N) quartzite gravel to 2.0". Rounded angular (broken fragments). 15-20% matrix of sandy clay. Clay is brownish yellow (10YR6/8) and slightly moist.
		NO RECOVERY: 7.2-8.0 No Recovery.

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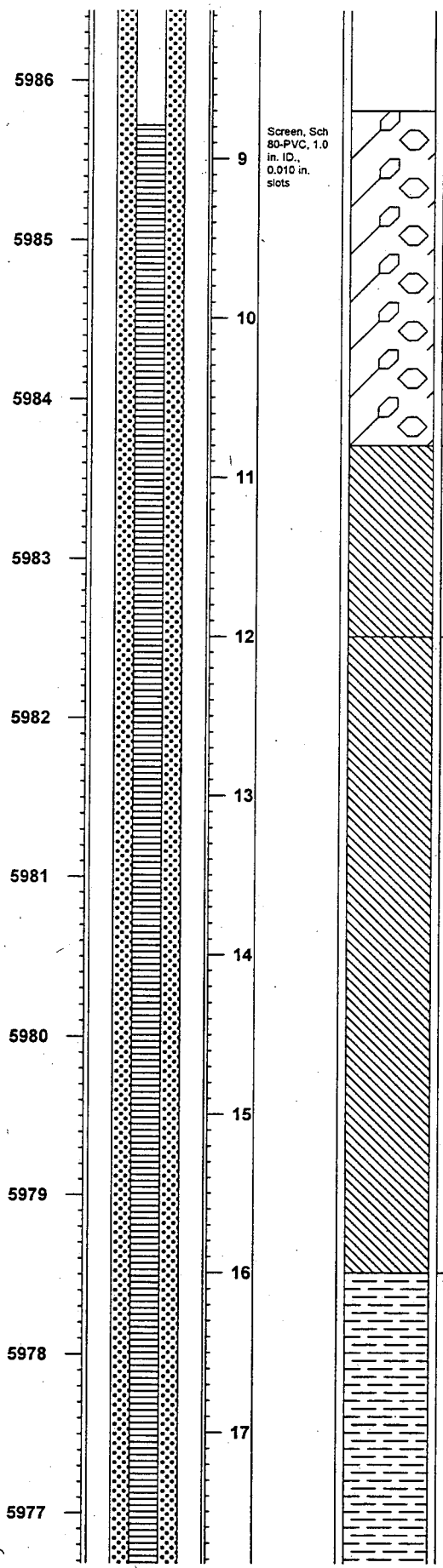
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 56001 Lithologic Description	Page 2 of 3



NO RECOVERY: 8.0-8.7 No Recovery.

GC: 8.7-10.8 Clayey GRAVEL-gray (GLEY1 5/-)-light gray (GLEY1 7/-) quartzite gravel to 1.5". Some red clay matrix. Gravel is predominantly angular broken fragments. Some subround. Abundant rock flour dust.

CL: 10.8-12.0 Sandy-gravelly CLAY-reddish yellow (5YR6/8)-yellowish red (5YR5/8). Soft-slightly firm. Iron-oxide. Some scattered sand grains. 5-10% quartzite gravel to 1.5". Slightly moist.

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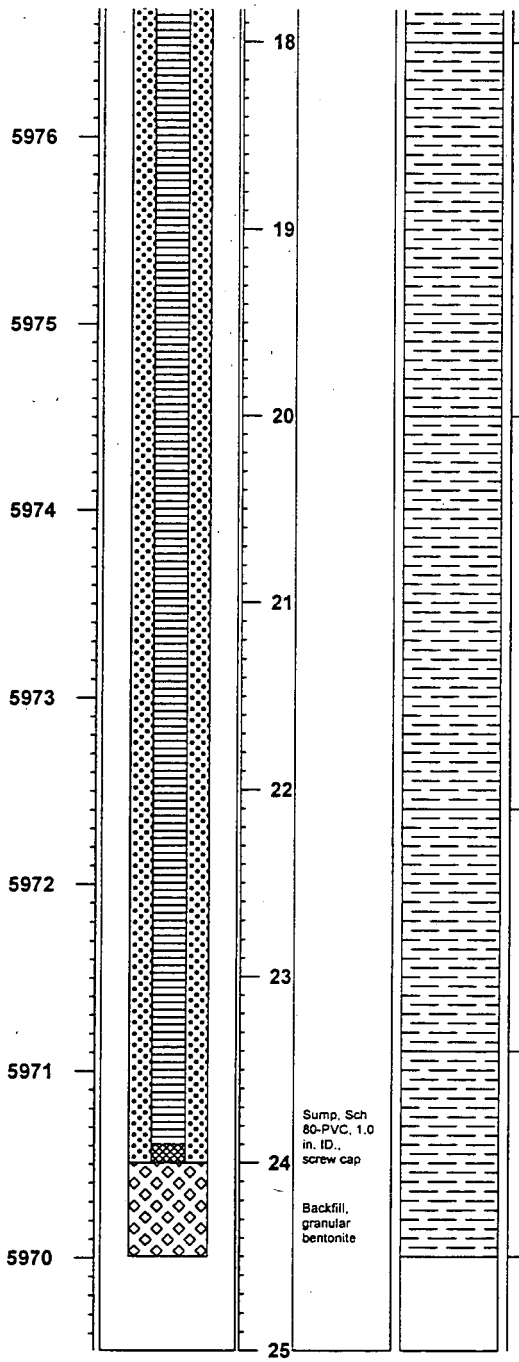
CL: 12.0-16.0 Sandy-gravelly CLAY-as above (10.8-12.0 ft.). Some mottled light greenish gray (GLEY1 7/1, 5GY)-red (7.5R4/6). 10-15% scattered sand. 10% gravel. Slightly moist.

CLAYSTONE: 16.0-18.0 CLAYSTONE-reddish yellow (7.5YR6/6)-light greenishg grey (GLEY1 7/1;10Y). Firm. Smooth texture on cut surface. Dense. Trace black carbonaceous inclusions. Slightly moist. TOP OF BEDROCK at 16.0 ft.

5/11/12

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 56001 Lithologic Description	Page 3 of 3



CLAYSTONE: 18.0-20.0 CLAYSTONE-brownish yellow (10YR6/6)-pale brown (10YR6/3). Occasionally mottled light gray (10YR7/2). Firm. Crumbly 18.0-19.5 ft. Dense and stiff 19.5-20.0 ft. Some iron-oxide stain on small fracture surfaces. Slightly moist.

CLAYSTONE: 20.0-22.1 CLAYSTONE-yellowish brown (20.0-20.5 ft., 10YR5/8)-brown at 20.5 ft.(10YR4/3). Firm. Stiff. Dense. Smooth texture on cut surface. Some black carbonaceous inclusions. Slightly moist-moist.

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CLAYSTONE: 22.1-23.4 CLAYSTONE-gray (10YR6/1). Firm. Rough texture. Some smooth tecture on cut surfaces. Stiff-crumbly. Trace black carbonaceous inclusions. Slightly moist. Dense. A 0.7 ft. black carbonaceous streak between 22.5 and 23.0 ft. (vertical).

CLAYSTONE: 23.4-24.5 CLAYSTONE-gray (10YR6/1). Mottled brownish yellow (10YR6/6). Firm. Rough texture. Dense. Slightly moist.

5947
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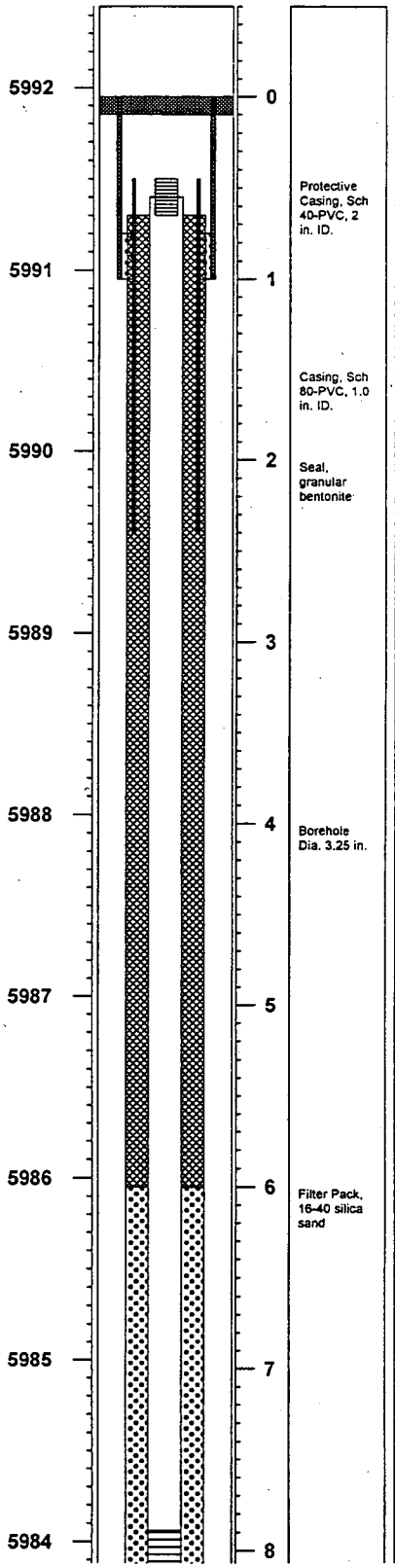
STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5991.95	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 750133.97	TOTAL DEPTH (FT): 26.50	BH DIA. (IN):	56101
EAST: 2083583.98	COMPLETION DATE: 12/4/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Joel Sobol		
REMARKS:			



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.1 No Recovery. Flushmount.
		CL: 1.1-2.0 Gravelly CLAY, reddish brown, 5YR4/6, large pebbles, large angular quartzite fragments, abundant sand.
		CL: 2.0-4.0 Gravelly CLAY, as above, becoming lighter colored, gray to light gray, 2.5Y6/6, varicolored, some olive gray, very sandy, 50% clay, 30% sand, 20% gravel, moist.
		CL: 4.0-6.0 Gravelly CLAY, reddish brown, 2.5Y6/6, varicolored with light green clay matrix, some pink and light red, abundant fractured quarzite pebbles, 50% clay, 40% gravel, 10% sand, moist.
		CL: 6.0-10.0 Gravelly CLAY, light olive-yellow brown, varicolored with yellow and red, and brown zones, abundant granitic material/feldspar fragments, 55% clay, 10% sand, 35% gravel, moist.

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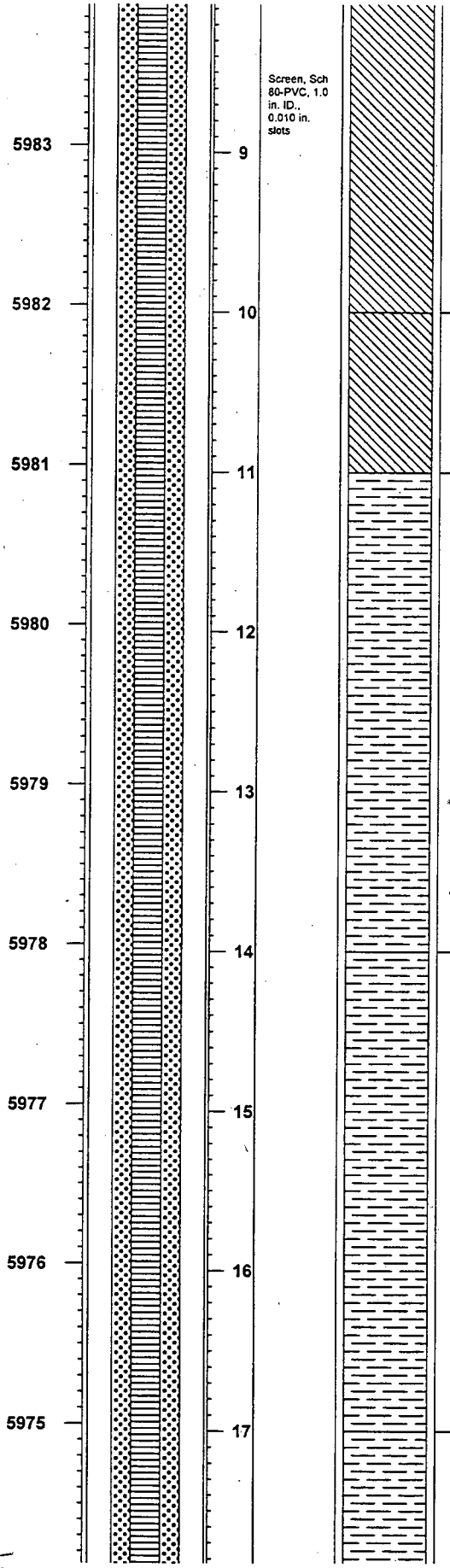
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 56101 Lithologic Description	Page 2 of 3



CL: 10.0-11.0 Gravelly CLAY, reddish-yellow brown, 7.5YR6/8, 80% clay, 20% gravel, firm-moderately indurated, occasional quartz pebbles, moist.

CLAYSTONE: 11.0-12.0 CLAYSTONE, light yellow gray-brownish yellow, 2.5Y6/3-10YR6/6, moderately indurated, traces carbonaceous matter, massive, moist. TOP OF BEDROCK at 11.0 ft.

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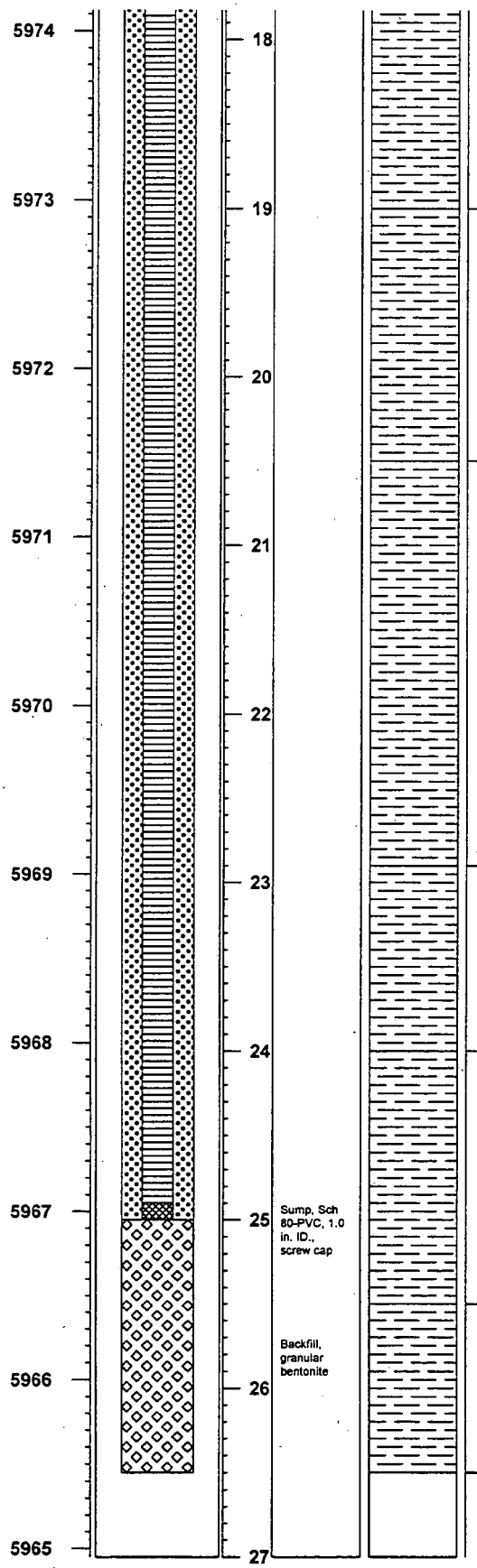
CLAYSTONE: 14.0-17.0 CLAYSTONE, yellow brown with some gray, 10YR6/6, varicolored, rust colored iron stains, black carbonaceous streaks, moderately indurated, blocky, massive, moist.

CLAYSTONE: 17.0-19.0 CLAYSTONE, yellow brown with some gray, 10YR6/6, varicolored, some black streaks, carbonaceous at 17.5 ft. becoming gray-grayish brown, moderately indurated, crumbly, moist.

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					LOG OF BORING NUMBER: **56101**
					Page 3 of 3



CLAYSTONE: 19.0-20.5 CLAYSTONE, yellowish gray-yellowish brown, 10YR6/6, varicolored with gray zones, moderately indurated, black carbonaceous streak, moist.

CLAYSTONE: 20.5-22.9 CLAYSTONE, brownish-grayish yellow, 10YR7/6, with gray zones, varicolored, moderately indurated, massive, moist at 22.4 ft., becoming gray-grayish brown, 2.5Y5/2), traces of coal.

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CLAYSTONE: 22.9-24.0 CLAYSTONE at 22.9 ft. becoming dark reddish brown, 2.5YR4/1, firm-moderately indurated, traces coal and carbonaceous, moist.

CLAYSTONE: 24.0-25.5 CLAYSTONE, dark gray-dark olive gray, firm-moderately indurated, blocky, traces coal, moist.

CLAYSTONE: 25.5-26.5 CLAYSTONE, as above, becoming grayish-brownish yellow, 10YR6/6, varicolored, at 26.1 ft. becoming more gray, firm, moist.

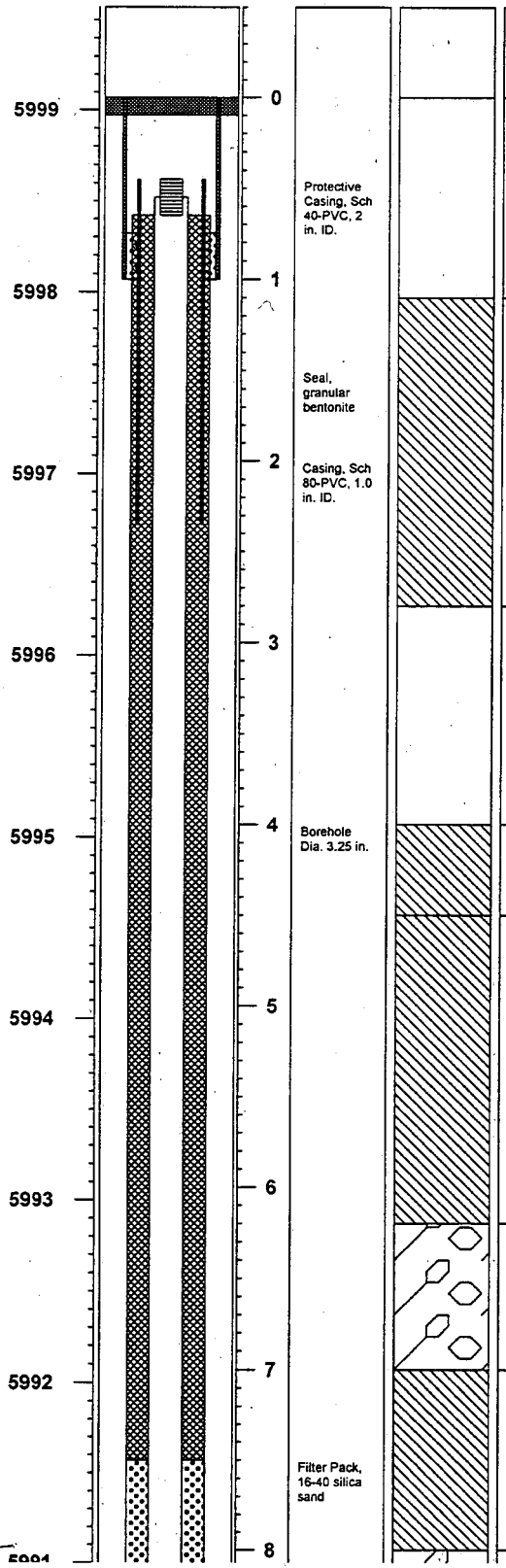
5966
6166

STATE PLANE COORDINATES AREA:
NORTH:750045.8
EAST: 2083341.18
PROJECT:
REMARKS:

GRND ELEV. (FT):5999.07
TOTAL DEPTH (FT): 26.50
COMPLETION DATE:11/20/01
GEOLOGIST: Brian Walsh

CASING DIA (IN):
BH DIA. (IN):
GRID LOCATOR:

LOG OF BORING NUMBER: 56201



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.1 No Recovery. Flushmount hole.
		CL: 1.1-2.8 Gravelly CLAY-yellowish red (5YR5/8)-reddish brown (5YR5/4). Soft. 20% gravel to 2" (predominantly quartzite). Some sand and silt. Moist.
		NO RECOVERY: 2.8-4.0 No Recovery.
		CL: 4.0-4.5 Gravelly CLAY-as above 1.1-2.8 ft.
		CL: 4.5-6.2 Gravelly CLAY-pale olive (5Y6/4). Soft. 20-25% gray quartzite and granitic gravel to 1.5". Some scattered sand and silt. Moist.
		GC: 6.2-7.0 Clayey GRAVEL-gray (GLEY1 5/-) quartxite gravel to 2.0". Subrounded-angular (broken) fragments. 30% light olive gray clayey matrix. Some sand and silt. Matrix is slightly moist.
		CL: 7.0-8.0 Gravelly CLAY-as above 4.5-6.2 ft. Some pink granitic gravel (pulverized).

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Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 56201 Lithologic Description	Page 2 of 3
5990	Screen, Sch 80-PVC, 1.0 in. ID., 0.010 in. slots	9			GC: 8.0-9.5 Clayey GRAVEL-predominantly gray (GLEY1 6/-) quartzite to 1.5".Subround-angular (broken) fragments. 30% reddish yellow (5YR6/6) clayey matrix. Some sand and silt in matrix. Slightly moist. Abundant "rock flour dust".	
5989		10			CL: 9.5-11.5 Sandy-gravelly CLAY-light greenish gray (GLEY1 7/1;5GY) 9.5-9.9 ft. Yellowish red (5YR5/8) below 9.9 ft. 10% gravel to 1.0". 10% scattered sand and silt. Iron-oxide. Soft. Slightly moist.	
5988		11				
5987		12			CL: 11.5-13.2 Sandy-gravelly CLAY-as above 10.0-11.5 ft. Occasionally mottled light greenish grey.	
5986		13				
5985		14			CL: 13.2-15.0 Sandy-gravelly CLAY-reddish brown (2.5YR5/4)-occasionally mottled light greenish gray (GLEY1 7/1;10). Soft-slightly firm. 10% gray quartzite gravel to 2.0". 5-10% scattered sand and silt. Iron-oxide. Slightly moist.	
5984		15			CL: 15.0-16.5 CLAY-light greenish gray (GLEY1 7/1;10Y)-strog brown (7.5YR5/8). Soft. Dense. Slightly silty-sandy. Slightly moist.	
5983		16				
5982		17			CL: 16.5-19.0 Gravelly-sandy CLAY-yellowish red (5YR5/8)-light greenish gray (GLEY1 7/1;5GY). Occasionally mottled reddish gray (10R6/1). Rough texture. 5% quartzite gravel to 2.0". Some scattered sand and silt. Slightly moist.	

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Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 56201 Lithologic Description	Page 3 of 3
5981		18				
5980		19			SC: 19.0-19.8 Clayey SAND-yellowish red (5YR5/6). Medium-fine grained. Subangular-subround. Moderately graded. Loose. 10-25% clayey matrix. WET.	
5979		20			CL: 19.8-21.0 Gravelly-sandy CLAY- reddish yellow (5YR6/6)-light reddish brown (5YR6/3). Soft-slightly firm. 5% quartzite gravel to 1.0". Scattered sand and silt. Moist-WET.	
5978		21			CLAYSTONE: 21.0-22.0 CLAYSTONE-reddish yellow (7.5yr6/8)-gray (7.5YR6/1). Firm. Dense. Trace black inclusions. Slightly moist. Iron-oxide. TOP OF BEDROCK at 21.0 ft.	
5977		22			CLAYSTONE: 22.0-23.5 CLAYSTONE-gray (7.5YR6/1). Very firm. Dense. Occasional bright orange iron-oxide staining on small fracture surfaces. Trace black inclusions. Slightly moist.	
5976		23				
5975		24			CLAYSTONE: 23.5-24.3 CLAYSTONE-brownish yellow (10YR6/6). Very firm. Dense. Some bright reddish orang iron-oxide staining on small fracture surfaces. Trace black inclusions, slightly moist.	
5974		25			CLAYSTONE: 24.3-25.5 CLAYSTONE-light brownish gray (10YR6/2). Very firm. Dense. Some black carbonaceous inclusions. Slightly moist.	
5973	Sump, Sch 80-PVC, 1.0 in. ID., screw cap Backfill, granular bentonite	26			CLAYSTONE: 25.5-26.5 CLAYSTONE-light yellowish brown (10YR6/4)-gray (10YR6/1). Very firm. Dense. Slightly moist-dry.	
		27				

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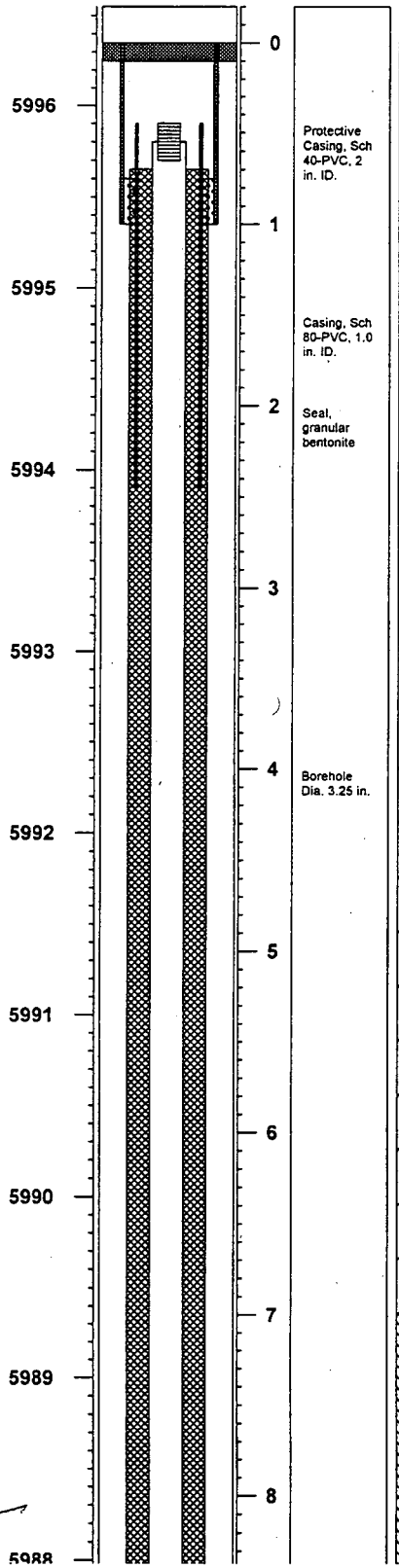
STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5996.35	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 750185.81	TOTAL DEPTH (FT): 27.50	BH DIA. (IN):	56301
EAST: 2083228.81	COMPLETION DATE: 11/16/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Joel Sobol		
REMARKS:			



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.1 No Recovery. Flushmount.
	GC	GC: 1.1-4.0 Clayey GRAVEL, 50% gravel, 30% sand, 20% clay, very pale brown-yellow brown, 10YR7/1-10YR6/6, gravel predominantly quartzite pebbles and angular rock fragments, sand & clay mixture with yellowish brown zones, loose, unconsolidated, dry.
	GC	GC: 4.0-7.0 Clayey GRAVEL as above becoming more sandy, 40% gravel, 35% sand, 25% clay, yellow brown, 10YR6/6, some angular quartzite fragments, large pebbles, iron stain, slightly moist.
	CL	CL: 7.0-8.0 Sandy-silty CLAY, 20% sand, 10% silt, 70% clay, light olive gray, 2.5Y5/4, mottled, reddish bown streaks, carbonaceous matter, firm to moderately indurated, slightly moist.
	CL	CL: 8.0-9.5 CLAY as above, becoming less sandy, some silt, olive gray-yellow brown, 2.5Y6/3, slightly moist.

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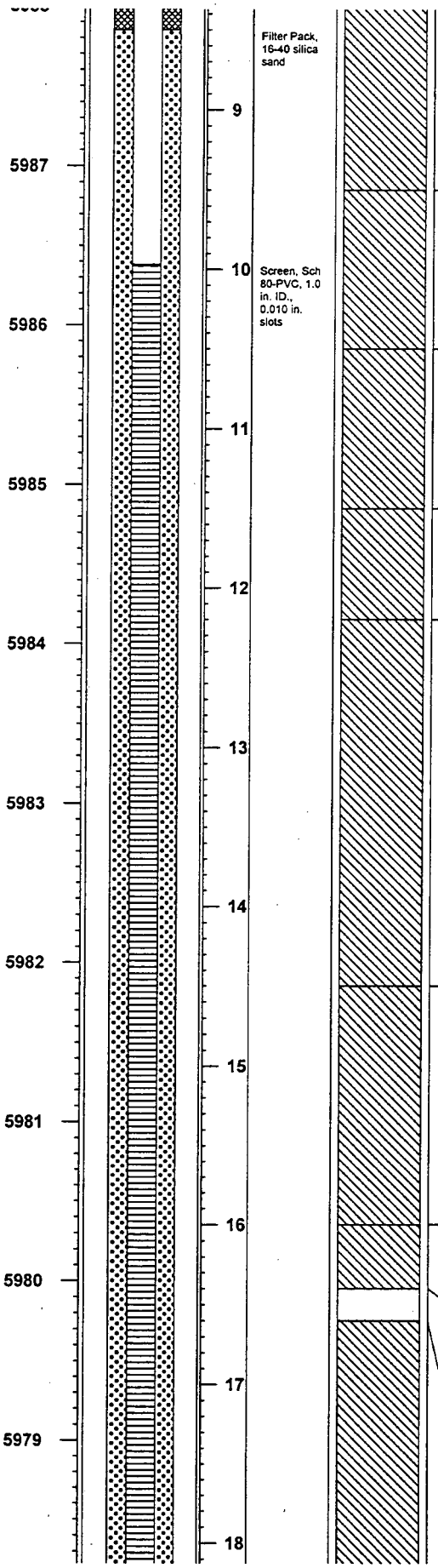
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description

LOG OF BORING NUMBER: **56301**



CL: 9.5-10.5 Sandy CLAY, 55% clay, 45% sand, reddish brown, 5YR5/8, with coarse and very coarse sand, quarzitic, subangular-subrounded, occasional pebbles, moist.

CL: 10.5-11.5 Sandy CLAY at 10.5 as above with occasional large pebble, reddish brown, 7.5YR5/8, black streak-possible carbonaceous matter, moist, white-light gray zones.

CL: 11.5-12.2 Sandy-gravelly CLAY, reddish brown, 5YR5/8, abundant sand and gravel less clay than above, moist.

CL: 12.2-14.5 Sandy CLAY, less gravel, wet. At 12.6 ft. becoming more gravelly. At 13.0 ft. less gravel very clayey. A 13.5 ft. gravelly with large pebbles and angular rock fragments.

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CL: 14.5-16.0 At 15.3 ft. CLAY, greenish gray-olive gray, 5Y6/2, sandy, some silt, reddish brown zone.

CL: 16.0-16.4 At 16.0 CLAY as above becoming reddish brown, 5YR5/4, sandy, wet.

SP: 16.4-16.6 SAND, fine-medium grained, white-light gray, subangular-subrounded, quarzitic, well sorted, wet.

CL: 16.6-17.5 Sandy CLAY, brownish gray, wet. At 17.0 ft. CLAY as above with abundant gravel and large pebbles and rock fragments.

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 56301 Lithologic Description	Page 3 of 3
5978		19				
5977						
5976		20			CL: 20.0-20.5 Gravelly CLAY, reddish brown, 5YR5/8, sandy zones, wet.	
		21			CL: 20.5-22.0 Gravelly CLAY, reddish brown-olive gray, 7.5YR6/8-5Y7/3, abundant large pebbles and coarse and very coarse sand, moist.	
5975						
5974		22			CLAYSTONE: 22.0-23.0 CLAYSTONE, gray-dark gray, 10YR4/1, firm-moderately hard, moderately indurated, slightly moist, yellow blebs-iron staining. TOP OF BEDROCK at 22.0 ft.	
5973		23			CLAYSTONE: 23.0-24.0 CLAYSTONE, gray-brownish gray, 10YR5/2, mottled with yellow specks, firm, slightly moist.	
5972		24			CLAYSTONE: 24.0-25.0 CLAYSTONE, grayish brown, varicolored, 2.5Y5/2, yellow specks iron stain, firm, moderately indurated, slightly moist.	
5971		25			CLAYSTONE: 25.0-26.0 CLAYSTONE, light gray, 2.5Y5/1, some iron staining and yellow blebs, moderately indurated, firm, slightly moist.	
5970		26			CLAYSTONE: 26.0-27.0 CLAYSTONE, olive gray-yellow gray, 2.5Y6/4, varicolored with yellow iron stain, some black streaks and carbonaceous matter, slightly moist.	
5969	Sump, Sch 80-PVC, 1.0 in. ID., screw cap Backfill, granular bentonite	27			CLAYSTONE: 27.0-27.5 CLAYSTONE, as above, gray-yellow gray, 2.5Y6/3, yellow streaks, iron stains, blocky, firm, slightly moist.	

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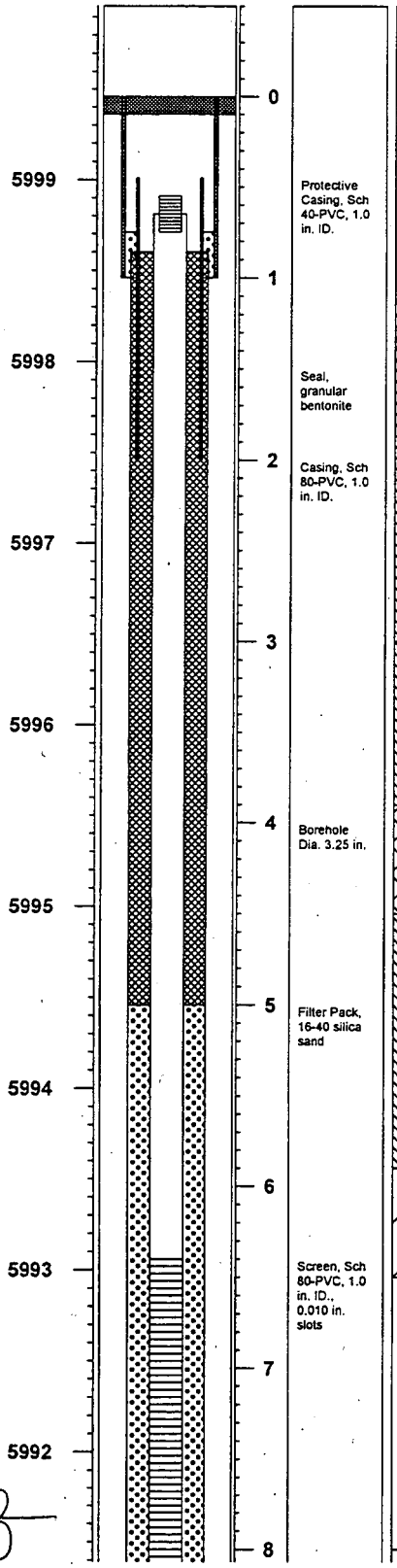
STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5999.46	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 748718.02	TOTAL DEPTH (FT): 22.00	BH DIA. (IN):	83101
EAST: 2083944.86	COMPLETION DATE: 10/10/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Joel Sobol		
REMARKS:			



Well or Piezometer Construction and Materials	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
			NO RECOVERY: 0.0-1.2 No Recovery. Flushmount hole.
			CL: 1.2-3.0 Gravelly CLAY, brown (7.5YR4/2)-dark reddish brown (5YR3/4). Soft. Moist. 15% quartzite gravel to 1.5". Trace caliche inclusions.
			CL: 3.0-3.9 CLAY/CALICHE, very pale brown (10YR8/6)-mottled strong brown (7.5YR5/6). Soft. Slightly moist. Crumbly. 5% quartzite gravel to 0.5".
			GW: 3.9-4.5 GRAVEL, gray (GLEY1 6/-). Broken angular fragments to 2.0" (quartzite). Minor clayey matrix (5%).
			CL: 4.5-5.9 Gravelly CLAY, light greenish gray (GLEY1 8/1), occasionally mottled greenish gray (GLEY1 6/1). Soft. Moist. 10% gravel to 1". 5% coarse sand. Abundant argillaceous caliche.
			GC: 5.9-6.5 Clayey-sandy GRAVEL, see below at 8.0-10.4 ft.
			NO RECOVERY: 6.5-8.0 No Recovery.

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Elev (Ft)	Depth (Ft)	Well or Piezometer Construction and Materials	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5991	9				GC: 8.0-10.4 Clayey-sandy GRAVEL, yellowish red (5YR5/8)-light reddish brown (2.5YR6.4). Occasionally mottled greenish gray (GLEY1 6/1; 5GY). Quartzite gravel to 1.0". Up to 5% clay-sand matrix. Trace white caliche inclusions. Slightly moist.
5990	10				
5989	11				CL: 10.4-10.8 CLAY, see below at 12.0-13.5 ft.
5988	12				NO RECOVERY: 10.8-12.0 No Recovery.
5987	13				CL: 12.0-13.5 CLAY, light greenish gray (GLEY1 7/1; 5GY)-olive yellow (2.5Y6/6). Smooth-waxy texture. Dense. Iron-oxide staining. Moist. Granitic pebbles 1.0-1.5" at 12.1 and 12.7 ft.
5986	14				CLAYSTONE: 13.5-17.0 CLAYSTONE, greenish gray (GLEY1 6/1;10Y)-reddish yellow (7.5Y6/8). Weathered. Iron-oxide staining. Rough texture. Crumbly. Slightly moist. Occasionally iron-oxide staining on small fracture surfaces. TOP OF BEDROCK at 13.5 ft.
5985	15				
5984	16				
5983	17				
5982					SILTY CLAYSTONE: 17.0-17.5 SILTY CLAYSTONE, brownish yellow (10YR6/6). Weathered. Crumbly. Gritty-rough texture. Trace black carbonaceous streaks and inclusions. Slightly moist.
					CLAYSTONE: 17.5-20.0 CLAYSTONE, light yellowish brown

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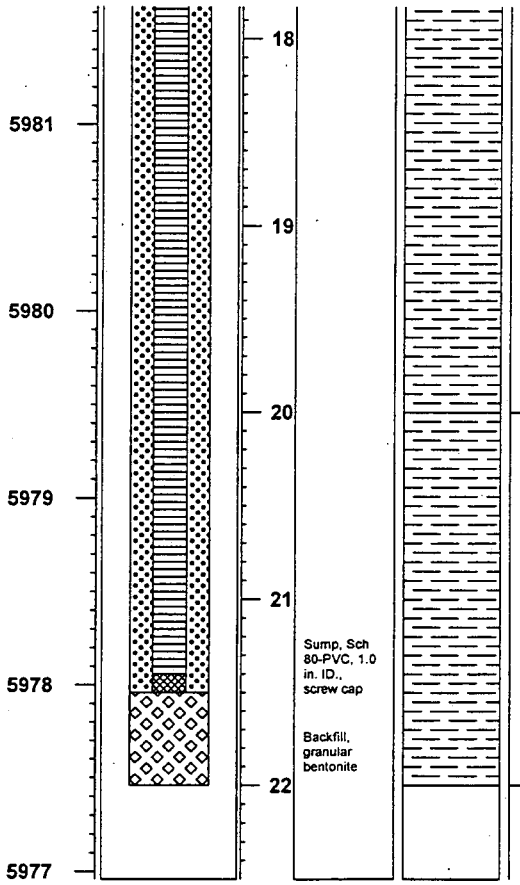
1024

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 83101 Lithologic Description	Page 3 of 3



(2.5Y6/4). Occasionally mottled light greenish gray (GLEY1 7/1;5GY). Firm. Rough texture. Some fractures with iron-oxide staining on surfaces. Trace black (carbonaceous?) inclusions. Thin white caliche layer at 19.5 ft. Slightly moist.

CLAYSTONE: 20.0-22.0 CLAYSTONE, light yellowish brown (2.5Y6/3)-occasionally mottled greenish gray (GLEY1 6/1;5GY). Some highly oxidized/weathered reddish yellow (7.5YR6/8) zones and fracture surfaces. Rough-smooth texture. Slightly moist.

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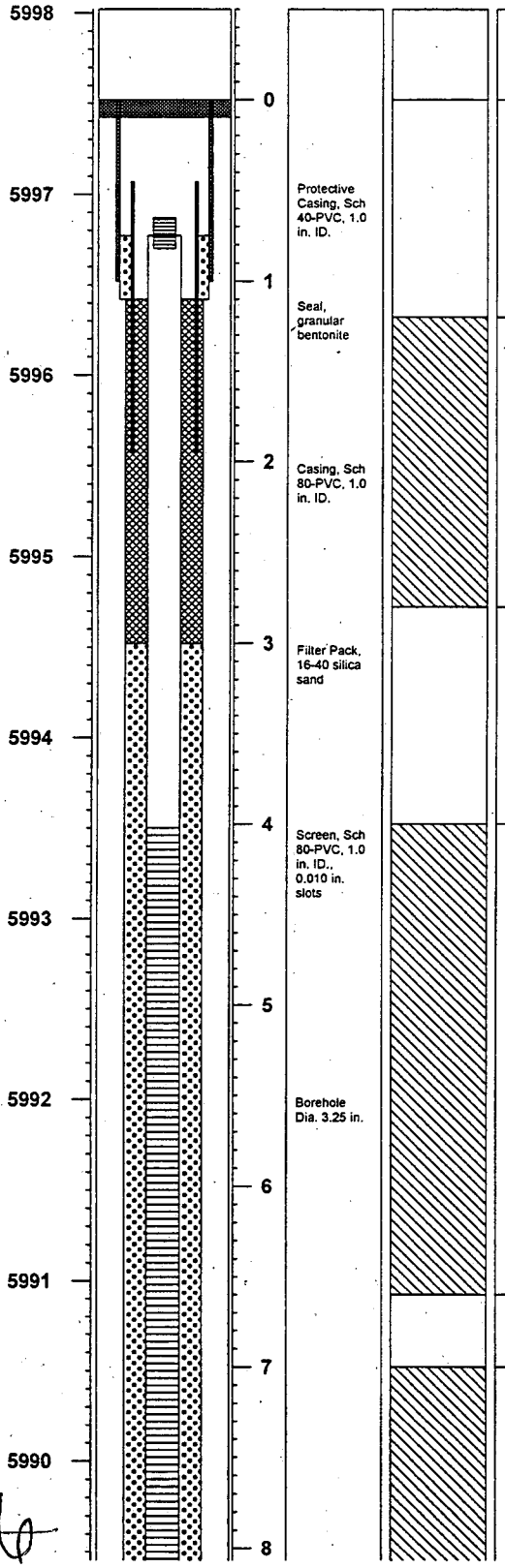
STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5997.52	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 748857.24	TOTAL DEPTH (FT): 20.50	BH DIA. (IN):	83201
EAST: 2083947.05	COMPLETION DATE: 10/9/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Joel Sobol		
REMARKS:			



Unified Soils Classification or Rock Type	Lithologic Description
	NO RECOVERY: 0.0-1.2 No Recovery. Flushmount, fill material-sand and gravel.
	CL: 1.2-2.8 CLAY, light tan-brown (10YR6/2). Argillaceous with white blebs, possible caliche nodules. Soft. Moist. At 2.2 ft. occasional large pebbles, some sand.
	NO RECOVERY: 2.8-4.0 No Recovery.
	CL: 4.0-6.6 CLAY, whitish tan (10YR7/1)-light gray (GLEY2 7/1;10 B). Abundant caliche. Soft. Low-medium plasticity, moist. Iron stains at 6.0 ft.
	NO RECOVERY: 6.6-7.0 No Recovery.
	CL: 7.0-8.6 CLAY, gray-light gray (GLEY1 6/1(;N?). Soft. Abundant caliche inclusions. Slightly moist.

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Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 83201 Lithologic Description	Page 2 of 3
5989		9				
					CLAYSTONE: 8.6-10.0 CLAYSTONE, gray-light olive gray (5Y6/3). Occasional yellow brown streaks. Iron stains. Poorly indurated. Soft. Slightly moist. TOP OF BEDROCK at 8.6 ft.	
5988		10				
					CLAYSTONE: 10.0-12.0 CLAYSTONE, light gray (2.5Y7/2)-olive brown (5Y6/2). Weathered. Poorly indurated. Soft. Slightly moist.	
5987		11				
5986		12				
					CLAYSTONE: 12.0-14.0 CLAYSTONE, light olive brown (2.5Y5/3), occasional yellow streaks. Iron-oxide staining. Mottled. Poorly indurated. Soft. Slightly moist.	
5985		13				
5984		14				
					CLAYSTONE: 14.0-16.0 CLAYSTONE, light brownish gray (2.5Y6/2)-yellow (2.5Y7/6). Highly weathered and oxidized with abundant iron staining. Poorly indurated. Soft. Slightly moist.	
5983		15				
5982		16				
					CLAYSTONE: 16.0-18.0 CLAYSTONE, light brownish gray (2.5Y6/2). Abundant orange and rust streaks. Iron staining. Mottled. Poorly indurated. Soft. slightly moist to moist.	
5981		17				
5980						

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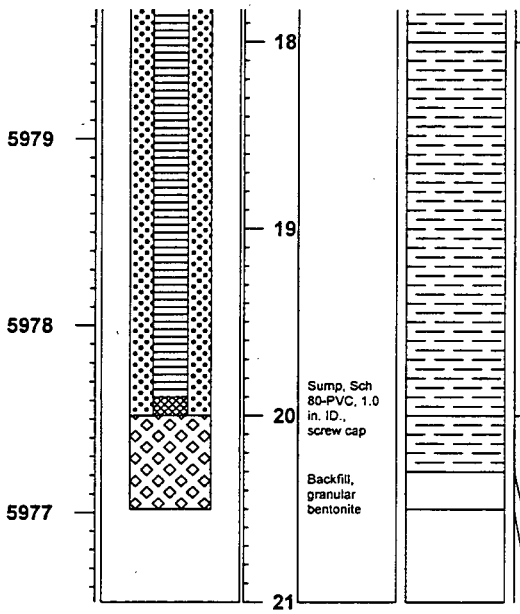
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 83201 Lithologic Description	Page 3 of 3



CLAYSTONE: 18.0-20.0 CLAYSTONE, light brownish gray (2.5Y6/2)-olive yellow (2.5Y6/8). Heavy iron staining . Soft. Poorly indurated. Moist. Abundant calcareous nodules at 19.2 ft.

CLAYSTONE: 20.0-20.3 CLAYSTONE, light brownish gray (2.5Y6/2)-olive yellow (2.5Y6/8). Iron staining. Moderately soft. Poorly indurated. Vertical and linear iron stains. Slightly moist.

NO RECOVERY: 20.3-20.5 No Recovery.

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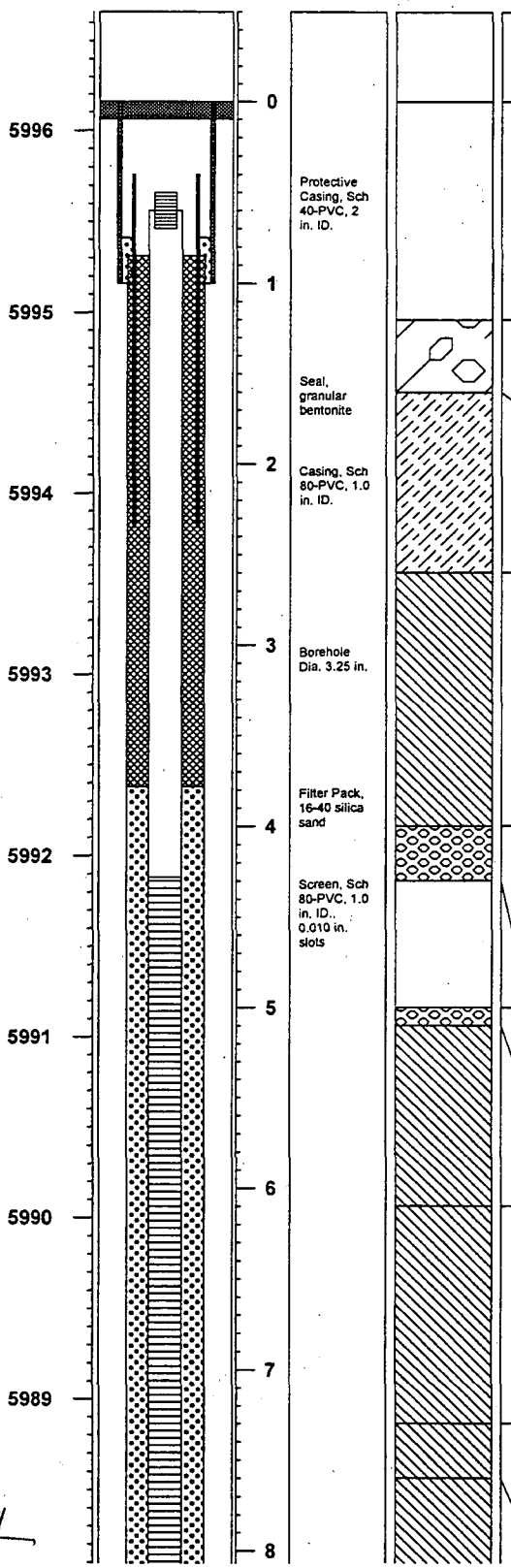
STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5996.16	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 749066.94	TOTAL DEPTH (FT): 24.50	BH DIA. (IN):	86501
EAST: 2083972.06	COMPLETION DATE: 10/17/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Joel Sobol		
REMARKS:			



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.2 No Recovery. Flushmount hole, sand and gravel, possible fill material.
	GC	GC: 1.2-1.6 Clayey GRAVEL, light brown (7.5YR6/3)-tan, some dark brown pebbles. Moist. 60% gravel, 40% fines.
	OH	OH: 1.6-2.6 ORGANIC CLAY, reddish black (5R2.5/1)-very dark brown (7.5YR2.5/2). Soft. Some small pebbles. Moist.
	CL	CL: 2.6-4.0 CLAY, light brown-very pale brown (10YR8/2). Occasional sand and small pebbles. Some orange specks. Soft. Very moist.
	SW	SW: 4.0-4.3 SAND, orange-reddish brown (5YR5/8). Coarse to fine grained. Angular to subangular. Poorly sorted. Moderately consolidated. Moist.
		NO RECOVERY: 4.3-5.0 No Recovery.
	SW	SW: 5.0-5.1 SAND, as above 4.0-4.3.
	CL	CL: 5.1-6.1 CLAY, light brown-tan (10YR8/3). Very sandy with gravel, 55% fines, 45% sand. Argillaceous. White blebs-possible caliche nodules. Soft. Moist.
	CL	CL: 6.1-7.3 CLAY, gray-yellow gray (5Y5/2). White fill material, argillaceous and possible caliche. Soft. Moist.
	CL	CL: 7.3-7.6 CLAY, reddish brown-gray (7.5YR4/8). Abundant sand and gravel grains. Stiff. Moist.
	CL	CL: 7.6-8.0 CLAY, gray-light gray (2.5Y6/2). White inclusions. Some

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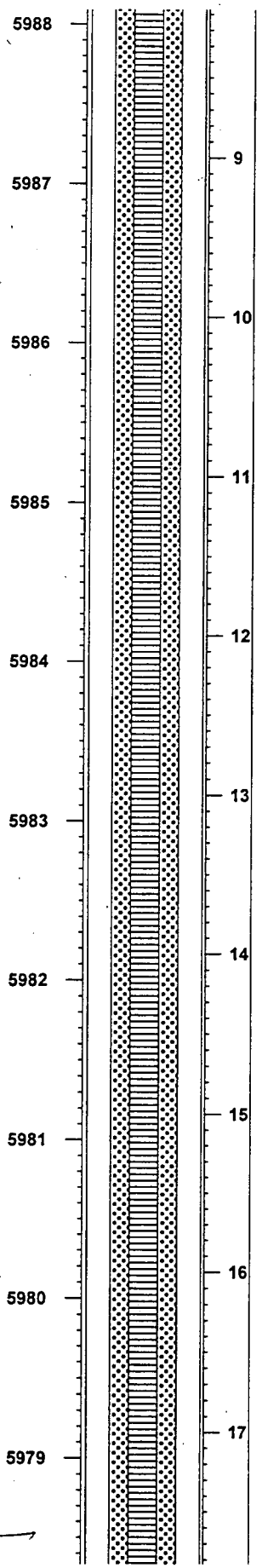
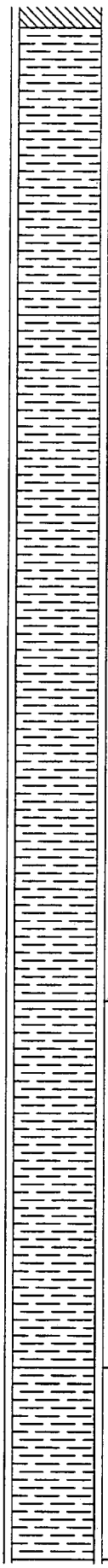
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 86501 Lithologic Description	Page 2 of 3





iron streaks. Stiff. Soft. Moist.

CLAYSTONE: 8.2-10.0 CLAYSTONE, light yellowish brown (10YR6/4), some light greenish gray (GLEY1 7/1;10Y) mottling. Firm. Rough texture. Crumbly. Some reddish yellow iron-oxide mottling. Slightly moist. 2.5" white calcite/caliche nodule at 9.5 ft. TOP OF BEDROCK at 8.2 ft.

CLAYSTONE: 10.0-14.3 CLAYSTONE, gray (GLEY1 6/-;N) 10.0-10.5 ft. Predominantly yellowish brown (10YR5/8) 10.5-14.3 ft. Some light gray (10YR7/1) mottling. Firm. Crumbly. Rough texture. Trace black carbonaceous inclusions. Weathered. Iron-oxide stained. Slightly moist.

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CLAYSTONE: 14.3-16.6 CLAYSTONE, light gray (10YR7/1). Firm-stiff. Smooth texture. Occasional bright orange iron-oxide staining on small fracture surfaces. Trace black carbonaceous inclusions (one is 0.33' in dia.). Trace white calcite/caliche at 15.4 ft. Slightly moist. Dense.

CLAYSTONE: 16.6-17.8 CLAYSTONE, yellowish brown (10YR5/6)-pale brown (10YR6/3). Some strong brown (7.5YR5/8) at 16.6-17.0 ft. Firm. Crumbly. Rough-smooth texture. Slightly moist.

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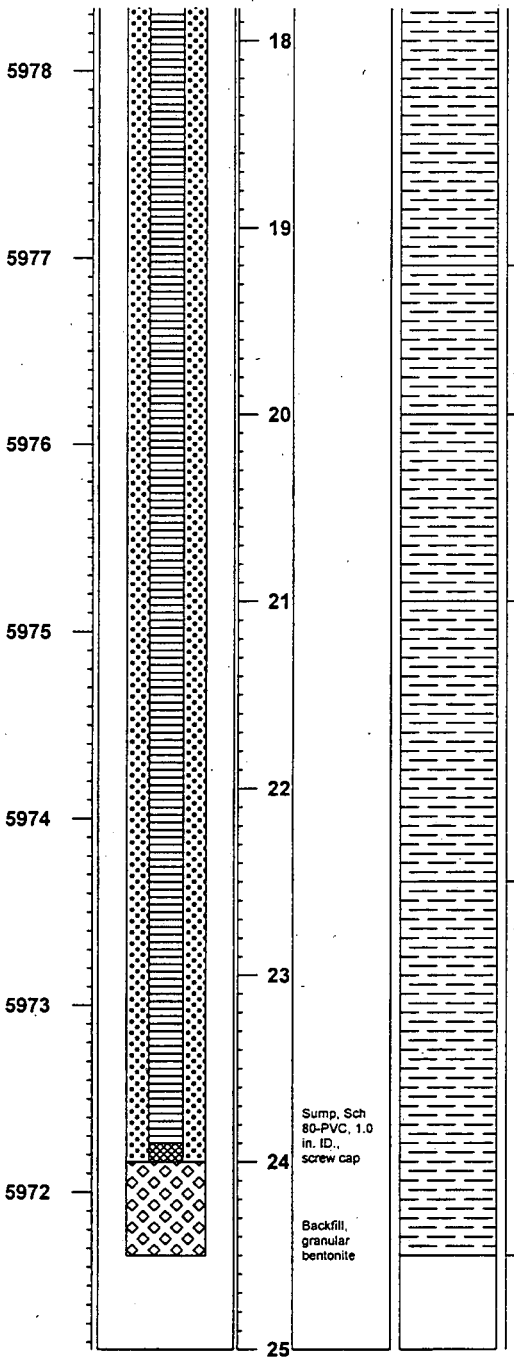
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 86501 Lithologic Description	Page 3 of 3



CLAYSTONE: 17.8-19.2 CLAYSTONE, brownish yellow (10YR6/8). Firm-stiff. Smooth-blocky texture. Occasional bright orange iron-oxide staining on small fracture surfaces. Dense. Slightly moist.

CLAYSTONE: 19.2-20.0 CLAYSTONE, light brownish gray (10YR6/2). Firm. Crumbly. Rough-gritty texture. Slightly silty. Some orange iron-oxide stained zones and fracture surfaces. Slightly moist.

CLAYSTONE: 20.0-21.0 CLAYSTONE, gray (10YR6/1). Firm. Crumbly. Rough-gritty texture. Slightly silty. Trace bright orange iron-oxide stained (small) fracture surfaces. Slightly moist.

CLAYSTONE: 21.0-22.5 CLAYSTONE, brownish yellow (10YR6/6)-light yellowish brown (10YR6/4). Smooth-rough texture. Some calcite/limy nodules at 21.8-22.0 ft. Occasional bright orange iron-oxide stain on fracture surfaces. Slightly moist.

CLAYSTONE: 22.5-24.5 CLAYSTONE, gray (10YR6/1). Becoming pale brown (10YR6/3) at 24.1 ft. Firm. Very crumbly. Rough-gritty texture. Slightly silty. Trace orange iron-oxide stain on fracture surfaces (very small). Slightly moist.

Preliminary

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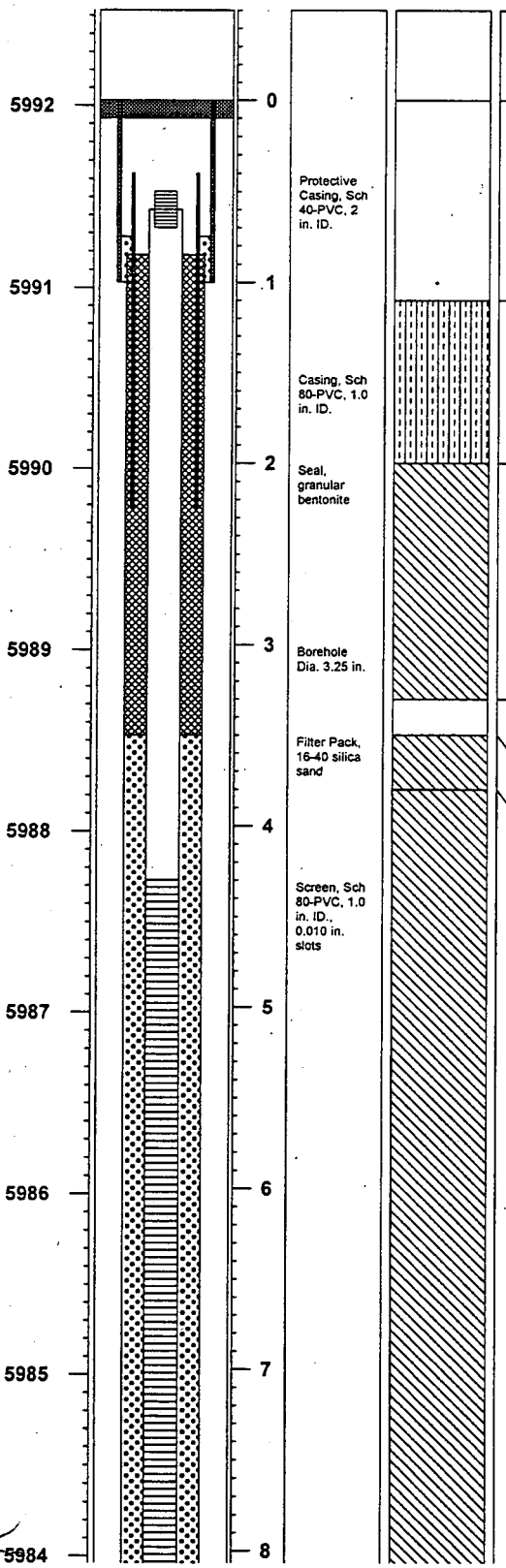
STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5992.03	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 749211.27	TOTAL DEPTH (FT): 24.50	BH DIA. (IN):	86601
EAST: 2084088.25	COMPLETION DATE: 10/18/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Brian Walsh		
REMARKS:			



Unified Soils Classification or Rock Type	Lithologic Description
	NO RECOVERY: 0.0-1.1 No Recovery. Flushmount hole.
	OL: 1.1-2.0 Sandy-gravelly SILT, dark brown (7.5YR3/2)-red (2.5YR4/6). Organic (brown). Clayey. 40% quartzite gravel to 1.0". Dry-slightly moist.
	CL: 2.0-3.3 Silty-gravelly CLAY, dark brown (7.5YR3/2). 5-10% quartzite gravel to 2.0". Organic. Slightly-moderately silty. Trace sand. Slightly moist.
	NO RECOVERY: 3.3-3.5 No Recovery.
	CL: 3.5-3.8 Silty-gravelly CLAY, as above 2.0-3.3 ft. Trace caliche.
	CL: 3.8-9.6 CLAY, light brownish gray (2.5Y6/2). Occasionally mottled brownish yellow (10YR6/6). Soft-firm. Slightly crumbly at 8.5-9.5 ft. Predominantly smooth texture. Dense. Locally abundant white caliche. Some gray quartzite gravel to 1.0" associated with caliche zones. Moist. Some bright orange iron-oxide staining 9.0-9.6 ft.

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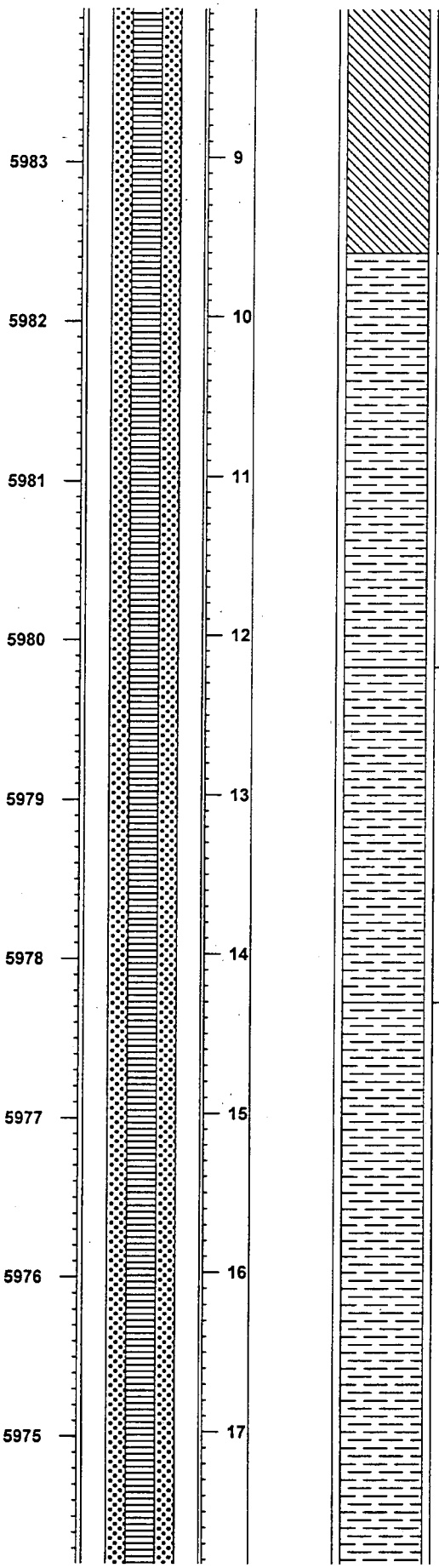
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 86601 Lithologic Description	Page 2 of 3



CLAYSTONE: 9.6-12.2 CLAYSTONE, gray (10YR6/1)-light yellowish brown (2.5Y6/3). Yellowish red (5YR5/8) iron-oxide stained zone with ironstone nodules to 1.5" at top (9.6-9.9 ft.). Firm. Crumbly 10-10.8 ft. Rough texture. Dense. Some small iron-oxide (orange & black) stains on small fracture surfaces. Slightly moist. TOP OF BEDROCK at 9.6 ft.

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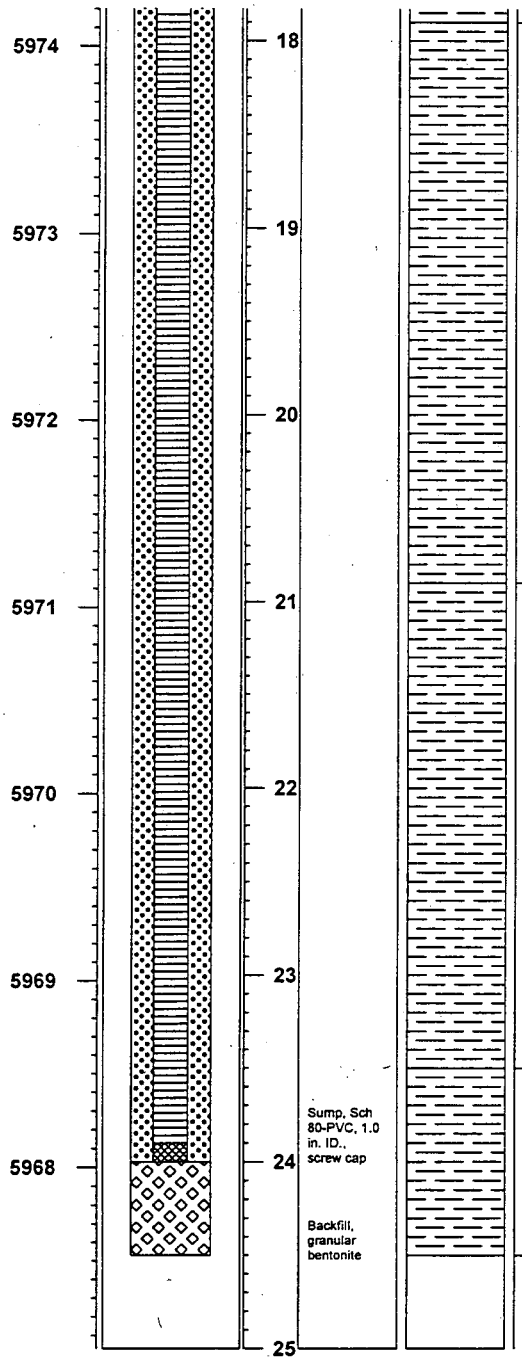
CLAYSTONE: 12.2-14.3 CLAYSTONE, light gray (10YR7/1)-light yellowish brown (2.5Y6/4). Yellowish red (5YR5/8) iron-oxide stained zone (12.8-13.2 ft.). Firm. Iron-oxide stained zone is very crumbly. Rough texture. Trace smooth texture. Some black staining on small fracture surfaces. Slightly moist.

CLAYSTONE: 14.3-17.9 CLAYSTONE, yellowish brown (10YR5/6)-light yellowish brown (10YR6/4). Firm-stiff. Smooth-waxy on cut surface. Occasional reddish yellow (7.5YR6/8) iron-oxide zones. Trace black carbonaceous inclusions. Moist. Dense. Tight.

Fig 3
1.33

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 86601 Lithologic Description	Page 3 of 3



CLAYSTONE: 17.9-20.9 CLAYSTONE, brown (7.5YR5/2). Very firm-stiff. Rough texture. Smooth-waxy texture on cut surface. Trace-occasional black carbonaceous inclusions. Very tight. Very dense. Slightly moist.

CLAYSTONE: 20.9-23.5 CLAYSTONE, brownish yellow (10YR6/8). Occasionally mottled light yellowish brown (10YR6/4). Smooth texture on cut surfaces. Weathered. NOTE: 21.0-21.4 ft. is a highly oxidized/iron-stained zone with ironstone fragments, this material is very moist-wet.

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CLAYSTONE: 23.5-24.5 CLAYSTONE, brownish yellow (10YR6/6) from 23.5 to 24.0 ft. Gray (10YR6/1) from 24.0 to 25.5 ft. Firm. Crumbly. Rough-gritty texture. Some bright orange iron-oxide stained, small, fracture surfaces. Slightly moist.

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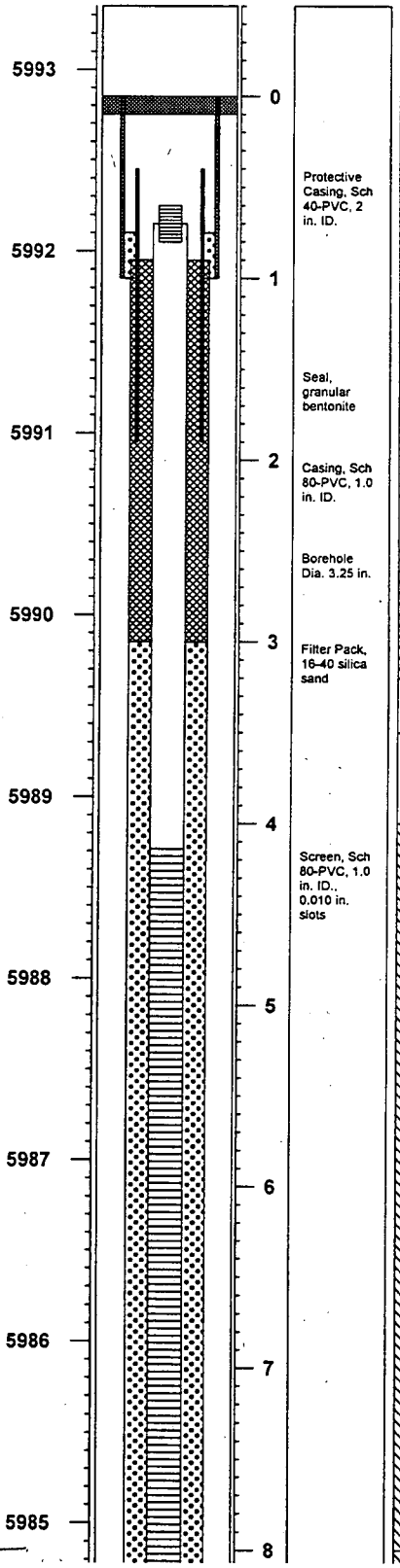
634

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT):5992.85	CASING DIA (IN):
NORTH:748933.65	TOTAL DEPTH (FT): 20.50	BH DIA. (IN):
EAST: 2084115.19	COMPLETION DATE:10/8/01	GRID LOCATOR:
PROJECT:	GEOLOGIST: Brian Walsh	
REMARKS:		

LOG OF BORING NUMBER: 86701



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.1 No Recovery. Flushmount hole.
		IRONSTONE: 1.1-1.6 CALICHE, pink (7.5YR8/3)-pinkish white (7.5YR8/2). Argillaceous/clayey. Occasionally mottled with reddish yellow (7.5YR6/6) oxidized clayey inclusions. Slightly silty-sandy. Trace quartzite pebbles to 0.5". Moist.
		GC: 1.6-2.5 Clayey GRAVEL, brownish yellow (10YR6/6). Gray-light gray (GLEY1 5/-,6/-,7/-) quartzite gravel to 1.75". Rounded-angular (broken) fragments. 40% clay and caliche matrix. Slightly silty-sandy. Slightly moist.
		CL: 2.5-3.2 CLAY, light gray (5YR7/1)-pale yellow (2.5Y7/3). Soft. Silty-slightly sandy. Abundant white caliche. Slightly moist.
		IRONSTONE: 3.2-3.5 CALICHE, white. Occasional clay inclusions. Moist.
		NO RECOVERY: 3.5-4.0 No Recovery.
		CL: 4.0-8.0 CLAY, light greenish gray (GLEY1 7/1)-brownish yellow (10YR6/6). Soft. Smooth. Moist. Weathered (iron-oxide). Occasional white caliche inclusions and layers. Trace black (carbonaceous?) inclusions. Becoming slightly moist and crumbly at 6.4 ft.

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565
635

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 86701 Lithologic Description	Page 2 of 3
5984		9			CL: 8.0-9.4 CLAY, greenish gray (GLEY1 6/1). Crumbly. Rough texture. Trace orange iron-oxide stain on fracture surfaces. Slightly moist.	
5983		10			CL: 9.4-11.8 CLAY, brownish yellow (10YR6/6). Mottled light brownish gray (10YR6/2). Soft-firm. Smooth texture. Weathered. Trace black inclusions. Slightly moist.	
5982		11				
5981		12			SILTY CLAYSTONE: 11.8-13.5 SILTY CLAYSTONE, light brownish gray (2.5Y6/2). Firm. Iron-oxide stain near top. Moderately-slightly silty. Gritty texture. Black carbonaceous inclusion (0.33") at 12.5 ft. Slightly moist. TOP OF BEDROCK at 11.8 ft.	
5980		13				
5979		14			CLAYSTONE: 13.5-14.4 CLAYSTONE with ironstone, light gray (2.5Y7/2)-pale brown (10YR6/3). Occasional dark reddish brown ironstone concretions to 0.75". Firm. Silty. Slightly moist.	
5978		15			CLAYSTONE: 14.4-17.8 CLAYSTONE, gray (5YR6/1). Occasionally mottled pale brown (10YR6/3). Some Silty zones. Trace black carbonaceous inclusions. Rough-hacky texture. Slightly moist.	
5977		16				
5976		17				

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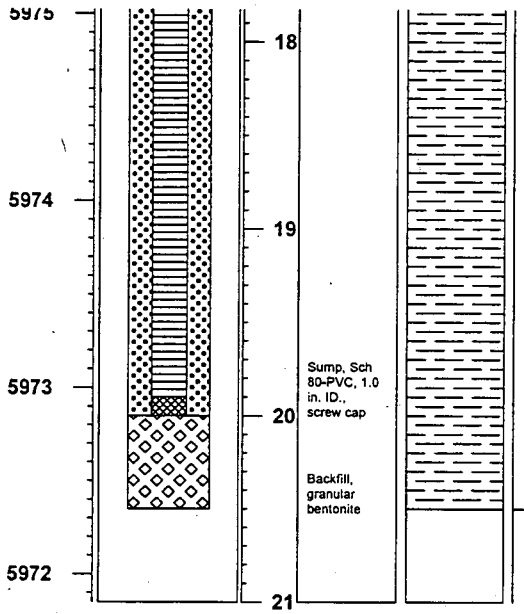
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 86701 Lithologic Description	Page 3 of 3



CLAYSTONE: 17.8-20.5 CLAYSTONE, brownish yellow (10YR6/6)-light yellowish brown (10YR6/4)-gray (10YR6/1). Firm. Rough texture. Weathered. Some silty zones. Trace orange iron-oxide stained fractures. Slightly-moderately silty. Slightly moist.

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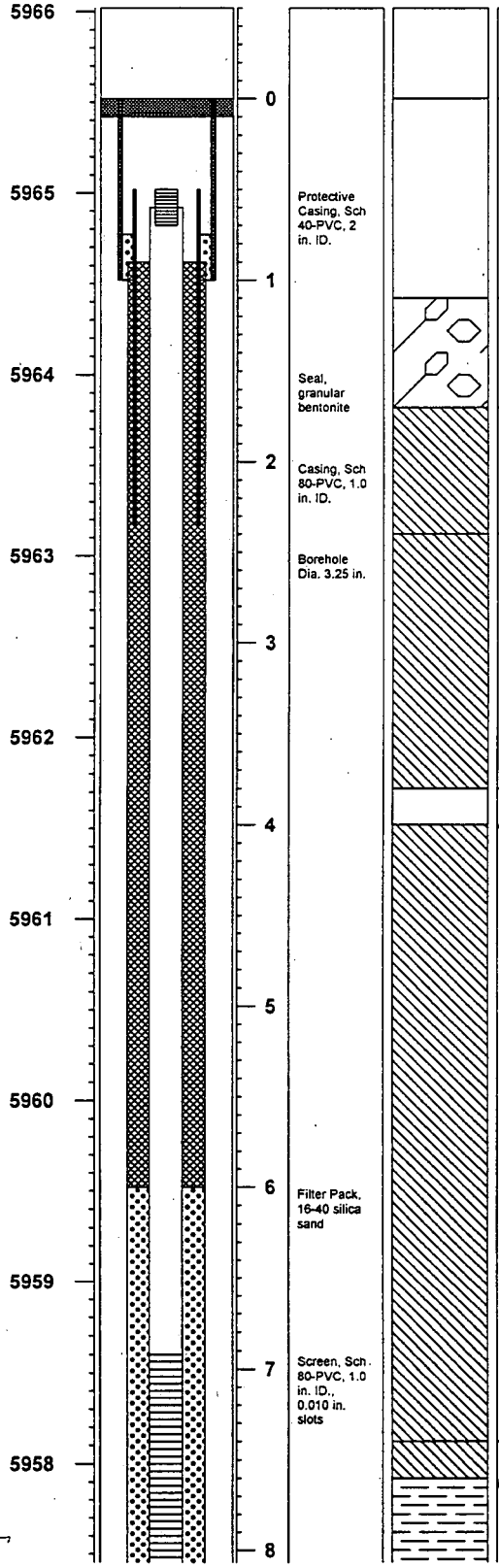
567
1237

STATE PLANE COORDINATES AREA:
NORTH:748122.62
EAST: 2084008.95
PROJECT:
REMARKS:

GRND ELEV. (FT):5965.52
TOTAL DEPTH (FT): 31.00
COMPLETION DATE: 10/23/01
GEOLOGIST: Brian Walsh

CASING DIA (IN):
BH DIA. (IN):
GRID LOCATOR:

LOG OF BORING NUMBER: 88101



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.1 No Recovery. Flushmount hole.
	GC	GC: 1.1-1.7 SAND-SILT-GRAVEL (mixture), brown (7.5YR5/4)-dark brown (7.5YR3/3). Unconsolidated. Slightly moist. Probably fill.
	CL	CL: 1.7-2.4 Gravelly CLAY, yellowish red (5YR5/6). Soft. 10-20% quartz and quartzite gravel to 2.0". Slightly sandy-silty. Slightly moist.
	CL	CL: 2.4-3.8 Sandy-gravelly CLAY, hellowish red (5YR4/6)-reddish brown (5YR5/4). Soft. Slightly moist-moist. Up to 30% fine-coarse grained sand. 20-25% quartzite gravel to 2.0". Sand is angular-subangular. Gravel is subround-subangular. Iron-oxide stained.
		NO RECOVERY: 3.8-4.0 No Recovery.
	CL	CL: 4.0-7.4 Sandy-gravelly CLAY, as above 2.4-3.8 ft.
	CL	CL: 7.4-7.6 CLAY, reddish brown (2.5YR5/4)-greenish gray (GLEY1 6/1;10Y). Soft. Smooth texture. Dense. 5% gravel to 0.5". Moist.
	CLAYSTONE	CLAYSTONE: 7.6-10.0 CLAYSTONE, light gray (2.5Y7/2)-brownish

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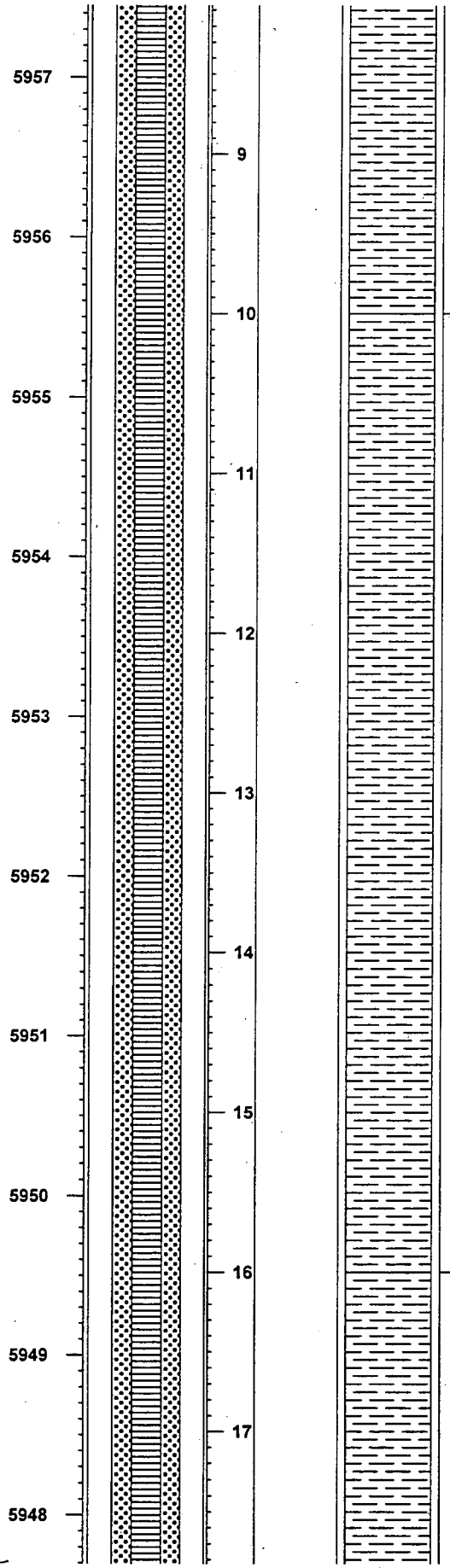
5168
1038

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 88101 Lithologic Description	Page 2 of 4



yellow (10YR6/8). Firm. Smooth-rough texture. Stiff-crumbly. Iron-oxide stained (brownish yellow). Slightly moist. TOP OF BEDROCK at 7.6 ft.

CLAYSTONE: 10.0-16.0 CLAYSTONE, light gray (2.5Y7/2)-brownish yellow (10YR6/8)-light brownish gray (10YR6/2). Firm. Smooth-rough texture. Occasionally slightly silty. Some iron-oxide stain (brownish yellow). Some bright orange iron-oxide staining on very small fracture surfaces. Slightly moist.

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CLAYSTONE: 16.0-20.0 CLAYSTONE, gray (7.5YR6/1). Firm-very firm. Very crumbly. Non-weathered. Slightly silty. Dry. trace black carbonaceous inclusions. Trace orange iron-oxide staining (very small).

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 88101 Lithologic Description	Page 3 of 4
5947		18				
5946		19				
5945		20			CLAYSTONE: 20.0-21.0 CLAYSTONE, grayish brown (10YR5/2). Firm. Stiff-crumbly. Rough-smooth texture. Trace bright orange iron-oxide staining on small fracture surfaces. Trace black carbonaceous inclusions. Slightly moist-dry.	
5944		21			CLAYSTONE: 21.0-23.2 CLAYSTONE, light brownish gray (10YR6/2). Firm. Very crumbly. Rough-gritty texture. Incresase in bright orange iron-oxide staining on fracture surfaces. Dry.	
5943		22				
5942		23			CLAYSTONE: 23.2-23.7 CLAYSTONE, gray (5YR5/1)-brownish yellow (10YR6/6). Firm. Stiff. Rough-gritty texture. Dry.	
5941		24			CLAYSTONE: 23.7-27.0 CLAYSTONE, grayish brown (10YR5/2)-gray (10YR6/1). Firm. Crumbly. Rough-gritty texture. Trace orange iron-oxide staining on small fracture surfaces. Dry.	
5940		25				
5939		26				
5938		27			CLAYSTONE: 27.0-28.0 CLAYSTONE, gray (2.5Y5/1). Some mottled light yellowish brown (10YR6/4). Firm. Crumbly. Rough texture. Iron-oxide stained (yellowish brown). Dry. Occasional bright	

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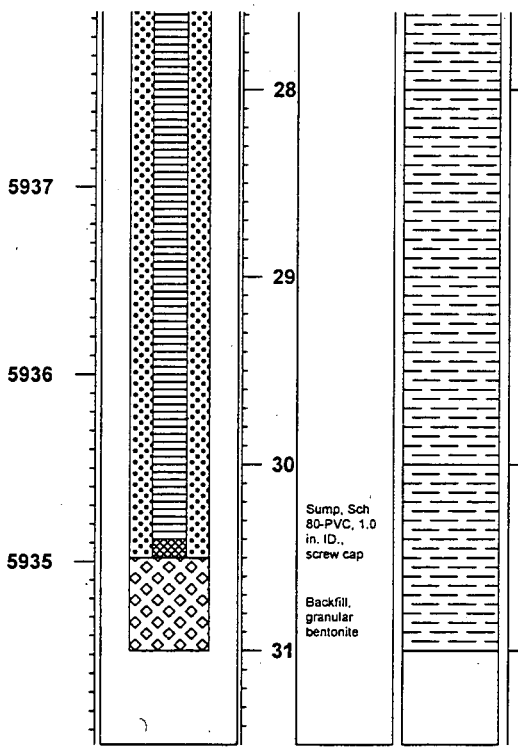
640

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 88101 Lithologic Description	Page 4 of 4



orange iron-oxide staining.

CLAYSTONE: 28.0-30.0 CLAYSTONE, gray (2.5Y5/1). Firm. Crumbly. Rough texture. Dry. Non-weathered.

CLAYSTONE: 30.0-31.0 CLAYSTONE, gray (GLEY1 5/N). Firm. Crumbly. Rough texture. Dry. Non-weathered.

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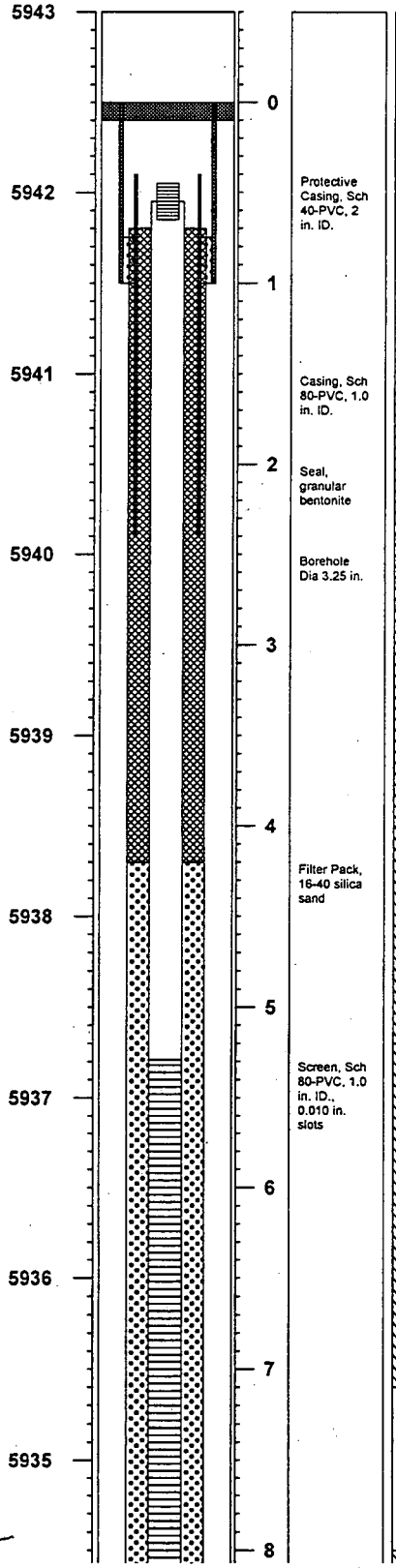
STATE PLANE COORDINATES AREA:	GRND ELEV. (FT):5942.50	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH:749895.26	TOTAL DEPTH (FT): 21.00	BH DIA. (IN):	**99101**
EAST: 2085272.77	COMPLETION DATE:11/5/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Joel Sobol		
REMARKS:			



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.1 No Recovery. Hand dug for flushmount an aseptic hole.
		CL: 1.1-4.0 Gravelly CLAY, light brown-light gray, 2.5YR5/3, abundant sand, large pebbles 2", angular quartzite fragments, trace iron staining, dry.
		CL: 4.0-5.2 Gravelly CLAY as above with increasing amounts of gravel and large pebbles (60% fines, 40% gravel), light gray-light brown, 7.5YR6/2, firm, dry.
		CL: 5.2-7.1 Gravelly CLAY with increasing clay content, 70% clay-30% gravel, light brown-tannish gray, 7.5YR6/2, abundant large quartzite pebbles and angular fragments & sand, firm.
		NO RECOVERY: 7.1-8.0 No Recovery.

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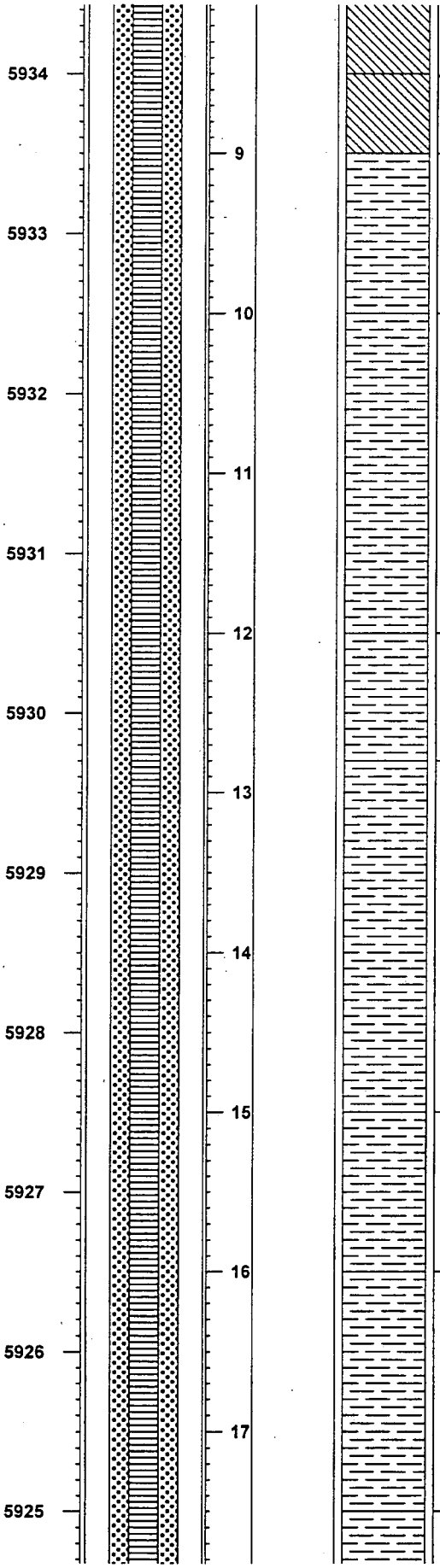
642

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description

LOG OF BORING NUMBER: **99101**



CL: 8.0-8.5 Gravelly CLAY, 8.0-8.5 ft., dark brown, blackish brown, 7.5YR2.5/2, 80% clay-20% gravel, some large pebbles and rock fragments, some sand, firm, slightly moist.

CL: 8.5-9.0 Gravelly CLAY?

CLAYSTONE: 9.0-10.0 CLAYSTONE, occasional pebbles and coarse sand, yellowish brown, 10YR5/3, firm, slightly moist. TOP OF BEDROCK at 9.0 ft.

CLAYSTONE: 10.0-12.0 CLAYSTONE, olive gray-yellowish gray, 10YR5/2, iron streaks and staining, occasional organic and carbonaceous matter, calcareous with calcite nodules, firm, slightly moist.

CLAYSTONE: 12.0-12.8 CLAYSTONE as above, olive yellow, 2.5Y6/3, iron staining along horizontal fracture surfaces, soft, firm, slightly moist.

CLAYSTONE: 12.8-15.0 CLAYSTONE, olive gray-light gray, 10YR6/2 - 6/1, yellow iron blebs, firm, slightly moist.

CLAYSTONE: 15.0-16.0 CLAYSTONE, light gray-yellow gray, 10YR5/1, blocky, firm, moderately indurated, slightly moist.

CLAYSTONE: 16.0-17.5 CLAYSTONE, light gray-yellowish gray, 10YR5/1, iron stain and iron blebs, blocky, firm, dry-slightly moist.

CLAYSTONE: 17.5-19.0 CLAYSTONE, gray-dark gray, 10YR4/1,

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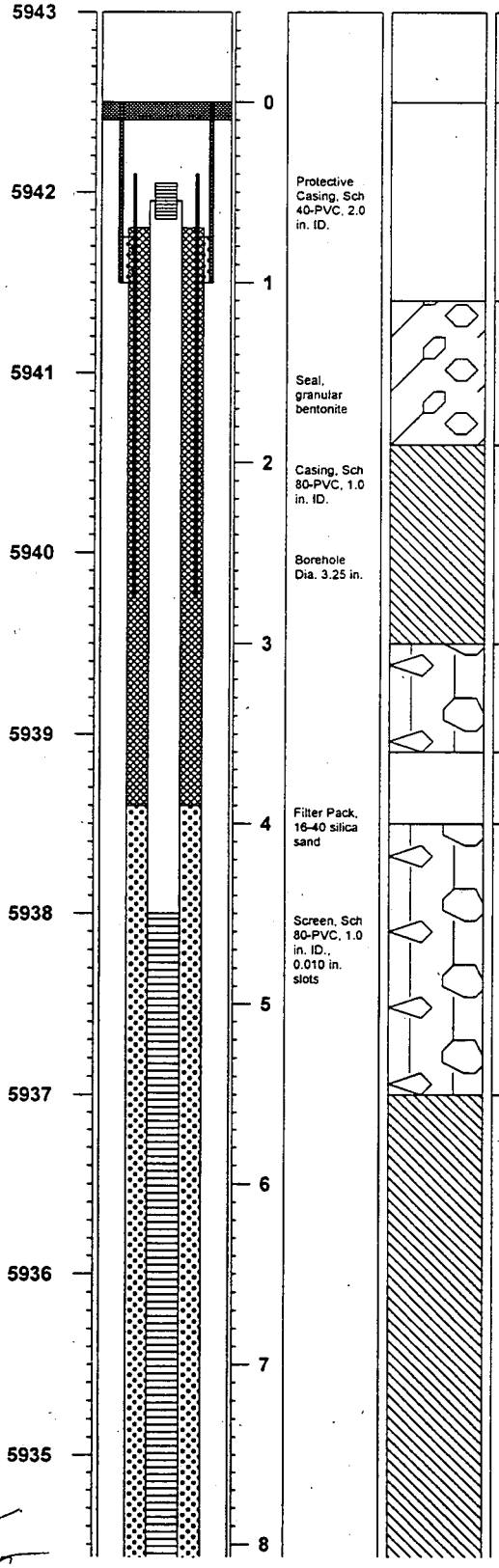
1043

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 99101 Lithologic Description	Page 3 of 3
5924		18				
		19			CLAYSTONE: 19.0-20.0 CLAYSTONE, dark-very dark gray, 10YR3/1, traces of coal and carbonaceous matter, soft-firm, slightly moist.	
5923						
		20			CLAYSTONE: 20.0-21.0 CLAYSTONE, dark gray, 10YR3/1, some coal-possible lignites, soft-firm, moist, blocky. At 20.6 ft. becoming dry-slightly moist, crumbly.	
5922	Sump, Sch 80-PVC, 1.0 in.ID., screw cap Backfill, granular bentonite					
		21				
5921						

Draft

574
644

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5942.50	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 749895.26	TOTAL DEPTH (FT): 30.50	BH DIA. (IN):	99201
EAST: 2085272.77	COMPLETION DATE: 11/2/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Brian Walsh		
REMARKS:			



Unified Soils Classification or Rock Type	Lithologic Description
	NO RECOVERY: 0.0-1.1 No Recovery. Flushmount hole.
GC	GC: 1.1-1.9 Sandy-clayey GRAVEL-yellowish red (5YR5//6), sandy-clayey matrix. Gray quartzite gravel to 2.0". Angular broken fragments. Some are subround. Matrix is slightly moist.
CL	CL: 1.9-3.0 CLAY (backfill)-light olive brown (2.5Y5/4)-dark brown (7.5YR3/3). Firm. Slightly sandy-silty. 5-10% quartzite gravel to 1.0". Trace black inclusions (probably asphalt).
GM	GM: 3.0-3.6 Silty-sandy GRAVEL, see description below (4.0-5.5 ft.).
	NO RECOVERY: 3.6-4.0 No Recovery.
GM	GM: 4.0-5.5 Silty-sandy GRAVEL-brown (7.5YR5/2)-light brown (7.5YR6/3), silt-sand-clayey matrix (30-40%). Gray quartzite gravel to 2.0". Angular (broken) fragments. Some rounded. Dry-slightly moist.
CL	CL: 5.5-8.9 Sandy-silty CLAY, yellowish red (5YR5/6)-light reddish brown (5YR6/4). Friable. 30-40% scattered sand and silt. Sand is subangular. Slightly moist. Increase in sand to 50% 7.5-8.9 ft. 5% gray quartzite gravel to 1.0".

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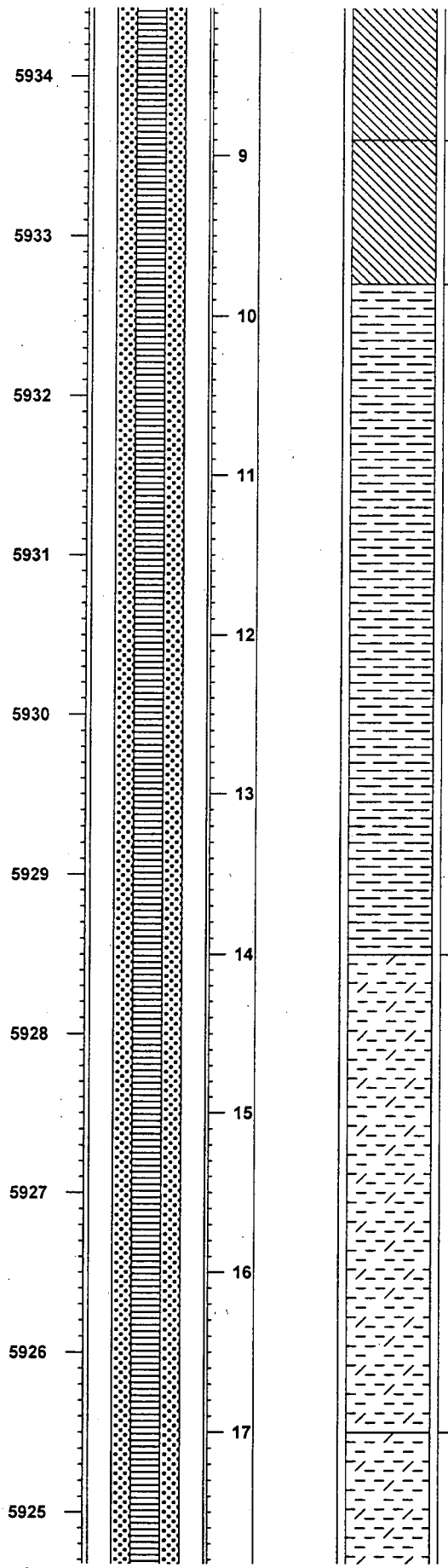
575
Q45

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 99201 Lithologic Description	Page 2 of 4



CL: 8.9-9.8 CLAY-reddish yellow (7.5YR6/6)-light gray (10YR7/2). Firm. Gritty texture. Occasional scattered sand gravel to 0.5". Slightly moist.

CLAYSTONE: 9.8-14.0 CLAYSTONE-light gray (2.5Y7/2)-occasionally mottled brownish yellow (10YR6/8). Firm. Smooth texture. Trace white caliche inclusions. Trace black inclusions. Slightly moist. Dense. Increase brownish yellow iron oxide-staining at 12.0-13.5 and at 14.5 ft. Predominantly crumbly below 11.0 ft. Becoming silty. TOP BEDROCK at 9.8 ft.

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SILTY CLAYSTONE: 14.0-17.0 SILTY CLAYSTONE-light gray (2.5Y7/2)-occasional iron-oxide staining (reddish yellow: 7.5YR6/8) in zones and on small fracture surfaces. Slightly-moderately silty. Crumbly-friable. Trace black inclusions. Slightly moist-dry.

SILTY CLAYSTONE: 17.0-20.0 SILTY CLAYSTONE-as above (14.0-17.0 ft.).

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 99201 Lithologic Description	Page 3 of 4
5924		18				
		19				
5923						
		20			SILTY CLAYSTONE: 20.0-21.5 SILTY CLAYSTONE-light gray (10YR7/1). Firm. Crumbly-friable. Occasional iron-oxide staining on small fracture surfaces. Slightly dry-moist. Probably 5-10% silt.	
5922						
		21				
5921					CLAYSTONE: 21.5-25.0 CLAYSTONE-light brownish gray (10YR6/2). Firm-stiff. Rough texture. A near vertical fracture with strong brown (7.5YR5/8) iron-oxide staining on surfaces at 21.5-22.0. This fracture is dry. Some iron-oxide staining at 22.5. Trace black carbonaceous inclusions. Slightly moist-dry.	
		22				
5920						
		23				
5919						
		24				
5918						
		25			CLAYSTONE: 25.0-26.5 CLAYSTONE-light brownish gray (10YR6/2). Firm-stiff. Rough-occasionally smooth texture. Some crumbly. Trace orange iron-oxide staining on small fracture surfaces. Slightly moist-dry.	
5917						
		26				
5916					CLAYSTONE: 26.5-28.0 CLAYSTONE-pale brown (10YR6/3). Firm-stiff. Rough texture. Slightly moist. Some black carbonaceous inclusions. A black-brown carbonaceous inclusion 3.0" long at 26.8-27.0 ft. Thin stringer of white-caliche/calcareous material at 27.7 ft.	
		27				
5915						

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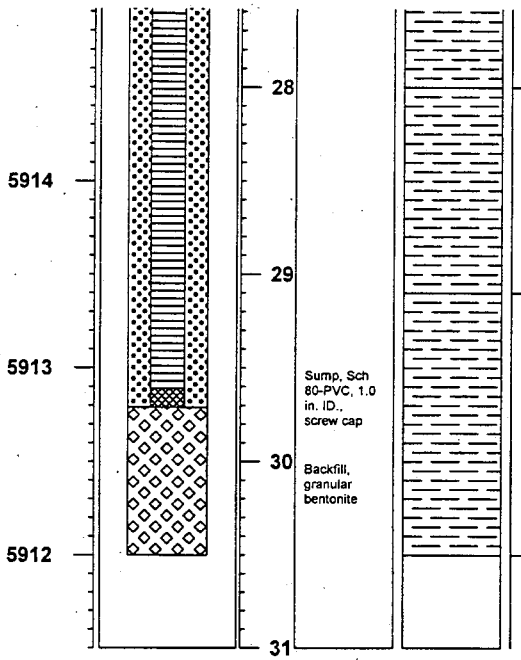
647

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 99201 Lithologic Description	Page 4 of 4



CLAYSTONE: 28.0-29.1 CLAYSTONE-grayish brown (10YR6/3). Very firm-stiff. Smooth-rough texture. Slightly moist. Some black carbonaceous inclusions.

CLAYSTONE: 29.1-30.5 CLAYSTONE-light brownish gray (2.5Y2.2). Occasionally mottled light yellowish brown (2.5Y6/4). Very firm. Rough texture. Trace orange iron-stained small fracture surfaces. Dry.

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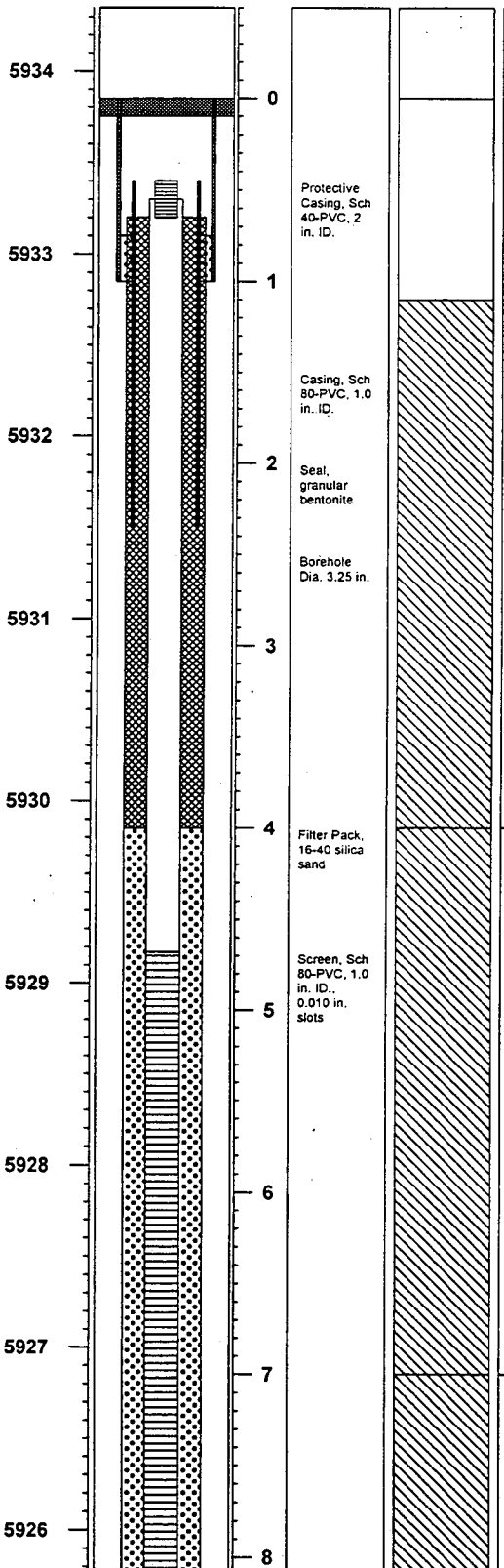
1048

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT):5933.85	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH:749974.86	TOTAL DEPTH (FT): 30.50	BH DIA. (IN):	99301
EAST: 2085631.49	COMPLETION DATE: 10/30/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Joel Sobol		
REMARKS:			



Unified Soils Classification or Rock Type	Lithologic Description
	NO RECOVERY: 0.0-1.1 No Recovery. Flushmount.
	CL: 1.1-4.0 Gravelly CLAY, light gray-yellow olive gray, 10YR6/4, abundant pebbles, some quartz fragments, slightly plastic, some iron staining, moist.
	CL: 4.0-7.0 Gravelly CLAY, olive gray-reddish gray, abundant carbonaceous matter and black stains, 2.5Y5/3, occasional yellow/iron staining, abundant large quartzite fragments.
	CL: 7.0-8.2 CLAY, black-dark gray, (GLEY1 2.5/N), soft, moderately plastic, occasional small pebbles, possible organic and carbonaceous material.

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Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 99301 Lithologic Description	Page 2 of 4
5925		9			CLAYSTONE: 8.2-9.3 CLAYSTONE, light greenish gray, soft, GLEY1 7/5GY, moist. TOP OF BEDROCK at 8.2 ft.	
5924		10			NO RECOVERY: 9.3-10.0 No Recovery.	
5923		11			CLAYSTONE: 10.0-12.0 CLAYSTONE, yellowish gray-light gray, 7.5YR6/6, soft, blocky, poorly indurated, moist.	
5922		12			CLAYSTONE: 12.0-13.0 CLAYSTONE, gray with yellow streaks, GLEY1 5/5GY, soft, crumbly, poorly indurated, moist.	
5921		13			CLAYSTONE: 13.0-15.0 CLAYSTONE, gray-dark gray, (GLEY1 4/10Y), firm, poor-moderately indurated, slightly moist.	
5920		14				
5919		15			CLAYSTONE: 15.0-16.0 CLAYSTONE, light olive gray-olive brown, 2.5Y5/2, frequent yellow streaks, iron stains along fracture surfaces, firm, poor-moderately indurated, slightly moist.	
5918		16			CLAYSTONE: 16.0-18.0 CLAYSTONE, gray-olive gray, 2.5Y5/3, blocky, firm, poor-moderately indurated, dry-slightly moist, some iron stains.	
5917		17				

Draft

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1050

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 99301 Lithologic Description	Page 3 of 4
5916		18				
					CLAYSTONE: 18.0-19.5 CLAYSTONE, 2.5Y5.1, gray-olive gray, occasional orange/red iron stain, firm, poor-moderatly indurated, blocky, slightly moist.	
5915		19				
					CLAYSTONE: 19.5-21.0 CLAYSTONE, olive-yellow gray, abundant yellow streaks 2.5Y5/3 mottled with yellow blebs, firm, poorly-moderatelly indurated, blocky, slightly moist.	
5914		20				
5913		21				
					CLAYSTONE: 21.0-22.5 CLAYSTONE, medium gray-olive gray, 2.5Y5/1, mottled, orange rust streaks, slightly silty, firm, poor-moderately indurated, dry-slightly moist.	
5912		22				
					CLAYSTONE: 22.5-23.25 CLAYSTONE, gray-yellowish gray, (2.5Y5/2), yellow stain, firm, dry-slightly moist.	
5911		23				
					CLAYSTONE: 23.25-23.5 CLAYSTONE, reddish tray-brownish gray, (10YR5/4), abundant ironstones-hard, claystone-firm, dry.	
5910		24			CLAYSTONE: 23.5-24.2 CLAYSTONE, yellowish brown-yellowish gray, (10YR6/6), mottled, firm, dry.	
					CLAYSTONE: 24.2-25.0 CLAYSTONE, yellowish gray, 10YR5/2, firm, moderately indurated, dry, light gray-white zones.	
5909		25				
					CLAYSTONE: 25.0-26.5 CLAYSTONE, yellowish brown-yellowish gray, (10YR5/8), silty, abundant iron staining, firm, poorly-moderately indurated, blocky, dry-slightly moist.	
5908		26				
					CLAYSTONE: 26.5-27.5 CLAYSTONE, gray-yellowish/brownish gray, (2.5Y5/2), rust streaks, very silty, firm, blocky, dry-slightly moist.	
5907		27				

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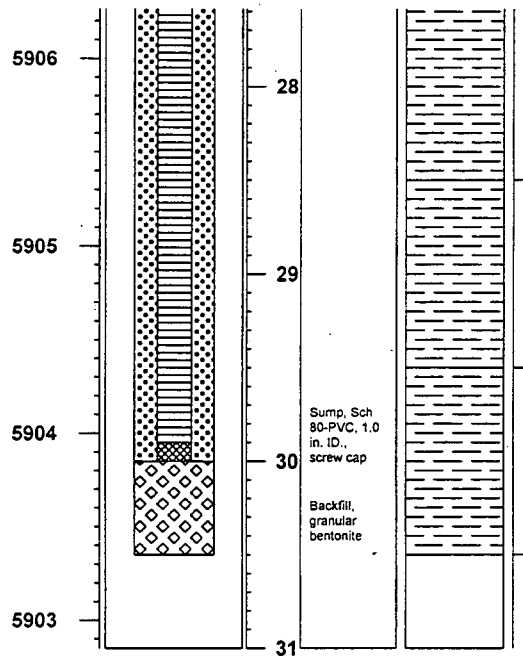
651

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 99301 Lithologic Description	Page 4 of 4



CLAYSTONE: 27.5-28.5 CLAYSTONE, gray-yellowish brown, (2.5Y4/4), silty, iron stain and rust colored streaks, firm, blocky, dry.

CLAYSTONE: 28.5-29.5 CLAYSTONE, gray-yellowish gray, 2.5Y5/3, silty, some very fine sand, iron stains, firm, blocky, dry.

CLAYSTONE: 29.5-30.5 CLAYSTONE, brown-brownish gray, 10YR5/4, mottled, iron stains, silty, blocky, firm, moderately indurated, dry.

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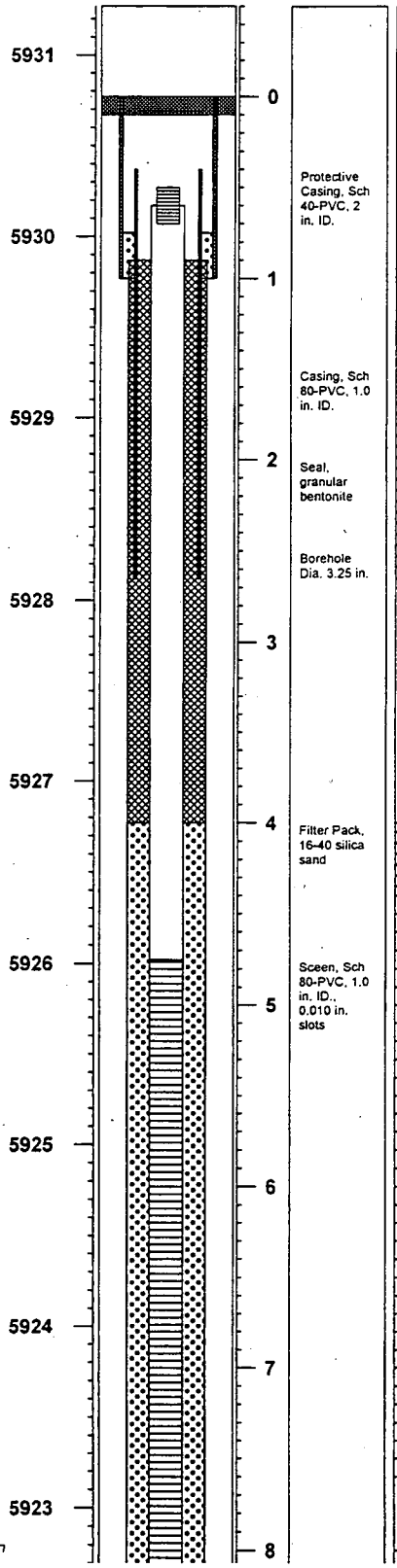
1.52

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5930.77	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 749861.82	TOTAL DEPTH (FT): 22.00	BH DIA. (IN):	99401
EAST: 2085586.29	COMPLETION DATE: 7/25/01	GRID LOCATOR:	
PROJECT:	GEOLOGIST: Brian Walsh		
REMARKS:			



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.1 No Recovery. Flushmount hole.
	GC	GC: 1.1-1.4 Clayey GRAVEL-dark gray (7.5YR4/1), organic clayey matrix (30%). Gray quartzite gravel to 2.0". Rounded-broken angular fragments. Moist. Slightly silty-sandy.
	CL	CL: 1.4-2.7 CLAY-light greenish gray (GLEY1 7/1; 10Y)-brownish yellow (10YR6/6). Soft. Plastic. Moist. 5% gravel (quartzite+granitic) to 2.0".
		NO RECOVERY: 2.7-4.0 No Recovery.
	CL	CL: 4.0-4.4 CLAY-as above (1.4-2.7 ft.), very moist.
	CLAYSTONE	CLAYSTONE: 4.4-6.5 CLAYSTONE-light greenish gray (GLEY1 7/1; 10Y)-brownish yellow (10YR6/6). Soft (at top)-firm. Rough texture. Moist. (Gradational transition 4.4-6.5 ft.) TOP OF BEDROCK at 4.4 ft.
	CLAYSTONE	CLAYSTONE: 6.5-7.6 CLAYSTONE-brownish yellow (10YR6/6). Mottled light brownish gray (10YR6/2). Firm. Rough texture. Slightly moist.
		NO RECOVERY: 7.6-8.0 No Recovery.

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Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 99401 Lithologic Description	Page 2 of 3
5922		9			CLAYSTONE: 8.0-8.2 CLAYSTONE-as above 6.5-7.6 ft.	
					CLAYSTONE: 8.2-10.0 CLAYSTONE-grayish brown (10YR5/2). Firm. Rough texture. Trace black carbonaceous inclusions. Occasional orange iron-oxide stained zones and small fracture surfaces. Slightly moist.	
5921		10			CLAYSTONE: 10.0-13.0 CLAYSTONE-gray (10YR5/1). Firm. Rough texture. Some crumbly. Occasional bright orange iron-oxide staining on small fractures/bedding planes. Occasional black carbonaceous inclusions. Slightly moist.	
5920		11				
5919		12				
5918		13			CLAYSTONE: 13.0-15.1 CLAYSTONE-dark grayish brown (10YR4/2)-grayish brown (10YR5/2). Firm. Crumbly. Some stiff. Rough texture. Trace bright orange iron-oxide staining on very small fracture surfaces. Slightly moist-dry. Trace black carbonaceous inclusions.	
5917		14				
5916		15			CLAYSTONE: 15.1-17.2 CLAYSTONE-gray (10YR6/1)-grayish brown (10YR5/2). Firm. Crumbly-stiff. Rough-gritty texture. Trace orange iron-oxide staining. Slightly moist-dry.	
5915		16				
5914		17				
5913					CLAYSTONE: 17.2-18.5 CLAYSTONE-light brownish gray (10YR6/2)-light yellowish brown (10yr6/4). Firm-very firm. Crumbly-stiff. Increase in iron-oxide staining. 1.0" ironstone nodule at 17.9 ft.	

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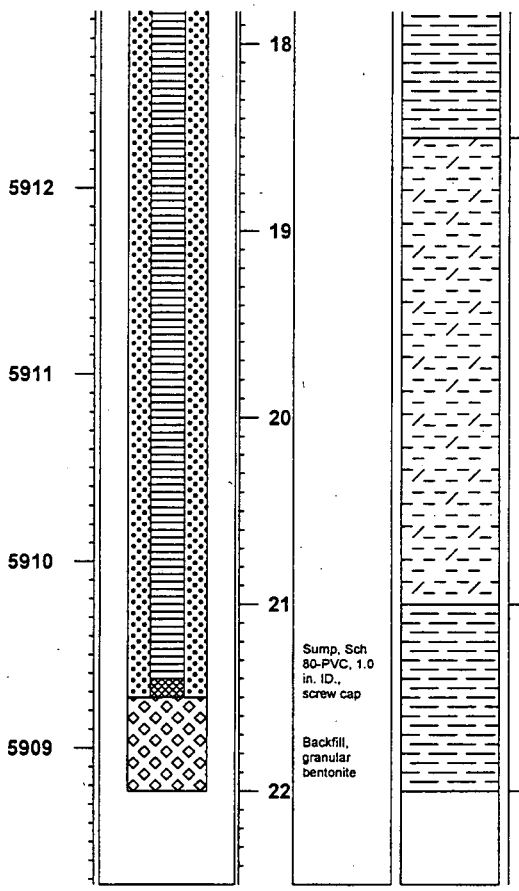
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					LOG OF BORING NUMBER: **99401**
					Page 3 of 3



Trace black carbonaceous inclusions. Slightly moist-dry.

SILTY CLAYSTONE: 18.5-20.0 SILTY CLAYSTONE-light brownish gray (10YR6/2)-light yellowish brown (10YR6/4). Firm-very firm. Crumbly-stiff. Slightly-moderately silty. Orange iron-oxide staining on fracture surfaces. Trace black carbonaceous inclusions. Slightly moist-dry.

CLAYSTONE: 21.0-22.0 CLAYSTONE-grayish brown (10YR5/2)-reddish yellow (7.5YR6/8). Firm. Crumbly. Rough-gritty texture. Silty. Increase iron-oxide staining (reddish yellow) on small fracture surfaces and irregular zones. Dry.

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Table 11-1

Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Validation	Dup Result	Dup Lab Qual	Dup Validation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RPD AbsVal/AveX100
Dissolve Gasses (Ethane, Ethene, Methane)												
31001	7/31/01	Methane	2			1			UG/L	1.0	1.5	**66.67%**
Volatile Organic Compounds												
02291	10/11/01	1,1,1,2-TETRACHLOROETHANE	1.6	J	V1	6.7	U	V1	UG/L	5.1	4.2	**122.89%**
00597	1/10/01	1,1,1-TRICHLOROETHANE	8.1		V1	8.7		V1	UG/L	0.6	8.4	7.14%
00597	7/19/01	1,1,1-TRICHLOROETHANE	5.4		V	6.3		V	UG/L	0.9	5.9	15.38%
02291	10/11/01	1,1,1-TRICHLOROETHANE	1.9	J	V1	1.9	J	V1	UG/L	0.0	1.9	0.00%
22796	5/14/01	1,1,1-TRICHLOROETHANE (TR1/TR1)	2.0		V1	2.0		V1	UG/L	0.0	2.0	0.00%
3687	10/16/01	1,1,2-TRICHLOROTRIFLUOROETHANE	12.0	J	V1	13.0	J	V1	UG/L	1.0	12.5	8.00%
02500	10/23/01	1,1,2-TRICHLOROTRIFLUOROETHANE	43.0		V1	48.0		V1	UG/L	5.0	45.5	10.99%
00100	11/15/01	1,1,2-TRICHLOROTRIFLUOROETHANE	6.7		V1	16.0		V1	UG/L	9.3	11.4	**81.94%**
22796	5/14/01	1,1,2-TRICHLOROTRIFLUOROETHANE (DL1/DL1)	82.0	D	V1	85.0	D	V1	UG/L	3.0	83.5	3.59%
00100	5/23/01	1,1,2-TRICHLOROTRIFLUOROETHANE (TR1/TR1)	10.0		V1	10.0		V1	UG/L	0.0	10.0	0.00%
02500	6/6/01	1,1,2-TRICHLOROTRIFLUOROETHANE (TR1/TR1)	20.0		V1	20.0		V1	UG/L	0.0	20.0	0.00%
41299	2/26/01	1,1-DICHLOROETHANE	2.2	J	V	2.0	J	V	UG/L	0.2	2.1	9.52%
40299	7/23/01	1,1-DICHLOROETHANE	13.0		V	13.0		V	UG/L	0.0	13.0	0.00%
02291	10/11/01	1,1-DICHLOROETHANE	1.8	J	V1	1.7	J	V1	UG/L	0.1	1.8	5.71%
00100	11/15/01	1,1-DICHLOROETHANE	0.8	J	V1	1.3		V1	UG/L	0.5	1.0	**51.21%**
22796	5/14/01	1,1-DICHLOROETHANE (TR1/TR1)	3.0		V1	3.0		V1	UG/L	0.0	3.0	0.00%
00100	5/23/01	1,1-DICHLOROETHANE (TR1/TR1)	1.0		V1	1.0		V1	UG/L	0.0	1.0	0.00%
00597	1/10/01	1,1-DICHLOROETHENE	4.5		V1	4.7		V1	UG/L	0.2	4.6	4.35%
12691	1/15/01	1,1-DICHLOROETHENE	1.4		V	1.4		V	UG/L	0.0	1.4	0.00%
P209389	2/13/01	1,1-DICHLOROETHENE	11.0		V	11.0		V	UG/L	0.0	11.0	0.00%
41299	2/26/01	1,1-DICHLOROETHENE	9.1		V	8.3		V	UG/L	0.8	8.7	9.20%
07391	3/6/01	1,1-DICHLOROETHENE	130.0	J	V1	130.0	J	V1	UG/L	0.0	130.0	0.00%
0	7/19/01	1,1-DICHLOROETHENE	3.0		V	3.6		V	UG/L	0.6	3.3	18.18%
40	7/23/01	1,1-DICHLOROETHENE	1.9		V	2.0		V	UG/L	0.1	2.0	5.13%
P209389	7/23/01	1,1-DICHLOROETHENE	13.0		V1	11.0		V1	UG/L	2.0	12.0	16.67%
02291	10/11/01	1,1-DICHLOROETHENE	4.2	J	V1	4.3	J	V1	UG/L	0.1	4.3	2.35%
3687	10/16/01	1,1-DICHLOROETHENE	23.0	J	V1	22.0	J	V1	UG/L	1.0	22.5	4.44%
22796	5/14/01	1,1-DICHLOROETHENE (TR1/TR1)	4.0		V1	4.0		V1	UG/L	0.0	4.0	0.00%
41299	2/26/01	1,2-DICHLOROETHANE	5.0	U	V	1.8	J	V	UG/L	3.2	3.4	**94.12%**
00100	11/15/01	1,4-DICHLOROBENZENE	0.4	J	J1	1.0	U	UJ1	UG/L	0.6	0.7	**89.86%**
02500	6/6/01	ACETONE (TR1/TR1)	2.0	BJ	JB1	2.0	BJ	JB1	UG/L	0.0	2.0	0.00%
22896	9/12/01	BROMODICHLOROMETHANE	2.0	J	V1	2.0	J	V1	UG/L	0.0	2.0	0.00%
03991	1/23/01	CARBON TETRACHLORIDE	11.0		V1	11.0		V1	UG/L	0.0	11.0	0.00%
P209389	2/13/01	CARBON TETRACHLORIDE	2.0		V	2.0		V	UG/L	0.0	2.0	0.00%
P209389	7/23/01	CARBON TETRACHLORIDE	1.9		V1	1.6		V1	UG/L	0.3	1.8	17.14%
03991	8/7/01	CARBON TETRACHLORIDE	7.1		V1	7.0		V1	UG/L	0.1	7.1	1.42%
90099	8/22/01	CARBON TETRACHLORIDE	750.0		V1	780.0		V1	UG/L	30.0	765.0	3.92%
22896	9/12/01	CARBON TETRACHLORIDE	0.8	J	V1	1.0	J	V1	UG/L	0.2	0.9	22.22%
3687	10/16/01	CARBON TETRACHLORIDE	360.0		V1	370.0		V1	UG/L	10.0	365.0	2.74%
00100	11/15/01	CARBON TETRACHLORIDE	2.4		V1	5.7		V1	UG/L	3.3	4.1	**81.48%**
12691	1/15/01	CARBON TETRACHLORIDE (DL1/DL1)	465.0	D	V	496.0	D	V	UG/L	31.0	480.5	6.45%
00100	5/23/01	CARBON TETRACHLORIDE (TR1/TR1)	5.0		V1	5.0		V1	UG/L	0.0	5.0	0.00%
22896	1/11/01	CHLOROFORM	7.0	J	V1	6.8	J	V1	UG/L	0.2	6.9	2.90%
03991	1/23/01	CHLOROFORM	1.0		V1	1.0		V1	UG/L	0.0	1.0	0.00%
P209389	2/13/01	CHLOROFORM	5.0		V	5.0		V	UG/L	0.0	5.0	0.00%
07391	3/6/01	CHLOROFORM	1300.0		V1	1400.0		V1	UG/L	100.0	1350.0	7.41%
P209389	7/23/01	CHLOROFORM	4.2		V1	4.2		V1	UG/L	0.0	4.2	0.00%
90099	8/22/01	CHLOROFORM	100.0		V1	96.0		V1	UG/L	4.0	98.0	4.08%
22	9/12/01	CHLOROFORM	34.0		V1	38.0		V1	UG/L	4.0	36.0	11.11%

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Table 11-1

Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid-ation	Dup Result	Dup Lab Qual	Dup Valid-ation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RP AbsVal/
Volatile Organic Compounds (Continued)												
02291	10/11/01	CHLOROFORM	3.0	J	V1	2.8	J	V1	UG/L	0.2	2.9	6.90%
3687	10/16/01	CHLOROFORM	140.0		V1	130.0		V1	UG/L	10.0	135.0	7.41%
00100	11/15/01	CHLOROFORM	3.1		V1	5.2		V1	UG/L	2.1	4.2	50.60%
22796	5/14/01	CHLOROFORM (DL1/DL1)	7.0	D	1	7.0	D	1	UG/L	0.0	7.0	0.00%
00100	5/23/01	CHLOROFORM (DL1/DL1)	5.0	D	1	5.0	D	1	UG/L	0.0	5.0	0.00%
12691	1/15/01	CHLOROFORM (DL1/DL1)	20.5	D		21.8	D		UG/L	1.3	21.2	6.15%
22796	5/14/01	CHLOROFORM (TR1/TR1)	7.0		V1	7.0		V1	UG/L	0.0	7.0	0.00%
00100	5/23/01	CHLOROFORM (TR1/TR1)	5.0		V1	5.0		V1	UG/L	0.0	5.0	0.00%
12691	1/15/01	CHLOROFORM (TR1/TR1)	22.4		V	21.8		V	UG/L	0.6	22.1	2.71%
02500	10/23/01	CHLOROTRIFLUOROETHENE (TIC)	1.2	J	V1	1.3	J	V1	UG/L	0.1	1.3	7.87%
41299	2/26/01	cis-1,2-DICHLOROETHENE	43.4		V	44.3		V	UG/L	0.9	43.9	2.05%
07391	3/6/01	cis-1,2-DICHLOROETHENE	1000.0	U	V1	100.0	J	V1	UG/L	900.0	550.0	163.64%
40299	7/23/01	cis-1,2-DICHLOROETHENE	8.0		V	8.2		V	UG/L	0.2	8.1	2.47%
90099	8/22/01	cis-1,2-DICHLOROETHENE	20.0	J	V1	20.0	J	V1	UG/L	0.0	20.0	0.00%
02291	10/11/01	cis-1,2-DICHLOROETHENE	21.0		V1	20.0		V1	UG/L	1.0	20.5	4.88%
3687	10/16/01	cis-1,2-DICHLOROETHENE	28.0	J	V1	28.0	J	V1	UG/L	0.0	28.0	0.00%
00100	11/15/01	cis-1,2-DICHLOROETHENE	3.8		V1	6.7		V1	UG/L	2.9	5.3	55.24%
22796	5/14/01	cis-1,2-DICHLOROETHENE (DL1/DL1)	30.0	D	1	31.0	D	1	UG/L	1.0	30.5	3.28%
00100	5/23/01	cis-1,2-DICHLOROETHENE (DL1/DL1)	6.0	D	1	6.0	D	1	UG/L	0.0	6.0	0.00%
12691	1/15/01	cis-1,2-DICHLOROETHENE (DL1/DL1)	63.1	D		66.6	D		UG/L	3.5	64.9	5.40%
02291	4/10/01	cis-1,2-DICHLOROETHENE (TR1/TR1)	22.0	JD	V	22.0	JD	V	UG/L	0.0	22.0	0.00%
22796	5/14/01	cis-1,2-DICHLOROETHENE (TR1/TR1)	29.0		V1	31.0		V1	UG/L	2.0	30.0	6.67%
00100	5/23/01	cis-1,2-DICHLOROETHENE (TR1/TR1)	7.0		V1	7.0		V1	UG/L	0.0	7.0	0.00%
12691	1/15/01	cis-1,2-DICHLOROETHENE (TR1/TR1)	70.2		V	67.9		V	UG/L	2.3	69.1	[redacted]
03991	1/23/01	DICHLORODIFLUOROMETHANE	1.0		V1	1.0	U	V1	UG/L	0.0	1.0	[redacted]
00100	11/15/01	DICHLORODIFLUOROMETHANE	40.0		V1	89.0		V1	UG/L	49.0	64.5	75.97%
00100	5/23/01	DICHLORODIFLUOROMETHANE (DL1/DL1)	72.0	D	V1	67.0	D	V1	UG/L	5.0	69.5	7.19%
41299	2/26/01	METHYLENE CHLORIDE	2.6	BJ	JB	3.6	BJ	JB	UG/L	1.0	3.1	32.26%
07391	3/6/01	METHYLENE CHLORIDE	570.0	BJ	JB1	530.0	BJ	JB1	UG/L	40.0	550.0	7.27%
22896	9/12/01	METHYLENE CHLORIDE	0.6	J	JB1	1.0	J	JB1	UG/L	0.4	0.8	50.00%
00100	11/15/01	METHYLENE CHLORIDE	2.4		V1	1.0	U	V1	UG/L	1.4	1.7	82.35%
03991	1/23/01	TETRACHLOROETHENE	3.0		V1	3.0		V1	UG/L	0.0	3.0	0.00%
41299	2/26/01	TETRACHLOROETHENE	265.0		V	259.0		V	UG/L	6.0	262.0	2.29%
07391	3/6/01	TETRACHLOROETHENE	940.0	J	V1	970.0	J	V1	UG/L	30.0	955.0	3.14%
40299	7/23/01	TETRACHLOROETHENE	52.0		V	56.0		V	UG/L	4.0	54.0	7.41%
03991	8/7/01	TETRACHLOROETHENE	1.7		V1	1.6		V1	UG/L	0.1	1.7	6.06%
90099	8/22/01	TETRACHLOROETHENE	40.0	J	V1	40.0	J	V1	UG/L	0.0	40.0	0.00%
02291	10/11/01	TETRACHLOROETHENE	6800.0		V1	6700.0		V1	UG/L	100.0	6750.0	1.48%
3687	10/16/01	TETRACHLOROETHENE	360.0		V1	390.0		V1	UG/L	30.0	375.0	8.00%
00100	11/15/01	TETRACHLOROETHENE	1.4		V1	3.5		V1	UG/L	2.1	2.5	85.71%
12691	1/15/01	TETRACHLOROETHENE (DL1/DL1)	130.0	D		136.0	D		UG/L	6.0	133.0	4.51%
02291	4/10/01	TETRACHLOROETHENE (TR1/TR1)	5200.0		V	5100.0	D	V	UG/L	100.0	5150.0	1.94%
00100	5/23/01	TETRACHLOROETHENE (TR1/TR1)	3.0		V1	3.0		V1	UG/L	0.0	3.0	0.00%
12691	1/15/01	TETRACHLOROETHENE (TR1/TR1)	139.0		V	130.0		V	UG/L	9.0	134.5	6.69%
00597	1/10/01	TRICHLOROETHENE	3.3		V1	3.5		V1	UG/L	0.2	3.4	5.88%
22896	1/11/01	TRICHLOROETHENE	1550.0		V1	1500.0		V1	UG/L	50.0	1525.0	3.28%
03991	1/23/01	TRICHLOROETHENE	1.0		V1	1.0		V1	UG/L	0.0	1.0	0.00%
41299	2/26/01	TRICHLOROETHENE	37.6		V	38.2		V	UG/L	0.6	37.9	1.58%
07391	3/6/01	TRICHLOROETHENE	70000.0	D	V1	67000.0	D	V1	UG/L	3000.0	68500.0	4.38%
00597	7/19/01	TRICHLOROETHENE	2.4		V	2.8		V	UG/L	0.4	2.6	15.38%
40299	7/23/01	TRICHLOROETHENE	2.8		V	3.0		V	UG/L	0.2	2.9	[redacted]

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Table 11-1
Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

[redacted]on	Sample Date	Analyte	Real Result	Real Lab Qual	Real Validation	Dup Result	Dup Lab Qual	Dup Validation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RPD AbsVal/AveX100
Volatile Organic Compounds (Continued)												
02291	10/11/01	TRICHLOROETHENE	630.0		V1	630.0		V1	UG/L	0.0	630.0	0.00%
3687	10/16/01	TRICHLOROETHENE	11000.0		V1	11000.0		V1	UG/L	0.0	11000.0	0.00%
02500	10/23/01	TRICHLOROETHENE	19.0		V1	19.0		V1	UG/L	0.0	19.0	0.00%
90099	8/22/01	TRICHLOROETHENE	1400.0		V1	1400.0		V1	UG/L	0.0	1400.0	0.00%
22896	9/12/01	TRICHLOROETHENE	140.0		V1	170.0		V1	UG/L	30.0	155.0	19.35%
00100	11/15/01	TRICHLOROETHENE	24.0		V1	55.0		V1	UG/L	31.0	39.5	**78.48%**
22796	5/14/01	TRICHLOROETHENE (DL1/DL1)	57.0	D	V1	57.0	D	V1	UG/L	0.0	57.0	0.00%
00100	5/23/01	TRICHLOROETHENE (DL1/DL1)	39.0	D	1	37.0	D	1	UG/L	2.0	38.0	5.26%
12691	1/15/01	TRICHLOROETHENE (DL1/DL1)	78.9	D		86.0	D		UG/L	7.1	82.5	8.61%
02291	4/10/01	TRICHLOROETHENE (TR1/TR1)	620.0	D	V	620.0	D	V	UG/L	0.0	620.0	0.00%
00100	5/23/01	TRICHLOROETHENE (TR1/TR1)	38.0		V1	38.0		V1	UG/L	0.0	38.0	0.00%
02500	6/6/01	TRICHLOROETHENE (TR1/TR1)	18.0		V1	16.0		V1	UG/L	2.0	17.0	11.76%
12691	1/15/01	TRICHLOROETHENE (TR1/TR1)	91.5		V	87.1		V	UG/L	4.4	89.3	4.93%
Location	**Sample Date**	**Analyte**	**Real Result**	**Real Lab Qual**	**Real Validation**	**Dup Result**	**Dup Lab Qual**	**Dup Validation**	**Units**	**Absolute Value |Real-Dup|**	**Average (Real+Dup)/2**	**RPD AbsVal/AveX100**
Polychlorinated Biphenyls (PCBs)												
37791	12/12/01	AROCLOR-1016	0.5	U	V	0.5	U	V	UG/L	0.0	0.5	0.00%
37791	12/12/01	AROCLOR-1221	0.5	U	V	0.5	U	V	UG/L	0.0	0.5	0.00%
37791	12/12/01	AROCLOR-1232	0.5	U	V	0.5	U	V	UG/L	0.0	0.5	0.00%
37791	12/12/01	AROCLOR-1242	0.5	U	V	0.5	U	V	UG/L	0.0	0.5	0.00%
37791	12/12/01	AROCLOR-1248	0.5	U	V	0.5	U	V	UG/L	0.0	0.5	0.00%
37791	12/12/01	AROCLOR-1254	0.5	U	V	0.5	U	V	UG/L	0.0	0.5	0.00%
37791	12/12/01	AROCLOR-1260	0.5	U	V	0.5	U	V	UG/L	0.0	0.5	0.00%
[redacted] Location	**Sample Date**	**Analyte**	**Real Result**	**Real Lab Qual**	**Real Validation**	**Dup Result**	**Dup Lab Qual**	**Dup Validation**	**Units**	**Absolute Value |Real-Dup|**	**Average (Real+Dup)/2**	**RPD AbsVal/AveX100**
Total and Dissolved Metals												
12691	1/15/01	ALUMINUM	7.6	U	V	10.4	B	V	UG/L	2.8	9.0	**31.11%**
03991	1/23/01	ALUMINUM	24.3		UJ	23.4		UJ	UG/L	0.9	23.9	3.77%
41299	2/26/01	ALUMINUM	13.2	B	V1	21.9		V1	UG/L	8.7	17.6	**49.57%**
07391	3/6/01	ALUMINUM	22.1		V1	20.8		V1	UG/L	1.3	21.5	6.06%
22996	3/20/01	ALUMINUM	72.9		V1	55.5		V1	UG/L	17.4	64.2	27.10%
02291	4/10/01	ALUMINUM	20.7		UJ1	29.8		V1	UG/L	9.1	25.3	**36.04%**
22796	5/14/01	ALUMINUM	33.0		V1	38.2		V1	UG/L	5.2	35.6	14.61%
00500	5/15/01	ALUMINUM	29.2		UJ1	33.0		V1	UG/L	3.8	31.1	12.22%
00100	5/23/01	ALUMINUM	13.1	B	UJ1	7.7	B	UJ1	UG/L	5.4	10.4	**51.92%**
02500	6/6/01	ALUMINUM	10.5	B	UJ1	10.2	B	UJ1	UG/L	0.3	10.4	2.90%
00597	7/19/01	ALUMINUM	7.6	B	V	4.4	B	V	UG/L	3.2	6.0	**53.33%**
40299	7/23/01	ALUMINUM	3.7	B	V	3.9	B	V	UG/L	0.2	3.8	5.26%
P209389	7/23/01	ALUMINUM	2.4	B	J1	2.8	B	J1	UG/L	0.4	2.6	15.38%
03991	8/7/01	ALUMINUM	6.5	BN	J1	48.0	N	J1	UG/L	41.5	27.3	**152.29%**
37201	8/10/01	ALUMINUM	39.0	N	J1	53.0	N	J1	UG/L	14.0	46.0	**30.43%**
22896	9/12/01	ALUMINUM	17.0	BN	UJ1	45.0	BN	J1	UG/L	28.0	31.0	**90.32%**
02500	10/23/01	ALUMINUM-dissolved	302.0		V1	192.0		V1	UG/L	110.0	247.0	**44.53%**
3687	10/16/01	ALUMINUM-total	15.3	B	V1	17.5		V1	UG/L	2.2	16.4	13.41%
22896	1/11/01	ANTIMONY	2.7	B	R1	2.2	U	V1	UG/L	0.4	2.5	17.52%
12691	1/15/01	ANTIMONY	2.2	U	V	2.3	B	R	UG/L	0.1	2.3	3.94%
41299	2/26/01	ANTIMONY	0.4	U	V1	0.7	B	V1	UG/L	0.3	0.6	**50.00%**
[redacted]	3/6/01	ANTIMONY	0.6	B	V1	0.4	U	V1	UG/L	0.1	0.5	26.80%

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Table 11-1
Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid-ation	Dup Result	Dup Lab Qual	Dup Valid-ation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RPD AbsVal
Total and Dissolved Metals (Continued)												
22996	3/20/01	ANTIMONY	0.6	B	V1	0.6	B	V1	UG/L	0.0	0.6	6.90%
00597	7/19/01	ANTIMONY	0.5	B	UJ	0.1	U	V	UG/L	0.4	0.3	**121.21%**
03991	8/7/01	ANTIMONY	3.0	B	UJ1	0.7	U	V1	UG/L	2.3	1.8	**126.98%**
37201	8/10/01	ANTIMONY	1.0	B	UJ1	0.9	B	UJ1	UG/L	0.1	1.0	10.53%
22896	9/12/01	ANTIMONY	0.3	U	V1	0.7	B	UJ1	UG/L	0.4	0.5	**71.70%**
02500	10/23/01	ANTIMONY-dissolved	1.4	U	J1	1.4	U	J1	UG/L	0.0	1.4	0.00%
22796	5/14/01	ARSENIC	0.6	U	J1	0.8	B	J1	UG/L	0.2	0.7	**33.09%**
00500	5/15/01	ARSENIC	3.9	B	J1	3.9	B	J1	UG/L	0.0	3.9	0.00%
00597	7/19/01	ARSENIC	0.4	B	V	0.4	B	V	UG/L	0.0	0.4	2.60%
40299	7/23/01	ARSENIC	0.2	B	V	0.3	B	V	UG/L	0.0	0.2	12.24%
P209389	7/23/01	ARSENIC	0.6	B	V1	0.5	B	V1	UG/L	0.1	0.5	15.09%
03991	8/7/01	ARSENIC	0.7	B	V1	0.6	U	V1	UG/L	0.0	0.7	4.58%
22896	9/12/01	ARSENIC	0.4	B	V1	0.4	B	V1	UG/L	0.0	0.4	5.56%
02500	10/23/01	ARSENIC-dissolved	1.8	B	V1	2.6	B	V1	UG/L	0.8	2.2	**36.36%**
00600	11/15/01	ARSENIC-dissolved	9.6		J1	11.4		J1	UG/L	1.8	10.5	17.14%
37791	12/11/01	ARSENIC-dissolved	1.7	U	V1	2.2	B	UJ1	UG/L	0.5	2.0	25.64%
00597	1/10/01	BARIUM	86.8	B	J1	93.3	B	J1	UG/L	6.5	90.1	7.22%
22896	1/11/01	BARIUM	149.0		J1	149.0		J1	UG/L	0.0	149.0	0.00%
12691	1/15/01	BARIUM	255.0		V	259.0		V	UG/L	4.0	257.0	1.56%
03991	1/23/01	BARIUM	213.0		V	210.0		V	UG/L	3.0	211.5	1.42%
P209389	2/13/01	BARIUM	88.3	B	J1	89.3	B	J1	UG/L	1.0	88.8	1.13%
41299	2/26/01	BARIUM	208.0		V1	200.0		V1	UG/L	8.0	204.0	3.92%
07391	3/6/01	BARIUM	124.0		V1	131.0		V1	UG/L	7.0	127.5	5.49%
22996	3/20/01	BARIUM	59.6	B	V1	59.2	B	V1	UG/L	0.4	59.4	0.67%
02291	4/10/01	BARIUM	174.0		V1	173.0		V1	UG/L	1.0	173.5	[redacted]
22796	5/14/01	BARIUM	378.0		V1	341.0		V1	UG/L	37.0	359.5	10.29%
00500	5/15/01	BARIUM	207.0		V1	217.0		V1	UG/L	10.0	212.0	4.72%
00100	5/23/01	BARIUM	115.0		V1	118.0		V1	UG/L	3.0	116.5	2.58%
02500	6/6/01	BARIUM	181.0		V1	161.0		V1	UG/L	20.0	171.0	11.70%
00597	7/19/01	BARIUM	92.9	B	V	94.4	B	V	UG/L	1.5	93.7	1.60%
40299	7/23/01	BARIUM	191.0		V	192.0		V	UG/L	1.0	191.5	0.52%
P209389	7/23/01	BARIUM	109.0		V1	115.0		V1	UG/L	6.0	112.0	5.36%
03991	8/7/01	BARIUM	190.0		V1	190.0		V1	UG/L	0.0	190.0	0.00%
37201	8/10/01	BARIUM	330.0		V1	350.0		V1	UG/L	20.0	340.0	5.88%
22896	9/12/01	BARIUM	62.0	B	V1	110.0		V1	UG/L	48.0	86.0	**55.81%**
02291	10/11/01	BARIUM-dissolved	193.0		V1	191.0		V1	UG/L	2.0	192.0	1.04%
02500	10/23/01	BARIUM-dissolved	191.0		V1	189.0		V1	UG/L	2.0	190.0	1.05%
00100	11/15/01	BARIUM-dissolved	105.0		V1	104.0		V1	UG/L	1.0	104.5	0.96%
00600	11/15/01	BARIUM-dissolved	127.0		V1	126.0		V1	UG/L	1.0	126.5	0.79%
37791	12/11/01	BARIUM-dissolved	224.0		V1	222.0		V1	UG/L	2.0	223.0	0.90%
3687	10/16/01	BARIUM-total	243.0		V1	246.0		V1	UG/L	3.0	244.5	1.23%
07391	3/6/01	BERYLLIUM	0.0	B	V1	0.0	B	V1	UG/L	0.0	0.0	28.57%
22996	3/20/01	BERYLLIUM	0.1	B	UJ1	0.1	B	UJ1	UG/L	0.0	0.1	0.00%
02291	4/10/01	BERYLLIUM	0.1	B	UJ1	0.1	B	UJ1	UG/L	0.0	0.1	0.00%
22796	5/14/01	BERYLLIUM	0.1	B	V1	0.1	B	V1	UG/L	0.0	0.1	11.76%
00500	5/15/01	BERYLLIUM	0.1	B	V1	0.1	B	V1	UG/L	0.0	0.1	7.41%
03991	1/23/01	CADMIUM	0.2	B	UJ	0.2	B	UJ	UG/L	0.0	0.2	17.14%
P209389	2/13/01	CADMIUM	0.3	U	V1	0.5	B	V1	UG/L	0.2	0.4	**51.57%**
41299	2/26/01	CADMIUM	0.3	B	V1	0.3	B	V1	UG/L	0.0	0.3	0.00%

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Table 11-1
Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

9/17/02

[redacted]tion	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid-ation	Dup Result	Dup Lab Qual	Dup Valid-ation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RPD AbsVal/AveX100
Total and Dissolved Metals (Continued)												
07391	3/6/01	CADMIUM	0.2	B	V1	0.2	B	V1	UG/L	0.0	0.2	4.65%
02291	4/10/01	CADMIUM	0.1	U	V1	0.1	B	V1	UG/L	0.0	0.1	22.22%
22796	5/14/01	CADMIUM	0.1	U	V1	0.1	B	V1	UG/L	0.0	0.1	**31.58%**
00500	5/15/01	CADMIUM	0.8	B	V1	0.4	B	V1	UG/L	0.4	0.6	**65.55%**
00100	5/23/01	CADMIUM	0.2	B	V1	0.3	B	V1	UG/L	0.0	0.3	8.00%
02500	6/6/01	CADMIUM	0.1	B	V1	0.1	B	V1	UG/L	0.0	0.1	9.52%
00597	7/19/01	CADMIUM	0.6	B	UJ	0.5	B	UJ	UG/L	0.1	0.6	10.91%
P209389	7/23/01	CADMIUM	0.3	B	UJ1	0.4	B	UJ1	UG/L	0.1	0.3	20.90%
03991	8/7/01	CADMIUM	0.1	B	V1	0.1	B	V1	UG/L	0.0	0.1	**38.41%**
37201	8/10/01	CADMIUM	0.2	B	V1	0.2	B	V1	UG/L	0.0	0.2	11.76%
22896	9/12/01	CADMIUM	0.1	B	V1	0.1	B	V1	UG/L	0.0	0.1	13.33%
02291	10/11/01	CADMIUM-dissolved	0.5	B	V1	0.2	U	V1	UG/L	0.3	0.4	**97.14%**
00597	1/10/01	CALCIUM	26400.0		V1	28300.0		V1	UG/L	1900.0	27350.0	6.95%
22896	1/11/01	CALCIUM	150000.0		V1	150000.0		V1	UG/L	0.0	150000.0	0.00%
12691	1/15/01	CALCIUM	165000.0		V	165000.0		V	UG/L	0.0	165000.0	0.00%
03991	1/23/01	CALCIUM	102000.0		V	101000.0		V	UG/L	1000.0	101500.0	0.99%
P209389	2/13/01	CALCIUM	128000.0		V1	130000.0		V1	UG/L	2000.0	129000.0	1.55%
41299	2/26/01	CALCIUM	107000.0		V1	103000.0		V1	UG/L	4000.0	105000.0	3.81%
07391	3/6/01	CALCIUM	643000.0		V1	671000.0		V1	UG/L	28000.0	657000.0	4.26%
22996	3/20/01	CALCIUM	41100.0	B	V1	42400.0	B	V1	UG/L	1300.0	41750.0	3.11%
02291	4/10/01	CALCIUM	77500.0		V1	77100.0		V1	UG/L	400.0	77300.0	0.52%
22796	5/14/01	CALCIUM	410000.0		V1	384000.0		V1	UG/L	26000.0	397000.0	6.55%
00500	5/15/01	CALCIUM	101000.0		V1	105000.0		V1	UG/L	4000.0	103000.0	3.88%
00100	5/23/01	CALCIUM	84400.0		V1	86200.0		V1	UG/L	1800.0	85300.0	2.11%
[redacted]	6/6/01	CALCIUM	178000.0		V1	158000.0		V1	UG/L	20000.0	168000.0	11.90%
00597	7/19/01	CALCIUM	28600.0		J	28600.0		J	UG/L	0.0	28600.0	0.00%
40299	7/23/01	CALCIUM	106000.0		J	107000.0		J	UG/L	1000.0	106500.0	0.94%
P209389	7/23/01	CALCIUM	113000.0		V1	113000.0		V1	UG/L	0.0	113000.0	0.00%
03991	8/7/01	CALCIUM	97000.0		V1	97000.0		V1	UG/L	0.0	97000.0	0.00%
37201	8/10/01	CALCIUM	120000.0		V1	120000.0		V1	UG/L	0.0	120000.0	0.00%
22896	9/12/01	CALCIUM	53000.0		V1	74000.0		V1	UG/L	21000.0	63500.0	**33.07%**
02291	10/11/01	CALCIUM-dissolved	77000.0		V1	76200.0		V1	UG/L	800.0	76600.0	1.04%
02500	10/23/01	CALCIUM-dissolved	144000.0		V1	149000.0		V1	UG/L	5000.0	146500.0	3.41%
00100	11/15/01	CALCIUM-dissolved	85600.0		V1	85100.0		V1	UG/L	500.0	85350.0	0.59%
00600	11/15/01	CALCIUM-dissolved	86200.0		V1	85900.0		V1	UG/L	300.0	86050.0	0.35%
37791	12/11/01	CALCIUM-dissolved	86900.0		V1	87900.0		V1	UG/L	1000.0	87400.0	1.14%
3687	10/16/01	CALCIUM-total	145000.0		V1	144000.0		V1	UG/L	1000.0	144500.0	0.69%
22896	1/11/01	CHROMIUM	12.4		V1	20.0		V1	UG/L	7.6	16.2	**46.91%**
41299	2/26/01	CHROMIUM	330.0		V1	327.0		V1	UG/L	3.0	328.5	0.91%
07391	3/6/01	CHROMIUM	0.4	B	J1	0.5	B	J1	UG/L	0.0	0.4	2.25%
22996	3/20/01	CHROMIUM	1.0	B	V1	1.0	B	V1	UG/L	0.0	1.0	3.05%
02291	4/10/01	CHROMIUM	1.0	B	V1	0.2	U	V1	UG/L	0.8	0.6	**126.05%**
22796	5/14/01	CHROMIUM	106.0		V1	77.5		V1	UG/L	28.5	91.8	**31.06%**
00100	5/23/01	CHROMIUM	0.3	B	V1	0.2	U	V1	UG/L	0.1	0.2	20.41%
02500	6/6/01	CHROMIUM	0.2	U	V1	0.3	B	V1	UG/L	0.1	0.3	**33.96%**
03991	8/7/01	CHROMIUM	6.0		V1	6.8		V1	UG/L	0.8	6.4	12.50%
37201	8/10/01	CHROMIUM	2.7		V1	3.3		V1	UG/L	0.6	3.0	20.00%
22896	9/12/01	CHROMIUM	3.7		V1	4.6		V1	UG/L	0.9	4.2	21.69%
00100	11/15/01	CHROMIUM-dissolved	1.2	B	J1	0.3	U	J1	UG/L	0.9	0.7	**128.77%**
3687	10/16/01	CHROMIUM-total	3.6		V1	4.9		V1	UG/L	1.3	4.3	**30.59%**
[redacted]	2/26/01	COBALT	0.5	B	V1	0.3	B	V1	UG/L	0.2	0.4	**42.86%**

Table 11-1

Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid-ation	Dup Result	Dup Lab Qual	Dup Valid-ation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RP AbsVal/
Total and Dissolved Metals (Continued)												
07391	3/6/01	COBALT	5.3	B	V1	5.4	B	V1	UG/L	0.1	5.4	1.87%
22796	5/14/01	COBALT	0.9	B	V1	0.7	B	V1	UG/L	0.2	0.8	24.10%
00500	5/15/01	COBALT	15.9	B	V1	16.5	B	V1	UG/L	0.6	16.2	3.70%
00100	5/23/01	COBALT	0.5	B	V1	0.5	B	V1	UG/L	0.0	0.5	2.15%
37201	8/10/01	COBALT	0.4	U	V1	0.5	B	V1	UG/L	0.1	0.5	10.99%
22896	9/12/01	COBALT	0.7	B	V1	0.4	U	V1	UG/L	0.3	0.6	49.12%
00600	11/15/01	COBALT	7.4	B	V1	7.7	B	V1	UG/L	0.3	7.6	3.97%
00597	1/10/01	COPPER	3.6		UJ1	2.5	B	UJ1	UG/L	1.1	3.0	34.60%
03991	1/23/01	COPPER	0.5	B	V	0.7	B	V	UG/L	0.1	0.6	21.49%
P209389	2/13/01	COPPER	1.9	B	UJ1	2.8	B	UJ1	UG/L	0.9	2.4	35.94%
41299	2/26/01	COPPER	1.0	B	V1	1.3	B	V1	UG/L	0.3	1.2	26.09%
07391	3/6/01	COPPER	4.3		V1	3.9		V1	UG/L	0.4	4.1	9.76%
22996	3/20/01	COPPER	1.1	B	J1	0.8	B	J1	UG/L	0.3	1.0	29.17%
02291	4/10/01	COPPER	0.8	B	UJ1	1.0	B	UJ1	UG/L	0.1	0.9	14.53%
22796	5/14/01	COPPER	2.2	B	UJ1	2.3	B	UJ1	UG/L	0.1	2.3	4.44%
00500	5/15/01	COPPER	0.2	B	UJ1	0.5	B	UJ1	UG/L	0.3	0.4	68.49%
00100	5/23/01	COPPER	1.7	B	UJ1	1.4	B	UJ1	UG/L	0.3	1.6	19.35%
02500	6/6/01	COPPER	1.4	B	V1	1.7	B	V1	UG/L	0.3	1.6	19.35%
00597	7/19/01	COPPER	0.5	B	UJ	5.5		V	UG/L	5.1	3.0	169.75%
40299	7/23/01	COPPER	0.2	B	UJ	0.1	U	J	UG/L	0.1	0.1	103.03%
P209389	7/23/01	COPPER	1.8	B	V1	1.9	B	V1	UG/L	0.1	1.9	5.41%
37201	8/10/01	COPPER	4.1		V1	3.6	B	V1	UG/L	0.5	3.9	12.99%
22896	9/12/01	COPPER	37.0		V1	1.2	B	V1	UG/L	35.8	19.1	187.43%
02500	10/23/01	COPPER-dissolved	3.1		UJ1	2.9	B	UJ1	UG/L	0.2	3.0	[redacted]
00100	11/15/01	COPPER-dissolved	1.3	B	J1	0.8	B	J1	UG/L	0.5	1.0	[redacted]
37791	12/11/01	COPPER-dissolved	2.2	B	UJ1	2.1	B	UJ1	UG/L	0.1	2.2	4.65%
3687	10/16/01	COPPER-total	1.4	B	UJ1	1.6	B	UJ1	UG/L	0.2	1.5	13.33%
00597	1/10/01	IRON	14.4	B	UJ1	6.2	B	UJ1	UG/L	8.2	10.3	79.61%
22896	1/11/01	IRON	115.0		UJ1	192.0		V1	UG/L	77.0	153.5	50.16%
12691	1/15/01	IRON	11.0	B	UJ	15.8	B	UJ	UG/L	4.8	13.4	35.82%
P209389	2/13/01	IRON	3.3	U	V1	3.3	U	V1	UG/L	0.0	3.3	0.00%
41299	2/26/01	IRON	13.5	B	V1	17.9	B	V1	UG/L	4.4	15.7	28.03%
07391	3/6/01	IRON	9.5	B	V1	4.4	U	V1	UG/L	5.1	7.0	73.38%
22996	3/20/01	IRON	31.8	B	V1	24.7	B	V1	UG/L	7.1	28.3	25.13%
02291	4/10/01	IRON	6.0	B	V1	4.2	B	V1	UG/L	1.8	5.1	35.29%
22796	5/14/01	IRON	827.0		V1	615.0		V1	UG/L	212.0	721.0	29.40%
00500	5/15/01	IRON	18400.0		V1	18800.0		V1	UG/L	400.0	18600.0	2.15%
00100	5/23/01	IRON	6.4	B	V1	3.9	U	V1	UG/L	2.5	5.2	48.54%
02500	6/6/01	IRON	6.3	B	V1	10.5	B	V1	UG/L	4.2	8.4	50.00%
00597	7/19/01	IRON	10.2	B	UJ	4.7	B	UJ	UG/L	5.5	7.5	73.83%
40299	7/23/01	IRON	11.5	B	UJ	7.9	B	UJ	UG/L	3.6	9.7	37.11%
P209389	7/23/01	IRON	5.8	B	UJ1	8.1	B	UJ1	UG/L	2.3	7.0	33.09%
03991	8/7/01	IRON	150.0		V1	160.0		V1	UG/L	10.0	155.0	6.45%
37201	8/10/01	IRON	390.0		V1	430.0		V1	UG/L	40.0	410.0	9.76%
22896	9/12/01	IRON	160.0		V1	360.0		V1	UG/L	200.0	260.0	76.92%
02500	10/23/01	IRON-dissolved	283.0		V1	53.6	B	UJ1	UG/L	229.4	168.3	136.30%
00600	11/15/01	IRON-dissolved	7080.0		V1	7470.0		V1	UG/L	390.0	7275.0	5.36%
3687	10/16/01	IRON-total	254.0		V1	110.0		UJ1	UG/L	144.0	182.0	79.12%
P209389	2/13/01	LEAD	1.5	U	V1	1.9	B	UJ1	UG/L	0.4	1.7	22.[redacted]
00500	5/15/01	LEAD	0.7	U	V1	0.7	B	V1	UG/L	0.0	0.7	[redacted]

Table 11-1
Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

9/17/02

[redacted]ion	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid-ation	Dup Result	Dup Lab Qual	Dup Valid-ation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RPD AbsVal/AveX100
Total and Dissolved Metals (Continued)												
00597	7/19/01	LEAD	0.1	B	UJ	0.1	B	UJ	UG/L	0.0	0.1	23.73%
40299	7/23/01	LEAD	0.0	B	UJ	0.0	B	UJ	UG/L	0.0	0.0	0.00%
P209389	7/23/01	LEAD	0.1	B	UJ1	0.1	B	UJ1	UG/L	0.0	0.1	26.09%
03991	8/7/01	LEAD	0.6	U	V1	0.9	B	V1	UG/L	0.3	0.8	**43.71%**
37201	8/10/01	LEAD	0.7	B	V1	1.0	B	V1	UG/L	0.3	0.8	**35.71%**
00597	1/10/01	LITHIUM	10.2	B	J1	10.0	B	J1	UG/L	0.2	10.1	1.98%
22896	1/11/01	LITHIUM	19.0	B	V1	19.4	B	V1	UG/L	0.4	19.2	2.08%
12691	1/15/01	LITHIUM	10.0	B	V	9.7	B	V	UG/L	0.3	9.8	2.95%
03991	1/23/01	LITHIUM	8.4	B	J	8.2	B	J	UG/L	0.2	8.3	2.41%
P209389	2/13/01	LITHIUM	14.2	BE	J1	14.4	BE	J1	UG/L	0.2	14.3	1.40%
41299	2/26/01	LITHIUM	7.7	B	V1	7.4	B	V1	UG/L	0.3	7.6	3.97%
07391	3/6/01	LITHIUM	47.6	B	J1	50.5	B	J1	UG/L	2.9	49.1	5.91%
22996	3/20/01	LITHIUM	9.4	B	J1	9.0	B	J1	UG/L	0.4	9.2	4.35%
02291	4/10/01	LITHIUM	33.3	B	J1	33.4	B	J1	UG/L	0.1	33.4	0.30%
22796	5/14/01	LITHIUM	53.4	B	V1	47.2	B	V1	UG/L	6.2	50.3	12.33%
00500	5/15/01	LITHIUM	297.0		V1	303.0		V1	UG/L	6.0	300.0	2.00%
00100	5/23/01	LITHIUM	10.5	B	V1	10.5	B	V1	UG/L	0.0	10.5	0.00%
02500	6/6/01	LITHIUM	4.4	B	J1	3.9	B	J1	UG/L	0.5	4.2	12.05%
00597	7/19/01	LITHIUM	8.2	B	UJ	7.8	B	UJ	UG/L	0.4	8.0	5.00%
40299	7/23/01	LITHIUM	11.7	B	UJ	10.4	B	UJ	UG/L	1.3	11.1	11.76%
P209389	7/23/01	LITHIUM	14.6	B	J1	14.3	B	J1	UG/L	0.3	14.5	2.08%
03991	8/7/01	LITHIUM	6.6	B	V1	5.8	B	V1	UG/L	0.8	6.2	12.90%
37201	8/10/01	LITHIUM	5.1	B	V1	6.2	B	V1	UG/L	1.1	5.7	19.47%
22896	9/12/01	LITHIUM	14.0	B	V1	8.5	B	V1	UG/L	5.5	11.3	**48.89%**
[redacted]	10/11/01	LITHIUM-dissolved	26.0	B	J1	25.2	B	J1	UG/L	0.8	25.6	3.13%
[redacted]	11/15/01	LITHIUM-dissolved	8.9	B	V1	12.3	B	V1	UG/L	3.4	10.6	**32.08%**
00600	11/15/01	LITHIUM-dissolved	4.8	B	V1	4.1	U	V1	UG/L	0.7	4.5	15.73%
37791	12/11/01	LITHIUM-dissolved	27.1	B	V1	28.6	B	V1	UG/L	1.5	27.9	5.39%
3687	10/16/01	LITHIUM-total	5.3	B	J1	4.1	U	J1	UG/L	1.2	4.7	25.53%
00597	1/10/01	MAGNESIUM	5110.0		V1	5520.0		V1	UG/L	410.0	5315.0	7.71%
22896	1/11/01	MAGNESIUM	29300.0		V1	29400.0		V1	UG/L	100.0	29350.0	0.34%
12691	1/15/01	MAGNESIUM	12500.0		V	12400.0		V	UG/L	100.0	12450.0	0.80%
03991	1/23/01	MAGNESIUM	12700.0		V	12500.0		V	UG/L	200.0	12600.0	1.59%
P209389	2/13/01	MAGNESIUM	18600.0		V1	18800.0		V1	UG/L	200.0	18700.0	1.07%
41299	2/26/01	MAGNESIUM	13600.0		V1	13100.0		V1	UG/L	500.0	13350.0	3.75%
07391	3/6/01	MAGNESIUM	46500.0		V1	48300.0		V1	UG/L	1800.0	47400.0	3.80%
22996	3/20/01	MAGNESIUM	10300.0		V1	10600.0		V1	UG/L	300.0	10450.0	2.87%
02291	4/10/01	MAGNESIUM	22400.0		V1	22300.0		V1	UG/L	100.0	22350.0	0.45%
22796	5/14/01	MAGNESIUM	98000.0		V1	91200.0		V1	UG/L	6800.0	94600.0	7.19%
00500	5/15/01	MAGNESIUM	16600.0		V1	17000.0		V1	UG/L	400.0	16800.0	2.38%
00100	5/23/01	MAGNESIUM	12500.0		V1	12700.0		V1	UG/L	200.0	12600.0	1.59%
02500	6/6/01	MAGNESIUM	22700.0		V1	20300.0		V1	UG/L	2400.0	21500.0	11.16%
00597	7/19/01	MAGNESIUM	5370.0		J	5400.0		J	UG/L	30.0	5385.0	0.56%
40299	7/23/01	MAGNESIUM	15800.0		J	16000.0		J	UG/L	200.0	15900.0	1.26%
P209389	7/23/01	MAGNESIUM	18800.0		V1	18900.0		V1	UG/L	100.0	18850.0	0.53%
03991	8/7/01	MAGNESIUM	11000.0		V1	11000.0		V1	UG/L	0.0	11000.0	0.00%
37201	8/10/01	MAGNESIUM	17000.0		V1	17000.0		V1	UG/L	0.0	17000.0	0.00%
22896	9/12/01	MAGNESIUM	9900.0		V1	11000.0		V1	UG/L	1100.0	10450.0	10.53%
02291	10/11/01	MAGNESIUM-dissolved	22300.0		V1	21800.0		V1	UG/L	500.0	22050.0	2.27%
02500	10/23/01	MAGNESIUM-dissolved	24000.0		V1	24600.0		V1	UG/L	600.0	24300.0	2.47%
[redacted]	11/15/01	MAGNESIUM-dissolved	12600.0		V1	12700.0		V1	UG/L	100.0	12650.0	0.79%
[redacted]	11/15/01	MAGNESIUM-dissolved	15500.0		V1	15500.0		V1	UG/L	0.0	15500.0	0.00%

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Table 11-1

Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid-ation	Dup Result	Dup Lab Qual	Dup Valid-ation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RP AbsVal/
Total and Dissolved Metals (Continued)												
37791	12/11/01	MAGNESIUM-dissolved	58400.0		V1	58800.0		V1	UG/L	400.0	58600.0	0.68%
3687	10/16/01	MAGNESIUM-total	11100.0		V1	11100.0		V1	UG/L	0.0	11100.0	0.00%
00597	1/10/01	MANGANESE	1.7	B	V1	1.0	B	V1	UG/L	0.6	1.3	48.12%
22896	1/11/01	MANGANESE	4.2	B	V1	3.8	B	V1	UG/L	0.4	4.0	9.50%
12691	1/15/01	MANGANESE	0.8	B	V	0.5	U	V	UG/L	0.3	0.6	48.57%
03991	1/23/01	MANGANESE	0.5	B	UJ	0.5	B	V	UG/L	0.1	0.5	11.76%
P209389	2/13/01	MANGANESE	0.5	B	V1	0.3	B	V1	UG/L	0.2	0.4	38.12%
41299	2/26/01	MANGANESE	89.1		V1	44.7		V1	UG/L	44.4	66.9	66.37%
07391	3/6/01	MANGANESE	6.7	B	V1	6.6	B	V1	UG/L	0.1	6.7	1.50%
22996	3/20/01	MANGANESE	0.9	B	V1	0.4	B	V1	UG/L	0.5	0.7	77.61%
02291	4/10/01	MANGANESE	0.2	B	UJ1	0.2	B	UJ1	UG/L	0.0	0.2	10.53%
22796	5/14/01	MANGANESE	511.0		V1	451.0		V1	UG/L	60.0	481.0	12.47%
00500	5/15/01	MANGANESE	4570.0		V1	4660.0		V1	UG/L	90.0	4615.0	1.95%
00100	5/23/01	MANGANESE	68.0		V1	66.2		V1	UG/L	1.8	67.1	2.68%
02500	6/6/01	MANGANESE	46.9		V1	50.0		V1	UG/L	3.1	48.5	6.40%
40299	7/23/01	MANGANESE	1.0	B	UJ	0.7	B	UJ	UG/L	0.3	0.8	36.59%
P209389	7/23/01	MANGANESE	2.2	B	V1	2.2	B	V1	UG/L	0.0	2.2	0.00%
37201	8/10/01	MANGANESE	200.0		V1	280.0		V1	UG/L	80.0	240.0	33.33%
22896	9/12/01	MANGANESE	16.0		V1	220.0		V1	UG/L	204.0	118.0	172.88%
02291	10/11/01	MANGANESE-dissolved	2.5	B	UJ1	6.1	B	UJ1	UG/L	3.6	4.3	83.72%
02500	10/23/01	MANGANESE-dissolved	91.6		V1	99.0		V1	UG/L	7.4	95.3	7.76%
00100	11/15/01	MANGANESE-dissolved	77.6		V1	75.8		V1	UG/L	1.8	76.7	2.35%
00600	11/15/01	MANGANESE-dissolved	1180.0		V1	1170.0		V1	UG/L	10.0	1175.0	0.85%
37791	12/11/01	MANGANESE-dissolved	3.5	B	V1	3.3	B	V1	UG/L	0.2	3.4	[redacted]
3687	10/16/01	MANGANESE-total	10.4	B	UJ1	6.8	B	UJ1	UG/L	3.6	8.6	41[redacted]
02500	6/6/01	MERCURY	0.1		V1	0.1		V1	UG/L	0.0	0.1	0.00%
02291	10/11/01	MERCURY-dissolved	0.0	U	V1	0.0	U	V1	UG/L	0.0	0.0	0.00%
03991	1/23/01	MOLYBDENUM	1.1	B	V	1.1	B	V	UG/L	0.0	1.1	0.00%
41299	2/26/01	MOLYBDENUM	1.8	B	V1	1.6	B	V1	UG/L	0.2	1.7	11.76%
07391	3/6/01	MOLYBDENUM	7.9	B	V1	8.2	B	V1	UG/L	0.3	8.1	3.73%
22996	3/20/01	MOLYBDENUM	15.3	B	V1	16.3	B	V1	UG/L	1.0	15.8	6.33%
02291	4/10/01	MOLYBDENUM	1.0	B	V1	0.9	B	V1	UG/L	0.1	0.9	14.05%
22796	5/14/01	MOLYBDENUM	7.0	B	V1	6.4	B	V1	UG/L	0.6	6.7	8.96%
00500	5/15/01	MOLYBDENUM	0.6	B	UJ1	0.7	B	UJ1	UG/L	0.0	0.6	4.65%
00100	5/23/01	MOLYBDENUM	1.6	B	V1	1.6	B	V1	UG/L	0.0	1.6	0.00%
02500	6/6/01	MOLYBDENUM	1.6	B	V1	1.4	B	V1	UG/L	0.2	1.5	13.33%
00597	7/19/01	MOLYBDENUM	1.4	U	V	1.6	B	V	UG/L	0.2	1.5	13.33%
P209389	7/23/01	MOLYBDENUM	1.9	B	V1	1.4	U	V1	UG/L	0.5	1.7	30.30%
02291	10/11/01	MOLYBDENUM-dissolved	1.4	B	UJ1	1.3	B	UJ1	UG/L	0.1	1.4	7.41%
02500	10/23/01	MOLYBDENUM-dissolved	3.1	B	UJ1	1.7	B	UJ1	UG/L	1.4	2.4	58.33%
00100	11/15/01	MOLYBDENUM-dissolved	1.5	B	J1	1.3	B	J1	UG/L	0.2	1.4	14.29%
00600	11/15/01	MOLYBDENUM-dissolved	2.0	B	J1	1.6	B	J1	UG/L	0.4	1.8	22.22%
37791	12/11/01	MOLYBDENUM-dissolved	5.0	B	V1	5.4	B	V1	UG/L	0.4	5.2	7.69%
3687	10/16/01	MOLYBDENUM-total	1.2	B	UJ1	1.1	B	UJ1	UG/L	0.1	1.2	8.70%
22896	1/11/01	NICKEL	12.1	B	V1	12.9	B	V1	UG/L	0.8	12.5	6.40%
03991	1/23/01	NICKEL	2.8	B	V	2.7	B	V	UG/L	0.1	2.8	3.64%
P209389	2/13/01	NICKEL	2.3	B	UJ1	2.4	B	UJ1	UG/L	0.1	2.4	3.36%
41299	2/26/01	NICKEL	1.1	B	V1	0.8	B	V1	UG/L	0.3	1.0	27.98%
07391	3/6/01	NICKEL	83.0		V1	85.7		V1	UG/L	2.7	84.4	3.20%
22996	3/20/01	NICKEL	1.0	B	UJ1	0.8	B	UJ1	UG/L	0.2	0.9	23[redacted]
02291	4/10/01	NICKEL	2.3	B	V1	1.5	B	V1	UG/L	0.8	1.9	4[redacted]

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Table 11-1

Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

[redacted]ion	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid-ation	Dup Result	Dup Lab Qual	Dup Valid-ation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RPD AbsVal/AveX100
Total and Dissolved Metals (Continued)												
22796	5/14/01	NICKEL	48.8		V1	39.4		V1	UG/L	9.4	44.1	21.32%
00500	5/15/01	NICKEL	16.9	B	V1	17.5	B	V1	UG/L	0.6	17.2	3.49%
00100	5/23/01	NICKEL	10.3	B	V1	10.3	B	V1	UG/L	0.0	10.3	0.00%
02500	6/6/01	NICKEL	2.2	B	V1	2.2	B	V1	UG/L	0.0	2.2	0.00%
00597	7/19/01	NICKEL	1.0	U	V	1.1	B	V	UG/L	0.1	1.1	9.52%
P209389	7/23/01	NICKEL	1.6	B	J1	1.8	B	J1	UG/L	0.2	1.7	11.76%
22896	9/12/01	NICKEL	63.0		V1	2.4	B	V1	UG/L	60.6	32.7	**185.32%**
02500	10/23/01	NICKEL-dissolved	4.2	B	V1	3.9	B	V1	UG/L	0.3	4.1	7.41%
00100	11/15/01	NICKEL-dissolved	11.3	B	V1	10.5	B	V1	UG/L	0.8	10.9	7.34%
00600	11/15/01	NICKEL-dissolved	7.1	B	V1	7.2	B	V1	UG/L	0.1	7.2	1.40%
3687	10/16/01	NICKEL-total	23.8		V1	17.3	B	V1	UG/L	6.5	20.6	**31.63%**
00597	1/10/01	POTASSIUM	649.0	B	V1	658.0	B	V1	UG/L	9.0	653.5	1.38%
22896	1/11/01	POTASSIUM	1280.0	BE	J1	1220.0	BE	J1	UG/L	60.0	1250.0	4.80%
12691	1/15/01	POTASSIUM	1210.0	BE	J	1220.0	BE	J	UG/L	10.0	1215.0	0.82%
03991	1/23/01	POTASSIUM	1200.0	B	J	1180.0	B	J	UG/L	20.0	1190.0	1.68%
P209389	2/13/01	POTASSIUM	1330.0	B	V1	1350.0	B	V1	UG/L	20.0	1340.0	1.49%
41299	2/26/01	POTASSIUM	1090.0	B	J1	1020.0	B	J1	UG/L	70.0	1055.0	6.64%
07391	3/6/01	POTASSIUM	3600.0	B	J1	3850.0	B	J1	UG/L	250.0	3725.0	6.71%
22996	3/20/01	POTASSIUM	1040.0	B	J1	995.0	B	J1	UG/L	45.0	1017.5	4.42%
02291	4/10/01	POTASSIUM	484.0	B	V1	474.0	B	V1	UG/L	10.0	479.0	2.09%
22796	5/14/01	POTASSIUM	1210.0	B	V1	1260.0	B	V1	UG/L	50.0	1235.0	4.05%
00500	5/15/01	POTASSIUM	6570.0		V1	6610.0		V1	UG/L	40.0	6590.0	0.61%
00100	5/23/01	POTASSIUM	1090.0	B	J1	1090.0	B	J1	UG/L	0.0	1090.0	0.00%
02500	6/6/01	POTASSIUM	5290.0		V1	4650.0	B	V1	UG/L	640.0	4970.0	12.88%
[redacted]	7/19/01	POTASSIUM	1140.0	B	UJ	1040.0	B	UJ	UG/L	100.0	1090.0	9.17%
[redacted]	7/23/01	POTASSIUM	1310.0	B	UJ	1850.0	B	UJ	UG/L	540.0	1580.0	**34.18%**
P209389	7/23/01	POTASSIUM	1510.0	B	J1	1720.0	B	J1	UG/L	210.0	1615.0	13.00%
03991	8/7/01	POTASSIUM	810.0	B	J1	820.0		J1	UG/L	10.0	815.0	1.23%
37201	8/10/01	POTASSIUM	5300.0		V1	5600.0		V1	UG/L	300.0	5450.0	5.50%
22896	9/12/01	POTASSIUM	810.0	B	V1	1600.0	B	V1	UG/L	790.0	1205.0	**65.56%**
02500	10/23/01	POTASSIUM-dissolved	4290.0	B	J1	4090.0	B	J1	UG/L	200.0	4190.0	4.77%
00100	11/15/01	POTASSIUM-dissolved	892.0	B	J1	1120.0	B	J1	UG/L	228.0	1006.0	22.66%
37791	12/11/01	POTASSIUM-dissolved	4160.0	B	J1	4370.0	B	J1	UG/L	210.0	4265.0	4.92%
00597	1/10/01	SELENIUM	2.9	B	R1	2.4	U	V1	UG/L	0.5	2.6	18.39%
41299	2/26/01	SELENIUM	1.2	B	V1	0.8	U	V1	UG/L	0.4	1.0	**42.42%**
07391	3/6/01	SELENIUM	2.6	B	V1	2.3	B	V1	UG/L	0.3	2.5	12.24%
22996	3/20/01	SELENIUM	1.7	B	UJ1	1.3	B	UJ1	UG/L	0.4	1.5	26.67%
02291	4/10/01	SELENIUM	1.9	B	J1	1.7	B	J1	UG/L	0.2	1.8	11.11%
22796	5/14/01	SELENIUM	3.0	B	J1	2.8	B	J1	UG/L	0.2	2.9	6.90%
02500	6/6/01	SELENIUM	2.3	B	UJ1	2.0	B	UJ1	UG/L	0.3	2.2	13.95%
00597	7/19/01	SELENIUM	0.7	B	V	0.7	B	V	UG/L	0.0	0.7	4.14%
40299	7/23/01	SELENIUM	0.7	B	V	0.7	B	V	UG/L	0.0	0.7	1.46%
03991	8/7/01	SELENIUM	1.3	B	V1	0.7	U	V1	UG/L	0.6	1.0	**65.31%**
22896	9/12/01	SELENIUM	1.4	B	V1	1.5	B	V1	UG/L	0.1	1.5	6.90%
02291	10/11/01	SELENIUM-dissolved	4.0		V1	2.8	B	V1	UG/L	1.2	3.4	**35.29%**
00597	7/19/01	SILVER	0.0	B	J	0.0	U	J	UG/L	0.0	0.0	**57.14%**
03991	8/7/01	SILVER	0.2	B	V1	0.1	B	UJ1	UG/L	0.1	0.1	**62.07%**
37201	8/10/01	SILVER	0.1	B	UJ1	0.3		UJ1	UG/L	0.2	0.2	**95.24%**
22896	9/12/01	SILVER	0.0	U	V1	0.1	B	UJ1	UG/L	0.0	0.0	**164.29%**
02291	10/11/01	SILVER-dissolved	0.3	B	UJ1	0.2	U	J1	UG/L	0.1	0.3	23.08%
[redacted]	1/10/01	SODIUM	10200.0	E	V1	11000.0	E	V1	UG/L	800.0	10600.0	7.55%

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6604

Table 11-1
Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid-ation	Dup Result	Dup Lab Qual	Dup Valid-ation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RP AbsVal/
Total and Dissolved Metals (Continued)												
22896	1/11/01	SODIUM	42800.0		V1	42600.0		V1	UG/L	200.0	42700.0	0.47%
12691	1/15/01	SODIUM	16400.0		V	16400.0		V	UG/L	0.0	16400.0	0.00%
03991	1/23/01	SODIUM	13500.0		V	13300.0		V	UG/L	200.0	13400.0	1.49%
P209389	2/13/01	SODIUM	74100.0	E	J1	76000.0	E	J1	UG/L	1900.0	75050.0	2.53%
41299	2/26/01	SODIUM	20500.0		V1	19700.0		V1	UG/L	800.0	20100.0	3.98%
07391	3/6/01	SODIUM	319000.0		V1	335000.0		V1	UG/L	16000.0	327000.0	4.89%
22996	3/20/01	SODIUM	68300.0		V1	67500.0		V1	UG/L	800.0	67900.0	1.18%
02291	4/10/01	SODIUM	20100.0		V1	20400.0		V1	UG/L	300.0	20250.0	1.48%
22796	5/14/01	SODIUM	321000.0		V1	323000.0		V1	UG/L	2000.0	322000.0	0.62%
00500	5/15/01	SODIUM	99200.0		V1	100000.0		V1	UG/L	800.0	99600.0	0.80%
00100	5/23/01	SODIUM	34400.0		V1	35100.0		V1	UG/L	700.0	34750.0	2.01%
02500	6/6/01	SODIUM	135000.0		V1	120000.0		V1	UG/L	15000.0	127500.0	11.76%
00597	7/19/01	SODIUM	8200.0		J	8810.0		J	UG/L	610.0	8505.0	7.17%
40299	7/23/01	SODIUM	17600.0		J	19600.0		J	UG/L	2000.0	18600.0	10.75%
P209389	7/23/01	SODIUM	58700.0		V1	59800.0		V1	UG/L	1100.0	59250.0	1.86%
03991	8/7/01	SODIUM	13000.0		V1	13000.0		V1	UG/L	0.0	13000.0	0.00%
37201	8/10/01	SODIUM	210000.0		V1	220000.0		V1	UG/L	10000.0	215000.0	4.65%
22896	9/12/01	SODIUM	26000.0		V1	27000.0		V1	UG/L	1000.0	26500.0	3.77%
02291	10/11/01	SODIUM-dissolved	21100.0		V1	21100.0		V1	UG/L	0.0	21100.0	0.00%
02500	10/23/01	SODIUM-dissolved	137000.0		V1	137000.0		V1	UG/L	0.0	137000.0	0.00%
00100	11/15/01	SODIUM-dissolved	25400.0		V1	26200.0		V1	UG/L	800.0	25800.0	3.10%
00600	11/15/01	SODIUM-dissolved	17200.0		V1	17200.0		V1	UG/L	0.0	17200.0	0.00%
37791	12/11/01	SODIUM-dissolved	116000.0		V1	117000.0		V1	UG/L	1000.0	116500.0	0.86%
3687	10/16/01	SODIUM-total	11700.0		V1	11300.0		V1	UG/L	400.0	11500.0	3.48%
00597	1/10/01	STRONTIUM	150.0	B	V1	161.0	B	V1	UG/L	11.0	155.5	[redacted]
22896	1/11/01	STRONTIUM	751.0		V1	751.0		V1	UG/L	0.0	751.0	[redacted]
12691	1/15/01	STRONTIUM	456.0		V	459.0		V	UG/L	3.0	457.5	0.66%
03991	1/23/01	STRONTIUM	435.0		V	429.0		V	UG/L	6.0	432.0	1.39%
P209389	2/13/01	STRONTIUM	550.0		V1	558.0		V1	UG/L	8.0	554.0	1.44%
41299	2/26/01	STRONTIUM	427.0		V1	407.0		V1	UG/L	20.0	417.0	4.80%
07391	3/6/01	STRONTIUM	1540.0		V1	1620.0		V1	UG/L	80.0	1580.0	5.06%
22996	3/20/01	STRONTIUM	377.0		V1	381.0		V1	UG/L	4.0	379.0	1.06%
02291	4/10/01	STRONTIUM	629.0		V1	628.0		V1	UG/L	1.0	628.5	0.16%
22796	5/14/01	STRONTIUM	2500.0		V1	2310.0		V1	UG/L	190.0	2405.0	7.90%
00500	5/15/01	STRONTIUM	428.0		V1	439.0		V1	UG/L	11.0	433.5	2.54%
00100	5/23/01	STRONTIUM	395.0		V1	403.0		V1	UG/L	8.0	399.0	2.01%
02500	6/6/01	STRONTIUM	692.0		V1	621.0		V1	UG/L	71.0	656.5	10.81%
00597	7/19/01	STRONTIUM	151.0	B	V	152.0	B	V	UG/L	1.0	151.5	0.66%
40299	7/23/01	STRONTIUM	498.0		V	501.0		V	UG/L	3.0	499.5	0.60%
P209389	7/23/01	STRONTIUM	587.0		V1	620.0		V1	UG/L	33.0	603.5	5.47%
03991	8/7/01	STRONTIUM	390.0		V1	390.0		V1	UG/L	0.0	390.0	0.00%
37201	8/10/01	STRONTIUM	690.0		V1	700.0		V1	UG/L	10.0	695.0	1.44%
22896	9/12/01	STRONTIUM	300.0		V1	290.0		V1	UG/L	10.0	295.0	3.39%
02291	10/11/01	STRONTIUM-dissolved	647.0		V1	650.0		V1	UG/L	3.0	648.5	0.46%
02500	10/23/01	STRONTIUM-dissolved	703.0		V1	702.0		V1	UG/L	1.0	702.5	0.14%
00100	11/15/01	STRONTIUM-dissolved	382.0		V1	378.0		V1	UG/L	4.0	380.0	1.05%
00600	11/15/01	STRONTIUM-dissolved	409.0		V1	406.0		V1	UG/L	3.0	407.5	0.74%
37791	12/11/01	STRONTIUM-dissolved	1230.0		V1	1220.0		V1	UG/L	10.0	1225.0	0.82%
3687	10/16/01	STRONTIUM-total	409.0		V1	414.0		V1	UG/L	5.0	411.5	1.22%
22896	1/11/01	THALLIUM	5.0		R1	6.3		R1	UG/L	1.3	5.6	23.69%
00597	7/19/01	THALLIUM	0.0	B	UJ	0.0	B	UJ	UG/L	0.0	0.0	31.11%
40299	7/23/01	THALLIUM	0.0	B	UJ	0.0	B	UJ	UG/L	0.0	0.0	[redacted]

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Table 11-1

Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

9/17/02

[redacted]ion	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid-ation	Dup Result	Dup Lab Qual	Dup Valid-ation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RPD AbsVal/AveX100
Total and Dissolved Metals (Continued)												
P209389	7/23/01	THALLIUM	0.0	B	UJ1	0.1	B	UJ1	UG/L	0.0	0.1	11.76%
37201	8/10/01	THALLIUM	0.2	B	V1	0.3	B	V1	UG/L	0.1	0.2	**45.45%**
22896	9/12/01	THALLIUM	0.1	U	V1	0.4	B	J1	UG/L	0.3	0.2	**154.55%**
02291	10/11/01	THALLIUM-dissolved	4.6		UJ1	4.9		UJ1	UG/L	0.3	4.8	6.32%
02500	10/23/01	THALLIUM-dissolved	7.4		UJ1	5.0		UJ1	UG/L	2.4	6.2	**38.71%**
00100	11/15/01	THALLIUM-dissolved	2.5	B	J1	2.9	B	J1	UG/L	0.4	2.7	14.81%
00600	11/15/01	THALLIUM-dissolved	4.4		J1	2.9	B	J1	UG/L	1.5	3.7	**41.10%**
37791	12/11/01	THALLIUM-dissolved	2.1	U	J1	2.3	B	UJ1	UG/L	0.2	2.2	9.09%
3687	10/16/01	THALLIUM-total	3.4	B	UJ1	3.9	B	UJ1	UG/L	0.5	3.7	13.70%
12691	1/15/01	TIN	3.0	B	UJ	2.4	U	V	UG/L	0.6	2.7	23.70%
02500	10/23/01	TIN-dissolved	3.0	B	UJ1	2.2	U	V1	UG/L	0.8	2.6	**30.77%**
00100	11/15/01	TIN-dissolved	2.2	U	V1	3.2	B	UJ1	UG/L	1.0	2.7	**37.04%**
00597	1/10/01	URANIUM, total	2.6	B	J1	0.7	U	J1	UG/L	1.8	1.6	**111.93%**
22896	1/11/01	URANIUM, total	22.3	B	UJ1	19.8	B	UJ1	UG/L	2.5	21.1	11.88%
12691	1/15/01	URANIUM, total	30.1	B	UJ	29.4	B	UJ	UG/L	0.7	29.8	2.35%
P209389	2/13/01	URANIUM, total	10.8	U	V1	13.8	B	UJ1	UG/L	3.0	12.3	24.39%
03991	8/7/01	URANIUM, total	2.8		V1	2.6		V1	UG/L	0.2	2.7	7.41%
37201	8/10/01	URANIUM, total	2.8		V1	2.8		V1	UG/L	0.0	2.8	0.00%
22896	9/12/01	URANIUM, total	0.1	BN	V1	0.1	BN	V1	UG/L	0.0	0.1	**40.34%**
00597	1/10/01	VANADIUM	0.5	B	UJ1	0.6	B	UJ1	UG/L	0.1	0.6	10.91%
22896	1/11/01	VANADIUM	0.6	B	V1	0.5	U	V1	UG/L	0.2	0.6	**35.00%**
12691	1/15/01	VANADIUM	1.5	B	V	1.5	B	V	UG/L	0.1	1.5	6.02%
03991	1/23/01	VANADIUM	0.6	B	V	0.4	B	V	UG/L	0.2	0.5	**39.22%**
[redacted]	2/26/01	VANADIUM	0.5	B	V1	0.5	B	V1	UG/L	0.0	0.5	5.71%
[redacted]	3/20/01	VANADIUM	1.1	B	V1	1.1	B	V1	UG/L	0.0	1.1	0.00%
22796	5/14/01	VANADIUM	0.2	B	UJ1	0.2	U	V1	UG/L	0.0	0.2	20.00%
00500	5/15/01	VANADIUM	0.3	B	UJ1	0.2	B	UJ1	UG/L	0.0	0.3	11.76%
00100	5/23/01	VANADIUM	0.6	B	V1	0.6	B	V1	UG/L	0.0	0.6	3.57%
02500	6/6/01	VANADIUM	0.7	B	UJ1	0.6	B	UJ1	UG/L	0.2	0.7	22.90%
00597	7/19/01	VANADIUM	0.8	B	V	0.9	B	V	UG/L	0.1	0.9	8.09%
40299	7/23/01	VANADIUM	0.5	B	V	0.4	U	V	UG/L	0.0	0.4	9.30%
03991	8/7/01	VANADIUM	2.4	B	V1	2.6	B	V1	UG/L	0.2	2.5	8.00%
00597	1/10/01	ZINC	12.7	B	V1	11.8	B	V1	UG/L	0.9	12.3	7.35%
22896	1/11/01	ZINC	2.8	B	UJ1	15.6	B	UJ1	UG/L	12.8	9.2	**139.31%**
12691	1/15/01	ZINC	14.5	B	UJ	14.6	B	UJ	UG/L	0.1	14.6	0.69%
03991	1/23/01	ZINC	3.1	B	V	3.8	B	V	UG/L	0.7	3.5	20.29%
P209389	2/13/01	ZINC	3.9	B	V1	4.1	B	V1	UG/L	0.2	4.0	5.97%
41299	2/26/01	ZINC	6.1	B	V1	6.2	B	V1	UG/L	0.1	6.2	1.63%
07391	3/6/01	ZINC	4.3	B	V1	3.9	B	V1	UG/L	0.4	4.1	9.76%
22996	3/20/01	ZINC	3.6	B	UJ1	3.7	B	UJ1	UG/L	0.1	3.7	2.74%
02291	4/10/01	ZINC	4.8	B	UJ1	5.9	B	UJ1	UG/L	1.1	5.4	20.56%
22796	5/14/01	ZINC	4.9	B	V1	4.7	B	V1	UG/L	0.2	4.8	4.17%
00500	5/15/01	ZINC	14.5	B	V1	14.4	B	V1	UG/L	0.1	14.5	0.69%
00100	5/23/01	ZINC	7.4	B	V1	5.2	B	V1	UG/L	2.2	6.3	**34.92%**
02500	6/6/01	ZINC	3.2	B	UJ1	22.1		V1	UG/L	18.9	12.7	**149.41%**
00597	7/19/01	ZINC	6.1	B	UJ	5.4	B	UJ	UG/L	0.7	5.8	12.17%
40299	7/23/01	ZINC	11.9	B	UJ	5.6	B	UJ	UG/L	6.3	8.8	**72.00%**
P209389	7/23/01	ZINC	6.2	B	V1	6.2	B	V1	UG/L	0.0	6.2	0.00%
37201	8/10/01	ZINC	3.5	B	V1	3.1	B	V1	UG/L	0.4	3.3	12.12%
[redacted]	9/12/01	ZINC	1.6	B	J1	4.9	B	J1	UG/L	3.3	3.3	**101.54%**

Table 11-1

Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid-ation	Dup Result	Dup Lab Qual	Dup Valid-ation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RPD AbsVal
Water Quality Parameters (WQPs)												
90099	8/22/01	CHLORIDE	64.0		V1	64.0		V1	MG/L	0.0	64.0	0.00%
40299	7/23/01	CYANIDE	0.0	U	V	0.0	B	V	MG/L	0.0	0.0	26.09%
00597	1/10/01	FLUORIDE	0.1		V1	0.1		V1	MG/L	0.0	0.1	22.22%
P209389	2/13/01	FLUORIDE	0.4		V1	0.4		V1	MG/L	0.0	0.4	0.00%
00597	7/19/01	FLUORIDE	0.4	B	V	0.4	B	V	MG/L	0.0	0.4	9.52%
P209389	7/24/01	FLUORIDE	0.5	B	V1	0.5		V1	MG/L	0.0	0.5	8.33%
90099	8/22/01	NITRATE	3.1		J1	3.2		J1	MG/L	0.1	3.2	3.17%
00597	1/10/01	NITRATE/NITRITE	11.0		V1	11.0		V1	MG/L	0.0	11.0	0.00%
22896	1/11/01	NITRATE/NITRITE	11.0		V	11.0		V	MG/L	0.0	11.0	0.00%
12691	1/15/01	NITRATE/NITRITE	4.2		V1	4.2		V1	MG/L	0.0	4.2	0.00%
03991	1/23/01	NITRATE/NITRITE	4.0		V1	4.1		V1	MG/L	0.1	4.1	2.47%
P209389	2/13/01	NITRATE/NITRITE	3.1		V1	3.3		V1	MG/L	0.2	3.2	6.25%
41299	2/26/01	NITRATE/NITRITE	3.1		V	3.1		V	MG/L	0.0	3.1	0.00%
07391	3/6/01	NITRATE/NITRITE	60.0		V1	59.0		V1	MG/L	1.0	59.5	1.68%
22996	3/20/01	NITRATE/NITRITE	2.4		V1	2.2		V1	MG/L	0.2	2.3	8.70%
02291	4/10/01	NITRATE/NITRITE	6.8		V1	6.4		V1	MG/L	0.4	6.6	6.06%
22796	5/14/01	NITRATE/NITRITE	1.8		V	1.7		V	MG/L	0.1	1.8	5.71%
00100	5/23/01	NITRATE/NITRITE	4.2		V1	4.2		V1	MG/L	0.0	4.2	0.00%
Real/Dup/Rinse sample/values were mixed up in shipping or at lab. In hardcopy Real=4.2, Dup=0.05, Rinse=4.2. The Rinse value is used for the duplicate here.												
02500	6/6/01	NITRATE/NITRITE	11.0		V1	11.0		V1	MG/L	0.0	11.0	0.00%
40299	7/23/01	NITRATE/NITRITE	5.6		V	5.6		V	MG/L	0.0	5.6	0.00%
P209389	7/23/01	NITRATE/NITRITE	2.0		V1	2.0		V1	MG/L	0.0	2.0	0.00%
03991	8/7/01	NITRATE/NITRITE	4.5		V1	4.5		V1	MG/L	0.0	4.5	0.00%
37201	8/10/01	NITRATE/NITRITE	0.8		V1	0.8		V1	MG/L	0.0	0.8	0.00%
22896	9/12/01	NITRATE/NITRITE	5.4		V1	4.2		V1	MG/L	1.2	4.8	[illegible]
02291	10/11/01	NITRATE/NITRITE	5.5		V1	5.6		V1	MG/L	0.1	5.6	[illegible]
3687	10/16/01	NITRATE/NITRITE	5.4		V1	5.6		V1	MG/L	0.2	5.5	3.64%
02500	10/23/01	NITRATE/NITRITE	15.7		V1	15.6		V1	MG/L	0.1	15.7	0.64%
00100	11/15/01	NITRATE/NITRITE	3.4		V1	3.6		V1	MG/L	0.2	3.5	5.71%
00600	11/15/01	NITRATE/NITRITE	0.1		V1	0.1		V1	MG/L	0.0	0.1	1.74%
37791	12/11/01	NITRATE/NITRITE	1.1		V1	1.1		V1	MG/L	0.0	1.1	0.00%
00597	7/19/01	NITRATE/NITRITE (DL1/DL1)	9.9		V	10.0		V	MG/L	0.1	10.0	1.01%
37791	12/12/01	PETROLEUM HYDROCARBONS, T. RECOVER	1.0	U	V1	1.0	U	V1	MG/L	0.0	1.0	0.00%
SW13494	12/12/01	PETROLEUM HYDROCARBONS, T. RECOVER	1.0	U	V1	1.0	U	V1	MG/L	0.0	1.0	0.00%
00597	1/10/01	SULFATE	28.0		V1	24.0		V1	MG/L	4.0	26.0	15.38%
P209389	2/13/01	SULFATE	160.0		V1	150.0		V1	MG/L	10.0	155.0	6.45%
07391	3/6/01	SULFATE	200.0		V1	200.0		V1	MG/L	0.0	200.0	0.00%
00597	7/19/01	SULFATE	26.8		V	27.2		V	MG/L	0.4	27.0	1.48%
90099	8/22/01	SULFATE	64.0		V1	64.0		V1	MG/L	0.0	64.0	0.00%
P209389	7/24/01	SULFATE (DL1/DL1)	136.0		V1	138.0		V1	MG/L	2.0	137.0	1.46%
90099	8/22/01	SULFIDE	0.1		V1	0.1		V1	MG/L	0.0	0.1	0.00%
00597	1/10/01	TOTAL DISSOLVED SOLIDS	230.0		V1	230.0		V1	MG/L	0.0	230.0	0.00%
22896	1/11/01	TOTAL DISSOLVED SOLIDS	810.0		V1	820.0		V1	MG/L	10.0	815.0	1.23%
12691	1/15/01	TOTAL DISSOLVED SOLIDS	580.0		V1	540.0		V1	MG/L	40.0	560.0	7.14%
03991	1/23/01	TOTAL DISSOLVED SOLIDS	390.0		V1	410.0		V1	MG/L	20.0	400.0	5.00%
P209389	2/13/01	TOTAL DISSOLVED SOLIDS	730.0		V1	730.0		V1	MG/L	0.0	730.0	0.00%
41299	2/26/01	TOTAL DISSOLVED SOLIDS	510.0		V	520.0		V	MG/L	10.0	515.0	1.94%
07391	3/6/01	TOTAL DISSOLVED SOLIDS	2000.0		V1	2000.0		V1	MG/L	0.0	2000.0	0.00%
22996	3/20/01	TOTAL DISSOLVED SOLIDS	270.0		V1	320.0		V1	MG/L	50.0	295.0	16.95%
02291	4/10/01	TOTAL DISSOLVED SOLIDS	660.0		J1	670.0		J1	MG/L	10.0	665.0	1.50%

Table 11-1

Relative Percent Differences (RPDs) - Groundwater - Calendar Year 2001

9/17/02

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid-ation	Dup Result	Dup Lab Qual	Dup Valid-ation	Units	Absolute Value |Real-Dup|	Average (Real+Dup)/2	RPD AbsVal/AveX100
Water Quality Parameters (WQPs, Continued)												
22796	5/14/01	TOTAL DISSOLVED SOLIDS	3600.0		V	3600.0		V	MG/L	0.0	3600.0	0.00%
00100	5/23/01	TOTAL DISSOLVED SOLIDS	450.0		V1	460.0		V1	MG/L	10.0	455.0	2.20%
02500	6/6/01	TOTAL DISSOLVED SOLIDS	1000.0		V1	990.0		V1	MG/L	10.0	995.0	1.01%
00597	7/19/01	TOTAL DISSOLVED SOLIDS	191.0		V	195.0		V	MG/L	4.0	193.0	2.07%
40299	7/23/01	TOTAL DISSOLVED SOLIDS	587.0		V	594.0		V	MG/L	7.0	590.5	1.19%
P209389	7/24/01	TOTAL DISSOLVED SOLIDS	649.0		V1	657.0		V1	MG/L	8.0	653.0	1.23%
03991	8/7/01	TOTAL DISSOLVED SOLIDS	490.0		V1	470.0		V1	MG/L	20.0	480.0	4.17%
37201	8/10/01	TOTAL DISSOLVED SOLIDS	1100.0		J1	1100.0		J1	MG/L	0.0	1100.0	0.00%
90099	8/22/01	TOTAL DISSOLVED SOLIDS	560.0		V1	550.0		V1	MG/L	10.0	555.0	1.80%
22896	9/12/01	TOTAL DISSOLVED SOLIDS	460.0		V1	450.0		V1	MG/L	10.0	455.0	2.20%
02291	10/11/01	TOTAL DISSOLVED SOLIDS	396.0		V1	400.0		V1	MG/L	4.0	398.0	1.01%
3687	10/16/01	TOTAL DISSOLVED SOLIDS	500.0		V1	490.0		V1	MG/L	10.0	495.0	2.02%
02500	10/23/01	TOTAL DISSOLVED SOLIDS	977.0		V1	974.0		V1	MG/L	3.0	975.5	0.31%
00100	11/15/01	TOTAL DISSOLVED SOLIDS	396.0		V1	414.0		V1	MG/L	18.0	405.0	4.44%
37791	12/12/01	TOTAL DISSOLVED SOLIDS	789.0		V1	786.0		V1	MG/L	3.0	787.5	0.38%
90099	8/22/01	TOTAL ORGANIC CARBON	1.5		V1	1.3		V1	MG/L	0.2	1.4	14.29%

598
10/08

Table 11-2

9/17/02

Duplicate Error Ratios (DERs) for Radionuclides - Groundwater - Calendar Year 2001

Location	Sample Date	Analyte	Real Result	Real 2 Sigma Error	Real LabQ/ Valid	Dup Result	Dup 2 Sigma Error	Dup LabQ/ Valid	Units	Absolute Value |Real-Dup|	Square Root of (2SigR)2+(2SigD)2	DER AbsVal/SqRt
02500	6/6/01	AMERICIUM-241	0.0616	0.022	/V1	0.087	0.034	/V1	PCI/L	0.02	0.04	0.61
22896	9/12/01	AMERICIUM-241	0.009	0.013	U/V1	0.018	0.021	/V1	PCI/L	0.009	0.025	0.36
3687	10/16/01	AMERICIUM-241	0.0077	0.0088	J/V	0.005	0.008	U/V	PCI/L	0.00	0.01	0.21
00100	11/15/01	AMERICIUM-241	0.0653	0.0267	/V	0.057	0.032	/V	PCI/L	0.01	0.04	0.20
00600	11/15/01	AMERICIUM-241	0.0355	0.0245	/V	0.012	0.012	U/V	PCI/L	0.02	0.03	0.88
37791	12/17/01	AMERICIUM-241	0.0195	0.0157	J/V	0.038	0.023	/V	PCI/L	0.02	0.03	0.66
22996	3/20/01	PLUTONIUM-239/240	-0.004	0.009	U/V1	0.065	0.024	/V1	PCI/L	0.07	0.03	**2.69**
00100	5/23/01	PLUTONIUM-239/240	0.113	0.036	B/V1	0.029	0.016	J/V1	PCI/L	0.08	0.04	**2.12**
02500	6/6/01	PLUTONIUM-239/240	0.0793	0.031	B/V1	0.103	0.044	B/V1	PCI/L	0.02	0.05	0.44
02500	10/23/01	PLUTONIUM-239/240	0.0489	0.0222	/V1	0.013	0.013	U/V1	PCI/L	0.04	0.03	1.39
00100	11/15/01	PLUTONIUM-239/240	0.0501	0.0262	/V	0.04	0.018	/V	PCI/L	0.01	0.03	0.31
00597	7/19/01	TRITIUM	68	105	/V1	43	103	/V1	PCI/L	25.000	147.085	0.17
40299	7/23/01	TRITIUM	63	105	/V1	73	105	/V1	PCI/L	10.000	148.492	0.07
12691	1/15/01	URANIUM-233,-234	2.58	0.767	/V1	2.49	0.745	/V1	PCI/L	0.09	1.07	0.08
03991	1/23/01	URANIUM-233,-234	1.92	0.612	/V1	1.62	0.525	/V1	PCI/L	0.30	0.81	0.37
P209389	2/13/01	URANIUM-233,-234	1.27	0.461	/V1	0.507	0.252	J/V1	PCI/L	0.76	0.53	1.45
41299	2/26/01	URANIUM-233,-234	1.47	0.498	/V1	1.37	0.486	/V1	PCI/L	0.10	0.70	0.14
07391	3/6/01	URANIUM-233,-234	31.9	7.74	/V1	31.8	7.68	/V1	PCI/L	0.10	10.90	0.01
22996	3/20/01	URANIUM-233,-234	2.18	0.676	/V1	2.42	0.754	/V1	PCI/L	0.24	1.01	0.24
02291	4/10/01	URANIUM-233,-234	3.18	0.898	/V	3.35	0.949	/V	PCI/L	0.17	1.31	0.13
22796	5/14/01	URANIUM-233,-234	2.4	0.24	/V1	2.3	0.23	/V1	PCI/L	0.10	0.33	0.30
00100	5/23/01	URANIUM-233,-234	3.11	0.424	/V1	2.79	0.39	/V1	PCI/L	0.32	0.58	0.56
02500	6/6/01	URANIUM-233,-234	5.41	0.553	/V1	6.01	0.632	/V1	PCI/L	0.60	0.84	0.71
00597	7/19/01	URANIUM-233,-234	0.083	0.045	/V1	0.057	0.04	/V1	PCI/L	0.026	0.060	0.43
40299	7/23/01	URANIUM-233,-234	0.41	0.11	/V1	0.47	0.12	/V1	PCI/L	0.060	0.163	0.37
03991	8/7/01	URANIUM-233,-234	1.42	0.27	/V1	1.61	0.3	/V1	PCI/L	0.190	0.404	0.47
37201	8/10/01	URANIUM-233,-234	1.46	0.35	/V1	1.42	0.35	/V1	PCI/L	0.040	0.495	0.08
02291	10/11/01	URANIUM-233,-234	2.4900	0.5660	/V	2.22	0.533	/V	PCI/L	0.27	0.78	0.35
3687	10/16/01	URANIUM-233,-234	1.7500	0.4670	/V	1.8	0.484	/V	PCI/L	0.05	0.67	0.07
02500	10/23/01	URANIUM-233,-234	6.2700	1.2900	/V1	5.32	1.14	/V1	PCI/L	0.95	1.72	0.55
00100	11/15/01	URANIUM-233,-234	2.3000	0.6760	/V	1.92	0.559	/V	PCI/L	0.38	0.88	0.43
00600	11/15/01	URANIUM-233,-234	0.2880	0.2040	J/V	0.2	0.157	J/V	PCI/L	0.09	0.26	0.34
37791	12/11/01	URANIUM-233,-234	7.3600	1.2300	/V	7.34	1.25	/V	PCI/L	0.02	1.75	0.01
07391	3/6/01	URANIUM-235	1.36	0.806	/V1	1.89	1	/V1	PCI/L	0.53	1.28	0.41
00597	7/19/01	URANIUM-235	0.049	0.031	/V1	0.021	0.02	/V1	PCI/L	0.028	0.037	0.76
40299	7/23/01	URANIUM-235	0.056	0.037	/V1	0.056	0.04	/V1	PCI/L	0.000	0.054	0.00
02291	10/11/01	URANIUM-235	0.1210	0.1030	U/V	0.134	0.107	J/V	PCI/L	0.01	0.15	0.09
02500	10/23/01	URANIUM-235	0.2460	0.1750	J/V1	0.279	0.188	J/V1	PCI/L	0.03	0.26	0.13
37791	12/11/01	URANIUM-235	0.3840	0.1620	J/V	0.461	0.189	J/V	PCI/L	0.08	0.25	0.31
12691	1/15/01	URANIUM-238	2.06	0.65	/V1	1.88	0.604	/V1	PCI/L	0.18	0.89	0.20
03991	1/23/01	URANIUM-238	1.14	0.423	/V1	1.11	0.404	/V1	PCI/L	0.03	0.58	0.05
07391	3/6/01	URANIUM-238	93.2	21.5	/V1	96.4	22.1	/V1	PCI/L	3.20	30.83	0.10
22996	3/20/01	URANIUM-238	1.52	0.516	/V1	1.87	0.621	/V1	PCI/L	0.35	0.81	0.43
02291	4/10/01	URANIUM-238	2.53	0.75	/V	2	0.637	/V	PCI/L	0.53	0.98	0.54
22796	5/14/01	URANIUM-238	1.7	0.2	/V1	2	0.21	/V1	PCI/L	0.30	0.29	1.03
02500	6/6/01	URANIUM-238	2.93	0.409	/V1	3.02	0.446	/V1	PCI/L	0.09	0.61	0.15
00597	7/19/01	URANIUM-238	0.059	0.039	/V1	0.047	0.031	/V1	PCI/L	0.012	0.050	0.24
40299	7/23/01	URANIUM-238	0.23	0.075	/V1	0.16	0.063	/V1	PCI/L	0.070	0.098	0.71
03991	8/7/01	URANIUM-238	1.09	0.22	/V1	0.98	0.2	/V1	PCI/L	0.110	0.297	0.37
37201	8/10/01	URANIUM-238	1.01	0.27	/V1	0.88	0.25	/V1	PCI/L	0.130	0.368	0.35
02291	10/11/01	URANIUM-238	1.3600	0.3770	/V	1.24	0.369	/V	PCI/L	0.12	0.53	0.23
3687	10/16/01	URANIUM-238	0.9460	0.3210	J/V	0.891	0.31	J/V	PCI/L	0.05	0.45	0.12
02500	10/23/01	URANIUM-238	3.2600	0.7880	/V1	3.12	0.77	/V1	PCI/L	0.14	1.10	0.13
00100	11/15/01	URANIUM-238	0.9070	0.3850	J/V	1.08	0.394	/V	PCI/L	0.17	0.55	0.31
37791	12/11/01	URANIUM-238	5.8700	1.0100	/V	5.6	0.998	/V	PCI/L	0.27	1.42	0.19

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Table 11-3
Summary of RPD and DER Results - Groundwater - Calendar Year 2001

Analyte Group	QC Criterion for Acceptable RPD or DER Value	Original Number of Available Real/Dup Pairs					Number of Acceptable RPD/DER Calculations					Overall Precision Compliance (Goal = 85%)					Number of RPDs/DERs Shown In Tables 11-1 and 11-2				
		Q1	Q2	Q3	Q4	Annual	Q1	Q2	Q3	Q4	Annual	Q1	Q2	Q3	Q4	Annual	Q1	Q2	Q3	Q4	Annual
Organic Compounds	less than 30%	464	320	448	384	1616	460	314	438	373	1585	99.1%	98.1%	97.8%	97.1%	98.1%	36	26	23	28	113
Metals	less than 30%	220	135	168	168	691	197	120	126	150	593	89.5%	88.9%	75.0%	89.3%	85.8%	134	96	116	82	428
PCBs	less than 30%				7	7				7	7				100.0%	100.0%				7	7
Radionuclides	less than 1.96	38	26	30	31	125	37	25	30	31	123	97.4%	96.2%	100.0%	100.0%	98.4%	12	10	13	20	55
Water Quality Parameters	less than 30%	22	9	23	13	67	22	9	23	13	67	100.0%	100.0%	100.0%	100.0%	100.0%	21	8	23	13	65

Calculation and Display Criteria for Table 11-1 and 11-2	Lab Qualifier = "U"		Lab Qualifier = "B"		Lab Qualifier = "J"	
	Meaning	Action	Meaning	Action	Meaning	Action
Organics	Non-detect	If both real and dup are "U", RPD is not displayed in 11-1 and value is counted as acceptable	Analyte in both sample and associated method blank.	If real or dup is "B", qualified, DER is shown in 11-1	Result is estimate.	If both real and dup are "J" or "JB", or if one "U" and one "J" or "JB", DER is not displayed in 11-1 and value is counted as acceptable if results are less than CRDLs for both real and dup.
Metals	Non-detect	If both real and dup are "U", RPD is not displayed in 11-1 and value is counted as acceptable	Result detected was less than contract required detection limit (CRDL) but greater than the instrument detection limit (IDL).	If real or dup is "B", qualified, DER is shown in 11-1	Result is estimate.	If both real and dup are "J", or if one "U" and one "J", DER is not displayed in 11-1 and value is counted as acceptable if results are less than CRDLs for both real and dup.
Polychlorinated Biphenyls (PCBs) and Water Quality Parameters (WQPs)	Non-detect	If both real and dup are "U", RPD is not displayed in 11-1 and value is counted as acceptable	Result detected was less than contract required detection limit (CRDL) but greater than the instrument detection limit (IDL).	If real or dup is "B", qualified, DER is shown in 11-1	Result is estimate.	If both real and dup are "J", or if one "U" and one "J", DER is not displayed in 11-1 and value is counted as acceptable if results are less than CRDLs for both real and dup.
Radionuclides	Non-detect	If both real and dup are "U", DER is not displayed in 11-2 and value is counted as acceptable	Activity in the method blank exceeded the minimal detectable activity (MDA).	If real or dup is "B", qualified, DER is shown in 11-2	Result is estimate.	If both real and dup are "J", or if one "U" and one "J", DER is not displayed in 11-2 and value is counted as acceptable if results are less than CRDLs for both real and dup.

Table 11-4

Contract Required Detection Limits (CRDLs) - Groundwater - Calendar Year 2001

CAS #	Analyte	Required Method	RDL	Units
		Dissolved Gas Analyses		
74-84-0	Ethane	Method 8015M (GC/FID Headsp)	Task Order	µg/L
74-85-1	Ethene	Method 8015M (GC/FID Headsp)	Task Order	µg/L
1333-74-0	Hydrogen	Method 8015M (GC/FID Headsp)	Task Order	µg/L
74-82-8	Methane	Method 8015M (GC/FID Headsp)	Task Order	µg/L
CAS #	**Analyte**	**Required Method**	**RDL**	**Units**
		Volatile Organic Compounds (SW-846 Method 8260 Low Level)		
630-20-6	1,1,1,2-Tetrachloroethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
71-55-6	1,1,1-Trichloroethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
79-34-5	1,1,2,2-Tetrachloroethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	2nd-4th Qtrs only, SW-846 Method 8260	1	µg/L
79-00-5	1,1,2-Trichloroethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
75-34-3	1,1-Dichloroethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
75-35-4	1,1-Dichloroethene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
563-58-6	1,1-Dichloropropene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
87-61-6	1,2,3-Trichlorobenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
96-18-4	1,2,3-Trichloropropane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
120-82-1	1,2,4-Trichlorobenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
95-63-6	1,2,4-Trimethylbenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
96-12-8	1,2-Dibromo-3-chloropropane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
106-93-4	1,2-Dibromoethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
95-50-1	1,2-Dichlorobenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
107-06-2	1,2-Dichloroethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
78-87-5	1,2-Dichloropropane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
108-67-8	1,3,5-Trimethylbenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
541-73-1	1,3-Dichlorobenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
142-28-9	1,3-Dichloropropane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
106-46-7	1,4-Dichlorobenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
594-20-7	2,2-Dichloropropane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
78-93-3	2-Butanone	2nd-4th Qtrs only, SW-846 Method 8260	10	µg/L
95-49-8	2-Chlorotoluene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
591-78-1	2-Hexanone	2nd-4th Qtrs only, SW-846 Method 8260	10	µg/L
106-43-4	4-Chlorotoluene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
108-10-1	4-Methyl-2-pentanone	2nd-4th Qtrs only, SW-846 Method 8260	10	µg/L
67-64-1	Acetone	2nd-4th Qtrs only, SW-846 Method 8260	10	µg/L
71-43-2	Benzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
108-86-1	Bromobenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
74-97-5	Bromochloromethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
75-27-4	Bromodichloromethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
75-25-2	Bromoform	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
74-83-9	Bromomethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
75-15-0	Carbon Disulfide	2nd-4th Qtrs only, SW-846 Method 8260	1	µg/L
56-23-5	Carbon Tetrachloride	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
108-90-7	Chlorobenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
75-00-3	Chloroethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
67-66-3	Chloroform	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
74-87-3	Chloromethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
156-59-2	cis-1,2-Dichloroethene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
10061-01-5	cis-1,3-Dichloropropene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
124-48-1	Dibromochloromethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
74-95-3	Dibromomethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
75-71-8	Dichlorodifluoromethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
100-41-4	Ethylbenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
87-68-3	Hexachlorobutadiene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
98-82-8	Isopropylbenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
75-09-2	Methylene Chloride	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
91-20-3	Naphthalene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
104-51-8	n-Butylbenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L

ND = Achievable RDL Not Determined.
Task Order = Determined by individual Task Order for specialized analyses.

Table 11-4

Contract Required Detection Limits (CRDLs) - Groundwater - Calendar Year 2001

CAS #	Analyte	Required Method	RDL	Units
Volatile Organic Compounds (SW-846 Method 8260 Low Level)				
103-65-1	n-Propylbenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
99-87-6	p-Isopropyltoluene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
135-98-8	sec-Butylbenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
100-42-5	Styrene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
98-06-6	tert-Butylbenzene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
127-18-4	Tetrachloroethene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
108-88-3	Toluene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
1330-20-7	Total Xylenes	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
156-60-5	trans-1,2-Dichloroethene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
10061-02-6	trans-1,3-Dichloropropene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
79-01-6	Trichloroethene	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
75-69-4	Trichlorofluoromethane	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
75-01-4	Vinyl chloride	1st Qtr EPA 542.2, 2nd-4th Qtrs SW-846 Method 8260	1	µg/L
CAS #	**Analyte**	**Required Method**	**RDL**	**Units**
PCB/Pesticides				
12674-11-2	Aroclor-1016	SW-846 Method 8082	0.50	µg/L
11104-28-2	Aroclor-1221	SW-846 Method 8082	0.50	µg/L
11141-16-5	Aroclor-1232	SW-846 Method 8082	0.50	µg/L
53469-21-9	Aroclor-1242	SW-846 Method 8082	0.50	µg/L
12672-29-6	Aroclor-1248	SW-846 Method 8082	0.50	µg/L
11097-69-1	Aroclor-1254	SW-846 Method 8082	0.50	µg/L
11096-82-5	Aroclor-1260	SW-846 Method 8082	0.50	µg/L
CAS #	**Analyte**	**Required Method**	**RDL**	**Units**
Dissolved and Total Metals				
7429-90-5	Aluminum	CLP-SOW 1st/2nd Qtrs, then EPA 600	17	µg/L
7440-36-0	Antimony	CLP-SOW 1st/2nd Qtrs, then EPA 600	3	µg/L
7440-38-2	Arsenic	CLP-SOW 1st/2nd Qtrs, then EPA 600	5	µg/L
7440-39-3	Barium	CLP-SOW 1st/2nd Qtrs, then EPA 600	100	µg/L
7440-41-7	Beryllium	CLP-SOW 1st/2nd Qtrs, then EPA 600	1	µg/L
7440-43-9	Cadmium	CLP-SOW 1st/2nd Qtrs, then EPA 600	1	µg/L
7440-70-2	Calcium	CLP-SOW 1st/2nd Qtrs, then EPA 600	5000	µg/L
7440-47-3	Chromium	CLP-SOW 1st/2nd Qtrs, then EPA 600	2	µg/L
7440-48-4	Cobalt	CLP-SOW 1st/2nd Qtrs, then EPA 600	50	µg/L
7440-50-8	Copper	CLP-SOW 1st/2nd Qtrs, then EPA 600	3	µg/L
7439-89-6	Iron	CLP-SOW 1st/2nd Qtrs, then EPA 600	100	µg/L
7439-92-1	Lead	CLP-SOW 1st/2nd Qtrs, then EPA 600	2	µg/L
7439-93-2	Lithium	CLP-SOW 1st/2nd Qtrs, then EPA 600	100	µg/L
7439-95-4	Magnesium	CLP-SOW 1st/2nd Qtrs, then EPA 600	5000	µg/L
7439-96-5	Manganese	CLP-SOW 1st/2nd Qtrs, then EPA 600	15	µg/L
7439-97-6	Mercury	CLP-SOW 1st/2nd Qtrs, then EPA 600	0.1	µg/L
7439-98-7	Molybdenum	CLP-SOW 1st/2nd Qtrs, then EPA 600	30	µg/L
7440-02-0	Nickel	CLP-SOW 1st/2nd Qtrs, then EPA 600	20	µg/L
7440-09-7	Potassium	CLP-SOW 1st/2nd Qtrs, then EPA 600	5000	µg/L
7782-49-2	Selenium	CLP-SOW 1st/2nd Qtrs, then EPA 600	3	µg/L
7440-22-4	Silver	CLP-SOW 1st/2nd Qtrs, then EPA 600	1	µg/L
7440-23-5	Sodium	CLP-SOW 1st/2nd Qtrs, then EPA 600	5000	µg/L
7440-24-6	Strontium	CLP-SOW 1st/2nd Qtrs, then EPA 600	200	µg/L
7440-28-0	Thallium	CLP-SOW 1st/2nd Qtrs, then EPA 600	4	µg/L
7440-31-5	Tin	CLP-SOW 1st/2nd Qtrs, then EPA 600	200	µg/L
7440-61-1	Uranium	CLP-SOW 1st/2nd Qtrs, then EPA 600	No Value	µg/L
7440-62-2	Vanadium	CLP-SOW 1st/2nd Qtrs, then EPA 600	40	µg/L
7440-66-6	Zinc	CLP-SOW 1st/2nd Qtrs, then EPA 600	20	µg/L

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Task Order = Determined by individual Task Order for specialized analyses.

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Table 11-4
Contract Required Detection Limits (CRDLs) - Groundwater - Calendar Year 2001

CAS #	Analyte	Required Method	RDL	Units
		Water Quality Parameters		
T-005	Alkalinity	EPA 310.1 or 310.2	10	mg/L
16887-00-6	Chloride	EPA 300.0	0.5	mg/L
10-30-0	Dissolved Organic Carbon-DOC	EPA 415.1	1.0	mg/L
16984-48-8	Fluoride	EPA 300.0	0.5	mg/L
14797-55-8	Nitrate as N	EPA 300.0	0.5	mg/L
C-005	Nitrate/Nitrite as N (Total)	EPA 353.1 or 353.2	0.05	mg/L
14808-79-8	Sulfate as SO_4^{2-}	EPA 375.1 or 375.2	5.0	mg/L
18496-25-8	Sulfide as S	EPA 376.1 or 376.3	0.002	mg/L
57-12-5	Total Cyanide	EPA 335.3 or 335.4	0.005	mg/L
10-33-3	Total Dissolved Solids-TDS	EPA 160.1	10.0	mg/L
11-59-6	Total Organic Carbon-TOC	EPA 415.1	1.0	mg/L
10-90-2	Total Petroleum Hydrocarbons-TPH	EPA 418.1	1	mg/L
10-32-2	Total Suspended Solids-TSS	EPA 160.2	5.0	mg/L
CAS #	**Analyte**	**Required Method**	**RDL**	**Units**
		Radionuclides		
14596-10-2	Americium-241	Alpha Spectrometry	0.03	pCi/L
10045-97-3	Cesium-137	Gamma Spectrometry	10	pCi/L
12587-46-1	Gross Alpha	Gas Proportional Counting	2	pCi/L
12587-47-2	Gross Beta	Gas Proportional Counting	4	pCi/L
13994-20-2	Neptunium-237	Alpha Spectrometry	1	pCi/L
10-12-8	Plutonium-239/240	Alpha Spectrometry	0.03	pCi/L
11-10-9	Strontium 89/90	Gas Proportional Counting	1.0	pCi/L
10028-17-8	Tritium	Liquid Scintillation Counting	400	pCi/L
11-08-5	Uranium-233/234	Alpha Spectrometry	1.0	pCi/L
15117-96-1	Uranium-235	Alpha Spectrometry	1.0	pCi/L
	Uranium-236	Alpha Spectrometry	Task Order	pCi/L
7440-61-1	Uranium-238	Alpha Spectrometry	1.0	pCi/L

ND = Achievable RDL Not Determined.
Task Order = Determined by individual Task Order for specialized analyses.

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Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples

Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
TRITIUM														
GEL	GS03	10/9/01	02D0089	02D0142-001.002	TRITIUM	MS1	101.0	%REC			304		1200098531	116132
GEL	GS40	10/1/01	02D01742	02D0265-003.002	TRITIUM	MS1	100.0	%REC			208		1200108069	120070
GEL	GS40	10/1/01	02D0216	02D0265-003.002	TRITIUM	MS1	100.0	%REC			208		1200108069	120070
GEL	GS44	10/4/01	02D0264	02D0299-002.003	TRITIUM	MS1	94.0	%REC			209		1200113420	122198
GEL	GS03	11/30/01	02D0292	02D0413-001.002	TRITIUM	MS1	99.0	%REC			201		1200120772	125112
GEL	2386	11/26/01	02D0347	02D0347-003.010	TRITIUM	MS1	95.0	%REC	NO		232		1200125055	126861
GEL	70193	10/11/01	02D0117	02D0117-006.008	TRITIUM	MS1	97.0	%REC	NO		314		1200103889	118358
DISSOLVED GASSES (Ethane, Ethene, Methane)														
SWRI	02097	1/30/01	01D0349	01D0349-003.011	METHANE	MD1	94.0	%REC	NO		550	1	156501	SDG155220
SWRI	02097	1/30/01	01D0349	01D0349-003.011	METHANE	MS1	94.0	%REC	NO		550	1	156501	SDG155220
SWRI	11791	3/9/01	01D0555	01D0555-027.006	ETHANE	MD1	112.0	%REC	NO				154224	SDG158104
SWRI	11791	3/9/01	01D0555	01D0555-027.006	ETHANE	MS1	91.0	%REC	NO				154224	SDG158104
SWRI	11791	3/9/01	01D0555	01D0555-027.006	ETHENE	MD1	100.0	%REC	NO				154224	SDG158104
SWRI	11791	3/9/01	01D0555	01D0555-027.006	ETHENE	MS1	83.0	%REC	NO				154224	SDG158104
SWRI	11791	3/9/01	01D0555	01D0555-027.006	METHANE	MD1	110.0	%REC	NO				154224	SDG158104
SWRI	11791	3/9/01	01D0555	01D0555-027.006	METHANE	MS1	80.0	%REC	NO				154224	SDG158104
SWRI	18199	05/09/01	01D0775	01D0775-004.014	ETHANE	MD1	99.0	%REC	NO		2	1	161160	161156
SWRI	18199	05/09/01	01D0775	01D0775-004.014	ETHANE	MS1	88.0	%REC	NO		2	1	161160	161156
SWRI	18199	05/09/01	01D0775	01D0775-004.014	ETHENE	MD1	97.0	%REC	NO		2	1	161160	161156
SWRI	18199	05/09/01	01D0775	01D0775-004.014	ETHENE	MS1	86.0	%REC	NO		2	1	161160	161156
SWRI	18199	05/09/01	01D0775	01D0775-004.014	METHANE	MD1	95.0	%REC	NO		1	1	161160	161156
SWRI	18199	05/09/01	01D0775	01D0775-004.014	METHANE	MS1	75.0	%REC	NO		1	1	161160	161156
SWRI	18199	05/09/01	01D0784	01D0775-004.014	ETHANE	MD1	99.0	%REC	NO		2	1	161160	161156
SWRI	18199	05/09/01	01D0784	01D0775-004.014	ETHANE	MS1	88.0	%REC	NO		2	1	161160	161156
SWRI	18199	05/09/01	01D0784	01D0775-004.014	ETHENE	MD1	97.0	%REC	NO		2	1	161160	161156
SWRI	18199	05/09/01	01D0784	01D0775-004.014	ETHENE	MS1	86.0	%REC	NO		2	1	161160	161156
SWRI	18199	05/09/01	01D0784	01D0775-004.014	METHANE	MD1	95.0	%REC	NO		1	1	161160	161156
SWRI	18199	05/09/01	01D0784	01D0775-004.014	METHANE	MS1	75.0	%REC	NO		1	1	161160	161156
SWRI	30900	7/31/01	01D1153	01D1153-001.012	ETHANE	MD1	75.0	%REC	NO				GW07727RG/MSD	165506
SWRI	30900	7/31/01	01D1153	01D1153-001.012	ETHANE	MS1	77.0	%REC	NO				GW07727RG/MSD	165506
SWRI	30900	7/31/01	01D1153	01D1153-001.012	ETHENE	MD1	77.0	%REC	NO				GW07727RG/MSD	165506
SWRI	30900	7/31/01	01D1153	01D1153-001.012	ETHENE	MS1	80.0	%REC	NO				GW07727RG/MSD	165506
[redacted]	30900	7/31/01	01D1153	01D1153-001.012	METHANE	MD1	75.0	%REC	NO				GW07727RG/MSD	165506
[redacted]	30900	7/31/01	01D1153	01D1153-001.012	METHANE	MS1	80.0	%REC	NO				GW07727RG/MSD	165506
SWRI	11791	8/22/01	01D1311	01D1311-011.009	ETHANE	MD1	80.0	%REC	NO				GW07725RG/MSD	166661
SWRI	11791	8/22/01	01D1311	01D1311-011.009	ETHANE	MS1	75.0	%REC	NO				GW07725RG/MSD	166661
SWRI	11791	8/22/01	01D1311	01D1311-011.009	ETHENE	MD1	74.0	%REC	NO				GW07725RG/MSD	166661
SWRI	11791	8/22/01	01D1311	01D1311-011.009	ETHENE	MS1	71.0	%REC	NO				GW07725RG/MSD	166661
SWRI	11791	8/22/01	01D1311	01D1311-011.009	METHANE	MD1	80.0	%REC	NO				GW07725RG/MSD	166661
SWRI	11791	8/22/01	01D1311	01D1311-011.009	METHANE	MS1	80.0	%REC	NO				GW07725RG/MSD	166661
SWRI	1187	8/27/01	01D1352	01D1352-005.009	ETHANE	MD1	83.0	%REC	NO				GW07723RG/MSD/MS	166993
SWRI	1187	8/27/01	01D1352	01D1352-005.009	ETHANE	MS1	85.0	%REC	NO				GW07723RG/MSD/MS	166993
SWRI	1187	8/27/01	01D1352	01D1352-005.009	ETHENE	MD1	80.0	%REC	NO				GW07723RG/MSD/MS	166993
SWRI	1187	8/27/01	01D1352	01D1352-005.009	ETHENE	MS1	86.0	%REC	NO				GW07723RG/MSD/MS	166993
SWRI	1187	8/27/01	01D1352	01D1352-005.009	METHANE	MD1	85.0	%REC	NO				GW07723RG/MSD/MS	166993
SWRI	1187	8/27/01	01D1352	01D1352-005.009	METHANE	MS1	85.0	%REC	NO				GW07723RG/MSD/MS	166993
SWRI	01497	9/4/01	01D1417	01D1417-007.008	ETHANE	MD1	88.0	%REC	NO		2	1	GW07734RG/MSD	164291
SWRI	01497	9/4/01	01D1417	01D1417-007.008	ETHANE	MS1	96.0	%REC	NO		2	1	GW07734RG/MSD	164291
SWRI	01497	9/4/01	01D1417	01D1417-007.008	ETHENE	MD1	91.0	%REC	NO		2	1	GW07734RG/MSD	164291
SWRI	01497	9/4/01	01D1417	01D1417-007.008	ETHENE	MS1	100.0	%REC	NO		2	1	GW07734RG/MSD	164291
SWRI	01497	9/4/01	01D1417	01D1417-007.008	METHANE	MD1	90.0	%REC	NO		1	1	GW07734RG/MSD	164291
SWRI	01497	9/4/01	01D1417	01D1417-007.008	METHANE	MS1	95.0	%REC	NO		1	1	GW07734RG/MSD	164291
SWRI	13091	9/25/01	01D1509	01D1509-004.007	ETHANE	MD1	86.0	%REC	NO		2	1	GW07767RG/MSD	168129
SWRI	13091	9/25/01	01D1509	01D1509-004.007	ETHANE	MS1	91.0	%REC	NO		2	1	GW07767RG/MSD	168129
SWRI	13091	9/25/01	01D1509	01D1509-004.007	ETHENE	MD1	91.0	%REC	NO		2	1	GW07767RG/MSD	168129
SWRI	13091	9/25/01	01D1509	01D1509-004.007	ETHENE	MS1	96.0	%REC	NO		2	1	GW07767RG/MSD	168129
SWRI	13091	9/25/01	01D1509	01D1509-004.007	METHANE	MD1	110.0	%REC	NO		1	1	GW07767RG/MSD	168129
SWRI	13091	9/25/01	01D1509	01D1509-004.007	METHANE	MS1	115.0	%REC	NO		1	1	GW07767RG/MSD	168129
SWRI	18199	10/29/01	02D0216	02D0216-004.012	ETHANE	MS1	45.0	%REC			2	1	170288 MSD	170285
SWRI	18199	10/29/01	02D0216	02D0216-004.012	ETHANE	MSD	43.0	%REC			2	1	170288 MSD	170285
SWRI	18199	10/29/01	02D0216	02D0216-004.012	ETHENE	MS1	51.0	%REC			2	1	170288 MSD	170285
SWRI	18199	10/29/01	02D0216	02D0216-004.012	ETHENE	MSD	49.0	%REC			2	1	170288 MSD	170285
SWRI	18199	10/29/01	02D0216	02D0216-004.012	METHANE	MS1	80.0	%REC			1	1	170288 MSD	170285
SWRI	18199	10/29/01	02D0216	02D0216-004.012	METHANE	MSD	70.0	%REC			1	1	170288 MSD	170285
VOLATILE ORGANIC COMPOUNDS (VOCs)														
GEL	00997	1/8/01	01D0326	01D0326-001.003	1,1-DICHLOROETHENE	MD1	84.0	%REC	NO		1	2	1000149680	60746
[redacted]	00997	1/8/01	01D0326	01D0326-001.003	1,1-DICHLOROETHENE	MS1	87.0	%REC	NO		1	2	1000149679	60746
[redacted]	00997	1/8/01	01D0326	01D0326-001.003	BENZENE	MD1	94.0	%REC	NO		1	2	1000149680	60746
[redacted]	00997	1/8/01	01D0326	01D0326-001.003	BENZENE	MS1	91.0	%REC	NO		1	2	1000149679	60746
GEL	00997	1/8/01	01D0326	01D0326-001.003	CHLOROBENZENE	MD1	87.0	%REC	NO		1	2	1000149680	60746

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilu-tion	Lab Sample #	Lab Ba
GEL	00997	1/8/01	01D0326	01D0326-001.003	CHLOROBENZENE	MS1	85.0	%REC	NO		1	2	1000149679	60746
GEL	00997	1/8/01	01D0326	01D0326-001.003	TOLUENE	MD1	90.0	%REC	NO		1	2	1000149680	60746
GEL	00997	1/8/01	01D0326	01D0326-001.003	TOLUENE	MS1	87.0	%REC	NO		1	2	1000149679	60746
GEL	00997	1/8/01	01D0326	01D0326-001.003	TRICHLOROETHENE	MD1	85.0	%REC	NO		1	2	1000149680	60746
GEL	00997	1/8/01	01D0326	01D0326-001.003	TRICHLOROETHENE	MS1	85.0	%REC	NO		1	2	1000149679	60746
GEL	0487	1/11/01	01D0335	01D0335-001.003	1,1-DICHLOROETHENE	MD1	92.0	%REC	NO		1	2	1000152600	61766
GEL	0487	1/11/01	01D0335	01D0335-001.003	1,1-DICHLOROETHENE	MS1	84.0	%REC	NO		1	2	1000152599	61766
GEL	0487	1/11/01	01D0335	01D0335-001.003	BENZENE	MD1	92.0	%REC	NO		1	2	1000152600	61766
GEL	0487	1/11/01	01D0335	01D0335-001.003	BENZENE	MS1	87.0	%REC	NO		1	2	1000152599	61766
GEL	0487	1/11/01	01D0335	01D0335-001.003	CHLOROBENZENE	MD1	91.0	%REC	NO		1	2	1000152600	61766
GEL	0487	1/11/01	01D0335	01D0335-001.003	CHLOROBENZENE	MS1	82.0	%REC	NO		1	2	1000152599	61766
GEL	0487	1/11/01	01D0335	01D0335-001.003	TOLUENE	MD1	89.0	%REC	NO		1	2	1000152600	61766
GEL	0487	1/11/01	01D0335	01D0335-001.003	TOLUENE	MS1	80.0	%REC	NO		1	2	1000152599	61766
GEL	0487	1/11/01	01D0335	01D0335-001.003	TRICHLOROETHENE	MD1	70.0	%REC	NO		1	2	1000152600	61766
GEL	0487	1/11/01	01D0335	01D0335-001.003	TRICHLOROETHENE	MS1	40.0	%REC	NO		1	2	1000152599	61766
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1,1,2-TETRACHLOROETHANE	MD1	120.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1,1,2-TETRACHLOROETHANE	MS1	118.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1,1-TRICHLOROETHANE	MD1	101.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1,1-TRICHLOROETHANE	MS1	106.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1,2,2-TETRACHLOROETHANE	MD1	109.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1,2,2-TETRACHLOROETHANE	MS1	113.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1,2-TRICHLOROETHANE	MD1	130.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1,2-TRICHLOROETHANE	MS1	135.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1-DICHLOROETHANE	MD1	104.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1-DICHLOROETHANE	MS1	107.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1-DICHLOROETHENE	MD1	106.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1-DICHLOROETHENE	MS1	108.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1-DICHLOROPROPENE	MD1	85.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,1-DICHLOROPROPENE	MS1	108.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2,3-TRICHLOROBENZENE	MD1	130.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2,3-TRICHLOROBENZENE	MS1	113.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2,3-TRICHLOROPROPANE	MD1	111.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2,3-TRICHLOROPROPANE	MS1	115.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2,4-TRICHLOROBENZENE	MD1	122.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2,4-TRICHLOROBENZENE	MS1	112.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2-DIBROMOETHANE	MD1	119.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2-DIBROMOETHANE	MS1	128.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2-DICHLOROBENZENE	MD1	105.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2-DICHLOROBENZENE	MS1	108.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2-DICHLOROETHANE	MD1	105.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2-DICHLOROETHANE	MS1	113.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2-DICHLOROPROPANE	MD1	100.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,2-DICHLOROPROPANE	MS1	112.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,3-DICHLOROBENZENE	MD1	104.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,3-DICHLOROBENZENE	MS1	107.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,3-DICHLOROPROPANE	MD1	112.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,3-DICHLOROPROPANE	MS1	123.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,4-DICHLOROBENZENE	MD1	103.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	1,4-DICHLOROBENZENE	MS1	112.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	2,2-DICHLOROPROPANE	MD1	96.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	2,2-DICHLOROPROPANE	MS1	101.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	4-ISOPROPYLTOLUENE	MD1	99.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	4-ISOPROPYLTOLUENE	MS1	100.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BENZENE	MD1	104.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BENZENE	MS1	109.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BENZENE, 1,2,4-TRIMETHYL	MD1	95.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BENZENE, 1,2,4-TRIMETHYL	MS1	104.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BENZENE, 1,3,5-TRIMETHYL-	MD1	98.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BENZENE, 1,3,5-TRIMETHYL-	MS1	103.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BROMOBENZENE	MD1	101.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BROMOBENZENE	MS1	108.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BROMOCHLOROMETHANE	MD1	108.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BROMOCHLOROMETHANE	MS1	115.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BROMODICHLOROMETHANE	MD1	104.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BROMODICHLOROMETHANE	MS1	117.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BROMOFORM	MD1	114.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BROMOFORM	MS1	122.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BROMOMETHANE	MD1	106.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	BROMOMETHANE	MS1	109.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	CARBON TETRACHLORIDE	MD1	97.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	CARBON TETRACHLORIDE	MS1	101.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	CHLOROBENZENE	MD1	113.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	CHLOROBENZENE	MS1	117.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	CHLOROETHANE	MD1	89.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	CHLOROETHANE	MS1	103.0	%REC	NO			10	0101L846-001	00LVK022

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]RL	30900	1/17/01	01D0347	01D0347-001.002	CHLOROFORM	MD1	102.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	CHLOROFORM	MS1	114.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	CHLOROMETHANE	MD1	93.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	CHLOROMETHANE	MS1	97.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	cis-1,2-DICHLOROETHENE	MD1	**125.0**	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	cis-1,2-DICHLOROETHENE	MS1	119.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	cis-1,3-DICHLOROPROPENE	MD1	110.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	cis-1,3-DICHLOROPROPENE	MS1	114.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	DIBROMOCHLOROMETHANE	MD1	**126.0**	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	DIBROMOCHLOROMETHANE	MS1	**136.0**	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	DIBROMOMETHANE	MD1	110.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	DIBROMOMETHANE	MS1	**129.0**	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	DICHLORODIFLUOROMETHANE	MD1	122.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	DICHLORODIFLUOROMETHANE	MS1	**127.0**	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	ETHYLBENZENE	MD1	104.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	ETHYLBENZENE	MS1	111.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	HEXACHLOROBUTADIENE	MD1	106.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	HEXACHLOROBUTADIENE	MS1	106.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	ISOPROPYLBENZENE	MD1	91.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	ISOPROPYLBENZENE	MS1	93.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	METHYLENE CHLORIDE	MD1	**67.0**	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	METHYLENE CHLORIDE	MS1	**65.0**	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	NAPHTHALENE	MD1	123.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	NAPHTHALENE	MS1	109.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	n-BUTYLBENZENE	MD1	98.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	n-BUTYLBENZENE	MS1	104.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	n-PROPYLBENZENE	MD1	91.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	n-PROPYLBENZENE	MS1	102.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	o-CHLOROTOLUENE	MD1	95.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	o-CHLOROTOLUENE	MS1	104.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	p-CHLOROTOLUENE	MD1	101.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	p-CHLOROTOLUENE	MS1	105.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	110.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	**125.0**	%REC	NO			10	0101L846-001	00LVK022
[redacted]RL	30900	1/17/01	01D0347	01D0347-001.002	sec-BUTYLBENZENE	MD1	94.0	%REC	NO			10	0101L846-001	00LVK022
[redacted]RL	30900	1/17/01	01D0347	01D0347-001.002	sec-BUTYLBENZENE	MS1	100.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	STYRENE	MD1	98.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	STYRENE	MS1	106.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	tert-BUTYLBENZENE	MD1	96.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	tert-BUTYLBENZENE	MS1	99.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	TETRACHLOROETHENE	MD1	**173.0**	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	TETRACHLOROETHENE	MS1	**147.0**	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	TOLUENE	MD1	113.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	TOLUENE	MS1	119.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	TOTAL XYLENES	MD1	97.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	TOTAL XYLENES	MS1	107.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	trans-1,2-DICHLOROETHENE	MD1	101.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	trans-1,2-DICHLOROETHENE	MS1	111.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	trans-1,3-DICHLOROPROPENE	MD1	114.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	trans-1,3-DICHLOROPROPENE	MS1	122.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	TRICHLOROETHENE	MD1	114.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	TRICHLOROETHENE	MS1	**125.0**	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	TRICHLOROFLUOROMETHANE	MD1	102.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	TRICHLOROFLUOROMETHANE	MS1	108.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	VINYL CHLORIDE	MD1	100.0	%REC	NO			10	0101L846-001	00LVK022
RECRL	30900	1/17/01	01D0347	01D0347-001.002	VINYL CHLORIDE	MS1	104.0	%REC	NO			10	0101L846-001	00LVK022
GEL	31001	1/30/01	01D0502	01D0502-001.002	1,1-DICHLOROETHENE	MD1	**74.0**	%REC	NO		1	2	1000160184	64550
GEL	31001	1/30/01	01D0502	01D0502-001.002	1,1-DICHLOROETHENE	MS1	**75.0**	%REC	NO		1	2	1000160183	64550
GEL	31001	1/30/01	01D0502	01D0502-001.002	BENZENE	MD1	91.0	%REC	NO		1	2	1000160184	64550
GEL	31001	1/30/01	01D0502	01D0502-001.002	BENZENE	MS1	93.0	%REC	NO		1	2	1000160183	64550
GEL	31001	1/30/01	01D0502	01D0502-001.002	CHLOROBENZENE	MD1	85.0	%REC	NO		1	2	1000160184	64550
GEL	31001	1/30/01	01D0502	01D0502-001.002	CHLOROBENZENE	MS1	86.0	%REC	NO		1	2	1000160183	64550
GEL	31001	1/30/01	01D0502	01D0502-001.002	TOLUENE	MD1	86.0	%REC	NO		1	2	1000160184	64550
GEL	31001	1/30/01	01D0502	01D0502-001.002	TOLUENE	MS1	86.0	%REC	NO		1	2	1000160183	64550
GEL	31001	1/30/01	01D0502	01D0502-001.002	TRICHLOROETHENE	MD1	**63.0**	%REC	NO		1	2	1000160184	64550
GEL	31001	1/30/01	01D0502	01D0502-001.002	TRICHLOROETHENE	MS1	**66.0**	%REC	NO		1	2	1000160183	64550
GEL	90299	2/19/01	01D0514	01D0514-001.002	1,1-DICHLOROETHENE	MD1	114.0	%REC	NO		1	2	1000167401	67246
GEL	90299	2/19/01	01D0514	01D0514-001.002	1,1-DICHLOROETHENE	MS1	107.0	%REC	NO		1	2	1000167400	67246
GEL	90299	2/19/01	01D0514	01D0514-001.002	BENZENE	MD1	107.0	%REC	NO		1	2	1000167401	67246
[redacted]	90299	2/19/01	01D0514	01D0514-001.002	BENZENE	MS1	105.0	%REC	NO		1	2	1000167400	67246
[redacted]	90299	2/19/01	01D0514	01D0514-001.002	CHLOROBENZENE	MD1	103.0	%REC	NO		1	2	1000167401	67246
[redacted]	90299	2/19/01	01D0514	01D0514-001.002	CHLOROBENZENE	MS1	101.0	%REC	NO		1	2	1000167400	67246
GEL	90299	2/19/01	01D0514	01D0514-001.002	TOLUENE	MD1	104.0	%REC	NO		1	2	1000167401	67246

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Ba
GEL	90299	2/19/01	01D0514	01D0514-001.002	TOLUENE	MS1	100.0	%REC	NO		1	2	1000167400	67246
GEL	90299	2/19/01	01D0514	01D0514-001.002	TRICHLOROETHENE	MD1	96.0	%REC	NO		1	2	1000167401	67246
GEL	90299	2/19/01	01D0514	01D0514-001.002	TRICHLOROETHENE	MS1	98.0	%REC	NO		1	2	1000167400	67246
GEL	40099	2/26/01	01D0543	01D0543-008.002	1,1-DICHLOROETHENE	MD1	134.0	%REC	NO		10	10	1000170030	68182
GEL	40099	2/26/01	01D0543	01D0543-008.002	1,1-DICHLOROETHENE	MS1	112.0	%REC	NO		10	10	1000170029	68182
GEL	40099	2/26/01	01D0543	01D0543-008.002	BENZENE	MD1	110.0	%REC	NO		10	10	1000170030	68182
GEL	40099	2/26/01	01D0543	01D0543-008.002	BENZENE	MS1	111.0	%REC	NO		10	10	1000170029	68182
GEL	40099	2/26/01	01D0543	01D0543-008.002	CHLOROBENZENE	MD1	109.0	%REC	NO		10	10	1000170030	68182
GEL	40099	2/26/01	01D0543	01D0543-008.002	CHLOROBENZENE	MS1	109.0	%REC	NO		10	10	1000170029	68182
GEL	40099	2/26/01	01D0543	01D0543-008.002	TOLUENE	MD1	100.0	%REC	NO		10	10	1000170030	68182
GEL	40099	2/26/01	01D0543	01D0543-008.002	TOLUENE	MS1	101.0	%REC	NO		10	10	1000170029	68182
GEL	40099	2/26/01	01D0543	01D0543-008.002	TRICHLOROETHENE	MD1	102.0	%REC	NO		10	10	1000170030	68182
GEL	40099	2/26/01	01D0543	01D0543-008.002	TRICHLOROETHENE	MS1	84.0	%REC	NO		10	10	1000170029	68182
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1,1,2-TETRACHLOROETHANE	MD1	108.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1,1,2-TETRACHLOROETHANE	MS1	102.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1,1-TRICHLOROETHANE	MD1	99.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1,1-TRICHLOROETHANE	MS1	101.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1,2,2-TETRACHLOROETHANE	MD1	102.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1,2,2-TETRACHLOROETHANE	MS1	96.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1,2-TRICHLOROETHANE	MD1	110.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1,2-TRICHLOROETHANE	MS1	105.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1-DICHLOROETHANE	MD1	81.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1-DICHLOROETHANE	MS1	81.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1-DICHLOROETHENE	MD1	93.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1-DICHLOROETHENE	MS1	91.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1-DICHLOROPROPENE	MD1	94.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,1-DICHLOROPROPENE	MS1	94.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2,3-TRICHLOROBENZENE	MD1	97.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2,3-TRICHLOROBENZENE	MS1	88.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2,3-TRICHLOROPROPANE	MD1	99.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2,3-TRICHLOROPROPANE	MS1	97.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2,4-TRICHLOROBENZENE	MD1	97.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2,4-TRICHLOROBENZENE	MS1	86.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2-DIBROMOETHANE	MD1	96.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2-DIBROMOETHANE	MS1	92.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2-DICHLOROBENZENE	MD1	105.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2-DICHLOROBENZENE	MS1	96.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2-DICHLOROETHANE	MD1	103.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2-DICHLOROETHANE	MS1	104.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2-DICHLOROPROPANE	MD1	94.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,2-DICHLOROPROPANE	MS1	97.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,3-DICHLOROBENZENE	MD1	102.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,3-DICHLOROBENZENE	MS1	97.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,3-DICHLOROPROPANE	MD1	102.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,3-DICHLOROPROPANE	MS1	96.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,4-DICHLOROBENZENE	MD1	105.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	1,4-DICHLOROBENZENE	MS1	97.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	2,2-DICHLOROPROPANE	MD1	96.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	2,2-DICHLOROPROPANE	MS1	99.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	4-ISOPROPYLTOLUENE	MD1	97.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	4-ISOPROPYLTOLUENE	MS1	89.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BENZENE	MD1	96.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BENZENE	MS1	96.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BENZENE, 1,2,4-TRIMETHYL	MD1	97.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BENZENE, 1,2,4-TRIMETHYL	MS1	92.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BENZENE, 1,3,5-TRIMETHYL-	MD1	99.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BENZENE, 1,3,5-TRIMETHYL-	MS1	93.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BROMOBENZENE	MD1	98.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BROMOBENZENE	MS1	93.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BROMOCHLOROMETHANE	MD1	96.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BROMOCHLOROMETHANE	MS1	96.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BROMODICHLOROMETHANE	MD1	100.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BROMODICHLOROMETHANE	MS1	101.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BROMOFORM	MD1	97.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BROMOFORM	MS1	94.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BROMOMETHANE	MD1	104.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	BROMOMETHANE	MS1	104.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	CARBON TETRACHLORIDE	MD1	99.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	CARBON TETRACHLORIDE	MS1	105.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	CHLOROBENZENE	MD1	99.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	CHLOROBENZENE	MS1	92.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	CHLOROETHANE	MD1	101.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	CHLOROETHANE	MS1	105.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	CHLOROFORM	MD1	99.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	CHLOROFORM	MS1	99.0	%REC	NO			5	0103L191-003	01LVK079

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

[redacted]	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]RL	40299	2/28/01	01D0547	01D0547-003.002	CHLOROMETHANE	MD1	97.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	CHLOROMETHANE	MS1	103.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	cis-1,2-DICHLOROETHENE	MD1	94.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	cis-1,2-DICHLOROETHENE	MS1	94.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	cis-1,3-DICHLOROPROPENE	MD1	91.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	cis-1,3-DICHLOROPROPENE	MS1	86.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	DIBROMOCHLOROMETHANE	MD1	110.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	DIBROMOCHLOROMETHANE	MS1	101.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	DIBROMOMETHANE	MD1	99.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	DIBROMOMETHANE	MS1	101.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	DICHLORODIFLUOROMETHANE	MD1	86.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	DICHLORODIFLUOROMETHANE	MS1	91.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	ETHYLBENZENE	MD1	101.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	ETHYLBENZENE	MS1	94.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	HEXACHLOROBUTADIENE	MD1	101.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	HEXACHLOROBUTADIENE	MS1	90.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	ISOPROPYLBENZENE	MD1	97.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	ISOPROPYLBENZENE	MS1	91.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	METHYLENE CHLORIDE	MD1	42.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	METHYLENE CHLORIDE	MS1	40.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	NAPHTHALENE	MD1	88.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	NAPHTHALENE	MS1	77.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	n-BUTYLBENZENE	MD1	96.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	n-BUTYLBENZENE	MS1	83.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	n-PROPYLBENZENE	MD1	102.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	n-PROPYLBENZENE	MS1	95.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	o-CHLOROTOLUENE	MD1	103.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	o-CHLOROTOLUENE	MS1	100.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	p-CHLOROTOLUENE	MD1	100.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	p-CHLOROTOLUENE	MS1	94.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	92.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	90.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	sec-BUTYLBENZENE	MD1	98.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	sec-BUTYLBENZENE	MS1	90.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	STYRENE	MD1	95.0	%REC	NO			5	0103L191-003	01LVK079
[redacted]RL	40299	2/28/01	01D0547	01D0547-003.002	STYRENE	MS1	92.0	%REC	NO			5	0103L191-003	01LVK079
[redacted]RL	40299	2/28/01	01D0547	01D0547-003.002	tert-BUTYLBENZENE	MD1	99.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	tert-BUTYLBENZENE	MS1	94.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	TETRACHLOROETHENE	MD1	20.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	TETRACHLOROETHENE	MS1	0.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	TOLUENE	MD1	98.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	TOLUENE	MS1	91.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	TOTAL XYLENES	MD1	98.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	TOTAL XYLENES	MS1	93.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	trans-1,2-DICHLOROETHENE	MD1	99.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	trans-1,2-DICHLOROETHENE	MS1	99.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	trans-1,3-DICHLOROPROPENE	MD1	94.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	trans-1,3-DICHLOROPROPENE	MS1	86.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	TRICHLOROETHENE	MD1	96.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	TRICHLOROETHENE	MS1	93.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	TRICHLOROFLUOROMETHANE	MD1	100.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	TRICHLOROFLUOROMETHANE	MS1	102.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	VINYL CHLORIDE	MD1	91.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	40299	2/28/01	01D0547	01D0547-003.002	VINYL CHLORIDE	MS1	92.0	%REC	NO			5	0103L191-003	01LVK079
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1,1,2-TETRACHLOROETHANE	MD1	90.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1,1,2-TETRACHLOROETHANE	MS1	93.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1,1-TRICHLOROETHANE	MD1	93.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1,1-TRICHLOROETHANE	MS1	94.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1,2,2-TETRACHLOROETHANE	MD1	89.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1,2,2-TETRACHLOROETHANE	MS1	92.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1,2-TRICHLOROETHANE	MD1	90.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1,2-TRICHLOROETHANE	MS1	92.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1-DICHLOROETHANE	MD1	90.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1-DICHLOROETHANE	MS1	91.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1-DICHLOROETHENE	MD1	89.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1-DICHLOROETHENE	MS1	91.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1-DICHLOROPROPENE	MD1	86.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,1-DICHLOROPROPENE	MS1	86.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,2,3-TRICHLOROBENZENE	MD1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,2,3-TRICHLOROBENZENE	MS1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,2,3-TRICHLOROPROPANE	MD1	85.0	%REC	NO			50	0103L238-011	01LVK083
[redacted]RL	90099	3/8/01	01D0555	01D0555-007.002	1,2,3-TRICHLOROPROPANE	MS1	88.0	%REC	NO			50	0103L238-011	01LVK083
[redacted]RL	90099	3/8/01	01D0555	01D0555-007.002	1,2,4-TRICHLOROBENZENE	MD1	85.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,2,4-TRICHLOROBENZENE	MS1	83.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,2-DIBROMOETHANE	MD1	82.0	%REC	NO			50	0103L238-011	01LVK083

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples

Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Ba
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,2-DIBROMOETHANE	MS1	87.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,2-DICHLOROBENZENE	MD1	91.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,2-DICHLOROBENZENE	MS1	93.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,2-DICHLOROETHANE	MD1	90.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,2-DICHLOROETHANE	MS1	94.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,2-DICHLOROPROPANE	MD1	89.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,2-DICHLOROPROPANE	MS1	92.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,3-DICHLOROBENZENE	MD1	93.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,3-DICHLOROBENZENE	MS1	94.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,3-DICHLOROPROPANE	MD1	87.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,3-DICHLOROPROPANE	MS1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,4-DICHLOROBENZENE	MD1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	1,4-DICHLOROBENZENE	MS1	94.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	2,2-DICHLOROPROPANE	MD1	86.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	2,2-DICHLOROPROPANE	MS1	92.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	4-ISOPROPYLTOLUENE	MD1	86.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	4-ISOPROPYLTOLUENE	MS1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BENZENE	MD1	87.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BENZENE	MS1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BENZENE, 1,2,4-TRIMETHYL	MD1	84.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BENZENE, 1,2,4-TRIMETHYL	MS1	87.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BENZENE, 1,3,5-TRIMETHYL-	MD1	86.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BENZENE, 1,3,5-TRIMETHYL-	MS1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BROMOBENZENE	MD1	85.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BROMOBENZENE	MS1	89.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BROMOCHLOROMETHANE	MD1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BROMOCHLOROMETHANE	MS1	92.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BROMODICHLOROMETHANE	MD1	90.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BROMODICHLOROMETHANE	MS1	93.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BROMOFORM	MD1	85.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BROMOFORM	MS1	89.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BROMOMETHANE	MD1	93.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	BROMOMETHANE	MS1	95.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	CARBON TETRACHLORIDE	MD1	30.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	CARBON TETRACHLORIDE	MS1	35.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	CHLOROBENZENE	MD1	87.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	CHLOROBENZENE	MS1	90.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	CHLOROETHANE	MD1	91.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	CHLOROETHANE	MS1	95.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	CHLOROFORM	MD1	80.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	CHLOROFORM	MS1	82.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	CHLOROMETHANE	MD1	77.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	CHLOROMETHANE	MS1	72.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	cis-1,2-DICHLOROETHENE	MD1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	cis-1,2-DICHLOROETHENE	MS1	87.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	cis-1,3-DICHLOROPROPENE	MD1	80.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	cis-1,3-DICHLOROPROPENE	MS1	83.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	DIBROMOCHLOROMETHANE	MD1	90.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	DIBROMOCHLOROMETHANE	MS1	92.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	DIBROMOMETHANE	MD1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	DIBROMOMETHANE	MS1	92.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	DICHLORODIFLUOROMETHANE	MD1	71.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	DICHLORODIFLUOROMETHANE	MS1	76.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	ETHYLBENZENE	MD1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	ETHYLBENZENE	MS1	91.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	HEXACHLOROBUTADIENE	MD1	90.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	HEXACHLOROBUTADIENE	MS1	91.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	ISOPROPYLBENZENE	MD1	87.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	ISOPROPYLBENZENE	MS1	89.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	METHYLENE CHLORIDE	MD1	62.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	METHYLENE CHLORIDE	MS1	58.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	NAPHTHALENE	MD1	89.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	NAPHTHALENE	MS1	72.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	n-BUTYLBENZENE	MD1	82.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	n-BUTYLBENZENE	MS1	85.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	n-PROPYLBENZENE	MD1	87.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	n-PROPYLBENZENE	MS1	91.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	o-CHLOROTOLUENE	MD1	92.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	o-CHLOROTOLUENE	MS1	94.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	p-CHLOROTOLUENE	MD1	86.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	p-CHLOROTOLUENE	MS1	93.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	83.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	83.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	sec-BUTYLBENZENE	MD1	88.0	%REC	NO			50	0103L238-011	01LVK083

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]RL	90099	3/8/01	01D0555	01D0555-007.002	sec-BUTYLBENZENE	MS1	91.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	STYRENE	MD1	85.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	STYRENE	MS1	89.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	tert-BUTYLBENZENE	MD1	87.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	tert-BUTYLBENZENE	MS1	92.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	TETRACHLOROETHENE	MD1	87.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	TETRACHLOROETHENE	MS1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	TOLUENE	MD1	86.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	TOLUENE	MS1	88.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	TOTAL XYLENES	MD1	87.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	TOTAL XYLENES	MS1	90.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	trans-1,2-DICHLOROETHENE	MD1	90.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	trans-1,2-DICHLOROETHENE	MS1	93.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	trans-1,3-DICHLOROPROPENE	MD1	79.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	trans-1,3-DICHLOROPROPENE	MS1	82.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	TRICHLOROETHENE	MD1	**0.0**	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	TRICHLOROETHENE	MS1	**0.0**	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	TRICHLOROFLUOROMETHANE	MD1	91.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	TRICHLOROFLUOROMETHANE	MS1	92.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	VINYL CHLORIDE	MD1	80.0	%REC	NO			50	0103L238-011	01LVK083
RECRL	90099	3/8/01	01D0555	01D0555-007.002	VINYL CHLORIDE	MS1	83.0	%REC	NO			50	0103L238-011	01LVK083
ACCU	02291	04/10/01	01D0693	01D0693-001.001	1,1-DICHLOROETHENE	MD1	100.0	%REC	NO		1		01-A6456MSD	9624042301
ACCU	02291	04/10/01	01D0693	01D0693-001.001	1,1-DICHLOROETHENE	MS1	105.0	%REC	NO		1		01-A6456MS	9624042301
ACCU	02291	04/10/01	01D0693	01D0693-001.001	BENZENE	MD1	100.0	%REC	NO		1		01-A6456MSD	9624042301
ACCU	02291	04/10/01	01D0693	01D0693-001.001	BENZENE	MS1	105.0	%REC	NO		1		01-A6456MS	9624042301
ACCU	02291	04/10/01	01D0693	01D0693-001.001	CHLOROBENZENE	MD1	100.0	%REC	NO		1		01-A6456MSD	9624042301
ACCU	02291	04/10/01	01D0693	01D0693-001.001	CHLOROBENZENE	MS1	100.0	%REC	NO		1		01-A6456MS	9624042301
ACCU	02291	04/10/01	01D0693	01D0693-001.001	TOLUENE	MD1	100.0	%REC	NO		1		01-A6456MSD	9624042301
ACCU	02291	04/10/01	01D0693	01D0693-001.001	TOLUENE	MS1	105.0	%REC	NO		1		01-A6456MS	9624042301
ACCU	02291	04/10/01	01D0693	01D0693-001.001	TRICHLOROETHENE	MD1	100.0	%REC	NO		1		01-A6456MSD	9624042301
ACCU	02291	04/10/01	01D0693	01D0693-001.001	TRICHLOROETHENE	MS1	105.0	%REC	NO		1		01-A6456MS	9624042301
ACCU	02291	04/10/01	01D0699	01D0693-001.001	1,1-DICHLOROETHENE	MD1	105.0	%REC	NO		1		01-A6770MSD	9626042701
ACCU	02291	04/10/01	01D0699	01D0693-001.001	1,1-DICHLOROETHENE	MS1	105.0	%REC	NO		1		01-A6770MS	9626042701
ACCU	02291	04/10/01	01D0699	01D0693-001.001	BENZENE	MD1	105.0	%REC	NO		1		01-A6770MSD	9626042701
ACCU	02291	04/10/01	01D0699	01D0693-001.001	BENZENE	MS1	105.0	%REC	NO		1		01-A6770MS	9626042701
[redacted]U	02291	04/10/01	01D0699	01D0693-001.001	CHLOROBENZENE	MD1	100.0	%REC	NO		1		01-A6770MSD	9626042701
[redacted]U	02291	04/10/01	01D0699	01D0693-001.001	CHLOROBENZENE	MS1	105.0	%REC	NO		1		01-A6770MS	9626042701
ACCU	02291	04/10/01	01D0699	01D0693-001.001	TOLUENE	MD1	105.0	%REC	NO		1		01-A6770MSD	9626042701
ACCU	02291	04/10/01	01D0699	01D0693-001.001	TOLUENE	MS1	105.0	%REC	NO		1		01-A6770MS	9626042701
ACCU	02291	04/10/01	01D0699	01D0693-001.001	TRICHLOROETHENE	MD1	110.0	%REC	NO		1		01-A6770MSD	9626042701
ACCU	02291	04/10/01	01D0699	01D0693-001.001	TRICHLOROETHENE	MS1	110.0	%REC	NO		1		01-A6770MS	9626042701
RECRL	23296	04/24/01	01D0716	01D0716-013.001	1,1-DICHLOROETHENE	MD1	101.0	%REC	NO			10	0104L643-019	01LVK131
RECRL	23296	04/24/01	01D0716	01D0716-013.001	1,1-DICHLOROETHENE	MS1	100.0	%REC	NO			10	0104L643-019	01LVK131
RECRL	23296	04/24/01	01D0716	01D0716-013.001	BENZENE	MD1	110.0	%REC	NO			10	0104L643-019	01LVK131
RECRL	23296	04/24/01	01D0716	01D0716-013.001	BENZENE	MS1	108.0	%REC	NO			10	0104L643-019	01LVK131
RECRL	23296	04/24/01	01D0716	01D0716-013.001	CHLOROBENZENE	MD1	103.0	%REC	NO			10	0104L643-019	01LVK131
RECRL	23296	04/24/01	01D0716	01D0716-013.001	CHLOROBENZENE	MS1	102.0	%REC	NO			10	0104L643-019	01LVK131
RECRL	23296	04/24/01	01D0716	01D0716-013.001	TOLUENE	MD1	110.0	%REC	NO			10	0104L643-019	01LVK131
RECRL	23296	04/24/01	01D0716	01D0716-013.001	TOLUENE	MS1	110.0	%REC	NO			10	0104L643-019	01LVK131
RECRL	23296	04/24/01	01D0716	01D0716-013.001	TRICHLOROETHENE	MD1	**72.0**	%REC	NO		10	10	0104L643-019	01LVK131
RECRL	23296	04/24/01	01D0716	01D0716-013.001	TRICHLOROETHENE	MS1	**65.0**	%REC	NO			10	0104L643-019	01LVK131
LVLI	23296	04/24/01	01D0748	01D0716-013.001	1,1-DICHLOROETHENE	MS1	102.0	%REC	NO				0104L643-019	01LVK136
LVLI	23296	04/24/01	01D0748	01D0716-013.001	BENZENE	MS1	110.0	%REC	NO				0104L643-019	01LVK136
LVLI	23296	04/24/01	01D0748	01D0716-013.001	CHLOROBENZENE	MS1	104.0	%REC	NO				0104L643-019	01LVK136
LVLI	23296	04/24/01	01D0748	01D0716-013.001	TOLUENE	MS1	114.0	%REC	NO				0104L643-019	01LVK136
LVLI	23296	04/24/01	01D0748	01D0716-013.001	TRICHLOROETHENE	MS1	111.0	%REC	NO				0104L643-019	01LVK136
LVLI	18499	05/09/01	01D0775	01D0784-001.001	1,1-DICHLOROETHENE	MD1	90.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0775	01D0784-001.001	1,1-DICHLOROETHENE	MS1	88.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0775	01D0784-001.001	BENZENE	MD1	98.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0775	01D0784-001.001	BENZENE	MS1	95.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0775	01D0784-001.001	CHLOROBENZENE	MD1	91.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0775	01D0784-001.001	CHLOROBENZENE	MS1	89.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0775	01D0784-001.001	TOLUENE	MD1	95.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0775	01D0784-001.001	TOLUENE	MS1	93.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0775	01D0784-001.001	TRICHLOROETHENE	MD1	102.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0775	01D0784-001.001	TRICHLOROETHENE	MS1	100.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0784	01D0784-001.001	1,1-DICHLOROETHENE	MD1	90.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0784	01D0784-001.001	1,1-DICHLOROETHENE	MS1	88.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0784	01D0784-001.001	BENZENE	MD1	98.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0784	01D0784-001.001	BENZENE	MS1	95.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0784	01D0784-001.001	CHLOROBENZENE	MD1	91.0	%REC	NO			50	0105L744-001	01LVK142
[redacted]LI	18499	05/09/01	01D0784	01D0784-001.001	CHLOROBENZENE	MS1	89.0	%REC	NO			50	0105L744-001	01LVK142
[redacted]LI	18499	05/09/01	01D0784	01D0784-001.001	TOLUENE	MD1	95.0	%REC	NO			50	0105L744-001	01LVK142
[redacted]LI	18499	05/09/01	01D0784	01D0784-001.001	TOLUENE	MS1	93.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	18499	05/09/01	01D0784	01D0784-001.001	TRICHLOROETHENE	MD1	102.0	%REC	NO			50	0105L744-001	01LVK142

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilu-tion	Lab Sample #	Lab Bat
LVLI	18499	05/09/01	01D0784	01D0784-001.001	TRICHLOROETHENE	MS1	100.0	%REC	NO			50	0105L744-001	01LVK142
LVLI	63193	05/21/01	01D0858	01D0858-008.002	1,1-DICHLOROETHENE	MD1	94.0	%REC	NO			1	0105L861-007	01LVK163
LVLI	63193	05/21/01	01D0858	01D0858-008.002	1,1-DICHLOROETHENE	MS1	104.0	%REC	NO			1	0105L861-007	01LVK163
LVLI	63193	05/21/01	01D0858	01D0858-008.002	BENZENE	MD1	103.0	%REC	NO			1	0105L861-007	01LVK163
LVLI	63193	05/21/01	01D0858	01D0858-008.002	BENZENE	MS1	113.0	%REC	NO			1	0105L861-007	01LVK163
LVLI	63193	05/21/01	01D0858	01D0858-008.002	CHLOROBENZENE	MD1	104.0	%REC	NO			1	0105L861-007	01LVK163
LVLI	63193	05/21/01	01D0858	01D0858-008.002	CHLOROBENZENE	MS1	112.0	%REC	NO			1	0105L861-007	01LVK163
LVLI	63193	05/21/01	01D0858	01D0858-008.002	TOLUENE	MD1	107.0	%REC	NO			1	0105L861-007	01LVK163
LVLI	63193	05/21/01	01D0858	01D0858-008.002	TOLUENE	MS1	116.0	%REC	NO			1	0105L861-007	01LVK163
LVLI	63193	05/21/01	01D0858	01D0858-008.002	TRICHLOROETHENE	MD1	100.0	%REC	NO			1	0105L861-007	01LVK163
LVLI	63193	05/21/01	01D0858	01D0858-008.002	TRICHLOROETHENE	MS1	111.0	%REC	NO			1	0105L861-007	01LVK163
LVLI	00100	05/23/01	01D0875	01D0875-003.001	1,1-DICHLOROETHENE	MD1	89.0	%REC	NO			5	0106L911-003	01LVK171
LVLI	00100	05/23/01	01D0875	01D0875-003.001	1,1-DICHLOROETHENE	MS1	90.0	%REC	NO		5	5	0106L911-003	01LVK171
LVLI	00100	05/23/01	01D0875	01D0875-003.001	BENZENE	MD1	99.0	%REC	NO			5	0106L911-003	01LVK171
LVLI	00100	05/23/01	01D0875	01D0875-003.001	BENZENE	MS1	99.0	%REC	NO			5	0106L911-003	01LVK171
LVLI	00100	05/23/01	01D0875	01D0875-003.001	CHLOROBENZENE	MD1	99.0	%REC	NO			5	0106L911-003	01LVK171
LVLI	00100	05/23/01	01D0875	01D0875-003.001	CHLOROBENZENE	MS1	100.0	%REC	NO			5	0106L911-003	01LVK171
LVLI	00100	05/23/01	01D0875	01D0875-003.001	TOLUENE	MD1	99.0	%REC	NO			5	0106L911-003	01LVK171
LVLI	00100	05/23/01	01D0875	01D0875-003.001	TOLUENE	MS1	101.0	%REC	NO			5	0106L911-003	01LVK171
LVLI	00100	05/23/01	01D0875	01D0875-003.001	TRICHLOROETHENE	MD1	96.0	%REC	NO			5	0106L911-003	01LVK171
LVLI	00100	05/23/01	01D0875	01D0875-003.001	TRICHLOROETHENE	MS1	97.0	%REC	NO			5	0106L911-003	01LVK171
LVLI	00700	05/29/01	01D0889	01D0889-006.002	1,1-DICHLOROETHENE	MD1	94.0	%REC	NO			100	0106L942-006	01LVK173
LVLI	00700	05/29/01	01D0889	01D0889-006.002	1,1-DICHLOROETHENE	MS1	91.0	%REC	NO			100	0106L942-006	01LVK173
LVLI	00700	05/29/01	01D0889	01D0889-006.002	BENZENE	MD1	100.0	%REC	NO			100	0106L942-006	01LVK173
LVLI	00700	05/29/01	01D0889	01D0889-006.002	BENZENE	MS1	98.0	%REC	NO			100	0106L942-006	01LVK173
LVLI	00700	05/29/01	01D0889	01D0889-006.002	CHLOROBENZENE	MD1	99.0	%REC	NO			100	0106L942-006	01LVK173
LVLI	00700	05/29/01	01D0889	01D0889-006.002	CHLOROBENZENE	MS1	97.0	%REC	NO			100	0106L942-006	01LVK173
LVLI	00700	05/29/01	01D0889	01D0889-006.002	TOLUENE	MD1	99.0	%REC	NO			100	0106L942-006	01LVK173
LVLI	00700	05/29/01	01D0889	01D0889-006.002	TOLUENE	MS1	97.0	%REC	NO			100	0106L942-006	01LVK173
LVLI	00700	05/29/01	01D0889	01D0889-006.002	TRICHLOROETHENE	MD1	103.0	%REC	NO			100	0106L942-006	01LVK173
LVLI	00700	05/29/01	01D0889	01D0889-006.002	TRICHLOROETHENE	MS1	101.0	%REC	NO			100	0106L942-006	01LVK173
LVLI	12191	06/07/01	01D0935	01D0935-008.001	1,1-DICHLOROETHENE	MD1	88.0	%REC	NO			25	0106L038-012	01LVN125
LVLI	12191	06/07/01	01D0935	01D0935-008.001	1,1-DICHLOROETHENE	MS1	92.0	%REC	NO			25	0106L038-012	01LVN125
LVLI	12191	06/07/01	01D0935	01D0935-008.001	BENZENE	MD1	107.0	%REC	NO			25	0106L038-012	01LVN125
LVLI	12191	06/07/01	01D0935	01D0935-008.001	BENZENE	MS1	103.0	%REC	NO			25	0106L038-012	01LVN125
LVLI	12191	06/07/01	01D0935	01D0935-008.001	CHLOROBENZENE	MD1	114.0	%REC	NO			25	0106L038-012	01LVN125
LVLI	12191	06/07/01	01D0935	01D0935-008.001	CHLOROBENZENE	MS1	111.0	%REC	NO			25	0106L038-012	01LVN125
LVLI	12191	06/07/01	01D0935	01D0935-008.001	TOLUENE	MD1	115.0	%REC	NO			25	0106L038-012	01LVN125
LVLI	12191	06/07/01	01D0935	01D0935-008.001	TOLUENE	MS1	113.0	%REC	NO			25	0106L038-012	01LVN125
LVLI	12191	06/07/01	01D0935	01D0935-008.001	TRICHLOROETHENE	MD1	104.0	%REC	NO			25	0106L038-012	01LVN125
LVLI	12191	06/07/01	01D0935	01D0935-008.001	TRICHLOROETHENE	MS1	104.0	%REC	NO			25	0106L038-012	01LVN125
STLDEN	60699	06/18/01	01D0993	01D0993-003.002	1,1-DICHLOROETHENE	MD1	103.0	%REC	NO			10	D1F200264-006D	1177450
STLDEN	60699	06/18/01	01D0993	01D0993-003.002	1,1-DICHLOROETHENE	MS1	106.0	%REC	NO			10	D1F200264-006S	1177450
STLDEN	60699	06/18/01	01D0993	01D0993-003.002	BENZENE	MD1	97.0	%REC	NO			10	D1F200264-006D	1177450
STLDEN	60699	06/18/01	01D0993	01D0993-003.002	BENZENE	MS1	96.0	%REC	NO			10	D1F200264-006S	1177450
STLDEN	60699	06/18/01	01D0993	01D0993-003.002	CHLOROBENZENE	MD1	98.0	%REC	NO			10	D1F200264-006D	1177450
STLDEN	60699	06/18/01	01D0993	01D0993-003.002	CHLOROBENZENE	MS1	96.0	%REC	NO			10	D1F200264-006S	1177450
STLDEN	60699	06/18/01	01D0993	01D0993-003.002	TOLUENE	MD1	96.0	%REC	NO			10	D1F200264-006D	1177450
STLDEN	60699	06/18/01	01D0993	01D0993-003.002	TOLUENE	MS1	94.0	%REC	NO			10	D1F200264-006S	1177450
STLDEN	60699	06/18/01	01D0993	01D0993-003.002	TRICHLOROETHENE	MD1	97.0	%REC	NO			10	D1F200264-006D	1177450
STLDEN	60699	06/18/01	01D0993	01D0993-003.002	TRICHLOROETHENE	MS1	93.0	%REC	NO			10	D1F200264-006S	1177450
STLDEN	00491	7/12/01	01D1057	01D1057-003.002	1,1-DICHLOROETHENE	MD1	107.0	%REC	NO			2	D1G130330-010D	1206477
STLDEN	?	?	01D1057		1,1-DICHLOROETHENE	MD1	113.0	%REC	NO			1	D1G190295-004D	1207396
STLDEN	00491	7/12/01	01D1057	01D1057-003.002	1,1-DICHLOROETHENE	MS1	100.0	%REC	NO			2	D1G130330-010S	1206477
STLDEN	?	?	01D1057		1,1-DICHLOROETHENE	MS1	110.0	%REC	NO			1	D1G190295-004S	1207396
STLDEN	00491	7/12/01	01D1057	01D1057-003.002	BENZENE	MD1	102.0	%REC	NO			2	D1G130330-010D	1206477
STLDEN	?	?	01D1057		BENZENE	MD1	98.0	%REC	NO			1	D1G190295-004D	1207396
STLDEN	00491	7/12/01	01D1057	01D1057-003.002	BENZENE	MS1	100.0	%REC	NO			2	D1G130330-010S	1206477
STLDEN	?	?	01D1057		BENZENE	MS1	101.0	%REC	NO			1	D1G190295-004S	1207396
STLDEN	00491	7/12/01	01D1057	01D1057-003.002	CHLOROBENZENE	MD1	99.0	%REC	NO			2	D1G130330-010D	1206477
STLDEN	?	?	01D1057		CHLOROBENZENE	MD1	101.0	%REC	NO			1	D1G190295-004D	1207396
STLDEN	00491	7/12/01	01D1057	01D1057-003.002	CHLOROBENZENE	MS1	95.0	%REC	NO			2	D1G130330-010S	1206477
STLDEN	?	?	01D1057		CHLOROBENZENE	MS1	100.0	%REC	NO			1	D1G190295-004S	1207396
STLDEN	00491	7/12/01	01D1057	01D1057-003.002	TOLUENE	MD1	95.0	%REC	NO			2	D1G130330-010D	1206477
STLDEN	?	?	01D1057		TOLUENE	MD1	105.0	%REC	NO			1	D1G190295-004D	1207396
STLDEN	00491	7/12/01	01D1057	01D1057-003.002	TOLUENE	MS1	94.0	%REC	NO			2	D1G130330-010S	1206477
STLDEN	?	?	01D1057		TOLUENE	MS1	99.0	%REC	NO			1	D1G190295-004S	1207396
STLDEN	00491	7/12/01	01D1057	01D1057-003.002	TRICHLOROETHENE	MD1	94.0	%REC	NO			2	D1G130330-010D	1206477
STLDEN	?	?	01D1057		TRICHLOROETHENE	MD1	105.0	%REC	NO			1	D1G190295-004D	1207396
STLDEN	00491	7/12/01	01D1057	01D1057-003.002	TRICHLOROETHENE	MS1	92.0	%REC	NO			2	D1G130330-010S	1206477
STLDEN	?	?	01D1057		TRICHLOROETHENE	MS1	104.0	%REC	NO			1	D1G190295-004S	1207396
STLDEN	?	?	01D1075		1,1-DICHLOROETHENE	MD1	100.0	%REC	NO			1	D1G180165-001D	1207434
STLDEN	?	?	01D1075		1,1-DICHLOROETHENE	MS1	106.0	%REC	NO			1	D1G180165-001S	1207434
STLDEN	?	?	01D1075		BENZENE	MD1	104.0	%REC	NO			1	D1G180165-001D	1207434
STLDEN	?	?	01D1075		BENZENE	MS1	109.0	%REC	NO			1	D1G180165-001S	1207434

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

6/81

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples

Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	[redacted]	[redacted]	01D1075	[redacted]	CHLOROBENZENE	MD1	97.0	%REC	NO			1	D1G180165-001D	1207434
STLDEN	[redacted]	[redacted]	01D1075	[redacted]	CHLOROBENZENE	MS1	102.0	%REC	NO			1	D1G180165-001S	1207434
STLDEN	[redacted]	[redacted]	01D1075	[redacted]	TOLUENE	MD1	91.0	%REC	NO			1	D1G180165-001D	1207434
STLDEN	[redacted]	[redacted]	01D1075	[redacted]	TOLUENE	MS1	99.0	%REC	NO			1	D1G180165-001S	1207434
STLDEN	[redacted]	[redacted]	01D1075	[redacted]	TRICHLOROETHENE	MD1	106.0	%REC	NO			1	D1G180165-001D	1207434
STLDEN	[redacted]	[redacted]	01D1075	[redacted]	TRICHLOROETHENE	MS1	110.0	%REC	NO			1	D1G180165-001S	1207434
STLDEN	[redacted]	[redacted]	01D1108	[redacted]	1,1-DICHLOROETHENE	MD1	105.0	%REC	NO			5	D1G190289-001D	1211481
STLDEN	[redacted]	[redacted]	01D1108	[redacted]	1,1-DICHLOROETHENE	MS1	101.0	%REC	NO			5	D1G190289-001S	1211481
STLDEN	[redacted]	[redacted]	01D1108	[redacted]	BENZENE	MD1	109.0	%REC	NO			5	D1G190289-001D	1211481
STLDEN	[redacted]	[redacted]	01D1108	[redacted]	BENZENE	MS1	105.0	%REC	NO			5	D1G190289-001S	1211481
STLDEN	[redacted]	[redacted]	01D1108	[redacted]	CHLOROBENZENE	MD1	98.0	%REC	NO			5	D1G190289-001D	1211481
STLDEN	[redacted]	[redacted]	01D1108	[redacted]	CHLOROBENZENE	MS1	96.0	%REC	NO			5	D1G190289-001S	1211481
STLDEN	[redacted]	[redacted]	01D1108	[redacted]	TOLUENE	MD1	96.0	%REC	NO			5	D1G190289-001D	1211481
STLDEN	[redacted]	[redacted]	01D1108	[redacted]	TOLUENE	MS1	93.0	%REC	NO			5	D1G190289-001S	1211481
STLDEN	[redacted]	[redacted]	01D1108	[redacted]	TRICHLOROETHENE	MD1	112.0	%REC	NO			5	D1G190289-001D	1211481
STLDEN	[redacted]	[redacted]	01D1108	[redacted]	TRICHLOROETHENE	MS1	106.0	%REC	NO			5	D1G190289-001S	1211481
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	1,1-DICHLOROETHENE	MD1	96.0	%REC	NO			1	D1G210151-011D	1213378
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	1,1-DICHLOROETHENE	MD2	95.0	%REC	NO			1	D1G250111-039D	1214596
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	1,1-DICHLOROETHENE	MS1	95.0	%REC	NO			1	D1G210151-011S	1213378
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	1,1-DICHLOROETHENE	MS2	98.0	%REC	NO			1	D1G250111-039S	1214596
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	BENZENE	MD1	97.0	%REC	NO			1	D1G210151-011D	1213378
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	BENZENE	MD2	100.0	%REC	NO			1	D1G250111-039D	1214596
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	BENZENE	MS1	96.0	%REC	NO			1	D1G210151-011S	1213378
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	BENZENE	MS2	102.0	%REC	NO			1	D1G250111-039S	1214596
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	CHLOROBENZENE	MD1	93.0	%REC	NO			1	D1G210151-011D	1213378
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	CHLOROBENZENE	MD2	96.0	%REC	NO			1	D1G250111-039D	1214596
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	CHLOROBENZENE	MS1	92.0	%REC	NO			1	D1G210151-011S	1213378
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	CHLOROBENZENE	MS2	98.0	%REC	NO			1	D1G250111-039S	1214596
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	TOLUENE	MD1	89.0	%REC	NO			1	D1G210151-011D	1213378
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	TOLUENE	MD2	95.0	%REC	NO			1	D1G250111-039D	1214596
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	TOLUENE	MS1	90.0	%REC	NO			1	D1G210151-011S	1213378
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	TOLUENE	MS2	99.0	%REC	NO			1	D1G250111-039S	1214596
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	TRICHLOROETHENE	MD1	99.0	%REC	NO			1	D1G210151-011D	1213378
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	TRICHLOROETHENE	MD2	0.0	%REC	NO			1	D1G250111-039D	1214596
STLDEN	[redacted]	[redacted]	01D1116	[redacted]	TRICHLOROETHENE	MS1	100.0	%REC	NO			1	D1G210151-011S	1213378
[redacted]	[redacted]	[redacted]	01D1116	[redacted]	TRICHLOROETHENE	MS2	0.0	%REC	NO			1	D1G250111-039S	1214596
[redacted]	[redacted]	[redacted]	01D1138	[redacted]	1,1-DICHLOROETHENE	MD1	100.0	%REC	NO			1	D1G270274-001D	1219461
STLDEN	[redacted]	[redacted]	01D1138	[redacted]	1,1-DICHLOROETHENE	MD2	97.0	%REC	NO			10	D1G270346-001D	1219368
STLDEN	[redacted]	[redacted]	01D1138	[redacted]	1,1-DICHLOROETHENE	MS1	96.0	%REC	NO			1	D1G270274-001S	1219461
STLDEN	[redacted]	[redacted]	01D1138	[redacted]	1,1-DICHLOROETHENE	MS2	98.0	%REC	NO			10	D1G270346-001S	1219368
STLDEN	[redacted]	[redacted]	01D1138	[redacted]	BENZENE	MD2	105.0	%REC	NO			10	D1G270346-001D	1219368
STLDEN	[redacted]	[redacted]	01D1138	[redacted]	BENZENE	MS2	106.0	%REC	NO			10	D1G270346-001S	1219368
STLDEN	[redacted]	[redacted]	01D1138	[redacted]	CHLOROBENZENE	MD2	102.0	%REC	NO			10	D1G270346-001D	1219368
STLDEN	[redacted]	[redacted]	01D1138	[redacted]	CHLOROBENZENE	MS2	105.0	%REC	NO			10	D1G270346-001S	1219368
STLDEN	[redacted]	[redacted]	01D1138	[redacted]	TOLUENE	MD2	102.0	%REC	NO			10	D1G270346-001D	1219368
STLDEN	[redacted]	[redacted]	01D1138	[redacted]	TOLUENE	MS2	105.0	%REC	NO			10	D1G270346-001S	1219368
STLDEN	[redacted]	[redacted]	01D1138	[redacted]	TRICHLOROETHENE	MD2	89.0	%REC	NO			10	D1G270346-001D	1219368
STLDEN	[redacted]	[redacted]	01D1138	[redacted]	TRICHLOROETHENE	MS2	87.0	%REC	NO			10	D1G270346-001S	1219368
ACCU	30900	7/31/01	01D1153	01D1153-001.001	1,1-DICHLOROETHENE	MS1	90.0	%REC	NO				01-A15078S	1410080901
ACCU	30900	7/31/01	01D1153	01D1153-001.001	1,2-DICHLOROBENZENE	MS1	100.0	%REC	NO				01-A15078S	1410080901
ACCU	30900	7/31/01	01D1153	01D1153-001.001	BENZENE	MS1	95.0	%REC	NO				01-A15078S	1410080901
ACCU	30900	7/31/01	01D1153	01D1153-001.001	CHLOROBENZENE	MS1	100.0	%REC	NO				01-A15078S	1410080901
ACCU	30900	7/31/01	01D1153	01D1153-001.001	TOLUENE	MS1	100.0	%REC	NO				01-A15078S	1410080901
ACCU	30900	7/31/01	01D1153	01D1153-001.001	TRICHLOROETHENE	MS1	95.0	%REC	NO				01-A15078S	1410080901
ACCU	P219089	7/27/01	01D1169	01D1169-003.001	1,1-DICHLOROETHENE	MS1	90.0	%REC	NO				01-A14979S	1410080801
ACCU	P219089	7/27/01	01D1169	01D1169-003.001	1,2-DICHLOROBENZENE	MS1	105.0	%REC	NO				01-A14979S	1410080801
ACCU	P219089	7/27/01	01D1169	01D1169-003.001	BENZENE	MS1	90.0	%REC	NO				01-A14979S	1410080801
ACCU	P219089	7/27/01	01D1169	01D1169-003.001	CHLOROBENZENE	MS1	100.0	%REC	NO				01-A14979S	1410080801
ACCU	P219089	7/27/01	01D1169	01D1169-003.001	TOLUENE	MS1	100.0	%REC	NO				01-A14979S	1410080801
ACCU	P219089	7/27/01	01D1169	01D1169-003.001	TRICHLOROETHENE	MS1	100.0	%REC	NO				01-A14979S	1410080801
ACCU	03991	8/7/01	01D1211	01D1211-002.001	1,1-DICHLOROETHENE	MS1	103.0	%REC	NO			1	G01080056-01AMS	R354
ACCU	03991	8/7/01	01D1211	01D1211-002.001	BENZENE	MS1	104.0	%REC	NO			1	G01080056-01AMS	R354
ACCU	03991	8/7/01	01D1211	01D1211-002.001	CHLOROBENZENE	MS1	105.0	%REC	NO			1	G01080056-01AMS	R354
ACCU	03991	8/7/01	01D1211	01D1211-002.001	TOLUENE	MS1	104.0	%REC	NO			1	G01080056-01AMS	R354
ACCU	03991	8/7/01	01D1211	01D1211-002.001	TRICHLOROETHENE	MS1	103.0	%REC	NO			1	G01080056-01AMS	R354
ACCU	03991	8/7/01	01D1234	01D1211-002.001	1,1-DICHLOROETHENE	MS1	103.0	%REC	NO			1	G01080056-01AMS	R354
ACCU	37501	8/14/01	01D1234	01D1234-015.001	1,1-DICHLOROETHENE	MS1	93.2	%REC	NO			1	G01080183-10AMS	R448
ACCU	37501	8/14/01	01D1234	01D1234-015.002	1,1-DICHLOROETHENE	MS1	93.2	%REC	NO			1	G01080183-10AMS	R448
ACCU	B371BAS	8/14/01	01D1234	01D1234-019.001	1,1-DICHLOROETHENE	MS1	98.4	%REC	NO			1	G01080183-14AMS	R449
ACCU	03991	8/7/01	01D1234	01D1211-002.001	BENZENE	MS1	104.0	%REC	NO			1	G01080056-01AMS	R354
ACCU	37501	8/14/01	01D1234	01D1234-015.001	BENZENE	MS1	105.0	%REC	NO			1	G01080183-10AMS	R448
[redacted]	37501	8/14/01	01D1234	01D1234-015.002	BENZENE	MS1	105.0	%REC	NO			1	G01080183-10AMS	R448
[redacted]	B371BAS	8/14/01	01D1234	01D1234-019.001	BENZENE	MS1	105.0	%REC	NO			1	G01080183-14AMS	R449
ACCU	03991	8/7/01	01D1234	01D1211-002.001	CHLOROBENZENE	MS1	105.0	%REC	NO			1	G01080056-01AMS	R354
ACCU	37501	8/14/01	01D1234	01D1234-015.001	CHLOROBENZENE	MS1	103.0	%REC	NO			1	G01080183-10AMS	R448

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

9/23/02

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Ba
ACCU	37501	8/14/01	01D1234	01D1234-015.002	CHLOROBENZENE	MS1	103.0	%REC	NO			1	G01080183-10AMS	R448
ACCU	B371BAS	8/14/01	01D1234	01D1234-019.001	CHLOROBENZENE	MS1	103.0	%REC	NO			1	G01080183-14AMS	R449
ACCU	03991	8/7/01	01D1234	01D1211-002.001	TOLUENE	MS1	104.0	%REC	NO			1	G01080056-01AMS	R354
ACCU	37501	8/14/01	01D1234	01D1234-015.001	TOLUENE	MS1	104.0	%REC	NO			1	G01080183-10AMS	R448
ACCU	37501	8/14/01	01D1234	01D1234-015.002	TOLUENE	MS1	104.0	%REC	NO			1	G01080183-10AMS	R448
ACCU	B371BAS	8/14/01	01D1234	01D1234-019.001	TOLUENE	MS1	103.0	%REC	NO			1	G01080183-14AMS	R449
ACCU	03991	8/7/01	01D1234	01D1211-002.001	TRICHLOROETHENE	MS1	103.0	%REC	NO			1	G01080056-01AMS	R354
ACCU	10194	8/16/01	01D1234	01D1311-008.001	TRICHLOROETHENE	MS1	102.0	%REC	NO			1	G01080227-03AMS	R383
ACCU	37501	8/14/01	01D1234	01D1234-015.001	TRICHLOROETHENE	MS1	104.0	%REC	NO			1	G01080183-10AMS	R448
ACCU	37501	8/14/01	01D1234	01D1234-015.002	TRICHLOROETHENE	MS1	104.0	%REC	NO			1	G01080183-10AMS	R448
ACCU	B371BAS	8/14/01	01D1234	01D1234-019.001	TRICHLOROETHENE	MS1	103.0	%REC	NO			1	G01080183-14AMS	R449
ACCU	10194	8/16/01	01D1311	01D1311-008.001	1,1-DICHLOROETHENE	MS1	99.4	%REC	NO			1	G01080227-03AMS	R383
ACCU	04591	8/21/01	01D1311	01D1311-010.001	1,1-DICHLOROETHENE	MS1	94.5	%REC	NO			1	G01080316-01AMS	VW1090101A
ACCU	P114389	8/24/01	01D1311	01D1352-007.001	1,1-DICHLOROETHENE	MS1	95.9	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	P114389	8/24/01	01D1311	01D1352-007.001	1,1-DICHLOROETHENE	MS2	95.9	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	10194	8/16/01	01D1311	01D1311-008.001	BENZENE	MS1	103.0	%REC	NO			1	G01080227-03AMS	R383
ACCU	04591	8/21/01	01D1311	01D1311-010.001	BENZENE	MS1	97.7	%REC	NO			1	G01080316-01AMS	VW1090101A
ACCU	P114389	8/24/01	01D1311	01D1352-007.001	BENZENE	MS1	101.0	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	P114389	8/24/01	01D1311	01D1352-007.001	BENZENE	MS2	101.0	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	10194	8/16/01	01D1311	01D1311-008.001	CHLOROBENZENE	MS1	102.0	%REC	NO			1	G01080227-03AMS	R383
ACCU	04591	8/21/01	01D1311	01D1311-010.001	CHLOROBENZENE	MS1	101.0	%REC	NO			1	G01080316-01AMS	VW1090101A
ACCU	P114389	8/24/01	01D1311	01D1352-007.001	CHLOROBENZENE	MS1	105.0	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	P114389	8/24/01	01D1311	01D1352-007.001	CHLOROBENZENE	MS2	105.0	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	10194	8/16/01	01D1311	01D1311-008.001	TOLUENE	MS1	103.0	%REC	NO			1	G01080227-03AMS	R383
ACCU	04591	8/21/01	01D1311	01D1311-010.001	TOLUENE	MS1	99.6	%REC	NO			1	G01080316-01AMS	VW1090101A
ACCU	P114389	8/24/01	01D1311	01D1352-007.001	TOLUENE	MS1	102.0	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	P114389	8/24/01	01D1311	01D1352-007.001	TOLUENE	MS2	102.0	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	10194	8/16/01	01D1311	01D1311-008.001	TRICHLOROETHENE	MS1	102.0	%REC	NO			1	G01080227-03AMS	R383
ACCU	04591	8/21/01	01D1311	01D1311-010.001	TRICHLOROETHENE	MS1	98.0	%REC	NO			1	G01080316-01AMS	VW1090101A
ACCU	P114389	8/24/01	01D1311	01D1352-007.001	TRICHLOROETHENE	MS1	101.0	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	P114389	8/24/01	01D1311	01D1352-007.001	TRICHLOROETHENE	MS2	101.0	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	04591	8/21/01	01D1352	01D1311-010.001	1,1-DICHLOROETHENE	MS1	94.5	%REC	NO			1	G01080316-01AMS	VW1090101A
ACCU	75992	8/28/01	01D1352	01D1352-011.001	1,1-DICHLOROETHENE	MS1	94.8	%REC	NO			1	G01080461-03A	R635
ACCU	P114389	8/24/01	01D1352	01D1352-007.001	1,1-DICHLOROETHENE	MS1	95.9	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	75992	8/28/01	01D1352	01D1352-011.001	1,2-DICHLOROBENZENE	MS1	102.0	%REC	NO			1	G01080461-03A	R635
ACCU	04591	8/21/01	01D1352	01D1311-010.001	BENZENE	MS1	97.7	%REC	NO			1	G01080316-01AMS	VW109010
ACCU	75992	8/28/01	01D1352	01D1352-011.001	BENZENE	MS1	99.4	%REC	NO			1	G01080461-03A	R635
ACCU	P114389	8/24/01	01D1352	01D1352-007.001	BENZENE	MS1	101.0	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	04591	8/21/01	01D1352	01D1311-010.001	CHLOROBENZENE	MS1	101.0	%REC	NO			1	G01080316-01AMS	VW1090101A
ACCU	75992	8/28/01	01D1352	01D1352-011.001	CHLOROBENZENE	MS1	96.6	%REC	NO			1	G01080461-03A	R635
ACCU	P114389	8/24/01	01D1352	01D1352-007.001	CHLOROBENZENE	MS1	105.0	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	04591	8/21/01	01D1352	01D1311-010.001	TOLUENE	MS1	99.6	%REC	NO			1	G01080316-01AMS	VW1090101A
ACCU	75992	8/28/01	01D1352	01D1352-011.001	TOLUENE	MS1	100.0	%REC	NO			1	G01080461-03A	R635
ACCU	P114389	8/24/01	01D1352	01D1352-007.001	TOLUENE	MS1	102.0	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	04591	8/21/01	01D1352	01D1311-010.001	TRICHLOROETHENE	MS1	98.0	%REC	NO			1	G01080316-01AMS	VW1090101A
ACCU	75992	8/28/01	01D1352	01D1352-011.001	TRICHLOROETHENE	MS1	98.0	%REC	NO			1	G01080461-03A	R635
ACCU	P114389	8/24/01	01D1352	01D1352-007.001	TRICHLOROETHENE	MS1	101.0	%REC	NO			1	G01080461-01AMS	VW1090201A
ACCU	30900	8/28/01	01D1375	01D1375-001.001	1,1-DICHLOROETHENE	MD1	92.2	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.002	1,1-DICHLOROETHENE	MD1	92.2	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.001	1,1-DICHLOROETHENE	MS1	95.6	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.002	1,1-DICHLOROETHENE	MS1	95.6	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.001	1,2-DICHLOROBENZENE	MD1	100.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.002	1,2-DICHLOROBENZENE	MD1	100.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.001	1,2-DICHLOROBENZENE	MS1	103.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.002	1,2-DICHLOROBENZENE	MS1	103.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.001	BENZENE	MD1	99.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.002	BENZENE	MD1	99.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.001	BENZENE	MS1	103.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.002	BENZENE	MS1	103.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.001	CHLOROBENZENE	MD1	95.2	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.002	CHLOROBENZENE	MD1	95.2	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.001	CHLOROBENZENE	MS1	97.5	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.002	CHLOROBENZENE	MS1	97.5	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.001	TOLUENE	MD1	98.6	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.002	TOLUENE	MD1	98.6	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.001	TOLUENE	MS1	102.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.002	TOLUENE	MS1	102.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.001	TRICHLOROETHENE	MD1	96.8	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.002	TRICHLOROETHENE	MD1	96.8	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.001	TRICHLOROETHENE	MS1	100.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1375	01D1375-001.002	TRICHLOROETHENE	MS1	100.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1417	01D1375-001.001	1,1-DICHLOROETHENE	MS1	95.6	%REC	NO			10	G01080425-01A	VW2091001
ACCU	90299	9/5/01	01D1417	01D1417-010.001	1,1-DICHLOROETHENE	MS1	95.6	%REC	NO			1	G01090160-01AMS	VW290110
ACCU	30900	8/28/01	01D1417	01D1375-001.001	1,2-DICHLOROBENZENE	MD1	100.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1417	01D1375-001.001	1,2-DICHLOROBENZENE	MS1	103.0	%REC	NO			10	G01080425-01A	VW2091001A

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

613
683

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]CU	90299	9/5/01	01D1417	01D1417-010.001	1,2-DICHLOROBENZENE	MS1	105.0	%REC	NO			1	G01090160-01AMS	VW2901101A
ACCU	30900	8/28/01	01D1417	01D1375-001.001	BENZENE	MD1	99.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1417	01D1375-001.001	BENZENE	MS1	103.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	90299	9/5/01	01D1417	01D1417-010.001	BENZENE	MS1	99.8	%REC	NO			1	G01090160-01AMS	VW2901101A
ACCU	30900	8/28/01	01D1417	01D1375-001.001	CHLOROBENZENE	MD1	95.2	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1417	01D1375-001.001	CHLOROBENZENE	MS1	97.5	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	90299	9/5/01	01D1417	01D1417-010.001	CHLOROBENZENE	MS1	97.0	%REC	NO			1	G01090160-01AMS	VW2901101A
ACCU	30900	8/28/01	01D1417	01D1375-001.001	TOLUENE	MD1	98.6	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1417	01D1375-001.001	TOLUENE	MS1	102.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	90299	9/5/01	01D1417	01D1417-010.001	TOLUENE	MS1	100.0	%REC	NO			1	G01090160-01AMS	VW2901101A
ACCU	30900	8/28/01	01D1417	01D1375-001.001	TRICHLOROETHENE	MD1	96.8	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	30900	8/28/01	01D1417	01D1375-001.001	TRICHLOROETHENE	MS1	100.0	%REC	NO			10	G01080425-01A	VW2091001A
ACCU	90299	9/5/01	01D1417	01D1417-010.001	TRICHLOROETHENE	MS1	96.1	%REC	NO			1	G01090160-01AMS	VW2901101A
ACCU	41591	9/10/01	01D1448	01D1448-001.001	1,1-DICHLOROETHENE	MS1	102.0	%REC	NO			1	G01090257-01AMS	VW1092201
ACCU	41591	9/10/01	01D1448	01D1448-001.002	1,1-DICHLOROETHENE	MS1	102.0	%REC	NO			1	G01090257-01AMS	VW1092201
ACCU	22896	9/12/01	01D1448	01D1448-006.001	1,1-DICHLOROETHENE	MS1	96.0	%REC	NO			1	G01090291-01AMS	VW1092001A
ACCU	41591	9/10/01	01D1448	01D1448-001.001	1,2-DICHLOROBENZENE	MS1	102.0	%REC	NO			1	G01090257-01AMS	VW1092201
ACCU	41591	9/10/01	01D1448	01D1448-001.002	1,2-DICHLOROBENZENE	MS1	102.0	%REC	NO			1	G01090257-01AMS	VW1092201
ACCU	22896	9/12/01	01D1448	01D1448-006.001	1,2-DICHLOROBENZENE	MS1	100.0	%REC	NO			1	G01090291-01AMS	VW1092001A
ACCU	41591	9/10/01	01D1448	01D1448-001.001	BENZENE	MS1	97.6	%REC	NO			1	G01090257-01AMS	VW1092201
ACCU	41591	9/10/01	01D1448	01D1448-001.002	BENZENE	MS1	97.6	%REC	NO			1	G01090257-01AMS	VW1092201
ACCU	22896	9/12/01	01D1448	01D1448-006.001	BENZENE	MS1	96.8	%REC	NO			1	G01090291-01AMS	VW1092001A
ACCU	41591	9/10/01	01D1448	01D1448-001.001	CHLOROBENZENE	MS1	96.8	%REC	NO			1	G01090257-01AMS	VW1092201
ACCU	41591	9/10/01	01D1448	01D1448-001.002	CHLOROBENZENE	MS1	96.8	%REC	NO			1	G01090257-01AMS	VW1092201
ACCU	22896	9/12/01	01D1448	01D1448-006.001	CHLOROBENZENE	MS1	101.0	%REC	NO			1	G01090291-01AMS	VW1092001A
ACCU	41591	9/10/01	01D1448	01D1448-001.001	TOLUENE	MS1	100.0	%REC	NO			1	G01090257-01AMS	VW1092201
ACCU	41591	9/10/01	01D1448	01D1448-001.002	TOLUENE	MS1	100.0	%REC	NO			1	G01090257-01AMS	VW1092201
ACCU	22896	9/12/01	01D1448	01D1448-006.001	TOLUENE	MS1	95.7	%REC	NO			1	G01090291-01AMS	VW1092001A
ACCU	41591	9/10/01	01D1448	01D1448-001.001	TRICHLOROETHENE	MS1	104.0	%REC	NO			1	G01090257-01AMS	VW1092201
ACCU	41591	9/10/01	01D1448	01D1448-001.002	TRICHLOROETHENE	MS1	104.0	%REC	NO			1	G01090257-01AMS	VW1092201
ACCU	22896	9/12/01	01D1448	01D1448-006.001	TRICHLOROETHENE	MS1	59.3	%REC	NO			1	G01090291-01AMS	VW1092001A
STLDEN	[redacted]	[redacted]	01D1495	[redacted]	1,1-DICHLOROETHENE	MD1	96.0	%REC	NO			1	D1I190222-002D	1267399
STLDEN	[redacted]	[redacted]	01D1495	[redacted]	1,1-DICHLOROETHENE	MS1	101.0	%REC	NO			1	D1I190222-002S	1267399
STLDEN	[redacted]	[redacted]	01D1495	[redacted]	BENZENE	MD1	98.0	%REC	NO			1	D1I190222-002D	1267399
STLDEN	[redacted]	[redacted]	01D1495	[redacted]	BENZENE	MS1	100.0	%REC	NO			1	D1I190222-002S	1267399
[redacted]DEN	[redacted]	[redacted]	01D1495	[redacted]	CHLOROBENZENE	MD1	92.0	%REC	NO			1	D1I190222-002D	1267399
[redacted]DEN	[redacted]	[redacted]	01D1495	[redacted]	CHLOROBENZENE	MS1	94.0	%REC	NO			1	D1I190222-002S	1267399
STLDEN	[redacted]	[redacted]	01D1495	[redacted]	TOLUENE	MD1	89.0	%REC	NO			1	D1I190222-002D	1267399
STLDEN	[redacted]	[redacted]	01D1495	[redacted]	TOLUENE	MS1	95.0	%REC	NO			1	D1I190222-002S	1267399
STLDEN	[redacted]	[redacted]	01D1495	[redacted]	TRICHLOROETHENE	MD1	101.0	%REC	NO			1	D1I190222-002D	1267399
STLDEN	[redacted]	[redacted]	01D1495	[redacted]	TRICHLOROETHENE	MS1	104.0	%REC	NO			1	D1I190222-002S	1267399
ACCU	13091	9/25/01	01D1509	01D1509-004.001	1,1-DICHLOROETHENE	MS1	103.0	%REC	NO			1	G01090524-01AMS	VW1100601
ACCU	13091	9/25/01	01D1509	01D1509-004.001	1,2-DICHLOROBENZENE	MS1	103.0	%REC	NO			1	G01090524-01AMS	VW1100601
ACCU	13091	9/25/01	01D1509	01D1509-004.001	BENZENE	MS1	98.0	%REC	NO			1	G01090524-01AMS	VW1100601
ACCU	13091	9/25/01	01D1509	01D1509-004.001	CHLOROBENZENE	MS1	101.0	%REC	NO			1	G01090524-01AMS	VW1100601
ACCU	13091	9/25/01	01D1509	01D1509-004.001	TOLUENE	MS1	99.8	%REC	NO			1	G01090524-01AMS	VW1100601
ACCU	13091	9/25/01	01D1509	01D1509-004.001	TRICHLOROETHENE	MS1	103.0	%REC	NO			1	G01090524-01AMS	VW1100601
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	1,1-DICHLOROETHENE	MD1	80.0	%REC	[redacted]			1	D1J110120-001D	1289340
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	1,1-DICHLOROETHENE	MD2	98.0	%REC	[redacted]			1	D1J110178-002D	1291434
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	1,1-DICHLOROETHENE	MS1	77.0	%REC	[redacted]			1	D1J110120-001S	1289340
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	1,1-DICHLOROETHENE	MS2	93.0	%REC	[redacted]			1	D1J110178-002S	1291434
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	BENZENE	MD1	103.0	%REC	[redacted]			1	D1J110120-001D	1289340
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	BENZENE	MD2	93.0	%REC	[redacted]			1	D1J110178-002D	1291434
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	BENZENE	MS1	102.0	%REC	[redacted]			1	D1J110120-001S	1289340
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	BENZENE	MS2	91.0	%REC	[redacted]			1	D1J110178-002S	1291434
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	CHLOROBENZENE	MD1	104.0	%REC	[redacted]			1	D1J110120-001D	1289340
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	CHLOROBENZENE	MD2	94.0	%REC	[redacted]			1	D1J110178-002D	1291434
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	CHLOROBENZENE	MS1	104.0	%REC	[redacted]			1	D1J110120-001S	1289340
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	CHLOROBENZENE	MS2	92.0	%REC	[redacted]			1	D1J110178-002S	1291434
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	TOLUENE	MD1	118.0	%REC	[redacted]			1	D1J110120-001D	1289340
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	TOLUENE	MD2	92.0	%REC	[redacted]			1	D1J110178-002D	1291434
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	TOLUENE	MS1	118.0	%REC	[redacted]			1	D1J110120-001S	1289340
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	TOLUENE	MS2	91.0	%REC	[redacted]			1	D1J110178-002S	1291434
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	TRICHLOROETHENE	MD1	100.0	%REC	[redacted]			1	D1J110120-001D	1289340
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	TRICHLOROETHENE	MD2	95.0	%REC	[redacted]			1	D1J110178-002D	1291434
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	TRICHLOROETHENE	MS1	96.0	%REC	[redacted]			1	D1J110120-001S	1289340
STLDEN	[redacted]	[redacted]	02D0089	[redacted]	TRICHLOROETHENE	MS2	92.0	%REC	[redacted]			1	D1J110178-002S	1291434
STLDEN	[redacted]	[redacted]	02D0117	[redacted]	1,1-DICHLOROETHENE	MD1	108.0	%REC	[redacted]			20	D1J130157-003D	1295426
STLDEN	[redacted]	[redacted]	02D0117	[redacted]	1,1-DICHLOROETHENE	MD3	90.0	%REC	[redacted]			20	D1J220153-002D	1302224
STLDEN	[redacted]	[redacted]	02D0117	[redacted]	1,1-DICHLOROETHENE	MS1	110.0	%REC	[redacted]			20	D1J130157-003S	1295426
STLDEN	[redacted]	[redacted]	02D0117	[redacted]	1,1-DICHLOROETHENE	MS3	91.0	%REC	[redacted]			20	D1J220153-002S	1302224
[redacted]DEN	[redacted]	[redacted]	02D0117	[redacted]	BENZENE	MD1	97.0	%REC	[redacted]			20	D1J130157-003D	1295426
[redacted]DEN	[redacted]	[redacted]	02D0117	[redacted]	BENZENE	MD3	95.0	%REC	[redacted]			20	D1J220153-002D	1302224
[redacted]DEN	[redacted]	[redacted]	02D0117	[redacted]	BENZENE	MS1	99.0	%REC	[redacted]			20	D1J130157-003S	1295426
STLDEN	[redacted]	[redacted]	02D0117	[redacted]	BENZENE	MS3	94.0	%REC	[redacted]			20	D1J220153-002S	1302224

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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6847

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

9/23/02

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Ba
STLDEN	?		02D0117		CHLOROBENZENE	MD1	97.0	%REC				20	D1J130157-003D	1295426
STLDEN	?		02D0117		CHLOROBENZENE	MD3	85.0	%REC				20	D1J220153-002D	1302224
STLDEN	?		02D0117		CHLOROBENZENE	MS1	97.0	%REC				20	D1J130157-003S	1295426
STLDEN	?		02D0117		CHLOROBENZENE	MS3	93.0	%REC				20	D1J220153-002S	1302224
STLDEN	?		02D0117		TOLUENE	MD1	99.0	%REC				20	D1J130157-003D	1295426
STLDEN	?		02D0117		TOLUENE	MD3	82.0	%REC				20	D1J220153-002D	1302224
STLDEN	?		02D0117		TOLUENE	MS1	98.0	%REC				20	D1J130157-003S	1295426
STLDEN	?		02D0117		TOLUENE	MS3	88.0	%REC				20	D1J220153-002S	1302224
STLDEN	?		02D0117		TRICHLOROETHENE	MD1	99.0	%REC				20	D1J130157-003D	1295426
STLDEN	?		02D0117		TRICHLOROETHENE	MD2	89.0	%REC				1	D1J200182-038D	1297487
STLDEN	?		02D0117		TRICHLOROETHENE	MD3	90.0	%REC				20	D1J220153-002D	1302224
STLDEN	?		02D0117		TRICHLOROETHENE	MS1	102.0	%REC				20	D1J130157-003S	1295426
STLDEN	?		02D0117		TRICHLOROETHENE	MS2	92.0	%REC				1	D1J200182-038S	1297487
STLDEN	?		02D0117		TRICHLOROETHENE	MS3	95.0	%REC				20	D1J220153-002S	1302224
STLDEN	?		02D0174		1,1-DICHLOROETHENE	MD1	90.0	%REC				20	D1J220153-002D	1302224
STLDEN	?		02D0174		1,1-DICHLOROETHENE	MD2	104.0	%REC				1	D1J270145-010D	1307147
STLDEN	?		02D0174		1,1-DICHLOROETHENE	MS1	91.0	%REC				20	D1J220153-002S	1302224
STLDEN	?		02D0174		1,1-DICHLOROETHENE	MS2	103.0	%REC				1	D1J270145-010S	1307147
STLDEN	?		02D0174		BENZENE	MD1	95.0	%REC				20	D1J220153-002D	1302224
STLDEN	?		02D0174		BENZENE	MD2	98.0	%REC				1	D1J270145-010D	1307147
STLDEN	?		02D0174		BENZENE	MS1	94.0	%REC				20	D1J220153-002S	1302224
STLDEN	?		02D0174		BENZENE	MS2	94.0	%REC				1	D1J270145-010S	1307147
STLDEN	?		02D0174		CHLOROBENZENE	MD1	85.0	%REC				20	D1J220153-002D	1302224
STLDEN	?		02D0174		CHLOROBENZENE	MD2	101.0	%REC				1	D1J270145-010D	1307147
STLDEN	?		02D0174		CHLOROBENZENE	MS1	93.0	%REC				20	D1J220153-002S	1302224
STLDEN	?		02D0174		CHLOROBENZENE	MS2	101.0	%REC				1	D1J270145-010S	1307147
STLDEN	?		02D0174		TOLUENE	MD1	82.0	%REC				20	D1J220153-002D	1302224
STLDEN	?		02D0174		TOLUENE	MD2	103.0	%REC				1	D1J270145-010D	1307147
STLDEN	?		02D0174		TOLUENE	MS1	88.0	%REC				20	D1J220153-002S	1302224
STLDEN	?		02D0174		TOLUENE	MS2	103.0	%REC				1	D1J270145-010S	1307147
STLDEN	?		02D0174		TRICHLOROETHENE	MD1	90.0	%REC				20	D1J220153-002D	1302224
STLDEN	?		02D0174		TRICHLOROETHENE	MD2	114.0	%REC				1	D1J270145-010D	1307147
STLDEN	?		02D0174		TRICHLOROETHENE	MS1	95.0	%REC				20	D1J220153-002S	1302224
STLDEN	?		02D0174		TRICHLOROETHENE	MS2	111.0	%REC				1	D1J270145-010S	1307147
STLDEN	21098	11/1/01	02D0216	02D0216-009.002	1,1-DICHLOROETHENE	MD1	101.0	%REC	NO			10	D1K010333-002D	1316477
STLDEN	?		02D0216		1,1-DICHLOROETHENE	MD1	93.0	%REC				1	D1J270147-002D	1311276
STLDEN	?		02D0216		1,1-DICHLOROETHENE	MD2	101.0	%REC				10	D1J310270-001D	1312333
STLDEN	21098	11/1/01	02D0216	02D0216-009.002	1,1-DICHLOROETHENE	MS1	93.0	%REC	NO			10	D1K010333-002S	1316477
STLDEN	?		02D0216		1,1-DICHLOROETHENE	MS1	94.0	%REC				1	D1J270147-002S	1311276
STLDEN	?		02D0216		1,1-DICHLOROETHENE	MS2	106.0	%REC				10	D1J310270-001S	1312333
STLDEN	21098	11/1/01	02D0216	02D0216-009.002	BENZENE	MD1	97.0	%REC	NO			10	D1K010333-002D	1316477
STLDEN	?		02D0216		BENZENE	MD1	89.0	%REC				1	D1J270147-002D	1311276
STLDEN	?		02D0216		BENZENE	MD2	91.0	%REC				10	D1J310270-001D	1312333
STLDEN	21098	11/1/01	02D0216	02D0216-009.002	BENZENE	MS1	91.0	%REC	NO			10	D1K010333-002S	1316477
STLDEN	?		02D0216		BENZENE	MS1	90.0	%REC				1	D1J270147-002S	1311276
STLDEN	?		02D0216		BENZENE	MS2	92.0	%REC				10	D1J310270-001S	1312333
STLDEN	21098	11/1/01	02D0216	02D0216-009.002	CHLOROBENZENE	MD1	93.0	%REC	NO			10	D1K010333-002D	1316477
STLDEN	?		02D0216		CHLOROBENZENE	MD1	94.0	%REC				1	D1J270147-002D	1311276
STLDEN	?		02D0216		CHLOROBENZENE	MD2	101.0	%REC				10	D1J310270-001D	1312333
STLDEN	21098	11/1/01	02D0216	02D0216-009.002	CHLOROBENZENE	MS1	89.0	%REC	NO			10	D1K010333-002S	1316477
STLDEN	?		02D0216		CHLOROBENZENE	MS1	96.0	%REC				1	D1J270147-002S	1311276
STLDEN	?		02D0216		CHLOROBENZENE	MS2	104.0	%REC				10	D1J310270-001S	1312333
STLDEN	21098	11/1/01	02D0216	02D0216-009.002	TOLUENE	MD1	95.0	%REC	NO			10	D1K010333-002D	1316477
STLDEN	?		02D0216		TOLUENE	MD1	98.0	%REC				1	D1J270147-002D	1311276
STLDEN	?		02D0216		TOLUENE	MD2	102.0	%REC				10	D1J310270-001D	1312333
STLDEN	21098	11/1/01	02D0216	02D0216-009.002	TOLUENE	MS1	91.0	%REC	NO			10	D1K010333-002S	1316477
STLDEN	?		02D0216		TOLUENE	MS1	100.0	%REC				1	D1J270147-002S	1311276
STLDEN	?		02D0216		TOLUENE	MS2	102.0	%REC				10	D1J310270-001S	1312333
STLDEN	21098	11/1/01	02D0216	02D0216-009.002	TRICHLOROETHENE	MD1	98.0	%REC	NO			10	D1K010333-002D	1316477
STLDEN	?		02D0216		TRICHLOROETHENE	MD1	86.0	%REC				1	D1J270147-002D	1311276
STLDEN	?		02D0216		TRICHLOROETHENE	MD2	86.0	%REC				10	D1J310270-001D	1312333
STLDEN	21098	11/1/01	02D0216	02D0216-009.002	TRICHLOROETHENE	MS1	92.0	%REC	NO			10	D1K010333-002S	1316477
STLDEN	?		02D0216		TRICHLOROETHENE	MS1	85.0	%REC				1	D1J270147-002S	1311276
STLDEN	?		02D0216		TRICHLOROETHENE	MS2	90.0	%REC				10	D1J310270-001S	1312333
STLDEN	?		02D0264		1,1-DICHLOROETHENE	MD1	92.0	%REC				1	D1K100177-010D	1323195
STLDEN	?		02D0264		1,1-DICHLOROETHENE	MS1	93.0	%REC				1	D1K100177-010S	1323195
STLDEN	?		02D0264		BENZENE	MD1	93.0	%REC				1	D1K100177-010D	1323195
STLDEN	?		02D0264		BENZENE	MS1	90.0	%REC				1	D1K100177-010S	1323195
STLDEN	?		02D0264		CHLOROBENZENE	MD1	89.0	%REC				1	D1K100177-010D	1323195
STLDEN	?		02D0264		CHLOROBENZENE	MS1	88.0	%REC				1	D1K100177-010S	1323195
STLDEN	?		02D0264		TOLUENE	MD1	90.0	%REC				1	D1K100177-010D	1323195
STLDEN	?		02D0264		TOLUENE	MS1	92.0	%REC				1	D1K100177-010S	1323195
STLDEN	?		02D0264		TRICHLOROETHENE	MD1	93.0	%REC				1	D1K100177-010D	1323195
STLDEN	?		02D0264		TRICHLOROETHENE	MS1	91.0	%REC				1	D1K100177-010S	1323195
STLDEN	00700	11/14/01	02D0292	02D0292-016.002	1,1-DICHLOROETHENE	MD1	104.0	%REC	NO			200	D1K170186-020D	1333330

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-5

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Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	?		02D0292		1,1-DICHLOROETHENE	MD1	104.0	%REC				1	D1K100160-001D	1322149
STLDEN	?		02D0292		1,1-DICHLOROETHENE	MD2	94.0	%REC				1	D1K100172-007D	1324405
STLDEN	00700	11/14/01	02D0292	02D0292-016.002	1,1-DICHLOROETHENE	MS1	102.0	%REC	NO			200	D1K170186-020S	1333330
STLDEN	?		02D0292		1,1-DICHLOROETHENE	MS1	102.0	%REC				1	D1K100160-001S	1322149
STLDEN	?		02D0292		1,1-DICHLOROETHENE	MS2	93.0	%REC				1	D1K100172-007S	1324405
STLDEN	00700	11/14/01	02D0292	02D0292-016.002	BENZENE	MD1	119.0	%REC	NO			200	D1K170186-020D	1333330
STLDEN	?		02D0292		BENZENE	MD1	108.0	%REC				1	D1K100160-001D	1322149
STLDEN	?		02D0292		BENZENE	MD2	104.0	%REC				1	D1K100172-007D	1324405
STLDEN	00700	11/14/01	02D0292	02D0292-016.002	BENZENE	MS1	117.0	%REC	NO			200	D1K170186-020S	1333330
STLDEN	?		02D0292		BENZENE	MS1	107.0	%REC				1	D1K100160-001S	1322149
STLDEN	?		02D0292		BENZENE	MS2	101.0	%REC				1	D1K100172-007S	1324405
STLDEN	00700	11/14/01	02D0292	02D0292-016.002	CHLOROBENZENE	MD1	97.0	%REC	NO			200	D1K170186-020D	1333330
STLDEN	?		02D0292		CHLOROBENZENE	MD1	89.0	%REC				1	D1K100160-001D	1322149
STLDEN	?		02D0292		CHLOROBENZENE	MD2	86.0	%REC				1	D1K100172-007D	1324405
STLDEN	00700	11/14/01	02D0292	02D0292-016.002	CHLOROBENZENE	MS1	96.0	%REC	NO			200	D1K170186-020S	1333330
STLDEN	?		02D0292		CHLOROBENZENE	MS1	90.0	%REC				1	D1K100160-001S	1322149
STLDEN	?		02D0292		CHLOROBENZENE	MS2	87.0	%REC				1	D1K100172-007S	1324405
STLDEN	00700	11/14/01	02D0292	02D0292-016.002	TOLUENE	MD1	106.0	%REC	NO			200	D1K170186-020D	1333330
STLDEN	?		02D0292		TOLUENE	MD1	105.0	%REC				1	D1K100160-001D	1322149
STLDEN	?		02D0292		TOLUENE	MD2	96.0	%REC				1	D1K100172-007D	1324405
STLDEN	00700	11/14/01	02D0292	02D0292-016.002	TOLUENE	MS1	105.0	%REC	NO			200	D1K170186-020S	1333330
STLDEN	?		02D0292		TOLUENE	MS1	104.0	%REC				1	D1K100160-001S	1322149
STLDEN	?		02D0292		TOLUENE	MS2	96.0	%REC				1	D1K100172-007S	1324405
STLDEN	00700	11/14/01	02D0292	02D0292-016.002	TRICHLOROETHENE	MD1	120.0	%REC	NO			200	D1K170186-020D	1333330
STLDEN	?		02D0292		TRICHLOROETHENE	MD1	113.0	%REC				1	D1K100160-001D	1322149
STLDEN	?		02D0292		TRICHLOROETHENE	MD2	107.0	%REC				1	D1K100172-007D	1324405
STLDEN	00700	11/14/01	02D0292	02D0292-016.002	TRICHLOROETHENE	MS1	117.0	%REC	NO			200	D1K170186-020S	1333330
STLDEN	?		02D0292		TRICHLOROETHENE	MS1	113.0	%REC				1	D1K100160-001S	1322149
STLDEN	?		02D0292		TRICHLOROETHENE	MS2	104.0	%REC				1	D1K100172-007S	1324405
STLDEN	?		02D0347		1,1-DICHLOROETHENE	MD1	115.0	%REC				1	D1K200292-024D	1337263
STLDEN	?		02D0347		1,1-DICHLOROETHENE	MD2	102.0	%REC				1	D1K200187-001D	1338449
STLDEN	?		02D0347		1,1-DICHLOROETHENE	MD3	96.0	%REC				1	D1K290213-002D	1344472
STLDEN	?		02D0347		1,1-DICHLOROETHENE	MS1	108.0	%REC				1	D1K200292-024S	1337263
STLDEN	?		02D0347		1,1-DICHLOROETHENE	MS2	96.0	%REC				1	D1K200187-001S	1338449
STLDEN	?		02D0347		1,1-DICHLOROETHENE	MS3	97.0	%REC				1	D1K290213-002S	1344472
[redacted]	?		02D0347		BENZENE	MD1	98.0	%REC				1	D1K200292-024D	1337263
[redacted]	?		02D0347		BENZENE	MD2	100.0	%REC				1	D1K200187-001D	1338449
STLDEN	?		02D0347		BENZENE	MD3	92.0	%REC				1	D1K290213-002D	1344472
STLDEN	?		02D0347		BENZENE	MS1	97.0	%REC				1	D1K200292-024S	1337263
STLDEN	?		02D0347		BENZENE	MS2	98.0	%REC				1	D1K200187-001S	1338449
STLDEN	?		02D0347		BENZENE	MS3	90.0	%REC				1	D1K290213-002S	1344472
STLDEN	?		02D0347		CHLOROBENZENE	MD1	90.0	%REC				1	D1K200292-024D	1337263
STLDEN	?		02D0347		CHLOROBENZENE	MD2	99.0	%REC				1	D1K200187-001D	1338449
STLDEN	?		02D0347		CHLOROBENZENE	MD3	94.0	%REC				1	D1K290213-002D	1344472
STLDEN	?		02D0347		CHLOROBENZENE	MS1	88.0	%REC				1	D1K200292-024S	1337263
STLDEN	?		02D0347		CHLOROBENZENE	MS2	98.0	%REC				1	D1K200187-001S	1338449
STLDEN	?		02D0347		CHLOROBENZENE	MS3	96.0	%REC				1	D1K290213-002S	1344472
STLDEN	?		02D0347		TOLUENE	MD1	90.0	%REC				1	D1K200292-024D	1337263
STLDEN	?		02D0347		TOLUENE	MD2	106.0	%REC				1	D1K200187-001D	1338449
STLDEN	?		02D0347		TOLUENE	MD3	94.0	%REC				1	D1K290213-002D	1344472
STLDEN	?		02D0347		TOLUENE	MS1	91.0	%REC				1	D1K200292-024S	1337263
STLDEN	?		02D0347		TOLUENE	MS2	103.0	%REC				1	D1K200187-001S	1338449
STLDEN	?		02D0347		TOLUENE	MS3	98.0	%REC				1	D1K290213-002S	1344472
STLDEN	?		02D0347		TRICHLOROETHENE	MD1	95.0	%REC				1	D1K200292-024D	1337263
STLDEN	?		02D0347		TRICHLOROETHENE	MD2	96.0	%REC				1	D1K200187-001D	1338449
STLDEN	?		02D0347		TRICHLOROETHENE	MD3	92.0	%REC				1	D1K290213-002D	1344472
STLDEN	?		02D0347		TRICHLOROETHENE	MS1	98.0	%REC				1	D1K200292-024S	1337263
STLDEN	?		02D0347		TRICHLOROETHENE	MS2	93.0	%REC				1	D1K200187-001S	1338449
STLDEN	?		02D0347		TRICHLOROETHENE	MS3	97.0	%REC				1	D1K290213-002S	1344472
STLDEN	?		02D0410		1,1-DICHLOROETHENE	MD1	107.0	%REC				1	D1K300337-001D	1345388
STLDEN	?		02D0410		1,1-DICHLOROETHENE	MS1	105.0	%REC				1	D1K300337-001S	1345388
STLDEN	?		02D0410		BENZENE	MD1	96.0	%REC				1	D1K300337-001D	1345388
STLDEN	?		02D0410		BENZENE	MS1	96.0	%REC				1	D1K300337-001S	1345388
STLDEN	?		02D0410		CHLOROBENZENE	MD1	92.0	%REC				1	D1K300337-001D	1345388
STLDEN	?		02D0410		CHLOROBENZENE	MS1	93.0	%REC				1	D1K300337-001S	1345388
STLDEN	?		02D0410		TOLUENE	MD1	92.0	%REC				1	D1K300337-001D	1345388
STLDEN	?		02D0410		TOLUENE	MS1	90.0	%REC				1	D1K300337-001S	1345388
STLDEN	?		02D0410		TRICHLOROETHENE	MD1	101.0	%REC				1	D1K300337-001D	1345388
STLDEN	?		02D0410		TRICHLOROETHENE	MS1	102.0	%REC				1	D1K300337-001S	1345388
STLDEN	?		02D0470		1,1-DICHLOROETHENE	MD1	85.0	%REC				1	D1L060196-003D	1348332
STLDEN	?		02D0470		1,1-DICHLOROETHENE	MD2	97.0	%REC				250	D1L130352-009D	1361321
STLDEN	?		02D0470		1,1-DICHLOROETHENE	MD3	98.0	%REC				1	D1L130356-002D	1360334
[redacted]EN	61199	12/11/01	02D0470	02D0470-008.002	1,1-DICHLOROETHENE	MD4	97.0	%REC	NO			5	D1L150206-014D	1360334
[redacted]EN	?		02D0470		1,1-DICHLOROETHENE	MS1	94.0	%REC				1	D1L060196-003S	1348332
STLDEN	?		02D0470		1,1-DICHLOROETHENE	MS2	96.0	%REC				250	D1L130352-009S	1361321

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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6&6

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples

Groundwater - Calendar Year 2001

9/23/02

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilu-tion	Lab Sample #	Lab Ba
STLDEN	?		02D0470		1,1-DICHLOROETHENE	MS3	96.0	%REC				1	D1L130356-002S	1360334
STLDEN	61199	12/11/01	02D0470	02D0470-008.002	1,1-DICHLOROETHENE	MS4	97.0	%REC	NO			5	D1L150206-014S	1360334
STLDEN	?		02D0470		BENZENE	MD1	98.0	%REC				1	D1L060196-003D	1348332
STLDEN	?		02D0470		BENZENE	MD2	98.0	%REC				250	D1L130352-009D	1361321
STLDEN	?		02D0470		BENZENE	MD3	98.0	%REC				1	D1L130356-002D	1360334
STLDEN	61199	12/11/01	02D0470	02D0470-008.002	BENZENE	MD4	98.0	%REC	NO			5	D1L150206-014D	1360334
STLDEN	?		02D0470		BENZENE	MS1	100.0	%REC				1	D1L060196-003S	1348332
STLDEN	?		02D0470		BENZENE	MS2	98.0	%REC				250	D1L130352-009S	1361321
STLDEN	?		02D0470		BENZENE	MS3	94.0	%REC				1	D1L130356-002S	1360334
STLDEN	61199	12/11/01	02D0470	02D0470-008.002	BENZENE	MS4	94.0	%REC	NO			5	D1L150206-014S	1360334
STLDEN	?		02D0470		CHLOROBENZENE	MD1	96.0	%REC				1	D1L060196-003D	1348332
STLDEN	?		02D0470		CHLOROBENZENE	MD2	97.0	%REC				250	D1L130352-009D	1361321
STLDEN	?		02D0470		CHLOROBENZENE	MD3	103.0	%REC				1	D1L130356-002D	1360334
STLDEN	61199	12/11/01	02D0470	02D0470-008.002	CHLOROBENZENE	MD4	102.0	%REC	NO			5	D1L150206-014D	1360334
STLDEN	?		02D0470		CHLOROBENZENE	MS1	104.0	%REC				1	D1L060196-003S	1348332
STLDEN	?		02D0470		CHLOROBENZENE	MS2	101.0	%REC				250	D1L130352-009S	1361321
STLDEN	?		02D0470		CHLOROBENZENE	MS3	98.0	%REC				1	D1L130356-002S	1360334
STLDEN	61199	12/11/01	02D0470	02D0470-008.002	CHLOROBENZENE	MS4	96.0	%REC	NO			5	D1L150206-014S	1360334
STLDEN	?		02D0470		TOLUENE	MD1	93.0	%REC				1	D1L060196-003D	1348332
STLDEN	?		02D0470		TOLUENE	MD2	98.0	%REC				250	D1L130352-009D	1361321
STLDEN	?		02D0470		TOLUENE	MD3	95.0	%REC				1	D1L130356-002D	1360334
STLDEN	61199	12/11/01	02D0470	02D0470-008.002	TOLUENE	MD4	95.0	%REC	NO			5	D1L150206-014D	1360334
STLDEN	?		02D0470		TOLUENE	MS1	101.0	%REC				1	D1L060196-003S	1348332
STLDEN	?		02D0470		TOLUENE	MS2	103.0	%REC				250	D1L130352-009S	1361321
STLDEN	?		02D0470		TOLUENE	MS3	96.0	%REC				1	D1L130356-002S	1360334
STLDEN	61199	12/11/01	02D0470	02D0470-008.002	TOLUENE	MS4	93.0	%REC	NO			5	D1L150206-014S	1360334
STLDEN	?		02D0470		TRICHLOROETHENE	MD1	92.0	%REC				1	D1L060196-003D	1348332
STLDEN	?		02D0470		TRICHLOROETHENE	MD2	102.0	%REC				250	D1L130352-009D	1361321
STLDEN	?		02D0470		TRICHLOROETHENE	MD3	98.0	%REC				1	D1L130356-002D	1360334
STLDEN	61199	12/11/01	02D0470	02D0470-008.002	TRICHLOROETHENE	MD4	100.0	%REC	NO			5	D1L150206-014D	1360334
STLDEN	?		02D0470		TRICHLOROETHENE	MS1	96.0	%REC				1	D1L060196-003S	1348332
STLDEN	?		02D0470		TRICHLOROETHENE	MS2	101.0	%REC				250	D1L130352-009S	1361321
STLDEN	?		02D0470		TRICHLOROETHENE	MS3	96.0	%REC				1	D1L130356-002S	1360334
STLDEN	61199	12/11/01	02D0470	02D0470-008.002	TRICHLOROETHENE	MS4	94.0	%REC	NO			5	D1L150206-014S	1360334
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.002	1,1-DICHLOROETHENE	MD1	104.0	%REC	NO			10	D1L180286-002D	2002281
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.002	1,1-DICHLOROETHENE	MS1	102.0	%REC	NO			10	D1L180286-002S	2002281
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.002	BENZENE	MD1	97.0	%REC	NO			10	D1L180286-002D	2002281
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.002	BENZENE	MS1	95.0	%REC	NO			10	D1L180286-002S	2002281
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.002	CHLOROBENZENE	MD1	94.0	%REC	NO			10	D1L180286-002D	2002281
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.002	CHLOROBENZENE	MS1	93.0	%REC	NO			10	D1L180286-002S	2002281
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.002	TOLUENE	MD1	90.0	%REC	NO			10	D1L180286-002D	2002281
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.002	TOLUENE	MS1	89.0	%REC	NO			10	D1L180286-002S	2002281
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.002	TRICHLOROETHENE	MD1	77.0	%REC	NO			10	D1L180286-002D	2002281
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.002	TRICHLOROETHENE	MS1	81.0	%REC	NO			10	D1L180286-002S	2002281
STLDEN	22796	10/9/01		02D0089-005.002	1,1-DICHLOROETHENE	MD1	97.0	%REC	NO			2	D1J110326-005D	1290359
STLDEN	22796	10/9/01		02D0089-005.002	1,1-DICHLOROETHENE	MS1	95.0	%REC	NO			2	D1J110326-005S	1290359
STLDEN	22796	10/9/01		02D0089-005.002	BENZENE	MD1	94.0	%REC	NO			2	D1J110326-005D	1290359
STLDEN	22796	10/9/01		02D0089-005.002	BENZENE	MS1	92.0	%REC	NO			2	D1J110326-005S	1290359
STLDEN	22796	10/9/01		02D0089-005.002	CHLOROBENZENE	MD1	96.0	%REC	NO			2	D1J110326-005D	1290359
STLDEN	22796	10/9/01		02D0089-005.002	CHLOROBENZENE	MS1	95.0	%REC	NO			2	D1J110326-005S	1290359
STLDEN	22796	10/9/01		02D0089-005.002	TOLUENE	MD1	91.0	%REC	NO			2	D1J110326-005D	1290359
STLDEN	22796	10/9/01		02D0089-005.002	TOLUENE	MS1	91.0	%REC	NO			2	D1J110326-005S	1290359
STLDEN	22796	10/9/01		02D0089-005.002	TRICHLOROETHENE	MD1	92.0	%REC	NO			2	D1J110326-005D	1290359
STLDEN	22796	10/9/01		02D0089-005.002	TRICHLOROETHENE	MS1	89.0	%REC	NO			2	D1J110326-005S	1290359

TOTAL and DISSOLVED METALS

GEL	00997	1/8/01	01D0327	01D0327-001.001	ALUMINUM	MD1	108.4	%REC	YES		7.6	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	ALUMINUM	MS1	106.4	%REC	YES		7.6	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	ANTIMONY	MD1	106.3	%REC	YES		2.24	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	ANTIMONY	MS1	104.1	%REC	YES		2.24	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	ARSENIC	MD1	102.4	%REC	YES		2.46	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	ARSENIC	MS1	100.6	%REC	YES		2.46	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	BARIUM	MD1	112.2	%REC	YES		0.49	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	BARIUM	MS1	109.6	%REC	YES		0.49	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	BERYLLIUM	MD1	100.2	%REC	YES		0.21	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	BERYLLIUM	MS1	99.0	%REC	YES		0.21	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	CADMIUM	MD1	97.2	%REC	YES		0.36	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	CADMIUM	MS1	96.0	%REC	YES		0.36	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	CALCIUM	MD1	100.0	%REC	YES		8.19	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	CALCIUM	MS1	60.0	%REC	YES		8.19	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	CHROMIUM	MD1	102.6	%REC	YES		0.7	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	CHROMIUM	MS1	100.8	%REC	YES		0.7	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	COBALT	MD1	100.0	%REC	YES		0.67	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	COBALT	MS1	98.6	%REC	YES		0.67	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	COPPER	MD1	109.2	%REC	YES		1.54	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	COPPER	MS1	107.2	%REC	YES		1.54	1	1000151021	61453

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	00997	1/8/01	01D0327	01D0327-001.001	IRON	MD1	103.5	%REC	YES		2.37	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	IRON	MS1	101.1	%REC	YES		2.37	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	LEAD	MD1	100.4	%REC	YES		2.25	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	LEAD	MS1	98.8	%REC	YES		2.25	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	LITHIUM	MD1	122.2	%REC	YES		0.003	1	1000150999	61452
GEL	00997	1/8/01	01D0327	01D0327-001.001	LITHIUM	MS1	120.2	%REC	YES		0.003	1	1000150998	61452
GEL	00997	1/8/01	01D0327	01D0327-001.001	MAGNESIUM	MD1	108.0	%REC	YES		4.55	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	MAGNESIUM	MS1	94.0	%REC	YES		4.55	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	MANGANESE	MD1	102.4	%REC	YES		0.48	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	MANGANESE	MS1	99.6	%REC	YES		0.48	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	MERCURY	MD1	102.0	%REC	YES		0.048	1	1000151044	61435
GEL	00997	1/8/01	01D0327	01D0327-001.001	MERCURY	MS1	103.0	%REC	YES		0.048	1	1000151043	61435
GEL	00997	1/8/01	01D0327	01D0327-001.001	MOLYBDENUM	MD1	105.1	%REC	YES		1.39	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	MOLYBDENUM	MS1	103.1	%REC	YES		1.39	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	NICKEL	MD1	101.0	%REC	YES		1.03	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	NICKEL	MS1	99.6	%REC	YES		1.03	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	POTASSIUM	MD2	98.4	%REC	YES		0.5	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	POTASSIUM	MS2	96.0	%REC	YES		0.5	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	SELENIUM	MD2	102.6	%REC	YES		2.37	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	SELENIUM	MS2	99.8	%REC	YES		2.37	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	SILVER	MD1	100.4	%REC	YES		0.62	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	SILVER	MS1	99.8	%REC	YES		0.62	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	SODIUM	MD1	120.0	%REC	YES		10.6	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	SODIUM	MS1	60.0	%REC	YES		10.6	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	STRONTIUM	MD1	108.8	%REC	YES		0.21	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	STRONTIUM	MS1	102.8	%REC	YES		0.21	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	THALLIUM	MD1	102.4	%REC	YES		3.26	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	THALLIUM	MS1	102.4	%REC	YES		3.26	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	TIN	MD1	102.0	%REC	YES		2.38	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	TIN	MS1	100.0	%REC	YES		2.38	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	URANIUM, TOTAL	MD1	112.1	%REC	YES		0.72	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	URANIUM, TOTAL	MS1	109.7	%REC	YES		0.72	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	VANADIUM	MD1	105.8	%REC	YES		0.46	1	1000151022	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	VANADIUM	MS1	103.6	%REC	YES		0.46	1	1000151021	61453
GEL	00997	1/8/01	01D0327	01D0327-001.001	ZINC	MD1	100.6	%REC	YES		0.5	1	1000151022	61453
[redacted]	00997	1/8/01	01D0327	01D0327-001.001	ZINC	MS1	98.8	%REC	YES		0.5	1	1000151021	61453
[redacted]	0487	1/11/01	01D0336	01D0336-001.001	ALUMINUM	MD1	99.5	%REC	YES		7.6	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	ALUMINUM	MS1	102.5	%REC	YES		7.6	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	ANTIMONY	MD1	101.2	%REC	YES		2.24	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	ANTIMONY	MS1	104.4	%REC	YES		2.24	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	ARSENIC	MD1	103.4	%REC	YES		2.46	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	ARSENIC	MS1	104.8	%REC	YES		2.46	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	BARIUM	MD1	95.6	%REC	YES		0.487	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	BARIUM	MS1	98.2	%REC	YES		0.487	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	BERYLLIUM	MD1	99.4	%REC	YES		0.212	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	BERYLLIUM	MS1	102.0	%REC	YES		0.212	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	CADMIUM	MD1	99.8	%REC	YES		0.361	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	CADMIUM	MS1	102.4	%REC	YES		0.361	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	CALCIUM	MD1	60.0	%REC	YES		8.19	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	CALCIUM	MS1	120.0	%REC	YES		8.19	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	CHROMIUM	MD1	101.4	%REC	YES		0.697	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	CHROMIUM	MS1	104.0	%REC	YES		0.697	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	COBALT	MD1	100.2	%REC	YES		0.669	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	COBALT	MS1	103.0	%REC	YES		0.669	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	COPPER	MD1	97.4	%REC	YES		1.54	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	COPPER	MS1	100.2	%REC	YES		1.54	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	IRON	MD1	98.3	%REC	YES		2.37	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	IRON	MS1	101.1	%REC	YES		2.37	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	LEAD	MD1	103.2	%REC	YES		2.25	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	LEAD	MS1	105.8	%REC	YES		2.25	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	LITHIUM	MD1	113.2	%REC	YES	B	0.003	1	1000154633	62785
GEL	0487	1/11/01	01D0336	01D0336-001.001	LITHIUM	MS1	109.0	%REC	YES	B	0.003	1	1000154632	62785
GEL	0487	1/11/01	01D0336	01D0336-001.001	MAGNESIUM	MD1	100.0	%REC	YES		4.55	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	MAGNESIUM	MS1	116.0	%REC	YES		4.55	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	MANGANESE	MD1	99.7	%REC	YES		0.477	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	MANGANESE	MS1	102.3	%REC	YES		0.477	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	MERCURY	MD1	110.0	%REC	YES		0.048	1	1000154710	62825
GEL	0487	1/11/01	01D0336	01D0336-001.001	MERCURY	MS1	110.0	%REC	YES		0.048	1	1000154709	62825
GEL	0487	1/11/01	01D0336	01D0336-001.001	MOLYBDENUM	MD1	102.5	%REC	YES		1.39	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	MOLYBDENUM	MS1	105.1	%REC	YES		1.39	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	NICKEL	MD1	99.7	%REC	YES		1.03	1	1000154613	62786
[redacted]	0487	1/11/01	01D0336	01D0336-001.001	NICKEL	MS1	102.7	%REC	YES		1.03	1	1000154612	62786
[redacted]	0487	1/11/01	01D0336	01D0336-001.001	POTASSIUM	MD2	100.9	%REC	YES		0.496	1	1000154613	62786
[redacted]	0487	1/11/01	01D0336	01D0336-001.001	POTASSIUM	MS2	103.9	%REC	YES		0.496	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	SELENIUM	MD1	100.2	%REC	YES		2.37	1	1000154613	62786

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-5

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Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilu-tion	Lab Sample #	Lab Ba
GEL	0487	1/11/01	01D0336	01D0336-001.001	SELENIUM	MS1	103.4	%REC	YES		2.37	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	SILVER	MD1	100.2	%REC	YES		0.618	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	SILVER	MS1	102.8	%REC	YES		0.618	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	SODIUM	MD1	40.0	%REC	YES		10.6	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	SODIUM	MS1	140.0	%REC	YES		10.6	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	STRONTIUM	MD1	90.8	%REC	YES		0.205	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	STRONTIUM	MS1	96.8	%REC	YES		0.205	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	THALLIUM	MD1	101.0	%REC	YES		3.26	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	THALLIUM	MS1	104.0	%REC	YES		3.26	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	TIN	MD1	103.0	%REC	YES		2.38	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	TIN	MS1	105.2	%REC	YES		2.38	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	URANIUM, TOTAL	MD1	91.4	%REC	YES		0.723	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	URANIUM, TOTAL	MS1	95.2	%REC	YES		0.723	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	VANADIUM	MD1	98.6	%REC	YES		0.455	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	VANADIUM	MS1	101.4	%REC	YES		0.455	1	1000154612	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	ZINC	MD1	99.2	%REC	YES		0.504	1	1000154613	62786
GEL	0487	1/11/01	01D0336	01D0336-001.001	ZINC	MS1	101.0	%REC	YES		0.504	1	1000154612	62786
GEL	04591	2/1/01	01D0502	01D0502-005.006	ALUMINUM	MD1	105.0	%REC	YES		7.57	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	ALUMINUM	MS1	106.4	%REC	YES		7.57	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	ANTIMONY	MD1	105.4	%REC	YES		2.65	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	ANTIMONY	MS1	106.6	%REC	YES		2.65	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	ARSENIC	MD1	101.6	%REC	YES		2.33	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	ARSENIC	MS1	103.0	%REC	YES		2.33	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	BARIUM	MD1	103.9	%REC	YES		0.162	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	BARIUM	MS1	105.5	%REC	YES		0.162	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	BERYLLIUM	MD1	101.8	%REC	YES		0.158	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	BERYLLIUM	MS1	103.0	%REC	YES		0.158	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	CADMIUM	MD1	100.2	%REC	YES		0.272	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	CADMIUM	MS1	101.6	%REC	YES		0.272	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	CALCIUM	MD1	98.0	%REC	YES		5	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	CALCIUM	MS1	120.0	%REC	YES		5	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	CHROMIUM	MD1	103.4	%REC	YES		0.582	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	CHROMIUM	MS1	104.6	%REC	YES		0.582	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	COBALT	MD1	100.8	%REC	YES		0.419	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	COBALT	MS1	102.0	%REC	YES		0.419	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	COPPER	MD1	101.7	%REC	YES		0.587	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	COPPER	MS1	103.1	%REC	YES		0.587	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	IRON	MD1	104.6	%REC	YES		3.27	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	IRON	MS1	105.6	%REC	YES		3.27	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	LEAD	MD1	102.8	%REC	YES		1.47	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	LEAD	MS1	104.0	%REC	YES		1.47	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	LITHIUM	MD1	110.6	%REC	YES		0.003	1	1000160550	65069
GEL	04591	2/1/01	01D0502	01D0502-005.006	LITHIUM	MS1	104.6	%REC	YES		0.003	1	1000160549	65069
GEL	04591	2/1/01	01D0502	01D0502-005.006	MAGNESIUM	MD1	104.0	%REC	YES		3.63	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	MAGNESIUM	MS1	110.0	%REC	YES		3.63	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	MANGANESE	MD1	103.9	%REC	YES		0.338	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	MANGANESE	MS1	105.1	%REC	YES		0.338	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	MERCURY	MD1	105.0	%REC	YES		0.057	1	1000159306	64740
GEL	04591	2/1/01	01D0502	01D0502-005.006	MERCURY	MS1	104.0	%REC	YES		0.057	1	1000159305	64740
GEL	04591	2/1/01	01D0502	01D0502-005.006	MOLYBDENUM	MD1	104.2	%REC	YES		1.28	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	MOLYBDENUM	MS1	105.6	%REC	YES		1.28	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	NICKEL	MD1	101.6	%REC	YES		0.815	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	NICKEL	MS1	103.0	%REC	YES		0.815	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	POTASSIUM	MD1	101.2	%REC	YES		6.52	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	POTASSIUM	MS1	102.4	%REC	YES		6.52	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	SELENIUM	MD1	100.6	%REC	YES		2.93	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	SELENIUM	MS1	102.0	%REC	YES		2.93	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	SILVER	MD1	101.4	%REC	YES		0.871	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	SILVER	MS1	102.6	%REC	YES		0.871	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	SODIUM	MD1	100.0	%REC	YES		7.85	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	SODIUM	MS1	136.0	%REC	YES		7.85	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	STRONTIUM	MD1	101.6	%REC	YES		0.16	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	STRONTIUM	MS1	104.2	%REC	YES		0.16	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	THALLIUM	MD1	103.2	%REC	YES		3.88	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	THALLIUM	MS1	103.0	%REC	YES		3.88	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	TIN	MD1	101.0	%REC	YES		2.31	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	TIN	MS1	102.4	%REC	YES		2.31	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	URANIUM, TOTAL	MD1	112.4	%REC	YES		10.8	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	URANIUM, TOTAL	MS1	111.6	%REC	YES		10.8	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	VANADIUM	MD1	103.8	%REC	YES		0.638	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	VANADIUM	MS1	105.0	%REC	YES		0.638	1	1000160518	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	ZINC	MD1	100.5	%REC	YES		0.72	1	1000160519	64935
GEL	04591	2/1/01	01D0502	01D0502-005.006	ZINC	MS1	101.7	%REC	YES		0.72	1	1000160518	64935
GEL	10394	2/20/01	01D0514	01D0514-004.006	ALUMINUM	MD1	101.7	%REC	NO		7.57	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	ALUMINUM	MS1	102.9	%REC	NO		7.57	1	1000166226	67054

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-5

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Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	10394	2/20/01	01D0514	01D0514-004.006	ANTIMONY	MD1	101.8	%REC	NO		2.65	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	ANTIMONY	MS1	102.8	%REC	NO		2.65	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	ARSENIC	MD1	96.2	%REC	NO		2.33	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	ARSENIC	MS1	97.6	%REC	NO		2.33	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	BARIUM	MD1	98.5	%REC	NO		0.162	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	BARIUM	MS1	99.5	%REC	NO		0.162	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	BERYLLIUM	MD1	97.8	%REC	NO		0.158	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	BERYLLIUM	MS1	98.8	%REC	NO		0.158	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	CADMIUM	MD1	95.4	%REC	NO		0.272	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	CADMIUM	MS1	96.8	%REC	NO		0.272	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	CALCIUM	MD1	72.0	%REC	NO		5	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	CALCIUM	MS1	86.0	%REC	NO		5	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	CHROMIUM	MD1	98.3	%REC	NO		0.582	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	CHROMIUM	MS1	100.3	%REC	NO		0.582	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	COBALT	MD1	97.6	%REC	NO		0.419	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	COBALT	MS1	99.0	%REC	NO		0.419	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	COPPER	MD1	97.3	%REC	NO		0.587	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	COPPER	MS1	98.1	%REC	NO		0.587	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	IRON	MD1	94.4	%REC	NO		3.27	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	IRON	MS1	96.4	%REC	NO		3.27	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	LEAD	MD1	96.8	%REC	NO		1.47	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	LEAD	MS1	98.6	%REC	NO		1.47	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	LITHIUM	MD1	103.0	%REC	NO		0.003	1	1000166240	67053
GEL	10394	2/20/01	01D0514	01D0514-004.006	LITHIUM	MS1	105.0	%REC	NO		0.003	1	1000166239	67053
GEL	10394	2/20/01	01D0514	01D0514-004.006	MAGNESIUM	MD1	92.0	%REC	NO		3.63	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	MAGNESIUM	MS1	98.0	%REC	NO		3.63	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	MANGANESE	MD1	97.2	%REC	NO		0.338	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	MANGANESE	MS1	98.8	%REC	NO		0.338	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	MERCURY	MD1	108.0	%REC	NO		0.057	1	1000166260	67071
GEL	10394	2/20/01	01D0514	01D0514-004.006	MERCURY	MS1	107.0	%REC	NO		0.057	1	1000166259	67071
GEL	10394	2/20/01	01D0514	01D0514-004.006	MOLYBDENUM	MD1	101.4	%REC	NO		1.28	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	MOLYBDENUM	MS1	103.2	%REC	NO		1.28	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	NICKEL	MD1	95.8	%REC	NO		0.815	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	NICKEL	MS1	97.2	%REC	NO		0.815	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	POTASSIUM	MD1	97.8	%REC	NO		6.52	1	1000166227	67054
[redacted]	10394	2/20/01	01D0514	01D0514-004.006	POTASSIUM	MS1	100.4	%REC	NO		6.52	1	1000166226	67054
[redacted]	10394	2/20/01	01D0514	01D0514-004.006	SELENIUM	MD1	97.8	%REC	NO		2.93	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	SELENIUM	MS1	99.6	%REC	NO		2.93	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	SILVER	MD1	100.4	%REC	NO		0.871	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	SILVER	MS1	101.2	%REC	NO		0.871	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	SODIUM	MD1	86.0	%REC	NO		7.85	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	SODIUM	MS1	92.0	%REC	NO		7.85	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	STRONTIUM	MD1	95.8	%REC	NO		0.16	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	STRONTIUM	MS1	97.0	%REC	NO		0.16	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	THALLIUM	MD1	97.2	%REC	NO		3.88	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	THALLIUM	MS1	97.8	%REC	NO		3.88	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	TIN	MD1	97.4	%REC	NO		2.31	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	TIN	MS1	99.6	%REC	NO		2.31	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	URANIUM, TOTAL	MD1	97.0	%REC	NO		10.8	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	URANIUM, TOTAL	MS1	99.8	%REC	NO		10.8	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	VANADIUM	MD1	97.2	%REC	NO		0.638	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	VANADIUM	MS1	98.6	%REC	NO		0.638	1	1000166226	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	ZINC	MD1	96.7	%REC	NO		0.72	1	1000166227	67054
GEL	10394	2/20/01	01D0514	01D0514-004.006	ZINC	MS1	98.1	%REC	NO		0.72	1	1000166226	67054
RECRL	40099	2/26/01	01D0543	01D0543-008.009	ALUMINUM	MS1	99.1	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	ANTIMONY	MS1	99.1	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	ARSENIC	MS1	97.6	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	BARIUM	MS1	95.2	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	BERYLLIUM	MS1	96.4	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	CADMIUM	MS1	91.7	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	CHROMIUM	MS1	93.4	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	COBALT	MS1	91.1	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	COPPER	MS1	96.0	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	IRON	MS1	90.5	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	LEAD	MS1	92.1	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	LITHIUM	MS1	122.8	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	MANGANESE	MS1	95.6	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	MERCURY	MS1	94.0	%REC	YES			1	0103L155-001	01C0076
RECRL	40099	2/26/01	01D0543	01D0543-008.009	MOLYBDENUM	MS1	94.1	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	NICKEL	MS1	89.3	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	SELENIUM	MS1	97.0	%REC	YES			1	0103L155-001	01L0147
[redacted]	40099	2/26/01	01D0543	01D0543-008.009	SILVER	MS1	101.7	%REC	YES			1	0103L155-001	01L0147
[redacted]	40099	2/26/01	01D0543	01D0543-008.009	STRONTIUM	MS1	97.6	%REC	YES			1	0103L155-001	01L0147
[redacted]	40099	2/26/01	01D0543	01D0543-008.009	THALLIUM	MS1	93.3	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	TIN	MS1	95.8	%REC	YES			1	0103L155-001	01L0147

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Bat
RECRL	40099	2/26/01	01D0543	01D0543-008.009	VANADIUM	MS1	95.5	%REC	YES			1	0103L155-001	01L0147
RECRL	40099	2/26/01	01D0543	01D0543-008.009	ZINC	MS1	94.0	%REC	YES			1	0103L155-001	01L0147
RECRL	07391	3/6/01	01D0555	01D0555-002.008	MERCURY	MS1	96.0	%REC	YES			1	0103L238-004	01C0085
RECRL	41099	3/14/01	01D0605	01D0605-001.001	ALUMINUM	MS1	112.3	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	ANTIMONY	MS1	103.4	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	ARSENIC	MS1	103.0	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	BARIUM	MS1	95.5	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	BERYLLIUM	MS1	98.7	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	CADMIUM	MS1	92.7	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	CHROMIUM	MS1	95.3	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	COBALT	MS1	92.3	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	COPPER	MS1	101.6	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	IRON	MS1	91.3	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	LEAD	MS1	92.9	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	LITHIUM	MS1	165.5	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	MANGANESE	MS1	97.9	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	MERCURY	MS1	93.0	%REC	YES			1	0103L365-001	01C0097
RECRL	41099	3/14/01	01D0605	01D0605-001.001	MOLYBDENUM	MS1	95.5	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	NICKEL	MS1	90.2	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	SELENIUM	MS1	103.9	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	SILVER	MS1	107.5	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	STRONTIUM	MS1	77.9	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	THALLIUM	MS1	93.2	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	TIN	MS1	99.6	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	VANADIUM	MS1	98.3	%REC	YES			1	0103L365-001	01L0198
RECRL	41099	3/14/01	01D0605	01D0605-001.001	ZINC	MS1	101.3	%REC	YES			1	0103L365-001	01L0198
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	ALUMINUM	MS1	243.4	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	ANTIMONY	MS1	97.9	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	ARSENIC	MS1	99.4	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	BARIUM	MS1	94.3	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	BERYLLIUM	MS1	99.6	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	CADMIUM	MS1	91.5	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	CHROMIUM	MS1	94.3	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	COBALT	MS1	92.0	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	COPPER	MS1	101.4	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	IRON	MS1	63.1	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	LEAD	MS1	160.3	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	LITHIUM	MS1	146.5	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	MANGANESE	MS1	92.5	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	MERCURY	MS1	105.0	%REC	NO			1	0104L639-001	01C0129
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	MOLYBDENUM	MS1	92.0	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	NICKEL	MS1	89.1	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	SELENIUM	MS1	98.3	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	SILVER	MS1	101.6	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	STRONTIUM	MS1	95.1	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	THALLIUM	MS1	85.5	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	TIN	MS1	95.8	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	VANADIUM	MS1	98.2	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0693	01D0737-005.002	ZINC	MS1	92.6	%REC	NO			1	0104L639-001	01L0264
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	ALUMINUM	MS1	309.8	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	ANTIMONY	MS1	96.1	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	ARSENIC	MS1	95.7	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	BARIUM	MS1	94.0	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	BERYLLIUM	MS1	99.5	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	CADMIUM	MS1	92.0	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	CHROMIUM	MS1	95.6	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	COBALT	MS1	93.6	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	COPPER	MS1	96.5	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	IRON	MS1	132.0	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	LEAD	MS1	90.5	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	LITHIUM	MS1	131.7	%REC	NO	N		1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	MANGANESE	MS1	96.9	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	MERCURY	MS1	106.0	%REC	NO			1	0104L532-001	01C0128
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	MOLYBDENUM	MS1	91.1	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	NICKEL	MS1	91.6	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	SELENIUM	MS1	98.2	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	SILVER	MS1	97.4	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	STRONTIUM	MS1	94.6	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	THALLIUM	MS1	94.1	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	TIN	MS1	94.7	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	VANADIUM	MS1	97.0	%REC	NO			1	0104L532-001	01L0230
RECRL	GS49	03/13/01	01D0699	01D0684-004.003	ZINC	MS1	96.3	%REC	NO			1	0104L532-001	01L0230
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	ALUMINUM	MS1	243.4	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	ANTIMONY	MS1	97.9	%REC	NO			1	0104L639-001	01L0264

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	GS40	04/06/01	01D0716	01D0737-005.002	ARSENIC	MS1	99.4	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	BARIUM	MS1	94.3	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	BERYLLIUM	MS1	99.6	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	CADMIUM	MS1	91.5	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	CHROMIUM	MS1	94.3	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	COBALT	MS1	92.0	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	COPPER	MS1	101.4	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	IRON	MS1	63.1	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	LEAD	MS1	150.3	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	LITHIUM	MS1	146.5	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	MANGANESE	MS1	92.5	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	MERCURY	MS1	105.0	%REC	NO			1	0104L639-001	01C0129
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	MOLYBDENUM	MS1	92.0	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	NICKEL	MS1	89.1	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	SELENIUM	MS1	98.3	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	SILVER	MS1	101.6	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	STRONTIUM	MS1	95.1	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	THALLIUM	MS1	85.5	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	TIN	MS1	95.8	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	VANADIUM	MS1	98.2	%REC	NO			1	0104L639-001	01L0264
RECRL	GS40	04/06/01	01D0716	01D0737-005.002	ZINC	MS1	92.6	%REC	NO			1	0104L639-001	01L0264
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	ALUMINUM	MS1	180.1	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	ANTIMONY	MS1	95.4	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	ARSENIC	MS1	97.7	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	BARIUM	MS1	80.4	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	BERYLLIUM	MS1	86.3	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	CADMIUM	MS1	90.5	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	CHROMIUM	MS1	83.0	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	COBALT	MS1	80.4	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	COPPER	MS1	84.7	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	IRON	MS1	99.2	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	LEAD	MS1	89.4	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	LITHIUM	MS1	133.3	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	MANGANESE	MS1	83.3	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	MERCURY	MS1	99.0	%REC	NO			1	0105L658-001	01L0272
[redacted]	SW119	04/21/01	01D0748	01D0753-001.002	MOLYBDENUM	MS1	91.4	%REC	NO			1	0105L658-001	01L0272
[redacted]	SW119	04/21/01	01D0748	01D0753-001.002	NICKEL	MS1	78.2	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	SELENIUM	MS1	96.2	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	SILVER	MS1	87.3	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	STRONTIUM	MS1	90.5	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	THALLIUM	MS1	86.6	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	TIN	MS1	93.9	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	VANADIUM	MS1	83.8	%REC	NO			1	0105L658-001	01L0272
RECRL	SW119	04/21/01	01D0748	01D0753-001.002	ZINC	MS1	83.9	%REC	NO			1	0105L658-001	01L0272
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	ALUMINUM	MS1	197.3	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	ANTIMONY	MS1	93.1	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	ARSENIC	MS1	95.8	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	BARIUM	MS1	91.0	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	BERYLLIUM	MS1	96.5	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	CADMIUM	MS1	87.0	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	CHROMIUM	MS1	91.2	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	COBALT	MS1	89.1	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	COPPER	MS1	96.0	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	IRON	MS1	19.4	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	LEAD	MS1	85.7	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	LITHIUM	MS1	134.8	%REC	NO	N		1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	MANGANESE	MS1	62.4	%REC	NO			1	0105L707-001	01L0273
LVLI	A4	05/06/01	01D0775	01D0768-009.007	MERCURY	MS1	97.0	%REC	NO			1	0105L708-001	01C0141
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	MOLYBDENUM	MS1	88.7	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	NICKEL	MS1	84.8	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	SELENIUM	MS1	95.5	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	SILVER	MS1	99.9	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	STRONTIUM	MS1	89.8	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	THALLIUM	MS1	86.2	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	TIN	MS1	91.2	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	VANADIUM	MS1	94.3	%REC	NO			1	0105L707-001	01L0273
LVLI	GS40	04/23/01	01D0775	01D0776-009.002	ZINC	MS1	82.4	%REC	NO			1	0105L707-001	01L0273
LVLI	SW120	05/14/01	01D0808	01D081.1-006.003	ALUMINUM	MS1	103.6	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D081.1-006.003	ANTIMONY	MS1	103.8	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D081.1-006.003	ARSENIC	MS1	100.4	%REC	NO			1	0105L781-001	01L0285
[redacted]	SW120	05/14/01	01D0808	01D081.1-006.003	BARIUM	MS1	99.6	%REC	NO			1	0105L781-001	01L0285
[redacted]	SW120	05/14/01	01D0808	01D081.1-006.003	BERYLLIUM	MS1	105.3	%REC	NO			1	0105L781-001	01L0285
[redacted]	SW120	05/14/01	01D0808	01D081.1-006.003	CADMIUM	MS1	102.1	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D081.1-006.003	CHROMIUM	MS1	101.9	%REC	NO			1	0105L781-001	01L0285

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	COBALT	MS1	101.7	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	COPPER	MS1	98.3	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	IRON	MS1	100.3	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	LEAD	MS1	100.9	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	LITHIUM	MS1	106.6	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	MANGANESE	MS1	104.5	%REC	NO			1	0105L781-001	01L0285
LVLI	22796	05/14/01	01D0808	01D0808-001.004	MERCURY	MS1	85.0	%REC	NO			1	0105L816-002	01C0155
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	MOLYBDENUM	MS1	103.1	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	NICKEL	MS1	101.4	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	SELENIUM	MS1	101.0	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	SILVER	MS1	100.3	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	STRONTIUM	MS1	99.6	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	THALLIUM	MS1	100.6	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	TIN	MS1	102.8	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	VANADIUM	MS1	101.7	%REC	NO			1	0105L781-001	01L0285
LVLI	SW120	05/14/01	01D0808	01D0811-006.003	ZINC	MS1	101.5	%REC	NO			1	0105L781-001	01L0285
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	ALUMINUM	MS1	103.0	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	ANTIMONY	MS1	100.7	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	ARSENIC	MS1	95.6	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	BARIUM	MS1	99.0	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	BERYLLIUM	MS1	101.5	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	CADMIUM	MS1	93.3	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	CHROMIUM	MS1	98.0	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	COBALT	MS1	97.9	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	COPPER	MS1	100.6	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	IRON	MS1	100.0	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	LEAD	MS1	90.4	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	LITHIUM	MS1	118.9	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	MANGANESE	MS1	102.6	%REC	NO			1	0105L835-002	01L0317
LVLI	22796	05/14/01	01D0858	01D0808-001.004	MERCURY	MS1	85.0	%REC	NO			1	0105L816-002	01C0155
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	MOLYBDENUM	MS1	99.8	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	NICKEL	MS1	96.5	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	SELENIUM	MS1	94.8	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	SILVER	MS1	102.2	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	STRONTIUM	MS1	99.3	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	THALLIUM	MS1	93.0	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	TIN	MS1	100.3	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	VANADIUM	MS1	102.3	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0858	01S0075-001.003	ZINC	MS1	103.7	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	ALUMINUM	MS1	103.0	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	ANTIMONY	MS1	100.7	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	ARSENIC	MS1	95.6	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	BARIUM	MS1	99.0	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	BERYLLIUM	MS1	101.5	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	CADMIUM	MS1	93.3	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	CHROMIUM	MS1	98.0	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	COBALT	MS1	97.9	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	COPPER	MS1	100.6	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	IRON	MS1	100.0	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	LEAD	MS1	90.4	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	LITHIUM	MS1	118.9	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	MANGANESE	MS1	102.6	%REC	NO			1	0105L835-002	01L0317
LVLI	00100	05/23/01	01D0875	01D0875-002.005	MERCURY	MS1	80.0	%REC	NO			1	0106L911-002	01C0176
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	MOLYBDENUM	MS1	99.8	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	NICKEL	MS1	96.5	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	SELENIUM	MS1	94.8	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	SILVER	MS1	102.2	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	STRONTIUM	MS1	99.3	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	THALLIUM	MS1	93.0	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	TIN	MS1	100.3	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	VANADIUM	MS1	102.3	%REC	NO			1	0105L835-002	01L0317
LVLI	891T-206	05/10/01	01D0875	01S0075-001.003	ZINC	MS1	103.7	%REC	NO			1	0105L835-002	01L0317
LVLI	00700	05/29/01	01D0889	01D0889-006.005	ALUMINUM	MS1	102.3	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	ANTIMONY	MS1	100.5	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	ARSENIC	MS1	98.9	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	BARIUM	MS1	97.6	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	BERYLLIUM	MS1	97.6	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	CADMIUM	MS1	94.2	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	CALCIUM	MS1	0.0	%REC	YES			5	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	CHROMIUM	MS1	96.1	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	COBALT	MS1	94.7	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	COPPER	MS1	100.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	IRON	MS1	97.4	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	LEAD	MS1	94.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	LITHIUM	MS1	119.3	%REC	YES			1	0106L942-007	01L0359

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	00700	05/29/01	01D0889	01D0889-006.005	MAGNESIUM	MS1	0.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	MANGANESE	MS1	98.1	%REC	YES			1	0106L942-007	01L0359
LVLI	30900	05/30/01	01D0889	01D0889-006.005	MERCURY	MS1	84.0	%REC	YES			1	0106L941-003	01C0185
LVLI	00700	05/29/01	01D0889	01D0889-006.005	MOLYBDENUM	MS1	98.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	NICKEL	MS1	91.8	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	POTASSIUM	MS1	0.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	SELENIUM	MS1	98.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	SILVER	MS1	101.6	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	SODIUM	MS1	0.0	%REC	YES			5	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	STRONTIUM	MS1	98.6	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	THALLIUM	MS1	97.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	TIN	MS1	98.5	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	VANADIUM	MS1	98.7	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0889	01D0889-006.005	ZINC	MS1	96.4	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	ALUMINUM	MS1	102.3	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	ANTIMONY	MS1	100.5	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	ARSENIC	MS1	98.9	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	BARIUM	MS1	97.6	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	BERYLLIUM	MS1	97.6	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	CADMIUM	MS1	94.2	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	CALCIUM	MS1	0.0	%REC	YES			5	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	CHROMIUM	MS1	96.1	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	COBALT	MS1	94.7	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	COPPER	MS1	100.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	IRON	MS1	97.4	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	LEAD	MS1	94.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	LITHIUM	MS1	119.3	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	MAGNESIUM	MS1	0.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	MANGANESE	MS1	98.1	%REC	YES			1	0106L942-007	01L0359
LVLI	00600	06/06/01	01D0935	01D0935-004.005	MERCURY	MS1	112.0	%REC	YES			1	0106L038-005	01C0198
LVLI	00700	05/29/01	01D0935	01D0889-006.005	MOLYBDENUM	MS1	98.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	NICKEL	MS1	91.8	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	POTASSIUM	MS1	0.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	SELENIUM	MS1	98.0	%REC	YES			1	0106L942-007	01L0359
[redacted]	00700	05/29/01	01D0935	01D0889-006.005	SILVER	MS1	101.6	%REC	YES			1	0106L942-007	01L0359
[redacted]	00700	05/29/01	01D0935	01D0889-006.005	SODIUM	MS1	0.0	%REC	YES			5	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	STRONTIUM	MS1	98.6	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	THALLIUM	MS1	97.0	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	TIN	MS1	98.5	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	VANADIUM	MS1	98.7	%REC	YES			1	0106L942-007	01L0359
LVLI	00700	05/29/01	01D0935	01D0889-006.005	ZINC	MS1	96.4	%REC	YES			1	0106L942-007	01L0359
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	ALUMINUM	MD1	103.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	ALUMINUM	MS1	100.0	%REC				1	D1G130330-012S	1200382
STLDEN	5887	7/12/01	01D1057	01D1057-004.004	ANTIMONY	MS1	99.0	%REC				1	D1G130330-018S	1201179
STLDEN	5887	7/12/01	01D1057	01D1057-004.004	ARSENIC	MS1	106.0	%REC				1	D1G130330-018S	1201179
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	BARIUM	MD1	102.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	BARIUM	MS1	101.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	BERYLLIUM	MD1	106.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	BERYLLIUM	MS1	104.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	CADMIUM	MD1	100.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	CADMIUM	MS1	98.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	CALCIUM	MD1	100.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	CALCIUM	MS1	100.0	%REC				1	D1G130330-012S	1200382
STLDEN	5887	7/12/01	01D1057	01D1057-004.004	CHROMIUM	MS1	101.0	%REC				1	D1G130330-018S	1201179
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	COBALT	MD1	104.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	COBALT	MS1	102.0	%REC				1	D1G130330-012S	1200382
STLDEN	5887	7/12/01	01D1057	01D1057-004.004	COPPER	MS1	101.0	%REC				1	D1G130330-018S	1201179
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	IRON	MD1	100.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	IRON	MS1	100.0	%REC				1	D1G130330-012S	1200382
STLDEN	5887	7/12/01	01D1057	01D1057-004.004	LEAD	MS1	99.0	%REC				1	D1G130330-018S	1201179
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	LITHIUM	MD1	99.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	LITHIUM	MS1	99.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	MAGNESIUM	MD1	104.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	MAGNESIUM	MS1	104.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	MANGANESE	MD1	103.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	MANGANESE	MS1	101.0	%REC				1	D1G130330-012S	1200382
STLDEN	70393	7/11/01	01D1057	01D1057-002.004	MERCURY	MD1	101.0	%REC				1	D1G130330-006D	1200184
STLDEN	70393	7/11/01	01D1057	01D1057-002.004	MERCURY	MS1	100.0	%REC				1	D1G130330-006S	1200184
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	MOLYBDENUM	MD1	102.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	MOLYBDENUM	MS1	100.0	%REC				1	D1G130330-012S	1200382
[redacted]	00491	7/12/01	01D1057	01D1057-003.004	NICKEL	MD1	96.0	%REC				1	D1G130330-012D	1200382
[redacted]	00491	7/12/01	01D1057	01D1057-003.004	NICKEL	MS1	95.0	%REC				1	D1G130330-012S	1200382
[redacted]	00491	7/12/01	01D1057	01D1057-003.004	POTASSIUM	MD1	109.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	POTASSIUM	MS1	109.0	%REC				1	D1G130330-012S	1200382

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

6214
10941

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilu-tion	Lab Sample #	Lab Bat
STLDEN	5887	7/12/01	01D1057	01D1057-004.004	SELENIUM	MS1	108.0	%REC				1	D1G130330-018S	1201179
STLDEN	5887	7/12/01	01D1057	01D1057-004.004	SILVER	MS1	99.0	%REC				1	D1G130330-018S	1201179
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	SODIUM	MD1	103.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	SODIUM	MS1	101.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	STRONTIUM	MD1	93.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	STRONTIUM	MS1	92.0	%REC				1	D1G130330-012S	1200382
STLDEN	5887	7/12/01	01D1057	01D1057-004.004	THALLIUM	MS1	99.0	%REC				1	D1G130330-018S	1201179
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	TIN	MD1	98.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	TIN	MS1	97.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	URANIUM, TOTAL	MD1	102.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	URANIUM, TOTAL	MS1	101.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	VANADIUM	MD1	108.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	VANADIUM	MS1	106.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	ZINC	MD1	98.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1057	01D1057-003.004	ZINC	MS1	97.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	ALUMINUM	MD1	103.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	ALUMINUM	MS1	100.0	%REC				1	D1G130330-012S	1200382
STLDEN	5887	7/12/01	01D1075	01D1057-004.004	ANTIMONY	MS1	99.0	%REC				1	D1G130330-018S	1201179
STLDEN	5887	7/12/01	01D1075	01D1057-004.004	ARSENIC	MS1	106.0	%REC				1	D1G130330-018S	1201179
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	BARIUM	MD1	102.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	BARIUM	MS1	101.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	BERYLLIUM	MD1	106.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	BERYLLIUM	MS1	104.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	CADMIUM	MD1	100.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	CADMIUM	MS1	98.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	CALCIUM	MD1	100.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	CALCIUM	MS1	100.0	%REC				1	D1G130330-012S	1200382
STLDEN	5887	7/12/01	01D1075	01D1057-004.004	CHROMIUM	MS1	101.0	%REC				1	D1G130330-018S	1201179
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	COBALT	MD1	104.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	COBALT	MS1	102.0	%REC				1	D1G130330-012S	1200382
STLDEN	5887	7/12/01	01D1075	01D1057-004.004	COPPER	MS1	101.0	%REC				1	D1G130330-018S	1201179
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	IRON	MD1	100.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	IRON	MS1	100.0	%REC				1	D1G130330-012S	1200382
STLDEN	5887	7/12/01	01D1075	01D1057-004.004	LEAD	MS1	99.0	%REC				1	D1G130330-018S	1201179
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	LITHIUM	MD1	99.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	LITHIUM	MS1	99.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	MAGNESIUM	MD1	104.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	MAGNESIUM	MS1	104.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	MANGANESE	MD1	103.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	MANGANESE	MS1	101.0	%REC				1	D1G130330-012S	1200382
STLDEN	70393	7/11/01	01D1075	01D1057-002.004	MERCURY	MD1	101.0	%REC				1	D1G130330-006D	1200184
STLDEN	70393	7/11/01	01D1075	01D1057-002.004	MERCURY	MS1	100.0	%REC				1	D1G130330-006S	1200184
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	MOLYBDENUM	MD1	102.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	MOLYBDENUM	MS1	100.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	NICKEL	MD1	96.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	NICKEL	MS1	95.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	POTASSIUM	MD1	109.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	POTASSIUM	MS1	109.0	%REC				1	D1G130330-012S	1200382
STLDEN	5887	7/12/01	01D1075	01D1057-004.004	SELENIUM	MS1	108.0	%REC				1	D1G130330-018S	1201179
STLDEN	5887	7/12/01	01D1075	01D1057-004.004	SILVER	MS1	99.0	%REC				1	D1G130330-018S	1201179
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	SODIUM	MD1	103.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	SODIUM	MS1	101.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	STRONTIUM	MD1	93.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	STRONTIUM	MS1	92.0	%REC				1	D1G130330-012S	1200382
STLDEN	5887	7/12/01	01D1075	01D1057-004.004	THALLIUM	MS1	99.0	%REC				1	D1G130330-018S	1201179
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	TIN	MD1	98.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	TIN	MS1	97.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	URANIUM, TOTAL	MD1	102.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	URANIUM, TOTAL	MS1	101.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	VANADIUM	MD1	108.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	VANADIUM	MS1	106.0	%REC				1	D1G130330-012S	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	ZINC	MD1	98.0	%REC				1	D1G130330-012D	1200382
STLDEN	00491	7/12/01	01D1075	01D1057-003.004	ZINC	MS1	97.0	%REC				1	D1G130330-012S	1200382
STLDEN	5887	7/12/01	01D1108	01D1057-004.004	ALUMINUM	MS1	106.0	%REC				1	D1G130330-018S	1201179
STLDEN	5887	7/12/01	01D1108	01D1057-004.004	ANTIMONY	MS1	99.0	%REC				1	D1G130330-018S	1201179
STLDEN	5887	7/12/01	01D1108	01D1057-004.004	ARSENIC	MS1	106.0	%REC				1	D1G130330-018S	1201179
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	BARIUM	MD1	107.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	BARIUM	MS1	106.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	BERYLLIUM	MD1	108.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	BERYLLIUM	MS1	108.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	CADMIUM	MD1	104.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	CADMIUM	MS1	104.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	CALCIUM	MD1	100.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	CALCIUM	MS1	100.0	%REC				1	D1G240209-004S	1212160
STLDEN	5887	7/12/01	01D1108	01D1057-004.004	CHROMIUM	MS1	101.0	%REC				1	D1G130330-018S	1201179

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	00597	7/19/01	01D1108	01D1116-001.004	COBALT	MD1	107.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	COBALT	MS1	108.0	%REC				1	D1G240209-004S	1212160
STLDEN	5887	7/12/01	01D1108	01D1057-004.004	COPPER	MS1	101.0	%REC				1	D1G130330-018S	1201179
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	IRON	MD1	101.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	IRON	MS1	101.0	%REC				1	D1G240209-004S	1212160
STLDEN	5887	7/12/01	01D1108	01D1057-004.004	LEAD	MS1	99.0	%REC				1	D1G130330-018S	1201179
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	LITHIUM	MD1	98.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	LITHIUM	MS1	98.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	MAGNESIUM	MD1	102.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	MAGNESIUM	MS1	102.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	MANGANESE	MD1	107.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	MANGANESE	MS1	107.0	%REC				1	D1G240209-004S	1212160
STLDEN	10992	7/18/01	01D1108	01D1108-001.004	MERCURY	MD1	104.0	%REC				1	D1G190283-004D	1205178
STLDEN	10992	7/18/01	01D1108	01D1108-001.004	MERCURY	MS1	106.0	%REC				1	D1G190283-004S	1205178
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	MOLYBDENUM	MD1	106.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	MOLYBDENUM	MS1	106.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	NICKEL	MD1	101.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	NICKEL	MS1	102.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	POTASSIUM	MD1	104.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	POTASSIUM	MS1	103.0	%REC				1	D1G240209-004S	1212160
STLDEN	5887	7/12/01	01D1108	01D1057-004.004	SELENIUM	MS1	108.0	%REC				1	D1G130330-018S	1201179
STLDEN	5887	7/12/01	01D1108	01D1057-004.004	SILVER	MS1	99.0	%REC				1	D1G130330-018S	1201179
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	SODIUM	MD1	107.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	SODIUM	MS1	103.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	STRONTIUM	MD1	101.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	STRONTIUM	MS1	101.0	%REC				1	D1G240209-004S	1212160
STLDEN	5887	7/12/01	01D1108	01D1057-004.004	THALLIUM	MS1	99.0	%REC				1	D1G130330-018S	1201179
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	TIN	MD1	102.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	TIN	MS1	102.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	URANIUM, TOTAL	MD1	107.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	URANIUM, TOTAL	MS1	107.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	VANADIUM	MD1	110.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	VANADIUM	MS1	110.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1108	01D1116-001.004	ZINC	MD1	103.0	%REC				1	D1G240209-004D	1212160
STLDEN	00596	7/18/01	01D1108	01D1116-001.004	ZINC	MS1	102.0	%REC				1	D1G240209-004S	1212160
[redacted]	10498	7/24/01	01D1116	01D1138-001.004	ALUMINUM	MD1	101.0	%REC		B		1	D1G270304-004D	1214230
[redacted]	10498	7/24/01	01D1116	01D1138-001.004	ALUMINUM	MS1	98.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	ANTIMONY	MD1	106.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	ANTIMONY	MS1	108.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	ARSENIC	MD1	111.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	ARSENIC	MS1	111.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	BARIUM	MD1	107.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	BARIUM	MS1	106.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	BERYLLIUM	MD1	108.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	BERYLLIUM	MS1	108.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	CADMIUM	MD1	104.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	CADMIUM	MS1	104.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	CALCIUM	MD1	100.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	CALCIUM	MS1	100.0	%REC				1	D1G240209-004S	1212160
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	CHROMIUM	MD1	95.0	%REC				1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	CHROMIUM	MS1	96.0	%REC				1	D1G270304-004S	1214230
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	COBALT	MD1	107.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	COBALT	MS1	108.0	%REC				1	D1G240209-004S	1212160
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	COPPER	MD1	98.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	COPPER	MS1	99.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	IRON	MD1	101.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	IRON	MS1	101.0	%REC				1	D1G240209-004S	1212160
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	LEAD	MD1	95.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	LEAD	MS1	95.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	LITHIUM	MD1	98.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	LITHIUM	MS1	98.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	MAGNESIUM	MD1	102.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	MAGNESIUM	MS1	102.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	MANGANESE	MD1	107.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	MANGANESE	MS1	107.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	MERCURY	MD1	95.0	%REC				1	D1G240209-004D	1212208
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	MERCURY	MS1	101.0	%REC				1	D1G240209-004S	1212208
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	MOLYBDENUM	MD1	106.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	MOLYBDENUM	MS1	106.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	NICKEL	MD1	101.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	NICKEL	MS1	102.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	POTASSIUM	MD1	104.0	%REC				1	D1G240209-004D	1212160
[redacted]	00597	7/19/01	01D1116	01D1116-001.004	POTASSIUM	MS1	103.0	%REC				1	D1G240209-004S	1212160
[redacted]	10498	7/24/01	01D1116	01D1138-001.004	SELENIUM	MD1	119.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	SELENIUM	MS1	120.0	%REC		B		1	D1G270304-004S	1214230

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

626
696

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Ba
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	SILVER	MD1	47.0	%REC				1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	SILVER	MS1	44.0	%REC				1	D1G270304-004S	1214230
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	SODIUM	MD1	107.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	SODIUM	MS1	103.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	STRONTIUM	MD1	101.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	STRONTIUM	MS1	101.0	%REC				1	D1G240209-004S	1212160
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	THALLIUM	MD1	94.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1116	01D1138-001.004	THALLIUM	MS1	95.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	TIN	MD1	102.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	TIN	MS1	102.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	URANIUM, TOTAL	MD1	107.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	URANIUM, TOTAL	MS1	107.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	VANADIUM	MD1	110.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	VANADIUM	MS1	110.0	%REC				1	D1G240209-004S	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	ZINC	MD1	103.0	%REC				1	D1G240209-004D	1212160
STLDEN	00597	7/19/01	01D1116	01D1116-001.004	ZINC	MS1	102.0	%REC				1	D1G240209-004S	1212160
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	ALUMINUM	MD1	101.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	ALUMINUM	MS1	98.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	ANTIMONY	MD1	106.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	ANTIMONY	MS1	108.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	ARSENIC	MD1	111.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	ARSENIC	MS1	111.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	BARIUM	MD1	110.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	BARIUM	MS1	110.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	BERYLLIUM	MD1	109.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	BERYLLIUM	MS1	110.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	CADMIUM	MD1	107.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	CADMIUM	MS1	108.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	CALCIUM	MD1	94.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	CALCIUM	MS1	95.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	CHROMIUM	MD1	95.0	%REC				1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	CHROMIUM	MS1	96.0	%REC				1	D1G270304-004S	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	COBALT	MD1	110.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	COBALT	MS1	111.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	COPPER	MD1	98.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	COPPER	MS1	99.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	IRON	MD1	100.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	IRON	MS1	100.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	LEAD	MD1	95.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	LEAD	MS1	95.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	LITHIUM	MD1	96.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	LITHIUM	MS1	96.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	MAGNESIUM	MD1	98.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	MAGNESIUM	MS1	99.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	MANGANESE	MD1	109.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	MANGANESE	MS1	109.0	%REC				1	D1G270304-004S	1219475
STLDEN	00597	7/19/01	01D1138	01D1116-001.004	MERCURY	MD1	95.0	%REC				1	D1G240209-004D	1212208
STLDEN	00597	7/19/01	01D1138	01D1116-001.004	MERCURY	MS1	101.0	%REC				1	D1G240209-004S	1212208
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	MOLYBDENUM	MD1	108.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	MOLYBDENUM	MS1	108.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	NICKEL	MD1	105.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	NICKEL	MS1	105.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	POTASSIUM	MD1	96.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	POTASSIUM	MS1	97.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	SELENIUM	MD1	119.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	SELENIUM	MS1	120.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	SILVER	MD1	47.0	%REC				1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	SILVER	MS1	44.0	%REC				1	D1G270304-004S	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	SODIUM	MD1	98.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	SODIUM	MS1	98.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	STRONTIUM	MD1	103.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	STRONTIUM	MS1	103.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	THALLIUM	MD1	94.0	%REC		B		1	D1G270304-004D	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	THALLIUM	MS1	95.0	%REC		B		1	D1G270304-004S	1214230
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	TIN	MD1	104.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	TIN	MS1	104.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	URANIUM, TOTAL	MD1	109.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	URANIUM, TOTAL	MS1	109.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	VANADIUM	MD1	100.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	VANADIUM	MS1	101.0	%REC				1	D1G270304-004S	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	ZINC	MD1	105.0	%REC				1	D1G270304-004D	1219475
STLDEN	10498	7/24/01	01D1138	01D1138-001.004	ZINC	MS1	106.0	%REC				1	D1G270304-004S	1219475
ACCU	31001	7/31/02	01D1153	01D1153-002.005	ALUMINUM	MS1	90.0	%REC			1.2		01-A15115S	176608240
ACCU	31001	7/31/02	01D1153	01D1153-002.005	ANTIMONY	MS1	119.0	%REC			0.34		01-A15115S	1766082401
ACCU	31001	7/31/02	01D1153	01D1153-002.005	ARSENIC	MS1	111.0	%REC			0.32		01-A15115S	1766082401

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

627
697

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	31001	7/31/02	01D1153	01D1153-002.005	BARIUM	MS1	99.0	%REC			0.25		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	BERYLLIUM	MS1	95.0	%REC			0.054		01-A15115S	1766082401
ACCU	31001	7/31/02	01D1153	01D1153-002.005	CADMIUM	MS1	104.0	%REC			0.016		01-A15115S	1766082401
ACCU	31001	7/31/02	01D1153	01D1153-002.005	CALCIUM	MS1	116.0	%REC			3.2		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	CHROMIUM	MS1	106.0	%REC			0.3		01-A15115S	1766082401
ACCU	31001	7/31/02	01D1153	01D1153-002.005	COBALT	MS1	96.0	%REC			0.43		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	COPPER	MS1	94.0	%REC			0.92		01-A15115S	1766082401
ACCU	31001	7/31/02	01D1153	01D1153-002.005	IRON	MS1	90.0	%REC			16		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	LEAD	MS1	112.0	%REC			0.29		01-A15115S	1766082401
ACCU	31001	7/31/02	01D1153	01D1153-002.005	LITHIUM	MS1	93.0	%REC			2.2		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	MAGNESIUM	MS1	98.0	%REC			25		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	MANGANESE	MS1	90.0	%REC			0.69		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	MERCURY	MS1	95.0	%REC			0.02		01-A15115S	1163082001
ACCU	31001	7/31/02	01D1153	01D1153-002.005	MOLYBDENUM	MS1	100.0	%REC			4		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	NICKEL	MS1	99.0	%REC			1		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	POTASSIUM	MS1	95.0	%REC			48		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	SELENIUM	MS1	113.0	%REC			0.33		01-A15115S	1766082401
ACCU	31001	7/31/02	01D1153	01D1153-002.005	SILVER	MS1	97.0	%REC			0.005		01-A15115S	1766082401
ACCU	31001	7/31/02	01D1153	01D1153-002.005	SODIUM	MS1	95.0	%REC			27		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	STRONTIUM	MS1	98.0	%REC			0.25		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	THALLIUM	MS1	91.0	%REC			0.05		01-A15115S	1766082401
ACCU	31001	7/31/02	01D1153	01D1153-002.005	TIN	MS1	106.0	%REC			6.9		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	URANIUM, TOTAL	MS1	102.0	%REC			0.005		01-A15115S	1718082101
ACCU	31001	7/31/02	01D1153	01D1153-002.005	VANADIUM	MS1	83.0	%REC			0.88		01-A15115S	1766082401
ACCU	31001	7/31/02	01D1153	01D1153-002.005	ZINC	MS1	102.0	%REC			1		01-A15115S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	ALUMINUM	MS1	90.0	%REC			1.2		01-A14997S	1766082401
ACCU	10692	7/27/02	01D1169	01D1169-001.002	ANTIMONY	MS1	119.0	%REC			0.34		01-A14997S	1766082401
ACCU	10692	7/27/02	01D1169	01D1169-001.002	ARSENIC	MS1	111.0	%REC			0.32		01-A14997S	1766082401
ACCU	10692	7/27/02	01D1169	01D1169-001.002	BARIUM	MS1	103.0	%REC			0.25		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	BERYLLIUM	MS1	95.0	%REC			0.054		01-A14997S	1766082401
ACCU	10692	7/27/02	01D1169	01D1169-001.002	CADMIUM	MS1	104.0	%REC			0.016		01-A14997S	1766082401
ACCU	10692	7/27/02	01D1169	01D1169-001.002	CALCIUM	MS1	120.0	%REC			3.2		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	CHROMIUM	MS1	106.0	%REC			0.3		01-A14997S	1766082401
ACCU	10692	7/27/02	01D1169	01D1169-001.002	COBALT	MS1	96.0	%REC			0.43		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	COPPER	MS1	94.0	%REC			0.92		01-A14997S	1766082401
[redacted]	10692	7/27/02	01D1169	01D1169-001.002	IRON	MS1	94.0	%REC			16		01-A14997S	1718082101
[redacted]	10692	7/27/02	01D1169	01D1169-001.002	LEAD	MS1	103.0	%REC			0.29		01-A14997S	1766082401
[redacted]	10692	7/27/02	01D1169	01D1169-001.002	LITHIUM	MS1	89.0	%REC			2.2		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	MAGNESIUM	MS1	95.0	%REC			25		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	MANGANESE	MS1	94.0	%REC			0.69		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-014.004	MERCURY	MS1	95.0	%REC			0.02		01-A14997S	1163082001
ACCU	10692	7/27/02	01D1169	01D1169-001.002	MOLYBDENUM	MS1	104.0	%REC			4		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	NICKEL	MS1	96.0	%REC			10		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	POTASSIUM	MS1	95.0	%REC			48		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	SELENIUM	MS1	113.0	%REC			0.33		01-A14997S	1766082401
ACCU	10692	7/27/02	01D1169	01D1169-001.002	SILVER	MS1	97.0	%REC			0.005		01-A14997S	1766082401
ACCU	10692	7/27/02	01D1169	01D1169-001.002	SODIUM	MS1	120.0	%REC			27		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	STRONTIUM	MS1	95.0	%REC			0.25		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	THALLIUM	MS1	91.0	%REC			0.05		01-A14997S	1766082401
ACCU	10692	7/27/02	01D1169	01D1169-001.002	TIN	MS1	108.0	%REC			6.9		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	URANIUM, TOTAL	MS1	108.0	%REC			0.005		01-A14997S	1718082101
ACCU	10692	7/27/02	01D1169	01D1169-001.002	VANADIUM	MS1	83.0	%REC			0.88		01-A14997S	1766082401
ACCU	10692	7/27/02	01D1169	01D1169-001.002	ZINC	MS1	101.0	%REC			1		01-A14997S	1718082101
ACCU	5686	8/8/01	01D1211	01D1211-005.002	ALUMINUM	MD1	71.2	%REC				1	G01080068-04AMSD	474
ACCU	03991	8/7/01	01D1211	01D1211-002.004	ALUMINUM	MS1	85.1	%REC				2	G01080068-01AMS	R702
ACCU	5686	8/8/01	01D1211	01D1211-005.002	ALUMINUM	MS1	41.5	%REC				1	G01080068-04AMS	474
ACCU	37201	8/10/01	01D1211	01D1234-001.004	ALUMINUM	MS1	67.0	%REC		N		2	G01080096-01AMS	R702
ACCU	5686	8/8/01	01D1211	01D1211-005.002	ANTIMONY	MD1	88.4	%REC				1	G01080068-04AMSD	474
ACCU	03991	8/7/01	01D1211	01D1211-002.004	ANTIMONY	MS1	102.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1211	01D1234-001.004	ANTIMONY	MS1	99.5	%REC				2	G01080096-01AMS	R702
ACCU	5686	8/8/01	01D1211	01D1211-005.002	ANTIMONY	MS1	88.8	%REC				1	G01080068-04AMS	474
ACCU	5686	8/8/01	01D1211	01D1211-005.002	ARSENIC	MD1	96.9	%REC				1	G01080068-04AMSD	474
ACCU	03991	8/7/01	01D1211	01D1211-002.004	ARSENIC	MS1	108.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1211	01D1234-001.004	ARSENIC	MS1	104.0	%REC				2	G01080096-01AMS	R702
ACCU	5686	8/8/01	01D1211	01D1211-005.002	ARSENIC	MS1	95.9	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1211	01D1211-001.004	BARIUM	MD1	97.5	%REC				1	G01080008-01AMSD	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	BARIUM	MS1	107.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	BARIUM	MS1	107.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1211	01D1311-010.004	BARIUM	MS1	104.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1211	01D1211-001.004	BARIUM	MS1	97.5	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1211	01D1211-005.002	BERYLLIUM	MD1	89.7	%REC				1	G01080068-04AMSD	474
[redacted]	37201	8/10/01	01D1211	01D1234-001.004	BERYLLIUM	MS1	97.1	%REC				2	G01080096-01AMS	R702
[redacted]	03991	8/7/01	01D1211	01D1211-002.004	BERYLLIUM	MS1	94.8	%REC				2	G01080068-01AMS	R702
[redacted]	5686	8/8/01	01D1211	01D1211-005.002	BERYLLIUM	MS1	90.0	%REC				1	G01080068-04AMS	474
ACCU	5686	8/8/01	01D1211	01D1211-005.002	CADMIUM	MD1	98.8	%REC				1	G01080068-04AMSD	474

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Ba
ACCU	03991	8/7/01	01D1211	01D1211-002.004	CADMIUM	MS1	102.0	%REC				2	G01080068-01AMS	R702
ACCU	5686	8/8/01	01D1211	01D1211-005.002	CADMIUM	MS1	99.2	%REC				1	G01080068-04AMS	474
ACCU	37201	8/10/01	01D1211	01D1234-001.004	CADMIUM	MS1	97.3	%REC				2	G01080096-01AMS	R702
ACCU	0386	8/2/01	01D1211	01D1211-001.004	CALCIUM	MD1	118.0	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1211	01D1211-001.004	CALCIUM	MS1	126.0	%REC				1	G01080008-01AMS	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	CALCIUM	MS1	108.0	%REC				1	G01080068-10AMS	R468
ACCU	04591	8/21/01	01D1211	01D1311-010.004	CALCIUM	MS1	95.0	%REC				1	G01080324-01AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	CALCIUM	MS1	79.4	%REC				1	G01080096-01AMS	R490
ACCU	5686	8/8/01	01D1211	01D1211-005.002	CHROMIUM	MD1	118.0	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1211	01D1211-005.002	CHROMIUM	MS1	106.0	%REC				1	G01080068-04AMS	474
ACCU	03991	8/7/01	01D1211	01D1211-002.004	CHROMIUM	MS1	98.3	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1211	01D1234-001.004	CHROMIUM	MS1	93.2	%REC				2	G01080096-01AMS	R702
ACCU	0386	8/2/01	01D1211	01D1211-001.004	COBALT	MD1	95.2	%REC				1	G01080008-01AMSD	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	COBALT	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	COBALT	MS1	102.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1211	01D1311-010.004	COBALT	MS1	100.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1211	01D1211-001.004	COBALT	MS1	95.7	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1211	01D1211-005.002	COPPER	MD1	87.3	%REC				1	G01080068-04AMSD	474
ACCU	03991	8/7/01	01D1211	01D1211-002.004	COPPER	MS1	93.8	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1211	01D1234-001.004	COPPER	MS1	89.3	%REC				2	G01080096-01AMS	R702
ACCU	5686	8/8/01	01D1211	01D1211-005.002	COPPER	MS1	88.5	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1211	01D1211-001.004	IRON	MD1	94.5	%REC				1	G01080008-01AMSD	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	IRON	MS1	99.8	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	IRON	MS1	99.1	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1211	01D1311-010.004	IRON	MS1	96.4	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1211	01D1211-001.004	IRON	MS1	94.3	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1211	01D1211-005.002	LEAD	MD1	100.0	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1211	01D1211-005.002	LEAD	MS1	101.0	%REC				1	G01080068-04AMS	474
ACCU	03991	8/7/01	01D1211	01D1211-002.004	LEAD	MS1	100.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1211	01D1234-001.004	LEAD	MS1	92.5	%REC				2	G01080096-01AMS	R702
ACCU	0386	8/2/01	01D1211	01D1211-001.004	LITHIUM	MD1	101.0	%REC				1	G01080008-01AMSD	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	LITHIUM	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	LITHIUM	MS1	101.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1211	01D1311-010.004	LITHIUM	MS1	98.2	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1211	01D1211-001.004	LITHIUM	MS1	97.9	%REC				1	G01080008-01AMS	473
ACCU	0386	8/2/01	01D1211	01D1211-001.004	MAGNESIUM	MD1	97.2	%REC				1	G01080008-01AMSD	473
ACCU	04591	8/21/01	01D1211	01D1311-010.004	MAGNESIUM	MS1	104.0	%REC				1	G01080324-01AMS	R468
ACCU	4787	8/8/01	01D1211	01D1211-016.001	MAGNESIUM	MS1	101.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	MAGNESIUM	MS1	99.1	%REC				1	G01080096-01AMS	R490
ACCU	0386	8/2/01	01D1211	01D1211-001.004	MAGNESIUM	MS1	97.2	%REC				1	G01080008-01AMS	473
ACCU	0386	8/2/01	01D1211	01D1211-001.004	MANGANESE	MD1	98.9	%REC				1	G01080008-01AMSD	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	MANGANESE	MS1	103.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	MANGANESE	MS1	103.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1211	01D1311-010.004	MANGANESE	MS1	101.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1211	01D1211-001.004	MANGANESE	MS1	99.0	%REC				1	G01080008-01AMS	473
ACCU	05391	8/16/01	01D1211	01D1311-006.004	MERCURY	MD1	93.8	%REC				1	G01080229-01AMSD	481
ACCU	5686	8/8/01	01D1211	01D1211-005.002	MERCURY	MD1	88.2	%REC				1	G01080068-04AMSD	496
ACCU	03991	8/7/01	01D1211	01D1211-002.004	MERCURY	MD1	85.1	%REC				1	G01080068-01AMSD	481
ACCU	5686	8/8/01	01D1211	01D1211-005.002	MERCURY	MS1	103.0	%REC				1	G01080068-04AMS	496
ACCU	05391	8/16/01	01D1211	01D1311-006.004	MERCURY	MS1	94.4	%REC				1	G01080229-01AMS	481
ACCU	03991	8/7/01	01D1211	01D1211-002.004	MERCURY	MS1	78.8	%REC				1	G01080068-01AMS	481
ACCU	0386	8/2/01	01D1211	01D1211-001.004	MOLYBDENUM	MD1	103.0	%REC				1	G01080008-01AMSD	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	MOLYBDENUM	MS1	106.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	MOLYBDENUM	MS1	104.0	%REC				1	G01080096-01AMS	R490
ACCU	0386	8/2/01	01D1211	01D1211-001.004	MOLYBDENUM	MS1	103.0	%REC				1	G01080008-01AMS	473
ACCU	04591	8/21/01	01D1211	01D1311-010.004	MOLYBDENUM	MS1	103.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1211	01D1211-001.004	NICKEL	MD1	96.8	%REC				1	G01080008-01AMSD	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	NICKEL	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	NICKEL	MS1	101.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1211	01D1311-010.004	NICKEL	MS1	101.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1211	01D1211-001.004	NICKEL	MS1	96.9	%REC				1	G01080008-01AMS	473
ACCU	0386	8/2/01	01D1211	01D1211-001.004	POTASSIUM	MD1	101.0	%REC				1	G01080008-01AMSD	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	POTASSIUM	MS1	107.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	POTASSIUM	MS1	107.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1211	01D1311-010.004	POTASSIUM	MS1	104.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1211	01D1211-001.004	POTASSIUM	MS1	98.6	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1211	01D1211-005.002	SELENIUM	MD1	90.9	%REC				1	G01080068-04AMSD	474
ACCU	03991	8/7/01	01D1211	01D1211-002.004	SELENIUM	MS1	115.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1211	01D1234-001.004	SELENIUM	MS1	112.0	%REC				2	G01080096-01AMS	R702
ACCU	5686	8/8/01	01D1211	01D1211-005.002	SELENIUM	MS1	90.1	%REC				1	G01080068-04AMS	474
ACCU	5686	8/8/01	01D1211	01D1211-005.002	SILVER	MD1	97.6	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1211	01D1211-005.002	SILVER	MS1	97.8	%REC				1	G01080068-04AMS	474
ACCU	03991	8/7/01	01D1211	01D1211-002.004	SILVER	MS1	84.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1211	01D1234-001.004	SILVER	MS1	81.8	%REC				2	G01080096-01AMS	R702
ACCU	0386	8/2/01	01D1211	01D1211-001.004	SODIUM	MD1	105.0	%REC				1	G01080008-01AMSD	473

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	0386	8/2/01	01D1211	01D1211-001.004	SODIUM	MS1	106.0	%REC				1	G01080008-01AMS	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	SODIUM	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	04591	8/21/01	01D1211	01D1311-010.004	SODIUM	MS1	88.0	%REC				1	G01080324-01AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	SODIUM	MS1	57.7	%REC				1	G01080096-01AMS	R490
ACCU	0386	8/2/01	01D1211	01D1211-001.004	STRONTIUM	MD1	101.0	%REC				1	G01080008-01AMSD	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	STRONTIUM	MS1	106.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	STRONTIUM	MS1	106.0	%REC				1	G01080096-01AMS	R490
ACCU	0386	8/2/01	01D1211	01D1211-001.004	STRONTIUM	MS1	101.0	%REC				1	G01080008-01AMS	473
ACCU	04591	8/21/01	01D1211	01D1311-010.004	STRONTIUM	MS1	101.0	%REC				1	G01080324-01AMS	R468
ACCU	5686	8/8/01	01D1211	01D1211-005.002	THALLIUM	MD1	88.8	%REC				1	G01080068-04AMSD	474
ACCU	03991	8/7/01	01D1211	01D1211-002.004	THALLIUM	MS1	101.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1211	01D1234-001.004	THALLIUM	MS1	93.3	%REC				2	G01080096-01AMS	R702
ACCU	5686	8/8/01	01D1211	01D1211-005.002	THALLIUM	MS1	87.0	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1211	01D1211-001.004	TIN	MD1	104.0	%REC				1	G01080008-01AMSD	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	TIN	MS1	110.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	TIN	MS1	107.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1211	01D1311-010.004	TIN	MS1	107.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1211	01D1211-001.004	TIN	MS1	104.0	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1211	01D1211-005.002	URANIUM, TOTAL	MD1	103.0	%REC				1	G01080068-04AMSD	474
ACCU	03991	8/7/01	01D1211	01D1211-002.004	URANIUM, TOTAL	MS1	104.0	%REC				1	G01080068-01AMS	R774
ACCU	5686	8/8/01	01D1211	01D1211-005.002	URANIUM, TOTAL	MS1	103.0	%REC				1	G01080068-04AMS	474
ACCU	37201	8/10/01	01D1211	01D1234-001.004	URANIUM, TOTAL	MS1	101.0	%REC				1	G01080096-01AMS	R774
ACCU	5686	8/8/01	01D1211	01D1211-005.002	VANADIUM	MD1	104.0	%REC				10	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1211	01D1211-005.002	VANADIUM	MS1	97.6	%REC				10	G01080068-04AMS	474
ACCU	03991	8/7/01	01D1211	01D1211-002.004	VANADIUM	MS1	89.8	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1211	01D1234-001.004	VANADIUM	MS1	88.3	%REC				2	G01080096-01AMS	R702
ACCU	0386	8/2/01	01D1211	01D1211-001.004	ZINC	MD1	99.4	%REC				1	G01080008-01AMSD	473
ACCU	4787	8/8/01	01D1211	01D1211-016.001	ZINC	MS1	110.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1211	01D1234-001.004	ZINC	MS1	110.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1211	01D1311-010.004	ZINC	MS1	108.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1211	01D1211-001.004	ZINC	MS1	99.8	%REC				1	G01080008-01AMS	473
ACCU	03991	8/7/01	01D1234	01D1211-002.004	ALUMINUM	MS1	85.1	%REC				2	G01080068-01AMS	R702
ACCU	23096	8/14/01	01D1234	01D1234-016.007	ALUMINUM	MS1	79.1	%REC				1	G01080210-12AMS	M092101DA
ACCU	05691	8/24/01	01D1234	01D1311-001.004	ALUMINUM	MS1	78.5	%REC				1	G01080346-01AMS	M092601A
ACCU	37201	8/10/01	01D1234	01D1234-001.004	ALUMINUM	MS1	67.0	%REC		N		2	G01080096-01AMS	R702
[redacted]	40099	8/13/01	01D1234	01D1234-005.004	ALUMINUM	MS1	72.4	%REC				1	G01080210-01AMS	M091901D
[redacted]	10994	8/14/01	01D1234	01D1234-016.007	ALUMINUM	MS1	67.7	%REC		N		1	G01080210-11AMS	M091901D
ACCU	03991	8/7/01	01D1234	01D1211-002.004	ANTIMONY	MS1	102.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1234	01D1234-001.004	ANTIMONY	MS1	99.5	%REC				2	G01080096-01AMS	R702
ACCU	10994	8/14/01	01D1234	01D1234-016.007	ANTIMONY	MS1	96.2	%REC				1	G01080210-11AMS	M091901D
ACCU	40099	8/13/01	01D1234	01D1234-005.004	ANTIMONY	MS1	92.1	%REC				1	G01080210-01AMS	M091901D
ACCU	23096	8/14/01	01D1234	01D1234-016.007	ANTIMONY	MS1	90.5	%REC				1	G01080210-12AMS	M092101DA
ACCU	40099	8/13/01	01D1234	01D1234-005.004	ARSENIC	MS1	118.0	%REC				1	G01080210-01AMS	M091901D
ACCU	10994	8/14/01	01D1234	01D1234-016.007	ARSENIC	MS1	117.0	%REC				1	G01080210-11AMS	M091901D
ACCU	23096	8/14/01	01D1234	01D1234-016.007	ARSENIC	MS1	116.0	%REC				1	G01080210-12AMS	M092101DA
ACCU	03991	8/7/01	01D1234	01D1211-002.004	ARSENIC	MS1	108.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1234	01D1234-001.004	ARSENIC	MS1	104.0	%REC				2	G01080096-01AMS	R702
ACCU	05091	8/14/01	01D1234	01D1234-010.004	BARIUM	MS1	108.0	%REC				1	G01080210-06AMS	468B
ACCU	4787	8/8/01	01D1234	01D1211-016.001	BARIUM	MS1	107.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1234	01D1234-001.004	BARIUM	MS1	107.0	%REC				1	G01080096-01AMS	R490
ACCU	05391	8/16/01	01D1234	01D1311-006.004	BARIUM	MS1	107.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1234	01D1311-010.004	BARIUM	MS1	104.0	%REC				1	G01080324-01AMS	R468
ACCU	40099	8/13/01	01D1234	01D1234-005.004	BERYLLIUM	MS1	99.3	%REC				1	G01080210-01AMS	M091901D
ACCU	37201	8/10/01	01D1234	01D1234-001.004	BERYLLIUM	MS1	97.1	%REC				2	G01080096-01AMS	R702
ACCU	03991	8/7/01	01D1234	01D1211-002.004	BERYLLIUM	MS1	94.8	%REC				2	G01080068-01AMS	R702
ACCU	23096	8/14/01	01D1234	01D1234-016.007	BERYLLIUM	MS1	91.1	%REC				1	G01080210-12AMS	M092101DA
ACCU	10994	8/14/01	01D1234	01D1234-016.007	BERYLLIUM	MS1	67.8	%REC		N		1	G01080210-11AMS	M091901D
ACCU	10994	8/14/01	01D1234	01D1234-016.007	CADMIUM	MS1	110.0	%REC				1	G01080210-11AMS	M091901D
ACCU	40099	8/13/01	01D1234	01D1234-005.004	CADMIUM	MS1	108.0	%REC				1	G01080210-01AMS	M091901D
ACCU	03991	8/7/01	01D1234	01D1211-002.004	CADMIUM	MS1	102.0	%REC				2	G01080068-01AMS	R702
ACCU	23096	8/14/01	01D1234	01D1234-016.007	CADMIUM	MS1	101.0	%REC				1	G01080210-12AMS	M092101DA
ACCU	37201	8/10/01	01D1234	01D1234-001.004	CADMIUM	MS1	97.3	%REC				2	G01080096-01AMS	R702
ACCU	4787	8/8/01	01D1234	01D1211-016.001	CALCIUM	MS1	108.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1234	01D1234-010.004	CALCIUM	MS1	99.0	%REC				1	G01080210-06AMS	468B
ACCU	04591	8/21/01	01D1234	01D1311-010.004	CALCIUM	MS1	95.0	%REC				1	G01080324-01AMS	R468
ACCU	37201	8/10/01	01D1234	01D1234-001.004	CALCIUM	MS1	79.4	%REC				1	G01080096-01AMS	R490
ACCU	05391	8/16/01	01D1234	01D1311-006.004	CALCIUM	MS1	52.6	%REC				1	G01080229-01AMS	468B
ACCU	03991	8/7/01	01D1234	01D1211-002.004	CHROMIUM	MS1	98.3	%REC				2	G01080068-01AMS	R702
ACCU	23096	8/14/01	01D1234	01D1234-016.007	CHROMIUM	MS1	98.1	%REC				1	G01080210-12AMS	M092101DA
ACCU	10994	8/14/01	01D1234	01D1234-016.007	CHROMIUM	MS1	97.9	%REC				1	G01080210-11AMS	M091901D
ACCU	40099	8/13/01	01D1234	01D1234-005.004	CHROMIUM	MS1	96.9	%REC				1	G01080210-01AMS	M091901D
[redacted]	37201	8/10/01	01D1234	01D1234-001.004	CHROMIUM	MS1	93.2	%REC				2	G01080096-01AMS	R702
[redacted]	4787	8/8/01	01D1234	01D1211-016.001	COBALT	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1234	01D1234-001.004	COBALT	MS1	102.0	%REC				1	G01080096-01AMS	R490
ACCU	05091	8/14/01	01D1234	01D1234-010.004	COBALT	MS1	101.0	%REC				1	G01080210-06AMS	468B

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples

Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Bat
ACCU	05391	8/16/01	01D1234	01D1311-006.004	COBALT	MS1	101.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1234	01D1311-010.004	COBALT	MS1	100.0	%REC				1	G01080324-01AMS	R468
ACCU	10994	8/14/01	01D1234	01D1234-016.007	COPPER	MS1	94.7	%REC				1	G01080210-11AMS	M091901D
ACCU	03991	8/7/01	01D1234	01D1211-002.004	COPPER	MS1	93.8	%REC				2	G01080068-01AMS	R702
ACCU	40099	8/13/01	01D1234	01D1234-005.004	COPPER	MS1	93.3	%REC				1	G01080210-01AMS	M091901D
ACCU	23096	8/14/01	01D1234	01D1234-016.007	COPPER	MS1	89.7	%REC				1	G01080210-12AMS	M092101DA
ACCU	37201	8/10/01	01D1234	01D1234-001.004	COPPER	MS1	89.3	%REC				2	G01080096-01AMS	R702
ACCU	4787	8/8/01	01D1234	01D1211-016.001	IRON	MS1	99.8	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1234	01D1234-001.004	IRON	MS1	99.1	%REC				1	G01080096-01AMS	R490
ACCU	05391	8/16/01	01D1234	01D1311-006.004	IRON	MS1	98.8	%REC				1	G01080229-01AMS	468B
ACCU	05091	8/14/01	01D1234	01D1234-010.004	IRON	MS1	98.0	%REC				1	G01080210-06AMS	468B
ACCU	04591	8/21/01	01D1234	01D1311-010.004	IRON	MS1	96.4	%REC				1	G01080324-01AMS	R468
ACCU	03991	8/7/01	01D1234	01D1211-002.004	LEAD	MS1	100.0	%REC				2	G01080068-01AMS	R702
ACCU	10994	8/14/01	01D1234	01D1234-016.007	LEAD	MS1	100.0	%REC				1	G01080210-11AMS	M091901D
ACCU	40099	8/13/01	01D1234	01D1234-005.004	LEAD	MS1	99.6	%REC				1	G01080210-01AMS	M091901D
ACCU	37201	8/10/01	01D1234	01D1234-001.004	LEAD	MS1	92.5	%REC				2	G01080096-01AMS	R702
ACCU	23096	8/14/01	01D1234	01D1234-016.007	LEAD	MS1	90.6	%REC				1	G01080210-12AMS	M092101DA
ACCU	05391	8/16/01	01D1234	01D1311-006.004	LITHIUM	MS1	104.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1234	01D1211-016.001	LITHIUM	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1234	01D1234-010.004	LITHIUM	MS1	102.0	%REC				1	G01080210-06AMS	468B
ACCU	37201	8/10/01	01D1234	01D1234-001.004	LITHIUM	MS1	101.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1234	01D1311-010.004	LITHIUM	MS1	98.2	%REC				1	G01080324-01AMS	R468
ACCU	05091	8/14/01	01D1234	01D1234-010.004	MAGNESIUM	MS1	106.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1234	01D1311-006.004	MAGNESIUM	MS1	104.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1234	01D1311-010.004	MAGNESIUM	MS1	104.0	%REC				1	G01080324-01AMS	R468
ACCU	4787	8/8/01	01D1234	01D1211-016.001	MAGNESIUM	MS1	101.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1234	01D1234-001.004	MAGNESIUM	MS1	99.1	%REC				1	G01080096-01AMS	R490
ACCU	05091	8/14/01	01D1234	01D1234-010.004	MANGANESE	MS1	104.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1234	01D1311-006.004	MANGANESE	MS1	104.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1234	01D1211-016.001	MANGANESE	MS1	103.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1234	01D1234-001.004	MANGANESE	MS1	103.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1234	01D1311-010.004	MANGANESE	MS1	101.0	%REC				1	G01080324-01AMS	R468
ACCU	37201	8/10/01	01D1234	01D1234-001.004	MERCURY	MD1	93.1	%REC				1	G01080096-01AMSD	522
ACCU	40099	8/13/01	01D1234	01D1234-005.004	MERCURY	MD1	79.5	%REC				1	G01080210-01AMSD	482
ACCU	10994	8/14/01	01D1234	01D1234-016.007	MERCURY	MD1	70.3	%REC				1	G01080210-11AMSD	482
ACCU	37201	8/10/01	01D1234	01D1234-001.004	MERCURY	MS1	90.0	%REC				1	G01080096-01AMS	522
ACCU	40099	8/13/01	01D1234	01D1234-005.004	MERCURY	MS1	82.7	%REC				1	G01080210-01AMS	482
ACCU	10994	8/14/01	01D1234	01D1234-016.007	MERCURY	MS1	70.1	%REC				1	G01080210-11AMS	482
ACCU	4787	8/8/01	01D1234	01D1211-016.001	MOLYBDENUM	MS1	106.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1234	01D1234-010.004	MOLYBDENUM	MS1	106.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1234	01D1311-006.004	MOLYBDENUM	MS1	106.0	%REC				1	G01080229-01AMS	468B
ACCU	37201	8/10/01	01D1234	01D1234-001.004	MOLYBDENUM	MS1	104.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1234	01D1311-010.004	MOLYBDENUM	MS1	103.0	%REC				1	G01080324-01AMS	R468
ACCU	4787	8/8/01	01D1234	01D1211-016.001	NICKEL	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1234	01D1234-010.004	NICKEL	MS1	102.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1234	01D1311-006.004	NICKEL	MS1	102.0	%REC				1	G01080229-01AMS	468B
ACCU	37201	8/10/01	01D1234	01D1234-001.004	NICKEL	MS1	101.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1234	01D1311-010.004	NICKEL	MS1	101.0	%REC				1	G01080324-01AMS	R468
ACCU	05391	8/16/01	01D1234	01D1311-006.004	POTASSIUM	MS1	110.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1234	01D1211-016.001	POTASSIUM	MS1	107.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1234	01D1234-001.004	POTASSIUM	MS1	107.0	%REC				1	G01080096-01AMS	R490
ACCU	05091	8/14/01	01D1234	01D1234-010.004	POTASSIUM	MS1	107.0	%REC				1	G01080210-06AMS	468B
ACCU	04591	8/21/01	01D1234	01D1311-010.004	POTASSIUM	MS1	104.0	%REC				1	G01080324-01AMS	R468
ACCU	40099	8/13/01	01D1234	01D1234-005.004	SELENIUM	MS1	137.0	%REC		N		1	G01080210-01AMS	M091901D
ACCU	23096	8/14/01	01D1234	01D1234-016.007	SELENIUM	MS1	132.0	%REC		N		1	G01080210-12AMS	M092101DA
ACCU	10994	8/14/01	01D1234	01D1234-016.007	SELENIUM	MS1	129.0	%REC				1	G01080210-11AMS	M091901D
ACCU	03991	8/7/01	01D1234	01D1211-002.004	SELENIUM	MS1	115.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1234	01D1234-001.004	SELENIUM	MS1	112.0	%REC				2	G01080096-01AMS	R702
ACCU	10994	8/14/01	01D1234	01D1234-016.007	SILVER	MS1	84.3	%REC				1	G01080210-11AMS	M091901D
ACCU	03991	8/7/01	01D1234	01D1211-002.004	SILVER	MS1	84.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1234	01D1234-001.004	SILVER	MS1	81.8	%REC				2	G01080096-01AMS	R702
ACCU	23096	8/14/01	01D1234	01D1234-016.007	SILVER	MS1	81.7	%REC				1	G01080210-12AMS	M092101DA
ACCU	40099	8/13/01	01D1234	01D1234-005.004	SILVER	MS1	78.6	%REC				1	G01080210-01AMS	M091901D
ACCU	4787	8/8/01	01D1234	01D1211-016.001	SODIUM	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1234	01D1234-010.004	SODIUM	MS1	101.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1234	01D1311-006.004	SODIUM	MS1	101.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1234	01D1311-010.004	SODIUM	MS1	88.0	%REC				1	G01080324-01AMS	R468
ACCU	37201	8/10/01	01D1234	01D1234-001.004	SODIUM	MS1	57.7	%REC				1	G01080096-01AMS	R490
ACCU	4787	8/8/01	01D1234	01D1211-016.001	STRONTIUM	MS1	106.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1234	01D1234-001.004	STRONTIUM	MS1	106.0	%REC				1	G01080096-01AMS	R490
ACCU	05091	8/14/01	01D1234	01D1234-010.004	STRONTIUM	MS1	105.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1234	01D1311-006.004	STRONTIUM	MS1	102.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1234	01D1311-010.004	STRONTIUM	MS1	101.0	%REC				1	G01080324-01AMS	R468
ACCU	40099	8/13/01	01D1234	01D1234-005.004	THALLIUM	MS1	103.0	%REC				1	G01080210-01AMS	M091901D
ACCU	10994	8/14/01	01D1234	01D1234-016.007	THALLIUM	MS1	103.0	%REC				1	G01080210-11AMS	M091901D

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples

Groundwater - Calendar Year 2001

9/23/02

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]CU	03991	8/7/01	01D1234	01D1211-002.004	THALLIUM	MS1	101.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1234	01D1234-001.004	THALLIUM	MS1	93.3	%REC				2	G01080096-01AMS	R702
ACCU	23096	8/14/01	01D1234	01D1234-016.007	THALLIUM	MS1	92.7	%REC				1	G01080210-12AMS	M092101DA
ACCU	05091	8/14/01	01D1234	01D1234-010.004	TIN	MS1	111.0	%REC				1	G01080210-06AMS	468B
ACCU	4787	8/8/01	01D1234	01D1211-016.001	TIN	MS1	110.0	%REC				1	G01080068-10AMS	R468
ACCU	05391	8/16/01	01D1234	01D1311-006.004	TIN	MS1	110.0	%REC				1	G01080229-01AMS	468B
ACCU	37201	8/10/01	01D1234	01D1234-001.004	TIN	MS1	107.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1234	01D1311-010.004	TIN	MS1	107.0	%REC				1	G01080324-01AMS	R468
ACCU	40099	8/13/01	01D1234	01D1234-005.004	URANIUM, TOTAL	MS1	108.0	%REC				1	G01080210-01AMS	M091901D
ACCU	10994	8/14/01	01D1234	01D1234-016.007	URANIUM, TOTAL	MS1	105.0	%REC				1	G01080210-11AMS	M091901D
ACCU	03991	8/7/01	01D1234	01D1211-002.004	URANIUM, TOTAL	MS1	104.0	%REC				1	G01080068-01AMS	R774
ACCU	37201	8/10/01	01D1234	01D1234-001.004	URANIUM, TOTAL	MS1	101.0	%REC				1	G01080096-01AMS	R774
ACCU	23096	8/14/01	01D1234	01D1234-016.007	URANIUM, TOTAL	MS1	93.4	%REC				1	G01080210-12AMS	M092101DA
ACCU	05391	8/16/01	01D1234	01D1311-006.004	VANADIUM	MS1	114.0	%REC				1	G01080229-01AMS	468B
ACCU	05091	8/14/01	01D1234	01D1234-010.004	VANADIUM	MS1	112.0	%REC				1	G01080210-06AMS	468B
ACCU	4787	8/8/01	01D1234	01D1211-016.001	VANADIUM	MS1	111.0	%REC				1	G01080068-10AMS	R468
ACCU	04591	8/21/01	01D1234	01D1311-010.004	VANADIUM	MS1	109.0	%REC				1	G01080324-01AMS	R468
ACCU	37701	8/14/01	01D1234	01D1234-018.004	VANADIUM	MS1	92.1	%REC				5	G01080210-13AMS	092201A
ACCU	03991	8/7/01	01D1234	01D1211-002.004	VANADIUM	MS1	89.8	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1234	01D1234-001.004	VANADIUM	MS1	88.3	%REC				2	G01080096-01AMS	R702
ACCU	23096	8/14/01	01D1234	01D1234-016.007	VANADIUM	MS1	77.9	%REC				1	G01080210-12AMS	M092101DA
ACCU	40099	8/13/01	01D1234	01D1234-005.004	VANADIUM	MS1	74.4	%REC				1	G01080210-01AMS	M091901D
ACCU	10994	8/14/01	01D1234	01D1234-016.007	VANADIUM	MS1	71.7	%REC				1	G01080210-11AMS	M091901D
ACCU	05091	8/14/01	01D1234	01D1234-010.004	ZINC	MS1	111.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1234	01D1311-006.004	ZINC	MS1	111.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1234	01D1211-016.001	ZINC	MS1	110.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1234	01D1234-001.004	ZINC	MS1	110.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1234	01D1311-010.004	ZINC	MS1	108.0	%REC				1	G01080324-01AMS	R468
ACCU	5686	8/8/01	01D1289	01D1211-005.002	ALUMINUM	MD1	71.2	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	ALUMINUM	MS1	41.5	%REC				1	G01080068-04AMS	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	ANTIMONY	MD1	88.4	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	ANTIMONY	MS1	88.8	%REC				1	G01080068-04AMS	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	ARSENIC	MD1	96.9	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	ARSENIC	MS1	95.9	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1289	01D1211-001.004	BARIUM	MD1	97.5	%REC				1	G01080008-01AMSD	473
[redacted]CU	0386	8/2/01	01D1289	01D1211-001.004	BARIUM	MS1	97.5	%REC				1	G01080008-01AMS	473
[redacted]CU	5686	8/8/01	01D1289	01D1211-005.002	BERYLLIUM	MD1	89.7	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	BERYLLIUM	MS1	90.0	%REC				1	G01080068-04AMS	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	CADMIUM	MD1	98.8	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	CADMIUM	MS1	99.2	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1289	01D1211-001.004	CALCIUM	MD1	118.0	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	CALCIUM	MS1	126.0	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1289	01D1211-005.002	CHROMIUM	MD1	118.0	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	CHROMIUM	MS1	106.0	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1289	01D1211-001.004	COBALT	MD1	95.2	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	COBALT	MS1	95.7	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1289	01D1211-005.002	COPPER	MD1	87.3	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	COPPER	MS1	88.5	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1289	01D1211-001.004	IRON	MD1	94.5	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	IRON	MS1	94.3	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1289	01D1211-005.002	LEAD	MD1	100.0	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	LEAD	MS1	101.0	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1289	01D1211-001.004	LITHIUM	MD1	101.0	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	LITHIUM	MS1	97.9	%REC				1	G01080008-01AMS	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	MAGNESIUM	MD1	97.2	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	MAGNESIUM	MS1	97.2	%REC				1	G01080008-01AMS	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	MANGANESE	MD1	98.9	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	MANGANESE	MS1	99.0	%REC				1	G01080008-01AMS	473
ACCU	63093	8/14/01	01D1289	01D1289-002.003	MERCURY	MD1	94.5	%REC				1	G01080211-02AMSD	630
ACCU	63093	8/14/01	01D1289	01D1289-002.003	MERCURY	MS1	98.1	%REC				1	G01080211-02AMS	630
ACCU	0386	8/2/01	01D1289	01D1211-001.004	MOLYBDENUM	MD1	103.0	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	MOLYBDENUM	MS1	103.0	%REC				1	G01080008-01AMS	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	NICKEL	MD1	96.8	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	NICKEL	MS1	96.9	%REC				1	G01080008-01AMS	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	POTASSIUM	MD1	101.0	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	POTASSIUM	MS1	98.6	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1289	01D1211-005.002	SELENIUM	MD1	90.9	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	SELENIUM	MS1	90.1	%REC				1	G01080068-04AMS	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	SILVER	MD1	97.6	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	SILVER	MS1	97.8	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1289	01D1211-001.004	SODIUM	MD1	105.0	%REC				1	G01080008-01AMSD	473
[redacted]CU	0386	8/2/01	01D1289	01D1211-001.004	SODIUM	MS1	106.0	%REC				1	G01080008-01AMS	473
[redacted]CU	0386	8/2/01	01D1289	01D1211-001.004	STRONTIUM	MD1	101.0	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	STRONTIUM	MS1	101.0	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1289	01D1211-005.002	THALLIUM	MD1	88.8	%REC				1	G01080068-04AMSD	474

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

637
702

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Ba
ACCU	5686	8/8/01	01D1289	01D1211-005.002	THALLIUM	MS1	87.0	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1289	01D1211-001.004	TIN	MD1	104.0	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	TIN	MS1	104.0	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1289	01D1211-005.002	URANIUM, TOTAL	MD1	103.0	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1289	01D1211-005.002	URANIUM, TOTAL	MS1	103.0	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1289	01D1211-001.004	VANADIUM	MD1	103.0	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	VANADIUM	MS1	103.0	%REC				1	G01080008-01AMS	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	ZINC	MD1	99.4	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1289	01D1211-001.004	ZINC	MS1	99.8	%REC				1	G01080008-01AMS	473
ACCU	05691	8/24/01	01D1311	01D1311-001.004	ALUMINUM	MS1	78.5	%REC				1	G01080346-01AMS	M092601A
ACCU	05691	8/24/01	01D1311	01D1311-001.004	ANTIMONY	MS1	92.8	%REC				1	G01080346-01AMS	M092601A
ACCU	23096	8/14/01	01D1311	01D1234-016.007	ANTIMONY	MS1	90.5	%REC				1	G01080210-12AMS	M092101DA
ACCU	05691	8/24/01	01D1311	01D1311-001.004	ARSENIC	MS1	120.0	%REC				1	G01080346-01AMS	M092601A
ACCU	23096	8/14/01	01D1311	01D1234-016.007	ARSENIC	MS1	116.0	%REC				1	G01080210-12AMS	M092101DA
ACCU	05091	8/14/01	01D1311	01D1234-010.004	BARIUM	MS1	108.0	%REC				1	G01080210-06AMS	468B
ACCU	4787	8/8/01	01D1311	01D1211-016.001	BARIUM	MS1	107.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1311	01D1234-001.004	BARIUM	MS1	107.0	%REC				1	G01080096-01AMS	R490
ACCU	05391	8/16/01	01D1311	01D1311-006.004	BARIUM	MS1	107.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1311	01D1311-010.004	BARIUM	MS1	104.0	%REC				1	G01080324-01AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	BARIUM	MS2	108.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	BARIUM	MS3	107.0	%REC				1	G01080229-01AMS	468B
ACCU	05691	8/24/01	01D1311	01D1311-001.004	BERYLLIUM	MS1	94.6	%REC				1	G01080346-01AMS	M092601A
ACCU	23096	8/14/01	01D1311	01D1234-016.007	BERYLLIUM	MS1	91.1	%REC				1	G01080210-12AMS	M092101DA
ACCU	05691	8/24/01	01D1311	01D1311-001.004	CADMIUM	MS1	104.0	%REC				1	G01080346-01AMS	M092601A
ACCU	23096	8/14/01	01D1311	01D1234-016.007	CADMIUM	MS1	101.0	%REC				1	G01080210-12AMS	M092101DA
ACCU	4787	8/8/01	01D1311	01D1211-016.001	CALCIUM	MS1	108.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	CALCIUM	MS1	99.0	%REC				1	G01080210-06AMS	468B
ACCU	04591	8/21/01	01D1311	01D1311-010.004	CALCIUM	MS1	95.0	%REC				1	G01080324-01AMS	R468
ACCU	37201	8/10/01	01D1311	01D1234-001.004	CALCIUM	MS1	79.4	%REC				1	G01080096-01AMS	R490
ACCU	05391	8/16/01	01D1311	01D1311-006.004	CALCIUM	MS1	52.6	%REC				1	G01080229-01AMS	468B
ACCU	05091	8/14/01	01D1311	01D1234-010.004	CALCIUM	MS2	99.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	CALCIUM	MS3	52.6	%REC				1	G01080229-01AMS	468B
ACCU	23096	8/14/01	01D1311	01D1234-016.007	CHROMIUM	MS1	98.1	%REC				1	G01080210-12AMS	M092101DA
ACCU	05691	8/24/01	01D1311	01D1311-001.004	CHROMIUM	MS1	88.8	%REC				1	G01080346-01AMS	M092601A
ACCU	4787	8/8/01	01D1311	01D1211-016.001	COBALT	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1311	01D1234-001.004	COBALT	MS1	102.0	%REC				1	G01080096-01AMS	R490
ACCU	05091	8/14/01	01D1311	01D1234-010.004	COBALT	MS1	101.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	COBALT	MS1	101.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1311	01D1311-010.004	COBALT	MS1	100.0	%REC				1	G01080324-01AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	COBALT	MS2	101.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	COBALT	MS3	101.0	%REC				1	G01080229-01AMS	468B
ACCU	23096	8/14/01	01D1311	01D1234-016.007	COPPER	MS1	89.7	%REC				1	G01080210-12AMS	M092101DA
ACCU	05691	8/24/01	01D1311	01D1311-001.004	COPPER	MS1	84.6	%REC				1	G01080346-01AMS	M092601A
ACCU	4787	8/8/01	01D1311	01D1211-016.001	IRON	MS1	99.8	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1311	01D1234-001.004	IRON	MS1	99.1	%REC				1	G01080096-01AMS	R490
ACCU	05391	8/16/01	01D1311	01D1311-006.004	IRON	MS1	98.8	%REC				1	G01080229-01AMS	468B
ACCU	05091	8/14/01	01D1311	01D1234-010.004	IRON	MS1	98.0	%REC				1	G01080210-06AMS	468B
ACCU	04591	8/21/01	01D1311	01D1311-010.004	IRON	MS1	96.4	%REC				1	G01080324-01AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	IRON	MS2	98.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	IRON	MS3	98.8	%REC				1	G01080229-01AMS	468B
ACCU	23096	8/14/01	01D1311	01D1234-016.007	LEAD	MS1	90.6	%REC				1	G01080210-12AMS	M092101DA
ACCU	05691	8/24/01	01D1311	01D1311-001.004	LEAD	MS1	89.3	%REC				1	G01080346-01AMS	M092601A
ACCU	05391	8/16/01	01D1311	01D1311-006.004	LITHIUM	MS1	104.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1311	01D1211-016.001	LITHIUM	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	LITHIUM	MS1	102.0	%REC				1	G01080210-06AMS	468B
ACCU	37201	8/10/01	01D1311	01D1234-001.004	LITHIUM	MS1	101.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1311	01D1311-010.004	LITHIUM	MS1	98.2	%REC				1	G01080324-01AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	LITHIUM	MS2	102.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	LITHIUM	MS3	104.0	%REC				1	G01080229-01AMS	468B
ACCU	05091	8/14/01	01D1311	01D1234-010.004	MAGNESIUM	MS1	106.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	MAGNESIUM	MS1	104.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1311	01D1311-010.004	MAGNESIUM	MS1	104.0	%REC				1	G01080324-01AMS	R468
ACCU	4787	8/8/01	01D1311	01D1211-016.001	MAGNESIUM	MS1	101.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1311	01D1234-001.004	MAGNESIUM	MS1	99.1	%REC				1	G01080096-01AMS	R490
ACCU	05091	8/14/01	01D1311	01D1234-010.004	MAGNESIUM	MS2	106.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	MAGNESIUM	MS3	104.0	%REC				1	G01080229-01AMS	468B
ACCU	05091	8/14/01	01D1311	01D1234-010.004	MANGANESE	MS1	104.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	MANGANESE	MS1	104.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1311	01D1211-016.001	MANGANESE	MS1	103.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1311	01D1234-001.004	MANGANESE	MS1	103.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1311	01D1311-010.004	MANGANESE	MS1	101.0	%REC				1	G01080324-01AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	MANGANESE	MS2	104.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	MANGANESE	MS3	104.0	%REC				1	G01080229-01AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	MERCURY	MD1	93.8	%REC				1	G01080229-01AMSD	481
ACCU	03991	8/7/01	01D1311	01D1211-002.004	MERCURY	MD1	85.1	%REC				1	G01080068-01AMSD	481

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

1034703

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	40099	8/13/01	01D1311	01D1234-005.004	MERCURY	MD1	79.5	%REC				1	G01080210-01AMSD	482
ACCU	10994	8/14/01	01D1311	01D1234-016.007	MERCURY	MD2	70.3	%REC				1	G01080210-11AMSD	482
ACCU	05391	8/16/01	01D1311	01D1311-006.004	MERCURY	MS1	94.4	%REC				1	G01080229-01AMS	481
ACCU	40099	8/13/01	01D1311	01D1234-005.004	MERCURY	MS1	82.7	%REC				1	G01080210-01AMS	482
ACCU	03991	8/7/01	01D1311	01D1211-002.004	MERCURY	MS1	78.8	%REC				1	G01080068-01AMS	481
ACCU	10994	8/14/01	01D1311	01D1234-016.007	MERCURY	MS2	70.1	%REC				1	G01080210-11AMS	482
ACCU	4787	8/8/01	01D1311	01D1211-016.001	MOLYBDENUM	MS1	106.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	MOLYBDENUM	MS1	106.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	MOLYBDENUM	MS1	106.0	%REC				1	G01080229-01AMS	468B
ACCU	37201	8/10/01	01D1311	01D1234-001.004	MOLYBDENUM	MS1	104.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1311	01D1311-010.004	MOLYBDENUM	MS1	103.0	%REC				1	G01080324-01AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	MOLYBDENUM	MS2	106.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	MOLYBDENUM	MS3	106.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1311	01D1211-016.001	NICKEL	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	NICKEL	MS1	102.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	NICKEL	MS1	102.0	%REC				1	G01080229-01AMS	468B
ACCU	37201	8/10/01	01D1311	01D1234-001.004	NICKEL	MS1	101.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1311	01D1311-010.004	NICKEL	MS1	101.0	%REC				1	G01080324-01AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	NICKEL	MS2	102.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	NICKEL	MS3	102.0	%REC				1	G01080229-01AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	POTASSIUM	MS1	110.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1311	01D1211-016.001	POTASSIUM	MS1	107.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1311	01D1234-001.004	POTASSIUM	MS1	107.0	%REC				1	G01080096-01AMS	R490
ACCU	05091	8/14/01	01D1311	01D1234-010.004	POTASSIUM	MS1	107.0	%REC				1	G01080210-06AMS	468B
ACCU	04591	8/21/01	01D1311	01D1311-010.004	POTASSIUM	MS1	104.0	%REC				1	G01080324-01AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	POTASSIUM	MS2	107.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	POTASSIUM	MS3	110.0	%REC				1	G01080229-01AMS	468B
ACCU	05691	8/24/01	01D1311	01D1311-001.004	SELENIUM	MS1	135.0	%REC		N		1	G01080346-01AMS	M092601A
ACCU	23096	8/14/01	01D1311	01D1234-016.007	SELENIUM	MS1	132.0	%REC		N		1	G01080210-12AMS	M092101DA
ACCU	23096	8/14/01	01D1311	01D1234-016.007	SILVER	MS1	81.7	%REC				1	G01080210-12AMS	M092101DA
ACCU	05691	8/24/01	01D1311	01D1311-001.004	SILVER	MS1	77.1	%REC				1	G01080346-01AMS	M092601A
ACCU	4787	8/8/01	01D1311	01D1211-016.001	SODIUM	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	SODIUM	MS1	101.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	SODIUM	MS1	101.0	%REC				1	G01080229-01AMS	468B
[redacted]	04591	8/21/01	01D1311	01D1311-010.004	SODIUM	MS1	88.0	%REC				1	G01080324-01AMS	R468
[redacted]	37201	8/10/01	01D1311	01D1234-001.004	SODIUM	MS1	57.7	%REC				1	G01080096-01AMS	R490
[redacted]	05091	8/14/01	01D1311	01D1234-010.004	SODIUM	MS2	101.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	SODIUM	MS3	101.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1311	01D1211-016.001	STRONTIUM	MS1	106.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1311	01D1234-001.004	STRONTIUM	MS1	106.0	%REC				1	G01080096-01AMS	R490
ACCU	05091	8/14/01	01D1311	01D1234-010.004	STRONTIUM	MS1	105.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	STRONTIUM	MS1	102.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1311	01D1311-010.004	STRONTIUM	MS1	101.0	%REC				1	G01080324-01AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	STRONTIUM	MS2	105.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	STRONTIUM	MS3	102.0	%REC				1	G01080229-01AMS	468B
ACCU	23096	8/14/01	01D1311	01D1234-016.007	THALLIUM	MS1	92.7	%REC				1	G01080210-12AMS	M092101DA
ACCU	05691	8/24/01	01D1311	01D1311-001.004	THALLIUM	MS1	91.1	%REC				1	G01080346-01AMS	M092601A
ACCU	05091	8/14/01	01D1311	01D1234-010.004	TIN	MS1	111.0	%REC				1	G01080210-06AMS	468B
ACCU	4787	8/8/01	01D1311	01D1211-016.001	TIN	MS1	110.0	%REC				1	G01080068-10AMS	R468
ACCU	05391	8/16/01	01D1311	01D1311-006.004	TIN	MS1	110.0	%REC				1	G01080229-01AMS	468B
ACCU	37201	8/10/01	01D1311	01D1234-001.004	TIN	MS1	107.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1311	01D1311-010.004	TIN	MS1	107.0	%REC				1	G01080324-01AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	TIN	MS2	111.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	TIN	MS3	110.0	%REC				1	G01080229-01AMS	468B
ACCU	23096	8/14/01	01D1311	01D1234-016.007	URANIUM, TOTAL	MS1	93.4	%REC				1	G01080210-12AMS	M092101DA
ACCU	05691	8/24/01	01D1311	01D1311-001.004	URANIUM, TOTAL	MS1	87.5	%REC				1	G01080346-01AMS	M092601A
ACCU	05391	8/16/01	01D1311	01D1311-006.004	VANADIUM	MS1	114.0	%REC				1	G01080229-01AMS	468B
ACCU	05091	8/14/01	01D1311	01D1234-010.004	VANADIUM	MS1	112.0	%REC				1	G01080210-06AMS	468B
ACCU	4787	8/8/01	01D1311	01D1211-016.001	VANADIUM	MS1	111.0	%REC				1	G01080068-10AMS	R468
ACCU	04591	8/21/01	01D1311	01D1311-010.004	VANADIUM	MS1	109.0	%REC				1	G01080324-01AMS	R468
ACCU	37701	8/14/01	01D1311	01D1234-018.004	VANADIUM	MS1	92.1	%REC				5	G01080210-13AMS	092201A
ACCU	05691	8/24/01	01D1311	01D1311-001.004	VANADIUM	MS1	80.3	%REC				1	G01080346-01AMS	M092601A
ACCU	05091	8/14/01	01D1311	01D1234-010.004	ZINC	MS1	111.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	ZINC	MS1	111.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1311	01D1211-016.001	ZINC	MS1	110.0	%REC				1	G01080068-10AMS	R468
ACCU	37201	8/10/01	01D1311	01D1234-001.004	ZINC	MS1	110.0	%REC				1	G01080096-01AMS	R490
ACCU	04591	8/21/01	01D1311	01D1311-010.004	ZINC	MS1	108.0	%REC				1	G01080324-01AMS	R468
ACCU	05091	8/14/01	01D1311	01D1234-010.004	ZINC	MS2	111.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1311	01D1311-006.004	ZINC	MS3	111.0	%REC				1	G01080229-01AMS	468B
ACCU	5686	8/8/01	01D1352	01D1211-005.002	ALUMINUM	MD1	71.2	%REC				1	G01080068-04AMSD	474
[redacted]	05691	8/24/01	01D1352	01D1311-001.004	ALUMINUM	MS1	78.5	%REC				1	G01080346-01AMS	M092601A
[redacted]	5686	8/8/01	01D1352	01D1211-005.002	ALUMINUM	MS1	41.5	%REC				1	G01080068-04AMS	474
[redacted]	5686	8/8/01	01D1352	01D1211-005.002	ANTIMONY	MD1	88.4	%REC				1	G01080068-04AMSD	474
ACCU	05691	8/24/01	01D1352	01D1311-001.004	ANTIMONY	MS1	92.8	%REC				1	G01080346-01AMS	M092601A

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

635 704

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Ba
ACCU	5686	8/8/01	01D1352	01D1211-005.002	ANTIMONY	MS1	88.8	%REC				1	G01080068-04AMS	474
ACCU	5686	8/8/01	01D1352	01D1211-005.002	ARSENIC	MD1	96.9	%REC				1	G01080068-04AMSD	474
ACCU	05691	8/24/01	01D1352	01D1311-001.004	ARSENIC	MS1	120.0	%REC				1	G01080346-01AMS	M092601A
ACCU	5686	8/8/01	01D1352	01D1211-005.002	ARSENIC	MS1	95.9	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1352	01D1211-001.004	BARIUM	MD1	97.5	%REC				1	G01080008-01AMSD	473
ACCU	05091	8/14/01	01D1352	01D1234-010.004	BARIUM	MS1	108.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1352	01D1311-006.004	BARIUM	MS1	107.0	%REC				1	G01080229-01AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	BARIUM	MS1	97.5	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1352	01D1211-005.002	BERYLLIUM	MD1	89.7	%REC				1	G01080068-04AMSD	474
ACCU	05691	8/24/01	01D1352	01D1311-001.004	BERYLLIUM	MS1	94.6	%REC				1	G01080346-01AMS	M092601A
ACCU	5686	8/8/01	01D1352	01D1211-005.002	BERYLLIUM	MS1	90.0	%REC				1	G01080068-04AMS	474
ACCU	5686	8/8/01	01D1352	01D1211-005.002	CADMIUM	MD1	98.8	%REC				1	G01080068-04AMSD	474
ACCU	05691	8/24/01	01D1352	01D1311-001.004	CADMIUM	MS1	104.0	%REC				1	G01080346-01AMS	M092601A
ACCU	5686	8/8/01	01D1352	01D1211-005.002	CADMIUM	MS1	99.2	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1352	01D1211-001.004	CALCIUM	MD1	118.0	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1352	01D1211-001.004	CALCIUM	MS1	**126.0**	%REC				1	G01080008-01AMS	473
ACCU	05091	8/14/01	01D1352	01D1234-010.004	CALCIUM	MS1	99.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1352	01D1311-006.004	CALCIUM	MS1	**52.6**	%REC				1	G01080229-01AMS	468B
ACCU	5686	8/8/01	01D1352	01D1211-005.002	CHROMIUM	MD1	118.0	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1352	01D1211-005.002	CHROMIUM	MS1	106.0	%REC				1	G01080068-04AMS	474
ACCU	05691	8/24/01	01D1352	01D1311-001.004	CHROMIUM	MS1	88.8	%REC				1	G01080346-01AMS	M092601A
ACCU	0386	8/2/01	01D1352	01D1211-001.004	COBALT	MD1	95.2	%REC				1	G01080008-01AMSD	473
ACCU	05091	8/14/01	01D1352	01D1234-010.004	COBALT	MS1	101.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1352	01D1311-006.004	COBALT	MS1	101.0	%REC				1	G01080229-01AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	COBALT	MS1	95.7	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1352	01D1211-005.002	COPPER	MD1	87.3	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1352	01D1211-005.002	COPPER	MS1	88.5	%REC				1	G01080068-04AMS	474
ACCU	05691	8/24/01	01D1352	01D1311-001.004	COPPER	MS1	84.6	%REC				1	G01080346-01AMS	M092601A
ACCU	0386	8/2/01	01D1352	01D1211-001.004	IRON	MD1	94.5	%REC				1	G01080008-01AMSD	473
ACCU	05391	8/16/01	01D1352	01D1311-006.004	IRON	MS1	98.8	%REC				1	G01080229-01AMS	468B
ACCU	05091	8/14/01	01D1352	01D1234-010.004	IRON	MS1	98.0	%REC				1	G01080210-06AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	IRON	MS1	94.3	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1352	01D1211-005.002	LEAD	MD1	100.0	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1352	01D1211-005.002	LEAD	MS1	101.0	%REC				1	G01080068-04AMS	474
ACCU	05691	8/24/01	01D1352	01D1311-001.004	LEAD	MS1	89.3	%REC				1	G01080346-01AMS	M092601A
ACCU	0386	8/2/01	01D1352	01D1211-001.004	LITHIUM	MD1	101.0	%REC				1	G01080008-01AMSD	473
ACCU	05391	8/16/01	01D1352	01D1311-006.004	LITHIUM	MS1	104.0	%REC				1	G01080229-01AMS	468B
ACCU	05091	8/14/01	01D1352	01D1234-010.004	LITHIUM	MS1	102.0	%REC				1	G01080210-06AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	LITHIUM	MS1	97.9	%REC				1	G01080008-01AMS	473
ACCU	0386	8/2/01	01D1352	01D1211-001.004	MAGNESIUM	MD1	97.2	%REC				1	G01080008-01AMSD	473
ACCU	05091	8/14/01	01D1352	01D1234-010.004	MAGNESIUM	MS1	106.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1352	01D1311-006.004	MAGNESIUM	MS1	104.0	%REC				1	G01080229-01AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	MAGNESIUM	MS1	97.2	%REC				1	G01080008-01AMS	473
ACCU	0386	8/2/01	01D1352	01D1211-001.004	MANGANESE	MD1	98.9	%REC				1	G01080008-01AMSD	473
ACCU	05091	8/14/01	01D1352	01D1234-010.004	MANGANESE	MS1	104.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1352	01D1311-006.004	MANGANESE	MS1	104.0	%REC				1	G01080229-01AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	MANGANESE	MS1	99.0	%REC				1	G01080008-01AMS	473
ACCU	P114389	8/28/01	01D1352	01D1352-007.004	MERCURY	MD1	95.4	%REC				1	G01080465-01AMSD	732
ACCU	05391	8/16/01	01D1352	01D1311-006.004	MERCURY	MD1	93.8	%REC				1	G01080229-01AMSD	481
ACCU	06091	8/24/01	01D1352	01D1352-003.004	MERCURY	MD1	92.2	%REC				1	G01080369-03AMSD	728
ACCU	03991	8/7/01	01D1352	01D1211-002.004	MERCURY	MD1	85.1	%REC				1	G01080068-01AMSD	481
ACCU	40099	8/13/01	01D1352	01D1234-005.004	MERCURY	MD1	79.5	%REC				1	G01080210-01AMSD	482
ACCU	10994	8/14/01	01D1352	01D1234-016.007	MERCURY	MD1	**70.3**	%REC				1	G01080210-11AMSD	482
ACCU	05391	8/16/01	01D1352	01D1311-006.004	MERCURY	MS1	94.4	%REC				1	G01080229-01AMS	481
ACCU	P114389	8/28/01	01D1352	01D1352-007.004	MERCURY	MS1	92.4	%REC				1	G01080465-01AMS	732
ACCU	06091	8/24/01	01D1352	01D1352-003.004	MERCURY	MS1	87.0	%REC				1	G01080369-03AMS	728
ACCU	40099	8/13/01	01D1352	01D1234-005.004	MERCURY	MS1	82.7	%REC				1	G01080210-01AMS	482
ACCU	03991	8/7/01	01D1352	01D1211-002.004	MERCURY	MS1	78.8	%REC				1	G01080068-01AMS	481
ACCU	10994	8/14/01	01D1352	01D1234-016.007	MERCURY	MS1	**70.1**	%REC				1	G01080210-11AMS	482
ACCU	0386	8/2/01	01D1352	01D1211-001.004	MOLYBDENUM	MD1	103.0	%REC				1	G01080008-01AMSD	473
ACCU	05091	8/14/01	01D1352	01D1234-010.004	MOLYBDENUM	MS1	106.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1352	01D1311-006.004	MOLYBDENUM	MS1	106.0	%REC				1	G01080229-01AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	MOLYBDENUM	MS1	103.0	%REC				1	G01080008-01AMS	473
ACCU	0386	8/2/01	01D1352	01D1211-001.004	NICKEL	MD1	96.8	%REC				1	G01080008-01AMSD	473
ACCU	05091	8/14/01	01D1352	01D1234-010.004	NICKEL	MS1	102.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1352	01D1311-006.004	NICKEL	MS1	102.0	%REC				1	G01080229-01AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	NICKEL	MS1	96.9	%REC				1	G01080008-01AMS	473
ACCU	0386	8/2/01	01D1352	01D1211-001.004	POTASSIUM	MD1	101.0	%REC				1	G01080008-01AMSD	473
ACCU	05391	8/16/01	01D1352	01D1311-006.004	POTASSIUM	MS1	110.0	%REC				1	G01080229-01AMS	468B
ACCU	05091	8/14/01	01D1352	01D1234-010.004	POTASSIUM	MS1	107.0	%REC				1	G01080210-06AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	POTASSIUM	MS1	98.6	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1352	01D1211-005.002	SELENIUM	MD1	90.9	%REC				1	G01080068-04AMSD	474
ACCU	05691	8/24/01	01D1352	01D1311-001.004	SELENIUM	MS1	**135.0**	%REC		N		1	G01080346-01AMS	M092601A
ACCU	5686	8/8/01	01D1352	01D1211-005.002	SELENIUM	MS1	90.1	%REC				1	G01080068-04AMS	474
ACCU	5686	8/8/01	01D1352	01D1211-005.002	SILVER	MD1	97.6	%REC				1	G01080068-04AMSD	474

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	5686	8/8/01	01D1352	01D1211-005.002	SILVER	MS1	97.8	%REC				1	G01080068-04AMS	474
ACCU	05691	8/24/01	01D1352	01D1311-001.004	SILVER	MS1	77.1	%REC				1	G01080346-01AMS	M092601A
ACCU	0386	8/2/01	01D1352	01D1211-001.004	SODIUM	MD1	105.0	%REC				1	G01080008-01AMSD	473
ACCU	0386	8/2/01	01D1352	01D1211-001.004	SODIUM	MS1	106.0	%REC				1	G01080008-01AMS	473
ACCU	05091	8/14/01	01D1352	01D1234-010.004	SODIUM	MS1	101.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1352	01D1311-006.004	SODIUM	MS1	101.0	%REC				1	G01080229-01AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	STRONTIUM	MD1	101.0	%REC				1	G01080008-01AMSD	473
ACCU	05091	8/14/01	01D1352	01D1234-010.004	STRONTIUM	MS1	105.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1352	01D1311-006.004	STRONTIUM	MS1	102.0	%REC				1	G01080229-01AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	STRONTIUM	MS1	101.0	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1352	01D1211-005.002	THALLIUM	MD1	88.8	%REC				1	G01080068-04AMSD	474
ACCU	05691	8/24/01	01D1352	01D1311-001.004	THALLIUM	MS1	91.1	%REC				1	G01080346-01AMS	M092601A
ACCU	5686	8/8/01	01D1352	01D1211-005.002	THALLIUM	MS1	87.0	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1352	01D1211-001.004	TIN	MD1	104.0	%REC				1	G01080008-01AMSD	473
ACCU	05091	8/14/01	01D1352	01D1234-010.004	TIN	MS1	111.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1352	01D1311-006.004	TIN	MS1	110.0	%REC				1	G01080229-01AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	TIN	MS1	104.0	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1352	01D1211-005.002	URANIUM, TOTAL	MD1	103.0	%REC				1	G01080068-04AMSD	474
ACCU	5686	8/8/01	01D1352	01D1211-005.002	URANIUM, TOTAL	MS1	103.0	%REC				1	G01080068-04AMS	474
ACCU	05691	8/24/01	01D1352	01D1311-001.004	URANIUM, TOTAL	MS1	87.5	%REC				1	G01080346-01AMS	M092601A
ACCU	5686	8/8/01	01D1352	01D1211-005.002	VANADIUM	MD1	104.0	%REC				10	G01080068-04AMSD	474
ACCU	0386	8/2/01	01D1352	01D1211-001.004	VANADIUM	MD1	103.0	%REC				1	G01080008-01AMSD	473
ACCU	05391	8/16/01	01D1352	01D1311-006.004	VANADIUM	MS1	114.0	%REC				1	G01080229-01AMS	468B
ACCU	05091	8/14/01	01D1352	01D1234-010.004	VANADIUM	MS1	112.0	%REC				1	G01080210-06AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	VANADIUM	MS1	103.0	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1352	01D1211-005.002	VANADIUM	MS1	97.6	%REC				10	G01080068-04AMS	474
ACCU	05691	8/24/01	01D1352	01D1311-001.004	VANADIUM	MS1	80.3	%REC				1	G01080346-01AMS	M092601A
ACCU	0386	8/2/01	01D1352	01D1211-001.004	ZINC	MD1	99.4	%REC				1	G01080008-01AMSD	473
ACCU	05091	8/14/01	01D1352	01D1234-010.004	ZINC	MS1	111.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1352	01D1311-006.004	ZINC	MS1	111.0	%REC				1	G01080229-01AMS	468B
ACCU	0386	8/2/01	01D1352	01D1211-001.004	ZINC	MS1	99.8	%REC				1	G01080008-01AMS	473
ACCU	5686	8/8/01	01D1375	01D1211-005.002	ALUMINUM	MD1	71.2	%REC				1	G01080068-04AMSD	474
ACCU	22896	9/12/01	01D1375	01D1448-007.004	ALUMINUM	MD1	68.8	%REC		N		10	G01090296-03AMSD	747
ACCU	03991	8/7/01	01D1375	01D1211-002.004	ALUMINUM	MS1	85.1	%REC				2	G01080068-01AMS	R702
ACCU	05691	8/24/01	01D1375	01D1311-001.004	ALUMINUM	MS1	78.5	%REC				1	G01080346-01AMS	M092601A
[redacted]	5686	8/8/01	01D1375	01D1211-005.002	ALUMINUM	MS1	41.5	%REC				1	G01080068-04AMS	474
[redacted]	37201	8/10/01	01D1375	01D1234-001.004	ALUMINUM	MS1	67.0	%REC		N		2	G01080096-01AMS	R702
ACCU	22896	9/12/01	01D1375	01D1448-007.004	ALUMINUM	MS1	71.8	%REC				10	G01090296-03AMS	747
ACCU	22896	9/12/01	01D1375	01D1448-007.004	ANTIMONY	MD1	125.0	%REC				1	G01090296-03AMSD	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	ANTIMONY	MD1	88.4	%REC				1	G01080068-04AMSD	474
ACCU	22896	9/12/01	01D1375	01D1448-007.004	ANTIMONY	MS1	124.0	%REC				1	G01090296-03AMS	747
ACCU	03991	8/7/01	01D1375	01D1211-002.004	ANTIMONY	MS1	102.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1375	01D1234-001.004	ANTIMONY	MS1	99.5	%REC				2	G01080096-01AMS	R702
ACCU	05691	8/24/01	01D1375	01D1311-001.004	ANTIMONY	MS1	92.8	%REC				1	G01080346-01AMS	M092601A
ACCU	5686	8/8/01	01D1375	01D1211-005.002	ANTIMONY	MS1	88.8	%REC				1	G01080068-04AMS	474
ACCU	22896	9/12/01	01D1375	01D1448-007.004	ARSENIC	MD1	115.0	%REC				1	G01090296-03AMSD	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	ARSENIC	MD1	96.9	%REC				1	G01080068-04AMSD	474
ACCU	05691	8/24/01	01D1375	01D1311-001.004	ARSENIC	MS1	120.0	%REC				1	G01080346-01AMS	M092601A
ACCU	22896	9/12/01	01D1375	01D1448-007.004	ARSENIC	MS1	114.0	%REC				1	G01090296-03AMS	747
ACCU	03991	8/7/01	01D1375	01D1211-002.004	ARSENIC	MS1	108.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1375	01D1234-001.004	ARSENIC	MS1	104.0	%REC				2	G01080096-01AMS	R702
ACCU	5686	8/8/01	01D1375	01D1211-005.002	ARSENIC	MS1	95.9	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1375	01D1211-001.004	BARIUM	MD1	97.5	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	BARIUM	MD1	91.0	%REC				1	G01090296-03AMSD	745
ACCU	05091	8/14/01	01D1375	01D1234-010.004	BARIUM	MS1	108.0	%REC				1	G01080210-06AMS	468B
ACCU	4787	8/8/01	01D1375	01D1211-016.001	BARIUM	MS1	107.0	%REC				1	G01080068-10AMS	R468
ACCU	05391	8/16/01	01D1375	01D1311-006.004	BARIUM	MS1	107.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1375	01D1311-010.004	BARIUM	MS1	104.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1375	01D1211-001.004	BARIUM	MS1	97.5	%REC				1	G01080008-01AMS	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	BARIUM	MS1	91.3	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1375	01D1448-007.004	BERYLLIUM	MD1	96.9	%REC				1	G01090296-03AMSD	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	BERYLLIUM	MD1	89.7	%REC				1	G01080068-04AMSD	474
ACCU	37201	8/10/01	01D1375	01D1234-001.004	BERYLLIUM	MS1	97.1	%REC				2	G01080096-01AMS	R702
ACCU	22896	9/12/01	01D1375	01D1448-007.004	BERYLLIUM	MS1	95.1	%REC				1	G01090296-03AMS	747
ACCU	03991	8/7/01	01D1375	01D1211-002.004	BERYLLIUM	MS1	94.8	%REC				2	G01080068-01AMS	R702
ACCU	05691	8/24/01	01D1375	01D1311-001.004	BERYLLIUM	MS1	94.6	%REC				1	G01080346-01AMS	M092601A
ACCU	5686	8/8/01	01D1375	01D1211-005.002	BERYLLIUM	MS1	90.0	%REC				1	G01080068-04AMS	474
ACCU	22896	9/12/01	01D1375	01D1448-007.004	CADMIUM	MD1	118.0	%REC				1	G01090296-03AMSD	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	CADMIUM	MD1	98.8	%REC				1	G01080068-04AMSD	474
ACCU	22896	9/12/01	01D1375	01D1448-007.004	CADMIUM	MS1	118.0	%REC				1	G01090296-03AMS	747
ACCU	05691	8/24/01	01D1375	01D1311-001.004	CADMIUM	MS1	104.0	%REC				1	G01080346-01AMS	M092601A
[redacted]	03991	8/7/01	01D1375	01D1211-002.004	CADMIUM	MS1	102.0	%REC				2	G01080068-01AMS	R702
[redacted]	5686	8/8/01	01D1375	01D1211-005.002	CADMIUM	MS1	99.2	%REC				1	G01080068-04AMS	474
ACCU	37201	8/10/01	01D1375	01D1234-001.004	CADMIUM	MS1	97.3	%REC				2	G01080096-01AMS	R702
ACCU	0386	8/2/01	01D1375	01D1211-001.004	CALCIUM	MD1	118.0	%REC				1	G01080008-01AMSD	473

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

637
706

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilu-tion	Lab Sample #	Lab Ba
ACCU	22896	9/12/01	01D1375	01D1448-007.004	CALCIUM	MD1	88.7	%REC				1	G01090296-03AMSD	745
ACCU	0386	8/2/01	01D1375	01D1211-001.004	CALCIUM	MS1	126.0	%REC				1	G01080008-01AMS	473
ACCU	4787	8/8/01	01D1375	01D1211-016.001	CALCIUM	MS1	108.0	%REC				1	G01080068-10AMS	R468
ACCU	22896	9/12/01	01D1375	01D1448-007.004	CALCIUM	MS1	102.0	%REC				1	G01090296-03AMS	745
ACCU	05091	8/14/01	01D1375	01D1234-010.004	CALCIUM	MS1	99.0	%REC				1	G01080210-06AMS	468B
ACCU	04591	8/21/01	01D1375	01D1311-010.004	CALCIUM	MS1	95.0	%REC				1	G01080324-01AMS	R468
ACCU	05391	8/16/01	01D1375	01D1311-006.004	CALCIUM	MS1	52.6	%REC				1	G01080229-01AMS	468B
ACCU	5686	8/8/01	01D1375	01D1211-005.002	CHROMIUM	MD1	118.0	%REC				1	G01080068-04AMSD	474
ACCU	22896	9/12/01	01D1375	01D1448-007.004	CHROMIUM	MD1	115.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1375	01D1448-007.004	CHROMIUM	MS1	113.0	%REC				1	G01090296-03AMS	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	CHROMIUM	MS1	106.0	%REC				1	G01080068-04AMS	474
ACCU	03991	8/7/01	01D1375	01D1211-002.004	CHROMIUM	MS1	98.3	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1375	01D1234-001.004	CHROMIUM	MS1	93.2	%REC				2	G01080096-01AMS	R702
ACCU	05691	8/24/01	01D1375	01D1311-001.004	CHROMIUM	MS1	88.8	%REC				1	G01080346-01AMS	M092601A
ACCU	0386	8/2/01	01D1375	01D1211-001.004	COBALT	MD1	95.2	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	COBALT	MD1	89.7	%REC				1	G01090296-03AMSD	745
ACCU	4787	8/8/01	01D1375	01D1211-016.001	COBALT	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1375	01D1234-010.004	COBALT	MS1	101.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1375	01D1311-006.004	COBALT	MS1	101.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1375	01D1311-010.004	COBALT	MS1	100.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1375	01D1211-001.004	COBALT	MS1	95.7	%REC				1	G01080008-01AMS	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	COBALT	MS1	90.1	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1375	01D1448-007.004	COPPER	MD1	112.0	%REC				1	G01090296-03AMSD	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	COPPER	MD1	87.3	%REC				1	G01080068-04AMSD	474
ACCU	22896	9/12/01	01D1375	01D1448-007.004	COPPER	MS1	111.0	%REC				1	G01090296-03AMS	747
ACCU	03991	8/7/01	01D1375	01D1211-002.004	COPPER	MS1	93.8	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1375	01D1234-001.004	COPPER	MS1	89.3	%REC				2	G01080096-01AMS	R702
ACCU	5686	8/8/01	01D1375	01D1211-005.002	COPPER	MS1	88.5	%REC				1	G01080068-04AMS	474
ACCU	05691	8/24/01	01D1375	01D1311-001.004	COPPER	MS1	84.6	%REC				1	G01080346-01AMS	M092601A
ACCU	0386	8/2/01	01D1375	01D1211-001.004	IRON	MD1	94.5	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	IRON	MD1	91.7	%REC				1	G01090296-03AMSD	745
ACCU	4787	8/8/01	01D1375	01D1211-016.001	IRON	MS1	99.8	%REC				1	G01080068-10AMS	R468
ACCU	05391	8/16/01	01D1375	01D1311-006.004	IRON	MS1	98.8	%REC				1	G01080229-01AMS	468B
ACCU	05091	8/14/01	01D1375	01D1234-010.004	IRON	MS1	98.0	%REC				1	G01080210-06AMS	468B
ACCU	04591	8/21/01	01D1375	01D1311-010.004	IRON	MS1	96.4	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1375	01D1211-001.004	IRON	MS1	94.3	%REC				1	G01080008-01AMS	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	IRON	MS1	92.5	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1375	01D1448-007.004	LEAD	MD1	123.0	%REC				1	G01090296-03AMSD	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	LEAD	MD1	100.0	%REC				1	G01080068-04AMSD	474
ACCU	22896	9/12/01	01D1375	01D1448-007.004	LEAD	MS1	125.0	%REC				1	G01090296-03AMS	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	LEAD	MS1	101.0	%REC				1	G01080068-04AMS	474
ACCU	03991	8/7/01	01D1375	01D1211-002.004	LEAD	MS1	100.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1375	01D1234-001.004	LEAD	MS1	92.5	%REC				2	G01080096-01AMS	R702
ACCU	05691	8/24/01	01D1375	01D1311-001.004	LEAD	MS1	89.3	%REC				1	G01080346-01AMS	M092601A
ACCU	0386	8/2/01	01D1375	01D1211-001.004	LITHIUM	MD1	101.0	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	LITHIUM	MD1	92.5	%REC				1	G01090296-03AMSD	745
ACCU	05391	8/16/01	01D1375	01D1311-006.004	LITHIUM	MS1	104.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1375	01D1211-016.001	LITHIUM	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1375	01D1234-010.004	LITHIUM	MS1	102.0	%REC				1	G01080210-06AMS	468B
ACCU	04591	8/21/01	01D1375	01D1311-010.004	LITHIUM	MS1	98.2	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1375	01D1211-001.004	LITHIUM	MS1	97.9	%REC				1	G01080008-01AMS	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	LITHIUM	MS1	92.6	%REC				1	G01090296-03AMS	745
ACCU	0386	8/2/01	01D1375	01D1211-001.004	MAGNESIUM	MD1	97.2	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	MAGNESIUM	MD1	94.5	%REC				1	G01090296-03AMSD	745
ACCU	05091	8/14/01	01D1375	01D1234-010.004	MAGNESIUM	MS1	106.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1375	01D1311-006.004	MAGNESIUM	MS1	104.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1375	01D1311-010.004	MAGNESIUM	MS1	104.0	%REC				1	G01080324-01AMS	R468
ACCU	4787	8/8/01	01D1375	01D1211-016.001	MAGNESIUM	MS1	101.0	%REC				1	G01080068-10AMS	R468
ACCU	0386	8/2/01	01D1375	01D1211-001.004	MAGNESIUM	MS1	97.2	%REC				1	G01080008-01AMS	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	MAGNESIUM	MS1	92.3	%REC				1	G01090296-03AMS	745
ACCU	0386	8/2/01	01D1375	01D1211-001.004	MANGANESE	MD1	98.9	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	MANGANESE	MD1	92.1	%REC				1	G01090296-03AMSD	745
ACCU	05091	8/14/01	01D1375	01D1234-010.004	MANGANESE	MS1	104.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1375	01D1311-006.004	MANGANESE	MS1	104.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1375	01D1211-016.001	MANGANESE	MS1	103.0	%REC				1	G01080068-10AMS	R468
ACCU	04591	8/21/01	01D1375	01D1311-010.004	MANGANESE	MS1	101.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1375	01D1211-001.004	MANGANESE	MS1	99.0	%REC				1	G01080008-01AMS	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	MANGANESE	MS1	92.5	%REC				1	G01090296-03AMS	745
ACCU	30900	8/28/01	01D1375	01D1375-001.005	MERCURY	MD1	104.0	%REC				1	G01080426-02AMSD	670
ACCU	P114389	8/28/01	01D1375	01D1352-007.004	MERCURY	MD1	95.4	%REC				1	G01080465-01AMSD	732
ACCU	05391	8/16/01	01D1375	01D1311-006.004	MERCURY	MD1	93.8	%REC				1	G01080229-01AMSD	481
ACCU	06091	8/24/01	01D1375	01D1352-003.004	MERCURY	MD1	92.2	%REC				1	G01080369-03AMSD	728
ACCU	03991	8/7/01	01D1375	01D1211-002.004	MERCURY	MD1	85.1	%REC				1	G01080068-01AMSD	481
ACCU	30900	8/28/01	01D1375	01D1375-001.005	MERCURY	MS1	106.0	%REC				1	G01080426-02AMS	670
ACCU	05391	8/16/01	01D1375	01D1311-006.004	MERCURY	MS1	94.4	%REC				1	G01080229-01AMS	481

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

638
207

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

9/23/02

[redacted]	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	P114389	8/28/01	01D1375	01D1352-007.004	MERCURY	MS1	92.4	%REC				1	G01080465-01AMS	732
ACCU	06091	8/24/01	01D1375	01D1352-003.004	MERCURY	MS1	87.0	%REC				1	G01080369-03AMS	728
ACCU	03991	8/7/01	01D1375	01D1211-002.004	MERCURY	MS1	78.8	%REC				1	G01080068-01AMS	481
ACCU	0386	8/2/01	01D1375	01D1211-001.004	MOLYBDENUM	MD1	103.0	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	MOLYBDENUM	MD1	91.1	%REC				1	G01090296-03AMSD	745
ACCU	4787	8/8/01	01D1375	01D1211-016.001	MOLYBDENUM	MS1	106.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1375	01D1234-010.004	MOLYBDENUM	MS1	106.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1375	01D1311-006.004	MOLYBDENUM	MS1	106.0	%REC				1	G01080229-01AMS	468B
ACCU	0386	8/2/01	01D1375	01D1211-001.004	MOLYBDENUM	MS1	103.0	%REC				1	G01080008-01AMS	473
ACCU	04591	8/21/01	01D1375	01D1311-010.004	MOLYBDENUM	MS1	103.0	%REC				1	G01080324-01AMS	R468
ACCU	22896	9/12/01	01D1375	01D1448-007.004	MOLYBDENUM	MS1	91.4	%REC				1	G01090296-03AMS	745
ACCU	0386	8/2/01	01D1375	01D1211-001.004	NICKEL	MD1	96.8	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	NICKEL	MD1	88.6	%REC				1	G01090296-03AMSD	745
ACCU	4787	8/8/01	01D1375	01D1211-016.001	NICKEL	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1375	01D1234-010.004	NICKEL	MS1	102.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1375	01D1311-006.004	NICKEL	MS1	102.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1375	01D1311-010.004	NICKEL	MS1	101.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1375	01D1211-001.004	NICKEL	MS1	96.9	%REC				1	G01080008-01AMS	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	NICKEL	MS1	89.2	%REC				1	G01090296-03AMS	745
ACCU	0386	8/2/01	01D1375	01D1211-001.004	POTASSIUM	MD1	101.0	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	POTASSIUM	MD1	93.3	%REC				1	G01090296-03AMSD	745
ACCU	05391	8/16/01	01D1375	01D1311-006.004	POTASSIUM	MS1	110.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1375	01D1211-016.001	POTASSIUM	MS1	107.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1375	01D1234-010.004	POTASSIUM	MS1	107.0	%REC				1	G01080210-06AMS	468B
ACCU	04591	8/21/01	01D1375	01D1311-010.004	POTASSIUM	MS1	104.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1375	01D1211-001.004	POTASSIUM	MS1	98.6	%REC				1	G01080008-01AMS	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	POTASSIUM	MS1	93.9	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1375	01D1448-007.004	SELENIUM	MD1	114.0	%REC				1	G01090296-03AMSD	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	SELENIUM	MD1	90.9	%REC				1	G01080068-04AMSD	474
ACCU	05691	8/24/01	01D1375	01D1311-001.004	SELENIUM	MS1	**135.0**	%REC		N		1	G01080346-01AMS	M092601A
ACCU	03991	8/7/01	01D1375	01D1211-002.004	SELENIUM	MS1	115.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1375	01D1234-001.004	SELENIUM	MS1	112.0	%REC				2	G01080096-01AMS	R702
ACCU	22896	9/12/01	01D1375	01D1448-007.004	SELENIUM	MS1	110.0	%REC				1	G01090296-03AMS	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	SELENIUM	MS1	90.1	%REC				1	G01080068-04AMS	474
ACCU	22896	9/12/01	01D1375	01D1448-007.004	SILVER	MD1	118.0	%REC				1	G01090296-03AMSD	747
[redacted]	5686	8/8/01	01D1375	01D1211-005.002	SILVER	MD1	97.6	%REC				1	G01080068-04AMSD	474
[redacted]	22896	9/12/01	01D1375	01D1448-007.004	SILVER	MS1	118.0	%REC				1	G01090296-03AMS	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	SILVER	MS1	97.8	%REC				1	G01080068-04AMS	474
ACCU	03991	8/7/01	01D1375	01D1211-002.004	SILVER	MS1	84.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1375	01D1234-001.004	SILVER	MS1	81.8	%REC				2	G01080096-01AMS	R702
ACCU	05691	8/24/01	01D1375	01D1311-001.004	SILVER	MS1	77.1	%REC				1	G01080346-01AMS	M092601A
ACCU	0386	8/2/01	01D1375	01D1211-001.004	SODIUM	MD1	105.0	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	SODIUM	MD1	89.8	%REC				1	G01090296-03AMSD	745
ACCU	0386	8/2/01	01D1375	01D1211-001.004	SODIUM	MS1	106.0	%REC				1	G01080008-01AMS	473
ACCU	4787	8/8/01	01D1375	01D1211-016.001	SODIUM	MS1	102.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1375	01D1234-010.004	SODIUM	MS1	101.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1375	01D1311-006.004	SODIUM	MS1	101.0	%REC				1	G01080229-01AMS	468B
ACCU	22896	9/12/01	01D1375	01D1448-007.004	SODIUM	MS1	95.5	%REC				1	G01090296-03AMS	745
ACCU	04591	8/21/01	01D1375	01D1311-010.004	SODIUM	MS1	88.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1375	01D1211-001.004	STRONTIUM	MD1	101.0	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	STRONTIUM	MD1	91.8	%REC				1	G01090296-03AMSD	745
ACCU	4787	8/8/01	01D1375	01D1211-016.001	STRONTIUM	MS1	106.0	%REC				1	G01080068-10AMS	R468
ACCU	05091	8/14/01	01D1375	01D1234-010.004	STRONTIUM	MS1	105.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1375	01D1311-006.004	STRONTIUM	MS1	102.0	%REC				1	G01080229-01AMS	468B
ACCU	0386	8/2/01	01D1375	01D1211-001.004	STRONTIUM	MS1	101.0	%REC				1	G01080008-01AMS	473
ACCU	04591	8/21/01	01D1375	01D1311-010.004	STRONTIUM	MS1	101.0	%REC				1	G01080324-01AMS	R468
ACCU	22896	9/12/01	01D1375	01D1448-007.004	STRONTIUM	MS1	93.3	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1375	01D1448-007.004	THALLIUM	MD1	116.0	%REC				1	G01090296-03AMSD	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	THALLIUM	MD1	88.8	%REC				1	G01080068-04AMSD	474
ACCU	22896	9/12/01	01D1375	01D1448-007.004	THALLIUM	MS1	118.0	%REC				1	G01090296-03AMS	747
ACCU	03991	8/7/01	01D1375	01D1211-002.004	THALLIUM	MS1	101.0	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1375	01D1234-001.004	THALLIUM	MS1	93.3	%REC				2	G01080096-01AMS	R702
ACCU	05691	8/24/01	01D1375	01D1311-001.004	THALLIUM	MS1	91.1	%REC				1	G01080346-01AMS	M092601A
ACCU	5686	8/8/01	01D1375	01D1211-005.002	THALLIUM	MS1	87.0	%REC				1	G01080068-04AMS	474
ACCU	0386	8/2/01	01D1375	01D1211-001.004	TIN	MD1	104.0	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	TIN	MD1	95.6	%REC				1	G01090296-03AMSD	745
ACCU	05091	8/14/01	01D1375	01D1234-010.004	TIN	MS1	111.0	%REC				1	G01080210-06AMS	468B
ACCU	4787	8/8/01	01D1375	01D1211-016.001	TIN	MS1	110.0	%REC				1	G01080068-10AMS	R468
ACCU	05391	8/16/01	01D1375	01D1311-006.004	TIN	MS1	110.0	%REC				1	G01080229-01AMS	468B
ACCU	04591	8/21/01	01D1375	01D1311-010.004	TIN	MS1	107.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1375	01D1211-001.004	TIN	MS1	104.0	%REC				1	G01080008-01AMS	473
[redacted]	22896	9/12/01	01D1375	01D1448-007.004	TIN	MS1	96.0	%REC				1	G01090296-03AMS	745
[redacted]	22896	9/12/01	01D1375	01D1448-007.004	URANIUM, TOTAL	MD1	**137.0**	%REC		N		1	G01090296-03AMSD	747
[redacted]	5686	8/8/01	01D1375	01D1211-005.002	URANIUM, TOTAL	MD1	103.0	%REC				1	G01080068-04AMSD	474
ACCU	22896	9/12/01	01D1375	01D1448-007.004	URANIUM, TOTAL	MS1	**138.0**	%REC		N		1	G01090296-03AMS	747

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilu-tion	Lab Sample #	Lab B
ACCU	03991	8/7/01	01D1375	01D1211-002.004	URANIUM, TOTAL	MS1	104.0	%REC				1	G01080068-01AMS	R774
ACCU	5686	8/8/01	01D1375	01D1211-005.002	URANIUM, TOTAL	MS1	103.0	%REC				1	G01080068-04AMS	474
ACCU	37201	8/10/01	01D1375	01D1234-001.004	URANIUM, TOTAL	MS1	101.0	%REC				1	G01080096-01AMS	R774
ACCU	05691	8/24/01	01D1375	01D1311-001.004	URANIUM, TOTAL	MS1	87.5	%REC				1	G01080346-01AMS	M092601A
ACCU	5686	8/8/01	01D1375	01D1211-005.002	VANADIUM	MD1	104.0	%REC				10	G01080068-04AMSD	474
ACCU	22896	9/12/01	01D1375	01D1448-007.004	VANADIUM	MD1	102.0	%REC				10	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1375	01D1448-007.004	VANADIUM	MS1	101.0	%REC				10	G01090296-03AMS	747
ACCU	5686	8/8/01	01D1375	01D1211-005.002	VANADIUM	MS1	97.6	%REC				10	G01080068-04AMS	474
ACCU	03991	8/7/01	01D1375	01D1211-002.004	VANADIUM	MS1	89.8	%REC				2	G01080068-01AMS	R702
ACCU	37201	8/10/01	01D1375	01D1234-001.004	VANADIUM	MS1	88.3	%REC				2	G01080096-01AMS	R702
ACCU	05691	8/24/01	01D1375	01D1311-001.004	VANADIUM	MS1	80.3	%REC				1	G01080346-01AMS	M092601A
ACCU	0386	8/2/01	01D1375	01D1211-001.004	ZINC	MD1	99.4	%REC				1	G01080008-01AMSD	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	ZINC	MD1	92.4	%REC				1	G01090296-03AMSD	745
ACCU	05091	8/14/01	01D1375	01D1234-010.004	ZINC	MS1	111.0	%REC				1	G01080210-06AMS	468B
ACCU	05391	8/16/01	01D1375	01D1311-006.004	ZINC	MS1	111.0	%REC				1	G01080229-01AMS	468B
ACCU	4787	8/8/01	01D1375	01D1211-016.001	ZINC	MS1	110.0	%REC				1	G01080068-10AMS	R468
ACCU	04591	8/21/01	01D1375	01D1311-010.004	ZINC	MS1	108.0	%REC				1	G01080324-01AMS	R468
ACCU	0386	8/2/01	01D1375	01D1211-001.004	ZINC	MS1	99.8	%REC				1	G01080008-01AMS	473
ACCU	22896	9/12/01	01D1375	01D1448-007.004	ZINC	MS1	92.9	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1417	01D1448-007.004	ALUMINUM	MD1	68.8	%REC		N		10	G01090296-03AMSD	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	ALUMINUM	MS1	88.4	%REC				10	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	ALUMINUM	MS1	71.8	%REC				10	G01090296-03AMS	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	ANTIMONY	MD1	125.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	ANTIMONY	MS1	124.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	ANTIMONY	MS1	93.8	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	ARSENIC	MD1	115.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	ARSENIC	MS1	114.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	ARSENIC	MS1	99.3	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	BARIUM	MD1	91.0	%REC				1	G01090296-03AMSD	745
ACCU	22896	9/12/01	01D1417	01D1448-007.004	BARIUM	MS1	91.3	%REC				1	G01090296-03AMS	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	BARIUM	MS1	90.8	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	BERYLLIUM	MD1	96.9	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	BERYLLIUM	MS1	95.1	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	BERYLLIUM	MS1	92.7	%REC				10	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	CADMIUM	MD1	118.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	CADMIUM	MS1	118.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	CADMIUM	MS1	96.3	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	CALCIUM	MD1	88.7	%REC				1	G01090296-03AMSD	745
ACCU	22896	9/12/01	01D1417	01D1448-007.004	CALCIUM	MS1	102.0	%REC				1	G01090296-03AMS	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	CALCIUM	MS1	4.2	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	CHROMIUM	MD1	115.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	CHROMIUM	MS1	113.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	CHROMIUM	MS1	95.2	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	COBALT	MD1	89.7	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	COBALT	MS1	92.6	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	COBALT	MS1	90.1	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1417	01D1448-007.004	COPPER	MD1	112.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	COPPER	MS1	111.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	COPPER	MS1	90.9	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	IRON	MD1	91.7	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	IRON	MS1	95.2	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	IRON	MS1	92.5	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1417	01D1448-007.004	LEAD	MD1	123.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	LEAD	MS1	125.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	LEAD	MS1	92.1	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	LITHIUM	MD1	92.5	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	LITHIUM	MS1	94.4	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	LITHIUM	MS1	92.6	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1417	01D1448-007.004	MAGNESIUM	MD1	94.5	%REC				1	G01090296-03AMSD	745
ACCU	22896	9/12/01	01D1417	01D1448-007.004	MAGNESIUM	MS1	92.3	%REC				1	G01090296-03AMS	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	MAGNESIUM	MS1	80.8	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	MANGANESE	MD1	92.1	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	MANGANESE	MS1	96.1	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	MANGANESE	MS1	92.5	%REC				1	G01090296-03AMS	745
ACCU	P114389	8/28/01	01D1417	01D1352-007.004	MERCURY	MD1	95.4	%REC				1	G01080465-01AMSD	732
ACCU	06091	8/24/01	01D1417	01D1352-003.004	MERCURY	MD1	92.2	%REC				1	G01080369-03AMSD	728
ACCU	P114389	8/28/01	01D1417	01D1352-007.004	MERCURY	MS1	92.4	%REC				1	G01080465-01AMS	732
ACCU	06091	8/24/01	01D1417	01D1352-003.004	MERCURY	MS1	87.0	%REC				1	G01080369-03AMS	728
ACCU	22896	9/12/01	01D1417	01D1448-007.004	MOLYBDENUM	MD1	91.1	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	MOLYBDENUM	MS1	98.7	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	MOLYBDENUM	MS1	91.4	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1417	01D1448-007.004	NICKEL	MD1	88.6	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	NICKEL	MS1	92.3	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	NICKEL	MS1	89.2	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1417	01D1448-007.004	POTASSIUM	MD1	93.3	%REC				1	G01090296-03AMSD	745

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

4/10/09

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	22896	9/12/01	01D1417	01D1448-007.004	POTASSIUM	MS1	93.9	%REC				1	G01090296-03AMS	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	POTASSIUM	MS1	93.4	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	SELENIUM	MD1	114.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	SELENIUM	MS1	110.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	SELENIUM	MS1	106.0	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	SILVER	MD1	118.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	SILVER	MS1	118.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	SILVER	MS1	85.3	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	SODIUM	MD1	89.8	%REC				1	G01090296-03AMSD	745
ACCU	22896	9/12/01	01D1417	01D1448-007.004	SODIUM	MS1	95.5	%REC				1	G01090296-03AMS	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	SODIUM	MS1	**64.9**	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	STRONTIUM	MD1	91.8	%REC				1	G01090296-03AMSD	745
ACCU	22896	9/12/01	01D1417	01D1448-007.004	STRONTIUM	MS1	93.3	%REC				1	G01090296-03AMS	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	STRONTIUM	MS1	88.3	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	THALLIUM	MD1	116.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	THALLIUM	MS1	118.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	THALLIUM	MS1	92.4	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	TIN	MD1	95.6	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	TIN	MS1	103.0	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	TIN	MS1	96.0	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1417	01D1448-007.004	URANIUM, TOTAL	MD1	**137.0**	%REC		N		1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	URANIUM, TOTAL	MS1	**138.0**	%REC		N		1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	URANIUM, TOTAL	MS1	93.8	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	VANADIUM	MD1	102.0	%REC				10	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1417	01D1448-007.004	VANADIUM	MS1	101.0	%REC				10	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	VANADIUM	MS1	95.1	%REC				10	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	ZINC	MD1	92.4	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1417	01D1417-001.006	ZINC	MS1	94.3	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1417	01D1448-007.004	ZINC	MS1	92.9	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	ALUMINUM	MD1	**68.8**	%REC		N		10	G01090296-03AMSD	747
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	ALUMINUM	MS1	88.4	%REC				10	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	ALUMINUM	MS1	**71.8**	%REC				10	G01090296-03AMS	747
ACCU	22896	9/12/01	01D1448	01D1448-007.004	ANTIMONY	MD1	**125.0**	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1448	01D1448-007.004	ANTIMONY	MS1	124.0	%REC				1	G01090296-03AMS	747
[redacted]	P313589	9/6/01	01D1448	01D1417-001.006	ANTIMONY	MS1	93.8	%REC				5	G01090175-01AMS	M101001A
[redacted]	22896	9/12/01	01D1448	01D1448-007.004	ARSENIC	MD1	115.0	%REC				1	G01090296-03AMSD	747
[redacted]	22896	9/12/01	01D1448	01D1448-007.004	ARSENIC	MS1	114.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	ARSENIC	MS1	99.3	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	BARIUM	MD1	91.0	%REC				1	G01090296-03AMSD	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	BARIUM	MS1	91.3	%REC				1	G01090296-03AMS	745
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	BARIUM	MS1	90.8	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	BERYLLIUM	MD1	96.9	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1448	01D1448-007.004	BERYLLIUM	MS1	95.1	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	BERYLLIUM	MS1	92.7	%REC				10	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	CADMIUM	MD1	118.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1448	01D1448-007.004	CADMIUM	MS1	118.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	CADMIUM	MS1	96.3	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	CALCIUM	MD1	88.7	%REC				1	G01090296-03AMSD	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	CALCIUM	MS1	102.0	%REC				1	G01090296-03AMS	745
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	CALCIUM	MS1	**4.2**	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	CHROMIUM	MD1	115.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1448	01D1448-007.004	CHROMIUM	MS1	113.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	CHROMIUM	MS1	95.2	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	COBALT	MD1	89.7	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	COBALT	MS1	92.6	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	COBALT	MS1	90.1	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	COPPER	MD1	112.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1448	01D1448-007.004	COPPER	MS1	111.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	COPPER	MS1	90.9	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	IRON	MD1	91.7	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	IRON	MS1	95.2	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	IRON	MS1	92.5	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	LEAD	MD1	123.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1448	01D1448-007.004	LEAD	MS1	**125.0**	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	LEAD	MS1	92.1	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	LITHIUM	MD1	92.5	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	LITHIUM	MS1	94.4	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	LITHIUM	MS1	92.6	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	MAGNESIUM	MD1	94.5	%REC				1	G01090296-03AMSD	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	MAGNESIUM	MS1	92.3	%REC				1	G01090296-03AMS	745
[redacted]	P313589	9/6/01	01D1448	01D1417-001.006	MAGNESIUM	MS1	80.8	%REC				1	G01090175-01AMS	ID100401A
[redacted]	22896	9/12/01	01D1448	01D1448-007.004	MANGANESE	MD1	92.1	%REC				1	G01090296-03AMSD	745
[redacted]	P313589	9/6/01	01D1448	01D1417-001.006	MANGANESE	MS1	96.1	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	MANGANESE	MS1	92.5	%REC				1	G01090296-03AMS	745

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

644
710

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Ba
ACCU	04991	9/12/01	01D1448	01D1448-005.005	MERCURY	MD1	96.0	%REC				1	G01090296-01AMSD	1020
ACCU	P114389	8/28/01	01D1448	01D1352-007.004	MERCURY	MD1	95.4	%REC				1	G01080465-01AMSD	732
ACCU	06091	8/24/01	01D1448	01D1352-003.004	MERCURY	MD1	92.2	%REC				1	G01080369-03AMSD	728
ACCU	04991	9/12/01	01D1448	01D1448-005.005	MERCURY	MS1	95.0	%REC				1	G01090296-01AMS	1020
ACCU	P114389	8/28/01	01D1448	01D1352-007.004	MERCURY	MS1	92.4	%REC				1	G01080465-01AMS	732
ACCU	06091	8/24/01	01D1448	01D1352-003.004	MERCURY	MS1	87.0	%REC				1	G01080369-03AMS	728
ACCU	22896	9/12/01	01D1448	01D1448-007.004	MOLYBDENUM	MD1	91.1	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	MOLYBDENUM	MS1	98.7	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	MOLYBDENUM	MS1	91.4	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	NICKEL	MD1	88.6	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	NICKEL	MS1	92.3	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	NICKEL	MS1	89.2	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	POTASSIUM	MD1	93.3	%REC				1	G01090296-03AMSD	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	POTASSIUM	MS1	93.9	%REC				1	G01090296-03AMS	745
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	POTASSIUM	MS1	93.4	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	SELENIUM	MD1	114.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1448	01D1448-007.004	SELENIUM	MS1	110.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	SELENIUM	MS1	106.0	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	SILVER	MD1	118.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1448	01D1448-007.004	SILVER	MS1	118.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	SILVER	MS1	85.3	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	SODIUM	MD1	89.8	%REC				1	G01090296-03AMSD	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	SODIUM	MS1	95.5	%REC				1	G01090296-03AMS	745
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	SODIUM	MS1	64.9	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	STRONTIUM	MD1	91.8	%REC				1	G01090296-03AMSD	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	STRONTIUM	MS1	93.3	%REC				1	G01090296-03AMS	745
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	STRONTIUM	MS1	88.3	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	THALLIUM	MD1	116.0	%REC				1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1448	01D1448-007.004	THALLIUM	MS1	118.0	%REC				1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	THALLIUM	MS1	92.4	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	TIN	MD1	95.6	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	TIN	MS1	103.0	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	TIN	MS1	96.0	%REC				1	G01090296-03AMS	745
ACCU	22896	9/12/01	01D1448	01D1448-007.004	URANIUM, TOTAL	MD1	137.0	%REC		N		1	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1448	01D1448-007.004	URANIUM, TOTAL	MS1	138.0	%REC		N		1	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	URANIUM, TOTAL	MS1	93.8	%REC				5	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	VANADIUM	MD1	102.0	%REC				10	G01090296-03AMSD	747
ACCU	22896	9/12/01	01D1448	01D1448-007.004	VANADIUM	MS1	101.0	%REC				10	G01090296-03AMS	747
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	VANADIUM	MS1	95.1	%REC				10	G01090175-01AMS	M101001A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	ZINC	MD1	92.4	%REC				1	G01090296-03AMSD	745
ACCU	P313589	9/6/01	01D1448	01D1417-001.006	ZINC	MS1	94.3	%REC				1	G01090175-01AMS	ID100401A
ACCU	22896	9/12/01	01D1448	01D1448-007.004	ZINC	MS1	92.9	%REC				1	G01090296-03AMS	745
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	ALUMINUM	MD1	99.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	ALUMINUM	MS1	99.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	ANTIMONY	MD1	100.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	ANTIMONY	MS1	99.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	ARSENIC	MD1	104.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	ARSENIC	MS1	104.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	BARIUM	MD1	98.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	BARIUM	MS1	98.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	BERYLLIUM	MD1	93.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	BERYLLIUM	MS1	93.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	CADMIUM	MD1	96.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	CADMIUM	MS1	95.0	%REC				1	D1I220108-002S	1269407
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	CALCIUM	MD1	99.0	%REC				1	D1I220108-001D	1268362
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	CALCIUM	MS1	101.0	%REC				1	D1I220108-001S	1268362
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	CHROMIUM	MD1	96.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	CHROMIUM	MS1	96.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	COBALT	MD1	96.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	COBALT	MS1	95.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	COPPER	MD1	102.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	COPPER	MS1	102.0	%REC				1	D1I220108-002S	1269407
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	IRON	MD1	99.0	%REC				1	D1I220108-001D	1268362
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	IRON	MS1	100.0	%REC				1	D1I220108-001S	1268362
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	LEAD	MD1	99.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	LEAD	MS1	99.0	%REC				1	D1I220108-002S	1269407
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	LITHIUM	MD1	103.0	%REC				1	D1I220108-001D	1268362
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	LITHIUM	MS1	104.0	%REC				1	D1I220108-001S	1268362
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	MAGNESIUM	MD1	106.0	%REC				1	D1I220108-001D	1268362
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	MAGNESIUM	MS1	106.0	%REC				1	D1I220108-001S	1268362
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	MANGANESE	MD1	96.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	MANGANESE	MS1	96.0	%REC				1	D1I220108-002S	1269407
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	MERCURY	MD1	105.0	%REC				1	D1I220108-001D	1280122
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	MERCURY	MS1	106.0	%REC				1	D1I220108-001S	1280122
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	MOLYBDENUM	MD1	96.0	%REC				1	D1I220108-002D	1269407

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]DEN	10398	9/13/01	01D1495	01D1495-003.001	MOLYBDENUM	MS1	96.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	NICKEL	MD1	96.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	NICKEL	MS1	96.0	%REC				1	D1I220108-002S	1269407
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	POTASSIUM	MD1	103.0	%REC				1	D1I220108-001D	1268362
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	POTASSIUM	MS1	104.0	%REC				1	D1I220108-001S	1268362
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	SELENIUM	MD1	108.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	SELENIUM	MS1	107.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	SILVER	MD1	102.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	SILVER	MS1	102.0	%REC				1	D1I220108-002S	1269407
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	SODIUM	MD1	106.0	%REC				1	D1I220108-001D	1268362
STLDEN	6586	9/17/01	01D1495	01D1495-001.004	SODIUM	MS1	108.0	%REC				1	D1I220108-001S	1268362
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	STRONTIUM	MD1	93.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	STRONTIUM	MS1	92.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	THALLIUM	MD1	97.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	THALLIUM	MS1	96.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	TIN	MD1	97.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	TIN	MS1	97.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	URANIUM, TOTAL	MD1	100.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	URANIUM, TOTAL	MS1	100.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	VANADIUM	MD1	99.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	VANADIUM	MS1	99.0	%REC				1	D1I220108-002S	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	ZINC	MD1	92.0	%REC				1	D1I220108-002D	1269407
STLDEN	10398	9/13/01	01D1495	01D1495-003.001	ZINC	MS1	92.0	%REC				1	D1I220108-002S	1269407
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	ALUMINUM	MD1	95.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	ALUMINUM	MS1	96.0	%REC				1	D1J020194-001S	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	ANTIMONY	MD1	95.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	ANTIMONY	MS1	97.0	%REC				1	D1J020194-001S	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	ARSENIC	MD1	101.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	ARSENIC	MS1	102.0	%REC				1	D1J020194-001S	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	BARIUM	MD1	96.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	BARIUM	MS1	97.0	%REC				1	D1J020194-001S	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	BERYLLIUM	MD1	94.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	BERYLLIUM	MS1	96.0	%REC				1	D1J020194-001S	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	CADMIUM	MD1	94.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	CADMIUM	MS1	96.0	%REC				1	D1J020194-001S	1277386
[redacted]DEN	40999	9/20/01	01D1509	01D1509-003.001	CALCIUM	MD1	92.0	%REC				1	D1I250158-001D	1277378
[redacted]DEN	40999	9/20/01	01D1509	01D1509-003.001	CALCIUM	MS1	91.0	%REC				1	D1I250158-001S	1277378
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	CHROMIUM	MD1	96.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	CHROMIUM	MS1	98.0	%REC				1	D1J020194-001S	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	COBALT	MD1	95.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	COBALT	MS1	96.0	%REC				1	D1J020194-001S	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	COPPER	MD1	95.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	COPPER	MS1	96.0	%REC				1	D1J020194-001S	1277386
STLDEN	40999	9/20/01	01D1509	01D1509-003.001	IRON	MD1	96.0	%REC				1	D1I250158-001D	1277378
STLDEN	40999	9/20/01	01D1509	01D1509-003.001	IRON	MS1	96.0	%REC				1	D1I250158-001S	1277378
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	LEAD	MD1	96.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	LEAD	MS1	98.0	%REC				1	D1J020194-001S	1277386
STLDEN	40999	9/20/01	01D1509	01D1509-003.001	LITHIUM	MD1	100.0	%REC				1	D1I250158-001D	1277378
STLDEN	40999	9/20/01	01D1509	01D1509-003.001	LITHIUM	MS1	100.0	%REC				1	D1I250158-001S	1277378
STLDEN	40999	9/20/01	01D1509	01D1509-003.001	MAGNESIUM	MD1	102.0	%REC				1	D1I250158-001D	1277378
STLDEN	40999	9/20/01	01D1509	01D1509-003.001	MAGNESIUM	MS1	101.0	%REC				1	D1I250158-001S	1277378
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	MANGANESE	MD1	91.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	MANGANESE	MS1	99.0	%REC				1	D1J020194-001S	1277386
STLDEN	6586	9/17/01	01D1509	01D1495-001.004	MERCURY	MD1	105.0	%REC				1	D1I220108-001D	1280122
STLDEN	6586	9/17/01	01D1509	01D1495-001.004	MERCURY	MS1	106.0	%REC				1	D1I220108-001S	1280122
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	MOLYBDENUM	MD1	94.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	MOLYBDENUM	MS1	96.0	%REC				1	D1J020194-001S	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	NICKEL	MD1	94.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	NICKEL	MS1	95.0	%REC				1	D1J020194-001S	1277386
STLDEN	40999	9/20/01	01D1509	01D1509-003.001	POTASSIUM	MD1	100.0	%REC				1	D1I250158-001D	1277378
STLDEN	40999	9/20/01	01D1509	01D1509-003.001	POTASSIUM	MS1	100.0	%REC				1	D1I250158-001S	1277378
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	SELENIUM	MD1	104.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	SELENIUM	MS1	106.0	%REC				1	D1J020194-001S	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	SILVER	MD1	100.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	SILVER	MS1	101.0	%REC				1	D1J020194-001S	1277386
STLDEN	40999	9/20/01	01D1509	01D1509-003.001	SODIUM	MD1	99.0	%REC				1	D1I250158-001D	1277378
STLDEN	40999	9/20/01	01D1509	01D1509-003.001	SODIUM	MS1	95.0	%REC				1	D1I250158-001S	1277378
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	STRONTIUM	MD1	92.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	STRONTIUM	MS1	94.0	%REC				1	D1J020194-001S	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	THALLIUM	MD1	94.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	THALLIUM	MS1	95.0	%REC				1	D1J020194-001S	1277386
[redacted]DEN	30900	10/1/01	01D1509	02D0065-001.004	TIN	MD1	95.0	%REC				1	D1J020194-001D	1277386
[redacted]DEN	30900	10/1/01	01D1509	02D0065-001.004	TIN	MS1	96.0	%REC				1	D1J020194-001S	1277386
[redacted]DEN	30900	10/1/01	01D1509	02D0065-001.004	URANIUM, TOTAL	MD1	100.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	URANIUM, TOTAL	MS1	101.0	%REC				1	D1J020194-001S	1277386

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Bat
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	VANADIUM	MD1	99.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	VANADIUM	MS1	101.0	%REC				1	D1J020194-001S	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	ZINC	MD1	93.0	%REC				1	D1J020194-001D	1277386
STLDEN	30900	10/1/01	01D1509	02D0065-001.004	ZINC	MS1	95.0	%REC				1	D1J020194-001S	1277386
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	ALUMINUM	MD1	98.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	ALUMINUM	MD1	93.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	ALUMINUM	MS1	99.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	ALUMINUM	MS1	93.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	ANTIMONY	MD1	97.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	ANTIMONY	MD1	96.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	ANTIMONY	MS1	97.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	ANTIMONY	MS1	96.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	ARSENIC	MD1	102.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	ARSENIC	MD1	101.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	ARSENIC	MS1	102.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	ARSENIC	MS1	102.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	BARIUM	MD1	95.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	BARIUM	MD1	94.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	BARIUM	MS1	96.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	BARIUM	MS1	94.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	BERYLLIUM	MD1	96.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	BERYLLIUM	MD1	91.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	BERYLLIUM	MS1	96.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	BERYLLIUM	MS1	92.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	CADMIUM	MD1	94.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	CADMIUM	MD1	93.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	CADMIUM	MS1	96.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	CADMIUM	MS1	94.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-002.004	CALCIUM	MD1	98.0	%REC	YES			1	D1J090223-002D	1284278
STLDEN	1986	10/8/01	02D0089	02D0089-004.004	CALCIUM	MD1	98.0	%REC	YES			1	D1J110329-001D	1288396
STLDEN	1986	10/8/01	02D0089	02D0089-004.004	CALCIUM	MS1	101.0	%REC	YES			1	D1J110329-001S	1288396
STLDEN	11891	10/5/01	02D0089	02D0089-002.004	CALCIUM	MS1	98.0	%REC	YES			1	D1J090223-002S	1284278
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	CHROMIUM	MD1	99.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	CHROMIUM	MD1	94.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	CHROMIUM	MS1	98.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	CHROMIUM	MS1	95.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	COBALT	MD1	97.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	COBALT	MD1	94.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	COBALT	MS1	97.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	COBALT	MS1	96.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	COPPER	MD1	95.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	COPPER	MD1	94.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	COPPER	MS1	96.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	COPPER	MS1	96.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-002.004	IRON	MD1	98.0	%REC	YES			1	D1J090223-002D	1284278
STLDEN	1986	10/8/01	02D0089	02D0089-004.004	IRON	MD1	93.0	%REC	YES			1	D1J110329-001D	1288396
STLDEN	1986	10/8/01	02D0089	02D0089-004.004	IRON	MS1	103.0	%REC	YES			1	D1J110329-001S	1288396
STLDEN	11891	10/5/01	02D0089	02D0089-002.004	IRON	MS1	99.0	%REC	YES			1	D1J090223-002S	1284278
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	LEAD	MD1	99.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	LEAD	MD1	98.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	LEAD	MS1	99.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	LEAD	MS1	98.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	1986	10/8/01	02D0089	02D0089-004.004	LITHIUM	MD1	103.0	%REC	YES			1	D1J110329-001D	1288396
STLDEN	11891	10/5/01	02D0089	02D0089-002.004	LITHIUM	MD1	92.0	%REC	YES			1	D1J090223-002D	1284278
STLDEN	1986	10/8/01	02D0089	02D0089-004.004	LITHIUM	MS1	104.0	%REC	YES			1	D1J110329-001S	1288396
STLDEN	11891	10/5/01	02D0089	02D0089-002.004	LITHIUM	MS1	93.0	%REC	YES			1	D1J090223-002S	1284278
STLDEN	1986	10/8/01	02D0089	02D0089-004.004	MAGNESIUM	MD1	105.0	%REC	YES			1	D1J110329-001D	1288396
STLDEN	11891	10/5/01	02D0089	02D0089-002.004	MAGNESIUM	MD1	100.0	%REC	YES			1	D1J090223-002D	1284278
STLDEN	1986	10/8/01	02D0089	02D0089-004.004	MAGNESIUM	MS1	106.0	%REC	YES			1	D1J110329-001S	1288396
STLDEN	11891	10/5/01	02D0089	02D0089-002.004	MAGNESIUM	MS1	100.0	%REC	YES			1	D1J090223-002S	1284278
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	MANGANESE	MD1	99.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	MANGANESE	MD1	94.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	MANGANESE	MS1	98.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	MANGANESE	MS1	95.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	MERCURY	MD1	94.0	%REC	YES			1	D1J090223-001D	1291240
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	MERCURY	MS1	96.0	%REC	YES			1	D1J090223-001S	1291240
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	MOLYBDENUM	MD1	98.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	MOLYBDENUM	MD1	94.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	MOLYBDENUM	MS1	98.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	MOLYBDENUM	MS1	95.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	NICKEL	MD1	94.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	NICKEL	MD1	94.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	NICKEL	MS1	95.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	NICKEL	MS1	94.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	1986	10/8/01	02D0089	02D0089-004.004	POTASSIUM	MD1	101.0	%REC	YES			1	D1J110329-001D	1288396

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

1444-713

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	11891	10/5/01	02D0089	02D0089-002.004	POTASSIUM	MD1	92.0	%REC	YES			1	D1J090223-002D	1284278
STLDEN	1986	10/8/01	02D0089	02D0089-004.004	POTASSIUM	MS1	102.0	%REC	YES			1	D1J110329-001S	1288396
STLDEN	11891	10/5/01	02D0089	02D0089-002.004	POTASSIUM	MS1	92.0	%REC	YES			1	D1J090223-002S	1284278
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	SELENIUM	MD1	106.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	SELENIUM	MD1	102.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	SELENIUM	MS1	107.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	SELENIUM	MS1	105.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	SILVER	MD1	106.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	SILVER	MD1	104.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	SILVER	MS1	105.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	SILVER	MS1	105.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	1986	10/8/01	02D0089	02D0089-004.004	SODIUM	MD1	99.0	%REC	YES			1	D1J110329-001D	1288396
STLDEN	11891	10/5/01	02D0089	02D0089-002.004	SODIUM	MD1	98.0	%REC	YES			1	D1J090223-002D	1284278
STLDEN	1986	10/8/01	02D0089	02D0089-004.004	SODIUM	MS1	103.0	%REC	YES			1	D1J110329-001S	1288396
STLDEN	11891	10/5/01	02D0089	02D0089-002.004	SODIUM	MS1	98.0	%REC	YES			1	D1J090223-002S	1284278
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	STRONTIUM	MD1	92.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	STRONTIUM	MD1	92.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	STRONTIUM	MS1	93.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	STRONTIUM	MS1	92.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	THALLIUM	MD1	96.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	THALLIUM	MD1	93.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	THALLIUM	MS1	96.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	THALLIUM	MS1	93.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	TIN	MD1	98.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	TIN	MD1	96.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	TIN	MS1	97.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	TIN	MS1	97.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	URANIUM, TOTAL	MD1	101.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	URANIUM, TOTAL	MD1	100.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	URANIUM, TOTAL	MS1	101.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	URANIUM, TOTAL	MS1	101.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	VANADIUM	MD1	103.0	%REC	YES			1	D1J090223-001D	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	VANADIUM	MD1	96.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	VANADIUM	MS1	102.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	VANADIUM	MS1	97.0	%REC	YES			1	D1J110329-006S	1303125
[redacted]	11891	10/5/01	02D0089	02D0089-001.004	ZINC	MD1	98.0	%REC	YES			1	D1J090223-001D	1284275
[redacted]	00300	10/10/01	02D0089	02D0089-014.004	ZINC	MD1	92.0	%REC	YES			1	D1J110329-006D	1303125
STLDEN	11891	10/5/01	02D0089	02D0089-001.004	ZINC	MS1	97.0	%REC	YES			1	D1J090223-001S	1284275
STLDEN	00300	10/10/01	02D0089	02D0089-014.004	ZINC	MS1	93.0	%REC	YES			1	D1J110329-006S	1303125
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	ALUMINUM	MD1	97.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	ALUMINUM	MD1	92.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	ALUMINUM	MS1	97.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	ALUMINUM	MS1	95.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	ANTIMONY	MD1	99.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	ANTIMONY	MD1	98.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	ANTIMONY	MS1	99.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	ANTIMONY	MS1	99.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	ARSENIC	MD1	103.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	ARSENIC	MD1	101.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	ARSENIC	MS1	104.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	ARSENIC	MS1	102.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	BARIUM	MD1	100.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	BARIUM	MD1	97.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	BARIUM	MS1	100.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	BARIUM	MS1	98.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	BERYLLIUM	MD1	94.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	BERYLLIUM	MD1	92.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	BERYLLIUM	MS1	94.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	BERYLLIUM	MS1	92.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	CADMIUM	MD1	98.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	CADMIUM	MD1	97.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	CADMIUM	MS1	98.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	CADMIUM	MS1	97.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-001.004	CALCIUM	MD1	96.0	%REC	YES			1	D1J150193-001D	1291362
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	CALCIUM	MD1	86.0	%REC	NO	N		1	D1J210104-001D	1296471
STLDEN	02291	10/11/01	02D0117	02D0117-001.004	CALCIUM	MS1	95.0	%REC	YES			1	D1J150193-001S	1291362
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	CALCIUM	MS1	92.0	%REC	NO			1	D1J210104-001S	1296471
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	CHROMIUM	MD1	97.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	CHROMIUM	MD1	95.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	CHROMIUM	MS1	98.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	CHROMIUM	MS1	96.0	%REC	YES			1	D1J150193-002S	1291364
[redacted]	3687	10/16/01	02D0117	02D0117-008.004	COBALT	MD1	97.0	%REC	NO			1	D1J210104-002D	1311169
[redacted]	02291	10/11/01	02D0117	02D0117-002.004	COBALT	MD1	94.0	%REC	YES			1	D1J150193-002D	1291364
[redacted]	3687	10/16/01	02D0117	02D0117-008.004	COBALT	MS1	97.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	COBALT	MS1	94.0	%REC	YES			1	D1J150193-002S	1291364

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

6465714

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples

Groundwater - Calendar Year 2001

9/23/02

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	COPPER	MD1	98.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	COPPER	MD1	98.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	COPPER	MS1	99.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	COPPER	MS1	98.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	IRON	MD1	104.0	%REC	NO			1	D1J210104-001D	1296471
STLDEN	02291	10/11/01	02D0117	02D0117-001.004	IRON	MD1	98.0	%REC	YES			1	D1J150193-001D	1291362
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	IRON	MS1	106.0	%REC	NO			1	D1J210104-001S	1296471
STLDEN	02291	10/11/01	02D0117	02D0117-001.004	IRON	MS1	98.0	%REC	YES			1	D1J150193-001S	1291362
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	LEAD	MD1	99.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	LEAD	MD1	97.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	LEAD	MS1	100.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	LEAD	MS1	98.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	LITHIUM	MD1	107.0	%REC	NO			1	D1J210104-001D	1296471
STLDEN	02291	10/11/01	02D0117	02D0117-001.004	LITHIUM	MD1	97.0	%REC	YES			1	D1J150193-001D	1291362
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	LITHIUM	MS1	106.0	%REC	NO			1	D1J210104-001S	1296471
STLDEN	02291	10/11/01	02D0117	02D0117-001.004	LITHIUM	MS1	98.0	%REC	YES			1	D1J150193-001S	1291362
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	MAGNESIUM	MD1	107.0	%REC	NO			1	D1J210104-001D	1296471
STLDEN	02291	10/11/01	02D0117	02D0117-001.004	MAGNESIUM	MD1	102.0	%REC	YES			1	D1J150193-001D	1291362
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	MAGNESIUM	MS1	105.0	%REC	NO			1	D1J210104-001S	1296471
STLDEN	02291	10/11/01	02D0117	02D0117-001.004	MAGNESIUM	MS1	101.0	%REC	YES			1	D1J150193-001S	1291362
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	MANGANESE	MD1	97.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	MANGANESE	MD1	95.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	MANGANESE	MS1	98.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	MANGANESE	MS1	95.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	MERCURY	MD1	98.0	%REC	NO			1	D1J210104-001D	1305286
STLDEN	?		02D0117		MERCURY	MD1	94.0	%REC				1	D1J090223-001D	1291240
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	MERCURY	MS1	97.0	%REC	NO			1	D1J210104-001S	1305286
STLDEN	?		02D0117		MERCURY	MS1	96.0	%REC				1	D1J090223-001S	1291240
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	MOLYBDENUM	MD1	96.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	MOLYBDENUM	MD1	94.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	MOLYBDENUM	MS1	96.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	MOLYBDENUM	MS1	94.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	NICKEL	MD1	98.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	NICKEL	MD1	97.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	NICKEL	MS1	98.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	NICKEL	MS1	98.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	POTASSIUM	MD1	104.0	%REC	NO			1	D1J210104-001D	1296471
STLDEN	02291	10/11/01	02D0117	02D0117-001.004	POTASSIUM	MD1	98.0	%REC	YES			1	D1J150193-001D	1291362
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	POTASSIUM	MS1	104.0	%REC	NO			1	D1J210104-001S	1296471
STLDEN	02291	10/11/01	02D0117	02D0117-001.004	POTASSIUM	MS1	97.0	%REC	YES			1	D1J150193-001S	1291362
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	SELENIUM	MD1	105.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	SELENIUM	MD1	102.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	SELENIUM	MS1	105.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	SELENIUM	MS1	103.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	SILVER	MD1	106.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	SILVER	MD1	105.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	SILVER	MS1	107.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	SILVER	MS1	106.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	SODIUM	MD1	108.0	%REC	NO			1	D1J210104-001D	1296471
STLDEN	02291	10/11/01	02D0117	02D0117-001.004	SODIUM	MD1	101.0	%REC	YES			1	D1J150193-001D	1291362
STLDEN	1786	10/16/01	02D0117	02D0117-007.004	SODIUM	MS1	104.0	%REC	NO			1	D1J210104-001S	1296471
STLDEN	02291	10/11/01	02D0117	02D0117-001.004	SODIUM	MS1	100.0	%REC	YES			1	D1J150193-001S	1291362
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	STRONTIUM	MD1	100.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	STRONTIUM	MD1	96.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	STRONTIUM	MS1	100.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	STRONTIUM	MS1	96.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	THALLIUM	MD1	96.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	THALLIUM	MD1	95.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	THALLIUM	MS1	96.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	THALLIUM	MS1	96.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	TIN	MD1	98.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	TIN	MD1	96.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	TIN	MS1	98.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	TIN	MS1	96.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	URANIUM, TOTAL	MD1	102.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	URANIUM, TOTAL	MD1	101.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	URANIUM, TOTAL	MS1	103.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	URANIUM, TOTAL	MS1	101.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	VANADIUM	MD1	99.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	VANADIUM	MD1	94.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	VANADIUM	MS1	100.0	%REC	NO			1	D1J210104-002S	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	VANADIUM	MS1	94.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	ZINC	MD1	95.0	%REC	NO			1	D1J210104-002D	1311169
STLDEN	02291	10/11/01	02D0117	02D0117-002.004	ZINC	MD1	92.0	%REC	YES			1	D1J150193-002D	1291364
STLDEN	3687	10/16/01	02D0117	02D0117-008.004	ZINC	MS1	95.0	%REC	NO			1	D1J210104-002S	1311169

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

[redacted]	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]EN	02291	10/11/01	02D0117	02D0117-002.004	ZINC	MS1	92.0	%REC	YES			1	D1J150193-002S	1291364
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	ALUMINUM	MD1	101.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	ALUMINUM	MD1	97.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	ALUMINUM	MS1	105.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	ALUMINUM	MS1	100.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	ANTIMONY	MD1	101.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	ANTIMONY	MD1	99.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	ANTIMONY	MS1	104.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	ANTIMONY	MS1	101.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	ARSENIC	MD1	105.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	ARSENIC	MD1	103.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	ARSENIC	MS1	105.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	ARSENIC	MS1	103.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	BARIUM	MD1	97.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	BARIUM	MD1	96.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	BARIUM	MS1	96.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	BARIUM	MS1	96.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	BERYLLIUM	MD1	94.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	BERYLLIUM	MD1	90.0	%REC	YES	N		1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	BERYLLIUM	MS1	95.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	BERYLLIUM	MS1	90.0	%REC	YES	N		1	D1J230240-002S	1298325
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	CADMIUM	MD1	95.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	CADMIUM	MD1	94.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	CADMIUM	MS1	96.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	CADMIUM	MS1	96.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	02500	10/23/01	02D0174	02D0174-009.004	CALCIUM	MD1	96.0	%REC	YES			1	D1J260246-002D	1305367
STLDEN	00200	10/18/01	02D0174	02D0174-001.004	CALCIUM	MD1	95.0	%REC	YES			1	D1J230240-001D	1298322
STLDEN	02500	10/23/01	02D0174	02D0174-009.004	CALCIUM	MS1	100.0	%REC	YES			1	D1J260246-002S	1305367
STLDEN	00200	10/18/01	02D0174	02D0174-001.004	CALCIUM	MS1	96.0	%REC	YES			1	D1J230240-001S	1298322
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	CHROMIUM	MD1	95.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	CHROMIUM	MD1	90.0	%REC	NO	N		1	D1J260246-001D	1305336
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	CHROMIUM	MS1	98.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	CHROMIUM	MS1	95.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	COBALT	MD1	97.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	COBALT	MD1	96.0	%REC	YES			1	D1J230240-002D	1298325
[redacted]EN	23296	10/23/01	02D0174	02D0174-008.004	COBALT	MS1	97.0	%REC	NO			1	D1J260246-001S	1305336
[redacted]EN	B208789	10/19/01	02D0174	02D0174-002.001	COBALT	MS1	96.0	%REC	YES			1	D1J230240-002S	1298325
[redacted]EN	23296	10/23/01	02D0174	02D0174-008.004	COPPER	MD1	122.0	%REC	NO	N*		1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	COPPER	MD1	100.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	COPPER	MS1	100.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	COPPER	MS1	97.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	02500	10/23/01	02D0174	02D0174-009.004	IRON	MD1	106.0	%REC	YES			1	D1J260246-002D	1305367
STLDEN	00200	10/18/01	02D0174	02D0174-001.004	IRON	MD1	95.0	%REC	YES			1	D1J230240-001D	1298322
STLDEN	02500	10/23/01	02D0174	02D0174-009.004	IRON	MS1	108.0	%REC	YES			1	D1J260246-002S	1305367
STLDEN	00200	10/18/01	02D0174	02D0174-001.004	IRON	MS1	96.0	%REC	YES			1	D1J230240-001S	1298322
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	LEAD	MD1	104.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	LEAD	MD1	100.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	LEAD	MS1	100.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	LEAD	MS1	100.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	02500	10/23/01	02D0174	02D0174-009.004	LITHIUM	MD1	98.0	%REC	YES			1	D1J260246-002D	1305367
STLDEN	00200	10/18/01	02D0174	02D0174-001.004	LITHIUM	MD1	94.0	%REC	YES			1	D1J230240-001D	1298322
STLDEN	02500	10/23/01	02D0174	02D0174-009.004	LITHIUM	MS1	98.0	%REC	YES			1	D1J260246-002S	1305367
STLDEN	00200	10/18/01	02D0174	02D0174-001.004	LITHIUM	MS1	95.0	%REC	YES			1	D1J230240-001S	1298322
STLDEN	02500	10/23/01	02D0174	02D0174-009.004	MAGNESIUM	MD1	101.0	%REC	YES			1	D1J260246-002D	1305367
STLDEN	00200	10/18/01	02D0174	02D0174-001.004	MAGNESIUM	MD1	100.0	%REC	YES			1	D1J230240-001D	1298322
STLDEN	02500	10/23/01	02D0174	02D0174-009.004	MAGNESIUM	MS1	102.0	%REC	YES			1	D1J260246-002S	1305367
STLDEN	00200	10/18/01	02D0174	02D0174-001.004	MAGNESIUM	MS1	101.0	%REC	YES			1	D1J230240-001S	1298322
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	MANGANESE	MD1	96.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	MANGANESE	MD1	94.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	MANGANESE	MS1	97.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	MANGANESE	MS1	95.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	?		02D0174		MERCURY	MD1	98.0	%REC				1	D1J210104-001D	1305286
STLDEN	?		02D0174		MERCURY	MS1	97.0	%REC				1	D1J210104-001S	1305286
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	MOLYBDENUM	MD1	97.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	MOLYBDENUM	MD1	95.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	MOLYBDENUM	MS1	98.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	MOLYBDENUM	MS1	95.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	NICKEL	MD1	95.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	NICKEL	MD1	94.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	NICKEL	MS1	96.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	NICKEL	MS1	94.0	%REC	NO			1	D1J260246-001S	1305336
[redacted]EN	02500	10/23/01	02D0174	02D0174-009.004	POTASSIUM	MD1	99.0	%REC	YES			1	D1J260246-002D	1305367
[redacted]EN	00200	10/18/01	02D0174	02D0174-001.004	POTASSIUM	MD1	97.0	%REC	YES			1	D1J230240-001D	1298322
[redacted]EN	02500	10/23/01	02D0174	02D0174-009.004	POTASSIUM	MS1	99.0	%REC	YES			1	D1J260246-002S	1305367
STLDEN	00200	10/18/01	02D0174	02D0174-001.004	POTASSIUM	MS1	98.0	%REC	YES			1	D1J230240-001S	1298322

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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7110

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilu-tion	Lab Sample #	Lab Ba
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	SELENIUM	MD1	107.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	SELENIUM	MD1	106.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	SELENIUM	MS1	107.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	SELENIUM	MS1	107.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	SILVER	MD1	110.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	SILVER	MD1	108.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	SILVER	MS1	109.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	SILVER	MS1	108.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	02500	10/23/01	02D0174	02D0174-009.004	SODIUM	MD1	105.0	%REC	YES			1	D1J260246-002D	1305367
STLDEN	00200	10/18/01	02D0174	02D0174-001.004	SODIUM	MD1	101.0	%REC	YES			1	D1J230240-001D	1298322
STLDEN	02500	10/23/01	02D0174	02D0174-009.004	SODIUM	MS1	106.0	%REC	YES			1	D1J260246-002S	1305367
STLDEN	00200	10/18/01	02D0174	02D0174-001.004	SODIUM	MS1	101.0	%REC	YES			1	D1J230240-001S	1298322
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	STRONTIUM	MD1	90.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	STRONTIUM	MD1	88.0	%REC	NO	N		1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	STRONTIUM	MS1	90.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	STRONTIUM	MS1	87.0	%REC	NO	N		1	D1J260246-001S	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	THALLIUM	MD1	97.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	THALLIUM	MD1	96.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	THALLIUM	MS1	98.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	THALLIUM	MS1	96.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	TIN	MD1	99.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	TIN	MD1	99.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	TIN	MS1	99.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	TIN	MS1	99.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	URANIUM, TOTAL	MD1	106.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	URANIUM, TOTAL	MD1	102.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	URANIUM, TOTAL	MS1	105.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	URANIUM, TOTAL	MS1	101.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	VANADIUM	MD1	101.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	VANADIUM	MD1	97.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	VANADIUM	MS1	101.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	VANADIUM	MS1	97.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	ZINC	MD1	94.0	%REC	YES			1	D1J230240-002D	1298325
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	ZINC	MD1	94.0	%REC	NO			1	D1J260246-001D	1305336
STLDEN	23296	10/23/01	02D0174	02D0174-008.004	ZINC	MS1	95.0	%REC	NO			1	D1J260246-001S	1305336
STLDEN	B208789	10/19/01	02D0174	02D0174-002.001	ZINC	MS1	94.0	%REC	YES			1	D1J230240-002S	1298325
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	ALUMINUM	MD1	98.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	ALUMINUM	MD1	96.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	ALUMINUM	MS1	102.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	ALUMINUM	MS1	100.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	ANTIMONY	MD1	97.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	ANTIMONY	MD1	97.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	ANTIMONY	MS1	99.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	ANTIMONY	MS1	97.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	ARSENIC	MD1	102.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	ARSENIC	MD1	100.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	ARSENIC	MS1	102.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	ARSENIC	MS1	101.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	BARIUM	MD1	97.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	BARIUM	MD1	94.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	BARIUM	MS1	97.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	BARIUM	MS1	96.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	BERYLLIUM	MD1	95.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	BERYLLIUM	MD1	91.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	BERYLLIUM	MS1	95.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	BERYLLIUM	MS1	93.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	CADMIUM	MD1	96.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	CADMIUM	MD1	95.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	CADMIUM	MS1	97.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	CADMIUM	MS1	95.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	CALCIUM	MD1	100.0	%REC	YES			1	D1J310242-001D	1310309
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	CALCIUM	MD1	92.0	%REC	NO			1	D1J300188-001D	1305371
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	CALCIUM	MS1	102.0	%REC	YES			1	D1J310242-001S	1310309
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	CALCIUM	MS1	91.0	%REC	NO			1	D1J300188-001S	1305371
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	CHROMIUM	MD1	96.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	CHROMIUM	MD1	95.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	CHROMIUM	MS1	97.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	CHROMIUM	MS1	96.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	COBALT	MD1	97.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	COBALT	MD1	95.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	COBALT	MS1	97.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	COBALT	MS1	96.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	COPPER	MD1	94.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	COPPER	MD1	94.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	COPPER	MS1	100.0	%REC	NO			1	D1J300188-001S	1305326

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	P219089	10/30/01	02D0216	02D0216-008.004	COPPER	MS1	96.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	IRON	MD1	97.0	%REC	NO			1	D1J300188-001D	1305371
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	IRON	MD1	97.0	%REC	YES			1	D1J310242-001D	1310309
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	IRON	MS1	97.0	%REC	NO			1	D1J300188-001S	1305371
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	IRON	MS1	97.0	%REC	YES			1	D1J310242-001S	1310309
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	LEAD	MD1	99.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	LEAD	MD1	98.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	LEAD	MS1	99.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	LEAD	MS1	98.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	LITHIUM	MD1	99.0	%REC	NO			1	D1J300188-001D	1305371
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	LITHIUM	MD1	98.0	%REC	YES			1	D1J310242-001D	1310309
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	LITHIUM	MS1	99.0	%REC	YES			1	D1J310242-001S	1310309
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	LITHIUM	MS1	97.0	%REC	NO			1	D1J300188-001S	1305371
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	MAGNESIUM	MD1	101.0	%REC	NO			1	D1J300188-001D	1305371
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	MAGNESIUM	MD1	101.0	%REC	YES			1	D1J310242-001D	1310309
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	MAGNESIUM	MS1	103.0	%REC	YES			1	D1J310242-001S	1310309
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	MAGNESIUM	MS1	100.0	%REC	NO			1	D1J300188-001S	1305371
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	MANGANESE	MD1	98.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	MANGANESE	MD1	94.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	MANGANESE	MS1	97.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	MANGANESE	MS1	96.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	?		02D0216		MERCURY	MD1	98.0	%REC				1	D1U210104-001D	1305286
STLDEN	?		02D0216		MERCURY	MS1	97.0	%REC				1	D1U210104-001S	1305286
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	MOLYBDENUM	MD1	96.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	MOLYBDENUM	MD1	94.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	MOLYBDENUM	MS1	96.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	MOLYBDENUM	MS1	96.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	NICKEL	MD1	97.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	NICKEL	MD1	95.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	NICKEL	MS1	97.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	NICKEL	MS1	96.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	POTASSIUM	MD1	100.0	%REC	NO			1	D1J300188-001D	1305371
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	POTASSIUM	MD1	97.0	%REC	YES			1	D1J310242-001D	1310309
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	POTASSIUM	MS1	99.0	%REC	NO			1	D1J300188-001S	1305371
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	POTASSIUM	MS1	98.0	%REC	YES			1	D1J310242-001S	1310309
[redacted]	18199	10/29/01	02D0216	02D0216-004.004	SELENIUM	MD1	105.0	%REC	NO			1	D1J300188-001D	1305326
[redacted]	P219089	10/30/01	02D0216	02D0216-008.004	SELENIUM	MD1	105.0	%REC	YES			1	D1J310242-001D	1310307
[redacted]	P219089	10/30/01	02D0216	02D0216-008.004	SELENIUM	MS1	106.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	SELENIUM	MS1	104.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	SILVER	MD1	105.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	SILVER	MD1	103.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	SILVER	MS1	105.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	SILVER	MS1	105.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	SODIUM	MD1	106.0	%REC	YES			1	D1J310242-001D	1310309
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	SODIUM	MD1	102.0	%REC	NO			1	D1J300188-001D	1305371
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	SODIUM	MS1	108.0	%REC	YES			1	D1J310242-001S	1310309
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	SODIUM	MS1	99.0	%REC	NO			1	D1J300188-001S	1305371
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	STRONTIUM	MD1	93.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	STRONTIUM	MD1	91.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	STRONTIUM	MS1	95.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	STRONTIUM	MS1	92.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	THALLIUM	MD1	95.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	THALLIUM	MD1	95.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	THALLIUM	MS1	97.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	THALLIUM	MS1	95.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	TIN	MD1	97.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	TIN	MD1	96.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	TIN	MS1	98.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	TIN	MS1	96.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	URANIUM, TOTAL	MD1	103.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	URANIUM, TOTAL	MD1	100.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	URANIUM, TOTAL	MS1	103.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	URANIUM, TOTAL	MS1	102.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	VANADIUM	MD1	100.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	VANADIUM	MD1	95.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	VANADIUM	MS1	99.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	VANADIUM	MS1	97.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	ZINC	MD1	95.0	%REC	NO			1	D1J300188-001D	1305326
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	ZINC	MD1	94.0	%REC	YES			1	D1J310242-001D	1310307
STLDEN	P219089	10/30/01	02D0216	02D0216-008.004	ZINC	MS1	99.0	%REC	YES			1	D1J310242-001S	1310307
STLDEN	18199	10/29/01	02D0216	02D0216-004.004	ZINC	MS1	95.0	%REC	NO			1	D1J300188-001S	1305326
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	ALUMINUM	MD1	100.0	%REC	YES			1	D1K050137-001D	1317294
[redacted]	FD-774-4	11/7/01	02D0264	02D0264-005.004	ALUMINUM	MD1	93.0	%REC	YES			1	D1K090260-002D	1319512
[redacted]	1386	11/1/01	02D0264	02D0264-002.001	ALUMINUM	MS1	99.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	ALUMINUM	MS1	93.0	%REC	YES			1	D1K090260-002S	1319512

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-5
Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

9/23/02

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Ba
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	ANTIMONY	MD1	101.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	ANTIMONY	MD1	97.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	ANTIMONY	MS1	99.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	ANTIMONY	MS1	97.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	ARSENIC	MD1	104.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	ARSENIC	MD1	100.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	ARSENIC	MS1	103.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	ARSENIC	MS1	100.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	BARIUM	MD1	99.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	BARIUM	MD1	96.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	BARIUM	MS1	98.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	BARIUM	MS1	96.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	BERYLLIUM	MD1	91.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	BERYLLIUM	MD1	90.0	%REC	YES	N		1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	BERYLLIUM	MS1	91.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	BERYLLIUM	MS1	90.0	%REC	YES	N		1	D1K050137-001S	1317294
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	CADMIUM	MD1	95.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	CADMIUM	MD1	93.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	CADMIUM	MS1	94.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	CADMIUM	MS1	94.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.004	CALCIUM	MD1	97.0	%REC	YES			1	D1K090260-001D	1319509
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	CALCIUM	MD1	88.0	%REC	YES			1	D1K050137-001D	1317306
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.004	CALCIUM	MS1	94.0	%REC	YES			1	D1K090260-001S	1319509
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	CALCIUM	MS1	91.0	%REC	YES			1	D1K050137-001S	1317306
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	CHROMIUM	MD1	96.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	CHROMIUM	MD1	95.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	CHROMIUM	MS1	95.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	CHROMIUM	MS1	95.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	COBALT	MD1	96.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	COBALT	MD1	94.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	COBALT	MS1	96.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	COBALT	MS1	94.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	COPPER	MD1	100.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	COPPER	MD1	97.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	COPPER	MS1	99.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	COPPER	MS1	96.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.004	IRON	MD1	97.0	%REC	YES			1	D1K090260-001D	1319509
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	IRON	MD1	96.0	%REC	YES			1	D1K050137-001D	1317306
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	IRON	MS1	98.0	%REC	YES			1	D1K050137-001S	1317306
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.004	IRON	MS1	96.0	%REC	YES			1	D1K090260-001S	1319509
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	LEAD	MD1	101.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	LEAD	MD1	96.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	LEAD	MS1	100.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	LEAD	MS1	97.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	LITHIUM	MD1	103.0	%REC	YES			1	D1K050137-001D	1317306
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.004	LITHIUM	MD1	96.0	%REC	YES			1	D1K090260-001D	1319509
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	LITHIUM	MS1	104.0	%REC	YES			1	D1K050137-001S	1317306
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.004	LITHIUM	MS1	96.0	%REC	YES			1	D1K090260-001S	1319509
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	MAGNESIUM	MD1	105.0	%REC	YES			1	D1K050137-001D	1317306
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.004	MAGNESIUM	MD1	101.0	%REC	YES			1	D1K090260-001D	1319509
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	MAGNESIUM	MS1	105.0	%REC	YES			1	D1K050137-001S	1317306
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.004	MAGNESIUM	MS1	100.0	%REC	YES			1	D1K090260-001S	1319509
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	MANGANESE	MD1	96.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	MANGANESE	MD1	95.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	MANGANESE	MS1	95.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	MANGANESE	MS1	95.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	?		02D0264		MERCURY	MD1	95.0	%REC				1	D1K010326-001D	1316429
STLDEN	?		02D0264		MERCURY	MS1	95.0	%REC				1	D1K010326-001S	1316429
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	MOLYBDENUM	MD1	96.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	MOLYBDENUM	MD1	93.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	MOLYBDENUM	MS1	96.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	MOLYBDENUM	MS1	93.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	NICKEL	MD1	95.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	NICKEL	MD1	94.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	NICKEL	MS1	96.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	NICKEL	MS1	94.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	POTASSIUM	MD1	103.0	%REC	YES			1	D1K050137-001D	1317306
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.004	POTASSIUM	MD1	98.0	%REC	YES			1	D1K090260-001D	1319509
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	POTASSIUM	MS1	103.0	%REC	YES			1	D1K050137-001S	1317306
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.004	POTASSIUM	MS1	97.0	%REC	YES			1	D1K090260-001S	1319509
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	SELENIUM	MD1	109.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	SELENIUM	MD1	103.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	SELENIUM	MS1	108.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	SELENIUM	MS1	103.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	SILVER	MD1	106.0	%REC	YES			1	D1K050137-001D	1317294

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]DEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	SILVER	MD1	100.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	SILVER	MS1	105.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	SILVER	MS1	101.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	SODIUM	MD1	104.0	%REC	YES			1	D1K050137-001D	1317306
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.004	SODIUM	MD1	98.0	%REC	YES			1	D1K090260-001D	1319509
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	SODIUM	MS1	106.0	%REC	YES			1	D1K050137-001S	1317306
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.004	SODIUM	MS1	98.0	%REC	YES			1	D1K090260-001S	1319509
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	STRONTIUM	MD1	95.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	STRONTIUM	MD1	93.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	STRONTIUM	MS1	95.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	STRONTIUM	MS1	92.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	THALLIUM	MD1	97.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	THALLIUM	MD1	94.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	THALLIUM	MS1	97.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	THALLIUM	MS1	94.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	TIN	MD1	100.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	TIN	MD1	95.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	TIN	MS1	99.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	TIN	MS1	95.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	URANIUM, TOTAL	MD1	103.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	URANIUM, TOTAL	MD1	102.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	URANIUM, TOTAL	MS1	102.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	URANIUM, TOTAL	MS1	102.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	VANADIUM	MD1	98.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	VANADIUM	MD1	96.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	VANADIUM	MS1	97.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	VANADIUM	MS1	96.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	ZINC	MD1	92.0	%REC	YES			1	D1K050137-001D	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	ZINC	MD1	91.0	%REC	YES			1	D1K090260-002D	1319512
STLDEN	1386	11/1/01	02D0264	02D0264-002.001	ZINC	MS1	92.0	%REC	YES			1	D1K050137-001S	1317294
STLDEN	FD-774-4	11/7/01	02D0264	02D0264-005.004	ZINC	MS1	91.0	%REC	YES			1	D1K090260-002S	1319512
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	ALUMINUM	MD1	**141.0**	%REC	YES	N		1	D1K150202-002D	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	ALUMINUM	MD1	100.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	ALUMINUM	MS1	**141.0**	%REC	YES	N		1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	ALUMINUM	MS1	99.0	%REC	YES			1	D1K120206-001S	1319500
[redacted]DEN	20498	11/8/01	02D0292	02D0292-001.004	ANTIMONY	MD1	103.0	%REC	YES			1	D1K120206-001D	1319500
[redacted]DEN	00500	11/12/01	02D0292	02D0292-007.004	ANTIMONY	MD1	97.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	ANTIMONY	MS1	101.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	ANTIMONY	MS1	99.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	ARSENIC	MD1	106.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	ARSENIC	MD1	102.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	ARSENIC	MS1	105.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	ARSENIC	MS1	104.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	BARIUM	MD1	96.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	BARIUM	MD1	95.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	BARIUM	MS1	97.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	BARIUM	MS1	95.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	BERYLLIUM	MD1	94.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	BERYLLIUM	MD1	92.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	BERYLLIUM	MS1	97.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	BERYLLIUM	MS1	91.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	CADMIUM	MD1	94.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	CADMIUM	MD1	93.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	CADMIUM	MS1	95.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	CADMIUM	MS1	93.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	60499	11/12/01	02D0292	02D0292-005.001	CALCIUM	MD1	96.0	%REC	YES			1	D1K150202-001D	1324589
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	CALCIUM	MD1	90.0	%REC	YES			1	D1K120206-001D	1319507
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	CALCIUM	MS1	98.0	%REC	YES			1	D1K120206-001S	1319507
STLDEN	60499	11/12/01	02D0292	02D0292-005.001	CALCIUM	MS1	96.0	%REC	YES			1	D1K150202-001S	1324589
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	CHROMIUM	MD1	96.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	CHROMIUM	MD1	96.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	CHROMIUM	MS1	98.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	CHROMIUM	MS1	96.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	COBALT	MD1	100.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	COBALT	MD1	96.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	COBALT	MS1	102.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	COBALT	MS1	96.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	COPPER	MD1	101.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	COPPER	MD1	101.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	COPPER	MS1	102.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	COPPER	MS1	100.0	%REC	YES			1	D1K120206-001S	1319500
[redacted]DEN	60499	11/12/01	02D0292	02D0292-005.001	IRON	MD1	99.0	%REC	YES			1	D1K150202-001D	1324589
[redacted]EN	20498	11/8/01	02D0292	02D0292-001.004	IRON	MD1	**0.0**	%REC	YES			1	D1K120206-001D	1319507
STLDEN	60499	11/12/01	02D0292	02D0292-005.001	IRON	MS1	100.0	%REC	YES			1	D1K150202-001S	1324589
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	IRON	MS1	**0.0**	%REC	YES			1	D1K120206-001S	1319507

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples

Groundwater - Calendar Year 2001

9/23/02

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Ba
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	LEAD	MD1	101.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	LEAD	MD1	98.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	LEAD	MS1	100.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	LEAD	MS1	100.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	60499	11/12/01	02D0292	02D0292-005.001	LITHIUM	MD1	101.0	%REC	YES			1	D1K150202-001D	1324589
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	LITHIUM	MD1	99.0	%REC	YES			1	D1K120206-001D	1319507
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	LITHIUM	MS1	101.0	%REC	YES			1	D1K120206-001S	1319507
STLDEN	60499	11/12/01	02D0292	02D0292-005.001	LITHIUM	MS1	101.0	%REC	YES			1	D1K150202-001S	1324589
STLDEN	60499	11/12/01	02D0292	02D0292-005.001	MAGNESIUM	MD1	102.0	%REC	YES			1	D1K150202-001D	1324589
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	MAGNESIUM	MD1	100.0	%REC	YES			1	D1K120206-001D	1319507
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	MAGNESIUM	MS1	103.0	%REC	YES			1	D1K120206-001S	1319507
STLDEN	60499	11/12/01	02D0292	02D0292-005.001	MAGNESIUM	MS1	102.0	%REC	YES			1	D1K150202-001S	1324589
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	MANGANESE	MD1	87.0	%REC	YES	N		1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	MANGANESE	MD1	83.0	%REC	YES	N		1	D1K150202-002D	1324590
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	MANGANESE	MS1	105.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	MANGANESE	MS1	76.0	%REC	YES	N		1	D1K120206-001S	1319500
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	MERCURY	MD1	56.0	%REC	YES	N		1	D1K120206-001D	1330241
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	MERCURY	MS1	56.0	%REC	YES	N		1	D1K120206-001S	1330241
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	MOLYBDENUM	MD1	96.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	MOLYBDENUM	MD1	95.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	MOLYBDENUM	MS1	96.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	MOLYBDENUM	MS1	95.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	NICKEL	MD1	97.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	NICKEL	MD1	96.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	NICKEL	MS1	98.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	NICKEL	MS1	96.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	POTASSIUM	MD1	101.0	%REC	YES			1	D1K120206-001D	1319507
STLDEN	60499	11/12/01	02D0292	02D0292-005.001	POTASSIUM	MD1	100.0	%REC	YES			1	D1K150202-001D	1324589
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	POTASSIUM	MS1	102.0	%REC	YES			1	D1K120206-001S	1319507
STLDEN	60499	11/12/01	02D0292	02D0292-005.001	POTASSIUM	MS1	100.0	%REC	YES			1	D1K150202-001S	1324589
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	SELENIUM	MD1	110.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	SELENIUM	MD1	108.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	SELENIUM	MS1	109.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	SELENIUM	MS1	109.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	SILVER	MD1	107.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	SILVER	MD1	105.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	SILVER	MS1	107.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	SILVER	MS1	105.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	60499	11/12/01	02D0292	02D0292-005.001	SODIUM	MD1	101.0	%REC	YES			1	D1K150202-001D	1324589
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	SODIUM	MD1	97.0	%REC	YES			1	D1K120206-001D	1319507
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	SODIUM	MS1	103.0	%REC	YES			1	D1K120206-001S	1319507
STLDEN	60499	11/12/01	02D0292	02D0292-005.001	SODIUM	MS1	102.0	%REC	YES			1	D1K150202-001S	1324589
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	STRONTIUM	MD1	93.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	STRONTIUM	MD1	93.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	STRONTIUM	MS1	95.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	STRONTIUM	MS1	90.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	THALLIUM	MD1	98.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	THALLIUM	MD1	98.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	THALLIUM	MS1	99.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	THALLIUM	MS1	97.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	TIN	MD1	102.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	TIN	MD1	100.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	TIN	MS1	102.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	TIN	MS1	101.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	URANIUM, TOTAL	MD1	101.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	URANIUM, TOTAL	MD1	101.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	URANIUM, TOTAL	MS1	102.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	URANIUM, TOTAL	MS1	101.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	VANADIUM	MD1	97.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	VANADIUM	MD1	97.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	VANADIUM	MS1	99.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	VANADIUM	MS1	96.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	ZINC	MD1	96.0	%REC	YES			1	D1K150202-002D	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	ZINC	MD1	93.0	%REC	YES			1	D1K120206-001D	1319500
STLDEN	00500	11/12/01	02D0292	02D0292-007.004	ZINC	MS1	101.0	%REC	YES			1	D1K150202-002S	1324590
STLDEN	20498	11/8/01	02D0292	02D0292-001.004	ZINC	MS1	92.0	%REC	YES			1	D1K120206-001S	1319500
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	ALUMINUM	MD1	108.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	ALUMINUM	MD1	96.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	ALUMINUM	MS1	109.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	ALUMINUM	MS1	95.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	ANTIMONY	MD1	105.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	ANTIMONY	MD1	103.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	ANTIMONY	MS1	105.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	ANTIMONY	MS1	104.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	ARSENIC	MD1	107.0	%REC	YES			1	D1K270264-002D	1334249

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]DEN	86501	11/28/01	02D0347	02D0347-004.005	ARSENIC	MD1	104.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	ARSENIC	MS1	107.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	ARSENIC	MS1	106.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	BARIUM	MD1	103.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	BARIUM	MD1	101.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	BARIUM	MS1	103.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	BARIUM	MS1	103.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	BERYLLIUM	MD1	104.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	BERYLLIUM	MD1	99.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	BERYLLIUM	MS1	103.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	BERYLLIUM	MS1	98.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	CADMIUM	MD1	101.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	CADMIUM	MD1	99.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	CADMIUM	MS1	101.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	CADMIUM	MS1	101.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	86601	11/28/01	02D0347	02D0347-005.004	CALCIUM	MD1	106.0	%REC	YES			1	D1K300254-002D	1338397
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	CALCIUM	MD1	95.0	%REC	YES			1	D1K270264-001D	1334246
STLDEN	86601	11/28/01	02D0347	02D0347-005.004	CALCIUM	MS1	102.0	%REC	YES			1	D1K300254-002S	1338397
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	CALCIUM	MS1	94.0	%REC	YES			1	D1K270264-001S	1334246
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	CHROMIUM	MD1	98.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	CHROMIUM	MD1	97.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	CHROMIUM	MS1	99.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	CHROMIUM	MS1	98.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	COBALT	MD1	98.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	COBALT	MD1	97.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	COBALT	MS1	98.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	COBALT	MS1	98.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	COPPER	MD1	105.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	COPPER	MD1	104.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	COPPER	MS1	105.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	COPPER	MS1	105.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	86601	11/28/01	02D0347	02D0347-005.004	IRON	MD1	101.0	%REC	YES			1	D1K300254-002D	1338397
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	IRON	MD1	96.0	%REC	YES			1	D1K270264-001D	1334246
STLDEN	86601	11/28/01	02D0347	02D0347-005.004	IRON	MS1	100.0	%REC	YES			1	D1K300254-002S	1338397
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	IRON	MS1	96.0	%REC	YES			1	D1K270264-001S	1334246
[redacted]DEN	2386	11/26/01	02D0347	02D0347-003.004	LEAD	MD1	103.0	%REC	YES			1	D1K270264-002D	1334249
[redacted]EN	86501	11/28/01	02D0347	02D0347-004.005	LEAD	MD1	101.0	%REC	YES			1	D1K300254-001D	1338392
[redacted]DEN	2386	11/26/01	02D0347	02D0347-003.004	LEAD	MS1	103.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	LEAD	MS1	102.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	LITHIUM	MD1	106.0	%REC	YES			1	D1K270264-001D	1334246
STLDEN	86601	11/28/01	02D0347	02D0347-005.004	LITHIUM	MD1	102.0	%REC	YES			1	D1K300254-002D	1338397
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	LITHIUM	MS1	107.0	%REC	YES			1	D1K270264-001S	1334246
STLDEN	86601	11/28/01	02D0347	02D0347-005.004	LITHIUM	MS1	103.0	%REC	YES			1	D1K300254-002S	1338397
STLDEN	86601	11/28/01	02D0347	02D0347-005.004	MAGNESIUM	MD1	105.0	%REC	YES			1	D1K300254-002D	1338397
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	MAGNESIUM	MD1	104.0	%REC	YES			1	D1K270264-001D	1334246
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	MAGNESIUM	MS1	104.0	%REC	YES			1	D1K270264-001S	1334246
STLDEN	86601	11/28/01	02D0347	02D0347-005.004	MAGNESIUM	MS1	104.0	%REC	YES			1	D1K300254-002S	1338397
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	MANGANESE	MD1	97.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	MANGANESE	MD1	96.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	MANGANESE	MS1	98.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	MANGANESE	MS1	97.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	MERCURY	MD1	53.0	%REC	YES	N		1	D1K270264-001D	1339218
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	MERCURY	MS1	53.0	%REC	YES	N		1	D1K270264-001S	1339218
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	MOLYBDENUM	MD1	98.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	MOLYBDENUM	MD1	96.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	MOLYBDENUM	MS1	98.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	MOLYBDENUM	MS1	97.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	NICKEL	MD1	103.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	NICKEL	MD1	102.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	NICKEL	MS1	103.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	NICKEL	MS1	103.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	POTASSIUM	MD1	104.0	%REC	YES			1	D1K270264-001D	1334246
STLDEN	86601	11/28/01	02D0347	02D0347-005.004	POTASSIUM	MD1	101.0	%REC	YES			1	D1K300254-002D	1338397
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	POTASSIUM	MS1	105.0	%REC	YES			1	D1K270264-001S	1334246
STLDEN	86601	11/28/01	02D0347	02D0347-005.004	POTASSIUM	MS1	102.0	%REC	YES			1	D1K300254-002S	1338397
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	SELENIUM	MD1	113.0	%REC	YES	N		1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	SELENIUM	MD1	110.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	SELENIUM	MS1	114.0	%REC	YES	N		1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	SELENIUM	MS1	112.0	%REC	YES	N		1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	SILVER	MD1	108.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	SILVER	MD1	108.0	%REC	YES			1	D1K300254-001D	1338392
[redacted]DEN	2386	11/26/01	02D0347	02D0347-003.004	SILVER	MS1	108.0	%REC	YES			1	D1K270264-002S	1334249
[redacted]EN	86501	11/28/01	02D0347	02D0347-004.005	SILVER	MS1	108.0	%REC	YES			1	D1K300254-001S	1338392
[redacted]EN	SW056	11/16/01	02D0347	02D0347-001.004	SODIUM	MD1	104.0	%REC	YES			1	D1K270264-001D	1334246
STLDEN	86601	11/28/01	02D0347	02D0347-005.004	SODIUM	MD1	104.0	%REC	YES			1	D1K300254-002D	1338397

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

653
722

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Bat
STLDEN	SW056	11/16/01	02D0347	02D0347-001.004	SODIUM	MS1	103.0	%REC	YES			1	D1K270264-001S	1334246
STLDEN	86601	11/28/01	02D0347	02D0347-005.004	SODIUM	MS1	102.0	%REC	YES			1	D1K300254-002S	1338397
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	STRONTIUM	MD1	101.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	STRONTIUM	MD1	101.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	STRONTIUM	MS1	104.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	STRONTIUM	MS1	102.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	THALLIUM	MD1	102.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	THALLIUM	MD1	101.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	THALLIUM	MS1	103.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	THALLIUM	MS1	102.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	TIN	MD1	101.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	TIN	MD1	99.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	TIN	MS1	101.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	TIN	MS1	101.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	URANIUM, TOTAL	MD1	105.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	URANIUM, TOTAL	MD1	103.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	URANIUM, TOTAL	MS1	107.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	URANIUM, TOTAL	MS1	105.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	VANADIUM	MD1	98.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	VANADIUM	MD1	96.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	VANADIUM	MS1	98.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	VANADIUM	MS1	97.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	ZINC	MD1	97.0	%REC	YES			1	D1K270264-002D	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	ZINC	MD1	92.0	%REC	YES			1	D1K300254-001D	1338392
STLDEN	2386	11/26/01	02D0347	02D0347-003.004	ZINC	MS1	97.0	%REC	YES			1	D1K270264-002S	1334249
STLDEN	86501	11/28/01	02D0347	02D0347-004.005	ZINC	MS1	94.0	%REC	YES			1	D1K300254-001S	1338392
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	ALUMINUM	MD1	102.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	ALUMINUM	MS1	102.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	ANTIMONY	MD1	107.0	%REC	YES	N		1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	ANTIMONY	MS1	106.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	ARSENIC	MD1	111.0	%REC	YES	N		1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	ARSENIC	MS1	110.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	BARIUM	MD1	51.0	%REC	YES	N		1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	BARIUM	MS1	55.0	%REC	YES	N		1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	BERYLLIUM	MD1	90.0	%REC	YES	N		1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	BERYLLIUM	MS1	89.0	%REC	YES	N		1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	CADMIUM	MD1	96.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	CADMIUM	MS1	95.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	CHROMIUM	MD1	96.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	CHROMIUM	MS1	95.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	COBALT	MD1	97.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	COBALT	MS1	97.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	COPPER	MD1	107.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	COPPER	MS1	106.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	LEAD	MD1	81.0	%REC	YES	N		1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	LEAD	MS1	83.0	%REC	YES	N		1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	MANGANESE	MD1	96.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	MANGANESE	MS1	96.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	MERCURY	MD1	95.0	%REC	YES			1	D1L050334-001D	1351214
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	MERCURY	MS1	94.0	%REC	YES			1	D1L050334-001S	1351214
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	MOLYBDENUM	MD1	99.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	MOLYBDENUM	MS1	98.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	NICKEL	MD1	97.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	NICKEL	MS1	97.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	SELENIUM	MD1	124.0	%REC	YES	N		1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	SELENIUM	MS1	124.0	%REC	YES	N		1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	SILVER	MD1	109.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	SILVER	MS1	108.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	STRONTIUM	MD1	89.0	%REC	YES			5	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	STRONTIUM	MS1	78.0	%REC	YES	N		5	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	THALLIUM	MD1	96.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	THALLIUM	MS1	96.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	TIN	MD1	101.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	TIN	MS1	101.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	URANIUM, TOTAL	MD1	101.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	URANIUM, TOTAL	MS1	100.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	VANADIUM	MD1	99.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	VANADIUM	MS1	98.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	ZINC	MD1	91.0	%REC	YES			1	D1L050334-001D	1344553
STLDEN	B206989	10/9/01	02D0410	02D0410-003.001	ZINC	MS1	90.0	%REC	YES			1	D1L050334-001S	1344553
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	ALUMINUM	MD1	99.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	ALUMINUM	MD2	100.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	ALUMINUM	MS1	99.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	ALUMINUM	MS2	100.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	ANTIMONY	MD1	94.0	%REC	YES			1	D1L150195-001D	1352264

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples

Groundwater - Calendar Year 2001

9/23/02

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]DEN	37791	12/11/01	02D0470	02D0470-004.004	ANTIMONY	MD2	101.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	ANTIMONY	MS1	96.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	ANTIMONY	MS2	100.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	ARSENIC	MD1	102.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	ARSENIC	MD2	105.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	ARSENIC	MS1	103.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	ARSENIC	MS2	104.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	BARIUM	MD1	101.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	BARIUM	MD2	99.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	BARIUM	MS1	101.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	BARIUM	MS2	98.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	BERYLLIUM	MD1	94.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	BERYLLIUM	MD2	95.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	BERYLLIUM	MS1	94.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	BERYLLIUM	MS2	94.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	CADMIUM	MD1	97.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	CADMIUM	MD2	96.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	CADMIUM	MS1	98.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	CADMIUM	MS2	95.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	99301	12/6/01	02D0470	02D0470-001.004	CALCIUM	MD1	98.0	%REC	YES			1	D1L120330-001D	1352377
STLDEN	GS23	12/12/01	02D0470	02D0470-015.005	CALCIUM	MD1	88.0	%REC	NO			1	D1L150195-002D	1352266
STLDEN	99301	12/6/01	02D0470	02D0470-001.004	CALCIUM	MS1	98.0	%REC	YES			1	D1L120330-001S	1352377
STLDEN	GS23	12/12/01	02D0470	02D0470-015.005	CALCIUM	MS1	93.0	%REC	NO			1	D1L150195-002S	1352266
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	CHROMIUM	MD1	97.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	CHROMIUM	MD2	97.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	CHROMIUM	MS1	98.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	CHROMIUM	MS2	95.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	COBALT	MD1	96.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	COBALT	MD2	96.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	COBALT	MS1	97.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	COBALT	MS2	95.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	COPPER	MD1	101.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	COPPER	MD2	98.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	COPPER	MS1	102.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	COPPER	MS2	97.0	%REC	YES			1	D1L150211-001S	1352421
[redacted]DEN	99301	12/6/01	02D0470	02D0470-001.004	IRON	MD1	98.0	%REC	YES			1	D1L120330-001D	1352377
[redacted]DEN	GS23	12/12/01	02D0470	02D0470-015.005	IRON	MD1	78.0	%REC	NO	N		1	D1L150195-002D	1352266
[redacted]DEN	99301	12/6/01	02D0470	02D0470-001.004	IRON	MS1	98.0	%REC	YES			1	D1L120330-001S	1352377
STLDEN	GS23	12/12/01	02D0470	02D0470-015.005	IRON	MS1	90.0	%REC	NO	N		1	D1L150195-002S	1352266
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	LEAD	MD1	98.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	LEAD	MD2	100.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	LEAD	MS1	99.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	LEAD	MS2	99.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	99301	12/6/01	02D0470	02D0470-001.004	LITHIUM	MD1	102.0	%REC	YES			1	D1L120330-001D	1352377
STLDEN	GS23	12/12/01	02D0470	02D0470-015.005	LITHIUM	MD1	87.0	%REC	NO			1	D1L150195-002D	1352266
STLDEN	99301	12/6/01	02D0470	02D0470-001.004	LITHIUM	MS1	102.0	%REC	YES			1	D1L120330-001S	1352377
STLDEN	GS23	12/12/01	02D0470	02D0470-015.005	LITHIUM	MS1	90.0	%REC	NO			1	D1L150195-002S	1352266
STLDEN	99301	12/6/01	02D0470	02D0470-001.004	MAGNESIUM	MD1	103.0	%REC	YES			1	D1L120330-001D	1352377
STLDEN	GS23	12/12/01	02D0470	02D0470-015.005	MAGNESIUM	MD1	88.0	%REC	NO	N		1	D1L150195-002D	1352266
STLDEN	99301	12/6/01	02D0470	02D0470-001.004	MAGNESIUM	MS1	102.0	%REC	YES			1	D1L120330-001S	1352377
STLDEN	GS23	12/12/01	02D0470	02D0470-015.005	MAGNESIUM	MS1	92.0	%REC	NO	N		1	D1L150195-002S	1352266
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	MANGANESE	MD1	97.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	MANGANESE	MD2	96.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	MANGANESE	MS1	98.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	MANGANESE	MS2	95.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	?		02D0470		MERCURY	MD1	95.0	%REC				1	D1L050334-001D	1351214
STLDEN	?		02D0470		MERCURY	MS1	94.0	%REC				1	D1L050334-001S	1351214
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	MOLYBDENUM	MD1	96.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	MOLYBDENUM	MD2	96.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	MOLYBDENUM	MS1	96.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	MOLYBDENUM	MS2	95.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	NICKEL	MD1	99.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	NICKEL	MD2	97.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	NICKEL	MS1	100.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	NICKEL	MS2	96.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	99301	12/6/01	02D0470	02D0470-001.004	POTASSIUM	MD1	101.0	%REC	YES			1	D1L120330-001D	1352377
STLDEN	GS23	12/12/01	02D0470	02D0470-015.005	POTASSIUM	MD1	86.0	%REC	NO	N		1	D1L150195-002D	1352266
STLDEN	99301	12/6/01	02D0470	02D0470-001.004	POTASSIUM	MS1	100.0	%REC	YES			1	D1L120330-001S	1352377
STLDEN	GS23	12/12/01	02D0470	02D0470-015.005	POTASSIUM	MS1	90.0	%REC	NO			1	D1L150195-002S	1352266
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	SELENIUM	MD1	106.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	SELENIUM	MD2	110.0	%REC	YES			1	D1L150211-001D	1352421
[redacted]DEN	GS23	12/12/01	02D0470	02D0470-015.004	SELENIUM	MS1	106.0	%REC	YES			1	D1L150195-001S	1352264
[redacted]DEN	37791	12/11/01	02D0470	02D0470-004.004	SELENIUM	MS2	110.0	%REC	YES			1	D1L150211-001S	1352421
[redacted]DEN	GS23	12/12/01	02D0470	02D0470-015.004	SILVER	MD1	101.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	SILVER	MD2	101.0	%REC	YES			1	D1L150211-001D	1352421

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

655
724

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilu-tion	Lab Sample #	Lab Bat
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	SILVER	MS1	101.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	SILVER	MS2	100.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	99301	12/6/01	02D0470	02D0470-001.004	SODIUM	MD1	106.0	%REC	YES			1	D1L120330-001D	1352377
STLDEN	GS23	12/12/01	02D0470	02D0470-015.005	SODIUM	MD1	88.0	%REC	NO	N		1	D1L150195-002D	1352266
STLDEN	99301	12/6/01	02D0470	02D0470-001.004	SODIUM	MS1	100.0	%REC	YES			1	D1L120330-001S	1352377
STLDEN	GS23	12/12/01	02D0470	02D0470-015.005	SODIUM	MS1	92.0	%REC	NO			1	D1L150195-002S	1352266
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	STRONTIUM	MD1	101.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	STRONTIUM	MD2	93.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	STRONTIUM	MS1	102.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	STRONTIUM	MS2	92.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	THALLIUM	MD1	99.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	THALLIUM	MD2	98.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	THALLIUM	MS1	99.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	THALLIUM	MS2	97.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	TIN	MD1	98.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	TIN	MD2	98.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	TIN	MS1	99.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	TIN	MS2	97.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	URANIUM, TOTAL	MD1	105.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	URANIUM, TOTAL	MD2	105.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	URANIUM, TOTAL	MS1	105.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	URANIUM, TOTAL	MS2	104.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	VANADIUM	MD1	97.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	VANADIUM	MD2	99.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	VANADIUM	MS1	98.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	VANADIUM	MS2	98.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	ZINC	MD1	86.0	%REC	YES			1	D1L150195-001D	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	ZINC	MD2	92.0	%REC	YES			1	D1L150211-001D	1352421
STLDEN	GS23	12/12/01	02D0470	02D0470-015.004	ZINC	MS1	89.0	%REC	YES			1	D1L150195-001S	1352264
STLDEN	37791	12/11/01	02D0470	02D0470-004.004	ZINC	MS2	91.0	%REC	YES			1	D1L150211-001S	1352421
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	ALUMINUM	MD1	100.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	ALUMINUM	MS1	100.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	ANTIMONY	MD1	102.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	ANTIMONY	MS1	102.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	ARSENIC	MD1	104.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	ARSENIC	MS1	105.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	BARIUM	MD1	97.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	BARIUM	MS1	97.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	BERYLLIUM	MD1	94.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	BERYLLIUM	MS1	93.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	CADMIUM	MD1	95.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	CADMIUM	MS1	95.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	CALCIUM	MD1	86.0	%REC	YES	N		1	D1L180289-001D	1361396
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	CALCIUM	MS1	87.0	%REC	YES	N		1	D1L180289-001S	1361396
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	CHROMIUM	MD1	96.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	CHROMIUM	MS1	96.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	COBALT	MD1	95.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	COBALT	MS1	95.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	COPPER	MD1	99.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	COPPER	MS1	99.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	IRON	MD1	94.0	%REC	YES			1	D1L180289-001D	1361396
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	IRON	MS1	94.0	%REC	YES			1	D1L180289-001S	1361396
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	LEAD	MD1	98.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	LEAD	MS1	98.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	LITHIUM	MD1	102.0	%REC	YES			1	D1L180289-001D	1361396
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	LITHIUM	MS1	102.0	%REC	YES			1	D1L180289-001S	1361396
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	MAGNESIUM	MD1	101.0	%REC	YES			1	D1L180289-001D	1361396
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	MAGNESIUM	MS1	101.0	%REC	YES			1	D1L180289-001S	1361396
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	MANGANESE	MD1	96.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	MANGANESE	MS1	95.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	MERCURY	MD1	97.0	%REC	YES			1	D1L180289-001D	2002223
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	MERCURY	MS1	98.0	%REC	YES			1	D1L180289-001S	2002223
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	MOLYBDENUM	MD1	96.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	MOLYBDENUM	MS1	96.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	NICKEL	MD1	96.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	NICKEL	MS1	96.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	POTASSIUM	MD1	101.0	%REC	YES			1	D1L180289-001D	1361396
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	POTASSIUM	MS1	100.0	%REC	YES			1	D1L180289-001S	1361396
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	SELENIUM	MD1	108.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	SELENIUM	MS1	108.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	SILVER	MD1	102.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	SILVER	MS1	103.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	SODIUM	MD1	102.0	%REC	YES			1	D1L180289-001D	1361396
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	SODIUM	MS1	102.0	%REC	YES			1	D1L180289-001S	1361396
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	STRONTIUM	MD1	96.0	%REC	YES			1	D1L180289-001D	1361398

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]DEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	STRONTIUM	MS1	97.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	THALLIUM	MD1	96.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	THALLIUM	MS1	96.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	TIN	MD1	100.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	TIN	MS1	100.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	URANIUM, TOTAL	MD1	103.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	URANIUM, TOTAL	MS1	103.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	VANADIUM	MD1	97.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	VANADIUM	MS1	97.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	ZINC	MD1	93.0	%REC	YES			1	D1L180289-001D	1361398
STLDEN	891COLWEL	12/17/01	02D0527	02D0527-001.004	ZINC	MS1	93.0	%REC	YES			1	D1L180289-001S	1361398
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	ALUMINUM	MD1	92.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	ALUMINUM	MS1	96.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	ANTIMONY	MD1	107.0	%REC	YES	N		1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	ANTIMONY	MS1	112.0	%REC	YES	N		1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	ARSENIC	MD1	109.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	ARSENIC	MS1	116.0	%REC	YES	N		1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	BARIUM	MD1	**50.0**	%REC	YES	N		1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	BARIUM	MS1	**56.0**	%REC	YES	N		1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	BERYLLIUM	MD1	90.0	%REC	YES	N		1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	BERYLLIUM	MS1	95.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	CADMIUM	MD1	93.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	CADMIUM	MS1	99.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	56201	12/27/01	02D0577	02D0577-003.003	CALCIUM	MD1	92.0	%REC	YES			1	D1L270233-002D	2002361
STLDEN	56201	12/27/01	02D0577	02D0577-003.003	CALCIUM	MS1	86.0	%REC	YES	N		1	D1L270233-002S	2002361
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	CHROMIUM	MD1	97.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	CHROMIUM	MS1	102.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	COBALT	MD1	97.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	COBALT	MS1	103.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	COPPER	MD1	101.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	COPPER	MS1	106.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	56201	12/27/01	02D0577	02D0577-003.003	IRON	MD1	91.0	%REC	YES	N		1	D1L270233-002D	2002361
STLDEN	56201	12/27/01	02D0577	02D0577-003.003	IRON	MS1	90.0	%REC	YES	N		1	D1L270233-002S	2002361
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	LEAD	MD1	85.0	%REC	YES	N		1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	LEAD	MS1	92.0	%REC	YES			1	D1L270233-001S	2002358
[redacted]DEN	56201	12/27/01	02D0577	02D0577-003.003	LITHIUM	MD1	94.0	%REC	YES			1	D1L270233-002D	2002361
[redacted]DEN	56201	12/27/01	02D0577	02D0577-003.003	LITHIUM	MS1	92.0	%REC	YES			1	D1L270233-002S	2002361
STLDEN	56201	12/27/01	02D0577	02D0577-003.003	MAGNESIUM	MD1	95.0	%REC	YES			1	D1L270233-002D	2002361
STLDEN	56201	12/27/01	02D0577	02D0577-003.003	MAGNESIUM	MS1	92.0	%REC	YES	N		1	D1L270233-002S	2002361
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	MANGANESE	MD1	97.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	MANGANESE	MS1	104.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	?		02D0577		MERCURY	MD1	97.0	%REC				1	D1L180289-001D	2002223
STLDEN	?		02D0577		MERCURY	MS1	98.0	%REC				1	D1L180289-001S	2002223
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	MOLYBDENUM	MD1	98.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	MOLYBDENUM	MS1	105.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	NICKEL	MD1	96.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	NICKEL	MS1	102.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	56201	12/27/01	02D0577	02D0577-003.003	POTASSIUM	MD1	93.0	%REC	YES			1	D1L270233-002D	2002361
STLDEN	56201	12/27/01	02D0577	02D0577-003.003	POTASSIUM	MS1	91.0	%REC	YES			1	D1L270233-002S	2002361
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	SELENIUM	MD1	119.0	%REC	YES	N		1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	SELENIUM	MS1	**128.0**	%REC	YES	N		1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	SILVER	MD1	110.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	SILVER	MS1	117.0	%REC	YES	N		1	D1L270233-001S	2002358
STLDEN	56201	12/27/01	02D0577	02D0577-003.003	SODIUM	MD1	95.0	%REC	YES			1	D1L270233-002D	2002361
STLDEN	56201	12/27/01	02D0577	02D0577-003.003	SODIUM	MS1	91.0	%REC	YES			1	D1L270233-002S	2002361
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	STRONTIUM	MD1	92.0	%REC	YES			10	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	STRONTIUM	MS1	**181.0**	%REC	YES	N		10	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	THALLIUM	MD1	94.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	THALLIUM	MS1	100.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	TIN	MD1	99.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	TIN	MS1	106.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	URANIUM, TOTAL	MD1	103.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	URANIUM, TOTAL	MS1	110.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	VANADIUM	MD1	101.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	VANADIUM	MS1	107.0	%REC	YES			1	D1L270233-001S	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	ZINC	MD1	105.0	%REC	YES			1	D1L270233-001D	2002358
STLDEN	83201	12/27/01	02D0577	02D0577-001.002	ZINC	MS1	108.0	%REC	YES			1	D1L270233-001S	2002358
WATER QUALITY PARAMETERS (WQPs)														
ACCU	995EFF	7/27/01	01D1153	01D1110-005.007	ALKALINITY,TOTAL AS CaCO3	MS1	95.0	%REC			5		01-A1478S	990080601
ACCU	995EFF	8/7/01	01D1153	01D1203-006.007	ALKALINITY,TOTAL AS CaCO3	MS1	98.0	%REC			5		01-A1563S	1386080901
[redacted]	995EFF	9/4/01	01D1417	01D1379-007.009	ALKALINITY,TOTAL AS CaCO3	MS1	94.0	%REC				1	G01090023-07AMS	ALK091501A
[redacted]	07391	3/6/01	01D0555	01D0555-001.001	CHLORIDE	MS1	**140.0**	%REC	NO	N	0.5		01-A3596S	4809030901
ACCU	90099	3/12/01	01D0555	01D0555-007.011	CHLORIDE	MS1	106.0	%REC	NO		0.5		01-A4065S	5220031401
ACCU	30900	05/01/01	01D0699	01D0748-010.008	CHLORIDE	MS1	97.0	%REC	NO		0.5		01-A7653S	9997050201

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

9/23/02

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Ba
ACCU	30900	05/01/01	01D0748	01D0748-010.008	CHLORIDE	MS1	97.0	%REC	NO		0.5		01-A7653S	999705020
ACCU	18499	05/09/01	01D0775	01D0784-001.006	CHLORIDE	MS1	104.0	%REC	NO		0.5		01-A8680S	1040051001
ACCU	21098	05/07/01	01D0775	01D0784-002.006	CHLORIDE	MS1	112.0	%REC	NO		0.5		01-A8362S	746050901
ACCU	18499	05/09/01	01D0784	01D0784-001.006	CHLORIDE	MS1	104.0	%REC	NO		0.5		01-A8680S	1040051001
ACCU	21098	05/07/01	01D0784	01D0784-002.006	CHLORIDE	MS1	112.0	%REC	NO		0.5		01-A8362S	746050901
ACCU	10992	7/18/01	01D1153	01D1169-016.001	CHLORIDE	MS1	92.0	%REC			0.5		01-A15222S	1654082001
ACCU	07391	8/23/01	01D1311	01D1311-023.007	CHLORIDE	MS1	101.0	%REC					G0108336-08A	
ACCU	90399	8/27/01	01D1352	01D1352-004.005	CHLORIDE	MS1	103.0	%REC				5	G01080380-01AMS	RIC091701A
ACCU	01097	8/29/01	01D1352	01D1352-012.007	CHLORIDE	MS1	105.0	%REC				1	G01080460-09AMS	ANION083101A
ACCU	01097	8/29/01	01D1375	01D1352-012.007	CHLORIDE	MS1	105.0	%REC				1	G01080460-09AMS	ANION083101A
ACCU	30900	8/28/01	01D1375	01D1375-001.009	CHLORIDE	MS1	107.0	%REC				1	G01080420-03ADMS	ANION082901B
ACCU	01497	9/4/01	01D1417	01D1417-007.007	CHLORIDE	MS1	106.0	%REC				1	G01090051-03AMS	ANION090601B
ACCU	02097	9/6/01	01D1417	01D1417-012.007	CHLORIDE	MS1	99.2	%REC				1	G01090152-03AMS	ICF092501A
ACCU	13091	9/25/01	01D1509	01D1509-004.006	CHLORIDE	MS1	112.0	%REC				1	G01090525-02A-MS	ICR100201A
STLDEN	30900	10/31/01	02D0216	02D0196-001.008	CHLORIDE	MD1	98.0	%REC				1	D1K010329-003D	1306283
STLDEN	18199	10/29/01	02D0216	02D0216-004.006	CHLORIDE	MD1	99.0	%REC	NO			1	D1J300177-004D	1304240
STLDEN	18799	10/30/01	02D0216	02D0216-006.005	CHLORIDE	MD1	101.0	%REC	NO			1	D1J310239-002D	1305267
STLDEN	30900	10/31/01	02D0216	02D0196-001.008	CHLORIDE	MS1	97.0	%REC				1	D1K010329-003S	1306283
STLDEN	18199	10/29/01	02D0216	02D0216-004.006	CHLORIDE	MS1	99.0	%REC	NO			1	D1J300177-004S	1304240
STLDEN	18799	10/30/01	02D0216	02D0216-006.005	CHLORIDE	MS1	100.0	%REC	NO			1	D1J310239-002S	1305267
ACCU	10298	2/7/01	01D0502	01D0502-012.003	CYANIDE	MS1	101.0	%REC	NO		0.005		01-A2258S	3336021701
ACCU	10498	2/13/01	01D0511	01D0511-008.001	CYANIDE	MS1	91.0	%REC	NO		0.005		01-A2599S	3785022501
ACCU	40199	2/27/01	01D0543	01D0543-009.008	CYANIDE	MS1	95.0	%REC	NO		0.005		01-A3162S	4335030301
ACCU	40399	2/28/01	01D0547	01D0547-002.009	CYANIDE	MS1	89.0	%REC	NO		0.005		01-A3497S	4977031101
ACCU	10598	3/21/01	01D0605	01D0605-022.003	CYANIDE	MS1	94.0	%REC	NO		0.005		01-A4908S	6332032801
ACCU	10398	3/20/01	01D0647	01D0647-009.001	CYANIDE	MS1	95.0	%REC	NO		0.005		01-A5081S	7151040501
STLDEN	?		01D1108	01D1108-008.007	CYANIDE	MD1	102.0	%REC					D1G190283-043D	1208303
STLDEN	?		01D1108	01D1108-008.007	CYANIDE	MS1	98.0	%REC					D1G190283-043S	1208303
STLDEN	40299	7/23/01	01D1116	01D1116-004.007	CYANIDE	MD1	98.0	%REC				1	D1G240209-025D	1213250
STLDEN	40299	7/23/01	01D1116	01D1116-004.007	CYANIDE	MS1	100.0	%REC				1	D1G240209-025S	1213250
STLDEN	10498	7/24/01	01D1138	01D1138-001.007	CYANIDE	MD1	99.0	%REC				1	D1G270304-007D	1215325
STLDEN	10498	7/24/01	01D1138	01D1138-001.007	CYANIDE	MS1	99.0	%REC				1	D1G270304-007S	1215325
ACCU	10298	7/16/01	01D1169	01D1169-011.003	CYANIDE	MS1	102.0	%REC			0.005		01-A15217S	632080401
ACCU	10198	8/6/01	01D1211	01D1211-010.001	CYANIDE	MS1	100.0	%REC				1	G01080006-03AMS	1
ACCU	40399	8/13/01	01D1234	01D1234-006.007	CYANIDE	MS1	88.9	%REC				1	G01080173-06AMS	2
ACCU	10098	8/30/01	01D1417	01D1417-002.001	CYANIDE	MS1	100.0	%REC				1	G01090008-03AMS	CNT09100
ACCU	0487	1/12/02	01D0326	01D0335-001.004	FLUORIDE	MS1	76.0	%REC	NO		0.05		01-A789S	97701230
ACCU	0386	1/23/01	01D0347	01D0347-009.007	FLUORIDE	MS1	89.0	%REC	NO		0.05		01-A1218S	1300012401
ACCU	02097	1/31/01	01D0349	01D0349-013.001	FLUORIDE	MS1	88.0	%REC	NO		0.05		01-A1572S	3683022301
ACCU	995EFF	1/30/01	01D0502	01D0343-003.006	FLUORIDE	MS1	88.0	%REC	NO		0.05		01-A1592S	3683022301
ACCU	P114389	2/13/01	01D0511	01D0511-004.005	FLUORIDE	MS1	97.0	%REC	NO		0.05		01-A2420S	3991022701
ACCU	P114389	2/13/01	01D0514	01D0511-004.005	FLUORIDE	MS1	97.0	%REC	NO		0.05		01-A2420S	3991022701
ACCU	GS01	3/13/01	01D0605	01D0592-007.003	FLUORIDE	MS1	92.0	%REC	NO		0.05		01-A4336S	7021040401
ACCU	30900	05/01/01	01D0693	01D0748-010.008	FLUORIDE	MS1	78.0	%REC	NO		0.05		01-A7653S	9997050201
ACCU	30900	05/01/01	01D0699	01D0748-010.008	FLUORIDE	MS1	78.0	%REC	NO		0.05		01-A7653S	9997050201
ACCU	21098	05/07/01	01D0716	01D0784-002.006	FLUORIDE	MS1	83.0	%REC	NO		0.05		01-A8362	746050901
ACCU	371 Prod Wtr	04/26/01	01D0748	01Z0262-001.012	FLUORIDE	MS1	90.0	%REC	NO		0.05		01-A7709S	2307052201
STLDEN	?		01D1057		FLUORIDE	MD1	97.0	%REC		B		1	D1G170166-002D	1213189
STLDEN	?		01D1057		FLUORIDE	MS1	98.0	%REC		B		1	D1G170166-002S	1213189
STLDEN	10394	7/16/01	01D1075	01D1075-001.006	FLUORIDE	MD1	105.0	%REC				1	D1G170284-006D	1222261
STLDEN	10394	7/16/01	01D1075	01D1075-001.006	FLUORIDE	MS1	104.0	%REC				1	D1G170284-006S	1222261
STLDEN	?		01D1108		FLUORIDE	MD1	105.0	%REC				1	D1H150288-001D	1215190
STLDEN	?		01D1108		FLUORIDE	MS1	104.0	%REC				1	D1H150288-001S	1215190
STLDEN	?		01D1116		FLUORIDE	MD1	106.0	%REC				1	D1H100137-001D	1219403
STLDEN	?		01D1116		FLUORIDE	MS1	106.0	%REC				1	D1H100137-001S	1219403
STLDEN	?		01D1138		FLUORIDE	MD1	106.0	%REC				1	D1H100137-001D	1219403
STLDEN	?		01D1138		FLUORIDE	MS1	106.0	%REC				1	D1H100137-001S	1219403
ACCU	SW134	7/10/01	01D1169	01D1058-005.002	FLUORIDE	MS1	102.0	%REC			0.05		01-A13659S	865080601
ACCU	0386	8/2/01	01D1211	01D1211-001.006	FLUORIDE	MS1	99.0	%REC				1	G01080006-02AMS	IC300090501A
ACCU	41691	8/30/01	01D1417	01D1417-004.006	FLUORIDE	MS1	95.0	%REC				1	G01090008-06AMS	IC091801A
ACCU	41591	9/10/01	01D1448	01D1448-001.006	FLUORIDE	MS1	92.1	%REC				10	G01090256-02AMS	ICF100401A
STLDEN	5887	10/9/01	02D0089	02D0089-006.006	FLUORIDE	MD1	95.0	%REC	NO			1	D1J120104-001D	1303190
STLDEN	5887	10/9/01	02D0089	02D0089-006.006	FLUORIDE	MS1	83.0	%REC	NO	N*		1	D1J120104-001S	1303190
STLDEN	70193	10/11/01	02D0117	02D0117-006.006	FLUORIDE	MD1	98.0	%REC	NO			1	D1J150194-008D	1306281
STLDEN	70493	10/17/01	02D0117	02D0117-014.006	FLUORIDE	MD1	95.0	%REC	NO			1	D1J210105-010D	1315095
STLDEN	70193	10/11/01	02D0117	02D0117-006.006	FLUORIDE	MS1	96.0	%REC	NO			1	D1J150194-008S	1306281
STLDEN	70493	10/17/01	02D0117	02D0117-014.006	FLUORIDE	MS1	97.0	%REC	NO			1	D1J210105-010S	1315095
STLDEN	70493	10/17/01	02D0174	02D0117-014.006	FLUORIDE	MD1	95.0	%REC				1	D1J210105-010D	1315095
STLDEN	70493	10/17/01	02D0174	02D0117-014.006	FLUORIDE	MS1	97.0	%REC				1	D1J210105-010S	1315095
STLDEN	1386	11/1/01	02D0264	02D0264-002.002	FLUORIDE	MD1	74.0	%REC	NO	N*		1	D1K050132-003D	1325447
STLDEN	1386	11/1/01	02D0264	02D0264-002.002	FLUORIDE	MS1	91.0	%REC	NO			1	D1K050132-003S	1325447
ACCU	07391	3/6/01	01D0555	01D0555-001.001	NITRATE	MS1	88.0	%REC	NO		0.05		01-A3596S	480903090
ACCU	90099	3/12/01	01D0555	01D0555-007.011	NITRATE	MS1	90.0	%REC	NO		0.05		01-A4065S	522003140
ACCU	30900	05/01/01	01D0748	01D0748-010.008	NITRATE	MS1	92.0	%REC	NO		0.05		01-A7653S	9997050201
ACCU	18499	05/09/01	01D0775	01D0784-001.006	NITRATE	MS1	93.0	%REC	NO		0.05		01-A8680S	1040051001

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]	21098	05/07/01	01D0775	01D0784-002.006	NITRATE	MS1	92.0	%REC	NO		0.05		01-A8362S	746050901
ACCU	18499	05/09/01	01D0784	01D0784-001.006	NITRATE	MS1	93.0	%REC	NO		0.05		01-A8680S	1040051001
ACCU	21098	05/07/01	01D0784	01D0784-002.006	NITRATE	MS1	92.0	%REC	NO		0.05		01-A8362S	746050901
ACCU	30900	7/31/01	01D1153	01D1153-001.008	NITRATE	MS1	93.0	%REC			0.05		01-A15092S	769080201
ACCU	11791	8/22/01	01D1311	01D1311-011.004	NITRATE	MS1	86.2	%REC				5	G01080311-03AMS	RIC091701C
ACCU	90099	8/22/01	01D1311	01D1311-014.006	NITRATE	MS1	75.0	%REC				1	G01080311-13AMS	ICR092401A
ACCU	01097	8/29/01	01D1352	01D1352-012.007	NITRATE	MS1	98.2	%REC				1	G01080460-09AMS	N03(300)083101B
ACCU	30900	8/28/01	01D1352	01D1375-001.009	NITRATE	MS1	84.2	%REC				1	G01080420-03AMS	620
ACCU	01097	8/29/01	01D1375	01D1352-012.007	NITRATE	MS1	98.2	%REC				1	G01080460-09AMS	N03(300)083101B
ACCU	30900	8/28/01	01D1375	01D1375-001.009	NITRATE	MS1	84.2	%REC				1	G01080420-03AMS	620
ACCU	01497	9/4/01	01D1417	01D1417-007.007	NITRATE	MS1	88.4	%REC				10	G01090051-03AMS	587
ACCU	02097	9/6/01	01D1417	01D1417-012.007	NITRATE	MS1	85.1	%REC				10	G01090152-03AMS	607
ACCU	13091	9/25/01	01D1509	01D1509-004.006	NITRATE	MS1	104.0	%REC				1	G01090525-02AMS	1131
STLDEN	30900	10/31/01	02D0216	02D0196-001.008	NITRATE	MD1	94.0	%REC				1	D1K010329-003D	1306284
STLDEN	18199	10/29/01	02D0216	02D0216-004.006	NITRATE	MD1	93.0	%REC	NO			1	D1J300177-004D	1304241
STLDEN	18799	10/30/01	02D0216	02D0216-006.005	NITRATE	MD1	98.0	%REC	NO			1	D1J310239-002D	1305268
STLDEN	30900	10/31/01	02D0216	02D0196-001.008	NITRATE	MS1	93.0	%REC				1	D1K010329-003S	1306284
STLDEN	18199	10/29/01	02D0216	02D0216-004.006	NITRATE	MS1	93.0	%REC	NO			1	D1J300177-004S	1304241
STLDEN	18799	10/30/01	02D0216	02D0216-006.005	NITRATE	MS1	95.0	%REC	NO			1	D1J310239-002S	1305268
ACCU	06491	1/9/01	01D0327	01D0327-002.005	NITRATE/NITRITE	MS1	112.0	%REC	NO		0.05		01-A798S	923012001
ACCU	P114389	1/11/01	01D0336	01D0336-006.002	NITRATE/NITRITE	MS1	102.0	%REC	NO		0.05		01-A1282S	2001020101
ACCU	70493	1/26/01	01D0339	01D0349-012.005	NITRATE/NITRITE	MS1	106.0	%REC	NO		0.05		01-A1429S	2001020101
ACCU	03991	1/23/01	01D0347	01D0347-003.005	NITRATE/NITRITE	MS1	102.0	%REC	NO		0.05		01-A1213S	1787013001
ACCU	SPPMM02	1/30/01	01D0347	01D0350-004.001	NITRATE/NITRITE	MS1	104.0	%REC	NO		0.05		01-A1602S	2001020101
ACCU	70493	1/26/01	01D0349	01D0349-012.005	NITRATE/NITRITE	MS1	116.0	%REC	NO		0.05		01-A1429S	2001020101
ACCU	5887	1/31/01	01D0502	01D0502-006.001	NITRATE/NITRITE	MS1	99.0	%REC	NO		0.05		01-A2007S	2832021001
ACCU	995EFF	2/15/01	01D0502	01D0505-003.005	NITRATE/NITRITE	MS1	102.0	%REC	NO		0.05		01-A2390S	3604022201
ACCU	22696	2/12/01	01D0511	01D0511-006.001	NITRATE/NITRITE	MS1	104.0	%REC	NO		0.05		01-A2424S	3604022201
ACCU	4087	2/20/01	01D0514	01D0514-005.001	NITRATE/NITRITE	MS1	104.0	%REC	NO		0.05		01-A2880S	3786022501
ACCU	P419689	2/26/01	01D0514	01D0543-010.005	NITRATE/NITRITE	MS1	118.0	%REC	NO		0.05		01-A3163S	4983031101
ACCU	P419689	2/26/01	01D0543	01D0543-010.005	NITRATE/NITRITE	MS1	114.0	%REC	NO		0.05		01-A3163S	4983031101
ACCU	40399	2/28/01	01D0547	01D0547-002.007	NITRATE/NITRITE	MS1	104.0	%REC	NO		0.05		01-A3495S	4983031101
ACCU	07391	3/6/01	01D0555	01D0555-004.005	NITRATE/NITRITE	MS1	100.0	%REC	NO		0.05		01-A4060S	5491031701
ACCU	5387	3/19/01	01D0605	01D0605-006.004	NITRATE/NITRITE	MS1	96.0	%REC	NO		0.05		01-A4894S	7875041201
ACCU	5387	3/19/01	01D0647	01D0605-006.004	NITRATE/NITRITE	MS1	96.0	%REC	NO		0.05		01-A4894S	7875041201
[redacted]	40999	3/26/01	01D0647	01D0647-002.002	NITRATE/NITRITE	MS1	98.0	%REC	NO		0.05		01-A5076S	7402040801
[redacted]	10398	3/27/01	01D0647	01D0647-012.001	NITRATE/NITRITE	MS1	102.0	%REC	NO		0.05		01-A5299S	8017041301
ACCU	02291	04/10/01	01D0693	01D0693-003.004	NITRATE/NITRITE	MS1	106.0	%REC	NO		0.05		01-A6463S	
ACCU	4087	04/09/01	01D0693	01D0693-005.004	NITRATE/NITRITE	MS1	102.0	%REC	NO		0.05		01-A6469S	9616042801
ACCU	3586	04/17/01	01D0699	01D0699-009.004	NITRATE/NITRITE	MS1	84.0	%REC	NO		0.05		01-A6772S	711050801
ACCU	371 Prod Wtr	04/26/01	01D0716	01Z0262-001.011	NITRATE/NITRITE	MS1	110.0	%REC	NO		0.05		01-A7708S	1415051401
ACCU	371 Prod Wtr	04/26/01	01D0748	01Z0262-002.010	NITRATE/NITRITE	MS1	110.0	%REC	NO		0.05		01-A7711S	1415051401
ACCU	P219489	05/07/01	01D0775	01D0775-007.001	NITRATE/NITRITE	MS1	103.0	%REC	NO		0.05		01-A8373S	2996053101
ACCU	2186	05/08/01	01D0775	01D0775-009.005	NITRATE/NITRITE	MS1	90.0	%REC	NO		0.05		01-A8668S	2436052301
ACCU	22796	05/14/01	01D0808	01D0808-001.005	NITRATE/NITRITE	MS1	97.0	%REC	NO		0.05		01-A9026S	2996053101
ACCU	00500	05/15/01	01D0808	01D0808-007.006	NITRATE/NITRITE	MS1	44.0	%REC	NO		0.05		01-A9097S	2996053101
ACCU	891T-206	05/10/01	01D0875	01S0075-001.007	NITRATE/NITRITE	MS1	108.0	%REC	NO		0.05		01-A9471S	2996053101
ACCU	00400	05/29/01	01D0889	01D0889-005.006	NITRATE/NITRITE	MS1	102.0	%REC	NO		0.05		01-A10115S	3200060301
ACCU	995EFF	06/04/01	01D0889	01D0903-005.003	NITRATE/NITRITE	MS1	98.0	%REC	NO		0.05		01-A10301S	3985060901
ACCU	12191	06/07/01	01D0935	01D0935-008.005	NITRATE/NITRITE	MS1	108.0	%REC	NO		0.05		01-A11098S	4910061601
ACCU	995EFF	06/12/01	01D0946	01D0930-009.004	NITRATE/NITRITE	MS1	101.0	%REC	NO		0.05		01-A11151S	4910061601
STLDEN	20298	06/21/01	01D0993	01D0993-002.001	NITRATE/NITRITE	MD1	78.0	%REC	NO			1	D1F250163-002D	1177498
STLDEN	20298	06/21/01	01D0993	01D0993-002.001	NITRATE/NITRITE	MS1	80.0	%REC	NO			1	D1F250163-002S	1177498
STLDEN	5887	7/12/01	01D1057	01D1057-004.005	NITRATE/NITRITE	MD1	90.0	%REC				1	D1G130330-019D	1215238
STLDEN	5887	7/12/01	01D1057	01D1057-004.005	NITRATE/NITRITE	MS1	93.0	%REC				1	D1G130330-019S	1215238
STLDEN	?		01D1075		NITRATE/NITRITE	MD1	122.0	%REC				1	D1H100137-001D	1218499
STLDEN	?		01D1075		NITRATE/NITRITE	MS1	125.0	%REC				1	D1H100137-001S	1218499
STLDEN	891IX3EFF	7/30/01	01D1108	01D1160-004.004	NITRATE/NITRITE	MD1	101.0	%REC				1	D1H010326-012D	1220276
STLDEN	?		01D1108		NITRATE/NITRITE	MD2	97.0	%REC				1	D1H150288-001D	1221396
STLDEN	891IX3EFF	7/30/01	01D1108	01D1160-004.004	NITRATE/NITRITE	MS1	101.0	%REC				1	D1H010326-012S	1220276
STLDEN	?		01D1108		NITRATE/NITRITE	MS2	100.0	%REC				1	D1H150288-001S	1221396
STLDEN	?		01D1116		NITRATE/NITRITE	MD1	101.0	%REC				1	D1H270126-001D	1226534
STLDEN	?		01D1116		NITRATE/NITRITE	MS1	100.0	%REC				1	D1H270126-001S	1226534
STLDEN	10598	7/24/01	01D1138	01D1138-002.002	NITRATE/NITRITE	MD1	96.0	%REC				1	D1G270304-009D	1228237
STLDEN	?		01D1138		NITRATE/NITRITE	MD1	90.0	%REC				1	D1H020206-003D	1229251
STLDEN	10598	7/24/01	01D1138	01D1138-002.002	NITRATE/NITRITE	MS1	98.0	%REC				1	D1G270304-009S	1228237
STLDEN	?		01D1138		NITRATE/NITRITE	MS1	92.0	%REC				1	D1H020206-003S	1229251
ACCU	995EFF	8/2/01	01D1169	01D1170-003.003	NITRATE/NITRITE	MS1	100.0	%REC			0.05		01-A15225S	696080301
ACCU	0386	8/2/01	01D1211	01D1211-001.005	NITRATE/NITRITE	MS1	102.0	%REC				2	G01080006-01AMS	NO3081001A
ACCU	03991	8/7/01	01D1211	01D1211-003.005	NITRATE/NITRITE	MS1	104.0	%REC				5	G01080064-03AMS	NO3+081901D
ACCU	03991	8/7/01	01D1211	01D1211-003.005	NITRATE/NITRITE	MS1	110.0	%REC				5	G01080114-03AMS	NO3+081901D
[redacted]	03991	8/7/01	01D1234	01D1211-003.005	NITRATE/NITRITE	MS1	104.0	%REC				5	G01080064-03AMS	NO3+081901D
[redacted]	03991	8/7/01	01D1234	01D1211-003.005	NITRATE/NITRITE	MS1	110.0	%REC				5	G01080114-03AMS	NO3+081901D
ACCU	05091	8/13/01	01D1234	01D1234-010.005	NITRATE/NITRITE	MS1	113.0	%REC				5	G01080173-16AMS	NO3+081901E
ACCU	70099	8/14/01	01D1234	01D1234-021.001	NITRATE/NITRITE	MS1	103.0	%REC				5	G01080173-42AMS	NO3+081901E

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

659
728

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

9/23/02

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilu-tion	Lab Sample #	Lab Ba
ACCU	10298	8/23/01	01D1311	01D1311-002.001	NITRATE/NITRITE	MS1	111.0	%REC				10	G01080336-03AMS	NO2NO30 G
ACCU	05391	8/16/01	01D1311	01D1311-006.005	NITRATE/NITRITE	MS1	108.0	%REC				5	G01080225-03AMS	NO2NO3010825B
ACCU	37601	8/21/01	01D1311	01D1311-018.001	NITRATE/NITRITE	MS1	112.0	%REC				5	G01080311-15AMS	NO2NO3010825D
ACCU	12691	8/24/01	01D1352	01D1352-002.005	NITRATE/NITRITE	MS1	103.0	%REC				1	G01080364-03AMS	NO2NO3-090201F
ACCU	P313589	8/30/01	01D1417	01D1417-001.004	NITRATE/NITRITE	MS1	99.0	%REC				2	G01090008-01AMS	NON092101A
ACCU	04991	9/7/01	01D1417	01D1448-005.004	NITRATE/NITRITE	MS1	100.0	%REC				10	G01090256-07AMS	NON092101A
ACCU	P313589	8/30/01	01D1448	01D1417-001.004	NITRATE/NITRITE	MS1	99.0	%REC				2	G01090008-01AMS	NON092101A
ACCU	04991	9/7/01	01D1448	01D1448-005.004	NITRATE/NITRITE	MS1	100.0	%REC				10	G01090256-07AMS	NON092101A
STLDEN	10098	9/13/01	01D1495	01D1495-002.001	NITRATE/NITRITE	MD1	83.0	%REC		N		1	D1I200236-003D	1279153
STLDEN	10098	9/13/01	01D1495	01D1495-002.001	NITRATE/NITRITE	MS1	84.0	%REC		N		1	D1I200236-003S	1279153
STLDEN	40999	9/24/01	01D1509	01D1509-003.002	NITRATE/NITRITE	MD1	117.0	%REC		N		1	D1I270184-001D	1294107
STLDEN	891IX2EFF	10/3/01	01D1509	02D0056-002.004	NITRATE/NITRITE	MD1	91.0	%REC				1	D1J050274-004D	1287131
STLDEN	40999	9/24/01	01D1509	01D1509-003.002	NITRATE/NITRITE	MS1	118.0	%REC		N		1	D1I270184-001S	1294107
STLDEN	891IX2EFF	10/3/01	01D1509	02D0056-002.004	NITRATE/NITRITE	MS1	92.0	%REC				1	D1J050274-004S	1287131
STLDEN	W+I	10/5/01	02D0089	02D0085-002.002	NITRATE/NITRITE	MD1	84.0	%REC		N		1	D1J110274-004D	1299236
STLDEN	995EFF	10/22/02	02D0089	02D0119-001.004	NITRATE/NITRITE	MD2	85.0	%REC		N		1	D1J220158-003D	1302603
STLDEN	W+I	10/5/01	02D0089	02D0085-002.002	NITRATE/NITRITE	MS1	87.0	%REC		N		1	D1J110274-004S	1299236
STLDEN	995EFF	10/22/02	02D0089	02D0119-001.004	NITRATE/NITRITE	MS2	85.0	%REC		N		1	D1J220158-003S	1302603
STLDEN	02291	10/11/01	02D0117	02D0117-002.005	NITRATE/NITRITE	MD1	82.0	%REC	NO	N		1	D1J150194-003D	1306227
STLDEN	02291	10/11/01	02D0117	02D0117-003.005	NITRATE/NITRITE	MD1	104.0	%REC	NO			1	D1J150194-005D	1304263
STLDEN	02500	10/23/01	02D0117	02D0117-011.005	NITRATE/NITRITE	MD1	115.0	%REC		N		1	D1J260251-007D	1310354
STLDEN	02291	10/11/01	02D0117	02D0117-002.005	NITRATE/NITRITE	MS1	89.0	%REC	NO	N		1	D1J150194-003S	1306227
STLDEN	02291	10/11/01	02D0117	02D0117-003.005	NITRATE/NITRITE	MS1	109.0	%REC	NO			1	D1J150194-005S	1304263
STLDEN	02500	10/23/01	02D0117	02D0117-011.005	NITRATE/NITRITE	MS1	118.0	%REC		N		1	D1J260251-007S	1310354
STLDEN	02500	10/23/01	02D0174	02D0174-011.005	NITRATE/NITRITE	MD1	115.0	%REC	NO	N		1	D1J260251-007D	1310354
STLDEN	02500	10/23/01	02D0174	02D0174-011.005	NITRATE/NITRITE	MS1	118.0	%REC	NO	N		1	D1J260251-007S	1310354
STLDEN	995EFF	11/12/01	02D0216	02D0276-007.003	NITRATE/NITRITE	MD1	105.0	%REC				1	D1K120183-003D	1319420
STLDEN	995EFF	11/12/01	02D0216	02D0276-007.003	NITRATE/NITRITE	MS1	105.0	%REC				1	D1K120183-003S	1319420
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.005	NITRATE/NITRITE	MD1	83.0	%REC	NO	N		1	D1K090269-001D	1333520
STLDEN	FD-774-1	11/7/01	02D0264	02D0264-004.005	NITRATE/NITRITE	MS1	85.0	%REC	NO	N		1	D1K090269-001S	1333520
STLDEN	995EFF	11/21/01	02D0292	02D0294-011.003	NITRATE/NITRITE	MD1	90.0	%REC				1	D1K210187-003D	1337216
STLDEN	995EFF	11/29/01	02D0292	02D0356-001.003	NITRATE/NITRITE	MD2	99.0	%REC				1	D1K290224-003D	1338500
STLDEN	995EFF	11/21/01	02D0292	02D0294-011.003	NITRATE/NITRITE	MS1	89.0	%REC		N		1	D1K210187-003S	1337216
STLDEN	995EFF	11/29/01	02D0292	02D0356-001.003	NITRATE/NITRITE	MS2	102.0	%REC				1	D1K290224-003S	1338500
STLDEN	SPPMM02	11/30/01	02D0347	02D0370-004.001	NITRATE/NITRITE	MD1	0.0	%REC		UN		1	D1L040219-004D	1348416
STLDEN	995EFF	12/10/01	02D0347	02D0359-007.003	NITRATE/NITRITE	MD2	121.0	%REC		N		1	D1L110270-003D	1353392
STLDEN	P416689	12/4/01	02D0347	02D0410-002.004	NITRATE/NITRITE	MD3	81.0	%REC		N		1	D1L050335-001D	1354509
STLDEN	SPPMM02	11/30/01	02D0347	02D0370-004.001	NITRATE/NITRITE	MS1	0.0	%REC		UN		1	D1L040219-004S	1348416
STLDEN	995EFF	12/10/01	02D0347	02D0359-007.003	NITRATE/NITRITE	MS2	109.0	%REC				1	D1L110270-003S	1353392
STLDEN	P416689	12/4/01	02D0347	02D0410-002.004	NITRATE/NITRITE	MS3	81.0	%REC		N		1	D1L050335-001S	1354509
STLDEN	P416689	12/4/01	02D0410	02D0410-002.004	NITRATE/NITRITE	MD1	81.0	%REC	NO	N		1	D1L050335-001D	1354509
STLDEN	P416689	12/4/01	02D0410	02D0410-002.004	NITRATE/NITRITE	MS1	81.0	%REC	NO	N		1	D1L050335-001S	1354509
STLDEN	37791	12/11/01	02D0470	02D0470-005.005	NITRATE/NITRITE	MD1	91.0	%REC	NO			1	D1L150198-007D	2002352
STLDEN	995EFF	12/20/01	02D0470	02D0458-001.004	NITRATE/NITRITE	MD2	98.0	%REC				1	D1L200283-003D	1362318
STLDEN	37791	12/11/01	02D0470	02D0470-005.005	NITRATE/NITRITE	MS1	91.0	%REC	NO			1	D1L150198-007S	2002352
STLDEN	995EFF	12/20/01	02D0470	02D0458-001.004	NITRATE/NITRITE	MS2	101.0	%REC				1	D1L200283-003S	1362318
STLDEN	995EFF	12/28/01	02D0577	02D0459-015.003	NITRATE/NITRITE	MD1	108.0	%REC				1	D1L280224-003D	2003333
STLDEN	995EFF	12/28/01	02D0577	02D0459-015.003	NITRATE/NITRITE	MS1	90.0	%REC				1	D1L280224-003S	2003333
ACCU	06491	1/9/01	01D0326	01D0326-002.004	SULFATE	MS1	114.0	%REC	NO		1		01-A635S	2405020701
ACCU	00597	1/10/01	01D0326	01D0326-010.004	SULFATE	MS1	116.0	%REC	NO		1		01-A639S	977012301
ACCU	0487	1/12/01	01D0335	01D0335-001.004	SULFATE	MS1	108.0	%REC	NO		1		01-A789S	977012301
ACCU	0386	1/23/01	01D0335	01D0347-009.007	SULFATE	MS1	92.0	%REC	NO		1		01-A1218S	1300012401
ACCU	0386	1/23/01	01D0347	01D0347-009.007	SULFATE	MS1	92.0	%REC	NO		1		01-A1218S	1300012401
ACCU	02097	1/31/01	01D0349	01D0349-013.001	SULFATE	MS1	108.0	%REC	NO		1		01-A1572S	3683022301
ACCU	995EFF	1/30/01	01D0502	01D0343-003.006	SULFATE	MS1	106.0	%REC	NO		1		01-A1592S	3683022301
ACCU	P209389	2/13/01	01D0511	01D0511-004.005	SULFATE	MS1	94.0	%REC	NO		1		01-A2420S	3991022701
ACCU	P209389	2/13/01	01D0514	01D0511-004.005	SULFATE	MS1	94.0	%REC	NO		1		01-A2420S	3991022701
ACCU	07391	3/6/01	01D0514	01D0555-001.001	SULFATE	MS1	102.0	%REC	NO		1		01-A3596S	4809030801
ACCU	07391	3/6/01	01D0555	01D0555-001.001	SULFATE	MS1	107.0	%REC	NO		1		01-A3596S	4809030901
ACCU	90099	3/12/01	01D0555	01D0555-007.011	SULFATE	MS1	97.0	%REC	NO		1		01-A4065S	5220031401
ACCU	GS01	3/13/01	01D0605	01D0592-007.003	SULFATE	MS1	99.0	%REC	NO		1		01-A4336S	7021040401
ACCU	30900	05/01/01	01D0693	01D0748-010.008	SULFATE	MS1	104.0	%REC	NO		1		01-A7653S	9997050201
ACCU	1386	04/17/01	01D0699	01D0699-005.005	SULFATE	MS1	101.0	%REC	NO		1		01-A6763S	9997050201
ACCU	21098	05/07/01	01D0716	01D0784-002.006	SULFATE	MS1	101.0	%REC	NO		1		01-A8362S	746050901
ACCU	30900	05/01/01	01D0748	01D0748-010.008	SULFATE	MS1	104.0	%REC	NO		1		01-A7653S	9997050201
ACCU	371 Prod Wtr	04/26/01	01D0748	01Z0262-001.012	SULFATE	MS1	94.0	%REC	NO		1		01-A7709S	2307052201
ACCU	18499	05/09/01	01D0775	01D0784-001.006	SULFATE	MS1	104.0	%REC	NO		1		01-A8680S	1040051001
ACCU	21098	05/07/01	01D0775	01D0784-002.006	SULFATE	MS1	102.0	%REC	NO		1		01-A8362S	746050901
ACCU	18499	05/09/01	01D0784	01D0784-001.006	SULFATE	MS1	104.0	%REC	NO		1		01-A8680S	1040051001
ACCU	21098	05/07/01	01D0784	01D0784-002.006	SULFATE	MS1	102.0	%REC	NO		1		01-A8362S	746050901
STLDEN	?		01D1057		SULFATE	MD1	93.0	%REC				1	D1G170166-002D	1213190
STLDEN	?		01D1057		SULFATE	MD1	104.0	%REC				1	D1G260180-001D	1214093
STLDEN	?		01D1057		SULFATE	MS1	95.0	%REC				1	D1G170166-002S	1213190
STLDEN	?		01D1057		SULFATE	MS1	104.0	%REC				1	D1G260180-001S	1214093
STLDEN	?		01D1075		SULFATE	MD1	110.0	%REC				1	D1H100137-001D	1222262

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

Table 11-5

Matrix Spike Recovery For Tritium - Dissolved Gas - VOC - Metal - WQP Samples
Groundwater - Calendar Year 2001

Lab	Location	Sample Date	RIN #	Bottle # (= RIN-Event.Bottle)	Analyte	Result Type	Result	Units	Field Filtered	Lab Qual	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[redacted]DEN	[redacted]?		01D1075		SULFATE	MS1	109.0	%REC				1	D1H100137-001S	1222262
STLDEN	[redacted]?		01D1108		SULFATE	MD1	110.0	%REC				1	D1H020237-001D	1215194
STLDEN	[redacted]?		01D1108		SULFATE	MS1	109.0	%REC				1	D1H020237-001S	1215194
STLDEN	[redacted]?		01D1116		SULFATE	MD1	100.0	%REC				1	D1H270126-001D	1219404
STLDEN	[redacted]?		01D1116		SULFATE	MS1	99.0	%REC				1	D1H270126-001S	1219404
STLDEN	[redacted]?		01D1138		SULFATE	MD1	100.0	%REC				1	D1H270126-001D	1219404
STLDEN	[redacted]?		01D1138		SULFATE	MS1	99.0	%REC				1	D1H270126-001S	1219404
ACCU	10992	7/18/01	01D1153	01D1169-016.001	SULFATE	MS1	99.0	%REC			1		01-A15092S	1783082401
ACCU	10992	7/18/01	01D1153	01D1169-016.001	SULFATE	MS1	106.0	%REC			1		01-A15222S	1654082001
ACCU	SW134	7/10/01	01D1169	01D1058-005.002	SULFATE	MS1	105.0	%REC			1		01-A13659S	1268080801
ACCU	10992	7/18/01	01D1169	01D1169-016.001	SULFATE	MS1	107.0	%REC			1		01-A15222S	1654082001
ACCU	0386	8/2/01	01D1211	01D1211-001.006	SULFATE	MS1	102.0	%REC				1	G01080006-02AMS	ANION082901A
ACCU	0487	8/13/01	01D1234	01D1234-011.006	SULFATE	MS1	99.4	%REC				10	G01080173-19AMS	IC091101A
ACCU	07391	8/23/01	01D1234	01D1311-023.007	SULFATE	MS1	97.8	%REC				25	G01080336-08AMS	IC091101A
ACCU	0487	8/13/01	01D1311	01D1234-011.006	SULFATE	MS1	99.4	%REC				10	G01080173-19AMS	IC091101A
ACCU	07391	8/23/01	01D1311	01D1311-023.007	SULFATE	MS1	97.8	%REC				25	G01080336-08AMS	IC091101A
ACCU	90399	8/27/01	01D1352	01D1352-004.005	SULFATE	MS1	98.6	%REC				5	G01080380-01AMS	RIC091701A
ACCU	01097	8/29/01	01D1352	01D1352-012.007	SULFATE	MS1	102.0	%REC				1	G01080460-09AMS	ANION083101A
ACCU	01097	8/29/01	01D1375	01D1352-012.007	SULFATE	MS1	102.0	%REC				1	G01080460-09AMS	ANION083101A
ACCU	30900	8/28/01	01D1375	01D1375-001.009	SULFATE	MS1	106.0	%REC				1	G01080420-03ADMS	ANION082901B
ACCU	41691	8/30/01	01D1417	01D1417-004.006	SULFATE	MS1	103.0	%REC				2	G01090008-06AMS	RAPIC092101A
ACCU	01497	9/4/01	01D1417	01D1417-007.007	SULFATE	MS1	103.0	%REC				1	G01090051-03AMS	ANION090601B
ACCU	02097	9/6/01	01D1417	01D1417-012.007	SULFATE	MS1	98.4	%REC				1	G01090152-03AMS	ICF092501A
ACCU	41591	9/10/01	01D1448	01D1448-001.006	SULFATE	MS1	87.9	%REC				10	G01090256-02AMS	ICF100401A
ACCU	13091	9/25/01	01D1509	01D1509-004.006	SULFATE	MS1	97.6	%REC				1	G01090525-02A-MS	ICR100201A
STLDEN	5887	10/9/01	02D0089	02D0089-006.006	SULFATE	MS1	85.0	%REC	NO	N		1	D1J120104-001S	1303191
STLDEN	5887	10/9/01	02D0090	02D0089-006.006	SULFATE	MD1	96.0	%REC	NO			1	D1J120104-001D	1303191
STLDEN	70193	10/11/01	02D0117	02D0117-006.006	SULFATE	MD1	96.0	%REC	NO			1	D1J150194-008D	1306282
STLDEN	70493	10/17/01	02D0117	02D0117-014.006	SULFATE	MD1	98.0	%REC	NO			1	D1J210105-010D	1315101
STLDEN	70193	10/11/01	02D0117	02D0117-006.006	SULFATE	MS1	98.0	%REC	NO			1	D1J150194-008S	1306282
STLDEN	70493	10/17/01	02D0117	02D0117-014.006	SULFATE	MS1	98.0	%REC	NO			1	D1J210105-010S	1315101
STLDEN	70493	10/17/01	02D0174	02D0117-014.006	SULFATE	MD1	98.0	%REC				1	D1J210105-010D	1315101
STLDEN	70493	10/17/01	02D0174	02D0117-014.006	SULFATE	MS1	98.0	%REC				1	D1J210105-010S	1315101
STLDEN	70193	10/11/01	02D0216	02D0117-006.006	SULFATE	MD1	96.0	%REC				1	D1J150194-008D	1306282
STLDEN	18199	10/29/01	02D0216	02D0216-004.006	SULFATE	MD1	99.0	%REC	NO			1	D1J300177-004D	1304242
[redacted]DEN	18799	10/30/01	02D0216	02D0216-006.005	SULFATE	MD1	95.0	%REC	NO			1	D1J310239-002D	1305270
[redacted]DEN	70193	10/11/01	02D0216	02D0117-006.006	SULFATE	MS1	98.0	%REC				1	D1J150194-008S	1306282
[redacted]LDEN	18199	10/29/01	02D0216	02D0216-004.006	SULFATE	MS1	99.0	%REC	NO			1	D1J300177-004S	1304242
STLDEN	18799	10/30/01	02D0216	02D0216-006.005	SULFATE	MS1	93.0	%REC	NO			1	D1J310239-002S	1305270
STLDEN	1386	11/1/01	02D0264	02D0264-002.002	SULFATE	MD1	107.0	%REC	NO			1	D1K050132-003D	1325448
STLDEN	1386	11/1/01	02D0264	02D0264-002.002	SULFATE	MS1	108.0	%REC	NO			1	D1K050132-003S	1325448
ACCU	07391	3/6/01	01D0555	01D0555-005.001	SULFIDE	MS1	81.0	%REC	NO		0.002		01-A3794S	5166031301
ACCU	Bldg 910	04/12/01	01D0748	01Z0262-002.001	SULFIDE	MS1	90.0	%REC	NO		0.002		01-A7263S	484050701
ACCU	18499	05/09/01	01D0775	01D0784-001.005	SULFIDE	MS1	90.0	%REC	NO		0.002		01-A8679S	1411051401
ACCU	18499	05/09/01	01D0784	01D0784-001.005	SULFIDE	MS1	90.0	%REC	NO		0.002		01-A8679S	1411051401
ACCU	31001	7/31/01	01D1153	01D1153-002.007	SULFIDE	MS1	65.0	%REC		N	0.002		01-A15094S	514080201
ACCU	11791	8/22/01	01D1311	01D1311-011.005	SULFIDE	MS1	85.0	%REC				1	G01080311-04AMS	441
ACCU	11791	8/22/01	01D1352	01D1311-011.005	SULFIDE	MS1	85.0	%REC				1	G01080311-04AMS	441
ACCU	01097	8/29/01	01D1352	01D1352-012.006	SULFIDE	MS1	30.0	%REC		N		1	G01080460-08AMS	508
ACCU	01097	8/29/01	01D1375	01D1352-012.006	SULFIDE	MS1	30.0	%REC		N		1	G01080460-08AMS	508
ACCU	01497	9/4/01	01D1417	01D1417-007.006	SULFIDE	MS1	47.5	%REC		N		1	G01090051-02AMS	641
ACCU	13091	9/25/01	01D1509	01D1509-004.005	SULFIDE	MS1	100.0	%REC				1	G01090525-01AMS	965
ACCU	18199	10/29/01	02D0216	02D0216-004.008	SULFIDE	MS1	23.5	%REC	NO	N		1	G01100508-01AMS	1532
ACCU	18399	11/1/01	02D0264	02D0264-001.003	SULFIDE	MS1	32.5	%REC	NO	N		1	G01110055-01AMS	1634
RECRL	90099	3/8/01	01D0555	01D0555-007.005	TOTAL ORGANIC CARBON	MS1	106.9	%REC	NO			1	0103L238-012	01LTCA18
ACCU	30900	05/01/01	01D0748	01D0748-010.014	TOTAL ORGANIC CARBON	MS1	108.0	%REC	NO		1		01-A7655S	945051001
ACCU	30900	05/01/01	01D0775	01D0748-010.014	TOTAL ORGANIC CARBON	MS1	108.0	%REC	NO		1		01-A7655S	945051001
ACCU	18499	05/09/01	01D0775	01D0784-001.004	TOTAL ORGANIC CARBON	MS1	112.0	%REC	NO		1		01-A8678S	2172052101
ACCU	30900	05/01/01	01D0784	01D0748-010.014	TOTAL ORGANIC CARBON	MS1	108.0	%REC	NO		1		01-A7655S	945051001
ACCU	18499	05/09/01	01D0784	01D0784-001.004	TOTAL ORGANIC CARBON	MS1	112.0	%REC	NO		1		01-A8678S	2172052101
ACCU	30900	7/31/01	01D1153	01D1153-001.009	TOTAL ORGANIC CARBON	MS1	106.0	%REC			1		01-A15108S	385080101
ACCU	11791	8/22/01	01D1311	01D1311-011.006	TOTAL ORGANIC CARBON	MS1	94.2	%REC				1	G01080321-01AMS	TOC082701A
ACCU	90399	8/27/01	01D1352	01D1352-004.008	TOTAL ORGANIC CARBON	MS1	109.0	%REC				1	G01080383-01AMS	TOC090501A
ACCU	90399	8/27/01	01D1375	01D1352-004.008	TOTAL ORGANIC CARBON	MS1	109.0	%REC				1	G01080383-01AMS	TOC090501A
ACCU	01497	9/4/01	01D1417	01D1417-007.005	TOTAL ORGANIC CARBON	MS1	110.0	%REC				1	G01090058-01AMS	TOC9/14/01A
ACCU	13091	9/25/01	01D1509	01D1509-004.004	TOTAL ORGANIC CARBON	MS1	120.0	%REC				1	G01090523-01AMS	TC4101501
STLDEN	21098	11/1/01	02D0216	02D0216-009.007	TOTAL ORGANIC CARBON	MD1	98.0	%REC	NO			1	D1K010337-002D	1330384
STLDEN	21098	11/1/01	02D0216	02D0216-009.007	TOTAL ORGANIC CARBON	MS1	99.0	%REC	NO			1	D1K010337-002S	1330384
STLDEN	21098	11/1/01	02D0264	02D0216-009.007	TOTAL ORGANIC CARBON	MD1	98.0	%REC				1	D1K010337-002D	1330384
STLDEN	21098	11/1/01	02D0264	02D0216-009.007	TOTAL ORGANIC CARBON	MS1	99.0	%REC				1	D1K010337-002S	1330384

Grayed entries indicate non-IMP locations used to generate matrix spike results associated with IMP locations.

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Table 11-6

9/23/02

Lab Control Sample Recovery For Radionuclides - Groundwater - Calendar Year 2001

Lab	RIN	Analyte	Result Type	LCS Yield Fraction	LCS Units	Result	Units (Result)	Lab Qual (Result)	Detect Limit (Result)	Sigma Error (Result)	Test Method	Lab Sample #	Lab Batch
SCA	01D0327	AMERICIUM-241	LC1	97	%REC	2.1	PCI/L		0.008	0.482	ALPHA SPECTROMETRY	SCAQC-2183-LC1	2183
SCA	01D0336	AMERICIUM-241	LC1	84	%REC	1.81	PCI/L		0.007	0.418	ALPHA SPECTROMETRY	SCAQC-2187-LC1	2187
SCA	01D0339	AMERICIUM-241	LC1	97	%REC	2.1	PCI/L		0.008	0.482	ALPHA SPECTROMETRY	SCAQC-2183-LC1	2188
SCA	01D0347	AMERICIUM-241	LC1	90	%REC	1.94	PCI/L		0.007	0.444	ALPHA SPECTROMETRY	SCAQC-2190-LC1	2190
SCA	01D0547	AMERICIUM-241	LC1B	90	%REC	1.94	PCI/L		0.023	0.469	ALPHA SPECTROMETRY	SCAQC-2230-LC1B	2230
SCA	01D0605	AMERICIUM-241	LC1	101	%REC	2.18	PCI/L		0.007	0.498	ALPHA SPECTROMETRY	SCAQC-2258-LC1	2258
SWLO	01D0647	AMERICIUM-241	LC1	97	%REC	1.9	PCI/L		0.016	0.12	ALPHA SPECTROMETRY	0104061211-LCS	0104061211
SCA	01D0693	AMERICIUM-241	LC1	107	%REC	2.31	PCI/L		0.007	0.526	ALPHA SPECTROMETRY	SCAQC-2296-LC1	2296
SCA	01D0699	AMERICIUM-241	LC1	83	%REC	1.8	PCI/L		0.007	0.412	ALPHA SPECTROMETRY	SCAQC-2298-LC1	2298
ACCU	01D0759	AMERICIUM-241	LC1	92	%REC	16.43	PCI/L		0.233	1.71	ALPHA SPECTROMETRY	143052801LCS	143052801
ACCU	01D0775	AMERICIUM-241	LC1	92	%REC	16.43	PCI/L		0.233	1.706	ALPHA SPECTROMETRY	143052801LCS	143052801
SWLO	01D0808	AMERICIUM-241	LC1	90	%REC	1.7	PCI/L		0.024	0.15	ALPHA SPECTROMETRY	0106051211-LCS	0106051211
GEL	01D0889	AMERICIUM-241	LC1	102	%REC	102	PCI/L		0.0433	0.184	ALPHA SPECTROMETRY	1200036857	90352
GEL	01D0889	AMERICIUM-241	LC1	103	%REC	103	PCI/L		0.0183	0.159	ALPHA SPECTROMETRY	1200043749	93440
GEL	01D0889	AMERICIUM-241	LC1	103	%REC	103	PCI/L		0.0316	0.208	ALPHA SPECTROMETRY	1200025461	85344
SWLO	01D0993	AMERICIUM-241	LC1	103	%REC	2	PCI/L		0.02	0.13	ALPHA SPECTROMETRY	0107301211-LCS	0107301211
ACCU	01D1057	AMERICIUM-241	LC1	88	%REC	1.571	PCI/L		0.025	0.262	ALPHA SPECTROMETRY	9822082301LCS	9822082301
ACCU	01D1075	AMERICIUM-241	LC1	88	%REC	1.571	PCI/L		0.025	0.262	ALPHA SPECTROMETRY	9822082301LCS	9822082301
ACCU	01D1108	AMERICIUM-241	LC1	88	%REC	1.571	PCI/L		0.025	0.262	ALPHA SPECTROMETRY	9822082301LCS	9822082301
ACCU	01D1116	AMERICIUM-241	LC1	88	%REC	1.571	PCI/L		0.025	0.262	ALPHA SPECTROMETRY	9822082301LCS	9822082301
GEL	01D1138	AMERICIUM-241	LC1	103	%REC		PCI/L		0.0167	0.333	ALPHA SPECTROMETRY	1200067745	104088
GEL	01D1169	AMERICIUM-241	LC1	103	%REC		PCI/L		0.0167	0.333	ALPHA SPECTROMETRY	1200067745	104088
ACCU	01D1211	AMERICIUM-241	LC1	89	%REC	1.33	PCI/L		0.027	0.22	ALPHA SPECTROMETRY	AS00037LCS1	AS00037
ACCU	01D1211	AMERICIUM-241	LC1	91	%REC	1.37	PCI/L		0.023	0.22	ALPHA SPECTROMETRY	AS00027LCS1	AS00027
ACCU	01D1234	AMERICIUM-241	LC1	91	%REC	1.37	PCI/L		0.025	0.22	ALPHA SPECTROMETRY	AS00027LCS1	AS00027
SCA	01D1311	AMERICIUM-241	LC1	90	%REC	1.93	PCI/L		0.006	0.435	ALPHA SPECTROMETRY	SCAQC-2541-LC1	2541
ACCU	01D1352	AMERICIUM-241	LC1	96	%REC	1.15	PCI/L		0.025	0.19	ALPHA SPECTROMETRY	AS00043LCS1	AS00043
ACCU	01D1417	AMERICIUM-241	LC1	96	%REC	1.15	PCI/L		0.025	0.19	ALPHA SPECTROMETRY	AS00043LCS1	AS00043
ACCU	01D1448	AMERICIUM-241	LC1	90	%REC	1.08	PCI/L		0.025	0.19	ALPHA SPECTROMETRY	AS00127LCS1	AS00127
GEL	01D1495	AMERICIUM-241	LC1	101	%REC		PCI/L		0.0224	0.392	ALPHA SPECTROMETRY	1200091630	113589
GEL	02D0089	AMERICIUM-241	LC1	102	%REC		PCI/L	B	0.0225	0.359	ALPHA SPECTROMETRY	1200100116	116806
GEL	02D0089	AMERICIUM-241	LC1	102	%REC		PCI/L	B	0.0225	0.359	ALPHA SPECTROMETRY	1200100116	116806
GEL	02D0117	AMERICIUM-241	LC1	108	%REC		PCI/L		0.0548	0.376	ALPHA SPECTROMETRY	1200102062	117557
GEL	02D0117	AMERICIUM-241	LC1	108	%REC		PCI/L		0.0548	0.376	ALPHA SPECTROMETRY	1200102062	117557
GEL	02D0174	AMERICIUM-241	LC1	87	%REC		PCI/L		0.0191	0.324	ALPHA SPECTROMETRY	1200109685	120739
GEL	02D0174	AMERICIUM-241	LC1	87	%REC		PCI/L		0.0191	0.324	ALPHA SPECTROMETRY	1200109685	120739
GEL	02D0216	AMERICIUM-241	LC1	87	%REC		PCI/L		0.0191	0.324	ALPHA SPECTROMETRY	1200109685	120739
GEL	02D0216	AMERICIUM-241	LC1	87	%REC		PCI/L		0.0191	0.324	ALPHA SPECTROMETRY	1200109685	120739
GEL	02D0264	AMERICIUM-241	LC1	94	%REC		PCI/L		0.0254	0.335	ALPHA SPECTROMETRY	1200112660	121913
GEL	02D0264	AMERICIUM-241	LC1	94	%REC		PCI/L		0.0254	0.335	ALPHA SPECTROMETRY	1200112660	121913
GEL	02D0271	AMERICIUM-241	LC1	103	%REC		PCI/L		0.0984	1.01	ALPHA SPECTROMETRY	1200108647	120278
GEL	02D0271	AMERICIUM-241	LC1	103	%REC		PCI/L		0.0984	1.01	ALPHA SPECTROMETRY	1200108647	120278
GEL	02D0292	AMERICIUM-241	LC1	110	%REC		PCI/L		0.0308	0.38	ALPHA SPECTROMETRY	1200120685	125087
GEL	02D0292	AMERICIUM-241	LC1	110	%REC		PCI/L		0.0308	0.38	ALPHA SPECTROMETRY	1200120685	125087
GEL	02D0347	AMERICIUM-241	LC1	105	%REC		PCI/L		0.0061	0.37	ALPHA SPECTROMETRY	1200128656	128240
GEL	02D0347	AMERICIUM-241	LC1	105	%REC		PCI/L		0.0061	0.37	ALPHA SPECTROMETRY	1200128656	128240
GEL	02D0470	AMERICIUM-241	LC1	105	%REC		PCI/L		0.0526	0.391	ALPHA SPECTROMETRY	1200130272	128858
GEL	02D0470	AMERICIUM-241	LC1	105	%REC		PCI/L		0.0526	0.391	ALPHA SPECTROMETRY	1200130272	128858
GEL	02D0577	AMERICIUM-241	LC1	105	%REC		PCI/L		0.0526	0.391	ALPHA SPECTROMETRY	1200130272	128858
GEL	02D0577	AMERICIUM-241	LC1	105	%REC		PCI/L		0.0526	0.391	ALPHA SPECTROMETRY	1200130272	128858
GEL	01D0555	CESIUM-137	LC1	105	%REC				5.36	13.5	GAMMA SPECTROMETRY	1000177170	70849
ACCU	01D1075	CESIUM-137	LC1	102	%REC	42200	PCI/L		480	1141	GAMMA SPECTROMETRY	1761081601LCS	1761081601
ACCU	01D1075	CESIUM-137	LC2	104	%REC	43260	PCI/L		452	1153	GAMMA SPECTROMETRY	1761081601LCSD	1761081601

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Lab	RIN	Analyte	Result Type	LCS Yield Fraction	LCS Units	Result	Units (Result)	Lab Qual (Result)	Detect Limit (Result)	Sigma Error (Result)	Test Method	Lab Sample #	Lab Batch #
GEL	01D1138	CESIUM-137	LC1	104	%REC		PCI/L		5.67	47.8	GAMMA SPECTROMETRY	1200066296	103517
GEL	01D1169	CESIUM-137	LC1	104	%REC		PCI/L		5.67	47.8	GAMMA SPECTROMETRY	1200066296	103517
ACCU	01D1211	CESIUM-137	LC1	108	%REC	39600	PCI/L			6900	GAMMA SPECTROMETRY	GS00036LCS1	GS00036
ACCU	01D1311	CESIUM-137	LC1	109	%REC	40100	PCI/L			7000	GAMMA SPECTROMETRY	GS00037LCS1	GS00037
ACCU	01D0759	NEPTUNIUM-237	LC1	86	%REC	2.012	PCI/L		0.139	0.279	ALPHA SPECTROMETRY	2870052801LCS	2870052801
ACCU	01D0775	NEPTUNIUM-237	LC1	86	%REC	2.01	PCI/L		0.139	0.279	ALPHA SPECTROMETRY	2870052801LCS	2870052801
GEL	01D0808	NEPTUNIUM-237	LC1	109	%REC	109	PCI/L		0.184	1.74	ALPHA SPECTROMETRY	1200012577	80307
GEL	01D0889	NEPTUNIUM-237	LC1	109	%REC	109	PCI/L		0.244	1.68	ALPHA SPECTROMETRY	1200027346	86056
GEL	01D1169	NEPTUNIUM-237	LC1	112	%REC		PCI/L		0.312	3.37	ALPHA SPECTROMETRY	1200069908	104866
ACCU	01D1448	NEPTUNIUM-237	LC1	79	%REC	1.85	PCI/L		0.053	0.34	ALPHA SPECTROMETRY	AS00131LCS1	AS00131
GEL	02D0216	NEPTUNIUM-237	LC1	114	%REC		PCI/L		0.296	3.63	ALPHA SPECTROMETRY	1200109706	120748
GEL	02D0216	NEPTUNIUM-237	LC1	114	%REC		PCI/L		0.296	3.63	ALPHA SPECTROMETRY	1200109706	120748
GEL	02D0264	NEPTUNIUM-237	LC1	114	%REC		PCI/L		0.193	3.04	ALPHA SPECTROMETRY	1200112666	121915
GEL	02D0264	NEPTUNIUM-237	LC1	114	%REC		PCI/L		0.193	3.04	ALPHA SPECTROMETRY	1200112666	121915
GEL	02D0292	NEPTUNIUM-237	LC1	117	%REC		PCI/L		0.327	3.38	ALPHA SPECTROMETRY	1200120691	125089
GEL	02D0292	NEPTUNIUM-237	LC1	117	%REC		PCI/L		0.327	3.38	ALPHA SPECTROMETRY	1200120691	125089
GEL	02D0347	NEPTUNIUM-237	LC1	89	%REC		PCI/L		0.227	2.05	ALPHA SPECTROMETRY	1200128666	128243
GEL	02D0347	NEPTUNIUM-237	LC1	89	%REC		PCI/L		0.227	2.05	ALPHA SPECTROMETRY	1200128666	128243
GEL	02D0577	NEPTUNIUM-237	LC1	100	%REC		PCI/L		0.561	6.54	ALPHA SPECTROMETRY	1200133428	130091
GEL	02D0577	NEPTUNIUM-237	LC1	100	%REC		PCI/L		0.561	6.54	ALPHA SPECTROMETRY	1200133428	130091
SCA	01D0327	PLUTONIUM-239/240	LC1	98	%REC	1.94	PCI/L		0.008	0.448	ALPHA SPECTROMETRY	SCAQC-2183-LC1	2183
SCA	01D0336	PLUTONIUM-239/240	LC1	93	%REC	1.84	PCI/L		0.006	0.412	ALPHA SPECTROMETRY	SCAQC-2187-LC1	2187
SCA	01D0339	PLUTONIUM-239/240	LC1	98	%REC	1.94	PCI/L		0.008	0.448	ALPHA SPECTROMETRY	SCAQC-2183-LC1	2188
SCA	01D0347	PLUTONIUM-239/240	LC1	98	%REC	1.94	PCI/L		0.006	0.435	ALPHA SPECTROMETRY	SCAQC-2190-LC1	2190
SCA	01D0547	PLUTONIUM-239/240	LC1B	116	%REC	2.29	PCI/L		0.01	0.539	ALPHA SPECTROMETRY	SCAQC-2230-LC1B	2230
[illegible]	01D0605	PLUTONIUM-239/240	LC1	106	%REC	2.1	PCI/L		0.014	0.468	ALPHA SPECTROMETRY	SCAQC-2258-LC1	2258
SWLO	01D0647	PLUTONIUM-239/240	LC1	106	%REC	2.2	PCI/L		0.0072	0.15	ALPHA SPECTROMETRY	0104061211-LCS	0104061211
SCA	01D0693	PLUTONIUM-239/240	LC1	101	%REC	1.98	PCI/L		0.029	0.452	ALPHA SPECTROMETRY	SCAQC-2296-LC1	2296
SCA	01D0699	PLUTONIUM-239/240	LC1	96	%REC	1.88	PCI/L		0.009	0.44	ALPHA SPECTROMETRY	SCAQC-2298-LC1	2298
ACCU	01D0759	PLUTONIUM-239/240	LC1	97	%REC	1.93	PCI/L		0.005	0.18	ALPHA SPECTROMETRY	143052801LCS	143052801
ACCU	01D0775	PLUTONIUM-239/240	LC1	106	%REC	2.12	PCI/L		0.016	0.2	ALPHA SPECTROMETRY	143052801LCS	143052801
SWLO	01D0808	PLUTONIUM-239/240	LC1	104	%REC	2.2	PCI/L		0.0097	0.17	ALPHA SPECTROMETRY	0106051211-LCS	0106051211
GEL	01D0889	PLUTONIUM-239/240	LC1	94	%REC	94	PCI/L		0.0192	0.163	ALPHA SPECTROMETRY	1200036854	90350
GEL	01D0889	PLUTONIUM-239/240	LC1	102	%REC	102	PCI/L	B	0.0109	0.203	ALPHA SPECTROMETRY	1200025484	85345
SWLO	01D0993	PLUTONIUM-239/240	LC1	94	%REC	2	PCI/L		0.02	0.14	ALPHA SPECTROMETRY	0107301211-LCS	0107301211
ACCU	01D1057	PLUTONIUM-239/240	LC1	91	%REC	1.812	PCI/L		0.025	0.296	ALPHA SPECTROMETRY	9822082301LCS	9822082301
ACCU	01D1075	PLUTONIUM-239/240	LC1	91	%REC	1.812	PCI/L		0.025	0.296	ALPHA SPECTROMETRY	9822082301LCS	9822082301
ACCU	01D1108	PLUTONIUM-239/240	LC1	91	%REC	1.812	PCI/L		0.025	0.296	ALPHA SPECTROMETRY	9822082301LCS	9822082301
ACCU	01D1116	PLUTONIUM-239/240	LC1	91	%REC	1.812	PCI/L		0.025	0.296	ALPHA SPECTROMETRY	9822082301LCS	9822082301
GEL	01D1138	PLUTONIUM-239/240	LC1	83	%REC		PCI/L		0.0214	0.279	ALPHA SPECTROMETRY	1200067748	104089
GEL	01D1169	PLUTONIUM-239/240	LC1	83	%REC		PCI/L		0.0214	0.279	ALPHA SPECTROMETRY	1200067748	104089
ACCU	01D1211	PLUTONIUM-239/240	LC1	104	%REC	1.73	PCI/L		0.0052	0.28	ALPHA SPECTROMETRY	AS00037LCS1	AS00037
ACCU	01D1234	PLUTONIUM-239/240	LC1	106	%REC	1.76	PCI/L		0.024	0.28	ALPHA SPECTROMETRY	AS00027LCS1	AS00027
SCA	01D1311	PLUTONIUM-239/240	LC1	102	%REC	2.01	PCI/L		0.006	0.448	ALPHA SPECTROMETRY	SCAQC-2541-LC1	2541
ACCU	01D1352	PLUTONIUM-239/240	LC1	100	%REC	0.0014	PCI/L	U	0.01	0.0047	ALPHA SPECTROMETRY	AS00043LCS1	AS00043
ACCU	01D1417	PLUTONIUM-239/240	LC1	100	%REC	0.0014	PCI/L	U	0.01	0.0047	ALPHA SPECTROMETRY	AS00043LCS1	AS00043
ACCU	01D1448	PLUTONIUM-239/240	LC1	100	%REC	0	PCI/L	U	0.015	0.0068	ALPHA SPECTROMETRY	AS00127LCS1	AS00127
GEL	01D1495	PLUTONIUM-239/240	LC1	96	%REC		PCI/L		0.0237	0.303	ALPHA SPECTROMETRY	1200091639	113590
GEL	02D0089	PLUTONIUM-239/240	LC1	100	%REC		PCI/L		0.0611	0.328	ALPHA SPECTROMETRY	1200100119	116807
GEL	02D0089	PLUTONIUM-239/240	LC1	100	%REC		PCI/L		0.0611	0.328	ALPHA SPECTROMETRY	1200100119	116807
GEL	02D0117	PLUTONIUM-239/240	LC1	98	%REC		PCI/L		0.0325	0.326	ALPHA SPECTROMETRY	1200102065	117558
GEL	02D0117	PLUTONIUM-239/240	LC1	98	%REC		PCI/L		0.0325	0.326	ALPHA SPECTROMETRY	1200102065	117558
[illegible]	02D0174	PLUTONIUM-239/240	LC1	91	%REC		PCI/L		0.028	0.291	ALPHA SPECTROMETRY	1200109688	120742

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Lab	RIN	Analyte	Result Type	LCS Yield Fraction	LCS Units	Result	Units (Result)	Lab Qual (Result)	Detect Limit (Result)	Sigma Error (Result)	Test Method	Lab Sample #	Lab Batch
GEL	02D0174	PLUTONIUM-239/240	LC1	91	%REC		PCI/L		0.028	0.291	ALPHA SPECTROMETRY	1200109688	120742
GEL	02D0216	PLUTONIUM-239/240	LC1	91	%REC		PCI/L		0.028	0.291	ALPHA SPECTROMETRY	1200109688	120742
GEL	02D0216	PLUTONIUM-239/240	LC1	91	%REC		PCI/L		0.028	0.291	ALPHA SPECTROMETRY	1200109688	120742
GEL	02D0264	PLUTONIUM-239/240	LC1	96	%REC		PCI/L		0.0229	0.311	ALPHA SPECTROMETRY	1200112663	121914
GEL	02D0264	PLUTONIUM-239/240	LC1	96	%REC		PCI/L		0.0229	0.311	ALPHA SPECTROMETRY	1200112663	121914
GEL	02D0292	PLUTONIUM-239/240	LC1	100	%REC		PCI/L		0.0175	0.315	ALPHA SPECTROMETRY	1200120688	125088
GEL	02D0292	PLUTONIUM-239/240	LC1	100	%REC		PCI/L		0.0175	0.315	ALPHA SPECTROMETRY	1200120688	125088
GEL	02D0347	PLUTONIUM-239/240	LC1	101	%REC		PCI/L		0.026	0.316	ALPHA SPECTROMETRY	1200128659	128241
GEL	02D0347	PLUTONIUM-239/240	LC1	101	%REC		PCI/L		0.026	0.316	ALPHA SPECTROMETRY	1200128659	128241
GEL	02D0470	PLUTONIUM-239/240	LC1	99	%REC		PCI/L		0.0298	0.332	ALPHA SPECTROMETRY	1200130275	128859
GEL	02D0470	PLUTONIUM-239/240	LC1	99	%REC		PCI/L		0.0298	0.332	ALPHA SPECTROMETRY	1200130275	128859
GEL	02D0577	PLUTONIUM-239/240	LC1	99	%REC		PCI/L		0.0298	0.332	ALPHA SPECTROMETRY	1200130275	128859
GEL	02D0577	PLUTONIUM-239/240	LC1	99	%REC		PCI/L		0.0298	0.332	ALPHA SPECTROMETRY	1200130275	128859
GEL	01D0327	STRONTIUM-89,90	LC1	114	%REC				0.836	19.7	GAS PROPORTIONAL CNT.	1000151638	61432
GEL	01D0336	STRONTIUM-89,90	LC1	87	%REC	87	PCI/L		0.804	13.9	GAS PROPORTIONAL CNT.	1000154880	62618
GEL	01D0543	STRONTIUM-89,90	LC1	97	%REC				0.155	5.48	GAS PROPORTIONAL CNT.	1000167803	67401
GEL	01D0693	STRONTIUM-89,90	LC1	91	%REC	91	PCI/L		0.173	4.78	GAS PROPORTIONAL CNT.	1000189693	76500
GEL	01D0699	STRONTIUM-89,90	LC1	91	%REC	91	PCI/L		0.173	4.78	GAS PROPORTIONAL CNT.	1000189693	76500
ACCU	01D0759	STRONTIUM-89,90	LC1	100	%REC	2.085	PCI/L		0.14	0.197	GAS PROPORTIONAL CNT.	2218052401LCS	2218052401
ACCU	01D0759	STRONTIUM-89,90	LC1	87	%REC	1.811	PCI/L		0.11	0.162	GAS PROPORTIONAL CNT.	2778052901LCS	2778052901
ACCU	01D1075	STRONTIUM-89,90	LC1	89	%REC	34.74	PCI/L		0.68	1.54	GAS PROPORTIONAL CNT.	1756082201LCS	1756082201
GEL	01D1138	STRONTIUM-89,90	LC1	93	%REC		PCI/L		0.24	6.67	GAS PROPORTIONAL CNT.	1200063071	102301
ACCU	01D1234	STRONTIUM-89,90	LC1	85	%REC	33.5	PCI/L			1.3	GAS PROPORTIONAL CNT.	GP00052LCS1	GP00052
ACCU	01D1417	STRONTIUM-89,90	LC1	85	%REC	33.5	PCI/L		0.47	1.3	GAS PROPORTIONAL CNT.	GP00052LCS1	GP00052
ACCU	01D1417	STRONTIUM-89,90	LC2		%REC	33.4	PCI/L		0.5	1.3	GAS PROPORTIONAL CNT.	GP00052LCS1-D1	GP00052
ACCU	01D1448	STRONTIUM-89,90	LC1		%REC	54.65	PCI/L		0.487	1.65	GAS PROPORTIONAL CNT.	GP00088LCS1	GP00088
GEL	02D0089	STRONTIUM-89,90	LC1	105	%REC		PCI/L		0.193	6.39	GAS PROPORTIONAL CNT.	1200102362	117668
GEL	02D0089	STRONTIUM-89,90	LC1	105	%REC		PCI/L		0.193	6.39	GAS PROPORTIONAL CNT.	1200102362	117668
GEL	02D0117	STRONTIUM-89,90	LC1	105	%REC		PCI/L		0.193	6.39	GAS PROPORTIONAL CNT.	1200102362	117668
GEL	02D0117	STRONTIUM-89,90	LC1	105	%REC		PCI/L		0.193	6.39	GAS PROPORTIONAL CNT.	1200102362	117668
GEL	02D0174	STRONTIUM-89,90	LC1	103	%REC		PCI/L		0.324	9.2	GAS PROPORTIONAL CNT.	1200108209	120114
GEL	02D0174	STRONTIUM-89,90	LC1	103	%REC		PCI/L		0.324	9.2	GAS PROPORTIONAL CNT.	1200108209	120114
GEL	02D0347	STRONTIUM-89,90	LC1	105	%REC		PCI/L		2.65	12.3	GAS PROPORTIONAL CNT.	1200128267	128093
GEL	02D0347	STRONTIUM-89,90	LC1	105	%REC		PCI/L		2.65	12.3	GAS PROPORTIONAL CNT.	1200128267	128093
GEL	01D0327	STRONTIUM-90	LC1	109	%REC				0.694	18.8	GAS PROPORTIONAL CNT.	1000151609	61426
GEL	01D0336	STRONTIUM-90	LC1	92	%REC	92	PCI/L		0.644	14.8	GAS PROPORTIONAL CNT.	1000154891	62622
GEL	01D0327	TRITIUM	LC1	107	%REC				263	382	LIQUID SCINTILLATION CNT.	1000150860	61166
GEL	01D0347	TRITIUM	LC1	106	%REC				273	386	LIQUID SCINTILLATION CNT.	1000156162	63086
GEL	01D0543	TRITIUM	LC1	104	%REC				349	540	LIQUID SCINTILLATION CNT.	1000167724	67372
GEL	01D0555	TRITIUM	LC1	107	%REC				282	540	LIQUID SCINTILLATION CNT.	1000173829	69582
GEL	01D0647	TRITIUM	LC1	111	%REC				269	525	LIQUID SCINTILLATION CNT.	1000178999	71533
GEL	01D0693	TRITIUM	LC1	99	%REC	99	PCI/L		312	518	LIQUID SCINTILLATION CNT.	1200004510	76268
GEL	01D0699	TRITIUM	LC1	99	%REC	99	PCI/L		312	518	LIQUID SCINTILLATION CNT.	1200004510	76268
ACCU	01D0759	TRITIUM	LC1	94	%REC	9290	PCI/L		190	1220	LIQUID SCINTILLATION CNT.	1511051501LCS	1511051501
ACCU	01D0775	TRITIUM	LC1	94	%REC	9270	PCI/L		183	1220	LIQUID SCINTILLATION CNT.	2600052401LCS	2600052401
GEL	01D0808	TRITIUM	LC1	89	%REC	89	PCI/L		321	460	LIQUID SCINTILLATION CNT.	1200007643	78372
GEL	01D0889	TRITIUM	LC1	113	%REC	113	PCI/L		319	543	LIQUID SCINTILLATION CNT.	1200028334	86437
ACCU	01D1057	TRITIUM	LC1	110	%REC	10740	PCI/L		179	1400	LIQUID SCINTILLATION CNT.	414080101LCS	414080101
ACCU	01D1075	TRITIUM	LC1	110	%REC	10740	PCI/L		179	1400	LIQUID SCINTILLATION CNT.	414080101LCS	414080101
ACCU	01D1108	TRITIUM	LC1	110	%REC	10740	PCI/L		179	1400	LIQUID SCINTILLATION CNT.	414080101LCS	414080101
ACCU	01D1116	TRITIUM	LC1	110	%REC	10740	PCI/L		179	1400	LIQUID SCINTILLATION CNT.	414080101LCS	414080101
GEL	01D1138	TRITIUM	LC1	119	%REC		PCI/L		361	574	LIQUID SCINTILLATION CNT.	1200069787	104829
GEL	01D1169	TRITIUM	LC1	119	%REC		PCI/L		361	574	LIQUID SCINTILLATION CNT.	1200069787	104829

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Lab Control Sample Recovery For Radionuclides - Groundwater - Calendar Year 2001

[redacted]	RIN	Analyte	Result Type	LCS Yield Fraction	LCS Units	Result	Units (Result)	Lab Qual (Result)	Detect Limit (Result)	Sigma Error (Result)	Test Method	Lab Sample #	Lab Batch #
ACCU	01D1211	TRITIUM	LC1	97	%REC	9300	PCI/L		180	1200	LIQUID SCINTILLATION CNT.	LS00013LCS1	LS00013
ACCU	01D1234	TRITIUM	LC1	97	%REC	9300	PCI/L		180	1200	LIQUID SCINTILLATION CNT.	LS00013LCS1	LS00013
ACCU	01D1417	TRITIUM	LC1	89	%REC	8500	PCI/L		180	1100	LIQUID SCINTILLATION CNT.	LS00042LCS1	LS00042
ACCU	01D1448	TRITIUM	LC1	89	%REC	8500	PCI/L		180	1100	LIQUID SCINTILLATION CNT.	LS00042LCS1	LS00042
GEL	01D1495	TRITIUM	LC1	89	%REC		PCI/L		266	418	LIQUID SCINTILLATION CNT.	1200092123	113730
GEL	02D0089	TRITIUM	LC1	105	%REC		PCI/L		310	488	LIQUID SCINTILLATION CNT.	1200098532	116132
GEL	02D0089	TRITIUM	LC1	105	%REC		PCI/L		310	488	LIQUID SCINTILLATION CNT.	1200098532	116132
GEL	02D0117	TRITIUM	LC1	88	%REC		PCI/L		315	432	LIQUID SCINTILLATION CNT.	1200103890	118358
GEL	02D0117	TRITIUM	LC1	88	%REC		PCI/L		315	432	LIQUID SCINTILLATION CNT.	1200103890	118358
GEL	02D0174	TRITIUM	LC1	107	%REC		PCI/L		206	453	LIQUID SCINTILLATION CNT.	1200108070	120070
GEL	02D0174	TRITIUM	LC1	107	%REC		PCI/L		206	453	LIQUID SCINTILLATION CNT.	1200108070	120070
GEL	02D0216	TRITIUM	LC1	107	%REC		PCI/L		206	453	LIQUID SCINTILLATION CNT.	1200108070	120070
GEL	02D0216	TRITIUM	LC1	107	%REC		PCI/L		206	453	LIQUID SCINTILLATION CNT.	1200108070	120070
GEL	02D0264	TRITIUM	LC1	102	%REC		PCI/L		206	433	LIQUID SCINTILLATION CNT.	1200113421	122198
GEL	02D0264	TRITIUM	LC1	102	%REC		PCI/L		206	433	LIQUID SCINTILLATION CNT.	1200113421	122198
GEL	02D0292	TRITIUM	LC1	102	%REC		PCI/L		202	433	LIQUID SCINTILLATION CNT.	1200120773	125112
GEL	02D0292	TRITIUM	LC1	102	%REC		PCI/L		202	433	LIQUID SCINTILLATION CNT.	1200120773	125112
GEL	02D0347	TRITIUM	LC1	95	%REC		PCI/L		227	410	LIQUID SCINTILLATION CNT.	1200125056	126861
GEL	02D0347	TRITIUM	LC1	95	%REC		PCI/L		227	410	LIQUID SCINTILLATION CNT.	1200125056	126861
SCA	01D0327	URANIUM-233,-234	LC1	101	%REC	3.65	PCI/L		0.027	0.908	ALPHA SPEC	SCAQC-2184-LC1	2184
SCA	01D0336	URANIUM-233,-234	LC1	106	%REC	3.82	PCI/L		0.022	0.922	ALPHA SPEC	SCAQC-2186-LC1	2186
SCA	01D0336	URANIUM-233,-234	LC1	100	%REC	3.61	PCI/L		0.032	0.932	ALPHA SPEC	SCAQC-2185-LC1	2185
SCA	01D0339	URANIUM-233,-234	LC1	106	%REC	3.82	PCI/L		0.022	0.922	ALPHA SPEC	SCAQC-2186-LC1	2189
SCA	01D0347	URANIUM-233,-234	LC1	99	%REC	3.59	PCI/L		0.043	0.86	ALPHA SPEC	SCAQC-2191-LC1	2191
SCA	01D0547	URANIUM-233,-234	LC1	98	%REC	3.53	PCI/L		0.023	0.861	ALPHA SPEC	SCAQC-2227-LC1	2227
[redacted]	01D0547	URANIUM-233,-234	LC1	105	%REC	3.8	PCI/L		0.043	0.928	ALPHA SPEC	SCAQC-2228-LC1	2228
[redacted]	01D0547	URANIUM-233,-234	LC1B	96	%REC	3.48	PCI/L		0.06	0.87	ALPHA SPEC	SCAQC-2229-LC1B	2229
SCA	01D0605	URANIUM-233,-234	LC1	92	%REC	3.33	PCI/L	B	0.048	0.842	ALPHA SPEC	SCAQC-2255-LC1	2255
SCA	01D0605	URANIUM-233,-234	LC1	120	%REC	4.33	PCI/L	B	0.04	1.15	ALPHA SPEC	SCAQC-2256-LC1	2256
SCA	01D0605	URANIUM-233,-234	LC1	107	%REC	3.86	PCI/L		0.04	0.933	ALPHA SPEC	SCAQC-2257-LC1	2257
SWLO	01D0647	URANIUM-233,-234	LC1	98	%REC	2.4	PCI/L		0.0068	0.15	ALPHA SPEC	0104061211-LCS	0104061211
SCA	01D0693	URANIUM-233,-234	LC1	99	%REC	3.59	PCI/L		0.019	0.852	ALPHA SPECTROMETRY	SCAQC-2297-LC1	2297
SCA	01D0699	URANIUM-233,-234	LC1	77	%REC	2.77	PCI/L		0.02	0.675	ALPHA SPECTROMETRY	SCAQC-2299-LC1	2299
ACCU	01D0759	URANIUM-233,-234	LC1	95	%REC	2.259	PCI/L		0.014	0.332	ALPHA SPECTROMETRY	181051901LCS	181051901
ACCU	01D0759	URANIUM-233,-234	LC1	95	%REC	2.257	PCI/L		0.064	0.319	ALPHA SPECTROMETRY	181052101LCS	181052101
ACCU	01D0775	URANIUM-233,-234	LC1	95	%REC	2.26	PCI/L		0.014	0.33	ALPHA SPECTROMETRY	181051801LCS	181051801
SWLO	01D0808	URANIUM-233,-234	LC1	104	%REC	2.5	PCI/L		0.0061	0.15	ALPHA SPECTROMETRY	0105241211-LCS	0105241211
SWLO	01D0993	URANIUM-233,-234	LC1	113	%REC	2.7	PCI/L		0.045	0.32	ALPHA SPECTROMETRY	0107061211-LCS	0107061211
ACCU	01D1057	URANIUM-233,-234	LC1	114	%REC	5.85	PCI/L		0.085	0.88	ALPHA SPECTROMETRY	1597081701LCS	1597081701
ACCU	01D1057	URANIUM-233,-234	LC1	113	%REC	5.791	PCI/L		0.188	0.95	ALPHA SPECTROMETRY	1694082301LCS	1694082301
ACCU	01D1075	URANIUM-233,-234	LC1	114	%REC	5.85	PCI/L		0.085	0.88	ALPHA SPECTROMETRY	1597081701LCS	1597081701
ACCU	01D1108	URANIUM-233,-234	LC1	114	%REC	5.85	PCI/L		0.085	0.88	ALPHA SPECTROMETRY	1597081701LCS	1597081701
ACCU	01D1116	URANIUM-233,-234	LC1	114	%REC	5.85	PCI/L		0.085	0.88	ALPHA SPECTROMETRY	1597081701LCS	1597081701
ACCU	01D1211	URANIUM-233,-234	LC1	102	%REC	12.2	PCI/L		0.096	1.9	ALPHA SPECTROMETRY	AS00038LCS1	AS00038
ACCU	01D1211	URANIUM-233,-234	LC1	95	%REC	11.4	PCI/L		0.057	1.8	ALPHA SPECTROMETRY	AS00034LCS1	AS00034
ACCU	01D1234	URANIUM-233,-234	LC1		%REC	23.9	PCI/L		0.34	3.8	ALPHA SPECTROMETRY	AS00028LCS1	AS00028
ACCU	01D1234	URANIUM-233,-234	LC1	95	%REC	11.4	PCI/L		0.057	1.8	ALPHA SPECTROMETRY	AS00034LCS1	AS00034
ACCU	01D1289	URANIUM-233,-234	LC1	95	%REC	11.4	PCI/L		0.057	1.8	ALPHA SPECTROMETRY	AS00034LCS1	AS00034
ACCU	01D1311	URANIUM-233,-234	LC1	103	%REC	12.4	PCI/L		0.07	1.9	ALPHA SPECTROMETRY	AS00042LCS1	AS00042
SCA	01D1311	URANIUM-233,-234	LC1	107	%REC	4.38	PCI/L		0.033	1.02	ALPHA SPECTROMETRY	SCAQC-2542-LC1	2542
ACCU	01D1417	URANIUM-233,-234	LC1	104	%REC	12.4	PCI/L		0.07	1.9	ALPHA SPECTROMETRY	AS00042LCS1	AS00042
SWLO	01D0647	URANIUM-235	LC1	0	%REC	0.12	PCI/L	J	0.0068	0.034	ALPHA SPECTROMETRY	0104061211-LCS	0104061211
[redacted]U	01D1057	URANIUM-235	LC1	103	%REC	5.276	PCI/L		0.087	0.874	ALPHA SPECTROMETRY	1694082301LCS	1694082301

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Lab Control Sample Recovery For Radionuclides - Groundwater - Calendar Year 2001

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Lab	RIN	Analyte	Result Type	LCS Yield Fraction	LCS Units	Result	Units (Result)	Lab Qual (Result)	Detect Limit (Result)	Sigma Error (Result)	Test Method	Lab Sample #	Lab Batch
ACCU	01D1057	URANIUM-235	LC1	119	%REC	6.11	PCI/L		0.015	0.092	ALPHA SPECTROMETRY	1597081701LCS	1597081701
ACCU	01D1075	URANIUM-235	LC1	119	%REC	6.11	PCI/L		0.015	0.092	ALPHA SPECTROMETRY	1597081701LCS	1597081701
ACCU	01D1108	URANIUM-235	LC1	119	%REC	6.11	PCI/L		0.015	0.092	ALPHA SPECTROMETRY	1597081701LCS	1597081701
ACCU	01D1116	URANIUM-235	LC1	119	%REC	6.11	PCI/L		0.015	0.092	ALPHA SPECTROMETRY	1597081701LCS	1597081701
ACCU	01D1211	URANIUM-235	LC1	100	%REC	0.44	PCI/L		0.045	0.12	ALPHA SPECTROMETRY	AS00034LCS1	AS00034
ACCU	01D1211	URANIUM-235	LC1		%REC	0.5	PCI/L		0.02	0.14	ALPHA SPECTROMETRY	AS00038LCS1	AS00038
ACCU	01D1234	URANIUM-235	LC1	100	%REC	1.21	PCI/L		0.14	0.32	ALPHA SPECTROMETRY	AS00028LCS1	AS00028
ACCU	01D1234	URANIUM-235	LC1	100	%REC	0.44	PCI/L	J	0.045	0.12	ALPHA SPECTROMETRY	AS00034LCS1	AS00034
ACCU	01D1289	URANIUM-235	LC1	100	%REC	0.44	PCI/L	J	0.045	0.12	ALPHA SPECTROMETRY	AS00034LCS1	AS00034
ACCU	01D1311	URANIUM-235	LC1	100	%REC	0.43	PCI/L	J	0.064	0.12	ALPHA SPECTROMETRY	AS00042LCS1	AS00042
ACCU	01D1352	URANIUM-235	LC1	100	%REC	0.43	PCI/L	J	0.064	0.12	ALPHA SPECTROMETRY	AS00042LCS1	AS00042
ACCU	01D1417	URANIUM-235	LC1	100	%REC	0.43	PCI/L	J	0.064	0.12	ALPHA SPECTROMETRY	AS00042LCS1	AS00042
ACCU	01D1448	URANIUM-235	LC1	100	%REC	0.74	PCI/L	J	0.021	0.19	ALPHA SPECTROMETRY	AS00109LCS1	AS00109
SCA	01D0327	URANIUM-238	LC1	105	%REC	3.8	PCI/L		0.027	0.942	ALPHA SPECTROMETRY	SCAQC-2184-LC1	2184
SCA	01D0336	URANIUM-238	LC1	102	%REC	3.7	PCI/L		0.022	0.892	ALPHA SPECTROMETRY	SCAQC-2186-LC1	2186
SCA	01D0336	URANIUM-238	LC1	105	%REC	3.81	PCI/L		0.032	0.977	ALPHA SPECTROMETRY	SCAQC-2185-LC1	2185
SCA	01D0339	URANIUM-238	LC1	102	%REC	3.7	PCI/L		0.022	0.892	ALPHA SPECTROMETRY	SCAQC-2186-LC1	2189
SCA	01D0347	URANIUM-238	LC1	109	%REC	3.95	PCI/L		0.043	0.939	ALPHA SPECTROMETRY	SCAQC-2191-LC1	2191
SCA	01D0547	URANIUM-238	LC1	92	%REC	3.32	PCI/L		0.048	0.814	ALPHA SPECTROMETRY	SCAQC-2227-LC1	2227
SCA	01D0547	URANIUM-238	LC1	99	%REC	3.58	PCI/L		0.024	0.877	ALPHA SPECTROMETRY	SCAQC-2228-LC1	2228
SCA	01D0547	URANIUM-238	LC1B	107	%REC	3.87	PCI/L		0.045	0.959	ALPHA SPECTROMETRY	SCAQC-2229-LC1B	2229
SCA	01D0605	URANIUM-238	LC1	95	%REC	3.43	PCI/L		0.027	0.865	ALPHA SPECTROMETRY	SCAQC-2255-LC1	2255
SCA	01D0605	URANIUM-238	LC1	125	%REC	4.52	PCI/L		0.084	1.2	ALPHA SPECTROMETRY	SCAQC-2256-LC1	2256
SCA	01D0605	URANIUM-238	LC1	101	%REC	3.67	PCI/L		0.022	0.889	ALPHA SPECTROMETRY	SCAQC-2257-LC1	2257
SWLO	01D0647	URANIUM-238	LC1	104	%REC	2.5	PCI/L		0.0068	0.15	ALPHA SPECTROMETRY	0104061211-LCS	0104061211
SCA	01D0693	URANIUM-238	LC1	97	%REC	3.5	PCI/L		0.039	0.833	ALPHA SPECTROMETRY	SCAQC-2297-LC1	2297
SCA	01D0699	URANIUM-238	LC1	95	%REC	3.42	PCI/L		0.035	0.82	ALPHA SPECTROMETRY	SCAQC-2299-LC1	2299
ACCU	01D0759	URANIUM-238	LC1	100	%REC	2.38	PCI/L		0.06	0.35	ALPHA SPECTROMETRY	181051901LCS	181051901
ACCU	01D0759	URANIUM-238	LC1	98	%REC	2.34	PCI/L		0.04	0.33	ALPHA SPECTROMETRY	181052101LCS	181052101
ACCU	01D0775	URANIUM-238	LC1	100	%REC	2.38	PCI/L		0.06	0.35	ALPHA SPECTROMETRY	181051801LCS	181051801
SWLO	01D0808	URANIUM-238	LC1	103	%REC	2.5	PCI/L		0.0061	0.15	ALPHA SPECTROMETRY	0105241211-LCS	0105241211
GEL	01D0889	URANIUM-238	LC1	92	%REC	92	PCI/L		0.13	0.796	ALPHA SPECTROMETRY	1200025440	85335
GEL	01D0889	URANIUM-238	LC1	92	%REC	92	PCI/L		0.239	0.856	ALPHA SPECTROMETRY	1200025435	85334
SWLO	01D0993	URANIUM-238	LC1	107	%REC	2.6	PCI/L		0.045	0.31	ALPHA SPECTROMETRY	0107061211-LCS	0107061211
GEL	01D1138	URANIUM-238	LC1	89	%REC		PCI/L		0.186	2.04	ALPHA SPECTROMETRY	1200067763	104097
GEL	01D1169	URANIUM-238	LC1	89	%REC		PCI/L		0.186	2.04	ALPHA SPECTROMETRY	1200067763	104097
ACCU	01D1211	URANIUM-238	LC1	101	%REC	12	PCI/L		0.054	1.9	ALPHA SPECTROMETRY	AS00038LCS1	AS00038
ACCU	01D1211	URANIUM-238	LC1	96	%REC	11.5	PCI/L		0.066	1.8	ALPHA SPECTROMETRY	AS00034LCS1	AS00034
ACCU	01D1234	URANIUM-238	LC1	106	%REC	25.4	PCI/L		0.04	4	ALPHA SPECTROMETRY	AS00028LCS1	AS00028
ACCU	01D1234	URANIUM-238	LC1	96	%REC	11.5	PCI/L		0.066	1.8	ALPHA SPECTROMETRY	AS00034LCS1	AS00034
ACCU	01D1289	URANIUM-238	LC1	96	%REC	11.5	PCI/L		0.066	1.8	ALPHA SPECTROMETRY	AS00034LCS1	AS00034
ACCU	01D1311	URANIUM-238	LC1	101	%REC	12.1	PCI/L		0.049	1.8	ALPHA SPECTROMETRY	AS00042LCS1	AS00042
SCA	01D1311	URANIUM-238	LC1	124	%REC	5.07	PCI/L		0.019	1.17	ALPHA SPECTROMETRY	SCAQC-2542-LC1	2542
ACCU	01D1352	URANIUM-238	LC1	101	%REC	12.1	PCI/L		0.049	1.8	ALPHA SPECTROMETRY	AS00042LCS1	AS00042
ACCU	01D1417	URANIUM-238	LC1	101	%REC	12.1	PCI/L		0.049	1.8	ALPHA SPECTROMETRY	AS00042LCS1	AS00042
ACCU	01D1448	URANIUM-238	LC1	100	%REC	12	PCI/L		0.021	1.9	ALPHA SPECTROMETRY	AS00109LCS1	AS00109
GEL	01D1495	URANIUM-238	LC1	86	%REC		PCI/L		0.117	1.7	ALPHA SPECTROMETRY	1200091676	113604
GEL	02D0089	URANIUM-238	LC1	105	%REC		PCI/L		0.247	2.54	ALPHA SPECTROMETRY	1200100122	116808
GEL	02D0089	URANIUM-238	LC1	105	%REC		PCI/L		0.247	2.54	ALPHA SPECTROMETRY	1200100122	116808
GEL	02D0117	URANIUM-238	LC1	91	%REC		PCI/L		0.152	1.93	ALPHA SPECTROMETRY	1200102068	117559
GEL	02D0117	URANIUM-238	LC1	91	%REC		PCI/L		0.152	1.93	ALPHA SPECTROMETRY	1200102068	117559
GEL	02D0174	URANIUM-238	LC1	93	%REC		PCI/L		0.158	2.13	ALPHA SPECTROMETRY	1200109698	120744
GEL	02D0174	URANIUM-238	LC1	93	%REC		PCI/L		0.158	2.13	ALPHA SPECTROMETRY	1200109698	120744

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Lab Control Sample Recovery For Radionuclides - Groundwater - Calendar Year 2001

Lab	RIN	Analyte	Result Type	LCS Yield Fraction	LCS Units	Result	Units (Result)	Lab Qual (Result)	Detect Limit (Result)	Sigma Error (Result)	Test Method	Lab Sample #	Lab Batch #
GEL	02D0216	URANIUM-238	LC1	93	%REC		PCI/L		0.158	2.13	ALPHA SPECTROMETRY	1200109698	120744
GEL	02D0216	URANIUM-238	LC1	93	%REC		PCI/L		0.158	2.13	ALPHA SPECTROMETRY	1200109698	120744
GEL	02D0292	URANIUM-238	LC1	91	%REC		PCI/L		0.239	2.15	ALPHA SPECTROMETRY	1200120716	125097
GEL	02D0292	URANIUM-238	LC1	91	%REC		PCI/L		0.239	2.15	ALPHA SPECTROMETRY	1200120716	125097
GEL	02D0347	URANIUM-238	LC1	97	%REC		PCI/L		0.209	2.38	ALPHA SPECTROMETRY	1200128821	128305
GEL	02D0347	URANIUM-238	LC1	97	%REC		PCI/L		0.209	2.38	ALPHA SPECTROMETRY	1200128821	128305
GEL	02D0347	URANIUM-238	LC2	98	%REC		PCI/L		0.187	4.51	ALPHA SPECTROMETRY	1200130581	128984
GEL	02D0347	URANIUM-238	LC2	98	%REC		PCI/L		0.187	4.51	ALPHA SPECTROMETRY	1200130581	128984
GEL	02D0470	URANIUM-238	LC1	92	%REC		PCI/L		0.117	1.81	ALPHA SPECTROMETRY	1200130241	128852
GEL	02D0470	URANIUM-238	LC1	92	%REC		PCI/L		0.117	1.81	ALPHA SPECTROMETRY	1200130241	128852

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Table11-7

Rinsate Quality Control Results - Detections Only - Groundwater - 2001

Location	Sample Date	Analyte	GW Sample #	Result Type	Result	Tier II	Units	Lab Qual	Valid-ation	Valid Reason	Detect Limit	2 Sigma Error	Field Filtered	RIN
Radionuclides														
12191	6/7/01	AMERICIUM-241	GW07473RG	TR1	0.0102	0.145	PCI/L	J	V1		0.0076	0.00998	YES	01D0889
02500	10/23/01	AMERICIUM-241	GW07860RG	TR1	0.0271	0.145	PCI/L	J	V1		0.0173	0.0168	NO	02D0174
00600	11/15/01	AMERICIUM-241	GW07852RG	TR1	0.0213	0.145	PCI/L	J	V		0.0186	0.0149	NO	02D0292
37791	12/17/01	AMERICIUM-241	GW07889RG	TR1	0.0228	0.145	PCI/L	J	V		0.0194	0.0167	NO	02D0470
00500	5/15/01	PLUTONIUM-239/240	GW07548RG	TR1	0.006	0.151	PCI/L	J	V1		0.0055	0.0068	YES	01D0808
02500	6/6/01	PLUTONIUM-239/240	GW07535RG	TR1	0.0374	0.151	PCI/L		V1		0.016	0.0277	YES	01D0889
12191	6/7/01	PLUTONIUM-239/240	GW07473RG	TR1	0.0084	0.151	PCI/L	J	V1		0.0063	0.00821	YES	01D0889
02500	10/23/01	PLUTONIUM-239/240	GW07860RG	TR1	0.0112	0.151	PCI/L	J	V1		0.0056	0.00903	NO	02D0174
37791	12/17/01	PLUTONIUM-239/240	GW07889RG	TR1	0.0212	0.151	PCI/L	J	V		0.0162	0.0145	NO	02D0470
12691	8/24/01	URANIUM-233,-234	GW07656RG	TR1	0.039	1.06	PCI/L	J	V1		0.036	0.031	YES	01D1352
40299	7/23/01	URANIUM-235	GW07741RG	TR1	0.021	1.01	PCI/L		V1		0.014	0.021	YES	01D1116
03991	8/7/01	URANIUM-235	GW07633RG	TR1	0.016	1.01	PCI/L	J	V1		0.014	0.018	YES	01D1211
07391	3/6/01	URANIUM-238	GW07336RG	TR1	0.194	0.768	PCI/L	J	V1		0.075	0.152	YES	01D0605
40299	7/23/01	URANIUM-238	GW07741RG	TR1	0.037	0.768	PCI/L		V1		0.014	0.028	YES	01D1116

Location	Sample Date	Analyte	GW Sample #	Result Type	Result	Tier II	Units	Lab Qual	Valid-ation	Valid Reason	Detect Limit	Dilution Factor	Field Filtered	RIN
Volatile Organic Compounds (VOCs)														
31001	1/30/01	CHLOROMETHANE	GW07400RG	TR1	1.2	6.55	UG/L		V1	139	1	2	NO	01D0502
12191	6/7/01	CHLOROMETHANE	GW07473RG	TR1	2	6.55	UG/L		V1		1	1	NO	01D0935
00597	7/19/01	CHLOROMETHANE	GW07627RG	TR1	1.1	6.55	UG/L		V		0.3	1	NO	01D1116
P209389	7/23/01	CHLOROMETHANE	GW07671RG	TR1	1.3	6.55	UG/L		V1		0.3	1	NO	01D1138
00600	11/15/01	CHLOROMETHANE	GW07852RG	TR1	1.5	6.55	UG/L		V1		0.3	1	NO	02D0292
02291	4/10/01	TETRACHLOROETHENE	GW07466RG	TR1	4	5	UG/L		V		1		NO	01D0693
02291	10/11/01	TETRACHLOROETHENE	GW07778RG	DL1	250	5	UG/L		V1		2.4	6.66	NO	02D0117
07391	3/6/01	TRICHLOROETHENE	GW07336RG	TR1	8	5	UG/L		J1	110	1	1	NO	01D05
07391	8/23/01	TRICHLOROETHENE	GW07765RG	TR1	4.9	5	UG/L		V1		1	1	NO	01D13
02291	10/11/01	TRICHLOROETHENE	GW07778RG	RX1	27	5	UG/L		V1		0.22	1	NO	02D0117
Metals														
12691	1/15/01	ALUMINUM	GW07353RG	TR1	12.2	36500	UG/L	B	V	214	7.6	1	YES	01D0339
03991	1/23/01	ALUMINUM	GW07156RG	TR1	19.4	36500	UG/L		UJ	107/112	5.7	1	YES	01D0347
P209389	2/13/01	ALUMINUM	GW07369RG	TR1	12.3	36500	UG/L	B	UJ1	107	7.57	1	YES	01D0514
41299	2/26/01	ALUMINUM	GW07430RG	TR1	5.9	36500	UG/L	B	V1		3.1	1	YES	01D0543
07391	3/6/01	ALUMINUM	GW07336RG	TR1	3.3	36500	UG/L	B	V1		3.1	1	YES	01D0555
891COLWEL	3/13/01	ALUMINUM	GW07394RG	TR1	6.2	36500	UG/L	B	J1	105/107	3.1	1	YES	01D0594
02291	4/10/01	ALUMINUM	GW07466RG	TR1	11.7	36500	UG/L	B	UJ1	107	3.2	1	YES	01D0693
00500	5/15/01	ALUMINUM	GW07548RG	TR1	6.3	36500	UG/L	B	UJ1	107	3.2	1	YES	01D0808
03991	8/7/01	ALUMINUM	GW07633RG	TR1	61	36500	UG/L	N	J1	112/117	2.4	2	YES	01D1211
37201	8/10/01	ALUMINUM	GW07683RG	TR1	58	36500	UG/L	N	J1	111/112	2.4	2	YES	01D1234
11891	10/5/01	ALUMINUM	GW07785RG	TR1	13.5	36500	UG/L	B	V1		12	1	YES	02D0089
02500	6/6/01	ANTIMONY	GW07535RG	TR1	0.48	6	UG/L	B	V1		0.48	1	YES	01D0935
02291	10/11/01	ANTIMONY	GW07778RG	TR1	1.5	6	UG/L	B	V1		1.4	1	YES	02D0117
00597	1/10/01	BARIUM	GW07150RG	TR1	0.5	2000	UG/L	B	J1	105/214	0.49	1	YES	01D0327
12691	1/15/01	BARIUM	GW07353RG	TR1	0.934	2000	UG/L	B	UJ	105/107/214	0.487	1	YES	01D0339
03991	1/23/01	BARIUM	GW07156RG	TR1	1.2	2000	UG/L	B	V		0.05	1	YES	01D0347
P209389	2/13/01	BARIUM	GW07369RG	TR1	4.53	2000	UG/L	B	J1	105	0.162	1	YES	01D0514
41299	2/26/01	BARIUM	GW07430RG	TR1	0.78	2000	UG/L	B	V1		0.05	1	YES	01D0543
07391	3/6/01	BARIUM	GW07336RG	TR1	1.7	2000	UG/L	B	V1		0.05	1	YES	01D0555
891COLWEL	3/13/01	BARIUM	GW07394RG	TR1	0.91	2000	UG/L	B	V1		0.05	1	YES	01D0594
02291	4/10/01	BARIUM	GW07466RG	TR1	0.35	2000	UG/L	B	V1		0.05	1	YES	01D0693
00500	5/15/01	BARIUM	GW07548RG	TR1	0.93	2000	UG/L	B	V1		0.05	1	YES	01D0808
00100	5/23/01	BARIUM	GW07532RG	TR1	1.7	2000	UG/L	B	V1		0.05	1	YES	01D0875
02500	6/6/01	BARIUM	GW07535RG	TR1	2.4	2000	UG/L	B	V1		0.05	1	YES	01D09

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Table11-7

9/17/02

Rinsate Quality Control Results - Detections Only - Groundwater - 2001

[redacted]ation	Sample Date	Analyte	GW Sample #	Result Type	Result	Tier II	Units	Lab Qual	Valid-ation	Valid Reason	Detect Limit	Dilution Factor	Field Filtered	RIN
12[redacted]	6/7/01	BARIUM	GW07473RG	TR1	3.5	2000	UG/L	B	V1		0.05	1	YES	01D0935
00597	7/19/01	BARIUM	GW07627RG	TR1	0.86	2000	UG/L	B	UJ	107	0.044	1	YES	01D1116
40299	7/23/01	BARIUM	GW07741RG	TR1	0.84	2000	UG/L	B	UJ	107	0.044	1	YES	01D1116
P209389	7/23/01	BARIUM	GW07671RG	TR1	1.7	2000	UG/L	B	V1		0.044	1	YES	01D1138
03991	8/7/01	BARIUM	GW07633RG	TR1	0.82	2000	UG/L	B	V1		0.25	1	YES	01D1211
37201	8/10/01	BARIUM	GW07683RG	TR1	0.46	2000	UG/L	B	V1		0.25	1	YES	01D1234
12691	8/24/01	BARIUM	GW07656RG	TR1	1.7	2000	UG/L	B	J1	117	0.25	1	YES	01D1352
11891	10/5/01	BARIUM	GW07785RG	TR1	3.8	2000	UG/L	B	V1		0.43	1	YES	02D0089
02291	10/11/01	BARIUM	GW07778RG	TR1	4.1	2000	UG/L	B	UJ1	107	0.43	1	YES	02D0117
02500	10/23/01	BARIUM	GW07860RG	TR1	2.7	2000	UG/L	B	V1		0.43	1	YES	02D0174
00100	11/15/01	BARIUM	GW07857RG	TR1	4.9	2000	UG/L	B	V1		0.43	1	YES	02D0292
00600	11/15/01	BARIUM	GW07852RG	TR1	6.3	2000	UG/L	B	V1		0.43	1	YES	02D0292
37791	12/11/01	BARIUM	GW07889RG	TR1	0.52	2000	UG/L	B	V1		0.43	1	YES	02D0470
02500	10/23/01	BERYLLIUM	GW07860RG	TR1	0.56	4	UG/L	B	UJ1	105/107	0.25	1	YES	02D0174
03991	1/23/01	CADMIUM	GW07156RG	TR1	0.09	5	UG/L	B	UJ	107	0.08	1	YES	01D0347
00597	7/19/01	CADMIUM	GW07627RG	TR1	0.34	5	UG/L	B	UJ	105/107	0.3	1	YES	01D1116
40299	7/23/01	CADMIUM	GW07741RG	TR1	0.33	5	UG/L	B	UJ	105/107	0.3	1	YES	01D1116
41299	2/26/01	CHROMIUM	GW07430RG	TR1	0.29	100	UG/L	B	V1		0.18	1	YES	01D0543
00597	1/10/01	COPPER	GW07150RG	TR1	2.63	1300	UG/L	B	UJ1	105/107/214	1.54	1	YES	01D0327
03991	1/23/01	COPPER	GW07156RG	TR1	1.2	1300	UG/L	B	V		0.22	1	YES	01D0347
41299	2/26/01	COPPER	GW07430RG	TR1	1.8	1300	UG/L	B	V1		0.15	1	YES	01D0543
07391	3/6/01	COPPER	GW07336RG	TR1	1.2	1300	UG/L	B	V1		0.15	1	YES	01D0555
891COLWEL	3/13/01	COPPER	GW07394RG	TR1	1.2	1300	UG/L	B	V1		0.15	1	YES	01D0594
02291	4/10/01	COPPER	GW07466RG	TR1	1.2	1300	UG/L	B	UJ1	107	0.18	1	YES	01D0693
00500	5/15/01	COPPER	GW07548RG	TR1	0.99	1300	UG/L	B	UJ1	107	0.18	1	YES	01D0808
00100	5/23/01	COPPER	GW07532RG	TR1	1.4	1300	UG/L	B	UJ1	107	0.18	1	YES	01D0875
0[redacted]	6/6/01	COPPER	GW07535RG	TR1	1.5	1300	UG/L	B	V1		0.18	1	YES	01D0935
12[redacted]	6/7/01	COPPER	GW07473RG	TR1	1.3	1300	UG/L	B	V1		0.18	1	YES	01D0935
00597	7/19/01	COPPER	GW07627RG	TR1	0.72	1300	UG/L	B	V		0.064	1	YES	01D1116
40299	7/23/01	COPPER	GW07741RG	TR1	0.86	1300	UG/L	B	V		0.064	1	YES	01D1116
P209389	7/23/01	COPPER	GW07671RG	TR1	1.8	1300	UG/L	B	V1		0.064	1	YES	01D1138
12691	8/24/01	COPPER	GW07656RG	TR1	1.4	1300	UG/L	B	V1		0.92	1	YES	01D1352
11891	10/5/01	COPPER	GW07785RG	TR1	2.7	1300	UG/L	B	UJ1	105/107	0.55	1	YES	02D0089
02500	10/23/01	COPPER	GW07860RG	TR1	2.1	1300	UG/L	B	UJ1	105/107/111	0.55	1	YES	02D0174
37791	12/11/01	COPPER	GW07889RG	TR1	1.7	1300	UG/L	B	UJ1	107	0.55	1	YES	02D0470
00597	7/19/01	LEAD	GW07627RG	TR1	0.079	15	UG/L	B	UJ	107	0.0099	1	YES	01D1116
40299	7/23/01	LEAD	GW07741RG	TR1	0.11	15	UG/L	B	UJ	107	0.0099	1	YES	01D1116
P209389	7/23/01	LEAD	GW07671RG	TR1	0.16	15	UG/L	B	UJ1	107	0.0099	1	YES	01D1138
03991	8/7/01	LEAD	GW07633RG	TR1	0.97	15	UG/L	B	V1		0.59	2	YES	01D1211
37201	8/10/01	LEAD	GW07683RG	TR1	1	15	UG/L	B	V1		0.59	2	YES	01D1234
00597	1/10/01	LITHIUM	GW07150RG	TR1	0.359	730	UG/L	B	J1	110/117/214	0.003	1	YES	01D0327
12691	1/15/01	LITHIUM	GW07353RG	TR1	0.219	730	UG/L	B	UJ	107/214	0.003	1	YES	01D0339
03991	1/23/01	LITHIUM	GW07156RG	TR1	0.16	730	UG/L	B	UJ	107/109/112/117	0.05	1	YES	01D0347
41299	2/26/01	LITHIUM	GW07430RG	TR1	0.11	730	UG/L	B	UJ1	107/117	0.05	1	YES	01D0543
07391	3/6/01	LITHIUM	GW07336RG	TR1	0.13	730	UG/L	B	UJ1	107/117	0.05	1	YES	01D0555
891COLWEL	3/13/01	LITHIUM	GW07394RG	TR1	0.15	730	UG/L	B	UJ1	107/112/117	0.05	1	YES	01D0594
02291	4/10/01	LITHIUM	GW07466RG	TR1	0.07	730	UG/L	B	UJ1	107/112	0.05	1	YES	01D0693
00500	5/15/01	LITHIUM	GW07548RG	TR1	0.26	730	UG/L	B	V1		0.05	1	YES	01D0808
00100	5/23/01	LITHIUM	GW07532RG	TR1	0.11	730	UG/L	B	UJ1	107	0.05	1	YES	01D0875
02500	6/6/01	LITHIUM	GW07535RG	TR1	0.15	730	UG/L	B	UJ1	107/117	0.05	1	YES	01D0935
12191	6/7/01	LITHIUM	GW07473RG	TR1	0.13	730	UG/L	B	UJ1	107/117	0.05	1	YES	01D0935
00597	7/19/01	LITHIUM	GW07627RG	TR1	2.6	730	UG/L	B	UJ	107/129/250	2.1	1	YES	01D1116
00597	1/10/01	MANGANESE	GW07150RG	TR1	4.92	1720	UG/L	B	V1	214	0.48	1	YES	01D0327
1[redacted]	1/15/01	MANGANESE	GW07353RG	TR1	2.53	1720	UG/L	B	V	214	0.477	1	YES	01D0339

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Table11-7

Rinsate Quality Control Results - Detections Only - Groundwater - 2001

Location	Sample Date	Analyte	GW Sample #	Result Type	Result	Tier II	Units	Lab Qual	Valid-ation	Valid Reason	Detect Limit	Dilution Factor	Field Filtered	RI
03991	1/23/01	MANGANESE	GW07156RG	TR1	1.3	1720	UG/L	B	V		0.05	1	YES	01D03
P209389	2/13/01	MANGANESE	GW07369RG	TR1	7.41	1720	UG/L	B	V1		0.338	1	YES	01D0514
41299	2/26/01	MANGANESE	GW07430RG	TR1	2.3	1720	UG/L	B	V1		0.05	1	YES	01D0543
07391	3/6/01	MANGANESE	GW07336RG	TR1	1.6	1720	UG/L	B	V1		0.05	1	YES	01D0555
891COLWEL	3/13/01	MANGANESE	GW07394RG	TR1	2.8	1720	UG/L	B	V1		0.05	1	YES	01D0594
02291	4/10/01	MANGANESE	GW07466RG	TR1	1.7	1720	UG/L	B	V1		0.02	1	YES	01D0693
00500	5/15/01	MANGANESE	GW07548RG	TR1	3	1720	UG/L	B	V1		0.02	1	YES	01D0808
00100	5/23/01	MANGANESE	GW07532RG	TR1	7.5	1720	UG/L	B	V1		0.02	1	YES	01D0875
02500	6/6/01	MANGANESE	GW07535RG	TR1	6.7	1720	UG/L	B	V1		0.02	1	YES	01D0935
12191	6/7/01	MANGANESE	GW07473RG	TR1	8.9	1720	UG/L	B	V1		0.02	1	YES	01D0935
00597	7/19/01	MANGANESE	GW07627RG	TR1	2.3	1720	UG/L	B	V		0.094	1	YES	01D1116
40299	7/23/01	MANGANESE	GW07741RG	TR1	2.2	1720	UG/L	B	V		0.094	1	YES	01D1116
P209389	7/23/01	MANGANESE	GW07671RG	TR1	3	1720	UG/L	B	V1		0.094	1	YES	01D1138
37201	8/10/01	MANGANESE	GW07683RG	TR1	3.4	1720	UG/L	B	V1		0.69	1	YES	01D1234
12691	8/24/01	MANGANESE	GW07656RG	TR1	2.2	1720	UG/L	B	V1		0.69	1	YES	01D1352
11891	10/5/01	MANGANESE	GW07785RG	TR1	2.9	1720	UG/L	B	UJ1	107	0.23	1	YES	02D0089
02291	10/11/01	MANGANESE	GW07778RG	TR1	1.8	1720	UG/L	B	UJ1	107	0.23	1	YES	02D0117
02500	10/23/01	MANGANESE	GW07860RG	TR1	3.4	1720	UG/L	B	UJ1	107	0.23	1	YES	02D0174
00100	11/15/01	MANGANESE	GW07857RG	TR1	5.3	1720	UG/L	B	V1		0.23	1	YES	02D0292
00600	11/15/01	MANGANESE	GW07852RG	TR1	8.8	1720	UG/L	B	V1		0.23	1	YES	02D0292
37791	12/11/01	MANGANESE	GW07889RG	TR1	0.64	1720	UG/L	B	V1		0.23	1	YES	02D0470
12691	8/24/01	MERCURY	GW07656RG	TR1	0.038	2	UG/L	B	V1		0.02	1	YES	01D1352
02291	10/11/01	MOLYBDENUM	GW07778RG	TR1	1.1	183	UG/L	B	UJ1	107	0.63	1	YES	02D0117
41299	2/26/01	NICKEL	GW07430RG	TR1	0.35	140	UG/L	B	V1		0.28	1	YES	01D0543
00500	5/15/01	NICKEL	GW07548RG	TR1	0.34	140	UG/L	B	UJ1	107	0.3	1	YES	01D0808
00100	5/23/01	NICKEL	GW07532RG	TR1	0.32	140	UG/L	B	V1		0.3	1	YES	01D0875
02500	6/6/01	NICKEL	GW07535RG	TR1	0.36	140	UG/L	B	V1		0.3	1	YES	01D0
12191	6/7/01	NICKEL	GW07473RG	TR1	0.74	140	UG/L	B	V1		0.3	1	YES	01D093
02500	6/6/01	SELENIUM	GW07535RG	TR1	1.3	50	UG/L	B	UJ1	105/107	0.65	1	YES	01D0935
12191	6/7/01	SELENIUM	GW07473RG	TR1	0.79	50	UG/L	B	UJ1	105/107	0.65	1	YES	01D0935
03991	8/7/01	SILVER	GW07633RG	TR1	0.054	183	UG/L	B	UJ1	107	0.01	2	YES	01D1211
37201	8/10/01	SILVER	GW07683RG	TR1	0.23	183	UG/L		UJ1	107	0.01	2	YES	01D1234
11891	10/5/01	SILVER	GW07785RG	TR1	0.25	183	UG/L	B	UJ1	105/107	0.23	1	YES	02D0089
12691	1/15/01	STRONTIUM	GW07353RG	TR1	0.496	21900	UG/L	B	V	214	0.205	1	YES	01D0339
03991	1/23/01	STRONTIUM	GW07156RG	TR1	0.4	21900	UG/L	B	UJ	107	0.02	1	YES	01D0347
P209389	2/13/01	STRONTIUM	GW07369RG	TR1	0.836	21900	UG/L	B	V1		0.16	1	YES	01D0514
41299	2/26/01	STRONTIUM	GW07430RG	TR1	0.39	21900	UG/L	B	V1		0.02	1	YES	01D0543
07391	3/6/01	STRONTIUM	GW07336RG	TR1	0.44	21900	UG/L	B	V1		0.02	1	YES	01D0555
891COLWEL	3/13/01	STRONTIUM	GW07394RG	TR1	0.37	21900	UG/L	B	V1		0.02	1	YES	01D0594
02291	4/10/01	STRONTIUM	GW07466RG	TR1	0.2	21900	UG/L	B	V1		0.02	1	YES	01D0693
00500	5/15/01	STRONTIUM	GW07548RG	TR1	0.96	21900	UG/L	B	V1		0.02	1	YES	01D0808
00100	5/23/01	STRONTIUM	GW07532RG	TR1	1.2	21900	UG/L	B	V1		0.02	1	YES	01D0875
02500	6/6/01	STRONTIUM	GW07535RG	TR1	0.75	21900	UG/L	B	V1		0.02	1	YES	01D0935
12191	6/7/01	STRONTIUM	GW07473RG	TR1	0.77	21900	UG/L	B	V1		0.02	1	YES	01D0935
00597	7/19/01	STRONTIUM	GW07627RG	TR1	0.46	21900	UG/L	B	UJ	107	0.03	1	YES	01D1116
40299	7/23/01	STRONTIUM	GW07741RG	TR1	0.61	21900	UG/L	B	UJ	107	0.03	1	YES	01D1116
P209389	7/23/01	STRONTIUM	GW07671RG	TR1	0.6	21900	UG/L	B	V1		0.03	1	YES	01D1138
03991	8/7/01	STRONTIUM	GW07633RG	TR1	0.28	21900	UG/L	B	V1		0.25	1	YES	01D1211
11891	10/5/01	STRONTIUM	GW07785RG	TR1	2.5	21900	UG/L	B	UJ1	107	0.18	1	YES	02D0089
02291	10/11/01	STRONTIUM	GW07778RG	TR1	2.8	21900	UG/L	B	V1		0.18	1	YES	02D0117
02500	10/23/01	STRONTIUM	GW07860RG	TR1	1.9	21900	UG/L	B	V1		0.18	1	YES	02D0174
00100	11/15/01	STRONTIUM	GW07857RG	TR1	0.74	21900	UG/L	B	V1		0.18	1	YES	02D0292
00600	11/15/01	STRONTIUM	GW07852RG	TR1	0.98	21900	UG/L	B	V1		0.18	1	YES	02D029
37791	12/11/01	STRONTIUM	GW07889RG	TR1	0.39	21900	UG/L	B	V1		0.18	1	YES	02D0

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Rinsate Quality Control Results - Detections Only - Groundwater - 2001

Location	Sample Date	Analyte	GW Sample #	Result Type	Result	Tier II	Units	Lab Qual	Valid-ation	Valid Reason	Detect Limit	Dilution Factor	Field Filtered	RIN
[redacted]	7/23/01	THALLIUM	GW07741RG	TR1	0.027	2	UG/L	B	UJ	107	0.013	1	YES	01D1116
P209389	7/23/01	THALLIUM	GW07671RG	TR1	0.015	2	UG/L	B	UJ1	107	0.013	1	YES	01D1138
03991	8/7/01	THALLIUM	GW07633RG	TR1	0.34	2	UG/L	B	UJ1	105/107	0.1	2	YES	01D1211
37201	8/10/01	THALLIUM	GW07683RG	TR1	0.28	2	UG/L	B	V1		0.1	2	YES	01D1234
11891	10/5/01	THALLIUM	GW07785RG	TR1	5.4	2	UG/L		UJ1	107	2.1	1	YES	02D0089
02291	10/11/01	THALLIUM	GW07778RG	TR1	4.3	2	UG/L		UJ1	107	2.1	1	YES	02D0117
02500	10/23/01	THALLIUM	GW07860RG	TR1	5	2	UG/L		UJ1	105/107	2.1	1	YES	02D0174
00600	11/15/01	THALLIUM	GW07852RG	TR1	2.4	2	UG/L	B	J1	105	2.1	1	YES	02D0292
03991	1/23/01	TIN	GW07156RG	TR1	0.66	21900	UG/L	B	V		0.65	1	YES	01D0347
891COLWEL	3/13/01	TIN	GW07394RG	TR1	0.62	21900	UG/L	B	UJ1	107	0.58	1	YES	01D0594
00500	5/15/01	TIN	GW07548RG	TR1	1.5	21900	UG/L	B	V1		0.88	1	YES	01D0808
00597	7/19/01	TIN	GW07627RG	TR1	3.3	21900	UG/L	B	UJ	107	2.4	1	YES	01D1116
11891	10/5/01	TIN	GW07785RG	TR1	2.3	21900	UG/L	B	J1	105	2.2	1	YES	02D0089
02500	10/23/01	TIN	GW07860RG	TR1	3	21900	UG/L	B	UJ1	107	2.2	1	YES	02D0174
00600	11/15/01	TIN	GW07852RG	TR1	3.7	21900	UG/L	B	UJ1	107	2.2	1	YES	02D0292
00597	1/10/01	ZINC	GW07150RG	TR1	3.3	11000	UG/L	B	V1	214	0.5	1	YES	01D0327
12691	1/15/01	ZINC	GW07353RG	TR1	6.38	11000	UG/L	B	UJ	105/107/214	0.504	1	YES	01D0339
03991	1/23/01	ZINC	GW07156RG	TR1	3.7	11000	UG/L	B	V		0.1	1	YES	01D0347
P209389	2/13/01	ZINC	GW07369RG	TR1	10.7	11000	UG/L	B	V1		0.72	1	YES	01D0514
41299	2/26/01	ZINC	GW07430RG	TR1	5.1	11000	UG/L	B	V1		0.12	1	YES	01D0543
07391	3/6/01	ZINC	GW07336RG	TR1	3	11000	UG/L	B	V1		0.12	1	YES	01D0555
891COLWEL	3/13/01	ZINC	GW07394RG	TR1	3.5	11000	UG/L	B	V1		0.12	1	YES	01D0594
02291	4/10/01	ZINC	GW07466RG	TR1	4.7	11000	UG/L	B	UJ1	107	0.08	1	YES	01D0693
00500	5/15/01	ZINC	GW07548RG	TR1	4.4	11000	UG/L	B	V1		0.08	1	YES	01D0808
00100	5/23/01	ZINC	GW07532RG	TR1	6.2	11000	UG/L	B	V1		0.08	1	YES	01D0875
02500	6/6/01	ZINC	GW07535RG	TR1	7.8	11000	UG/L	B	UJ1	107	0.08	1	YES	01D0935
[redacted]	6/7/01	ZINC	GW07473RG	TR1	11	11000	UG/L	B	UJ1	107	0.08	1	YES	01D0935
[redacted]	7/19/01	ZINC	GW07627RG	TR1	4.5	11000	UG/L	B	UJ	107	2.5	1	YES	01D1116
40299	7/23/01	ZINC	GW07741RG	TR1	4.5	11000	UG/L	B	UJ	107	2.5	1	YES	01D1116
P209389	7/23/01	ZINC	GW07671RG	TR1	7.1	11000	UG/L	B	V1		2.5	1	YES	01D1138
03991	8/7/01	ZINC	GW07633RG	TR1	1	11000	UG/L	B	J1	105	1	1	YES	01D1211
00600	11/15/01	ZINC	GW07852RG	TR1	11.2	11000	UG/L	B	V1		6.5	1	YES	02D0292

Location	Sample Date	Analyte	GW Sample #	Result Type	Result	Tier II	Units	Lab Qual	Valid-ation	Valid Reason	Detect Limit	Dilution Factor	Field Filtered	RIN
Water Quality Parameters (WQPs)														
40299	7/23/01	CYANIDE	GW07741RG	TR1	0.0028	200	MG/L	B	V		0.002	1	NO	01D1116
90099	8/22/01	NITRATE	GW07718RG	TR1	0.1	10	MG/L		J1	701	0.05	1	NO	01D1311
00597	1/10/01	NITRATE/NITRITE	GW07150RG	TR1	0.06	10	MG/L		V1		0.05		NO	01D0327
00597	7/19/01	NITRATE/NITRITE	GW07627RG	TR1	0.12	10	MG/L		V		0.021	1	NO	01D1116
40299	7/23/01	NITRATE/NITRITE	GW07741RG	TR1	0.047	10	MG/L	B	V		0.021	1	NO	01D1116
37201	8/10/01	NITRATE/NITRITE	GW07683RG	TR1	0.071	10	MG/L		V1		0.05	1	NO	01D1234
12691	8/24/01	NITRATE/NITRITE	GW07656RG	TR1	0.056	10	MG/L		V1		0.01	1	NO	01D1352
11891	10/5/01	NITRATE/NITRITE	GW07785RG	TR1	0.053	10	MG/L		V1		0.021	1	NO	02D0089
02291	10/11/01	NITRATE/NITRITE	GW07778RG	TR1	0.13	10	MG/L		V1		0.021	1	NO	02D0117
00100	11/15/01	NITRATE/NITRITE	GW07857RG	TR1	0.031	10	MG/L	B	V1		0.021	1	NO	02D0292
00600	11/15/01	NITRATE/NITRITE	GW07852RG	TR1	0.048	10	MG/L	B	V1		0.021	1	NO	02D0292

Table11-7

Rinsate Quality Control Results - Detections Only - Groundwater - 2001

Editing for Table 11-7

1.) Laboratory qualified "U" values are not shown.

2.) If the Result was less than the Tier II and
the Detection Limit was also less than Tier II and
the Detection Limit was also less than or equal to the Contract Required Detection Limit
Then the Result is not shown.

3.) If the Result is "B" qualified by the laboratory (means blank contamination) and the validation code is "249" which indicate that the contamination significantly affected the analytical results.

4.) Validation/verification values R/ R1 (Rejections) are not shown.

Validation Reason Codes

105 = Low level check sample recovery were not met.
107 = Analyte detected but less than Required Detection Limit in calibration blank verification.
109 = Interference indicated in the ICP Interference Check Sample.
110 = Laboratory Control Sample recovery criteria not met.
111 = Laboratory duplicate sample precision criteria were not met.
112 = Predigestion matrix spike criteria were not met (+/- 25%).
117 = Serial dilution percent difference criteria not met.
129 = Verification criteria for frequency or sequence were not met.
139 = Tune criteria not met.
214 = Instrument Detection Limit is older than 3 months from date of analysis.
250 = Incorrect analysis sequence.
701 = Holding times were exceeded (not attributed to lab).

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Table 11-8
RFCA Groundwater Monitoring Sample Comparison:
Required versus Actual - Groundwater - Calendar Year 2001

Sample Types	Required Number of Visits					Actual Number of Visits*					Actual Number of Locations Sampled					Deviation					Success Ratio % Samples Collected (or Locations Visited)					Discrepancy Justification
	Q1	Q2	Q3	Q4	Annual Total	Q1	Q2	Q3	Q4	Annual Total	Q1	Q2	Q3	Q4	Annual Total	Q1	Q2	Q3	Q4	Annual Total	Q1	Q2	Q3	Q4	Annual Total	
Groundwater Wells (Visits)	98	76	111	98	383	98	76	111	98	383	NA	NA	NA	NA	NA	0	0	0	0	0	100.0	100.0	100.0	100.0	100.0	
VOCs	98	75	112	98	383	98	75	112	98	383	80	64	98	63	305	18	11	14	35	78	81.6	85.3	87.5	64.3	79.6	Dry or Insw
Dissolved Gasses	9	5	9	5	28	9	5	9	5	28	9	5	9	5	28	0	0	0	0	0	100.0	100.0	100.0	100.0	100.0	
Metals	83	62	104	85	334	83	62	104	85	334	65	46	82	49	242	18	16	23	36	93	78.3	74.2	78.8	57.6	72.5	Dry or Insw
PCBs	0	1	10	27	38	0	1	10	27	38	0	1	3	12	16	0	0	7	15	22		100.0	30.0	44.4	42.1	Dry or Insw
Radionuclides																										
Pu/Am	45	54	66	69	234	45	54	66	69	234	34	36	53	35	158	11	18	13	34	76	75.6	66.7	80.3	50.7	67.5	Dry or Insw
U-isotope	88	64	106	88	346	88	64	106	88	346	68	47	84	52	251	20	17	22	36	95	77.3	73.4	79.2	59.1	72.5	Dry or Insw
Tritium	28	34	37	35	134	28	34	37	35	134	21	24	26	17	88	7	10	11	18	46	75.0	70.6	70.3	48.6	65.7	Dry or Insw
^{137}Cesium	6	0	6	0	12	6	0	6	0	12	6	0	6	0	12	0	0	0	0	0	100.0		100.0		100.0	
$^{89/90}$Strontium	12	11	12	11	46	12	11	12	11	46	9	6	6	4	25	3	5	6	7	21	75.0	54.5	50.0	36.4	54.3	Dry or Insw
^{237}Neptunium	0	18	10	19	47	0	18	10	19	47	0	6	2	8	16	0	12	7	11	30		33.3	20.0	42.1	34.0	Dry or Insw
Water Quality Parameters																										
Alkalinity	4	0	4	0	8	4	0	4	0	8	4	0	4	0	8	0	0	0	0	0	100.0		100.0		100.0	
Chloride	9	5	9	5	28	9	5	9	5	28	9	5	9	5	28	0	0	0	0	0	100.0	100.0	100.0	100.0	100.0	
Total Cyanide	13	0	13	0	26	13	0	13	0	26	13	0	13	0	26	0	0	0	0	0	100.0		100.0		100.0	
Fluoride	21	19	21	19	80	21	19	21	19	80	13	11	14	9	47	5	8	7	10	30	61.9	57.9	66.7	47.4	58.8	Dry or Insw
Nitrate or Nitrite (sole)	9	5	9	5	28	9	5	9	5	28	9	5	9	5	28	0	0	0	0	0	100.0	100.0	100.0	100.0	100.0	
Nitrate/Nitrite (Combined)	82	51	101	76	310	82	51	101	76	310	65	44	82	46	237	17	7	19	30	73	79.3	86.3	81.2	60.5	76.5	Dry or Insw
Sulfate	49	24	51	24	148	49	24	51	24	148	35	16	36	14	101	14	8	14	10	46	71.4	66.7	70.6	58.3	68.2	Dry, Insw, 1 Missed
Sulfide as H_2S	9	5	9	5	28	9	5	9	5	28	9	5	9	5	28	0	0	0	0	0	100.0	100.0	100.0	100.0	100.0	
Total Dissolved Solids	90	55	109	88	342	90	55	109	88	342	67	39	82	48	236	24	16	17	40	97	74.4	70.9	75.2	54.5	69.0	Dry, Insw, 1 Missed
Total Organic Carbon	9	5	9	5	28	9	5	9	5	28	9	5	9	5	28	0	0	0	0	0	100.0	100.0	100.0	100.0	100.0	
T. Rcvr. Petrol. Hydroc.	0	0	9	14	23	0	0	9	14	23	0	0	9	6	15	0	0	0	8	8			100.0	42.9	65.2	Dry or Insw
Sampling Totals	664	493	816	678	2651	664	493	816	678	2651	525	365	645	388	1923	137	128	160	290	715	79.1	74.0	79.0	57.2	72.5	Dry, Insw, 2 Missed

*Does not reflect multiple visits to dry wells.
Dry = Well did not recharge after purging. No samples collected.
Insw = Insufficient water to collect a complete sample suite.

Corrections and Missing
1Q2001 - Data for wells 01097, 01497, 02097, 11791 and 70693 added to data set. These were sampled in the first quarter but not reported. They were added officially to the sampling list in the third quarter.
1Q2001 - As reported in the Section 7.1 Metals, page 7-7, the TDS sample collected at well 10298 was mislabeled for metal analysis. This metal analysis (GW07374RG, Bottle 01D0555-020.001) is invalid.
A valid metal analysis at 10298 is cited in the Report and listed in the Metals - Appendix (GW07374RG, Bottle 01D0502-012.001).
3Q2001 - Bottle for TDS/SO_4 analysis successfully collected at 10994, however SO_4 inadvertently left off analytical request so analysis not performed. (Not recorded in 3rd Quarter Report.)

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Appendix E

9/17/02

Table 11-9
Summary of Validation / Verification Completeness
Groundwater - Calendar Year 2001

Sample Types	Usable Data Points - Dp_u					Non-usable Data Points - DP_n					Total Data Points - DP_t					Percent of Usable Data Points					No Validation / Verification				
	Q1	Q2	Q3	Q4	Annual Total	Q1	Q2	Q3	Q4	Annual Total	Q1	Q2	Q3	Q4	Annual Total	Q1	Q2	Q3	Q4	Annual Total	Q1	Q2	Q3	Q4	Annual Total
VOC's	5607	4655	7204	4852	22318	15	80	179	0	274	5622	4735	7383	4852	22592	99.7	98.3	97.6	100.0	98.8	5				
Dissolved Gasses											30	15	33	15	93						30	15	33	15	93
Metals	2100	1514	2607	1705	7926	105	0	46	2	153	2205	1514	2653	1707	8079	95.2	100.0	98.3	99.9	98.1					
PCBs	0	7	21	98	126	0	0	0	0	0	0	7	21	98	126		100.0	100.0	100.0	100.0					
Radionuclides																									
Pu / Am	84	94	122	94	394	0	0	0	0	0	84	94	122	94	394	100.0	100.0	100.0	100.0	100.0					
U-isotope	244	177	288	192	901	0	0	0	0	0	244	177	288	192	901	100.0	100.0	100.0	100.0	100.0					
Tritium	27	26	32	19	104	0	0	0	0	0	27	26	32	19	104	100.0	100.0	100.0	100.0	100.0					
^{137}Cesium	6	0	4	0	10	0	0	0	0	0	6	0	6	0	12	100.0		66.7		83.3			2		
$^{89/90}$Strontium	15	6	8	4	33	0	0	0	0	0	15	6	8	4	33	100.0	100.0	100.0	100.0	100.0					
^{237}Neptunium	0	6	2	8	16	0	0	0	0	0	0	6	2	8	16		100.0	100.0	100.0	100.0					
Water Quality Parameters																									
Alkalinity	4	0	4	0	8	0	0	0	0	0	4	0	4	0	8	100.0		100.0		100.0					
Chloride	9	5	11	5	30	0	0	0	0	0	9	5	11	5	30	100.0	100.0	100.0	100.0	100.0					
Fluoride	17	11	18	9	55	0	0	0	0	0	17	11	18	9	55	100.0	100.0	100.0	100.0	100.0					
Nitrate or Nitrite (sole)	9	5	11	5	30	0	0	0	0	0	9	5	11	5	30	100.0	100.0	100.0	100.0	100.0					
Nitrate/Nitrite (combined)	79	53	94	58	284	0	1	0	0	1	79	54	94	58	285	100.0	98.1	100.0	100.0	99.6					
Sulfate	41	16	42	14	113	0	0	0	0	0	41	16	42	14	113	100.0	100.0	100.0	100.0	100.0					
Sulfide as H_2S	9	5	10	1	25	0	0	1	4	5	9	5	11	5	30	100.0	100.0	90.9	20.0	83.3					
Total Cyanide	15	0	15	0	30	0	0	0	0	0	15	0	15	0	30	100.0		100.0		100.0					
Total Dissolved Solids	82	47	95	58	282	0	0	1	0	1	82	47	96	58	283	100.0	100.0	99.0	100.0	99.6					
Total Organic Carbon	11	5	11	5	32	0	0	0	0	0	11	5	11	5	32	100.0	100.0	100.0	100.0	100.0					
Total Rcvr. Petrol. Hydroc.	0	0	11	8	19	0	0	0	0	0	0	0	11	8	19			100.0	100.0	100.0					
Totals	8053	6225	9954	7134	31366	117	81	202	6	406	8182	6321	10835	7156	32494	98.4	98.5	91.9	99.7	96.5	20	15	33	15	83

1Q2001 Added data from wells 01097, 01497, 02097, 11791 and 70693. These wells were added to the program in the third quarter, but had been sampled in the first quarter.
3Q2001 Table updated with data from outstanding validaton/verifications that were not available at the time the quarterly report was written.

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Appendix F
RFETS Aquifer Test Data

Well ID	Well ID	Plant Area	Location Northing	Location Easting	Date Tested	Analysis Method	Test Duration (min)	Interval Test (ft.)	Aquifer Conditons	Initial Saturated Thickness (ft.)	Depth to Water (ft.)	Maximum Drawdown (ft.)	Average Discharge (gpm)	Hydraulic Conductivity (cm/sec)	Hydraulic Conductivity (ft/d)	Lithologic Unit Tested	Type of Test	Data Usable ?
I-1	I-1	881 Hillside			12/18/91	Jacob	477.33	2.32-6.0	unconfined	3.68	NA	0.307	1.56	1.90E-02	5.39E+01	Qvf	pumping	yes
I-1					12/18/91	Theis	890	2.32-6.0	unconfined	3.68	NA	0.307	1.56	3.70E-02	1.05E+02	Qvf	recovery	yes
I-1					12/18/91	Boulton	477.33	2.32-6.0	unconfined	3.68	NA	0.307	1.56	3.70E-02	1.05E+02	Qvf	pumping	yes
I-1					12/18/91	Boulton	477.33	2.32-6.0	unconfined	3.68	NA	0.307	1.56	1.40E-02	3.97E+01	Qvf	pumping	no
I-2	I-2	881 Hillside			12/18/91	Boulton	477.33	2.53-6.0	unconfined	3.47	NA	0.307	1.56	1.60E-02	4.54E+01	Qvf	pumping	yes
I-2					12/18/91	Boulton	477.33	2.53-6.0	unconfined	3.47	NA	0.307	1.56	1.10E-02	3.12E+01	Qvf	pumping	no
O-1	O-1	881 Hillside			12/18/91	Jacob	477.33	2.28-6.0	unconfined	3.72	NA	0.321	1.56	1.90E-02	5.39E+01	Qvf	pumping	yes
O-1					12/18/91	Theis	890	2.28-6.0	unconfined	3.72	NA	0.321	1.56	2.80E-02	7.94E+01	Qvf	recovery	yes
O-1					12/18/91	Boulton	477.33	2.28-6.0	unconfined	3.72	NA	0.321	1.56	2.80E-02	7.94E+01	Qvf	pumping	yes
O-1					12/18/91	Boulton	477.33	2.28-6.0	unconfined	3.72	NA	0.321	1.56	7.80E-03	2.21E+01	Qvf	pumping	no
O-2	O-2	881 Hillside			12/18/91	Jacob	477.33	2.35-6.0	unconfined	3.65	NA	0.325	1.56	1.80E-02	5.10E+01	Qvf	pumping	yes
O-2					12/18/91	Theis	890	2.35-6.0	unconfined	3.65	NA	0.325	1.56	3.00E-02	8.50E+01	Qvf	recovery	yes
O-2					12/18/91	Boulton	477.33	2.35-6.0	unconfined	3.65	NA	0.325	1.56	3.10E-02	8.79E+01	Qvf	pumping	yes
O-2					12/18/91	Boulton	477.33	2.35-6.0	unconfined	3.65	NA	0.325	1.56	1.60E-02	4.54E+01	Qvf	pumping	no
O-3	O-3	881 Hillside			12/18/91	Jacob	477.33	2.63-6.0	unconfined	3.37	NA	0.601	1.56	1.70E-02	4.82E+01	Qvf	pumping	yes
O-3					12/18/91	Theis	890	2.63-6.0	unconfined	3.37	NA	0.601	1.56	3.00E-02	8.50E+01	Qvf	recovery	yes
O-3					12/18/91	Boulton	477.33	2.63-6.0	unconfined	3.37	NA	0.601	1.56	5.90E-03	1.67E+01	Qvf	pumping	no
O-3					12/18/91	Boulton	477.33	2.63-6.0	unconfined	3.37	NA	0.601	1.56	5.90E-03	1.67E+01	Qvf	pumping	no
0166	1-66		748977.2	2080937.2		Thiem	39			22				6.70E-05	1.90E-01	Qrf/Ka?	recovery	no
0366	3-66		750808.6	2086661.2		Thiem	50			118.5				3.70E-07	1.05E-03	Ka?	recovery	no
0174	1-74	Mound	749628.8	2086569	Dec-85	Thiem	81.5	unknown		9.3		7.69	2.53	4.00E-05	1.13E-01	Ka?	recovery	no
2174	21-74		748996.6	2083026.4		Thiem	70			238.4				2.00E-07	5.67E-04	Ka?	recovery	no
2274	22-74		749527.5	2087502.4	Dec-85	Thiem	1466	unknown		175.5		9.48	0.71	2.70E-07	7.65E-04	Ka?	recovery	no
0181	1-81	Buffer East	753291.7	2090580.5		Thiem	44			10				8.60E-05	2.44E-01	Qvf?	recovery	no
0881	8-81	Buffer West	749978.6	2080053.3		Theis	62.5			151.5				3.20E-06	9.07E-03	Ka?	recovery	no
0981	9-81	Buffer West	749976.2	2080115.1		Thiem	39.5			27.6				2.90E-05	8.22E-02	Qrf?	recovery	no
1081	10-81		748870.7	2076475.3		Thiem	117			13		7.37	7.82	2.90E-03	8.22E+00	Qrf?	recovery	no
0386	3-86	Buffer East	750500.9	2093772.9		Thiem	35	10.36-23.67	unconfined	12.6	11.07	8.93		8.00E-05	2.27E-01	KaKlss(w)	recovery	yes
0886	8-86	Landfill	752817.1	2084001.2		Theis	5685	59.08-63.79		4.71		46.49	0.146	7.00E-08	1.98E-04	KaKlslt(u)	bailer/recovery	yes
0886			752817.1	2084001.2		?								5.00E-07	1.42E-03			ND
0886			752817.1	2084001.2		?								5.00E-06	1.42E-02			ND
0886			752817.1	2084001.2		Thiem		33.50-43.53		10.03	5.14		0.0365	6.90E-06	1.96E-02	Ka	packer	ND
0886			752817.1	2084001.2		Thiem		33.50-43.53		10.03	5.14		0.0295	5.10E-06	1.45E-02	Ka	packer	ND
0886			752817.1	2084001.2		Thiem		33.50-43.53		10.03	5.14		0.0156	3.10E-06	8.79E-03	Ka	packer	ND
0886			752817.1	2084001.2		Thiem		43.50-53.53		10.03	5.14		0.0014	2.10E-07	5.95E-04	Ka	packer	ND
0886			752817.1	2084001.2		Thiem		53.50-63.53		10.03	5.14		0.0063	1.10E-06	3.12E-03	Ka	packer	ND
0886			752817.1	2084001.2		Thiem		53.50-63.53		10.03	5.14		0.00027	3.00E-08	8.50E-05	Ka	packer	ND
0986	9-86	Landfill	752190.7	2082472.5		Theis	5989	122.57-135.	confined	12.78	64.3	58.76	0.109	4.00E-08	1.13E-04	KaKlss(u)	bailer/recovery	yes
0986			752190.7	2082472.5		Thiem		87.64-97.67	confined	10.03	67.42		0	<1E-08	0.00E+00	Ka	packer	ND
0986			752190.7	2082472.5		Thiem		87.64-97.67	confined	10.03	67.42		0.00061	1.00E-08	2.83E-05	Ka	packer	ND
0986			752190.7	2082472.5		Thiem		87.64-97.67	confined	10.03	67.42		0	<1E-08	0.00E+00	Ka	packer	ND
0986			752190.7	2082472.5		Thiem		97.67-107.7	confined	10.03	67.42		0.0022	6.00E-08	1.70E-04	Ka	packer	ND
0986			752190.7	2082472.5		Thiem		97.67-107.7	confined	10.03	67.42		0.0012	3.00E-08	8.50E-05	Ka	packer	ND

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0986			752190.7	2082472.5		Thiem		107.70-117.	confined	10.23	67.42		0.0001	<1E-08	0.00E+00	Ka	packer	ND
0986			752190.7	2082472.5		Thiem		107.70-117.	confined	10.23	67.42		0.00061	1.00E-08	2.83E-05	Ka	packer	ND
0986			752190.7	2082472.5		Thiem		107.70-117.	confined	10.23	67.42		0	<1E-08	0.00E+00	Ka	packer	ND
0986			752190.7	2082472.5		Thiem		121.00-131.	confined	10.03	67.42		0.0041	9.00E-08	2.55E-04	Ka	packer	ND
0986			752190.7	2082472.5		Thiem		121.00-131.	confined	10.03	67.42		0.002	4.00E-08	1.13E-04	Ka	packer	ND
0986			752190.7	2082472.5		Thiem		121.00-131.	confined	10.03	67.42		0	<1E-08	0.00E+00	Ka	packer	ND
0986			752190.7	2082472.5		Thiem		135.00-145.	confined	10.03	67.42		0.0056	1.20E-07	3.40E-04	Ka	packer	ND
0986			752190.7	2082472.5		Thiem		135.00-145.	confined	10.03	67.42		0.00061	1.00E-08	2.83E-05	Ka	packer	ND
0986			752190.7	2082472.5		Thiem		135.00-145.	confined	10.03	67.42		0.00061	1.00E-08	2.83E-05	Ka	packer	ND
1086	10-86	Landfill	752168.6	2082490.9		Theis		11.05-23.78	unconfined	12.73	11.05	12.49	0.429	1.40E-06	3.97E-03	Qrf	bailer/recovery	yes
1286	12-86	Buffer East	752345.1	2087894.2	9/26/86	Thiem	18.8	4.08-11.3	unconfined	7.22	4.08	5.88		2.00E-04	5.67E-01	Qvf	bailer/recovery	no
1486	14-86	Solar Pond	751868.1	2085841.3	9/26/86	Theis	4775	39.42-55.36	confined	15.94	14.8	39.99	0.277	1.90E-07	5.39E-04	KaKlss(u)	bailer/recovery	yes
1486			751868.1	2085841.3	9/2/86	Thiem		32.46-43.64	confined	11.18	10.86		0.0034	7.80E-07	2.21E-03	KaKlclst(u)	packer	yes
1486			751868.1	2085841.3	9/2/86	Thiem		32.46-43.64	confined	11.18	10.86		0.0321	3.50E-06	9.92E-03	KaKlclst(u)	packer	yes
1486			751868.1	2085841.3	9/2/86	Thiem		32.46-43.64	confined	11.18	10.86		0.0039	8.80E-07	2.49E-03	KaKlclst(u)	packer	yes
1486			751868.1	2085841.3	9/2/86	Thiem		43.26-54.44	confined	11.18	10.86		0.0091	2.10E-06	5.95E-03	KaKlss(u)	packer	yes
1486			751868.1	2085841.3	9/2/86	Thiem		43.26-54.44	confined	11.18	10.86		0.0596	7.30E-06	2.07E-02	KaKlss(u)	packer	yes
1486			751868.1	2085841.3	9/2/86	Thiem		43.26-54.44	confined	11.18	10.86		0.0028	6.50E-07	1.84E-03	KaKlss(u)	packer	yes
1486			751868.1	2085841.3	9/2/86	Thiem		53.91-65.09	confined	11.18	10.86		0.001	2.50E-07	7.09E-04	KaKlclst(u)	packer	yes
1486			751868.1	2085841.3	9/2/86	Thiem		53.91-65.09	confined	11.18	10.86		0.0343	2.40E-06	6.80E-03	KaKlclst(u)	packer	yes
1486			751868.1	2085841.3	9/2/86	Thiem		53.91-65.09	confined	11.18	10.86		0.001	2.40E-07	6.80E-04	KaKlclst(u)	packer	yes
1586	15-86	Solar Pond	751852.1	2085811.7	9/26/86	Theis	199	4.33-14.69	unconfined	10.36	4.33	6.61	0.872	4.30E-05	1.22E-01	Qvf	recovery	yes
1586						Theis								4.30E-05	1.22E-01	Qvf	recovery	yes
1686	16-86	Solar Pond	751761.6	2085263.4	9/26/86	Theis	9999	39.06-45.06	confined	6	10.18	34.88	0.5	6.00E-08	1.70E-04	KaKlss(u)	bailer/recovery	yes
1686			751761.6	2085263.4	8/27/86	Thiem		28.68-38.68	confined	10	5.09		0.011	3.90E-06	1.11E-02	Ka	packer	no
1686			751761.6	2085263.4	8/27/86	Thiem		28.68-38.68	confined	10	5.09		0.0248	7.10E-06	2.01E-02	Ka	packer	no
1686			751761.6	2085263.4	8/27/86	Thiem		34.43-44.42	confined	9.99	5.09		0.0043	1.50E-06	4.25E-03	KaKlclst(u)	packer	yes
1686			751761.6	2085263.4	8/27/86	Thiem		34.43-44.42	confined	9.99	5.09		0.0067	1.20E-06	3.40E-03	KaKlclst(u)	packer	yes
1686			751761.6	2085263.4	8/27/86	Thiem		34.43-44.42	confined	9.99	5.09		0.007	2.60E-06	7.37E-03	KaKlclst(u)	packer	yes
1686			751761.6	2085263.4	8/27/86	Thiem		42.59-52.59	confined	10	5.09		0.00015	4.00E-08	1.13E-04	KaKlss(u)	packer	yes
1686			751761.6	2085263.4	8/27/86	Thiem		42.59-52.59	confined	10	5.09		0.0086	1.30E-06	3.68E-03	KaKlss(u)	packer	yes
1686			751761.6	2085263.4	8/27/86	Thiem		42.59-52.59	confined	10	5.09		0.002	7.20E-07	2.04E-03	KaKlss(u)	packer	yes
1686			751761.6	2085263.4	8/27/86	Thiem		52.43-62.43	confined	10	5.09		0.00069	2.00E-07	5.67E-04	KaKlclst(u)	packer	yes
1686			751761.6	2085263.4	8/27/86	Thiem		52.43-62.43	confined	10	5.09		0.0173	1.90E-06	5.39E-03	KaKlclst(u)	packer	yes
1686			751761.6	2085263.4	8/27/86	Thiem		52.43-62.43	confined	10	5.09		0.0011	3.00E-07	8.50E-04	KaKlclst(u)	packer	yes
1786	17-86	Solar Pond	751754	2085245.4	11/19/86	Bouwer/Rice	83	4.63-13.98	unconfined	9.35	4.63	1.17		4.80E-06	1.36E-02	Qvf	airlift/slug	no
1786			751754	2085245.4	11/19/86	Hvorslev	83	4.63-13.98	unconfined	9.35	4.63	1.17		6.50E-06	1.84E-02	Qvf	airlift/slug	no
1786			751754	2085245.4	11/19/86	Cooper et al	83	4.63-13.98	unconfined	9.35	4.63	1.17		7.00E-06	1.98E-02	Qvf	airlift/slug	no
1786			751754	2085245.4	11/19/86	Ferris/Knowles	83	4.63-13.98	unconfined	9.35	4.63	1.17		2.10E-06	5.95E-03	Qvf	airlift/slug	no
1986	19-86	Solar Pond	750893.9	2083296.1	10/21/86	?	12							?			bailer/recovery	no
2186	21-86	Plant North	750911.4	2082502.8	2/2/88	Bouwer/Rice	18.9	35.00-67.20	confined	34	7.27	0.99	NA	5.58E-07	1.58E-03	Qrf	slug	no
2286	22-86	Solar Pond	750737	2084411.8	9/26/86	Bouwer/Rice	136	7.27-11.2	unconfined	3.93	7.27	3.93	NA	8.70E-06	2.47E-02	Qrf	bailer/slug	no
2286			750737	2084411.8	9/26/86	Hvorslev	136	7.27-11.2	unconfined	3.93	7.27	3.93		4.80E-05	1.36E-01	Qrf	bailer/slug	no
2286			750737	2084411.8	9/26/86	Cooper et al	136	7.27-11.2	unconfined	3.93	7.27	3.93		1.20E-04	3.40E-01	Qrf	bailer/slug	no
2286			750737	2084411.8	9/26/86	Ferris/Knowles	136	7.27-11.2	unconfined	3.93	7.27	3.93		3.10E-05	8.79E-02	Qrf	bailer/slug	no
2386	23-86	Solar Pond	750356.9	2084258.6	2/2/88	Bouwer/Rice	22.36	113.00-117.	confined	5.5	105.55	1.22		2.17E-07	6.15E-04	Ka	slug	no
2386			750356.9	2084258.6	9/26/86	Thiem		37.25-48.43	unsaturated	11.18			0.0042	2.00E-07	5.67E-04	Ka	packer	no

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2386			750356.9	2084258.6	9/26/86	Thiem		41.14-52.35	unsaturated	11.21			0.0078	3.30E-07	9.35E-04	KaKlclst(w)	packer	yes
2386			750356.9	2084258.6	9/26/86	Thiem		41.14-52.35	unsaturated	11.21			0.0304	1.10E-06	3.12E-03	KaKlclst(w)	packer	yes
2386			750356.9	2084258.6	9/26/86	Thiem		41.14-52.35	unsaturated	11.21			0.00071	3.00E-08	8.50E-05	KaKlclst(w)	packer	yes
2386			750356.9	2084258.6	9/26/86	Thiem		44.68-52.35	unsaturated	7.67			0.0078	4.30E-07	1.22E-03	KaKlclst(w)	packer	yes
2386			750356.9	2084258.6	9/26/86	Thiem		44.68-52.35	unsaturated	7.67			0.0304	1.40E-06	3.97E-03	KaKlclst(w)	packer	yes
2386			750356.9	2084258.6	9/26/86	Thiem		44.68-52.35	unsaturated	7.67			0.00071	4.00E-08	1.13E-04	KaKlclst(w)	packer	yes
2386			750356.9	2084258.6	9/26/86	Thiem		52.35-63.55	unsaturated	11.2			0.001	4.00E-08	1.13E-04	Ka	packer	no
2386			750356.9	2084258.6	9/26/86	Thiem		52.35-63.55	unsaturated	11.2			0.0191	9.30E-07	2.64E-03	Ka	packer	no
2386			750356.9	2084258.6	9/26/86	Thiem		52.35-63.55	unsaturated	11.2			0.0017	6.00E-08	1.70E-04	Ka	packer	no
2386			750356.9	2084258.6	9/26/86	Thiem		66.10-77.30	unsaturated	11.2			0.0025	7.00E-08	1.98E-04	KaKlslt(u)	packer	yes
2386			750356.9	2084258.6	9/26/86	Thiem		66.10-77.30	unsaturated	11.2			0.0148	3.60E-07	1.02E-03	KaKlslt(u)	packer	yes
2386			750356.9	2084258.6	9/26/86	Thiem		66.10-77.30	unsaturated	11.2			0.0003	1.00E-08	2.83E-05	KaKlslt(u)	packer	yes
2386			750356.9	2084258.6	9/26/86	Thiem		67.80-79.00	unsaturated	11.2			0.0222	6.30E-07	1.79E-03	Ka	packer	no
2386			750356.9	2084258.6	9/26/86	Thiem		71.80-83.00	unsaturated	11.2			0.0091	4.80E-07	1.36E-03	Ka	packer	no
2386			750356.9	2084258.6	9/26/86	Thiem		78.00-79.00	unsaturated	1			0.0222	3.10E-06	8.79E-03	Ka	packer	no
2386			750356.9	2084258.6	9/26/86	Thiem		82.72-93.92	unsaturated	11.2			0.0122	2.90E-07	8.22E-04	Ka	packer	no
2386			750356.9	2084258.6	9/26/86	Thiem		84.05-95.25	unsaturated	11.2			0.0156	3.60E-07	1.02E-03	Ka	packer	no
2386			750356.9	2084258.6	9/26/86	Thiem		104.21-115.	unsaturated	11.19			0.0032	6.00E-08	1.70E-04	KaKlslt(u)	packer	yes
2386			750356.9	2084258.6	9/26/86	Thiem		104.21-115.	unsaturated	11.19			0.0077	1.40E-07	3.97E-04	KaKlslt(u)	packer	yes
2586	25-86	Solar Pond	750428.3	2084830.7	11/12/86	Theis	3031	74.04-82.00	unconfined ?	7.96	74.04	8.71	0.0593	7.00E-08	1.98E-04	Ka	bailer/recovery	no
2586					11/12/86	Theis	3031	74.04-82.00	unconfined ?	7.96	74.04	8.71	0.0593	1.87E-05	5.30E-02	KaKlclst(u)	bailer/recovery	yes
2586			750428.3	2084830.7	9/6/86	Thiem		35.88-47.06	unsaturated	11.18			0.0096	7.80E-07	2.21E-03	KaKlclst(w)	packer	yes
2586			750428.3	2084830.7	9/6/86	Thiem		35.88-47.06	unsaturated	11.18			0.0305	2.10E-06	5.95E-03	KaKlclst(w)	packer	yes
2586			750428.3	2084830.7	9/6/86	Thiem		35.88-47.06	unsaturated	11.18			0.0037	3.20E-07	9.07E-04	KaKlclst(w)	packer	yes
2586			750428.3	2084830.7	9/6/86	Thiem		48.05-59.23	unsaturated	11.18			0.00013	1.00E-08	2.83E-05	Ka	packer	no
2586			750428.3	2084830.7	9/6/86	Thiem		48.05-59.23	unsaturated	11.18			0.00043	2.00E-08	5.67E-05	Ka	packer	no
2586			750428.3	2084830.7	9/6/86	Thiem		58.86-70.04	unsaturated	11.18			0.00043	2.00E-08	5.67E-05	KaKlclst(u)	packer	yes
2586			750428.3	2084830.7	9/6/86	Thiem		58.86-70.04	unsaturated	11.18			0.014	5.90E-07	1.67E-03	KaKlclst(u)	packer	yes
2586			750428.3	2084830.7	9/6/86	Thiem		58.86-70.04	unsaturated	11.18			0.0059	3.30E-07	9.35E-04	KaKlclst(u)	packer	yes
2586			750428.3	2084830.7	9/6/86	Thiem		69.36-80.54	unconfined ?	11.18	69.92		0.00046	2.00E-08	5.67E-05	KaKlclst(u)	packer	yes
2586			750428.3	2084830.7	9/6/86	Thiem		69.36-80.54	unconfined ?	11.18	69.92		0.0743	2.70E-06	7.65E-03	KaKlclst(u)	packer	yes
2586			750428.3	2084830.7	9/6/86	Thiem		69.36-80.54	unconfined ?	11.18	69.92		0.0159	7.70E-07	2.18E-03	KaKlclst(u)	packer	yes
2586			750428.3	2084830.7	9/6/86	Thiem		83.29-94.47	unconfined ?	11.18	69.92		0.0028	1.40E-07	3.97E-04	Ka	packer	no
2586			750428.3	2084830.7	9/6/86	Thiem		83.29-94.47	unconfined ?	11.18	69.92		0.0586	2.00E-06	5.67E-03	Ka	packer	no
2586			750428.3	2084830.7	9/6/86	Thiem		83.29-94.47	unconfined ?	11.18	69.92		0.0607	3.10E-06	8.79E-03	Ka	packer	no
2686	26-86	Solar Pond	750427.8	2084841.4	11/12/86	Bouwer/Rice	8792	3.95-11.00	unconfined	7.05	3.95	6.85	NA	4.00E-08	1.13E-04	Fill ?	bailer/slug	no
2686			750427.8	2084841.4	11/12/86	Hvorslev	8792	3.95-11.00	unconfined	7.05	3.95	6.85	NA	2.90E-08	8.22E-05	Fill?	bailer/slug	no
2686			750427.8	2084841.4	11/12/86	Cooper et al	8792	3.95-11.00	unconfined	7.05	3.95	6.85	NA	3.30E-07	9.35E-04	Fill?	bailer/slug	no
2686			750427.8	2084841.4	11/12/86	Ferris/Knowles	8792	3.95-11.00	unconfined	7.05	3.95	6.85	NA	2.10E-05	5.95E-02	Fill?	bailer/slug	no
2686					11/12/86	Theis	8792	3.95-11.00	unconfined	7.05	3.95	6.85	NA	1.98E-05	5.61E-02	Qrf	slug	yes
2786	27-86	Solar Pond	750796.1	2085239.1	11/11/86	Theis	4465	128.50-133.	confined?	4.5	126.65	4.98	0.0833	1.90E-07	5.39E-04	KaKlslt(u)	bailer/recovery	yes
2786			750796.1	2085239.1	9/15/86	Thiem		24.65-35.84	unsaturated	11.19	129.14		0.0197	2.00E-06	5.67E-03	Ka	packer	no
2786			750796.1	2085239.1	9/15/86	Thiem		24.65-35.84	unsaturated	11.19	129.14		0.0147	1.40E-06	3.97E-03	Ka	packer	no
2786			750796.1	2085239.1	9/15/86	Thiem		35.84-47.03	unsaturated	11.19	129.14		0.0059	4.70E-07	1.33E-03	KaKlclst(w)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		35.84-47.03	unsaturated	11.19	129.14		0.0093	6.50E-07	1.84E-03	KaKlclst(w)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		35.84-47.03	unsaturated	11.19	129.14		0.00051	4.00E-08	1.13E-04	KaKlclst(w)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		42.58-53.77	unsaturated	11.19	129.14		0.0001	1.00E-08	2.83E-05	Ka	packer	no

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2786			750796.1	2085239.1	9/15/86	Thiem		42.58-53.77	unsaturated	11.19	129.14		0.0001	1.00E-08	2.83E-05	Ka	packer	no
2786			750796.1	2085239.1	9/15/86	Thiem		42.58-53.77	unsaturated	11.19	129.14		0	<1E-08	0.00E+00	Ka	packer	no
2786			750796.1	2085239.1	9/15/86	Thiem		70.96-82.15	unsaturated	11.19	129.14		0.0215	1.00E-06	2.83E-03	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		70.96-82.15	unsaturated	11.19	129.14		0.0831	3.00E-06	8.50E-03	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		70.96-82.15	unsaturated	11.19	129.14		0.0356	1.70E-06	4.82E-03	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		82.15-93.34	unsaturated	11.19	129.14		0.0041	1.70E-07	4.82E-04	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		82.15-93.34	unsaturated	11.19	129.14		0.1234	3.80E-06	1.08E-02	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		82.15-93.34	unsaturated	11.19	129.14		0.0089	3.80E-07	1.08E-03	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		96.43-107.6	unsaturated	11.19	129.14		0.0085	3.10E-07	8.79E-04	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		96.43-107.6	unsaturated	11.19	129.14		0.0078	2.10E-07	5.95E-04	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		96.43-107.6	unsaturated	11.19	129.14		0.001	4.00E-08	1.13E-04	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		107.62-118.	unsaturated	11.19	129.14		0.0004	1.00E-08	2.83E-05	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		107.62-118.	unsaturated	11.19	129.14		0.0036	9.00E-08	2.55E-04	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		107.62-118.	unsaturated	11.19	129.14		0.0002	1.00E-08	2.83E-05	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		118.81-130.	unsaturated	11.19	129.14		0.0004	1.00E-08	2.83E-05	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		118.81-130.	unsaturated	11.19	129.14		0.0051	1.10E-07	3.12E-04	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		118.81-130.	unsaturated	11.19	129.14		0.00061	2.00E-08	5.67E-05	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		130.00-141.	unconfined?	11.19	129.14		0.0003	1.00E-08	2.83E-05	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		130.00-141.	unconfined?	11.19	129.14		0.0276	5.80E-07	1.64E-03	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		130.00-141.	unconfined?	11.19	129.14		0.0026	8.00E-08	2.27E-04	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		138.37-149.	unconfined?	11.19	129.14		0.00051	1.00E-08	2.83E-05	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		138.37-149.	unconfined?	11.19	129.14		0.0027	6.00E-08	1.70E-04	KaKlclst(u)	packer	yes
2786			750796.1	2085239.1	9/15/86	Thiem		138.37-149.	unconfined?	11.19	129.14		0	<1E-08	0.00E+00	KaKlclst(u)	packer	yes
2886	28-86	Solar Pond	750802.9	2085239.6	11/11/86	Theis	10592	6.19-9.96	unconfined	3.77	6.19	2.61	0.069	5.10E-07	1.45E-03	Qrf	bailer/recovery	no
2886					11/11/86	Theis	10592	6.19-9.96	unconfined	3.77	6.19	2.61	0.06	6.81E-07	1.93E-03	Qrf	bailer/recovery	yes
3086	30-86	Solar Pond	751094.4	2084923.7	11/13/86	Theis	6134	4.11-14.93	unconfined	10.82	4.11	10.23	0.22	8.60E-07	2.44E-03	KaKlclst(w)	bailer/recovery	yes
3086					1994	Hvorslev	8400	3.19-16.09	unconfined	8.95	7.14	10.4	NA	7.62E-06	2.16E-02	KaKlclst(w)	slug	ND
3086					1994	Bouwer/Rice	8400	3.19-16.09	unconfined	8.95	7.14	10.4	NA	2.39E-05	6.77E-02	KaKlclst(w)	slug	ND
3086					1994									2.39E-05	6.77E-02	KaKlclst(w)	slug	yes
3286	32-86	Solar Pond	751067.7	2084744.8	11/10/86	Theis	3134	114.90-125.	confined	10.6	108.05	18.08	0.0581	9.00E-08	2.55E-04	KaKlss(u)	bailer/recovery	yes
3286			751067.7	2084744.8	9/26/86	Thiem		35.20-45.20	unsaturated	10	63.88		0	<1E-08	0.00E+00	Ka	packer	no
3286			751067.7	2084744.8	9/26/86	Thiem		35.20-45.20	unsaturated	10	63.88		0.001	8.00E-08	2.27E-04	Ka	packer	no
3286			751067.7	2084744.8	9/26/86	Thiem		35.20-45.20	unsaturated	10	63.88		0	<1E-08	0.00E+00	Ka	packer	no
3286			751067.7	2084744.8	9/26/86	Thiem		45.20-55.20	unsaturated	10	63.88		0.008	5.60E-07	1.59E-03	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		45.20-55.20	unsaturated	10	63.88		0.0135	8.10E-07	2.30E-03	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		45.20-55.20	unsaturated	10	63.88		0.002	1.40E-07	3.97E-04	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		55.20-65.20	unsaturated	10	63.88		0.0047	2.80E-07	7.94E-04	Ka	packer	no
3286			751067.7	2084744.8	9/26/86	Thiem		55.20-65.20	unsaturated	10	63.88		0.0012	6.00E-08	1.70E-04	Ka	packer	no
3286			751067.7	2084744.8	9/26/86	Thiem		65.20-75.20	confined	10	63.88		0.0078	4.60E-07	1.30E-03	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		65.20-75.20	confined	10	63.88		0.0141	6.40E-07	1.81E-03	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		65.20-75.20	confined	10	63.88		0.0031	1.90E-07	5.39E-04	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		75.20-85.20	confined	10	63.88		0.0014	8.00E-08	2.27E-04	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		75.20-85.20	confined	10	63.88		0.0086	3.70E-07	1.05E-03	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		75.20-85.20	confined	10	63.88		0.001	6.00E-08	1.70E-04	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		85.20-95.20	confined	10	63.88		0.0026	1.50E-07	4.25E-04	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		85.20-95.20	confined	10	63.88		0.0018	7.00E-08	1.98E-04	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		85.20-95.20	confined	10	63.88		0.001	6.00E-08	1.70E-04	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		95.20-105.2	confined	10	63.88		0.0064	3.70E-07	1.05E-03	KaKlclst(u)	packer	yes

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3286			751067.7	2084744.8	9/26/86	Thiem		95.20-105.2	confined	10	63.88		0.0105	4.10E-07	1.16E-03	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		95.20-105.2	confined	10	63.88		0.0011	7.00E-08	1.98E-04	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		95.20-105.9	confined	10.72	63.88		0.0064	3.50E-07	9.92E-04	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		95.20-105.9	confined	10.72	63.88		0.0105	3.90E-07	1.11E-03	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		95.20-105.9	confined	10.72	63.88		0.0011	6.00E-08	1.70E-04	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		105.20-115.	confined	10	63.88		0.001	6.00E-08	1.70E-04	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		105.20-115.	confined	10	63.88		0.0123	4.60E-07	1.30E-03	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		105.20-115.	confined	10	63.88		0.0022	1.30E-07	3.68E-04	KaKlclst(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		116.08-126.	confined	10	63.88		0.0065	3.80E-07	1.08E-03	KaKlss(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		116.08-126.	confined	10	63.88		0.0131	4.70E-07	1.33E-03	KaKlss(u)	packer	yes
3286			751067.7	2084744.8	9/26/86	Thiem		116.08-126.	confined	10	63.88		0.0037	2.20E-07	6.24E-04	KaKlss(u)	packer	yes
3486	34-86	East Trenches	750173.1	2086192.2	9/26/86	Theis	140	44.24-56.25	confined	12.01	20.8	33.59	0.409	3.10E-06	8.79E-03	KaKlslt(u)	bailer/recovery	yes
3486			750173.1	2086192.2	10/14/87	Cooper et al	30.33	44.24-56.25	confined	10.6	20.82	1.26	NA	3.50E-06	9.92E-03	Ka	slug	no
3486			750173.1	2086192.2	10/14/87	Bouwer/Rice	30.33	44.24-56.25	confined	10.6	20.82	1.26	NA	1.10E-05	3.12E-02	KaKlslt(u)	slug	yes
3486			750173.1	2086192.2	10/22/87	Bouwer/Rice	42.33	44.24-56.25	confined	100	20.82	8.65	NA	1.01E-06	2.86E-03	Ka	slug	no
3486					10/14/87	Cooper	30.33	44.24-56.25	confined	10.6		1.26		1.33E-05	3.77E-02	KaKlslt(u)	slug	yes
3486			750173.1	2086192.2	8/29/86	Thiem		46.10-56.00	confined	9.99	20.46		0.0124	1.70E-06	4.82E-03	Ka	packer	no
3486			750173.1	2086192.2	8/29/86	Thiem		46.10-56.00	confined	9.99	20.46		0	<1E-08	0.00E+00	Ka	packer	no
3486			750173.1	2086192.2	8/29/86	Thiem		46.10-56.00	confined	9.99	20.46		0.045	6.30E-06	1.79E-02	Ka	packer	no
3486			750173.1	2086192.2	8/29/86	Thiem		55.01-65.00	confined	9.99	20.46		0.0285	4.10E-06	1.16E-02	KaKlss(u)	packer	yes
3486			750173.1	2086192.2	8/29/86	Thiem		55.01-65.00	confined	9.99	20.46		0.0675	5.70E-06	1.62E-02	KaKlss(u)	packer	yes
3486			750173.1	2086192.2	8/29/86	Thiem		55.01-65.00	confined	9.99	20.46		0.0107	1.60E-06	4.54E-03	KaKlss(u)	packer	yes
3486			750173.1	2086192.2	8/29/86	Thiem		76.71-86.70	confined	9.99	20.46		0.0058	4.70E-07	1.33E-03	Ka	packer	no
3486			750173.1	2086192.2	8/29/86	Thiem		85.10-95.09	confined	9.99	20.46		0.0041	5.60E-07	1.59E-03	KaKlss(u)	packer	yes
3486			750173.1	2086192.2	8/29/86	Thiem		85.10-95.09	confined	9.99	20.46		0.0643	4.30E-06	1.22E-02	KaKlss(u)	packer	yes
3486			750173.1	2086192.2	8/29/86	Thiem		85.10-95.09	confined	9.99	20.46		0	<1E-08	0.00E+00	KaKlss(u)	packer	yes
3586	35-86	East Trenches	750178.7	2086218.1	9/25/86	Theis		6.94-11.60	unconfined	4.66	6.94	4.23	0.25	2.60E-05	7.37E-02	Qvf	bailer/recovery	no
3586						Theis								3.13E-05	8.87E-02	Qvf	bailer/recovery	yes
3586			750178.7	2086218.1	10/14/87	Bouwer/Rice	58.42	7.04-11.60	unconfined	4.59	7.04	0.64	NA	1.40E-04	3.97E-01	Qvf	slug	yes
3586			750178.7	2086218.1	10/22/87	Bouwer/Rice	58.42	7.04-11.60	unconfined	100	7.04	4.35	NA	8.77E-06	2.49E-02	Qvf	slug	no
3886	3886				1994	Hvorslev	5800	8.50-10.73	unconfined	2.23	8.5	9.66	NA	1.98E-06	5.62E-03	Qvf	slug	ND
3886					1994	Bouwer/Rice	5800	8.50-10.73	unconfined	2.23	8.5	9.66	NA	3.25E-06	9.22E-03	Qvf	slug	ND
3886					1994									3.25E-06	9.22E-03	Qvf	slug	yes
3986	39-86	Buffer East	751290.6	2090695.5	9/25/86			23.85-31.50	unconfined	7.65	23.85	2.97		3.70E-04	1.05E+00	Qrf	pumping	no
3986						Theis								1.72E-03	4.88E+00	Qrf	pumping	yes
4086	40-86	East Trenches	749614.7	2088501.9	1/26/88	Bouwer/Rice	12.68	95.14-111.5	unconfined	16.36	95.14	1.12		1.20E-05	3.40E-02	Ka	slug	no
4086			749614.7	2088501.9	1/26/88	Cooper et al	12.68	95.14-111.5	unconfined	16.36	95.14	1.14		2.40E-06	6.80E-03	KaKlclst(u)	slug	yes
4086			749614.7	2088501.9	10/7/86	Thiem		63.00-73.03	unsaturated	10.03	91		0.0023	1.30E-07	3.35E-02	KaKlclst(u)	packer	yes
4086			749614.7	2088501.9	10/7/86	Thiem		63.00-73.03	unsaturated	10.03	91		0.0131	5.70E-07	1.62E-03	KaKlclst(u)	packer	yes
4086			749614.7	2088501.9	10/7/86	Thiem		63.00-73.03	unsaturated	10.03	91		0.0035	1.90E-07	5.39E-04	KaKlclst(u)	packer	yes
4086			749614.7	2088501.9	10/7/86	Thiem		92.00-102.0	unconfined	10.03	91		0.0027	1.20E-07	3.40E-04	KaKlclst(u)	packer	yes
4086			749614.7	2088501.9	10/7/86	Thiem		92.00-102.0	unconfined	10.03	91		0.0091	2.80E-07	7.94E-04	KaKlclst(u)	packer	yes
4086			749614.7	2088501.9	10/7/86	Thiem		92.00-102.0	unconfined	10.03	91		0.0012	5.00E-08	1.42E-04	KaKlclst(u)	packer	yes
4086			749614.7	2088501.9	10/7/86	Thiem		102.00-112.	unconfined	10.03	91		0.0021	9.00E-08	2.55E-04	KaKlclst(u)	packer	yes
4086			749614.7	2088501.9	10/7/86	Thiem		102.00-112.	unconfined	10.03	91		0.0087	2.90E-07	8.22E-04	KaKlclst(u)	packer	yes
4086			749614.7	2088501.9	10/7/86	Thiem		102.00-112.	unconfined	10.03	91		0.003	1.30E-07	3.68E-04	KaKlclst(u)	packer	yes
4086			749614.7	2088501.9	10/7/86	Thiem		113.00-123.	unconfined	10.03	91		0.0093	4.00E-07	1.13E-03	KaKlclst(u)	packer	yes
4086			749614.7	2088501.9	10/7/86	Thiem		113.00-123.	unconfined	10.03	91		0.1127	3.30E-06	9.35E-03	KaKlclst(u)	packer	yes

Appendix F
RFETS Aquifer Test Data

4086			749614.7	2088501.9	07-Oct-86	Thiem		113.00-123.	unconfined	10.03	91		0.009	3.80E-07	1.08E-03	KaKlclst(u)	packer	yes
4086					1994	Hvorslev	8400	102.88-112.	unconfined	9.81	102.88	105.24	NA	4.47E-07	1.27E-03	KaKlclst(u)	slug	ND
4086					1994	Bouwer/Rice	8400	102.88-112.	unconfined	9.81	102.88	105.24	NA	2.69E-07	7.63E-04	KaKlclst(u)	slug	ND
4086					1994									4.47E-07	1.27E-03	KaKlclst(u)	slug	yes
4186	41-86	East Trenches	749609.1	2088543.4				24.91-44.70	unconfined	19.79	24.91	19.07				Qrf	bailer/recovery	no
4186						Theis								1.67E-04	4.73E-01	Qrf	bailer/recovery	yes
4286	42-86	East Trenches	749567.6	2087111.7	10/14/87	Bouwer/Rice	0.25	19.96-29.70	unconfined	9.74	19.96	1	NA	5.00E-02	1.42E+02	Qrf	slug	yes
4286			749567.6	2087111.7	10/23/87	Bouwer/Rice	1.27	19.96-29.70	unconfined	9.74	19.96	9.29	NA	1.29E-04	3.66E-01	Qrf	slug	no
4486	44-86				1994	Hvorslev	2600	7.92-30.36	unconfined	22.44	7.92	5.7	NA	3.56E-05	1.01E-01	Qrf	falling head	ND
4486					1994	Bouwer/Rice	2600	7.92-30.36	unconfined	22.44	7.92	5.7	NA	8.64E-05	2.45E-01	Qrf	falling head	ND
4486					1994									8.64E-05	2.45E-01	Qrf	slug	yes
4586	45-86	Buffer West	750315.8	2079469.3	10/22/86	Bouwer/Rice	15	22.01-48.20	unconfined	26.19	22.01	9.36		2.10E-05	5.95E-02	Qrf	airlift/slug	no
4586														2.10E-05	5.95E-02			no
4586			750315.8	2079469.3	10/22/86	Cooper et al	15	22.01-48.20	unconfined	26.19	22.01	9.36		8.20E-05	2.32E-01	Qrf	airlift/slug	no
4586														3.90E-05	1.11E-01			no
4586			750315.8	2079469.3	10/22/86	Hvorslev	15	22.01-48.20	unconfined	26.19	22.01	9.36		5.60E-05	1.59E-01	Qrf	airlift/slug	no
4586														2.80E-05	7.94E-02			no
4586			750315.8	2079469.3	10/22/86	Ferris/Knowles	15	22.01-48.20	unconfined	26.19	22.01	9.36		1.80E-05	5.10E-02	Qrf	airlift/slug	no
4586														4.60E-06	1.30E-02			no
4586					10/22/86	Theis	15	22.01-48.20	unconfined	26.19	22.01	9.36		1.47E-05	4.17E-02	Qrf	slug	yes
4686	46-86	Buffer West	750854.1	2078283.5		Theis	4348	149.21-160.	unconfined	20.46	149.21	13.42	0.0583	5.20E-08	1.47E-04	Ka	bailer/recovery	no
4686			750854.1	2078283.5	10/17/86	Thiem		107.27-117.	unsaturated	10.03	132.63		0.00069	3.00E-08	8.50E-05	Ka	packer	no
4686			750854.1	2078283.5	10/17/86	Thiem		130.22-140.	unsaturated	10.03	132.63		0.00028	1.00E-08	2.83E-05	KaKlclst(u)	packer	yes
4686			750854.1	2078283.5	10/17/86	Thiem		130.22-140.	unsaturated	10.03	132.63		0.0078	1.70E-07	4.82E-04	KaKlclst(u)	packer	yes
4686			750854.1	2078283.5	10/17/86	Thiem		130.22-140.	unsaturated	10.03	132.63		0.002	6.00E-08	1.70E-04	KaKlclst(u)	packer	yes
4686			750854.1	2078283.5	10/17/86	Thiem		140.64-150.	unconfined	10.03	132.63		0.00027	1.00E-08	2.83E-05	KaKlslt(u)	packer	yes
4686			750854.1	2078283.5	10/17/86	Thiem		140.64-150.	unconfined	10.03	132.63		0.0239	5.10E-07	1.45E-03	KaKlslt(u)	packer	yes
4686			750854.1	2078283.5	10/17/86	Thiem		140.64-150.	unconfined	10.03	132.63		0.0035	1.10E-07	3.12E-04	KaKlslt(u)	packer	yes
4686			750854.1	2078283.5	10/17/86	Thiem		151.00-161.	unconfined	10.03	132.63		0.0004	1.00E-08	2.83E-05	KaKlslt(u)	packer	yes
4686			750854.1	2078283.5	10/17/86	Thiem		151.00-161.	unconfined	10.03	132.63		0.0036	7.00E-08	1.98E-04	KaKlslt(u)	packer	yes
4686			750854.1	2078283.5	10/17/86	Thiem		151.00-161.	unconfined	10.03	132.63		0.00048	1.00E-08	2.83E-05	KaKlslt(u)	packer	yes
4686					1994	Hvorslev	8400	106.05-164.	unconfined	58.94	106.05	133.7	NA	3.35E-08	9.50E-05	KaKlslt(u)	slug	ND
4686					1994	Bouwer/Rice	8400	106.05-164.	unconfined	58.94	106.05	133.7	NA	2.43E-08	6.90E-05	KaKlslt(u)	slug	ND
4686					1994	Ramey	8400	106.05-164.	unconfined	58.94	106.05	133.7	NA	6.70E-09	1.90E-05	KaKlslt(u)	slug	ND
4686					1994										9.50E-05	KaKlslt(u)	slug	yes
4786	47-86	Buffer West	750824.3	2078288.9	11/18/86	Theis	75	56.80-94.49	unconfined	37.69	58.87	5.08	0.238	2.60E-05	7.37E-02	Qrf	bailer/recovery	yes
4886	48-86	West Spray Field	748989.1	2078286.8	1/22/88	Bouwer/Rice	27.26	191.99-207.	confined	9.73	61.75	1.29	NA	1.06E-06	3.01E-03	Ka	slug	no
4886			748989.1	2078286.8	1/22/88	Cooper et al	27.26	191.99-207.	confined	9.73	61.75	1.29	NA	5.40E-07	1.53E-03	Ka	slug	no
4886			748989.1	2078286.8	11/3/86	Thiem		101.23-110.	confined	9.65	54.91		0.00032	2.00E-08	5.67E-05	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		113.80-123.	confined	9.73	54.91		0.0025	1.60E-07	4.54E-04	KaKlslt(u)	packer	yes
4886			748989.1	2078286.8	11/3/86	Thiem		113.80-123.	confined	9.73	54.91		0.0013	6.00E-08	1.70E-04	KaKlslt(u)	packer	yes
4886			748989.1	2078286.8	11/3/86	Thiem		113.80-123.	confined	9.73	54.91		0.00011	1.00E-08	2.83E-05	KaKlslt(u)	packer	yes
4886			748989.1	2078286.8	11/3/86	Thiem		124.69-134.	confined	9.65	54.91		0.0036	2.30E-07	6.52E-04	KaKlclst(u)	packer	yes
4886			748989.1	2078286.8	11/3/86	Thiem		124.69-134.	confined	9.65	54.91		0.0159	7.00E-07	1.98E-03	KaKlclst(u)	packer	yes
4886			748989.1	2078286.8	11/3/86	Thiem		124.69-134.	confined	9.65	54.91		0.0015	1.00E-07	2.83E-04	KaKlclst(u)	packer	yes
4886			748989.1	2078286.8	11/3/86	Thiem		128.05-137.	confined	9.65	54.91		0.0059	3.80E-07	1.08E-03	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		130.05-139.	confined	9.65	54.91		0.0085	5.50E-07	1.56E-03	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		141.03-150.	confined	9.36	54.91		0.0014	9.00E-08	2.55E-04	KaKlslt(u)	packer	yes

Appendix F
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4886														0.0051	3.40E-07	9.64E-04	KaKlslt(u)	packer	yes
4886			748989.1	2078286.8	11/3/86	Thiem		141.03-150.	confined	9.36	54.91			0.0168	6.50E-07	1.84E-03	KaKlslt(u)	packer	yes
4886			748989.1	2078286.8	11/3/86	Thiem		141.03-150.	confined	9.36	54.91			0.00043	3.00E-08	8.50E-05	KaKlslt(u)	packer	yes
4886			748989.1	2078286.8	11/3/86	Thiem		144.00-153.	confined	9.65	54.91			0.039	2.50E-07	7.09E-04	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		145.94-155.	confined	9.65	54.91			0.0029	1.90E-07	5.39E-04	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		160.00-169.	confined	9.65	54.91			0.0067	4.30E-07	1.22E-03	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		161.88-171.	confined	9.65	54.91			0.0021	1.30E-07	3.68E-04	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		165.20-174.	confined	9.6	54.91			0.0015	1.00E-07	2.83E-04	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		167.10-176.	confined	9.64	54.91			0.0047	3.10E-07	8.79E-04	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		175.85-185.	confined	9.65	54.91			0.0036	2.20E-07	6.24E-04	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		177.75-187.	confined	9.65	54.91			0.0001	1.00E-08	2.83E-05	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		181.21-190.	confined	9.65	54.91			0.0024	1.50E-07	4.25E-04	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		183.11-192.	confined	9.65	54.91			0.00065	4.00E-08	1.13E-04	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		192.00-201.	confined	9.65	54.91			0.00011	1.00E-08	2.83E-05	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		194.00-230.	confined	9.6	54.91			0.0047	3.00E-07	8.50E-04	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		196.15-206.	confined	10.65	54.91			0.0184	1.10E-07	3.12E-04	Ka	packer	no
4886			748989.1	2078286.8	11/3/86	Thiem		198.76-208.	confined	9.65	54.91			0.00043	3.00E-08	8.50E-05	Ka	packer	no
4886					1994	Hvorslev	11000	190.50-211.	confined	139	61.59	65.6	NA	1.02E-07	2.88E-04	Ka	slug		ND
4886					1994	Ramey	11000	190.50-211.	confined	139	61.59	65.6	NA	8.13E-08	2.30E-04	Ka	slug		ND
4886					1994									1.02E-07	2.88E-04	KaKlslt(u)	slug		yes
4986	49-86	West Spray Field	748964.4	2078287.7	1/22/88	Bouwer/Rice	18.73	23.64-67.60	unconfined	23.64	43.96	0.17	NA	9.67E-05	2.74E-01		Qrf	slug	no
5086	50-86	West Spray Field	747783	2077299	1/28/88	Bouwer/Rice	1.68	46.72-96.15	unconfined	49.43	46.72	0.22	NA	5.30E-04	1.51E+00		Qrf	slug	no
5186	51-86	Buffer West	748575	2076136.3	11/14/86	NA	125	61.68-79.06	unconfined	17.38	61.68	78.88	unknown				Qrf	bailer/recovery	no
5286	52-86	Buffer West	748606.8	2076132.2	1/28/88	Bouwer/Rice	23.43	92.00-125.8	confined	38.8	70.45	1.15	NA	7.09E-06	2.01E-02		Ka	slug	no
5286			748606.8	2076132.2	1/28/88	Cooper et al	23.43	92.00-125.8	confined	38.8	70.45	1.15	NA	1.90E-05	5.39E-02		Ka	slug	no
5286					1/28/88	Cooper	23.43	92.00-125.8	confined	38.8	70.45	1.15	NA	6.90E-06	1.96E-02		Ka	slug	no
5486	54-86	Buffer West	745294.2	2078320	2/4/88	Bouwer/Rice	47.88	75.43-85.24	confined	11.55	37.21	1.25	NA	1.80E-07	5.10E-04		Ka	slug	no
5486			745294.2	2078320	2/4/88	Cooper et al	47.88	75.43-85.24	confined	11.55	37.21	1.25	NA	3.70E-07	1.05E-03		Ka	slug	no
5486			745294.2	2078320	10/10/86	Thiem		55.00-65.03	confined	10.03	32		0.002	2.00E-07	1.36E-03		KaKlclst(w)	packer	yes
5486			745294.2	2078320	10/10/86	Thiem		55.00-65.03	confined	10.03	32		0.0232	1.70E-06	4.82E-03		KaKlclst(w)	packer	yes
5486			745294.2	2078320	10/10/86	Thiem		55.00-65.03	confined	10.03	32		0.0034	3.40E-07	9.64E-04		KaKlclst(w)	packer	yes
5486			745294.2	2078320	10/10/86	Thiem		65.00-75.03	confined	10.03	32		0.00081	8.00E-08	2.27E-04		KaKlclst(u)	packer	yes
5486			745294.2	2078320	10/10/86	Thiem		65.00-75.03	confined	10.03	32		0.0059	3.90E-07	1.11E-03		KaKlclst(u)	packer	yes
5486			745294.2	2078320	10/10/86	Thiem		65.00-75.03	confined	10.03	32		0.00061	6.00E-08	1.70E-04		KaKlclst(u)	packer	yes
5486			745294.2	2078320	10/10/86	Thiem		73.00-83.03	confined	10.03	32		0.0111	1.10E-06	3.12E-03		KaKlclst(u)	packer	yes
5486			745294.2	2078320	10/10/86	Thiem		73.00-83.03	confined	10.03	32		0.0311	1.90E-06	5.39E-03		KaKlclst(u)	packer	yes
5486			745294.2	2078320	10/10/86	Thiem		73.00-83.03	confined	10.03	32		0.005	4.90E-07	1.39E-03		KaKlclst(u)	packer	yes
5586	55-86	Buffer West	745223.1	2078340.1	10/21/86			15.96-36.39	unconfined	20.43	15.96						Ka	bailer/recovery	no
5586						Theis									5.43E-06	1.54E-02	Qrf	bailer/recovery	yes
5686	56-86	Buffer South	747073.4	2080208	10/1/86	Theis	33	6.16-9.6	unconfined	3.44	6.16	2.98	0.0492	5.90E-06	1.67E-02		Qrf	bailer/recovery	no
5686						Thiem	33	6.16-9.6	unconfined	3.44	6.16	2.83	NA	3.90E-04	1.11E+00		Qrf	bailer/recovery	no
5686						Theis	33	6.16-9.6	unconfined	3.44	6.16	3.31	0.23	3.20E-04	9.07E-01		Qvf	bailer/recovery	yes
5686						Theis	33	6.16-9.6	unconfined	3.44	6.16	3.31		3.20E-04	9.07E-01		Qvf	bailer/recovery	yes
5686						Bouwer/Rice	27	6.16-9.6	unconfined	3.44	6.16	3.31		5.00E-05	1.42E-01		Qrf	slug	no
5686						Cooper et al	27	6.16-9.6	unconfined	3.44	6.16	3.31		3.80E-04	1.08E+00		Qrf	slug	no
5686						Hvorslev	27	6.16-9.6	unconfined	3.44	6.16	3.31		1.50E-04	4.25E-01		Qrf	slug	no
5686						Ferris/Knowles	27	6.16-9.6	unconfined	3.44	6.16	3.31		1.00E-04	2.83E-01		Qrf	slug	no

Appendix F
RFETS Aquifer Test Data

5986	59-86	881 Hillside	747772.1	2084257										4.30E-04	1.22E+00			ND
5986	59-86BR		747753.2	2084260.1		Bouwer/Rice	1.66	21.86-29.06	unconfined	3.53				1.40E-02	3.97E+01		Slug in	ND
5986	59-86BR				10/23/86	Theis	20.8	25.09-28.00	unconfined	2.91	25.09	2.37	0.07	1.90E-04	5.39E-01	KaKlss(w)	bailer/recovery	yes
5986						Thiem	20.8	25.09-28.00	unconfined	3.01	25.09	2.37		4.30E-04	1.22E+00	Ka	bailer/recovery	no
5986						Theis	20.8	25.09-28.00	unconfined	2.91	25.09	2.37	0.07	2.10E-04	5.95E-01	KaKlss(w)	bailer/recovery	yes
5986R	59-86R		747753.2	2084260.1										1.40E-02	3.97E+01		Slug out	no
5986R	59-86R		747753.2	2084260.1		Bouwer/Rice	100 s	25.53-29.06	unconfined	3.53				1.50E-02	4.25E+01		Slug in	no
6186	61-86				1994	Hvorslev	7200	10.00-13.60	unconfined	3.6	10	11.1	NA	4.12E-05	1.17E-01	Qrf	slug	ND
6186					1994	Bouwer/Rice	7200	10.00-13.60	unconfined	3.6	10	11.1	NA	2.39E-05	6.77E-02	Qrf	slug	ND
6186					1994									4.12E-05	1.17E-01	Qrf	slug	yes
6286	62-86BR	903 Pad	748142.9	2085724.8	9/15/86	Theis	395	25.12-35.19	unconfined	10.07	25.12	9.3	0.25	1.50E-05	4.25E-02	KaKlss(w)	bailer/recovery	yes
6286						Thiem	395	25.12-35.19	unconfined	9.08	25.12	9.3		1.40E-05	3.97E-02	Ka	bailer/recovery	no
6286						Theis	395	25.12-35.19	unconfined	10.07	25.12	9.3	0.25	1.30E-05	3.68E-02	KaKlss(w)	bailer/recovery	yes
6286					10/15/87	Bouwer/Rice	42.37	24.27-35.19	unconfined	10.23	24.27	0.81	NA	5.70E-06	1.62E-02	KaKlss(w)	slug	yes
6286					10/15/87	Bouwer/Rice	42.37	24.27-35.19	unconfined	100	24.27	8.76	NA	2.10E-06	5.95E-03	Ka	slug	no
6586	65-86	Buffer South	747888.4	2087493.4	9/30/86	Theis	12	5.30-8.00	unconfined	2.7	5.3	1.59	0.33	2.10E-03	5.95E+00	Qvf	bailer/recovery	yes
6586						Thiem	12	5.30-8.00	unconfined	1.7	5.3	1.59		3.50E-03	9.92E+00	Qvf	bailer/recovery	no
6586						Theis	12	5.30-8.00	unconfined	2.7	5.3	1.59	0.33	2.10E-03	5.95E+00	Qvf	slug	yes
6686	66-86				1994	Bouwer/Rice	10	7.15-8.40	unconfined	1.25	7.15	7.77	NA	3.20E-03	9.07E+00	Qvf	slug	ND
6686					1994		10	7.15-8.40	unconfined	1.25	7.15	7.77	NA	3.20E-03	9.07E+00	Qvf	slug	yes
6886	68-86	Buffer South	747154.4	2083581.6	9/29/86	Theis	8	0.92-3.50	unconfined	2.58	0.92	2.21	0.38	5.50E-04	1.56E+00	Qvf	bailer/recovery	yes
6886						Thiem	8	0.92-3.50	unconfined	1.88	0.92	2.21		4.40E-03	1.25E+01	Qvf	bailer/recovery	no
6886						Theis	8	0.92-3.50	unconfined	2.58	0.92	2.21	0.38	9.80E-04	2.78E+00	Qvf	bailer/recovery	yes
6986	69-86	881 Hillside	747769.7	2084281.6	10/6/86	Theis	27	5.70-14.00	unconfined	8.3	5.7	6.8	0.5	1.40E-04	3.97E-01	Qc	bailer/recovery	yes
6986						Thiem	27	5.70-14.00	unconfined	2.3	5.7	6.8		6.80E-04	1.93E+00	Qc	bailer/recovery	no
6986						Theis	27	5.70-14.00	unconfined	8.3	5.7	6.8	0.5	2.40E-04	6.80E-01	Qc	bailer/recovery	yes
6986					10/26/87	Bouwer/Rice	28.36	6.68-14.00	unconfined	7.32	6.68	0.31	NA	1.74E-04	4.93E-01	Qc	slug	yes
6986					10/26/87	Bouwer/Rice	28.36	6.68-14.00	unconfined	7.32	6.68	0.31	NA	4.38E-06	1.24E-02	Qc	slug	no
7086	70-86	Buffer South	747491	2082003.4	10/23/86	Theis	10	1.74-7.90	unconfined	6.16	1.74	5.06	0.55	1.50E-04	4.25E-01	Qvf	bailer/recovery	yes
7086						Thiem	10	1.74-7.90	unconfined	4	1.74	5.06	0.55	6.80E-04	1.93E+00	Qvf	bailer/recovery	no
7086						Theis	10	1.74-7.90	unconfined	6.16	1.74	5.06	0.55	2.10E-04	5.95E-01	Qvf	bailer/recovery	yes
0287	2-87	881 Hillside	747708.1	2083933.7	6/15/87	Jacob	133	3.41-11.08	unconfined	7.67	3.41	11.61	0.07	3.40E-05	9.64E-02	Qc/Fill?	pumping	no
0287						Theis	200	3.41-11.08	unconfined	7.67	3.41	11.61	0.07	3.60E-05	1.02E-01	Qc/Fill?	recovery	no
0287						Thiem	200	3.41-11.08	unconfined	6.25	3.41	11.61		3.60E-05	1.02E-01	Qc/Fill?	recovery	no
0287						Theis	200	3.41-11.08	unconfined	7.67	3.41	11.61	0.07	3.30E-05	9.35E-02	Qc	recovery	yes
0387	3-87BR	881 Hillside	747705.7	2083961.5	6/18/87	Theis	1040	102.80-107.	confined	4.4	95.67	14.15	0.11	2.00E-04	5.67E-01	Ka	bailer/recovery	no
0387						Thiem	1040	102.80-107.	confined	4.4	95.67	14.15		3.30E-06	9.35E-03	Ka	bailer/recovery	no
0387						Cooper et al	1040	102.80-107.	confined	4.4	95.67	14.15		8.30E-07	2.35E-03	Ka	slug	no
0387					6/4/87	Thiem		62.90-72.55	unsaturated	9.65	79.35		0.00011	1.00E-08	2.83E-05	KaKlclst(u)	packer	yes
0387					6/4/87	Thiem		62.90-72.55	unsaturated	9.65	79.35		0.0087	3.30E-07	9.35E-04	KaKlclst(u)	packer	yes
0387					6/4/87	Thiem		62.90-72.55	unsaturated	9.65	79.35		0.00032	2.00E-08	5.67E-05	KaKlclst(u)	packer	yes
0387					6/4/87	Thiem		74.55-84.20	unsaturated	9.65	79.35		0.000011	<1E-08	0.00E+00	KaKlclst(u)	packer	yes
0387					6/4/87	Thiem		74.55-84.20	unsaturated	9.65	79.35		0.0016	5.00E-08	1.42E-04	KaKlclst(u)	packer	yes
0387					6/4/87	Thiem		74.55-84.20	unsaturated	9.65	79.35		0.00081	4.00E-08	1.13E-04	KaKlclst(u)	packer	yes
0387					6/4/87	Thiem		88.20-97.85	confined?	9.65	79.35		0.00011	<1E-08	0.00E+00	KaKlclst(u)	packer	yes
0387					6/4/87	Thiem		88.20-97.85	confined?	9.65	79.35		0.0149	4.50E-07	1.28E-03	KaKlclst(u)	packer	yes
0387					6/4/87	Thiem		88.20-97.85	confined?	9.65	79.35		0.000011	<1E-08	0.00E+00	KaKlclst(u)	packer	yes
0387					6/4/87	Thiem		97.85-107.5	confined?	9.65	79.35		0.0017	8.00E-08	2.27E-04	KaKlclst(u)	packer	yes

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0387					6/4/87	Thiem		97.85-107.5	confined?	9.65	79.35		0.0152	4.40E-07	1.25E-03	KaKlclst(u)	packer	yes
0387					6/4/87	Thiem		97.85-107.5	confined?	9.65	79.35		0.0011	5.00E-08	1.42E-04	KaKlclst(u)	packer	yes
0387					6/4/87	Thiem		101.26-110.	confined?	9.65	79.35		0.000011	<1E-08	0.00E+00	Ka	packer	no
0387					6/4/87	Thiem		101.26-110.	confined?	9.65	79.35		0.000011	<1E-08	0.00E+00	Ka	packer	no
0487	4-87	881 Hillside	747943.1	2084886.8	6/8/87	Jacob	30	7.99-19.47	unconfined	11.48	7.99	12.64	0.13	6.60E-05	1.87E-01	Qc	pumping	no
0487						Theis	40	7.99-19.47	unconfined	11.48	7.99	12.64	0.13	8.00E-05	2.27E-01	Qc	recovery	no
0487						Thiem											recovery	no
0487						Theis								6.60E-05	1.87E-01		pumping	no
0487						Theis				6.25				6.70E-06	1.90E-02		recovery	no
0587	5-87BR	881 Hillside	748081.1	2084849.2	6/16/87	Theis	60	46.87-53.25	confined	5.6	46.87	6.65	2.2	6.30E-05	1.79E-01	Ka	bailer/recovery	no
0587						Thiem	55	46.87-53.25	confined	5.6	46.87	6.65		9.70E-05	2.75E-01	Ka	bailer/recovery	no
0587					10/23/87	Cooper et al	47.33	44.95-51.25	confined	6.3	45	0.61	NA	9.10E-05	2.58E-01	Ka	slug	no
0587					10/23/87	Bouwer/Rice	47.33	44.95-51.25	confined	6.3	45	0.61	NA	6.57E-05	1.86E-01	KaKlss(w)	slug	yes
0587					10/23/87	Bouwer/Rice	47.33	44.95-51.25	confined	100	45	7.51	NA	1.29E-06	3.66E-03	Ka	slug	no
0587					5/28/87	Thiem		26.40-36.05	unsaturated	9.65	44.56		0.0198	1.90E-06	5.39E-03	Ka	packer	no
0587					5/28/87	Thiem		26.40-36.05	unsaturated	9.65	44.56		0.000011	<1E-08	0.00E+00	Ka	packer	no
0587					5/28/87	Thiem		36.05-45.70	unsaturated	9.65	44.56		0.0152	1.20E-06	3.40E-03	Ka	packer	no
0587					5/28/87	Thiem		36.05-45.70	unsaturated	9.65	44.56		0.0026	2.00E-07	5.67E-04	Ka	packer	no
0587					5/28/87	Thiem		45.70-55.35	confined?	9.65	44.56		0.0107	7.80E-07	2.21E-03	Ka	packer	no
0587					5/28/87	Thiem		45.70-55.35	confined?	9.65	44.56		0.0029	2.00E-07	5.67E-04	Ka	packer	no
0887	8-87BR	881 Hillside	747757.7	2084294.3	6/19/87	Theis	318	87.97-91.02	unconfined?	3.05	87.97	3.33	0.14	5.80E-04	1.64E+00	Ka	bailer/recovery	no
0887					6/19/87	Theis	318	87.97-91.02	unconfined?	3.05	87.97	3.33	0.14	7.52E-06	2.13E-02	KaKlclst(u)	bailer/recovery	yes
0887						Thiem	285	87.97-91.02	unconfined?	2.03	87.97	3.33		2.50E-05	7.09E-02	Ka	bailer/recovery	no
0887						Cooper et al	318	87.97-91.02	unconfined?	2.03	87.97	3.33		2.10E-06	5.95E-03	Ka	slug	no
0887					5/20/87	Thiem		62.61-72.26	unsaturated	9.65	77.69		0	<1E-08 ?	0.00E+00	Ka	packer	no
0887					5/20/87	Thiem		62.61-72.26	unsaturated	9.65	77.69		0.0187	7.00E-07	1.98E-03	Ka	packer	no
0887					5/20/87	Thiem		83.43-93.08	unconfined ?	9.65	77.69		0.0019	9.00E-08	2.55E-04	Ka	packer	no
0887					5/20/87	Thiem		83.43-93.08	unconfined ?	9.65	77.69		0.00018	1.00E-08	2.83E-05	Ka	packer	no
0987	9-87BR	903 Pad	749068	2085348.2	10/9/87	Bouwer/Rice	2.93	16.60-32.15	unconfined	14.9	16.6	0.75	NA	3.10E-03	8.79E+00	KaNo.1ss(w)	slug	yes
0987					10/9/87	Bouwer/Rice								4.49E-05	1.27E-01	Ka	slug	no
0987					10/9/87	Bouwer/Rice	1.5	16.60-32.15	unconfined	14.9	16.6	0.89		4.20E-03	1.19E+01	KaNo.1ss(w)	slug	yes
0987					10/9/87	Bouwer/Rice								4.50E-05	1.28E-01	Ka	slug	no
0987					10/9/87	Bouwer/Rice	4.16	16.60-32.15	unconfined	14.9	16.6	0.54		1.80E-03	5.10E+00	KaNo.1ss(w)	slug	yes
0987					10/9/87	Bouwer/Rice								3.93E-05	1.11E-01	Ka	slug	no
1187	11-87BR	903 Pad	748409.2	2086100										5.00E-04	1.42E+00			ND
1287	12-87BR	903 Pad	748580.6	2086066.4										5.00E-04	1.42E+00			ND
1487	14-87BR	903 Pad	748228.3	2086616	10/15/87	Bouwer/Rice	58.85	19.00-24.05	unconfined	11.3	12.75	1.16	NA	2.26E-05	6.41E-02	KaKlss(w)	slug	yes
1487					10/15/87	Bouwer/Rice	58.85	19.00-24.05	unconfined	100	12.75			1.55E-06	4.39E-03	Ka	slug	no
1587	15-87	903 Pad	749010.3	2086248.7										1.00E-03	2.83E+00			ND
1687	16-87BR	903 Pad	749129.8	2086248.9	10/14/87	Cooper et al	18.18	100.00-125.	confined	34.44	90.56	1.26	NA	1.90E-06	5.39E-03	Ka	slug	no
1687					10/14/87	Bouwer/Rice	18.18	100.00-125.	confined	34.44	90.56	1.26	NA	2.90E-07	8.22E-04	Ka	slug	no
1687					10/14/87	Bouwer/Rice	18.18	100.00-125.	confined	100	90.56	1.26	NA	1.18E-09	3.34E-06	Ka	slug	no
1687					7/14/87	Thiem		48.41-58.06	unsaturated	9.65	103.08		0.00043	3.00E-08	8.50E-05	Ka	packer	no
1687					7/14/87	Thiem		55.90-65.55	unsaturated	9.65	103.08		0.00054	4.00E-08	1.13E-04	Ka	packer	no
1687					7/14/87	Thiem		55.90-65.55	unsaturated	9.65	103.08		0.0057	2.80E-07	7.94E-04	Ka	packer	no
1687					7/14/87	Thiem		57.90-67.55	unsaturated	9.65	103.08		0.00011	1.00E-08	2.83E-05	Ka	packer	no
1687					7/14/87	Thiem		67.55-77.20	unsaturated	9.65	103.08		0.0011	6.00E-08	1.70E-04	KaKlclst(u)	packer	yes

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1687					7/14/87	Thiem		67.55-77.20	unsaturated	9.65	103.08		0.0116	4.80E-07	1.36E-03	KaKlclst(u)	packer	yes
1687					7/14/87	Thiem		67.55-77.20	unsaturated	9.65	103.08		0.0023	1.30E-07	3.68E-04	KaKlclst(u)	packer	yes
1687					7/14/87	Thiem		69.55-79.20	unsaturated	9.65	103.08		0.0073	4.00E-07	1.13E-03	Ka	packer	no
1687					7/14/87	Thiem		79.05-88.70	unsaturated	9.65	103.08		0.0142	7.10E-07	2.01E-03	KaKlclst(u)	packer	yes
1687					7/14/87	Thiem		79.05-88.70	unsaturated	9.65	103.08		0.0478	1.70E-06	4.82E-03	KaKlclst(u)	packer	yes
1687					7/14/87	Thiem		79.05-88.70	unsaturated	9.65	103.08		0.0075	3.70E-07	1.05E-03	KaKlclst(u)	packer	yes
1687					7/14/87	Thiem		88.70-98.35	unsaturated	9.65	103.08		0	<1E-08 ?	0.00E+00	KaKlclst(u)	packer	yes
1687					7/14/87	Thiem		88.70-98.35	unsaturated	9.65	103.08		0.0437	1.40E-06	3.97E-03	KaKlclst(u)	packer	yes
1687					7/14/87	Thiem		88.70-98.35	unsaturated	9.65	103.08		0.00043	2.00E-08	5.67E-05	KaKlclst(u)	packer	yes
1687					7/14/87	Thiem		90.70-100.3	unsaturated	9.65	103.08		0.0328	1.40E-06	3.97E-03	Ka	packer	no
1687					7/14/87	Thiem		100.50-110.	unsaturated	9.65	103.08		0.0036	1.30E-07	3.68E-04	KaKlslt(u)	packer	yes
1687					7/14/87	Thiem		100.50-110.	unsaturated	9.65	103.08		0.046	1.30E-06	3.68E-03	KaKlslt(u)	packer	yes
1687					7/14/87	Thiem		100.50-110.	unsaturated	9.65	103.08		0.0036	1.30E-07	3.68E-04	KaKlslt(u)	packer	yes
1687					7/14/87	Thiem		109.72-119.	confined?	9.65	103.08		0.0033	1.40E-07	3.97E-04	KaKlslt(u)	packer	yes
1687					7/14/87	Thiem		109.72-119.	confined?	9.65	103.08		0.0897	2.50E-06	7.09E-03	KaKlslt(u)	packer	yes
1687					7/14/87	Thiem		109.72-119.	confined?	9.65	103.08		0.0051	2.10E-07	5.95E-04	KaKlslt(u)	packer	yes
1687					7/14/87	Thiem		119.37-129.	confined?	9.65	103.08		0.0035	1.40E-07	3.97E-04	KaKlslt(u)	packer	yes
1687					7/14/87	Thiem		119.37-129.	confined?	9.65	103.08		0.147	4.00E-06	1.13E-02	KaKlslt(u)	packer	yes
1687					7/14/87	Thiem		119.37-129.	confined?	9.65	103.08		0.0035	1.40E-07	3.97E-04	KaKlslt(u)	packer	yes
1687					7/14/87	Thiem		129.02-138.	confined?	9.65	103.08		0.0074	3.00E-07	8.50E-04	KaKlclst(u)	packer	yes
1687					7/14/87	Thiem		129.02-138.	confined?	9.65	103.08		0.0368	9.60E-07	2.72E-03	KaKlclst(u)	packer	yes
1687					7/14/87	Thiem		129.02-138.	confined?	9.65	103.08		0.0059	2.40E-07	6.80E-04	KaKlclst(u)	packer	yes
1687					7/14/87	Thiem		131.02-140.	confined?	9.65	103.08		0.00006	2.00E-09	5.67E-06	Ka	packer	no
1687					7/14/87	Thiem		134.94-144.	confined?	9.65	103.08		0.000006	2.50E-10	7.09E-07	Ka	packer	no
1687					7/14/87	Thiem		144.71-154.	confined?	9.65	103.08		0.0041	1.70E-07	4.82E-04	Ka	packer	no
1687					7/14/87	Thiem		146.71-156.	confined?	9.65	103.08		0.0079	3.20E-07	9.07E-04	Ka	packer	no
1687					7/14/87	Thiem		151.35-161.	confined?	9.65	103.08		0.0007	2.80E-08	7.94E-05	Ka	packer	no
1687					7/14/87	Thiem		153.35-163.	confined?	9.65	103.08		0.00064	2.60E-08	7.37E-05	Ka	packer	no
1687					1994	Hvorslev	38	101.42-127.	unconfined	48.39	79.03	83	NA	2.12E-08	6.00E-05	KaKlslt(u)	slug	ND
1687					1994	Bouwer/Rice	38	101.42-127.	unconfined	48.39	79.03	83	NA	3.88E-08	1.10E-04	KaKlslt(u)	slug	ND
1687					1994	Ramey	38	101.42-127.	unconfined	48.39	79.03	83	NA	1.38E-08	3.90E-05	KaKlslt(u)	slug	ND
1687					1994									5.08E-08	1.44E-04	KaKlslt(u)	slug	yes
1787	17-87	Mound	749415.2	2086308.1	10/14/87	Bouwer/Rice	36.75	18.35-25.50	unconfined	7.15	18.35	0.56	NA	6.00E-05	1.70E-01	Qrf	slug	yes
1787					10/14/87	Bouwer/Rice	36.75	18.35-25.50	unconfined	13.7	18.35			5.89E-06	1.67E-02	Qrf	slug	no
1787					1992	Coooper/Jacob								1.78E-04	5.05E-01	Qrf	pump	yes
1787					1992	Theis Analysis								1.61E-04	4.57E-01	Qrf	pump	yes
1787					1992	Theis Recovery								9.18E-04	2.60E+00	Qrf	pump	yes
1887	18-87BR	Mound	749404.1	2086338.7	8/21/87												packer	no
1887					1994	Hvorslev	20080	130.72-135.	unconfined	4.82	130.72	133.46	NA	1.73E-07	4.90E-04	KaKlslt(u)	rising head	ND
1887					1994	Bouwer/Rice	20080	130.72-135.	unconfined	4.82	130.72	133.46	NA	1.13E-07	3.20E-04	KaKlslt(u)	rising head	ND
1887					1994										4.90E-04	KaKlslt(u)	slug	yes
2087	20-87BR	Mound	749634.2	2086155.2	8/11/87	Thiem		53.90-63.55	unsaturated	9.65	106.91		0.0017	1.20E-07	3.40E-04	Ka	packer	no
2087					8/11/87	Thiem		53.90-63.55	unsaturated	9.65	106.91		0.00097	4.60E-08	1.30E-04	Ka	packer	no
2087					8/11/87	Thiem		65.55-75.20	unsaturated	9.65	106.91		0.00076	3.00E-08	8.50E-05	Ka	packer	no
2087					8/11/87	Thiem		75.20-84.85	unsaturated	9.65	106.91		0.0011	3.80E-08	1.08E-04	Ka	packer	no
2087					8/11/87	Thiem		86.85-96.50	unsaturated	9.65	106.91		0.003	9.40E-08	2.66E-04	Ka	packer	no
2087					8/11/87	Thiem		96.50-106.1	unsaturated	9.65	106.91		0.0037	1.00E-07	2.83E-04	Ka	packer	no
2087					8/11/87	Thiem		107.20-116.	unconfined?	9.65	106.91		0.00011	4.00E-09	1.13E-05	Ka	packer	no

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2087					8/11/87	Thiem		107.20-116.	unconfined?	9.65	106.91		0.0038	1.00E-07	2.83E-04	Ka	packer	no
2087					8/11/87	Thiem		106.15-115.	unconfined?	9.65	106.91		0.0038	1.00E-07	2.83E-04	Ka	packer	no
2087					8/11/87	Thiem		114.42-124.	unconfined?	9.65	106.91		0.0285	1.10E-06	3.12E-03	Ka	packer	no
2087					8/11/87	Thiem		114.42-124.	unconfined?	9.65	106.91		0.0018	4.70E-08	1.33E-04	Ka	packer	no
2087					1994	Hvorslev	21520	107.36-117.	unconfined	13.72	104.24	108	NA	3.53E-08	1.00E-04	KaKlclst(u)	slug	ND
2087					1994	Bouwer/Rice	21520	107.36-117.	unconfined	13.72	104.24	108	NA	2.40E-08	6.80E-05	KaKlclst(u)	slug	ND
2087					1994	Ramey	21520	107.36-117.	unconfined	13.72	104.24	108	NA	2.33E-08	6.60E-05	KaKlclst(u)	slug	ND
2087					1994									3.56E-08	1.01E-04	KaKlclst(u)	slug	yes
2287	22-87BR	Mound	749923.5	2085821.6	10/12/87	Thiem		45.60-52.55	unsaturated	6.95	78.66		0.00065	6.30E-08	1.79E-04	Ka	packer	no
2287					10/12/87	Thiem		45.60-52.55	unsaturated	6.95	78.66		0.0016	1.30E-07	3.68E-04	Ka	packer	no
2287					10/12/87	Thiem		52.55-62.20	unsaturated	9.65	78.66		0.00054	3.50E-08	9.92E-05	Ka	packer	no
2287					10/12/87	Thiem		52.55-62.20	unsaturated	9.65	78.66		0.0013	6.90E-08	1.96E-04	Ka	packer	no
2287					10/12/87	Thiem		62.20-71.85	unsaturated	9.65	78.66		0.00011	6.00E-09	1.70E-05	Ka	packer	no
2287					10/12/87	Thiem		71.85-81.50	unsaturated	9.65	78.66		0.00032	1.70E-08	4.82E-05	Ka	packer	no
2287					10/12/87	Thiem		71.85-81.50	unsaturated	9.65	78.66		0.0016	6.40E-08	1.81E-04	KaKlclst(u)	packer	yes
2287					10/12/87	Thiem		81.50-91.15	unconfined?	9.65	78.66		0.0289	1.50E-06	4.25E-03	KaKlclst(u)	packer	yes
2287					10/12/87	Thiem		81.50-91.15	unconfined?	9.65	78.66		0.048	1.80E-06	5.10E-03	KaKlclst(u)	packer	yes
2287					10/12/87	Thiem		81.50-91.15	unconfined?	9.65	78.66		0.0206	1.10E-06	3.12E-03	KaKlclst(u)	packer	yes
2287					10/12/87	Thiem		82.70-92.35	unconfined?	9.65	78.66		0.0317	1.60E-06	4.54E-03	KaKlclst(u)	packer	yes
2287					10/12/87	Thiem		82.70-92.35	unconfined?	9.65	78.66		0.042	1.50E-06	4.25E-03	KaKlclst(u)	packer	yes
2287					10/12/87	Thiem		82.70-92.35	unconfined?	9.65	78.66		0.0277	1.40E-06	3.97E-03	KaKlclst(u)	packer	yes
2287					10/12/87	Thiem		92.35-102.0	unconfined?	9.65	78.66		0.0095	4.80E-07	1.36E-03	KaKlclst(u)	packer	yes
2287					10/12/87	Thiem		92.35-102.0	unconfined?	9.65	78.66		0.018	6.30E-07	1.79E-03	KaKlclst(u)	packer	yes
2287					10/12/87	Thiem		92.35-102.0	unconfined?	9.65	78.66		0.0064	3.30E-07	9.35E-04	KaKlclst(u)	packer	yes
2287					1994	Hvorslev	8500	81.97-90.60	unconfined	10.24	80.36	77.7	NA	4.24E-06	1.20E-02	KaKlclst(u)	rising head	ND
2287					1994	Bouwer/Rice	8500	81.97-90.60	unconfined	10.24	80.36	77.7	NA	3.14E-06	8.90E-03	KaKlclst(u)	rising head	ND
2287					1994									4.27E-06	1.21E-02	KaKlclst(u)	slug	yes
2387	23-87BR	Mound	749404.1	2085910.3	10/14/87	Bouwer/Rice	26.28	21.09-37.61	unconfined	16.52	21.09	1.13	NA	1.76E-04	4.99E-01	Ka	slug	no
2387					10/14/87	Bouwer/Rice	26.28	21.09-37.61	unconfined	100	21.09			9.72E-06	2.76E-02	Ka	slug	no
2387					10/14/87	Bouwer/Rice	26.28	21.09-37.61	unconfined	16.52	21.09	1.13	NA	3.96E-05	1.12E-01	KaNo.1ss(w)	slug	yes
2387					1994	Hvorslev	70	18.40-40.00	confined	22.65	15.72	13.6	NA	3.81E-05	1.08E-01	KaNo.1ss(w)	rising head	ND
2387					1994	Ramey	70	18.40-40.00	confined	22.65	15.72	13.6	NA	4.17E-05	1.18E-01	KaNo.1ss(w)	rising head	ND
2387					1994	Hvorslev	70	18.40-40.00	confined	22.65	15.72	13.6	NA	3.81E-05	1.08E-01	KaNo.1ss(w)	falling head	ND
2387					1994									7.12E-05	2.02E-01	KaNo.1ss(w)	slug	yes
2587	25-87BR	East Trenches	749718.7	2086747.7	10/14/87	Bouwer/Rice	6.38	22.90-43.45	unconfined	20.55	22.9	0.84	NA	1.53E-03	4.34E+00	Ka	slug	no
2587					10/14/87	Bouwer/Rice	6.38	22.90-43.45	unconfined	100	22.9			7.30E-06	2.07E-02	Ka	slug	no
2587					10/14/87	Bouwer/Rice	6.38	22.90-43.45	unconfined	20.55	22.9	0.84	NA	4.52E-04	1.28E+00	KaNo.1ss(w)	slug	yes
2587					1994	Hvorslev	5.5	23.13-45.38	unconfined	22.25	23.13	25.5	NA	1.93E-03	5.47E+00	KaNo.1ss(w)	rising head	ND
2587					1994	Bouwer/Rice	5.5	23.13-45.38	unconfined	22.25	23.13	25.5	NA	1.98E-03	5.62E+00	KaNo.1ss(w)	rising head	ND
2587					1994	Hvorslev	7.5	23.13-45.38	unconfined	22.25	23.13	21.7	NA	1.93E-03	5.47E+00	KaNo.1ss(w)	falling head	ND
2587					1994	Bouwer/Rice	7.5	23.13-45.38	unconfined	22.25	23.13	21.7	NA	3.00E-03	8.50E+00	KaNo.1ss(w)	falling head	ND
2587					1994									2.29E-03	6.48E+00	KaNo.1ss(w)	slug	yes
2887	28-87BR	East Trenches	749438.5	2088090.2	9/17/87	Thiem		57.35-67.00	unsaturated	9.65	193.23		0.0289	1.80E-06	5.10E-03	KaKlclst(u)	packer	yes
2887					9/17/87	Thiem		57.35-67.00	unsaturated	9.65	193.23		0.0075	3.60E-07	1.02E-03	KaKlclst(u)	packer	yes
2887					9/17/87	Thiem		57.35-67.00	unsaturated	9.65	193.23		0.0014	8.50E-08	2.41E-04	KaKlclst(u)	packer	yes
2887					9/17/87	Thiem		62.68-72.33	unsaturated	9.65	193.23		0.0061	2.70E-07	7.65E-04	Ka	packer	no
2887					9/17/87	Thiem	15	78.70-88.35	unsaturated	9.65	193.23		0.0032	1.10E-07	3.12E-04	Ka	packer	no
2887					9/17/87	Thiem	15	78.70-88.35	unsaturated	9.65	193.23		0.001	4.90E-08	1.39E-04	Ka	packer	no

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2887					9/17/87	Thiem	15	88.35-98.00	unsaturated	9.65	193.23		0.0144	4.60E-07	1.30E-03	Ka	packer	no
2887					9/17/87	Thiem	15	88.35-98.00	unsaturated	9.65	193.23		0.00047	2.10E-08	5.95E-05	Ka	packer	no
2887					9/17/87	Thiem	15	98.00-107.6	unsaturated	9.65	193.23		0.0029	8.60E-08	2.44E-04	Ka	packer	no
2887					9/17/87	Thiem	15	100.35-110.	unsaturated	9.65	193.23		0.00038	1.50E-08	4.25E-05	Ka	packer	no
2887					9/17/87	Thiem	15	183.39-193.	unsaturated	9.65	193.23		0.0006	1.40E-08	3.97E-05	Ka	packer	no
2887					9/17/87	Thiem	14	183.37-193.	unsaturated	9.65	193.23		0.000081	2.00E-09	5.67E-06	Ka	packer	no
2887					9/17/87	Thiem	15	185.39-195.	unsaturated	9.65	193.23		0.000022	1.00E-09	2.83E-06	Ka	packer	no
2887					9/17/87	Thiem	15	187.54-197.	unsaturated	9.65	193.23		0.00043	1.00E-08	2.83E-05	Ka	packer	no
2887					9/17/87	Thiem	14	187.55-197.	unsaturated	9.65	193.23		0.0026	5.90E-08	1.67E-04	Ka	packer	no
2887					1994	Hvorslev	8500	190.02-200.	unconfined	10.24	190.02	193.1	NA	2.05E-07	5.80E-04	KaKlclst(u)	slug	ND
2887					1994	Bouwer/Rice	8500	190.02-200.	unconfined	10.24	190.02	193.1	NA	1.41E-07	4.00E-04	KaKlclst(u)	slug	ND
2887					1994									2.03E-07	5.76E-04	KaKlclst(u)	slug	yes
3087	30-87BR	Buffer South	748089.5	2087424.2	9/17/87	Thiem											packer	no
3187	31-87BR	East Trenches	749835.9	2087931.4										1.00E-05	2.83E-02			ND
3187					10/26/87	Cooper et al	38.45	110.64-129.	confined	36.51	92.49	0.93	NA	1.10E-06	3.12E-03	Ka	slug	no
3187					10/26/87	Bouwer/Rice	38.45	110.64-129.	confined	36.51	92.49	0.93	NA	5.51E-07	1.56E-03	Ka	slug	no
3187					10/26/87	Bouwer/Rice	38.45	110.64-129.	confined	100	92.49			4.80E-08	1.36E-04	Ka	slug	no
3187					9/30/87	Thiem	15	62.45-72.10	unsaturated	9.65	92.21		0.0049	2.90E-07	8.22E-04	KaKlclst(u)	packer	yes
3187					9/30/87	Thiem	15	62.45-72.10	unsaturated	9.65	92.21		0.011	4.90E-07	1.39E-03	KaKlclst(u)	packer	yes
3187					9/30/87	Thiem	15	62.45-72.10	unsaturated	9.65	92.21		0.0014	8.20E-08	2.32E-04	KaKlclst(u)	packer	yes
3187					9/30/87	Thiem	15	81.75-91.40	unsaturated	9.65	92.21		0.0017	6.10E-08	1.73E-04	Ka	packer	no
3187					9/30/87	Thiem	15	91.40-101.0	unsaturated	9.65	92.21		0.0214	9.30E-07	2.64E-03	KaKlclst(u)	packer	yes
3187					9/30/87	Thiem	15	91.40-101.0	unsaturated	9.65	92.21		0.0478	1.50E-06	4.25E-03	KaKlclst(u)	packer	yes
3187					9/30/87	Thiem	15	91.40-101.0	unsaturated	9.65	92.21		0.0132	5.80E-07	1.64E-03	KaKlclst(u)	packer	yes
3187					9/30/87	Thiem	15	101.05-110.	confined?	9.65	92.21		0.0011	4.90E-08	1.39E-04	Ka	packer	no
3187					9/30/87	Thiem	15	101.05-110.	confined?	9.65	92.21		0.0116	3.60E-07	1.02E-03	Ka	packer	no
3187					9/30/87	Thiem	15	110.70-120.	confined?	9.65	92.21		0.0114	5.10E-07	1.45E-03	KaKlclst(u)	packer	yes
3187					9/30/87	Thiem	15	110.70-120.	confined?	9.65	92.21		0.029	8.60E-07	2.44E-03	KaKlclst(u)	packer	yes
3187					9/30/87	Thiem	15	110.70-120.	confined?	9.65	92.21		0.0076	3.40E-07	9.64E-04	KaKlclst(u)	packer	yes
3187					9/30/87	Thiem	15	119.55-129.	confined?	9.65	92.21		0.0129	5.80E-07	1.64E-03	KaKlss(u)	packer	yes
3187					9/30/87	Thiem	15	119.55-129.	confined?	9.65	92.21		0.0385	1.10E-06	3.12E-03	KaKlss(u)	packer	yes
3187					9/30/87	Thiem	15	119.55-129.	confined?	9.65	92.21		0.013	5.80E-07	1.64E-03	KaKlss(u)	packer	yes
3187					1994	Hvorslev	8500	111.76-132.	unconfined	32.22	99.84	103.6	NA	8.47E-07	2.40E-03	KaKlss(u)	bailer/recovery	ND
3187					1994	Bouwer/Rice	8500	111.76-132.	unconfined	32.22	99.84	103.6	NA	6.71E-07	1.90E-03	KaKlss(u)	bailer/recovery	ND
3187					1994	Ramey	8500	111.76-132.	unconfined	32.22	99.84	103.6	NA	6.71E-07	1.90E-03	KaKlss(u)	bailer/recovery	ND
3187					1994									8.64E-07	2.45E-03	KaKlss(u)	slug	yes
3287	32-87	East Trenches	749510.7	2088362.8	10/23/87	Bouwer/Rice	13.43	38.85-46.58	unconfined	7.73	38.85	1.11	NA	1.20E-03	3.40E+00	Qrf	slug	no
3287					10/23/87	Bouwer/Rice	13.43	38.85-46.58	unconfined	12.88	38.85			4.90E-05	1.39E-01	Qrf	slug	no
3287					10/23/87	Bouwer/Rice	13.43	38.85-46.58	unconfined	7.73	38.85	1.11	NA	2.88E-04	8.16E-01	Qrf	slug	yes
3487	34-87BR	East Trenches	749835.9	2087931.4										1.00E-05	2.83E-02			ND
3487					10/26/87	Cooper et al	5.93	97.29-104.2	confined	31.15	72.49	1.27	NA	2.50E-06	7.09E-03	Ka	slug	no
3487					10/26/87	Bouwer/Rice	5.93	97.29-104.2	confined	31.15	72.49	1.27	NA	2.04E-06	5.78E-03	Ka	slug	no
3487					10/26/87	Bouwer/Rice	5.93	97.29-104.2	confined	100	72.49			2.27E-07	6.43E-04	Ka	slug	no
3487					9/2/87	Thiem	15	65.40-75.05	unsaturated	9.65	72.85		0.0164	9.60E-07	2.72E-03	KaKlclst(u)	packer	yes
3487					9/2/87	Thiem	15	65.40-75.05	unsaturated	9.65	72.85		0.0108	4.30E-07	1.22E-03	KaKlclst(u)	packer	yes
3487					9/2/87	Thiem	15	65.40-75.05	unsaturated	9.65	72.85		0.0025	1.40E-07	3.97E-04	KaKlclst(u)	packer	yes
3487					9/2/87	Thiem	15	75.05-84.70	confined?	9.65	72.85		0.00043	1.60E-08	4.54E-05	Ka	packer	no

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3487					9/2/87	Thiem	15	84.70-94.35	confined?	9.65	72.85		0.00087	3.10E-08	8.79E-05	Ka	packer	no
3487					9/2/87	Thiem	15	94.35-104.0	confined?	9.65	72.85		0.00011	6.00E-09	1.70E-05	Ka	packer	no
3487					9/2/87	Thiem	15	94.35-104.0	confined?	9.65	72.85		0.0031	1.10E-07	3.12E-04	Ka	packer	no
3487					9/2/87	Thiem	15	104.00-113.	confined?	9.65	72.85		0.00087	2.90E-08	8.22E-05	Ka	packer	no
3487					1994	Hvorslev	8300	97.92-106.5	unconfined	45.24	61.28	65	NA	1.38E-07	3.90E-04	KaKlclst(u)	slug	ND
3487					1994	Bouwer/Rice	8300	97.92-106.5	unconfined	45.24	61.28	65	NA	1.13E-07	3.20E-04	KaKlclst(u)	slug	ND
3487					1994	Ramey	8300	97.92-106.5	unconfined	45.24	61.28	65	NA	1.98E-07	5.60E-04	KaKlclst(u)	slug	ND
3487					1994									1.98E-07	5.62E-04	KaKlclst(u)	slug	yes
3687	36-87BR	East Trenches	749979.2	2087295.1	10/14/87	Bouwer/Rice	12.9	31.52-63.35	unconfined	31.83	31.52	1.2	NA	1.00E-03	2.83E+00	Ka	slug	no
3687					10/14/87	Bouwer/Rice	12.9	31.52-63.35	unconfined	100	31.52			1.47E-05	4.17E-02	Ka	slug	no
3687					10/14/87	Bouwer/Rice	12.9	31.52-63.35	unconfined	31.83	31.52	1.2	NA	2.73E-04	7.74E-01	KaNo.1ss(w)	slug	yes
3687					1994	Hvorslev	22	35.48-65.10	unconfined	29.62	35.48	35.74	NA	8.13E-05	2.30E-01	KaNo.1ss(w)	rising head	ND
3687					1994	Bouwer/Rice	22	35.48-65.10	unconfined	29.62	35.48	35.74	NA	5.08E-05	1.44E-01	KaNo.1ss(w)	rising head	ND
3687					1994	Hvorslev	28	35.48-65.10	unconfined	29.62	35.48	35.26	NA	5.08E-05	1.44E-01	KaNo.1ss(w)	falling head	ND
3687					1994	Bouwer/Rice	28	35.48-65.10	unconfined	29.62	35.48	35.26	NA	3.51E-05	9.94E-02	KaNo.1ss(w)	falling head	ND
3687					1994									6.61E-05	1.87E-01	KaNo.1ss(w)	slug	yes
3687					1992	Theis recovery								4.18E-04	1.19E+00	KaNo.1ss(w)	pump	yes
3687					1992	CooperJacob								4.02E-03	1.14E+01	KaNo.1ss(w)	pump	yes
3687					1992	Theis Analysis								4.37E-04	1.24E+00	KaNo.1ss(w)	pump	yes
3987	39-87BR	Solar Ponds	751080.5	2085268.5	11/12/87	Thiem	15	50.10-59.75	unsaturated	9.65	83.98		0.00054	2.50E-08	7.09E-05	Ka	packer	no
3987					11/12/87	Thiem	15	59.75-69.40	unsaturated	9.65	83.98		0.0014	6.10E-08	1.73E-04	Ka	packer	no
3987					11/12/87	Thiem	15	69.40-79.05	unsaturated	9.65	83.98		0.0011	4.10E-08	1.16E-04	Ka	packer	no
3987					11/12/87	Thiem	15	79.05-88.70	unsaturated	9.65	83.98		0.00022	1.00E-08	2.83E-05	Ka	packer	no
3987					11/12/87	Thiem	15	79.05-88.70	unsaturated	9.65	83.98		0.00087	3.00E-08	8.50E-05	Ka	packer	no
3987					11/12/87	Thiem	15	88.70-98.35	confined	9.65	83.98		0.00076	2.50E-08	7.09E-05	Ka	packer	no
3987					11/12/87	Thiem	15	98.35-108.0	confined	9.65	83.98		0.0012	3.60E-08	1.02E-04	Ka	packer	no
3987					11/12/87	Thiem	15	108.00-117.	confined	9.65	83.98		0.0019	6.10E-08	1.73E-04	Ka	packer	no
3987					11/12/87	Thiem	15	115.65-125.	confined	9.65	83.98		0.0131	3.90E-07	1.11E-03	Ka	packer	no
3987					11/12/87	Thiem	15	122.68-132.	confined	9.65	83.98		0.00032	1.50E-08	4.25E-05	Ka	packer	no
3987					11/12/87	Thiem	15	122.68-132.	confined	9.65	83.98		0.0013	3.60E-08	1.02E-04	Ka	packer	no
4187	41-87BR	Landfill	753118.1	2084821.3	1/26/88	Bouwer/Rice	44.88	41.68-93.79	confined	100	41.68	1.25	NA	2.34E-07	6.63E-04	Ka	slug	no
4187					1/26/88	Bouwer/Rice	44.88	41.68-93.79	confined	9.73	41.68	1.25	NA	5.04E-07	1.43E-03	Ka	slug	no
4187					1/26/88	Cooper et al	44.88	41.68-93.79	confined	100	41.68	1.25	NA	2.80E-08	7.94E-05	Ka	slug	no
4187					1/26/88	Cooper et al	44.88	41.68-93.79	confined	9.73	41.68	1.25	NA	3.70E-07	1.05E-03	Ka	slug	no
4187					7/31/87	Thiem	15	20.85-30.50	unsaturated	9.65	41.83		0.0041	5.70E-07	1.62E-03	KaKlclst(w)	packer	yes
4187					7/31/87	Thiem	15	20.85-30.50	unsaturated	9.65	41.83		0.0141	1.70E-06	4.82E-03	KaKlclst(w)	packer	yes
4187					7/31/87	Thiem	15	20.85-30.50	unsaturated	9.65	41.83		0.0074	9.90E-07	2.81E-03	KaKlclst(w)	packer	yes
4187					7/31/87	Thiem	15	32.50-42.15	unsaturated	9.65	41.83		0.0037	3.50E-07	9.92E-04	KaKlclst(u)	packer	yes
4187					7/31/87	Thiem	15	32.50-42.15	unsaturated	9.65	41.83		0.0011	1.00E-07	2.83E-04	KaKlclst(u)	packer	yes
4187					7/31/87	Thiem	15	32.50-42.15	unsaturated	9.65	41.83		0.00011	1.00E-08	2.83E-05	KaKlclst(u)	packer	yes
4187					7/31/87	Thiem	15	41.55-51.20	unsaturated	9.65	41.83		0.0116	9.00E-07	2.55E-03	KaKlclst(u)	packer	yes
4187					7/31/87	Thiem	15	41.55-51.20	unsaturated	9.65	41.83		0.0367	2.50E-06	7.09E-03	KaKlclst(u)	packer	yes
4187					7/31/87	Thiem	15	41.55-51.20	unsaturated	9.65	41.83		0.0212	1.80E-06	5.10E-03	KaKlclst(u)	packer	yes
4187					7/31/87	Thiem	15	53.05-62.70		9.65	41.83		0.0023	2.00E-07	5.67E-04	KaKlclst(u)	packer	yes
4187					7/31/87	Thiem	15	53.05-62.70		9.65	41.83		0.0058	3.90E-07	1.11E-03	KaKlclst(u)	packer	yes
4187					7/31/87	Thiem	15	53.05-62.70		9.65	41.83		0.0011	1.00E-07	2.83E-04	KaKlclst(u)	packer	yes
4187					7/31/87	Thiem	15	62.70-72.35		9.65	41.83		0.0049	4.20E-07	1.19E-03	KaKlss(u)	packer	yes
4187					7/31/87	Thiem	15	62.70-72.35		9.65	41.83		0.0109	6.60E-07	1.87E-03	KaKlss(u)	packer	yes

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4187					7/31/87	Thiem	15	62.70-72.35		9.65	41.83		0.0019	1.70E-07	4.82E-04	KaKlss(u)	packer	yes
4187					7/31/87	Thiem	15	72.35-82.00		9.65	41.83		0.0106	9.10E-07	2.58E-03	Ka	packer	no
4187					7/31/87	Thiem	15	72.35-82.00		9.65	41.83		0.0455	2.60E-06	7.37E-03	Ka	packer	no
4187					7/31/87	Thiem	15	82.00-91.65		9.65	41.83		0.0065	5.70E-07	1.62E-03	Ka	packer	no
4187					7/31/87	Thiem	15	82.00-91.65		9.65	41.83		0.00087	4.60E-08	1.30E-04	Ka	packer	no
4587	45-87BR	903 Pad	748313.2	2085451.3		Bouwer/Rice	10.3	98.48-101.3	unconfined	10.82	90.48	0.61	NA	1.33E-04	3.77E-01	KaKlss(u)	slug	no
4587						Bouwer/Rice	10.3	98.48-101.3	unconfined	10.82	90.48	0.61	NA	6.81E-05	1.93E-01	KaKlss(u)	slug	yes
5287	52-87	881 Hillside	748145.1	2084066.7	2/4/88	Bouwer/Rice	9.68	3.5-20.3	unconfined	13.76	6.54	0.82	NA	2.08E-04	7.94E-01	Qc	slug	no
5287					2/4/88	Bouwer/Rice	9.68	3.5-20.3	unconfined	13.76	6.54	0.82	NA	6.24E-05	1.77E-01	Qc	slug	yes
5887	58-87	Landfill	752234.1	2082530.8	1/28/88	Bouwer/Rice	23.45	13.80-22.26	unconfined	8.46	13.8	0.88	NA	1.56E-05	4.42E-02	Qrf	slug	no
5887			752234.1	2082530.8	1/28/88	Bouwer/Rice	23.45	13.80-22.26	unconfined	38.8	?	0.88	NA	5.50E-06	1.56E-02	Qrf	slug	no
6087	60-87	Landfill	752930.2	2083035.2	1/26/88	Bouwer/Rice	3	11.32-27.47	unconfined	16.15	11.32	1.25	NA	1.29E-03	3.66E+00	Qrf	slug	no
6087			752930.2	2083035.2	1/26/88	Bouwer/Rice	3	11.32-27.47	unconfined	11.55	?	1.26	NA	5.41E-04	1.53E+00	Qrf	slug	no
6087					1/26/88	Bouwer/Rice	3	11.32-27.47	unconfined	16.15	11.32	1.25	NA	2.01E-04	5.70E-01	Qrf	slug	yes
6187	61-87	Landfill	752860	2083071.7	1/27/88	Bouwer/Rice	4.52	12.46-28.24	unconfined	15.78	12.46	0.71	NA	9.87E-04	2.80E+00	Qrf	slug	no
6187			752860	2083071.7	1/27/88	Bouwer/Rice	4.52	12.46-28.24	unconfined	15.78	12.46	0.71	NA	9.87E-04	2.80E+00	Qrf	slug	no
6187			752860	2083071.7	1/27/88	Bouwer/Rice	4.52	12.46-28.24	unconfined	38.8	?	0.71	NA	1.35E-04	3.83E-01	Qrf	slug	no
6287	62-87	Landfill	752800	2083096.8	1/27/88	Bouwer/Rice	7.72	12.66-26.56	unconfined	13.9	12.66	1.01	NA	6.21E-04	1.76E+00	Qrf	slug	no
6287			752800	2083096.8	1/27/88	Bouwer/Rice	7.72	12.66-26.56	unconfined	13.9	12.66	1.01	NA	6.21E-04	1.76E+00	Qrf	slug	no
6287			752800	2083096.8	1/27/88	Bouwer/Rice	7.72	12.66-26.56	unconfined	38.8	?	1.01	NA	7.67E-05	2.17E-01	Qrf	slug	no
6387	63-87	Landfill	752717.1	2083137.8	1/27/88	Bouwer/Rice	10.13	14.56-25.40	unconfined	10.84	14.56	0.73	NA	6.68E-04	1.89E+00	Qrf	slug	no
6387			752717.1	2083137.8	1/27/88	Bouwer/Rice	10.13	14.56-25.40	unconfined	10.84	14.56	0.73	NA	6.68E-04	1.89E+00	Qrf	slug	no
6387			752717.1	2083137.8	1/27/88	Bouwer/Rice	10.13	14.56-25.40	unconfined	38.8	?	0.73	NA	7.00E-05	1.98E-01	Qrf	slug	no
6587	65-87	Landfill	752229.8	2083299.1	1/28/88	Bouwer/Rice	12.28	12.82-23.96	unconfined	11.14	12.82	0.77	NA	4.63E-04	4.37E-01	Qrf	slug	no
6587			752229.8	2083299.1	1/28/88	Bouwer/Rice	12.28	12.82-23.96	unconfined	11.14	12.82	0.77	NA	4.63E-04	1.31E+00	Qrf	slug	no
6587			752229.8	2083299.1	1/28/88	Bouwer/Rice	12.28	12.82-23.96	unconfined	38.8	?	0.77	NA	4.98E-05	1.41E-01	Qrf	slug	no
6687	66-87	Landfill	752150	2083325.2	1/27/88	Bouwer/Rice	10.08	11.37-17.96	unconfined	6.59	11.37	1.27	NA	1.79E-04	5.07E-01	Qrf	slug	no
6687			752150	2083325.2	1/27/88	Bouwer/Rice	10.08	11.37-17.96	unconfined	38.8	?	1.27	NA	1.24E-05	3.51E-02	Qrf	slug	no
6787	67-87	Landfill	753163.7	2083774.5	1/27/88	Bouwer/Rice	19.45	8.74-16.46	unconfined	5.08	8.74	1.14	NA	6.42E-05	1.82E-01	Qrf	slug	no
6787			753163.7	2083774.5	1/27/88	Bouwer/Rice	19.45	8.74-16.46	unconfined	38.8	?	1.17	NA	1.65E-05	4.68E-02	Qrf	slug	no
7078	70-86/87?		747517	2081993										3.00E-04	8.50E-01			ND
7187	71-87	Landfill	753321.9	2084086.8	1/26/88	Bouwer/Rice	5.65	5.67-13.50	unconfined	7.83	5.67	1.2	NA	6.60E-04	1.87E+00	Qrf	slug	yes
7187			753321.9	2084086.8	1/26/88	Bouwer/Rice	5.65	5.67-13.50	unconfined	11.55	?	1.2	NA	1.63E-04	4.62E-01	Qrf	slug	no
7187					NA	NA	NA	5.67-13.50	unconfined	NA	NA	NA	NA	6.60E-04	1.87E+00	Qrf	slug	ND
B10228	B102289/18-89		753091.5	2079511.8	1989	Bouwer/Rice	34.6	4.76-14.23	unconfined	11.23	3	2.3	NA	2.30E-04	6.24E-01	Qvf	Slug in	yes
B102289			753091.5	2079511.8	1989	Bouwer/Rice	32.5	4.76-14.23	unconfined	11.23	3	3.1	NA	2.20E-04	6.24E-01	Qvf	Slug out	yes
B10238	B102389/19-89		753833.5	2080256	1989	Bouwer/Rice	51.7	5.74-12.58	unconfined	6.34	5.74	2.2	NA	1.40E-04	4.54E-01	Qvf	Slug in	no
B102389			753833.5	2080256	1989	Bouwer/Rice	58.3	5.74-12.58	unconfined	6.34	5.74	1.6	NA	9.40E-05	2.66E-01	Qvf	Slug out	no
B102389					1989	Bouwer/Rice	51.7	5.74-12.58	unconfined	6.34	5.74	2.2	NA	2.34E-04	6.63E-01	Qc	Slug in	yes
B102389					1989	Bouwer/Rice	58.3	5.74-12.58	unconfined	6.34	5.74	1.6	NA	1.52E-04	4.31E-01	Qc	Slug out	yes
B11088	B110889/SF04-89D				1989	Bouwer/Rice	2	47.47-66.95	unconfined	31.55	35.4	2.33	NA	3.30E-03	9.35E+00	Qrf	Slug out	yes
B110889					1989	Bouwer/Rice	2	47.47-66.95	unconfined	31.55	35.4	2.1	NA	3.00E-03	8.50E+00	Qrf	Slug in	yes
B11098	B110989/SF05-89		749794.5	2078778.2	1989	Bouwer/Rice	8.5	48.19-67.67	unconfined	20.05	47.62	2	NA	7.40E-04	2.10E+00	Qrf	Slug in	yes
B110989			749794.5	2078778.2	1989	Bouwer/Rice	8.5	48.19-67.67	unconfined	20.05	47.62	1.9	NA	7.60E-04	2.15E+00	Qrf	Slug out	yes
B11118	B111189/SF06-89		749645.4	2077580.7	1989	Bouwer/Rice	32.5	56.97-74.4	unconfined	17.43	56.97	1.4	NA	3.00E-04	8.51E-01	Qrf	Slug out	yes
B111189			749645.4	2077580.7	1989	Bouwer/Rice	44.2	56.97-74.4	unconfined	17.43	56.97	1	NA	1.00E-04	2.83E-01	Qrf	Slug in	yes

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B20058	B200589/5-89	754837.3	2083536.2	1989	Bouwer/Rice	8.5	21.26-33.34	unconfined	10.51	21.26	1.1	NA	2.90E-03	9.64E+00	Qrf	Slug in	no
B200589		754837.3	2083536.2	1989	Bouwer/Rice	7	21.26-33.34	unconfined	10.51	21.26	1.6	NA	1.20E-03	3.40E+00	Qrf	Slug out	no
B200589				1989	Bouwer/Rice	8.5	21.26-33.34	unconfined	10.51	21.26	1.1	NA	8.30E-03	2.35E+01	Qrf	Slug in	yes
B200589				1989	Bouwer/Rice	7	21.26-33.34	unconfined	10.51	21.26	1.6	NA	3.40E-03	9.64E+00	Qrf	Slug out	yes
B20068	B200689/6-89	755238.4	2084158.4	1989	Bouwer/Rice	30	23.33-32.89	unconfined	9.11	23.33	2.4	NA	4.30E-04	2.10E+00	Qrf	Slug out	no
B200689		755238.4	2084158.4	1989	Bouwer/Rice	26.3	23.33-32.89	unconfined	9.11	23.33	2	NA	3.70E-04	1.81E+00	Qrf	Slug in	no
B200689				1989	Bouwer/Rice	30	23.33-32.89	unconfined	9.11	23.33	2.4	NA	7.40E-04	2.10E+00	Qrf	Slug out	yes
B200689				1989	Bouwer/Rice	26.3	23.33-32.89	unconfined	9.11	23.33	2	NA	6.40E-04	1.81E+00	Qrf	Slug in	yes
B20068	B200689/6-89D	755238.4	2084158.4	1989	Bouwer/Rice	30	23.33-32.89	unconfined	9.11	23.33	2.2	NA	3.70E-04	1.05E+00	Qrf	Slug out	no
B200689		755238.4	2084158.4	1989	Bouwer/Rice	30	23.33-32.89	unconfined	9.11	23.33	2.1	NA	3.70E-04	1.05E+00	Qrf	Slug in	no
B200689				1989	Bouwer/Rice	30	23.33-32.89	unconfined	9.11	23.33	2.2	NA	6.40E-04	1.81E+00	Qrf	Slug out	yes
B200689				1989	Bouwer/Rice	30	23.33-32.89	unconfined	9.11	23.33	2.1	NA	6.00E-04	1.70E+00	Qrf	Slug in	yes
B20078	B200789/7-89	755765.4	2085008.2	1989	Bouwer/Rice	12	21.0-30.48	unconfined	8.98	21	2	NA	8.20E-04	4.25E+00	Qrf	Slug in	no
B200789		755765.4	2085008.2	1989	Bouwer/Rice	10	21.0-30.48	unconfined	8.98	21	2	NA	8.50E-04	2.41E+00	Qrf	Slug out	no
B200789				1989	Bouwer/Rice	12	21.0-30.48	unconfined	8.98	21	2	NA	1.40E-03	3.97E+00	Qrf	Slug in	yes
B200789				1989	Bouwer/Rice	10	21.0-30.48	unconfined	8.98	21	2	NA	1.40E-03	3.97E+00	Qrf	Slug out	yes
B20088	B200889/8-89	756186.5	2085702.4	1989	Bouwer/Rice	27.5	20.84-25.10	unconfined	3.94	20.84	7.4	NA	5.20E-04	1.98E+00	Qrf	Slug in	no
B200889		756186.5	2085702.4	1989	Bouwer/Rice	27.5	20.84-25.10	unconfined	3.94	20.84	6.1	NA	4.00E-04	2.41E+00	Qrf	Slug out	no
B200889				1989	Bouwer/Rice	27.5	20.84-25.10	unconfined	3.94	20.84	7.4	NA	8.80E-04	2.49E+00	Qrf	Slug in	yes
B200889				1989	Bouwer/Rice	27.5	20.84-25.10	unconfined	3.94	20.84	6.1	NA	7.10E-04	2.01E+00	Qrf	Slug out	yes
B20088	B200889/8-89D	756186.5	2085702.4	1989	Bouwer/Rice	31.3	20.84-25.10	unconfined	3.94	20.84	7.4	NA	5.20E-04	1.47E+00	Qrf	Slug in	no
B200889		756186.5	2085702.4	1989	Bouwer/Rice	31.3	20.84-25.10	unconfined	3.94	20.84	7.8	NA	4.90E-04	1.39E+00	Qrf	Slug out	no
B200889				1989	Bouwer/Rice	31.3	20.84-25.10	unconfined	3.94	20.84	7.4	NA	5.83E-04	1.65E+00	Qrf	Slug in	yes
B200889				1989	Bouwer/Rice	31.3	20.84-25.10	unconfined	3.94	20.84	7.8	NA	8.53E-04	2.42E+00	Qrf	Slug out	yes
B20118	B201189/10-89	757645.1	2086851.8	8/18/89	Bouwer/Rice	237.5	22.27-36.71	unconfined	28.52	7.39	4.1	NA	9.10E-06	2.69E-02	Qc	Slug in	yes
B201189		757645.1	2086851.8	8/18/89	Bouwer/Rice	238.3	22.27-36.71	unconfined	28.52	7.39	2.95	NA	9.40E-06	3.97E+01	Qc	Slug out	yes
B201189		757645.1	2086851.8	8/18/89	Theis	410	22.27-36.71	unconfined	26.44	11.97	17.5	0.73	4.90E-04	6.24E-02	Qc	pumping	yes
B201189		757645.1	2086851.8	8/18/89	Theis	3590	22.27-36.71	unconfined	26.44?	11.97	17.5	0.73	2.00E-04	5.67E-01	Qc	recovery	yes
B201189				8/18/89	Theis	400	22.27-36.71	unconfined	26.4	11.97	17.5	0.73	9.29E-04	2.63E+00	Qc	recovery	yes
B201189				8/18/89	Papadopulus/Co	400	22.27-36.71	unconfined	26.4	11.97	17.5	0.73	2.86E-05	8.11E-02	Qc	recovery	yes
B20248	B202489/20-89	757394.8	2083893.8	1989	Bouwer/Rice	1.7	9.09-14.83	unconfined	5.24	9.09	1.3	NA	7.60E-03	4.82E+01	Qvf	Slug in	no
B202489		757394.8	2083893.8	1989	Bouwer/Rice	1.7	9.09-14.83	unconfined	5.24	9.09	2.2	NA	1.00E-02	2.83E+01	Qvf	Slug out	no
B202489				1989	Bouwer/Rice	1.7	9.09-14.83	unconfined	5.24	9.09	1.3	NA	1.32E-02	3.74E+01	Qvf	Slug in	yes
B202489				1989	Bouwer/Rice	1.7	9.09-14.83	unconfined	5.24	9.09	2.2	NA	1.70E-02	4.82E+01	Qvf	Slug out	yes
B20248	B202489/20-89D	757394.8	2083893.8	1989	Bouwer/Rice	1.7	9.09-14.83	unconfined	5.24	9.09	1.3	NA	7.30E-03	2.07E+01	Qvf	Slug in	no
B202489		757394.8	2083893.8	1989	Bouwer/Rice	1.7	9.09-14.83	unconfined	5.24	9.09	2	NA	9.70E-03	2.75E+01	Qvf	Slug out	no
B202489				1989	Bouwer/Rice	1.7	9.09-14.83	unconfined	5.24	9.09	1.3	NA	1.27E-02	3.60E+01	Qvf	Slug in	yes
B202489				1989	Bouwer/Rice	1.7	9.09-14.83	unconfined	5.24	9.09	2	NA	1.65E-02	4.68E+01	Qvf	Slug out	yes
B20258	B202589/21-89	758112.4	2085712.4	1989	Bouwer/Rice	0.58	6.38-13.45	unconfined	8.97	4.08	4	NA	2.20E-02	5.39E+00	Qvf	Slug in	yes
B20258	B202589/21-89D	758112.4	2085712.4	1989	Bouwer/Rice	0.67	6.38-13.45	unconfined	8.97	4.08	3.8	NA	2.00E-02	5.67E+01	Qvf	Slug in	yes
B202589		758112.4	2085712.4	1989	Bouwer/Rice	0.67	6.38-13.45	unconfined	8.97	4.08	4	NA	1.90E-02	5.39E+01	Qvf	Slug out	yes
B20318	B203189			1994	Hvorslev	37000	35.99-48.20	unconfined	15.47	32.73	35.38	NA	4.59E-08	1.30E-04	KaKlclst(w)	bailer/recovery	ND
B203189				1994	Bouwer/Rice	37000	35.99-48.20	unconfined	15.47	32.73	35.38	NA	2.86E-08	8.10E-05	KaKlclst(w)	bailer/recovery	ND
B203189				1994	Ramey	37000	35.99-48.20	unconfined	15.47	32.73	35.38	NA	5.65E-08	1.60E-04	KaKlclst(w)	bailer/recovery	ND
B203189				1994									5.59E-08	1.58E-04	KaKlclst(w)	slug	yes
B20328	B203289			1994	Hvorslev	26000	35.99-46.49	unconfined	14.5	25.24	28.59	NA	3.88E-08	1.10E-04	KaKlclst(w)	bailer/recovery	ND

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B203289				1994	Ramey	26000	35.99-46.49	unconfined	14.5	25.24	28.59	NA	1.59E-07	4.50E-04	KaKlclst(w)	bailer/recovery	ND
B203289				1994									1.52E-07	4.32E-04	KaKlclst(w)	slug	yes
B20348B203489				1994	Hvorslev	21500	32.01-43.26	confined	12.66	28.38	31.79	NA	3.53E-08	1.00E-04	KaKlclst(w)	bailer/recovery	ND
B203489				1994	Ramey	21500	32.01-43.26	confined	12.66	28.38	31.79	NA	3.53E-08	1.00E-04	KaKlclst(w)	bailer/recovery	ND
B203489				1994									3.81E-08	1.08E-04	KaKlclst(w)	slug	yes
B20358B203589				1994	Hvorslev	1000	30.57-41.81	confined	8.91	29.67	33.1	NA	2.44E-08	6.90E-05	KaKlclst(w)	rising head	ND
B203589				1994	Ramey	1000	30.57-41.81	confined	8.91	29.67	33.1	NA	3.00E-08	8.50E-05	KaKlclst(w)	rising head	ND
B203589				1994									3.00E-08	8.50E-05	KaKlclst(w)	slug	yes
B20378B203789				1994	Hvorslev	20000	135.08-143.	unconfined	100.04	43.29	48.29	NA	2.86E-08	8.10E-05	KaKlclst(w)	bailer/recovery	ND
B203789				1994	Bouwer/Rice	20000	135.08-143.	unconfined	100.04	43.29	48.29	NA	2.54E-08	7.20E-05	KaKlclst(w)	bailer/recovery	ND
B203789				1994	Ramey	20000	135.08-143.	unconfined	100.04	43.29	48.29	NA	2.44E-08	6.90E-05	KaKlclst(w)	bailer/recovery	ND
B203789				1994									2.85E-08	8.06E-05	KaKlclst(u)	slug	yes
B20388B203889				1994	Hvorslev	20080	107.69-115.	unconfined	72.26	43.73	47.96	NA	2.08E-08	5.90E-05	KaKlclst(u)	bailer/recovery	ND
B203889				1994	Bouwer/Rice	20080	107.69-115.	unconfined	72.26	43.73	47.96	NA	1.59E-08	4.50E-05	KaKlclst(u)	bailer/recovery	ND
B203889				1994	Ramey	20080	107.69-115.	unconfined	72.26	43.73	47.96	NA	1.87E-08	5.30E-05	KaKlclst(u)	bailer/recovery	ND
B203889				1994									2.08E-08	5.90E-05	KaKlclst(u)	slug	yes
B20398B203989				1994	Hvorslev	8800	125.88-134.	unconfined	65.15	69.73	73.4	NA	1.02E-05	2.88E-02	KaKlclst(u)	rising head	ND
B203989				1994	Bouwer/Rice	8800	125.88-134.	unconfined	65.15	69.73	73.4	NA	7.62E-06	2.16E-02	KaKlclst(u)	rising head	ND
B203989				1994	Ramey	8800	125.88-134.	unconfined	65.15	69.73	73.4	NA	1.57E-05	4.46E-02	KaKlclst(u)	rising head	ND
B203989				1994	Hvorslev	2800	125.88-134.	unconfined	65.15	69.73	65.56	NA	5.58E-06	1.58E-02	KaKlclst(u)	falling head	ND
B203989				1994	Bouwer/Rice	2800	125.88-134.	unconfined	65.15	69.73	65.56	NA	3.81E-06	1.08E-02	KaKlclst(u)	falling head	ND
B203989				1994	Ramey	2800	125.88-134.	unconfined	65.15	69.73	65.56	NA	2.54E-05	7.20E-02	KaKlclst(u)	falling head	ND
B203989				1994									2.08E-05	5.90E-02	KaKlclst(u)	slug	yes
B20408B204089				1994	Hvorslev	20000	107.19-116.	unconfined	50.47	66.45	69.18	NA	6.71E-08	1.90E-04	KaKlclst(u)	bailer/recovery	ND
B204089				1994	Bouwer/Rice	20000	107.19-116.	unconfined	50.47	66.45	69.18	NA	5.65E-08	1.60E-04	KaKlclst(u)	bailer/recovery	ND
B204089				1994	Ramey	20000	107.19-116.	unconfined	50.47	66.45	69.18	NA	4.24E-08	1.20E-04	KaKlclst(u)	bailer/recovery	ND
B204089				1994									6.61E-08	1.87E-04	KaKlss(u)	slug	yes
B20418B204189/36-89BR		755340.5	2088469.4	1989	Cooper et al	5833	83.06-97.29	confined	14.1	NA	NA	NA	8.20E-08	4.25E-04	KaKlss(u)	Slug in	yes
B204189		755340.5	2088469.4	1989	Cooper et al	8333	83.06-97.29	confined	14.1	NA	NA	NA	1.50E-07	4.25E-04	KaKlss(u)	Slug out	yes
B204189				1994	Hvorslev	21520	81.96-99.58	unconfined	32.07	67.51	71.18	NA	7.06E-08	2.00E-04	KaKlss(u)	bailer/recovery	ND
B204189				1994	Bouwer/Rice	21520	81.96-99.58	unconfined	32.07	67.51	71.18	NA	4.24E-08	1.20E-04	KaKlss(u)	bailer/recovery	ND
B204189				1994	Ramey	21520	81.96-99.58	unconfined	32.07	67.51	71.18	NA	1.31E-07	3.70E-04	KaKlss(u)	bailer/recovery	ND
B204189				1994									1.32E-07	3.74E-04	KaKlss(u)	slug	yes
B20558B205589/46-89		757654.1	2086855.2	1989	Bouwer/Rice	1.7	13.98-18.36	unconfined	4.38	13.98	5.6	NA	1.70E-03	3.12E+01	Qc	Slug in	no
B205589		757654.1	2086855.2	1989	Bouwer/Rice	1.7	13.98-18.36	unconfined	4.38	13.98	6.8	NA	2.50E-03	7.09E+00	Qc	Slug out	no
B205589		757654.1	2086855.2	8/18/89	Theis	410	13.98-18.36	unconfined	4	15.34	0.03	0.73	ND	ND	Qc	pumping	no
B20658B206589/LF06-89BR		752458	2084121.3	1989	Bouwer/Rice	1105	25.42-37.06	confined	27.09	9.33	1	NA	5.80E-06	1.64E-03	KaKlclst(w)	Slug in	yes
B206589		752458	2084121.3	1989	Bouwer/Rice	433.3	25.42-37.06	confined	27.09	9.33	2.65	BA	5.80E-06	1.64E-02	KaKlclst(w)	Slug out	yes
B206589				1994	Hvorslev	18640	24.42-38.96	confined	29.54	7.55	11	NA	5.65E-07	1.60E-03	KaKlclst(w)	slug	ND
B206589				1994	Bouwer/Rice	18640	24.42-38.96	confined	29.54	7.55	11	NA	2.89E-06	8.20E-03	KaKlclst(w)	slug	ND
B206589				1994	Ramey	18640	24.42-38.96	confined	29.54	7.55	11	NA	1.62E-06	4.60E-03	KaKlclst(w)	slug	ND
B206589				1994	Bouwer/Rice	18640	24.42-38.96	confined	29.54	7.55	11	NA	2.90E-06	8.21E-03	KaKlclst(w)	slug out	yes
B20678B206789BR/LF09-89BR		752818.5		1990	Bouwer/Rice	NA	12.09-31.57	unconfined	14.17	NA	NA	NA	ND	ND	Ka	Slug in	no
B206789				1994	Hvorslev	8800	16.36-23.59	unconfined	7.23	16.36	19.5	NA	4.59E-07	1.30E-03	KaKlclst(w)	slug	ND
B206789				1994	Bouwer/Rice	8800	16.36-23.59	unconfined	7.23	16.36	19.5	NA	2.65E-07	7.50E-04	KaKlclst(w)	slug	ND
B206789				1994									4.47E-07	1.27E-03	KaKlclst(w)	slug	yes
B20708B207089/LF12-89BR		753103.1	2084837.2	1990	Bouwer/Rice	866.7	33.2-54.88	confined	30.89	23.49	1.7	NA	2.30E-07	6.52E-04	KaKlclst(u)	Slug in	yes
B20718B207189/LF13-89BR		753091.6	2084837.4	1990	Bouwer/Rice	1000	72.9-77.35	confined	44.67	32.68	4.3	NA	1.50E-07	4.25E-04	KaKlclst(u)	Slug out	yes
B207189		753091.6	2084837.4	1990	Bouwer/Rice	733.3	72.9-77.35	confined	44.67	32.68	4.3	NA	1.40E-07	3.97E-04	KaKlclst(u)	Slug in	yes

Appendix F
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B207189		749345.5	2079273.2	1990	Bouwer/Rice	2	47.47-66.95	unconfined	31.55				3.20E-03	9.36E+00	KaKlclst(u)	Slug in	yes
B21748B217489				1994	Hvorslev	25840	134.60-151.	unconfined	63.41	88.11	91.93	NA	9.53E-08	2.70E-04	KaKlss(u)	slug	ND
B217489				1994	Bouwer/Rice	25840	134.60-151.	unconfined	63.41	88.11	91.93	NA	4.94E-08	1.40E-04	KaKlss(u)	slug	ND
B217489				1994	Ramey	25840	134.60-151.	unconfined	63.41	88.11	91.93	NA	4.59E-08	1.30E-04	KaKlss(u)	slug	ND
B217489				1994									9.66E-08	2.74E-04	KaKlss(u)	slug	yes
B21758B217589				1994	Hvorslev	20080	85.22-97.67	unconfined	57.75	39.92	43.81	NA	6.00E-08	1.70E-04	KaKlss(u)	slug	ND
B217589				1994	Bouwer/Rice	20080	85.22-97.67	unconfined	57.75	39.92	43.81	NA	4.24E-08	1.20E-04	KaKlss(u)	slug	ND
B217589				1994	Ramey	20080	85.22-97.67	unconfined	57.75	39.92	43.81	NA	8.12E-08	2.30E-04	KaKlss(u)	slug	ND
B217589				1994									8.13E-08	2.30E-04	KaKlss(u)	slug	yes
B21768B217689				1994	Hvorslev	18640	97.83-109.2	unconfined	69.25	40.03	43.69	NA	6.00E-08	1.70E-04	KaKlss(u)	slug	ND
B217689				1994	Bouwer/Rice	18640	97.83-109.2	unconfined	69.25	40.03	43.69	NA	4.24E-08	1.20E-04	KaKlss(u)	slug	ND
B217689				1994	Ramey	18640	97.83-109.2	unconfined	69.25	40.03	43.69	NA	1.59E-07	4.50E-04	KaKlss(u)	slug	ND
B217689				1994									1.58E-07	4.46E-04	KaKlss(u)	slug	yes
B21778B217789				1994	Hvorslev	8300	71.87-89.27	unconfined	37.64	51.63	52.25	NA	2.33E-07	6.60E-04	KaKlclst(u)	slug	ND
B217789				1994	Bouwer/Rice	8300	71.87-89.27	unconfined	37.64	51.63	52.25	NA	1.48E-07	4.20E-04	KaKlclst(u)	slug	ND
B217789				1994	Ramey	8300	71.87-89.27	unconfined	37.64	51.63	52.25	NA	2.86E-07	8.10E-04	KaKlclst(u)	slug	ND
B217789				1994									2.85E-07	8.06E-04	KaKlclst(u)	slug	yes
B30288B302889/24-89		745826.7	2089524.8	1989	Bouwer/Rice	8.5	8.25-12.85	unconfined	6.57	5.96	2.3	NA	2.80E-03	6.24E+00	Qvf	Slug in	yes
B302889		745826.7	2089524.8	1989	Bouwer/Rice	8	8.25-12.85	unconfined	6.57	5.96	2.2	NA	2.20E-03	6.24E+00	Qvf	Slug out	yes
B30298B302989/25-89		745355.6	2091265.9	1989	Bouwer/Rice	14	5.39-9.83	unconfined	5.52	3.81	2.4	NA	1.20E-03	4.25E+00	Qvf	Slug in	yes
B302989		745355.6	2091265.9	1989	Bouwer/Rice	12.2	5.39-9.83	unconfined	5.52	3.81	2.4	NA	1.50E-03	4.25E+00	Qvf	Slug out	yes
B30428B304289/37-89BR		744679.3	2086215.4	1989	Cooper et al	1000	86.22-90.67	confined	4	11.91	NA	NA	9.80E-06	3.12E-02	KaKlss(u)	Slug in	yes
B304289		744679.3	2086215.4	1989	Cooper et al	500	86.22-90.67	confined	4	11.91	NA	NA	3.50E-05	9.92E-02	KaKlss(u)	Slug out	yes
B304289		744679.3	2086215.4		?								2.20E-04	6.24E-01			ND
B304289		744679.3	2086215.4	9/13/89	NA	63	84.0-88.5	confined	NA	11.11	73.44	0.21	ND	ND	Ka	pumping	no
B30458B304589/37-89P		744690.5		9/13/89	NA	63	NA	unconfined	NA	11.27	0	0.21	ND	ND	Qrf	pumping	no
B30488B304889				1994	Hvorslev	40000	15.66-27.96	unconfined	15.43	12.53	8.11	NA	2.51E-07	7.10E-04	KaKlclst(w)	falling head	ND
B304889				1994	Bouwer/Rice	40000	15.66-27.96	unconfined	15.43	12.53	8.11	NA	1.73E-07	4.90E-04	KaKlclst(w)	falling head	ND
B304889				1994	Ramey	40000	15.66-27.96	unconfined	15.43	12.53	8.11	NA	6.11E-07	1.73E-03	KaKlclst(w)	falling head	ND
B304889				1994									2.49E-07	7.06E-04	KaKlclst(w)	slug	yes
B30498B304989				1994	Hvorslev	4200	76.62-88.40	unconfined	72.8	15.6	11.4	NA	3.88E-07	1.10E-03	KaKlss(u)	falling head	ND
B304989				1994	Bouwer/Rice	4200	76.62-88.40	unconfined	72.8	15.6	11.4	NA	3.53E-07	1.00E-03	KaKlss(u)	falling head	ND
B304989				1994	Ramey	4200	76.62-88.40	unconfined	72.8	15.6	11.4	NA	1.24E-06	3.50E-03	KaKlss(u)	falling head	ND
B304989				1994									1.22E-06	3.46E-03	KaKlss(u)	slug	yes
B30538B305389/44-89BR		744718	2086232	1989	Cooper et al	350	17.08-26.48	confined	6	8.41	NA	NA	3.40E-05	5.10E-01	KaKlslt(w)	Slug in	yes
B305389		744718	2086232	1989	Cooper et al	3000	17.08-26.48	confined	6	8.41	NA	NA	3.00E-05	8.50E-02	KaKlslt(w)	Slug out	yes
B30538B305389				1994	Hvorslev	7200	15.80-27.80	confined	16.7	5.94	9.85	NA	1.06E-05	3.00E-02	KaKlslt(w)	slug	ND
B305389				1994	Ramey	7200	15.80-27.80	confined	16.7	5.94	9.85	NA	2.34E-05	6.62E-02	KaKlslt(w)	slug	ND
B305389				1994									2.34E-05	6.62E-02	KaKlslt(w)	slug	yes
B31528B315289				1994	Hvorslev	8400	90.0-101.00	unconfined	43.5	57.5	60.45	NA	8.64E-07	2.45E-03	KaKlclst(u)	slug	ND
B315289				1994	Bouwer/Rice	8400	90.0-101.00	unconfined	43.5	57.5	60.45	NA	4.57E-07	1.30E-03	KaKlclst(u)	slug	ND
B315289				1994	Ramey	8400	90.0-101.00	unconfined	43.5	57.5	60.45	NA	8.64E-07	2.45E-03	KaKlclst(u)	slug	ND
B315289				1994									8.64E-07	2.45E-03	KaKlclst(u)	slug	yes
B400081-89P		744565	2078308.7										5.50E-04	1.56E+00			ND
B40008B400089		744565	2078308.7	7/20/89	Theis	265		unconfined	14.83	23.43	2.21	0.68	5.00E-05	1.42E-01	Qrf	pumping	yes
B40018B400189/1-89A		744565.2	2078308.6	1989	Bouwer/Rice	68.3	22.55-51.64	unconfined	29.09	22.55	1.7	NA	5.80E-05	1.64E-01	Qrf	Slug in	no
B400189				1989	Bouwer/Rice	64.2	22.55-51.64	unconfined	29.09	22.55	2.2	NA	7.00E-05	1.99E-01	Qrf	Slug out	no
B400189				1989	Bouwer/Rice	68.3	22.55-51.64	unconfined	29.09	22.55	1.7	NA	3.20E-06	9.07E-03	Qrf	Slug in	yes

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B400189				1989	Bouwer/Rice	64.2	22.55-51.64	unconfined	29.09	22.55	2.2	NA	4.00E-06	1.13E-02	Qrf	Slug out	yes
B400189				7/20/89	Theis	265	24.1-49.6	unconfined	27.53	24.1	21.01	0.68	1.56E-04	4.42E-01	Qrf	pumping	yes
B400189				7/20/89	Theis	1055	24.1-49.6	unconfined	27.53	24.1	21.01	0.68	2.00E-04	5.67E-01	Qrf	recovery	yes
B40028	B400289/2-89			1989	Bouwer/Rice	9.6	22.32-51.8	unconfined	29.08	16.12	4.1	NA	7.60E-04	2.13E+00	Qrf	Slug in	yes
B400289		744644.6	2079142.2	1989	Bouwer/Rice	7.6	22.32-51.8	unconfined	29.08	16.12	4	NA	7.60E-04	2.13E+00	Qrf	Slug out	yes
B40038	B400389/3-89	743760.4	2078394.9	1989	Bouwer/Rice	46.3	21.42-51.00	unconfined	29.08	21.42	2.2	NA	1.30E-04	3.80E-01	Qrf	Slug in	no
B400389		743760.4	2078394.9	1989	Bouwer/Rice	30	21.42-51.00	unconfined	29.08	21.42	2.7	NA	1.80E-04	5.18E-01	Qrf	Slug out	no
B400389				1989	Bouwer/Rice	46.3	21.42-51.00	unconfined	29.08	21.42	2.2	NA	2.90E-04	8.22E-01	Qrf	Slug in	yes
B400389				1989	Bouwer/Rice	30	21.42-51.00	unconfined	29.08	21.42	2.7	NA	3.90E-04	1.11E+00	Qrf	Slug out	yes
B40048	B400489/4-89	743820.6	2079205.3	1989	Bouwer/Rice	30	12.02-56.60	unconfined	45.73	10.42	2.8	NA	5.80E-03	1.67E+01	Qrf	Slug out	yes
B400489		743820.6	2079205.3	1989	Bouwer/Rice	30	12.02-56.60	unconfined	45.73	10.42	4.1	NA	7.00E-03	1.98E+01	Qrf	Slug in	yes
B400489		743820.6	2079205.3	7/28/89	Theis	360	12.92-54.5	unconfined	31.66	12.92	1.72	12.06	2.00E-02	3.69E+00	Qrf	pumping	yes
B400489		743820.6	2079205.3	7/28/89	Theis	5440	12.92-54.5	unconfined	31.66	12.92	1.72	12.06	3.00E-02	8.50E+01	Qrf	Recovery	yes
B400489					Theis								1.50E-02	4.25E+01	Qrf	Recovery	yes
B400489					Theis								2.00E-02	5.67E+01	Qrf	Recovery	yes
B40198	B401989/15-89	745848.8	2081634.7	1989	Bouwer/Rice	12	8.68-23.13	unconfined	17.97	4.66	1.9	NA	2.90E-04	8.51E-01	Qc	Slug in	yes
B401989		745848.8	2081634.7	1989	Bouwer/Rice	18	8.68-23.13	unconfined	17.97	4.66	1.8	NA	3.00E-04	8.50E-01	Qc	Slug out	yes
B40218	B402189/17-89BR	746339.1	2081476.4	1989	Bouwer/Rice	26	15.65-25.05	confined	13.49	11.56	2.9	NA	2.30E-04	6.52E-01	KaNo.1ss(w)	Slug in	yes
B402189		746339.1	2081476.4	1989	Bouwer/Rice	39.2	15.65-25.05	confined	13.49	11.56	2.9	NA	2.20E-04	6.24E-01	KaNo.1ss(w)	Slug out	yes
B402189		746339.1	2081476.4	1989	Cooper et al	41.7	15.65-25.05	confined	13.49	11.56	NA	NA	6.10E-04	1.73E+00	KaNo.1ss(w)	Slug in	yes
B402189		746339.1	2081476.4	1989	Cooper et al	66.7	15.65-25.05	confined	13.49	11.56	NA	NA	6.10E-04	1.73E+00	KaNo.1ss(w)	Slug out	yes
B402189		746339.1	2081476.4	8/8/89	Theis	480	15.65-25.05	confined	12	14.22	0.76	6.14	8.00E-03	1.47E+01	Ka	pumping	no
B402189		746339.1	2081476.4										1.20E-02	3.40E+01			ND
B402189		746339.1	2081476.4										7.30E-03	2.07E+01			ND
B40528	B405289			1994	Hvorslev	56000	41.92-49.72	unconfined	27.85	21.85	24.98	NA	2.13E-08	6.05E-05	KaKlclst(u)	slug	ND
B405289				1994	Bouwer/Rice	56000	41.92-49.72	unconfined	27.85	21.85	24.98	NA	2.08E-08	5.90E-05	KaKlclst(u)	slug	ND
B405289				1994	Ramey	56000	41.92-49.72	unconfined	27.85	21.85	24.98	NA	3.05E-08	8.64E-05	KaKlclst(u)	slug	ND
B405289				1994									3.05E-08	8.64E-05	KaKlclst(u)	slug	yes
B40568	B405689/47-89	743819.5	2079189.9		Bouwer/Rice	1100	6.95-24.55	unconfined	17.6	6.95	2.1	NA	2.20E-07	5.10E-03	Qrf	Slug in	yes
B405689		743819.5	2079189.9		Bouwer/Rice	1100	6.95-24.55	unconfined	17.6	6.95	1.1	NA	1.20E-07	3.40E-04	Qrf	Slug out	yes
B405689		743819.5	2079189.9	7/28/89	Theis	360	10.7-22.5	unconfined	13.85	10.7	0.05	12.06	1.80E-06	5.04E-03	Qrf	pumping	no
B40568	B405689			1994	Hvorslev	1400	13.26-25.80	unconfined	12.54	13.26	16.12	NA	6.61E-05	1.87E-01	Qrf	slug	ND
B405689				1994	Bouwer/Rice	1400	13.26-25.80	unconfined	12.54	13.26	16.12	NA	2.54E-05	7.20E-02	Qrf	slug	ND
B405689				1994									6.10E-06	1.73E-02	Qrf	slug	yes
B40578	B405789/48-89	743821.5	2079220.1	1989	Bouwer/Rice	1	44.91-54.38	unconfined	43.88	10.02	5	NA	3.00E-02	3.97E+01	Qrf	Slug in	yes
B405789		743821.5	2079220.1	1989	Bouwer/Rice	1.1	44.91-54.38	unconfined	43.88	10.02	2	NA	1.40E-02	3.97E+01	Qrf	Slug out	yes
B405789		743821.5	2079220.1	7/28/89	Theis	360	44.91-54.38	unconfined	41.9	12.48	1.07	12.06	2.00E-02	5.67E+00	Qrf	pumping	yes
B405789		743821.5	2079220.1	7/28/89	Theis	5080	44.91-54.38	unconfined	41.9	12.48	1.07	12.06	3.00E-02	8.50E+01	Qrf	recovery	yes
B40578	B405789			1994	Hvorslev	10	43.29-55.90	unconfined	41.86	14.04	17.6	NA	4.42E-05	1.25E-01	Qrf	rising head	ND
B405789				1994	Bouwer/Rice	10	43.29-55.90	unconfined	41.86	14.04	17.6	NA	4.37E-03	1.24E+01	Qrf	rising head	ND
B405789				1994	Ramey	10	43.29-55.90	unconfined	41.86	14.04	17.6	NA	2.64E-01	7.49E+02	Qrf	rising head	ND
B405789				1994	Hvorslev	10	43.29-55.90	unconfined	41.86	14.04	uncertain	NA	6.10E-03	1.73E+01	Qrf	falling head	ND
B405789				1994	Bouwer/Rice	10	43.29-55.90	unconfined	41.86	14.04	uncertain	NA	4.22E-03	1.20E+01	Qrf	falling head	ND
B405789				1994	Ramey	10	43.29-55.90	unconfined	41.86	14.04	uncertain	NA	2.54E-01	7.20E+02	Qrf	falling head	ND
B405789				1994									3.66E-02	1.04E+02	Qrf	slug	yes
B40588	B405889/49-89BR	746332.1	2081476.3	1989	Cooper et al	18.3	38.01-47.47	confined	12	12.35	NA	NA	2.40E-03	6.52E+00	KaNo.1ss(w)	Slug in	yes

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B405889		746332.1	2081476.3	1989	Cooper et al	18.3	38.01-47.47	confined	12	12.35	NA	NA	2.30E-03	6.52E+00	KaNo.1ss(w)	Slug out	yes
B405889		746332.1	2081476.3	8/8/89	Theis	2380	38.01-47.47	confined	11.5	14.57	14.55	6.14	2.00E-03	8.79E-01	KaNo.1ss(w)	recovery	yes
B405889		746332.1	2081476.3										9.50E-04	2.69E+00			ND
B405889		746332.1	2081476.3										1.10E-03	3.12E+00			ND
B405889					Theis								9.25E-03	2.62E+01	KaNo.1ss(w)	recovery	yes
B405889					Theis								7.81E-03	2.21E+01	KaNo.1ss(w)	recovery	yes
B405889					Theis								8.00E-03	2.27E+01	KaNo.1ss(w)	recovery	yes
B41128	B411289/SF07-89	748717.8	2076943	1989	Bouwer/Rice	86.7	59.74-70.29	unconfined	10.55	59.74	1.4	NA	1.60E-05	4.54E-02	Qrf	slug out	yes
B411289		748717.8	2076943	1989	Bouwer/Rice	100	59.74-70.29	unconfined	10.55	59.74	1.3	NA	1.90E-05	5.39E-02	Qrf	Slug in	yes
B41138	B411389/SF08-89	748728	2077712.6	1989	Bouwer/Rice	89.2	53.00-65.08	unconfined	12.08	53	1	NA	8.50E-05	2.35E-01	Qrf	Slug out	yes
B411389		748728	2077712.6	1989	Bouwer/Rice	78.8	53.00-65.08	unconfined	12.08	53	0.94	NA	7.00E-05	1.98E-01	Qrf	Slug in	yes
P11438	P114389			1994	Hvorslev	5700	11.07-17.97	unconfined	10.01	7.96	11.2	NA	2.19E-06	6.19E-03	Qrf	rising head	ND
P114389				1994	Bouwer/Rice	5700	11.07-17.97	unconfined	10.01	7.96	11.2	NA	1.47E-06	4.18E-03	Qrf	rising head	ND
P114389				1994	Hvorslev	3900	11.07-17.97	unconfined	10.01	7.96	4.9	NA	6.61E-06	1.87E-02	Qrf	falling head	ND
P114389				1994	Bouwer/Rice	3900	11.07-17.97	unconfined	10.01	7.96	4.9	NA	4.47E-06	1.27E-02	Qrf	falling head	ND
P114389				1994	Ramey	3900	11.07-17.97	unconfined	10.01	7.96	4.9	NA	1.37E-05	3.89E-02	Qrf	falling head	ND
P114389				1994		3900	11.07-17.97	unconfined	10.01	7.96	4.9	NA	1.37E-05	3.89E-02	Qrf	slug	yes
P11448	P114489			1994	Hvorslev	38	34.10-52.00	unconfined	39.61	12.39	15.75	NA	4.02E-05	1.14E-01	Qrf	rising head	ND
P114489				1994	Bouwer/Rice	38	34.10-52.00	unconfined	39.61	12.39	15.75	NA	3.66E-05	1.04E-01	Qrf	rising head	ND
P114489				1994	Ramey	38	34.10-52.00	unconfined	39.61	12.39	15.75	NA	1.93E-04	5.47E-01	Qrf	rising head	ND
P114489				1994	Hvorslev	1600	34.10-52.00	unconfined	39.61	12.39	9.3	NA	2.39E-05	6.77E-02	Qrf	falling head	ND
P114489				1994	Bouwer/Rice	1600	34.10-52.00	unconfined	39.61	12.39	9.3	NA	2.19E-05	6.19E-02	Qrf	falling head	ND
P114489				1994	Ramey	1600	34.10-52.00	unconfined	39.61	12.39	9.3	NA	4.93E-05	1.40E-01	Qrf	falling head	ND
P114489				1994									9.66E-05	2.74E-01	Qrf	slug	yes
P11468	P114689			1994	Hvorslev	24	18.31-25.61	unconfined	15.99	9.62	12.7	NA	2.69E-04	7.63E-01	Qrf	rising head	ND
P114689				1994	Bouwer/Rice	24	18.31-25.61	unconfined	15.99	9.62	12.7	NA	2.08E-04	5.90E-01	Qrf	rising head	ND
P114689				1994	Ramey	24	18.31-25.61	unconfined	15.99	9.62	12.7	NA	1.07E-03	3.02E+00	Qrf	rising head	ND
P114689				1994	Hvorslev	18	18.31-25.61	unconfined	15.99	9.62	6.7	NA	3.05E-04	8.64E-01	Qrf	falling head	ND
P114689				1994	Bouwer/Rice	18	18.31-25.61	unconfined	15.99	9.62	6.7	NA	2.74E-04	7.78E-01	Qrf	falling head	ND
P114689				1994	Ramey	18	18.31-25.61	unconfined	15.99	9.62	6.7	NA	1.47E-03	4.18E+00	Qrf	falling head	ND
P114689				1994									1.27E-03	3.60E+00	Qrf	slug	yes
P11478	P114789			1994	Hvorslev	10000	22.80-29.40	unconfined	20.32	9.08	12.3	NA	7.62E-05	2.16E-01	Qrf	rising head	ND
P114789				1994	Bouwer/Rice	10000	22.80-29.40	unconfined	20.32	9.08	12.3	NA	6.10E-05	1.73E-01	Qrf	rising head	ND
P114789				1994	Ramey	10000	22.80-29.40	unconfined	20.32	9.08	12.3	NA	2.85E-04	8.06E-01	Qrf	rising head	ND
P114789				1994	Hvorslev	4000	22.80-29.40	unconfined	20.32	9.08	6	NA	7.62E-05	2.16E-01	Qrf	falling head	ND
P114789				1994	Bouwer/Rice	4000	22.80-29.40	unconfined	20.32	9.08	6	NA	5.59E-05	1.58E-01	Qrf	falling head	ND
P114789				1994	Ramey	4000	22.80-29.40	unconfined	20.32	9.08	6	NA	2.54E-04	7.20E-01	Qrf	falling head	ND
P114789				1994									2.69E-04	7.63E-01	Qrf	slug	yes
P11488	P114889			1994	Hvorslev	4000	15.21-17.21	unconfined	2	15.21	16.16	NA	3.46E-06	9.79E-03	Qrf	bailer/recovery	ND
P114889				1994	Bouwer/Rice	4000	15.21-17.21	unconfined	2	15.21	16.16	NA	1.68E-06	4.75E-03	Qrf	bailer/recovery	ND
P114889				1994									3.46E-06	9.79E-03	Qrf	slug	yes
P11498	P114989			1994	Hvorslev	12880	34.64-41.84	unconfined	27.58	14.26	16.75	NA	9.15E-07	2.59E-03	Qrf	rising head	ND
P114989				1994	Bouwer/Rice	12880	34.64-41.84	unconfined	27.58	14.26	16.75	NA	7.62E-07	2.16E-03	Qrf	rising head	ND
P114989				1994	Ramey	12880	34.64-41.84	unconfined	27.58	14.26	16.75	NA	7.12E-07	2.02E-03	Qrf	rising head	ND
P114989				1994	Hvorslev	20080	34.64-41.84	unconfined	27.58	14.26	11.4	NA	2.29E-07	6.48E-04	Qrf	falling head	ND
P114989				1994	Bouwer/Rice	20080	34.64-41.84	unconfined	27.58	14.26	11.4	NA	1.93E-07	5.47E-04	Qrf	falling head	ND

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P114989				1994	Ramey	20080	34.64-41.84	unconfined	27.58	14.26	11.4	NA	2.80E-06	7.92E-03	Qrf	falling head	ND
P114989				1994									1.73E-06	4.90E-03	Qrf	slug	yes
P11508	P115089			1994	Hvorslev	12	26.51-44.01	unconfined	30.79	13.22	15.83	NA	9.15E-04	2.59E+00	Qrf	rising head	ND
P115089				1994	Bouwer/Rice	12	26.51-44.01	unconfined	30.79	13.22	15.83	NA	8.13E-04	2.30E+00	Qrf	rising head	ND
P115089				1994	Ramey	12	26.51-44.01	unconfined	30.79	13.22	15.83	NA	2.39E-03	6.77E+00	Qrf	rising head	ND
P115089				1994	Hvorslev	16	26.51-44.01	unconfined	30.79	13.22	10.7	NA	4.57E-04	1.30E+00	Qrf	falling head	ND
P115089				1994	Bouwer/Rice	16	26.51-44.01	unconfined	30.79	13.22	10.7	NA	5.59E-04	1.58E+00	Qrf	falling head	ND
P115089				1994	Ramey	16	26.51-44.01	unconfined	30.79	13.22	10.7	NA	6.61E-03	1.87E+01	Qrf	falling head	ND
P115089				1994									4.42E-03	1.25E+01	Qrf	slug	yes
P11548	P115489			1994	Hvorslev	140	22.40-29.45	unconfined	20.75	8.7	12	NA	1.07E-04	3.02E-01	Qrf	rising head	ND
P115489				1994	Bouwer/Rice	140	22.40-29.45	unconfined	20.75	8.7	12	NA	9.15E-05	2.59E-01	Qrf	rising head	ND
P115489				1994	Ramey	140	22.40-29.45	unconfined	20.75	8.7	12	NA	1.68E-04	4.75E-01	Qrf	rising head	ND
P115489				1994	Hvorslev	1000	22.40-29.45	unconfined	20.75	8.7	5.65	NA	1.07E-04	3.02E-01	Qrf	falling head	ND
P115489				1994	Bouwer/Rice	1000	22.40-29.45	unconfined	20.75	8.7	5.65	NA	7.62E-05	2.16E-01	Qrf	falling head	ND
P115489				1994	Ramey	1000	22.40-29.45	unconfined	20.75	8.7	5.65	NA	3.30E-04	9.36E-01	Qrf	falling head	ND
P115489				1994									2.49E-04	7.06E-01	Qrf	slug	yes
P11558	P115589			1994	Hvorslev	9600	25.72-32.57	unconfined	26.51	6.06	9.8	NA	3.00E-07	8.50E-04	Qrf	rising head	ND
P115589				1994	Bouwer/Rice	9600	25.72-32.57	unconfined	26.51	6.06	9.8	NA	3.10E-07	8.78E-04	Qrf	rising head	ND
P115589				1994	Ramey	9600	25.72-32.57	unconfined	26.51	6.06	9.8	NA	1.47E-06	4.18E-03	Qrf	rising head	ND
P115589				1994	Hvorslev	4300	25.72-32.57	unconfined	26.51	6.06	2.8	NA	6.10E-07	1.73E-03	Qrf	falling head	ND
P115589				1994	Bouwer/Rice	4300	25.72-32.57	unconfined	26.51	6.06	2.8	NA	5.08E-07	1.44E-03	Qrf	falling head	ND
P115589				1994	Ramey	4300	25.72-32.57	unconfined	26.51	6.06	2.8	NA	1.02E-06	2.88E-03	Qrf	falling head	ND
P115589				1994									1.02E-06	2.88E-03	Qrf	slug	yes
P11568	P115689			1994	Hvorslev	1200	16.71-23.12	unconfined	13.1	10.02	13.4	NA	5.59E-05	1.58E-01	Qrf	rising head	ND
P115689				1994	Bouwer/Rice	1200	16.71-23.12	unconfined	13.1	10.02	13.4	NA	4.22E-05	1.20E-01	Qrf	rising head	ND
P115689				1994	Ramey	1200	16.71-23.12	unconfined	13.1	10.02	13.4	NA	1.17E-04	3.31E-01	Qrf	rising head	ND
P115689				1994	Hvorslev	100	16.71-23.12	unconfined	13.1	10.02	6.8	NA	3.66E-05	1.04E-01	Qrf	falling head	ND
P115689				1994	Bouwer/Rice	100	16.71-23.12	unconfined	13.1	10.02	6.8	NA	4.57E-05	1.30E-01	Qrf	falling head	ND
P115689				1994	Ramey	100	16.71-23.12	unconfined	13.1	10.02	6.8	NA	8.64E-05	2.45E-01	Qrf	falling head	ND
P115689				1994									1.02E-04	2.88E-01	Qrf	slug	yes
P11938	P119389			1994	Hvorslev	8200	13.75-19.98	unconfined	6.23	13.75	15.9	NA	3.05E-07	8.64E-04	Qrf	slug	ND
P119389				1994	Bouwer/Rice	8200	13.75-19.98	unconfined	6.23	13.75	15.9	NA	2.13E-07	6.05E-04	Qrf	slug	ND
P119389				1994									3.05E-07	8.64E-04	Qrf	slug	yes
P20798	P207989			1994	Hvorslev	8400	19.01-23.80	unconfined	4.79	19.01	20.83	NA	4.17E-07	1.18E-03	KaKlclst(w)	slug	ND
P207989				1994	Bouwer/Rice	8400	19.01-23.80	unconfined	4.79	19.01	20.83	NA	2.34E-07	6.62E-04	KaKlclst(w)	slug	ND
P207989				1994									4.17E-07	1.18E-03	KaKlclst(w)	slug	yes
P21368	P213689			1994	Hvorslev	8200	11.77-16.54	unconfined	4.77	11.77	14.35	NA	4.07E-07	1.15E-03	Qrf	slug	ND
P213689				1994	Bouwer/Rice	8200	11.77-16.54	unconfined	4.77	11.77	14.35	NA	2.69E-07	7.63E-04	Qrf	slug	ND
P213689				1994									4.07E-07	1.15E-03	Qrf	slug	yes
P21578	P215789			1994	Hvorslev	10	15.30-21.35	unconfined	6.05	15.3	18.1	NA	7.62E-03	2.16E+01	Qrf	rising head	ND
P215789				1994	Bouwer/Rice	10	15.30-21.35	unconfined	6.05	15.3	18.1	NA	9.66E-03	2.74E+01	Qrf	rising head	ND
P215789				1994									0.00E+00	NONE	Qrf	slug	yes
P21808	P218089			1994	Hvorslev	8400	5.92-10.70	unconfined	4.78	5.92	7.64	NA	7.12E-08	2.02E-04	Qrf	slug	ND
P218089				1994	Bouwer/Rice	8400	5.92-10.70	unconfined	4.78	5.92	7.64	NA	3.35E-08	9.50E-05	Qrf	slug	ND
P218089				1994									7.12E-08	2.02E-04	Qrf	slug	yes
P31348	P313489			1994	Hvorslev	10000	16.88-24.25	unconfined	10.89	13.36	16.7	NA	3.41E-05	9.65E-02	Qrf	rising head	ND
P313489				1994	Bouwer/Rice	10000	16.88-24.25	unconfined	10.89	13.36	16.7	NA	2.49E-05	7.06E-02	Qrf	rising head	ND
P313489				1994	Ramey	10000	16.88-24.25	unconfined	10.89	13.36	16.7	NA	9.15E-05	2.59E-01	Qrf	rising head	ND
P313489				1994	Hvorslev	4000	16.88-24.25	unconfined	10.89	13.36	10.8	NA	6.61E-05	1.87E-01	Qrf	falling head	ND

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P313489				1994	Bouwer/Rice	4000	16.88-24.25	unconfined	10.89	13.36	10.8	NA	4.27E-05	1.21E-01	Qrf	falling head	ND
P313489				1994	Ramey	4000	16.88-24.25	unconfined	10.89	13.36	10.8	NA	2.13E-04	6.05E-01	Qrf	falling head	ND
P313489				1994									1.52E-04	4.32E-01	Qrf	slug	yes
P31358 P313589				1994	Hvorslev	1600	9.00-16.20	unconfined	7.99	8.21	11.34	NA	1.93E-06	5.47E-03	Qrf	rising head	ND
P313589				1994	Bouwer/Rice	1600	9.00-16.20	unconfined	7.99	8.21	11.34	NA	2.59E-06	7.34E-03	Qrf	rising head	ND
P313589				1994	Hvorslev	1200	9.00-16.20	unconfined	7.99	8.21	5.4	NA	4.47E-06	1.27E-02	Qrf	falling head	ND
P313589				1994	Bouwer/Rice	1200	9.00-16.20	unconfined	7.99	8.21	5.4	NA	2.44E-06	6.91E-03	Qrf	falling head	ND
P313589				1994									4.47E-06	1.27E-02	Qrf	slug	yes
P31408 P314089				1994	Hvorslev	1000	10.76-13.34	unconfined	2.58	10.76	11.47	NA	1.22E-06	3.46E-03	Qrf	slug	ND
P314089				1994	Bouwer/Rice	1000	10.76-13.34	unconfined	2.58	10.76	11.47	NA	4.37E-07	1.24E-03	Qrf	slug	ND
P314089				1994									1.22E-06	3.46E-03	Qrf	slug	yes
P31798 P317989				1994	Hvorslev	7000	6.35-10.50	unconfined	4.15	6.35	8.38	NA	1.78E-07	5.04E-04	Qrf	slug	ND
P317989				1994	Bouwer/Rice	7000	6.35-10.50	unconfined	4.15	6.35	8.38	NA	6.10E-08	1.73E-04	Qrf	slug	ND
P317989				1994									1.78E-07	5.04E-04	Qrf	slug	yes
P32008 P320089				1994	Hvorslev	12	14.97-22.05	unconfined	9.88	12.17	14.3	NA	2.13E-03	6.05E+00	Qrf	rising head	ND
P320089				1994	Bouwer/Rice	12	14.97-22.05	unconfined	9.88	12.17	14.3	NA	1.58E-03	4.46E+00	Qrf	rising head	ND
P320089				1994	Hvorslev	12	14.97-22.05	unconfined	9.88	12.17	10.3	NA	2.69E-03	7.63E+00	Qrf	falling head	ND
P320089				1994	Bouwer/Rice	12	14.97-22.05	unconfined	9.88	12.17	10.3	NA	2.03E-03	5.76E+00	Qrf	falling head	ND
P320089				1994									2.69E-03	7.63E+00	Qrf	slug	yes
P41418 P414189				1994	Hvorslev	42500	15.00-22.00	unconfined	14.09	7.91	11.25	NA	3.00E-08	8.50E-05	Qrf	rising head	ND
P414189				1994	Bouwer/Rice	42500	15.00-22.00	unconfined	14.09	7.91	11.25	NA	2.34E-08	6.62E-05	Qrf	rising head	ND
P414189				1994	Ramey	42500	15.00-22.00	unconfined	14.09	7.91	11.25	NA	6.10E-08	1.73E-04	Qrf	rising head	ND
P414189				1994	Hvorslev	25500	15.00-22.00	unconfined	14.09	7.91	4.76	NA	1.02E-07	2.88E-04	Qrf	falling head	ND
P414189				1994	Bouwer/Rice	25500	15.00-22.00	unconfined	14.09	7.91	4.76	NA	8.13E-08	2.30E-04	Qrf	falling head	ND
P414189				1994	Ramey	25500	15.00-22.00	unconfined	14.09	7.91	4.76	NA	1.93E-07	5.47E-04	Qrf	falling head	ND
P414189				1994									1.93E-07	5.47E-04	Qrf	slug	yes
P41588 P415889				1994	Hvorslev	10	39.75-47.00	unconfined	33.84	13.16	16.6	NA	9.15E-04	2.59E+00	Qrf	rising head	ND
P415889				1994	Bouwer/Rice	10	39.75-47.00	unconfined	33.84	13.16	16.6	NA	7.12E-04	2.02E+00	Qrf	rising head	ND
P415889				1994	Ramey	10	39.75-47.00	unconfined	33.84	13.16	16.6	NA	2.13E-03	6.05E+00	Qrf	rising head	ND
P415889				1994	Hvorslev	12	39.75-46.50	unconfined	33.84	13.16	11.4	NA	4.52E-04	1.28E+00	Qrf	falling head	ND
P415889				1994	Bouwer/Rice	12	39.75-46.50	unconfined	33.84	13.16	11.4	NA	4.02E-04	1.14E+00	Qrf	falling head	ND
P415889				1994	Ramey	12	39.75-46.50	unconfined	33.84	13.16	11.4	NA	1.27E-02	3.60E+01	Qrf	falling head	ND
P415889				1994									2.13E-03	6.05E+00	Qrf	slug	yes
P41598 P415989				1994	Hvorslev	18	23.11-29.81	unconfined	24.02	5.79	9.1	NA	6.61E-04	1.87E+00	Qrf	rising head	ND
P415989				1994	Bouwer/Rice	18	23.11-29.81	unconfined	24.02	5.79	9.1	NA	5.59E-04	1.58E+00	Qrf	rising head	ND
P415989				1994	Ramey	18	23.11-29.81	unconfined	24.02	5.79	9.1	NA	1.83E-03	5.18E+00	Qrf	rising head	ND
P415989				1994	Hvorslev	22	23.11-29.81	unconfined	24.02	5.79	2.6	NA	4.88E-04	1.38E+00	Qrf	falling head	ND
P415989				1994	Bouwer/Rice	22	23.11-29.81	unconfined	24.02	5.79	2.6	NA	4.32E-04	1.22E+00	Qrf	falling head	ND
P415989				1994	Ramey	22	23.11-29.81	unconfined	24.02	5.79	2.6	NA	2.85E-03	8.06E+00	Qrf	falling head	ND
P415989				1994									2.85E-03	8.06E+00	Qrf	slug	yes
P41608 P416089				1994	Hvorslev	280	30.50-38.65	unconfined	30.32	8.33	11.5	NA	6.61E-05	1.87E-01	Qrf	rising head	ND
P416089				1994	Bouwer/Rice	280	30.50-38.65	unconfined	30.32	8.33	11.5	NA	5.59E-05	1.58E-01	Qrf	rising head	ND
P416089				1994	Ramey	280	30.50-38.65	unconfined	30.32	8.33	11.5	NA	2.24E-04	6.34E-01	Qrf	rising head	ND
P416089				1994	Hvorslev	50	30.50-38.65	unconfined	30.32	8.33	4.9	NA	7.12E-05	2.02E-01	Qrf	falling head	ND
P416089				1994	Bouwer/Rice	50	30.50-38.65	unconfined	30.32	8.33	4.9	NA	5.59E-05	1.58E-01	Qrf	falling head	ND
P416089				1994	Ramey	50	30.50-38.65	unconfined	30.32	8.33	4.9	NA	2.54E-04	7.20E-01	Qrf	falling head	ND
P416089				1994									2.39E-04	6.77E-01	Qrf	slug	yes
P41618 P416189				1994	Hvorslev	14	25.29-32.19	unconfined	23.82	8.37	11.7	NA	9.15E-04	2.59E+00	Qrf	rising head	ND
P416189				1994	Bouwer/Rice	14	25.29-32.19	unconfined	23.82	8.37	11.7	NA	8.64E-04	2.45E+00	Qrf	rising head	ND

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P416189				1994	Ramey	14	25.29-32.19	unconfined	23.82	8.37	11.7	NA	7.62E-03	2.16E+01	Qrf	rising head	ND
P416189				1994	Hvorslev	12	25.29-32.19	unconfined	23.82	8.37	4.8	NA	6.10E-04	1.73E+00	Qrf	falling head	ND
P416189				1994	Bouwer/Rice	12	25.29-32.19	unconfined	23.82	8.37	4.8	NA	8.64E-04	2.45E+00	Qrf	falling head	ND
P416189				1994	Ramey	12	25.29-32.19	unconfined	23.82	8.37	4.8	NA	3.51E-03	9.94E+00	Qrf	falling head	ND
P416189				1994									5.59E-03	1.58E+01	Qrf	slug	yes
P41628	P416289			1994	Hvorslev	11440	19.69-26.72	unconfined	13.83	12.89	15.7	NA	1.37E-07	3.89E-04	Qrf	rising head	ND
P416289				1994	Bouwer/Rice	11440	19.69-26.72	unconfined	13.83	12.89	15.7	NA	1.02E-07	2.88E-04	Qrf	rising head	ND
P416289				1994	Hvorslev	6800	19.69-26.72	unconfined	13.83	12.89	9.7	NA	2.54E-07	7.20E-04	Qrf	falling head	ND
P416289				1994	Bouwer/Rice	6800	19.69-26.72	unconfined	13.83	12.89	9.7	NA	4.63E-07	1.31E-03	Qrf	falling head	ND
P416289				1994	Ramey	6800	19.69-26.72	unconfined	13.83	12.89	9.7	NA	7.62E-07	2.16E-03	Qrf	falling head	ND
P416289				1994									7.62E-07	2.16E-03	Qrf	slug	yes
P41638	P416389			1994	Hvorslev	26	26.43-33.14	unconfined	19.6	13.54	16.85	NA	2.13E-04	6.05E-01	Qrf	rising head	ND
P416389				1994	Bouwer/Rice	26	26.43-33.14	unconfined	19.6	13.54	16.85	NA	1.78E-04	5.04E-01	Qrf	rising head	ND
P416389				1994	Ramey	26	26.43-33.14	unconfined	19.6	13.54	16.85	NA	4.47E-04	1.27E+00	Qrf	rising head	ND
P416389				1994	Hvorslev	30	26.43-33.14	unconfined	19.6	13.54	10.35	NA	2.13E-04	6.05E-01	Qrf	falling head	ND
P416389				1994	Bouwer/Rice	30	26.43-33.14	unconfined	19.6	13.54	10.35	NA	1.73E-04	4.90E-01	Qrf	falling head	ND
P416389				1994	Ramey	30	26.43-33.14	unconfined	19.6	13.54	10.35	NA	4.88E-04	1.38E+00	Qrf	falling head	ND
P416389				1994									4.47E-04	1.27E+00	Qrf	slug	yes
P41648	P416489			1994	Hvorslev	2400	21.65-28.75	unconfined	11.52	17.23	20.45	NA	1.27E-06	3.60E-03	Qrf	rising head	ND
P416489				1994	Bouwer/Rice	2400	21.65-28.75	unconfined	11.52	17.23	20.45	NA	1.12E-06	3.17E-03	Qrf	rising head	ND
P416489				1994	Ramey	2400	21.65-28.75	unconfined	11.52	17.23	20.45	NA	6.10E-06	1.73E-02	Qrf	rising head	ND
P416489				1994	Hvorslev	5600	21.65-28.75	unconfined	11.52	17.23	14	NA	2.44E-06	6.91E-03	Qrf	falling head	ND
P416489				1994	Bouwer/Rice	5600	21.65-28.75	unconfined	11.52	17.23	14	NA	1.58E-06	4.46E-03	Qrf	falling head	ND
P416489				1994	Ramey	5600	21.65-28.75	unconfined	11.52	17.23	14	NA	4.93E-06	1.40E-02	Qrf	falling head	ND
P416489				1994									6.10E-06	1.73E-02	Qrf	slug	yes
P41658	P416589			1994	Hvorslev	64	27.66-34.21	unconfined	7.95	26.26	28.8	NA	1.42E-04	4.03E-01	Qrf	rising head	ND
P416589				1994	Bouwer/Rice	64	27.66-34.21	unconfined	7.95	26.26	28.8	NA	1.02E-04	2.88E-01	Qrf	rising head	ND
P416589				1994	Hvorslev	44	27.66-34.21	unconfined	7.95	26.26	23.78	NA	8.64E-05	2.45E-01	Qrf	falling head	ND
P416589				1994	Bouwer/Rice	44	27.66-34.21	unconfined	7.95	26.26	23.78	NA	6.10E-05	1.73E-01	Qrf	falling head	ND
P416589				1994									1.42E-04	4.03E-01	Qrf	slug	yes
P41668	P416689			1994	Hvorslev	15000	29.17-35.31	unconfined	6.14	29.17	31.55	NA	1.78E-06	5.04E-03	Fill	slug	ND
P416689				1994	Bouwer/Rice	15000	29.17-35.31	unconfined	6.14	29.17	31.55	NA	1.02E-06	2.88E-03	Fill	slug	ND
P416689				1994									1.78E-06	5.04E-03	Fill	slug	yes
P41678	P416789			1994	Hvorslev	2800	26.61-30.17	unconfined	3.56	26.61	27.72	NA	4.02E-04	1.14E+00	Qrf	slug	ND
P416789				1994	Bouwer/Rice	2800	26.61-30.17	unconfined	3.56	26.61	27.72	NA	2.13E-04	6.05E-01	Qrf	slug	ND
P416789				1994									4.02E-04	1.14E+00	Qrf	slug	yes
P41688	P416889			1994	Hvorslev	5600	17.51-22.91	unconfined	5.4	17.51	21	NA	2.13E-04	6.05E-01	Qrf	slug	ND
P416889				1994	Bouwer/Rice	5600	17.51-22.91	unconfined	5.4	17.51	21	NA	1.32E-05	3.74E-02	Qrf	slug	ND
P416889				1994									2.13E-05	6.05E-02	Qrf	slug	yes
P41698	P416989			1994	Hvorslev	4600	151.0-160.0	unconfined	118.77	41.23	45.05	NA	1.88E-06	5.33E-03	KaKlslt(u)	rising head	ND
P416989				1994	Bouwer/Rice	4600	151.0-160.0	unconfined	118.77	41.23	45.05	NA	1.58E-06	4.46E-03	KaKlslt(u)	rising head	ND
P416989				1994	Ramey	4600	151.0-160.0	unconfined	118.77	41.23	45.05	NA	2.49E-06	7.06E-03	KaKlslt(u)	rising head	ND
P416989				1994	Hvorslev	5800	151.0-160.0	unconfined	118.77	41.23	37.25	NA	1.52E-06	4.32E-03	KaKlslt(u)	falling head	ND
P416989				1994	Bouwer/Rice	5800	151.0-160.0	unconfined	118.77	41.23	37.25	NA	1.22E-06	3.46E-03	KaKlslt(u)	falling head	ND
P416989				1994	Ramey	5800	151.0-160.0	unconfined	118.77	41.23	37.25	NA	6.61E-06	1.87E-02	KaKlslt(u)	falling head	ND
P416989				1994									6.61E-06	1.87E-02	KaKlslt(u)	slug	yes
P41968	P419689			1994	Hvorslev	34	19.18-26.02	unconfined	6.84	19.18	21.99	NA	8.13E-04	2.30E+00	Qrf	slug	ND
P419689				1994	Bouwer/Rice	34	19.18-26.02	unconfined	6.84	19.18	21.99	NA	5.59E-04	1.58E+00	Qrf	slug	ND
P419689				1994									8.13E-04	2.30E+00	Qrf	slug	yes

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0590	05-90				1994	Hvorslev	20	16.63-34.47	unconfined	17.84	16.63	19.8	NA	9.15E-05	2.59E-01	Qrf	rising head	ND
0590					1994	Bouwer/Rice	20	16.63-34.47	unconfined	17.84	16.63	19.8	NA	6.10E-05	1.73E-01	Qrf	rising head	ND
0590					1994	Hvorslev	1600	16.63-34.47	unconfined	17.84	16.63	15.8	NA	8.13E-06	2.30E-02	Qrf	falling head	ND
0590					1994	Bouwer/Rice	1600	16.63-34.47	unconfined	17.84	16.63	15.8	NA	5.08E-06	1.44E-02	Qrf	falling head	ND
0590					1994									8.13E-06	2.30E-02	Qrf	slug	yes
0690	06-90				1994	Hvorslev	10	12.52-30.51	unconfined	17.99	12.52	14	NA	1.63E-03	4.61E+00	Qrf	rising head	ND
0690					1994	Bouwer/Rice	10	12.52-30.51	unconfined	17.99	12.52	14	NA	9.66E-04	2.74E+00	Qrf	rising head	ND
0690					1994	Hvorslev	2800	12.52-30.51	unconfined	17.99	12.52	12.2	NA	2.54E-06	7.20E-03	Qrf	falling head	ND
0690					1994	Bouwer/Rice	2800	12.52-30.51	unconfined	17.99	12.52	12.2	NA	1.42E-07	4.03E-04	Qrf	falling head	ND
0690					1994									2.54E-02	7.20E+01	Qrf	slug	yes
0790	07-90				1994	Hvorslev	10	30.30-56.19	unconfined	40.61	15.58	16.5	NA	7.62E-03	2.16E+01	Qrf	rising head	ND
0790					1994	Bouwer/Rice	10	30.30-56.19	unconfined	40.61	15.58	16.5	NA	6.10E-03	1.73E+01	Qrf	rising head	ND
0790					1994	Hvorslev	10	30.30-56.19	unconfined	40.61	15.58	15	NA	2.80E-03	7.92E+00	Qrf	falling head	ND
0790					1994	Bouwer/Rice	10	30.30-56.19	unconfined	40.61	15.58	15	NA	1.73E-03	4.90E+00	Qrf	falling head	ND
0790					1994									7.62E-03	2.16E+01	Qrf	slug	yes
0990	09-90				1994	Hvorslev	10	18.28-43.28	unconfined	36.22	7.06	8.9	NA	6.10E-04	1.73E+00	Qrf	rising head	ND
0990					1994	Bouwer/Rice	10	18.28-43.28	unconfined	36.22	7.06	8.9	NA	4.17E-04	1.18E+00	Qrf	rising head	ND
0990					1994	Hvorslev	10	18.28-43.28	unconfined	36.22	7.06	5.3	NA	5.59E-04	1.58E+00	Qrf	falling head	ND
0990					1994	Bouwer/Rice	10	18.28-43.28	unconfined	36.22	7.06	5.3	NA	3.56E-04	1.01E+00	Qrf	falling head	ND
0990					1994									1.58E-03	4.46E+00	Qrf	slug	yes
B30019	B300190	881 Hillside				USBR		18.82-25.08		6.26				<1.5E-06		Ka	packer	no
B30029	B300290	881 Hillside	748019.1	2085340.2		USBR		14.95-21.25		6.26				2.20E-03	6.24E+00	Ka	packer	no
B300290			748019.1	2085340.2		USBR		18.09-24.35		6.26				2.30E-03	6.52E+00	Ka	packer	no
B30059	B300590	881 Hillside				USBR		9.71-14.98		5.27				<2.8E-06		Ka	packer	no
B300590						USBR		14.76-20.03		5.27				<3.7E-06		Ka	packer	no
B300590						USBR		17.13-22.40		5.27				<4.5E-06		KaKlclst(w)	packer	yes
B30069	B300690	881 Hillside	747833.7	2084990.4		USBR		10.10-15.37		5.27				<3.3E-06		Ka	packer	no
B300690			747833.7	2084990.4		USBR		14.98-20.25		5.27				<3.7E-06		Wxbr	packer	yes
B300690			747833.7	2084990.4		USBR		20.10-25.37		5.27				8.40E-07	2.38E-03	Ka	packer	no
B30079	B300790	881 Hillside				USBR		10.12-13.00		2.88				<5E-06		Ka	packer	no
B300790						USBR		13.0-17.00		4				<8.4E-06		Ka	packer	no
B300790						USBR		17.00-23.00		6				<4.8E-06		Ka	packer	no
B30089	B300890	881 Hillside	747806.5	2084793.2		USBR		16.26-19.50		3.24				<5.9E-06		Ka	packer	no
B300890			747806.5	2084793.2		USBR		19.50-25.00		5.5				<3.4E-06		Ka	packer	no
B300890			747806.5	2084793.2		USBR		24.50-29.50		5				2.00E-05	5.67E-02	Wxbr	packer	yes
B30099	B300990	881 Hillside				USBR		14.30-19.30		5				<2.6E-06		Ka	packer	no
B300990						USBR		19.30-24.30		5				<1.3E-06		Ka	packer	no
B300990						USBR		24.30-29.30		5				<2E-06		Ka	packer	no
B30109	B301090	881 Hillside	747782.9	2084596		USBR		22.07-27.34		5.27				6.40E-05	1.81E-01	Ka	packer	no
B30119	B301190	881 Hillside				USBR		23.00-28.00		5				<6.6E-06		Ka	packer	no
B301190						USBR		28.00-33.00		5				<5.3E-06		Ka	packer	no
B301190						USBR		34.00-39.00		5				<3.5E-06		Ka	packer	no
B30129	B301290	881 Hillside	747761	2084400		USBR		9.50-14.50		5				<1.5E-06		Ka	packer	no
B301290			747761	2084400		USBR		14.50-19.50		5				<1E-06		Ka	packer	no
B301290			747761	2084400		USBR		19.50-24.50		5				1.10E-04	3.12E-01	Ka	packer	no
B30139	B301390	881 Hillside	747749	2084300		USBR		14.80-18.80		4				3.50E-06	9.92E-03	Wxbr	packer	yes
B301390			747749	2084300		USBR		18.80-23.80		5				1.70E-06	4.82E-03	KaKlclst(w)	packer	yes

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B301390		747749	2084300		USBR		24.80-28.80		4				3.50E-06	9.92E-03	Ka	packer	no
B301390		747749	2084300		USBR		28.80-33.80		5				<5E-07		KaKlclst(w)	packer	yes
B30149B301490	881 Hillside				USBR		18.00-23.27		5.27				<4.9E-06		Ka	packer	no
B301490					USBR		22.70-27.97		5.27				<6E-06		Ka	packer	no
B301490					USBR		27.50-32.77		5.27				<2.3E-06		Ka	packer	no
B30159B301590	881 Hillside	747725	2084100		USBR		16.50-20.30		3.8				8.50E-04	2.41E+00	Wxbr	packer	yes
B301590		747725	2084100		USBR		20.30-25.30		5				4.20E-05		KaKlclst(w)	packer	yes
B301590		747725	2084100		USBR		25.30-30.30		5				2.30E-06		KaKlclst(w)	packer	yes
B301590		747725	2084100		USBR		26.30-30.30		4				8.00E-06	2.27E-02	KaKlclst(w)	packer	yes
B30169B301690	881 Hillside	747716	2084010		USBR		22.80-27.60		4.8				<6.6E-07		KaKlclst(w)	packer	yes
B301690		747716	2084010		USBR		24.75-32.90		8.15				<4.3E-07		KaKlclst(w)	packer	yes
B301690		747716	2084010		USBR		32.90-37.80		4.9				4.40E-07	1.25E-03	KaKlclst(w)	packer	yes
B30179B301790	881 Hillside				USBR		22.76-24.60		1.84				<1.3E-06		KaKlclst(w)	packer	yes
B301790					USBR		24.60-29.60		5				<5.8E-07		KaKlclst(w)	packer	yes
B301790					USBR		29.60-34.60		5				<4.8E-07		KaKlclst(w)	packer	yes
B301790					USBR		34.60-39.60		5				<4.1E-07		KaKlclst(w)	packer	yes
B30189B301890	881 Hillside	747715	2083810		USBR		23.50-26.90		3.4				<8.3E-07		KaKlclst(w)	packer	yes
B301890		747715	2083810		USBR		26.90-31.90		5				3.90E-06	1.11E-02	KaKlclst(w)	packer	yes
B301890		747715	2083810		USBR		31.90-36.90		5				<4.5E-07		KaKlclst(w)	packer	yes
B301890		747715	2083810		USBR		37.90-41.90		4				<4.5E-07		KaKlclst(w)	packer	yes
B30199B301990	881 Hillside				USBR		22.60-26.60		4				<7.4E-07		Ka	packer	no
B301990					USBR		26.60-31.60		5				<5.4E-07		Ka	packer	no
B301990					USBR		31.60-36.60		5				<5.6E-07		Ka	packer	no
B301990					USBR		38.60-41.60		3				<5.3E-07		Ka	packer	no
B30209B302090	881 Hillside				USBR		29.00-32.00		3				<7.2E-07		Ka	packer	no
B302090					USBR		32.00-37.00		5				<5.5E-07		Ka	packer	no
B302090					USBR		33.00-37.00		4				<5.2E-07		Ka	packer	no
B302090					USBR		38.00-42.00		4				<4.5E-07		Ka	packer	no
B30219B302190	881 Hillside				USBR		32.00-35.20		3.2				<6.2E-07		Ka	packer	no
B302190					USBR		35.20-40.00		4.8				<4.2E-07		Ka	packer	no
B302190					USBR		40.00-45.00		5				<3.6E-07		Ka	packer	no
B30229B302290	881 Hillside				USBR		23.00-27.00		4				<7.4E-07		Ka	packer	no
B302290					USBR		27.00-32.00		5				<5.4E-07		Ka	packer	no
B302290					USBR		32.00-37.00		5				<4.5E-07		Ka	packer	no
B30379B303790	881 Hillside				USBR		17.00-22.00		5				<8.2E-07		Ka	packer	no
B303790					USBR		22.00-27.00		5				<6.6E-07		Ka	packer	no
B303790					USBR		27.00-32.00		5				<5.4E-07		Ka	packer	no
B30389B303890	881 Hillside				USBR		14.00-18.00		4				<1.2E-06		Ka	packer	no
B303890					USBR		20.00-23.00		3				<1E-06		Ka	packer	no
B303890					USBR		23.00-28.00		5				<6.2E-07		Ka	packer	no
00491	4-91			1994	Hvorslev	3000	15.15-19.00	unconfined	3.85	15.15	17.6	NA	1.63E-06	4.61E-03	Qc	rising head	ND
00491				1994	Bouwer/Rice	3000	15.15-19.00	unconfined	3.85	15.15	17.6	NA	1.32E-06	3.74E-03	Qc	rising head	ND
00491				1994	Hvorslev	2400	15.15-19.00	unconfined	3.85	15.15	14.6	NA	3.96E-06	1.12E-02	Qc	falling head	ND
00491				1994	Bouwer/Rice	2400	15.15-19.00	unconfined	3.85	15.15	14.6	NA	3.35E-06	9.50E-03	Qc	falling head	ND
00491				1994									3.96E-06	1.12E-02	Qc	slug	yes
01991	19-91			1994	Hvorslev	92	28.21-40.71	confined	9.9	19.35	22.3	NA	1.02E-04	2.88E-01	KaKlclst(w)	rising head	ND
01991				1994	Ramey	92	28.21-40.71	confined	9.9	19.35	22.3	NA	5.59E-04	1.58E+00	KaKlclst(w)	rising head	ND

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01991						1994	Hvorslev	38	28.21-40.71	confined	9.9	19.35	16.3	NA	9.66E-05	2.74E-01	KaKlclst(w)	falling head	ND
01991						1994	Ramey	38	28.21-40.71	confined	9.9	19.35	16.3	NA	5.59E-04	1.58E+00	KaKlclst(w)	falling head	ND
01991						1994									5.59E-04	1.58E+00	KaKlclst(w)	slug	yes
03391	33-91					1994	Hvorslev	8300	28.62-41.62	unconfined	16.15	25.47	23.1	NA	2.24E-05	6.34E-02	KaNo.1ss(w)	falling head	ND
03391						1994	Bouwer/Rice	8300	28.62-41.62	unconfined	16.15	25.47	23.1	NA	2.69E-05	7.63E-02	KaNo.1ss(w)	falling head	ND
03391						1994	Ramey	8300	28.62-41.62	unconfined	16.15	25.47	23.1	NA	2.24E-04	6.34E-01	KaNo.1ss(w)	falling head	ND
03391						1994									2.24E-04	6.34E-01	KaNo.1ss(w)	slug	yes
11491						1992	Cooper/Jacob								1.81E-03	5.14E+00	Qrf	pump	yes
11491						1992	Theis Analysis								1.61E-03	4.54E+00	Qrf	pump	yes
11791	117-91					1994	Hvorslev	8500	9.53-15.43	confined	6.8	7.88	5.1	NA	1.27E-06	3.60E-03	KaKlclst(w)	falling head	ND
11791						1994	Ramey	8500	9.53-15.43	confined	6.8	7.88	5.1	NA	9.15E-06	2.59E-02	KaKlclst(w)	falling head	ND
11791						1994									9.15E-06	2.59E-02	KaKlclst(w)	slug	yes
11891	118-91					1994	Hvorslev	84	25.06-29.96	confined	4.9	25.06	26.52	NA	4.63E-04	1.31E+00	KaNo.1ss(w)	rising head	ND
11891						1994	Bouwer/Rice	84	25.06-29.96	confined	4.9	25.06	26.52	NA	3.86E-04	1.09E+00	KaNo.1ss(w)	rising head	ND
11891						1994	Hvorslev	82	25.06-29.96	confined	4.9	25.06	24.68	NA	1.63E-04	4.61E-01	KaNo.1ss(w)	falling head	ND
11891						1994	Bouwer/Rice	82	25.06-29.96	confined	4.9	25.06	24.68	NA	1.52E-04	4.32E-01	KaNo.1ss(w)	falling head	ND
11891						1994									4.63E-04	1.31E+00	KaNo.1ss(w)	slug	yes
13491	134-91					1994	Hvorslev	920	18.94-31.02	unconfined	12.08	18.94	21.3	NA	1.58E-03	4.46E+00	Qrf	rising head	ND
13491						1994	Bouwer/Rice	920	18.94-31.02	unconfined	12.08	18.94	21.3	NA	1.27E-03	3.60E+00	Qrf	rising head	ND
13491						1994	Hvorslev	26	18.94-31.02	unconfined	12.08	18.94	16.8	NA	2.13E-03	6.05E+00	Qrf	falling head	ND
13491						1994	Bouwer/Rice	26	18.94-31.02	unconfined	12.08	18.94	16.8	NA	1.52E-03	4.32E+00	Qrf	falling head	ND
13491						1994									1.88E-03	5.33E+00	Qrf	slug	yes
20291	202-91					1994	Hvorslev	18	29.04-34.68	unconfined	5.64	29.04	30.9	NA	1.42E-03	4.03E+00	Qrf	rising head	ND
20291						1994	Bouwer/Rice	18	29.04-34.68	unconfined	5.64	29.04	30.9	NA	9.66E-04	2.74E+00	Qrf	rising head	ND
20291						1994	Hvorslev	18	29.04-34.68	unconfined	5.64	29.04	28.3	NA	1.17E-03	3.31E+00	Qrf	falling head	ND
20291						1994	Bouwer/Rice	18	29.04-34.68	unconfined	5.64	29.04	28.3	NA	9.66E-04	2.74E+00	Qrf	falling head	ND
20291						1994									1.32E-03	3.74E+00	Qrf	slug	yes
20291						1992	Cooper/Jacob								8.79E-04	2.49E+00	Qrf	pump	yes
20291						1992	Theis Analysis								8.13E-04	2.31E+00	Qrf	pump	yes
20491	204-91					1994	Hvorslev	10	29.16-33.61	unconfined	4.45	29.16	30.6	NA	2.74E-03	7.78E+00	Qrf	rising head	ND
20491						1994	Bouwer/Rice	10	29.16-33.61	unconfined	4.45	29.16	30.6	NA	4.83E-03	1.37E+01	Qrf	rising head	ND
20491						1994	Hvorslev	16	29.16-33.61	unconfined	4.45	29.16	28.6	NA	2.74E-03	7.78E+00	Qrf	falling head	ND
20491						1994	Bouwer/Rice	16	29.16-33.61	unconfined	4.45	29.16	28.6	NA	1.02E-03	2.88E+00	Qrf	falling head	ND
20491						1992	Cooper/Jacob								3.58E-03	1.02E+01	Qrf	pump	yes
20491						1992	Theis Analysis								3.10E-03	8.79E+00	Qrf	Pump	yes
20491						1994									2.90E-03	8.21E+00	Qrf	slug	yes
20591	205-91					1994	Hvorslev	1200	16.81-26.21	unconfined	9.4	16.81	19.5	NA	1.63E-04	4.61E-01	Qrf	rising head	ND
20591						1994	Bouwer/Rice	1200	16.81-26.21	unconfined	9.4	16.81	19.5	NA	1.17E-04	3.31E-01	Qrf	rising head	ND
20591						1994	Hvorslev	20	16.81-26.21	unconfined	9.4	16.81	14.7	NA	4.17E-04	1.18E+00	Qrf	falling head	ND
20591						1994	Bouwer/Rice	20	16.81-26.21	unconfined	9.4	16.81	14.7	NA	2.69E-04	7.63E-01	Qrf	falling head	ND
20591						1994									2.90E-04	8.21E-01	Qrf	slug	yes
20591						1992	Cooper/Jacob								1.61E-04	4.55E-01	Qrf	pump	yes
20591						1992	Theis Analysis								1.42E-04	4.03E-01	Qrf	pump	yes
20591						1992	Theis Recovery								8.61E-04	2.44E+00	Qrf	pump	yes
20691	206-91					1994	Hvorslev	1200	21.30-27.00	unconfined	5.7	21.3	25	NA	2.13E-04	6.05E-01	Qrf	rising head	ND
20691						1994	Bouwer/Rice	1200	21.30-27.00	unconfined	5.7	21.3	25	NA	2.59E-04	7.34E-01	Qrf	rising head	ND
20691						1994									3.86E-04	1.09E+00	Qrf	slug	yes
20691						1992	Cooper/Jacob								1.30E-04	3.70E-01	Qrf	pump	yes
20691						1992	Theis Analysis								1.21E-04	3.43E-01	Qrf	pump	yes

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20691					1992	Theis Recovery									4.44E-04	1.26E-01	Qrf	pump	yes
20791	207-91				1994	Hvorslev	30160	30.7-36.5	confined	10	18.82	21.54	NA	3.00E-05	8.50E-02	KaKlclst(u)	rising head	ND
20791					1994	Ramey	30160	30.7-36.5	confined	10	18.82	21.54	NA	7.12E-04	2.02E+00	KaKlclst(u)	rising head	ND
20791					1994	Hvorslev	41680	30.7-36.5	confined	10	18.82	15.6	NA	2.59E-08	7.34E-05	KaKlclst(u)	falling head	ND
20791					1994	Ramey	41680	30.7-36.5	confined	10	18.82	15.6	NA	1.58E-08	4.46E-05	KaKlclst(u)	falling head	ND
20791					1994									2.59E-08	7.34E-05	KaKlclst(u)	slug	yes
20891	208-91				1994	Hvorslev	12	35.43-68.62	unconfined	33.19	35.43	36.18	NA	1.93E-05	5.47E-02	KaNo.1ss(w)	slug	ND
20891					1994	Bouwer/Rice	12	35.43-68.62	unconfined	33.19	35.43	36.18	NA	5.59E-05	1.58E-01	KaNo.1ss(w)	slug	ND
20891					1994									5.59E-05	1.58E-01	KaNo.1ss(w)	slug	yes
20891					1992	Cooper/Jacob								3.56E-03	1.01E+01	KaNo.1ss(w)	pump	yes
20891					1992	Theis Analysis								4.17E-04	1.18E+00	KaNo.1ss(w)	pump	yes
20991	209-91				1994	Hvorslev	12	35.60-65.00	unconfined	29.4	35.6	38	NA	8.13E-04	2.30E+00	KaNo.1ss(w)	rising head	ND
20991					1994	Bouwer/Rice	12	35.60-65.00	unconfined	29.4	35.6	38	NA	6.10E-04	1.73E+00	KaNo.1ss(w)	rising head	ND
20991					1994	Hvorslev	16	35.60-65.00	unconfined	29.4	35.6	34.5	NA	1.63E-04	4.61E-01	KaNo.1ss(w)	falling head	ND
20991					1994	Bouwer/Rice	16	35.60-65.00	unconfined	29.4	35.6	34.5	NA	1.42E-04	4.03E-01	KaNo.1ss(w)	falling head	ND
20991					1994									8.13E-04	2.30E+00	KaNo.1ss(w)	slug	yes
20991					1992	Theis Recovery								3.68E-04	1.04E+00	KaNo.1ss(w)	pump	yes
20991					1992	Theis Analysis								3.68E-04	1.16E+00	KaNo.1ss(w)	pump	yes
20991					1992	Cooper/Jacobs								4.33E-03	1.23E+01	KaNo.1ss(w)	pump	yes
21091					1992	Theis Recovery								4.13E-04	1.17E+00	KaNo.1ss(w)	pump	yes
21091					1992	Theis Analysis								4.13E-04	1.29E+00	KaNo.1ss(w)	Pump	yes
21091					1992	Cooper/Jacobs								4.08E-03	1.16E+01	KaNo.1ss(w)	pump	yes
31891	318-91							16.80-18.40						2.00E-04	5.67E-01		slug injection	ND
31891														2.00E-04	5.67E-01		slug withdrawal	ND
34791	347-91							6.20-7.70						1.00E-05	2.84E-02		slug injection	ND
34791														6.00E-06	1.70E-02		slug withdrawal	ND
35691	356-91							15.80-26.40						1.00E-06	2.83E-03		slug injection	ND
35691														9.00E-07	2.55E-03		slug withdrawal	ND
36191	361-91							9.70-14.40						1.00E-06	2.83E-03		bailer/recovery	ND
37191	371-91				12/7/91	Bouwer/Rice	26	11.30-20.90	unconfined	13.74	9.88			1.00E-04	2.83E-01	Qc	slug injection	ND
37191					12/7/91	Bouwer/Rice	64	11.30-20.90	unconfined	13.74	9.88	1.92		4.00E-05	1.13E-01	Qc	slug withdrawal	ND
37391	373-91							2.55-2.80						8.10E-09	2.30E-05			ND
37391								2.20-2.55										ND
37391								11.00-11.75										ND
37391								11.75-12.00						2.50E-09	7.09E-06			ND
37491	374-91							2.70-3.00						1.70E-08	4.82E-05			ND
37491								3.00-3.25										ND
37591	375-91							3.00-3.25										ND
37591								3.25-3.50						5.90E-06	1.67E-02			ND
37591								6.95-7.45										ND
37591								7.45-7.70						1.30E-05	3.68E-02			ND
37591					12/21/91	Bouwer/Rice	2650	7.80-12.40	unconfined	1.21	13.29	1.43		7.00E-06	1.98E-02	Qrf	bailer/recovery	ND
37691	376-91							13.50-13.80						3.70E-08	1.05E-04			ND
37691								13.80-14.00										ND
37891	378-91							0.08-1.10								Qc		ND
37891								1.10-1.35						1.80E-07	5.10E-04	Qc		ND
37891								7.50-7.75						3.80E-08	1.08E-04	KaKlclst(w)		ND
37891								10.20-10.45						4.70E-08	1.33E-04	KaKlclst(w)		ND
37891								46.15-46.40						5.00E-08	1.42E-04	KaKlclst(w)		ND

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37891					12/18/91	Bouwer/Rice	2680	43.40-53.00	unconfined	13.3	43.7			5.00E-07	1.42E-03	aKlclst(w)/sl	slug injection	ND
37891					12/21/91	Bouwer/Rice	1490	43.40-53.00	unconfined	13.3	43.7	1.25		1.00E-06	2.83E-03	aKlclst(w)/sl	slug withdrawal	ND
37991	379-91							3.00-3.50						1.30E-08	3.68E-05	Qc		ND
37991								3.50-3.75						1.30E-08	3.60E-05	Qc		ND
37991								11.40-11.65						5.50E-09	1.56E-05	KaKlclst(w)		ND
37991								46.70-48.00						7.80E-05	2.21E-01	KaKlclst(w)		ND
37991					12/18/91	Bouwer/Rice	1370	45.40-55.00	unconfined	8.5	50.89	5.5		7.00E-06	1.98E-02	aKlclst(w)/sl	bailer/recovery	ND
38191	381-91					Bouwer/Rice		10.10-14.90						2.00E-06	5.67E-03	Qc	slug withdrawal	ND
38191						Bouwer/Rice		10.10-14.90						4.00E-04	1.13E+00	Qc	slug injection	ND
38591	385-91							4.80-5.05						1.70E-05	4.82E-02			ND
38591								5.05-5.30						5.10E-08	1.45E-04			ND
38591								5.90-7.50						4.20E-09	1.19E-05		bailer/recovery	ND
38991	389-91							1.50-1.75						1.00E-06	2.83E-03	Qc		ND
38991								1.75-2.00						1.70E-05	4.82E-02	Qc		ND
38991								11.50-11.75								Qc		ND
38991								11.75-12.00						5.10E-08	1.45E-04	Qc		ND
38991								21.15-21.40						4.20E-09	1.19E-05	KaKlclst(w)		ND
38991								27.00-36.60						1.00E-06	2.83E-03	aKlclst(w)/sl	bailer/recovery	ND
39091	390-91							0.50-0.90										ND
39091								0.90-1.15						1.20E-03	3.40E+00			ND
39191	391-91							3.0-3.25								Qc		ND
39191								3.25-3.50						2.10E-08	5.95E-05	Qc		ND
39191								11.75-12.00						9.50E-08	2.69E-04	KaKlclst(w)		ND
39191								17.60-26.80						1.70E-06	4.82E-03	KaKlclst(w)	packer	ND
39191								21.15-21.40						4.20E-09	1.19E-05	KaKlclst(w)		ND
39191						Bouwer/Rice		33.00-42.60						2.00E-05	5.67E-02	aKlclst(w)/sl	bailer/recovery	ND
39191								42.25-42.50						1.60E-06	4.54E-03	KaKlclst(w)		ND
39291	392-91					Bouwer/Rice		34.20-43.80						3.00E-05	8.50E-02	aKlclst(w)/sl	slug injection	ND
39291						Bouwer/Rice		34.20-43.80						3.00E-05	8.50E-02	aKlclst(w)/sl	slug withdrawal	ND
39691	396-91							5.00-5.25										ND
39691								5.25-5.50						7.60E-07	2.15E-03			ND
41191	411-91				1/14/91	USDI	195.72	125.00-130.	confined	5.2	64	NA	0.000226	2.10E-07	5.95E-04	KaKlclst(u)	packer	ND
41391	413-91				2/4/92	Jacob and Lohm	265	145.00-150.	confined	5.2	1.5	NA	0.013	3.80E-06	1.08E-02	KaKlclst(u)	packer	ND
41391					2/4/92	USDI	265	145.00-150.	confined	5.2	1.5	NA	0.013	4.50E-06	1.28E-02	KaKlclst(u)	packer	ND
41791	417-91				2/4/92	NA	NA	53.00-58.20	unconfined	NA	45.94	NA	NA	NA		KaKlclst(u)	NA	ND
41791					2/4/92	NA	NA	59.05-64.25	unconfined	NA	45.94	NA	NA	NA		KaKlclst(u)	NA	ND
5691					1992	Cooper/Jacob								1.78E-03	5.04E+00		pump	yes
5691					1992	Theis analysis								1.83E-03	5.04E+00		pump	yes
41292	412-92				7/8/92	USDI	138.18	109.00-112.	confined	3.5	18.3	NA	0.00214	1.20E-07	3.40E-04	KaKlclst(u)	packer	ND
41292					7/8/92	Jacob	138.18	112.50-114.	confined	1.75	18.3	NA	0.00214	1.50E-07	4.25E-04	KaKlclst(u)	packer	ND
41292					7/7/92	USDI	246	131.00-136.	confined	5.25	18.3	NA	0.00014	2.40E-08	6.80E-05	KaKlclst(u)	constant head/pack	ND
41892	418-92				4/3/92	USDI	218	70.00-75.75	confined	5.75	48.6	NA	0.000263	4.10E-08	1.16E-04	KaKlclst(u)	packer	ND
41992	419-92				3/24/92	USDI	229	58.00-69.13	confined	11.13	25.8	NA	0.0034	3.20E-07	9.07E-04	KaKlclst(u)	constant head	ND
41992					3/24/92	Bouwer/Rice	229	58.00-69.13	confined	11.13	25.8	NA	0.0034	2.00E-07	5.67E-04	KaKlclst(u)	falling head	ND
41992					4/25/92	Jacob	230.33	78.00-85.83	confined	7.83	25.8	NA	0.00614	1.40E-07	3.97E-04	KaKlclst(u)	packer	ND
41992					4/25/92	USDI	230.33	85.83-89.13	confined	3.3	25.8	NA	0.00614	4.70E-07	1.33E-03	KaKlclst(u)	packer	ND
42092	420-92				2/25/92	USDI	247	70.00-75.50			49.1	NA	0.000211	2.40E-08	6.80E-05		packer	ND

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46392	463-92				1994	Hvorslev	1600	65.40-84.20	confined	26.4	31.84	35.5	NA	1.78E-06	5.04E-03	KaKlclst(w)	rising head	ND
46392					1994	Hvorslev	3800	65.40-84.20	confined	26.4	31.84	28.8	NA	2.39E-06	6.77E-03	KaKlclst(w)	falling head	ND
46392					1994	Ramey	3800	65.40-84.20	confined	26.4	31.84	28.8	NA	1.17E-06	3.31E-03	KaKlclst(w)	falling head	ND
46392					1994										5.90E-03	KaKlclst(w)	slug	yes
46492	464-92				1994	Hvorslev	4200	27.11-51.11	unconfined	26.96	24.15	26.4	NA	1.52E-07	4.32E-04	Qrf	rising head	ND
46492					1994	Bouwer/Rice	4200	27.11-51.11	unconfined	26.96	24.15	26.4	NA	8.64E-08	2.45E-04	Qrf	rising head	ND
46492					1994	Hvorslev	1000	27.11-51.11	unconfined	26.96	24.15	21.6	NA	8.13E-07	2.30E-03	Qrf	falling head	ND
46492					1994	Bouwer/Rice	1000	27.11-51.11	unconfined	26.96	24.15	21.6	NA	5.59E-07	1.58E-03	Qrf	falling head	ND
46492					1994										1.34E-03	Qrf	slug	yes
46692	466-92				1994	Hvorslev	14320	72.05-91.35	unconfined	46.67	44.68	47.75	NA	1.37E-07	3.89E-04	KaKlss(u)	rising head	ND
46692					1994	Bouwer/Rice	14320	72.05-91.35	unconfined	46.67	44.68	47.75	NA	1.17E-07	3.31E-04	KaKlss(u)	rising head	ND
46692					1994	Ramey	14320	72.05-91.35	unconfined	46.67	44.68	47.75	NA	7.62E-08	2.16E-04	KaKlss(u)	rising head	ND
46692					1994										3.89E-04	KaKlss(u)	slug	yes
46792	467-92				1994	Hvorslev	21520	96.84-116.7	unconfined	57.58	59.16	65.2	NA	3.56E-08	1.01E-04	KaKlslt(u)	slug	ND
46792					1994	Bouwer/Rice	21520	96.84-116.7	unconfined	57.58	59.16	65.2	NA	2.74E-08	7.78E-05	KaKlslt(u)	slug	ND
46792					1994	Ramey	21520	96.84-116.7	unconfined	57.58	59.16	65.2	NA	1.68E-08	4.75E-05	KaKlslt(u)	slug	ND
46792					1994										1.01E-04	KaKlslt(u)	slug	yes
46892	468-92				1994	Hvorslev	1200	149.41-166.	unconfined	17.15	144.41	152.35	NA	1.22E-06	3.46E-03	KaKlss(u)	slug	ND
46892					1994	Bouwer/Rice	1200	149.41-166.	unconfined	17.15	144.41	152.35	NA	7.62E-07	2.16E-03	KaKlss(u)	slug	ND
46892					1994										3.46E-03	KaKlss(u)	slug	yes
00293	2-93				1994	Hvorslev	18	38.05-52.35	unconfined	27.15	25.2	28.5	NA	7.12E-04	2.02E+00	Qvf	rising head	ND
00293					1994	Bouwer/Rice	18	38.05-52.35	unconfined	27.15	25.2	28.5	NA	5.59E-04	1.58E+00	Qvf	rising head	ND
00293					1994	Ramey	18	38.05-52.35	unconfined	27.15	25.2	28.5	NA	1.32E-03	3.74E+00	Qvf	rising head	ND
00293					1994	Hvorslev	24	38.05-52.35	unconfined	27.15	25.2	22.9	NA	8.13E-04	2.30E+00	Qvf	falling head	ND
00293					1994	Bouwer/Rice	24	38.05-52.35	unconfined	27.15	25.2	22.9	NA	4.12E-04	1.17E+00	Qvf	falling head	ND
00293					1994	Ramey	24	38.05-52.35	unconfined	27.15	25.2	22.9	NA	2.85E-03	8.06E+00	Qvf	falling head	ND
00293					1994									2.08E-03	5.90E+00	Qvf	slug	yes
23193	231-93				1994	Hvorslev	38	68.90-79.40	unconfined	43.97	35.43	39	NA	9.66E-07	2.74E-03	KaKlss(u)	rising head	ND
23193					1994	Bouwer/Rice	38	68.90-79.40	unconfined	43.97	35.43	39	NA	7.12E-07	2.02E-03	KaKlss(u)	rising head	ND
23193					1994	Ramey	38	68.90-79.40	unconfined	43.97	35.43	39	NA	1.17E-06	3.31E-03	KaKlss(u)	rising head	ND
23193					1994	Hvorslev	38	68.90-79.40	unconfined	43.97	35.43	31.5	NA	6.10E-07	1.73E-03	KaKlss(u)	falling head	ND
23193					1994	Bouwer/Rice	38	68.90-79.40	unconfined	43.97	35.43	31.5	NA	1.47E-06	4.18E-03	KaKlss(u)	falling head	ND
23193					1994	Ramey	38	68.90-79.40	unconfined	43.97	35.43	31.5	NA	1.52E-06	4.32E-03	KaKlss(u)	falling head	ND
23193					1994									1.52E-06	4.32E-03	KaKlss(u)	slug	yes
70593					1994	Hvorslev	12880	122.35-135.	unconfined	93.36	45.84	55.36	NA	3.05E-08	8.64E-05	KaKlslt(u)	slug	yes
70593					1994	Bouwer/Rice	12880	122.35-135.	unconfined	93.36	45.84	55.36	NA	2.54E-08	7.20E-05	KaKlslt(u)	slug	ND
70593					1994	Ramey	12880	122.35-135.	unconfined	93.36	45.84	55.36	NA	3.36E-09	9.50E-06	KaKlslt(u)	slug	ND
1586			751852	2085812	1995	Hvorslev	1000		unconfined	13.35	6.88		NA	1.27E-04	3.60E-01	Qvf	rising head	ND
1586			751852	2085812	1995	Bouwer/Rice	1000		unconfined	13.35	6.88		NA	7.12E-05	2.02E-01	Qvf	rising head	ND
1586			751852	2085812	1995									1.27E-04	3.60E-01	Qvf	rising head	yes
3786			751561	2088854	1995	Hvorslev	58960		unconfined	5.7	4.71		NA	1.32E-07	3.74E-04	Qvf	rising head	ND
3786			751561	2088854	1995	Bouwer/Rice	58960		unconfined	5.7	4.71		NA	9.15E-08	2.59E-04	Qvf	rising head	ND
3786			751561	2088854	1995									1.32E-07	3.74E-04	Qvf	rising head	yes
P218289			748952	2082653	1995	Hvorslev	24		unconfined	19.28	8.32		NA	4.78E-04	1.35E+00	Qrf	falling head	ND
P218289			748952	2082653	1995	Bouwer/Rice	24		unconfined	19.28	8.32		NA	3.30E-04	9.36E-01	Qrf	falling head	ND
P218289			748952	2082653	1995									4.78E-04	1.35E+00	Qrf	falling head	yes
0190			751087	2080307	1995	Hvorslev	14		unconfined	11.78	39.8		NA	1.73E-03	4.90E+00	Qrf	rising head	ND
0190			751087	2080307	1995	Bouwer/Rice	14		unconfined	11.78	39.8		NA	1.32E-03	3.74E+00	Qrf	rising head	ND
0190			751087	2080307	1995	Hvorslev	14		unconfined	11.78	39.8		NA	1.73E-03	4.90E+00	Qrf	falling head	ND
0190			751087	2080307	1995	Bouwer/Rice	14		unconfined	11.78	39.8		NA	1.07E-03	3.02E+00	Qrf	falling head	ND

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0190			751087	2080307	1995										1.73E-03	4.90E+00	Qrf	rising head	yes
0290			752245	2079308	1995	Hvorslev	10		unconfined	15.81	49.04		NA		2.74E-03	7.78E+00	Qrf	rising head	ND
0290			752245	2079308	1995	Bouwer/Rice	10		unconfined	15.81	49.04		NA		1.83E-03	5.18E+00	Qrf	rising head	ND
0290			752245	2079308	1995	Hvorslev	10		unconfined	15.81	49.04		NA		1.37E-03	3.89E+00	Qrf	falling head	ND
0290			752245	2079308	1995	Bouwer/Rice	10		unconfined	15.81	49.04		NA		9.66E-04	2.74E+00	Qrf	falling head	ND
0290			752245	2079308	1995										2.74E-03	7.78E+00	Qrf	rising head	yes
0390			751328	2078292	1995	Hvorslev	10		unconfined	19.37	57.36		NA		5.59E-03	1.58E+01	Qrf	rising head	ND
0390			751328	2078292	1995	Bouwer/Rice	10		unconfined	19.37	57.36		NA		3.41E-03	9.65E+00	Qrf	rising head	ND
0390			751328	2078292	1995	Hvorslev	16		unconfined	19.37	57.36		NA		1.93E-03	5.47E+00	Qrf	falling head	ND
0390			751328	2078292	1995	Bouwer/Rice	16		unconfined	19.37	57.36		NA		5.59E-03	1.58E+01	Qrf	falling head	ND
0390			751328	2078292	1995										5.59E-03	1.58E+01	Qrf	rising head	yes
1090			754160	2082725	1995	Hvorslev	10		unconfined	17.55	21.21		NA		2.85E-02	8.06E+01	Qrf	rising head	ND
1090			754160	2082725	1995	Bouwer/Rice	10		unconfined	17.55	21.21		NA		1.68E-02	4.75E+01	Qrf	rising head	ND
1090			754160	2082725	1995	Hvorslev	12		unconfined	17.55	21.21		NA		1.52E-02	4.32E+01	Qrf	falling head	ND
1090			754160	2082725	1995	Bouwer/Rice	12		unconfined	17.55	21.21		NA		2.49E-02	7.06E+01	Qrf	falling head	ND
1090			754160	2082725	1995										1.52E-02	4.32E+01	Qrf	falling head	yes
1290			752605	2081400	1995	Hvorslev	16		unconfined	1.33	28.14		NA		7.12E-03	2.02E+01	Qrf	rising head	ND
1290			752605	2081400	1995	Bouwer/Rice	16		unconfined	1.33	28.14		NA		4.63E-03	1.31E+01	Qrf	rising head	ND
1290			752605	2081400	1995	Hvorslev	12		unconfined	1.33	28.14		NA		1.42E-02	4.03E+01	Qrf	falling head	ND
1290			752605	2081400	1995	Bouwer/Rice	12		unconfined	1.33	28.14		NA		1.07E-02	3.02E+01	Qrf	falling head	ND
1290			752605	2081400	1995										1.42E-02	4.03E+01	Qrf	falling head	yes
1390			752848	2080951	1995	Hvorslev	14		unconfined	15.74	31.68		NA		9.66E-03	2.74E+01	Qrf	rising head	ND
1390			752848	2080951	1995	Bouwer/Rice	14		unconfined	15.74	31.68		NA		8.13E-03	2.30E+01	Qrf	rising head	ND
1390			752848	2080951	1995	Hvorslev	18		unconfined	15.74	31.68		NA		3.20E-03	9.07E+00	Qrf	falling head	ND
1390			752848	2080951	1995	Bouwer/Rice	18		unconfined	15.74	31.68		NA		2.03E-03	5.76E+00	Qrf	falling head	ND
1390			752848	2080951	1995										9.66E-03	2.74E+01	Qrf	rising head	yes
41091			753241	2089994	1995	Hvorslev	1600		unconfined	5.89	6.66		NA		5.08E-05	1.44E-01	Qvf	falling head	ND
41091			753241	2089994	1995	Bouwer/Rice	1600		unconfined	5.89	6.66		NA		3.71E-05	1.05E-01	Qvf	falling head	ND
41091			753241	2089994	1995										5.08E-05	1.44E-01	Qvf	falling head	yes
41691			753470	2093851	1995	Hvorslev	10		unconfined	11.24	8.04		NA		1.37E-02	3.89E+01	Qvf	rising head	ND
41691			753470	2093851	1995	Bouwer/Rice	10		unconfined	11.24	8.04		NA		8.13E-03	2.30E+01	Qvf	rising head	ND
41691			753470	2093851	1995										1.37E-02	3.89E+01	Qvf	rising head	yes
75292			752305	2089809	1995	Hvorslev	3000		unconfined	2.92	6.68		NA		1.83E-04	5.18E-01	Qvf	rising head	ND
75292			752305	2089809	1995	Bouwer/Rice	3000		unconfined	2.92	6.68		NA		1.07E-04	3.02E-01	Qvf	rising head	ND
75292			752305	2089809	1995										1.83E-04	5.18E-01	Qvf	rising head	yes
10294			742318.891	2093691.181	1995	Hvorslev	14		unconfined	11.78	4.96		NA		6.10E-04	1.73E+00	Qvf	falling head	ND
10294			742318.891	2093691.181	1995	Bouwer/Rice	14		unconfined	11.78	4.96		NA		5.08E-04	1.44E+00	Qvf	falling head	ND
10294			742318.891	2093691.181	1995										6.10E-04	1.73E+00	Qvf	falling head	yes
10394			744946.927	2093663.724	1995	Hvorslev	16		unconfined	6.17	4.76		NA		1.47E-03	4.18E+00	Qvf	falling head	ND
10394			744946.927	2093663.724	1995	Bouwer/Rice	16		unconfined	6.17	4.76		NA		1.22E-03	3.46E+00	Qvf	falling head	ND
10394			744946.927	2093663.724	1995										1.47E-03	4.18E+00	Qvf	falling head	yes
10694			752659.046	2088757.133	1995	Hvorslev	14		unconfined	5.14	5.81		NA		4.52E-04	1.28E+00	Qvf	falling head	ND
10694			752659.046	2088757.133	1995	Bouwer/Rice	14		unconfined	5.14	5.81		NA		2.29E-04	6.48E-01	Qvf	falling head	ND
10694			752659.046	2088757.133	1995										4.52E-04	1.28E+00	Qvf	falling head	yes
10894			753948.175	2092348.305	1995	Hvorslev	14		unconfined	4.24	5.87		NA		9.15E-04	2.59E+00	Qvf	rising head	ND
10894			753948.175	2092348.305	1995	Bouwer/Rice	14		unconfined	4.24	5.87		NA		5.59E-04	1.58E+00	Qvf	rising head	ND
10894			753948.175	2092348.305	1995										9.15E-04	2.59E+00	Qvf	rising head	yes
11294			749435.155	2074304.959	1995	Hvorslev	64		unconfined	56.06	24.54		NA		1.07E-04	3.02E-01	Qrf	rising head	ND
11294			749435.155	2074304.959	1995	Bouwer/Rice	64		unconfined	56.06	24.54		NA		9.66E-05	2.74E-01	Qrf	rising head	ND
11294			749435.155	2074304.959	1995	Ramey	64		unconfined	56.06	24.54		NA		1.12E-04	3.17E-01	Qrf	rising head	ND
11294			749435.155	2074304.959	1995	Hvorslev	26		unconfined	56.06	24.54		NA		9.15E-05	2.59E-01	Qrf	falling head	ND
11294			749435.155	2074304.959	1995	Bouwer/Rice	26		unconfined	56.06	24.54		NA		7.62E-05	2.16E-01	Qrf	falling head	ND

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11294			749435.155	2074304.959	1995	Ramey	26		unconfined	56.06	24.54		NA	1.22E-04	3.46E-01	Qrf	falling head	ND
11294			749435.155	2074304.959	1995									1.22E-04	3.46E-01	Qrf	falling head	yes
11494			748147.582	2074267.009	1995	Hvorslev	10		unconfined	48.74	22.77		NA	7.12E-04	2.02E+00	Qrf	rising head	ND
11494			748147.582	2074267.009	1995	Bouwer/Rice	10		unconfined	48.74	22.77		NA	8.13E-04	2.30E+00	Qrf	rising head	ND
11494			748147.582	2074267.009	1995	Ramey	10		unconfined	48.74	22.77		NA	1.83E-03	5.18E+00	Qrf	rising head	ND
11494			748147.582	2074267.009	1995	Hvorslev	12		unconfined	48.74	22.77		NA	8.64E-04	2.45E+00	Qrf	falling head	ND
11494			748147.582	2074267.009	1995	Bouwer/Rice	12		unconfined	48.74	22.77		NA	7.12E-04	2.02E+00	Qrf	falling head	ND
11494			748147.582	2074267.009	1995	Ramey	12		unconfined	48.74	22.77		NA	1.93E-03	5.47E+00	Qrf	falling head	ND
11494			748147.582	2074267.009	1995									1.88E-03	5.33E+00	Qrf	rising/falling head	yes
12094			753879.857	2088529.224	1995	Hvorslev	28		unconfined	3.45	11.62		NA	1.37E-03	3.89E+00	Qvf	rising head	ND
12094			753879.857	2088529.224	1995	Bouwer/Rice	28		unconfined	3.45	11.62		NA	7.62E-04	2.16E+00	Qvf	rising head	ND
12094			753879.857	2088529.224	1995	Hvorslev	28		unconfined	3.45	11.62		NA	1.78E-03	5.04E+00	Qvf	falling head	ND
12094			753879.857	2088529.224	1995	Bouwer/Rice	28		unconfined	3.45	11.62		NA	6.61E-04	1.87E+00	Qvf	falling head	ND
12094			753879.857	2088529.224	1995									1.78E-03	5.04E+00	Qvf	falling head	yes
53194			753434.332	2086036.587	1995	Hvorslev	7200		unconfined	1.24	7.66		NA	2.59E-05	7.34E-02	Qvf	rising head	ND
53194			753434.332	2086036.587	1995	Bouwer/Rice	7200		unconfined	1.24	7.66		NA	6.10E-05	1.73E-01	Qvf	rising head	ND
53194			753434.332	2086036.587	1995									6.10E-05	1.73E-01	Qvf	rising head	yes
56994			747987.34	2082008.7	1995	Hvorslev	5400		unconfined	10.97	17.99		NA	1.68E-02	4.75E+01		rising head	ND
56994			747987.34	2082008.7	1995	Bouwer/Rice	5400		unconfined	10.97	17.99		NA	1.12E-02	3.17E+01		rising head	ND
56994			747987.34	2082008.7	1995	Hvorslev	340		unconfined	10.97	17.99		NA	1.78E-03	5.04E+00		falling head	ND
56994			747987.34	2082008.7	1995	Bouwer/Rice	340		unconfined	10.97	17.99		NA	1.07E-03	3.02E+00		falling head	ND
56994			747987.34	2082008.7	1995									1.68E-02	4.75E+01		rising head	yes
57594			747590.93	2082153.24	1995	Hvorslev	6000		unconfined	85.2	8.21		NA	1.17E-06	3.31E-03		rising head	ND
57594			747590.93	2082153.24	1995	Ramey	6000		unconfined	85.2	8.21		NA	6.10E-07	1.73E-03		rising head	ND
57594			747590.93	2082153.24	1995	Hvorslev	4200		unconfined	85.2	8.21		NA	8.64E-07	2.45E-03		falling head	ND
57594			747590.93	2082153.24	1995	Ramey	4200		unconfined	85.2	8.21		NA	1.83E-06	5.18E-03		falling head	ND
57594			747590.93	2082153.24	1995									1.83E-06	5.18E-03		falling head	yes
59594			747981.44	2081243.75	1995	Hvorslev	10		unconfined	9.59	32.31		NA	7.62E-03	2.16E+01	Qrf	rising head	ND
59594			747981.44	2081243.75	1995	Bouwer/Rice	10		unconfined	9.59	32.31		NA	4.78E-03	1.35E+01	Qrf	rising head	ND
59594			747981.44	2081243.75	1995	Hvorslev	14		unconfined	9.59	32.31		NA	7.62E-03	2.16E+01	Qrf	falling head	ND
59594			747981.44	2081243.75	1995	Bouwer/Rice	14		unconfined	9.59	32.31		NA	4.88E-03	1.38E+01	Qrf	falling head	ND
59594			747981.44	2081243.75	1995									7.62E-03	2.16E+01	Qrf	rising/falling head	yes
59694			747759.66	2081356.09	1995	Hvorslev	14320		unconfined	11.95	8.01		NA	4.12E-03	1.17E+01		rising head	ND
59694			747759.66	2081356.09	1995	Bouwer/Rice	14320		unconfined	11.95	8.01		NA	3.56E-03	1.01E+01		rising head	ND
59694			747759.66	2081356.09	1995	Hvorslev	1600		unconfined	11.95	8.01		NA	4.12E-03	1.17E+01		falling head	ND
59694			747759.66	2081356.09	1995	Bouwer/Rice	1600		unconfined	11.95	8.01		NA	2.85E-03	8.06E+00		falling head	ND
59694			747759.66	2081356.09	1995									4.12E-03	1.17E+01		rising/falling head	yes
59894			747728.38	2080723.85	1995	Hvorslev	3000		unconfined	80.27	43.05		NA	1.78E-06	5.04E-03		rising head	ND
59894			747728.38	2080723.85	1995	Bouwer/Rice	3000		unconfined	80.27	43.05		NA	7.12E-07	2.02E-03		rising head	ND
59894			747728.38	2080723.85	1995	Ramey	3000		unconfined	80.27	43.05		NA	6.61E-07	1.87E-03		rising head	ND
59894			747728.38	2080723.85	1995	Hvorslev	15760		unconfined	79.04	44.28		NA	1.73E-06	4.90E-03		falling head	ND
59894			747728.38	2080723.85	1995	Bouwer/Rice	15760		unconfined	79.04	44.28		NA	1.47E-06	4.18E-03		falling head	ND
59894			747728.38	2080723.85	1995	Ramey	15760		unconfined	79.04	44.28		NA	1.58E-06	4.46E-03		falling head	ND
59894			747728.38	2080723.85	1995									1.78E-06	5.04E-03		rising head	yes
71494			747881.61	2082013.59	1995	Hvorslev	1200		unconfined	14.63	29.37		NA	2.19E-06	6.19E-03		rising head	ND
71494			747881.61	2082013.59	1995	Bouwer/Rice	1200		unconfined	14.63	29.37		NA	1.58E-06	4.46E-03		rising head	ND
71494			747881.61	2082013.59	1995	Ramey	1200		unconfined	14.63	29.37		NA	3.86E-06	1.09E-02		rising head	ND
71494			747881.61	2082013.59	1995	Hvorslev	5800		unconfined	15.09	28.91		NA	4.98E-06	1.41E-02		falling head	ND
71494			747881.61	2082013.59	1995	Bouwer/Rice	5800		unconfined	15.09	28.91		NA	3.61E-06	1.02E-02		falling head	ND
71494			747881.61	2082013.59	1995	Ramey	5800		unconfined	15.09	28.91		NA	8.13E-06	2.30E-02		falling head	ND
71494			747881.61	2082013.59	1995									8.13E-06	2.30E-02		falling head	yes
41691			753470	2093851	1995	Neuman	767		unconfined	16	8.15	4.23	2.3	1.12E-02	3.17E+01	Qvf	pumping	ND

Appendix F
RFETS Aquifer Test Data

OW1					1995	Neuman			unconfined				2.3	5.59E-04	1.58E+00	Qvf	pumping	ND
OW2					1995	Neuman			unconfined				2.3	4.88E-03	1.38E+01	Qvf	pumping	ND
OW2					1995	Jacob			unconfined				2.3	1.98E-02	5.62E+01	Qvf	pumping	ND
10394			744946.927	2093663.724	1995	Neuman			unconfined					3.61E-03	1.02E+01	Qvf	pumping	ND
10394			744946.927	2093663.724	1995	Jacob			unconfined					1.47E-02	4.18E+01	Qvf	pumping	ND

Appendix F
RFETS Aquifer Test Data

Key Source Key

gpm = g(1) HydroSearch (1986), Geological and Hydrological Data Summary, July 21, 1986

cm/sec =(2) Chen and Associates (1988), Transmittal Of Slug Test Data, March 31, 1988

ft/d = fe (3) Chen and Associates (1988), Transmittal of Slug Test Data, May 20, 1988

NA = Not available

ND = N (5) R. F. Weston (1990), Draft Background Field Program Report, May, 1990

Qvf = Q(6) R. F. Weston (1990), Draft Summary of Field Activities Report, August 3, 1990

Qrf = Q(7) French Drain Geotechnical Investigation Report, October 5, 1990

Qc = Q (8) Solar Evaporation Pond Closure Plan, July 1988

KaKlcls (9) 903 RI Report, December, 1987

KaKlslt((10) Present Landfill Closure Plan, July, 1988

KaKlss((11) West Spray Field RI/FS Work Plan

KaKlcls (12) 881 Hillside Response to EPA Comments, February, 1989

KaKlslt((13) R. F. Weston (1991), Revised Background Pumping Tests, November, 1991

KaNo.1 (14) Doty and Associates (1992), Evaluation of O-3 Pumping Test, Woman Creek Alluvium, January, 1992

KaKlss((15) Phase III RFI/RI

Ka = Un(16) Phase II Geologic Characterization Data Acquisition, October 1992

Wxbr = (17) Golder and Associates, Analyses of Aquifer Tests

Fill = A (18) Phase II RF/RI Aquifer Test Report of OU2

ND = N (19) Hydrogeologic Characterization Report, 1994.

Slug tes * see explanation for rationale of rejected values

water into or from a well and measuring the subsequent recovery rate to static conditions

Bailer-recovery test = Conducted by removing a volume of water from a well with a bailer and measuring the subsequent recovery rate to static conditions. A bailer-recovery test is differentiated from a slug test by the time of bailing

Constant-rate test or pump(ing) test = Conducted by discharging or injecting water from or into a well at a constant rate. Changes in hydraulic head are measured in the pumping or injection well and nearby observation wells

Packer test = Conducted by inducing hydraulic pressures on isolated zones. Injection rates and hydraulic head responses are recorded for the duration of time it takes the test interval to reach steady state conditions

Source

(1) HydroSearch (1986), Geological and Hydrological Data Summary, July 21, 1986

(3) Chen and Associates (1988), Transmittal of Slug Test Data, May 20, 1988

(4) Chen and Associates (1988), Transmittal of Slug Test Data, September 20, 1988

(4a) Chen and Associates (1987), Revised Slug Test Results, December 22, 1987.

(4b) Chen and Associates (1987), Hydraulic Conductivity Results, November 11, 1987.

(5) R. F. Weston (1990), Draft Background Field Program Report, May, 1990

(6) R. F. Weston (1990), Draft Summary of Field Activities Report, August 3, 1990

(7) French Drain Geotechnical Investigation Report, October 5, 1990

(8) Solar Evaporation Pond Closure Plan, July 1988

(9) 903 RI Report, December, 1987

(10) Present Landfill Closure Plan, July, 1988

(11) West Spray Field RI/FS Work Plan

(12) 881 Hillside Response to EPA Comments, February, 1989

(13) R. F. Weston (1991), Revised Background Pumping Tests, November, 1991

(14) Doty and Associates (1992), Evaluation of O-3 Pumping Test, Woman Creek Alluvium, January, 1992

(15) OU1 Phase III RFI/RI

(16) Phase II Geologic Characterization Data Acquisition, October 1992

(17) Golder and Associates, Analyses of Aquifer Tests

(18) Phase II RF/RI Aquifer Test Report of OU2

(19) Hydrogeologic Characterization Report, 1994.

(20) Phase II RFI/RI aquifer test report of OU2

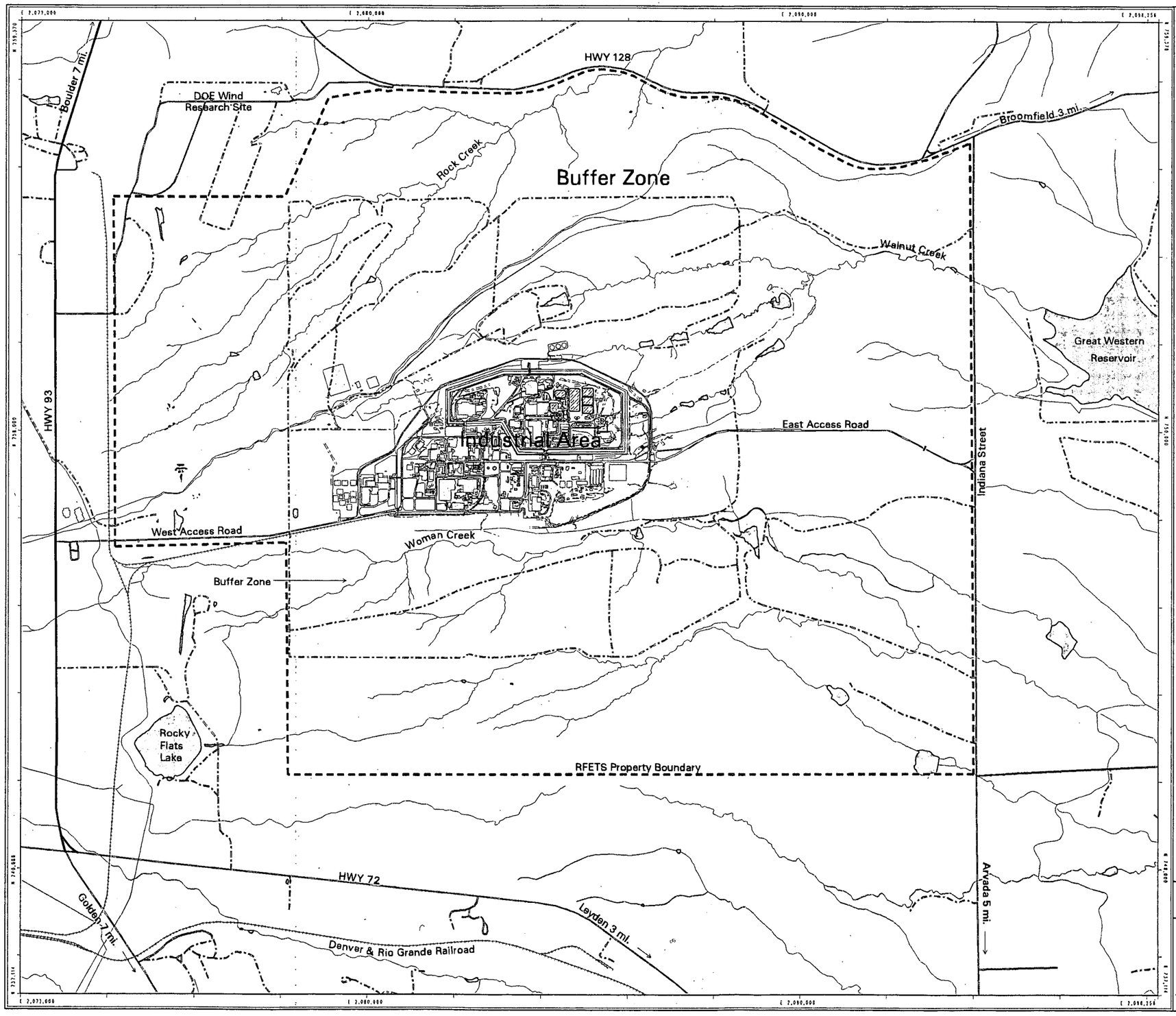

Figure 1-2

Rocky Flats Environmental Technology Site Map

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences
- Rocky Flats boundary
- Heavy duty paved roads
- Medium duty paved roads
- Light duty paved roads
- Dirt roads
- Railroads

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Scale = 1 : 28720
1 inch represents approximately 2393 feet

700 0 1400 2800 ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KAISER-HILL COMPANY

August 08, 2002

NT_Svr w:/projects/fy2002/02-0781/fig1-2.aml

Figure 3-1

Linear Flow Velocity Well Pairs

2001 Annual RFCA Groundwater Monitoring Report

- Paired Groundwater Well to measure flow velocity
- Groundwater Monitoring Well with Water Level Elevation
- Dry Groundwater Monitoring Well
- 2nd Quarter 2001 Data Water Level Contour (20' Interval)
- Dashed where inferred
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1:95
Topographic contours were derived from digital elevation model (DEM) data by Montson Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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Scale = 1 : 8910
1 inch represents approximately 743 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

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Prepared for: KAISER-HILL COMPANY

November 18, 2002

NT_Svr w:/projects/fy2002/02-0594/potent2001wellpairs_b-size.aml

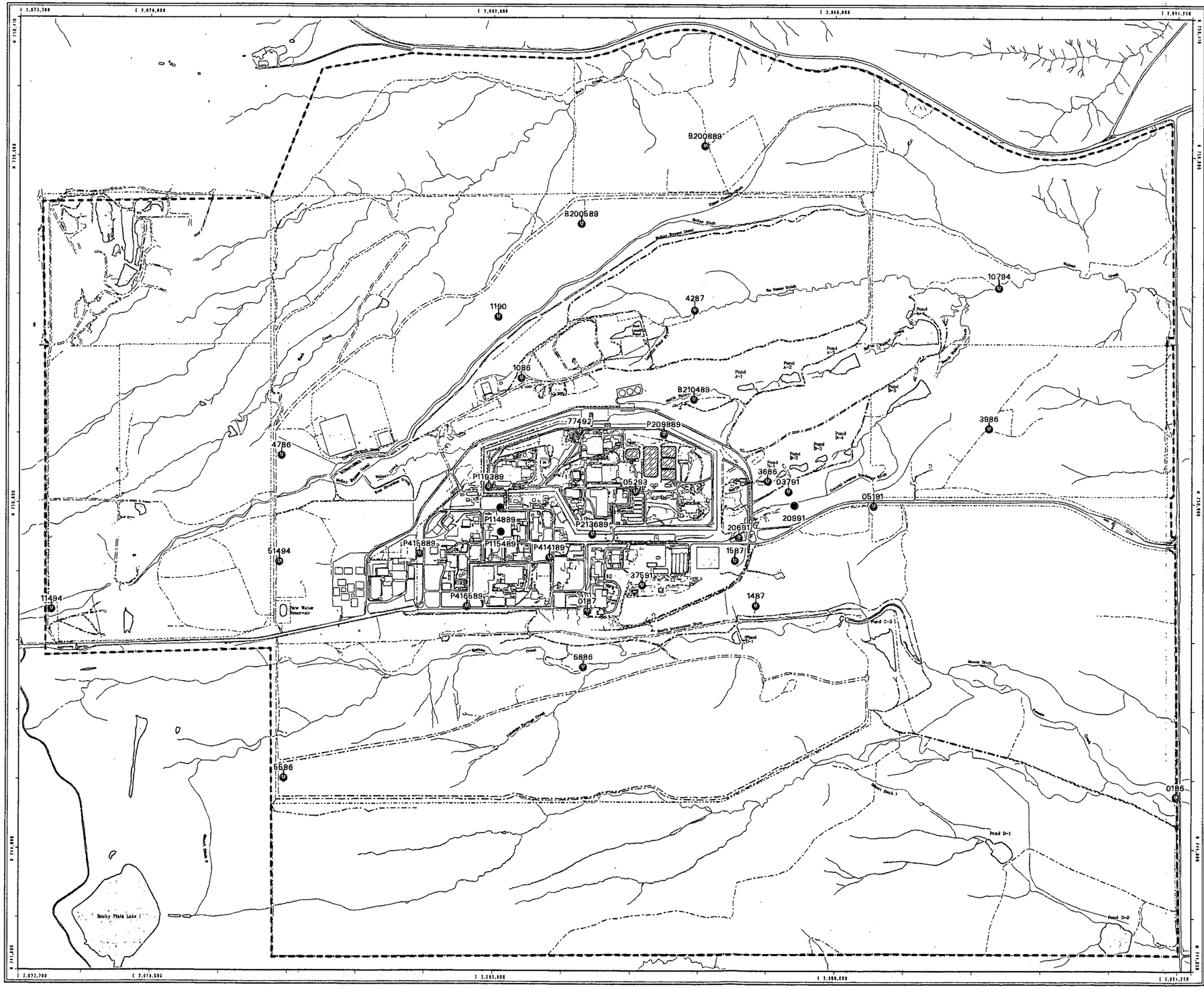

Figure 3-2

Real-Time Groundwater Monitoring Well Locations

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Groundwater well with real time water level monitoring

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Rocky Flats Environmental Technology Site boundary
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

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Scale = 1 : 21330
1 inch represents approximately 1778 feet

500 0 1000 2000 ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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November 13, 2002

NT_Srr w:/projects/fy2002/02-0734/wtr-level-nt.aml

95

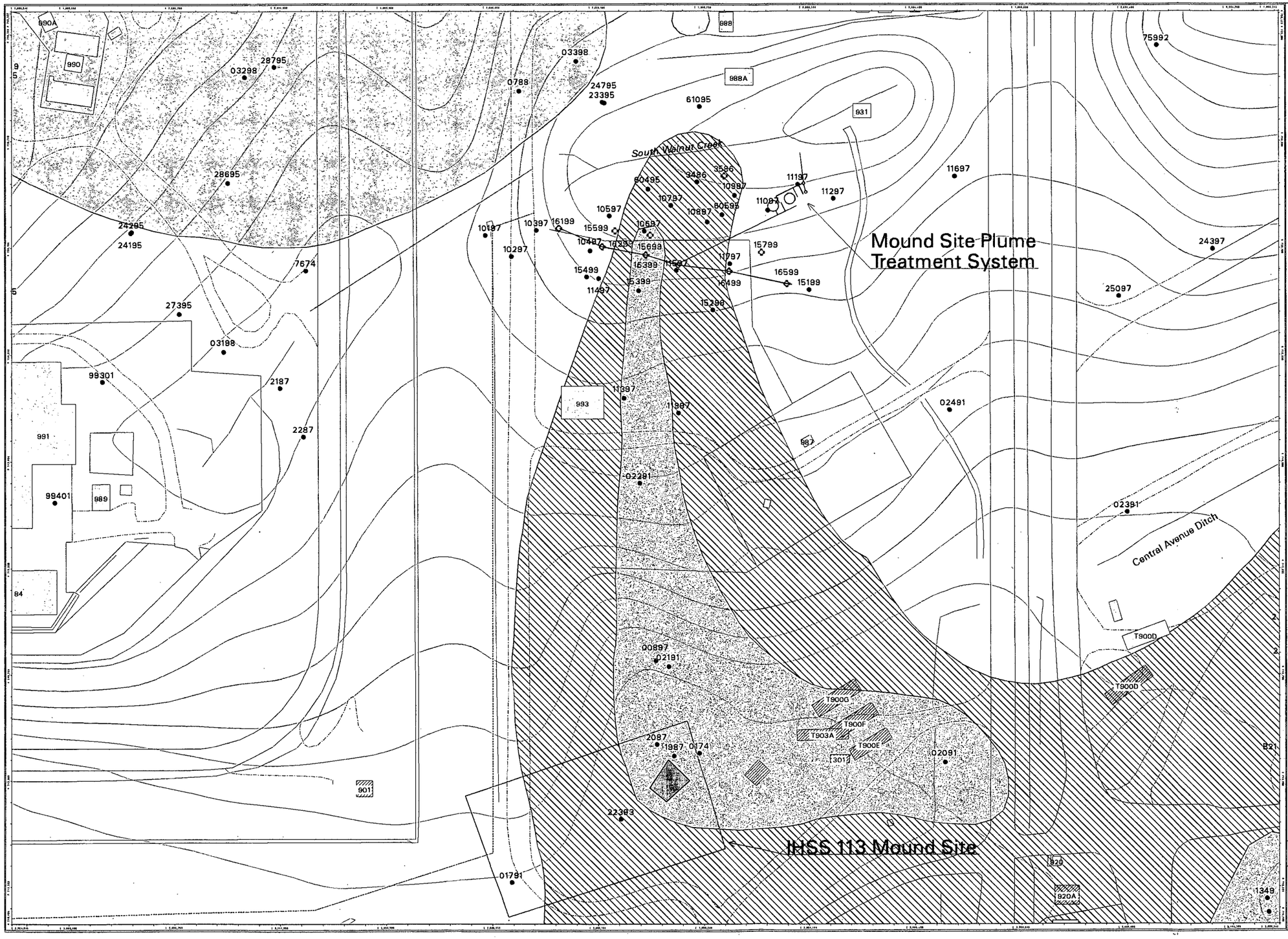

Figure 4-1

Mound Site Plume Area and Source Removal

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

Groundwater Well Type

- Mound Treatment System Performance Monitoring Well
- Inline Treateatment System Flow Monitoring Well
- Mound Source Removal Performance Monitoring Well
- Flow Monitoring Well
- Composite VOC Groundwater Plume (100 X MCL)
- Composite VOC Groundwater Plume (concentration equal to MCL)
- 100 x Nitrate Standard (1000 mg/l)
- Nitrate Standard (10 mg/l)
- Surveyed Location of Excavated area at the Mound Site Source Removal Area
- Selected IHSS Boundaries
- Approximate Location of Collection Trench
- Approximate Location of 72" Storm Sewer
- Large Diameter Culvert

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

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Scale = 1: 1110
1 inch represents approximately 831 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7767

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Prepared for: KAISER-HILL COMPANY

November 13, 2002

NT_Svr w:/projects/fy2002/02-0768/moundsite.aml

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Figure 4-3A

Solar Ponds Plume Treatment System Locations and Nitrate Plume

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Other Flow Monitoring Well
- In Trench Piezometer Location
- Plume Treatment System Monitoring Well
- Old Interceptor Trench System
- New Interceptor Trench System (Installed 1999)
- Nitrate Standard (10 mg/l)
- 100 x Nitrate Standard (1000 mg/l)

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1:95
Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

NOTES:
Early Nitrate Data (1990-2000) used to delineate edge of plume in areas where recent data is sparse.

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Scale = 1 : 2730
1 inch represents approximately 228 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. (303)966-7717

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November 04, 2002

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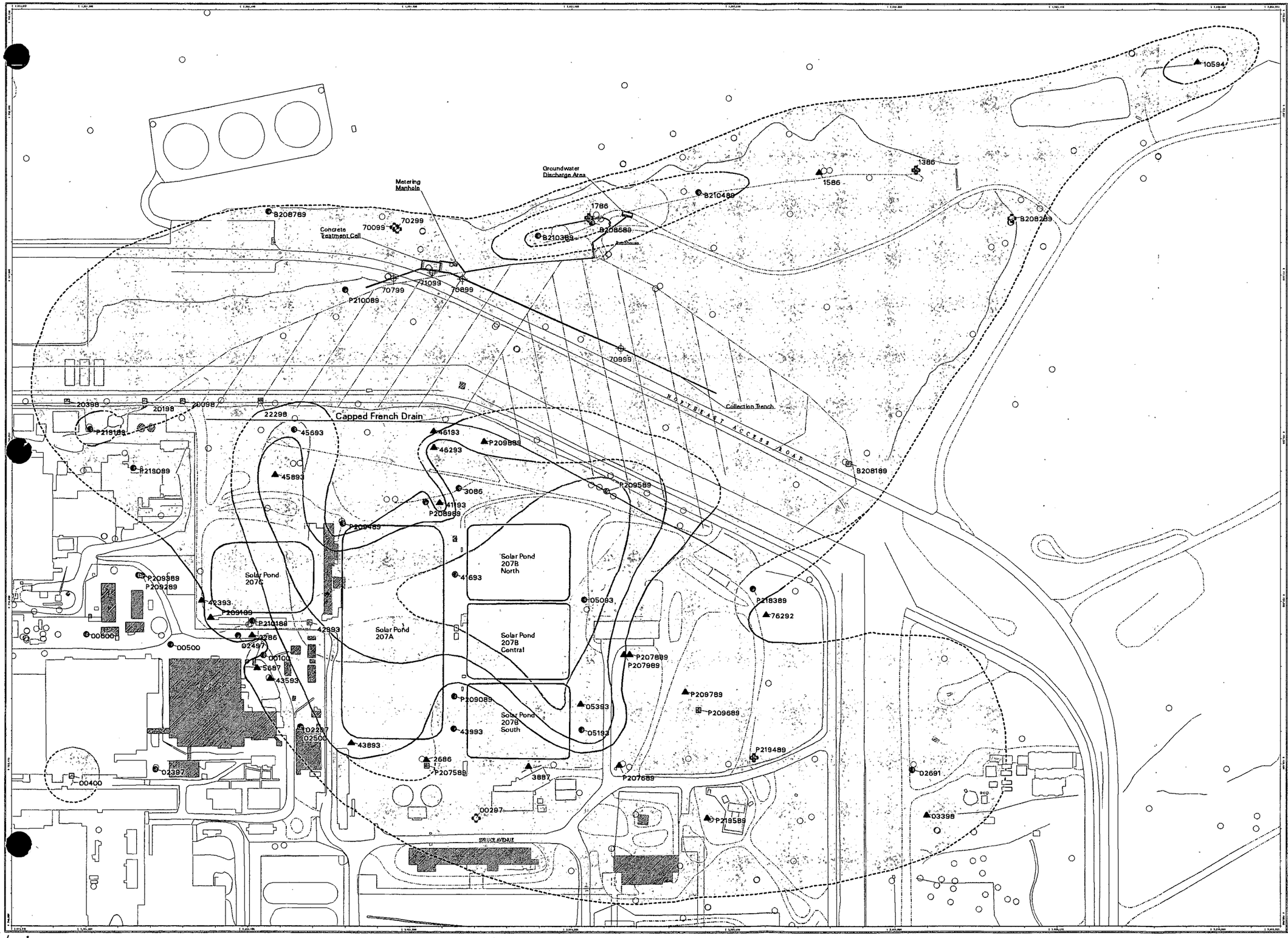

Figure 4-3B

Solar Ponds Plume Treatment System Locations and Filtered Uranium Plume

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Trench Piezometer Location
- Plume Treatment System Monitoring Well
- Well with No Data
- Well with 1997-2000 data
- Well with 2001-2002 data
- Well with both 1997-2000 and 2001-2002 data
- Old Interceptor Trench System
- New Interceptor Trench System (Installed 1999)

Uranium Plume Values

- = > 2.847 < 50.0 pCi/l (2001-2002)
- = > 50.0 < 104.29 pCi/l (2001-2002)
- = > 104.29 < 284.7 pCi/l (2001-2002)
- = > 284.7 pCi/l (2001-2002)
- Inferred 2001-2002 Plume Extent
- = > 2.847 < 50.0 pCi/l (1997-2000) (Dashed where inferred)
- = > 50.0 < 104.29 pCi/l (1997-2000) (Dashed where inferred)
- = > 104.29 < 284.7 pCi/l (1997-2000) (Dashed where inferred)
- = > 284.7 pCi/l (1997-2000) (Dashed where inferred)
- Solar Evaporation Ponds (SEPs)

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial flyover data captured by EG&G Rkt. Las Vegas. Digitized from the orthophotographs. 1/95

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Scale = 1 : 3750
1 inch represents approximately 312 feet

Grid = Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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Prepared for: KH KAISER-HILL COMPANY

November 14, 2002

NT_Svr w:/projects/fy2002/02-0807/sep_ur_plume.aml

165

Figure 4-4
East Trenches Plume Treatment System Locations
2001 Annual RFCA Groundwater Monitoring Report

Treatment Cells
Pond B-4
Pond B-3
Pond B-2
Pond B-1
Groundwater Collection Trench
Collection Sump
Trench T-4
Trench T-3
East Access Road
nds

TH047092
TH046992
66595
24097
95089
23296
TH046592
TH046792
95699
95199
95799
B213789
23495
60395
3686
63396
80295
02398
75892
95299
60195
95899
03581
03781
11891
11697
95691
21191
20191
20291
12491
11491
20491
03591
11691
03391
21091
22593
23193
3687
20891
20991
12691
B220189
02491
02891
03191
03091
B217589
3367
3487
23283
12191
02991
2487
2587
08091
12891
07891
B217889
02091
08381
9
6599
15139

EXPLANATION

- Flow Monitoring Well
- T3/T4 Performance Monitoring Well
- East Trenches Plume Treatment Flow Monitoring wells
- East Trenches Plume Treatment Performance Monitoring wells
- Treatment Cell
- Influent Pipe
- Surveyed Trench Excavation Boundary
- Collection Trench
- Composite VOC Groundwater Plume (concentration equal to MCL)
- Composite VOC Groundwater Plume (100 x MCL)

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial flyover data captured by EG&G RSL Las Vegas. Digitized from the orthophotographs, 1/95
Topographic contours were derived from digital elevation model (DEM) data by Jonteam Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data were captured by the Remote Sensing Lab, Las Vegas, 7/7; 1994 Aerial Flyover at ~10 meter resolution. DEM post processing performed by MK, Winter 1997.

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Scale = 1 : 1780
1 inch represents approximately 148 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site
GIS Dept. 303-966-7707

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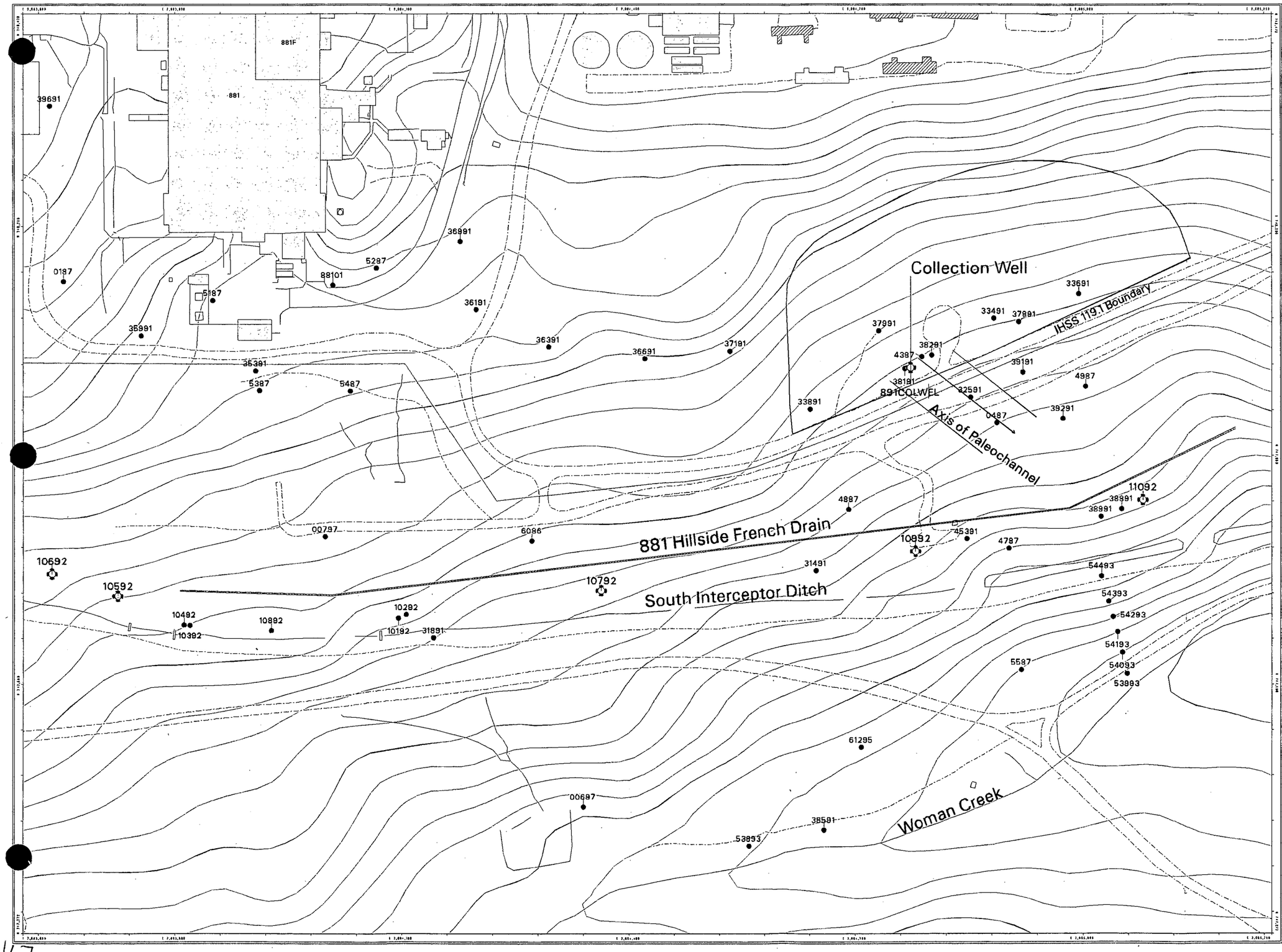
Prepared for: KAISER-HILL COMPANY

November 15, 2002

N:\T_Svr w:/projects/fy2002/02-0827/east_trench.aml

Figure 4-5
881 Hillside Area

2001 Annual RFCA Groundwater Monitoring Report



EXPLANATION

- Flow Monitoring Well
- Performance Monitoring Well
- French Drain System
- IHSS 119.1 Boundary

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE/BASELAYERS:
Buildings, fences, hydrography, roads and other structures from 1994 aerial flyover data captured by LC&G RSI, Las Vegas. Digitized from the orthophotographs. 1/2ft Topographic contours were derived from digital elevation model (DLM) data by Morrison Knudson (MK) using LSRI Arc TIN and LAITCL to process the DLM data to create 5-foot contours. The DLM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyovers at 70 meter resolution. DEM post processing performed by MK, Weiler 1997.

Data Sources:
Borehole and Piezometer Well data - Approved by Steve Singer ISSOC, 303-966-3381.

Individual Hazardous Substance Site (IHSS) data - Approved by Nick Demos ISSOC, 303-966-4605.

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Scale 1 : 1480
1 Inch represents approximately 124 foot

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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Rocky Flats Environmental Technology Site

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Prepared for: KAISER•HILL COMPANY

November 13, 2002

NT_Svr w:/projects/fy2002/02-0827/hillside_881.aml

167

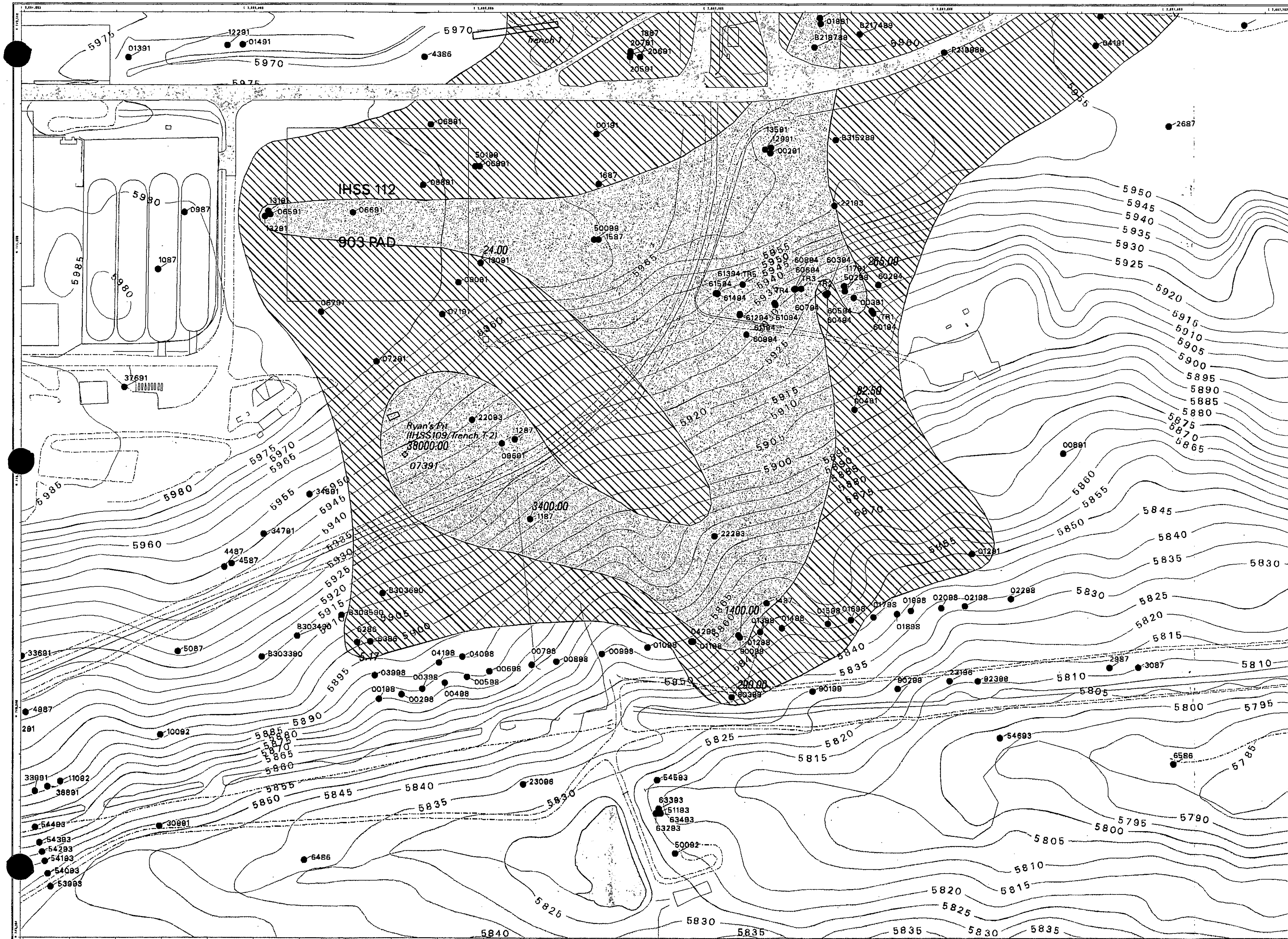

Figure 4-6
Ryan's Pit Area Location Map

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Trench
- Ryan's Pit Performance Monitoring Well

Composite Plume Key

- Composite VOC Groundwater Plume (concentration equal to MCL)
- Composite VOC Groundwater Plume (100 x MCL)

Standard Map Features

- Buildings and other structures
- Paved roads fill
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial flyover data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95
Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV. 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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Scale = 1 : 2470
1 inch represents approximately 206 feet

50 0 100 200ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by: DynCorp THE ART OF TECHNOLOGY

Prepared for: KAISER•HILL COMPANY

November 18, 2002

NT_Svr w:/projects/fy2002/02-0827/ryans_pit_loc.aml

168

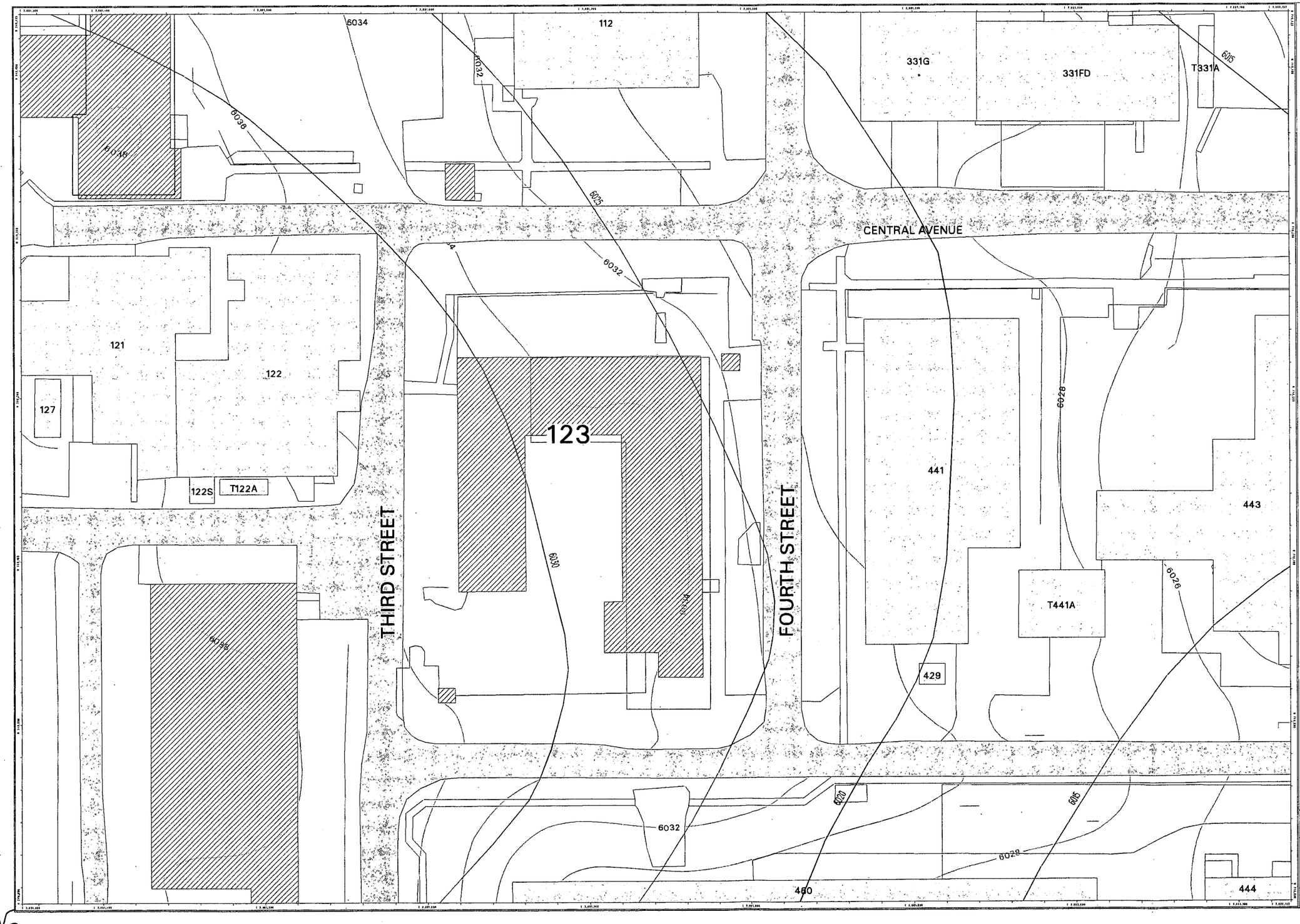

Figure 5-1

Building 123 Location Map with D&D Monitoring Wells 2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP

Water Level Contours Second Quarter 2001

- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Pertinent B123 IHSSs

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (2-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSI, Las Vegas.
Digitized from the orthophotographs, 1/95
Topographic contours were derived from digital elevation model (DEM) data by Harrison Knudson, FAO using ESRI Arc TIN and LATTICE to process the DEM data to create 2-foot contours.
The DEM data was captured by the Remote Sensing Lab, Las Vegas, 11/, 1994 Aerial Flyover at ~ 10 meter resolution.
DEM post-processing performed by RIK, 7/Inder 1997.

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Scale = 1 : 700
1 inch represents approximately 58 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
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November 14, 2002

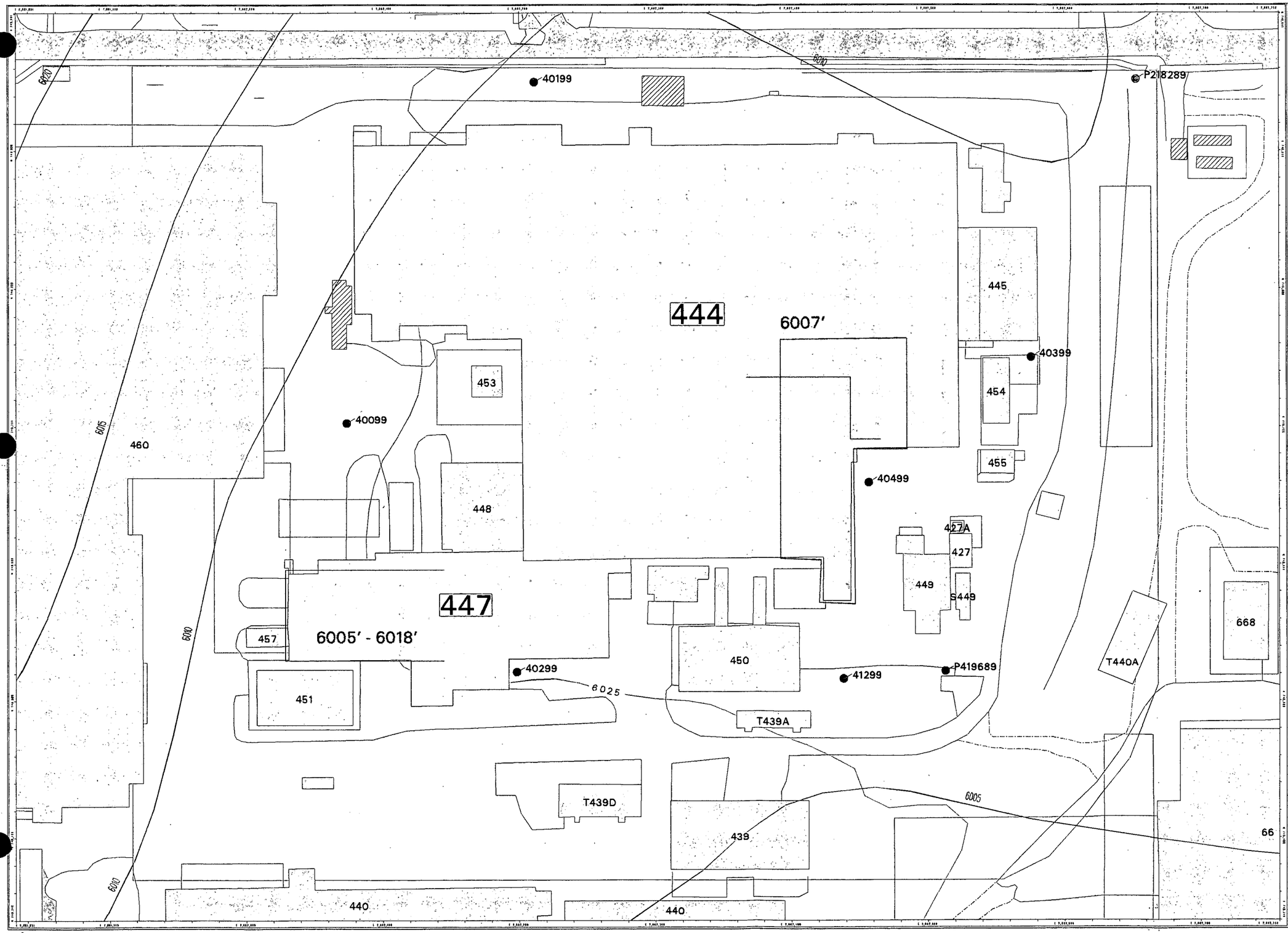
NT_Svr d:/projects/fy2002/02-0733/bldg_123-dd.aml

205

Figure 5-2

Building 444 Location Map with D&D Monitoring Wells

2001 Annual RFCA Groundwater Monitoring Report



EXPLANATION

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP

Water Level Contours Second Quarter 2001

- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Pertinent B444 IHSSs
- D&D Building

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial by aero data contained by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 10ft topographic contours were defined from digital elevation model (DEM) data by Merrick & Kaufman (M&K) using FGRI Arc TIN and LATTICE to improve the DLM data to create 5-foot contours. The DLM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 And Aerial Photo. [illegible] resolution. DFM post-processing performed by MK, Winter 1997.

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Scale 1:1920
1 inch represents approximately 160 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
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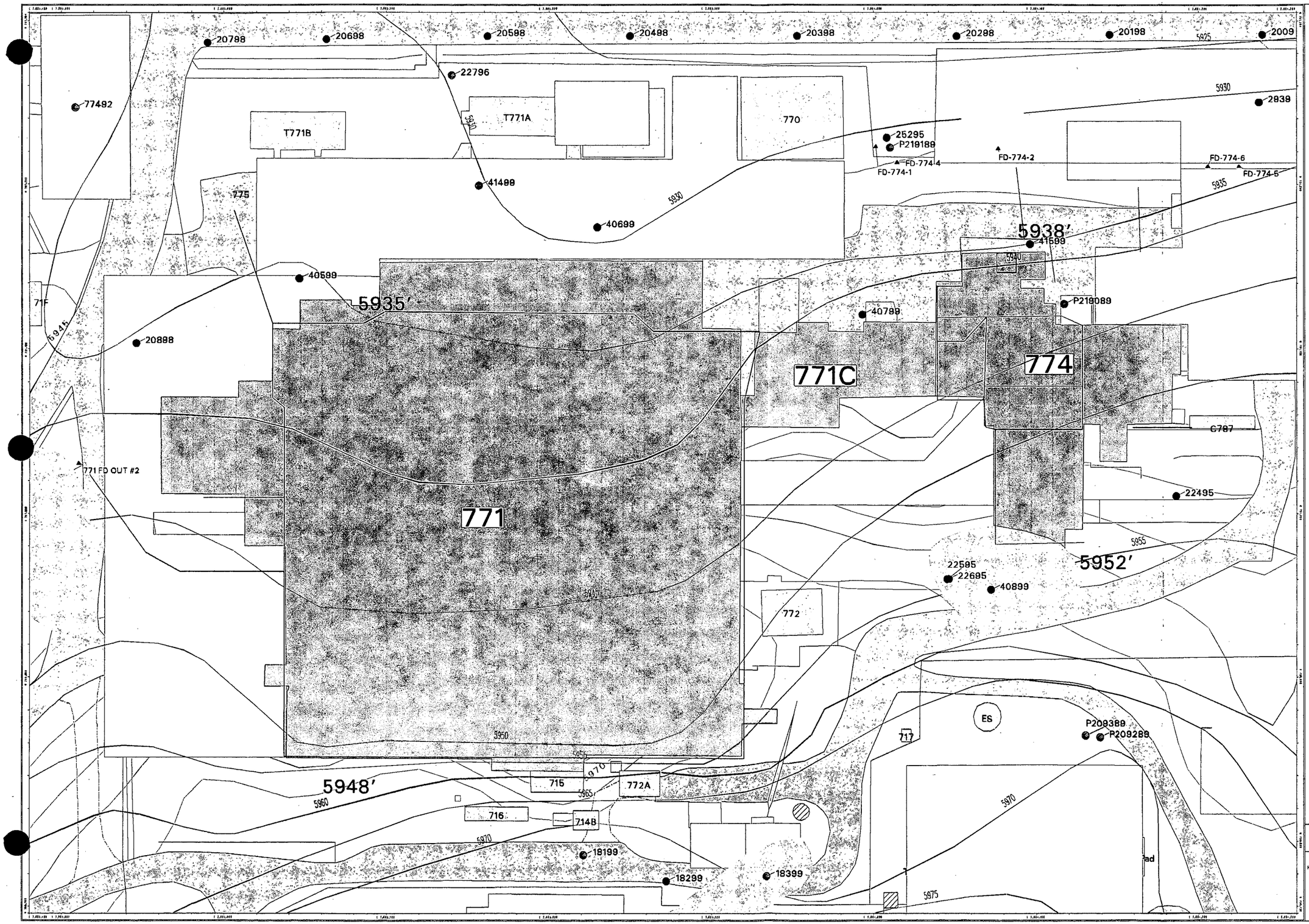
NT_Svr:/projects/fy2002/02-0733/bldg_444-dd.aml

210

Figure 5-3

Building 771 Location Map with D&D Monitoring Wells

2001 Annual RFCA Groundwater Monitoring Report



EXPLANATION

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP
- Footing Drain Outfall

Water Level Contours Second Quarter 2001

- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Pertinent B771 IHSSs
- D&D Building

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, trailers, utility roads, and other structures from 1994 aerial photography captured by EG&G Rotech, Las Vegas.
Digitized from the orthorectified color infrared (IR) topographic resources were derived from digital elevation model (DEM) data by Earthsat Boulder (MN) using CAM Arc 7.1 on ARC/INFO to produce the final data in arc/info + field coverages. The final data was captured by the Remote Sensing Lab, Las Vegas, 772, 1994 Aerial Photo at 1"=100' resolution. Digitized and processed by personnel in Winter 1997.

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Scale: 1" = 600'
(1 inch represents 600 feet)

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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November 15, 2002

N:_Svr w:/projects/fy2002/02-0733/bldg_771-dd.aml

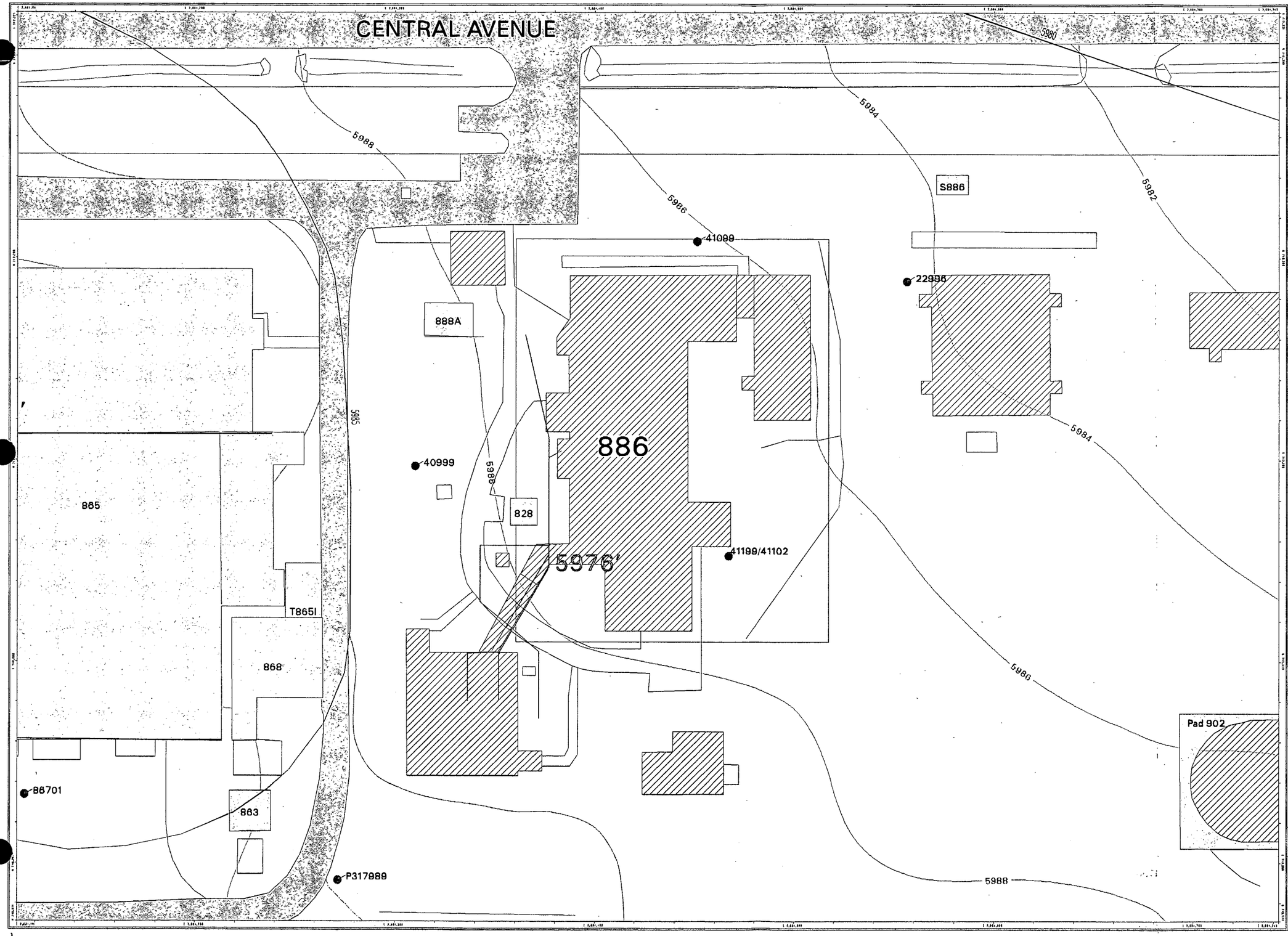

Figure 5-4

Building 886 Location Map with D&D Monitoring Wells

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP

Water Level Contours Second Quarter 2001

- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Pertinent B886 IHSSs

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (2-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography roads and other information from TIGER and Hydrography data captured by EG&G RSI, Las Vegas.
Digitized from the orthophotographs, 1:2k
Topographic contours were derived from digital elevation model (DEM) data by Merrick Kingston (MK) using ESRI Arc TIN and LAI ICS to process the DEM data to create 2 foot contours. The NAD 83 data was captured by the Bechtel Nevada, Las Vegas, NV, 1994 Aerial Photos at ~ 10 meter resolution. DEM post processing performed by MK Merrick 1997.

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Scale as shown
1 inch represents approximately 4.47 feet

North American Datum 1983
Colorado Central Zone
Datum: NAD 27

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Prepared for: KAISER-HILL COMPANY

Revised: 4/2002

NT_Svr d:/projects/fy2002/02-0733/bldg_886-dd.aml

2/2

Figure 5-5

Building 779 Location Map with D&D Monitoring Wells

2001 Annual RFCA Groundwater Monitoring Report

713A Pad
207
777
779
Basement
2A
2B
1A
1B
5975'
5975
T779A
Sump
P209189
P210189
22295
22395
42893
23895
02497
2286
5984
00500
5982
5978
5986
00100
5687
42893
43593
5970
5974
5980
22795
02397
02500
43893

EXPLANATION

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP

Water Level Contours Second Quarter 2001

- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Pertinent B779 IHSSs

Standard Map Features

- Basement
- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Solar Evaporation Ponds (SEPs)
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (2-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, herbicide use, north boundary structures from 1994 aerial photography updated by EG&G Rocky Flats, Inc. August. Northwest from the ortho photography 1/93.

Topographic contours were derived from digital elevation model (DEM) data by Aluminum Boundaries (TIN) using ARC INFO and LATTICE to process the DEM data to create 2-foot contours. The DEM data was supplied by the Remote Sensing Laboratory, EPA, 1994 aerial photography at 1" = 100' scale with DEM post-processing performed by EMI, March 1995.

NOTES:
Building 779 sub-basement vaults located directly below basement.

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Scale = 1" = 82 feet
1 inch represents approximately 47 feet

State Plane Coordinate System
Colorado Central Zone
Projection: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

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DynCorp
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Prepared for:
KAISER-HILL COMPANY

November 14, 2001

NT Svr d:/projects/fy2002/02-0733/bldg 779-dd.aml

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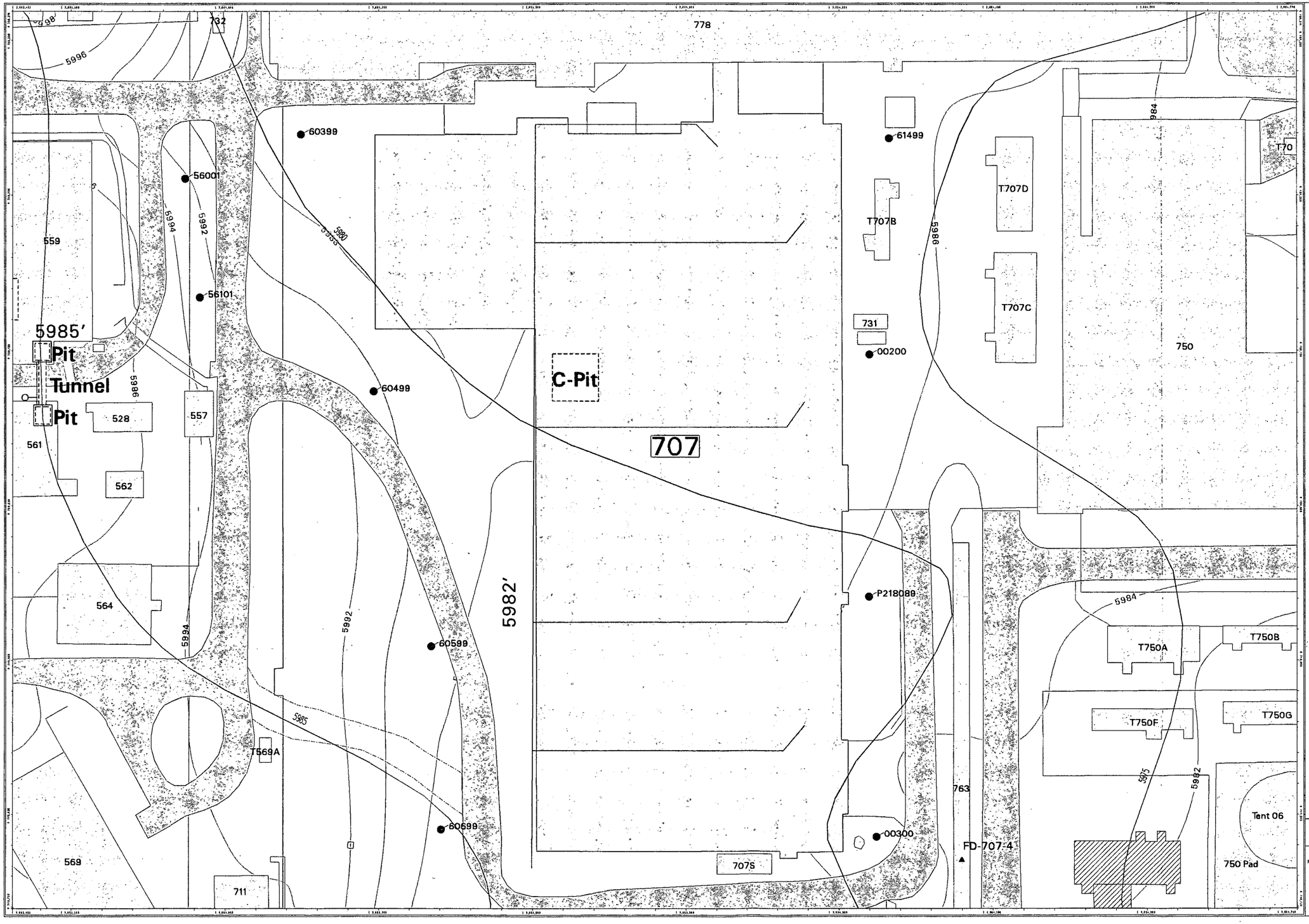
Figure 5-6
Building 707 Location Map with D&D Monitoring Wells
2001 Annual RFCA Groundwater Monitoring Report



EXPLANATION

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP
- Foundation Drain Sampling Location

Water Level Contours Second Quarter 2001

- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Pertinent 8707 IHSSs
- D&D Building

Standard Map Features

- Basement
- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (2-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL Las Vegas. Digitized from the orthophotographs, 1/95
Topographic contours were derived from digital elevation model (DEM) data by Aluminum Knudsen (AK) using ERDAS Arc TIN and LATTICE to process the DEM data to create 2-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Photos at ~ 10 meter resolution. DEM post-processing performed by AK, Golden CO.

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Scale = 1 : 750
1 inch represents approximately 631 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
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NT_Svr d:/projects/fy2002/02-0733/bldg_707-dd.aml

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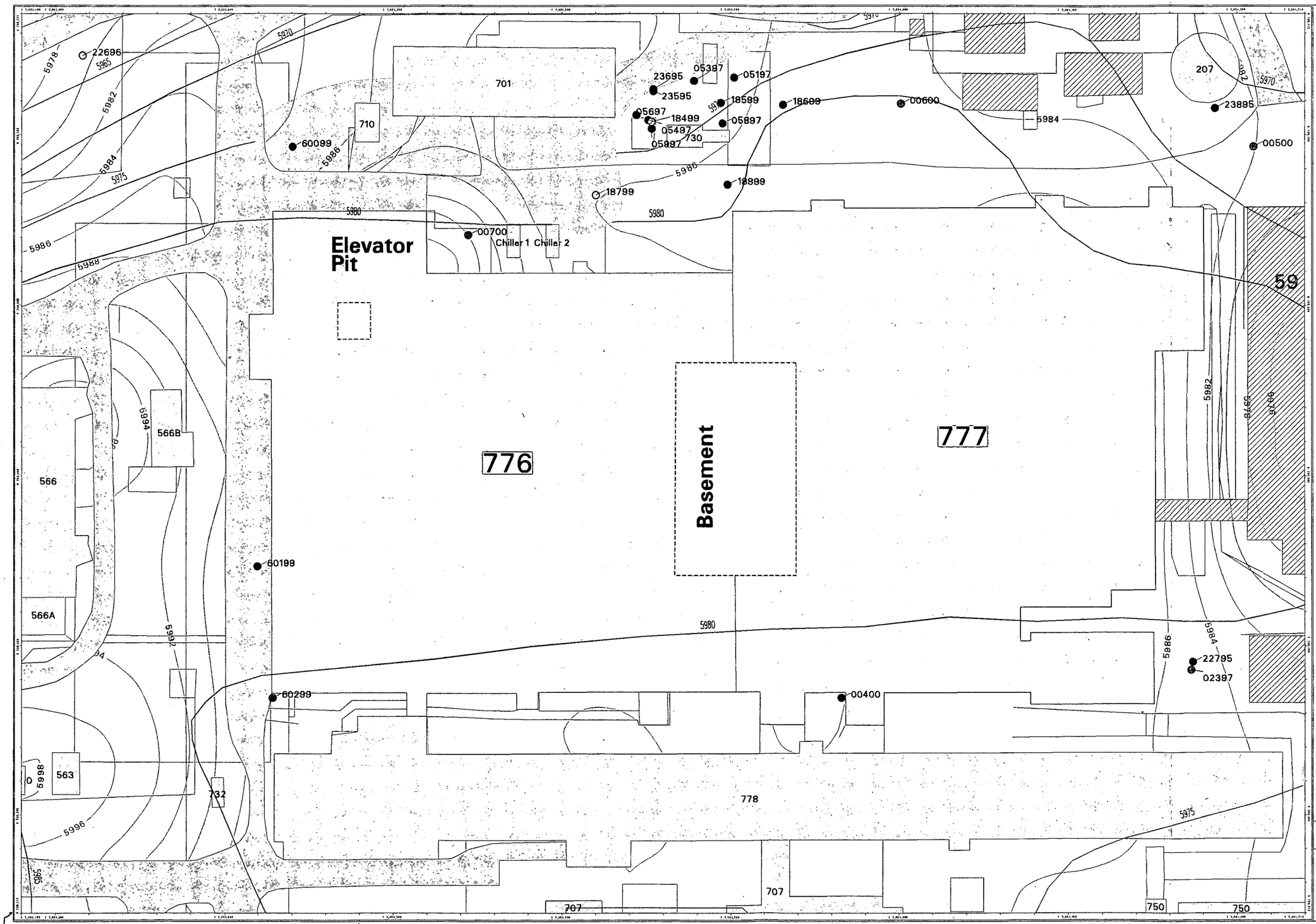
Figure 5-7

Building 776/777 Location Map with D&D Monitoring Wells

2001 Annual RFCA Groundwater Monitoring Report



EXPLANATION

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP

Water Level Contours Second Quarter 2001

- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Pertinent B776/777 IHSSs
- D&D Building

Standard Map Features

- Basement
- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (2-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSI, Las Vegas. Digitized from the orthophotographs, 1/95
Topographic contours were derived from digital elevation model (DEM) data by Harrison Knudson (1/10) using DEM Arc TIN and LATTICE to process the DEM data to create 2-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, 11/, 1994 Aerial Flyovers at ~ 10 meter resolution. DEM post-processing performed by MK, 1/inter 1997.

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Scale = 1 : 880
1 inch represents approximately 67 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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Figure 5-8

Building 371/374 Location Map with D&D Monitoring Wells

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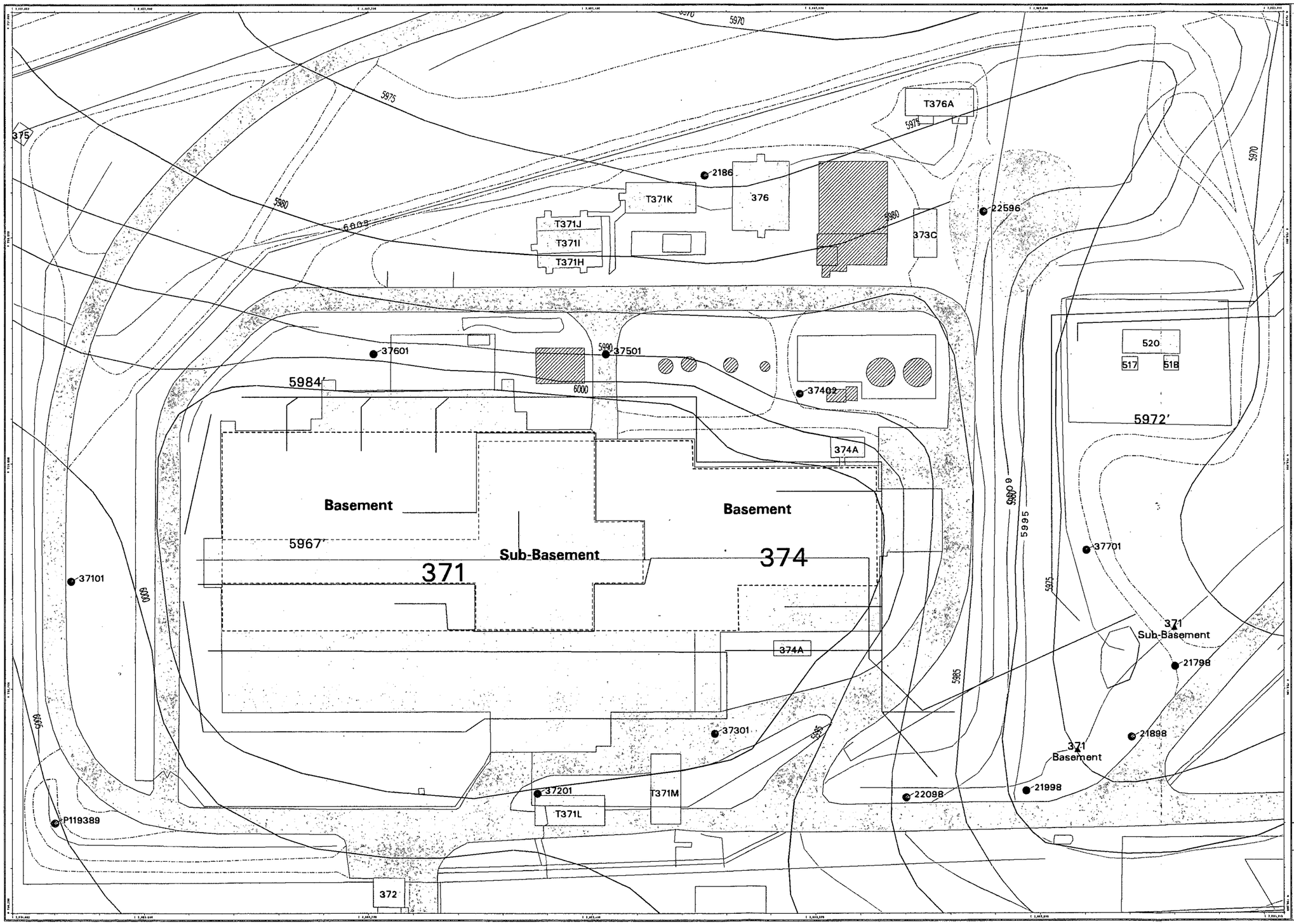

EXPLANATION

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP
- Foundation Drain Sampling Location

Water Level Contours Second Quarter 2001

- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Pertinent B371 & B374 IHSSs

Standard Map Features

- Sub-Basement
- Basement
- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial flyover data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs, 1/95. Topographic contours were derived from digital elevation model (DEM) data by Jonson Knudson (JKA) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, 1/2, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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Scale = 1 : 1030
1 inch represents approximately 86 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum : NAD27

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November 05, 2002

NT_Svr w:/projects/fy2002/02-0733/bldg_371-374.aml

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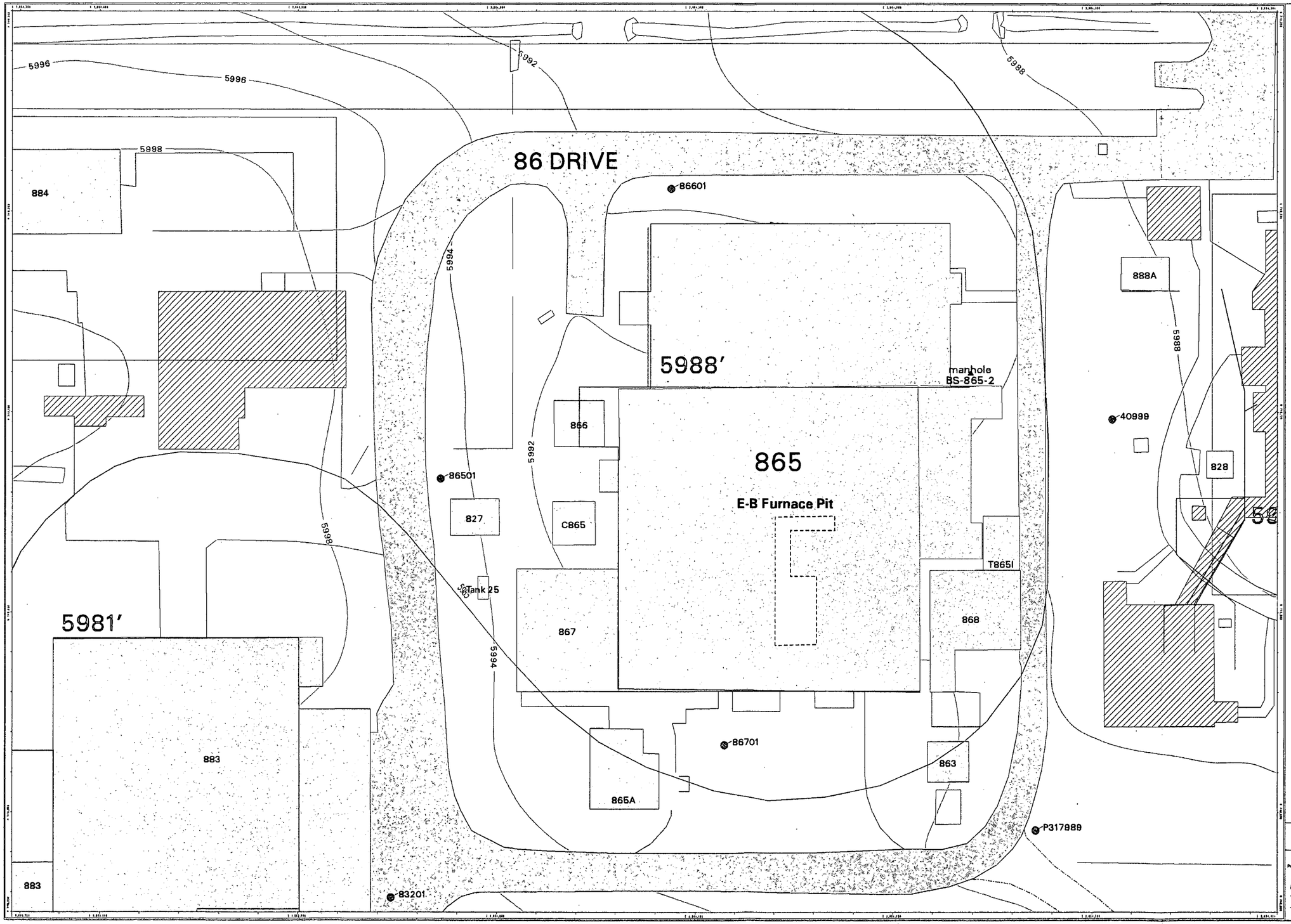

Figure 5-9

Building 865 Location Map with D&D Monitoring Wells

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP
- Foundation Drain Sampling Location

Water Level Contours Second Quarter 2001

- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Pertinent 8865 IHSSs

Standard Map Features

- Basement
- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (2-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs, 1/95
Topographic contours were derived from digital elevation model (DEM) data by Merrimen Knudson (1/10) using DSN Arc TIN and LATTICE to process the DEM data to create 2-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, 11/1994 Aerial Photos at ~ 10 meter resolution. DEM post-processing performed by KHK, Winter 1997.

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Scale = 1 : 580
1 inch represents approximately 48 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
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GIS Dept. 303-966-7707

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November 14, 2002

NT_Svr d:/projects/fy2002/02-0733/bldg_865.aml

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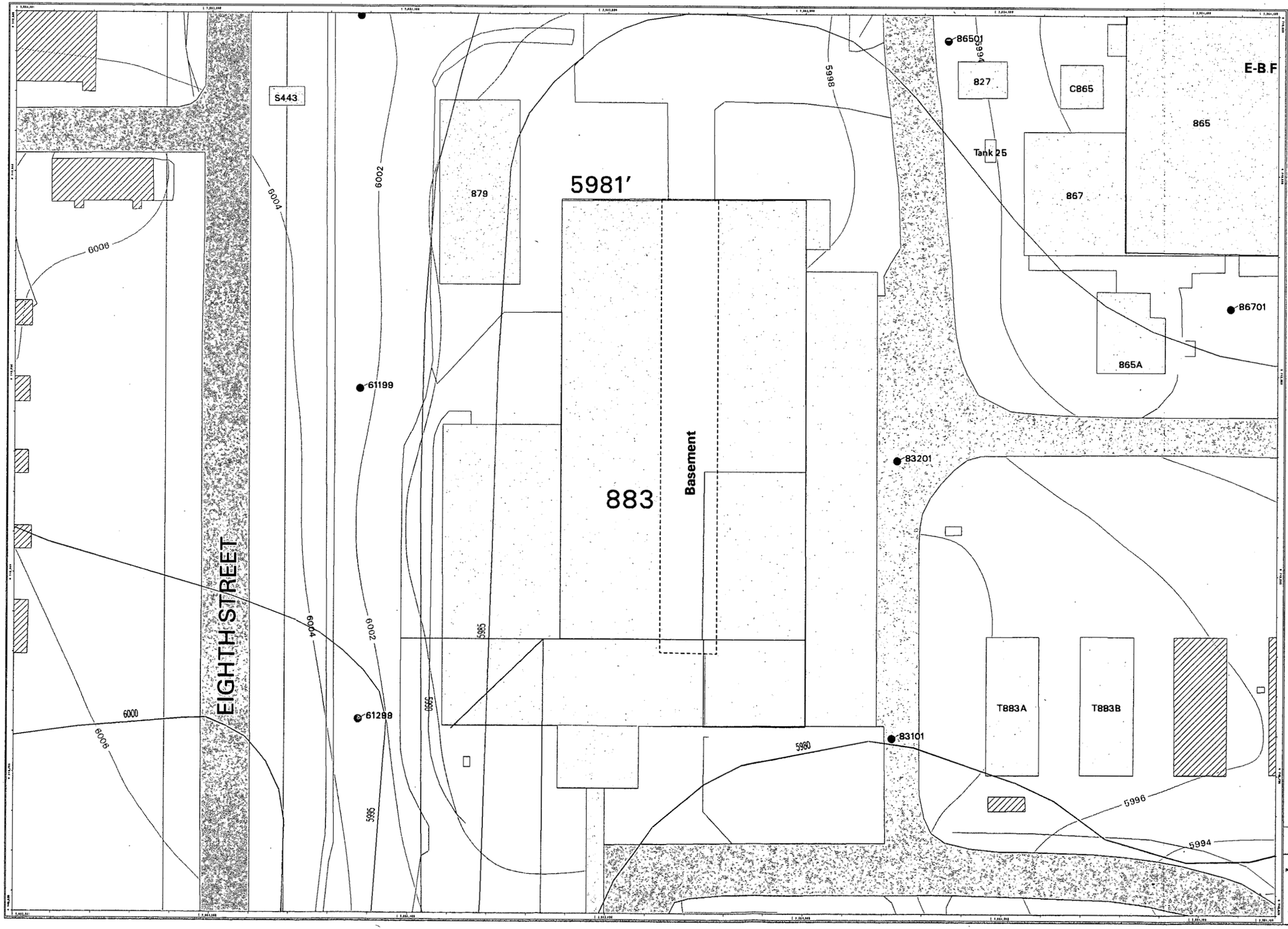
Figure 5-10
Building 883 Location Map with D&D Monitoring Wells
2001 Annual RFCA Groundwater Monitoring Report



EXPLANATION

IMP Well Type
- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP
- Foundation Drain Sampling Location

Water Level Contours Second Quarter 2001
- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Pertinent 8883 IHSSs

Standard Map Features
- Basement
- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (2-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial flyover data captured by EG&G RSL, Las Vegas.
Digitized from the ortophotographs, 1/95.
Topographic contours were derived from digital elevation model (DEM) data by Aberdeen Rhodson (ARI) using ESRI Arc TIN and LATTICE to process the DEM data to create 2-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, ITC 1994 Aerial Flyover at ~ 10 meter resolution. DSM post-processing performed by MK, Winter 1997.

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Scale = 1 : 580
1 inch represents approximately 48 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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November 14, 2002

NT_Svr d:/projects/fy2002/02-0733/bldg_883.aml

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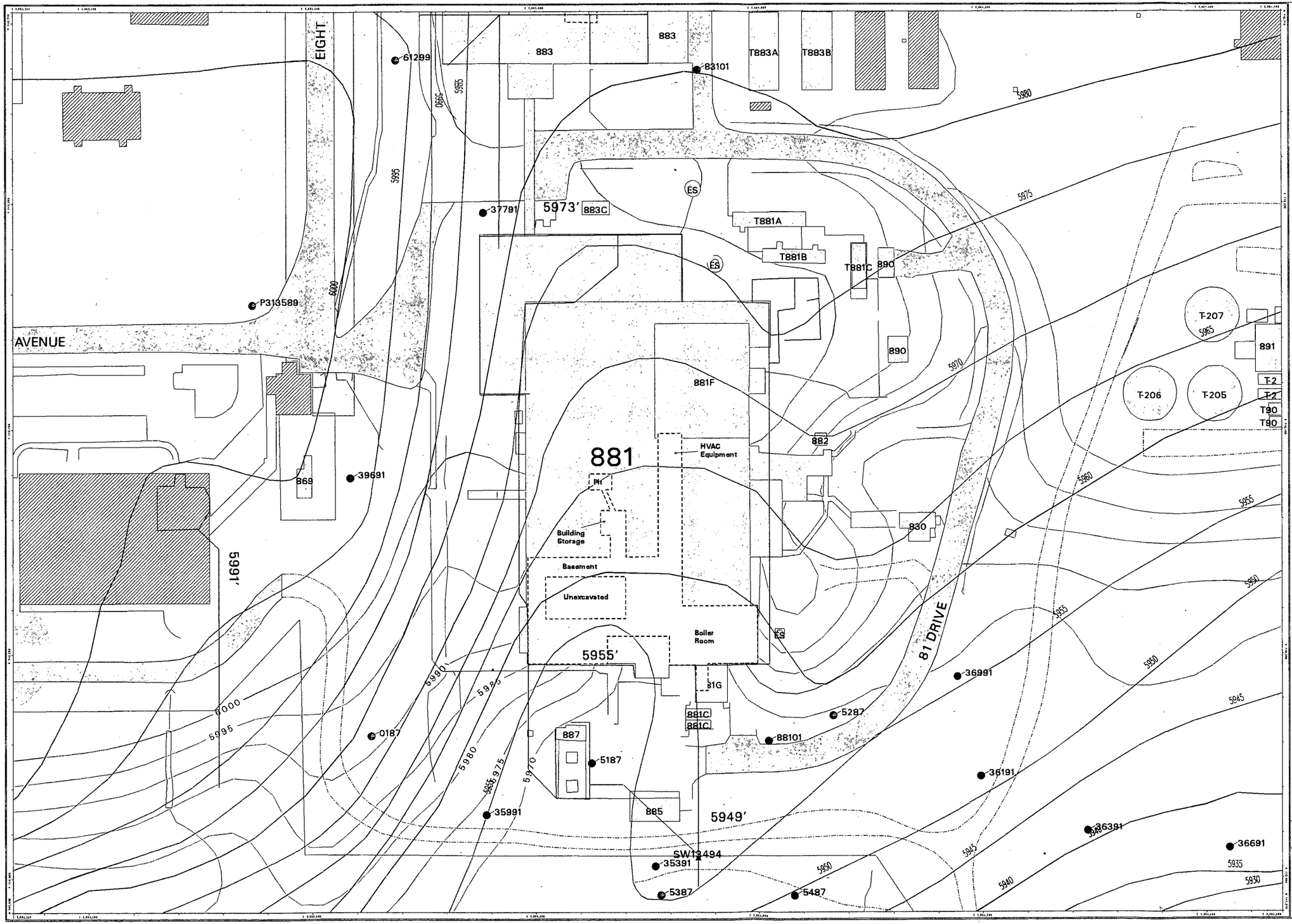
Figure 5-11

Building 881 Location Map with D&D Monitoring Wells

2001 Annual RFCA Groundwater Monitoring Report



EXPLANATION

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP
- Foundation Drain Sampling Location

Water Level Contours Second Quarter 2001

- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Pertinent 8881 IHSSs

Standard Map Features

- Basement
- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G REI, Las Vegas. Digitized from the orthophotographs, 1/95
Topographic contours were derived from digital elevation model (DEM) data by Johnson Wladson (MK) using ESRI Arc TIN and LATTICE to process the DCRI data to create 5-foot contours. The DCRI data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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Scale = 1 : 1000
1 inch represents approximately 83 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum : NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site
GIS Dept. 303-966-7707

Prepared by: DynCorp — THE ART OF TECHNOLOGY
Prepared for: KAISER-HILL COMPANY

November 05, 2002

NT_Svr w:/projects/fy2002/02-0733/bldg_881.aml

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Figure 5-12

Building 991 Location Map with D&D Monitoring Wells

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP

Water Level Contours Second Quarter 2001

- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Pertinent B991 IHSSs

Standard Map Features

- Basement
- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G REI, Las Vegas. Digitized from the orthophotographs, 1/95
Topographic contours were derived from digital elevation model (DEM) data by Harrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5 foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, 17.1.1994 Aerial Photos at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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Scale = 1 : 1250
1 inch represents 105 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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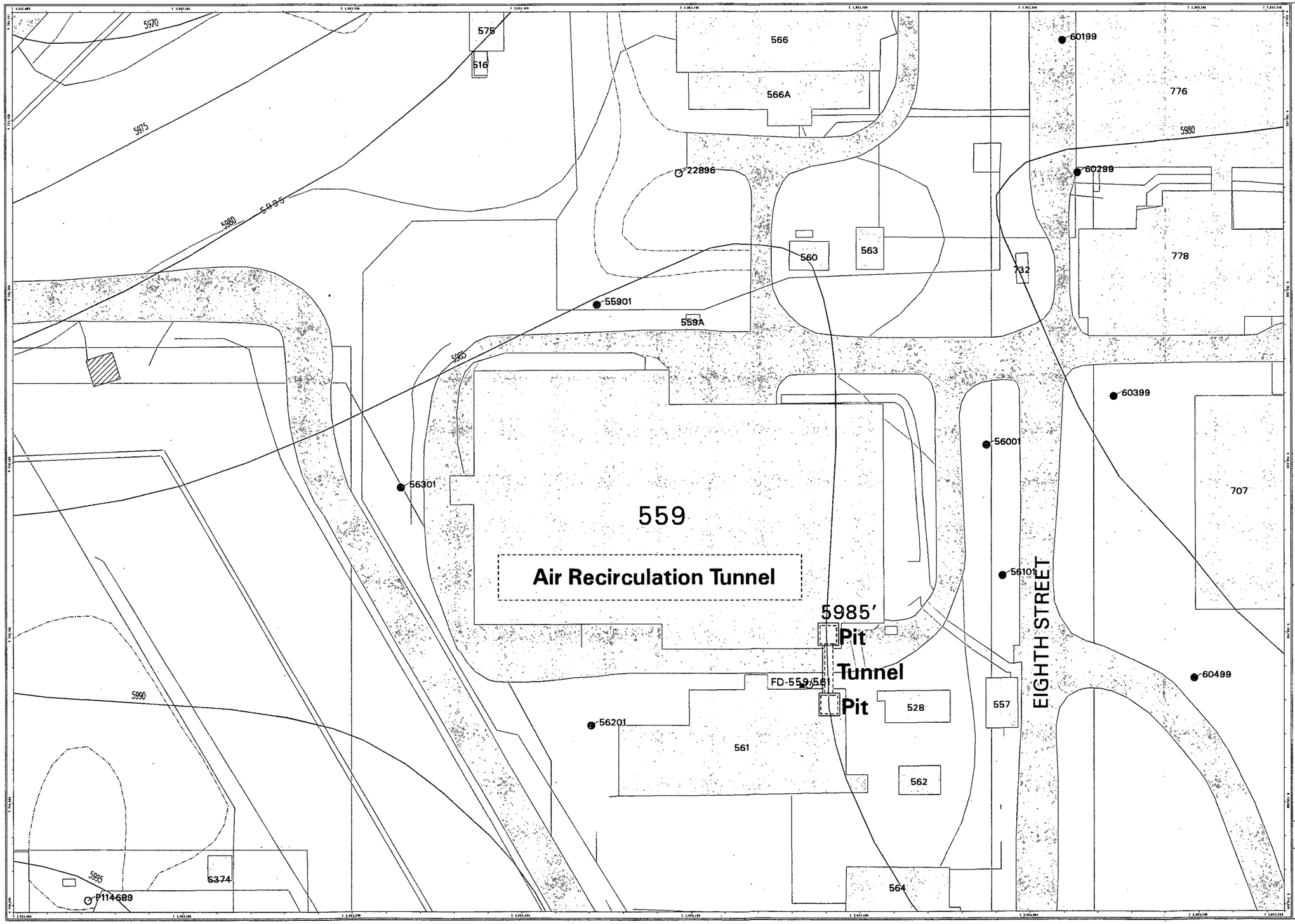
NT_Svr w:/projects/rfoa/fy02/projects/02-0733/bldg_991.aml

220

Figure 5-13

Building 559 Location Map with D&D Monitoring Wells

2001 Annual RFCA Groundwater Monitoring Report



EXPLANATION

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP
- Foundation Drain Sampling Location

Water Level Contours Second Quarter 2001

- 20-Foot Water Level Contour
- 5-Foot Intermediate Contour
- Foundation Drain
- Pertinent B559 IHSSs

Standard Map Features

- Basement
- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, Hydrography, roads and other structures from 1994 aerial flyover data captured by EG&G RSI, Las Vegas. Digitized from the orthophotographs, 1993 Topographic contours were derived from digital elevation model (DEM) data by Harrison Knudson (HK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, 7/7, 1994 Aerial Flyovers at ~ 10 meter resolution. DEM post-processing performed by HK, Winter 1997.

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Scale = 1 : 880
1 inch represents approximately 67 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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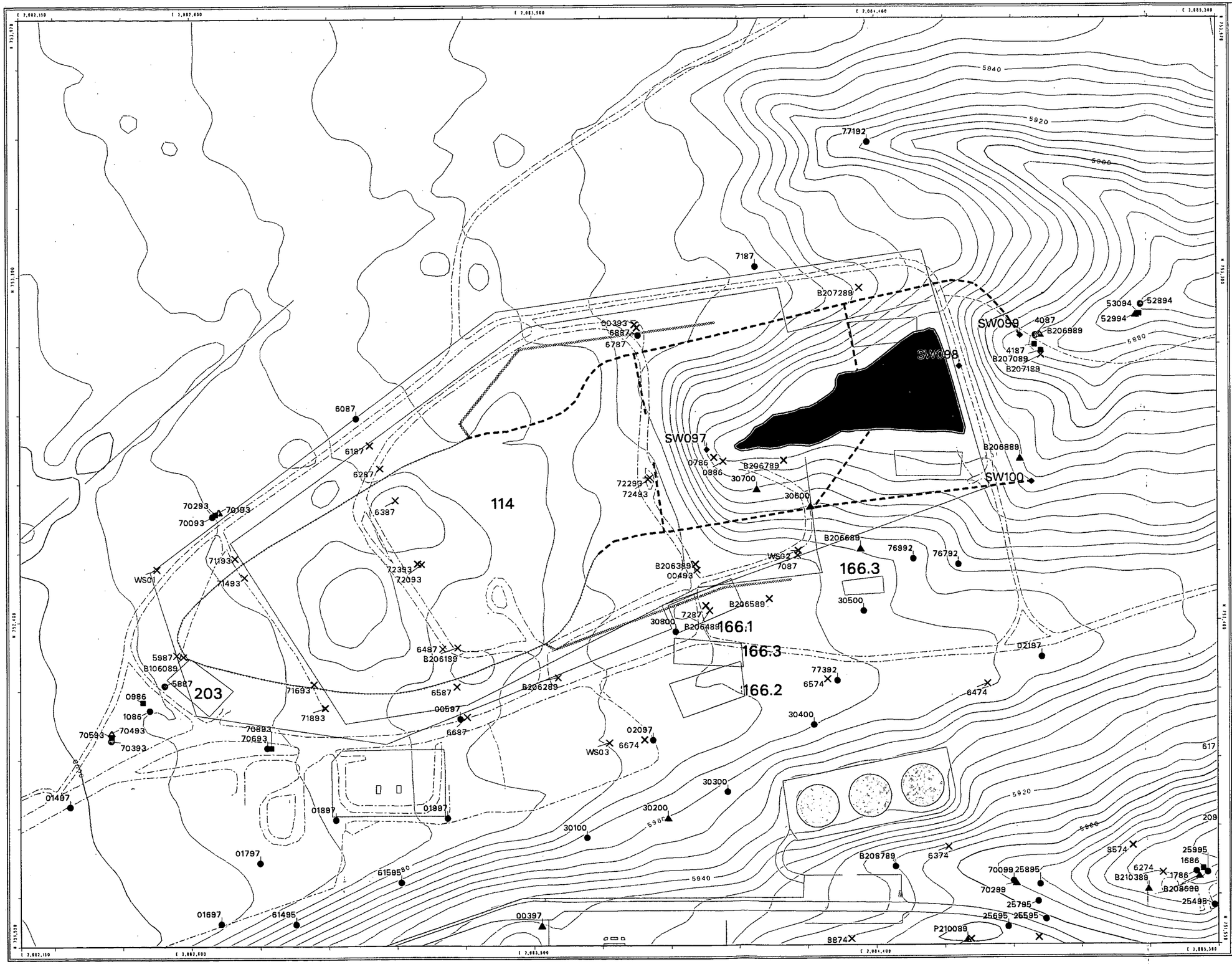
224

Figure 6-1

Groundwater Intercept and Diversion System Layout at the Present Sanitary Landfill

2001 Annual RFCA Groundwater Monitoring Report



EXPLANATION

- Groundwater Monitor Well UHSU Surficial Material
- Groundwater Monitor Well UHSU Bedrock
- Groundwater Monitor Well LHSU Bedrock
- Landfill Groundwater Monitoring Wells
- All Other Existing Wells
- Abandoned Wells
- Surface Water Monitoring Locations
- Individual Hazardous Substance Site
- Slurry Wall
- GW Intercept System - Perforated
- GW Intercept System - Non-Perforated
- East Landfill Pond
- Tanks
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

N

Scale = 1 : 2970
1 inch represents approximately 248 feet

50 0 100 200ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
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November 07, 2002

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Figure 6-2

Water Quality Parameters (mg/L) above the Reported Detection Limit at the Present Sanitary Landfill

2001 Annual RFCA Groundwater Monitoring Report

B206989	Background	Q1	Q2	Q3	Q4
FLUORIDE	1.55	LW	NS	BDL	BDL
NITRATE/NITRITE	4.664	60	NS	33.3	31.4
SULFATE	435.6	LW	NS	2800	2760
TOTAL DISSOLVED SOLIDS	979.51	LW	NS	5200	5170

4087	Background	Q1	Q2	Q3	Q4
FLUORIDE	1.55	2	1.2	LW	NS
NITRATE/NITRITE	4.664	0.09	0.07	0.13	NS
SULFATE	435.6	280	130	LW	NS
TOTAL DISSOLVED SOLIDS	979.51	750	540	LW	NS

5887	Background	Q1	Q2	Q3	Q4
FLUORIDE	1.55	0.17	0.16	BDL	BDL
NITRATE/NITRITE	4.664	3.8	3.2	2.4	3.3
SULFATE	435.6	31	27	22.4	27.4
TOTAL DISSOLVED SOLIDS	979.51	150	130	163	177

70193	Background	Q1	Q2	Q3	Q4
FLUORIDE	1.55	0.3	0.35	BDL	BDL
NITRATE/NITRITE	4.664	1.8	2.3	2.3	2.9
SULFATE	435.6	21	21	23	22.5
TOTAL DISSOLVED SOLIDS	979.51	160	150	193	203

52994	Background	Q1	Q2	Q3	Q4
FLUORIDE	1.55	NS	NS	NS	NS
NITRATE/NITRITE	4.664	NS	NS	NS	NS
SULFATE	435.6	NS	NS	NS	NS
TOTAL DISSOLVED SOLIDS	979.51	NS	NS	NS	NS

52894	Background	Q1	Q2	Q3	Q4
FLUORIDE	1.55	NS	NS	2.1	NS
NITRATE/NITRITE	4.664	NS	NS	0.58	NS
SULFATE	435.6	NS	NS	86.2	NS
TOTAL DISSOLVED SOLIDS	979.51	NS	NS	638	NS

70393	Background	Q1	Q2	Q3	Q4
FLUORIDE	1.55	0.21	0.16	BDL	BDL
NITRATE/NITRITE	4.664	5.6	5.5	4.3	5.2
SULFATE	435.6	27	30	32	30.5
TOTAL DISSOLVED SOLIDS	979.51	140	150	182	171

70493	Background	Q1	Q2	Q3	Q4
FLUORIDE	1.55	0.65	0.67	0.86	0.75
NITRATE/NITRITE	4.664	2.3	2.8	2.1	2.6
SULFATE	435.6	13	13	13.9	14.9
TOTAL DISSOLVED SOLIDS	979.51	190	220	207	201

EXPLANATION

- Groundwater Monitor Well UHSU Surficial Material
- Groundwater Monitor Well UHSU Bedrock
- Groundwater Monitor Well LHSU Bedrock
- Landfill Groundwater Monitoring Wells
- All Other Existing Wells
- Abandoned Wells
- Surface Water Monitoring Locations
- Individual Hazardous Substance Site
- Slurry Wall
- GW Intercept System - Perforated
- GW Intercept System - Non-Perforated
- East Landfill Pond
- Tanks
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

NOTES:
BDL - Below Detection Limit
LW - Lacked Water
NS - Not Sampled/Dry Conditions

Source of GIS data available upon request.

Scale = 1 : 2970
1 inch represents approximately 248 feet

50 0 100 200ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KAISER+HILL COMPANY

November 07, 2002

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Figure 6-3

Selected Metals (ug/L) above the Reported Detection Limit at the Present Sanitary Landfill

2001 Annual RFCA Groundwater Monitoring Report

4087	Background	Q1	Q2	Q3	Q4
ALUMINUM	234.1	BDL	36.3	BDL	NS
CHROMIUM	12.44	16.6	BDL	44.5	NS
COPPER	13.85	BDL	BDL	3.1	NS
LITHIUM	142.55	148	BDL	148	NS
SELENIUM	43.72	11.8	3.8	13.1	NS
STRONTIUM	930.76	734	529	896	NS

B206989	Background	Q1	Q2	Q3	Q4
ALUMINUM	234.1	46.2	NS	BDL	26.6
BARIUM	152.54	BDL	NS	14	BDL
CADMIUM	4.25	1.3	NS	0.46	BDL
CHROMIUM	12.44	BDL	NS	9.8	BDL
COPPER	13.85	5.4	NS	16	5.5
IRON	283.14	BDL	NS	390	BDL
LITHIUM	142.55	2140	NS	1100	1150
MANGANESE	162.33	30.9	NS	BDL	BDL
SELENIUM	43.72	272	NS	280	303
STRONTIUM	930.76	5980	NS	6400	6470
THALLIUM	4.9	BDL	NS	BDL	4.5

5887	Background	Q1	Q2	Q3	Q4
ALUMINUM	234.1	BDL	33.4	BDL	BDL
CHROMIUM	12.44	2.88	BDL	BDL	2
COPPER	13.85	5.63	5.7	2.1	BDL
SELENIUM	43.72	4.05	BDL	BDL	3.4

70193	Background	Q1	Q2	Q3	Q4
ALUMINUM	234.1	48.3	105	BDL	BDL
BARIUM	152.54	BDL	BDL	101	BDL
SELENIUM	43.72	8.6	4.8	11.2	5.7

52994	Background	Q1	Q2	Q3	Q4
All Metals	N/A	NS	NS	NS	NS

52894	Background	Q1	Q2	Q3	Q4
ALUMINUM	234.1	NS	NS	45.9	NS
COPPER	13.85	NS	NS	2.9	NS
LITHIUM	142.55	NS	NS	127	NS
SELENIUM	43.72	NS	NS	5.2	NS
STRONTIUM	930.76	NS	NS	463	NS

70393	Background	Q1	Q2	Q3	Q4
ALUMINUM	234.1	31.9	34.8	BDL	BDL

70493	Background	Q1	Q2	Q3	Q4
ALUMINUM	234.1	BDL	26.3	BDL	BDL
BARIUM	152.54	104	BDL	100	BDL
SELENIUM	43.72	10.8	7.2	BDL	4.1
SILVER	7.08	1.33	BDL	BDL	2.6
STRONTIUM	930.76	254	237	222	238

EXPLANATION

- Groundwater Monitor Well UHSU Surficial Material
- Groundwater Monitor Well UHSU Bedrock
- Groundwater Monitor Well LHSU Bedrock
- Landfill Groundwater Monitoring Wells
- All Other Existing Wells
- Abandoned Wells
- Surface Water Monitoring Locations
- Individual Hazardous Substance Site
- Slurry Wall
- GW Intercept System - Perforated
- GW Intercept System - Non-Perforated
- East Landfill Pond
- Tanks
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

NOTES:
BDL - Below Detection Limit
NS - Not Sampled/Dry Conditions

Source of GIS data available upon request.

Scale = 1 : 2870
1 inch represents approximately 248 feet

50 0 100 200ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
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Figure 6-4

Tritium & Dissolved Uranium (pCi/L) above the Reported Detection Limit at the Present Sanitary Landfill

2001 Annual RFCA Groundwater Monitoring Report

4087	Background	Q1	Q2	Q3	Q4
TRITIUM	612.98	BDL	BDL	BDL	NS
URANIUM-233,-234	60.7	12	13.2	19	NS
URANIUM-235	1.79	0.594	0.544	0.53	NS
URANIUM-238	41.8	9.6	9.09	14	NS

B206989	Background	Q1	Q2	Q3	Q4
TRITIUM	612.98	BDL	NS	BDL	BDL
URANIUM-233,-234	60.7	LW	NS	60.5	53.4
URANIUM-235	1.79	LW	NS	1.5	1.64
URANIUM-238	41.8	LW	NS	37.2	32.1

5887	Background	Q1	Q2	Q3	Q4
TRITIUM	612.98	BDL	BDL	88	BDL
URANIUM-233,-234	60.7	BDL	BDL	0.13	BDL
URANIUM-235	1.79	BDL	BDL	0.057	BDL
URANIUM-238	41.8	BDL	BDL	0.071	BDL

70193	Background	Q1	Q2	Q3	Q4
TRITIUM	612.98	BDL	BDL	BDL	BDL
URANIUM-233,-234	60.7	BDL	0.273	BDL	BDL
URANIUM-235	1.79	BDL	BDL	BDL	0.163
URANIUM-238	41.8	BDL	0.244	BDL	BDL

52994	Background	Q1	Q2	Q3	Q4
All Rads	N/A	NS	NS	NS	NS

52894	Background	Q1	Q2	Q3	Q4
TRITIUM	612.98	NS	NS	68	NS
URANIUM-233,-234	60.7	NS	NS	16	NS
URANIUM-235	1.79	NS	NS	0.52	NS
URANIUM-238	41.8	NS	NS	12	NS

70493	Background	Q1	Q2	Q3	Q4
TRITIUM	612.98	BDL	BDL	BDL	BDL
URANIUM-233,-234	60.7	1.89	1.61	0.785	1.64
URANIUM-235	1.79	0.214	BDL	BDL	BDL
URANIUM-238	41.8	0.989	1	0.454	0.659

70393	Background	Q1	Q2	Q3	Q4
TRITIUM	612.98	BDL	BDL	8	BDL
URANIUM-233,-234	60.7	BDL	0.025	0.11	BDL
URANIUM-235	1.79	BDL	0.008	0.035	BDL
URANIUM-238	41.8	BDL	0.051	0.035	BDL

EXPLANATION

- Groundwater Monitor Well UHSU Surficial Material
- Groundwater Monitor Well UHSU Bedrock
- Groundwater Monitor Well LHSU Bedrock
- Landfill Groundwater Monitoring Wells
- All Other Existing Wells
- Abandoned Wells
- Surface Water Monitoring Locations
- Individual Hazardous Substance Site
- Slurry Wall
- GW Intercept System - Perforated
- GW Intercept System - Non-Perforated
- East Landfill Pond
- Tanks
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

NOTES:
BDL - Below Detection Limit
LW - Lacked Water
NS - Not Sampled/Dry Conditions

Source of GIS data available upon request.

Scale = 1 : 2970
1 inch represents approximately 248 feet

50 0 100 200ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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Figure 6-5

Volatile Organic Compounds (ug/L) above the Method Detection Limit at the Present Sanitary Landfill

2001 Annual RFCA Groundwater Monitoring Report

5887 METHYLENE CHLORIDE	Q1	Q2	Q3	Q4
	0.32	BDL	BDL	BDL

70193 TETRACHLOROETHENE	Q1	Q2	Q3	Q4
	0.1	BDL	BDL	BDL

4087 All VOCs	Q1	Q2	Q3	Q4
	BDL	BDL	BDL	BDL

B206989 All VOCs	Q1	Q2	Q3	Q4
	BDL	BDL	BDL	BDL

52894 METHYLENE CHLORIDE	Q1	Q2	Q3	Q4
	BDL	BDL	0.93	BDL

52994 All VOCs	Q1	Q2	Q3	Q4
	BDL	BDL	BDL	BDL

70393	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	19.4	10	13	14
1,1-DICHLOROETHENE	15.2	8	10	11
CARBON TETRACHLORIDE	0.54	BDL	0.4	0.48
CHLOROFORM	BDL	0.2	BDL	0.26
cis-1,2-DICHLOROETHENE	BDL	0.1	BDL	BDL
TETRACHLOROETHENE	7	4	5.7	5.6
TRICHLOROETHENE	22.6	13	15	17

70493	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	0.5	0.5	0.5	0.54
1,1-DICHLOROETHENE	0.3	BDL	BDL	0.24
METHYLENE CHLORIDE	0.2	BDL	BDL	BDL
TETRACHLOROETHENE	0.2	BDL	BDL	BDL
TRICHLOROETHENE	1	1	1.1	1.3

114 203 166.1 166.2 166.3 166.3

SW097 SW098 SW099 SW100

EXPLANATION

- Groundwater Monitor Well UHSU Surficial Material
- Groundwater Monitor Well UHSU Bedrock
- Groundwater Monitor Well LHSU Bedrock
- Landfill Groundwater Monitoring Wells
- All Other Existing Wells
- Abandoned Wells
- Surface Water Monitoring Locations
- Individual Hazardous Substance Site
- Slurry Wall
- GW Intercept System - Perforated
- GW Intercept System - Non-Perforated
- East Landfill Pond
- Tanks
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

NOTES:
BDL - Below Detection Limit

Source of GIS data available upon request.

Scale = 1 : 2970
1 inch represents approximately 248 feet

50 0 100 200ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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241

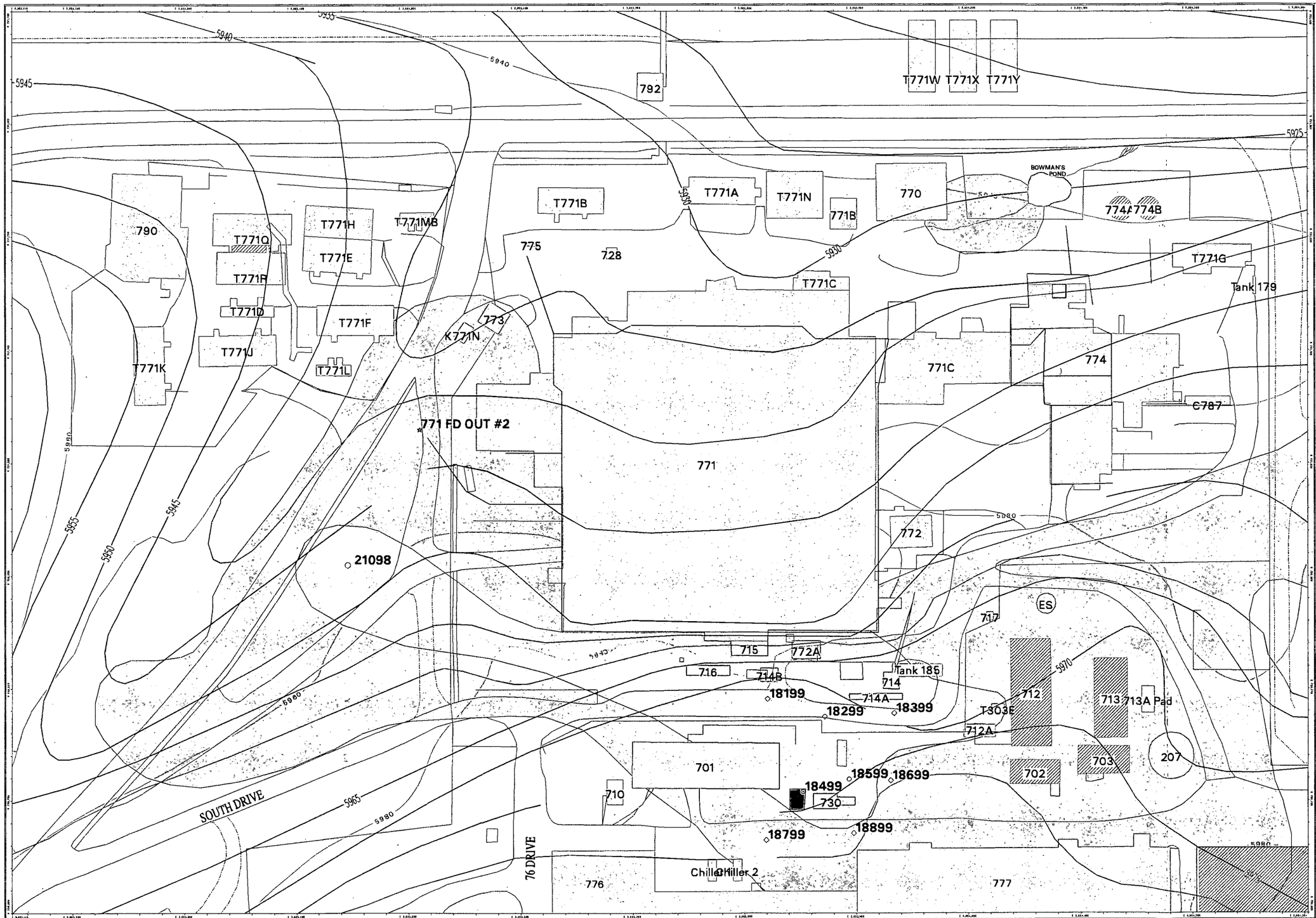

Figure 7-1

Location Map
IHSS 118.1 Wells

2001 Annual RFCA Groundwater Monitoring Report

IHSS 118.1 Wells
- Alluvial Wells
- Alluvial/Bedrock Wells
- Surface Water Monitoring Locations
- Location of IHSS 118.1

Potentiometric Contours
- 20-Foot Water Level Contour
- Dashed where inferred
- 5-Foot Intermediate Water Level Contour
- Dashed where inferred

VOC Groundwater Plumes
- Carbon Tetrachloride concentration equal to or greater than 5 ug/L
- Carbon Tetrachloride concentration equal to or greater than 500 ug/L

Standard Map Features
- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrographic roads and other structures from 1994 aerial fly-over data captured by EG&G RSI, Las Vegas. Digitized from the orthophotographs, 1/95.
Topographic contours were derived from digital elevation model (DEM) data by Jamison Knudson (RMI) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, 7½ 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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Scale = 1 : 1040
1 inch represents approximately 88 feet

State Plane Coordinate Projection
Colorado Central Zone
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268

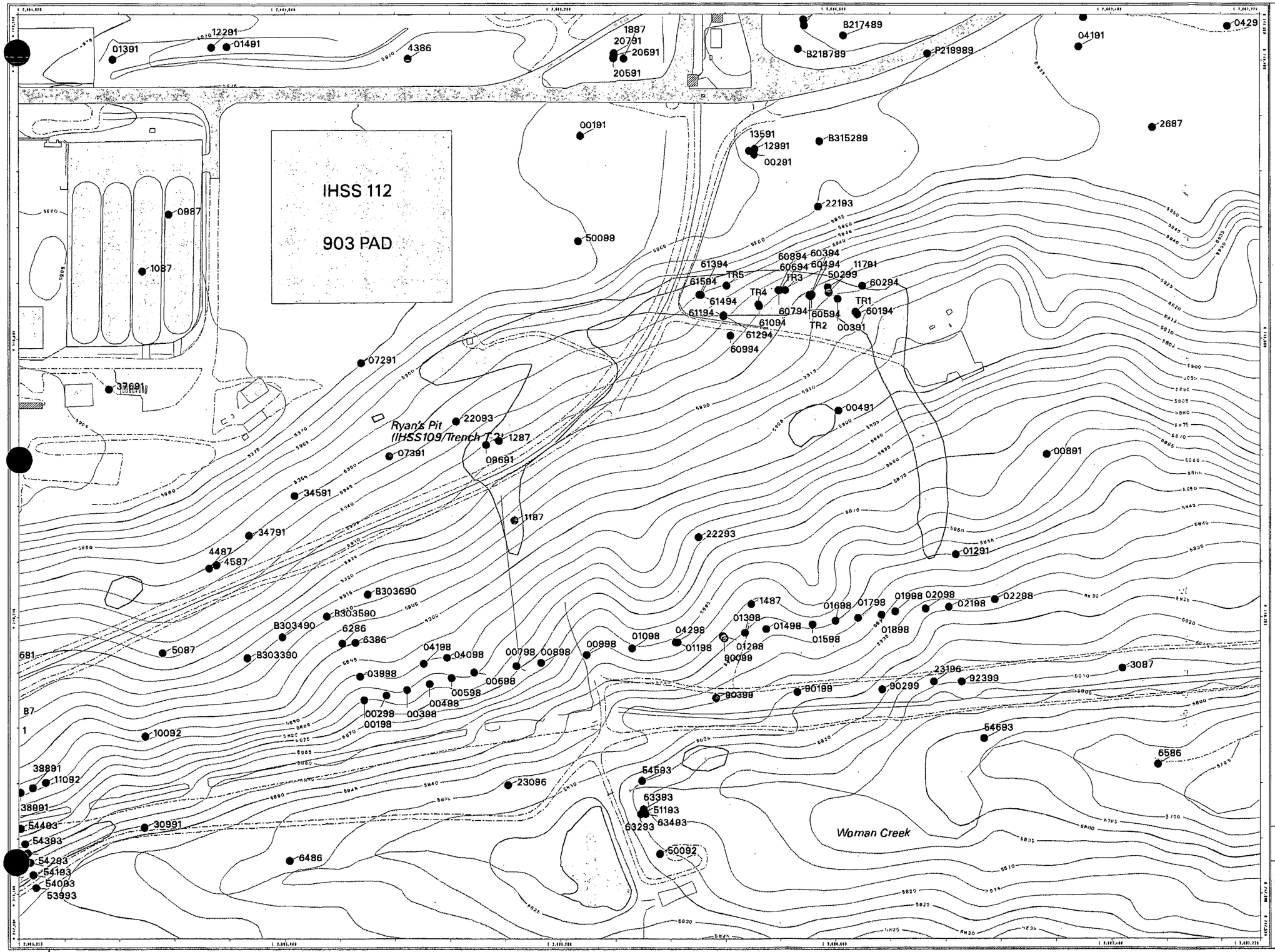

Figure 7-7
903 Pad/Ryan's Pit Area Location Map
2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Groundwater Wells
- Project Wells
- Seeps

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Paved roads fill
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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Scale = 1 : 2470
1 inch represents approximately 206 feet

50 0 100 200ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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November 07, 2002

NT_Srv:w:/projects/fy2002/02-0843/fig7-7.aml

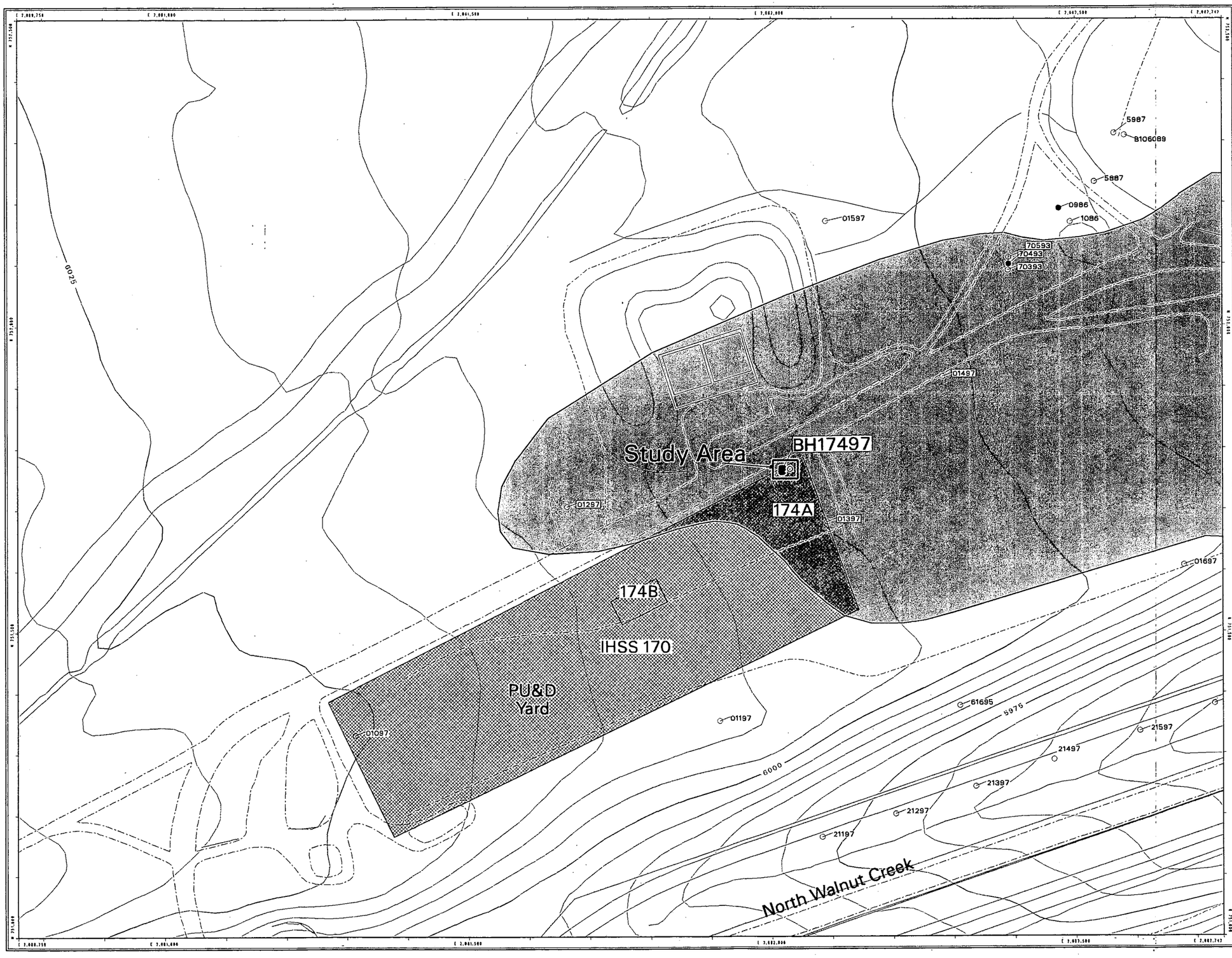

Figure 7-13

PU&D Yard Groundwater VOC Plume Treatability Study Area

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- PU&D Yard Monitoring Well
- Groundwater Monitor Well UHSU Surficial Material
- Groundwater Monitor Well UHSU Bedrock
- Groundwater Monitor Well LHSU Bedrock
- Borehole Locations
- Abandoned Monitor Well
- Material Insertion Point
- Composite VOC Groundwater Plume (concentration equal to MCL)
- PU&D Yard IHSS

Standard Map Features

- Buildings and other structures
- Landfill Pond
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

NOTES:
Source of GIS data available upon request.

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N

Scale = 1 : 1900
1 inch represents approximately 158 feet

60 0 100 200ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

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Prepared for: KAISER-HILL COMPANY

September 10, 2002

NT_Svr w:/projects/fy2002/02-0812/pud-yard.aml

280

Figure 8-2a

Selected Groundwater Wells used for Uranium ICP/MS Ratios

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- ▲ Wells with U236 Present
- □ Wells with U235 Enriched Uranium detection
- ◇ Wells with U235 Depleted Uranium detection
- ○ All other wells with ICP/MS Uranium Values

Standard Map Features

- Lakes and ponds
- Streams, ditches, or other drainage features
- Topographic Contour (20-Foot)

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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N

500 0 1000 2000ft

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November 04, 2002

NT_Svr w:/projects/fy2003/03-0027/iepms_locs-bsize.aml

305
935

Figure 8-3

Tetrachloroethene Concentrations (ug/L) From 1997-2002 Industrial Area Plume

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

Well Sample by Year

- 1997 Well Samples
- 1998 Well Samples
- 1999 Well Samples
- 2000 Well Samples
- 2001 Well Samples
- 2002 Well Samples

Tetrachloroethene Plume Concentrations

- 5 ug/L (Tier II)
- 100 ug/L
- 200 ug/L
- 300 ug/L

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads
- Foundation Drain
- Possible or inferred fault with direction of movement U = Up & D = Down

DATA SOURCE BASE FEATURES:

Subject Matter Expert: Joel Sobol x6786
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs 1/96.
Topography (contours) were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 6-foot contours. The DEM data were captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution.
DEM post-processing performed by MK, Winter 1997.

Scale = 1 : 4820
1 inch represents 385 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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GIS Dept. 303-966-7707

Prepared by: DynCorp VSE ART OF TECHNOLOGY

Prepared for: KAISER-HILL COMPANY

November 07, 2002

NT_Svr w:/projects/fy2002/02-0881/poe_iap.aml

308
338

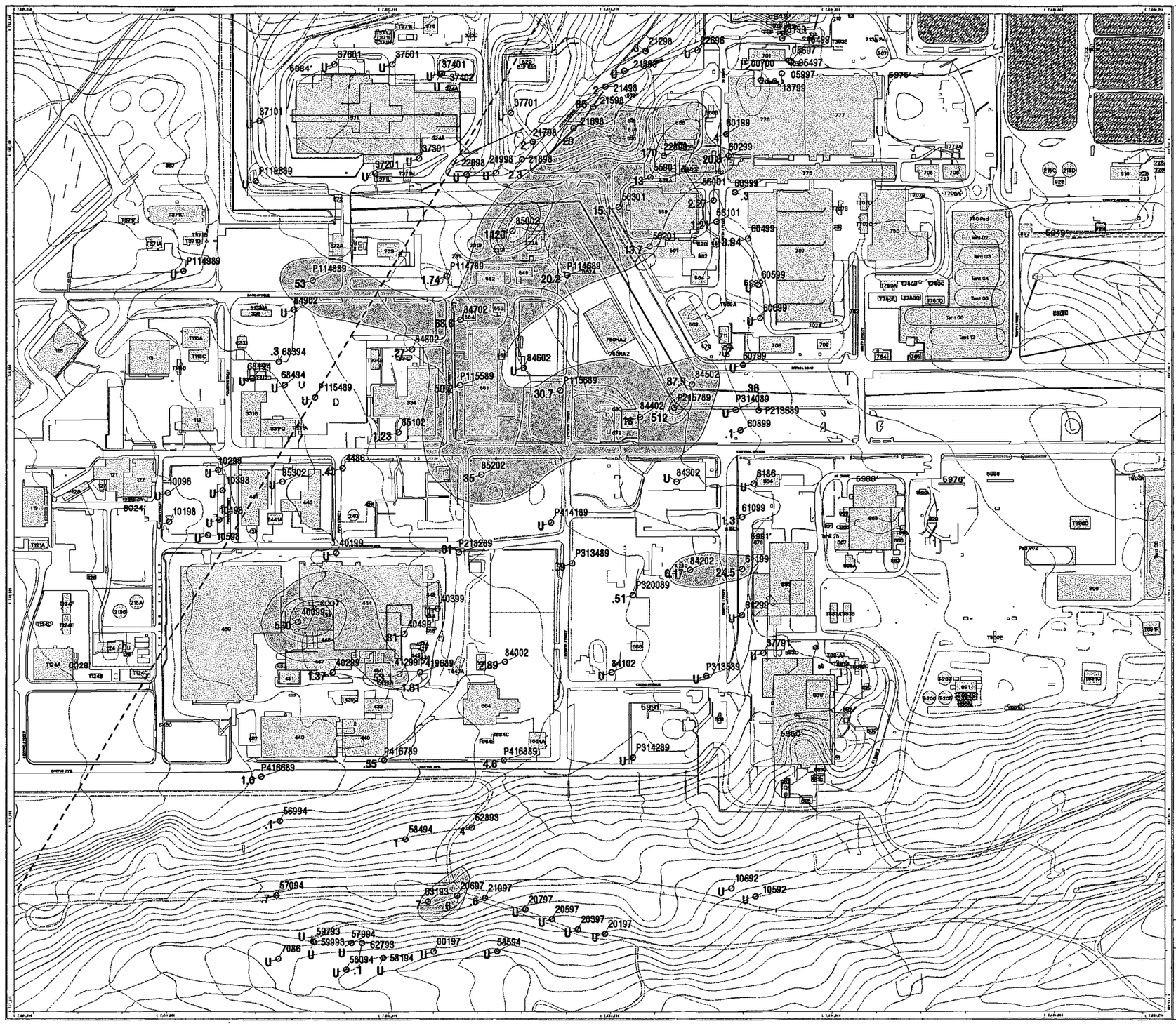

Figure 8-4

Trichloroethene Concentrations (ug/L) From 1997-2002 Industrial Area Plume

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

Well Sample by Year

- 1997 Well Samples
- 1998 Well Samples
- 1999 Well Samples
- 2000 Well Samples
- 2001 Well Samples
- 2002 Well Samples

Trichloroethene Plume Concentrations

- 5 ug/L (Tier II)
- 100 ug/L
- 500 ug/L (Tier I)
- 1,000 ug/L

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads
- Foundation Drain
- Possible or inferred fault with direction of movement U = Up & D = Down

DATA SOURCE BASE FEATURES:

Subject Matter Expert: Joel Sobol x6786
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSI, Las Vegas. Digitized from the orthophotographs 1/95.
Topography (contours) were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data were captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution.
DEM post-processing performed by MK, Winter 1997.

Scale = 1 : 4620
1 inch represents 385 feet

0 385 770 1540 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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November 07, 2002

NT_Svr w:/projects/fy2002/02-0881/toe_iap.aml

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2339

Figure 8-5

Cis 1,2 Dichloroethene Concentrations (ug/L) From 1997-2002 Industrial Area Plume

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

Well Sample by Year

- 1997 Well Samples
- 1998 Well Samples
- 1999 Well Samples
- 2000 Well Samples
- 2001 Well Samples
- 2002 Well Samples

Cis 1,2 Dichloroethene Plume Concentrations

- 70 ug/L (Tier II)
- 200 ug/L
- 500 ug/L

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads
- Foundation Drain
- Possible or inferred fault with direction of movement U = Up & D = Down

DATA SOURCE BASE FEATURES:
Subject Matter Expert: Joel Sobol x6786
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs 1/95. Topography (contours) were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data were captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

Scale = 1 : 4820
1 inch represents 400 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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November 07, 2002

NT_Svr w:/projects/fy2002/02-0881/doe_iap.aml

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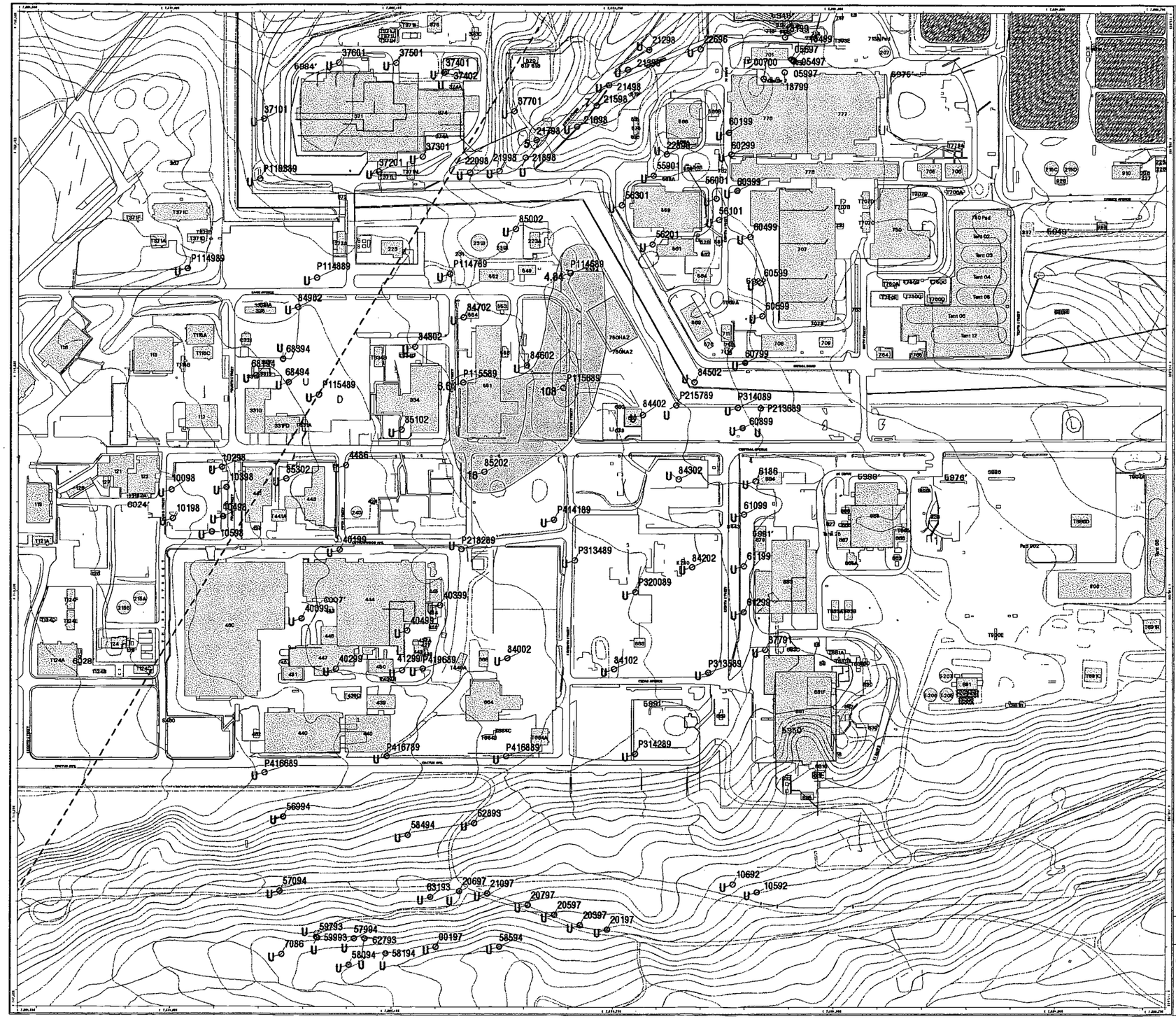

Figure 8-6

Vinyl Chloride Concentrations (ug/L) From 1997-2002 Industrial Area Plume

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

Well Sample by Year

- 1997 Well Samples
- 1998 Well Samples
- 1999 Well Samples
- 2000 Well Samples
- 2001 Well Samples
- 2002 Well Samples

Vinyl Chloride Plume Concentrations

- 2 ug/L (Tier II)
- 100 ug/L

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads
- Foundation Drain
- Possible or inferred fault with direction of movement U = Up & D = Down

DATA SOURCE BASE FEATURES:

Subject Matter Expert: Joel Sobol x6786
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs 1/95.
Topography (contours) were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 6-foot contours. The DEM data were captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution.
DEM post-processing performed by MK, Winter 1997.

Scale = 1 : 4800
1 inch represents 398 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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311
2077

Figure 8-7

Carbon Tetrachloride Concentrations (ug/L) From 1997-2002 Industrial Area Plume

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

Well Sample by Year

- 1997 Well Samples
- 1998 Well Samples
- 1999 Well Samples
- 2000 Well Samples
- 2001 Well Samples
- 2002 Well Samples

Carbon Tetrachloride Plume Concentrations

- 5 ug/L (Tier II)
- 100 ug/L
- 500 ug/L (Tier I)

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads
- Foundation Drain
- Possible or inferred fault with direction of movement U = Up & D = Down

DATA SOURCE BASE FEATURES:

Subject Matter Expert: Joel Sobol x6786
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs 1/96.
Topography (contours) were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data were captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution.
DEM post-processing performed by MK, Winter 1997.

Scale = 1 : 4020
1 inch represents 335 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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312
248

Figure 9-1

Metals Above Tier II Concentrations in Groundwater at the Solar Evaporation Ponds

Location P210089

Analyte	Result	Units	Sample Date	Tier II
SELENIUM	917	UG/L	4/1/2002	50
THALLIUM	4.5	UG/L	4/1/2002	2

Location B210389

Analyte	Result	Units	Sample Date	Tier II
LITHIUM	746	UG/L	3/20/2002	730
THALLIUM	5.5	UG/L	3/20/2002	2

Location 45693

Analyte	Result	Units	Sample Date	Tier II
THALLIUM	4.7	UG/L	3/26/2002	2

Location 22298

Analyte	Result	Units	Sample Date	Tier II
THALLIUM	3.7	UG/L	3/26/2002	2

Location 20198

Analyte	Result	Units	Sample Date	Tier II
CADMIUM	6.4	UG/L	5/30/2001	5
MANGANESE	2210	UG/L	5/30/2001	1720

Location B210489

Analyte	Result	Units	Sample Date	Tier II
SELENIUM	179	UG/L	3/28/2002	50
THALLIUM	4.6	UG/L	3/28/2002	2

Location B208689

Analyte	Result	Units	Sample Date	Tier II
LITHIUM	880	UG/L	3/20/2002	730

Location P208989

Analyte	Result	Units	Sample Date	Tier II
THALLIUM	2.9	UG/L	3/18/2002	2

Location 3086

Analyte	Result	Units	Sample Date	Tier II
CADMIUM	6.8	UG/L	3/19/2002	5
THALLIUM	2.5	UG/L	3/19/2002	2

Location P209589

Analyte	Result	Units	Sample Date	Tier II
LITHIUM	4130	UG/L	3/25/2002	730
STRONTIUM	31300	UG/L	3/25/2002	21900
THALLIUM	27.6	UG/L	3/25/2002	2

Location P209489

Analyte	Result	Units	Sample Date	Tier II
THALLIUM	3.4	UG/L	10/5/2001	2

Location 42993

Analyte	Result	Units	Sample Date	Tier II
THALLIUM	3.5	UG/L	3/22/2002	2

Location 41693

Analyte	Result	Units	Sample Date	Tier II
ALUMINUM	57800	UG/L	3/22/2002	36500
BERYLLIUM	9	UG/L	3/22/2002	4
CADMIUM	45.8	UG/L	3/22/2002	5
LEAD	97.1	UG/L	3/22/2002	15
LITHIUM	3210	UG/L	3/22/2002	730
MANGANESE	4150	UG/L	3/22/2002	1720
NICKEL	225	UG/L	3/22/2002	140

Location 02497

Analyte	Result	Units	Sample Date	Tier II
THALLIUM	5.33	UG/L	11/15/2000	2

Location 05093

Analyte	Result	Units	Sample Date	Tier II
THALLIUM	4.7	UG/L	4/4/2002	2

Location 00500

Analyte	Result	Units	Sample Date	Tier II
MANGANESE	2610	UG/L	11/12/2001	1720
THALLIUM	2.4	UG/L	11/12/2001	2

Location P209689

Analyte	Result	Units	Sample Date	Tier II
SELENIUM	94.4	UG/L	3/25/2002	50

Location 00100

Analyte	Result	Units	Sample Date	Tier II
THALLIUM	2.9	UG/L	11/15/2001	2

Location P209089

Analyte	Result	Units	Sample Date	Tier II
THALLIUM	4	UG/L	4/2/2002	2

Location P207589

Analyte	Result	Units	Sample Date	Tier II
SELENIUM	74.4	UG/L	3/25/2002	50
THALLIUM	4.5	UG/L	3/25/2002	2

Location 05193

Analyte	Result	Units	Sample Date	Tier II
THALLIUM	5.4	UG/L	4/8/2002	2

Location 02691

Analyte	Result	Units	Sample Date	Tier II
THALLIUM	2.5	UG/L	3/27/2002	2

Pond A-1

North Walnut Creek

South Walnut Creek

EXPLANATION

- Wells
  (For sampled wells:
  Red = filtered, Green = unfiltered)

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Rocky Flats Environmental Technology Site boundary
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial flyover data captured by EG&G RSI, Las Vegas. Digitized from the orthophotographs. 1/95
Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

Scale = 1 : 3230
1 inch represents approximately 269 feet

50 0 100 200ft

State Plane Coordinate Projection
Colorado Central Zone
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November 11, 2002

NT_Svr w:/projects/fy2002/02-0867/sep_metals.aml

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330

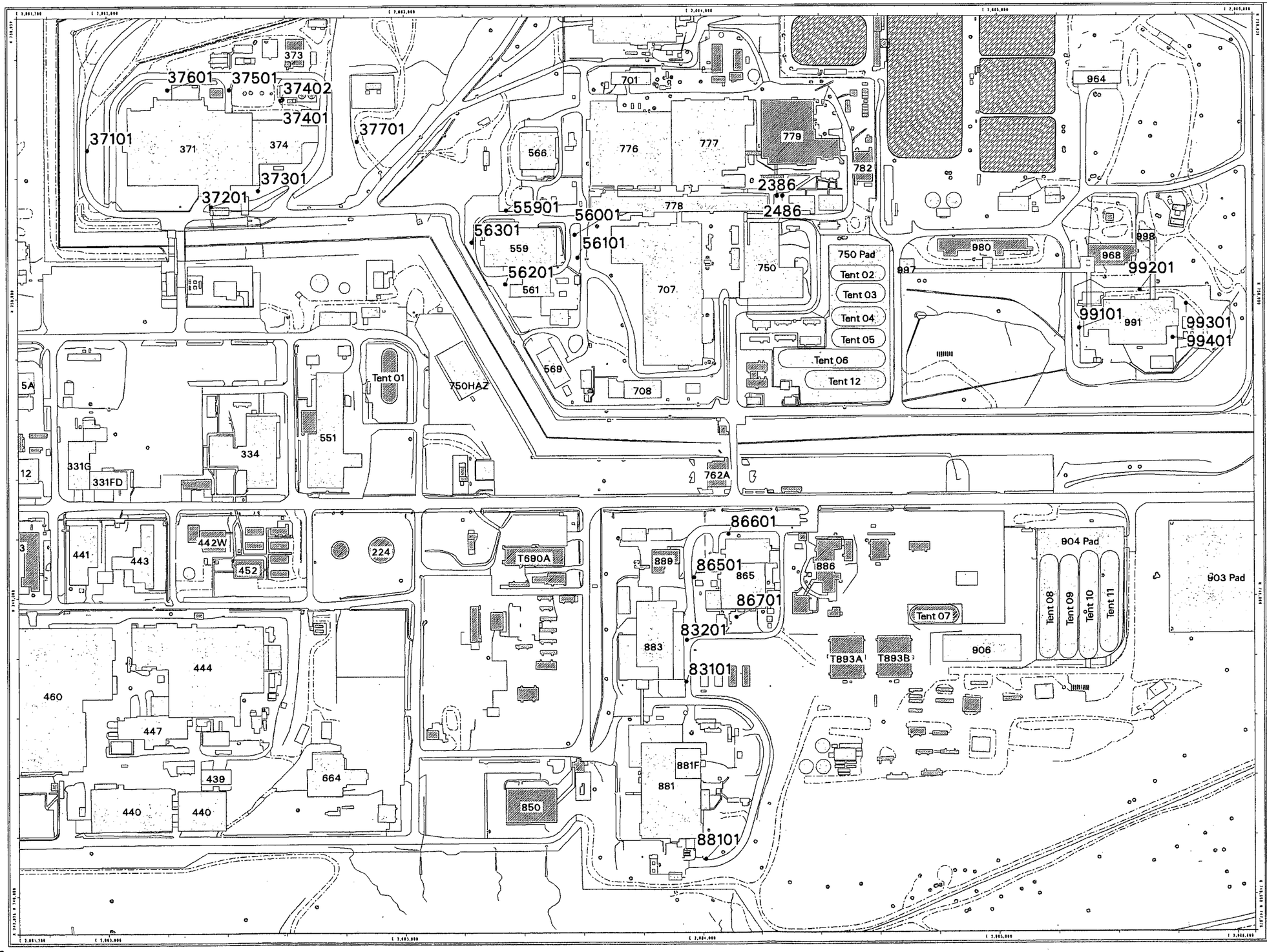

Figure 10-1

Well Abandonments and Installations in 2001

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Wells Installed in 2001
- Wells Abandoned in 2001
- Wells Installed and Abandoned in 2001
- Other Wells

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

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Scale = 1 : 3950
1 inch represents approximately 329 feet

100 0 200 400ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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November 07, 2002

NT_Svr w:/projects/fy2002/02-0747/well_aban_install_2001.aml

273
243

Figure 10-2
Potential Residential Use of Shallow Groundwater at RFETS

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- ▲ Wells which theoretically can support a residential water supply w/ Simulated Drawdown Values in Blue (Units in Feet)
- ● Wells which cannot theoretically support a residential water supply as simulated drawdown exceeds 1/3 average saturated thickness.

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Rocky Flats Environmental Technology Site boundary
- Roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95
Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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Scale = 1 : 21330
1 inch represents approximately 1778 feet

500 0 1000 2000 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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November 07, 2002

NT_Svr w:/projects/fy2002/02-0773/shallowwellresults-b.aml

274
344

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Plate 1

IMP Monitoring Well RFETS Location Map

2001 Annual RFCA Groundwater Monitoring Report

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP
- △ Wells installed 2001 or later (color denotes IMP well type)

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Rocky Flats Environmental Technology Site boundary
- Roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95
Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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Scale = 1 : 7200
1 inch represents 600 feet

500 0 1000 2000 ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy

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Prepared by:

DynCorp
THE ART OF TECHNOLOGY

Prepared for:

KAISER•HILL COMPANY

October 31, 2002

Please See Plate 2 for Industrial Area Wells

Pg 6-8 SW/A-004694

Plate 2

IMP Monitoring Well IA Location Map

2001 Annual RFCA Groundwater Monitoring Report

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP
- △ Wells installed 2001 or later (color denotes IMP well type)

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Roads

DATA SOURCE BASE FEATURES:

Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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Scale = 1 : 2770
1 inch represents approximately 231 feet

250 0 500 1000 ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy

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November 06, 2002

P1679 3 of 7 SW-A-004644

Plate 3

Potentiometric Surface Permeable Units of the UHSU Second Quarter 2001

2001 Annual RFCA Groundwater Monitoring Repor

- Groundwater Monitoring Well with Water Level Elevation
- Dry Groundwater Monitoring Well
- 2nd Quarter 2001 Data Water Level Contour (20' Interval)
- Dashed where inferred
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Area without Groundwater Elevation Data
- Seeps

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Rocky Flats Environmental Technology Site boundary
- Roads

DATA SOURCE BASE FEATURES:

Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

N

Scale = 1 : 7200
1 inch represents 600 feet

500 0 1000 2000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by: DynCorp THE ART OF TECHNOLOGY

Prepared for: KAISER•HILL COMPANY

November 06, 2002

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Plate 4

Potentiometric Surface Permeable Units of the UHSU Fourth Quarter 2001

2001 Annual RFCA Groundwater Monitoring Repor

- Groundwater Monitoring Well with Water Level Elevation
- Dry Groundwater Monitoring Well
- 2nd Quarter 2001 Data Water Level Contour (20' Interval)
- Dashed where inferred
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Area without Groundwater Elevation Data
- Seeps

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Rocky Flats Environmental Technology Site boundary
- Roads

DATA SOURCE BASE FEATURES:

Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

Scale = 1 : 7200
1 inch represents 600 feet

500 0 1000 2000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by:

DynCorp
THE ART OF TECHNOLOGY

Prepared for:

KAISER•HILL COMPANY

November 06, 2002

Pg 1681 SW-A-004694

Plate 5

Industrial Area Potentiometric Surface Permeable Units of the UHSU Second Quarter 2001

2001 Annual RFCA Groundwater Monitoring Report

- Groundwater Monitoring Well with Water Level Elevation
- Dry Groundwater Monitoring Well
- 20-Foot Water Level Contour
- 5-Foot Water Level Contour
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Seeps

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Roads

Scale = 1 : 2400
1 inch represents 200 feet

150 0 300 600ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by:
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Prepared for:
KAISER•HILL COMPANY

November 07, 2002

Plate 6

Industrial Area Potentiometric Surface Permeable Units of the UHSU Fourth Quarter 2001

2001 Annual RFCA Groundwater Monitoring Report

- Groundwater Monitoring Well with Water Level Elevation
- Dry Groundwater Monitoring Well
- 20-Foot Water Level Contour
- 5-Foot Water Level Contour
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Seeps

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Roads

Scale = 1 : 2400
1 inch represents 200 feet

150 0 300 600ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

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Prepared for:
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November 07, 2002

Pg 683 SW-A-0046

Plate 7

Radionuclides in Groundwater RFCA Wells, 2001

2001 Annual RFCA Groundwater Monitoring Report

Well Classifications

- Plume Degradation
- Plume Definition
- Plume Extent
- Performance Monitoring
- Drainage
- Boundary
- RCRA
- D&D
- Non-IMP

- ○ Alluvial Wells
- △ Bedrock/UHSU Wells
- ◇ Alluvial/Bedrock Wells
- ☆ Surface Water Monitoring Locations

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Rocky Flats Environmental Technology Site boundary
- Roads

NOTES:

Wells shown with box plot have at least one Uranium value above 8.0 pCi/L.

NS = Not sampled
DRY = No sample collected
INSW = Insufficient water for full sample suite

All results in picoCuries per liter (pCi/L)

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy

Rocky Flats Environmental Technology Site

GIS Dept. 303-966

Prepared by: DynCorp THE ART OF TECHNOLOGY

Prepared for: KAISER•HILL COMPANY

November

B208789	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	0	NS	0.0169
PLUTONIUM-239/240	NS	0.004	NS	0.0136
STRONTIUM-89/90	NS	0.204	NS	-0.0498
TRITIUM	NS	-93.8	NS	-258
URANIUM-233/234	NS	10.6	NS	7.38
URANIUM-235	NS	0.361	NS	0.42
URANIUM-238	NS	7.26	NS	5.53

B206989	Q1	Q2	Q3	Q4
TRITIUM	0	DRY	30	-103
URANIUM-233/234	INSW	DRY	60.5	53.4
URANIUM-235	INSW	DRY	1.5	1.64
URANIUM-238	INSW	DRY	37.2	32.1

4087	Q1	Q2	Q3	Q4
TRITIUM	-300	-31.2	-32	DRY
URANIUM-233/234	12	13.2	19	DRY
URANIUM-235	0.594	0.544	0.53	DRY
URANIUM-238	9.6	9.09	14	DRY

52894	Q1	Q2	Q3	Q4
TRITIUM	DRY	NS	68	NS
URANIUM-233/234	DRY	NS	16	NS
URANIUM-235	DRY	NS	0.52	NS
URANIUM-238	DRY	NS	12	NS

1786	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	-0.001	NS	0
PLUTONIUM-239/240	NS	0.005	NS	0.000
STRONTIUM-89/90	NS	0.0869	NS	-0.00418
TRITIUM	NS	219	NS	293
URANIUM-233/234 (Diss.)	NS	37.3	NS	NS
URANIUM-233/234 (Total)	36.7	38.2	43	32.3
URANIUM-235 (Diss.)	NS	1.25	NS	NS
URANIUM-235 (Total)	1.3	1.79	1.4	1.96
URANIUM-238 (Diss.)	NS	25.9	NS	NS
URANIUM-238 (Total)	26.9	28.4	33	24

1386	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	0.003	NS	0.0226
PLUTONIUM-239/240	NS	-0.004	NS	0.00207
STRONTIUM-89/90	NS	-0.0807	NS	0.0321
TRITIUM	NS	-125	NS	54.6
URANIUM-233/234 (Diss.)	NS	12.3	NS	NS
URANIUM-233/234 (Total)	9.97	9.62	7.5	5.88
URANIUM-235 (Diss.)	NS	0.412	NS	NS
URANIUM-235 (Total)	0.581	0.374	0.251	0.319
URANIUM-238 (Diss.)	NS	9.92	NS	NS
URANIUM-238 (Total)	7.96	7.82	6.4	4.31

99301 (Installed Q4)	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	NS	NS	0.0445
PLUTONIUM-239/240	NS	NS	NS	0.0123
URANIUM-233/234	NS	NS	NS	21.4
URANIUM-235	NS	NS	NS	0.852
URANIUM-238	NS	NS	NS	16.2

P209489	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	0.007	NS	0.0229
PLUTONIUM-239/240	NS	0.005	NS	0.00192
STRONTIUM-89/90	NS	0.6	NS	-0.119
TRITIUM	NS	337	NS	365
URANIUM-233/234	NS	32	NS	26.5
URANIUM-235	NS	1.8	NS	1.13
URANIUM-238	NS	26	NS	21.7

15699	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	0.012	NS	INSW
PLUTONIUM-239/240	NS	0.007	NS	INSW
URANIUM-233/234	NS	15	NS	17.7
URANIUM-235	NS	0.57	NS	0.974
URANIUM-238	NS	13	NS	11.7

P219189	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	INSW	NS	INSW
PLUTONIUM-239/240	NS	INSW	NS	INSW
NEPTUNIUM-237	NS	INSW	NS	INSW
STRONTIUM-89/90	NS	INSW	NS	INSW
TRITIUM	NS	257	NS	376
URANIUM-233/234	NS	57	NS	52.8
URANIUM-235	NS	1.5	NS	1.62
URANIUM-238	NS	40	NS	37.9

23296	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	-0.002	NS	0.0126
PLUTONIUM-239/240	NS	0.01	NS	0.0147
URANIUM-233/234	NS	20	NS	17.7
URANIUM-235	NS	0.85	NS	0.894
URANIUM-238	NS	16	NS	13.2

P219089	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	0.031	0.014	0.0154
PLUTONIUM-239/240	NS	0.018	0.0048	0.00713
NEPTUNIUM-237	NS	-0.011	0.0434	0.0259
TRITIUM	NS	125	-155	106
URANIUM-233/234	NS	9.6	5.43	6.12
URANIUM-235	NS	0.35	0.297	0.432
URANIUM-238	NS	7.3	4.21	3.32

06491	Q1	Q2	Q3	Q4
AMERICIUM-241	0.003	NS	INSW	NS
PLUTONIUM-239/240	0	NS	INSW	NS
TRITIUM	-168	NS	-170	NS
URANIUM-233/234	26.7	NS	40.5	NS
URANIUM-235	1.14	NS	1.84	NS
URANIUM-238	18	NS	25.9	NS

22696	Q1	Q2	Q3	Q4
AMERICIUM-241	INSW	NS	-0.005	NS
PLUTONIUM-239/240	INSW	NS	-0.002	NS
URANIUM-233/234	INSW	NS	9.3	NS
URANIUM-235	INSW	NS	0.33	NS
URANIUM-238	INSW	NS	6.3	NS

0386	Q1	Q2	Q3	Q4
AMERICIUM-241	0.005	NS	0.003	NS
PLUTONIUM-239/240	-0.006	NS	0.002	NS
TRITIUM	-108	NS	20	NS
URANIUM-233/234	11.1	NS	11.3	NS
URANIUM-235	0.407	NS	0.35	NS
URANIUM-238	7.64	NS	8.2	NS

37401 (Installed Q2)	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	NS	0.016	NS
PLUTONIUM-239/240	NS	NS	0.063	NS
URANIUM-233/234	NS	NS	27.5	NS
URANIUM-235	NS	NS	0.95	NS
URANIUM-238	NS	NS	22	NS

61499	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	INSW	NS	DRY
PLUTONIUM-239/240	NS	INSW	NS	DRY
NEPTUNIUM-237	NS	INSW	NS	DRY
URANIUM-233/234	NS	8.11	NS	DRY
URANIUM-235	NS	0.386	NS	DRY
URANIUM-238	NS	6.72	NS	DRY

41591	Q1	Q2	Q3	Q4
AMERICIUM-241	0.004	NS	-0.002	NS
PLUTONIUM-239/240	0.002	NS	-0.0044	NS
TRITIUM	-36.4	NS	10	NS
URANIUM-233/234	12	NS	8.3	NS
URANIUM-235	0.36	NS	0.263	NS
URANIUM-238	10	NS	5.9	NS

60599	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	0.0085	NS	INSW
PLUTONIUM-239/240	NS	0.0086	NS	INSW
NEPTUNIUM-237	NS	INSW	NS	INSW
URANIUM-233/234	NS	16.3	NS	16.5
URANIUM-235	NS	0.728	NS	0.574
URANIUM-238	NS	13.2	NS	10.5

40999	Q1	Q2	Q3	Q4
AMERICIUM-241	INSW	NS	0.011	NS
PLUTONIUM-239/240	INSW	NS	0	NS
URANIUM-233/234	9.7	NS	9	NS
URANIUM-235	0.28	NS	0.33	NS
URANIUM-238	7.8	NS	6.6	NS

60699	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	INSW	NS	DRY
PLUTONIUM-239/240	NS	INSW	NS	DRY
NEPTUNIUM-237	NS	INSW	NS	DRY
URANIUM-233/234	95	70	NS	DRY
URANIUM-235	2.81	2.1	NS	DRY
URANIUM-238	60.9	48	NS	DRY

90299	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	NS	0.0293	NS
PLUTONIUM-239/240	NS	NS	0.00454	NS
URANIUM-233/234	NS	NS	25.9	NS
URANIUM-235	NS	NS	1.33	NS
URANIUM-238	NS	NS	19.7	NS

00300	Q1	Q2	Q3	Q4
AMERICIUM-241	NS	0.00949	NS	0.0162
PLUTONIUM-239/240	NS	0.00588	NS	0.0191
NEPTUNIUM-237	NS	0.0285	NS	0.193
URANIUM-233/234	NS	27	NS	23.9
URANIUM-235	NS	0.861	NS	0.965
URANIUM-238	NS	19	NS	15.8

07391	Q1	Q2	Q3	Q4
AMERICIUM-241	INSW	NS	0	NS
PLUTONIUM-239/240	INSW	NS	0.005	NS
URANIUM-233/234	31.9	NS	29.1	NS
URANIUM-235	1.89	NS	1.58	NS
URANIUM-238	96.4	NS	86.1	NS

86601 (Installed Q4)	Q1	Q2	Q3	Q4
URANIUM-233/234	NS	NS	NS	17.4
URANIUM-235	NS	NS	NS	0.565
URANIUM-238	NS	NS	NS	12

41099	Q1	Q2	Q3	Q4
AMERICIUM-241	0.0013	NS	0.00184	NS
PLUTONIUM-239/240	0.0091	NS	0.00183	NS
URANIUM-233/234	27.4	NS	21.5	NS
URANIUM-235	0.977	NS	0.783	NS
URANIUM-238	17.7	NS	13.5	NS

86501 (Installed Q4)	Q1	Q2	Q3	Q4
URANIUM-233/234	NS	NS	NS	37.2
URANIUM-235	NS	NS	NS	1.1
URANIUM-238	NS	NS	NS	26.5

41199	Q1	Q2	Q3	Q4
AMERICIUM-241	0.001	NS	0.012	NS
PLUTONIUM-239/240	0.002	NS	0.002	NS
URANIUM-233/234	9.03	NS	9.2	NS
URANIUM-235	0.298	NS	0.32	NS
URANIUM-238	3.34	NS	3.2	NS

5387	Q1	Q2	Q3	Q4
URANIUM-233/234	8.77	NS	9.5	NS
URANIUM-235	0.372	NS	0.38	NS
URANIUM-238	7.15	NS	7.1	NS

P317989	Q1	Q2	Q3	Q4
AMERICIUM-241	DRY	NS	INSW	NS
PLUTONIUM-239/240	DRY	NS	INSW	NS
URANIUM-233/234	DRY	NS	50.4	DRY
URANIUM-235	DRY	NS	2.3	DRY
URANIUM-238	DRY	NS	37.8	DRY

10692	Q1	Q2	Q3	Q4
URANIUM-233/234	17.8	NS	16.6	NS
URANIUM-235	0.618	NS	0.651	NS
URANIUM-238	10.6	NS	11.7	NS

0487	Q1	Q2	Q3	Q4
URANIUM-233/234	12.6	NS	9.6	NS
URANIUM-235	0.662	NS	0.35	NS
URANIUM-238	8.45	NS	7	NS

10294	Q1	Q2	Q3	Q4
AMERICIUM-241	0.006	NS	0.00687	NS
PLUTONIUM-239/240	-0.002	NS	0.00979	NS
TRITIUM	-209	NS	-351	NS
URANIUM-233/234	13.4	NS	20.8	NS
URANIUM-235	0.85	NS	1.16	NS
URANIUM-238	11.2	NS	17.2	NS

10994	Q1	Q2	Q3	Q4
STRONTIUM-90	-0.0736	NS	NS	NS
STRONTIUM-89/90	-0.152	NS	0.28	NS
URANIUM-233/234	8.76	NS	9.3	NS
URANIUM-235	0.152	NS	0.42	NS
URANIUM-238	5.68	NS	6	NS

891COLWEL	Q1	Q2	Q3	Q4
URANIUM-233/234	11	9.4	11.4	11.3
URANIUM-235	0.606	0.5	0.337	0.437
URANIUM-238	7.57	7.3	8.5	7.83

10592	Q1	Q2	Q3	Q4
URANIUM-233/234	29	NS	14.1	NS
URANIUM-235	0.58	NS	0.671	NS
URANIUM-238	19	NS	9.33	NS

00797	Q1	Q2	Q3	Q4
URANIUM-233/234	8.91	NS	7.95	NS
URANIUM-235	0.294	NS	0.39	NS
URANIUM-238	6.48	NS	5.57	NS

83101 (Installed Q4)	Q1	Q2	Q3	Q4
URANIUM-233/234	NS	NS	NS	161
URANIUM-235	NS	NS	NS	7.19
URANIUM-238	NS	NS	NS	127

83201 (Installed Q4)	Q1	Q2	Q3	Q4
URANIUM-233/234	NS	NS	NS	8.14
URANIUM-235	NS	NS	NS	0.636
URANIUM-238	NS	NS	NS	7.56

38591	Q1	Q2	Q3	Q4
STRONTIUM-89/90	0.189	NS	DRY	NS
STRONTIUM-90	0.498	NS	DRY	NS
URANIUM-233/234	15.6	NS	DRY	NS
URANIUM-235	0.606	NS	DRY	NS
URANIUM-238	9.86	NS	DRY	NS

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Plate 8

Volatile Organic Compounds in Groundwater RFCA Wells, 2001

2001 Annual RFCA Groundwater Monitoring Report

Well Classifications

- Plume Degradation
- Plume Definition
- Plume Extent
- Performance Monitoring
- Drainage
- Boundary
- RCRA
- D&D
- Non-IMP

- ○ Alluvial Wells
- △ Bedrock/UHSU Wells
- ◇ Alluvial/Bedrock Wells
- ☆ Surface Water Monitoring Locations

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Rocky Flats Environmental Technology Site boundary
- Roads

NOTES:

Wells shown with box plot have at least one value that is above Tier II Action Level.

In any one box plot, sample results of analytes where all analyses were either non-detections or a combination of non-detections and detections at less than the Contract Required Detection Limit of 1 µg/L are not shown.

NS = Not sampled
DRY = No sample collected
INSW = Insufficient water for full sample suite
BDL = Below detection limit

All results in micrograms per liter (µg/L)

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

Tier II Action Levels For Selected Volatile Organic Compounds		
1,1,1-Trichloroethane	200	µg/L
1,1,2-Trichloroethane	5	µg/L
1,1-Dichloroethene	7	µg/L
Carbon Tetrachloride	5	µg/L
Chloroform	100	µg/L
cis-1,2-Dichloroethene	70	µg/L
Methylene Chloride	5	µg/L
Tetrachloroethene	5	µg/L
Trichloroethene	5	µg/L
Vinyl Chloride	2	µg/L

01497	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	94	NS	45	NS
1,1-DICHLOROETHENE	79	NS	32	NS
CARBON TETRACHLORIDE	6	NS	3.1	NS
CHLOROFORM	1	NS	0.6	NS
cis-1,2-DICHLOROETHENE	2	NS	0.8	NS
TETRACHLOROETHENE	13	NS	5.8	NS
TRICHLOROETHENE	33	NS	20	NS

771 FD OUT #2	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	NS	2	NS	DRY
1,1-DICHLOROETHENE	NS	3	NS	DRY
CARBON TETRACHLORIDE	NS	310	NS	DRY
CHLOROFORM	NS	120	NS	DRY
cis-1,2-DICHLOROETHENE	NS	2	NS	DRY
TETRACHLOROETHENE	NS	7	NS	DRY

20998	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	NS	190	220	DRY
CHLOROFORM	NS	47	70	DRY

21098	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	NS	2300	NS	4300
CHLOROFORM	NS	260	NS	230
METHYLENE CHLORIDE	NS	73	NS	BDL
TETRACHLOROETHENE	NS	BDL	NS	5

18199	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	NS	18000	NS	19000
CHLOROFORM	NS	3300	NS	3300
METHYLENE CHLORIDE	NS	94	NS	BDL
TETRACHLOROETHENE	NS	65	NS	44
TRICHLOROETHENE	NS	6	NS	BDL

18399	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	NS	31000	NS	55000
CHLOROFORM	NS	2700	NS	3700
METHYLENE CHLORIDE	NS	65	NS	BDL
TETRACHLOROETHENE	NS	12	NS	BDL

18499	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	NS	17000	NS	24000
CHLOROFORM	NS	3500	NS	5468
METHYLENE CHLORIDE	NS	98	NS	100
TETRACHLOROETHENE	NS	62	NS	78

00700	Q1	Q2	Q3	Q4
1,1-DICHLOROETHENE	NS	330	NS	500
CARBON TETRACHLORIDE	NS	2900	NS	3000
CHLOROFORM	NS	230	NS	340
METHYLENE CHLORIDE	NS	92	NS	BDL
TETRACHLOROETHENE	NS	11	NS	11
TRICHLOROETHENE	NS	17	NS	2.7

18799	Q1	Q2	Q3	Q4
1,1-DICHLOROETHENE	NS	4	NS	11
CARBON TETRACHLORIDE	NS	460	NS	850
CHLOROFORM	NS	410	NS	520
METHYLENE CHLORIDE	NS	4	NS	BDL
TETRACHLOROETHENE	NS	14	NS	12

22896	Q1	Q2	Q3	Q4
CHLOROFORM	7	NS	38	NS
TRICHLOROETHENE	1550	NS	170	NS

55901 (Installed 4th Qtr)	Q1	Q2	Q3	Q4
1,1-DICHLOROETHENE	NS	NS	NS	13
CARBON TETRACHLORIDE	NS	NS	NS	49
CHLOROFORM	NS	NS	NS	24
cis-1,2-DICHLOROETHENE	NS	NS	NS	1.9
TETRACHLOROETHENE	NS	NS	NS	5.5
TRICHLOROETHENE	NS	NS	NS	14

56301 (Installed 4th Qtr)	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	NS	NS	NS	1.7
1,1-DICHLOROETHENE	NS	NS	NS	21
CARBON TETRACHLORIDE	NS	NS	NS	44
CHLOROFORM	NS	NS	NS	23
cis-1,2-DICHLOROETHENE	NS	NS	NS	2.4
TETRACHLOROETHENE	NS	NS	NS	9.7
TRICHLOROETHENE	NS	NS	NS	16

FD-559-561	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	NS	NS	NS	1.1
1,1-DICHLOROETHENE	NS	NS	NS	14
CARBON TETRACHLORIDE	NS	NS	NS	100
CHLOROFORM	NS	NS	NS	5.5
cis-1,2-DICHLOROETHENE	NS	NS	NS	7.8
TETRACHLOROETHENE	NS	NS	NS	5.5
TRICHLOROETHENE	NS	NS	NS	270

56201 (Installed 4th Qtr)	Q1	Q2	Q3	Q4
1,1-DICHLOROETHENE	NS	NS	NS	8.2
CARBON TETRACHLORIDE	NS	NS	NS	37
CHLOROFORM	NS	NS	NS	9.6
cis-1,2-DICHLOROETHENE	NS	NS	NS	1.3
TETRACHLOROETHENE	NS	NS	NS	3.6
TRICHLOROETHENE	NS	NS	NS	20

10498	Q1	Q2	Q3	Q4
TETRACHLOROETHENE	980	NS	4.6	NS
TRICHLOROETHENE	4	NS	BDL	NS

60599	Q1	Q2	Q3	Q4
TETRACHLOROETHENE	NS	260	NS	170

40099	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	18.2	NS	18	NS
1,1-DICHLOROETHENE	299	NS	190	NS
cis-1,2-DICHLOROETHENE	741	NS	520	NS
METHYLENE CHLORIDE	6.8	NS	BDL	NS
TETRACHLOROETHENE	24.8	NS	15	NS
TRICHLOROETHENE	726	NS	530	NS

40499	Q1	Q2	Q3	Q4
cis-1,2-DICHLOROETHENE	5	NS	5	NS
TETRACHLOROETHENE	7	NS	6.6	NS
TRICHLOROETHENE	1	NS	1.6	NS

40299	Q1	Q2	Q3	Q4
1,1-DICHLOROETHENE	3	NS	2	NS
cis-1,2-DICHLOROETHENE	9	NS	8.2	NS
TETRACHLOROETHENE	78	NS	56	NS
TRICHLOROETHENE	2	NS	3	NS

41299	Q1	Q2	Q3	Q4
1,1-DICHLOROETHENE	9.1	NS	11	NS
CHLOROFORM	BDL	NS	1.5	NS
cis-1,2-DICHLOROETHENE	44.3	NS	54	NS
TETRACHLOROETHENE	265	NS	330	NS
TRICHLOROETHENE	38.2	NS	54	NS

P419689	Q1	Q2	Q3	Q4
cis-1,2-DICHLOROETHENE	7	NS	4.3	NS
TETRACHLOROETHENE	18.8	NS	10	NS
TRICHLOROETHENE	1.7	NS	1.2	NS

61499	Q1	Q2	Q3	Q4
TETRACHLOROETHENE	NS	5	NS	DRY

P416889	Q1	Q2	Q3	Q4
1,1-DICHLOROETHENE	NS	2	NS	BDL
CARBON TETRACHLORIDE	NS	10	NS	BDL
CHLOROFORM	NS	10	NS	BDL
cis-1,2-DICHLOROETHENE	NS	5	NS	4.2
TETRACHLOROETHENE	NS	41	NS	57
TRICHLOROETHENE	NS	4	NS	4.6

00300	Q1	Q2	Q3	Q4
cis-1,2-DICHLOROETHENE	NS	6	NS	1.5
TRICHLOROETHENE	NS	17	NS	5.8

61099	Q1	Q2	Q3	Q4
1,1-DICHLOROETHENE	2	NS	NS	0.67
cis-1,2-DICHLOROETHENE	4	NS	NS	3.5
TETRACHLOROETHENE	26	NS	NS	15
TRICHLOROETHENE	2	NS	NS	0.92

61199	Q1	Q2	Q3	Q4
cis-1,2-DICHLOROETHENE	27	NS	NS	17
METHYLENE CHLORIDE	5	NS	NS	BDL
TETRACHLOROETHENE	230	NS	NS	160
TRICHLOROETHENE	17	NS	NS	11

70693	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	38	NS	24	NS
1,1-DICHLOROETHENE	22	NS	15	NS
CARBON TETRACHLORIDE	2	NS	1.2	NS
TETRACHLOROETHENE	4	NS	3.2	NS
TRICHLOROETHENE	9	NS	8.8	NS

70393	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	19.4	10	13	14
1,1-DICHLOROETHENE	15.2	8	10	11
TETRACHLOROETHENE	7	4	5.7	5.6
TRICHLOROETHENE	22.6	13	15	17

02097	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	14	NS	7.2	NS
1,1-DICHLOROETHENE	9	NS	4	NS
cis-1,2-DICHLOROETHENE	2	NS	1.3	NS
TETRACHLOROETHENE	5	NS	2.9	NS
TRICHLOROETHENE	30	NS	22	NS

22796	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	NS	2	NS	BDL
1,1-DICHLOROETHENE	NS	4	NS	0.76
CHLOROFORM	NS	7	NS	1.2
cis-1,2-DICHLOROETHENE	NS	31	NS	13
TETRACHLOROETHENE	NS	0.4	NS	22
TRICHLOROETHENE	NS	57	NS	23

41499	Q1	Q2	Q3	Q4
1,1-DICHLOROETHENE	NS	4	9.9	INSW
cis-1,2-DICHLOROETHENE	NS	9	18	INSW
METHYLENE CHLORIDE	NS	5	BDL	INSW
TETRACHLOROETHENE	NS	2	0.16	INSW
TRICHLOROETHENE	NS	62	130	INSW

P209389	Q1	Q2	Q3	Q4
1,1-DICHLOROETHENE	11	NS	13	NS
CARBON TETRACHLORIDE	2	NS	1.9	NS
CHLOROFORM	5	NS	4.2	NS

P219189	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	NS	BDL	NS	1
1,1,2-TRICHLOROETHANE	NS	BDL	NS	1
1,1-DICHLOROETHENE	NS	39	NS	21
CHLOROFORM	NS	1	NS	1
cis-1,2-DICHLOROETHENE	NS	1	NS	0.8

40699	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	NS	DRY	6	DRY
1,1-DICHLOROETHENE	NS	DRY	200	DRY
CHLOROFORM	NS	DRY	1.7	DRY

P209489	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	NS	23	NS	35
CHLOROFORM	NS	20	NS	18
cis-1,2-DICHLOROETHENE	NS	8	NS	7.5
METHYLENE CHLORIDE	NS	2	NS	BDL
TETRACHLOROETHENE	NS	3	NS	2.8
TRICHLOROETHENE	NS	45	NS	49

00100	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	NS	5	NS	5.7
CHLOROFORM	NS	5	NS	5.2
cis-1,2-DICHLOROETHENE	NS	7	NS	6.7
METHYLENE CHLORIDE	NS	BDL	NS	2.4
TETRACHLOROETHENE	NS	3	NS	3.5
TRICHLOROETHENE	NS	38	NS	55

02500	Q1	Q2	Q3	Q4
TRICHLOROETHENE	NS	18	NS	19

99301 (Installed 4th Qtr)	Q1	Q2	Q3	Q4
cis-1,2-DICHLOROETHENE	NS	NS	NS	2.3
TETRACHLOROETHENE	NS	NS	NS	1.8
TRICHLOROETHENE	NS	NS	NS	55

15599	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	NS	1	NS	DRY
1,1-DICHLOROETHENE	NS	1	NS	DRY
CHLOROFORM	NS	5	NS	DRY
cis-1,2-DICHLOROETHENE	NS	15	NS	DRY
TETRACHLOROETHENE	NS	41	NS	DRY
TRICHLOROETHENE	NS	75	NS	DRY

15699	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	NS	BDL	NS	10
1,1-DICHLOROETHENE	NS	16	NS	86
CHLOROFORM	NS	BDL	NS	5.5
cis-1,2-DICHLOROETHENE	NS	66	NS	200
TETRACHLOROETHENE	NS	190	NS	920
TRICHLOROETHENE	NS	350	NS	1400

3586	Q1	Q2	Q3	Q4
cis-1,2-DICHLOROETHENE	NS	5	NS	5.4
VINYL CHLORIDE	NS	5	NS	5.4

95199	Q1	Q2	Q3	Q4
cis-1,2-DICHLOROETHENE	NS	2	NS	2.5
TETRACHLOROETHENE	NS	2	NS	2
TRICHLOROETHENE	NS	65	NS	51

23296	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	NS	6	NS	10
CHLOROFORM	NS	16	NS	10
cis-1,2-DICHLOROETHENE	NS	63	NS	150
METHYLENE CHLORIDE	NS	10	NS	BDL
TETRACHLOROETHENE	NS	17	NS	12
TRICHLOROETHENE	NS	530	NS	380
VINYL CHLORIDE	NS	BDL	NS	1.2

03991	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	11	NS	7.1	NS
CHLOROFORM	1	NS	0.6	NS
TETRACHLOROETHENE	3	NS	1.7	NS
TRICHLOROETHENE	1	NS	0.8	NS

06091	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	BDL	NS	7.8	NS
TETRACHLOROETHENE	4	NS	3.8	NS
TRICHLOROETHENE	1	NS	1.2	NS

05391	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	13.4	NS	14	NS
CHLOROFORM	1	NS	0.9	NS
TETRACHLOROETHENE	4.5	NS	3.7	NS
TRICHLOROETHENE	1.9	NS	1.6	NS

05691	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	112	NS	87	NS
CHLOROFORM	4.5	NS	3.7	NS
cis-1,2-DICHLOROETHENE	6.3	NS	5.1	NS
TETRACHLOROETHENE	27.8	NS	20	NS
TRICHLOROETHENE	12.6	NS	11	NS

12691	Q1	Q2	Q3	Q4
1,1-DICHLOROETHENE	1.4	NS	BDL	NS
CARBON TETRACHLORIDE	496	NS	580	NS
CHLOROFORM	22.4	NS	25	NS
cis-1,2-DICHLOROETHENE	70.2	NS	64	NS
TETRACHLOROETHENE	139	NS	120	NS
TRICHLOROETHENE	91.5	NS	65	NS

3687	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	NS	24	NS	BDL
1,1-DICHLOROETHENE	NS	18	NS	23
CARBON TETRACHLORIDE	NS	290	NS	370
CHLOROFORM	NS	150	NS	140
cis-1,2-DICHLOROETHENE	NS	27	NS	28
TETRACHLOROETHENE	NS	290	NS	390
TRICHLOROETHENE	NS	9500	NS	11000

11891	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	NS	2	NS	1.3
1,1-DICHLOROETHENE	NS	3	NS	2
CARBON TETRACHLORIDE	NS	470	NS	490
CHLOROFORM	NS	17	NS	11
cis-1,2-DICHLOROETHENE	NS	23	NS	22
METHYLENE CHLORIDE	NS	9	NS	2.4
TETRACHLOROETHENE	NS	210	NS	220
TRICHLOROETHENE	NS	46	NS	35

12191	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	NS	2	NS	BDL
1,1-DICHLOROETHENE	NS	4	NS	1.3
CARBON TETRACHLORIDE	NS	200	NS	110
CHLOROFORM	NS	7	NS	4
cis-1,2-DICHLOROETHENE	NS	13	NS	15
METHYLENE CHLORIDE	NS	41	NS	BDL
TETRACHLOROETHENE	NS	430	NS	470
TRICHLOROETHENE	NS	38	NS	40

02291	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	NS	BDL	NS	1.9
1,1-DICHLOROETHENE	NS	BDL	NS	4.3
CHLOROFORM	NS	BDL	NS	3
cis-1,2-DICHLOROETHENE	NS	22	NS	21
TETRACHLOROETHENE	NS	5200	NS	6800
TRICHLOROETHENE	NS	620	NS	630

00897	Q1	Q2	Q3	Q4
cis-1,2-DICHLOROETHENE	NS	BDL	NS	57
TETRACHLOROETHENE	NS	BDL	NS	22000
TRICHLOROETHENE	NS	1500	NS	1500

11791	Q1	Q2	Q3	Q4
1,1-DICHLOROETHENE	1	NS	BDL	NS
CARBON TETRACHLORIDE	250	NS	390	NS
CHLOROFORM	68	NS	72	NS
cis-1,2-DICHLOROETHENE	40	NS	46	NS
TETRACHLOROETHENE	79	NS	93	NS
TRICHLOROETHENE	54	NS	61	NS

00491	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	79	NS	91	NS
CHLOROFORM	49	NS	56	NS
cis-1,2-DICHLOROETHENE	11	NS	7.3	NS
TETRACHLOROETHENE	30	NS	21	NS
TRICHLOROETHENE	67	NS	39	NS

90099	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	360	NS	780	NS
CHLOROFORM	75	NS	100	NS
cis-1,2-DICHLOROETHENE	10	NS	20	NS
METHYLENE CHLORIDE	43	NS	BDL	NS
TETRACHLOROETHENE	24	NS	40	NS
TRICHLOROETHENE	880	NS	1400	NS

90399	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	130	NS	290	NS
CHLOROFORM	23	NS	35	NS
cis-1,2-DICHLOROETHENE	2	NS	BDL	NS
TETRACHLOROETHENE	4	NS	BDL	NS
TRICHLOROETHENE	110	NS	220	NS

1187	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	65	NS	340	NS
CHLOROFORM	84	NS	80	NS
METHYLENE CHLORIDE	46	NS	BDL	NS
TETRACHLOROETHENE	30	NS	BDL	NS
TRICHLOROETHENE	2300	NS	3400	NS

SW13494	Q1	Q2	Q3	Q4
CHLOROFORM	BDL	0.2	BDL	BDL
cis-1,2-DICHLOROETHENE	1	3	1.5	0.98
TETRACHLOROETHENE	28	30	30	27
TRICHLOROETHENE	2	3	3.1	2

83101 (Installed 4th Qtr)	Q1	Q2	Q3	Q4
CHLOROFORM	NS	NS	NS	2.8
cis-1,2-DICHLOROETHENE	NS	NS	NS	29
TETRACHLOROETHENE	NS	NS	NS	29
TRICHLOROETHENE	NS	NS	NS	8.6

891COLWEL	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	2	3	BDL	2.3
1,1-DICHLOROETHENE	BDL	18	23	14
CARBON TETRACHLORIDE	14	10	20	13
CHLOROFORM	BDL	1	BDL	0.74
METHYLENE CHLORIDE	6	9	BDL	BDL
TETRACHLOROETHENE	28	30	33	29
TRICHLOROETHENE	310	300	420	320

0487	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	1.1	NS	0.7	NS
CHLOROFORM	1.4	NS	0.8	NS
TETRACHLOROETHENE	2.1	NS	1.6	NS
TRICHLOROETHENE	95	NS	154	NS

6286	Q1	Q2	Q3	Q4
CARBON TETRACHLORIDE	5.6	NS	5.8	NS

07391	Q1	Q2	Q3	Q4
1,1,1-TRICHLOROETHANE	1200	NS	100	NS
1,1-DICHLOROETHENE	130	NS	BDL	NS
CARBON TETRACHLORIDE	130	NS	BDL	NS
CHLOROFORM	1400	NS	1100	NS
cis-1,2-DICHLOROETHENE	100	NS	BDL	NS
METHYLENE CHLORIDE	570	NS	BDL	NS
TETRACHLOROETHENE	970	NS	800	NS
TRICHLOROETHENE	70000	NS	47000	NS

U.S. Department of Energy

Rocky Flats Environmental Technology Site

GIS Dept. 303-966

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Prepared for:

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November 1

Plate 9

Water Quality Parameters in Groundwater RFCA Wells, 2001

2001 Annual RFCA Groundwater Monitoring Report

B206989	Q1	Q2	Q3	Q4
FLUORIDE	INSW	DRY	0.5	1
NITRATE/NITRITE	60	DRY	33.3	31.4
SULFATE	INSW	DRY	2800	2760

02197	Q1	Q2	Q3	Q4
FLUORIDE	DRY	NS	1.5	NS
NITRATE/NITRITE	DRY	NS	10.1	NS
SULFATE	DRY	NS	59.2	NS

1786	Q1	Q2	Q3	Q4
FLUORIDE	NS	1.1	NS	0.94
NITRATE/NITRITE	570	620	363	7.7
SULFATE	NS	470	NS	388

P209489	Q1	Q2	Q3	Q4
FLUORIDE	NS	0.48	NS	0.5
NITRATE/NITRITE	NS	160	NS	186
SULFATE	NS	82	NS	66.6

Q2500	Q1	Q2	Q3	Q4
FLUORIDE	NS	NS	NS	NS
NITRATE/NITRITE	NS	11	NS	15.7
SULFATE	NS	NS	NS	NS

P219489	April	May	June	October
FLUORIDE	INSW	INSW	INSW	INSW
NITRATE/NITRITE	42	40	34	36.1
SULFATE	INSW	INSW	INSW	INSW

00597	Q1	Q2	Q3	Q4
FLUORIDE	0.1	NS	0.44	NS
NITRATE/NITRITE	11	NS	10	NS
SULFATE	28	NS	27.2	NS

41499	Q1	Q2	Q3	Q4
FLUORIDE	NS	NS	NS	NS
NITRATE/NITRITE	NS	19	INSW	INSW
SULFATE	NS	NS	NS	NS

40599	Q1	Q2	Q3	Q4
FLUORIDE	NS	NS	NS	NS
NITRATE/NITRITE	NS	26	INSW	DRY
SULFATE	NS	NS	NS	NS

22896	Q1	Q2	Q3	Q4
FLUORIDE	NS	NS	NS	NS
NITRATE/NITRITE	11	NS	5.4	NS
SULFATE	NS	NS	NS	NS

10298	Q1	Q2	Q3	Q4
FLUORIDE	NS	NS	NS	NS
NITRATE/NITRITE	7.5	NS	11	NS
SULFATE	NS	NS	NS	NS

02397	Q1	Q2	Q3	Q4
FLUORIDE	NS	NS	NS	NS
NITRATE/NITRITE	NS	11	NS	DRY
SULFATE	NS	NS	NS	NS

41099	Q1	Q2	Q3	Q4
FLUORIDE	NS	NS	NS	NS
NITRATE/NITRITE	30	NS	22	NS
SULFATE	NS	NS	NS	NS

07391	Q1	Q2	Q3	Q4
FLUORIDE	NS	NS	NS	NS
NITRATE/NITRITE	60	NS	65	NS
SULFATE	210	NS	210	NS

10992	Q1	Q2	Q3	Q4
FLUORIDE	NS	NS	NS	NS
NITRATE/NITRITE	14	NS	18	NS
SULFATE	110	NS	130	NS

10994	Q1	Q2	Q3	Q4
FLUORIDE	NS	NS	NS	NS
NITRATE/NITRITE	10	NS	11	NS
SULFATE	280	NS	NS	NS

06491	Q1	Q2	Q3	Q4
FLUORIDE	0.89	NS	INSW	NS
NITRATE/NITRITE	0.64	NS	0.88	NS
SULFATE	530	NS	INSW	NS

10294	Q1	Q2	Q3	Q4
FLUORIDE	1.8	NS	2.7	NS
NITRATE/NITRITE	0.05	NS	7.4	NS
SULFATE	810	NS	790	NS

Well Classifications

- Plume Degradation
- Plume Definition
- Plume Extent
- Performance Monitoring
- Drainage
- Boundary
- RCRA
- D&D
- Non-IMP

- ○ Alluvial Wells
- △ Bedrock/UHSU Wells
- ◇ Alluvial/Bedrock Wells
- ☆ Surface Water Monitoring Locations

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Rocky Flats Environmental Technology Site boundary
- Roads

NOTES:

Wells shown with box plot have at least one value above Tier II Action Levels.

NS = Not sampled
DRY = No sample collected
INSW = Insufficient water for full sample suite

All results in milligrams per liter (mg/L)

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7

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DynCorp
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November 13,

Plate 10

Metals in Groundwater RFCA Wells, 2001

2001 Annual RFCA Groundwater Monitoring Report

Well Classifications

- Plume Degradation
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NOTES:

Wells shown with box plot have at least one value above Tier II Action Levels.

NS = Not sampled
DRY = No sample collected
INSW = Insufficient water for full sample suite
BDL = Below detection Limit
R = Rejected in validation/verification

All results in micrograms per liter (μg/L)

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy

Rocky Flats Environmental Technology Site

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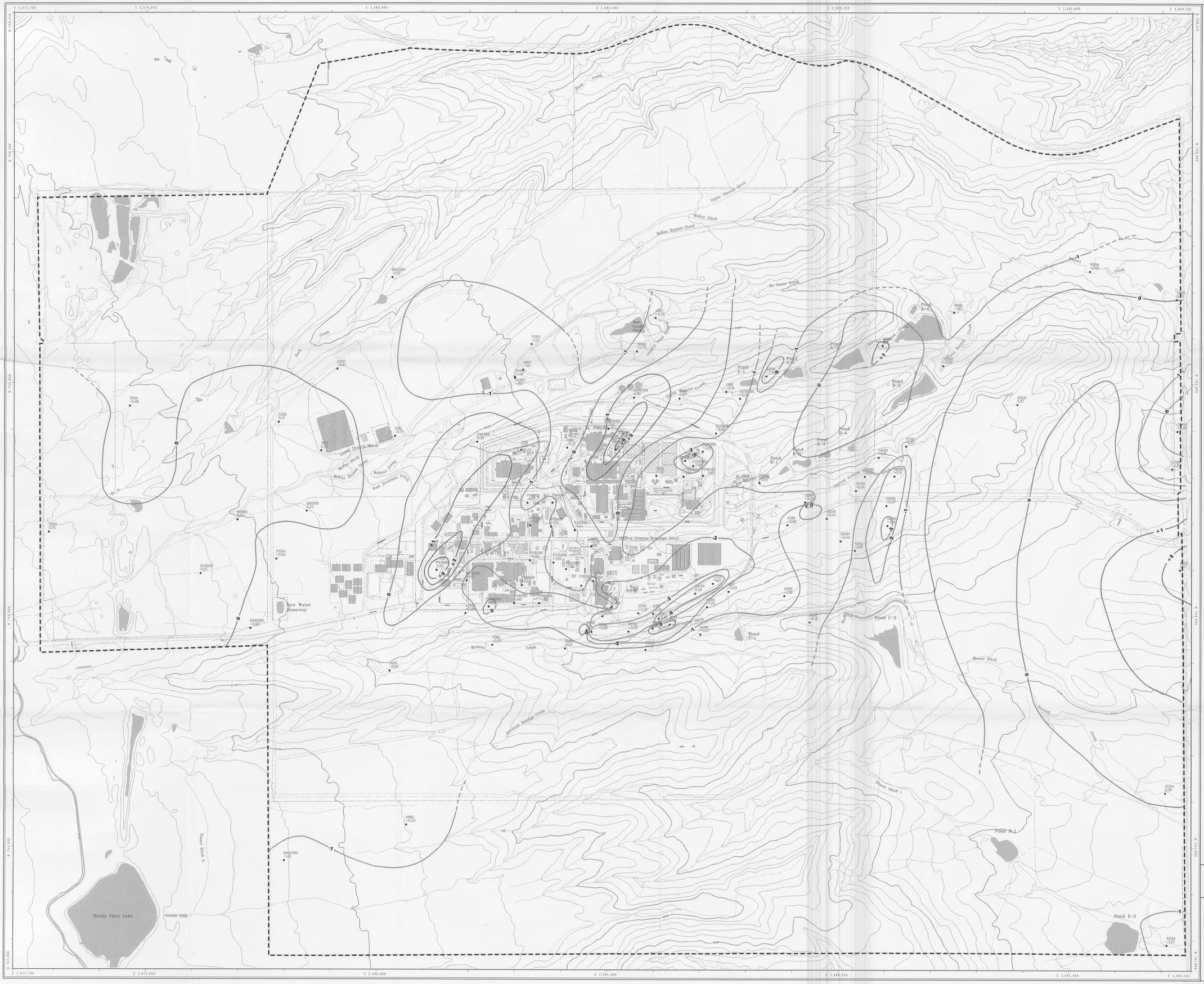
Plate 11

Water Level Change Map
1996 vs. 2001
Second Quarter 2001

2001 Annual RFCA Groundwater Monitoring Report



EXPLANATION

- Groundwater Monitoring Well (with change in water level)
- Contour depicting Positive Change In Water Level
- Contour depicting Negative Change In Water Level
- Contour depicting Zero Change In Water Level

NOTES:
Where water level change data is inferred, the contour is dashed

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Rocky Flats Environmental Technology Site boundary
- Roads

DATA SOURCE BASE FEATURES:

Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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N

Scale = 1 : 7480
1 inch represents approximately 623 feet

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy

Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by:

DynCorp
THE ART OF TECHNOLOGY

Prepared for:

KAISER•HILL COMPANY

November 06, 2002

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PG688 SW-A-004668

Plate 12

Water Level Change Map 1996 vs. 2001 Fourth Quarter 2001

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Groundwater Monitoring Well (with change in water level)
- Contour depicting Positive Change In Water Level
- Contour depicting Negative Change In Water Level
- Contour depicting Zero Change In Water Level

NOTES:
Where water level change data is inferred, the contour is dashed

Standard Map Features

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N

Scale = 1 : 7480
1 inch represents approximately 623 feet

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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Plate 13
Composite VOC & Nitrate Plum

2001 Annual RFCA Groundwater Monitoring Report

1998-2002 Sample Locations

- ▲ Sample Location with VOC data only
- ■ Sample Location with Nitrate data only
- ● Sample Location with both VOC and Nitrate data
- ○ Sample Location with no data
- ◇ Abandoned well supporting 1997 VOC plumes
- Collection Trenches
- Old Solar Pond Interceptor Trench System

Current Composite Plume Key

- Composite VOC Groundwater Plume (100 X MCL)
- Composite VOC Groundwater Plume (concentration equal to MCL)
- Isolated occurrence of VOC exceeding Tier II Action Levels (1998-2002 Data)
- VOC Plume Extent (1998-2002 Data) (Dashed where Inferred)
- 100 x Nitrate Standard (1000 mg/l)
- Nitrate Standard (10 mg/l)
- Isolated occurrence of Nitrate exceeding Tier II Action Levels (1998-2002 Data)
- Nitrate Plume Extent (1998-2002 Data) (Dashed where Inferred)

Historic Composite Plume Key

- 1997 Composite VOC Groundwater Plume (100 X MCL)
- 1997 Composite VOC Groundwater Plume (concentration equal to MCL)
- 1997 100 x Nitrate Standard (1000 mg/l)
- 1997 Nitrate Standard (10 mg/l)

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Roads
- Solar Evaporation Ponds (SEPs)

DATA SOURCE BASE FEATURES:

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NOTES:

Before using this map for any interpretations or decisions, read the explanation of the methodology used to create it. That explanation is in Section 8.3 of the 2001 Annual RFCA Groundwater Monitoring Report.

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Scale = 1 : 2880
1 inch represents 240 feet

100 0 200 400 Ft

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November

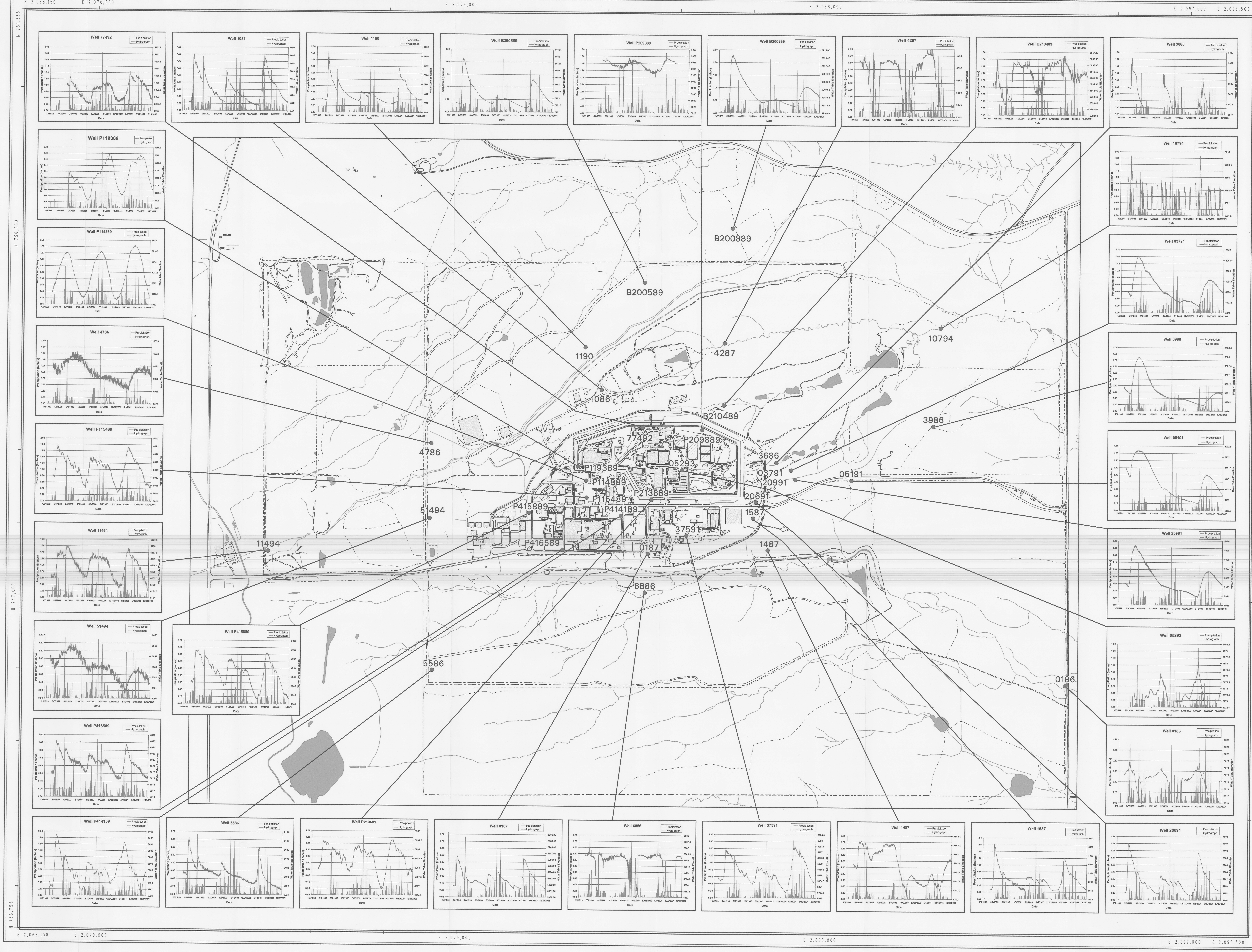

Plate 14

Real-Time Groundwater Monitoring Location Hydrographs with Precipitation Data

2001 Annual RFCA Groundwater Monitoring Report

EXPLANATION

Groundwater well with real time water level monitoring

Standard Map Features

Buildings and other structures

Solar Evaporation Ponds (SEPs)

Lakes and ponds

Streams, ditches, or other drainage features

Fences and other barriers

Paved roads

Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

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500 0 1000 2000ft

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October 30, 2002

Pg 6691 SW-A-004694

Plate 15

Well Abandonments Through CY 2001

2001 Annual RFCA Groundwater Monitoring Report

- Wells abandoned in 2001
- Wells abandoned prior to 2001

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Rocky Flats Environmental Technology Site boundary
- Roads

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Scale = 1 : 7200
1 inch represents 600 feet

500 0 1000 2000ft

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October 31, 2002

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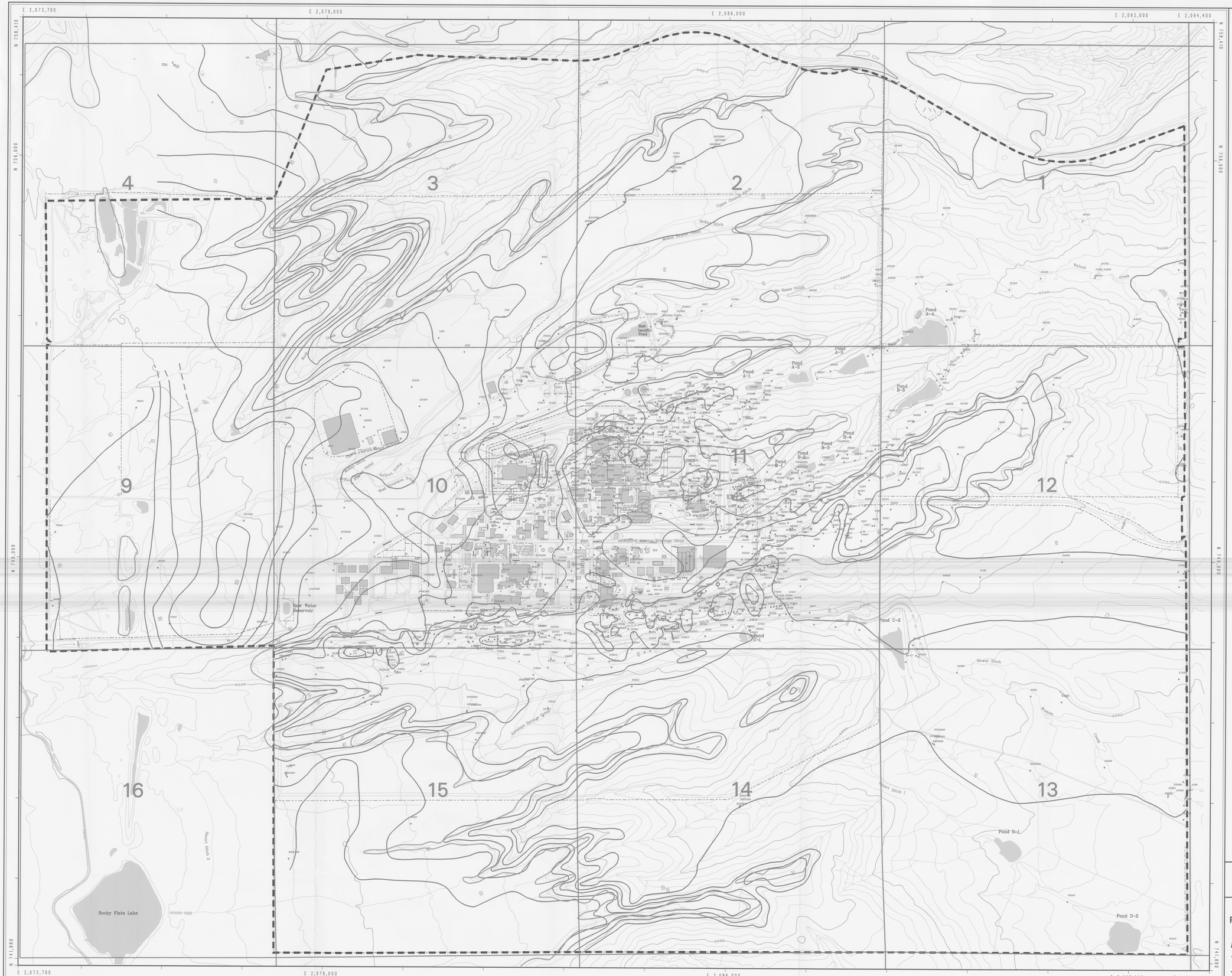
Plate 16
Isopach of Alluvial Thickness



EXPLANATION

- All Non-Abandoned Groundwater Wells
- Isopach Line Indicating Approximate Thickness of Surficial Deposits
- Approximate Extent of Rocky Flats Alluvium
- Section Lines

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
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N

Scale = 1 : 6000
1 inch represents 500 feet

500 0 1000 2000ft

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17-17
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Plate 17

Isopach of Unsaturated Rocky Flats Alluvium

- Isopach Contours of Unsaturated Rocky Flats Alluvium (Approximate)
- Isopach Contours of Unsaturated Rocky Flats Alluvium (Inferred)
- All Non-Abandoned Wells
- 2001 Well Installations
- Section Lines

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
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Scale = 1 : 6000
1 inch represents 500 feet

500 0 1000 2000ft

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