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KAISER·HILL
COMPANY

FINAL

2000 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

Volume 1 of 2 (Text, Figures and Appendices)

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FINAL

2000 ANNUAL ROCKY FLATS CLEANUP AGREEMENT

(RFCA)

GROUNDWATER MONITORING REPORT

for the

Rocky Flats Environmental Technology Site

November 16, 2001

RMRS Rocky Mountain Remediation Services, L.L.C.
. . . protecting the environment

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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 and results at the Rocky Flats Environmental Technology Site (RFETS) for calendar year (CY) 2000. The report is presented in one volume that contains text, tables, figures, plates and appendices. This report is intended as a stand-alone volume where all groundwater issues at RFETS for CY 2000 can be referenced and reviewed.

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 2000 with respect to exceedances of RFCA action levels. Section 3.0 presents groundwater flow conditions during CY 2000 and compares them to groundwater flow conditions documented during CY 1996. Hydrologic conditions during calendar year 1996 are considered to represent a sitewide baseline to be used in assessing annual changes to the groundwater flow system in the remaining years of plant closure and 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. Section 5.0 presents a summary of groundwater activities, with respect to decontamination and decommissioning (D&D), that have taken place historically and during 2000. Section 6.0 presents a discussion of the Present Sanitary Landfill. Plume degradation monitoring of the Carbon Tetrachloride Plume (IHSS 118.1), the 903 Pad/Ryan's Pit Plume, and the 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 CY 2000 groundwater characterization activities at RFETS including the Actinide Migration Project. Section 10.0 serves to outline other Groundwater Program activities including the CY 2000 well abandonment and installation activities. Section 11.0 contains a 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 all references that are cited in the text of this document.

There are five appendices to this report. Appendix A consists of trend plots. Appendix B consists of CY 2000 water level data. Appendix C presents well hydrographs. Appendix D presents borehole logs and well construction diagrams for monitoring wells installed during 2000. Appendix E presents tables from Section 11.0.

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1.0 INTRODUCTION

This Annual Groundwater Monitoring Report summarizes the groundwater monitoring activities and results at Rocky Flats Environmental Technology Site (RFETS) for calendar year 2000 (CY 2000), as required in the Rocky Flats Cleanup Agreement (RFCA 1996), and outlined in the Integrated Monitoring Plan (IMP) (K-H 2000a). Section 1.0 serves as a brief introduction to the report. Section 2.0 discusses the groundwater quality data collected in CY 2000. Section 3.0 presents baseline and CY 2000 hydrogeologic data for the RFCA groundwater monitoring network. Section 4.0 discusses the performance monitoring activities that are in process. Section 5.0 discusses groundwater issues with respect to building Decontamination and Decommissioning (D&D). Section 6.0 discusses the monitoring of the Present Landfill and Section 7.0 gives a summary of plume degradation activities. Sections 8.0 and 9.0 discuss 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. Section 12.0 presents conclusions and future activities, and Section 13.0 lists all references.

1.1 Site Description

Rocky Flats Environmental Technology Site 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).

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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 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 uppermost 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 is 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.

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.

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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 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 about the 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). 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 recharge also occurs from stream, ditch, and pond seepage. Some of the groundwater that discharges from the UHSU to streams and seeps evaporates as it is being discharged. Limited investigation of the former Operable Unit (OU) 2 area during the period of July through October 1993 indicated that the precipitation component of recharge was lost to evapotranspiration demands (EG&G, 1993b).

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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 2 and 3, and for the IA on Plates 4 and 5. The periods illustrated, spring and fall quarters, represent the times of year when static water levels are expected to be highest and lowest. Current areas of unsaturated and seasonally unsaturated alluvium and colluvium are indicated 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 2 and 3. 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 is primarily lateral because of the low permeability of the underlying claystone bedrock. Groundwater in the ridge tops generally flows toward the east-northeast. 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.

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 flux through claystones

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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 (7.9×10^{-4} cm/sec); Rocky Flats Alluvium (4.18×10^{-4} cm/sec); colluvium (9.3×10^{-5} cm/sec); weathered Laramie Formation sandstones (3.9×10^{-5} cm/sec); and weathered Laramie Formation claystones (8.8×10^{-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. The semi-arid climate sharply limits the amount of surface water available for groundwater recharge.

(2) The lithology and permeability of the unconsolidated surficial deposits permit meteoric waters to recharge the water table in times of low evapotranspiration. 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 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 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 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. The additional information is submitted on an annual basis 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 the Environmental Restoration Department 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 12 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, and local variations in groundwater transport velocity. Previously published plume maps for individual constituents can be found in the previous RFCA Annual Reports (RMRS 1997e, DOE 1998b, RMRS 1999m and 2000d), the annual RCRA Groundwater reports (EG&G 1992, 1993c, 1994b, 1995d; RMRS/KH 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 for individual constituents. 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. Plate 12 presents the distribution of some of the most common VOC contaminants

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in groundwater at RFETS. The most probable sources of VOC contamination were identified using the results of recent field sampling programs and knowledge of Site processes (see RMRS 1996b). A flow diagram (RMRS 1996b) illustrates the method used to locate the contaminant plumes and corresponding sources, and to assist in determining which areas should be evaluated for potential remedial action. Other contaminants will also be addressed where there is a potential impact to surface water above action levels.

Six VOC groundwater contaminant plumes have 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 are two plumes with contaminant concentrations above Tier II action levels that have the potential to impact surface water. These two VOC plumes are associated with the Present Landfill and the Property Utilization and Disposal (PU&D) Yard (RMRS 1996b).

In addition to the VOC plumes, there is a nitrate and uranium plume that emanates from the Solar Ponds. There are other 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 (see Section 1.3.2) and in other media. The Integrated Monitoring Plan (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 Report is also required to summarize all actions taken for groundwater compliance within each calendar year.

For documented 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 lists 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. 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.

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Table 1-1 IMP Wells

WELL NO	FREQUENCY	CLASS	PLUME/AREA	FORMATION	PURPOSE
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	Ind. Area	AL	Plume Extent well monitoring the northern migration of the IA Plume
2186	Semiannual	PE	Ind. 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 Carbon Tet Plumes
3586	Semiannual	PE/PM	Mound	AL	Plume Extent well tracking migration of Solar Ponds nitrate Plume
3687	Semiannual	PM	East Trenches	BD/USHU	Performance Monitoring well monitoring effects of remediation downgradient of Trench T-4
4087	Quarterly	RCRA	Landfill	AL	RCRA/Plume Extent well monitoring downgradient of Landfill Plume
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
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
5887	Quarterly	RCRA	PU&D	AL	RCRA upgradient/ Plume Extent Well monioring the PU&D Yard Plume – LF
6186	Semiannual	PE	Ind. Area	AL	Plume Extent well monitoring easward migration of IA Plume
6286	Semiannual	PD	903 Pad	BD/USHU	Plume Definition well monitoring pathway to Woman Cr. in the 903 Pad/Ryans Pit Plume
6386	Semiannual	PD	903 Pad	AL	Plume Definition well monitoring pathway to Woman Cr. in the 903 Pad/Ryans Pit Plume
6486	Semiannual	D	NA	AL	Drainage well monitoring the Woman Cr. drainage downgradient of the 881 Hillside Plume
6586	Semiannual	D	NA	AL	Drainage well monitoring the No. side Woman Cr. 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	Bldg. 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	Bldg. 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	Bldg. 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	Bldg. 123	AL	D & D Monitoring for Building 123
10498	Semiannual	DD	Bldg. 123	AL	D & D Monitoring for Building 123
10592	Semiannual	PM	881 Hillside	AL	Performance Monitoring for the French Drain
10598	Semiannual	DD	Bldg. 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

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Table 1-1 IMP Wells

WELL NO	FREQUENCY	CLASS	PLUME/AREA	FORMATION	PURPOSE
10994	Semiannual	PE	IA/Old Landfill	AL	Plume Extent IA VOA Plume/Old Landfill Plume near Woman Cr.
11092	Semiannual	PM	881 Hillside	AL	Performance Monitoring for the French Drain
11891	Semiannual	PM	East Trenches	BD/UHSU	Performance Montoring well monitoring effects of remediation downgradient of Trench T-3
12191	Semiannual	PM	East Tranches	BD/UHSU	Performance Monitoring at edge of T3 soil excavation
12691	Semiannual	PM	East Trenches	BD/USHU	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/DD	IHSS 118.1/B771	AL	Plume Degredation well monitoring the IHSS 118.1 plume and D&D monitoring for Building 771 Complex
18399	Semiannual	PA	IHSS 118.1	AL	Plume Degredation well monitoring the IHSS 118.1 plume
18499	Semiannual	PA	IHSS 118.1	AL	Plume Degredation well monitoring the IHSS 118.1 plume
18799	Semiannual	PA	IHSS 118.1	AL	Plume Degredation well monitoring the IHSS 118.1 plume
20998	Semiannual	DD	Bldg 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	Ind. Area	AL	Plume Extent well monitoring the northern migration of the IA Plume
22696	Semiannual	PE	Ind. Area	AL	Plume Extent well monitoring the westward migration of the Carbon Tet Plume
22796	Semiannual	PE	Ind. Area	AL	Plume Extent well monitoring the northward migration of Carbon Tet Plume
22896	Semiannual	PE	Ind. Area	AL	Plume Extent well monitoring the northward migration of IA VOA Plume
22996	Semiannual	DD	Bldg 886	AL	D & D Monitoring for Building 886
23096	Semiannual	PE	903 Pad	AL	Plume Extent well monitoring the southern migration of the Ryans- OU2 VOA Plume
23296	Semiannual	PE/PM	East Trenches	AL	Plume Extent/Performance Monitoring well monitoring the East Trenches Treatment System
37101	Semiannual	DD	Bldg 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37201	Semiannual	DD	Bldg 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37301	Semiannual	DD	Bldg 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37401	Semiannual	DD	Bldg 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37501	Semiannual	DD	Bldg 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37601	Semiannual	DD	Bldg 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
37701	Semiannual	DD	Bldg 371/374	AL/BD	D & D Monitoring for Building 371/374 Complex
38591	Semiannual	D	NA	AL	Drainage well in Woman Cr. Drainage below 881 Hillside Plume
40099	Semiannual	DD	Bldg 444	AL/BD	D & D Monitoring for Building 444 Complex
40199	Semiannual	DD	Bldg 444	AL/BD	D & D Monitoring for Building 444 Complex
40299	Semiannual	DD	Bldg 444	AL/BD	D & D Monitoring for Building 444 Complex

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Table 1-1 IMP Wells cont.

WELL NO	FREQUENCY	CLASS	PLUME/AREA	FORMATION	PURPOSE
40399	Semiannual	DD	Bldg 444	AL/BD	D & D Monitoring for Building 444 Complex
40499	Semiannual	DD	Bldg 444	AL/BD	D & D Monitoring for Building 444 Complex
40599	Semiannual	DD	Bldg 771	AL/BD	D & D Monitoring for Building 771 Complex
40699	Semiannual	DD	Bldg 771	AL/BD	D & D Monitoring for Building 771 Complex
40799	Semiannual	DD	Bldg 771	AL/BD	D & D Monitoring for Building 771 Complex
40899	Semiannual	DD	Bldg 771	AL/BD	D & D Monitoring for Building 771 Complex
40999	Semiannual	DD	Bldg 886	AL/BD	D & D Monitoring for Building 886
41099	Semiannual	DD	Bldg 886	AL/BD	D & D Monitoring for Building 886
41199	Semiannual	DD	Bldg 886	AL/BD	D & D Monitoring for Building 886
41299	Semiannual	DD	Bldg 444	AL/BD	D & D Monitoring for Building 444 Complex
41499	Semiannual	DD	Bldg 771	AL/BD	D & D Monitoring for Building 771 Complex
41591	Semiannual	B	Boundary	AL	Boundary Well - in small drainage near east access gate
41599	Semiannual	DD	Bldg 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	Ind. Area	AL	Plume Extent well monitoring southward migration of IA Plume
52894	Quarterly	RCRA	Landfill	AL	RCRA/Plume Extent well monitoring downgradient of Landfill Plume
52994	Quarterly	RCRA	Landfill	AL	RCRA/Plume Extent well monitoring downgradient of Landfill Plume
60299	Semiannual	DD	Bldg 776/777	AL/BD	D & D Monitoring for Building 776/777 Complex
60499	Semiannual	DD	Bldg 707	AL/BD	D & D Monitoring for Building 707
60599	Semiannual	DD	Bldg 707	AL/BD	D & D Monitoring for Building 707
60699	Semiannual	DD	Bldg 707	AL/BD	D & D Monitoring for Building 707
61499	Semiannual	DD	Bldg 707	AL/BD	D & D Monitoring for Building 707
70099	Quarterly	PM	Solar Ponds	AL/BD	Performance Monitoring of groundwater treatment system below Solar Ponds
70193	Quarterly	RCRA	PU&D	BD/UHSU	RCRA upgradient/Plume Extent well monitoring the PU&D Yard Plume
70299	Quarterly	PM	Solar Ponds	AL/BD	Performance Monitoring of groundwater treatment system below Solar Ponds
70393	Quarterly	RCRA	PU&D	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
75992	Semiannual	PE	Mound/E. 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
90099	Semiannual	PA	903 Pad/Ryans Pit	AL/BD	Plume Degredation well monitoring the southern migration of the 903 Pad/Ryan's Pit Plume
90199	Semiannual	PE	903 Pad/Ryans Pit	AL/BD	Plume Extent well monitoring the southern migration of the 903 Pad/Ryan's Pit Plume
90299	Semiannual	PE	903 Pad/Ryans Pit	AL/BD	Plume Extent well monitoring the southern migration of the 903 Pad/Ryan's Pit Plume
90399	Semiannual	PA	903 Pad/Ryans Pit	AL/BD	Plume Degredation well monitoring the southern migration of the 903 Pad/Ryan's Pit Plume

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Table 1-1 IMP Wells cont.

WELL NO	FREQUENCY	CLASS	PLUME/AREA	FORMATION	PURPOSE
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
00100	Semiannual	DD	Bldg 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	Bldg 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	Bldg 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	Bldg 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	Bldg 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	Bldg 776/777	AL/BD	D & D Monitoring for Building 776/777 Complex
00700	Semiannual	DD	Bldg 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
02197	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	DD	Bldg 779	AL	D&D monitoring upgradient of Bldg. 779
02497	Semiannual	DD	Bldg 779	AL	D&D monitoring downgradient of Bldg. 779
02500	Semiannual	DD	Bldg 779	AL/BD	D&D monitoring downgradient of Bldg. 779
0386	Semiannual	B	Boundary	BD/UHSU	Boundary Well - in small drainage north of the east access gate
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 theEastTrenches Plume

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Table 1-1 IMP Wells cont.

WELL NO	FREQUENCY	CLASS	PLUME/AREA	FORMATION	PURPOSE
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 the Site at Indiana St.
07391	Semiannual	PM	903 Pad	AL/BD	Performance Monitoring well monitoring effects of remediation downgradient of Ryans Pit
08091	Semiannual	PE	Mound/E. Trench	AL	Plume Extent well monitoring the southern migration of Mound and East Trenches Plumes
771FDOut# 2	Semiannual	DD	Bldg 771	NA	D&D Monitoring for B771 at foundation drain outfall
891COLWE L	Quarterly	PM	881 Hillside	AL	Performance Monitoring of groundwater in collection well on 881 Hillside
B206989	Quarterly	RCRA	Landfill	BD/UHSU	RCRA/Plume Extent well monitoring downgradient of Landfill Plume
B208289	Semiannual	PE	Solar Ponds	BD/UHSU	Plume Extent well monitoring the northeast mitgration of the SEP Nitrate Plume
B208789	Semiannual	PE	Solar Ponds	AL	Plume Extent well monitoring the northeast mitgration of the SEP Nitrate Plume
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
FD-707-4	Semiannual	DD	Bldg 707	NA	D&D Monitoring for Building 707 at foundation drain access point
P114389	Semiannual	PE	Ind. Area	AL	Plume Extent well to monitor extent of Industrial Area plume pathway to Walnut Cr.
P209289	Semiannual	PD	Carbon Tet	AL	Plume Definition well in the Carbon Tet Plume
P209389	Semiannual	PD	Carbon Tet	BD	Plume Definition well in the Carbon Tet Plume
P209489	Semiannual	PD	Solar Ponds	BD/UHSU	Plume Definition well for the Carbon Tet. Plume
P218089	Semiannual	DD	Bldg 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	Bldg 771	AL/BD	D & D Monitoring for Building 771 Complex
P219189	Semiannual	PD	Carbon Tet	AL	Plume Definition well for VOC contamination comming from Carbon Tet Plume
P219489	Semiannual	PE	Solar Ponds	AL	Plume Extent well monitoring the northern migration of the SEP Nitrate Plume
P313589	Semiannual	PE	Ind. Area	AL	Plume Extent to monitor the eastward migration of IA Plume near Bldg. 881
P314289	Semiannual	PE	Ind. Area	AL	Plume Extent to monitor the southern migration of IA Plume near Bldg. 850
P317989	Semiannual	DD	Bldg 886	AL	D & D Monitoring for Building 886
P416689	Semiannual	PE	Ind. Area	AL	Plume Extent to monitor southern migration of IA Plume south of Bldg. 440
P416789	Semiannual	PD	Ind. Area	AL	Plume Definition of IA Plume south of 400 area along pathway to Woman Cr.
P416889	Semiannual	PD	Ind. Area	AL	Plume Definition of IA Plume south of Bldg. 664 along pathway to Woman Cr.
P419689	Semiannual	DD	Bldg 444	AL/BD	D & D Monitoring for Building 444 Complex

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Table 1-1 IMP Wells cont.

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
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	PM	881 Hillside	NA	Performance Monitoring of groundwater in footing drain seep below Bldg. 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 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.

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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 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 of groundwater evaluations and remediation activities. Plate 1 shows the locations of all existing monitoring wells at RFETS.

During 2000, D&D monitoring networks were established around Buildings 707 and 776/777, and an additional monitoring well was installed at the site of Building 779. Building 707 was a former plutonium production facility. Six monitoring wells were installed at Building 707 and are numbered 60499, 60599,60699, 61499, 00200 and 00300. Existing well P218089 is also utilized at Building 707. One footing drain outfall, FD-707-4, is also sampled. Five monitoring wells were installed at building 776/777 and are numbered 60299, 00400, 00500,00600 and 00700. Building 776/777 was a former plutonium production facility. These projects are described in detail in Section 5.0 of this report.

An investigation of the eastern extent of the PU&D Yard VOC Plume was conducted in 2000. Nine temporary wells were installed and were numbered 30100–30900. One seep piezometer was also installed and is identified as SW00495. Based on the results of the investigation, VOC contamination was interpreted to extend slightly farther

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to the southeast than previously thought. Wells were also selected for investigation of plume degradation. These wells are numbered 01097, 30900, 01497, 70693 and 02097. This evaluation project is described further in Sections 7.4 and 8.4 of this report.

A plume degradation study was initiated to evaluate the extent of the 903 Pad/Ryan's Pit VOC Plume. Five monitoring wells numbered 07391, 1187, 90099, 90399 and 11791 were sampled to help quantify the degree of plume degradation that is occurring. The results are described in Section 7.3 of this report.

Removals from the Groundwater Monitoring Network

Wells are proposed for removal from the Site monitoring network either because of improvements to the network (i.e., new well installations noted above), or, because of well damage.

Because of the new installations at the 903 Pad/Ryan's Pit Plume, several poorly positioned wells have been removed from the network. These wells are numbered 23196, 2987, and 3087.

The number of monitoring wells used for plume degradation of the IHSS 118.1 source was reduced. Wells 18299, 18599, 18699 and 18899 have been removed from the program. Well 21098, which was installed for another purpose has been retained for use in the IHSS 118.1 investigation.

Well 20998, initially installed for another purpose, is being monitored as part of the Building 771 D&D monitoring network. However, well 21098 is in a better upgradient location and it will be used instead of well 20998 for the D&D monitoring of Building 771.

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Table 1-2
ANALYTE SUITE

WELL NO	FREQUENCY	PLUME/AREA	DRIVERS	VOC Suite	METALS Suite	TRITIUM	PU/AM	SR 89/90	URANIUM	NITRATE	FLUORIDE	SULFATE	TDS	CYANIDE	CESIUM-137	CHLORIDE	SULFIDE	TOC	METHANE	WATQUAL Suite	Np-237	TPH
1386	Quarterly**	Drainage/Solar Ponds	RFCA, RCRA	X	X	X	X	X	X+X (D&T)	X	X	X	X									
1786	Quarterly**	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X+X (D&T)	X	X	X	X									
1986	Semiannual	Ind. Area	RFCA	X	X		X		X	X			X									
2186	Semiannual	Ind. Area	RFCA	X	X		X		X	X			X									
3386	Semiannual	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X	X	X	X	X									
3586	Semiannual	Mound		X	X		X		X	X			X									
3687	Semiannual	East Trenches		X	X		X		X	X			X									
4087	Quarterly	Landfill	RFCA, RCRA	X	X	X			X	X	X	X	X									
4787	Semiannual	881 Hillside	RFCA	X	X				X	X		X	X									
4887	Semiannual	881 Hillside	RFCA	X	X				X	X		X	X									
5387	Semiannual	881 Hillside	RFCA	X	X				X	X		X	X									
5587	Semiannual	Drainage	RFCA	X	X			X	X	X		X	X									
5887	Quarterly	PU&D	RFCA, RCRA	X	X	X			X	X	X	X	X									
6186	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X			X									
6286	Semiannual	903 Pad	RFCA	X	X		X		X	X		X	X									
6386	Semiannual	903 Pad	RFCA	X	X		X		X	X		X	X									
6486	Semiannual	Drainage	RFCA	X	X			X	X	X		X	X									
6586	Semiannual	Drainage	RFCA	X	X		X		X	X			X									
7086	Semiannual	IA/Old Landfill	RFCA	X	X			X	X	X		X	X									
10098	Semiannual	Bldg. 123		X	X		X		X	X			X	X	X							
10194	Semiannual	East Trenches	RFCA	X	X		X		X	X			X									
10198	Semiannual	Bldg. 123		X	X		X		X	X			X	X	X							
10294	Semiannual	Boundary	RFCA, AIP	X	X	X	X		X	X	X	X	X									
10298	Semiannual	Bldg. 123		X	X		X		X	X			X	X	X							
10394	Semiannual	Boundary	RFCA, AIP	X	X	X	X	X	X	X	X	X	X									
10398	Semiannual	Bldg. 123		X	X		X		X	X			X	X	X							
10498	Semiannual	Bldg. 123		X	X		X		X	X			X	X	X							
10592	Semiannual	881 Hillside	RFCA, IM/IRA -FD	X	X				X	X		X	X									
10598	Semiannual	Bldg. 123		X	X		X		X	X			X	X	X							
10692	Semiannual	881 Hillside	RFCA, IM/IRA -FD	X	X				X	X		X	X									
10792	Semiannual	881 Hillside	RFCA, IM/IRA -FD	X	X				X	X		X	X									
10992	Semiannual	881 Hillside	RFCA, IM/IRA -FD	X	X				X	X		X	X									
10994	Semiannual	IA/Old Landfill	RFCA	X	X			X	X	X		X	X									
11092	Semiannual	881 Hillside	RFCA, IM/IRA -FD	X	X				X	X		X	X									
11891	Semiannual	East Trenches		X	X		X		X	X			X									
12691	Semiannual	East Trenches		X	X		X		X	X			X									
15599	Semiannual	Mound		X			X		X				X									
15699	Semiannual	Mound		X			X		X				X									
15799	Semiannual	Mound		X			X		X				X									
18199	Semiannual	IHSS 118.1/Bldg 771		X	X	X	X		X	X		X	X			X	X	X	X		X	
18399	Semiannual	IHSS 118.1		X						X		X	X			X	X	X	X			
18499	Semiannual	IHSS 118.1		X						X		X	X			X	X	X	X			
18799	Semiannual	IHSS 118.1		X						X		X	X			X	X	X	X			
20998	Semiannual	Bldg 771		X	X	X	X		X	X			X								X	
21098	Semiannual	IHSS 118.1		X						X		X	X			X	X	X	X			
22596	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X			X									
22696	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X			X									
22796	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X			X									
22896	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X			X									
22996	Semiannual	Bldg 886	RFCA, IM/IRA for IA	X	X		X		X	X			X									
23096	Semiannual	903 Pad	RFCA	X	X		X		X	X		X	X									
23296	Semiannual	East Trenches	RFCA	X	X		X		X	X			X									
37101	Semiannual	Bldg 371/374		X	X		X		X	X			X									X*
37201	Semiannual	Bldg 371/374		X	X		X		X	X			X									X*
37301	Semiannual	Bldg 371/374		X	X		X		X	X			X									X*
37401	Semiannual	Bldg 371/374		X	X		X		X	X			X									X*
37501	Semiannual	Bldg 371/374		X	X		X		X	X			X									X*
37601	Semiannual	Bldg 371/374		X	X		X		X	X			X									X*
37701	Semiannual	Bldg 371/374		X	X		X		X	X			X									X*
38591	Semiannual	Drainage	RFCA	X	X			X	X	X		X	X									
40099	Semiannual	Bldg 444		X	X	X			X	X			X	X								
40199	Semiannual	Bldg 444		X	X	X			X	X			X	X								
40299	Semiannual	Bldg 444		X	X	X			X	X			X	X								
40399	Semiannual	Bldg 444		X	X	X			X	X			X	X								
40499	Semiannual	Bldg 444		X	X	X			X	X			X	X								
40599	Semiannual	Bldg 771		X	X	X	X		X	X			X								X	
40699	Semiannual	Bldg 771		X	X	X	X		X	X			X								X	
40799	Semiannual	Bldg 771		X	X	X	X		X	X			X								X	

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Table 1-2
ANALYTE SUITE

WELL NO	FREQUENCY	PLUME/AREA	DRIVERS	VOC Suite	METALS Suite	TRITIUM	PU/AM	SR 89/90	URANIUM	NITRATE	FLUORIDE	SULFATE	TDS	CYANIDE	CESIUM-137	CHLORIDE	SULFIDE	TOC	METHANE	WATQUAL Suite	Np-237	TPH
40899	Semiannual	Bldg 771		X	X	X	X		X	X			X								X	
40999	Semiannual	Bldg 865/886		X	X		X		X	X			X									
41099	Semiannual	Bldg 886		X	X		X		X	X			X									
41199	Semiannual	Bldg 886		X	X		X		X	X			X									
41299	Semiannual	Bldg 444		X	X	X			X	X			X	X								
41499	Semiannual	Bldg 771		X	X	X	X		X	X			X								X	
41591	Semiannual	Boundary	RFCA, AIP	X	X	X	X		X	X	X	X	X									
41599	Semiannual	Bldg 771		X	X	X	X		X	X			X								X	
41691	Semiannual	Boundary	RFCA, AIP	X	X	X	X	X	X	X	X	X	X									
43392	Semiannual	Ind. Area	RFCA	X	X		X		X	X			X									
52894	Quarterly	Landfill	RFCA, RCRA	X	X	X			X	X	X	X	X									
52994	Quarterly	Landfill	RFCA, RCRA	X	X	X			X	X	X	X	X									
60299	Semiannual	Bldg 776/777		X	X	X	X		X	X			X									
60499	Semiannual	Bldg 707		X	X		X		X				X								X	
60599	Semiannual	Bldg 707		X	X		X		X				X								X	
60699	Semiannual	Bldg 707		X	X		X		X				X								X	
61499	Semiannual	Bldg 707		X	X		X		X				X								X	
70099	Quarterly	Solar Ponds							X (T)	X			X									
70193	Quarterly	PU&D	RFCA, RCRA	X	X	X			X	X	X	X	X									
70299	Quarterly	Solar Ponds							X (T)	X			X									
70393	Quarterly	PU&D	RFCA, RCRA	X	X	X			X	X	X	X	X									
70493	Quarterly	PU&D	RFCA, RCRA	X	X	X			X	X	X	X	X									
75992	Semiannual	Mound/E. Trench	RFCA	X	X		X	X	X	X			X									
76992	Semiannual	PU&D/Landfill	RFCA, RCRA	X	X	X			X	X	X	X	X									
77392	Semiannual	Landfill	RFCA	X	X	X			X	X	X	X	X									
90099	Semiannual	903 Pad/Ryans Pit		X	X								X									
90199	Semiannual	903 Pad/Ryans Pit		X	X								X									
90299	Semiannual	903 Pad/Ryans Pit		X	X								X									
90399	Semiannual	903 Pad/Ryans Pit		X	X								X									
95099	Semiannual	East Trenches	RFCA	X									X									
95199	Semiannual	East Trenches	RFCA	X									X									
95299	Semiannual	East Trenches	RFCA	X									X									
00100	Semiannual	Bldg 779		X	X		X		X	X			X									
00197	Semiannual	Old Landfill	RFCA	X	X	X		X	X	X	X	X	X									
00200	Semiannual	Bldg 707		X	X		X		X				X								X	
00297	Semiannual	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X	X	X	X	X									
00300	Semiannual	Bldg 707		X	X		X		X				X								X	
00397	Semiannual	PU&D	RFCA	X	X	X			X	X	X	X	X									
00400	Semiannual	Bldg 776/777		X	X	X	X		X	X			X									
00491	Semiannual	903 Pad		X	X		X		X	X		X	X									
00500	Semiannual	Bldg 776/777		X	X	X	X		X	X			X									
00597	Semiannual	PU&D/Landfill	RFCA	X	X	X			X	X	X	X	X									
00600	Semiannual	Bldg 776/777		X	X	X	X		X	X			X									
00700	Semiannual	Bldg 776/777		X	X	X	X		X	X			X									
00797	Semiannual	881 Hillside	RFCA	X	X				X	X		X	X									
00897	Semiannual	Mound		X	X		X		X	X			X									
00997	Semiannual	Drainage	RFCA	X	X		X	X	X				X									
02197	Semiannual	PU&D	RFCA	X	X	X			X	X	X	X	X									
02291	Semiannual	Mound		X	X		X		X	X			X									
02397	Semiannual	Bldg 779		X	X		X		X	X			X									
02497	Semiannual	Bldg 779	RFCA	X	X		X		X	X			X									
02500	Semiannual	Bldg 779		X	X		X		X	X			X									
0386	Semiannual	Boundary	RFCA, AIP	X	X	X	X		X	X	X	X	X									
03991	Semiannual	East Trenches	RFCA	X	X		X		X	X			X									
04091	Semiannual	East Trenches	RFCA	X	X		X		X	X			X									
04591	Semiannual	East Trenches	RFCA	X	X		X		X	X			X									
0487	Semiannual	881 Hillside	RFCA	X	X				X	X		X	X									
04991	Semiannual	East Trenches	RFCA	X	X		X		X	X			X									
05091	Semiannual	East Trenches	RFCA	X	X		X		X	X			X									
05391	Semiannual	East Trenches		X	X		X		X	X			X									
05691	Semiannual	East Trenches		X	X		X		X	X			X									
06091	Semiannual	East Trenches	RFCA	X	X		X		X	X			X									
06491	Semiannual	Boundary	RFCA, AIP	X	X	X	X		X	X	X	X	X									
07391	Semiannual	903 Pad		X	X		X		X	X		X	X									
08091	Semiannual	Mound/E. Trench	RFCA	X	X		X	X	X	X			X									
12191	Semiannual	East Trenches	East Tranches	X	X		X		X	X			X									
771FDOut#2	Semiannual	Bldg 771		X	X	X	X		X	X			X								X	
891COLWEL	Quarterly	881 Hillside		X	X				X				X									

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Table 1-2
ANALYTE SUITE

WELL NO	FREQUENCY	PLUME/AREA	DRIVERS	VOC Suite	METALS Suite	TRITIUM	PU/AM	SR 89/90	URANIUM	NITRATE	FLUORIDE	SULFATE	TDS	CYANIDE	CESIUM-137	CHLORIDE	SULFIDE	TOC	METHANE	WATQUAL Suite	Np-237	TPH
B206989	Quarterly	Landfill	RFCA, RCRA	X	X	X			X	X	X	X	X									
B208289	Semiannual	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X	X	X	X	X									
B208789	Semiannual	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X	X	X	X	X									
ETP ef	Semiannual	East Trenches		X	X (T)							X				X						
ETP in	Semiannual	East Trenches		X	X (T)							X				X						
FD-707-4	Semiannual	Bldg 707		X	X		X		X				X								X	
NOTES	*	Can be omitted after first round of sampling, if results indicate no contamination with these species.																				
P114389	Semiannual	Ind. Area	RFCA	X	X		X		X	X			X									
P209289	Semiannual	Carbon Tet	RFCA, RCRA	X	X	X	X	X	X	X	X	X	X									
P209389	Semiannual	Carbon Tet	RFCA, RCRA	X	X	X	X	X	X	X	X	X	X									
P209489	Semiannual	Solar Ponds		X	X	X	X	X	X	X	X	X	X									
P218089	Semiannual	Bldg 707		X	X		X		X				X								X	
P218389	Semiannual	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X	X	X	X	X									
P219089	Semiannual	Bldg 771		X	X	X	X		X	X			X								X	
P219189	Semiannual	Carbon Tet	RFCA, RCRA	X	X	X	X	X	X	X	X	X	X									
P219489	Semiannual	Solar Ponds	RFCA, RCRA	X	X	X	X	X	X	X	X	X	X									
P313589	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X			X									
P314289	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X			X									
P317989	Semiannual	Bldg 885/886		X	X		X		X	X			X									
P416689	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X			X									
P416789	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X			X									
P416889	Semiannual	Ind. Area	RFCA, IM/IRA for IA	X	X		X		X	X			X									
P419689	Semiannual	Bldg 444		X	X	X			X	X			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		
SW099	Quarterly	Landfill		X									X									
SW100	Quarterly	Landfill		X									X									
SW13494	Quarterly	881 Hillside		X	X				X				X									
	**	Full IMP suite semiannually, reduced Solar Ponds Plume suite in remaining quarters.																				
	(D), (T)	Filtered, unfiltered, respectively.																				

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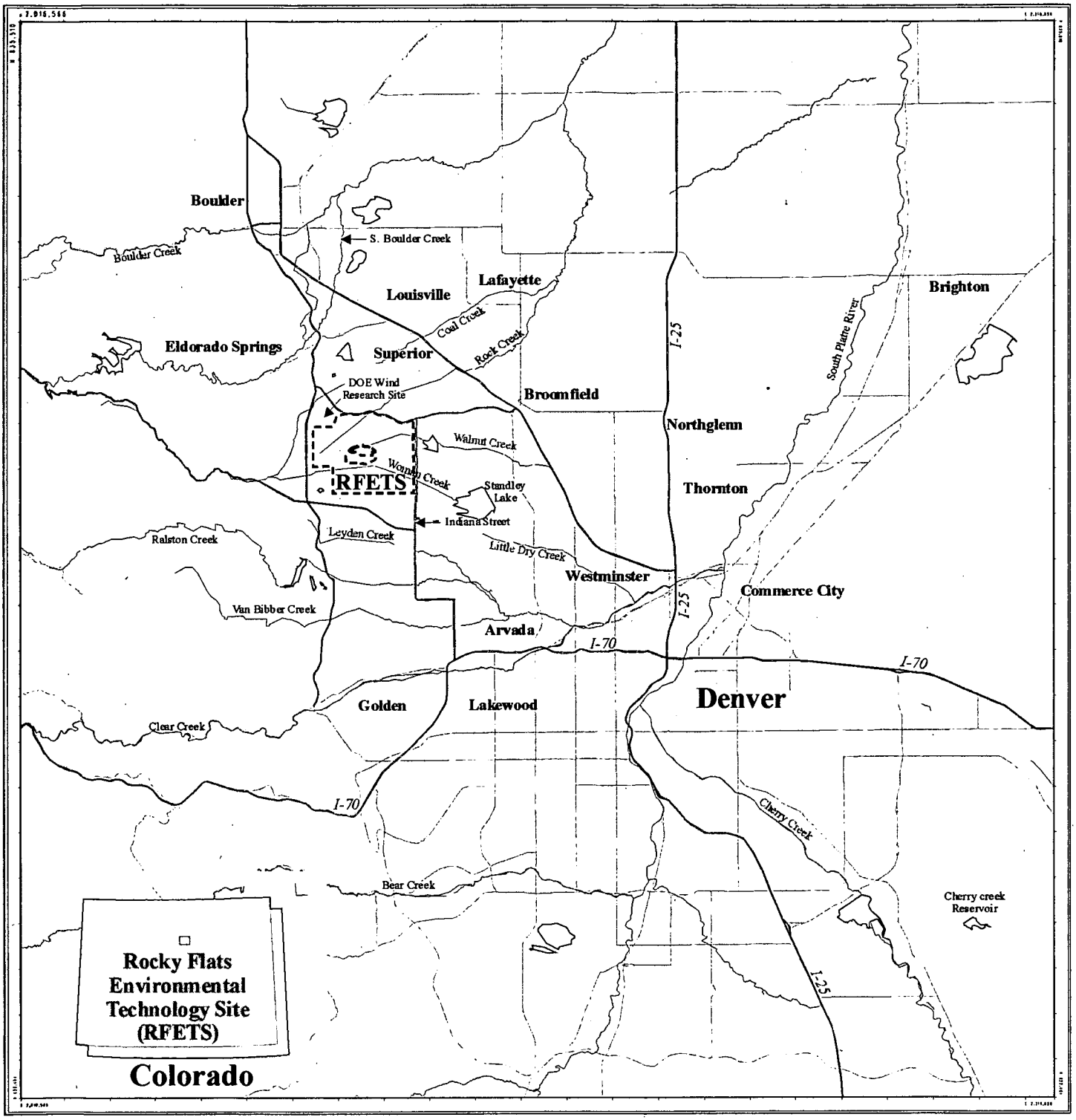

Figure 1-1 Location of Rocky Flats Environmental Technology Site (RFETS)
2000 Annual RFCA Groundwater Monitoring Report

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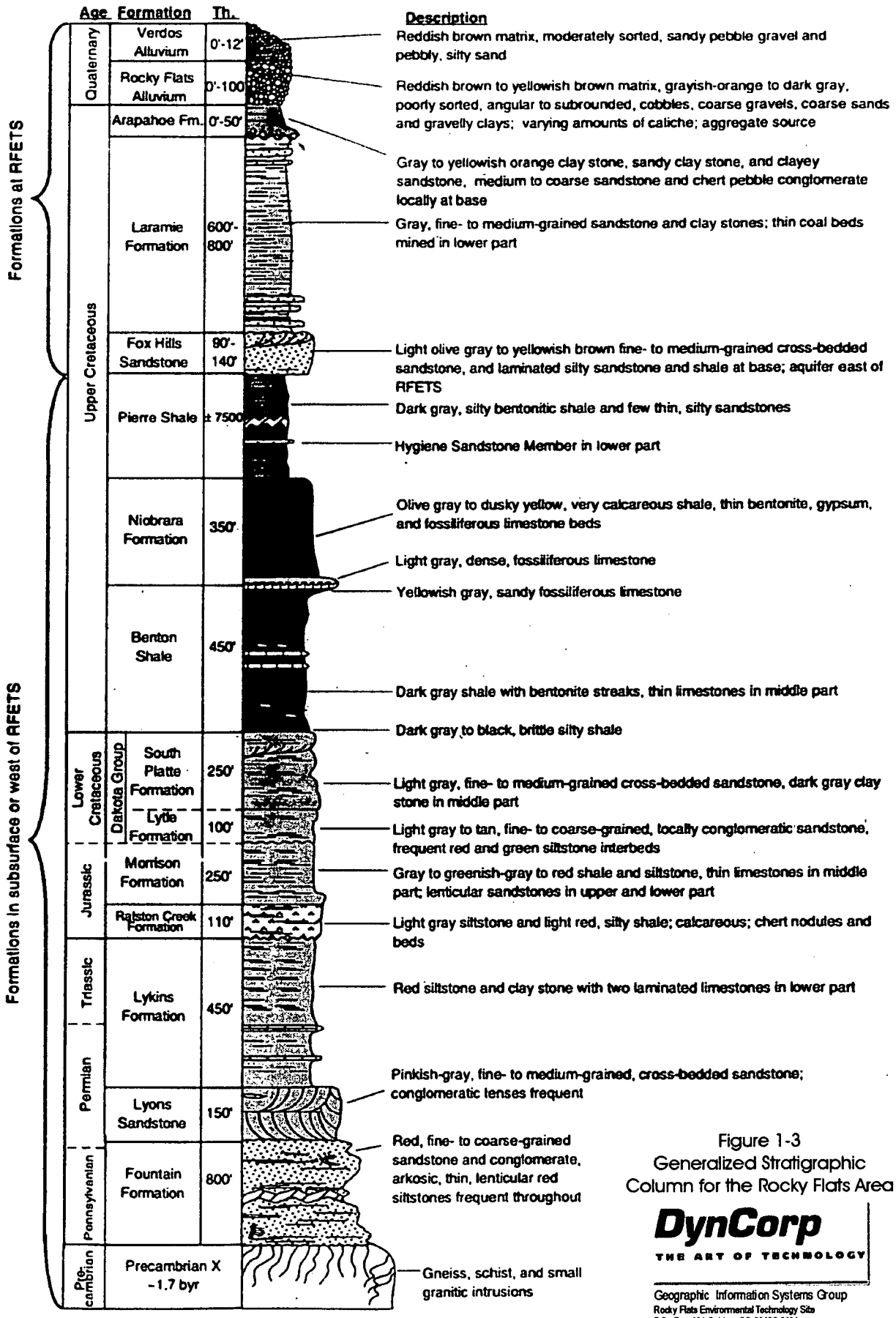
Geographic Information Systems Group
Rocky Flats Environmental Technology Site
P.O. Box 464 Golden, CO 80402-0464

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

w:\projects\fy2001\01-0827\fig1-1.cdr

32



Modified from LeRoy and Weimer (1971)w:/projects/fy2001/01-0927/fig1-3.cdr

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

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Rocky Flats Environmental Technology Site
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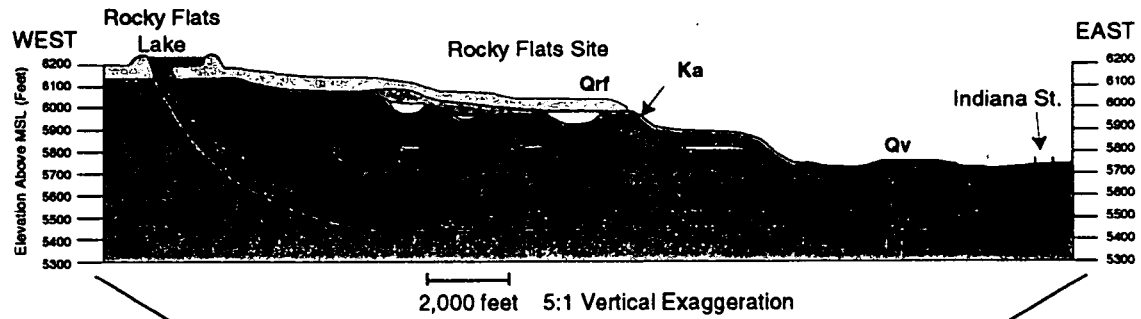
Geologic Units

- 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
- TRPl — Lykins Formation
- PIPf — Lyons & Fountain Formations
- p€ — Undivided Igneous & Metamorphic Units

Structural interpretation from EG&G, 1993a.



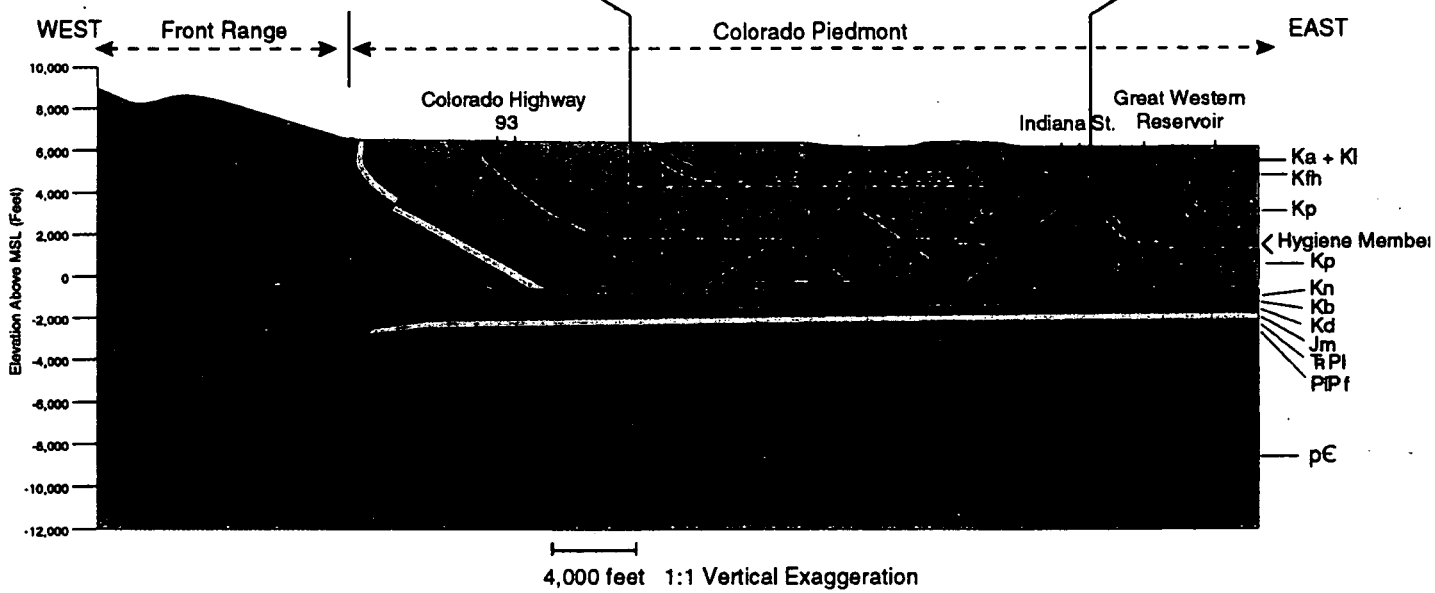


Figure 1-4
Generalized Geologic Cross Section of the Front Range and the Rocky Flats Area

2000 Annual RFCA
Groundwater Monitoring Report

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Projects/fy2001/01-0927/fig1-4.cdr

2.0 DATA SUMMARY FOR RFCA-DESIGNATED WELLS SAMPLED IN 2000

2.1 Data Screening

RFCA groundwater analytical data for 2000 were utilized to assess compliance with RFCA well classifications as set forth in the DQOs section of the IMP (DOE 2000). Because many well categories rely on Tier I or Tier II action level criteria to trigger further action, the Tier II action level criteria have been adopted for reducing 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 well networks (not action level based), which in this 2000 Annual Report includes only the Present Sanitary Landfill, are evaluated in Section 6.0 using an upgradient to downgradient groundwater quality comparison approach. Plume Degradation wells from IHSS 118.1, the PU&D Yard and the 903 Pad/Ryan's Pit Plume are examined in Section 7.0.

Table 2-1 provides a collection summary of 2000 IMP well groundwater samples for 161 locations. Table 2-2 provides a 2000 summary of 19 dry RFCA wells. Table 2-3 presents a summary of results for contaminants with concentrations greater than Tier II action levels. The Tier II values from Table 2-3 have been reported previously in the 2000 RFCA Quarterly Groundwater Monitoring Reports (RMRS 2000a, 2000b, 2001a, 2001b). Table 2-3 has been updated as needed to include data that was unavailable at the time the quarterly reports were written or when errors were found. 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. Trend plots for analytes discussed in this section (Figures A-1 to A-156) are found in Appendix A.

Plates 6 through 9 present summarized annual information by IMP well class and location for radionuclides, VOCs, water quality parameters and metals. Plate 6, Radionuclides in Groundwater, presents analytical results for americium, plutonium, strontium, tritium and uranium isotopes where at least one uranium isotope had a value equal to or greater than 8.0 picoCuries/Liter (pCi/L). These analytes represent the principal radionuclide contaminants of concern at RFETS. The 8.0 pCi/L concentration was selected solely for the convenience of displaying a manageable number of locations on the plate. Plate 7, VOCs in Groundwater, presents analytical results for 1,1,1-trichloroethane; 1,1,2-trichloroethane; 1,1-dichloroethene; carbon tetrachloride; chloroform; cis-1,2-dichloroethene; methylene chloride; tetrachloroethene; trichloroethene; and vinyl chloride. These VOCs represent the contaminants of concern that are most commonly found at RFETS. A location is shown on Plate 7 if it had a result that was greater than a Tier II action level for any of the listed compounds. Plate 8, Water Quality Parameters in Groundwater, presents analytical results for fluoride, nitrate/nitrite, and sulfate where at least one value was greater

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than a Tier II action level. Plate 9, Metals in Groundwater, presents results for any metal that exceeded its Tier II action level. Thallium results from the 4th quarter have not been included in Plate 9 because their high values have been judged to be laboratory artifacts. See the discussion below for details.

As detailed in the 2000 Fourth Quarter Groundwater Monitoring Report (RMRS 2001b), a minimum of 15 sampling locations had analytical results above the Tier II action level for thallium that are considered by the Groundwater Program to be suspicious. The locations involved are 04991, 11891, 12191, 1386, 1786, 22796, 3586, 891COLWEL, B206989, B208789, P209289, P209489, P317989, P416689 and SW13494. The results are thought to be spurious because at least ten of these locations had thallium results that were ten times any previous result. These thallium results are listed in Table 2-3 but are not discussed with the wells in the following subsections.

In total, 110 of 161 RFCA-designated monitoring wells had concentrations of one or more analytes above Tier II action levels (Table 2-3). Nineteen of 161 RFCA-designated wells were dry and yielded no samples (Table 2-2).

Historic trends of analytical values of contaminants of concern for selected Boundary, Drainage, Plume Definition, and Plume Extent wells are presented in Figures A-1 through A-156 (Appendix A). These contaminant trend plots depict organic compounds 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 for inorganics and radionuclides were adopted from the 1993 Background Geochemical Characterization Report (DOE 1993b) with the exception of americium-241, plutonium-239/240, uranium-233/234, uranium-235, and uranium-238. Background values for these radionuclides were taken from the Draft Background Comparison for Radionuclides in Groundwater Report (DOE 1997a). Data were extracted directly from the Soil and Water Database (SWD) and/or the local groundwater database to calculate the Historic M2SDs for locations with analytes exceeding Tier II ALF criteria. The following subsections present a compilation of the data and information first provided in the CY 2000 quarterly reports. The decision rules that define the conditions under which values above action levels become "reportable" as described in Section 1.3.2 of this report.

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Table 2-2 Dry RFCA-Designated Wells-Groundwater 2000

Well Number	IMP Well Class
00197	PLUME EXTENT
00297	PLUME DEFINITION
00300	D&D (Building 707)
00397	PLUME EXTENT
02197	PLUME EXTENT
08091	PLUME EXTENT
11092	PERFORMANCE MONITORING
15599	PERFORMANCE MONITORING
40899	D&D (Building 771)
4787	PLUME EXTENT
4887	PLUME EXTENT
52994	RCRA
5587	DRAINAGE
77392	PLUME DEFINITION
90199	PLUME DEGRADATION
95299	PERFORMANCE MONITORING
P218389	PLUME EXTENT
SW099	PERFORMANCE MONITORING
SW100	PERFORMANCE MONITORING

2.2 Values Above Tier I and Tier II Action Level Criteria

2.2.1 Boundary Wells

Six IMP designated Boundary wells (0386, 06491, 10294, 10394, 41591, and 41691) were sampled in 2000. Boundary wells monitor groundwater leaving the eastern Site boundary through stream drainage channels.

Reportable concentrations of nickel were detected in samples from well 41591 in the 1st and 3rd Quarters of 2000 (Figure A-108). Nickel in 41591 was above the Tier II level, the background and historic M2SDs. Samples collected prior to 1999 were bailed and field filtered and analyses were performed for dissolved metals. Samples from the pump equipped well were typically not field filtered and were analyzed for total metals. The two reportable 2000 metals samples have values that are considerably higher than those analyzed prior to 1999 for either

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total or dissolved nickel. The nickel concentrations in well 41591, in terms of total metals, have remained high for the past year. Section 8.6 discusses metals anomalies in groundwater at RFETS.

The uranium isotopes 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 are, therefore, not considered reportable values. Because these isotopes are naturally occurring, and naturally increase in a downstream direction, these values may be a reflection of natural processes.

2.2.2 Drainage Wells

Drainage wells are located in stream drainages at RFETS, downgradient of contaminant plumes. 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 2000. Well 5587 was dry during 2000.

Nickel was reported above the Tier II action level and background M2SD for a sample collected from well 6486 in early 2000 (Table 2-3), which represents a reportable value. Well 6486 is cased with stainless steel. Figure A-112 shows that this result (529 μg/L) is the highest ever recorded at the well. A subsequent sample collected in January of 2001 (the well was dry through the middle of 2000) had a value of 129 μg/L, still a high result but consistent with values recorded in the past. See Section 8.6 for an evaluation of metal anomalies in groundwater.

Uranium isotopes 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 and contain contaminants in amounts that exceed the Tier II action levels. A reportable result occurs when contaminant concentrations exceed the Tier I action level (100x Tier II). Eighteen Plume Definition wells were monitored during 2000; 903 Pad/Ryan's Pit Plume wells (00491, 2987, 3087, 6286 and 6386), PU&D Yard Plume wells (00597 and 77392), East Trenches Plume wells (03991 and 05391), 881 Hillside Plume wells (0487, P416789 and P416889), Carbon Tetrachloride Plume wells (P209289, P209389, P209489 and P219189), Industrial Area VOC Plume well 22896, and Solar Ponds Plume well 00297. Wells 2987 and 3087 were dropped from the program during 2000 because of poor location and well casing damage. As reported in Table 2-3, thirteen of these wells contained at least one or more contaminants that exceeded Tier II action levels.

903 Pad/Ryan's Pit VOC Plume

Wells 00491, 2987, 3087, 6286 and 6386 are Plume Definition wells that monitor the 903 Pad/Ryan's Pit Plume (see also Sections 4.6 and 7.2). This plume is characterized by VOC contamination. Samples from well 00491 had results above the Tier II action levels for carbon tetrachloride (Figure A-1), methylene chloride (Figure A-2), tetrachloroethene (Figure A-3), trichloroethene (Figure A-4), uranium-233/234 and uranium-238, but all were below

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their historic background M2SD benchmarks and, therefore, were not reportable. After generally declining in concentration from late 1991 to mid-1995, carbon tetrachloride, tetrachloroethene and trichloroethene concentrations stabilized from mid-1995 through the end of 2000. The methylene chloride trend analysis is complicated by significant contamination in the laboratory method blanks as determined in verification.

Well 2987 was damaged when a malfunctioning submersible pump became lodged in the well casing and could not be removed. The lodged pump prevented further sampling. This well has since been removed from the program and wells located more favorably have been added. No results greater than Tier II action levels were observed in well 3087 during 2000. The well was sampled in both the 2nd and 4th Quarters. Well 3087 has also been removed from the program because of poor location and has been replaced.

Plume Definition well 6286 exhibited non-reportable amounts of carbon tetrachloride, selenium and uranium isotopes U-233/234 and U-238. The results were all below Tier I action levels but above the Tier II levels. The carbon tetrachloride results (Figure A-110) and uranium results were below the historic M2SD benchmark. Carbon tetrachloride concentrations have remained relatively stable in this well since 1994. Selenium concentrations, while near the historic M2SD level appear to be decreasing since a high in the first half of 1999 (Figure A-111). Well 6286 was one of seven wells in the vicinity of the southern portion of the Industrial Area that contained elevated selenium during 2000. In general, the selenium concentration is above the background M2SD benchmark but within the historic M2SD for all the wells in this group except 6286. Well 23196 has only one selenium result. Selenium in the other locations has remained relatively constant.

Plume Definition well 6386 was generally dry; only one VOC and one nitrate sample were collected during the year. There were no results greater than Tier II for these analyses.

PU&D Yard Plume

Plume Definition wells 00597 and 77392 are located in the PU&D Yard Plume. Contaminants of concern in 00597 are trichloroethene and nitrate/nitrite. Both contaminants were above their Tier II but below the Tier I action levels (Table 2-3). No historical M2SD data are available for this well. Trichloroethene in well 00597 equaled the Tier II action level in the January 2000 sampling but fell back below the action level in September (Figure A-6). Since December of 1997 the nitrate/nitrite in 00597 has increased from 9 mg/L to 17 mg/L (Figure A-5). Elevated nitrate/nitrite concentrations are also present in well B206989 (39-44 mg/L) (Table 2-3). Plume Definition well 77392 was dry throughout all of 2000.

New wells were installed in the PU&D yard area in late September of 2000. These wells are being used to assess plume degradation within the PU&D Yard VOC plume as discussed in Section 7.3.

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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-13), and uranium-233/234 and uranium-238 that were above the Tier II action levels but below Tier I action levels. The carbon tetrachloride and uranium isotopes were below their respective historic and background M2SDs. The carbon tetrachloride trend plot shows that the concentration has remained relatively constant during 2000.

Carbon tetrachloride (Figure A-19), tetrachloroethene (Figure A-20) and 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. The VOCs and uranium isotopes were below their historic M2SDs (and background M2SDs for the isotopes). As shown in the trend plots, carbon tetrachloride and tetrachloroethene have increased over levels detected in 1999 but are within their historic ranges.

See Sections 2.2.4 and 4.3 for additional discussion of East Trenches Plume wells.

881 Hillside Plume

Three Plume Definition wells (0487, P416789 and P416889) are used to monitor the 881 Hillside Plume. Well 0487 contained carbon tetrachloride (Figure A-14), methylene chloride (Figure A-15), tetrachloroethene (Figure A-17), trichloroethene (Figure A-18), selenium (Figure A-16) and uranium-233/234 and uranium-238 that were above Tier II, but below Tier I action levels. Both the VOC and selenium results in 0487 were below their historic M2SDs and the uranium isotopes were below the background M2SDs. Except for the methylene chloride, which is compromised by method blank significant contamination as determined by validation, the VOC and selenium results for 2000 continue trends of decreasing concentrations established since 1994.

With a limited supply of water for sampling, Plume Definition monitoring well P416789 exhibited non-reportable uranium-233/234 that was above the Tier II action level but below the Tier I action level. Uranium-233/234 in this well was below the background M2SD benchmark.

Plume Definition monitoring well P416889 contained non-reportable concentrations of methylene chloride, tetrachloroethene and uranium-233/234 that were below Tier I but above Tier II action levels. The April 2000 methylene chloride concentration of 10 µg/L was twice the Tier II concentration but also associated with significant (verification) method blank contamination (Figure A-153). The November sample was a non-detect at much less than the Tier II level with no method blank contamination. These results do not give a clear indication of whether methylene chloride is increasing or decreasing in the well. The tetrachloroethene in P416889 was below its historic M2SD in both April and November (Figure A-154). The tetrachloroethene detections do not clearly indicate a decreasing or increasing trend. The uranium concentration was below its background M2SD.

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Carbon Tetrachloride Plume

The Carbon Tetrachloride Plume is monitored by Plume Definition wells P209289, P209389, P209489 and P219189. VOCs detected in these wells include carbon tetrachloride; 1,1-dichloroethene; cis-1,3-dichloropropene; and trichloroethene. Most of these constituents appear to be declining in concentration.

Well P209289 was dry during the 2nd quarter of 2000 but was sampled during the 4th quarter. P209289 contained carbon tetrachloride, U-233/234 and U-238 at levels above Tier II but below Tier I action levels. These results were not reportable. The uranium isotope results were well below the background M2SD benchmarks. Except for a high result in 1995, carbon tetrachloride (Figure A-140) has decreased in general since sampling began in 1991.

Monitoring well P209389 samples contained 1,1-dichloroethene and uranium-238 as non-reportable contaminants of concern. Two sampling events showed 1,1-dichloroethene to be above the Tier II but below the Tier I action level. Figure A-141 shows that the 1,1-dichloroethene concentration was within its historic M2SD range and has generally declined since sampling began in 1991. Uranium-238 was well below the background M2SD level.

Well P209489 samples contained levels of carbon tetrachloride, methylene chloride, trichloroethene, nitrate/nitrite, uranium-233/234 and uranium-238 that were above the Tier II action levels. None of these analytes were above the Tier I action level so they were not reportable. All the analytes were below their historic M2SDs and in the case of nitrate/nitrite and uranium isotopes below the background M2SDs. Carbon tetrachloride (Figure A-142) and trichloroethene (Figure A-145) concentrations appear to be decreasing slowly although the carbon tetrachloride results are erratic. Methylene chloride (Figure A-143) is represented by samples associated with significant method blank contamination (one validation and one verification) so defining a trend is difficult. The nitrate/nitrite shows a general decrease (Figure A-144). Overall nitrate/nitrite concentrations have declined since sampling began. As is typical, the uranium-233/234 and uranium-238 were below their respective background M2SD levels.

The 2000 contaminants of concern in Plume Definition well P219189 are 1,1-dichloroethene and uranium isotopes. The well provided limited amounts of water so sample aliquots for some analytes were limited. Results for the contaminants of concern were above the Tier II but below the Tier I benchmarks. The 1,1-dichloroethene concentration was below its historic M2SD (Figure A-146). Only one set of uranium isotope analyses are available for well P219189. The uranium results were close to but slightly above the background M2SDs. Figures A-147 (uranium-233/234), A-148 (uranium-235) and A-149 (uranium-238), each containing only four data points, show that U-233/234 activity may be increasing slightly, U-235 activity may be decreasing and U-238 activity may be remaining constant. Uranium concentrations in well P219189 are probably affected by its proximity to the Solar Ponds (see Section 4.2).

Industrial Area VOC Plume

Plume Definition well 22896 monitors the Industrial Area VOC Plume. When the First Quarter 2000 RFCA Groundwater Monitoring Report (RMRS 2000a) was written, well 22896 was still classified as a Plume Extent Well.

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The well was later reclassified as a Plume Definition well. The 1st quarter 2000 Plume Extent data have been reevaluated here, within the IMP Plume Definition class, and displayed as Plume Definition data in Table 2-3. The two 2000 trichloroethene results for well 22896 were above both the Tier I and Tier II action levels and thus were reportable. The well also contained non-reportable methylene chloride, tetrachloroethene, nickel and nitrate/nitrite.

As illustrated in Figure A-88, the trichloroethene concentration in well 22896 has been increasing since 1999 although currently it is still within its normal range. Because of the high trichloroethene concentration in well 22896 it is difficult for the laboratories to analyze for VOCs with lower concentrations. Interpretation of methylene chloride and tetrachloroethene is difficult because of the resulting non-detections at high detection limits. Methylene chloride concentrations were above the Tier II action level in 2000 (Figure A-84). Both 2000 methylene chloride results are compromised by laboratory method blank contamination. The February contamination was significant, July was not as indicated by verification. Because the level of contamination of the blanks is relatively low with respect to the analytical results for 1999 and 2000, the methylene chloride concentration may have increased after the fourth quarter of 1998. The February tetrachloroethene analysis showed that tetrachloroethene was above the Tier II action level while the July analysis was a non-detection below Tier II. The February detection for tetrachloroethene consisted of a "J" qualified result (22 μg/L) with a detection limit of 200 μg/L (Figure A-87). The July analysis and one in early 2001 did not detect any tetrachloroethene at detection limits of 50 μg/L and 12.5 μg/L respectively. Tetrachloroethene does not appear to be a serious problem in well 22896. The 22896 nickel values were similar to those of 1999. The February sampling event recorded a value higher than the Tier II action level while the July sample was well below (Figure A-85). Sampling technique may influence this apparent cyclic trend. (See the discussion of Metals Anomalies in Groundwater in Section 8.6 of this report.) The nitrate/nitrite results for 2000 in 22896 were both greater than the Tier II action level but below Tier I (Figure A-86). The nitrate concentration has decreased from the maximum value recorded in 1999 (15 mg/L).

Solar Ponds Plume

The southern margin of the Solar Ponds Plume, which consists of nitrate/nitrite and uranium isotopes, is monitored by Plume Definition well 00297. Well 00297 was dry during all 2000 sampling events.

2.2.4 Plume Extent Wells

Thirty-nine 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 wells have dual monitoring purposes. In the well lists below, the secondary plume monitored by a specific well is noted in parentheses. The East Trenches Plume is monitored by wells 04091, 04591, 04991, 05091, 06091, 08091 (plus Mound Plume), 10194, 75992 (plus Mound Plume) and 23296. Wells 1386, 1786, 3386, B208289, B208789, P218389 and P219489 monitor the Solar Ponds Plume. Plume Extent wells monitoring the Industrial Area VOC Plume include 10994 (plus the Old Landfill), 1986, 2186, 22596, 22696, 43392, 6186, 7086 (plus the Old Landfill), P114389, P313589, P314289 and P416689. The Carbon Tetrachloride Plume is monitored by wells 22796 and 3386 (plus Solar Ponds Plume). The 903 Pad/Ryan's Pit Plume is monitored by wells 23096 and 23196. Plume Extent wells 00397, 02197 and 76992 are

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used to monitor the PU&D Yard/Present Landfill. Plume Extent wells 4787, 4887, and 5387 are used to monitor the 881 Hillside. The Mound Plume is monitored by well 3586 (plus the Solar Ponds Plume).

East Trenches Plume

The East Trenches Plume is monitored by nine Plume Extent wells including 04091, 04591, 04991, 05091, 06091, 08091, 10194, and 23296. The ninth well, 75992, is located near the boundaries of the East Trenches and Mound Plumes and is, therefore, utilized to monitor contamination that may originate from either plume. As shown in Plate 12, these wells are located along the outermost edge of the East Trenches Plume to 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 flowing from the East Trenches plume. VOCs represent the primary constituents of this plume. Additional discussion of the East Trenches Plume can be found in Sections 4.3 and 8.5.1.

Before discussing the VOC results for the East Trenches Plume, other analytes found in the East Trenches Plume wells will be discussed. As in 1999, well 08091 was dry during sampling visits. Samples from the eight remaining East Trenches wells had uranium-233/234 and uranium-238 analytical results that were above Tier II action levels but below the background M2SD benchmarks. None of the uranium isotopic results were reportable. Well 06091 contained reportable chromium and nitrate/nitrite. The chromium and nitrate/nitrite results were above their respective Tier II action level and the background and historic M2SDs for the well (Table 2-3). Chromium in 06091 increased dramatically in 2000 (Figure A-26). This may be because of the installation of a dedicated submersible pump and the associated change from dissolved to total metal analyses. Nitrate/nitrite data for well 06091 included one 2000 result above the Tier II level and a second below (Figure A-27). Samples from well 23296 included a single chromium result that was above the Tier II action level (Figure A-91). As the trend plot shows much lower chromium analyses preceded the October 2000 result. This high total chromium result is thought to be an artifact of the sampling technique used at this pump equipped well.

VOCs in the East Trenches plume during 2000 were elevated in only two of the eight sampled Plume Extent wells (06091 and 23296). Well 06091 had two reportable carbon tetrachloride results that were above the Tier II and historic M2SDs for the well (Figure A-25). The April 2000 result (9 μg/L) is the highest carbon tetrachloride concentration ever recorded at the well; the November 2000 sample is lower. Increasing concentrations of carbon tetrachloride in well 06091 may be because of continued eastward migration of the plume.

Samples from well 23296 contained reportable concentrations of carbon tetrachloride; cis-1,2-dichloroethene; methylene chloride; tetrachloroethene; and trichloroethene. These VOCs were above the Tier II action levels. No historic M2SDs are available for this well. The carbon tetrachloride concentration (Figure A-90) increased in the 1st quarter of 2000 to its all-time high in the well (40 μg/L), then decreased sharply for the balance of the year. The cis-1,2-dichloroethene concentration in 23296 is erratic (Figure A-92). Methylene chloride (Figure A-93) increased to an all time high concentration in March 2000 (120 μg/L) and then decreased to below the Tier II level, although most of the reportable samples are associated with significant method blank contamination as determined by verification or validation. Tetrachloroethene (Figure A-94) and trichloroethene (Figure A-95) concentrations in

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23296 increased to all time maximums in February (36 µg/L and 120 µg/L, respectively) and then decreased through the rest of 2000. Despite the VOC increases during 2000, all of these analytes have returned to concentrations that are similar to those prior to installation of the East Trenches Treatment System. Equilibration of groundwater elevation and chemistry in the vicinity of well 23296 was expected to take at least a year after the treatment system was completed. Because well 23296 is immediately adjacent to the East Trenches Treatment System, groundwater in the area was probably affected by ponding of accumulated surface and groundwater during construction. Concentrations of these VOCs are expected to decrease in future years as the effects related to installation of the treatment system wane.

Solar Ponds Plume

Plume Extent wells 1386, 1786, 3386, B208289, B208789, P218389, and P219489 are utilized for groundwater monitoring of nitrate and uranium isotope contamination associated with the Solar Ponds Plume. The wells are located at the edge of the Solar Ponds Plume, which primarily extends north from the Solar Ponds to North Walnut Creek, with additional minor groundwater pathways to the east and south toward South Walnut Creek (see Plate 12). Wells 3386 and P218389 were dry during 2000. Well B208789 had no reportable results except for a spurious 4th quarter thallium. Uranium isotopes are mentioned at the end of the subsection. During 2000, nitrate and metals were the principal contaminants found in samples from these wells, while no VOCs were reported at concentrations above Tier II action levels.

Plume Extent well 1386 had three reportable occurrences of nickel in 2000 that were all above the Tier II action level, the background M2SD and historic M2SD (Figure A-57). The concentration began to rise irregularly in late 1997 and generally continues to be higher than the concentration prior to late 1997. Well 1386 is part of a program, discussed in Section 8.6, to investigate potential effects of sample collection technique and/or well completion materials on nickel concentrations.

Plume Extent well 1786 exhibited two reportable results for nitrate/nitrite and four for selenium during 2000. The nitrate/nitrite analyses were above the Tier II action level and background M2SD benchmark but below the historic M2SD for the well (Figure A-64). Nitrate concentrations are generally consistent. Three of the four selenium results were part of a sampling suite in which a sample was collected monthly for three consecutive months (Figure A-63). Selenium results from the monthly sampling are very consistent. The trend plot of these total metal analyses suggests an increasing trend in selenium that began in late 1998, which coincides with installation of a pump in the well and the associated shift from dissolved to total metal analyses.

Plume extent well B208289 provided limited water during 2000. Nitrate/nitrite from the one available sample was above the Tier II action level and the background M2SD and was therefore reportable (Figure A-139). This result was less than the historic M2SD and well within its normal range. The nitrate concentration does not seem to be increasing.

The nitrate concentration in Plume Extent well P219489 for two 2000 samples was above the Tier II action level and background M2SD (Figure A-150). There is insufficient data between 1991 and 1995 to calculate a historic M2SD for nitrate in the well. The December 2000 nitrate concentration was the highest recorded to date (57 mg/L), and as

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a result, a suite of monthly samples were collected and will be reported in the Second Quarter 2001 Groundwater Report. Except for the December 2000 result, the nitrate concentration in this well is relatively steady.

The four uranium isotopes commonly monitored at RFETS were present above Tier II action levels in Solar Ponds Plume Extent wells 1386, 1786, and B208789. None of the isotopic results for uranium were reportable because they were all below the background M2SDs. Uranium-233/234 and U-238 activities were above Tier II action levels in wells 1386, 1786, and B208789. Well 1786 also had U-235 activities above Tier II action levels.

Industrial Area VOC and Carbon Tetrachloride Plumes

Plume Extent wells monitoring the Industrial Area VOC Plume include 00197, 10994, 1986, 2186, 22596, 22696, 43392, 6186, 7086, P114389, P313589, P314289 and P416689. Wells 00197, 7086 and 10994 also monitor potential groundwater contamination originating from the Old Landfill located on the hillside south of the Building 130 and Building 400 complexes and north of Woman Creek. The Carbon Tetrachloride Plume (IHSS 118.1) is monitored by two Plume Extent wells, 22796 and 3386. Well 3386 also monitors the Solar Ponds Plume. Plume Extent wells 00197 and 3386 were dry during 2000. Plume Extent well 22596, which produced enough water for complete sample suites, did not contain any contaminants of concern. Well P416689 with limited water also did not contain contamination excluding a spurious 4th quarter thallium.

As shown on Plate 12, the Industrial Area VOC Plume spans the middle of the Industrial Area in a north-northeast orientation. The plume migrates toward both Woman Creek and North Walnut Creek. Carbon tetrachloride, tetrachloroethene and trichloroethene are the primary contaminants. The distribution of these VOCs tends to be source-specific and non-uniform. There are no known inorganic and radiological groundwater plumes that coincide with the Industrial Area VOC plume. The Carbon Tetrachloride Plume lies within the north-central portion of the Industrial Area VOC Plume. It migrates in an east/northeast direction from its source and potentially toward North Walnut Creek.

Samples from plume Extent well 10994 exhibited no VOCs above Tier II levels but did have two selenium results and one nitrate result that were reportable (see also discussion of uranium isotopes below) in that they were above their Tier II action levels. The 2000 selenium results were above the background M2SD but below the historic M2SD (Figure A-45). Although the data fluctuates, selenium may be declining slightly with time. The August 2000 nitrate sample was above the Tier II action level and background M2SD (Figure A-44). Although the August nitrate concentration was the highest in several years, analyses from January 1995 through January 1997 have similar values.

Plume Extent well 1986 had no VOC detections above Tier II action levels but exhibited two analytical results for manganese that were above their Tier II action levels. The total manganese analyses were above both the background M2SD and the historic M2SD for the well (Figure A-80). The manganese concentration seems to be increasing slightly in well 1986. Part of the increase may be because of the switch to total metal analyses associated with the installation of a submersible pump.

Well 2186 contained a single chromium result (Figure A-81) that exhibited the same characteristics of the spurious thallium results from the Fourth Quarter 2000 Report (RMRS 2001b). The chromium result was discounted in the

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report because it was the highest total or dissolved chromium concentration ever recorded from the well. It did not fit the recent pattern for total chromium results. Subsequent analyses in 2001 will help determine whether the high concentration of chromium in the 4th quarter is an aberration. Except for the 4th quarter result, the chromium concentration appears to be low and relatively steady in well 2186.

Plume Extent well 22796 contained trichloroethene and chromium that were above Tier II action levels and were reportable. Trichloroethene concentrations show no clear trend (Figure A-83). Because the chromium analytical value from December 1999 was above Tier II (Figure A-82), a set of three consecutive monthly samples for metals were collected from this well. The four samples indicate that chromium in well 22796 is fluctuating. The first monthly chromium result, from May 2000, was similar to the concentration in December 1999 and was also above Tier II. Subsequent 2000 chromium results (June, July and December) were below the Tier II action levels regardless of whether dissolved or total analyses were performed. Sampling procedures at well 22796 may be a factor in these erratic analytical results for chromium.

Plume Extent well 43392 had no VOC detections above Tier II levels but did have a single thallium result that was above the Tier II action level (Figure A-109). Unlike 4th quarter thallium results from other wells, this 3rd quarter analysis may be accurate. Because the result was below the background M2SD for thallium it was not reportable; however, it still was above the historic M2SD for the well. Continued sampling in 2001 will show whether this result indicates an increasing trend for thallium in well 43392.

Plume Extent well P314289 had a single reportable nickel result from the 3rd quarter. This result was above the Tier II and background M2SD levels (Figure A-151). There is no historical M2SD for the well because of frequent dry conditions. The well P314289 trend plot for nickel, based on data from the four samples, suggests that the concentration of nickel is increasing in the well.

All analytical results for uranium isotopes from Plume Extent wells associated with the Industrial Area VOC and Carbon Tetrachloride Plumes were above the Tier II action levels but below the background M2SDs so they were not reportable. Wells 10994, 1986, 22796, 6186, P114389, P313589 and P416689 each had two results above Tier II for uranium-233/234 and uranium -238. Well 2186 had two uranium -233/234 analyses that were over Tier II. Wells 22696 and P314289 had one uranium -233/234 and one uranium -238 above Tier II and well 7086 had two uranium -233/234s and one uranium -238 over Tier II. Wells 22596 and 43392 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, 7086, P114389, and P313589.

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 and 23196. Plate 12 illustrates the location of these wells in relationship to the distal end of the plume and Woman Creek. The plume is mainly composed of carbon tetrachloride from the 903 Pad area and trichloroethene from Ryan's Pit. A more complete listing of individual 903 Pad and Ryan's Pit plume contaminants is provided in the discussion of Plume Definition wells presented above and in Sections 4.6 and 7.2 of this report.

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No VOC, metal or water quality contaminants were detected above Tier II action levels in Plume Extent well 23096 during 2000. The uranium isotopes U-233/234 and U-238 were detected above Tier II action levels in 23096, but both isotopes were below background M2SD levels so the results were not reportable.

Plume Extent well 23196 had a selenium and a nitrate analyses that were reportable because they were above Tier II action levels and background M2SDs. The November 2000 selenium result was the first ever metal analysis performed because the well has historically produced a limited supply of water. A set of three consecutive monthly samples for metals was initiated in May of 2001, and a sample was collected, but during June and July the well was dry. The November 2000 (106 µg/L) and May 2001 (118 µg/L) selenium results are similar. The reportable nitrate concentration at well 23196 was from the first sampling event in 2000; the second sample was back below the Tier II level (Figure A-89). The nitrate concentration in 23196 does not appear to be increasing or decreasing significantly.

PU&D Yard Plume

Plume Extent wells 00397, 02197 and 76992 monitor VOC contamination associated with the PU&D Yard Plume. 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 12). The primary plume contaminants consist of tetrachloroethene, trichloroethene and 1,1,1-trichloroethane. Further discussion of the PU&D Yard Plume is presented in Section 7.3 of this report.

Because of below average precipitation and groundwater recharge during 2000, the only PU&D Yard Plume sample collected was a single VOC sample in January from well 76992. The resulting VOC analyses did not contain any analytes above Tier II action levels. Wells 00397 and 02197 were dry throughout the year.

881 Hillside Plume / Building 881 Footing Drain Sump

Plume Extent wells 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 4787 and 4887 were dry during both semiannual sampling events in 2000. Well 5387 was found to contain uranium isotopes U-233/234 and U-238 at concentrations that were above Tier II but below the background M2SDs, so they were not reportable.

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 uranium-233/234 and uranium-238. The results were above the Tier II levels but below the background M2SDs.

In 2000, Plume Extent well 3586 produced samples containing vinyl chloride, manganese, uranium-233/234, and uranium-238 at concentrations that exceeded their respective Tier II action levels. The uranium isotopes were less than their background M2SDs and therefore were not reportable. The vinyl chloride and manganese results, because they were above background M2SDs, were reportable. The vinyl chloride, while above Tier II was well below the

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historic M2SD for the well (Figure A-97). The vinyl chloride trend plot shows a definite decreasing trend in the well. The dissolved manganese results from this well (Figure A-96) are considerably above the background M2SD. The 2nd and 4th quarter 2000 manganese concentrations were also above the historic M2SD for the well, whereas the 1st and 3rd quarter results were below the historic M2SD. The trend plot for manganese in well 3586 shows that the concentration before 1997 was relatively consistent, and slightly lower, than post-1997 data, which is also relatively consistent.

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Table 2-1 Summary of Samples Collected - Groundwater 2000

	PRINCIPAL ANALYTES																																											
									RADIONUCLIDES																WATER QUALITY PARAMETERS																			
Well	VOCs				Metals				Pu/Am				U-isotopes				Tritium				$^{89/90}$Strontium				Nitrate / Nitrite				Total Dissolved Solids				Sulfate				Fluoride			
Quarter->	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								
00197		D		D		D		D						D		D		D		D		D		D		D		D		D		D		D		D				D
00200				S				S				S				S																								
00297		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D				D
00300				D				D				D				D																								
00397		D		D		D		D						D		D		D		D						D		D		D		D		D		D		D		D
00400				S				S				S				S				S								S												
00491	S		S		S		S		S		S		S		S										S		S		S		S		S		S					
00500				S				S				S				S				S								S												
00597	S		S		S		S						S		S		S		S						S		S		S		S		S		S		S		S	
00600				S				S				S				S				S								S												
00700				S				S				S				S				S								S												
00797	S		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									
02197		D		D		D		D						D		D		D		D					D	D		D		D		D		D		D		D		D
02291		S		S		S		S		S		S		S		S										S		S		S		S								
02297		B				B				B				B												B				B										
02397		S		D		I		D		I		D		I		D										S		D		I		D								
02497		S		S		I		S		I		I		S		I										S		I		I		I								
02500				S				S				S				S												S				S								
0386	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		I		S		S										S		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		S		S		S		S		S						S		S		S		S		S		S		S			
07391	S		S		S		S		S		S		S		S										S		S		S		S		S		S					
08091		D		D		D		D		D		D		D		D						D		D		D		D		D		D								

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Table 2-1 Summary of Samples Collected - Groundwater 2000

PRINCIPAL ANALYTES

Well	VOCs				Metals				RADIONUCLIDES: Pu/Am				RADIONUCLIDES: U-Isotopes				RADIONUCLIDES: Tritium				RADIONUCLIDES: 89/90 Strontium				WATER QUALITY PARAMETERS: Nitrate / Nitrite				WATER QUALITY PARAMETERS: Total Dissolved Solids				WATER QUALITY PARAMETERS: Sulfate				WATER QUALITY PARAMETERS: Fluoride			
Quarter->	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
09691	S												S																											
10098	S		S		S		S		I		I		S		S										S		S		I		I									
10194	S		S		S		S		S		S		S		S										S		S		S		S									
10198	S		S		S		S		I		I		S		S										S		S		S		I									
10294	S		S		S		S		S		S		S		S		S		S						S		S		S		S				S				S	
10298	S		S		S		S		I		I		S		S										S		S		S		S									
10394	S		D		S		D		S		D		S		D		S		D		S		D		S		D		S		D		S		D		S		D	
10398	S		S		S		S		I		I		I		I										S		S		I		I									
10498	S		S		S		S		S		S		S		S										S		S		S		S									
10592		S		S		S		S						S		S										S		S		I		S		I		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		S		S						S		S										S		S		I		S		I		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		S					
11092		D		D		D		D						D		D										D		D		D		D		D		D				
1187	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									
1287	S												S																											
1386		S		S		S	S	S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S		S
1487	S												S																											
15599	D	D	D	D					D	D	D	D	D	D	D	D																								
15699	S	S	S	D					S	S	I	D	S	S	S	D																								
15799	D	S	D	D					D	I	D	D	D	I	D	D																								
1786		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				
18299	S			S																												S	S			S				
18399	D			S																												I	D			S				
18499	S			S																												S	S			S				
18599	S			S																												S	S			S				
18699	S			S																												S	S			S				
18799	D			S																												S	D			S				

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Table 2-1 Summary of Samples Collected - Groundwater 2000

PRINCIPAL ANALYTES

Well	VOCs				Metals				RADIONUCLIDES: Pu/Am				RADIONUCLIDES: U-isotopes				RADIONUCLIDES: Tritium				RADIONUCLIDES: $^{89/90}$Strontium				WATER QUALITY PARAMETERS: Nitrate/Nitrite				WATER QUALITY PARAMETERS: Total Dissolved Solids				WATER QUALITY PARAMETERS: Sulfate				WATER QUALITY PARAMETERS: Fluoride			
Quarter->	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
18899	D			S																												I	D			S				
1986		S		S		S		S		S		S		S		S										S		S		S		S								
20998		S		D		I		D		I		D		I		D		I		D						I		D				D								
21098				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		S		S		I		I		I		S										S		S		S		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					S					S		S	S			S								
23096	S		S		S		S		S		S		S		S										S		S		S		S		S		S					
23196		S		S		I		S		I		I		I		I										S		S		I		I		I		I				
23296	S	S	S	S	S		S	S	S		S	S	S		S	S									S		S	S	S		S	S								
2987		Da				Da				Da				Da												Da				Da				Da						
3087		S		S		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		D		D
3586	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S									S	S	S	S	S	S	S	S								
3687		S		S		S		S		S		S		S		S										S		S		S		S								
38591	S		D		S		D						S		D						S		D		S		D		S		D		S		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		D		S		D		I		D		I		D		I		D		S						D		I				I								
40699		D		S		D		I		D		I		D		I		D		I						D		I				I								
40799		S		S		I		I		I		I		I		I		S		S						I		I				I								
4087	S	S	S	D	S	S	I	D					S	S	I	D	S	S	S	D					S	S	S	D	S	S	S	D	S	S	S	D	S	S	S	D
40899		D		D		D		D		D		D		D		D		D		D						D		D				D								
40999		S		S		I		I		I		I		S		S										S		I				I								
41099		S		S		S		S		I		I		S		S										S		S				I								
41199		S		S		S		S		S		S		S		S										S		N An				S								
41299		S		S		S		S						S		S		S		S						S		S				S								
41499		S		S		I		I		I		I		I		I		S		I						I		I				I								

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Table 2-1 Summary of Samples Collected - Groundwater 2000

PRINCIPAL ANALYTES

Well	VOCs				Metals				RADIONUCLIDES: Pu/Am				U-isotopes				Tritium				$^{89/90}$Strontium				WATER QUALITY PARAMETERS: Nitrate / Nitrite				Total Dissolved Solids				Sulfate				Fluoride			
Quarter->	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
41591	S		S		S		S		S		S		S		S		S		S						S		S		S		S		S		S		S		S	
41599		D		S		D		I		D		I		D		I		D		I						D		I				I								
41691	S		S		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		S									
4787	D		D		D		D						D		D										D		D		D		D		D		D					
4887	D		D		D		D						D		D										D		D		D		D		D		D					
52894	D	S	S	D	D	S	S	D					D	S	S	D	D	S	S	D					D	S	S	D	D	S	S	D	D	S	S	D	D	S	S	D
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		I		S		I		S		I				
5587		D		D		D		D						D		D						D		D		D		D		D		D		D		D				
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			S				I				I				I				I								S												
60499	S			S				I				I				I																								
60599	S			S				I				I				I																								
61499	D	S		S				I				I				I																								
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		S					
6386	S		D		I		D		I		D		I		D										S		D		I		D		I		D					
6486	S		D		S		D	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
7086	S		S		S		S						S		S						S		S		S		S		S		S		S		S					
75992	S		S		S		S		I		I		S		S						S		I		S		I		S		I									
76992	S		D		I		D						I		D		I		D						I		D		I		D		I		D		I		D	
77392		D		D		D		D						D		D		D		D						D		D		D		D		D		D		D		D
891COLGAL	S	S	S		S	S	S						S	S	S																									
891COLWEL	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								
90299	S	S	S	S																												S								
90399	S	S	S	S							S																					S								
95099	S	S	S	S																																				

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Table 2-1 Summary of Samples Collected - Groundwater 2000

	PRINCIPAL ANALYTES																																							
									RADIONUCLIDES																WATER QUALITY PARAMETERS															
Well	VOCs				Metals				Pu/Am				U-isotopes				Tritium				$^{89/90}$Strontium				Nitrate / Nitrite				Total Dissolved Solids				Sulfate				Fluoride			
Quarter->	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
95199	S	S	S	S																																				
95299	D	D	D	D																																				
B206989	S	S	D	S	S	S	D	S					S	I	D	I	S	I	D	S					S	S	D	S	I	S	D	S	I	S	D	S	I	S	D	S
B208289		S		D		I		D		I		D		I		D		S		D		I		D		S		D		I		D		I		D		I		D
B208789		S		S		S		S		S				S		S		S		S		S				S		S		S		S		S		S		S		S
FD-707-4				S																																				
P114389	S		S		S		S		S		S		S		S										S		S		S		S									
P209289		D		S		D		S		D		S		D		S		D		S		D		S		D		S		D		S		D		S		D		S
P209389	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		S
P218089				S				S				S				S																								
P218389		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D		D
P219089				S				S				S				S				S								S				S								
P219189		S		S		I		I		I		I		S		I		S		S		I		I		S		S		I		I		I		I		I		I
P219489		S		S		I		I		I		I		I		I		S		S		I		I		S		S		I		I		I		I		I		I
P313589	S		S		S		S		S		S		S		S										S		S		S		S									
P314289	S		S		I		S		I		I		I		S										I		S		I		S									
P317989		S		S		S		S		I		I		S		I										I		I				I								
P416689		S		S		S		S		S		S		S		S										S		S		S		S								
P416789		S		S		S		I		S		I		S		I										S		I		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								
SW099	D	D		D																																				
SW100	D	D		D																																				
SW13494	S	S	S	S	S	S	S	S					S	S	S	S																S								

Blank indicates no sample attempted or required.

S = Indicates location was successfully sampled.

D = Indicates location was dry. No samples collected at this location at this time.

I = Indicates location produced insufficient water for this analyte. Other samples were collected at the location.

Da = Well is damaged and cannot be sampled.

B = Well completely broken. Replaced by another well.

N An = (Not Analyzed) Sample collected, analysis not performed.

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Table 2-1 Summary of Samples Collected - Groundwater 2000

	ACCESSORY ANAYLTES																								
Well	^{137}Cesium		^{237}Neptunium		Polychlorinated Biphenyls (PCBs)				Total Cyanide				Methane		Total Organic Carbon		Dissolved Organic Carbon	Total Recoverable Petroleum Hydrocarbons		Nitrate		Sulfide		Chloride	
Quarter->	Q1	Q3	Q2	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q4	Q1	Q4	Q1	Q2	Q4	Q1	Q4	Q1	Q4	Q1	Q4
00100																									
00197																									
00200				S				S											S						
00297																									
00300				D				D											D						
00397																									
00400																			S						
00491																									
00500																			S						
00597																									
00600																			S						
00700																			S						
00797																									
00897																									
00997																									
02197																									
02291																									
02297																									
02397																									
02497																									
02500																									
0386																									
03991																									
04091																									
04591																									
0487																									
04991																									
05091																									
05391																									
05691																									
06091																									
06491																									
07391																									
08091																									

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Table 2-1 Summary of Samples Collected - Groundwater 2000

	ACCESSORY ANAYLTES																								
Well	^{137}Cesium		^{237}Neptunium		Polychlorinated Biphenyls (PCBs)				Total Cyanide				Methane		Total Organic Carbon		Dissolved Organic Carbon	Total Recoverable Petroleum Hydrocarbons		Nitrate		Sulfide		Chloride	
Quarter->	Q1	Q3	Q2	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q4	Q1	Q4	Q1	Q2	Q4	Q1	Q4	Q1	Q4	Q1	Q4
09691																									
10098	I	I							I		I														
10194																									
10198	I	I							I		I														
10294																									
10298	S	S							S		S														
10394																									
10398	I	S							I		I														
10498	S	S							S		S														
10592																									
10598	S	S							S		S														
10692																									
10792																									
10992																									
10994																									
11092																									
1187																									
11891																									
12191																									
12691																									
1287																									
1386																									
1487																									
15599																									
15699																									
15799																									
1786																									
18199			S	S		S		S					S	S	S	S	S			S	S	S	S	S	S
18299													S		S		S			S		S		S	
18399													D	S		S	D			D	S	D	S	D	S
18499													S	S	S	S	S			S	S	S	S	S	S
18599													S	S	S	S	S			S	S	S	S	S	S
18699													S	S	S	S	S			S	S	S	S	S	S
18799													D	S	D	S	D			D	S	D	S	D	S

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Table 2-1 Summary of Samples Collected - Groundwater 2000

	ACCESSORY ANAYLTES																								
Well	^{137}Cesium		^{237}Neptunium		Polychlorinated Biphenyls (PCBs)				Total Cyanide				Methane		Total Organic Carbon		Dissolved Organic Carbon	Total Recoverable Petroleum Hydrocarbons		Nitrate		Sulfide		Chloride	
Quarter->	Q1	Q3	Q2	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q4	Q1	Q4	Q1	Q2	Q4	Q1	Q4	Q1	Q4	Q1	Q4
18899													D	S	D	S	D			D	S	D	I	D	S
1986																									
20998			I	D		I																			
21098														S		S					S		S		S
2186																									
22596																									
22696																									
22796																									
22896																									
22996																									
23096																									
23196																									
23296																									
2987																									
3087																									
3386																									
3586																									
3687																									
38591																									
40099						S				S		S						N An							
40199						S				S		S						N An							
40299						S				S		S						N An							
40399						S				S		S						N An							
40499						I				S		S						I							
40599			D	I		D		I																	
40699			D	I		D		I																	
40799			I	I		I		I																	
4087																									
40899			D	D		D		D																	
40999																									
41099																									
41199																									
41299						S				S		S						N An							
41499			I	I		I		I																	

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Table 2-1 Summary of Samples Collected - Groundwater 2000

	ACCESSORY ANAYLTES																								
Well	^{137}Cesium		^{237}Neptunium		Polychlorinated Biphenyls (PCBs)				Total Cyanide				Methane		Total Organic Carbon		Dissolved Organic Carbon	Total Recoverable Petroleum Hydrocarbons		Nitrate		Sulfide		Chloride	
Quarter->	Q1	Q3	Q2	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q4	Q1	Q4	Q1	Q2	Q4	Q1	Q4	Q1	Q4	Q1	Q4
41591																									
41599			D	I		D		I																	
41691																									
43392																									
4787																									
4887																									
52894																									
52994																									
5387																									
5587																									
5887																									
60299																			I						
60499				I				I											I						
60599				I				I											I						
61499				I				I											I						
6186																									
6286																									
6386																									
6486																									
6586																									
70193																									
70393																									
70493																									
7086																									
75992																									
76992																									
77392																									
891COLGAL																									
891COLWEL																									
90099																									
90199																									
90299																									
90399																									
95099																									

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Table 2-1 Summary of Samples Collected - Groundwater 2000

	ACCESSORY ANAYLTES																								
Well	^{137}Cesium		^{237}Neptunium		Polychlorinated Biphenyls (PCBs)				Total Cyanide				Methane		Total Organic Carbon		Dissolved Organic Carbon	Total Recoverable Petroleum Hydrocarbons		Nitrate		Sulfide		Chloride	
Quarter->	Q1	Q3	Q2	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q4	Q1	Q4	Q1	Q2	Q4	Q1	Q4	Q1	Q4	Q1	Q4
95199																									
95299																									
B206989																									
B208289																									
B208789																									
FD-707-4				S				S											S						
P114389																									
P209289																									
P209389																									
P209489																									
P218089				S				S											S						
P218389																									
P219089				S				S																	
P219189																									
P219489																									
P313589																									
P314289																									
P317989																									
P416689																									
P416789																									
P416889																									
P419689						S				S		S						I							
SW099																									
SW100																									
SW13494																									

Blank indicates no sample attempted or required.

S = Indicates location was successfully sampled.

D = Indicates location was dry. No samples collected at this location at this time.

I = Indicates location produced insufficient water for this analyte. Other samples were collected at the location.

Da = Well is damaged and cannot be sampled.

B = Well completely broken. Replaced by another well.

N An = (Not Analyzed) Sample collected, analysis not performed.

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Table 2-3; 2000 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/7/01

Well Class	Loc	Sample Date	Sample #	Analyte	QC Type	Res Type	Res	Unit	Tier II	Lab Qual	Val	Det Limit	Dil	Tier II Ratio	Back M23D	Back Ratio	Hist M23D	Hist Rat	Rep Result?
Boundary	0386	2/10/00	GW06671TE	URANIUM-233/234	DUP	TR1	8.93881	PCI/L	1.06		V1	0.058072		8.43	60.70	0.15			No
	0386	7/25/00	GW07013RG	URANIUM-233/234	REAL	TR1	10.3	PCI/L	1.06		V	0.351		9.72	60.70	0.17			No
	0386	2/10/00	GW06670TE	URANIUM-238	REAL	TR1	6.69633	PCI/L	0.768		V1	0.040325		8.72	41.80	0.16			No
	0386	7/25/00	GW07013RG	URANIUM-238	REAL	TR1	6.27	PCI/L	0.768		V	0.468		8.16	41.80	0.15			No
	06491	1/24/00	GW06681TE	URANIUM-233/234	REAL	TR1	19.9422	PCI/L	1.06		V1	0.051801		18.81	60.70	0.33			No
	06491	7/25/00	GW07019RG	URANIUM-233/234	REAL	TR1	23.8	PCI/L	1.06		V	0.538		22.45	60.70	0.39			No
	06491	1/24/00	GW06681TE	URANIUM-238	REAL	TR1	13.6691	PCI/L	0.768		V1	0.033492		17.80	41.80	0.33			No
	06491	7/25/00	GW07019RG	URANIUM-238	REAL	TR1	17.6	PCI/L	0.768		V	0.37		22.92	41.80	0.42			No
	10294	1/19/00	GW06693TE	URANIUM-233/234	DUP	TR1	10.9873	PCI/L	1.06		V1	0.067401		10.37	60.70	0.18			No
	10294	7/25/00	GW07115RG	URANIUM-233/234	DUP	TR1	16.7	PCI/L	1.06		V	0.631		15.75	60.70	0.28			No
	10294	1/19/00	GW06693TE	URANIUM-238	DUP	TR1	9.04452	PCI/L	0.768		V1	0.05421		11.78	41.80	0.22			No
	10294	7/25/00	GW07115RG	URANIUM-238	DUP	TR1	13	PCI/L	0.768		V	0.462		16.93	41.80	0.31			No
	10394	2/11/00	GW06695TE	URANIUM-233/234	REAL	TR1	2.77642	PCI/L	1.06		V1	0.058422		2.62	60.70	0.05			No
	10394	2/11/00	GW06695TE	URANIUM-238	REAL	TR1	2.09482	PCI/L	0.768		V1	0.05173		2.73	41.80	0.05			No
	41591	2/16/00	GW06707TE	NICKEL	REAL	TR1	229	UG/L	140		V	0.35	1	1.64	21.37	10.72	46.18	4.96	Yes
	41591	7/26/00	GW07042RG	NICKEL	REAL	TR1	273	UG/L	140	B	V	0.3	1	1.95	21.37	12.77	46.32	5.89	Yes
	41591	2/16/00	GW06708TE	URANIUM-233/234	DUP	TR1	9.51856	PCI/L	1.06		V1	0.056674		8.98	60.70	0.16			No
	41591	7/26/00	GW07042RG	URANIUM-233/234	REAL	TR1	9.3	PCI/L	1.06		V	0.355		8.77	60.70	0.15			No
	41591	2/16/00	GW06708TE	URANIUM-238	DUP	TR1	7.73752	PCI/L	0.768		V1	0.035634		10.07	41.80	0.19			No
	41591	7/26/00	GW07042RG	URANIUM-238	REAL	TR1	8.34	PCI/L	0.768		V	0.474		10.86	41.80	0.20			No
	41691	7/26/00	GW07043RG	URANIUM-233/234	REAL	TR1	1.31	PCI/L	1.06		V	0.474		1.24	60.70	0.02			No
	41691	7/26/00	GW07043RG	URANIUM-238	REAL	TR1	1.42	PCI/L	0.768		V	0.325		1.85	41.80	0.03			No
Decontamination & Decommissioning Bldg 123	10098	2/29/00	GW06718TE	URANIUM-233/234	REAL	TR1	1.19128	PCI/L	1.06		V1	0.129759		1.12	60.70	0.02			No
	10098	8/10/00	GW07051RG	URANIUM-233/234	REAL	TR1	1.21	PCI/L	1.06		J1	0.115		1.14	60.70	0.02			No
	10098	2/29/00	GW06718TE	URANIUM-238	REAL	TR1	0.999874	PCI/L	0.768	J	V1	0.109097		1.30	41.80	0.02			No
	10098	8/10/00	GW07051RG	URANIUM-238	REAL	TR1	0.92	PCI/L	0.768	J	J1	0.11		1.20	41.80	0.02			No
	10498	2/17/00	GW06722TE	METHYLENE CHLORIDE	REAL	TR1	62	UG/L	5	JB	JB1	100	100	12.40			ND		No
	10498	8/9/00	GW07120RG	NITRATE/NITRITE	DUP	TR1	10	MG/L	10		V	0.05	10	1.00	4.66	2.15	ND		No
	10498	2/17/00	GW06677TE	TETRACHLOROETHENE	DUP	TR1	1700	UG/L	5		V1	100	100	340.00			ND		No
	10498	8/9/00	GW07055RG	TETRACHLOROETHENE	REAL	TR1	15	UG/L	5		V	1	1	3.00			ND		No
	10498	2/21/00	GW06722TE	URANIUM-233/234	REAL	TR1	1.14743	PCI/L	1.06		V1	0.19467		1.08	60.70	0.02			No
	10498	8/9/00	GW07055RG	URANIUM-233/234	REAL	TR1	1.14	PCI/L	1.06		J1	0.088		1.08	60.70	0.02			No
	10498	2/21/00	GW06722TE	URANIUM-238	REAL	TR1	1.19066	PCI/L	0.768		V1	0.145851		1.55	41.80	0.03			No
	10498	8/9/00	GW07120RG	URANIUM-238	DUP	TR1	1.1	PCI/L	0.768		J1	0.118		1.43	41.80	0.03			No
	10598	2/21/00	GW06723TE	BARIUM	REAL	TR1	2210	UG/L	2000		V1	0.05		1.11	152.54	14.49	ND		No
	10598	2/21/00	GW06723TE	CADMIUM	REAL	TR1	12.2	UG/L	5		J1	0.08		2.44	4.25	2.87	ND		No
Decontamination & Decommissioning Bldg 444	40099	5/16/00	GW06860RG	1,1-DICHLOROETHENE	REAL	TR1	190	UG/L	7		V1	50	50	27.14			ND		No
	40099	12/4/00	GW07325RG	1,1-DICHLOROETHENE	REAL	TR2	538	UG/L	7	D	V	25	50	76.86			ND		No
	40099	5/16/00	GW06860RG	cis-1,2-DICHLOROETHENE	REAL	TR1	650	UG/L	70		V1	50	50	9.29			ND		No
	40099	12/4/00	GW07325RG	cis-1,2-DICHLOROETHENE	REAL	TR2	1310	UG/L	70	D	V	25	50	18.71			ND		No
	40099	5/16/00	GW06860RG	METHYLENE CHLORIDE	REAL	TR1	54	UG/L	5	B	UJ1	50	50	10.80			ND		No
	40099	5/16/00	GW06860RG	TETRACHLOROETHENE	REAL	TR1	18	UG/L	5	J	V1	50	50	3.60			ND		No
	40099	12/4/00	GW07325RG	TETRACHLOROETHENE	REAL	TR1	41.2	UG/L	5		1	1	2	8.24			ND		No
	40099	12/4/00	GW07325RG	THALLIUM	REAL	TR1	3.45	UG/L	2	B	V	3.26	1	1.73	4.90	0.70	ND		No
	40099	5/16/00	GW06860RG	TRICHLOROETHENE	REAL	TR1	500	UG/L	5		V1	50	50	100.00			ND		No
	40099	12/4/00	GW07325RG	TRICHLOROETHENE	REAL	TR2	1340	UG/L	5	D	1	25	50	268.00			ND		No
	40199	11/30/00	GW07326RG	THALLIUM	REAL	TR1	4.64	UG/L	2		V	3.26	1	2.32	4.90	0.95	ND		No
	40199	11/30/00	GW07326RG	URANIUM-233/234	REAL	TR1	1.1	PCI/L	1.06		V1	0.21		1.04	60.70	0.02			No
	40299	5/16/00	GW06862RG	METHYLENE CHLORIDE	REAL	TR1	6	UG/L	5	B	UJ1	5	5	1.20			ND		No
	40299	5/16/00	GW06862RG	TETRACHLOROETHENE	REAL	TR1	37	UG/L	5		V1	5	5	7.40			ND		No
	40299	12/4/00	GW07327RG	TETRACHLOROETHENE	REAL	TR1	77.5	UG/L	5		V	1	2	15.50			ND		No
	40299	5/16/00	GW06862RG	TRICHLOROETHENE	REAL	TR1	13	UG/L	5		V1	5	5	2.60			ND		No
	40499	5/24/00	GW06864RG	TETRACHLOROETHENE	REAL	TR1	7	UG/L	5		V1	1	1	1.40			ND		No
	40499	11/30/00	GW07329RG	TETRACHLOROETHENE	REAL	TR1	8.3	UG/L	5		V	1	2	1.66			ND		No
	41299	5/17/00	GW06865RG	1,1-DICHLOROETHENE	REAL	TR2	9	UG/L	7	J	V1	20	20	1.29			ND		No
	41299	12/12/00	GW07331RG	1,1-DICHLOROETHENE	DUP	TR1	10	UG/L	7		V1	2.5	5	1.43			ND		No
	41299	5/17/00	GW06865RG	CHROMIUM	REAL	TR1	370	UG/L	100		V	0.15	1	3.70	12.44	29.74	ND		No
	41299	12/12/00	GW07330RG	CHROMIUM	REAL	TR1	470	UG/L	100		V1	0.697	1	4.70	12.44	37.78	ND		No
	41299	5/17/00	GW06865RG	cis-1,2-DICHLOROETHENE	REAL	TR2	89	UG/L	70		V1	20	20	1.27			ND		No
	41299	5/17/00	GW06865RG	TETRACHLOROETHENE	REAL	TR2	280	UG/L	5		V1	20	20	56.00			ND		No
	41299	12/12/00	GW07330RG	TETRACHLOROETHENE	REAL	TR1	216	UG/L	5		V1	2.5	5	43.20			ND		No
	41299	12/12/00	GW07331RG	THALLIUM	DUP	TR1	5.37	UG/L	2		J1	3.26	1	2.69	4.90	1.10	ND		No
	41299	5/17/00	GW06865RG	TRICHLOROETHENE	REAL	TR2	77	UG/L	5		V1	20	20	15.40			ND		No
	41299	12/12/00	GW07330RG	TRICHLOROETHENE	REAL	TR1	27.2	UG/L	5		V1	2.5	5	5.44			ND		No
	41299	5/17/00	GW06865RG	URANIUM-233/234	REAL	TR1	1.89	PCI/L	1.06		V	0.32		1.78	60.70	0.03	ND		No
	41299	12/12/00	GW07331RG	URANIUM-233/234	DUP	TR1	1.3	PCI/L	1.06		UJ1	0.052		1.23	60.70	0.02			No
	41299	5/17/00	GW06865RG	URANIUM-238	REAL	TR1	0.79	PCI/L	0.77	J	V	0.18		1.02	41.80	0.02	ND		No
	P419689	5/23/00	GW06866RG	TETRACHLOROETHENE	REAL	TR1	17	UG/L	5		V1	1	1	3.40			49.44	0.34	No
	P419689	12/4/00	GW07333RG	TETRACHLOROETHENE	REAL	TR1	18.5	UG/L	5		V	1	2	3.70			49.40	0.37	No

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

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Table 2-3, 2000 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/7/01

Well Class	Loc	Sample Date	Sample #	Analyte	QC Type	Res Type	Res	Unit	Tier II	Lab Qual	Val	Det Limit	Dil	Tier II Ratio	Back M2SD	Back Ratio	Hist M2SD	Hist Rat	Rep Result?
Decontamination & Decommissioning Bldg 707	00200	11/27/00	GW07114RG	CADMIUM	REAL	TR1	8.49	UG/L	5		V1	0.361	1	1.70	4.25	2.00	ND		No
	00200	11/27/00	GW07114RG	THALLIUM	REAL	TR1	3.78	UG/L	2	B	UJ1	3.26	1	1.89	4.90	0.77	ND		No
	60599	2/24/00	GW06739TE	METHYLENE CHLORIDE	REAL	TR1	7	UG/L	5	B	UJ1	5	5	1.40			ND		No
	60599	2/24/00	GW06739TE	TETRACHLOROETHENE	REAL	TR1	100	UG/L	5		V1	5	5	20.00			ND		No
	60599	12/6/00	GW07136RG	TETRACHLOROETHENE	REAL	TR1	111	UG/L	5		V1	1	2	22.20			ND		No
	61499	5/10/00	GW06957RG	TETRACHLOROETHENE	REAL	TR1	5	UG/L	5		V1	1	1	1.00			ND		No
	P218089	12/5/00	GW07111RG	URANIUM-233/234	REAL	TR1	3.3	PCI/L	1.06		V1	0.28		3.11	60.70	0.05			No
	P218089	12/5/00	GW07111RG	URANIUM-238	REAL	TR1	2.3	PCI/L	0.768		V1	0.21		2.99	41.80	0.06			No
Decontamination & Decommissioning Bldg 771	20998	6/1/00	GW06874RG	CARBON TETRACHLORIDE	REAL	TR1	150	UG/L	5		V1	10	10	30.00			ND		No
	20998	6/1/00	GW06874RG	CHLOROFORM	REAL	TR1	130	UG/L	100		V1	10	10	1.30			ND		No
	20998	6/1/00	GW06874RG	METHYLENE CHLORIDE	REAL	TR1	24	UG/L	5	JB	UJ1	10	10	4.80			ND		No
	40699	11/6/00	GW07310RG	1,1-DICHLOROETHENE	REAL	TR2	389	UG/L	7	D	V1	2.5	5	55.57			ND		No
	41499	5/30/00	GW06872RG	TRICHLOROETHENE	REAL	TR1	53	UG/L	5		V	5	5	10.60			ND		No
	41499	11/6/00	GW07313RG	TRICHLOROETHENE	REAL	TR1	74.4	UG/L	5		V1	0.5	1	14.88			ND		No
	P219089	11/6/00	GW07221RG	URANIUM-233/234	REAL	TR1	9.1	PCI/L	1.06		V	0.3		8.58	60.70	0.15			No
	P219089	11/6/00	GW07221RG	URANIUM-238	REAL	TR1	6.4	PCI/L	0.768		V	0.17		8.33	41.80	0.15			No
Decontamination & Decommissioning Bldg 776/777	00400	11/27/00	GW07140RG	CADMIUM	REAL	TR1	7.09	UG/L	5		V1	0.361	1	1.42	4.25	1.67	ND		No
	00400	11/27/00	GW07140RG	THALLIUM	REAL	TR1	4.95	UG/L	2		UJ1	3.26	1	2.48	4.90	1.01	ND		No
	00400	11/27/00	GW07140RG	URANIUM-233/234	REAL	TR1	2.6	PCI/L	1.06		J	0.15		2.45	60.70	0.04			No
	00400	11/27/00	GW07140RG	URANIUM-238	REAL	TR1	1.2	PCI/L	0.768		J	0.26		1.56	41.80	0.03			No
	00500	11/8/00	GW07141RG	MANGANESE	REAL	TR1	2540	UG/L	1720		V1	0.477	1	1.48	162.33	15.65	ND		No
	00500	11/8/00	GW07141RG	THALLIUM	REAL	TR1	3.82	UG/L	2	B	J1	3.26	1	1.91	4.90	0.78	ND		No
	00700	11/15/00	GW07143RG	1,1-DICHLOROETHENE	REAL	TR2	455	UG/L	7	D	1	25	50	65.00			ND		No
	00700	11/15/00	GW07143RG	1,2-DICHLOROETHANE	REAL	TR1	8	UG/L	5		V1	2.5	5	1.60			ND		No
	00700	11/15/00	GW07143RG	CARBON TETRACHLORIDE	REAL	TR2	3920	UG/L	5	D	V1	25	50	784.00			ND		No
	00700	11/15/00	GW07143RG	CHLOROFORM	REAL	TR2	300	UG/L	100	D	1	25	50	3.00			ND		No
	00700	11/15/00	GW07143RG	TETRACHLOROETHENE	REAL	TR2	13.4	UG/L	5	JD	1	25	50	2.68			ND		No
Decontamination & Decommissioning Bldg 779	00100	12/1/00	GW07315RG	CARBON TETRACHLORIDE	REAL	TR1	14.8	UG/L	5		V1	1	2	2.96			ND		No
	00100	12/1/00	GW07315RG	PLUTONIUM-239/240	REAL	TR1	0.68	PCI/L	0.151		V1	0.012		4.50			ND		No
	00100	12/1/00	GW07315RG	TRICHLOROETHENE	REAL	TR1	61.8	UG/L	5		V1	1	2	12.36			ND		No
	00100	12/1/00	GW07315RG	URANIUM-233/234	REAL	TR1	1.1	PCI/L	1.06		V1	0.12		1.04	60.70	0.02			No
	02397	5/1/00	GW06826RG	NITRATE/NITRITE	REAL	TR1	19	MG/L	10		V	0.05	10	1.90	4.66	4.08	ND		No
	02497	11/15/00	GW07319RG	CADMIUM	REAL	TR1	15.1	UG/L	5		J1	0.361	1	3.02	4.25	3.55	ND		No
	02497	11/15/00	GW07319RG	THALLIUM	REAL	TR1	5.33	UG/L	2		J1	3.26	1	2.67	4.90	1.09	ND		No
	02497	5/1/00	GW06827RG	URANIUM-233/234	REAL	TR1	1.42	PCI/L	1.06		V1	0.07		1.34	60.70	0.02	ND		No
	02497	5/1/00	GW06827RG	URANIUM-238	REAL	TR1	0.81	PCI/L	0.77	J	V1	0.06		1.05	41.80	0.02	ND		No
	02500	11/15/00	GW07317RG	URANIUM-233/234	REAL	TR1	4.2	PCI/L	1.06		V	0.022		3.96	60.70	0.07			No
	02500	11/15/00	GW07317RG	URANIUM-238	REAL	TR1	2.1	PCI/L	0.768		V	0.022		2.73	41.80	0.05			No
Decontamination & Decommissioning Bldg 886	22996	2/14/00	GW06703TE	URANIUM-233/234	REAL	TR1	3.59841	PCI/L	1.06		V1	0.027307		3.39	60.70	0.06			No
	22996	6/16/00	GW06880RG	URANIUM-233/234	REAL	TR1	4.62	PCI/L	1.06		V	0.16		4.36	60.70	0.08			No
	22996	12/7/00	GW07323RG	URANIUM-233/234	REAL	TR1	2.3	PCI/L	1.06		V1	0.025		2.17	60.70	0.04			No
	22996	2/14/00	GW06703TE	URANIUM-238	REAL	TR1	2.50873	PCI/L	0.768		V1	0.027307		3.27	41.80	0.06			No
	22996	6/16/00	GW06880RG	URANIUM-238	REAL	TR1	3.02	PCI/L	0.77		V	0.12		3.93	41.80	0.07			No
	22996	12/7/00	GW07323RG	URANIUM-238	REAL	TR1	1.6	PCI/L	0.768		V1	0.025		2.08	41.80	0.04			No
	40999	6/15/00	GW06876RG	URANIUM-233/234	REAL	TR1	10.70	PCI/L	1.06		V	0.13		10.09	60.70	0.18			No
	40999	11/30/00	GW07320RG	URANIUM-233/234	REAL	TR1	10	PCI/L	1.06		V1	0.06		9.43	60.70	0.16			No
	40999	6/15/00	GW06876RG	URANIUM-238	REAL	TR1	7.83	PCI/L	0.77		V	0.06		10.20	41.80	0.19			No
	40999	11/30/00	GW07320RG	URANIUM-238	REAL	TR1	8.3	PCI/L	0.768		V1	0.06		10.81	41.80	0.20			No
	41099	6/15/00	GW06877RG	CADMIUM	REAL	TR1	5.40	UG/L	5		V1	0.1	1	1.08	4.25	1.27	ND		No
	41099	11/30/00	GW07321RG	CADMIUM	REAL	TR1	5.43	UG/L	5		V1	0.361	1	1.09	4.25	1.28	ND		No
	41099	6/15/00	GW06877RG	NITRATE/NITRITE	REAL	TR1	47	MG/L	10		V1	0.05	50	4.70	4.66	10.09	ND		No
	41099	11/30/00	GW07321RG	NITRATE/NITRITE	REAL	TR1	36	MG/L	10		V1	0.05	50	3.60	4.66	7.73	ND		No
	41099	11/30/00	GW07321RG	THALLIUM	REAL	TR1	4.89	UG/L	2		UJ1	3.26	1	2.45	4.90	1.00	ND		No
	41099	6/15/00	GW06877RG	URANIUM-233/234	REAL	TR1	45.50	PCI/L	1.06		V	0.28		42.92	60.70	0.75			No
	41099	11/30/00	GW07321RG	URANIUM-233/234	REAL	TR1	42	PCI/L	1.06		V1	0.022		39.62	60.70	0.69			No
	41099	6/15/00	GW06877RG	URANIUM-235	REAL	TR1	1.41	PCI/L	1.01		V	0.25		1.40	1.79	0.79			No
	41099	11/30/00	GW07321RG	URANIUM-235	REAL	TR1	1.4	PCI/L	1.01		V1	0.022		1.39	1.79	0.78			No
	41099	6/15/00	GW06877RG	URANIUM-238	REAL	TR1	27.10	PCI/L	0.77		V	0.21		35.29	41.80	0.65			No
	41099	11/30/00	GW07321RG	URANIUM-238	REAL	TR1	27	PCI/L	0.768		V1	0.022		35.16	41.80	0.65			No
	41199	6/15/00	GW06878RG	URANIUM-233/234	REAL	TR1	8.39	PCI/L	1.06		V	0.10		7.92	60.70	0.14			No
	41199	11/30/00	GW07322RG	URANIUM-233/234	REAL	TR1	8.6	PCI/L	1.06		V1	0.021		8.11	60.70	0.14			No
	41199	6/15/00	GW06878RG	URANIUM-238	REAL	TR1	4.33	PCI/L	0.77		V	0.13		5.64	41.80	0.10			No
	41199	11/30/00	GW07322RG	URANIUM-238	REAL	TR1	3.7	PCI/L	0.768		V1	0.021		4.82	41.80	0.09			No
	P317989	6/15/00	GW06880RG	SELENIUM	REAL	TR1	120	UG/L	50		V1	1.1	1	2.40	43.72	2.74	ID		No
	P317989	12/13/00	GW07324RG	SELENIUM	REAL	TR1	128	UG/L	50		V1	2.37	1	2.56	43.72	2.93	ID		No
	P317989	12/13/00	GW07324RG	THALLIUM	REAL	TR1	4.45	UG/L	2		V1	3.26	1	2.23	4.90	0.91	ID		No
	P317989	6/15/00	GW06880RG	URANIUM-233/234	REAL	TR1	51.10	PCI/L	1.06		V	0.259		48.21	60.70	0.84			No
	P317989	6/15/00	GW06880RG	URANIUM-235	REAL	TR1	2.28	PCI/L	1.01		V	0.118		2.26	1.79	1.27			No
	P317989	6/15/00	GW06880RG	URANIUM-238	REAL	TR1	38.50	PCI/L	0.77		V	0.218		50.13	41.80	0.92			No
Drainage	00997	1/20/00	GW06669TE	URANIUM-233/234	REAL	TR1	4.65985	PCI/L	1.06		V1	0.062952		4.40	60.70	0.08			No
	00997	7/28/00	GW07011RG	URANIUM-233/234	REAL	TR1	4.77	PCI/L	1.06		V1	0.144		4.50	60.70	0.08			No
	00997	1/20/00	GW06669TE	URANIUM-238	REAL	TR1	3.46691	PCI/L	0.768		V1	0.039581		4.51	41.80	0.08			No
	00997	7/28/00	GW07011RG	URANIUM-238	REAL	TR1	3.04	PCI/L	0.768		V1	0.175		3.96	41.80	0.07			No
	38591	1/10/00	GW06706TE	URANIUM-233/234	REAL	TR1	12.3869	PCI/L	1.06		V1	0.465135		11.69	60.70	0.20			No
	38591	1/10/00	GW06706TE	URANIUM-238	REAL	TR1	7.83979	PCI/L	0.768		V1	0.268935		10.21	41.80	0.19			No
	6486	1/12/00	GW06688TE	NICKEL	REAL	TR1	529	UG/L	140		V	0.25	1	3.78	21.37	24.75	ID		Yes
	6486	1/12/00	GW06688TE	URANIUM-233/234	REAL	TR1	5.68831	PCI/L	1.06		V	0.640732		5.37	60.70	0.09			No
	6486	1/12/00	GW06688TE	URANIUM-238	REAL	TR1	3.11468	PCI/L	0.768		V	0.489561		4.06	41.80	0.07			No

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

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Table 2-3, 2000 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

Well Class	Loc	Sample Date	Sample #	Analyte	QC Type	Res Type	Res	Unit	Tier II	Lab Qual	Val	Det Limit	Dil	Tier II Ratio	Back M23D	Back Ratio	Hist M23D	Hist Rat	Rep Result?
Drainage	6586	8/23/00	GW07027RG	NICKEL	REAL	TR1	364	UG/L	140		V	0.3	1	2.60	21.37	17.03	78.78	4.62	Yes
	6586	2/14/00	GW06689TE	URANIUM-233/234	REAL	TR1	1.86544	PCI/L	1.06		V1	0.301151		1.76	60.70	0.03			No
	6586	8/23/00	GW07027RG	URANIUM-233/234	REAL	TR1	4.21	PCI/L	1.06		V1	0.181		3.97	60.70	0.07			No
	6586	2/14/00	GW06689TE	URANIUM-238	REAL	TR1	1.08907	PCI/L	0.768		V1	0.322242		1.42	41.80	0.03			No
	6586	8/23/00	GW07027RG	URANIUM-238	REAL	TR1	2.46	PCI/L	0.768		V1	0.0824		3.20	41.80	0.06			No
Performance Monitoring	00797	1/19/00	GW06668TE	URANIUM-233/234	REAL	TR1	8.16941	PCI/L	1.06		V	0.533147		7.71	60.70	0.13			No
	00797	7/24/00	GW07010RG	URANIUM-233/234	REAL	TR1	10.3	PCI/L	1.06		V1	0.15		9.72	60.70	0.17			No
	00797	1/19/00	GW06668TE	URANIUM-238	REAL	TR1	7.46645	PCI/L	0.768		V	0.626299		9.72	41.80	0.18			No
	00797	7/24/00	GW07010RG	URANIUM-238	REAL	TR1	8.1	PCI/L	0.768		V1	0.149		10.55	41.80	0.19			No
	00897	4/24/00	GW06822RG	METHYLENE CHLORIDE	REAL	TR1	2400	UG/L	5	B	UJ1	1000	1000	480.00			ND		No
	00897	4/24/00	GW06822RG	TETRACHLOROETHENE	REAL	TR1	19000	UG/L	5		V1	1000	1000	3800.00			ND		No
	00897	11/9/00	GW07228RG	TETRACHLOROETHENE	REAL	TR2	21300	UG/L	5	D	V	250	500	4260.00			ND		No
	00897	4/24/00	GW06822RG	TRICHLOROETHENE	REAL	TR1	1700	UG/L	5		V1	1000	1000	340.00			ND		No
	00897	11/9/00	GW07228RG	TRICHLOROETHENE	REAL	TR2	1690	UG/L	5	D	1	250	500	338.00			ND		No
	00897	4/24/00	GW06822RG	URANIUM-233/234	REAL	TR1	3.88	PCI/L	1.06		V1	0.26		3.66	60.70	0.06			No
	00897	11/9/00	GW07228RG	URANIUM-233/234	REAL	TR1	3.2	PCI/L	1.06		V	0.085		3.02	60.70	0.05			No
	00897	4/24/00	GW06822RG	URANIUM-238	REAL	TR1	2.31	PCI/L	0.77		V1	0.22		3.00	41.80	0.06			No
	00897	11/9/00	GW07228RG	URANIUM-238	REAL	TR1	1.9	PCI/L	0.768		V	0.019		2.47	41.80	0.05			No
	02291	4/19/00	GW06824RG	METHYLENE CHLORIDE	REAL	TR1	540	UG/L	5	B	U	250	250	108.00			62.86	8.59	No
	02291	4/19/00	GW06824RG	TETRACHLOROETHENE	REAL	TR1	6200	UG/L	5		V	250	250	1240.00			4201.94	1.48	No
	02291	10/20/00	GW07230RG	TETRACHLOROETHENE	REAL	TR1	5060	UG/L	5	ED	V	25	50	1012.00			4204.60	1.20	No
	02291	4/19/00	GW06824RG	TRICHLOROETHENE	REAL	TR1	740	UG/L	5		V	250	250	148.00			453.73	1.63	No
	02291	10/20/00	GW07230RG	TRICHLOROETHENE	REAL	TR1	646	UG/L	5	D	V	25	50	129.20			453.73	1.42	No
	02291	4/19/00	GW06824RG	URANIUM-233/234	REAL	TR1	2.80	PCI/L	1.06		V1	0.19		2.64	60.70	0.05			No
	02291	10/20/00	GW07213RG	URANIUM-233/234	REAL	TR1	2.7	PCI/L	1.06		V	0.018		2.55	60.70	0.04			No
	02291	4/19/00	GW06824RG	URANIUM-238	REAL	TR1	1.63	PCI/L	0.77		V1	0.09		2.13	41.80	0.04			No
	02291	10/20/00	GW07213RG	URANIUM-238	REAL	TR1	1.9	PCI/L	0.768		V	0.018		2.47	41.80	0.05			No
	05691	1/18/00	GW06680TE	CARBON TETRACHLORIDE	REAL	TR1	130	UG/L	5		V	10	10	26.00			228.07	0.57	No
	05691	7/24/00	GW07018RG	CARBON TETRACHLORIDE	REAL	DL1	130	UG/L	5	D	V	10	10	26.00			228.07	0.57	No
	05691	1/18/00	GW06680TE	METHYLENE CHLORIDE	REAL	TR1	7	UG/L	5	JB	JB	10	10	1.40			0.56	12.50	No
	05691	1/18/00	GW06680TE	TETRACHLOROETHENE	REAL	TR1	27	UG/L	5		V	10	10	5.40			62.15	0.43	No
	05691	7/24/00	GW07018RG	TETRACHLOROETHENE	REAL	DL1	28	UG/L	5	D	1	10	10	5.60			62.15	0.45	No
	05691	1/18/00	GW06680TE	TRICHLOROETHENE	REAL	TR1	12	UG/L	5		V	10	10	2.40			41.18	0.29	No
	05691	7/24/00	GW07018RG	TRICHLOROETHENE	REAL	DL1	15	UG/L	5	D	1	10	10	3.00			41.18	0.36	No
	05691	1/18/00	GW06680TE	URANIUM-233/234	REAL	TR1	2.66169	PCI/L	1.06		V	0.641312		2.51	60.70	0.04			No
	05691	7/24/00	GW07018RG	URANIUM-233/234	REAL	TR1	2.36	PCI/L	1.06		V1	0.127		2.23	60.70	0.04			No
	05691	1/18/00	GW06680TE	URANIUM-238	REAL	TR1	1.34025	PCI/L	0.768		V	0.490004		1.75	41.80	0.03			No
	05691	7/24/00	GW07018RG	URANIUM-238	REAL	TR1	1.63	PCI/L	0.768		V1	0.15		2.12	41.80	0.04			No
	07391	1/13/00	GW06682TE	1,1,1-TRICHLOROETHANE	REAL	TR1	510	UG/L	200	J	V1	5000	5000	2.55			2724.6	0.19	No
	07391	1/13/00	GW06682TE	CHLOROFORM	REAL	TR1	2000	UG/L	100	J	V1	5000	5000	20.00			4439.22	0.45	No
	07391	8/2/00	GW07020RG	CHLOROFORM	REAL	TR1	2200	UG/L	100	J	J1	5000	5000	22.00			4439.22	0.50	No
	07391	1/13/00	GW06682TE	METHYLENE CHLORIDE	REAL	TR1	3200	UG/L	5	JB	JB1	5000	5000	640.00			2722.64	1.18	No
	07391	8/2/00	GW07020RG	METHYLENE CHLORIDE	REAL	TR1	2400	UG/L	5	JB	JB1	5000	5000	480.00			2077.24	1.16	No
	07391	1/13/00	GW06682TE	NITRATE/NITRITE	REAL	TR1	97	MG/L	10		V1	0.05	50	9.70	4.66	20.80	33.62	2.89	No
	07391	8/2/00	GW07020RG	NITRATE/NITRITE	REAL	TR1	65	MG/L	10		V	0.05	50	6.50	4.66	13.95	33.62	1.93	No
	07391	1/13/00	GW06682TE	TETRACHLOROETHENE	REAL	TR1	2100	UG/L	5	J	V1	5000	5000	420.00			3030.17	0.69	No
	07391	8/2/00	GW07020RG	TETRACHLOROETHENE	REAL	TR1	2000	UG/L	5	J	J1	5000	5000	400.00			3030.17	0.66	No
	07391	1/13/00	GW06682TE	TRICHLOROETHENE	REAL	TR1	75000	UG/L	5		V1	5000	5000	15000.00			158350.0	0.47	No
	07391	8/2/00	GW07020RG	TRICHLOROETHENE	REAL	TR1	96000	UG/L	5		J1	5000	5000	19200.00			158350.0	0.61	No
	07391	1/13/00	GW06682TE	URANIUM-233/234	REAL	TR1	29.2935	PCI/L	1.06		V1	0.080501		27.64	60.70	0.48			No
	07391	8/2/00	GW07020RG	URANIUM-233/234	REAL	TR2	32.9	PCI/L	1.06		V1	0.762		31.04	60.70	0.54			No
	07391	1/13/00	GW06682TE	URANIUM-235	REAL	TR1	2.34188	PCI/L	1.01		V1	0.01318		2.32	1.79	1.31	1.6287	1.44	No
	07391	8/2/00	GW07020RG	URANIUM-235	REAL	TR1	2.26	PCI/L	1.01		1	0.516		2.24	1.79	1.26	1.6287	1.39	No
	07391	1/13/00	GW06682TE	URANIUM-238	REAL	TR1	85.6504	PCI/L	0.768		V1	0.052049		111.52	41.80	2.05	43.4	1.97	No
	07391	8/2/00	GW07020RG	URANIUM-238	REAL	TR1	84.3	PCI/L	0.768		1	0.223		109.77	41.80	2.02	43.4	1.94	No
	10592	5/9/00	GW06840RG	SELENIUM	REAL	TR1	117	UG/L	50		V1	1.1	1	2.34	43.72	2.68	ID		No
	10592	10/26/00	GW07242RG	SELENIUM	REAL	TR1	139	UG/L	50		V	2.37	1	2.78	43.72	3.18	ID		No
	10592	5/9/00	GW06840RG	URANIUM-233/234	REAL	TR1	13.40	PCI/L	1.06		V1	0.08		12.64	60.70	0.22			No
	10592	10/26/00	GW07242RG	URANIUM-233/234	REAL	TR1	12	PCI/L	1.06		V	0.019		11.32	60.70	0.20			No
	10592	5/9/00	GW06840RG	URANIUM-238	REAL	TR1	8.72	PCI/L	0.77		V1	0.06		11.35	41.80	0.21			No
	10592	10/26/00	GW07242RG	URANIUM-238	REAL	TR1	8.6	PCI/L	0.768		V	0.019		11.20	41.80	0.21			No
	10692	1/20/00	GW06696TE	URANIUM-233/234	REAL	TR1	16.462	PCI/L	1.06		V1	0.352302		15.53	60.70	0.27			No
	10692	8/1/00	GW07032RG	URANIUM-233/234	REAL	TR1	19.2	PCI/L	1.06		V1	0.21		18.11	60.70	0.32			No
	10692	1/20/00	GW06696TE	URANIUM-238	REAL	TR1	9.77029	PCI/L	0.768		V1	0.286139		12.72	41.80	0.23			No
	10692	8/1/00	GW07032RG	URANIUM-238	REAL	TR1	9.57	PCI/L	0.768		V1	0.101		12.46	41.80	0.23			No
	10792	5/10/00	GW06841RG	URANIUM-233/234	REAL	TR1	6.51	PCI/L	1.06		V1	0.07		6.14	60.70	0.11			No
	10792	10/26/00	GW07243RG	URANIUM-233/234	REAL	TR1	5.4	PCI/L	1.06		V	0.094		5.09	60.70	0.09			No
	10792	5/10/00	GW06841RG	URANIUM-238	REAL	TR1	4.77	PCI/L	0.77		V1	0.06		6.21	41.80	0.11			No
	10792	10/26/00	GW07243RG	URANIUM-238	REAL	TR1	4.3	PCI/L	0.768		V	0.019		5.60	41.80	0.10			No
	10992	1/24/00	GW06697TE	NITRATE/NITRITE	REAL	TR1	30	MG/L	10		V1	0.05	25	3.00	4.66	6.43	ID		No
	10992	8/1/00	GW07033RG	NITRATE/NITRITE	REAL	TR1	25	MG/L	10		V	0.05	25	2.50	4.66	5.36	ID		No
	10992	1/24/00	GW06697TE	SELENIUM	REAL	TR1	481	UG/L	50		V1	1.1	1	9.62	43.72	11.00	ID		No
	10992	8/1/00	GW07033RG	SELENIUM	REAL	TR1	489	UG/L	50		V1	1.1	1	9.78	43.72	11.18	ID		No
	10992	1/24/00	GW06697TE	URANIUM-233/234	REAL	TR1	7.04094	PCI/L	1.06		V1	0.291737		6.64	60.70	0.12			No
	10992	8/1/00	GW07033RG	URANIUM-233/234	REAL	TR1	6.22	PCI/L	1.06		V1	0.133		5.87	60.70	0.10			No
	10992	1/24/00	GW06697TE	URANIUM-238	REAL	TR1	4.32194	PCI/L	0.768		V1	0.225261		5.63	41.80	0.10			No
	10992	8/1/00	GW07033RG	URANIUM-238	REAL	TR1	5.17	PCI/L	0.768		V1	0.133		6.73	41.80	0.12			No
	11891	5/5/00	GW06844RG	CARBON TETRACHLORIDE	DUP	TR1	680	UG/L	5		V	50	50	136.00			737.11	0.92	No

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

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Performance Monitoring

Well Class	Loc	Sample Date	Sample #	Analyte	QC Type	Res Type	Res	Unit	Tier II	Lab Qual	Val	Det Limit	Dil	Tier II Ratio	Back M23D	Back Ratio	Hist M23D	Hist Rat	Rep Result?
	11891	10/24/00	GW07246RG	CARBON TETRACHLORIDE	DUP	TR2	604	UG/L	5	D	1	5	10	120.80			737.11	0.82	No
	11891	5/5/00	GW06843RG	METHYLENE CHLORIDE	REAL	TR1	24	UG/L	5	JB	JB	50	50	4.80			5.29	4.54	No
	11891	5/5/00	GW06843RG	TETRACHLOROETHENE	REAL	TR1	270	UG/L	5		V	50	50	54.00			319.90	0.84	No
	11891	10/24/00	GW07245RG	TETRACHLOROETHENE	REAL	TR2	270	UG/L	5	D	1	5	10	54.00			319.90	0.84	No
	11891	10/24/00	GW07245RG	THALLIUM	REAL	TR1	5.72	UG/L	2		V	3.26	1	2.86	4.90	1.17	2.33	2.45	No
	11891	5/5/00	GW06844RG	TRICHLOROETHENE	DUP	TR1	54	UG/L	5		V	50	50	10.80			97.07	0.56	No
	11891	10/24/00	GW07245RG	TRICHLOROETHENE	REAL	TR1	52.7	UG/L	5		V1	0.5	1	10.54			97.07	0.54	No
	11891	5/5/00	GW06844RG	URANIUM-233/234	DUP	TR1	2.51	PCI/L	1.06		V1	0.09		2.37	60.70	0.04			No
	11891	10/24/00	GW07245RG	URANIUM-233/234	REAL	TR1	2.4	PCI/L	1.06		V	0.097		2.26	60.70	0.04			No
	11891	5/5/00	GW06844RG	URANIUM-238	DUP	TR1	1.52	PCI/L	0.77		V1	0.07		1.98	41.80	0.04			No
	11891	10/24/00	GW07245RG	URANIUM-238	REAL	TR1	1.5	PCI/L	0.768		V	0.02		1.95	41.80	0.04			No
	12191	6/19/00	GW06846RG	CARBON TETRACHLORIDE	REAL	DL1	160	UG/L	5	D	V	20	20	32.00			435.97	0.37	No
	12191	12/18/00	GW07248RG	CARBON TETRACHLORIDE	REAL	TR1	130	UG/L	5		J	2.5	5	26.00			435.97	0.30	No
	12191	6/19/00	GW06846RG	METHYLENE CHLORIDE	REAL	DL1	49	UG/L	5	BD		20	20	9.80			29.20	1.68	No
	12191	6/19/00	GW06846RG	TETRACHLOROETHENE	REAL	DL1	270	UG/L	5	D	V	20	20	54.00			486.46	0.56	No
	12191	12/18/00	GW07248RG	TETRACHLOROETHENE	REAL	TR1	361	UG/L	5		V	2.5	5	72.20			486.46	0.74	No
	12191	12/18/00	GW07248RG	THALLIUM	REAL	TR1	5.68	UG/L	2		UJ1	3.26	1	2.84	4.90	1.16	2.60	2.18	No
	12191	6/19/00	GW06846RG	TRICHLOROETHENE	REAL	DL1	31	UG/L	5	D	V	20	20	6.20			67.86	0.46	No
	12191	12/18/00	GW07248RG	TRICHLOROETHENE	REAL	TR1	35.3	UG/L	5		V	2.5	5	7.06			67.86	0.52	No
	12191	6/19/00	GW06846RG	URANIUM-233/234	REAL	TR1	1.90	PCI/L	1.06		V	0.13		1.79	60.70	0.03			No
	12191	12/18/00	GW07248RG	URANIUM-233/234	REAL	TR1	1.9	PCI/L	1.06		V1	0.11		1.79	60.70	0.03			No
	12191	6/19/00	GW06846RG	URANIUM-238	REAL	TR1	1.14	PCI/L	0.77		V	0.06		1.48	41.80	0.03			No
	12191	12/18/00	GW07248RG	URANIUM-238	REAL	TR1	1.1	PCI/L	0.768		V1	0.024		1.43	41.80	0.03			No
	12691	2/2/00	GW06699TE	CARBON TETRACHLORIDE	REAL	TR1	450	UG/L	5		V1	25	25	90.00			2968.95	0.15	No
	12691	7/27/00	GW07116RG	CARBON TETRACHLORIDE	DUP	DL1	720	UG/L	5	D	V	50	50	144.00			2968.95	0.24	No
	12691	2/2/00	GW06699TE	METHYLENE CHLORIDE	REAL	TR1	15	UG/L	5	JB	JB1	25	25	3.00			6.83	2.20	No
	12691	2/2/00	GW06699TE	TETRACHLOROETHENE	REAL	TR1	77	UG/L	5		V1	25	25	15.40			646.52	0.12	No
	12691	7/27/00	GW07116RG	TETRACHLOROETHENE	DUP	DL1	140	UG/L	5	D	1	50	50	28.00			646.52	0.22	No
	12691	2/2/00	GW06699TE	TRICHLOROETHENE	REAL	TR1	40	UG/L	5		V1	25	25	8.00			356.26	0.11	No
	12691	7/27/00	GW07035RG	TRICHLOROETHENE	REAL	DL1	71	UG/L	5	D	V	50	50	14.20			356.26	0.20	No
	12691	2/2/00	GW06810TE	URANIUM-233/234	DUP	TR1	2.67312	PCI/L	1.06		V1	0.392367		2.52	60.70	0.04			No
	12691	7/27/00	GW07116RG	URANIUM-233/234	DUP	TR1	2.6	PCI/L	1.06		V	0.634		2.45	60.70	0.04			No
	12691	2/2/00	GW06810TE	URANIUM-238	DUP	TR1	1.84321	PCI/L	0.768		V1	0.128079		2.40	41.80	0.04			No
	12691	7/27/00	GW07035RG	URANIUM-238	REAL	TR1	1.79	PCI/L	0.768		V	0.572		2.33	41.80	0.04			No
	15699	1/25/00	GW06752TE	1,1-DICHLOROETHENE	REAL	TR1	68	UG/L	7	J	V1	100	100	9.71			ND		No
	15699	5/19/00	GW06922RG	1,1-DICHLOROETHENE	REAL	TR1	94	UG/L	7		V1	100	100	13.43			ND		No
	15699	8/2/00	GW07061RG	1,1-DICHLOROETHENE	REAL	TR1	79	UG/L	7	J	J1	100	100	11.29			ND		No
	15699	1/25/00	GW06752TE	cis-1,2-DICHLOROETHENE	REAL	TR1	280	UG/L	70		V1	100	100	4.00			ND		No
	15699	5/19/00	GW06922RG	cis-1,2-DICHLOROETHENE	REAL	TR1	260	UG/L	70		V1	100	100	3.71			ND		No
	15699	8/2/00	GW07061RG	cis-1,2-DICHLOROETHENE	REAL	TR1	310	UG/L	70		V1	100	100	4.43			ND		No
	15699	1/25/00	GW06752TE	METHYLENE CHLORIDE	REAL	TR1	73	UG/L	5	JB	JB1	100	100	14.60			ND		No
	15699	5/19/00	GW06922RG	METHYLENE CHLORIDE	REAL	TR1	720	UG/L	5	B	V1	100	100	144.00			ND		No
	15699	8/2/00	GW07061RG	METHYLENE CHLORIDE	REAL	TR1	330	UG/L	5	B	J1	100	100	66.00			ND		No
	15699	1/25/00	GW06752TE	TETRACHLOROETHENE	REAL	TR1	780	UG/L	5		V1	100	100	156.00			ND		No
	15699	5/19/00	GW06922RG	TETRACHLOROETHENE	REAL	TR1	930	UG/L	5		V1	100	100	186.00			ND		No
	15699	8/2/00	GW07061RG	TETRACHLOROETHENE	REAL	TR1	910	UG/L	5		V1	100	100	182.00			ND		No
	15699	1/25/00	GW06752TE	TRICHLOROETHENE	REAL	TR1	1300	UG/L	5		V1	100	100	260.00			ND		No
	15699	5/19/00	GW06922RG	TRICHLOROETHENE	REAL	TR1	1700	UG/L	5		V1	100	100	340.00			ND		No
	15699	8/2/00	GW07061RG	TRICHLOROETHENE	REAL	TR1	1800	UG/L	5		J1	100	100	360.00			ND		No
	15699	1/25/00	GW06752TE	URANIUM-233/234	REAL	TR1	11.8994	PCI/L	1.06		V1	0.324984		11.23	60.70	0.20			No
	15699	5/19/00	GW06922RG	URANIUM-233/234	REAL	TR1	9.12	PCI/L	1.06		V1	0.41		8.60	60.70	0.15			No
	15699	8/2/00	GW07061RG	URANIUM-233/234	REAL	TR1	10.2	PCI/L	1.06		V1	0.236		9.62	60.70	0.17			No
	15699	1/25/00	GW06752TE	URANIUM-238	REAL	TR1	10.7765	PCI/L	0.768		V1	0.27957		14.03	41.80	0.26			No
	15699	5/19/00	GW06922RG	URANIUM-238	REAL	TR1	7.57	PCI/L	0.77		V1	0.31		9.86	41.80	0.18			No
	15699	8/2/00	GW07061RG	URANIUM-238	REAL	TR1	8.64	PCI/L	0.768		V1	0.22		11.25	41.80	0.21			No
	21098	12/5/00	GW07306RG	CARBON TETRACHLORIDE	REAL	TR1	959	UG/L	5	D	V1	25	50	191.80			ND		No
	21098	12/5/00	GW07306RG	CHLOROFORM	REAL	TR2	348	UG/L	100		V1	2.5	5	3.48			ND		No
	3687	11/3/00	GW07239RG	1,1-DICHLOROETHENE	REAL	TR1	19	UG/L	7	J	V1	25	50	2.71			191.60	0.10	No
	3687	4/18/00	GW06837RG	CARBON TETRACHLORIDE	REAL	TR1	560	UG/L	5	J	V	1000	1000	112.00			1255.40	0.45	No
	3687	11/3/00	GW07239RG	CARBON TETRACHLORIDE	REAL	TR1	450	UG/L	5		V1	25	50	90.00			1255.40	0.36	No
	3687	4/18/00	GW06837RG	CHLOROFORM	REAL	TR1	500	UG/L	100	J	V	1000	1000	5.00			1072.39	0.47	No
	3687	11/3/00	GW07239RG	CHLOROFORM	REAL	TR1	181	UG/L	100		V1	25	50	1.81			1072.39	0.17	No
	3687	4/18/00	GW06837RG	METHYLENE CHLORIDE	REAL	TR1	2500	UG/L	5	B	U	1000	1000	500.00			185.12	13.50	No
	3687	11/3/00	GW07239RG	METHYLENE CHLORIDE	REAL	TR1	13	UG/L	5	JB	V1	25	50	2.60			185.12	0.07	No
	3687	4/18/00	GW06837RG	TETRACHLOROETHENE	REAL	TR1	600	UG/L	5	J	V	1000	1000	120.00			814.46	0.74	No
	3687	11/3/00	GW07239RG	TETRACHLOROETHENE	REAL	TR1	287	UG/L	5		V1	25	50	57.40			814.46	0.35	No
	3687	4/18/00	GW06837RG	TRICHLOROETHENE	REAL	TR2	22000	UG/L	5	D	V	2000	2000	4400.00			91325.32	0.24	No
	3687	11/3/00	GW07239RG	TRICHLOROETHENE	REAL	TR2	13800	UG/L	5	D	V1	125	250	2760.00			91325.32	0.15	No
	3687	4/18/00	GW06837RG	URANIUM-233/234	REAL	TR1	1.46	PCI/L	1.06		V1	0.35		1.38	60.70	0.02			No
	3687	11/3/00	GW07239RG	URANIUM-233/234	REAL	TR1	1.5	PCI/L	1.06		V1	0.022		1.42	60.70	0.02			No
	3687	4/18/00	GW06837RG	URANIUM-238	REAL	TR1	0.86	PCI/L	0.77	J	V1	0.30		1.12	41.80	0.02			No
	3687	11/3/00	GW07239RG	URANIUM-238	REAL	TR1	0.9	PCI/L	0.768		V1	0.022		1.17	41.80	0.02			No
	891COLGAL	1/26/00	GW06766TE	URANIUM-233/234	REAL	TR1	7.48027	PCI/L	1.06		V1	0.325224		7.06	60.70	0.12			No
	891COLGAL	6/20/00	GW06897RG	URANIUM-233/234	REAL	TR1	5.76	PCI/L	1.06		V	0.20		5.43	60.70	0.09			No
	891COLGAL	8/24/00	GW07074RG	URANIUM-233/234	REAL	TR1	7.28	PCI/L	1.06		V1	0.22		6.87	60.70	0.12			No
	891COLGAL	1/26/00	GW06766TE	URANIUM-238	REAL	TR1	5.59012	PCI/L	0.768		V1	0.325224		7.28	41.80	0.13			No
	891COLGAL	6/20/00	GW06897RG	URANIUM-238	REAL	TR1	4.73	PCI/L	0.77		V	0.18		6.16	41.80	0.11			No
	891COLGAL	8/24/00	GW071728RG	URANIUM-238	DUP	TR1	4.93	PCI/L	0.768		V1	0.0868		6.42	41.80	0.12			No

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

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Table 2-3, 2000 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

Well Class	Loc	Sample Date	Sample #	Analyte	QC Type	Res Type	Res	Unit	Tier II	Lab Qual	Val	Det Limit	Dil	Tier II Ratio	Back M2SD	Back Ratio	Hist M2SD	Hist Rat	Rep Result?
Performance Monitoring	891COLWEL	6/20/00	GW06896RG	1,1-DICHLOROETHENE	REAL	TR1	21	UG/L	7		V	20	20	3.00			44.16	0.48	No
	891COLWEL	8/24/00	GW07126RG	1,1-DICHLOROETHENE	DUP	TR1	12	UG/L	7	J	J1	20	20	1.71			44.16	0.27	No
	891COLWEL	12/18/00	GW07293RG	1,1-DICHLOROETHENE	REAL	TR1	9.5	UG/L	7		V	2.5	5	1.36			44.16	0.22	No
	891COLWEL	2/14/00	GW06765TE	CARBON TETRACHLORIDE	REAL	TR1	7	UG/L	5	J	V1	25	25	1.40			34.70	0.20	No
	891COLWEL	8/24/00	GW07073RG	CARBON TETRACHLORIDE	REAL	TR1	10	UG/L	5	J	J1	20	20	2.00			34.70	0.29	No
	891COLWEL	12/18/00	GW07293RG	CARBON TETRACHLORIDE	REAL	TR1	9.4	UG/L	5		J	2.5	5	1.88			34.70	0.27	No
	891COLWEL	2/14/00	GW06765TE	METHYLENE CHLORIDE	REAL	TR1	15	UG/L	5	JB	JB1	25	25	3.00			19.99	0.75	No
	891COLWEL	6/20/00	GW06896RG	METHYLENE CHLORIDE	REAL	TR1	6	UG/L	5	JB	JB	20	20	1.20			19.99	0.30	No
	891COLWEL	8/24/00	GW07126RG	METHYLENE CHLORIDE	DUP	TR1	58	UG/L	5	B	UJ1	20	20	11.60			19.99	2.90	No
	891COLWEL	2/14/00	GW06765TE	SELENIUM	REAL	TR1	577	UG/L	50		V	1.1	1	11.54	43.72	13.20	924.05	0.62	No
	891COLWEL	6/20/00	GW06896RG	SELENIUM	REAL	TR1	612	UG/L	50		V1	1.1	1	12.24	43.72	14.00	924.05	0.66	No
	891COLWEL	8/24/00	GW07073RG	SELENIUM	REAL	TR1	664	UG/L	50		V	1.1	1	13.28	43.72	15.19	924.05	0.72	No
	891COLWEL	12/18/00	GW07293RG	SELENIUM	REAL	TR1	622	UG/L	50		V1	2.37	1	12.44	43.72	14.23	924.05	0.67	No
	891COLWEL	2/14/00	GW06765TE	TETRACHLOROETHENE	REAL	TR1	48	UG/L	5		V1	25	25	9.60			154.58	0.31	No
	891COLWEL	6/20/00	GW06896RG	TETRACHLOROETHENE	REAL	TR1	50	UG/L	5		V	20	20	10.00			154.58	0.32	No
	891COLWEL	8/24/00	GW07126RG	TETRACHLOROETHENE	DUP	TR1	39	UG/L	5		V1	20	20	7.80			154.58	0.25	No
	891COLWEL	12/18/00	GW07293RG	TETRACHLOROETHENE	REAL	TR1	26.9	UG/L	5		V	2.5	5	5.38			154.58	0.17	No
	891COLWEL	12/18/00	GW07293RG	THALLIUM	REAL	TR1	5.4	UG/L	2		UJ1	3.26	1	2.70	4.90	1.10	5.37	1.01	No
	891COLWEL	2/14/00	GW06765TE	TRICHLOROETHENE	REAL	TR1	370	UG/L	5		V1	25	25	74.00			1234.43	0.30	No
	891COLWEL	6/20/00	GW06896RG	TRICHLOROETHENE	REAL	TR1	370	UG/L	5		V	20	20	74.00			1234.43	0.30	No
	891COLWEL	8/24/00	GW07126RG	TRICHLOROETHENE	DUP	TR1	360	UG/L	5		V1	20	20	72.00			1234.43	0.29	No
	891COLWEL	12/18/00	GW07293RG	TRICHLOROETHENE	REAL	TR1	264	UG/L	5		V	2.5	5	52.80			1234.43	0.21	No
	891COLWEL	2/14/00	GW06765TE	URANIUM-233/234	REAL	TR1	10.3016	PCI/L	1.06		V1	0.188943		9.72	60.70	0.17			No
	891COLWEL	6/20/00	GW06896RG	URANIUM-233/234	REAL	TR1	10.10	PCI/L	1.06		V	0.08		9.53	60.70	0.17			No
	891COLWEL	8/24/00	GW07126RG	URANIUM-233/234	DUP	TR1	10.2	PCI/L	1.06		V1	0.239		9.62	60.70	0.17			No
	891COLWEL	12/18/00	GW07293RG	URANIUM-233/234	REAL	TR1	9.5	PCI/L	1.06		V1	0.095		8.96	60.70	0.16			No
	891COLWEL	2/14/00	GW06765TE	URANIUM-238	REAL	TR1	7.63856	PCI/L	0.768		V1	0.08347		9.95	41.80	0.18			No
	891COLWEL	6/20/00	GW06896RG	URANIUM-238	REAL	TR1	8.06	PCI/L	0.77		V	0.15		10.49	41.80	0.19			No
	891COLWEL	8/24/00	GW07073RG	URANIUM-238	REAL	TR1	7.01	PCI/L	0.768		V1	0.333		9.13	41.80	0.17			No
	891COLWEL	12/18/00	GW07293RG	URANIUM-238	REAL	TR1	7.1	PCI/L	0.768		V1	0.074		9.24	41.80	0.17			No
	95199	5/19/00	GW06934RG	METHYLENE CHLORIDE	REAL	TR1	5	UG/L	5	BJ	JB1	5	5	1.00			ND		No
	95199	3/16/00	GW06817TE	TRICHLOROETHENE	REAL	TR2	53	UG/L	5	D	V	5	5	10.60			ND		No
	95199	5/19/00	GW06934RG	TRICHLOROETHENE	REAL	TR1	54	UG/L	5		V1	1	1	10.80			ND		No
	95199	7/17/00	GW07069RG	TRICHLOROETHENE	REAL	TR1	61	UG/L	5		V1	5	5	12.20			ND		No
	95199	10/25/00	GW07273RG	TRICHLOROETHENE	REAL	TR1	52.3	UG/L	5		V1	0.5	1	10.46			ND		No
	SW13494	2/1/00	GW06764TE	TETRACHLOROETHENE	REAL	TR1	25	UG/L	5		V1	1		5.00			30.70	0.81	No
	SW13494	5/10/00	GW06895RG	TETRACHLOROETHENE	REAL	DL1	26	UG/L	5	D	V1	2	2	5.20			30.70	0.85	No
	SW13494	8/22/00	SW07072RG	TETRACHLOROETHENE	REAL	TR1	24	UG/L	5		V1	1	1	4.80			30.70	0.78	No
	SW13494	10/26/00	GW07292RG	TETRACHLOROETHENE	REAL	TR1	19.8	UG/L	5		V1	0.5	1	3.96			30.70	0.64	No
	SW13494	10/26/00	GW07292RG	THALLIUM	REAL	TR1	4.59	UG/L	2		V1	3.26	1	2.30	4.90	0.94	ID		No
	SW13494	2/1/00	GW06764TE	URANIUM-233/234	REAL	TR1	3.74835	PCI/L	1.06		V1	0.197697		3.53	60.70	0.06			No
	SW13494	5/10/00	GW06895RG	URANIUM-233/234	REAL	TR1	3.68	PCI/L	1.06		V1	0.07		3.47	60.70	0.06			No
	SW13494	8/22/00	SW07072RG	URANIUM-233/234	REAL	TR1	3.36	PCI/L	1.06		V1	0.196		3.17	60.70	0.06			No
	SW13494	10/26/00	GW07292RG	URANIUM-233/234	REAL	TR1	2.7	PCI/L	1.06		V	0.018		2.55	60.70	0.04			No
	SW13494	2/1/00	GW06764TE	URANIUM-238	REAL	TR1	2.68428	PCI/L	0.768		V1	0.232239		3.50	41.80	0.06			No
	SW13494	5/10/00	GW06895RG	URANIUM-238	REAL	TR1	2.44	PCI/L	0.77		V1	0.05		3.18	41.80	0.06			No
	SW13494	8/22/00	SW07124RG	URANIUM-238	DUP	TR1	2.29	PCI/L	0.768		V1	0.145		2.98	41.80	0.05			No
	SW13494	10/26/00	GW07292RG	URANIUM-238	REAL	TR1	2.2	PCI/L	0.768		V	0.018		2.86	41.80	0.05			No
Plume Definition	00491	1/20/00	GW06666TE	CARBON TETRACHLORIDE	REAL	TR1	160	UG/L	5		V1	10	10	32.00			545.16	0.29	No
	00491	7/24/00	GW07008RG	CARBON TETRACHLORIDE	REAL	TR1	200	UG/L	5		V	10	10	40.00			545.16	0.37	No
	00491	1/20/00	GW06666TE	METHYLENE CHLORIDE	REAL	TR1	13	UG/L	5	B	U1	10	10	2.60			38.41	0.34	No
	00491	7/24/00	GW07008RG	METHYLENE CHLORIDE	REAL	TR1	18	UG/L	5	B	UJ	10	10	3.60			38.41	0.47	No
	00491	1/20/00	GW06666TE	TETRACHLOROETHENE	REAL	TR1	26	UG/L	5		V1	10	10	5.20			54.23	0.48	No
	00491	7/24/00	GW07008RG	TETRACHLOROETHENE	REAL	TR1	31	UG/L	5		V	10	10	6.20			54.23	0.57	No
	00491	1/20/00	GW06666TE	TRICHLOROETHENE	REAL	TR1	49	UG/L	5		V1	10	10	9.80			153.17	0.32	No
	00491	7/24/00	GW07008RG	TRICHLOROETHENE	REAL	TR1	66	UG/L	5		V	10	10	13.20			153.17	0.43	No
	00491	1/20/00	GW06666TE	URANIUM-233/234	REAL	TR1	5.21354	PCI/L	1.06		V1	0.128369		4.92	60.70	0.09			No
	00491	7/24/00	GW07008RG	URANIUM-233/234	REAL	TR1	5.01	PCI/L	1.06		V1	0.13		4.73	60.70	0.08			No
	00491	1/20/00	GW06666TE	URANIUM-238	REAL	TR1	3.87147	PCI/L	0.768		V1	0.074619		5.04	41.80	0.09			No
	00491	7/24/00	GW07008RG	URANIUM-238	REAL	TR1	3.9	PCI/L	0.768		V1	0.072		5.08	41.80	0.09			No
	00597	1/20/00	GW06667TE	NITRATE/NITRITE	REAL	TR1	12	MG/L	10		V1	0.05	25	1.20	4.66	2.57			No
	00597	9/22/00	GW07009RG	NITRATE/NITRITE	REAL	TR1	17	MG/L	10		1	0.05	50	1.70	4.66	3.65	ND		No
	00597	1/20/00	GW06667TE	TRICHLOROETHENE	REAL	TR1	5	UG/L	5		V	1	1	1.00			ND		No
	03991	1/24/00	GW06673TE	CARBON TETRACHLORIDE	REAL	TR1	13	UG/L	5		V1	1	1	2.60			27.15	0.48	No
	03991	7/25/00	GW07013RG	CARBON TETRACHLORIDE	REAL	TR1	13	UG/L	5		V	1	1	2.60			27.15	0.48	No
	03991	1/24/00	GW06673TE	URANIUM-233/234	REAL	TR1	1.55598	PCI/L	1.06		V1	0.045282		1.47	60.70	0.03			No
	03991	7/25/00	GW07013RG	URANIUM-233/234	REAL	TR1	1.63	PCI/L	1.06		V1	0.074		1.54	60.70	0.03			No
	03991	1/24/00	GW06673TE	URANIUM-238	REAL	TR1	0.928056	PCI/L	0.768	J	V1	0.025924		1.21	41.80	0.02			No
	03991	7/25/00	GW07013RG	URANIUM-238	REAL	TR1	1.29	PCI/L	0.768		V1	0.131		1.68	41.80	0.03			No
	0487	1/18/00	GW06675TE	CARBON TETRACHLORIDE	REAL	TR1	11	UG/L	5		V	10	10	2.20			325.7	0.03	No
	0487	1/18/00	GW06675TE	METHYLENE CHLORIDE	REAL	TR1	5	UG/L	5	JB	JB	10	10	1.00			10.06	0.50	No
	0487	7/20/00	GW07015RG	METHYLENE CHLORIDE	REAL	TR1	9	UG/L	5	B	UJ	5	5	1.80			10.06	0.89	No
	0487	1/18/00	GW06675TE	SELENIUM	REAL	TR1	123	UG/L	50		V1	1	1	2.46	43.72	2.81	699.76	0.18	No
	0487	7/20/00	GW07015RG	SELENIUM	REAL	TR1	84.9	UG/L	50		V1	1.1	1	1.70	43.72	1.94	699.76	0.12	No
	0487	1/18/00	GW06675TE	TETRACHLOROETHENE	REAL	TR1	5	UG/L	5	J	V	10	10	1.00			74.75	0.07	No
	0487	1/18/00	GW06675TE	TRICHLOROETHENE	REAL	TR1	110	UG/L	5		V	10	10	22.00			1330.06	0.08	No
	0487	7/20/00	GW07015RG	TRICHLOROETHENE	REAL	TR1	87	UG/L	5		V	5	5	17.40			1330.06	0.07	No
	0487	1/18/00	GW06675TE	URANIUM-233/234	REAL	TR1	12.0392	PCI/L	1.06		V1	0.036638		11.36	60.70	0.20			No

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Table 2-3, 2000 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

Well Class	Loc	Sample Date	Sample #	Analyte	QC Type	Res Type	Res	Unit	Tier II	Lab Qual	Val	Det Limit	Dil	Tier II Ratio	Back M2SD	Back Ratio	Hist M2SD	Hist Rat	Rep Result?
Plume Definition	0487	7/20/00	GW07015RG	URANIUM-233/234	REAL	TR1	12	PCI/L	1.06		V1	0.069		11.32	60.70	0.20			No
	0487	1/18/00	GW06675TE	URANIUM-238	REAL	TR1	8.89227	PCI/L	0.768		V1	0.009279		11.58	41.80	0.21			No
	0487	7/20/00	GW07015RG	URANIUM-238	REAL	TR1	9.19	PCI/L	0.768		V1	0.068		11.97	41.80	0.22			No
	05391	1/11/00	GW06679TE	CARBON TETRACHLORIDE	REAL	TR1	21	UG/L	5		V1	1	1	4.20			32.88	0.64	No
	05391	7/20/00	GW07017RG	CARBON TETRACHLORIDE	REAL	TR1	24	UG/L	5		V	1	1	4.80			32.88	0.73	No
	05391	1/11/00	GW06679TE	TETRACHLOROETHENE	REAL	TR1	5	UG/L	5		V1	1	1	1.00			8.50	0.59	No
	05391	7/20/00	GW07017RG	TETRACHLOROETHENE	REAL	TR1	6	UG/L	5		V	1	1	1.20			8.50	0.71	No
	05391	1/11/00	GW06679TE	URANIUM-233/234	REAL	TR1	1.55134	PCI/L	1.06		V1	0.694417		1.46	60.70	0.03			No
	05391	7/20/00	GW07017RG	URANIUM-233/234	REAL	TR1	1.99	PCI/L	1.06		V1	0.07		1.88	60.70	0.03			No
	05391	7/20/00	GW07017RG	URANIUM-238	REAL	TR1	1.51	PCI/L	0.768		V1	0.124		1.97	41.80	0.04			No
	22896	2/22/00	GW06702TE	METHYLENE CHLORIDE	REAL	TR1	210	UG/L	5	B	UJ1	200	200	42.00			ND		No
	22896	7/28/00	GW07038RG	METHYLENE CHLORIDE	REAL	TR1	150	UG/L	5	B	J1	50	50	30.00			ND		No
	22896	2/22/00	GW06702TE	NICKEL	REAL	TR1	729	UG/L	140		V1	0.35	1	5.21	21.37	34.11	ND		No
	22896	2/22/00	GW06702TE	NITRATE/NITRITE	REAL	TR1	14	MG/L	10		V1	0.05	10	1.40	4.66	3.00	ND		No
	22896	7/28/00	GW07038RG	NITRATE/NITRITE	REAL	TR1	12	MG/L	10		V	0.05	10	1.20	4.66	2.58	ND		No
	22896	2/22/00	GW06702TE	TETRACHLOROETHENE	REAL	TR1	22	UG/L	5	J	V1	200	200	4.40			ND		No
	22896	2/22/00	GW06702TE	TRICHLOROETHENE	REAL	TR1	3400	UG/L	5		V1	200	200	680.00			ND		Yes
	22896	7/28/00	GW07038RG	TRICHLOROETHENE	REAL	DL1	4000	UG/L	5	D	J1	200	200	800.00			ND		Yes
	6286	1/13/00	GW06686TE	CARBON TETRACHLORIDE	REAL	TR1	6	UG/L	5		V1	1	1	1.20			9.76	0.61	No
	6286	7/25/00	GW07024RG	CARBON TETRACHLORIDE	REAL	TR1	8	UG/L	5		V	1	1	1.60			9.76	0.82	No
	6286	1/13/00	GW06686TE	SELENIUM	REAL	TR1	67.8	UG/L	50		V	1	1	1.36	43.72	1.55	65.96	1.03	No
	6286	7/25/00	GW07024RG	SELENIUM	REAL	TR1	62.3	UG/L	50		J	1.1	1	1.25	43.72	1.42	65.96	0.94	No
	6286	1/13/00	GW06686TE	URANIUM-233/234	REAL	TR1	8.02983	PCI/L	1.06		V	0.661537		7.58	60.70	0.13			No
	6286	7/25/00	GW07024RG	URANIUM-233/234	REAL	TR1	3.26	PCI/L	1.06		V	0.502		3.08	60.70	0.05			No
	6286	1/13/00	GW06686TE	URANIUM-238	REAL	TR1	5.5689	PCI/L	0.768		V	0.593771		7.25	41.80	0.13			No
	6286	7/25/00	GW07024RG	URANIUM-238	REAL	TR1	3.11	PCI/L	0.768		V	0.502		4.05	41.80	0.07			No
	P209289	11/27/00	GW07254RG	CARBON TETRACHLORIDE	REAL	TR1	11.2	UG/L	5		V1	1	2	2.24			ID		No
	P209289	11/27/00	GW07254RG	THALLIUM	REAL	TR1	4.36	UG/L	2		J1	3.26	1	2.18	4.90	0.89	ID		No
	P209289	11/27/00	GW07254RG	URANIUM-233/234	REAL	TR1	1.5	PCI/L	1.06		J	0.25		1.42	60.70	0.02			No
	P209289	11/27/00	GW07254RG	URANIUM-238	REAL	TR1	0.82	PCI/L	0.768		J	0.15		1.07	41.80	0.02			No
	P209389	1/18/00	GW06757TE	1,1-DICHLOROETHENE	DUP	TR1	21	UG/L	7		V	1	1	3.00			88.48	0.24	No
	P209389	7/31/00	GW07118RG	1,1-DICHLOROETHENE	DUP	DL1	28	UG/L	7	D	V1	5	5	4.00			88.48	0.32	No
	P209389	1/18/00	GW06757TE	URANIUM-238	DUP	TR1	0.890777	PCI/L	0.768	J	V	0.473371		1.16	41.80	0.02			No
	P209489	5/3/00	GW06853RG	CARBON TETRACHLORIDE	REAL	TR1	36	UG/L	5		V	5	5	7.20			83.26	0.43	No
	P209489	11/29/00	GW07255RG	CARBON TETRACHLORIDE	REAL	TR1	32.5	UG/L	5		V1	1	2	6.50			83.26	0.39	No
	P209489	5/3/00	GW06853RG	METHYLENE CHLORIDE	REAL	TR1	6	UG/L	5	B	UJ	5	5	1.20			8.27	0.73	No
	P209489	5/3/00	GW06853RG	NITRATE/NITRITE	REAL	TR1	140	MG/L	10		V	0.05	250	14.00	4.66	30.04	316.34	0.44	No
	P209489	11/29/00	GW07255RG	NITRATE/NITRITE	REAL	TR1	180	MG/L	10		V	0.05	100	18.00	4.66	38.63	316.34	0.57	No
	P209489	11/29/00	GW07255RG	THALLIUM	REAL	TR1	6.18	UG/L	2		J1	3.26	1	3.09	4.90	1.26	6.54	0.94	No
	P209489	5/3/00	GW06853RG	TRICHLOROETHENE	REAL	TR1	53	UG/L	5		V	5	5	10.60			90.40	0.59	No
	P209489	11/29/00	GW07255RG	TRICHLOROETHENE	REAL	TR1	53.4	UG/L	5		V1	1	2	10.68			90.40	0.59	No
	P209489	5/3/00	GW06853RG	URANIUM-233/234	REAL	TR1	20.00	PCI/L	1.06		V1	0.10		18.87	60.70	0.33			No
	P209489	11/29/00	GW07255RG	URANIUM-233/234	REAL	TR1	34	PCI/L	1.06		J	0.33		32.08	60.70	0.56			No
	P209489	5/3/00	GW06853RG	URANIUM-238	REAL	TR1	17.10	PCI/L	0.77		V1	0.08		22.27	41.80	0.41			No
	P209489	11/29/00	GW07255RG	URANIUM-238	REAL	TR1	25	PCI/L	0.768		J	0.39		32.55	41.80	0.60			No
	P219189	5/2/00	GW06855RG	1,1-DICHLOROETHENE	REAL	TR1	23	UG/L	7		V	1	1	3.29			46.80	0.49	No
	P219189	11/27/00	GW07257RG	1,1-DICHLOROETHENE	REAL	TR1	33.2	UG/L	7		V1	1	2	4.74			46.80	0.71	No
	P219189	5/2/00	GW06855RG	URANIUM-233/234	REAL	TR1	63.00	PCI/L	1.06		V1	0.50		59.43	60.70	1.04			No
	P219189	5/2/00	GW06855RG	URANIUM-235	REAL	TR1	1.93	PCI/L	1.01		V1	0.23		1.91	1.79	1.08			No
	P219189	5/2/00	GW06855RG	URANIUM-238	REAL	TR1	44.90	PCI/L	0.77		V1	0.23		58.46	41.80	1.07			No
	P416789	5/8/00	GW06858RG	URANIUM-233/234	REAL	TR1	1.40	PCI/L	1.06		V1	0.06		1.32	60.70	0.02			No
	P416889	4/24/00	GW06859RG	METHYLENE CHLORIDE	REAL	TR1	10	UG/L	5	B	UJ1	5	5	2.00			1.17	8.55	No
	P416889	4/24/00	GW06859RG	TETRACHLOROETHENE	REAL	TR1	38	UG/L	5		V1	5	5	7.60			79.60	0.48	No
	P416889	11/2/00	GW07261RG	TETRACHLOROETHENE	REAL	TR1	52.4	UG/L	5		V1	0.5	1	10.48			79.60	0.66	No
	P416889	4/24/00	GW06859RG	URANIUM-233/234	REAL	TR1	1.16	PCI/L	1.06		V1	0.09		1.10	60.70	0.02			No
Plume Degradation	18199	3/14/00	GW06725TE	CARBON TETRACHLORIDE	DUP	TR2	39000	UG/L	5	D	V1	5000	5000	7800.00			ND		No
	18199	5/30/00	GW06875RG	CARBON TETRACHLORIDE	REAL	TR2	17000	UG/L	5	D	V	2000	2000	3400.00			ND		No
	18199	12/5/00	GW07307RG	CARBON TETRACHLORIDE	REAL	TR1	27300	UG/L	5	D	V1	250	500	5460.00			ND		No
	18199	3/14/00	GW06725TE	CHLOROFORM	DUP	TR2	6100	UG/L	100	D	1	5000	5000	61.00			ND		No
	18199	5/30/00	GW06875RG	CHLOROFORM	REAL	TR2	3900	UG/L	100	D	V	2000	2000	39.00			ND		No
	18199	12/5/00	GW07307RG	CHLOROFORM	REAL	TR2	4110	UG/L	100		V1	25	50	41.10			ND		No
	18199	3/14/00	GW06724TE	METHYLENE CHLORIDE	REAL	TR1	2400	UG/L	5	B	UJ1	1000	1000	480.00			ND		No
	18199	5/30/00	GW06875RG	METHYLENE CHLORIDE	REAL	TR1	67	UG/L	5	JB	JB	100	100	13.40			ND		No
	18199	12/18/00	GW07308RG	METHYLENE CHLORIDE	DUP	TR2	20.8	UG/L	5	JB	JB1	25	50	4.16			ND		No
	18199	5/30/00	GW06875RG	TETRACHLOROETHENE	REAL	TR1	91	UG/L	5	J	V	100	100	18.20			ND		No
	18199	12/5/00	GW07307RG	TETRACHLOROETHENE	REAL	TR2	63.7	UG/L	5		V1	25	50	12.74			ND		No
	18199	12/18/00	GW07308RG	THALLIUM	DUP	TR1	8.23	UG/L	2		UJ1	3.26	1	4.12	4.90	1.68	ND		No
	18299	3/14/00	GW06727TE	CARBON TETRACHLORIDE	REAL	TR2	3700	UG/L	5	D	V1	500	500	740.00			ND		No
	18299	12/5/00	GW07299RG	CARBON TETRACHLORIDE	REAL	TR1	2800	UG/L	5	D	V1	25	50	560.00			ND		No
	18299	3/14/00	GW06727TE	CHLOROFORM	REAL	TR2	2900	UG/L	100	D	V1	500	500	29.00			ND		No
	18299	12/5/00	GW07299RG	CHLOROFORM	REAL	TR1	3170	UG/L	100	D	V1	25	50	31.70			ND		No
	18299	3/14/00	GW06727TE	METHYLENE CHLORIDE	REAL	TR1	270	UG/L	5	B	UJ1	100	100	54.00			ND		No
	18299	12/5/00	GW07299RG	METHYLENE CHLORIDE	REAL	TR2	34.1	UG/L	5	B	U1	5	10	6.82			ND		No
	18299	3/14/00	GW06727TE	TETRACHLOROETHENE	REAL	TR1	48	UG/L	5	J	J1	100	100	9.60			ND		No
	18299	12/5/00	GW07299RG	TETRACHLOROETHENE	REAL	TR2	40.1	UG/L	5		V1	5	10	8.02			ND		No
	18399	12/5/00	GW07300RG	CARBON TETRACHLORIDE	REAL	TR1	53100	UG/L	5		V1	500	1000	10620.00			ND		No
	18399	12/5/00	GW07300RG	CHLOROFORM	REAL	TR1	3960	UG/L	100		V1	500	1000	39.60			ND		No
	18499	3/14/00	GW06729TE	CARBON TETRACHLORIDE	REAL	TR1	22000	UG/L	5		V1	1000	1000	4400.00			ND		No

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

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Table 2-3, 2000 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/7/01

Well Class	Loc	Sample Date	Sample #	Analyte	QC Type	Res Type	Res	Unit	Tier II	Lab Qual	Val	Det Limit	Dil	Tier II Ratio	Back M2SD	Back Ratio	Hist M2SD	Hist Rat	Rep Result?
Plume Degradation	18499	12/5/00	GW07301RG	CARBON TETRACHLORIDE	REAL	TR1	24200	UG/L	5		J1	500	1000	4840.00			ND		No
	18499	3/14/00	GW06729TE	CHLOROFORM	REAL	TR1	4600	UG/L	100		V1	1000	1000	46.00			ND		No
	18499	12/5/00	GW07301RG	CHLOROFORM	REAL	TR1	7080	UG/L	100		J1	500	1000	70.80			ND		No
	18499	3/14/00	GW06729TE	METHYLENE CHLORIDE	REAL	TR1	2400	UG/L	5	B	UJ1	1000	1000	480.00			ND		No
	18599	3/14/00	GW06730TE	CARBON TETRACHLORIDE	REAL	TR2	40000	UG/L	5	D	V1	5000	5000	8000.00			ND		No
	18599	12/5/00	GW07302RG	CARBON TETRACHLORIDE	REAL	TR1	11500	UG/L	5	D	V1	100	200	2300.00			ND		No
	18599	3/14/00	GW06730TE	CHLOROFORM	REAL	TR2	5500	UG/L	100	D	1	5000	5000	55.00			ND		No
	18599	12/5/00	GW07302RG	CHLOROFORM	REAL	TR1	1030	UG/L	100	D	V1	100	200	10.30			ND		No
	18599	3/14/00	GW06730TE	METHYLENE CHLORIDE	REAL	TR1	2400	UG/L	5	B	UJ1	1000	1000	480.00			ND		No
	18599	12/5/00	GW07302RG	METHYLENE CHLORIDE	REAL	TR2	13	UG/L	5	B	V1	0.5	1	2.60			ND		No
	18599	12/5/00	GW07302RG	TETRACHLOROETHENE	REAL	TR2	19.7	UG/L	5		V1	0.5	1	3.94			ND		No
	18799	12/5/00	GW07304RG	1,1-DICHLOROETHENE	REAL	TR1	10.4	UG/L	7		V1	10	20	1.49			ND		No
	18799	12/5/00	GW07304RG	CARBON TETRACHLORIDE	REAL	TR1	825	UG/L	5		V1	10	20	165.00			ND		No
	18799	12/5/00	GW07304RG	CHLOROFORM	REAL	TR1	546	UG/L	100		V1	10	20	5.46			ND		No
	18799	12/5/00	GW07304RG	METHYLENE CHLORIDE	REAL	TR1	7.3	UG/L	5	JB	JB1	10	20	1.46			ND		No
	18799	12/5/00	GW07304RG	TETRACHLOROETHENE	REAL	TR1	9	UG/L	5	J	V1	10	20	1.80			ND		No
	90099	1/12/00	GW06767TE	CARBON TETRACHLORIDE	REAL	TR1	310	UG/L	5		V1	50	50	62.00			ND		No
	90099	6/19/00	GW06942RG	CARBON TETRACHLORIDE	REAL	TR1	270	UG/L	5		V	50	50	54.00			ND		No
	90099	7/13/00	GW07075RG	CARBON TETRACHLORIDE	REAL	TR1	270	UG/L	5		V1	50	50	54.00			ND		No
	90099	10/25/00	GW07294RG	CARBON TETRACHLORIDE	REAL	TR2	232	UG/L	5	D	1	25	50	46.40			ND		No
	90099	1/12/00	GW06767TE	METHYLENE CHLORIDE	REAL	TR1	38	UG/L	5	JB	JB1	50	50	7.60			ND		No
	90099	6/19/00	GW06942RG	METHYLENE CHLORIDE	REAL	TR1	190	UG/L	5	B	V	50	50	38.00			ND		No
	90099	7/13/00	GW07075RG	METHYLENE CHLORIDE	REAL	TR1	140	UG/L	5	B	V1	50	50	28.00			ND		No
	90099	10/25/00	GW07294RG	METHYLENE CHLORIDE	REAL	TR2	20.6	UG/L	5	BJD	1	25	50	4.12			ND		No
	90099	1/12/00	GW06767TE	TETRACHLOROETHENE	REAL	TR1	18	UG/L	5	J	V1	50	50	3.60			ND		No
	90099	6/19/00	GW06942RG	TETRACHLOROETHENE	REAL	TR1	21	UG/L	5	J	J	50	50	4.20			ND		No
	90099	7/13/00	GW07075RG	TETRACHLOROETHENE	REAL	TR1	21	UG/L	5	J	J1	50	50	4.20			ND		No
	90099	10/25/00	GW07294RG	TETRACHLOROETHENE	REAL	TR1	19.5	UG/L	5		V1	0.5	1	3.90			ND		No
	90099	1/12/00	GW06767TE	TRICHLOROETHENE	REAL	TR1	710	UG/L	5		V1	50	50	142.00			ND		No
	90099	6/19/00	GW06942RG	TRICHLOROETHENE	REAL	TR1	720	UG/L	5		V	50	50	144.00			ND		No
	90099	7/13/00	GW07075RG	TRICHLOROETHENE	REAL	TR1	790	UG/L	5		V1	50	50	158.00			ND		No
	90099	10/25/00	GW07294RG	TRICHLOROETHENE	REAL	TR2	732	UG/L	5	D	1	25	50	146.40			ND		No
	90299	6/19/00	GW06944RG	TRICHLOROETHENE	REAL	TR1	5	UG/L	5		V	1	1	1.00			ND		No
	90399	2/14/00	GW06772TE	CARBON TETRACHLORIDE	REAL	TR1	450	UG/L	5		V1	50	50	90.00			ND		No
	90399	6/19/00	GW06945RG	CARBON TETRACHLORIDE	REAL	TR1	370	UG/L	5		V	20	20	74.00			ND		No
	90399	7/13/00	GW07078RG	CARBON TETRACHLORIDE	REAL	TR1	380	UG/L	5		V1	20	20	76.00			ND		No
	90399	10/25/00	GW07297RG	CARBON TETRACHLORIDE	REAL	TR2	224	UG/L	5	D	1	5	10	44.80			ND		No
	90399	2/14/00	GW06772TE	METHYLENE CHLORIDE	REAL	TR1	15	UG/L	5	JB	JB1	50	50	3.00			ND		No
	90399	6/19/00	GW06945RG	METHYLENE CHLORIDE	REAL	TR1	80	UG/L	5	B	V	20	20	16.00			ND		No
	90399	7/13/00	GW07078RG	METHYLENE CHLORIDE	REAL	TR1	15	UG/L	5	JB	JB1	20	20	3.00			ND		No
	90399	2/14/00	GW06772TE	TETRACHLOROETHENE	REAL	TR1	13	UG/L	5	J	V1	50	50	2.60			ND		No
	90399	6/19/00	GW06945RG	TETRACHLOROETHENE	REAL	TR1	10	UG/L	5	J	J	20	20	2.00			ND		No
	90399	7/13/00	GW07078RG	TETRACHLOROETHENE	REAL	TR1	12	UG/L	5	J	J1	20	20	2.40			ND		No
	90399	10/25/00	GW07297RG	TETRACHLOROETHENE	REAL	TR1	7.3	UG/L	5		V1	0.5	1	1.46			ND		No
	90399	2/14/00	GW06772TE	TRICHLOROETHENE	REAL	TR1	380	UG/L	5		V1	50	50	76.00			ND		No
	90399	6/19/00	GW06945RG	TRICHLOROETHENE	REAL	TR1	280	UG/L	5		V	20	20	56.00			ND		No
	90399	7/13/00	GW07078RG	TRICHLOROETHENE	REAL	TR1	330	UG/L	5		V1	20	20	66.00			ND		No
	90399	10/25/00	GW07297RG	TRICHLOROETHENE	REAL	TR2	179	UG/L	5	D	1	5	10	35.80			ND		No
Plume Extent	04091	5/4/00	GW06828RG	URANIUM-233/234	REAL	TR1	1.62	PCI/L	1.06		V1	0.08		1.53	60.70	0.03			No
	04091	11/30/00	GW07231RG	URANIUM-233/234	REAL	TR1	2.2	PCI/L	1.06		V1	0.094		2.08	60.70	0.04			No
	04091	5/4/00	GW06828RG	URANIUM-238	REAL	TR1	1.30	PCI/L	0.77		V1	0.07		1.69	41.80	0.03			No
	04091	11/30/00	GW07231RG	URANIUM-238	REAL	TR1	0.95	PCI/L	0.768		V1	0.021		1.24	41.80	0.02			No
	04591	3/6/00	GW06674TE	URANIUM-233/234	REAL	TR1	2.07526	PCI/L	1.06		V	0.16251		1.96	60.70	0.03			No
	04591	8/2/00	GW07013RG	URANIUM-233/234	REAL	TR1	2.6	PCI/L	1.06		V1	0.317		2.45	60.70	0.04			No
	04591	3/6/00	GW06674TE	URANIUM-238	REAL	TR1	0.968629	PCI/L	0.768	J	V	0.16251		1.26	41.80	0.02			No
	04591	8/2/00	GW07013RG	URANIUM-238	REAL	TR1	1.44	PCI/L	0.768		V1	0.158		1.88	41.80	0.03			No
	04991	11/30/00	GW07232RG	THALLIUM	REAL	TR1	4.03	UG/L	2		UJ1	3.26	1	2.02	4.90	0.82	ID		No
	04991	6/20/00	GW06829RG	URANIUM-233/234	REAL	TR1	5.06	PCI/L	1.06		V	0.19		4.77	60.70	0.08			No
	04991	11/30/00	GW07232RG	URANIUM-233/234	REAL	TR1	6.1	PCI/L	1.06		V1	0.093		5.75	60.70	0.10			No
	04991	6/20/00	GW06829RG	URANIUM-238	REAL	TR1	2.34	PCI/L	0.77		V	0.14		3.05	41.80	0.06			No
	04991	11/30/00	GW07232RG	URANIUM-238	REAL	TR1	2.5	PCI/L	0.768		V1	0.081		3.26	41.80	0.06			No
	05091	1/28/00	GW06676TE	URANIUM-233/234	REAL	TR1	4.04353	PCI/L	1.06		V1	0.226107		3.81	60.70	0.07			No
	05091	7/20/00	GW07016RG	URANIUM-233/234	REAL	TR1	4.27	PCI/L	1.06		V1	0.136		4.03	60.70	0.07			No
	05091	1/28/00	GW06676TE	URANIUM-238	REAL	TR1	2.11391	PCI/L	0.768		V1	0.226107		2.75	41.80	0.05			No
	05091	7/20/00	GW07016RG	URANIUM-238	REAL	TR1	2.21	PCI/L	0.768		V1	0.076		2.88	41.80	0.05			No
	06091	4/18/00	GW06830RG	CARBON TETRACHLORIDE	REAL	TR1	9	UG/L	5		V	1	1	1.80			4.44	2.03	Yes
	06091	11/2/00	GW07233RG	CARBON TETRACHLORIDE	REAL	TR1	7.5	UG/L	5		V1	0.5	1	1.50			4.44	1.69	Yes
	06091	11/2/00	GW07233RG	CHROMIUM	REAL	TR1	125	UG/L	100		V	0.697	1	1.25	12.44	10.05	7.40	16.89	Yes
	06091	4/18/00	GW06830RG	NITRATE/NITRITE	REAL	TR1	11	MG/L	10		V1	0.05	10	1.10	4.66	2.36	8.63	1.27	Yes
	06091	4/18/00	GW06830RG	URANIUM-233/234	REAL	TR1	3.39	PCI/L	1.06		V1	0.23		3.20	60.70	0.06			No
	06091	11/2/00	GW07233RG	URANIUM-233/234	REAL	TR1	3.3	PCI/L	1.06		V1	0.019		3.11	60.70	0.05			No
	06091	4/18/00	GW06830RG	URANIUM-238	REAL	TR1	1.82	PCI/L	0.77		V1	0.26		2.37	41.80	0.04			No
	06091	11/2/00	GW07233RG	URANIUM-238	REAL	TR1	1.7	PCI/L	0.768		V1	0.052		2.21	41.80	0.04			No
	10194	1/31/00	GW06691TE	URANIUM-233/234	REAL	TR1	2.02271	PCI/L	1.06		V1	0.288225		1.91	60.70	0.03			No
	10194	7/24/00	GW07029RG	URANIUM-233/234	REAL	TR1	1.99	PCI/L	1.06		V1	0.121		1.88	60.70	0.03			No
	10194	1/31/00	GW06691TE	URANIUM-238	REAL	TR1	0.880485	PCI/L	0.768	J	V1	0.245356		1.15	41.80	0.02			No
	10194	7/24/00	GW07029RG	URANIUM-238	REAL	TR1	1.16	PCI/L	0.768		V1	0.12		1.51	41.80	0.03			No
	10994	8/14/00	GW07034RG	NITRATE/NITRITE	REAL	TR1	15	MG/L	10		V	0.05	10	1.50	4.66	3.22	ID		Yes

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

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Table 2-3, 2000 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

Plume Extent

Well Class	Loc	Sample Date	Sample #	Analyte	QC Type	Res Type	Res	Unit	Tier II	Lab Qual	Val	Det Limit	Dil	Tier II Ratio	Back M23D	Back Ratio	Hist M23D	Hist Rat	Rep Result?
	10994	1/24/00	GW06698TE	SELENIUM	REAL	TR1	351	UG/L	50		V1	1.1	1	7.02	43.72	8.03	1097.22	0.32	Yes
	10994	8/14/00	GW07034RG	SELENIUM	REAL	TR1	542	UG/L	50		V1	1.1	1	10.84	43.72	12.40	1097.22	0.49	Yes
	10994	1/24/00	GW06698TE	URANIUM-233/234	REAL	TR1	8.80629	PCI/L	1.06		V1	0.216307		8.31	60.70	0.15			No
	10994	8/14/00	GW07034RG	URANIUM-233/234	REAL	TR1	7.28	PCI/L	1.06		V1	0.183		6.87	60.70	0.12			No
	10994	1/24/00	GW06698TE	URANIUM-238	REAL	TR1	6.45266	PCI/L	0.768		V1	0.216307		8.40	41.80	0.15			No
	10994	8/14/00	GW07034RG	URANIUM-238	REAL	TR1	5.79	PCI/L	0.768		V1	0.2		7.54	41.80	0.14			No
	1386	5/4/00	GW06939RG	NICKEL	REAL	TR1	433	UG/L	140		V	0.35		3.09	21.37	20.26	308.75	1.40	Yes
	1386	9/11/00	GW07110RG	NICKEL	REAL	TR1	698	UG/L	140	E	J1	1.29	1	4.99	21.37	32.66	308.75	2.26	Yes
	1386	10/26/00	GW07279RG	NICKEL	REAL	TR1	778	UG/L	140		V1	1.03	1	5.56	21.37	36.41	308.75	2.52	Yes
	1386	10/26/00	GW07279RG	THALLIUM	REAL	TR1	5.02	UG/L	2		UJ1	3.26	1	2.51	4.90	1.02	1.84	2.73	Yes
	1386	5/4/00	GW06939RG	URANIUM-233/234	REAL	TR1	8.30	PCI/L	1.06		V1	0.08		7.83	60.70	0.14			No
	1386	10/26/00	GW07279RG	URANIUM-233/234	REAL	TR1	8.7	PCI/L	1.06		V1	0.075		8.21	60.70	0.14			No
	1386	5/4/00	GW06939RG	URANIUM-238	REAL	TR1	6.65	PCI/L	0.77		V1	0.06		8.66	41.80	0.16			No
	1386	10/26/00	GW07279RG	URANIUM-238	REAL	TR1	7.3	PCI/L	0.768		V1	0.065		9.51	41.80	0.17			No
	1786	5/4/00	GW06940RG	NITRATE/NITRITE	REAL	TR1	560	MG/L	10		V	0.05	500	56.00	4.66	120.17	689.31	0.81	Yes
	1786	11/8/00	GW07280RG	NITRATE/NITRITE	REAL	TR1	630	MG/L	10		V1	0.05	500	63.00	4.66	135.19	689.31	0.91	Yes
	1786	5/4/00	GW06940RG	SELENIUM	REAL	TR1	534	UG/L	50		V	1.1		10.68	43.72	12.21	248.70	2.15	Yes
	1786	6/16/00	GW07005RG	SELENIUM	REAL	TR1	540	UG/L	50		V1	1.1	1	10.80	43.72	12.35	248.70	2.17	Yes
	1786	7/18/00	GW07107RG	SELENIUM	REAL	TR1	537	UG/L	50		V1	1.1	1	10.74	43.72	12.28	248.70	2.16	Yes
	1786	11/8/00	GW07280RG	SELENIUM	REAL	TR3	540	UG/L	50		V1	2.37	1	10.80	43.72	12.35	248.70	2.17	Yes
	1786	11/8/00	GW07280RG	THALLIUM	REAL	TR1	14.1	UG/L	2		UJ1	3.26	1	7.05	4.90	2.88	5.48	2.57	Yes
	1786	5/4/00	GW06940RG	URANIUM-233/234	REAL	TR1	41.70	PCI/L	1.06		V1	0.13		39.34	60.70	0.69			No
	1786	11/8/00	GW07280RG	URANIUM-233/234	REAL	TR1	36	PCI/L	1.06		V1	0.018		33.96	60.70	0.59			No
	1786	5/4/00	GW06940RG	URANIUM-235	REAL	TR1	1.56	PCI/L	1.01		V1	0.08		1.54	1.79	0.87			No
	1786	11/8/00	GW07280RG	URANIUM-235	REAL	TR1	1.1	PCI/L	1.01		V1	0.018		1.09	1.79	0.61			No
	1786	5/4/00	GW06940RG	URANIUM-238	REAL	TR1	29.00	PCI/L	0.77		V1	0.10		37.76	41.80	0.69			No
	1786	11/8/00	GW07280RG	URANIUM-238	REAL	TR1	26	PCI/L	0.768		V1	0.018		33.85	41.80	0.62			No
	1986	5/8/00	GW06832RG	MANGANESE	REAL	TR1	4030	UG/L	1720		V1	0.05	1	2.34	162.33	24.83	3316.10	1.22	Yes
	1986	12/7/00	GW07235RG	MANGANESE	REAL	TR1	3680	UG/L	1720		V1	0.477	1	2.14	162.33	22.67	3316.10	1.11	Yes
	1986	12/7/00	GW07235RG	THALLIUM	REAL	TR1	4.42	UG/L	2		V1	3.26	1	2.21	4.90	0.90	4.21	1.05	Yes
	1986	5/8/00	GW06832RG	URANIUM-233/234	REAL	TR1	4.28	PCI/L	1.06		V1	0.07		4.04	60.70	0.07			No
	1986	12/7/00	GW07235RG	URANIUM-233/234	REAL	TR1	3.3	PCI/L	1.06		V1	0.11		3.11	60.70	0.05			No
	1986	5/8/00	GW06832RG	URANIUM-238	REAL	TR1	2.84	PCI/L	0.77		V1	0.06		3.70	41.80	0.07			No
	1986	12/7/00	GW07235RG	URANIUM-238	REAL	TR1	2.1	PCI/L	0.768		V1	0.11		2.73	41.80	0.05			No
	2186	12/5/00	GW07236RG	CHROMIUM	REAL	TR1	156	UG/L	100		V1	0.697	1	1.56	12.44	12.54	8.90	17.53	Yes
	2186	5/9/00	GW06833RG	URANIUM-233/234	REAL	TR1	1.99	PCI/L	1.06	B	V1	0.1		1.88	60.70	0.03			No
	2186	12/5/00	GW07236RG	URANIUM-233/234	REAL	TR1	2.8	PCI/L	1.06		V1	0.19		2.64	60.70	0.05			No
	22696	8/1/00	GW07037RG	URANIUM-233/234	REAL	TR1	12.8	PCI/L	1.06		V1	0.185		12.08	60.70	0.21			No
	22696	8/1/00	GW07037RG	URANIUM-238	REAL	TR1	9.19	PCI/L	0.768		V1	0.218		11.97	41.80	0.22			No
	22796	5/9/00	GW06847RG	CHROMIUM	REAL	TR1	127	UG/L	100		V1	0.15	1	1.27	12.44	10.21	ND		Yes
	22796	12/6/00	GW07249RG	THALLIUM	REAL	TR1	7.37	UG/L	2		V1	3.26	1	3.69	4.90	1.50	ND		Yes
	22796	5/9/00	GW06847RG	TRICHLOROETHENE	REAL	TR1	18	UG/L	5		V1	1	1	3.60			ND		Yes
	22796	12/6/00	GW07249RG	TRICHLOROETHENE	REAL	TR1	16.9	UG/L	5		V1	1	2	3.38			ND		Yes
	22796	5/9/00	GW06847RG	URANIUM-233/234	REAL	TR1	2.34	PCI/L	1.06		V1	0.07		2.21	60.70	0.04			No
	22796	12/6/00	GW07249RG	URANIUM-233/234	REAL	TR1	1.8	PCI/L	1.06		V1	0.25		1.70	60.70	0.03			No
	22796	5/9/00	GW06847RG	URANIUM-238	REAL	TR1	1.71	PCI/L	0.77		V1	0.06		2.23	41.80	0.04			No
	22796	12/6/00	GW07249RG	URANIUM-238	REAL	TR1	1.1	PCI/L	0.768		V1	0.13		1.43	41.80	0.03			No
	23096	1/10/00	GW06704TE	URANIUM-233/234	REAL	TR1	2.49376	PCI/L	1.06		V1	0.580822		2.35	60.70	0.04			No
	23096	7/27/00	GW07039RG	URANIUM-233/234	REAL	TR1	1.91	PCI/L	1.06		V	0.428		1.80	60.70	0.03			No
	23096	1/10/00	GW06704TE	URANIUM-238	REAL	TR1	1.22789	PCI/L	0.768		V1	0.580822		1.60	41.80	0.03			No
	23096	7/27/00	GW07039RG	URANIUM-238	REAL	TR1	2.22	PCI/L	0.768		V	0.36		2.89	41.80	0.05			No
	23196	4/19/00	GW06848RG	NITRATE/NITRITE	REAL	TR1	10	MG/L	10		V1	0.05	10	1.00	4.66	2.15	ND		Yes
	23196	11/30/00	GW07250RG	SELENIUM	REAL	TR1	106	UG/L	50		V1	2.37	1	2.12	43.72	2.42	ND		Yes
	23296	2/15/00	GW6705TE	CARBON TETRACHLORIDE	REAL	TR1	37	UG/L	5	J	V1	100	100	7.40			ND		Yes
	23296	3/10/00	GW06813TE	CARBON TETRACHLORIDE	REAL	TR1	40	UG/L	5	J	V1	50	50	8.00			ND		Yes
	23296	4/17/00	GW06941RG	CARBON TETRACHLORIDE	REAL	TR1	14	UG/L	5	J	V	25	25	2.80			ND		Yes
	23296	10/30/00	GW07275RG	CARBON TETRACHLORIDE	REAL	TR1	5.7	UG/L	5		V1	0.5	1	1.14			ND		Yes
	23296	10/30/00	GW07276RG	CHROMIUM	DUP	TR1	265	UG/L	100		V1	0.697	1	2.65	12.44	21.30	ND		Yes
	23296	2/15/00	GW06705TE	cis-1,2-DICHLOROETHENE	REAL	TR1	71	UG/L	70	J	V1	100	100	1.01			ND		Yes
	23296	7/18/00	GW07040RG	cis-1,2-DICHLOROETHENE	REAL	TR1	120	UG/L	70		V1	20	20	1.71			ND		Yes
	23296	10/30/00	GW07276RG	cis-1,2-DICHLOROETHENE	DUP	TR2	82	UG/L	70	D	1	2.5	5	1.17			ND		Yes
	23296	2/15/00	GW06705TE	METHYLENE CHLORIDE	REAL	TR1	30	UG/L	5	JB	JB1	100	100	6.00			ND		Yes
	23296	3/10/00	GW06813TE	METHYLENE CHLORIDE	REAL	TR1	120	UG/L	5	B	UJ1	50	50	24.00			ND		Yes
	23296	4/17/00	GW06941RG	METHYLENE CHLORIDE	REAL	TR1	48	UG/L	5	B	U	25	25	9.60			ND		Yes
	23296	7/18/00	GW07040RG	METHYLENE CHLORIDE	REAL	TR1	14	UG/L	5	JB	JB1	20	20	2.80			ND		Yes
	23296	2/15/00	GW06705TE	TETRACHLOROETHENE	REAL	TR1	36	UG/L	5	J	V1	100	100	7.20			ND		Yes
	23296	3/10/00	GW06813TE	TETRACHLOROETHENE	REAL	TR1	28	UG/L	5	J	V1	50	50	5.60			ND		Yes
	23296	4/17/00	GW06941RG	TETRACHLOROETHENE	REAL	TR1	19	UG/L	5	J	V	25	25	3.80			ND		Yes
	23296	7/18/00	GW07040RG	TETRACHLOROETHENE	REAL	TR1	15	UG/L	5	J	J1	20	20	3.00			ND		Yes
	23296	10/30/00	GW07275RG	TETRACHLOROETHENE	REAL	TR1	9	UG/L	5		V1	0.5	1	1.80			ND		Yes
	23296	2/15/00	GW06705TE	TRICHLOROETHENE	REAL	TR1	960	UG/L	5		V1	100	100	192.00			ND		Yes
	23296	3/10/00	GW06813TE	TRICHLOROETHENE	REAL	TR1	780	UG/L	5		V1	50	50	156.00			ND		Yes
	23296	4/17/00	GW06941RG	TRICHLOROETHENE	REAL	TR1	450	UG/L	5		V	25	25	90.00			ND		Yes
	23296	7/18/00	GW07040RG	TRICHLOROETHENE	REAL	TR1	390	UG/L	5		V1	20	20	78.00			ND		Yes
	23296	10/30/00	GW07275RG	TRICHLOROETHENE	REAL	TR2	288	UG/L	5	D	UJ1	2.5	5	57.60			ND		Yes
	23296	2/15/00	GW06705TE	URANIUM-233/234	REAL	TR1	12.1465	PCI/L	1.06		V1	0.036882		11.46	60.70	0.20			No
	23296	7/18/00	GW07040RG	URANIUM-233/234	REAL	TR1	16.9	PCI/L	1.06		V1	0.101		15.94	60.70	0.28			No
	23296	10/30/00	GW07275RG	URANIUM-233/234	REAL	TR1	15	PCI/L	1.06		V	0.02		14.15	60.70	0.25			No

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

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Table 2-3, 2000 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/7/01

Well Class	Loc	Sample Date	Sample #	Analyte	QC Type	Res Type	Res	Unit	Tier II	Lab Qual	Val	Det Limit	Dil	Tier II Ratio	Back M2SD	Back Ratio	Hist M2SD	Hist Rat	Rep Result?
Plume Extent	23296	2/15/00	GW06705TE	URANIUM-238	REAL	TR1	9.35772	PCI/L	0.768		V1	0.007096		12.18	41.80	0.22			No
	23296	7/18/00	GW07040RG	URANIUM-238	REAL	TR1	13.4	PCI/L	0.768		V1	0.101		17.45	41.80	0.32			No
	23296	10/30/00	GW07275RG	URANIUM-238	REAL	TR1	12	PCI/L	0.768		V	0.02		15.63	41.80	0.29			No
	3586	1/31/00	GW06744TE	MANGANESE	REAL	TR1	3850	UG/L	1720		V1	0.08	1	2.24	162.33	23.72	4358.00	0.88	Yes
	3586	5/18/00	GW06924RG	MANGANESE	REAL	TR1	4500	UG/L	1720		V	0.05	1	2.62	162.33	27.72	4358.00	1.03	Yes
	3586	7/27/00	GW07057RG	MANGANESE	REAL	TR1	4200	UG/L	1720		V	0.05	1	2.44	162.33	25.87	4358.00	0.96	Yes
	3586	10/25/00	GW07268RG	MANGANESE	DUP	TR1	4710	UG/L	1720		V	0.477	1	2.74	162.33	29.01	4358.00	1.08	Yes
	3586	10/25/00	GW07167RG	THALLIUM	REAL	TR1	4.6	UG/L	2		V	3.26	1	2.30	4.90	0.94	3.49	1.32	No
	3586	1/31/00	GW06744TE	URANIUM-233/234	REAL	TR1	2.63339	PCI/L	1.06		V1	0.085325		2.48	60.70	0.04			No
	3586	5/18/00	GW06924RG	URANIUM-233/234	REAL	TR1	2.60	PCI/L	1.06		V	0.25		2.45	60.70	0.04			No
	3586	7/27/00	GW07057RG	URANIUM-233/234	REAL	TR1	2.53	PCI/L	1.06		V	0.512		2.39	60.70	0.04			No
	3586	10/25/00	GW07268RG	URANIUM-233/234	DUP	TR1	2.3	PCI/L	1.06		V	0.051		2.17	60.70	0.04			No
	3586	1/31/00	GW06744TE	URANIUM-238	REAL	TR1	1.97969	PCI/L	0.768		V1	0.055703		2.58	41.80	0.05			No
	3586	5/18/00	GW06925RG	URANIUM-238	DUP	TR1	1.78	PCI/L	0.77		V	0.42		2.32	41.80	0.04			No
	3586	7/27/00	GW07057RG	URANIUM-238	REAL	TR1	1.74	PCI/L	0.768		V	0.351		2.27	41.80	0.04			No
	3586	10/25/00	GW07268RG	URANIUM-238	DUP	TR1	1.6	PCI/L	0.768		V	0.019		2.08	41.80	0.04			No
	3586	1/31/00	GW06744TE	VINYL CHLORIDE	REAL	TR1	22	UG/L	2		V1	1		11.00			776.32	0.03	Yes
	3586	5/18/00	GW06925RG	VINYL CHLORIDE	DUP	DL1	18	UG/L	2	D	1	2	2	9.00			776.32	0.02	Yes
	3586	7/27/00	GW07057RG	VINYL CHLORIDE	REAL	DL1	17	UG/L	2	D	1	2	2	8.50			776.32	0.02	Yes
	3586	10/25/00	GW07167RG	VINYL CHLORIDE	REAL	TR1	19.2	UG/L	2		V1	0.5	1	9.60			776.32	0.02	Yes
	43392	9/7/00	GW07044RG	THALLIUM	REAL	TR1	2.19	UG/L	2	B	J1	2.11	1	1.10	4.90	0.45	2.02	1.08	No
	5387	6/19/00	GW06838RG	URANIUM-233/234	REAL	TR1	5.94	PCI/L	1.06	B	V	0.34		5.60	60.70	0.10			No
	5387	10/26/00	GW07240RG	URANIUM-233/234	REAL	TR1	11	PCI/L	1.06		J	0.29		10.38	60.70	0.18			No
	5387	6/19/00	GW06838RG	URANIUM-238	REAL	TR1	4.14	PCI/L	0.77		V	0.13		5.39	41.80	0.10			No
	5387	10/26/00	GW07240RG	URANIUM-238	REAL	TR1	7.3	PCI/L	0.768		J	0.23		9.51	41.80	0.17			No
	6186	1/31/00	GW06685TE	URANIUM-233/234	REAL	TR1	2.58335	PCI/L	1.06		V1	0.220874		2.44	60.70	0.04			No
	6186	7/24/00	GW07032RG	URANIUM-233/234	REAL	TR1	2.75	PCI/L	1.06		V1	0.083		2.59	60.70	0.05			No
	6186	1/31/00	GW06685TE	URANIUM-238	REAL	TR1	2.15075	PCI/L	0.768		V1	0.259466		2.80	41.80	0.05			No
	6186	7/24/00	GW07032RG	URANIUM-238	REAL	TR1	1.61	PCI/L	0.768		V1	0.082		2.10	41.80	0.04			No
	7086	2/7/00	GW06690TE	URANIUM-233/234	REAL	TR1	4.46084	PCI/L	1.06		V1	0.303385		4.21	60.70	0.07			No
	7086	7/31/00	GW07028RG	URANIUM-233/234	REAL	TR1	1.19	PCI/L	1.06		V1	0.156		1.12	60.70	0.02			No
	7086	2/7/00	GW06690TE	URANIUM-238	REAL	TR1	3.32481	PCI/L	0.768		V1	0.144534		4.33	41.80	0.08			No
	75992	1/24/00	GW06712TE	URANIUM-233/234	REAL	TR1	6.32537	PCI/L	1.06		V1	0.057309		5.97	60.70	0.10			No
	75992	7/28/00	GW07045RG	URANIUM-233/234	REAL	TR1	7.15	PCI/L	1.06		V1	0.28		6.75	60.70	0.12			No
	75992	1/24/00	GW06712TE	URANIUM-238	REAL	TR1	5.44746	PCI/L	0.768		V1	0.025711		7.09	41.80	0.13			No
	75992	7/28/00	GW07045RG	URANIUM-238	REAL	TR1	5.61	PCI/L	0.768		V1	0.174		7.30	41.80	0.13			No
	B208289	5/2/00	GW06850RG	NITRATE/NITRITE	REAL	TR1	45	MG/L	10		V	0.05	100	4.50	4.66	9.66	60.44	0.74	Yes
	B208789	12/13/00	GW07253RG	THALLIUM	REAL	TR1	5.91	UG/L	2		V1	3.26	1	2.96	4.90	1.21	ID		Yes
	B208789	6/19/00	GW06851RG	URANIUM-233/234	REAL	TR1	11.50	PCI/L	1.06		V	0.18		10.85	60.70	0.19			No
	B208789	12/13/00	GW07253RG	URANIUM-233/234	REAL	TR1	9.1	PCI/L	1.06		V1	0.025		8.58	60.70	0.15			No
	B208789	6/19/00	GW06851RG	URANIUM-238	REAL	TR1	8.97	PCI/L	0.77		V	0.16		11.68	41.80	0.21			No
	B208789	12/13/00	GW07253RG	URANIUM-238	REAL	TR1	6.4	PCI/L	0.768		V1	0.025		8.33	41.80	0.15			No
	P114389	1/25/00	GW06714TE	URANIUM-233/234	REAL	TR1	2.35673	PCI/L	1.06		V1	0.063356		2.22	60.70	0.04			No
	P114389	7/26/00	GW07047RG	URANIUM-233/234	REAL	TR1	3.33	PCI/L	1.06		V	0.738		3.14	60.70	0.05			No
	P114389	1/25/00	GW06714TE	URANIUM-238	REAL	TR1	1.54729	PCI/L	0.768		V1	0.03507		2.01	41.80	0.04			No
	P114389	7/26/00	GW07047RG	URANIUM-238	REAL	TR1	1.99	PCI/L	0.768		V	0.358		2.59	41.80	0.05			No
	P219489	5/3/00	GW06856RG	NITRATE/NITRITE	REAL	TR1	39	MG/L	10		V	0.05	100	3.90	4.66	8.37	ID		Yes
	P219489	12/5/00	GW07258RG	NITRATE/NITRITE	REAL	TR1	57	MG/L	10		V1	0.05	50	5.70	4.66	12.23	ID		Yes
	P313589	1/11/00	GW06716TE	URANIUM-233/234	REAL	TR1	1.99467	PCI/L	1.06		V1	0.471704		1.88	60.70	0.03			No
	P313589	8/14/00	GW07049RG	URANIUM-233/234	REAL	TR1	1.74	PCI/L	1.06		V1	0.16		1.64	60.70	0.03			No
	P313589	1/11/00	GW06716TE	URANIUM-238	REAL	TR1	1.0708	PCI/L	0.768		V1	0.554121		1.39	41.80	0.03			No
	P313589	8/14/00	GW07049RG	URANIUM-238	REAL	TR1	1.02	PCI/L	0.768		V1	0.073		1.33	41.80	0.02			No
	P314289	8/21/00	GW07062RG	NICKEL	REAL	TR1	209	UG/L	140		V	0.3	1	1.49	21.37	9.78	ID		Yes
	P314289	9/18/00	GW07050RG	URANIUM-233/234	REAL	TR1	1.8	PCI/L	1.06		V1	0.196		1.70	60.70	0.03			No
	P314289	9/18/00	GW07050RG	URANIUM-238	REAL	TR1	1.2	PCI/L	0.768		V1	0.0581		1.56	41.80	0.03			No
	P416689	12/6/00	GW07259RG	THALLIUM	REAL	TR1	3.85	UG/L	2	B	UJ	3.26	1	1.93	4.90	0.79	ID		No
	P416689	5/8/00	GW06857RG	URANIUM-233/234	REAL	TR1	2.59	PCI/L	1.06		V1	0.07		2.44	60.70	0.04			No
	P416689	12/6/00	GW07259RG	URANIUM-233/234	REAL	TR1	2.3	PCI/L	1.06		V1	0.057		2.17	60.70	0.04			No
	P416689	5/8/00	GW06857RG	URANIUM-238	REAL	TR1	0.94	PCI/L	0.77	J	V1	0.05		1.23	41.80	0.02			No
	P416689	12/6/00	GW07259RG	URANIUM-238	REAL	TR1	0.96	PCI/L	0.768		V1	0.057		1.25	41.80	0.02			No
RCRA	4087	7/27/00	GW07058RG	SULFATE	REAL	TR1	930	MG/L	500		V	1		1.86	435.60	2.13	940.32	0.99	Yes
	4087	1/12/00	GW06747TE	URANIUM-233/234	REAL	TR1	21.6081	PCI/L	1.06		V1	0.049487		20.39	60.70	0.36			No
	4087	4/20/00	GW06881RG	URANIUM-233/234	REAL	TR1	14.85	PCI/L	1.06		V1	0.29		14.01	60.70	0.24			No
	4087	1/12/00	GW06747TE	URANIUM-238	REAL	TR1	15.4929	PCI/L	0.768		V1	0.041893		20.17	41.80	0.37			No
	4087	4/20/00	GW06881RG	URANIUM-238	REAL	TR1	10.92	PCI/L	0.77		V1	0.20		14.21	41.80	0.26			No
	52894	5/10/00	GW06885RG	URANIUM-233/234	REAL	TR1	27.60	PCI/L	1.06		V1	0.09		26.04	60.70	0.45			No
	52894	9/25/00	GW07063RG	URANIUM-233/234	REAL	TR1	11.9	PCI/L	1.06		V1	0.255		11.23	60.70	0.20			No
	52894	5/10/00	GW06885RG	URANIUM-238	REAL	TR1	19.80	PCI/L	0.77		V1	0.07		25.78	41.80	0.47			No
	52894	9/25/00	GW07063RG	URANIUM-238	REAL	TR1	8.43	PCI/L	0.768		V1	0.145		10.98	41.80	0.20			No
	70193	1/11/00	GW06749TE	NITRATE/NITRITE	DUP	TR1	34	MG/L	10		V1	0.05	25	3.40	4.66	7.29			No
	70393	1/17/00	GW06759TE	1,1-DICHLOROETHENE	REAL	TR1	11	UG/L	7		V	1	1	1.57			21.16	0.52	No
	70393	6/1/00	GW06891RG	1,1-DICHLOROETHENE	DUP	TR1	15	UG/L	7		J	1	1	2.14			21.16	0.71	No
	70393	9/22/00	GW07066RG	1,1-DICHLOROETHENE	REAL	TR1	12.2	UG/L	7		V	0.5	1	1.74			21.16	0.58	No
	70393	11/1/00	GW07289RG	1,1-DICHLOROETHENE	REAL	TR1	8.5	UG/L	7		V	0.5	1	1.21			21.16	0.40	No
	70393	1/17/00	GW06759TE	TETRACHLOROETHENE	REAL	TR1	6	UG/L	5		V	1	1	1.20			9.06	0.66	No
	70393	6/1/00	GW06890RG	TETRACHLOROETHENE	REAL	TR1	8	UG/L	5		V	1	1	1.60			9.06	0.88	No
	70393	9/22/00	GW07066RG	TETRACHLOROETHENE	REAL	TR1	5.7	UG/L	5		V	0.5	1	1.14			9.06	0.63	No
	70393	1/17/00	GW06759TE	TRICHLOROETHENE	REAL	TR1	18	UG/L	5		V	1	1	3.60			36.33	0.50	No

ID = Insufficient Data to calculate Historic Mean + 2 Std. Deviations for 1991-1995

ND = Location has no Historic Data prior to 1995

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Table 2-3, 2000 RFCA Groundwater Sample Comparisons With Tier II Action Levels and IMP Reporting Criteria

11/7/01

Well Class	Loc	Sample Date	Sample #	Analyte	QC Type	Res Type	Res	Unit	Tier II	Lab Qual.	Val	Det Limit	Dil	Tier II Ratio	Back M2SD	Back Ratio	Hist M2SD	Hist Rat	Rep Result?
RCRA	70393	6/1/00	GW06890RG	TRICHLOROETHENE	REAL	TR1	22	UG/L	5		V	1	1	4.40			36.33	0.61	No
	70393	9/22/00	GW07068RG	TRICHLOROETHENE	REAL	TR1	18.7	UG/L	5		V	0.5	1	3.74			36.33	0.51	No
	70393	11/1/00	GW07289RG	TRICHLOROETHENE	REAL	TR1	13.1	UG/L	5		V	0.5	1	2.62			36.33	0.36	No
	70493	1/12/00	GW06762TE	URANIUM-233/234	REAL	TR1	2.47222	PCI/L	1.06		V	1.10356		2.33	60.70	0.04			No
	70493	5/8/00	GW06893RG	URANIUM-233/234	REAL	TR1	1.91	PCI/L	1.06		V1	0.07		1.80	60.70	0.03			No
	70493	7/27/00	GW07067RG	URANIUM-233/234	REAL	TR1	1.15	PCI/L	1.06		V	0.723		1.08	60.70	0.02			No
	70493	1/12/00	GW06762TE	URANIUM-238	REAL	TR1	1.1689	PCI/L	0.768		V	0.395965		1.52	41.80	0.03			No
	70493	5/8/00	GW06893RG	URANIUM-238	REAL	TR1	0.90	PCI/L	0.77	J	V1	0.06		1.17	41.80	0.02			No
	B206989	1/12/00	GW06763TE	LITHIUM	REAL	TR1	1750	UG/L	730		J	0.02	1	2.40	142.55	12.28	ID		Yes
	B206989	5/31/00	GW06894RG	LITHIUM	REAL	TR1	1230	UG/L	730		J1	0.05	1	1.68	142.55	8.63	ID		Yes
	B206989	6/27/00	GW07007RG	LITHIUM	REAL	TR1	1490	UG/L	730		J1	0.05	1	2.04	142.55	10.45	ID		Yes
	B206989	11/27/00	GW07258RG	LITHIUM	REAL	TR1	1150	UG/L	730	BEN	J1	1.14	15	1.58	142.55	8.07	ID		Yes
	B206989	1/12/00	GW06763TE	NITRATE/NITRITE	REAL	TR1	40	MG/L	10		V1	0.05	50	4.00	4.66	8.58	75.35	0.53	Yes
	B206989	6/15/00	GW06894RG	NITRATE/NITRITE	REAL	TR1	39	MG/L	10		V1	0.05	25	3.90	4.66	8.37	75.35	0.52	Yes
	B206989	11/27/00	GW07291RG	NITRATE/NITRITE	REAL	TR1	44	MG/L	10		V	0.05	25	4.40	4.66	9.44	75.35	0.58	Yes
	B206989	1/12/00	GW06763TE	SELENIUM	REAL	TR1	280	UG/L	50		V	1	1	5.60	43.72	6.40	ID		Yes
	B206989	5/31/00	GW06894RG	SELENIUM	REAL	TR1	285	UG/L	50		V1	1.1	1	5.70	43.72	6.52	ID		Yes
	B206989	6/27/00	GW07007RG	SELENIUM	REAL	TR1	223	UG/L	50		V1	1.1	1	4.46	43.72	5.10	ID		Yes
	B206989	11/27/00	GW07258RG	SELENIUM	REAL	TR1	220	UG/L	50		V1	2.37	1	4.40	43.72	5.03	ID		Yes
	B206989	5/31/00	GW06894RG	SULFATE	REAL	TR1	3100	MG/L	500		V1	1		6.20	435.60	7.12	ID		Yes
	B206989	11/27/00	GW07291RG	SULFATE	REAL	TR1	2750	MG/L	500		V1	125	500	5.50	435.60	6.31	ID		Yes
	B206989	12/14/00	GW07145RG	SULFATE	REAL	TR1	3400	MG/L	500		J1	1	50	6.80	435.60	7.81	ID		Yes
	B206989	11/27/00	GW07258RG	THALLIUM	REAL	TR1	14.8	UG/L	2		V1	3.26	1	7.40	4.90	3.02	ID		Yes
	B206989	1/12/00	GW06763TE	URANIUM-233/234	REAL	TR1	48.1692	PCI/L	1.06		V	0.27274		45.44	60.70	0.79			No
	B206989	1/12/00	GW06763TE	URANIUM-235	REAL	TR1	1.58715	PCI/L	1.01		V	0.16925		1.57	1.79	0.89			No
	B206989	1/12/00	GW06763TE	URANIUM-238	REAL	TR1	30.4416	PCI/L	0.768		V	0.097861		39.64	41.80	0.73			No

Abbreviations

MG/L = milligrams per liter

PCI/L = picocuries per liter

TR1 = First analytical run

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

TR3 = Third analytical run, etc.

UG/L = micrograms per liter

Lab Qualifiers (note analyte group)

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

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

B = activity in the method blank exceeded the minimal detectable activity (MDA) (radionuclides)

D = sample run at a dilution (organics)

E =analyte exceeds calibration range of instrument (organics, used only if no other acceptable result is available)

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*

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. (list in order from highest confidence to lowest)

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

ID = Insufficient Data to calculate Historic Mean + 2 Std. Deviations for 1991-1995

ND = Location has no Historic Data prior to 1995

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3.0 GROUNDWATER FLOW CONDITIONS DURING 2000

Groundwater level data collected throughout calendar year 2000 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 last year before 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 post-closure monitoring.

The data review included preparation of semiannual potentiometric surface maps, quarterly well pair linear flow velocity calculations, selected well hydrographs, and water level change maps. In addition, there is a discussion of the real time groundwater monitoring network, which includes 33 monitoring wells outfitted with downhole dataloggers that measure water levels simultaneously and several times each day in the wells.

Comparison of the 2000 data to previous potentiometric surface maps (from previous 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.

3.1 Potentiometric Surface Maps

Potentiometric surface maps of the Site (Plates 2 and 3) and of the Industrial Area (Plates 4 and 5) were constructed from water level data collected during the second and fourth quarters (April and October data, respectively) of 2000. The data utilized is 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 well pairs for velocity calculations and definition of plume extent and migration. For map construction, it was assumed that well construction details, borehole logs, and water level measurements were accurate. 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.

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, located in the West Spray Field, were not utilized for construction of potentiometric contours. Likewise, where well pairs show conflicting water level elevations, the well completion data was reviewed for the screened interval and depth to bedrock. The water level data most representative of the UHSU was selected for construction of potentiometric contours. Information on currently unsaturated alluvial areas and from previous UHSU potentiometric maps, particularly the 1993 maps (EG&G, 1994b), were used in the construction of the second and fourth quarter 2000 maps. Areas previously labeled as unsaturated were evaluated and reconfigured utilizing new monitoring well coverage (i.e., IA IM/IRA, D&D wells) and the current water level data. Information

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on seep areas was added to Plates 4 and 5 from the 1995 Hydrogeologic Characterization Report (EG&G, 1995b). The non-contoured areas on Plates 2 and 3 indicate areas where well coverage is insufficient or absent. Conceptual potentiometric contour refinements were made in areas with new well coverage such as the north IA and with respect to building foundation drain elevations.

The configuration of the Site potentiometric surfaces, depicted on a 20-foot contour interval, generally matches the configurations depicted in previous Annual Reports. The configuration of the IA potentiometric surfaces, depicted on a 5-foot contour interval beginning with the 1999 Annual Report, were prepared to facilitate more detailed groundwater evaluations with respect to increased well coverage and the effect of building foundation drains on the potentiometric surface. In the future, the effect of certain building foundation drains may still be observed after the completion of Decontamination and Decommissioning (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 been undergone D&D. This assumes that the below ground structures are left in place. In the case of a building where the foundation drain does not operate by gravity flow, but rather effluent is collected and pumped to a storage and/or treatment area, the water table should equilibrate to a relatively normal configuration after D&D activities cease and the active pumping systems are abandoned.

Plant operations appear to have impacted groundwater flow patterns in areas where potentiometric contours deviate from ground surface topographic and/or bedrock surface topographic configurations. A prominent and persistent eastward distention of the 5980 through 6040-foot contour lines in the IA deviates significantly from the pattern that might be expected. The presence of this broad, mound-like feature within an industrialized portion of the Site suggests that a greater amount of groundwater recharge may be occurring in this area compared to other areas at RFETS, situated to the north and south of the IA, which exhibit similar geologic conditions. Similar and slightly less prominent eastward distentions of the water table surface exist beneath and eastward of the Solar Ponds and the 904 Pad/903 Pad areas. These two areas would likely coalesce into one prominent continuing distention of the major one discussed above were it not for the effects of the low topographic elevation and foundation drains associated with Building 991.

The convergence and/or redirection 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. Compressed potentiometric contours on the maps, indicating a steeper hydraulic gradient in many of those areas, are associated with steep topography and/or building foundation drains. The most extensive area of non-topographically influenced steep hydraulic gradient exists in the western and north central PA. 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 areas depicted on the 2000 maps were generally more extensive, especially for the fourth quarter, than shown on the 1996 and 1999 maps. This condition probably reflects the effects of improved sitewide well coverage and the fact that annual precipitation at RFETS during 2000 was less than average. The fourth quarter potentiometric maps (Plates 3 and 5) indicate large unsaturated areas southeast and northeast of the IA.

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3.2 Average Linear Flow Velocities

Average linear groundwater flow velocities (seepage velocities) were calculated for 24 UHSU well pairs (where current data was available) located generally within and adjacent to the IA. Well pairs were selected based on flow directions derived from data depicted on the 1996 and 2000 potentiometric surface maps. 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

Values for hydraulic gradient were calculated from quarterly water level measurements made between well pairs located along a groundwater pathway. These well pairs were chosen on the basis of their perpendicular orientation to potentiometric contour lines. In some cases the data are not complete based on the fact that both wells constituting a pair are not necessarily visited for a water level measurement each quarter. Hydraulic conductivity values used for velocity calculations were derived from the geometric mean values reported for the Rocky Flats Alluvium, colluvium, and Arapahoe Formation sandstone (No. 1 Sand) 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 absence of measured values of n (effective porosity), a conservative value of 0.1 is assumed based on its predominant usage in previous velocity calculations performed at RFETS.

It should be noted that the hydraulic conductivity values used for the Site for the Qrf (Rocky Flats Alluvium) and the Qvf (Valley Fill Alluvium) 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 additional aquifer tests performed in 1995. These tests were performed only on the Qrf and Qvf; therefore, the geometric mean K values for the other water bearing formations listed in Table G-2 have not changed. The geometric mean hydraulic conductivity value for the Rocky Flats Alluvium has changed from 2.10E-04 cm/sec to 4.18E-04 cm/sec. The geometric mean hydraulic conductivity value for the Valley Fill Alluvium has changed from 2.54E-03 cm/sec to 9.197E-04 cm/sec. Only the change in the K value for the Rocky Flats Alluvium is pertinent to this discussion of linear flow velocities. Basically, the change in K for the Rocky Flats Alluvium, with all other parameters (i.e., hydraulic gradient, effective porosity) staying the same, amounts to doubling the velocity in cm/sec or ft/yr. With only 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

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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. Wells that are screened across different lithologies could also lead to contaminant migration rates that vary from the 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. Although actual linear flow velocities between any given well pair are not known with certainty, changes in relative flow velocities, combined with potentiometric mapping and hydrograph analysis, can provide some insight into plume dynamics and movement. Linear flow velocity calculations are sensitive only to the magnitude of the hydraulic gradient, because the assigned values of K and n are constant. Temporal analysis of relative linear flow velocities using 1996 as a baseline year is expected to compliment the other available assessment tools (potentiometric and water level change maps, hydrographs, plume extent maps, etc.) in monitoring contaminant plume migration toward surface water.

As shown in Table 3-1, the calculated 2000 groundwater flow velocities for all formations ranged from a minimum of 29.0 feet per year (ft/yr) between well pair P215789/P218089 (4th quarter), located in the IA, to a maximum of 454.0 ft/yr between well pair 3687/63395 (2nd quarter), located in the East Trenches area. The minimum value is associated with the Rocky Flats Alluvium. The maximum value is associated with the weathered (No. 1) sandstone of the Arapahoe Formation. The next highest value of 354.0 ft/yr, calculated for the 4th quarter of 2000 for well pair 07291/07391, is associated with the 903 Pad area and groundwater velocity within the Rocky Flats Alluvium.

Linear flow velocities for the Rocky Flats Alluvium ranged from 29.0 ft/yr to 354.0 ft/yr. The next highest velocity (at a different well pair) for groundwater moving through Qrf is 140.6 ft/yr. Linear flow velocities for the Quaternary colluvium (Qc) ranged from 51.6 ft/yr to 193.6 ft/yr. In general, flow velocity ranges for the Qrf (except for the 354.0 ft/yr) and the Qc are similar.

Data from 2000 used to calculate linear flow velocities are more comprehensive than for 1996. Water level data for many well pairs were reported for only one quarter in 1996. Table 3-1 below presents only the second and fourth quarter linear flow velocities because the data set for these quarters is more robust. As a result, 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 2000 data, the flow velocities generally are consistent between both quarters. Only four well pairs had flow velocities that varied between quarters by more than 10 ft/yr. In three of the four cases, the 4th quarter velocity was the higher of the two, and all three of these cases involved the Rocky Flats Alluvium. The fourth case, in which the 2nd quarter flow velocity was the higher, involved the Quaternary colluvium. This variation is a response to moderate changes in hydraulic gradient from quarter to quarter, and may be a result of the amount and distribution of precipitation with respect to time.

As stated in the 1999 Annual Report, well pair 3687/63395 is a replacement pair for well pair 3687/60295. Well 60295 was destroyed during construction of the East Trenches Groundwater Intercept System. Linear velocity

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values for well pairs 3687/60295 (historic) and 3687/63395 are exceptionally high because of the weathered sandstone (K = 7.88E-04 cm/sec) in the East Trenches area. Small changes in water levels between the well pairs combined with the hydraulic gradient, which is more a result of topography, result in the high velocity currently observed for the 2nd quarter, and for the high historical variations in velocities between quarters. Well pair 3687/60295 changed 47 ft/yr between the second and fourth quarters of 1998 and well pair 3687/63395 changed 41 ft/yr between the second and fourth quarters of 1999. Despite these seemingly large changes, they still represent less than a 10 percent change between quarters.

In general, velocities for the 24 well pairs vary by less than 10 percent when comparing a given well pair and quarter in 1996 versus 2000. The following exceptions occurred. For well pair P313489/6186 in the south central IA, the 2000 flow velocity for the 4th quarter is 24 percent lower than the 4th quarter 1996 velocity. For well pair 1987/3586 in the Mound Site area, the 2000 flow velocity for the 4th quarter is 19 percent lower than the 4th quarter 1996 velocity. This may be a result of the installation of the Mound Site Plume Treatment System. For well pair P218389/B208089, immediately northeast of the Solar Ponds area, the 2000 flow velocity for the 2nd quarter is 11 percent lower than the 1996 velocity data. It is interesting to note that the major changes in flow velocities when comparing 1996 and 2000 are in 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 are 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 Operable Unit mean K values that were used in the past.

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Table 3-1 Linear Flow Velocities

WELL PAIR	AREA	2000 QTR	WL Elevation well 1	WL Elevation well 2	Dh	dl	dh/dl (gradient)	K (cm/sec)	n_e	v (cm/sec)	v (ft/yr)
5387 / 00797	881 Hillside	2	5957.06	5919.72	37.34	209.9	0.1779	9.33E-05	0.1	1.66E-04	171.7
5387 / 00797	881 Hillside	4	5951.56	5918.32	33.24	209.9	0.1584	9.33E-05	0.1	1.48E-04	152.9
00191/13491	903 Pad	2	5952.52	5940.25	12.27	548.7	0.0224	4.18E-04	0.1	9.35E-05	96.7
00191/13491	903 Pad	4	5951.84	5939.92	11.92	548.7	0.0217	4.18E-04	0.1	9.08E-05	94.0
04591 / 10194	903 Pad	2	5905.14	5901.37	3.77	299.2	0.0126	4.18E-04	0.1	5.27E-05	54.5
04591 / 10194	903 Pad	4	5905.01	5901.13	3.88	299.2	0.0130	4.18E-04	0.1	5.42E-05	56.1
07291 / 07391	903 Pad	2	5957.78	5941.91	15.87	210.0	0.0756	4.18E-04	0.1	3.16E-04	326.8
07291 / 07391	903 Pad	4	5958.24	5941.05	17.19	210.0	0.0819	4.18E-04	0.1	3.42E-04	354.0
34791 / 6386	903 Pad	2	5950.99	5885.18	65.81	328.1	0.2006	9.33E-05	0.1	1.87E-04	193.6
34791 / 6386	903 Pad	4	5948.71	Dry	ND	328.1	ND	9.33E-05	0.1	ND	ND
05291 / 05091	East Trenches	2	5906.16	5895.49	10.67	452.3	0.0236	4.18E-04	0.1	9.86E-05	102.0
05291 / 05091	East Trenches	4	dry	5895.02	ND	452.3	ND	4.18E-04	0.1	ND	ND
05391/06091	East Trenches	2	5906.11	5893.88	12.23	711.4	0.0172	4.18E-04	0.1	7.19E-05	74.3
05391/06091	East Trenches	4	5905.81	5893.5	12.31	711.4	0.0173	4.18E-04	0.1	7.23E-05	74.8
3687/63395	East Trenches	2	5913.4	5892.24	21.16	380.0	0.0557	7.88E-04	0.1	4.39E-04	454.0
3687/63395	East Trenches	4	5912.79	Dry	ND	380.0	ND	7.88E-04	0.1	ND	ND
4286/20291	East Trenches	2	5931.56	5917.17	14.39	701.1	0.0205	4.18E-04	0.1	8.58E-05	88.8
4286/20291	East Trenches	4	5933.08	5915.55	17.53	701.1	0.0250	4.18E-04	0.1	1.05E-04	108.1
4486 / P115689	Industrial Area	2	6015.77	6000.19	15.58	832.5	0.0187	4.18E-04	0.1	7.82E-05	80.9
4486 / P115689	Industrial Area	4	6015.28	5997.76	17.52	832.5	0.0210	4.18E-04	0.1	8.80E-05	91.0
P114689 / 22896	Industrial Area	2	5996.64	5982.19	14.45	550.7	0.0262	4.18E-04	0.1	1.10E-04	113.5
P114689 / 22896	Industrial Area	4	5995.13	5980.81	14.32	550.7	0.0260	4.18E-04	0.1	1.09E-04	112.5
P115089 / P119389	Industrial Area	2	6025.09	No data in '00	ND	749.7	ND	4.18E-04	0.1	ND	ND
P115089 / P119389	Industrial Area	4	6024.45	No data in '00	ND	749.7	ND	4.18E-04	0.1	ND	ND
P215789 / P218089	Industrial Area	2	5988.83	5982.31	6.52	754.9	0.0086	4.18E-04	0.1	3.61E-05	37.4
P215789 / P218089	Industrial Area	4	5987.96	5982.9	5.06	754.9	0.0067	4.18E-04	0.1	2.80E-05	29.0
P313489 / 6186	Industrial Area	2	6001.14	5991.74	9.4	714.7	0.0132	4.18E-04	0.1	5.50E-05	56.9
P313489 / 6186	Industrial Area	4	5998.94	5990.86	8.08	714.7	0.0113	4.18E-04	0.1	4.73E-05	48.9
P314289 / 10492	Industrial Area	2	5996.57	No data in '00	ND	757.0	ND	9.33E-05	0.1	ND	ND
P314289 / 10492	Industrial Area	4	5997.52	No data in '00	ND	757.0	ND	9.33E-05	0.1	ND	ND
P415989 / P115489	Industrial Area	2	6040.85	No data in '00	ND	1223.0	ND	4.18E-04	0.1	ND	ND
P415989 / P115489	Industrial Area	4	6039.03	No data in '00	ND	1223.0	ND	4.18E-04	0.1	ND	ND
P416289 / P416689	Industrial Area	2	6025.81	6006.76	19.05	593.6	0.0321	4.18E-04	0.1	1.34E-04	138.8
P416289 / P416689	Industrial Area	4	6026.2	6006.9	19.3	593.6	0.0325	4.18E-04	0.1	1.36E-04	140.6

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Table 3-1 Linear Flow Velocities (continued)

WELL PAIR	AREA	2000 QTR	WL Elevation well 1	WL Elevation well 2	Dh	dl	dh/dl (gradient)	K (cm/sec)	n_e	v (cm/sec)	v (ft/yr)
P419689 / P416889	Industrial Area	2	6006.28	6002.55	3.73	437.1	0.0085	4.18E-04	0.1	3.57E-05	36.9
P419689 / P416889	Industrial Area	4	6004.64	6001.07	3.57	437.1	0.0082	4.18E-04	0.1	3.41E-05	35.3
1987/3586	Mound	2	5957.86	5905.52	52.34	545.9	0.0959	9.33E-05	0.1	8.95E-05	92.6
1987/3586	Mound	4	5958.94	5904.65	54.29	545.9	0.0994	9.33E-05	0.1	9.28E-05	96.0
00491 / 23196	SE Buffer Zone	2	5890.42	5790.24	100.2	620.9	0.1613	9.33E-05	0.1	1.51E-04	155.7
00491 / 23196	SE Buffer Zone	4	dry	5790.3	ND	620.9	ND	9.33E-05	0.1	ND	ND
05293 / 3386	Solar Pond	2	no data in '00	dry	ND	569.2	ND	4.18E-04	0.1	ND	ND
05293 / 3386	Solar Pond	4	5973.32	dry	ND	569.2	ND	4.18E-04	0.1	ND	ND
1986 / 77492	Solar Pond	2	5941.24	No data in '00	ND	411.5	ND	9.33E-05	0.1	ND	ND
1986 / 77492	Solar Pond	4	5940.81	No data in '00	ND	411.5	ND	9.33E-05	0.1	ND	ND
2286 / 45793	Solar Pond	2	5971.3	dry	ND	436.9	ND	4.18E-04	0.1	ND	ND
2286 / 45793	Solar Pond	4	5971.68	dry	ND	436.9	ND	4.18E-04	0.1	ND	ND
P218389 / B208089	Solar Pond	2	5944.52	5923.85	20.67	386.4	0.0535	9.33E-05	0.1	4.99E-05	51.6
P218389 / B208089	Solar Pond	4	5944.65	5923.1	21.55	386.4	0.0558	9.33E-05	0.1	5.20E-05	53.8
P215789 / P218089	Industrial Area	2	5988.83	5982.31	6.52	754.9	0.0086	4.18E-04	0.1	3.61E-05	37.4
P215789 / P218089	Industrial Area	4	5987.96	5982.9	5.06	754.9	0.0067	4.18E-04	0.1	2.80E-05	29.0
P313489 / 6186	Industrial Area	2	6001.14	5991.74	9.4	714.7	0.0132	4.18E-04	0.1	5.50E-05	56.9
P313489 / 6186	Industrial Area	4	5998.94	5990.86	8.08	714.7	0.0113	4.18E-04	0.1	4.73E-05	48.9
P314289 / 10492	Industrial Area	2	5996.57	No data in '00	ND	757.0	ND	9.33E-05	0.1	ND	ND
P314289 / 10492	Industrial Area	4	5997.52	No data in '00	ND	757.0	ND	9.33E-05	0.1	ND	ND
P415989 / P115489	Industrial Area	2	6040.85	No data in '00	ND	1223.0	ND	4.18E-04	0.1	ND	ND
P415989 / P115489	Industrial Area	4	6039.03	No data in '00	ND	1223.0	ND	4.18E-04	0.1	ND	ND
P416289 / P416689	Industrial Area	2	6025.81	6006.76	19.05	593.6	0.0321	4.18E-04	0.1	1.34E-04	138.8
P416289 / P416689	Industrial Area	4	6026.2	6006.9	19.3	593.6	0.0325	4.18E-04	0.1	1.36E-04	140.6
P419689 / P416889	Industrial Area	2	6006.28	6002.55	3.73	437.1	0.0085	4.18E-04	0.1	3.57E-05	36.9
P419689 / P416889	Industrial Area	4	6004.64	6001.07	3.57	437.1	0.0082	4.18E-04	0.1	3.41E-05	35.3
1987/3586	Mound	2	5957.86	5905.52	52.34	545.9	0.0959	9.33E-05	0.1	8.95E-05	92.6

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Table 3-1 Linear Flow Velocities (continued)

WELL PAIR	AREA	2000 QTR	WL Elevation well 1	WL Elevation well 2	Dh	dl	dh/dl (gradient)	K (cm/sec)	n	v (cm/sec)	v (ft/yr)
1987/3586	Mound	4	5958.94	5904.65	54.29	545.9	0.0994	9.33E-05	0.1	9.28E-05	96.0
00491 / 23196	SE Buffer Zone	2	5890.42	5790.24	100.2	620.9	0.1613	9.33E-05	0.1	1.51E-04	155.7
00491 / 23196	SE Buffer Zone	4	dry	5790.3	ND	620.9	ND	9.33E-05	0.1	ND	ND
05293 / 3386	Solar Pond	2	no data in '00	dry	ND	569.2	ND	4.18E-04	0.1	ND	ND
05293 / 3386	Solar Pond	4	5973.32	dry	ND	569.2	ND	4.18E-04	0.1	ND	ND
1986 / 77492	Solar Pond	2	5941.24	No data in '00	ND	411.5	ND	9.33E-05	0.1	ND	ND
1986 / 77492	Solar Pond	4	5940.81	No data in '00	ND	411.5	ND	9.33E-05	0.1	ND	ND
2286 / 45793	Solar Pond	2	5971.3	Dry	ND	436.9	ND	4.18E-04	0.1	ND	ND
2286 / 45793	Solar Pond	4	5971.68	Dry	ND	436.9	ND	4.18E-04	0.1	ND	ND
P218389 / B208089	Solar Pond	2	5944.52	5923.85	20.67	386.4	0.0535	9.33E-05	0.1	4.99E-05	51.6
P218389 / B208089	Solar Pond	4	5944.65	5923.1	21.55	386.4	0.0558	9.33E-05	0.1	5.20E-05	53.8

ND = no data

3.3 Well Hydrographs and Water Level Change Maps

Hydrograph plots for many RFCA water quality wells have been constructed in order to observe changes in water table elevation with time and are contained in Appendix C. 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 hydrograph data to background well hydrograph data may suggest whether any of the observed trends are naturally or artificially induced. Assuming that 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 water levels collected during the 1996 baseline year.

Water levels measured during 2000 were, for the most part, observed to fluctuate within previously observed ranges. Some wells, including recharge-sensitive wells such as 20691, 4286, 12191, B200889, and P416689, exhibited recharge peaks during the spring season that were less prominent than those observed in 1999 and 1998. In general, for all site wells, water levels were higher during the first half of 2000 compared to the second half, based on 2nd versus 4th quarter data. Overall, water levels were similar in 2000 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. Sitewide precipitation data from 1995 through 2000 indicates that precipitation was very high in 1995 (21.6 inches), 1996 produced near average precipitation (14.4 inches), 1997 produced below average precipitation (13.8 inches), 1998 produced near average precipitation (14.4 inches), 1999 produced above average precipitation (17.8 inches),

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and 2000 produced below average precipitation (12.3 inches). The mean annual precipitation for the Site is 14.5 inches (EG&G, 1995b) and the annual precipitation figures for the Site, referenced above, were obtained from the Site meteorological station and reported in the RFETS DOE Radionuclide Air Emissions Annual Reports for calendar years 1995 through 2000. The continuing trend of average to slightly higher than average UHSU water levels may be based on recurrent higher than average precipitation (except for 1997 and 2000), providing ample groundwater recharge, since 1995. The sitewide scale of this trend implies that climate is the dominant cause of water level changes during 2000.

Water level change maps (Plates 10 and 11) were prepared utilizing the difference between 2000 and 1996 water levels at wells that had water level measurements in common for the two years. These data are used to compare the 2000 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 (2000). It is important to keep in mind that wells that have been purged for sample collection a short time prior to the water level measurement, and 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 2000

The water level change map for comparing the second quarters of 1996 and 2000 (Plate 10) generally shows no change to slightly positive change in the IA, indicating static to slightly higher water levels during 2000, as compared to 1996. Exceptions to this within the IA are a localized area of strongly negative water level change (-5 feet) observed immediately east of the Solar Ponds, possibly because of closure of the Solar Ponds, and an area of moderate negative water level changes (> -1 foot) observed in the vicinity of Building 881. The area of negative water level change immediately east of the Solar Ponds extends to the northeast through the A- and B-Ponds drainages. In addition, an area south and east of the 903 Pad shows negative water level change of up to two feet. The West Spray Field shows a slight positive water level change that may be a lingering result of ample groundwater recharge from the high precipitation experienced during 1999. The background area north and west (upgradient) of the Present Landfill shows positive (+2 feet) water level change. Localized areas of high positive water level change are found south of the three storage tanks (MSTs), north of the North Perimeter Road, and north of Building 991.

Fourth Quarter 1996 compared to Fourth Quarter 2000

The water level change map comparing the fourth quarters of 1996 and 2000 (Plate 11) shows that, in general, there is a zero or slightly negative or positive change (< +1 to < -1) throughout the IA. The northwest (Building 371/374) and north central (Buildings 776/777 and the 771 complex) portions of the PA exhibit generally positive water level change during 2000, as compared to 1996. Between these two areas and in the east central (Solar Ponds area) portion of the former PA, there is essentially no change in water levels comparing 1996 to 2000. The southern half of the IA exhibits generally no change to slightly negative change during 2000, as compared to 1996. The area north and west (upgradient) of the Present Landfill shows generally negative water level change, in contrast with the

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2nd quarter map, with an area in the vicinity of the PU&D Yard exhibiting change greater than -2 feet. The Walnut Creek and Woman Creek drainages generally show subtle positive or negative water level change with localized areas of appreciable water level change. A high positive change (> +3 feet) is observed northwest and northeast of the T130 trailer complex, as well as positive water level change for the rest of the West Spray Field. This is probably a lingering result of ample groundwater recharge from higher than average precipitation during 1999.

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. The 1996 data set will represent the baseline for future annual water level change evaluations.

In summary, groundwater flow conditions for 2000 appear to generally resemble flow conditions described for recent years with slight variations depending on the location within RFETS. This situation is not unexpected because closure activities undertaken to date have been minimal and the relative impact to the UHSU is probably negligible except in some localized areas. Positive water level changes observed west of the IA may be the result of consistently higher than average precipitation recharge to those areas from 1995 through 2000. Localized areas of positive water level change in the vicinity of the IA may be a result of leaking water lines.

3.4 Real Time Groundwater Monitoring Network

As a requirement of the RFETS Integrated Monitoring Plan, 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 outfitted 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 downgradient of the IA, and along stream channels to the north, south, and east of the IA. These data, when used alone or in conjunction with RFETS surface water data, allow a greater understanding of the effects of precipitation and surface water infiltration events 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.

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Currently, each of the Trolls® is programmed to measure the water level every four hours; twelve A.M., four A.M., eight A.M., twelve P.M., four P.M., and eight P.M. As shown on Plate 13 and Figure 3-1, 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 will allow observation, simultaneously across the site, of the impact of a precipitation infiltration 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 currently included in the real time groundwater-monitoring network are 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.

Data presented on Plate 13 is from calendar years 1999 and 2000. Data downloaded from the real time monitoring network for CY 2000 is complete. There are certain wells from which CY 1999 data are incomplete. 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 In-Situ, Inc. firmware. Monitoring wells 20991 and 4786 initially had Trolls® installed during 1998 beneath a water column of greater than 34.5 feet. This exceeded the 15 pounds per square inch (psi) pressure rating 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 2000 Annual RFCA Groundwater Monitoring Report from the real time groundwater-monitoring network has been analyzed for the period of January 1999 through December 2000. Two full yearly cycles of water level fluctuations and precipitation data are displayed, allowing for the following analysis and discussion. The eight wells added to the program in 1999 (Figure 3-1) were outfitted with Trolls® during February and March of 1999. These Trolls® will have slightly less than a year of data recorded for CY 1999. Plate 13 presents the 33 monitoring locations with a hydrograph of the groundwater elevation data collected from each station. Superimposed on each hydrograph is precipitation data from the nearest RFETS surface water station that contains a rain gauge. As stated above, CY 1999 was a year of above average precipitation (17.8 inches); CY 2000 had below average precipitation (12.3 inches).

The following are general observations made from the first full two years of real time groundwater monitoring data from the entire network:

- The hydrographs indicate that responses to precipitation events and subsequent groundwater recharge are varied and dependent on the location of the individual well at RFETS.

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- Wells located in the Buffer Zone, with a few exceptions, exhibit baseflow without the anthropogenic effects of the IA, and show relatively little or no response to below average 2000 precipitation as compared to well above average 1999 precipitation.

- Wells located in the IA, with a few exceptions, exhibit a much greater response to the below average precipitation that occurred during 2000 than Buffer Zone wells, and show more irregularities in their hydrographs that are attributed to anthropogenic causes.

- Wells located in or adjacent to streambeds are the most sensitive to precipitation with respect to groundwater recharge response time and also graphically show the effects of evapotranspiration, or lack of evapotranspiration, depending on the season.

The following are specific observations made from the first full two years of real time groundwater monitoring data from the entire network:

Hydrographs from the series of Buffer Zone wells trending from the southwest to the 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 11494, 51494, 4786, 1190, B200589, and B200889. In addition, well 5586, located southwest of the IA, probably exhibits the same sort of background baseflow. Generally, these wells show a high water level achieved during the spring or summer of 1999 because of the high precipitation during 1999. Most 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. Comparing the results of these wells to the IA wells will allow a better understanding of various facility specific effects on the individual well responses to recharge or dewatering events.

Wells in the IA (including the PA), 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 acute responses to individual precipitation events. 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 no apparent responses to individual precipitation events. It is situated between two wells with Trolls®, P119389 and P115489, which exhibit marked responses to individual precipitation events. Curiously, two of these wells, P114889 and P119389, actually show a larger overall response to 2000 annual precipitation than the much greater 1999 annual precipitation. Another unusual hydrograph is from well P209889, located on the vegetated hillside just north of the SEPs, which exhibits a very slight baseflow decline between 1999 and 2000 with very minor individual precipitation event responses. The well maintains a relatively high water level all year. It also shows the drawdown effects of three sampling events at the end of 1999 and the first half of 2000. 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,

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located on the hillside immediately southwest of Building 881 shows the greatest and most immediate response to a precipitation event of any well other than those adjacent to a streambed. The grassy area to the north and east encompassing this well and Building 881 is regularly watered, as is the Building 850 lawn, which may account for the unusual recharge spikes observed on the hydrograph.

Wells in or immediately adjacent to streambeds (wells 4287, B210489, 3686, 10794, 0186, and 6886) exhibit an almost immediate, although varying in magnitude, response to precipitation events. 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 1999-2000. During this period there was relatively low precipitation. The response in these wells probably reflects the lag time resulting from a gaining stream receiving groundwater recharge from ample precipitation during 1999, combined with low watershed evapotranspiration during the cooler time of year encompassing late fall through early 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 superimposed with minor responses to precipitation events. The area immediately adjacent to well 3686 was undergoing maintenance of a pipeline that extends from the Sewage Treatment Plant to Pond B-3 during mid-September 1999 through early March 2000. The area was being dewatered for construction purposes and effectively dewatered the material that the well is screened in during that time period.

Wells located east of the IA (wells 03791, 20991, 20691, 1587, 05191and 3986) generally exhibit baseflow conditions with little or no response to individual precipitation events. These wells, except for 20691 and 1587, show a relatively smooth decline in water level during the last six months of 1999 with almost no response to year 2000 precipitation. Well 20691, located just southeast of the southeast corner of the PA, and well 1587, located due east of the 903 Pad, exhibit the general 1999 trend but show a marked overall response to 2000 precipitation with individual precipitation event responses superimposed on the baseflow for years 1999 and 2000. The hydrographs for wells 20691 and 1587 are strikingly similar. Well 20691is 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. During this period 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 stays at a relatively high elevation. Groundwater coming down the hillside through more permeable materials probably slows down as it gets into the weathered bedrock; the slower draining bedrock effectively backing up the water and causing the water level to remain high through the dry portion of the year.

Well 1086, located immediately upgradient of the Present Landfill, exhibits an approximately one-week 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 response to Site annual precipitation is most similar to the majority of wells located in the IA; it exhibits the higher response to the less than average precipitation in 2000. This may be a response to the

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location of the well with respect to the Present Sanitary Landfill. Groundwater mounding at the upgradient end of the landfill, which may be caused by the groundwater diversion structures in this area (slurry wall and/or groundwater intercept system), may increase the sensitivity of this well with respect to precipitation.

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4.0 PERFORMANCE MONITORING

Performance monitoring refers to monitoring the effect(s) of a remediation system 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.

4.1 Mound Plume

4.1.1 Mound Plume/SW059 Remediation System

The Mound Site is located north of Central Avenue and east of the PA fence and consists of a former waste burial area where 1,405 drums were stored. 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, 883, 771, and 776 and contained uranium and beryllium contaminated lathe coolant (a mixture of approximately 70% hydraulic oil and 30% carbon tetrachloride), tetrachloroethene (PCE) and other VOCs, and low levels of plutonium.. Ten percent of the drums were suspected to have leaked. Groundwater contamination is also present.

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 have detected VOCs, primarily PCE, in subsurface soils at concentrations above the subsurface soil action levels that require cleanup.

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

An accelerated soil removal action was completed during the spring of 1997 to remove VOC contaminated soils above the Tier I action levels from the Mound Site. Low-temperature thermal desorption was used to remove VOCs, and then treated soils were returned to the excavation. 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.

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

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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. Work performed during 1998 on this project consisted of the installation of the MSPTS 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. Nine sets of MSPTS influent/effluent samples were collected in 2000. The results of all nine sampling rounds indicate that all of the contaminants of concern, VOCs, uranium 235 and 238, and americium 241 have been reduced to below Tier II action levels in effluent from Reactor II, the second treatment cell.

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 Mound Plume remediation system: 3586, 15599, 15699, and 15799 (Figure 4-1). These wells are all located downgradient of the MSPTS collection trench with well 3586 being further downgradient and adjacent to South Walnut Creek, while the other three wells are immediately downgradient of the interceptor trench.

Vinyl chloride concentrations have been consistently above Tier II action levels in well 3586 (Figure 4.1-1) 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. 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.

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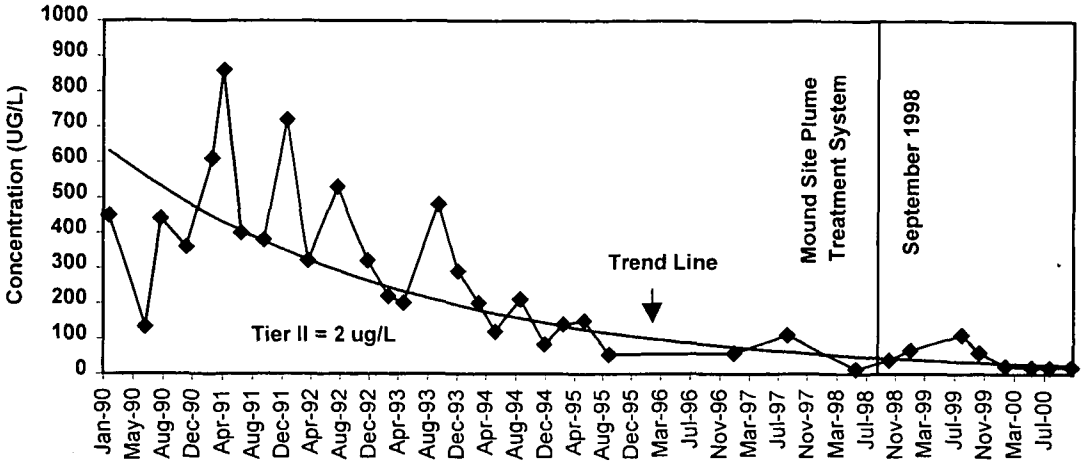
Figure 4.1-1 Vinyl Chloride Trend Plot For Well 3586



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 4.1-2 and 4.1-3) 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.

Figure 4.1-2 Tetrachloroethene Trend Plot For Well 15699

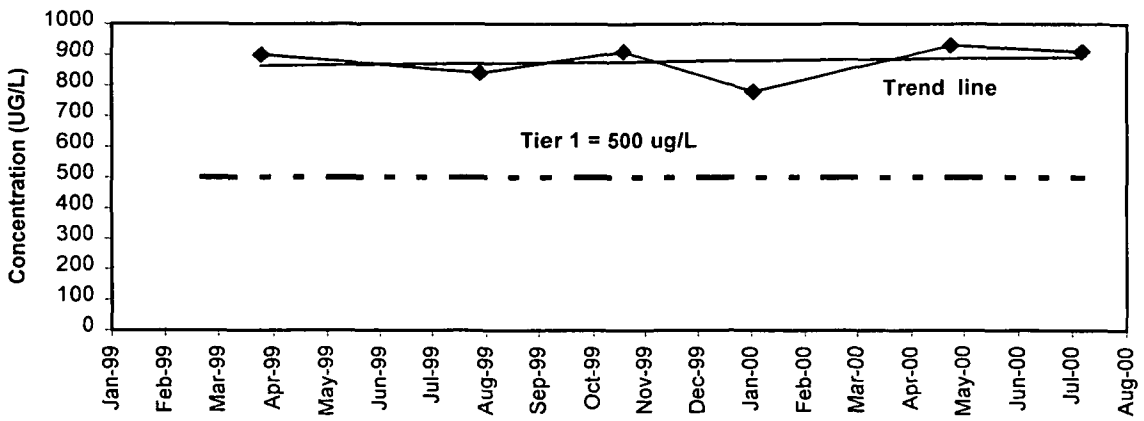


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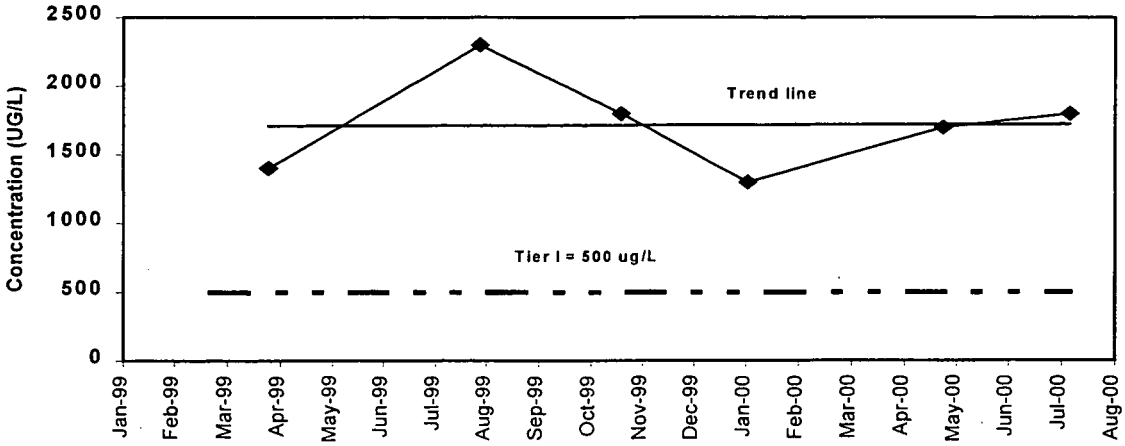
Figure 4.1-3 Trichloroethene Trend Plot For Well 15699



Prior to conducting the regression analysis, the data were statistically evaluated for outliers. One non-detect PCE and one non-detect TCE value 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 4.1-4 and 4.1-5) indicate that one value, shown by an asterisk, on each figure is considered highly suspect because it lies outside the lower outer fence. The lower outer fence is equivalent to more than three standard deviations from the mean.

Figure 4.1-4 Box and Whisker Plot of PCE Concentrations in Well 15699

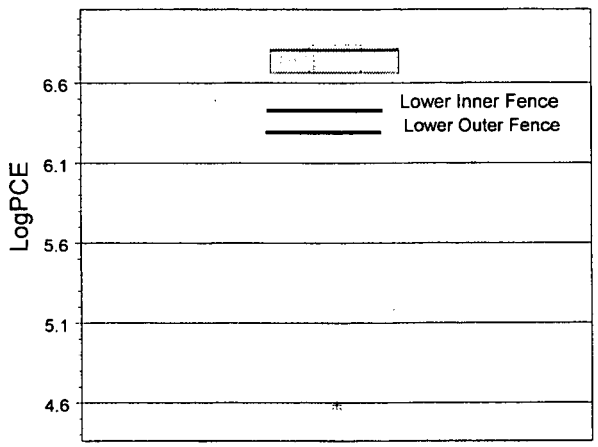


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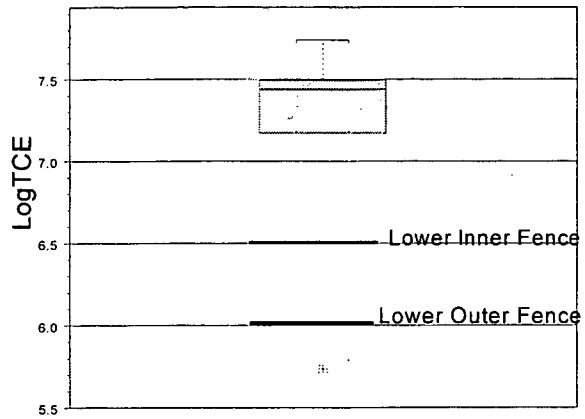
Figure 4.1-5 Box and Whisker Plot of TCE Concentrations in Well 15699



The histogram and probability plot (Figures 4.1-6 through 4.1-9) 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 4.1-6 Histogram of PCE Concentrations in Well 15699

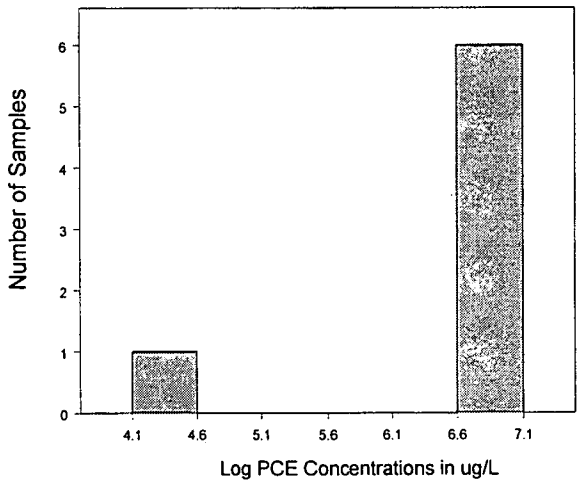


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Figure 4.1-7 Histogram of TCE Concentrations in Well 15699

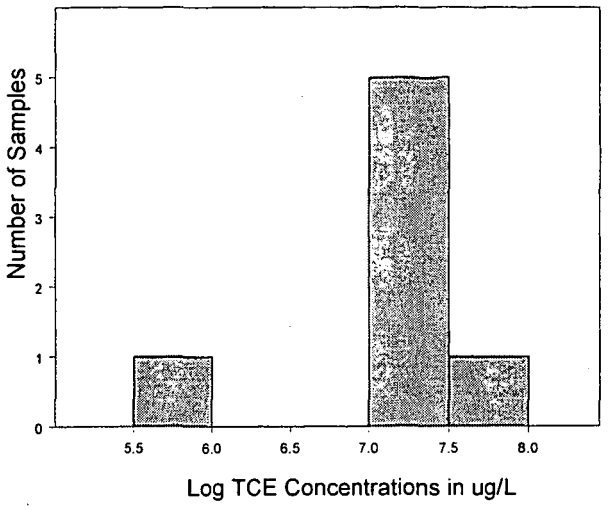

Figure 4.1-8 Probability Plot of PCE Concentrations in Well 15699

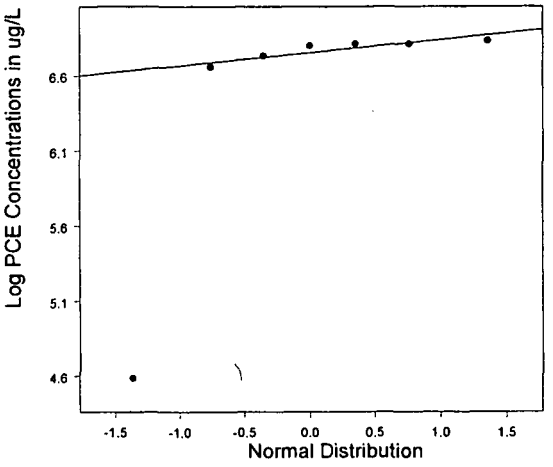

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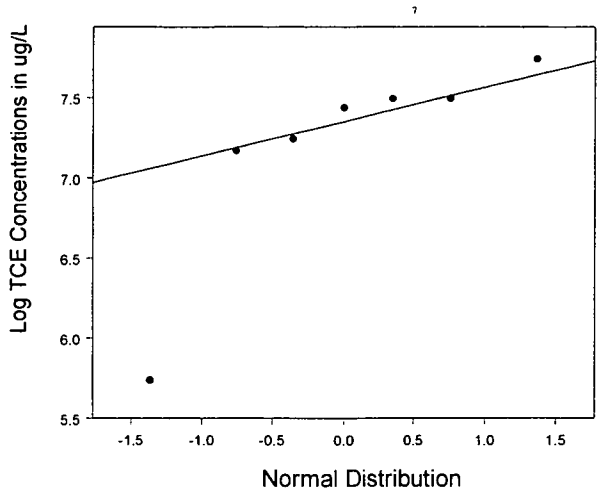
Figure 4.1-9 Probability Plot of TCE Concentrations in 15699



Concentrations of cis-1,2-DCE (Figure 4.1-10) and 1,1-DCE (Figure 4.1-11) 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 increases 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.

Figure 4.1-10 Cis-1,2-Dichloroethene Trend Plot For Well 15699

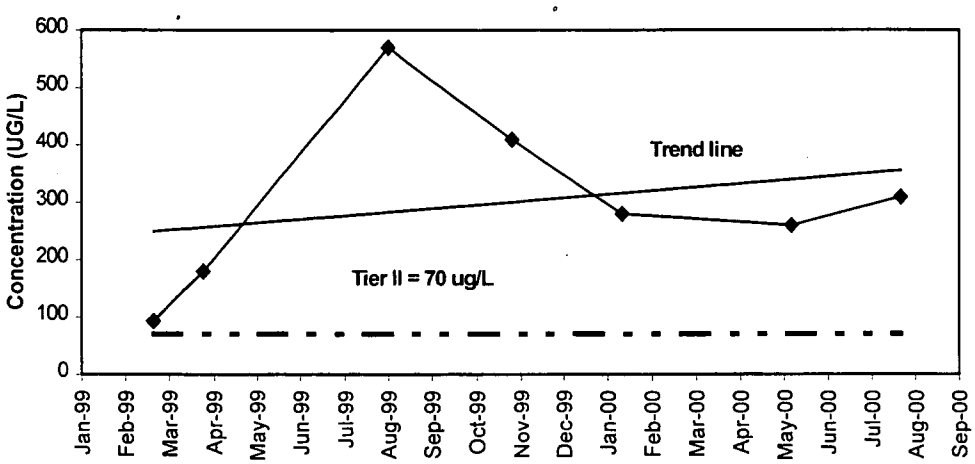


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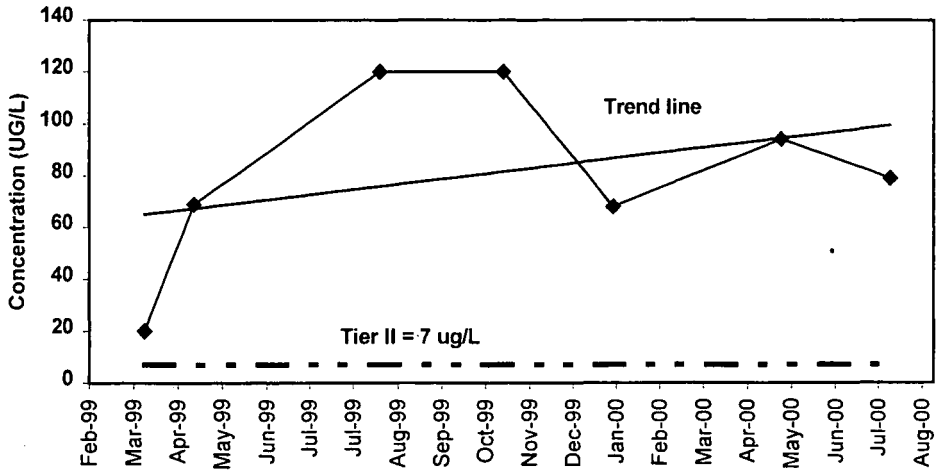
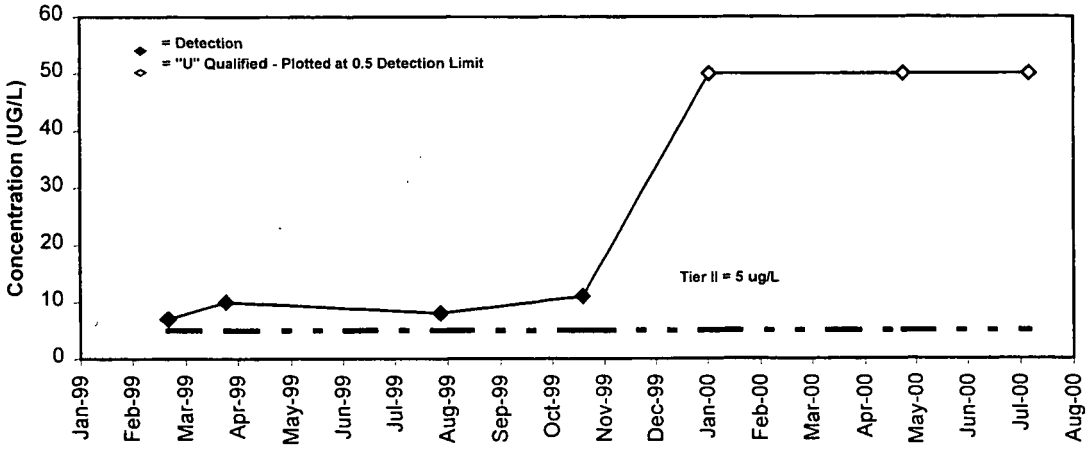
Figure 4.1-11 1,1-Dichloroethene Trend Plot For Well 15699



Low concentrations, slightly greater than Tier II levels, of 1,2- DCA have also been detected in well 15699 (Figure 4.1-12); however, since November 1999, the compound has not been detected. For this reason, no regression analysis was performed. The recent high non-detect values from 2000 are due to elevated detection limits that result from sample dilution.

Figure 4.1-12 1,2-Dichloroethane Trend Plot For Well 15699



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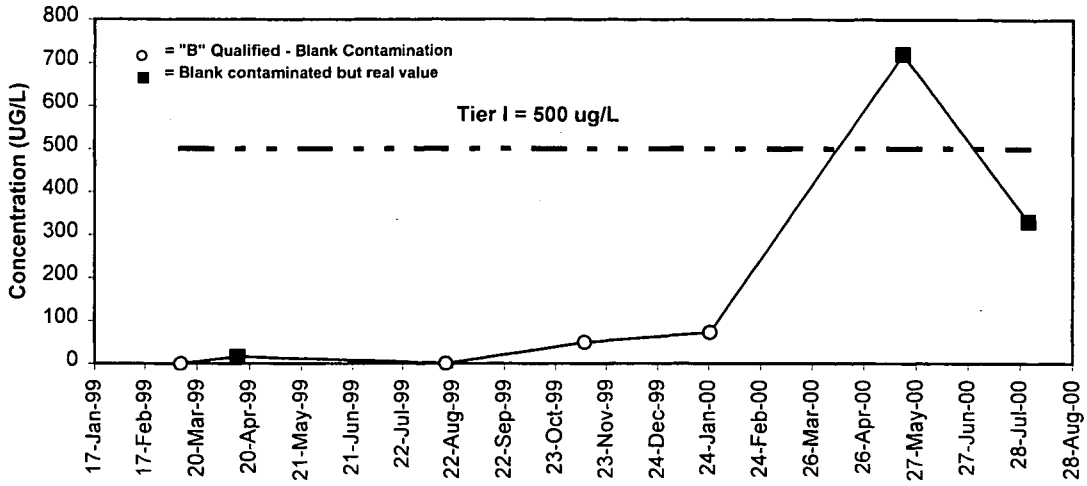
Methylene chloride has also been detected in well 15699 during 2000 at levels substantially above recorded blank contamination (Figure 4.1-13). Several of the blank contaminated samples are labeled as real values because the sample concentration exceeds 10 times the blank concentration.

Figure 4.1-13 Methylene Chloride Trend Plot For Well 15699



Well 15599 has been consistently dry since its installation and therefore has not produced water for analytical samples. PCE and TCE concentrations in well 15799 have been at or below the detection limit since sampling commenced.

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 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 slight declines in water levels with time. However, these trends are insignificant since the slope of these lines cannot be statistically distinguished from zero.

The MSPTS is fully operational and is treating contaminated groundwater to well below the specified system performance requirements. 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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4.1.2 Mound Site Source Removal

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 history of the Mound Site previous to the Source Removal is described in detail at the beginning of Section 4.1.1 above.

The accelerated source removal action included the excavation and treatment of approximately 724.5 cubic yards of soil contaminated with VOCs, predominantly PCE and TCE, above the Tier I ALF 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 VOCs and the treated soils were returned to the excavation in September 1997. *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 concern, 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 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 16,671 µg/L and range from a minimum of 7,400 µg/L in November 1998 to 21,300 µg/L in November 2000. As illustrated on Figure 4.1-14, 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. This means statistically that there is no trend or change in the data with time.

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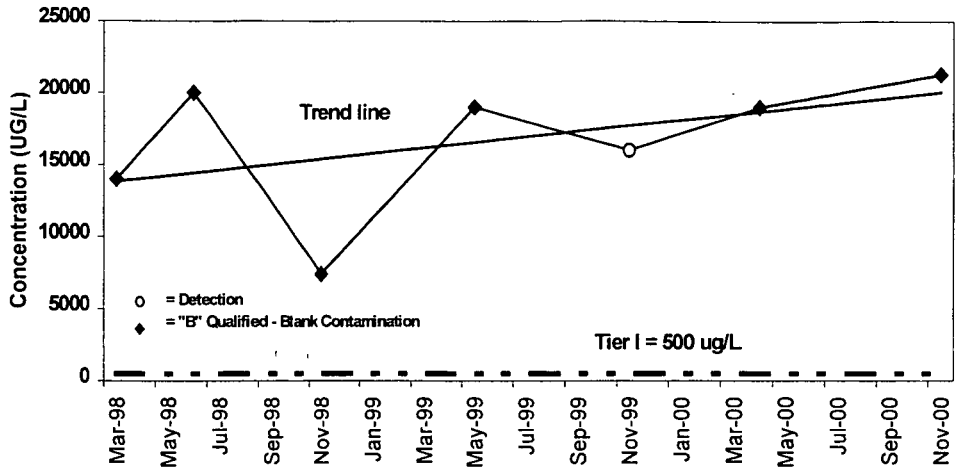
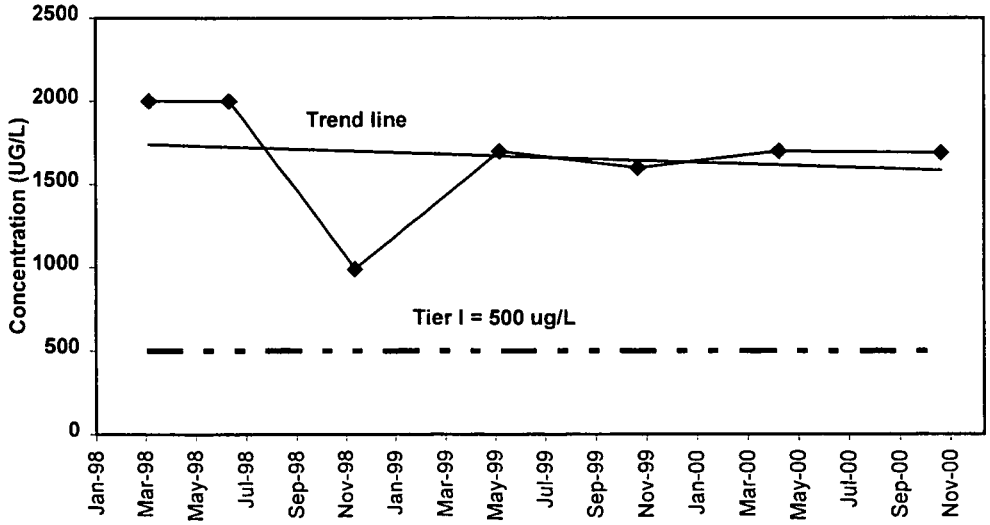
Figure 4.1-14 Tetrachloroethene Trend Plot For Well 00897



TCE concentrations, as shown in Figure 4.1-15, range from an initial high of 2,000 µg/L in March and June 1998 to a minimum of 990 µg/L in November 1998 with a mean concentration of 1,669 µg/L for 1998-2000.

Figure 4.1-15 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 4.1-15. This downward trend is also apparent and not statistically significant. 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.

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One low PCE and one low TCE value were considered suspect but were retained for trend analysis because they fall between the inner lower and outer lower fences as shown on the box and whisker plots below (Figures 4.1-16 and 4.1-17). The outer lower fence on both of these figures lies beyond the limits of the vertical scale and therefore is not shown.

Figure 4.1-16 Box and Whisker Plot of PCE Concentrations in Well 00897

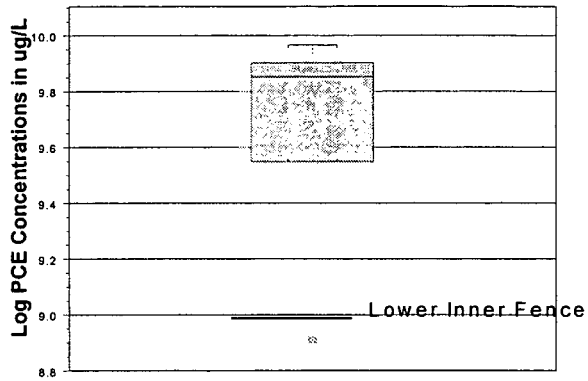
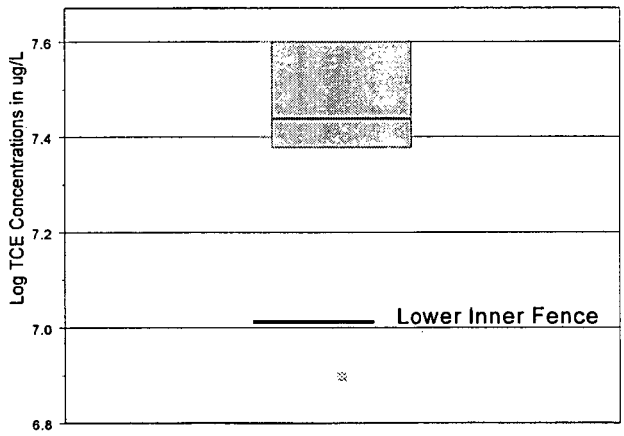


Figure 4.1-17 Box and Whisker Plot of TCE Concentrations in Well 00897



Methylene chloride was detected at 12,000 µg/L during one sampling event in June 1998 (Figure 4.1-18). Since that time, samples have been well below that concentration and have been reported as either non-detects or blank contaminated.

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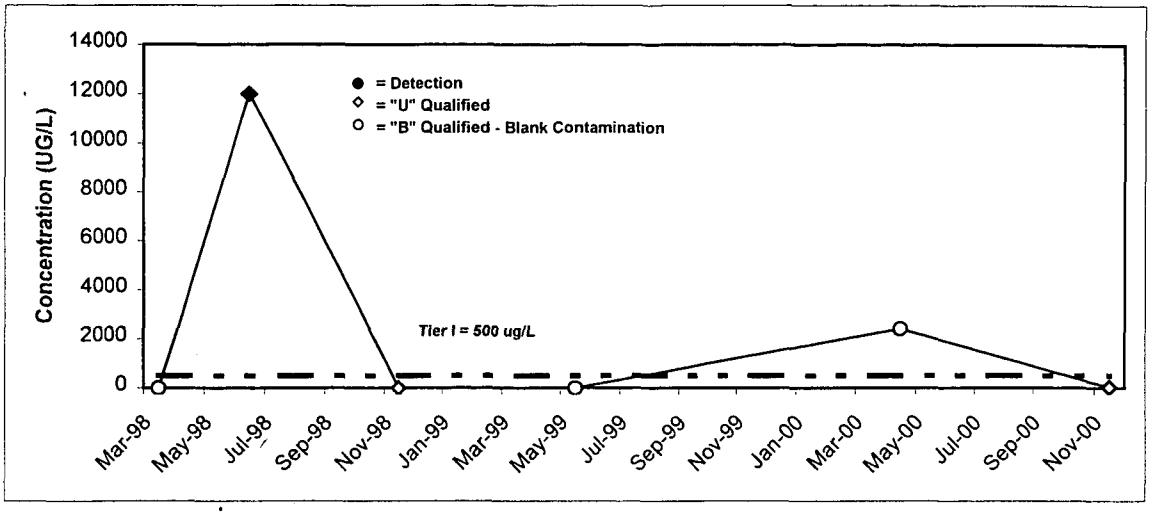
Figure 4.1-18 Methylene Chloride Trend Plot For Well 00897



In summary, concentrations of PCE have increased slightly 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 MSPTS. PCE concentrations appear to fluctuate with a mean concentration of 3,124 µg/L and range from a minimum of 210 µg/L in December 1991 to a maximum of 6600 µg/L in May 1999 (Figure 4.1-19). PCE levels in well 02291 (Figure 4.1-19) appear to be increasing over the long term although there has been a noticeable decrease in concentration from the second quarter to the fourth quarter of 2000. 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 continued their upward trend.

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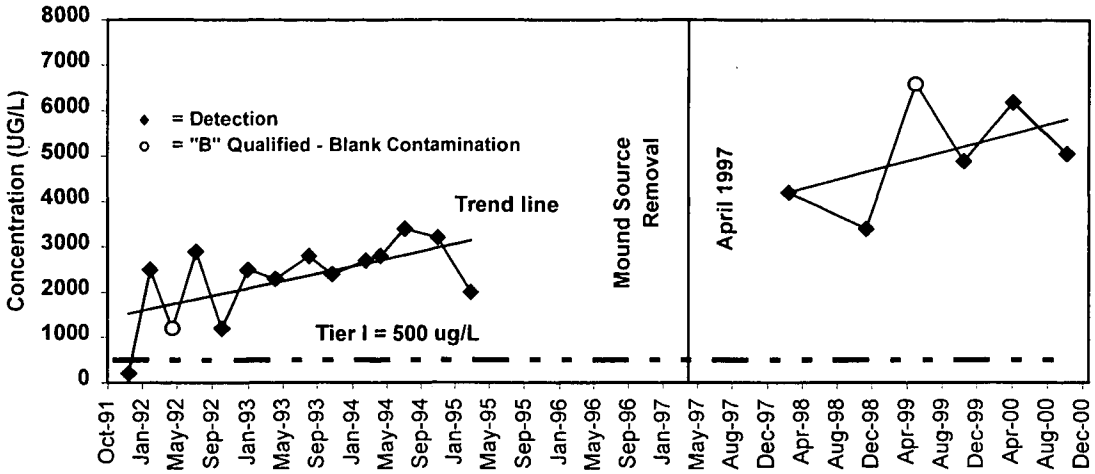
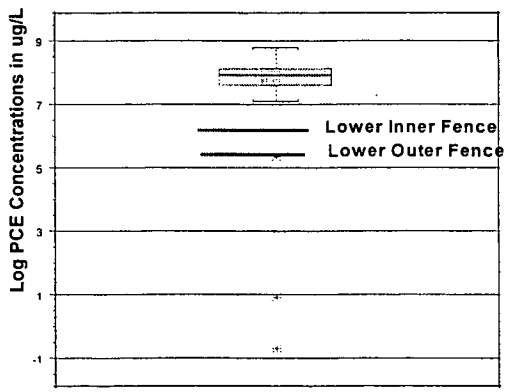
Figure 4.1-19 Tetrachloroethene Trend Plot For Well 02291



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 4.1-20) 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 4.1-21).

Figure 4.1-20 Box and Whisker Plot of PCE Concentrations in Well 02291



The histogram and probability plot (Figures 4.1-21 and 4.1-22) 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 02291

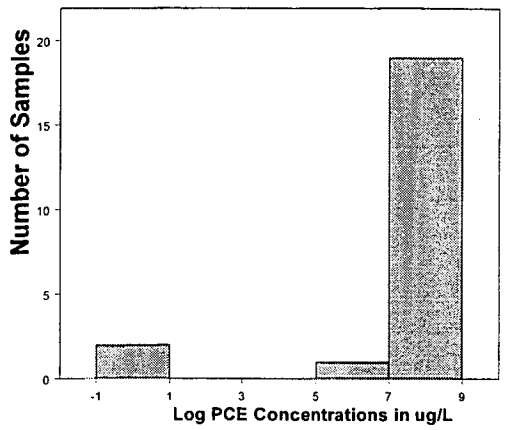
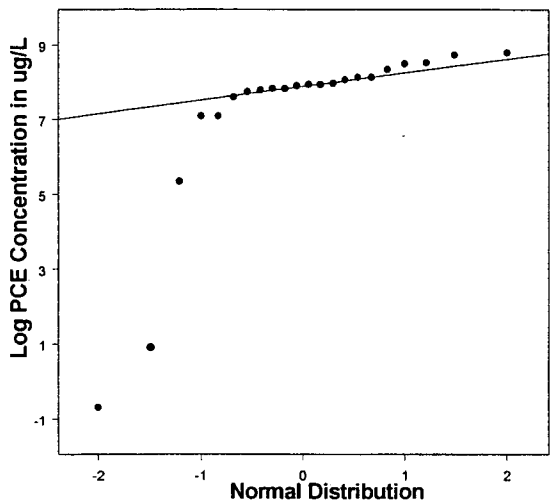


Figure 4.1-22 Probability Plot of PCE Concentrations in Well 02291



TCE in well 02291 (Figure 4.1-23) follows a similar trend to PCE, except that 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 397 µg/L and range from a minimum of 100 µg/L in December 1991 to a maximum of740 µg/L in April 2000. Trend lines before and after mound source removal indicate that TCE concentrations have also been increasing.

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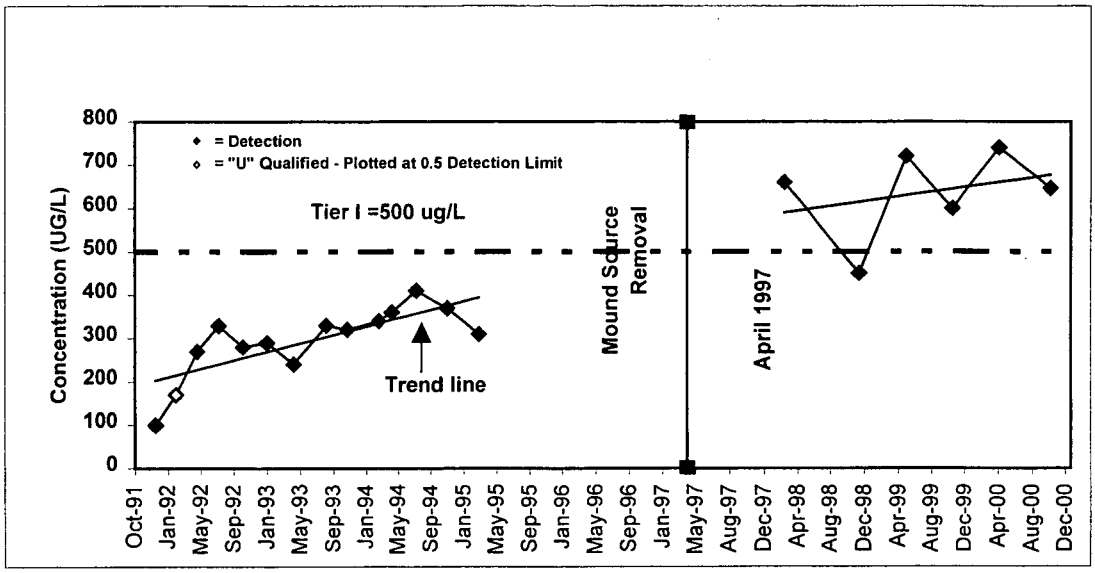
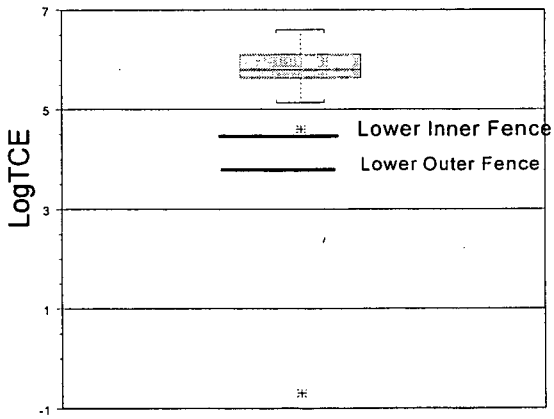
Figure 4.1-23 Trichloroethene Trend Plot For Well 02291



As shown on Figures 4.1-24 through 4.1-26, one (non-detect) data point was determined to be a statistical outlier and was excluded from further trend analysis.

Figure 4.1-24 Box and Whisker Plot of TCE Concentrations in Well 02291



100

Figure 4.1-25 Histogram of TCE Concentrations in Well 02291

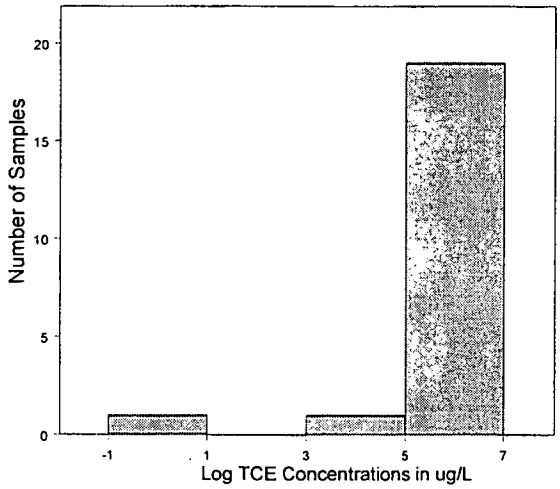
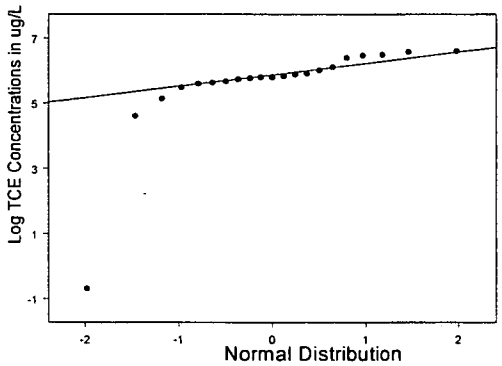


Figure 4.1-26 Probability Plot of TCE Concentrations in Well 02291



In summary, concentrations of Mound Site contaminants of concern have been observed to increase in downgradient wells 00897 and 02291 after the accelerated source removal action. Monitoring will continue until VOC concentrations decrease to below Tier I action levels.

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4.2 Solar Evaporation Ponds Nitrate/Uranium Plume

The Solar Ponds Plume (SPP) is an area of groundwater contamination that extends from the Solar Evaporation Ponds (SEPs) 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 the 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 Interceptor Trench System (ITS) was constructed in 1981 to dewater the hillside between North Walnut Creek and the SEPs 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, RMRS began sampling in 1997 to evaluate alternatives for the management and treatment of the water collected by the ITS. The objective 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 spectroscopy (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 8.2 of this Annual report provides a detailed discussion of the ICP/MS sampling to date.

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Based on the results of the 1997 through 1998 investigation, the *Solar Ponds Plume Decision Document* (RMRS,1999f)was prepared. The Decision 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 an 1,100-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 northermost 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 2000, fluctuating groundwater levels within the collection trench caused flow through the treatment cell to be intermittent. The influent location is sampled monthly. The 2000 Quarterly Reports for the Rocky Flats Groundwater Plume Treatment Systems can be referenced for more details. During CY 2001, 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, located approximately 1000 feet of SPPTS, 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 the increase in nickel. 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. This topic is discussed in detail in Section 8.6

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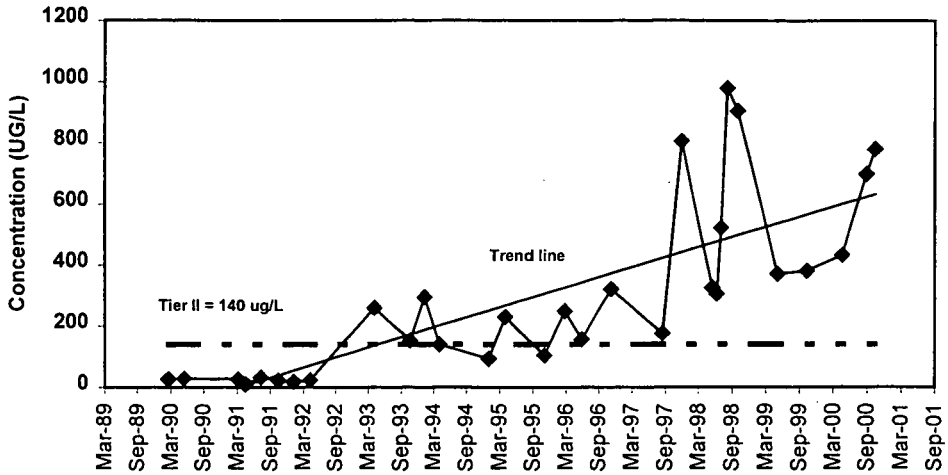
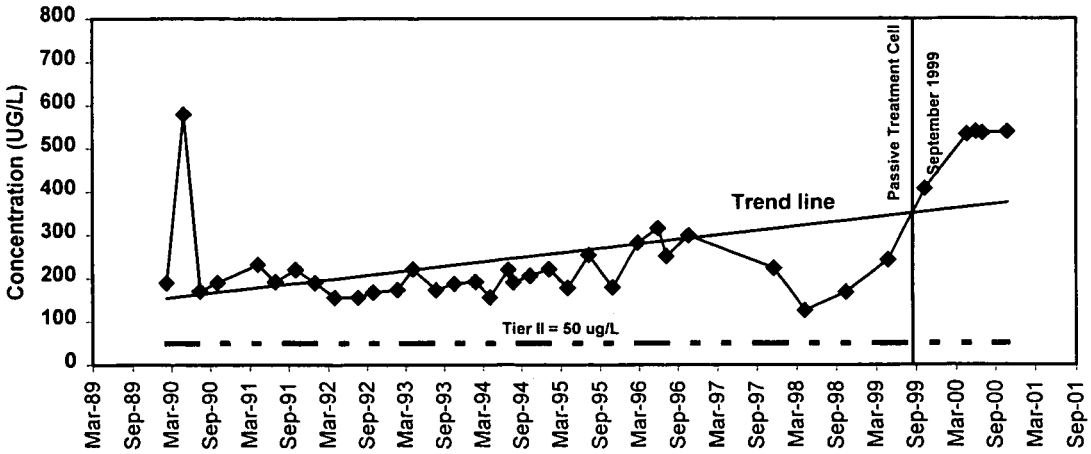
Figure 4.2-1 Nickel Trend Plot For Well 1386



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, there is an upward trend to the selenium concentration with time. This trends appears to be unaffected by the installation of the ITS in 1981. No outliers were identified during statistical analysis of the data.

Figure 4.2-2 Selenium Trend Plot For Well 1786



Nitrate in well 1786 (Figure 4.2-3) has remained essentially unchanged with time as illustrated by the relatively flat slope to the trend line. Least squares regression analysis indicates that the slope of the trend line cannot be differentiated from zero and that nitrate concentrations have statistically not changed with time. Not outliers were identified during statistical analysis.

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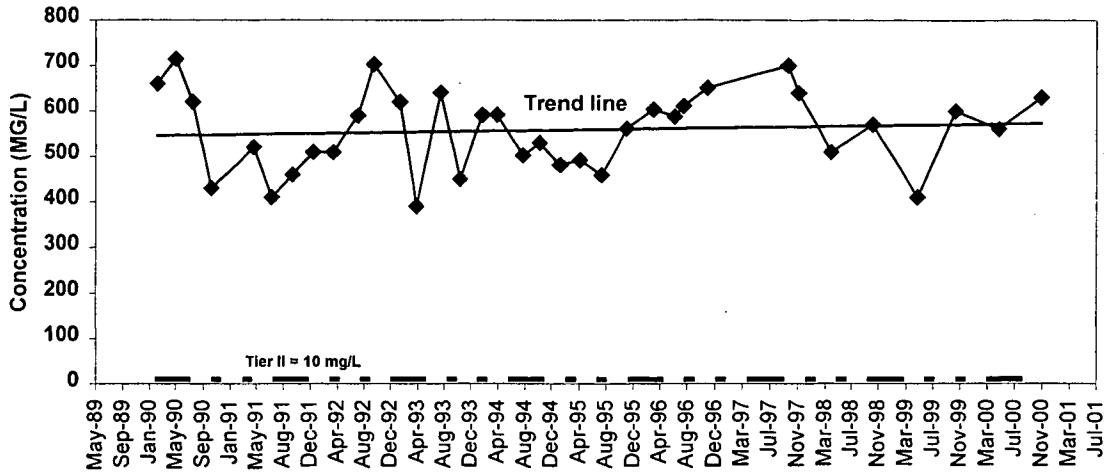
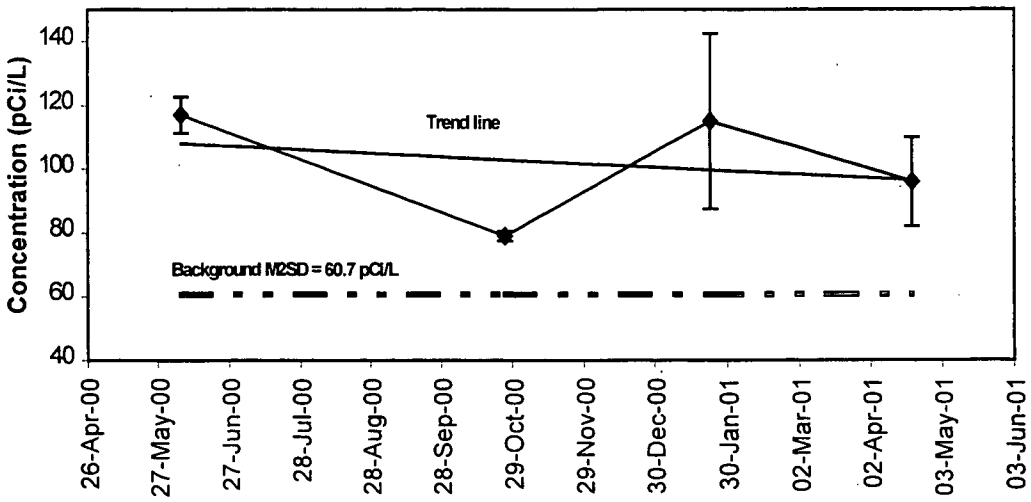
Figure 4.2-4 Nitrate Trend Plot For Well 1786



U-233/234 concentrations in well 70099 (Figure 4.2-5) have been elevated above background levels (60.7 pCi/L) since sampling was initiated in June 2000. Although there appears to be a slight downward trend to the data, this trend is statistically insignificant and cannot be differentiated from zero.

Figure 4.2-5 Uranium 233/234 Trend Plot For Well 70099 with Error Bars (Note Use of Background M2SD For Comparison-Not Tier II Action Level)



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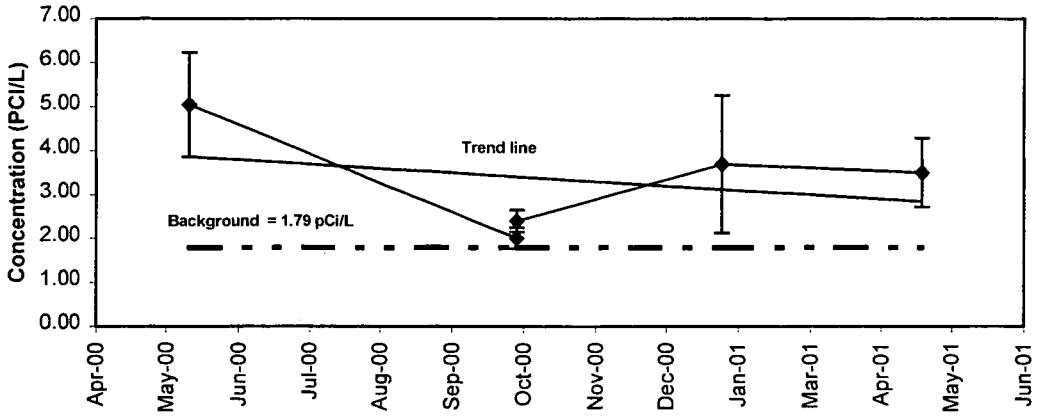
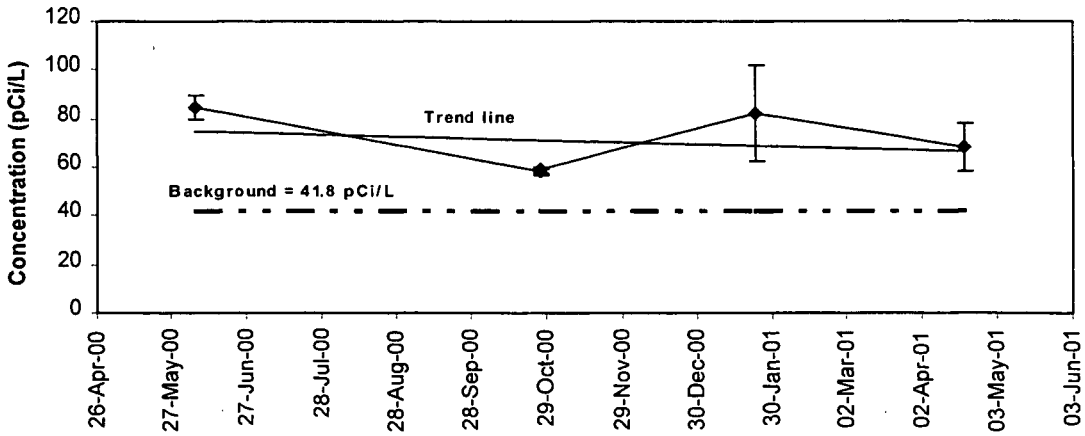
Similar to U-233/234, the U-235 concentration in well 70099 (Figure 4.2-6) has been elevated above the background level (1.79 pCi/L) since sampling was initiated in June 2000. Although there appears to be a slight downward trend to the data, this trend is statistically insignificant.

Figure 4.2-6 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 4.2-7) has been above the background level (41.8 pCi/L) since sampling at the well began. Although there appears to be a slight downward trend to the data, this trend is statistically insignificant and cannot be differentiated from zero.

Figure 4.2-7 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 2000. U-233/234 and U-238 concentrations in well 70299 have been below background but above Tier II action levels during 2000. 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 ITS, are included in Appendix C. A slight upward trend in water level elevations has occurred in wells 1386 and 70299 while water levels in wells 1786 and 70099 have remained fairly constant with no significant statistical trends present. A complete set of analytical data for CY2000 can be found in the RFCA Groundwater Quarterly Reports.

4.3 East Trenches Plume

4.3.1 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 believed to originate from the East Trenches and 903 Pad that 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 RFCA VOC groundwater 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.

A large plume of contaminated groundwater is located in the East Trenches area (Plate 12). Most of the groundwater contamination is believed to be derived from the trenches on the north side of the East Access Road, including Trenches T-3 and T-4 (RMRS, 1996c). 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.

Trenches T-3 and T-4 were used between 1964 and 1967 for disposal of sanitary sewage sludge contaminated with low levels of uranium and plutonium, VOCs, crushed drums, and miscellaneous waste (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, and PCE. The remediated soil, which was then below Tier II action levels, was returned to the trench excavation and the area was revegetated.

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 soils and solvents which were stored in the area from the summer of 1958 to January 1967 (RMRS, 1996d; 1997).

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Pre-remedial investigations were conducted in the fall of 1997 and the spring of 1998 to determine the extent and configuration of the distal (northern) 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 water-bearing strata are incised by the creek. There is a spring and seep complex on the south bank of South Walnut Creek, above Ponds B-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 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 Valley Fill Alluvium 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 system is utilized 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 concern, carbon tetrachloride, TCE, and PCE, collected and analyzed from the East Trenches plume treatment system during 2000 were below Tier II action levels. As in past sampling, methylene chloride was detected in the effluent and in the laboratory blanks. However, most of the samples had high enough methylene chloride concentrations to be considered real values.

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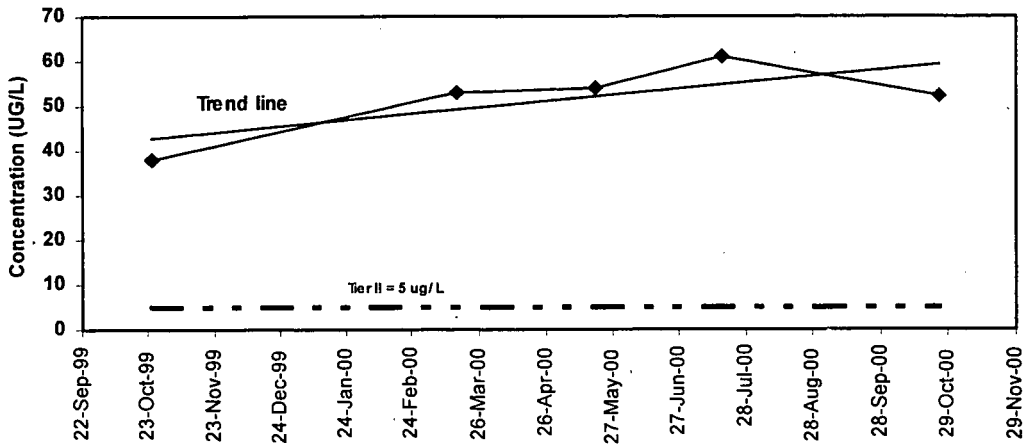
Four monitoring wells are currently being sampled as performance monitoring wells for the East Trenches Plume Treatment System (ETPTS). These wells are 23296, 95099, 95199, and 95299. Wells 95199 and 23296 are downgradient of the treatment system in the vicinity of the distal end of the East Trenches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

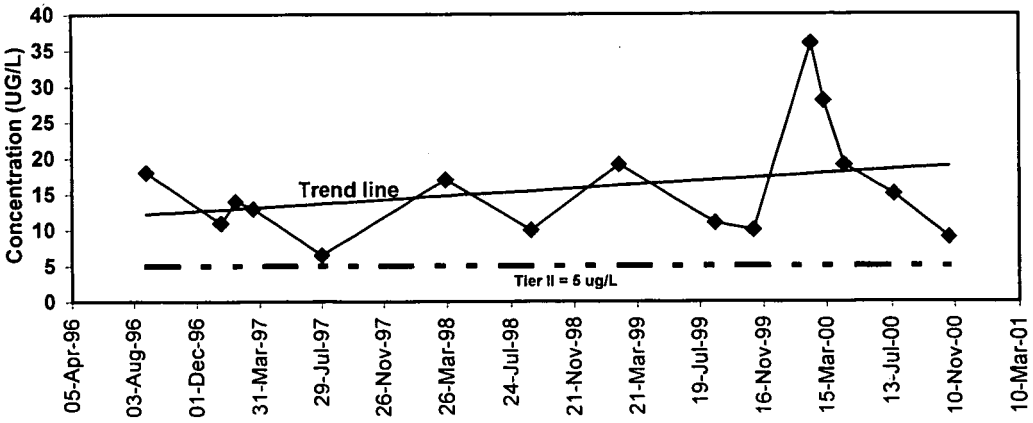
TCE has been detected in well 95199 at concentrations above Tier II action levels. The maximum TCE concentration in well 95199 during 2000 was 61 µg/L. As shown on Figure 4.3-1, the upward trend line indicates an increase in TCE concentrations since sampling commenced. However, this upward trend is apparent and not statistically significant because the slope of the trend line cannot be distinguished from zero.

Figure 4.3-1 Trichloroethene Trend Plot for Well 95199



PCE concentrations in well 23296 have been consistently above Tier II action levels as shown on Figure 4.3-2. Trend analysis of these data indicate a slight upward trend or increase in PCE concentrations with time. However, this trend is apparent and not statistically significant suggesting that PCE concentrations have remained unchanged with time. No outliers were detected during exploratory statistical analysis.

Figure 4.3-2 Tetrachloroethene Trend Plot for Well 23296



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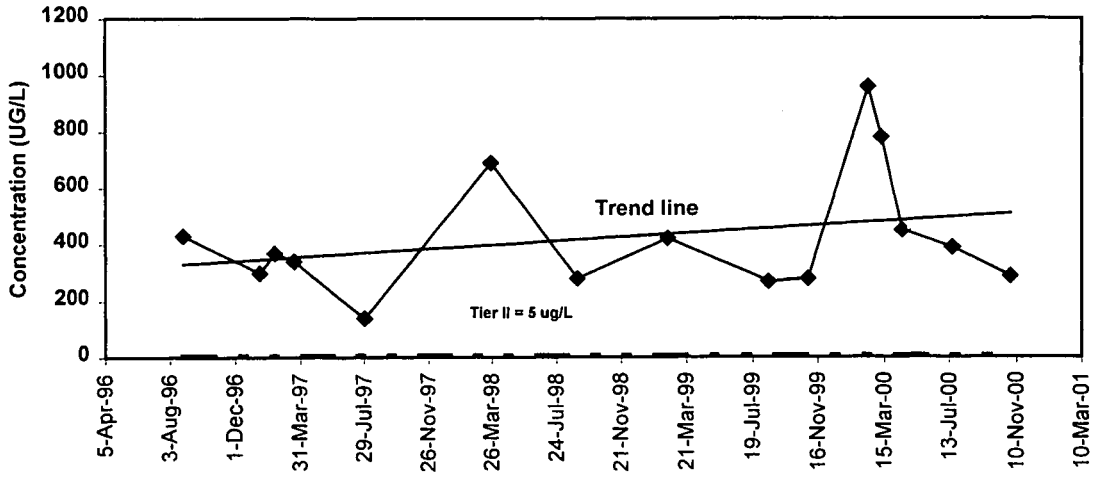
TCE concentrations in well 23296 have been consistently above Tier II levels and occasionally above Tier I (Figure 4.3-3). The maximum TCE concentration in well 23296 during 2000 was 960 µg/L. Trend analysis for these data shows a relatively flat slope with a slight upward trend. Statistically, this trend is insignificant indicating that TCE concentrations have not changed with time. No outliers were detected during summary statistical analysis.

Figure 4.3-3 Trichloroethene Trend Plot for Well 23296



The maximum concentration of cis-1,2-dichloroethene in well 23296 during 2000 was 120 ug/L (Figure 4.3-4). 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. However, this trend is apparent and statistically insignificant. No outliers were detected during exploratory statistical analysis.

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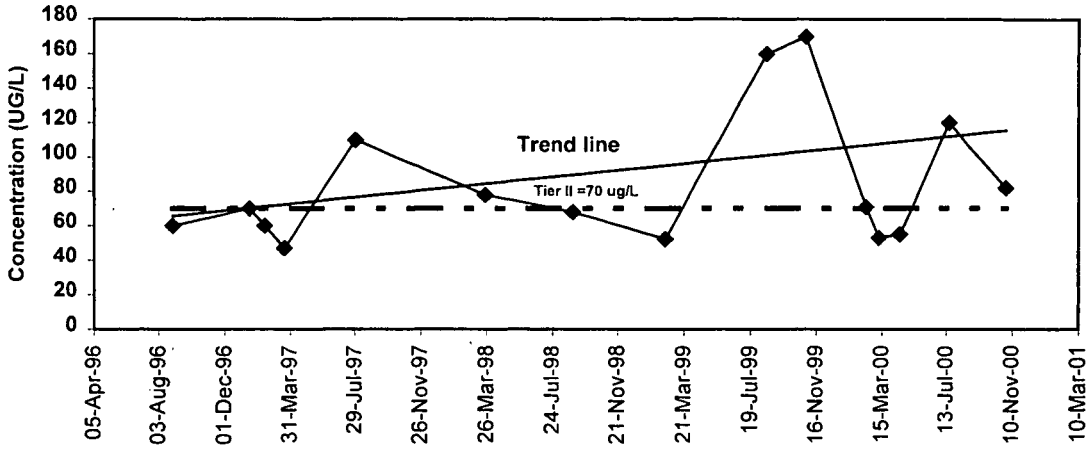
Figure 4.3-4 Cis-1,2-Dichloroethene Trend Plot for Well 23296



Concentrations of these contaminants in wells 95199 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 levels, qualified with a "J," of less than 1 µg/L of TCE, carbon tetrachloride, and chloroform have been detected in well 95099.

Well 95299 has been dry and, therefore, could not been sampled.

Hydrographs of wells 95099, 95199, and 23296 located downgradient of the interceptor trench for the ETPTS, are included in Appendix C. Water levels in these wells have remained relatively constant with time with no significant statistical trends present.

The ETPTS is fully operational and treating contaminated groundwater to below the specified system performance requirements. Monthly sampling during CY 2001 will continue to verify the performance of the treatment system. A complete set of analytical data for CY 2000 can be found in the RFCA Groundwater Quarterly Reports.

4.3.2 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 to remediate contaminated soils that were contributing to the degradation of groundwater in the area (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 4-6). Please refer to Section 4.3.1 for a description of the depositional history of Trenches T-3 and T-4.

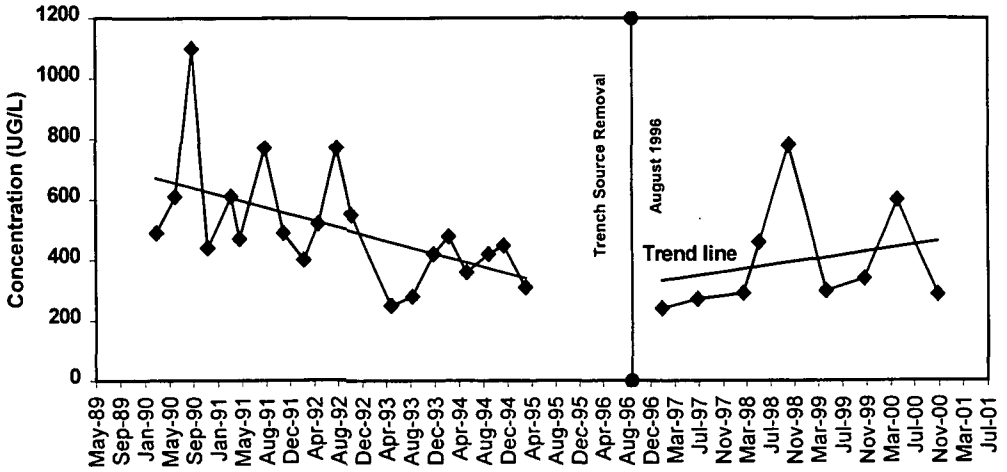
The accelerated source removal action consisted of the excavation and treatment of approximately 3,800 cubic yards of soil contaminated with VOCs, above the Tier I ALF for subsurface soil (RMRS, 1996d). The *Completion Report for the Source Removal at Trenches T-3 and T-4 (IHSSs 110 and 111.1),* (RMRS, 1996d) summarizes the source removal action. The removed soil and debris were treated using low temperature thermal desorption treatment technology to remove VOCs, which consisted primarily of carbon tetrachloride, PCE, TCE, and additional VOCs as summarized in the Completion Report (RMRS, 1996d). The excavation and treatment activities were completed in August 1996, and the treated soils were returned to the excavations in September 1996. The area was then revegetated (RMRS, 1996d).

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 Proposed Action Memorandum (PAM) (RMRS, 1996e). However, it was decided that because of the difficulty of excavating deeper into the bedrock sandstone (encountered at a depth of 22 feet) and because the 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 4.3-5). A trend plot for PCE in this well indicates a downward trend prior to source removal in the east trenches. 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 4.3-5 Tetrachloroethene Trend Plot For Well 3687



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Prior to conducting the trend analysis, the data were evaluated for outliers. The results of exploratory statistical methods, as shown in Figures 4.3-6 to 4.3-8, indicate that one low PCE value was considered highly suspect and was excluded from further analysis.

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

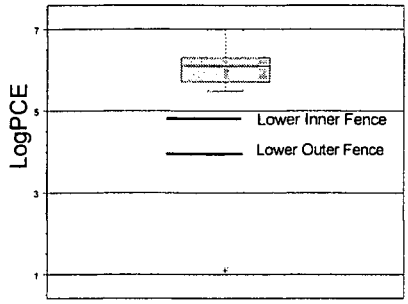

Figure 4.3-7 Histogram of Tetrachloroethene in Well 3687

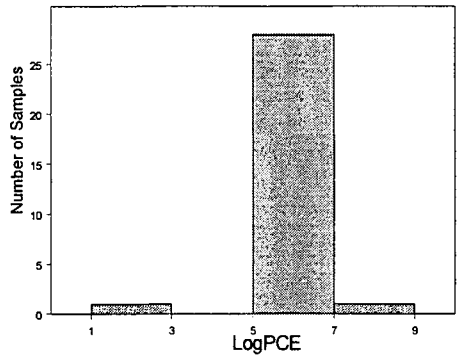

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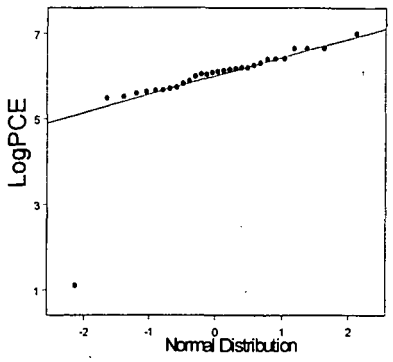
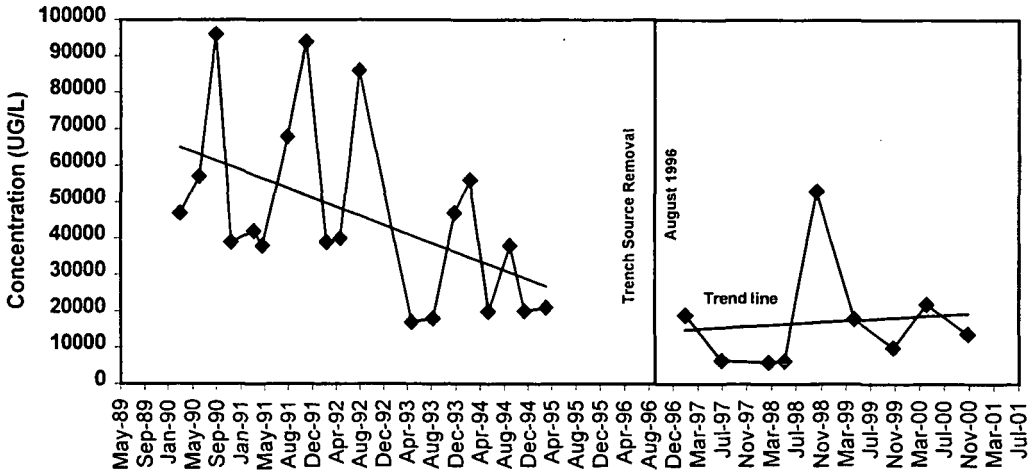
Figure 4.3-8 Probability Plot of Tetrachloroethene in Well 3687



TCE concentrations in well 3687 have also been generally decreasing with time. A trend plot (Figure 4.3-9) indicates a 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 this latter trend line cannot be statistically differentiated from zero indicating that TCE concentrations have remained unchanged with time.

Figure 4.3-9 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 4.3-10) indicates that two values are highly suspect because they lie outside the lower outer fence. The histogram and

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probability plot (Figures 4.3-11 and 4.3-12) 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 4.3-10 Box and Whisker Plot of Trichloroethene in Well 3687

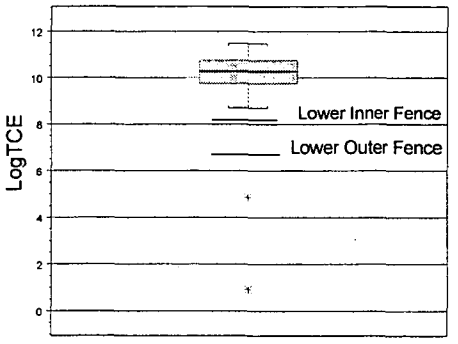


Figure 4.3-11 Histogram of Trichloroethene in Well 3687

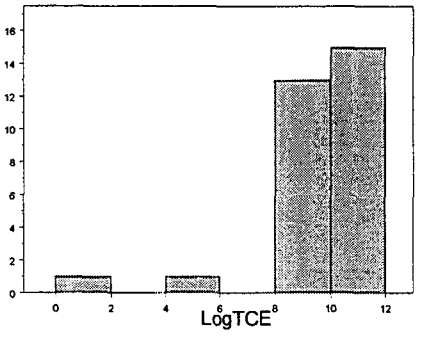
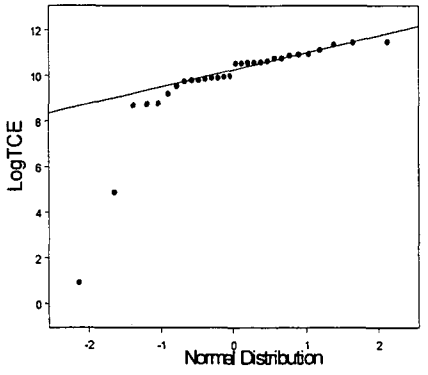


Figure 4.3-12 Probability Plot of Trichloroethene in Well 3687



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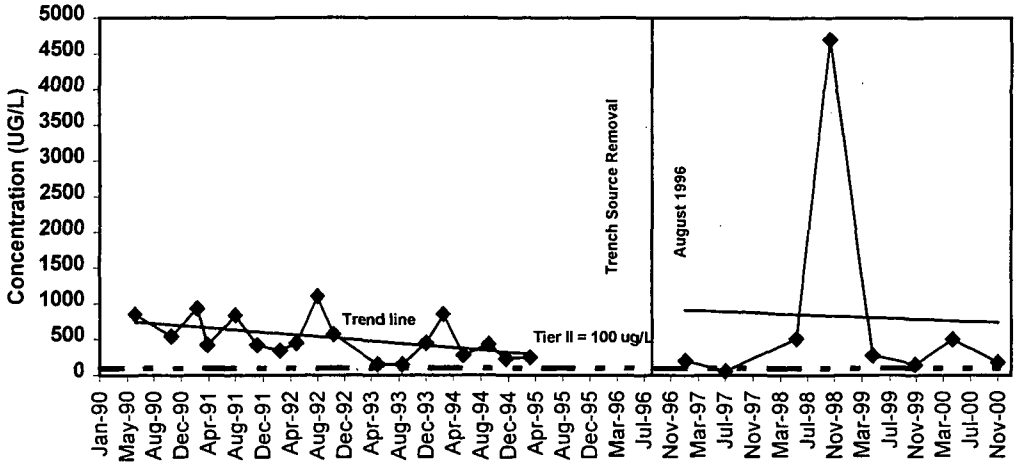
Chloroform concentrations in well 3687 have been generally decreasing except for a sharp spike that occurred in the 4th Quarter 1998 (Figure 4.3-13). This spike appears to coincide with similar increases in PCE and TCE as shown on figures 4.3-5 and 4.3-9 and occurs after trench source material had been 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 has been 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 4.3-13 Chloroform Trend Plot for Well 3687



Statistical analysis of the chloroform data indicates the presence of one low outlier (Figures 4.3-14 to 4.3-16). 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 and was connected to the main data on the histogram (Figure 4.3-15).

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

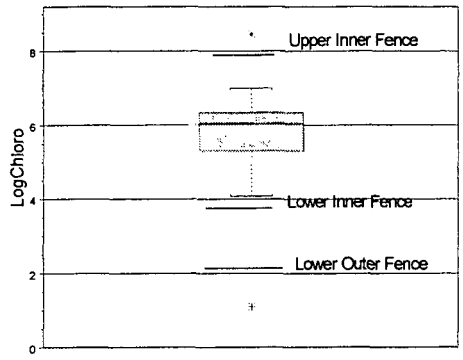


Figure 4.3-15 Histogram of Chloroform in Well 3687

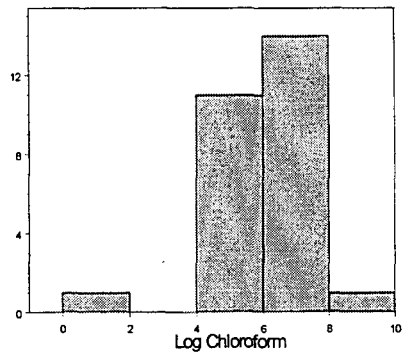
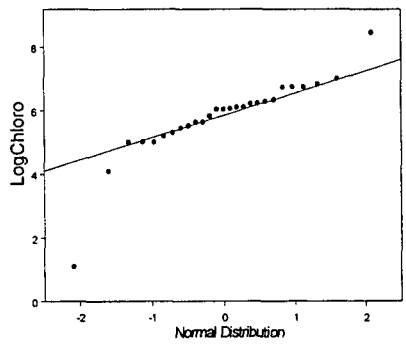


Figure 4.3-16 Probability Plot of Chloroform in Well 3687



Since 1993, carbon tetrachloride concentrations in well 3687 have remained fairly constant as shown by the relatively flat trend lines on Figure 4.3-17. 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 levels.

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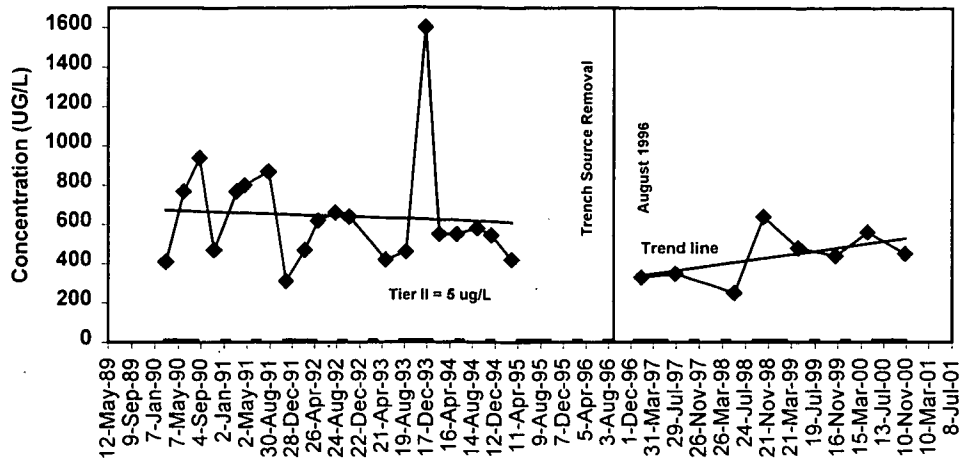
Figure 4.3-17 Carbon Tetrachloride Trend Plot for Well 3687



Statistical analysis of the carbon tetrachloride data indicates the presence of one low outlier (Figures 4.3-18 to 4.3-20). 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 plot also indicate 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 connected to the main data on the histogram (Figures 4.3-13 and 4.3-14).

Figure 4.3-18 Box and Whisker Plot of Carbon Tetrachloride in Well 3687

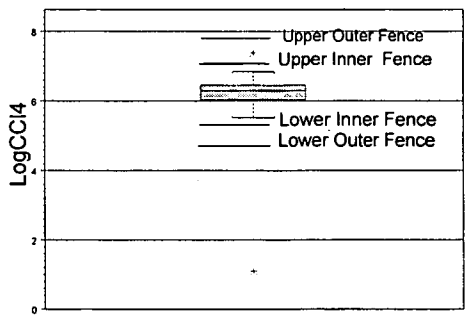


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Figure 4.3-19 Histogram of Carbon Tetrachloride in Well 3687

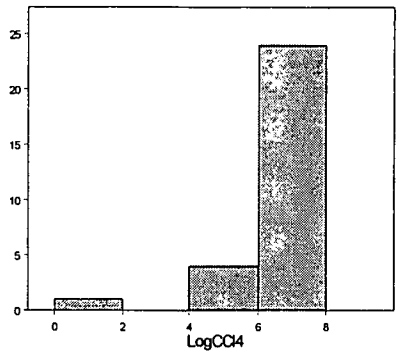
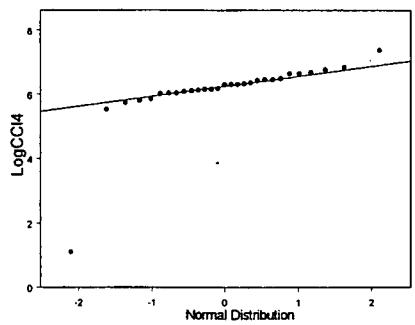


Figure 4.3-20 Probability Plot of Carbon Tetrachloride in Well 3687



The methylene chloride concentrations in well 3687 have either been non-detect or have been qualified with a "B" 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 through the 3rd Quarter 1995 (Figures 4.3-21 to 4.3-23). After this time, PCE and carbon tetrachloride concentrations appear to increase to current concentrations above Tier II action levels as illustrated by the upward trend line on Figures 4.3-21 and 4.3-23, while TCE concentrations have remained fairly constant (Figure 4.3-22). No outliers were identified during exploratory statistical analysis of these compounds.

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Figure 4.3-21 Tetrachloroethene Trend Plot for Well 05691

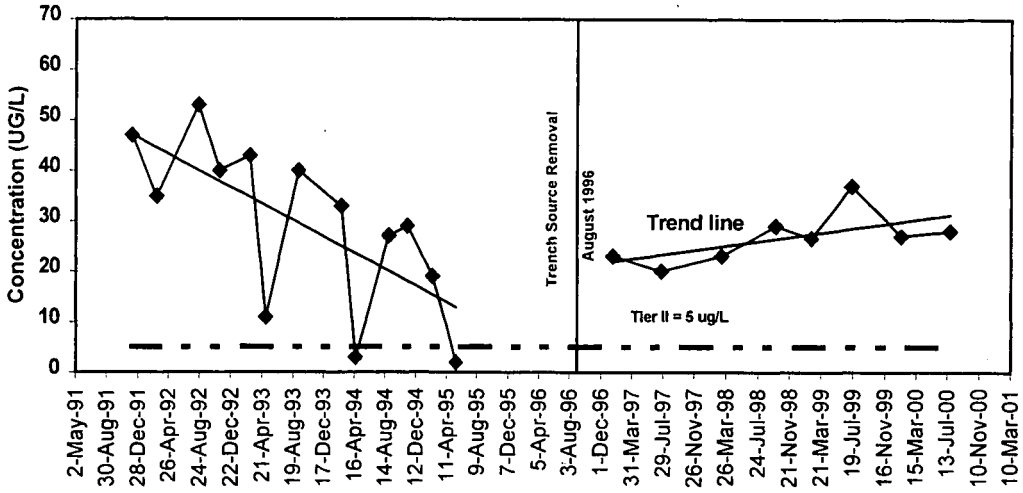
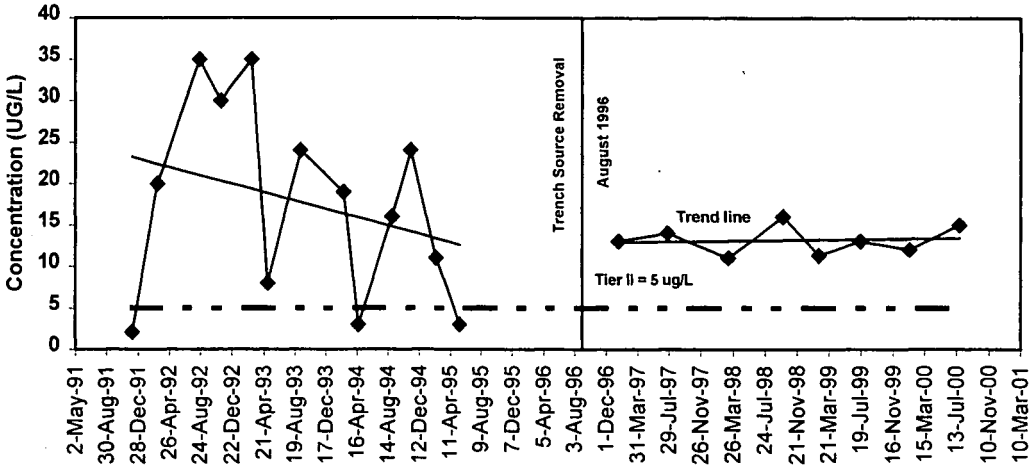
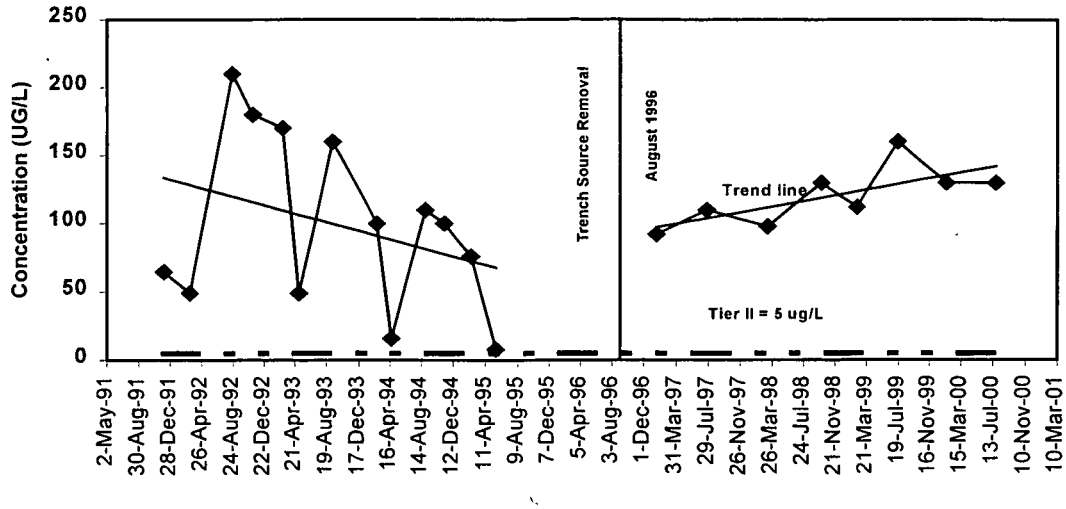


Figure 4.3-22 Trichlorothene Trend Plot for Well 05691



120

Figure 4.3-23 Carbon Tetrachloride Trend Plot of Well 05691



PCE and carbon tetrachloride concentrations have generally increased with time in well 11891 as shown on Figures 4.3-24 and 4.3-25. 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 and subsequent to treatment of trench source material. However, because of the rather poor correlation and fit of data to the linear model, the slope of these trends is statistically the same and cannot be differentiated from zero. Trend analysis for carbon tetrachloride data collected after remediation of trench source material indicates a statistically significant upward trend to the data from well 11891, whereas the slope of the trend line for the early data is not significant. Concentrations of PCE and carbon tetrachloride have been consistently above Tier II action levels.

Figure 4.3-24 Tetrachloroethene Trend Plot for Well 11891

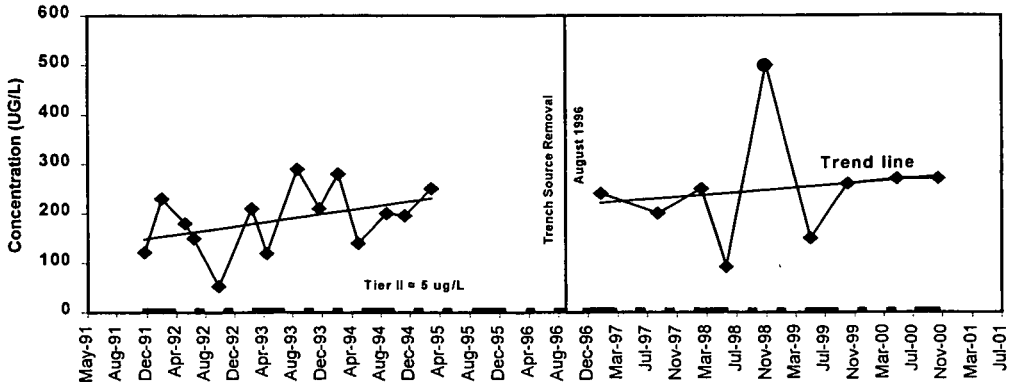


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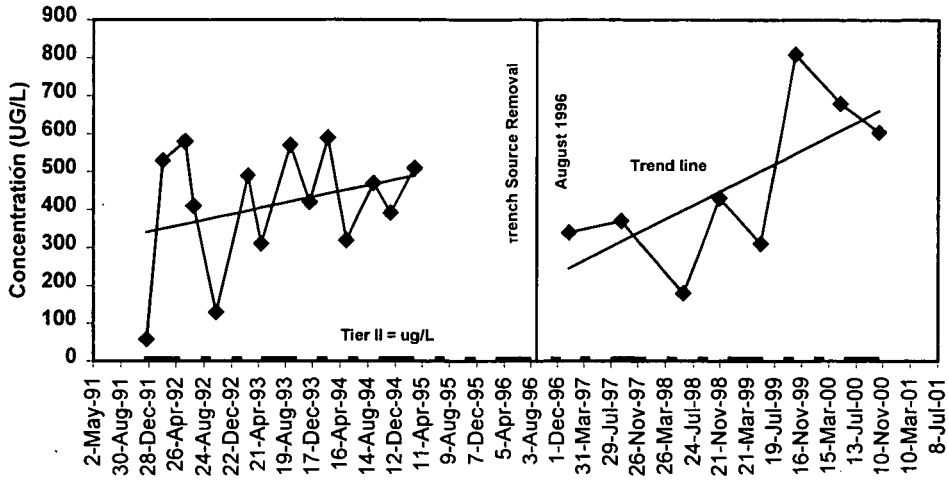
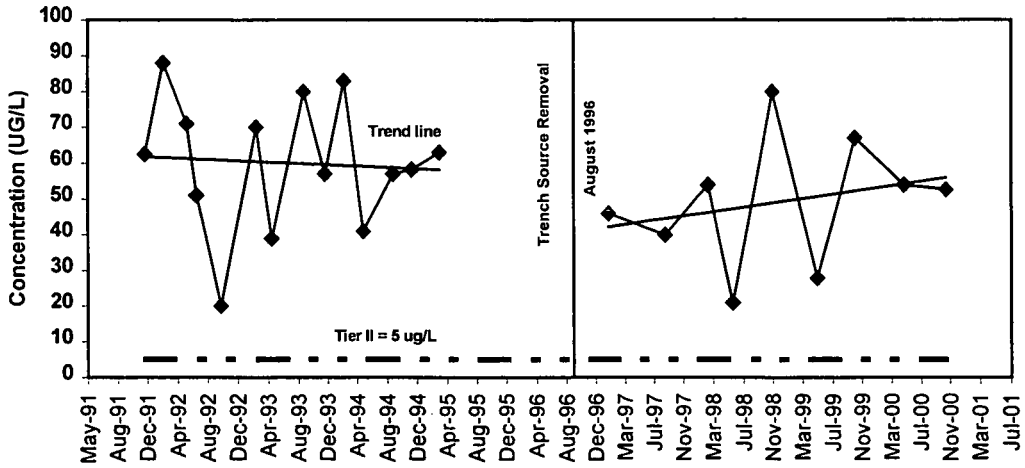
Figure 4.3-25 Carbon Tetrachloride Trend Plot for Well 11891



Except for one exceedance, PCE concentrations have been below the Tier I level. Carbon tetrachloride concentrations have frequently been above Tier I action levels. Although TCE concentrations in well 11891 have fluctuated dramatically (Figure 4.3-26), 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 4.3-26 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 4.3-27 to 4.3-29). 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 4.3-27 Tetrachloroethene Trend Plot for Well 12691

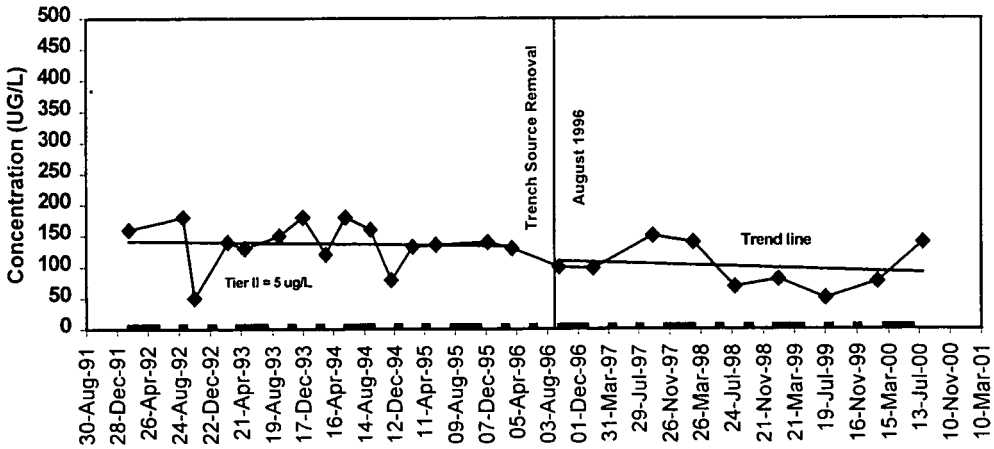

Figure 4.3-28 Trichloroethene Trend Plot for Well 12691

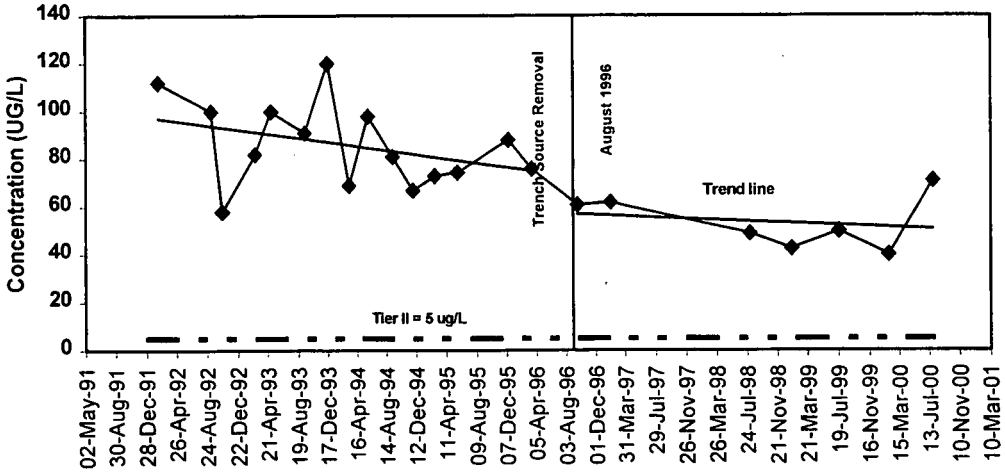

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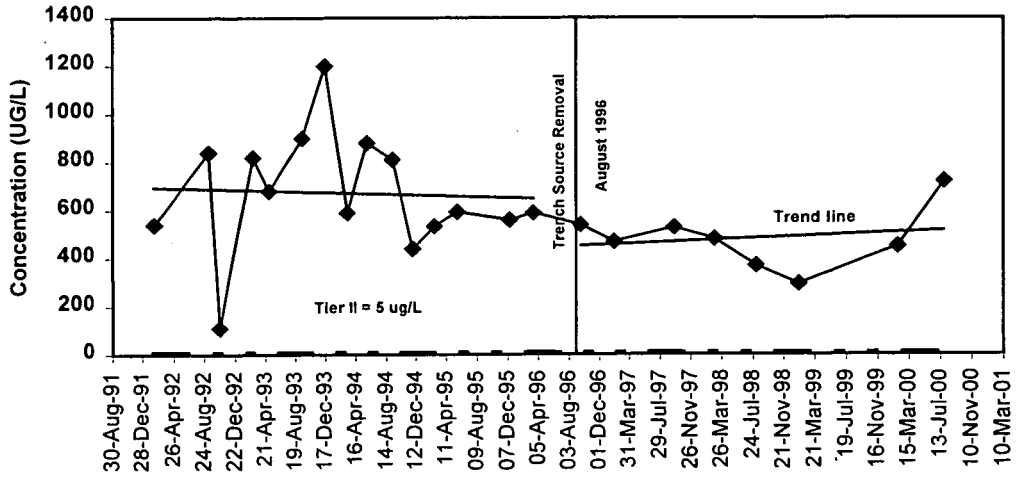
Figure 4.3-29 Carbon Tetrachloride Trend Plot for Well 12691



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 4.3-30). In addition, the value was detached from the main body of data on the histogram (Figure 4.3-31) and departed significantly from the best-fit line on the probability plot (Figure 4.3-32).

Figure 4.3-30 Box and Whisker Plot of PCE in Well 12691

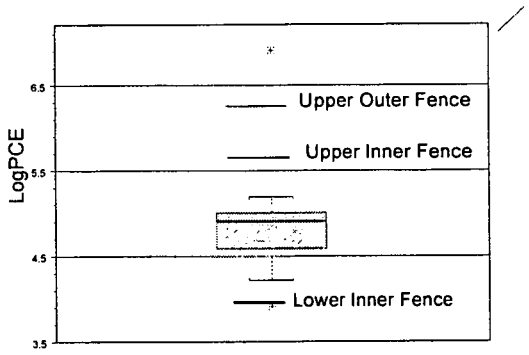


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Figure 4.3-31 Histogram of PCE in Well 12691

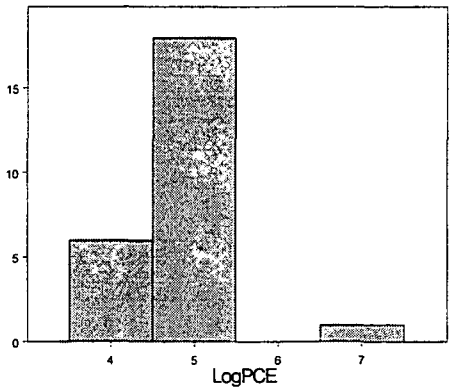
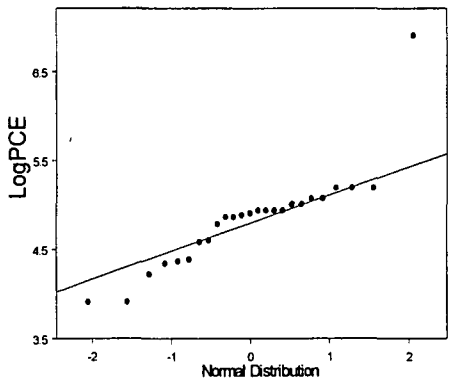


Figure 4.3-32 Probability Plot of PCE in Well 12691



Two outliers, one high and one low value, were identified in the well 12691 TCE data and were excluded from further trend analysis. These values are shown on Figures 4.3-33 to 4.3-35.

Figure 4.3-33 Box and Whisker Plot of TCE in Well 12691

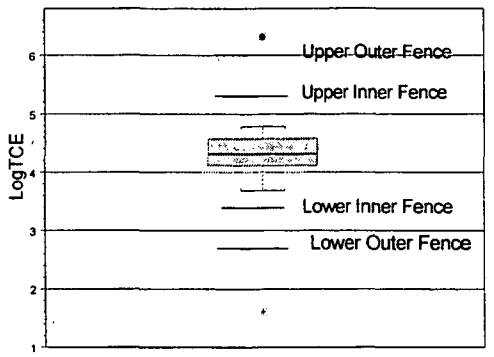


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Figure 4.3-34 Histogram of TCE in Well 12691

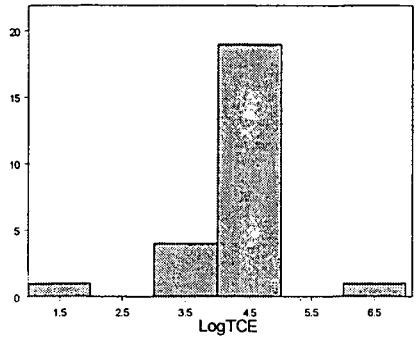
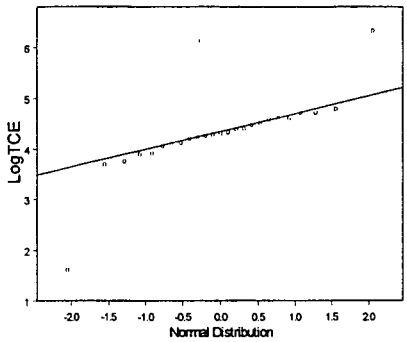


Figure 4.3-35 Probability Plot of TCE in Well 12691



Exploratory statistical analysis identified two 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 one was a low value that lay below the lower outer fence (4.3-36). Although these values may not be apparent outliers on the histogram (Figure 4.3-37), these points depart significantly from the best-fit line on the normal probability plot (Figure 4.3-38).

Figure 4.3-36 Box and Whisker Plot of Carbon Tetrachloride in Well 12691

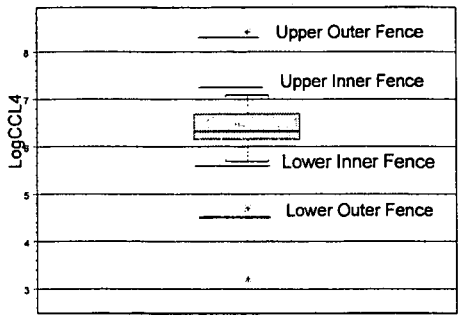


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Figure 4.3-37 Histogram of Carbon Tetrachloride in Well 12691

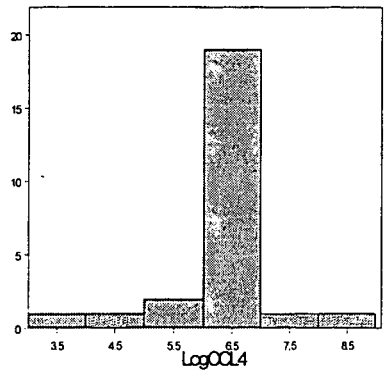
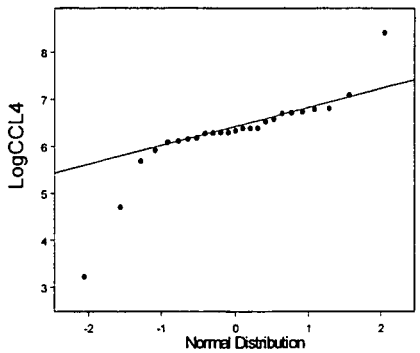


Figure 4.3-38 Probability Plot of Carbon Tetrachloride in Well 12691



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 4.3-39). However, the long-term trend in PCE concentrations has remained constant as illustrated by the relatively flat slope (zero slope statistically) of the trend line in Figure 4.3-39.

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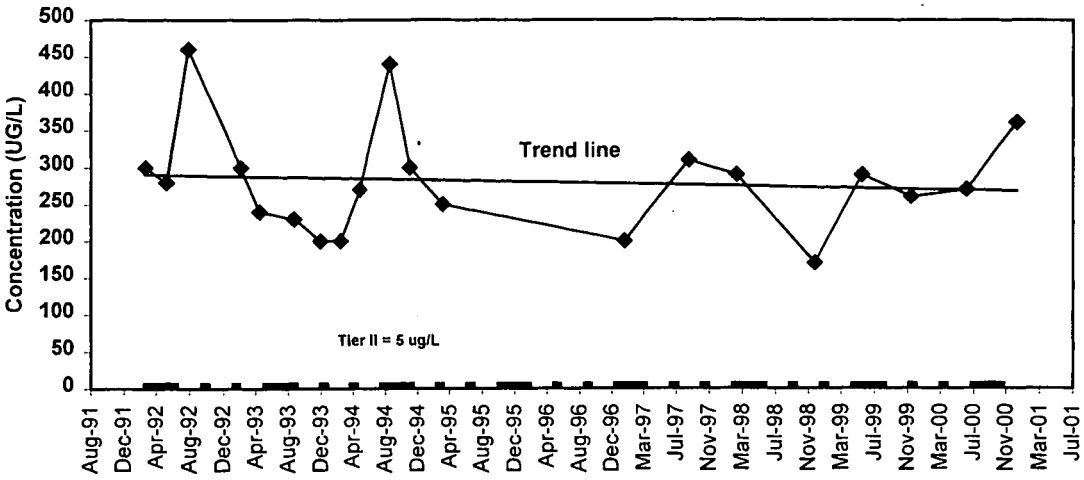
Figure 4.3-39 Tetrachloroethene Trend Plot for Well 12191



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 4.3-40) below the lower outer fence. A histogram and probability plot of the data also support this conclusion (Figures 4.3-41 and 4.3-42).

Figure 4.3-40 Box and Whisker Plot of PCE in Well 12191

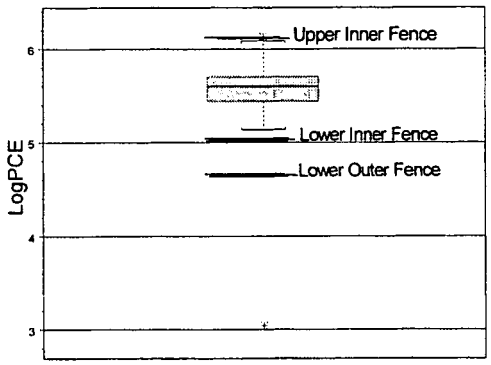


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Figure 4.3-41Histogram of PCE in Well 12191

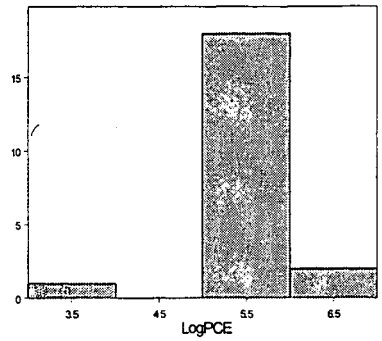
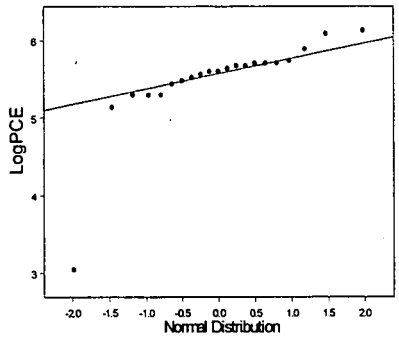


Figure 4.3-42 Probability Plot of PCE in Well 12191



TCE concentrations range from 20 to 68 µg/L in well 12191and exhibit temporal fluctuations similar to PCE (Figure 4.3-43). 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.

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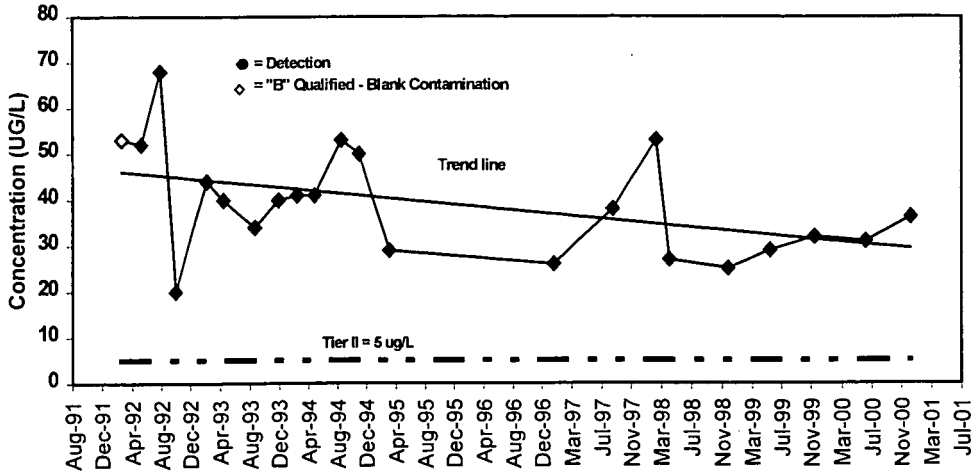
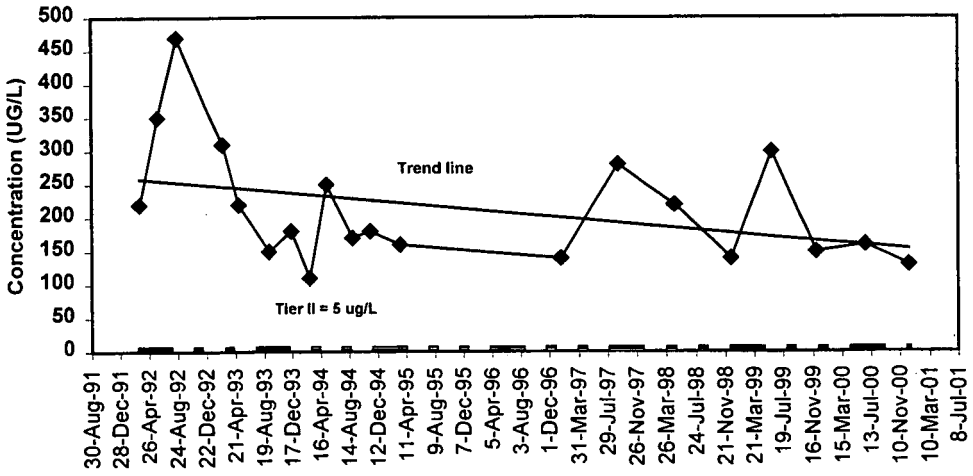
Figure 4.3-43 Trichloroethene Trend Plot for Well 12191



Carbon tetrachloride concentrations in well 12191 range from 110 to 470 µg/L and appear to be decreasing with time (Figure 4.3-44). 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 4.3-44 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 4.3-45), 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 4.3-46 and 4.3-47).

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Figure 4.3-45 Box and Whisker Plot of Carbon Tetrachloride in Well 12191

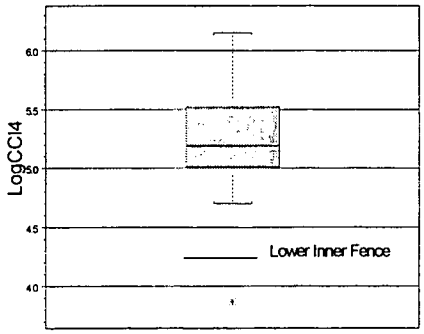


Figure 4.3-46 Histogram of Carbon Tetrachloride in Well 12191

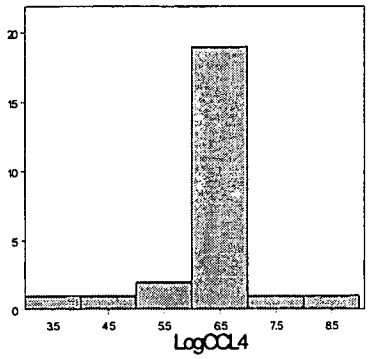
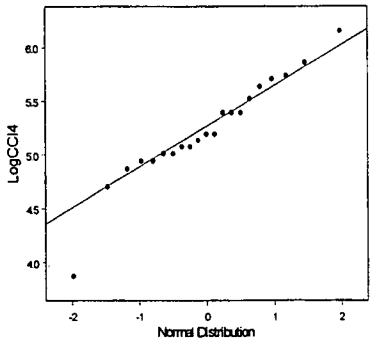


Figure 4.3-47 Probability Plot of Carbon Tetrachloride in Well 12191



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.

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In summary, concentrations of PCE, TCE, and chloroform downgradient of Trenches T3 and T4 have decreased in wells 11891 and 3687 prior to the accelerated source removal action. Since the source removal action, concentrations of these contaminants have remained essentially unchanged. An increase in carbon tetratchloride concentrations has occurred in well 11891 since removal of trench source material. 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.

4.4 881 Hillside French Drain

The former Operable Unit (OU) 1 is also referred to as the 881 Hillside Area. The former OU 1 is located just south of the IA on the hillside south of Building 881, 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 OU 1 flowing west to east just north of and parallel to Woman Creek. Figure 4-6 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 Interim Measure/Interim Remedial Action (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 OU 1. The french drain along with an upgradient extraction well (891COLWEL) constitutes the 881 Hillside groundwater collection and treatment system. The system collects 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 1999, to the Combined 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, OU 1 is continuing 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). The IHSS is located on a south-facing hillside where locally saturated, unconsolidated surficial materials overlie weathered claystone bedrock. Groundwater occurrence in the IHSS 119.1 area is limited and primarily found in the unconsolidated surficial materials and in isolated northwest-southeast trending paleochannel 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 evapotranspiration 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 concern 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 concern were well below the ALF 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.

Plate 12, the VOCs and nitrate composite plume map, has been updated to reflect sampling results from 2000. Groundwater sample results from the 891COLWEL for 2000 indicate no Tier I exceedances for VOC contaminants occurred. 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 downward trend line. Current TCE concentrations are substantially above Tier II action levels.

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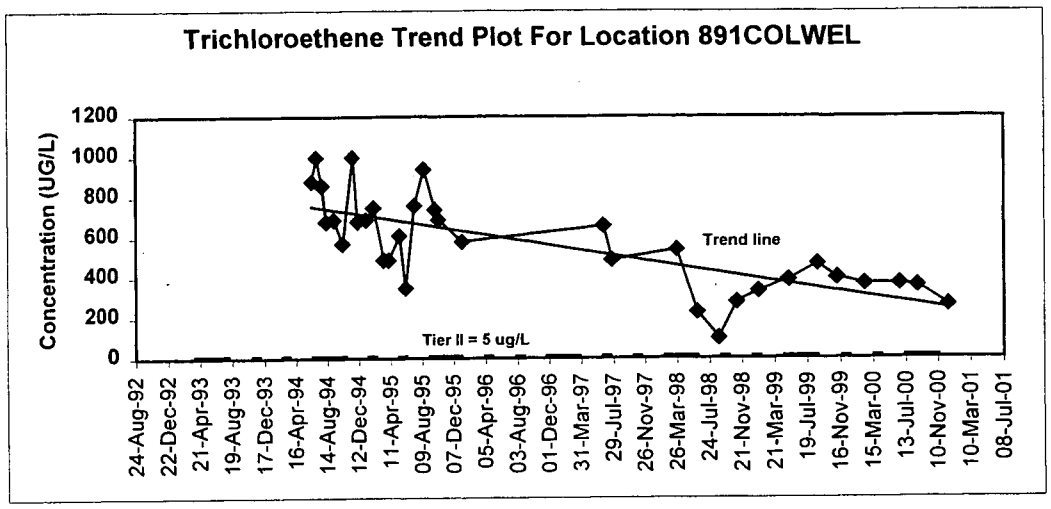
Figure 4.4-1 Trichloroethene Trend Plot for 891COLWEL



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

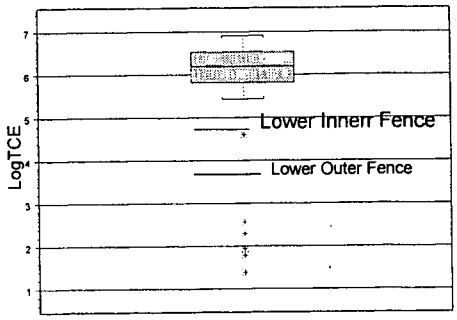


Figure 4.4-3 Histogram of Trichloroethene in 891COLWEL

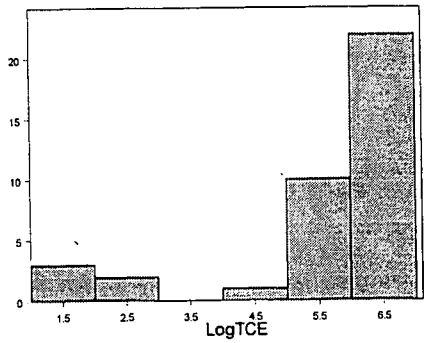


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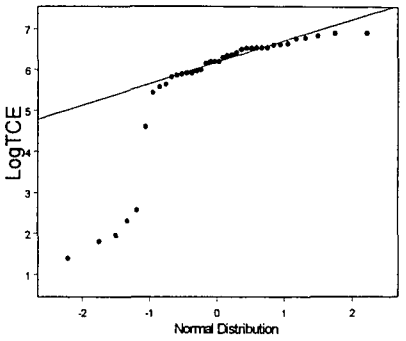
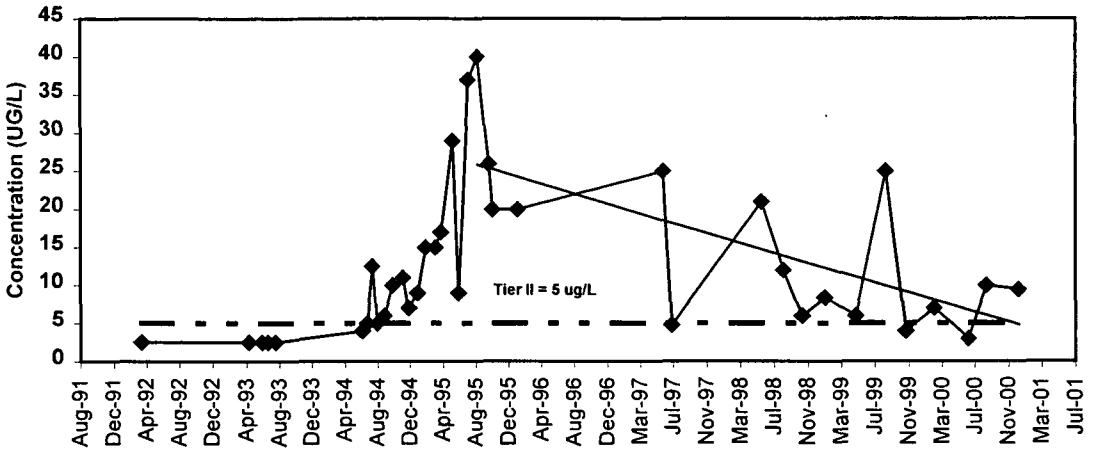
Figure 4.4-4 Probability Plot of Trichloroethene in 891COLWEL



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 July 1994 exhibit one distinct trend while the later data appear to exhibit another. Based on the bi-modal nature of the data, two trend analysis were performed. These analysis indicate statistically significant trends occur for both the early and latter data. The early data exhibit an upward trend while the latter data display a downward trend. No outliers were identified during statistical analysis of the PCE data.

Figure 4.4-5 Tetrachlorethene 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 levels. Based on the bi-modal nature of the data, two trend analysis were performed. These analysis indicate statistically significant trends occur for both the early and latter data. The early data exhibit an upward trend while the latter data display a downward trend.

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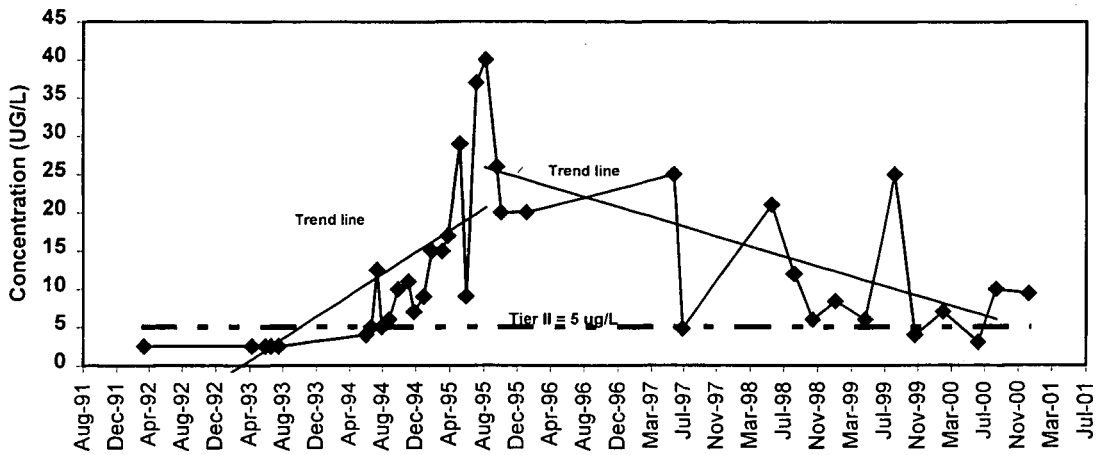
Figure 4.4-6 Carbon Tetrachloride Trend Plot for 891COLWEL



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

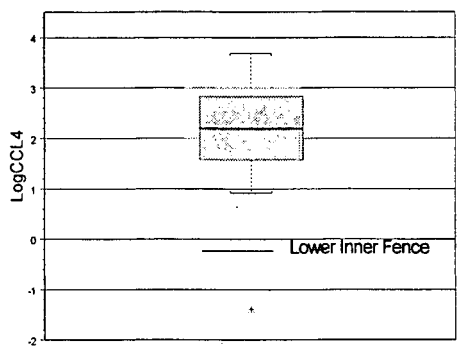


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Figure 4.4-8 Histogram of Carbon Tetrachloride in 891COLWEL

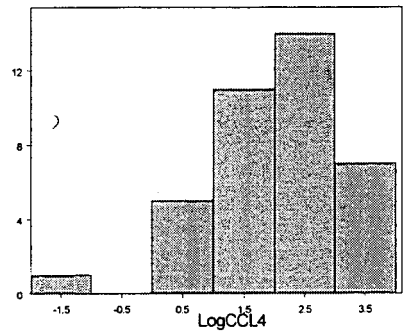
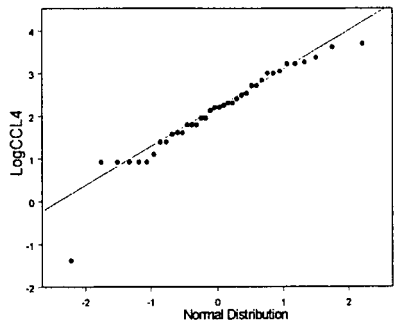


Figure 4.4-9 Probability Plot of Carbon Tetrachloride in 891COLWEL



891COLWELL samples collected during 2000 showed slight Tier II exceedances of 1,1-DCE (Figure 4.4-10). Based on the bi-modal nature of the data, two trend analysis were performed. These analysis indicate statistically significant trends occur for both the early and latter data. The early data exhibit an upward trend while the latter data display a downward trend. No outliers were identified during exploratory statistical analysis of the 1,1-DCE data.

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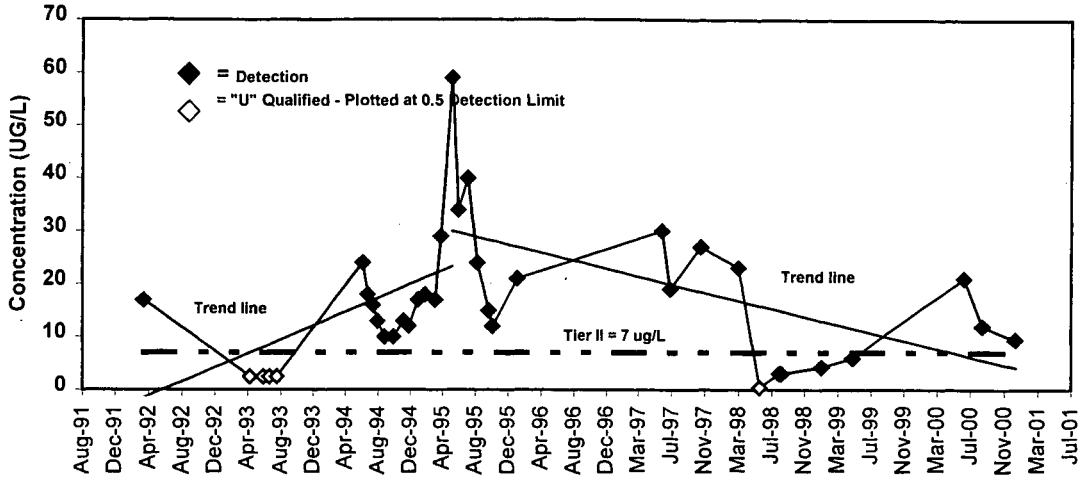
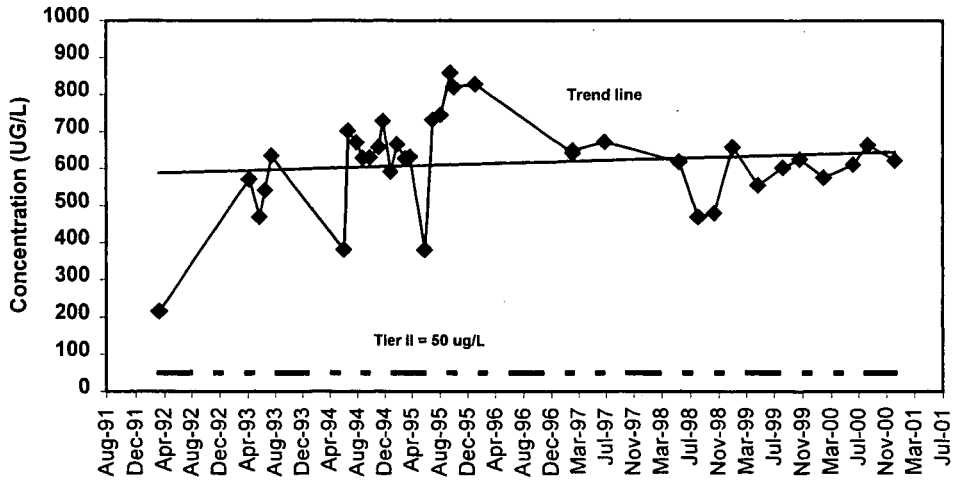
Figure 4.4-10 1,1-Dichloroethene Trend Plot for 891COLWEL



Except for several low "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 COLWELL has been generally one order of magnitude above Tier II action levels (Figure 4.4-11). There has been no statistical trend to selenium concentrations with time. No outliers were identified during statistical analysis.

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 2000.

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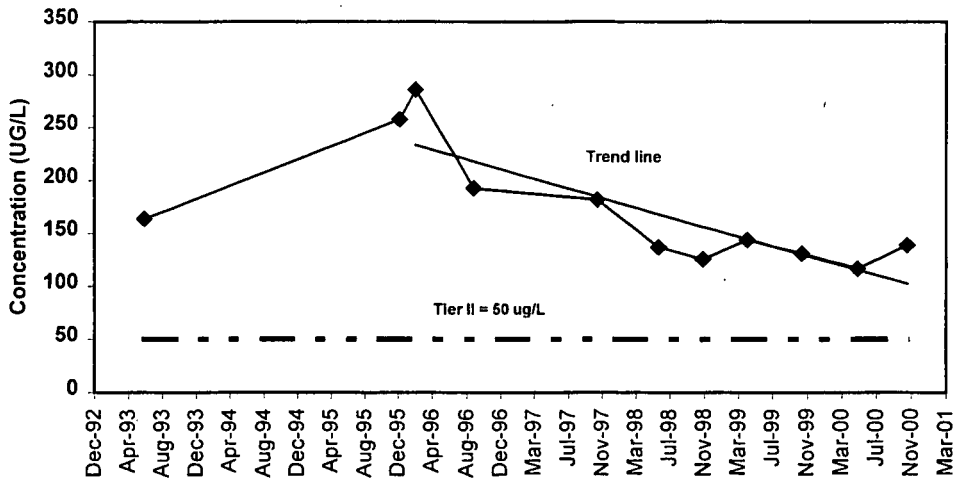
Selenium in well 10592 has historically been above the Tier II action level but has been decreasing with time since February 1996 as shown by the downward trend line in Figure 4.4-12. The trend analysis was performed on data since February 1996 because prior to that time there was a considerable hiatus in sample collection. The one early data point from December 1992 would tend to skew the regression analysis. No outliers are present in the selenium data.

Figure 4.4-12 Selenium Trend Plot for Well 10592



Selenium in well 10792 has been decreasing since January 1999 and is currently at approximately Tier II levels (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.

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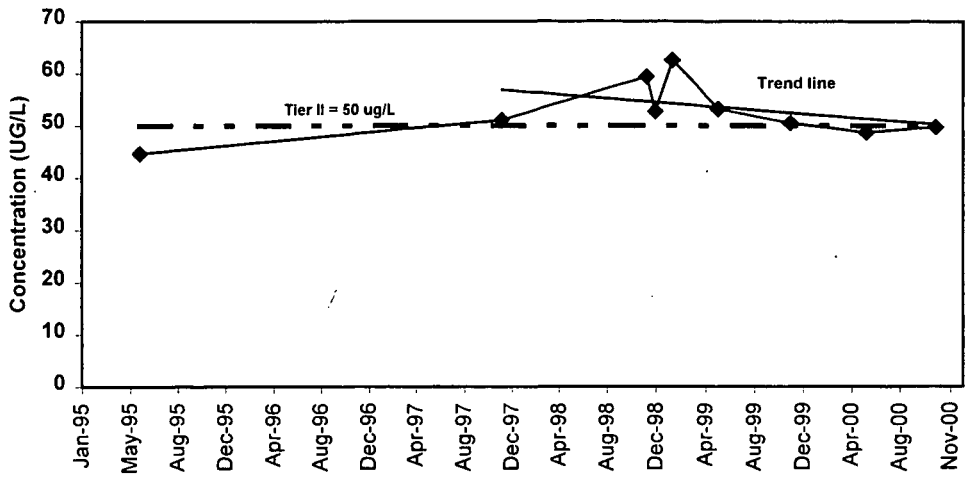
Figure 4.4-13 Selenium Trend Plot for Well 10792



One highly suspect selenium data point 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

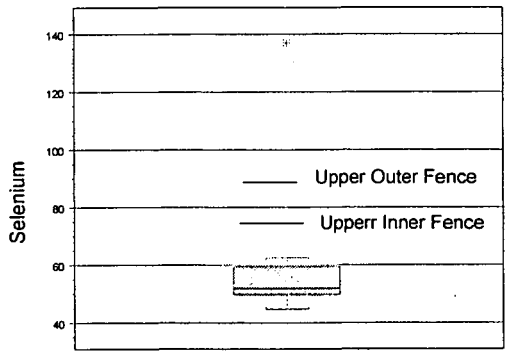


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Figure 4.4-15 Histogram of Selenium in Well 10792

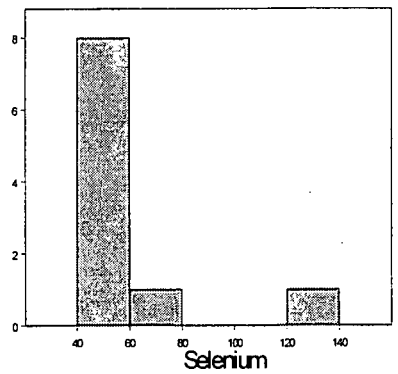
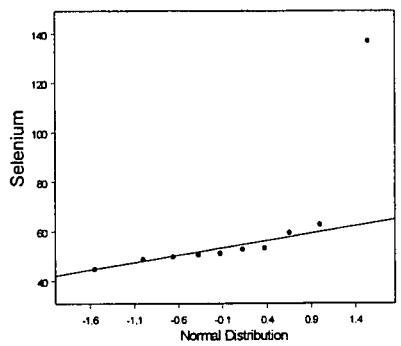


Figure 4.4-16 Probability Plot of Selenium in Well 10792



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 downward or negative slope. However, this trend is apparent and statistically insignificant. No outliers are present in the selenium data set.

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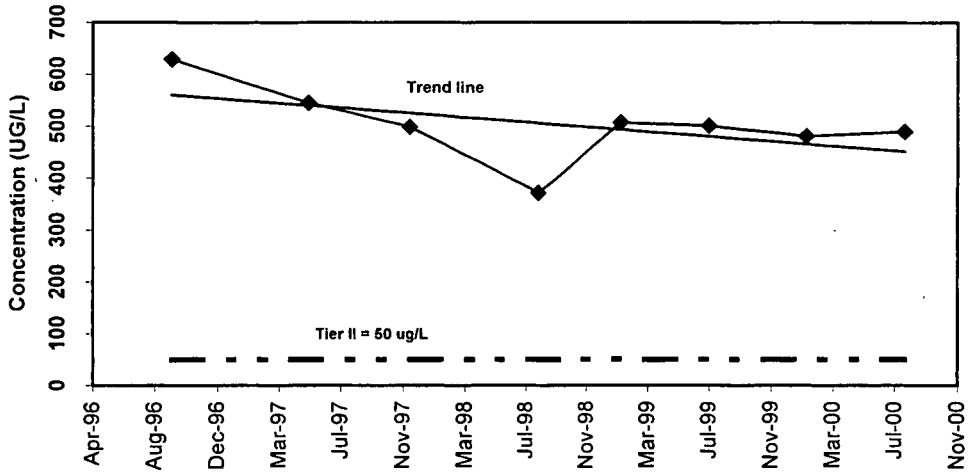
Figure 4.4-17 Selenium Trend Plot for Well 10992



A complete set of analytical data for CY 2000 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 wells 10692, 10792, and 11092 have remained fairly constant since the time of installation in 1992.

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 Drum Storage Area at RFETS (Figure 4-7). Ryan's Pit was ranked fourth on the IHSS Ranking and Prioritization List because of contaminant chemical concentrations in soil, high mobility, 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, TCE, and 1,1,1-TCA), paint thinners (toluene, ethylbenzene, and xylene), 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

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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 concern in subsurface soil from Ryan's Pit were PCE, TCE, and 1,1,1-TCA along with additional contaminants summarized in the Proposed Action Memorandum (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 concern 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 Drum Storage Area (see Section 7.2).

Concentrations of PCE in well 07391 have 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 an upward trend but is statistically insignificant because of poor correlation of the data. No outliers were identified during exploratory statistical analysis.

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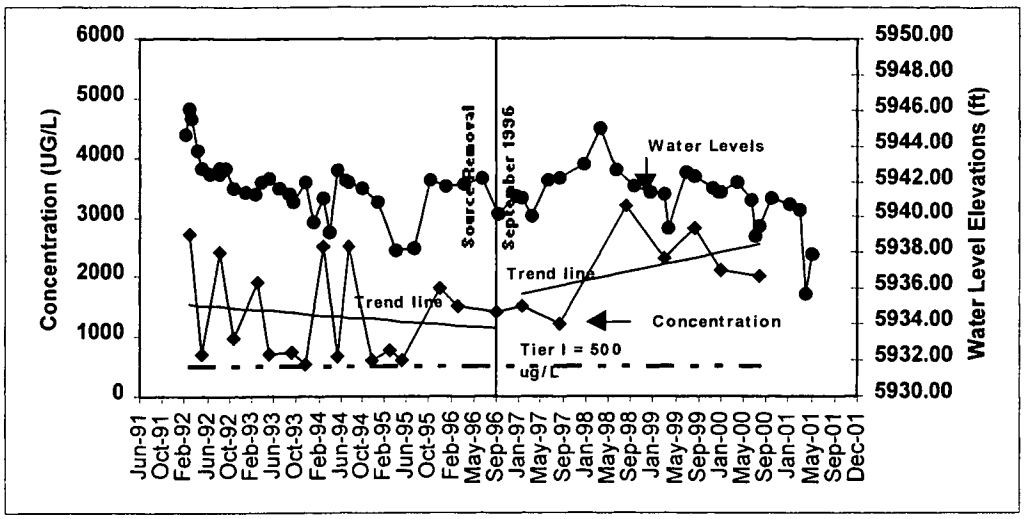
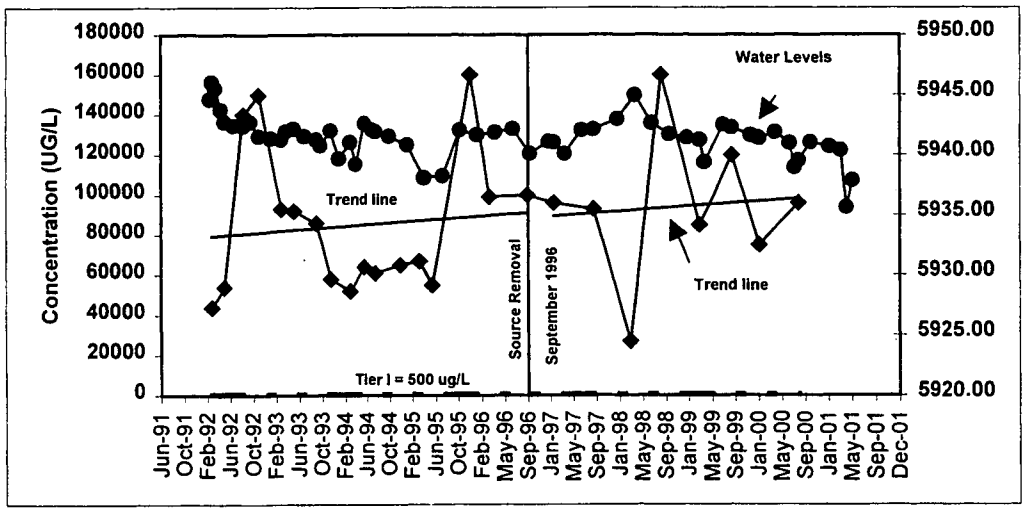
Figure 4.5-1Tetrachloroethene Trend Plot for Well 07391



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 2000 indicates concentrations are still present above 70,000 µg/L. Although a slight upward trend in the data is discernible, the trend is apparent with no statistical significance 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 Tier II action levels since August 1997. However, despite considerable fluctuations, 1,1,1-TCE concentrations appear to have remained constant. Because of the high proportion of non-detects (50 percent), a trend analysis was not conducted.

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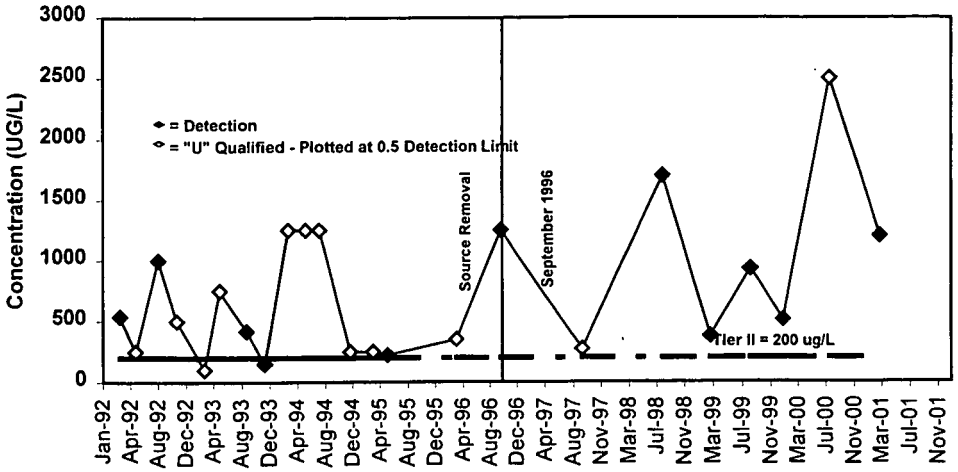
Figure 4.5-3 1,1,1-Trichloroethane Trend Plot for Well 07391



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

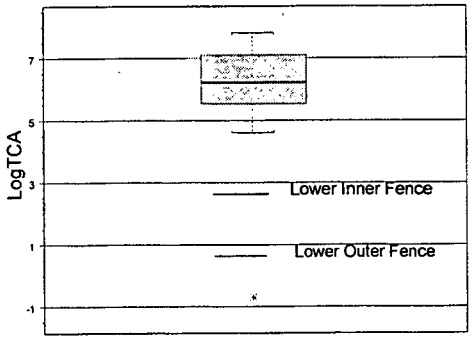


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Figure 4.5-5 Histogram of 1,1,1-Trichloroethane for Well 07391

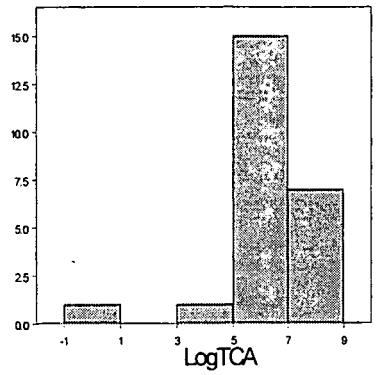
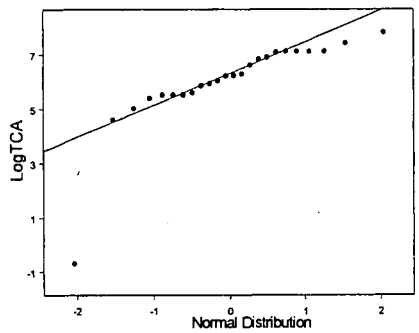


Figure 4.5-6 Probability Plot of 1,1,1-Trichloroethane for Well 07391



Chloroform concentrations in well 07391 have fluctuated substantially with time and have been consistently above Tier II action levels (Figure 4.5-7). Chloroform concentrations have remained fairly constant prior to and after the removal of source material in Ryan's Pit. Statistically, there is no trend to either one of the regression lines.

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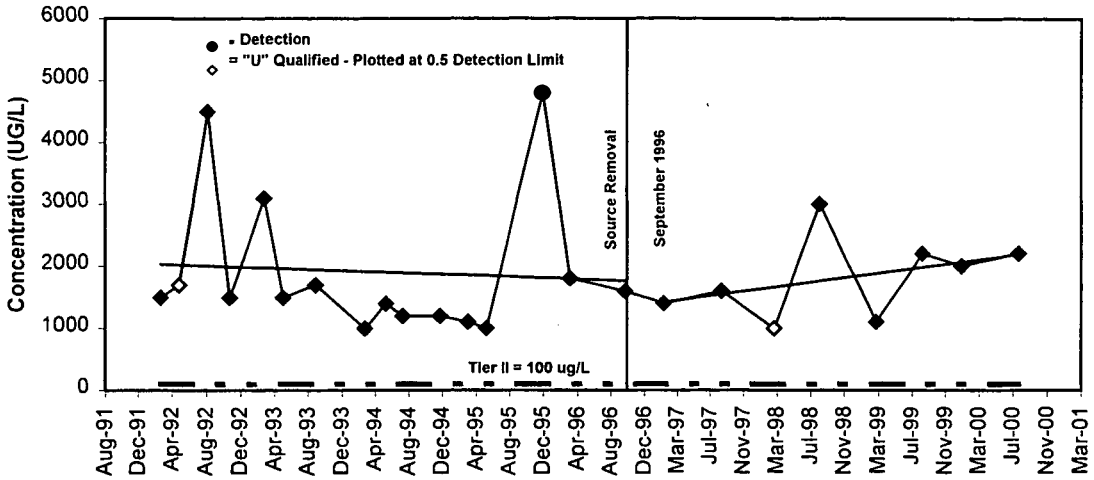
Figure 4.5-7 Chloroform Trend Plot for Well 07391



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

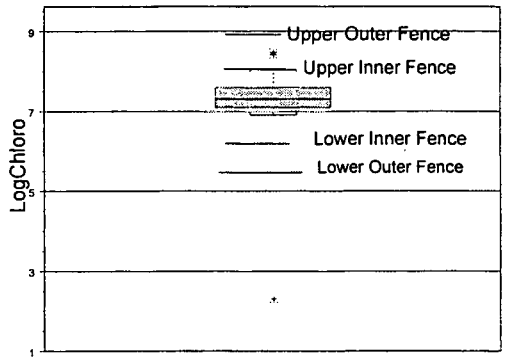


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Figure 4.5-9 Histogram of Chloroform for Well 07391

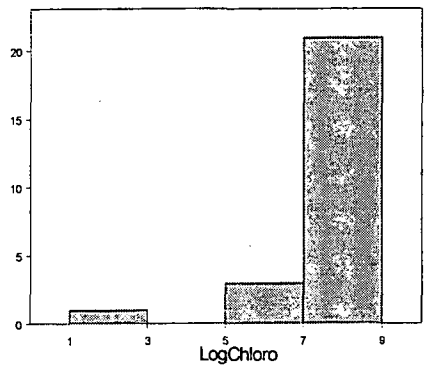
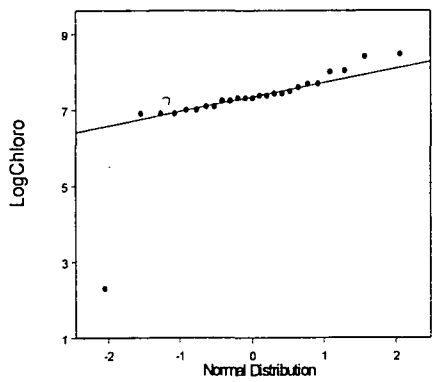


Figure 4.5-10 Probability Plot of Chloroform for Well 07391



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 Trench T-2 was removed. However, post treatment data indicate increasing activities as illustrated by the upward and positive slope to the trend line. Uranium-235 data collected in 2000 exceed background activities (M2SD = 1.79 pCi/L). Exploratory statistical analysis indicates there are no outliers in U-235 data.

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 is greater than the prescribed error commonly set at 0.05 (i.e., equivalent to a 95 percent confidence level). Instead of being 95 percent confident that the slope is negative, the confidence level for this negative slope has been reduced to 90 percent. With the exception of the first sample, U-238 activities during this time period have been below the U-238 background level.

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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)

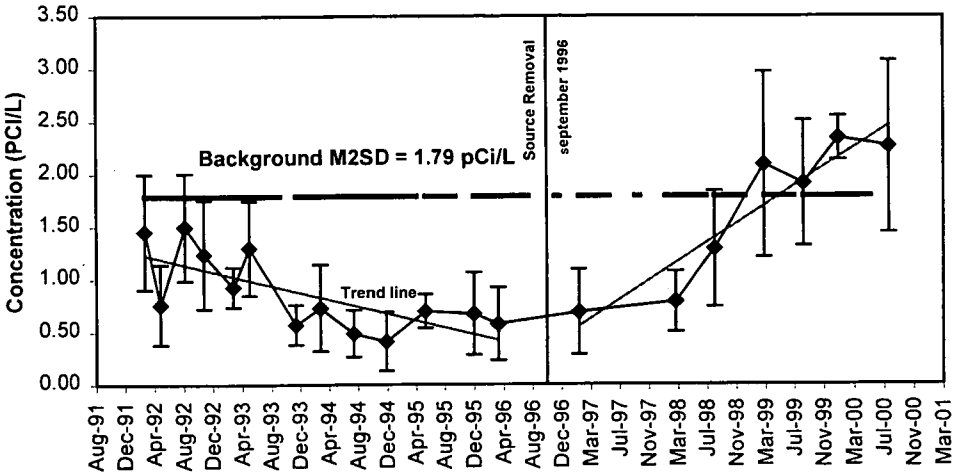
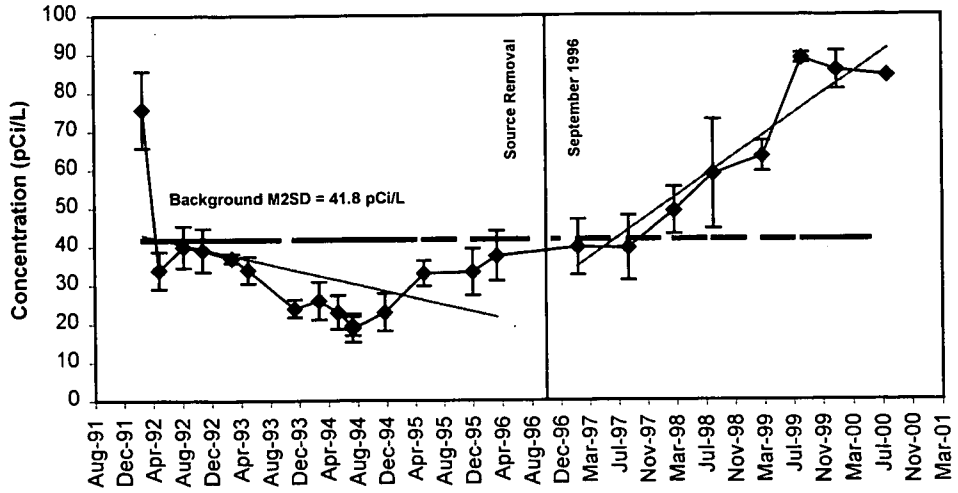


Figure 4.5-11 Uranium U-238 Trend Plot for Well 07391 With Error Bars (Note Use of Background M2SD for Comparison-Not Tier II Action Level)



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.

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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 treatment of the contaminated source material occurred. Monitoring of this well will continue until VOC concentrations decrease to acceptable levels. In contrast, sampling and analysis of U-isotopes such as U-235 and U-238 indicates that activities have increased with a statistically significant upward trend.

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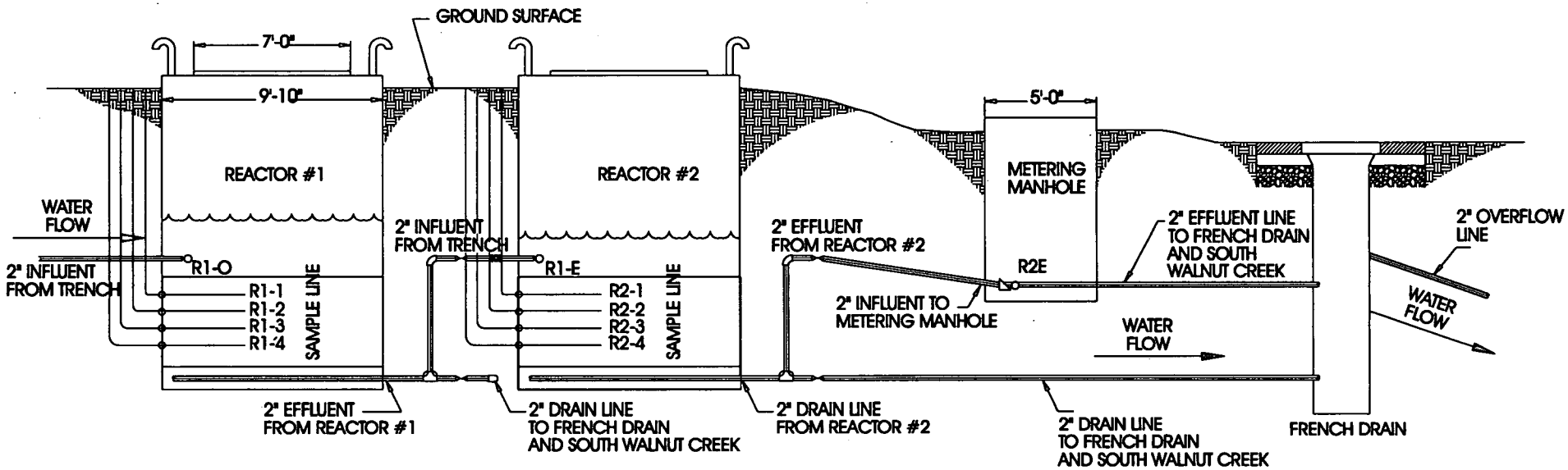

LEGEND

REACTIVE IRON

SAMPLE LOCATION

WATER LINE

NOT TO SCALE

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

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projects/fy2001/01-0870/MOUND_PLUME_TRT_CELLS

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5.0 BUILDING D&D MONITORING

The DOE decontamination and decommissioning (D&D) process is the sequence of events that occurs in the disposition of surplus DOE facilities. D&D is primarily concerned with decontamination, dismantling, removal, or entombment of the surplus facilities. The primary tasks associated with D&D are:

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

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).

Building specific D&D activities involve three major steps:

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

The IMP outlines groundwater monitoring activities established to ensure that building D&D activities do not 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. Exceedances to this baseline are defined as detected concentrations greater than the mean + 2 standard deviations (M2SD) above the baseline (K-H 1998b).

Based on the IMP, a minimum of four groundwater sampling events 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 may become accelerated for a given building if it is determined that D&D

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of that building has become accelerated or for specific areas at RFETS where groundwater sample aliquots are difficult to collect because of dry conditions.

Monitoring is being accomplished by the installation of D&D monitoring wells adjacent to the specific buildings. These wells, in conjunction with appropriately located preexisting wells, will provide the 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 utilizing sampling data from the previous three years.

If a baseline cannot be established, water quality with respect to a given building will be evaluated in terms of an upgradient/downgradient comparison of groundwater quality. 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 instance and are not RFCA or compliance driven with regard to building D&D. Occasionally, an analyte is discussed or listed in a table even though it may be found in concentrations that are below Tier II action levels. This is only done on a case by case basis for analytes that are contaminants of concern for specific buildings.

Building demolition is described in terms of the fiscal year (FY) that the demolition is projected to take place. Following is the current estimated schedule for demolition of buildings discussed in this section. Note that Building 123 and Building 779 have previously been demolished:

- Building 444 – mid to late FY 2004
- Building 771 complex – early to mid FY 2004
- Building 886 – late FY 2003 to early FY 2004
- Building 707 – late FY 2005
- Building 776/777 – late FY 2003
- Building 371/374 – early to mid FY 2006
- Building 865 – mid FY 2005
- Building 883 – mid FY 2005
- Building 881 – mid FY 2005
- Building 991 – late FY 2004 to early FY 2005
- Building 559 – early FY 2005

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Building D&D Monitoring is a relatively new section of the Annual RFCA Groundwater Monitoring Report. It will be expanded during each successive year to incorporate the D&D groundwater activities for that calendar year. The Section 5.0 subsections are organized by the particular buildings, as described in various Agency approved Sampling and Analysis Plans (SAPs) for Building D&D Groundwater Monitoring. The subsections below discuss historical D&D activities through 2000 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), and Building 776/777 (Section 5.7). Buildings 371/374, 865, 883, 881, 991 and 559 are discussed in the same subsection (Section 5.8) because there has been no D&D groundwater monitoring data collected for them through CY 2000.

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. All that remains is the concrete building foundation. Subsequent to demolition, six monitoring wells (10098-10598) were installed with a Geoprobe rig immediately adjacent to the building foundation. Wells 10098 and 10198 are upgradient. The rest of the wells are downgradient, with well 10598 potentially being cross gradient. 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 report 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 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 2000, five sampling rounds have been completed at the Building 123 D&D 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 quarter and one in the 3rd quarter, were completed during 1999 and 2000.

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. The Tier I and Tier II levels are only used as a screening tool and are not RFCA or compliance driven.

Table 5-1 presents a summary of historical Building 123 D&D groundwater monitoring data. The results of the five D&D groundwater sampling rounds completed at Building 123 to date indicate that metals analyses have exhibited no results above Tier II action levels in any of the Building 123 wells. There were no analyte concentrations greater than Tier I action levels for nitrate or U-isotopes; only an isolated Tier I exceedance for PCE in February 2000 in

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well 10498. The only concentrations greater than the Tier II action level for PCE (five samples, fall 1998 through 2000) and nitrate (in fall 1998, spring 1999, fall 2000) occurred in downgradient monitoring well 10498. 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 linear groundwater flow velocity of 167 ft/yr (1.609E-04 cm/sec) was calculated between upgradient well 10198 and downgradient well 10398 utilizing 2nd quarter 2000 water level data. Hydraulic conductivity (Rocky Flats Alluvium) and effective porosity values were used as described in Section 3.2 of this RFCA Annual Report. This flow velocity would allow groundwater to travel from well 10198 to well 10398 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.

In conclusion, there are no Building 123 upgradient VOC or nitrate concentrations which are greater than Tier II action levels compared to downgradient PCE concentrations (well 10498) that are greater than Tier I and Tier II action levels and downgradient nitrate concentrations (well 10498) 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 three downgradient wells (10298, 10398, and 10498). Monitoring wells 10198 and 10598 are unaffected to date by PCE, nitrate, and U-isotopes. Downgradient monitoring well 10498 is the most impacted well to date at Building 123. The geologic log for this well indicates that it may be installed in a utility corridor.

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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**
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
10298	Downgradient	8/98	U	0.61	**1.08**	**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
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
		8-9/00	U	4.1	INSW	INSW
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**
		8/00	**15**	**10**	**1.14**	**1.10**
10598	Upgradient/ Crossgradient	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

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

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. Building 444 complex is currently scheduled for demolition in 2004. This will allow adequate time to construct a groundwater chemistry baseline for these facilities.

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

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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 generally only been sampled three times through CY 2000. Preexisting well P419689 had no groundwater samples collected from it between 12/96 and 11/99 (a D&D groundwater sampling round); therefore, the three years of data previous to 1999 are not available for baseline consideration. Until a geochemical baseline is established for groundwater in the vicinity of Building 444, analytes have been screened in terms of concentrations relative to Tier I and Tier II groundwater action levels. The Tier I and Tier II action levels are only used as a screening tool and are not RFCA or compliance driven.

Table 5-2 presents a summary of results of D&D groundwater monitoring at the Building 444 cluster to date. Earlier well P419689 data is included for comparison to the recent D&D data. The results of the D&D sampling completed through 2000 indicate that there are no Tier I exceedances for nitrates or metals from any Building 444 monitoring well. Monitoring well 40099, which is an upgradient well, has concentrations of TCE that exceed the Tier I action level for all three D&D sampling rounds completed through CY 2000. This well also exhibits concentrations greater than the Tier II action level for 1,1-DCE, 1,2-DCE and PCE for all three D&D sampling rounds completed through CY 2000. The analyte most commonly detected is PCE. Five wells (40099, 40299, 40499, 41299, and P419689) exhibited concentrations greater than the Tier II action level for PCE for all three D&D sampling rounds completed to date. The concentrations of PCE in downgradient well 41299 were approximately an order of magnitude higher than the other wells that contained PCE. 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 and 40399 had no detections of VOCs above Tier II action levels. All the VOC detections in these two wells were extremely low concentrations. Wells 40199, 41299, and P419689 exhibited concentrations greater than Tier II action levels but below the Site M2SDs of 60.7 pCi/L and 41.8 pCi/L for U-233/234 and U-238, respectively. The only metal concentrations over Tier II action levels were for thallium.

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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)	Thallium (µg/L)	U-233/234 (pCi/L)
40099 Upgradient	11/99	**240**	**780**	**28**	***830***	1.2(B)	0.176
	5/00	**190**	**650**	**18**	***500***	U	0.332
	12/00	**538**	**1310**	**41**	***1340***	**3.45(B)**	0.270
40199 Upgradient	11/99	U	U	0.9	0.1	U	**1.224**
	5/00	U	U	0.5	U	U	0.512
	11/00	U	U	0.74	U	**4.64**	**1.10**
40299 Downgradient	11/99	2	8	**34**	2	U	0.410
	5/00	4	11	**37**	**13**	U	0.553
	12/00	3.6	10.5	**77.5**	2.1	U	0.250
40399 Downgradient	11/99	U	0.5	0.5	0.2	U	0.165
	5/00	U	0.8	0.7	0.2	U	0.187
	12/00	U	0.92	0.69	1	U	0.20
40499 Downgradient	11/99	0.2	11	**13**	3	U	0.381
	5/00	0.1	4	**7**	2	U	0.236
	11/00	U	4.9	**8.3**	1.9	U	0.091
41299 Downgradient	11/99	**16**	48	**290**	**33**	U	**1.797**
	5/00	**9**	**89**	**280**	**77**	U	**1.891**
	12/00	**10**	31.4	**216**	**27.2**	**5.37**	**1.30**
P419689 Downgradient	3-4/96	1	5	**17**	2	NA	**1.315**
	9/96	1	4	**12**	1	**6.3(B)**	NA
	12/96	NA	NA	NA	NA	**7.2(B)**	**1.174**
	11/99	1	7	**16**	2	U	0.733
	5/00	1	6	**17**	2	U	0.888
	12/00	1	7.1	**18.5**	2.3	U	0.420

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

In addition to the results discussed above, the following detections, which are greater than the Tier II action levels for the specific analytes, have occurred in Building 444 D&D downgradient monitoring well 41299.

- Uranium-238 was detected at concentrations of 1.047 pCi/L and 0.787 pCi/L in December 1999 and May 2000, respectively.
- Chromium was detected at concentrations of 370 µg/L and 462 µg/L in May and December 2000, respectively.

In conclusion, there were not enough D&D groundwater monitoring sampling events completed through CY 2000 to establish baseline analyte concentrations for any of the Building 444 wells. Upgradient versus downgradient well comparisons are not warranted at the Building 444 cluster because the buildings have not yet been demolished. Even though upgradient well 40099 contains TCE in concentrations which are greater than the Tier I action level,

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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. Monitoring well 40399 is the only well without a concentration of any analyte that is greater than a Tier II action level. Nitrate does not appear to be an issue for the Building 444 cluster.

5.3 Building 771

The Sampling and Analysis Plan for the D&D monitoring of the Building 771 cluster was initiated during late 1998. The SAP (RMRS 1999o) was submitted Final 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 cluster, including Buildings 771C and 774, is currently scheduled for demolition in 2004.

The Building 771 cluster is located in the former PA, at the northeast end of the diagonal road, 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. 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.

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 the D&D of the Building 771 complex is probably going to destroy most of the currently utilized Building 771 D&D wells. The Groundwater Program is evaluating existing wells, located farther away from the Building 771 complex, that can potentially be used for future D&D monitoring.

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, based on a post D&D well installation building walk down and recent insight into prior Building 774 operations, 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.

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Only preexisting wells 20998 and 18199 (associated with IHSS 118.1) produced any samples through CY 1999. The six D&D monitoring wells installed in the fall of 1999 at Building 771 failed to produce enough water for any samples to be collected from them during the 4th quarter of 1999. Of these six wells, only wells 40799 and 41499 produced enough water for a 2nd quarter and a 4th quarter 2000 VOC sample. The rest of the new wells, except for well 40899, only produced enough water for a 4th quarter VOC sample. Well 40899 has not produced enough water for a sample to be collected from it through CY 2000. Tritium samples were also collected from wells 40599 and 41499 in the 4th quarter 2000, and from well 40799 in the 2nd and 4th quarters of 2000. These sampling results are further evidence of the lack of groundwater in this area.

Table 5-3 presents Building 771 complex D&D monitoring results to date. Until a geochemical 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. The Tier I and Tier II action levels are only used as a screening tool and are not RFCA or compliance driven.

Six 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 six sampling events. In addition, concentrations greater than the Tier II action level for PCE were observed in five out of the six events; the exception was a non-detect in March 2000. Other analyte concentrations above Tier II action levels at well 18199 include hexachloroethane at 12.6 μg/L and 17 μg/L in March and September of 1999, respectively; vinyl chloride at 120 μg/L in September 1999; and thallium at 8.23 μg/L in December 2000. There were no nitrate concentrations greater than the Tier II action level in any samples collected from well 18199.

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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)
18199	Upgradient	3/99	***15,400***	**37.6**	**2200(B)**	Hexachloroethane **12.6**
		9/99	***14,000***	**39**	**2400**	Hexachloroethane **17**
						Vinyl Chloride **120**
		12/99	***25,300***	**60.4**	**3790**	----------
		3/00	***39,000***	U	**5200**	----------
		5/00	***17,000***	**91**	**3900**	----------
		12/00	***27,300***	**63.7**	**4110**	Thallium **8.23**
20998	Upgradient	9/98	**42**	U	**130**	----------
		4/99	**48**	0.3	28	----------
		6/00	**150**	U	**130**	----------
40599	Downgradient	11/00	4	4	6.8	----------
40699	Downgradient	11/00	U	2	2	1,1-Dichloroethene **389**
40799	Downgradient	5/00	U	0.1	0.1	----------
		11/00	U	U	U	----------
40899	Upgradient	None	----------	----------	----------	----------
41499	Downgradient	5/00	U	U	U	TCE **53**
		11/00	U	4.5	0.42	TCE **74.4**
41599	Downgradient	11/00	U	2.4	U	----------
P219089	Downgradient	11/00	U	0.53	U	U-233/234 **9.10 pCi/L**
						U-238 **6.40 pCi/L**

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

Results from preexisting upgradient well 20998 indicate carbon tetrachloride concentrations greater than Tier II in September 1998, April 1999, and June 2000, as well as chloroform concentrations greater than Tier II in September 1998 and June 2000. Only VOCs were analyzed in these samples.

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. These include 1,1-DCE (389 µg/L) in downgradient well 40699 in November 2000, TCE in downgradient well 41499 in May (53 µg/L) and November (74.4 µg/L) 2000, and U-233/234 (9.10 pCi/L) and U-238 (6.40 pCi/L) in well P219089 in November 2000. These uranium 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. There was also a tritium detection of 437 pCi/L (below Tier II) at well 40799 in May 2000.

D&D well 20998 is currently being monitored as part of the Building 771 network. However, since well 21098 is close to 20998 and serves other monitoring functions, and is in a better location to monitor upgradient groundwater conditions, it should be used instead of well 20998 for the D&D monitoring of Building 771.

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In conclusion, there were not enough D&D groundwater monitoring sampling events completed through CY 2000 to establish baseline analyte concentrations for any of the Building 771 wells except monitoring well 18199 (for specific VOCs only; carbon tetrachloride, chloroform, and PCE). These baselines will be calculated when enough additional data is available to calculate analyte baselines for other Building 771 D&D wells. Upgradient versus downgradient well comparisons are not warranted at Building 771 because the building has not yet been demolished. Nitrate does not appear to be an issue for Building 771.

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. We do not see appreciable carbon tetrachloride in downgradient wells at Building 771 and, in addition, currently have very little groundwater in these wells. It can be surmised that the extensive footing drain systems for Buildings 771 and 774 are intercepting a large amount of upgradient groundwater that may have significant VOC contamination.

Efforts to determine the location and extent of the footing drains for Buildings 771 and 774 have only provided partial information on where they outfall. One footing drain for Building 771, location 771-FDOUT #2 is a footing drain outfall with minor amounts of water and low levels of carbon tetrachloride. Samples from manholes 771NWMANHOLE and 771NWMANHOLE#3 showed appreciable flow but no detections of carbon tetrachloride. A literature review and walkdown of the Bowman's Pond area has determined that there are four outfalls in the area. 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. The Bowman's Pond evaluation project was conducted in 1999 to evaluate the sediments in the pond for possible remediation (see 1999 RFCA Annual Groundwater Report). Surface water samples from the pond showed concentrations of carbon tetrachloride that range from 5 – 21 μg/L. A grab sample from each of the footing drain outfalls collected in May 2001 showed 18 μg/L of carbon tetrachloride in the westernmost footing drain outfall. Given that these drains provide a direct conduit to surface water, it is proposed to collect an additional round of samples from these drains, preferably during storm and non-storm events. Based on the results obtained, one or more of these drains may be recommended for inclusion in the D&D monitoring for Buildings 771/774.

5.4 Building 886

The Sampling and Analysis Plan for the D&D monitoring of Building 886 was initiated during late 1998. The SAP (RMRS 1999o) was submitted Final to the Agencies in July 1999. The D&D monitoring wells associated with the building were installed before the end of 1999. Building 886 is currently scheduled for demolition in late 2003 and early 2004. This should allow adequate time to construct a groundwater chemistry baseline for the monitoring wells at this building.

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.

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Plutonium, uranium, and nitrate were considered to be the contaminants of concern at Building 886 based on research of historical practices at the building. Figure 5-4 presents the location of Building 886 and the D&D groundwater monitoring wells associated with it.

Three new D&D monitoring wells (40999, 41099, and 41199) were installed at Building 886 during the fall of 1999. Well 40999 and preexisting well P317989 are upgradient D&D wells. Wells 41099, 41199, and preexisting well 22996 are downgradient D&D wells. Three D&D sampling rounds were completed at Building 886 through CY 2000. Preexisting well P317989 had no groundwater samples collected from it between 3/21/95 and 11/10/99 (a D&D groundwater sampling round); therefore, the previous three years of data are not available for D&D groundwater chemistry baseline consideration. Groundwater data have been collected from well 22996 for the 3rd and 4th quarters of 1996, the 1st and 3rd quarters of 1998, the 1st, 3rd, and 4th quarters of 1999, and 1st, 2nd, and 4th quarters of 2000.

Table 5-4 presents a summary of Building 886 D&D groundwater monitoring data collected through CY 2000. 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. Until a geochemical baseline is established for Building 886, analytes will be discussed in terms of concentrations relative to Tier I and Tier II groundwater action levels. The Tier I and Tier II action levels are only used as a screening tool and are not RFCA or compliance driven.

The results of the three D&D sampling rounds completed at Building 886 through CY 2000 indicate there were no concentrations of any analytes greater than Tier I action levels. Concentrations greater than Tier II action levels exist for U-233/234 and U-238 for every Building 886 D&D monitoring well for every sampling round that produced enough water for a U-isotope sample. In addition, U-235 concentrations greater than the Tier II action levels were found in all U-isotope samples collected from upgradient well P317989 and downgradient well 41099. 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 P317989 and 41099 approach the M2SD values.

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. The only VOC detections at any Building 886 D&D well are very low concentrations of PCE in upgradient well 40999 (0.2 μg/L) and downgradient well 41199 (2.0 μg/L), and TCE in well 22996 (range 0.7 – 1.0 μg/L). Metals results indicate that upgradient well P317989 has been impacted by selenium in concentrations greater than the Tier II action levels; downgradient well 41099 has been impacted by cadmium and thallium in concentrations greater than the Tier II action levels.

In conclusion, there were not enough D&D groundwater monitoring sampling events completed through CY 2000 to establish baseline analyte concentrations for any of the Building 886 wells except monitoring well 22996 (for U-233/234 and U-238). These baselines will be calculated when enough additional data is available to calculate analyte baselines for other Building 886 D&D wells. Upgradient versus downgradient well comparisons are not

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warranted at Building 886 because the building has not yet been demolished. At this time, nitrate and VOCs do not appear to be a pre-D&D issue for Building 886.

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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	PCE 0.2
		6/00	**10.70**	**7.83**	INSW	0.54	-----
		11/00	**10.0**	**8.30**	INSW	INSW	-----
P317989	Upgradient	11/99	INSW	INSW	Selenium **121**	3.8	-----
		6/00	**51.10**	**38.50**	Selenium **120**	INSW	U-235 **2.28**
		12/00	INSW	INSW	Cadmium 2.45	INSW	-----
					Selenium **128**		
41099	Downgradient	11/99	**51.65**	**33.77**	Cadmium 2.3	**47**	U-235 **2.316**
					Selenium 12.3		
		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**
					Selenium 4.15		
					Thallium **4.89**		
41199	Downgradient	11/99	**10.74**	**3.997**	Cadmium 1.6	1.5	PCE 2.0
		6/00	**8.39**	**4.33**	Selenium 3.2	5.6	-----
		11/00	**8.60**	**3.70**	-----	INSW	-----
22996	Downgradient	8/96	**2.335**	**2.13**	Cadmium 4.6(B)	1.9	-----
		11/96	**2.325**	**1.836**	Thallium **7.8(B)**	0.65	-----
		3/98	**3.01**	**2.68**	NA	NA	-----
		8/98	**2.86**	**2.40**	NA	NA	-----
		2/99	**3.573**	**3.011**	Selenium 2.7(B)	NA	TCE 0.99
		8/99	**3.38**	**2.48**	Selenium 1.4(B)	NA	TCE 0.7
		11/99	**3.58**	**2.399**	Selenium 2(B)	3.3	TCE 0.7
		2/00	**3.598**	**2.509**	Selenium 1.5(B)	INSW	TCE 1.0
		6/00	**4.62**	**3.02**	Selenium 2.8 (B)	4.2	TCE 1.0
		12/00	**2.30**	**1.60**	-----	0.9	-----

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

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.

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

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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 bgs) positioned to monitor groundwater quality downgradient of the Building 779 basement and sub-basement.

As described above in the introduction to Section 5.0, a minimum of 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, in addition to the destroyed monitoring well (02297), the construction of its replacement well (02500) and additional basement monitoring well (00100), the schedule for Building 779 D&D became accelerated and it was not possible to collect the required amount of pre-demolition data to derive baseline values for the D&D wells. In addition, 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. Figure 5-5 presents the building location and the associated D&D monitoring wells.

Because a baseline cannot be established, water quality with respect to Building 779 must 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 Tier I and Tier II levels are only used as a screening tool and are not RFCA or compliance driven.

The alluvial deposits are very thinly saturated in the vicinity of Building 779. In addition, a foundation drain dewaters the northwest and northern edge 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. In most cases, through CY 2000, three sampling rounds have been completed at Building 779 D&D monitoring wells 02397 and 02297/02500 for VOCs. Fewer rounds have been completed for the other analyte groups. Monitoring well 02497 has produced seven sets of VOC samples and four sets of nitrate samples. No sampling rounds were completed during 1997 at the Building 779 D&D monitoring wells because of lack of water. Sampling rounds were accomplished with varying success at the Building 779 D&D monitoring wells during the period of 1998 through 2000. Not all monitoring wells produced the same number of sampling rounds or amount of samples per round during the period because the wells were either dry or did not produce enough groundwater for full sample suites. Monitoring well 02397 produced no samples during 1999. During CY 2000, monitoring wells 00100 and 02500 were sampled in the 4th quarter for VOCs, nitrate, metals, Pu/Am, and U-isotopes (full suite). Well 02397 was sampled during the 2nd quarter of 2000 for VOCs and nitrate. Well 02497 was sampled during the 2nd quarter of 2000 for VOCs, nitrate, and U-isotopes; and during the 4th quarter of 2000 for VOCs and metals.

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 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. Upgradient well 02397 has the only nitrate concentrations which are greater than Tier II action levels. New monitoring well 00100 is the only well that exhibited VOC concentrations (TCE and

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carbon tetrachloride) greater than Tier II action levels. Downgradient monitoring wells 02497 and 02297/02500 have produced samples with concentrations of U-233/234 and U-238 that are greater than the Tier II action levels for those analytes for all sampling rounds in which there was enough groundwater available for a U-isotope sample. Well 02497 also exhibited an americium result of 0.233 pCi/L in May 1999, which is greater than the Tier II action level, and concentrations of cadmium and thallium in November 2000 above their respective Tier II action levels. In addition to the VOCs, samples from well 00100 in December 2000 had concentrations of U-233/234 and plutonium (0.68 pCi/L) which are greater than the Tier II action levels for those analytes. All the U-isotope results were below Site background M2SD values.

A linear groundwater flow velocity of 72 ft/yr (7.0E-05 cm/sec) was calculated between upgradient well 02397 and downgradient well 02500 utilizing 4th quarter 2000 water level data. Hydraulic conductivity (Rocky Flats Alluvium) and effective porosity values were used as described in Section 3.2 of this RFCA Annual Report. This flow velocity would allow groundwater to travel from well 02397 to well 02500 in approximately 5 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 years. (See Section 5.5.1 for more discussion of the Building 779 sub-basement.)

In conclusion, there are upgradient Building 779 nitrate concentrations that are greater than Tier II action levels compared to no Tier II level nitrate concentrations in downgradient Building 779 D&D wells (although downgradient wells 02497 and 02297/02500 show recent nitrate concentrations that are approaching the Tier II action level). 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 wells. Nitrate appears to be the only upgradient contaminant of concern to Building 779.

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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
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**
00100	Down-gradient	12/00	**14.8**	**61.8**	3.1	**1.10**	0.61	Pu **0.68**
								PCE 4.2
02297 then 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**	-----

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, CCl4 = carbon tetrachloride.

5.5.1 Building 779 Sub-Basement

While the demolition of Building 779 was occurring, it was learned from building personnel that there was a small sub-basement area beneath the Building 779 basement. The sub-basement area contained four vaults, the bases of which are approximately 24 feet below the Building 779 ground floor. Upon inspection, it was noted that three of the vaults contained water, potentially groundwater which may have seeped into them and mobilized existing point source contamination. The CDPHE expressed concern because the previously submitted Final Building 779 D&D Groundwater Monitoring SAP did not address these below basement structures. CDPHE requested that the vaults with water be sampled.

The results of the initial December 1999 sampling effort indicated that water from all three vaults (Pit 1A, Pit 2A, Pit 2B) contained numerous metals (including beryllium) above Tier II but below Tier I groundwater action levels. The water in Pit 1A contained U-233/234 and U-238 in concentrations that exceed the site background values for groundwater (60.7 pCi/L for U-233/234 and 41.8 pCi/L for U-238). Plutonium and americium were found above their Tier II groundwater action levels in Pits 2A and 2B. The levels found in Pit 1A (plutonium 74.9 pCi/L and americium 31.3 pCi/L) exceed their respective Tier I groundwater action levels. In addition, 1,1,2,2,-tetrachloroethane (PCA) was found in the Pit 1A sample at a concentration exceeding its Tier I groundwater action level. Pit 1A appeared to be the most impacted. The Building 779 sumps/vaults were pumped out after the first sampling round. A second sampling round was taken of the influent water to help determine if this new recharge water would have analyte concentrations similar to that collected from the standing water in the sub-basement

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vaults. The results of the May 2000 confirmatory sampling round indicate that Pit 1A was the only Building 779 vault with any results above Tier II action levels. The Tier II exceedances were for metals (cadmium, chromium, lead, and nickel) and radionuclides (americium, plutonium, uranium-238, and uranium-233/234. There were no uranium isotope results above the site background values listed above.

In addition to the Building 779 vaults, Building 783, containing three below grade vaults, and Building 782, which contains a sump, were sampled in May 2000. These below grade structures were not included in the initial, December 1999, sampling round. The results of the May 2000 sampling indicate that there is some contamination in these structures. The Building 783 vaults show some slight Tier II exceedances for americium, U-233/234 and U-238, arsenic and manganese. The Building 782 sump showed Tier II exceedances for U-233/234, nitrate, and TCE.

Water levels were measured in the Building 779 and 783 vaults and Building 782 sump five times between April 2000 and January 2001. Water levels were measured from surveyed measuring points so that water level elevations could be calculated for each location. The water level elevations in the subgrade structures could then be compared to the local water table elevation so that assumptions could be made with respect to the origin of the water in the structures. Building 779 Pits 2A and 2B were dry except for the July 2000 measurements. Pit 1B only contained water during the July and October 2000 monitoring visits. Pit 1A contained water during each of the five monitoring visits. The Building 783 vaults and the Building 782 sump contained water during each of the five monitoring visits.

Buildings 779, 783, and 782 are located between the 5970 and 5975 potentiometric contours on Plates 4 and 5 of this report. The water level elevations for the Building 783 vaults, which range from elevation 5969.3 to 5971.7 for the five monitoring events, correlate well with the elevation of the potentiometric surface in that area. The Building 782 sump water levels range from elevation 5963.4 in April 2000 to 5970.3 in January 2001. This is inconsistent with the local water table elevation in that the water level is progressively higher during the five monitoring visits, when it might be expected that the water level would be highest in April and lowest in January. The Building 779 vaults exhibit water levels that range from elevation 5960.4 to 5962.5. These levels are consistent to each other but are well below the water table elevation in the vicinity of Building 779. Only the Building 783 vaults water level elevations correlate to the local water table elevation.

The results of the two rounds of Building 779 sub-basement vault sampling and five rounds of water level measurements imply that the major source of the contamination is material originally contained in the below grade vaults and not the groundwater which may be seeping into the vaults. If the source of the contamination was infiltrating groundwater, then the results of the two rounds of sampling for the vaults would be similar, and wells adjacent to Building 779 would probably show similar contamination. PCA was detected in Pit 1A during the first round of sampling above its Tier I action level, but was not even detected above its Tier II action level in the second round. Vaults 2A and 2B showed no Tier II exceedances for any analytes for the second round after having many Tier II exceedances for metals and radionuclides during the first sampling round. The fact that the water in the vaults was pumped out between the first and second sampling events probably contributed to the significant difference in concentrations of radionuclides, PCA, and some metals.

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As discussed above, a new D&D monitoring well (00100) was constructed during 2000 at the request of the CDPHE. The well is located northeast of Building 779 and is completed to the appropriate depth to monitor groundwater downgradient of the sub-basement vaults. The screened interval of this well extends from elevation 5971 to 5946. The CDPHE also requested that the outfall from the Building 779 foundation drain (SW085) be sampled during 2000. The foundation drain, located at elevation 5975, is a gravity flow drain. Because of its intake elevation, the foundation drain probably has no relevance to the Building 779 sub-basement contamination. Groundwater elevations in monitoring wells adjacent to Building 779 during 2000 confirm that the foundation drain was above the groundwater elevations in the wells during 2000, hence samples could not be collected. A grab sample was collected from the outfall during May 2001. Previous sampling includes eleven samples collected from the Building 779 foundation drain outfall from July 1988 through May 1990. No samples were collected from the outfall between May 1990 and May 2001.

As shown in Table 5-5, the groundwater sample collected from monitoring well 00100 in December 2000 resulted in concentrations of plutonium, U-233/234, carbon tetrachloride and TCE that are greater than the Tier II action levels for those analytes. The May 2001 foundation drain outfall sample yielded concentrations of plutonium (0.47 pCi/L), americium (0.32 pCi/L), U-233/234 (5.90 pCi/L), and U-238 (3.20 pCi/L) that are all greater than their respective Tier II action levels.

The historical results from the Building 779 foundation drain from July 1988 through May 1990 (eleven sampling rounds) show result concentrations of U-233/234 (9 results), U-235 (3 results), U-238 (8 results), plutonium (7 results), americium (6 results), tritium (1 result), beryllium (2 results), strontium-89/90 (1 result), and nitrate (10 results) greater than their respective Tier II action levels. In addition, cadmium had 2 results and each of the following had one result greater than its Tier II action level: antimony, chromium, manganese, nickel and vanadium.

In conclusion, new D&D monitoring well 00100 provides a monitoring point downgradient of Building 779 that will allow a determination to be made of upgradient versus downgradient water quality with respect to the basement and sub-basement vaults. The foundation drain, which continues to dewater the northern end of the remaining Building 779 foundation (when the water table is high enough), is capable of capturing potentially contaminated groundwater in the vicinity of the building. The May 2001 outfall sampling event confirms the historical foundation drain data from 1988 through 1990. It would be difficult to ascertain the origin of the groundwater captured by the Building 779 foundation drain, with respect to D&D monitoring, and, therefore, the meaningfulness of samples collected from the drain outfall (with respect to D&D monitoring). Continued monitoring of the outfall would be of doubtful value, and is probably not warranted.

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 U.S. 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.

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Building 707 is scheduled for demolition in late 2005, which should provide adequate time to construct a 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 east side. 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 (called 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 in 1969 at Building 776/777, 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.

Well installation and groundwater sampling activities that took place at this building during 2000 include the installation and development of downgradient D&D monitoring wells 00200 and 00300. Preexisting wells 60499 and 60599, installed for the East Industrial Area Plume (EIAP) characterization project, are utilized as upgradient Building 707 D&D wells. EIAP well 61499 and preexisting well P218089 are 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 chemical 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, the SAP states that radionuclide and metals samples from the foundation drain will be collected from surface water sampling station GS40 located just east of the 750 Pad. Figure 5-6 presents the site location as well as the location of D&D monitoring wells.

Based on the research performed in support of the Building 707 D&D SAP, the most abundant potential contaminants associated with Building 707 are plutonium, americium, U-isotopes, chlorinated solvents, and a variety of metals including lead, chromium, and mercury. Table 5-6 presents a summary of Building 707 D&D groundwater monitoring data collected through CY 2000. Until a geochemical baseline is established for Building 707, analytes will be discussed in terms of concentrations relative to Tier I and Tier II groundwater action levels. The Tier I and Tier II action levels are only used as a screening tool and are not RFCA or compliance driven with regard to building D&D.

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Except for downgradient D&D wells 00200 and P218089, there has been little groundwater available for sampling through CY 2000. The alluvial saturated thickness in this portion of the site is very thin. In addition, the Building 707 foundation drain is extensive and 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. Upgradient wells 60499 and 60599 and downgradient well 61499 have only had enough water available for VOC analyses. Downgradient well 00300 was dry during CY 2000.

The results of the D&D sampling rounds to date are inconclusive because of the small number of results available. There were no concentrations of any analytes that were above Tier I action levels. Upgradient well 60599 has been impacted by PCE in concentrations greater than the Tier II action level during the 1st and 4th quarters of 2000. Samples from downgradient well P218089 contained activity concentrations of U-233/234 and U-238 greater than the Tier II action level during the 4th quarter of 2000. Downgradient well 00200 samples had cadmium and thallium (B qualified) concentrations greater than the Tier II action level during the 4th quarter of 2000. VOC sample results from FD-707-4 during the 4th quarter 2000 were all non-detect. Many samples were collected from surface water station GS40 during CY 2000. The results of these analyses indicate that concentrations of U-233/234, U-238, and antimony above their respective Tier II action levels are consistently found in this water. No plutonium or americium was detected at concentrations above their respective Tier II action levels in samples from station GS40.

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

Well	Location	Dates	U-233/234 (pCi/L)	Pu/Am (pCi/L)	CCl_4 (µg/L)	TCE (µg/L)	Others (µg/L or pCi/L)
60499	Upgradient	1/00 12/00	INSW INSW	INSW INSW	U 0.66	0.8 1.5	Chloroform 11 PCE 0.3 Chloroform 9.5 PCE 1.1
60599	Upgradient	2/00 12/00	INSW INSW	INSW INSW	U 0.7	U U	PCE **100** PCE **111**
61499	Downgradient	5/00 12/00	INSW INSW	INSW INSW	U U	0.1 U	PCE **5** INSW
P218089	Downgradient	12/00	**3.30**	Am U Pu 0.008	U	U	U-238 **2.30**
00200	Downgradient	11/00	U	U	1.4	0.27	Cadmium **8.49** Thallium **3.78(B)** PCBs U
00300	Downgradient	Dry	Dry	Dry	Dry	Dry	Dry

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

5.7 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 U.S. 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 late 2003. This may 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

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777 was assembly of parts. After the 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 production curtailment activities included waste handling and maintenance activities in Building 776, and a tritium surveillance laboratory and container repackaging operations in Building 777 (DOE 1994a).

Well installation and groundwater sampling activities that took place at this building during 2000 include the installation and development of upgradient monitoring well 00400 and downgradient monitoring wells 00500, 00600, and 00700. Preexisting monitoring well 60299, part of the EIAP investigation, will be 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 Building 776/777 are plutonium, americium, U-isotopes, tritium, chlorinated solvents, a variety of metals including beryllium, and potentially nitrate. Table 5-7 presents summary Building 776/777 D&D groundwater monitoring data collected through CY 2000. Until a geochemical baseline is established for Building 776/777, analytes will be discussed in terms of concentrations relative to Tier I and Tier II groundwater action levels. The Tier I and Tier II action levels are only used as a screening tool.

Except for upgradient D&D well 60299, all of the Building 776/777 D&D wells produced full sample suites (VOCs, metals, U-isotopes, Pu/Am, tritium, nitrate, and TRPH) in the 4th quarter of 2000. Monitoring well 60299 only produced enough water for VOC samples in the 1st and 4th quarters of 2000. In addition, a nitrate sample was collected from this well in the 4th quarter of 2000.

The results of the 4th quarter 2000 sampling round show that the carbon tetrachloride concentration in downgradient well 00700 is greater than the Tier I action level. There were no concentrations of any other analytes that were above Tier I action levels from Building 776/777 D&D wells. Chloroform; 1,1-DCE; 1,2-DCA; and PCE concentrations in well 00700 were all greater than their respective Tier II action levels. Upgradient well 00400 has been impacted by U-isotopes, cadmium, and thallium in concentrations greater than the Tier II action level. Downgradient well 00500 exhibited manganese and thallium (B qualified) concentrations greater than their respective Tier II action levels. Tritium was detected in downgradient well 00700 at an estimated concentration of 300 pCi/L; tritium was non-detect at all other wells. Beryllium and total recoverable petroleum hydrocarbons (TRPH) were non-detect at all wells; nitrate was either non-detect or at a concentration below its Tier II action level at all wells.

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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 11/00	INSW INSW	INSW INSW	INSW INSW	TCE 1.0 CCl_4, PCE <1 TCE 2.1 CCl_4, PCE <1
00400	Upgradient	11/00	Am U Pu 0.012	U-233/234 **2.60** U-238 **1.20**	Cadmium **7.09** Thallium **4.95**	TCE 1.6 CCl_4, PCE U
00500	Downgradient	11/00	Am U Pu 0.058	U-233/234 0.18 U-238 0.16	Thallium **3.82(B)** Manganese **2540**	PCE U CCl_4, TCE <1
00600	Downgradient	11/00	Am U Pu 0.016	U-233/234 0.19 U-238 0.20	Manganese 1150 Arsenic 11.6	All U
00700	Downgradient	11/00	Am U Pu 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**

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 Building 371/374, 865, 883, 881, 991, 559

A Sampling and Analysis Plan for the D&D groundwater monitoring of Buildings 371/374, 865, and 883 (RMRS 2000c) was prepared early in CY 2000 and submitted to the CDPHE and U.S. 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 investigations at the individual building areas. The Final SAP for these buildings was submitted to the Agencies in August 2000. It was anticipated that well installation and groundwater sampling activities would take place for these buildings during the summer and fall of 2000. D&D wells were not installed at Buildings 371/374, 883, and 865 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. To date, Building 883 and 865 D&D wells have not been installed. It is anticipated that D&D wells will be installed at these buildings during the fall of 2001. Individual sections for each of these buildings will be initiated in the 2001 Annual RFCA Groundwater Monitoring Report.

A Sampling and Analysis Plan for the D&D groundwater monitoring of Buildings 881, 991, and 559 (RMRS 2001d) was prepared early in CY 2001 and submitted to the CDPHE and U.S. 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

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Final SAP for these buildings was submitted to the Agencies in July 2001. It is anticipated that well installation and groundwater sampling activities for these buildings may take place during the fall of 2001.

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6.0 PRESENT SANITARY LANDFILL

This section presents the CY 2000 groundwater quality data for the Present Sanitary Landfill (previously known as Operable Unit 7). The Present Sanitary Landfill, located in the Buffer Zone north of the IA, occupies approximately 44 acres (encompassing both the landfill and 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 Landfill Pond. The landfill served as a former solid-waste disposal facility for RFETS and is currently scheduled for cover and final closure during year 2004.

Throughout 2000, groundwater monitoring was conducted in accordance with the requirements of the RFCA, as set forth in the IMP (K-H, 2000). This plan, under an agreement with the U. S. EPA and the CDPHE, supersedes Title 6 of the Colorado Code of Regulations, *6 CCR 1007-2* and *6 CCR 1007-3,* as the governing authority for groundwater monitoring at RFETS.

Information presented in this section includes a review of historical activities at the Present Sanitary Landfill (Section 6.1); a summary of previous investigations (Section 6.2); the status of the current groundwater monitoring program (Section 6.3); the current understanding of the physical characteristics of groundwater flow at the site (Section 6.4); an assessment of groundwater quality (Section 6.5); and general conclusions regarding groundwater quality and the groundwater monitoring program at the landfill (Section 6.6).

6.1 Operating History of the Present Sanitary Landfill

The Present Sanitary Landfill began operating on August 14, 1968, for the disposal of Rocky Flats sanitary waste. However, records indicated that, prior to 1986, some hazardous waste was disposed of at the landfill; therefore, in 1986, the landfill was classified as a RCRA-regulated unit. Disposal of hazardous constituents in the landfill was halted in November 1986. 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. All RFETS sanitary waste is currently delivered to an offsite commercial Subtitle D sanitary waste landfill for disposal. The following paragraphs provide a brief historical summary of 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, radiation 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 (Ponds No. 1 and No. 2, also known as the West Landfill Pond and East Landfill Pond, respectively) immediately east of the landfill, and the installation of a subsurface leachate-collection system

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and subsurface intercept system for diverting groundwater around the landfill. Ditches were also constructed to control surface water.

The West Landfill Pond embankment was built approximately 500 ft east of the 1974 position of the advancing face of the landfill. The East Landfill Pond embankment was constructed approximately 1,000 ft east of the West Landfill Pond embankment. A cutoff wall, set in bedrock, was constructed in the East Landfill Pond embankment to reduce seepage through the embankment foundation. The embankments and ponds were built to collect and evaporate groundwater, surface water, and leachate collected by the subsurface drainage-control system. The West Landfill Pond was removed in 1981 (see discussion below). The existing (East Landfill) pond contains no outlet other than a spillway that is designed for use during extreme storm events. Groundwater exiting the landfill discharges to the East Landfill Pond where it either evaporates or is pumped to Pond A-3 via the Pond A-1 bypass for eventual discharge from the Site. Subsurface leakage of the East Landfill Pond may also occur; this would recharge the unconsolidated deposits downgradient of the pond dam and the underlying bedrock claystones. The amount of leakage is expected to be small considering the low hydraulic conductivity of the underlying bedrock materials and the minimal amount of water present in wells immediately downgradient of the dam.

An inner leachate-collection system and outer groundwater-intercept/diversion system were constructed around the north, west, and south perimeters of the landfill (Figure 6-1). The leachate collection system was designed to provide a perimeter drain for the prevention of leachate migration outside the landfill boundary and to reduce water levels within landfill refuse. The groundwater-intercept/diversion system was constructed along the outside edge of the leachate collection system to prevent groundwater from entering the landfill area. Groundwater diverted from the landfill by the intercept system is, as currently understood, directed eastward around waste materials and discharges either to the East Landfill Pond or No Name Gulch below (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.

Sometime after the Present Sanitary Landfill went into operation in 1968, excess water from the landfill pond was sprayed onto a ridge south of the East Landfill Pond. The sprayed water collected on the roadway and flowed into North Walnut Creek. When this misdirected flow was discovered, the spraying activities were moved to an area north of the landfill pond adjacent to an irrigation ditch. Because the subsequent spray water then collected in local drainage channels and flowed around the landfill pond to the main drainage, the spraying activities were again moved. The final spray location was an area south of the western end of the landfill pond; excess spray water then flowed back into the East Landfill Pond.

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 treatment system was originally composed of a settling basin, bag filters to remove suspended solids, and granular activated carbon to remove organic chemical constituents, but was modified in the fourth quarter of 1998 to allow passive aeration of leachate water. The treated effluent is sampled monthly for VOCs; semivolatile organics (SVOCs); metals; isotopic plutonium, uranium, and americium; gross alpha and beta; and tritium, with results published in the Quarterly Report for the Consolidated Water Treatment Facility and Operable Unit 7 (OU7) Passive Seep Interception System.

Groundwater monitoring was originally instituted in 1989 in accordance with *6 CCR 1007-2* and *6 CCR 1007-3, Subsection 265.90(d)*. This 2000 Annual RFCA Groundwater Monitoring Report addresses monitoring requirements pertaining to RCRA units as specified in the IMP. Monitoring pertaining to RFETS RCRA units prior to 1996 are addressed in the Annual RCRA Groundwater Monitoring Reports (DOE, 1990, 1991a, 1992d, 1993c, 1994c, 1995, and 1996a). Subsequent groundwater monitoring activities conducted under the authority of 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). The regulations require that the groundwater-monitoring program be capable of determining the impact of a facility on the water quality of the uppermost aquifer.

The Annual RCRA Reports for RFETS (referenced above) 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. Work conducted for Phase I included cone-penetrometer testing, soil sampling, and the installation and sampling of additional groundwater monitoring wells outside of and within the landfill.

A closure plan for the Present Sanitary Landfill was developed in the IM/IRA decision document (DOE, 1996c), in accordance with the RFCA (RFCA, 1996) and applicable Colorado hazardous-waste regulations. Because of the Present Sanitary Landfill's position on the Environmental Restoration Ranking (20th of 358), action has been deferred until higher ranked areas are remediated. Post-closure groundwater monitoring of the Present Sanitary Landfill will be performed in accordance with the requirements of the IMP.

6.2 Summary of Previous Investigations

Annual RCRA Groundwater Monitoring Reports from 1989 through 1995 and Present Sanitary Landfill Groundwater Monitoring Reports from 1996 through 1999 describe groundwater elevations and flow rates as well as the results of the groundwater analyses. The sampling and analysis records were maintained in compliance with *6 CCR 1007-3* and *40 CFR 265.94(b)*. The *Phase I RFI/RI Work Plan for OU7 - Present Sanitary Landfill* (DOE, 1991b) and the Operable Unit 7 Revised Draft IM/IRA Decision Document and Closure Plan (DOE, 1996c) present additional information.

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The impact of the Present Sanitary Landfill on groundwater quality has been evaluated in previous Annual RCRA and Landfill Groundwater Monitoring Reports (DOE, 1990, 1991a, 1992d, 1993c, 1994c, 1995, 1996a, 1997b, 1998a). In 1992, groundwater from surficial deposits within and around the Present Sanitary Landfill had concentrations of major anions (bicarbonate, chloride, nitrate/nitrite, and sulfate), total dissolved solids (TDS), dissolved metals (calcium, chromium, lithium, magnesium, potassium, sodium, and strontium), and radionuclides that were elevated relative to mean background concentrations/activities. Some VOCs were also detected. The dissolved radionuclides present included americium-241, plutonium-239/240, uranium-233/234, uranium-238, and radium-226.

During 1992, VOCs were detected sporadically and infrequently in wells screened in surficial materials of the UHSU. In UHSU bedrock, VOCs were detected in groundwater sampled from two wells. Methylene chloride, acetone, and toluene were detected once. The infrequent occurrence of VOCs in the UHSU bedrock indicated that the Present Sanitary Landfill had not adversely impacted groundwater in UHSU bedrock, even though some contamination of groundwater had occurred in UHSU surficial materials overlying the bedrock.

In 1993, the groundwater chemistry at the Present Sanitary Landfill was generally consistent with water-quality conditions of 1992 (DOE, 1994c). The 1993 statistical comparisons of upgradient versus downgradient UHSU groundwater at the Present Sanitary Landfill indicated statistically significant increases in downgradient concentrations of dissolved metals (calcium, lithium, magnesium, potassium, sodium, and strontium), and major anions (chloride and sulfate). None of the radionuclides or VOCs showed a statistically significant difference in upgradient versus downgradient activities or concentrations, respectively. Radionuclide activities and concentrations of VOCs, metals, and anions were notably highest within the landfill and in the area adjacent to IHSSs located southeast of the landfill, relative to other areas in the vicinity of the Present Sanitary Landfill. In groundwater from UHSU bedrock beneath and downgradient of the landfill, VOCs were detected infrequently, but radionuclides were present at activities higher than mean background.

Analysis of 1994 data by analysis of variance (ANOVA) indicated statistically significant differences in upgradient versus downgradient groundwater quality in the UHSU for radionuclides (uranium-233/234 and uranium-238), dissolved metals (calcium, lithium, magnesium, sodium, and strontium), anions (carbonate, chloride, fluoride, and sulfate), and TDS (DOE, 1995). In the UHSU bedrock, there were statistically significant differences in upgradient versus downgradient groundwater quality for dissolved metals (calcium, lithium, magnesium, sodium, and strontium), anions (bicarbonate, chloride, and sulfate), and TDS. All VOCs had less than 50-percent quantifiable results.

For 1995 data, statistical comparisons of upgradient versus downgradient UHSU groundwater at the Present Sanitary Landfill indicated statistically significant increases in levels of dissolved barium, calcium, lithium, magnesium, silicon, sodium, strontium, uranium-233/234, and gross beta, as well as bicarbonate, chloride, sulfate, and TDS. Activities of total americium-241, plutonium-239/240, and tritium did not show statistically significant differences between upgradient and downgradient UHSU groundwater. VOCs were detected in fewer than 50 percent of the samples, so these analytes were not statistically evaluated.

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Analysis of the 1996 data tend to confirm the results of previous sampling (DOE, 1997f). Approved well abandonments and deactivations combined with an inadequate volume of water for sampling of downgradient wells prevented statistical analysis for many analytes during these years. Detected analytes and concentration ranges during 1996 were generally consistent with corresponding data from prior years. Barium, calcium, chromium, lithium, magnesium, potassium, selenium, and sodium were detected in downgradient wells at levels below mean background concentrations. 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 were again prevented by an insufficient number of analyses, as explained above for the 1996 data. Fluoride, sulfate, TDS, barium, copper, iron, lithium, manganese, selenium, strontium, nitrate, and zinc appeared to be elevated in one or more downgradient versus upgradient wells. Tritium and certain VOCs were detected in upgradient wells at concentrations that exceeded the downgradient well concentrations. The trends of potential contaminants detected in the downgradient wells did not, however, 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, 1996c). In addition, previous reports indicate that the leachate collection trench was buried beneath waste during landfill expansion (DOE, 1996c). 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.

An evaluation of groundwater-elevation data for 1991 through 1995 and the hydrologic evaluation data for the OU7 IM/IRA indicate that previous conclusions made regarding the impact of the leachate/groundwater-intercept system are still valid. These conclusions are:

- The groundwater-intercept system diverts groundwater away from the landfill and is most effective in diverting flow on the west and south sides.
- The clay barrier is an effective barrier to groundwater flow in the landfill along the west but it may not be completely keyed into bedrock on the northwest side. This may allow groundwater to enter the north side of the landfill.

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

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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 Action Levels and Standards Framework (ALF) for Surface Water, Ground Water, 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 are, 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 Present Sanitary Landfill.

Recent changes to the site groundwater monitoring program are outlined in the IMP (K-H, 2000). 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 2000 reporting period, upgradient wells 5887, 70193, 70393, and 70493, and downgradient wells 4087, 52894, 52994, and B206989, were sampled on a quarterly basis (January-March, April-June, July-September, and October-December) to determine compliance with RFCA, as set forth in the IMP. Table 6-1 summarizes sampling activities and shows the hydrostratigraphic unit monitored and material screened for all wells sampled in and near the Present Sanitary Landfill in 2000. 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 2000 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,W,N,T	Dry
52894	UPPER	ALLUVIUM	Dry	V,W,N,M,T,U	V,W,N,M,T,U	Dry
52994	UPPER	BEDROCK	Dry	Dry	Dry	Dry
B206989	UPPER	BEDROCK	V,N,M,T,U	V,W,N,M	Dry	V,W,N,M.T

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

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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 (also 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, evapotranspiration through valley-bottom vegetation consumes much of the available shallow groundwater in the gulch 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 SVOCs, were not included in the sampling program as a result of PCOC screening conducted during the IMP data quality objective 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 *6 CCR 1007-2*.

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 previous RFETS reports (EG&G, 1995a, 1995b, and 1995c). In 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 Rocky Flats Alluvium, colluvium, valley-fill alluvium, and artificial fill. The Rocky Flats Alluvium and artificial fill (landfilled wastes and soil-cover materials) are present upgradient of and within the landfill; colluvium and valley-fill alluvium 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 geochemical data from the well, hydraulic conductivity measurements (where available), and geological information from borehole logs.

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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
2,2-Dichloropropane	Total Xylenes	Vanadium
Benzene	Trans-1,2-Dichloroethene	Zinc
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

The Rocky Flats Alluvium 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 landfill pond. Colluvium is 1 to 5 feet thick on the slopes around

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the East Landfill Pond and below the dam. The valley-fill alluvium 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 thicknesses vary 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).

Average depth to groundwater ranges from 5 to 15 feet in surficial deposits (excluding artificial fill) (EG&G, 1995b). Within the landfill, groundwater is 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 Rocky Flats Alluvium at the western end. The thinnest saturated sections are found in colluvial and valley fill deposits east of the East Landfill Pond and in the Rocky Flats Alluvium along the south divide. EG&G (1995b) reported saturated thicknesses 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 evapotranspiration, surface water, or as lateral subsurface flow at the Indiana Street east RFETS boundary.

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.

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6.4.3 Vertical Hydraulic Gradients

The vertical hydraulic gradient is the quotient 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 is 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 flow-paths in UHSU surficial deposits and three flow-paths 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.

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 less 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 Present Sanitary Landfill, and include results of historic slug tests (DOE, 1994c). Values of hydraulic conductivity used for flow

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velocity calculations are 1.1 x 10^{-4} centimeters/second (cm/sec) for surficial deposits (including landfill wastes) and 5.3 x 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 Present Sanitary 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 metals include only those analytes for which the uncensored arithmetic mean of pooled downgradient well values were greater than the pooled upgradient well values.. Box-plots for VOCs include all detected compounds for upgradient and downgradient wells. 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.

As shown in Figure 6-2, concentrations of water quality parameters (fluoride, nitrate/nitrite, sulfate, and TDS) fall within the range of 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

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below the CRDL ("B" qualified data). Aluminum was detected in all four upgradient wells (13.82 µg/L maximum). Chromium (2.21 µg/L maximum), copper (4.3 µg/L), and lead (7.6 µg/L) were detected in well 5887 (a stainless steel well). Aluminum (26.3 µg/L maximum) and selenium (11.7 µg/L maximum) were detected in well 70193. Well 70393 contained aluminum (50 µg/L maximum) and single detections of chromium (2.36 µg/L) and lead (4.3 µg/L). Well 70493 contained aluminum (21.4 µg/L), barium (105 µg/L maximum), selenium (8.5 µg/L maximum), silver (1.8 µg/L maximum), and strontium (264 µg/L maximum). Tritium was not detected in any of the upgradient samples. Uranium-233/234 was detected in wells 5887 (0.02 pCi/L), 70193 (0.02 pCi/L), and 70493 (2.472 pCi/L maximum) and U-238 was detected in wells 5887 (0.034 pCi/L), 70193 (0.014 pCi/L), and 70493 (1.1689 pCi/L maximum).

Alluvial well 70393 yielded detections of nine chlorinated VOCs, including TCE (22 µg/L maximum), PCE (8 µg/L maximum), carbon tetrachloride (0.53 µg/L maximum), 1,1,1-TCA (23 µg/L maximum), 1,1-DCE (14 µg/L maximum), cis-1,2-DCE (0.3 µg/L maximum), chloroform (0.3 µg/L maximum), and single detections of 1,1-DCA (0.1 µg/L) and methylene chloride (0.1 µg/L). Weathered bedrock well 70493, paired with well 70393, contained generally lower concentrations and less consistent detections of the type of VOCs found in the overlying alluvium. VOCs found in this well included TCE (1.1 µg/L maximum), PCE (0.2 µg/L maximum), 1,1,1-TCA (0.51 µg/L maximum), 1,1-DCE (0.2 µg/L maximum), and a single detection of methylene chloride (0.1 µg/L). Alluvial well 5887 contained only 1,1,1-TCA (0.25 µg/L maximum). Weathered bedrock well 70193 contained 1,1,1-TCA (0.1 µg/L maximum) and a single detection of methylene chloride (0.2 µg/L). 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 2000 were characteristic of previous years, with groundwater availability limited by seasonal availability. Complete sample suites could only be collected from alluvial wells 4087 (2 quarters collected) and 52894 (2 quarters collected). A partial sample suite was collected from well 4087 during the third quarter. Only partial sample suites could be collected from well B206989 (3 quarters collected) because of low well yields, despite repeated visits to the well to obtain additional sample aliquots. Dry well conditions were prevalent at all wells during the remaining quarters, including all four quarters at bedrock well 52994. The statistical significance of these data relative to upgradient groundwater quality will be evaluated later in Section 6.5.2.

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Downgradient groundwater quality monitored at wells 4087, 52894, and B206989 indicate that concentrations of all water quality parameters 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. The majority of antimony, arsenic, cadmium, chromium, cobalt, lead, molybdenum, nickel, and vanadium results were reported 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 well samples. Aluminum was detected in wells 4087, 52894, and B206989 at concentrations of up to 974 µg/L. Cadmium (1.61 µg/L maximum), copper (5.1 µg/L maximum), and a single thallium detection (14.8 µg/L) were reported for samples collected at well B206989. Slightly elevated concentrations of chromium are associated with well 4087, which is constructed with stainless steel well casing and screen, thus raising the possibility that trace quantities of some metals may have originated from well construction materials. Lead was reported below detection or CRDL in all downgradient samples except one at well 52894 (3.29 µg/L). Elevated concentrations of lithium (116 to 1,750 µg/L); manganese (129 to 203 µg/L); selenium (3.1 to 285 µg/L); strontium (401 to 6,430 µg/L); and zinc (21.4 to 66.2 µg/L) were reported in downgradient samples. Lithium and selenium concentrations at well B206989 were especially high. 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.

The uranium isotopes U-233/234, U-235, and U-238 (Figure 6-4) also appear to have elevated activity-concentrations in downgradient wells compared to upgradient wells, with the highest activities found in well B206989. Tritium was reported in a single sample from well B206989 (505.7 pCi/L), but was undetected in all other downgradient samples.

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). A pre-analysis 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 is a result of the existence of 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 downgradient well data for comparison to the upgradient data. The rationale for this approach is further justified later in this section.

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Table 6-3 presents a sampling and detection summary for each groundwater analyte monitored during 2000. 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 for 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 statistical comparisons for all analytes with more than 10 percent quantifiable results. Volatile organic compounds 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 mercury, thallium, tin, and tritium met the sample volume criteria, but non-detections exceeded 90 percent of the data sets, so it was necessary to exclude these compounds 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 way that defines the sole groundwater flow path leading from the landfill. 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 based on EPA guidance for statistical evaluations involving two data groups (EPA, 1992a). The reader is referred to the EPA guidance document for further description of the statistical methods and parameters used in this section.

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 fluoride, sulfate, TDS, calcium, lithium, magnesium, molybdenum, nickel, sodium, strontium, zinc, U-233/234, U-235, and U-238. These results are similar those reported in previous RCRA and Present Sanitary Landfill groundwater monitoring reports (see Section 6.2).

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Table 6-3 Groundwater Sample and Detection Summary for Landfill Wells – CY2000

Parameter	Number of Samples			Number of Detections			Percent Detections			Percent Non-Detects	Sample Mean	
	Upgradient	Down-Gradient	Total	Upgradient	Down-Gradient	Total	Upgradient	Down-Gradient	Total	Non-Detects	Upgradient	Down-Gradient
Water Quality (mg/L)												
Fluoride	16	7	23	16	5	21	100.0	71.4	91.3	8.7	0.35	2.02
Nitrate/Nitrite, as N	16	8	24	16	8	24	100.0	100.0	100.0	0.0	5.4	15.5
Sulfate	16	8	24	16	8	24	100.0	100.0	100.0	0.0	24	1404
Total Dissolved Solids	16	7	23	16	7	23	100.0	100.0	100.0	0.0	182	2223
Metals (ug/L)												
Aluminum	15	8	23	9	7	16	60.0	87.5	69.6	30.4	23.2	140.9
Antimony	16	8	24	5	4	9	31.3	50.0	37.5	62.5	1.17	1.12
Arsenic	16	8	24	0	5	5	0.0	62.5	20.8	79.2	1.46	1.41
Barium	16	8	24	16	8	24	100.0	100.0	100.0	0.0	75.0	37.9
Beryllium	16	8	24	4	2	6	25.0	25.0	25.0	75.0	0.13	0.08
Cadmium	16	8	24	5	7	12	31.3	87.5	50.0	50.0	0.25	0.69
Calcium	16	8	24	16	8	24	100.0	100.0	100.0	0.0	23625	298513
Chromium	16	8	24	10	7	17	62.5	87.5	70.8	29.2	0.86	9.41
Cobalt	16	8	24	1	4	5	6.3	50.0	20.8	79.2	0.40	0.67
Copper	16	8	24	9	7	16	56.3	87.5	66.7	33.3	1.26	3.28
Iron	16	8	24	12	7	19	75.0	87.5	79.2	20.8	14.0	117.0
Lead	16	8	24	3	6	9	18.8	75.0	37.5	62.5	1.82	1.46
Lithium	16	8	24	16	8	24	100.0	100.0	100.0	0.0	9.0	780.0
Magnesium	16	8	24	16	8	24	100.0	100.0	100.0	0.0	5037	111075
Manganese	16	8	24	13	6	19	81.3	75.0	79.2	20.8	1.9	42.9
Mercury	16	6	22	0	0	0	0.0	0.0	0.0	100.0	0.1	0.1
Molybdenum	16	8	24	8	8	16	50.0	100.0	66.7	33.3	1.27	4.41
Nickel	16	8	24	12	8	20	75.0	100.0	83.3	16.7	1.9	6.4
Potassium	16	8	24	16	8	24	100.0	100.0	100.0	0.0	1036	9066
Selenium	16	8	24	8	7	15	50.0	87.5	62.5	37.5	3.9	127.2
Silver	16	8	24	3	0	3	18.8	0.0	12.5	87.5	0.59	0.28
Sodium	16	8	24	16	8	24	100.0	100.0	100.0	0.0	12216	453125
Strontium	16	8	24	16	8	24	100.0	100.0	100.0	0.0	155	3540
Thallium	16	8	24	0	1	1	0.0	12.5	4.2	95.8	1.70	3.00
Tin	16	8	24	0	0	0	0.0	0.0	0.0	100.0	1.42	1.14
Vanadium	16	8	24	8	5	13	50.0	62.5	54.2	45.8	0.55	0.65
Zinc	13	6	19	13	6	19	100.0	100.0	100.0	0.0	6.6	30.2
Radionuclides (pCi/L)												
Tritium	16	7	23	0	1	1	0.0	14.3	4.3	95.7	-125.200	9.386
U-233/234	16	5	21	6	5	11	37.5	100.0	52.4	47.6	0.447	24.850
U-235	16	5	21	0	5	5	0.0	100.0	23.8	76.2	0.0310	0.8680
U-238	16	5	21	6	5	11	37.5	100.0	52.4	47.6	0.2160	17.0160
Volatile Organic Compounds (ug/L)												
1,1,1,2-Tetrachloroethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,1,1-Trichloroethane	16	8	24	14	0	14	87.5	0.0	58.3	41.7	N/D	N/D
1,1,2,2-Tetrachloroethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,1,2-Trichloroethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,1-Dichloroethane	16	8	24	1	0	1	6.3	0.0	4.2	95.8	N/D	N/D
1,1-Dichloroethene	16	8	24	7	0	7	43.8	0.0	29.2	70.8	N/D	N/D
1,1-Dichloropropene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D

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Table 6-3 Groundwater Sample and Detection Summary for Landfill Wells – CY2000 (continued)

Parameter	Number of Samples			Number of Detections			Percent Detections			Percent Non-Detects	Sample Mean	
	Upgradient	Down-Gradient	Total	Upgradient	Down-Gradient	Total	Upgradient	Down-Gradient	Total	Non-Detects	Upgradient	Down-Gradient
1,2,3-Trichlorobenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,2,3-Trichloropropane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,2,4-Trichlorobenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,2,4-Trimethylbenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,2-Dibromo-3-chloropropane	12	6	18	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,2-Dibromoethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,2-Dichlorobenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,2-Dichloroethane	13	8	21	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,2-Dichloropropane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,3,5-Trimethylbenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,3-Dichlorobenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,3-Dichloropropane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
1,4-Dichlorobenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
2,2-Dichloropropane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
4-Isopropyltoluene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Benzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Bromobenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Bromochloromethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Bromodichloromethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Bromoform	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Bromomethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Carbon Tetrachloride	16	8	24	3	1	4	18.8	12.5	16.7	83.3	N/D	N/D
Chlorobenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Chloroethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Chloroform	16	8	24	2	0	2	12.5	0.0	8.3	91.7	N/D	N/D
Chloromethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Cis-1,2-Dichloroethene	16	8	24	2	0	2	12.5	0.0	8.3	91.7	N/D	N/D
Cis-1,3-Dichloropropene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Dibromochloromethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Dibromomethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Dichlorodifluoromethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Ethylbenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Hexachlorobutadiene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Isopropylbenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Methylene Chloride	16	8	24	3	3	6	18.8	37.5	25.0	75.0	N/D	N/D

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Table 6-3 Groundwater Sample and Detection Summary for Landfill Wells – CY2000 (continued)

Parameter	Number of Samples			Number of Detections			Percent Detections			Percent Non-Detects	Sample Mean	
	Upgradient	Down-Gradient	Total	Upgradient	Down-Gradient	Total	Upgradient	Down-Gradient	Total	Non-Detects	Upgradient	Down-Gradient
Naphthalene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
n-Butylbenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
n-Propylbenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
o-Chlorotoluene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
p-Chlorotoluene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Sec-Butylbenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Styrene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Tert-Butylbenzene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Tetrachloroethene	16	8	24	7	0	7	43.8	0.0	29.2	70.8	N/D	N/D
Toluene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Total Xylenes	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Trans-1,2-Dichloroethene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Trans-1,3-Dichloropropene	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Trichloroethene	16	8	24	8	0	8	50.0	0.0	33.3	66.7	N/D	N/D
Trichlorofluoromethane	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D
Vinyl Chloride	16	8	24	0	0	0	0.0	0.0	0.0	100.0	N/D	N/D

[1]No correction made for non detections

[2]N/D = Not determined for VOCs because most detections were estimated quantitations ("J" qualifier) below the detection limit

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Table 6-4 Comparative Statistics for Groundwater Analytes with <90 Percent Sample Non-Detections and Downgradient Sample Means Greater than Upgradient Sample Means – CY 2000

Parameter	% Non-	Shapiro-Wilk Normality Test				Levene Test				Parametric ANOVA (Single				Wilcoxon Rank-Sum Test			
		W_x	$W_{Ln\,x}$	$W_{n,0.05}$	Distribution Type	F_x	$F_{Ln\,x}$	$F_{.05}$	Variances Equal?	F_x	$F_{Ln\,x}$	$F_{.05}$	Significant Diff?	W	Z	$Z_{.01}$	Significant Diff
Water Quality (mg/L)																	
Fluoride	8.7	0.770	0.965	0.914	Lognormal		2.505	4.325	Yes		**6.770**	**4.325**	**Yes**	**96**	**2.641**	**2.326**	**Yes**
Nitrate/Nitrite (as N)	0	0.593	0.900	0.916	Unknown				Unknown					24.0	-2.482	2.326	No
Sulfate	0	0.510	0.774	0.916	Unknown				Unknown					**104.0**	**2.429**	**2.326**	**Yes**
TDS	0	0.519	0.761	0.914	Unknown				Unknown					**112.0**	**3.717**	**2.326**	**Yes**
Metals (ug/L)																	
Aluminum	4.3	0.286	0.781	0.914	Unknown				Unknown					73.0	0.8	2.326	No
Cadmium	50	N/A	N/A	N/A	Unknown				Unknown					82.0	1.082	2.326	No
Calcium	0	0.554	0.742	0.916	Unknown				Unknown					**107.0**	**2.603**	**2.326**	**Yes**
Chromium	29.2	N/A	N/A	N/A	Unknown				Unknown					66.0	0.092	2.326	No
Cobalt	79.2	N/A	N/A	N/A	Unknown				Unknown					61.5	-0.192	2.326	No
Copper	33.3	N/A	N/A	N/A	Unknown				Unknown					93.5	1.781	2.326	No
Iron	20.8	N/A	N/A	N/A	Unknown				Unknown					53.0	-0.705	2.326	No
Lithium	0	0.549	0.830	0.916	Unknown				Unknown					**107.0**	**2.603**	**2.326**	**Yes**
Magnesium	0	0.549	0.766	0.916	Unknown				Unknown					**104.0**	**2.419**	**2.326**	**Yes**
Manganese	20.8	N/A	N/A	N/A	Unknown				Unknown					66.0	0.092	2.326	No
Molybdenum	33.3	N/A	N/A	N/A	Unknown				Unknown					**110.0**	**2.794**	**2.326**	**Yes**
Nickel	16.7	N/A	N/A	N/A	Unknown				Unknown					**105.0**	**2.5**	**2.326**	**Yes**
Potassium	0	0.549	0.815	0.916	Unknown				Unknown					99.0	2.113	2.326	No
Selenium	37.5	N/A	N/A	N/A	Unknown				Unknown					75.0	0.645	2.326	No
Sodium	0	0.634	0.763	0.916	Unknown				Unknown					**105.0**	**2.480**	**2.326**	**Yes**
Strontium	0	0.536	0.778	0.916	Unknown				Unknown					**107.0**	**2.603**	**2.326**	**Yes**
Zinc	0	0.660	0.928	0.901	Lognormal		6.560	4.325	No					**69.0**	**2.587**	**2.326**	**Yes**
Radionuclides (pCi/L)																	
U-233/234	47.6	N/A	N/A	N/A	Unknown				Unknown					**80.0**	**3.263**	**2.326**	**Yes**
U-235	76.2	N/A	N/A	N/A	Unknown				Unknown					**80.0**	**3.272**	**2.326**	**Yes**
U-238	47.6	N/A	N/A	N/A	Unknown				Unknown					**80.0**	**3.262**	**2.326**	**Yes**

N/A = not applicable
[1] Calculated for <15% non-detects only
[2] Significant difference in downgradient to upgradient sample groups shown in bold typeface

Mercury, thallium, and tin - the only trace metals reported with non-detections exceeding 90 percent of the sample set - were not detected in any downgradient sample, with the exception of a single thallium value (14.8 µg/L) in well B206989. The other thallium results from this well were below detection, indicating that the detectable result was not significant. The presence of detectable tritium in well B206989, combined with the elevated nitrate/nitrite, lithium, selenium, and uranium isotopes in this well, may signify an association with a contaminant source other than the landfill (see next section).

6.5.3 Trend Plots and Data Interpretation

Trend plots of analytes in downgradient wells that exceed upgradient concentrations are presented in Appendix C per the requirements of the IMP. Concentration trends for most analytes with three or more data points tend to

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fluctuate somewhat, but are generally flat or declining, therefore indicating that potentially contaminated landfill groundwater is not currently migrating eastward past the East Landfill Pond dam. Specifically, the fluoride, sulfate, TDS, calcium, lithium, magnesium, molybdenum, nickel, potassium, sodium, strontium, zinc, and U-235 concentrations in all downgradient wells (except fluoride, sulfate, lithium, and zinc in well B206989) do not appear to be increasing above historical levels. Lithium, zinc, U-233/234, and U-238 concentrations in well B206989 show evidence of an increasing 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 a RFCA action level criterion.

Assuming that seepage of contaminated groundwater past the dam is not appreciable enough to influence downgradient groundwater quality, 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;
- evaporative concentration of solutes in pond water in combination with other factors, such as mineral build-up in soils resulting from seasonal desaturation of valley-fill alluvial materials;
- contribution of more highly mineralized groundwater from the underlying LHSU to UHSU bedrock;
- natural mineralization of groundwater resulting from prolonged contact with aquifer materials as it travels along a flow path, and
- a secondary contaminant source that is upgradient of the well, but is not associated with the landfill or pond.

Analysis of analyte trends showing concentration increases must account for these conditions in order to differentiate between natural and anthropogenic influences.

In general, natural processes involving evapotranspiration, upwelling of LHSU groundwater, and mineralization along the flow path do not appear to provide satisfactory explanations for the geochemistry at well B206989, mainly because the elevated nitrate/nitrite, lithium, and selenium concentrations are well above their normal background ranges. They also do not appear to be landfill related, as the concentrations of these analytes in landfill leachate and pond water have historically been relatively low. For example, the mean concentrations of nitrate/nitrite (0.3 mg/L), lithium (40 μg/L), and selenium (2 μg/L) at surface water monitoring station SW097 (landfill leachate), and nitrate/nitrite (0.093 mg/L) and lithium (77 μg/L) at SW098 (landfill pond) (DOE, 1996a, Tables 2-2 and 2-3), are significantly lower than concentrations found in well B206989 groundwater. In addition, elevated concentrations of nitrate/nitrite (mean=143.5 mg/L), lithium (199 μg/L) and selenium (504 μg/L) have been detected in samples from UHSU bedrock well B206889, located to the south and upgradient of well B206989. Elevated concentrations of some or all of these constituents have been found in other contaminant plumes, including the Solar Ponds Plume and IHSS 119.1.

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As suggested above and reported in *1998 Groundwater Monitoring at the Present Sanitary Landfill* (DOE, 1999), 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 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 2000 appear to be generally consistent with the results of previous monitoring. Statistical comparisons of upgradient versus downgradient UHSU groundwater at the Present Sanitary 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% level) in upgradient compared to downgradient groundwater quality were found for fluoride, sulfate, TDS, calcium, lithium, magnesium, molybdenum, nickel, sodium, strontium, zinc, U-233/234, U-235, and U-238. Volatile organic compounds were not evaluated statistically because the percentage of non-detections exceeded 90 percent or because contaminants were found only in upgradient samples.

Apart from fluoride, sulfate, lithium, zinc, U-233/234, and U-238 in well B206989, the trends of potential inorganic and radionuclide contaminants do not appear to be increasing with time in the downgradient wells. The increasing trends of lithium, zinc, U-233/234, and U-238 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 lithium, zinc, and uranium isotopes in downgradient well B206989.

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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 are 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, 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 is suggestive of inadequate evidence of biodegradation. A score of 6 to 14 suggests limited evidence of biodegradation, a score of 15 to 20 shows adequate evidence and scores above 20 show strong evidence of biodegradation.

7.1.1 Electron Donors

The process 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) was collected to ascertain the availability of carbon in the environment to 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 results of the carbon tetrachloride plume (IHSS 118.1), plume degradation monitoring program that was initiated in 1999. Additional sampling from CY 2000 has been added to the data collected in 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.

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

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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 two wells upgradient of the DNAPL source (18799, 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 from the source (18199, 18299, 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 Report. Figure 7-1 shows the location of the wells and sampling locations.

Dedicated bladder pumps were installed in the 1999 wells so that 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 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 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 across the IHSS 118.1 area

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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	1	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	0.05
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	0.05
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	0	240		
18199	5/30/00	35000	5500	94	0	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	0	2		
18499	12/5/00	24200	7080	0	0	195		
18199	12/5/00	27300	3820	219	0	190		
21098	12/5/00	959	348	22.4	0	1		
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	0.26
18199	12/5/00	27	0.002	0.45	69	0.01	3	0.74
21098	12/5/00	24	0.02	NA	190	NA	2	1.6

NA = not analyzed

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7.2.1 Electron Donors

Figure 7-2 shows results for total organic carbon for the 4 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 insures 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 sample 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 lab contaminant and was reported in the lab 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 .26 to 2 mg/L, which is near the RFETS background mean of 1.4 mg/L for Rocky Flats Alluvium (DOE 1993b). In Figure 7-2, nitrate concentration is seen to decrease at the source and then increase again in concentration away from the source. Contrary to this trend is data from the first quarter of 2000, which is 6.8 mg/L at the source, decreasing downgradient. 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 typically low concentration of nitrate in the vicinity of the

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IHSS (.05 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 sulfate concentration in upgradient well 18799 ranges 38 to 53 mg/L, which is above the RFETS background mean of 22 mg/L (DOE 1993b). Figure 7-5 shows the concentration of sulfate dropping near source well 18499, and then increasing 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 was found at 30 mg/L in the source area and at higher levels 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 ranges from 2.5 to 5.4 mg/L and decreases to below 1.0 mg/L in source well 18499. DO concentration rises again in downgradient well 18199. Taking the data at face value, it would appear that DO levels are detrimental for anaerobic degradation of organic compounds except at the source. DO was measured using a DO probe housed inside a flow-through cell. Complications have occurred where the DO measurements may have been improperly measured during some sample events. The values shown are believed to be in units of mg/L even though field forms may have reported some values in percent.

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 in the first quarter 1999 sampling event ferrous iron appears to decrease near the source area. However, the 2000 Fe^{2+} data show increases from near 0 mg/L in background well 18799 to 1.6 –3 mg/L in source well 18499, then decreases to 0.10 mg/L in downgradient well 18199. Wiedemeier et al (1996) believe that ferrous iron above 1 mg/L would suggest that reductive dechlorination is taking place. Given the similarity in the results obtained in the two 2000 sampling rounds it is possible 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 7-2 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

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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 increases from approximately 0.003 mg/L to .05 - 0.20 mg/L in the source area, then decreased to 0.007 in downgradient well 18199. 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 were fairly low, suggesting that there is little if any petroleum hydrocarbons present there. However, the 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 concentration was reported in the 63 – 100 mg/L range and does show change across the source in the third quarter 1999 sample. 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 inconsistencies of the data and the lack of dramatic change in chloride concentration at IHSS 118.1 relative to both upgradient and downgradient wells and the surrounding Industrial Area, 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.

7.2.4 Conclusions and Recommendations

The 2000 results are similar in most respects to the data collected at IHSS 118.1 in 1999. 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 18 (see Table 7-2). 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.

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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.

Based on the results obtained to date the following recommendations can be made with respect to future sampling:

The present sampling suite should be continued on the current semiannual schedule for IHSS 118.1. Attempts will be made to document the correct readings for DO and ferrous iron in the field.

Given the probable involvement of the Building 771 and Building 774 footing 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 footing drains from the buildings mentioned above exit at this location. An initial evaluation of these drains was performed in 2001; results will be reviewed and, if warranted, the Bowman's Pond drain effluent should be sampled on the same frequency as the building D&D and IHSS 118.1 wells to ascertain whether a connection exists between the plume and the drain system.

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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	3	0
Oxygen	> 1.0 mg/L	Prohibits reductive dechlorination	-3	0	-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	3	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**	18	3

7.3 903 Pad/Ryan's Pit Plume

The 903 Pad/Ryan's Pit Plume is located directly south of the southeast corner of the PA and between the 903 Pad and 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 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 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.

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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. The other three wells are downgradient of the 1998 Geoprobe wells and 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 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 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.

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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	3800	0	0		
1187	3/9/01	65	84	46	0	3		
90099	3/8/01	360	75	43	0	0		
90399	3/8/01	130	23	2	0	0		
11791	3/9/01	250	68	22	0	22		
Well	**Date**	**1,1,1-TRICHLOROETHANE**	**1,1-DICHLORO-ETHANE**	**CHLOROETHANE**	**ETHENE**			
07391	3/6/01	380	88	0	0			
1187	3/9/01	0	0	0	0			
90099	3/8/01	0.54	0	0	0			
90399	3/8/01	0.32	0	0	0			
11791	3/9/01	0.3	0.3	0	NA			
Well	**Date**	**TETRACHLOROETHENE**	**TRICHLORO-ETHENE**	**Cis-1,2-DICHLOROETHENE**	**VINYL CHLORIDE**	**ETHENE**		
07391	3/6/01	1200	67000	100	0	0		
1187	3/9/01	30	2300	0	0	0		
90099	3/8/01	24	880	10	0	0		
90399	3/8/01	4	110	2	0	0		
11791	3/9/01	79	54	40	0	0		
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

NA = not analyzed

7.3.1 Electron Donors

Figure 7-8 shows results for total organic carbon for the first quarter 2000. TOC is approximately 13 mg/L near well 07391 but decreases to the 2-4 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 products, in order, and Figure 7-10 shows the likely PCE breakdown 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

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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 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 of approximately 1200 μg/L at well 0739,1 decreasing in a downgradient direction to just below Tier II action levels in well 90399. However, TCE occurs at levels of 67,000 μg/L at well 07391 and steadily decreases in concentration downgradient to reach approximately 100 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 large concentration of TCE is probably because of its disposal in Ryan's Pit. Additional evidence for this is the low concentrations of the other 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 is 67 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) suggest 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 was 200 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

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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.

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). Multiparameter downhole probes were installed in wells 07391, 1187 and 90399 to measure DO. Figure 7-8 shows that DO concentration (represented as an average of many 4-hour readings) at well 07391 were approximately 5.4 mg/L and decreases to 4.2 mg/L in well 1187. DO readings at 90399 averaged 5.3 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. Unfortunately, there appeared to be some drift in the DO measurements from the downhole probes, which typically displayed lower readings with time in the well. Because of this drift, DO measurements may not reflect actual conditions in the groundwater.

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 2000 because of a sampling oversight. It will be collected in future sampling rounds.

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. 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 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. Wiedemeier et al (1996) believe 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 the complete breakdown of solvents to the methane end product is

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not occurring. However, the higher methane reading at well 11791 may suggest that a more favorable environment occurs closer to the 903 Pad source area. 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 releases chlorine in the process. Figure 7-8 shows the concentrations of chloride seen in well 07391 are very high (470 mg/L). Chloride concentrations drop in downgradient well 1187 to 69 mg/L and finally down to 34 mg/L in well 90399. Well 11791 has a similar value of 59 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.

7.3.4 Conclusions and Recommendations

The results from the sampling in 2000 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. A suggested by Wiedemeier et al (1996), a score of 0 to 5 points indicates that there may be minimal biodegradation occurring. This is the case for the single round of sampling data available for the 903 Pad/Ryan's Pit Plume wells.

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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

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. Unfortunately, process knowledge of organic solvents used at the site refutes the PCE-TCE transition because large amounts of TCE were used. 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 2000, 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 discusses the groundwater evaluation project that was conducted. Maps showing the location of the plume and the wells discussed can be found in Figures 8.7 – 8.11 in Section 8.

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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 along the contaminant migration pathway in the plume. 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 7-4.

Table 7-5 PU&D Yard Sample Results

WELL	DATE	CARBON TETRACHLORIDE	CHLOROFORM	METHYLENE CHLORIDE	CHLOROMETHANE	METHANE		
01097	1/24/01	1	1	0.88	1	1		
30900	1/17/01	0.3	1	1	1	5		
01497	1/24/01	7	1	0.1	1	1		
70693	1/24/01	2	0.8	1	2	1		
02097	1/24/01	1	0.9	0.2	2	17000		
WELL	**DATE**	**1,1,1-TRICHLOROETHANE**	**1,1-DICHLORO-ETHANE**	**CHLORO-ETHANE**	**ETHANE**			
01097	1/24/01	1	1	1	2			
30900	1/17/01	1	1	1	2.5			
01497	1/24/01	0.7	0.7	1	2			
70693	1/24/01	38	0.3	1	2			
02097	1/24/01	13	4	1	2			
WELL	**DATE**	**TETRACHLORO-ETHENE**	**TRICHLORO-ETHENE**	**cis-1,2-DICHLORO-ETHENE**	**1,1-DICHLOROETHENE**	**VINYL CHLORIDE**	**ETHANE**	
01097	1/24/01	1	1	1	0.5	1	2	
30900	1/17/01	120	9	1.2	0.5	1	2	
01497	1/24/01	15	33	2	79	1	2	
70693	1/24/01	5	9	0.3	25	1	2	
02097	1/24/01	5	30	0.3	9	0.9	2	
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

NA = not analyzed

7.4.1 Electron Donors

Figure 7-11 shows results for total organic carbon for the first quarter 2001. TOC is approximately 0.65 mg/L in upgradient well 01097, and increases to 1.4 mg/L in source well 30900. The TOC values then decrease again to approximately 0.5 – 0.6 mg/L in wells 01497and 70693, then rise again to 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 be retarding the rate of reductive dechlorination in the PU&D Yard area.

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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 drops in concentration from 120 µg/L at the source well to approximately 5 µg/L downgradient along the plume. Figure 7-12 also shows that TCE and 1,1-DCE increase in concentration downgradient of the source well in well 01497. Downgradient of well 01497, 1,1-DCE decreases in concentration to 9 µg/L at well 02097. TCE decreases in concentration to 9 µg/L at well 70693 before increasing again to 30 µg/L at well 02097. Other breakdown products of PCE were not observed.

Given the data available, it would appear that there may be 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. Unfortunately, process knowledge of organic solvents used at the Site complicates the PCE-TCE transition because large amounts of TCE were used. Questions remain as to whether 1,1, DCE was used as a process chemical at the Site. Also, the plume maps in Section 8 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-DCE is predominantly a breakdown product of 1,1,1 TCA. 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 PU&D Yard source, the reductive dechlorination of carbon tetrachloride and its 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 2.5 mg/L, which is slightly above the RFETS background mean of 1.4 mg/L for Rocky Flats Alluvium (DOE 1993b). In Figure 7-16 nitrate concentration is seen to decrease in concentration downgradient to 0.05 mg/L and slightly rising again to 0.5 mg/L at well 02097. Low nitrate values in the source would favor biodegradation whereas high values would tend to retard dechlorination. Wiedemeier et al (1996), suggest 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 concentrations in well 01097 is 16 mg/L, which is below the RFETS background mean of 22 mg/L (DOE 1993b). Figure 7-11 shows the concentration of sulfate steadily rising downgradient of well 01097 to 32 mg/L in well 02097. 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

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at slightly higher levels away from the source, it can be deduced that sulfate may have little effect 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.

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). Multiparameter downhole probes were installed in wells 01097 and 01497 to measure dissolved oxygen. Figure 7-11 shows that DO concentrations (as an average of many 4-hour readings) at well 01097 were approximately 0.20 mg/L and increases to 5.8 mg/L in well 01497. Taking the data at face value, it would appear that DO levels are favorable to anaerobic degradation of organic compounds upgradient of the source, but become unfavorable downgradient of the source in this area. Unfortunately, there appeared to be some drift in the DO measurements from the downhole probes, which typically displayed lower readings with time in the well. Because of this drift, DO measurements may not reflect actual conditions in the groundwater.

7.4.3 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 measurements were not collected from the PU&D Yard area wells in 2000 because of a sampling oversight. It will be collected in future sample rounds

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 is 0.079 in upgradient well 01097, and 0.056 mg/L in source well 30900. Sulfide in well 01497 is 0.08 mg/L, 70693 us 0.031 mg/L and in well 02097 is 0.002 mg/L. 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 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, and is undetected in wells 01497 and 70693. Well 02097 shows a very high methane measurement at 17 mg/L. 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 the complete breakdown of solvents to the methane end product is not occurring. 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 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

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methane from the landfill could migrate along the fault to this location, however, additional investigation is required to confirm this possibility. 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 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. Figure 7-11 shows that chloride concentrations steadily increase from 7.3 mg/L at upgradient well 01097 to 16 mg/L at the farthest downgradient well (02097). The RFETS background mean concentrations for chloride in alluvial materials is 8 to 18 mg/L (DOE 1993b). The chloride concentration is, therefore, increasing downgradient, which would 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, the 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 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.

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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

The PU&D Yard at RFETS, also known as IHSS 170, was used to store empty drums, dumpsters, cargo boxes and excess materials from 1974 until 1997. A plume of VOC contaminated groundwater is derived from a contaminant source located in the PU&D Yard (see Figures 8.7 – 8.11). Investigation results indicate that subsurface VOC contamination is present in only a few locations and that the primary contaminant is PCE. Most of the soil contamination lies in the saturated zone, and the groundwater plume, although well developed, is relatively dispersed with low concentrations of solvents.

A treatability study is in progress to evaluate the effectiveness of Hydrogen Release Compound (HRC®) for enhancing biodegradation of the VOCs in the groundwater and soil at the PU&D Yard Plume. 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 reductive

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The product has been used at other sites to stimulate rapid degradation of chlorinated VOC contaminants in groundwater and soil. This study will evaluate the effectiveness of HRC® in the low flow groundwater regimes common at RFETS. This project is a cooperative effort between RFETS and the DOE Subsurface Contaminant Focus Area (SCFA) and funding is provided by DOE SCFA.

A number of investigations have been conducted in the PU&D Yard area during the 1990s. Based on these investigations, the study area was located in the northeast corner of IHSS 174 in the PU&D Yard, within the most highly contaminated portion of the PU&D Yard Plume. The contamination is likely derived from storage of drums that contained residual VOCs. Although the primary contaminant in the study area is PCE, there are many different chlorinated and non-chlorinated solvents present in the groundwater.

A monitoring well (30900) was installed in 2000 in a location immediately adjacent to borehole 17497, where the highest concentrations of VOCs in soils were detected. An additional monitoring well (31001) was installed slightly downgradient of the source area in January 2001. Baseline samples were collected from these two monitoring wells prior to insertion of the HRC® (see Table 7-7).

Table 7-7 Baseline Groundwater Concentrations

Well	Tetrachloroethene (µg/L)	Trichloroethene (µg/L)
30900	9	120
31001	18	5.5
RFCA Tier I Groundwater Action Levels	500	500
RFCA Tier II Groundwater Action Levels	5	5

In February 2001, 16 small diameter boreholes were drilled as insertion points for the HRC®. Approximately 800 pounds of HRC® was placed into the subsurface. These material insertion points are located within the source area of the plume immediately surrounding borehole 17497. Instead of injecting the HRC® into the aquifer, a tremie pipe was placed in each material insertion point and slowly withdrawn as each hole was filled with HRC®. Once filled, each hole was capped in bentonite. Insertion of the HRC® was completed on March 1, 2001.

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Monitoring was initiated at the end of April 2000, two months after the HRC® was inserted. The purpose of this delay was to allow subsurface conditions to stabilize. Monthly monitoring of wells 30900 and 31001 has continued subsequent to the initial sampling to evaluate the effectiveness of the treatment.

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Figure 7- 2
Nitrate, TOC and, Sulfide Concentrations at IHSS 118.1

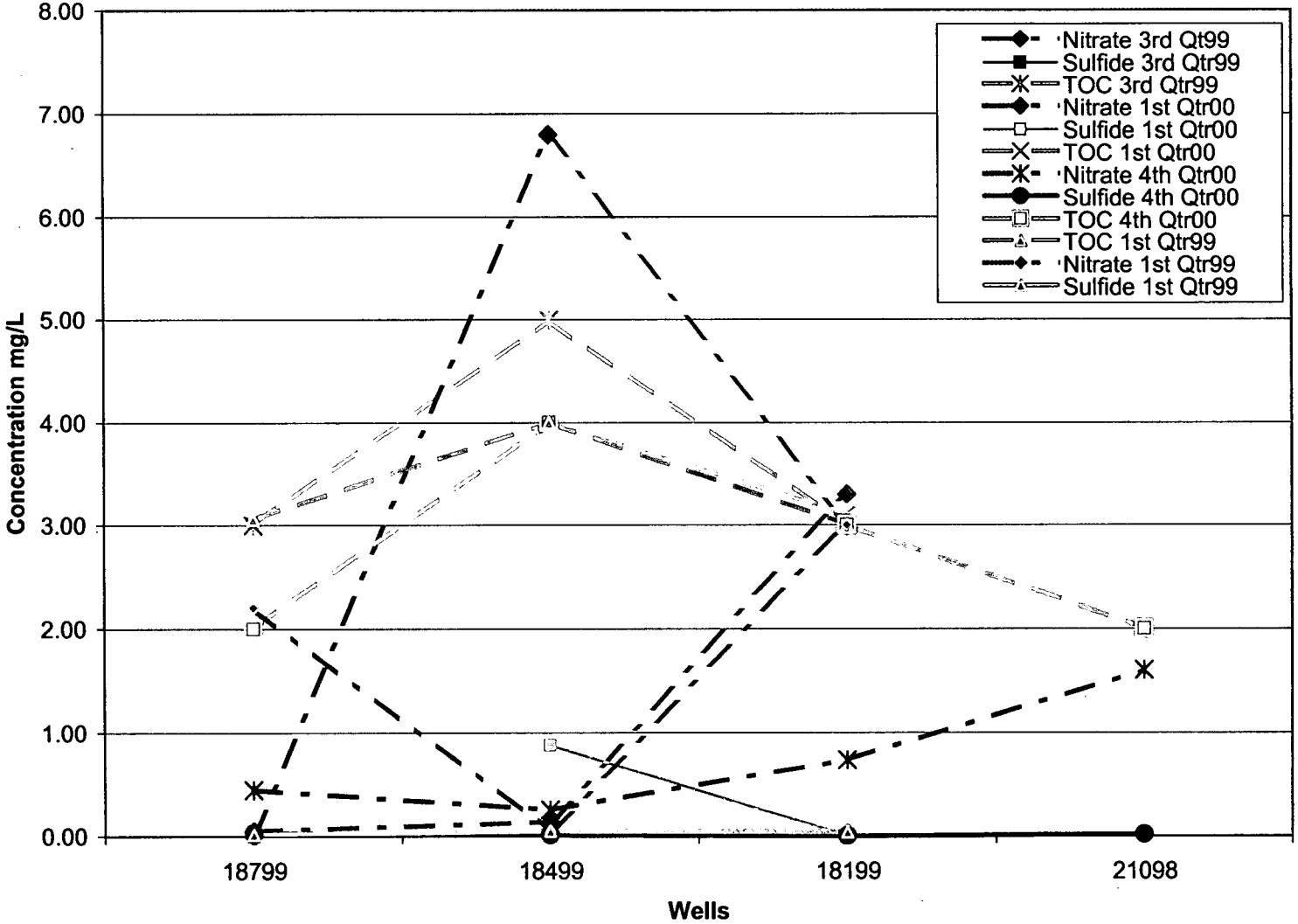

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Figure 7- 3
Carbon Tetrachloride and Chloroform Concentrations at IHSS 118.1

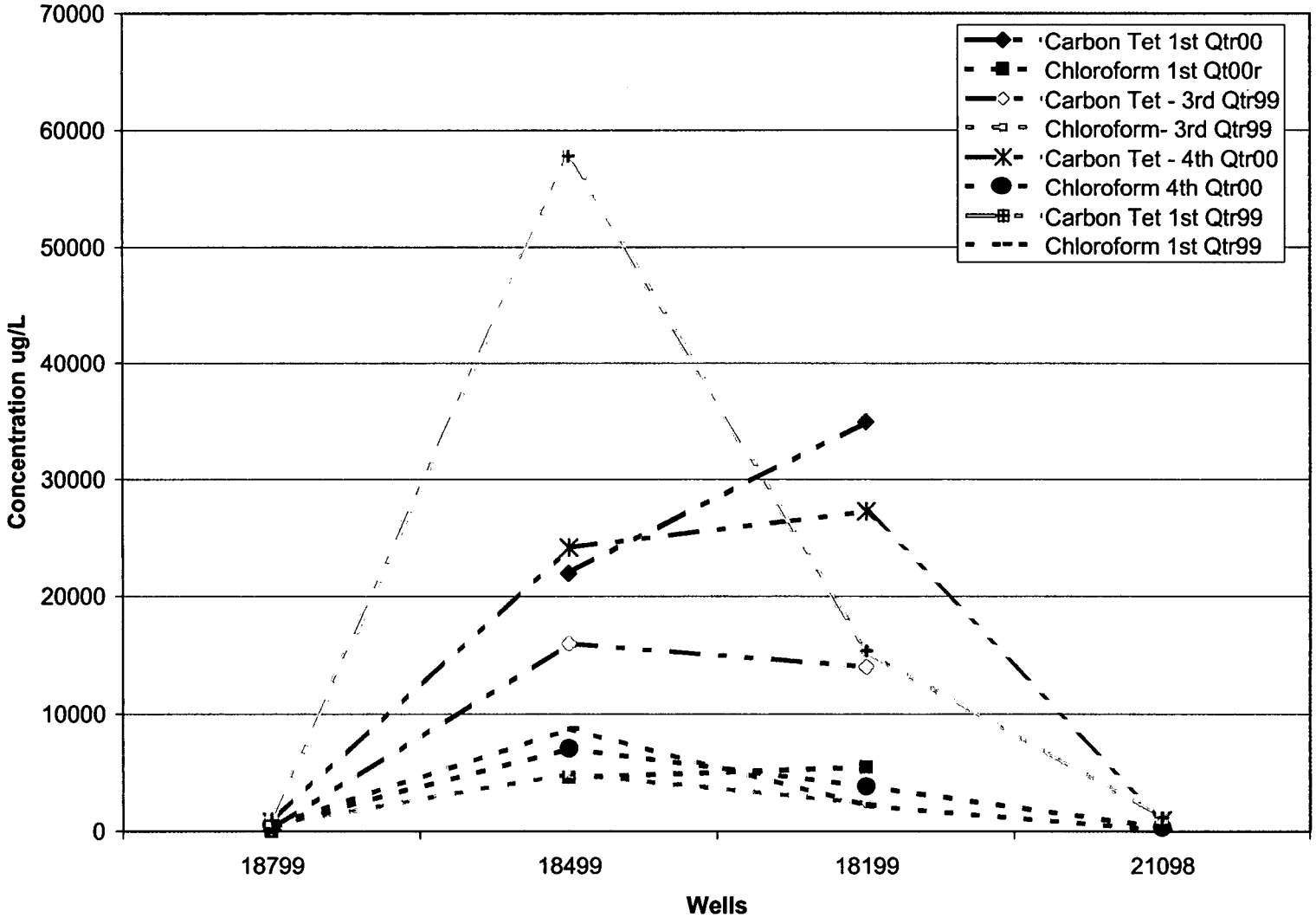

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Figure 7- 4
Methylene Chloride, Chloromethane and Methane Concentrations at IHSS 118.1

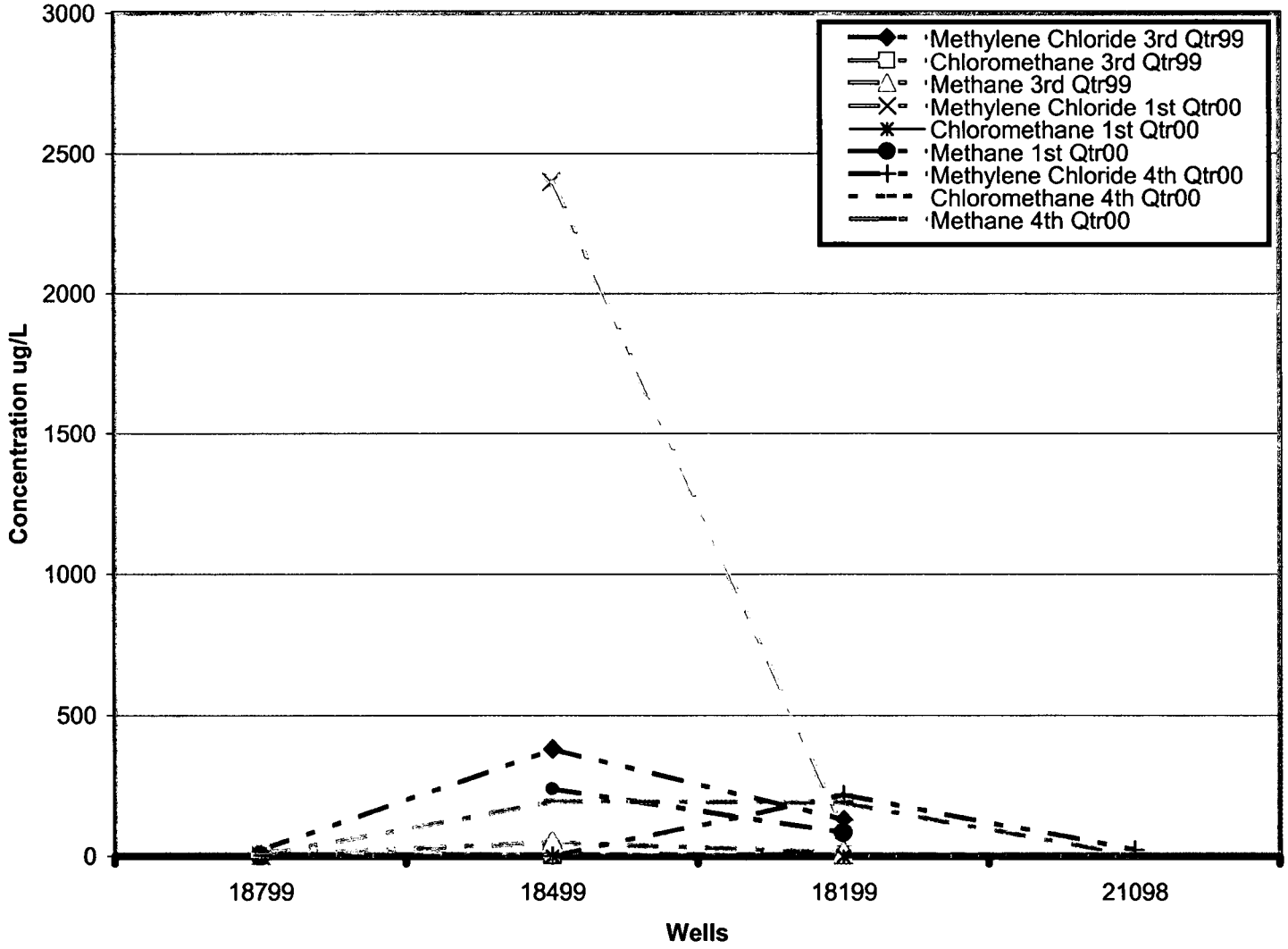

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Figure 7- 5
Chloride and Sulfate Concentrations at IHSS 118.1

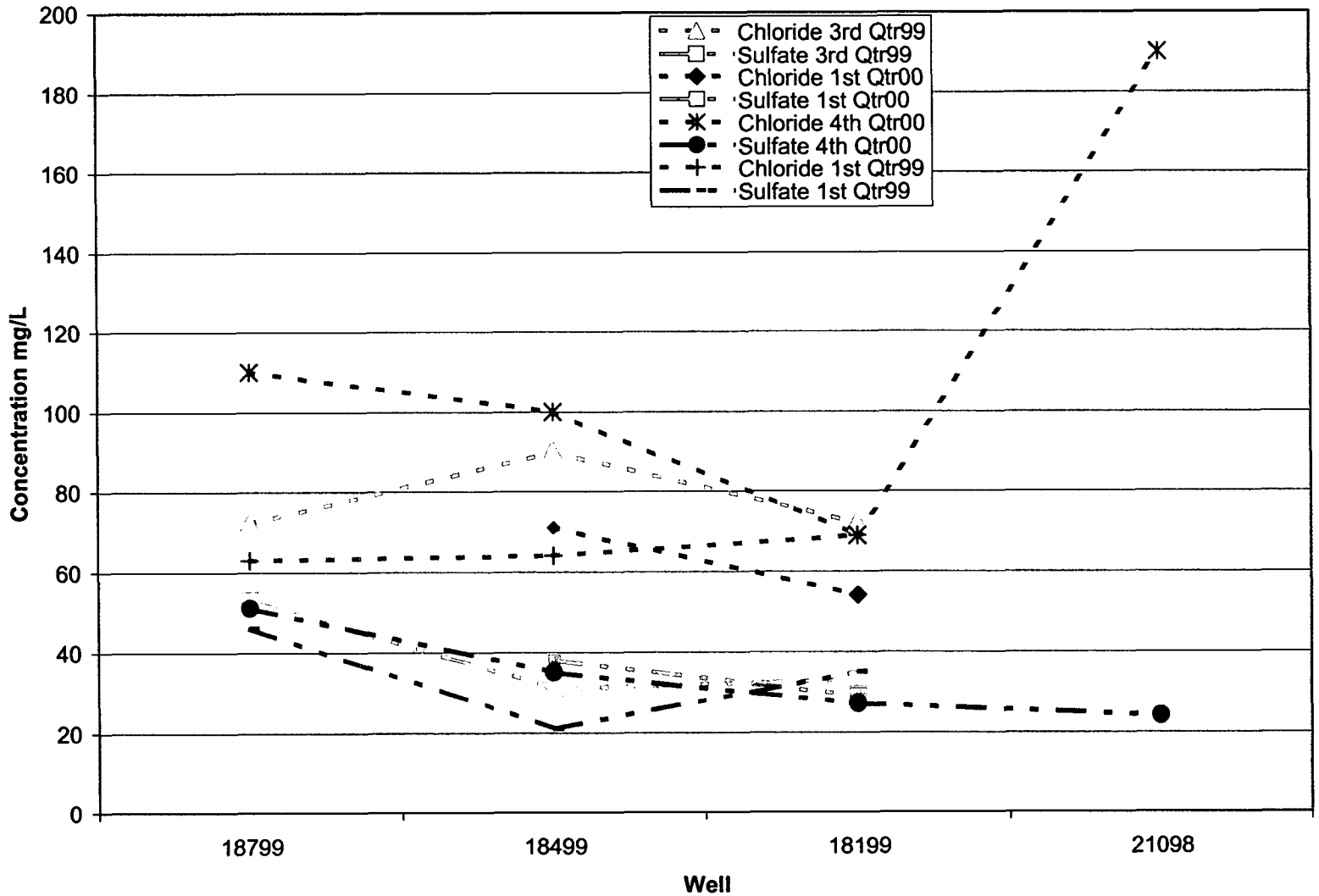

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Figure 7- 6
Dissolved Oxygen and Ferrous Iron at IHSS 118.1

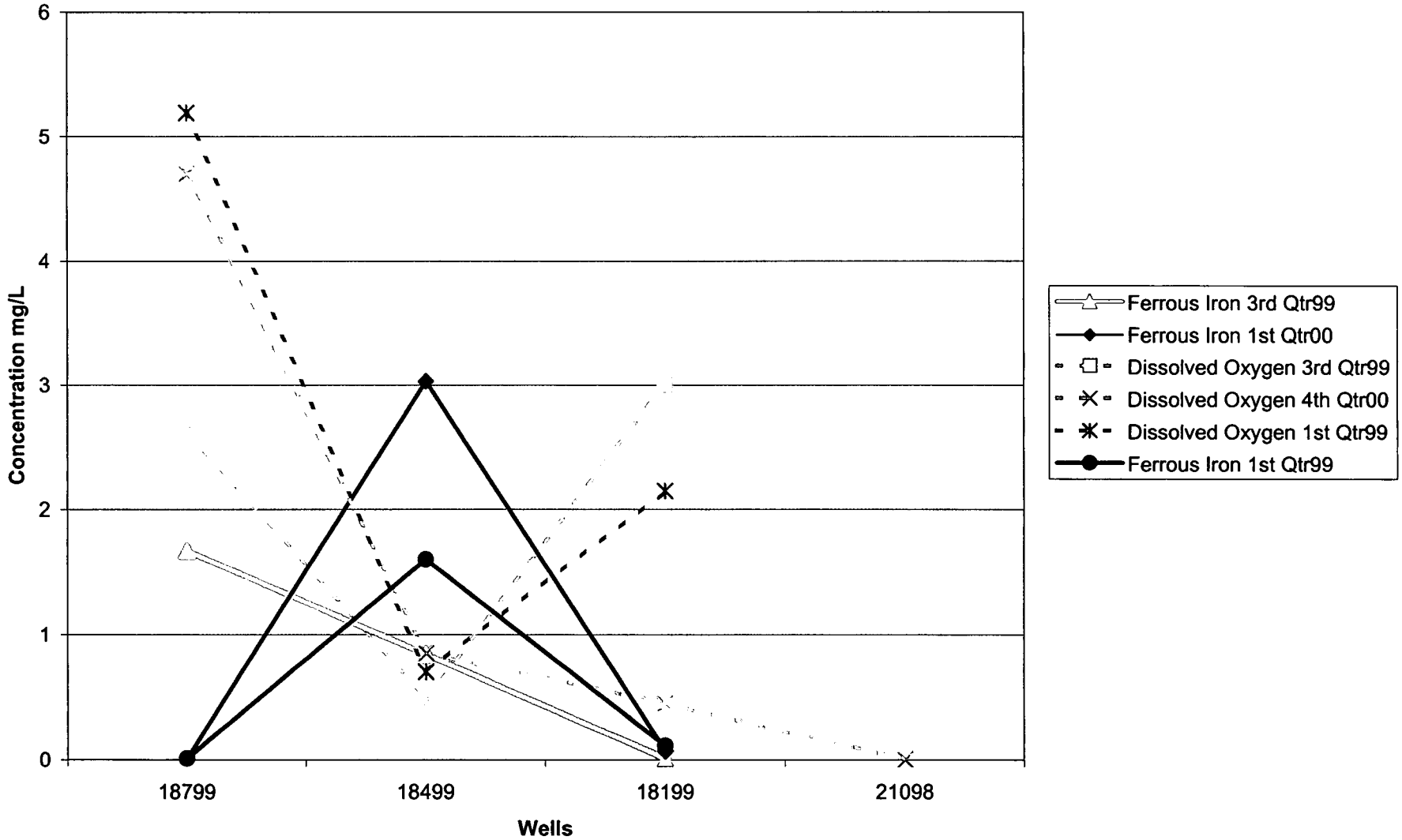

TABLE 7- 8
Sulfate, Sulfide, Nitrate, Chloride, TOC and Dissolved Oxygen for Ryan's Pit Plume Degradation

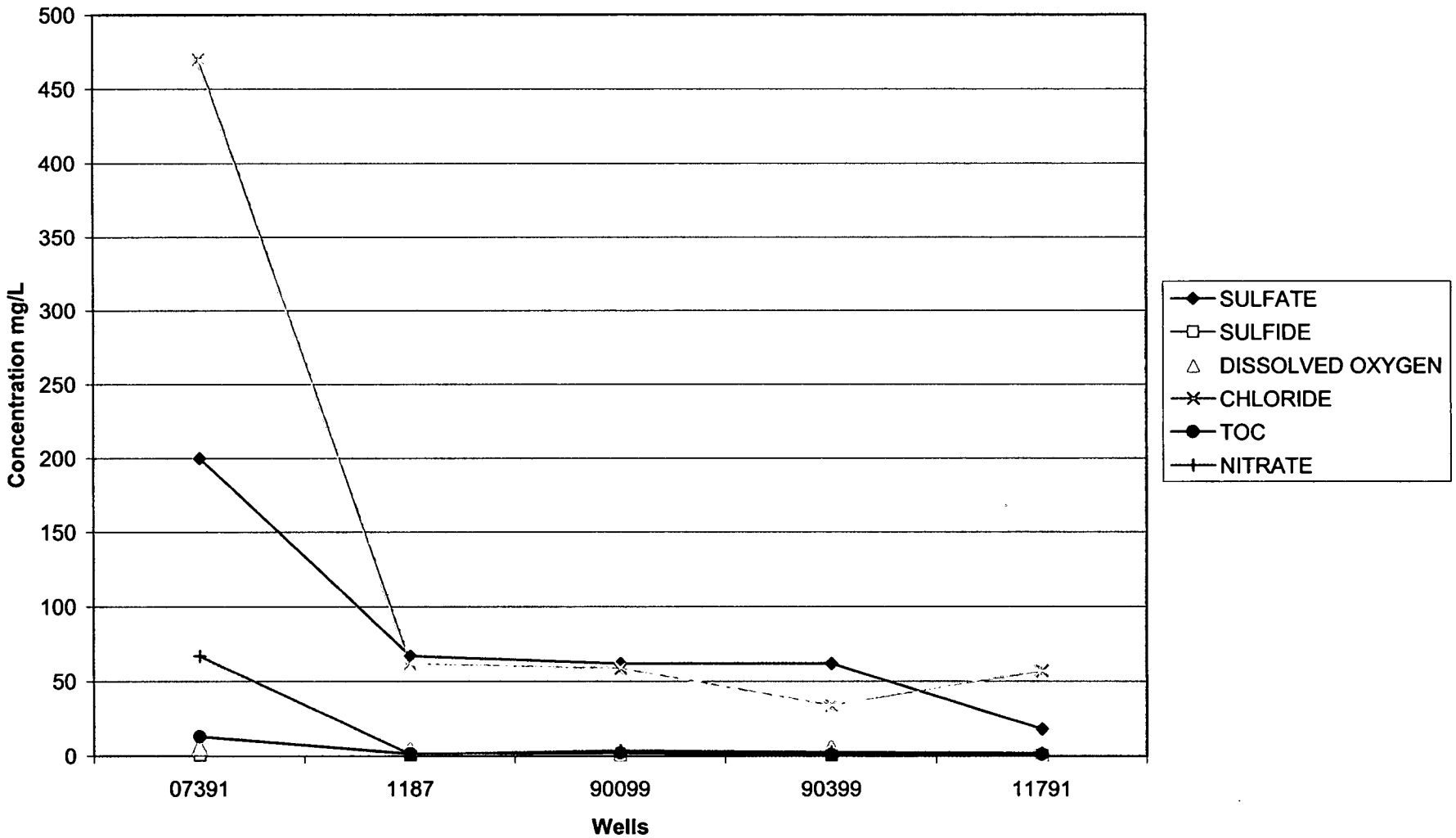

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TABLE 7 - 10
Tetrachloroethene breakdown chain, Ryan's Pit Plume Degradation

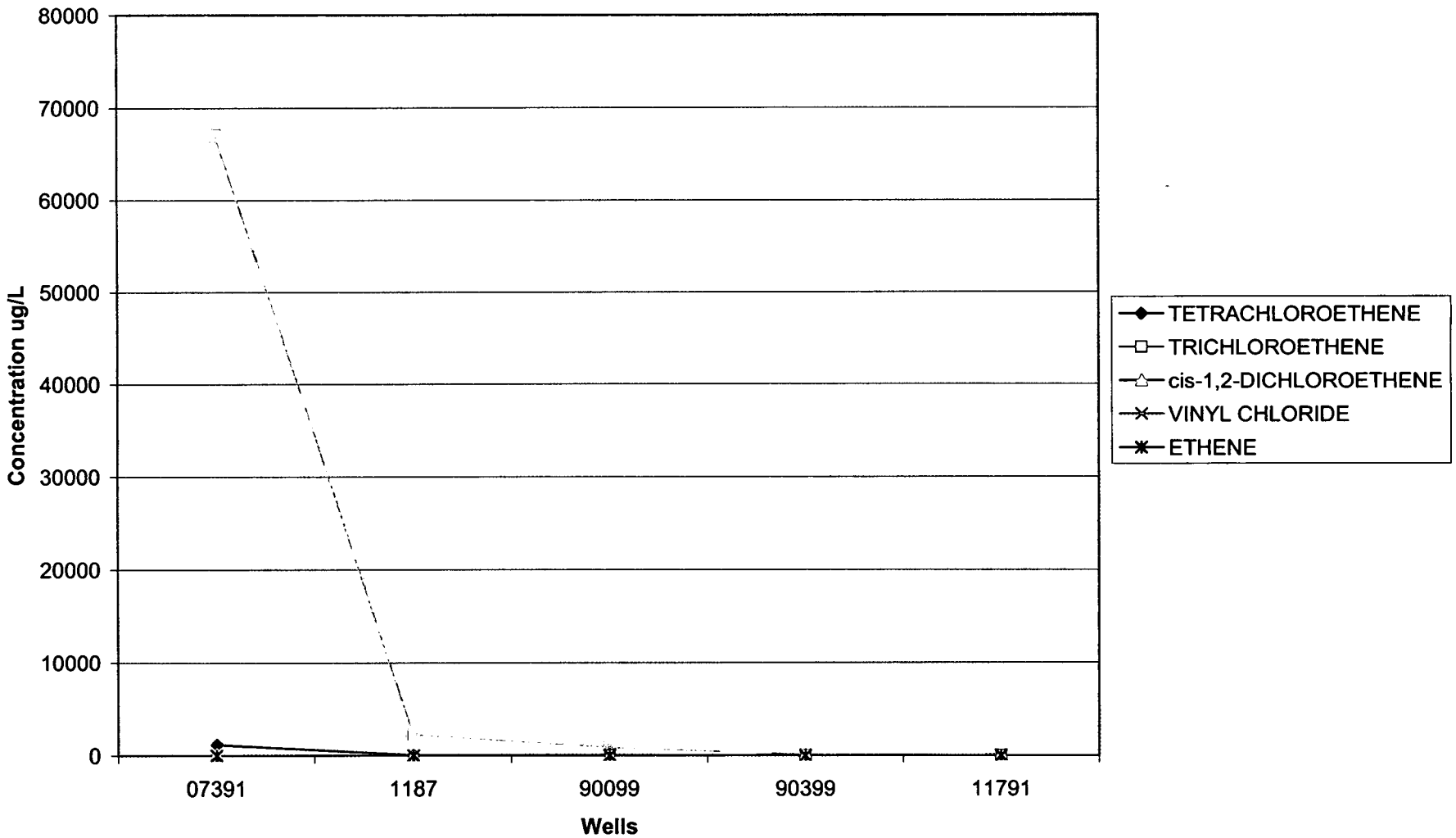

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TABLE 7 - 11

Sulfate, Sulfide, Nitrate, Chloride, TOC and Dissolved Oxygen: PU&D Yard Plume Degradation

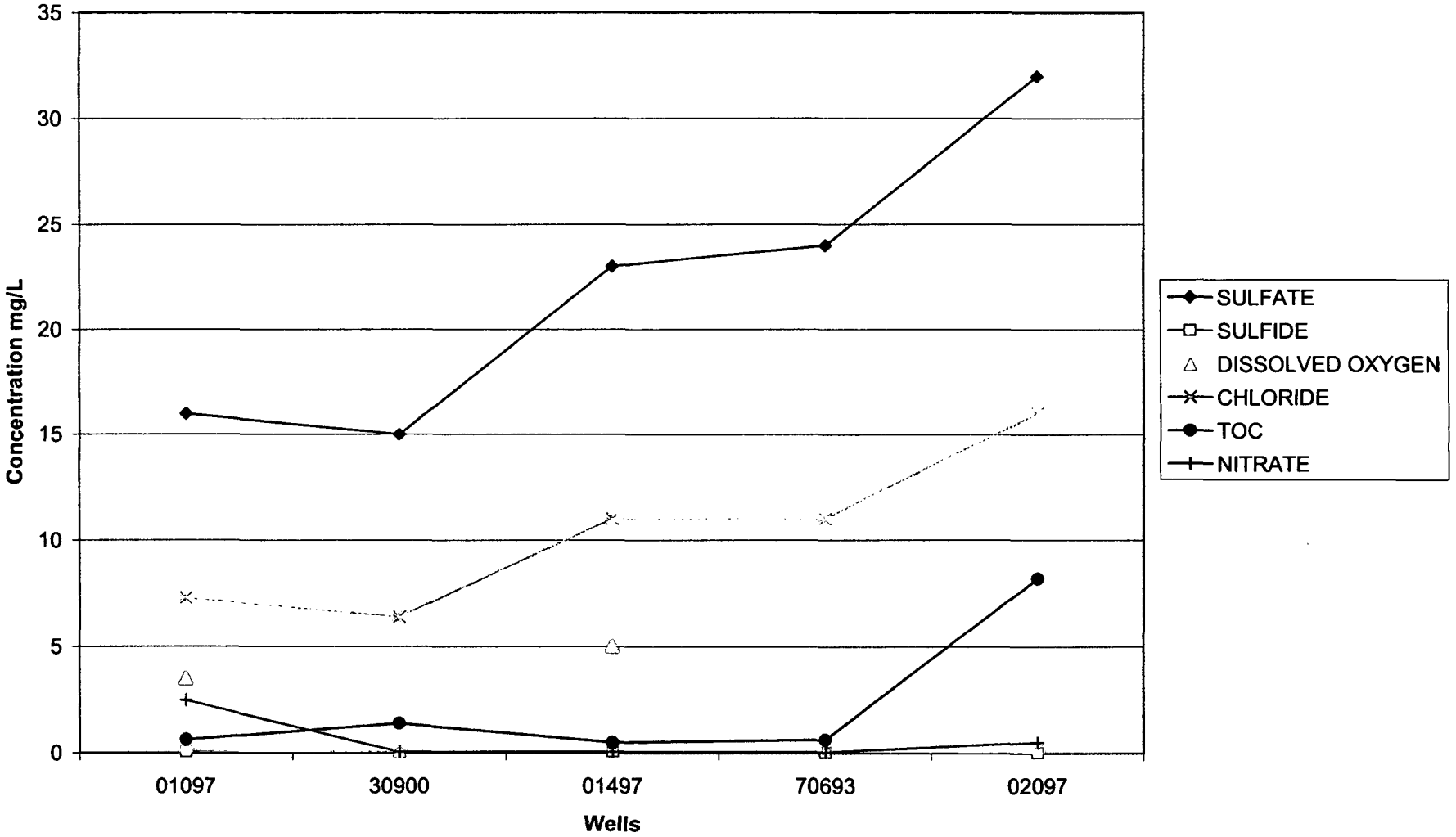

TABLE 7 - 12
Tetrachloroethene Breakdown Chain: PU&D Yard Plume Degradation

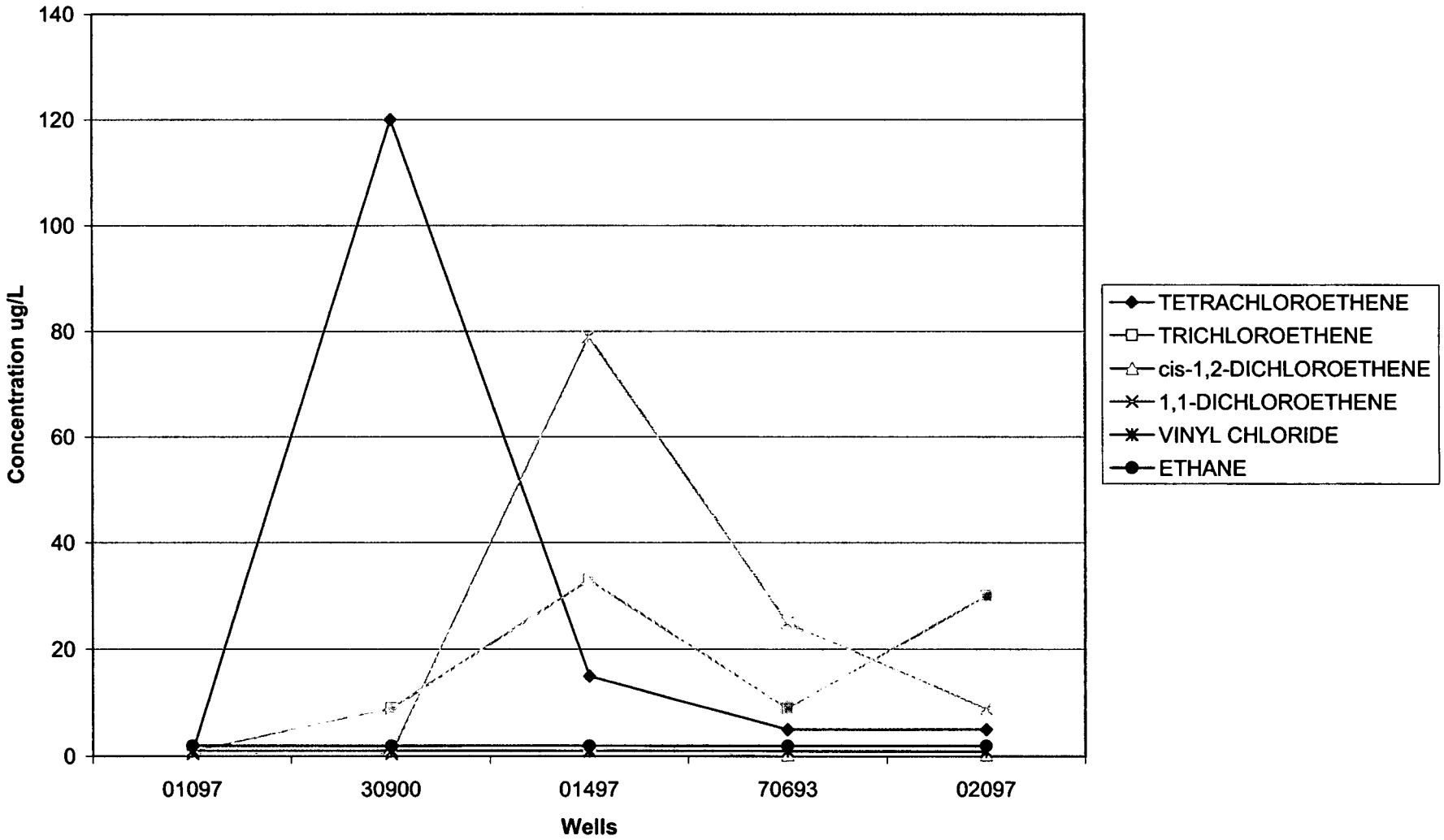

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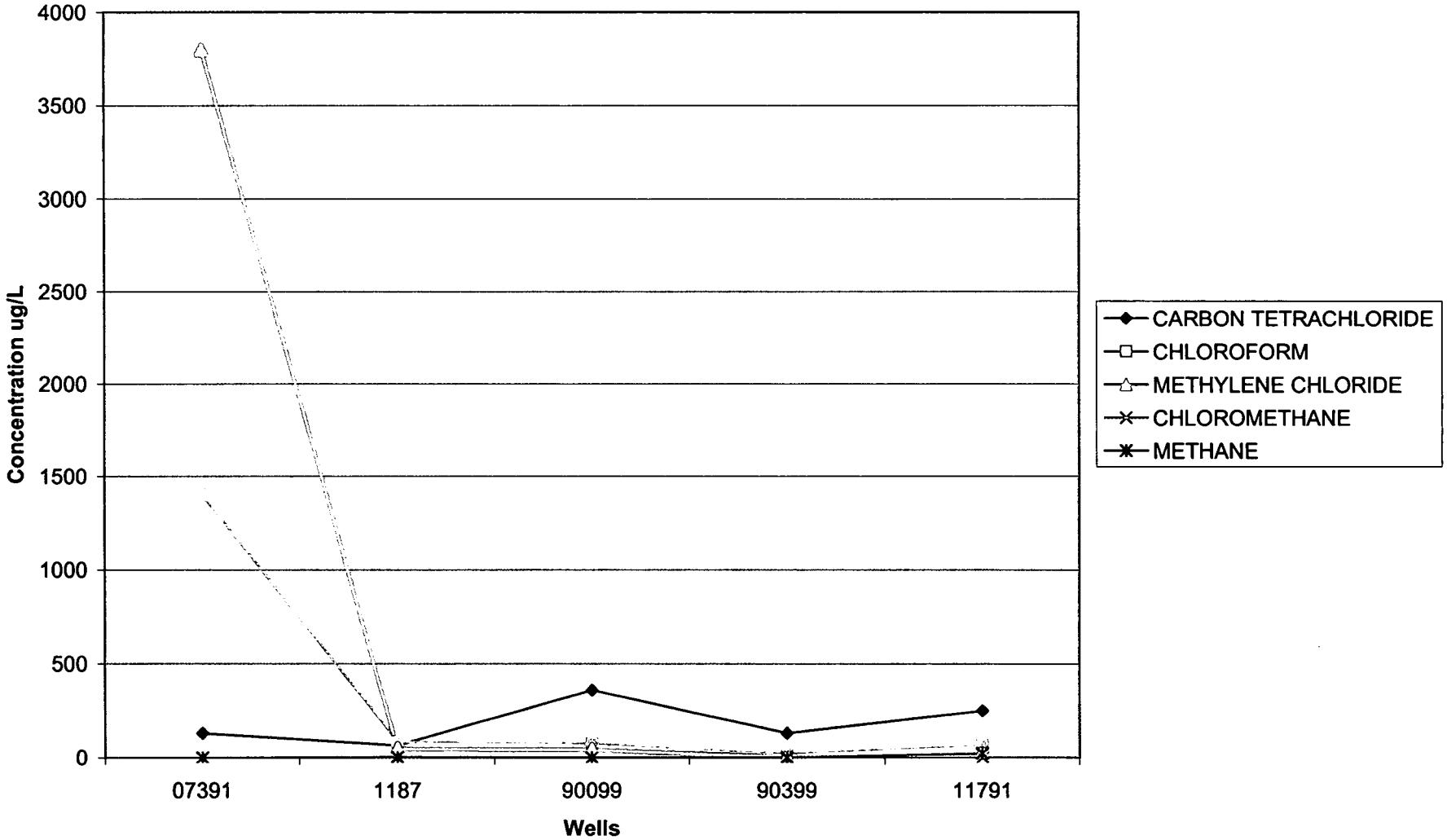
TABLE 7 - 9
Carbon Tetrachloride Breakdown Chain, Ryans Pit Plume Degradation



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8.0 GROUNDWATER EVALUATIONS

8.1 East Industrial Area Plume Investigation

In 1999, an investigation of the eastern edge of the Industrial Area VOC groundwater plume (EIAP) was initiated. The known extent of the plume, based on the existing wells in the area, appeared to coincide with a major north-south utility corridor located east of Eighth Street in the Industrial Area (RMRS, 1999c). The utility corridor extends in a north-south direction through most of this portion of the IA and contains numerous power and water lines. Because well coverage in this part of the IA was sparse, a project was designed to evaluate whether contaminated groundwater has migrated east past this corridor. Figure 8-1 presents the site area and existing monitoring wells.

The general approach for the EIAP groundwater investigation was to complete a line of wells in the UHSU along the utility corridor, which generally corresponds to the IHSS running north-south along Eighth Street on Figure 8-1. The line extends from the northwest corner of Building 776 in the north to the northwest corner of Building 881 in the south. Wells 60099 through 61499 were installed, except for well 60999, which could not be installed because of the density of utilities at the corner of Eighth and Central Avenues. Existing well 6186 was substituted for this well and is not far from the proposed location of 60999. Wells 60799 and 61399 were installed to investigate a known bedrock scour that trends in a northeast direction and was thought to direct groundwater preferentially in this area. Existing well 37791, located adjacent to the northwest corner of Building 881, was utilized for the southernmost well in the line.

The new EIAP wells were installed in September and October of 1999. Wells were installed with a Geoprobe rig and were ¾-inch in diameter. In some cases the alluvium was very thin, but averaged eight to nine feet thick in most places. The bedrock was not extensively weathered in many of the boreholes. Sampling was begun in the 4th quarter of 1999 and continued into 2000. Because of limited saturated thickness and the fact that 2000 was a relatively dry year, initial well development and sampling of some of the EIAP wells was difficult. A second round of samples and additional water level data were collected in the 4th quarter of 2000 to confirm the previous sampling results. Table 8-1, which shows the depth to bedrock and the saturated thickness of the alluvium in EIAP and associated wells (unless the water table elevation is below the level of the bedrock), has been updated to reflect the second sample round.

Figure 8-2 presents an updated water level potentiometric surface map, prepared using 4th Quarter 2000 data. The potentiometric surface map is in general agreement with the map prepared for the 1999 Annual report. A possible drainage divide is depicted in the southern portion of Figure 8-2 but is only defined by two wells, P218289 and P313589. If present, the drainage divide might help explain the decrease in saturated thickness in the southern portion of the EIAP line. Figure 8-2 does show that water levels decrease from west to east. However, complications arise when trying to ascribe this change to the utility corridor alone. Figure 8-2 shows the 5990 potentiometric contour straightening in the area of wells 61099, 61199, 61299 and 37791. This perturbation of the

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contour is primarily because of the effects of the foundation drains in Building 883, which have an elevation of 5981 feet, which is ten feet below the water table in the immediate vicinity. Building 881 also has foundation drains at even lower elevations, which are effecting the water table in this area. Further evidence for a lack of impact from the utility corridor is the similarity of water levels in wells west of the corridor with those installed along the EIAP line east of the corridor. Wells 60799 and 60899 are east of the corridor, yet show no marked change in water level relative to well P215789 that is west of the corridor. Similarly, well 61299 is east of the corridor and only shows approximately one foot of water table elevation difference when compared with well P320089 west of the corridor. The regional hydraulic gradient in the central IA as shown in Figure 8-2 is .015 ft/ft of distance. The gradient between well P320089 and well 61299 is approximately .004 ft/ft of distance, which is less than the regional gradient.

Figure 8-3 is an isopleth map showing water table saturated thickness for unconsolidated surficial deposits in the area of the utility corridor. Figure 8-4 is an isopach map showing the thickness of unconsolidated deposits in the same area. The two maps are similar in appearance, and show that both alluvial thickness and saturated thickness decrease from west to east. The change in the saturated thickness can be observed for wells in the area to ascertain whether a drastic change in saturated thickness or water level occurs across the utility corridor. In general, saturated thicknesses of alluvial materials found along the EIAP line are small, especially in the northern half of the line where water levels are near the bedrock contact or below it. The largest saturated thickness seen in wells east of the line occurs in wells P213689, 61099, and 61199. Coincidentally, the latter two wells have significant detections of PCE. Taken as a whole, the wells immediately east of the utility corridor tend to have an alluvial saturated thickness of 1-2 feet. Comparison of this saturated thickness with wells to the west of the utility corridor suggests that changes may be normal for the area. Wells P313589 and P215789 have had a historic saturated thickness averaging approximately 4 feet. Farther west, wells P114689, P115689 and P414189 tend to have saturated thicknesses of 10-12 feet. The change in saturated thickness between these two sets of wells takes place over a distance of approximately 750 feet in an east-west direction in the IA. Changes from the 4 foot saturated thickness to wells with 1-2 feet of saturated thickness occur over a similar distance. Therefore, there appears to be a natural gradient for water levels in the central IA; strong evidence is lacking of an abrupt change at the utility corridor. The maps suggest that these decreases are not abrupt in the location of the utility corridor, but are probably affected by the corridor locally.

An important feature is depicted on both maps in the area encompassing well 61199. Here the alluvial materials are thicker than in adjacent wells, and cause a perturbation in the isopleth map. This increase in thickness is caused by an increase in the depth to bedrock in well 61199, suggesting that there may be a bedrock scour in this area. Given that well 61199 is the focus for PCE and TCE that appears to be migrating past the utility corridor in this area, it can be concluded that the bedrock scour is aiding in contaminant migration. Figures 8-5 and 8-6 show TCE and PCE concentrations in the area of the EIAP line.

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Table 8-1 Water Levels and Saturated Thickness for EIAP Line

Well	Date	Depth to Water	Units	Top of Casing Elevation	Water Table Elevation	Surface Elevation	Depth of Bedrock	Bedrock Elevation	Alluvial Saturated Thickness
Fourth Quarter 2000									
60099	10/11/00	Dry	ft	5982.75	NA	5983.30	9.00	5974.30	NA
60199	10/11/00	5.44	ft	5986.68	5981.24	5987.18	7.70	5979.48	1.76
60299	10/11/00	7.55	ft	5986.88	5979.33	5987.38	7.70	5979.68	-0.35
60399	10/10/00	9.07	ft	5986.23	5977.16	5986.70	6.70	5980.00	-2.84
60499	10/10/00	8.9	ft	5991.02	5982.12	5991.76	10.70	5981.06	1.06
60599	10/10/00	4.85	ft	5987.91	5983.06	5988.51	5.40	5983.11	-0.05
60699	10/10/00	3.99	ft	5986.92	5982.93	5987.42	2.30	5985.12	-2.19
60799	10/10/00	5.23	ft	5993.14	5987.91	5993.75	5.30	5988.45	-0.54
60899	10/9/00	7.92	ft	5995.67	5987.75	5996.09	10.20	5985.89	1.86
61099	10/9/00	8.99	ft	6001.81	5992.82	6002.29	13.60	5988.69	4.13
61199	10/9/00	9.18	ft	6002.80	5993.62	6003.31	17.00	5986.31	7.31
61299	10/9/00	7.1	ft	6003.48	5996.38	6003.88	9.80	5994.08	2.30
61399	10/10/00	6.94	ft	5983.89	5976.95	5984.47	1.50	5982.97	-6.02
61499	10/9/00	7.85	ft	5986.33	5978.48	5986.87	7.60	5979.27	-0.79
6186	10/9/00	9.74	ft	6000.60	5990.86	5999.5	11.50	5987.97	2.89
P313589	10/6/00	8.18	ft	6010.11	6001.93	6008.5	11.00	5997.50	4.43
P213689	12/6/00	10.22	ft	5996.04	5985.82	5994.3	13.00	5981.30	4.52
P317989	10/9/00	9.11	ft	5992.84	5983.73	5990.9	6.40	5984.50	-0.77
P320089	10/5/00	14.33	ft	6011.87	5997.54	6009.9	18.80	5991.10	6.44
First Quarter 2000									
60099	1/6/00	Dry	ft	5982.75	NA	5983.30	9.00	5974.30	NA
60199	1/6/00	6.09	ft	5986.68	5980.59	5987.18	7.70	5979.48	1.11
60299	1/6/00	8.69	ft	5986.88	5978.19	5987.38	7.70	5979.68	-1.49
60399	1/10/00	6.18	ft	5986.23	5980.05	5986.70	6.70	5980.00	0.05
60499	1/10/00	8.89	ft	5991.02	5982.13	5991.76	10.70	5981.06	1.07
60599	1/10/00	4.50	ft	5987.91	5983.41	5988.51	5.40	5983.11	0.30
60699	1/10/00	7.12	ft	5986.92	5979.80	5987.42	2.30	5985.12	-5.32
60799	1/10/00	6.92	ft	5993.14	5986.22	5993.75	5.30	5988.45	-2.23
60899	1/4/00	8.48	ft	5995.67	5987.19	5996.09	10.20	5985.89	1.30
61099	1/4/00	9.92	ft	6001.81	5991.89	6002.29	13.60	5988.69	3.20
61199	1/4/00	9.95	ft	6002.80	5992.85	6003.31	17.00	5986.31	6.54
61299	1/4/00	7.61	ft	6003.48	5995.87	6003.88	9.80	5994.08	1.79
61399	1/10/00	3.99	ft	5983.89	5979.90	5984.47	1.50	5982.97	-3.07
61499	1/6/00	8.51	ft	5986.33	5977.82	5986.87	7.60	5979.27	-1.45
6186	1/3/00	10.45	ft	6000.60	5990.15	5999.5	11.50	5987.97	2.18
P313589	1/3/00	9.60	ft	6010.11	6000.51	6008.5	11.00	5997.50	3.01
P317989	1/4/00	9.70	ft	5992.84	5983.14	5990.9	6.40	5984.50	-1.36

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Sample from the EIAP wells were analyzed for VOCs using EPA method 524.2. Table 8-2 has been updated to show the recent sampling results for detected VOCs along the EIAP line. The results from the second round of sampling confirm the earlier results and suggest that concentration levels are consistent throughout the year.

PCE was the only organic compound detected above Tier II action levels, except for TCE, which was detected above Tier II in wells 60599 and 61199. Wells 61099 and 61199 showed detections of PCE at 26 and 230 μg/L respectively. Farther north, well 60599 contained concentrations of PCE at 111 μg/L. Well 61499 showed PCE at the action level of 5 μg/L and well 60199 showed PCE at a concentration of 56 μg/L. Wells located between these wells were either dry or showed no detections of VOCs.

The results suggest that contamination is moving across the utility corridor in three areas as evidenced by the detections in wells listed above. Contaminant concentrations are all below the Tier I action level, which helps define the high concentration portion of the IA plume better than was known previously. It is possible that the concentrations of contaminants in well 61499 are an extension of those seen in well 60599; however, this is not certain. The detection of PCE in the southern portion of the EIAP line is consistent with high PCE contamination near well P320089. However, wells 22896 and P114689 show high TCE that is not showed by other wells in the northern portion of the EIAP line.

Evaluation of the eastern portion of the IA plume has better defined the migration of VOCs in the vicinity of the major north-south utility corridor. Recommendations for additional work involve implementing the evaluation of the IA plume sources, which is proposed for CY 2001. Though evidence now suggests that contaminants are moving laterally along the utility corridor, future investigation may prove necessary if it supports Site closure.

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Table 8-2 VOC Detections in Groundwater EIAP Line

Location	Sample Date	PCE	Lab Qual	TCE	Lab Qual	Type	Detect Limit	Validation
37791	10/31/96	0.4	J	1	U	REAL	1	Y
60199	3/2/00	36		0.4	J	REAL	2	V
	3/8/01	56		0.4	J	REAL		V1
60299	3/23/00	0.3	J	1		REAL	1	V
	11/8/00	0.51		2.1		REAL		V
60399	9/27/00	0.5	U	0.5	U	REAL		V1
	3/8/01	0.6	J	0.3	J	REAL		V1
60499	1/26/00	0.3	J	0.8		REAL	1	V1
	12/6/00	1.1		2		REAL		V1
60599	2/24/00	100		5	U	REAL	5	V1
	12/6/00	111		1	U	REAL		V1
60699	5/10/00	1	U	1	U	REAL	1	V1
	3/8/01	0.1	J	1	U	REAL		V1
60799	5/10/00	0.4	J	1	U	REAL	1	V1
60899	12/13/99	1		0.2	J	REAL	1	V1
	3/8/01	0.4	J	0.1	J	REAL		V1
61099	12/14/99	27		1	J	REAL	2	V1
	3/8/01	26	BD	2	JD	REAL		V1
61199	12/9/99	220		12	J	DUP	20	V1
61199	12/9/99	200		12	J	REAL	20	V1
	3/8/01	230		17		REAL		V1
61299	12/13/99	2		0.1	J	REAL	1	V1
	3/8/01	0.2		1		REAL		V1
61399	2/24/00	1	U	0.3	J	REAL	1	V1
	3/8/01	1	U	1	U	REAL		V1
61499	5/10/00	5		0.1	J	REAL	1	V1
	4/23/01	5		0.2	J	REAL		V1
6186	1/31/00	0.5	J	1	U	REAL	1	V1
	7/24/00	0.6	J	1	U	REAL		V
39691	8/22/94	0.2	U	0.2	U	REAL	0.2	V
P213689	8/8/95	0.7	J	0.4	J	REAL	1	V
P314089	8/21/95	1	U	1	U	REAL	1	V

8.2 Groundwater ICP/MS Sampling Project

The inductively coupled plasma/mass spectrometry (ICP/MS) uranium 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 RFETS. The project is an outgrowth of a smaller investigation performed as part of the Solar Ponds Plume investigation, which was completed in 1998 (RMRS 1999f). The ICP/MS analytical method 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

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influenced by count time and masking effects. The goal of the ICP/MS sampling is to determine where anthropogenic uranium contamination, as opposed to natural uranium, is occurring at RFETS.

Uranium samples were collected from July 1999 through August 2000. In most cases, four ICP/MS samples were collected from a well so as to have a statistically qualified population for each location. At the time of the writing of the 1999 Annual Report, three samples collected from the initial set of wells had not been analyzed. These wells are 00997, 37991 and 07391. Table 8-3 lists the mean results from the ICP/MS sampling, and has been updated to include the three outstanding samples in the mean calculations. Table 8-3 also includes the sample data from the Solar Ponds Plume investigation. Some of these wells were only sampled once and are listed with a 'Single Value' designation in the table.

All samples were analyzed at the Los Alamos National Laboratory Isotope Lab (New Mexico), which has equipment capable of detecting small amounts of isotopes such as U-236 with the required accuracy. Isotopic concentrations were established for U-234, U-235, U-236 and U-238. From the isotopic data uranium ratios were determined. These ratios can be used to determine which locations show effects other than would be typical of natural uranium in the environment.

The U-235/U-238 ratio in nature is .0072. A ratio higher than this would suggest that enriched uranium (i.e., U-235) had been introduced to the environment. A ratio that is smaller than this number would suggest that depleted uranium (i.e., U-238) had been added to the environment. In addition, any detectable ratio for U-236/U-238 would suggest the introduction of anthropogenic uranium because U-236 is a fission product and not found in nature. Figure 8-7 is a plot of the U-235/U-238 ratio versus the U-236/U-238 ratio. 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 Figure 8-7, 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.

As discussed above, Table 8-3 lists the mean results from the ICP/MS sampling, and has been updated to include the three outstanding samples in the mean calculations. Table 8-4 shows the data from the new sample locations. Figures 8-8 and 8-9 show the location and values for U-235/U-238 ratios and U-236/ U-238 ratios, respectively.

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Table 8-3 Summary of Original ICP/MS Isotope Data (updated)

Sample	Sample Location	U-234 (µg/l)	U-235(µg/l)	U-236(µg/l)	U-238 (µg/l)	U (µg/l)	U-234/U-238	U-235/U-238	U-236/U-238
Mean	1586	0.004028	0.440778	0.000313	62.517733	62.96	0.000066	0.007122	0.000004
Mean	3586	0.000654	0.062299	-0.000009	8.866486	8.93	0.000075	0.007144	0.000000
Mean	4087	0.003579	0.360437	0.000037	51.292162	51.66	0.000071	0.007087	0.000001
Mean	5387	0.001336	0.140144	0.000023	18.556238	18.70	0.000074	0.007656	0.000001
Mean	10294	0.002769	0.306654	-0.000054	42.715535	43.03	0.000067	0.007313	0.000000
Mean	10394	0.000477	0.038961	-0.000013	6.028885	6.07	0.000065	0.006556	0.000000
Mean	10592	0.002394	0.216995	-0.000036	30.041391	30.26	0.000081	0.007327	-0.000001
Mean	10594	0.009746	0.916240	-0.000179	129.325339	130.25	0.000086	0.007176	-0.000002
Mean	10694	0.001779	0.170900	0.000031	24.929110	25.10	0.000073	0.006812	0.000001
Mean	11294	0.000067	0.006677	-0.000012	1.002538	1.01	0.000069	0.006752	-0.000005
Mean	22996	0.000725	0.051193	0.000002	7.047342	7.10	0.000071	0.007293	0.000003
Mean	23296	0.002067	0.196020	0.000145	26.300772	26.50	0.000080	0.007407	0.000006
Mean	36391	0.002284	0.211320	-0.000041	29.462032	29.68	0.000080	0.007252	-0.000001
Mean	37791	0.001780	0.199289	-0.000031	27.581279	27.78	0.000067	0.007319	0.000000
Mean	37991	0.004416	0.358036	-0.000059	49.728530	50.09	0.000092	0.007297	-0.000001
Mean	41591	0.001470	0.168101	-0.000018	23.201038	23.37	0.000064	0.007318	-0.000001
Mean	41691	0.000207	0.020464	0.000041	3.252841	3.28	0.000067	0.006408	0.000012
Mean	43993	0.003742	0.396439	0.001945	60.078093	60.47	0.000066	0.006782	0.000033
Mean	52894	0.003294	0.327952	-0.000048	46.659800	46.99	0.000073	0.007151	-0.000001
Mean	53194	0.002393	0.215764	-0.000004	29.310511	29.53	0.000061	0.007458	0.000001
Mean	59393	0.000925	0.090107	-0.000006	12.567129	12.66	0.000070	0.007267	0.000001
Mean	59793	0.004795	0.498053	-0.000070	68.992038	69.49	0.001583	0.007316	0.000000
Mean	61093	0.007431	1.413728	0.025292	600.071765	601.52	0.000032	0.002427	0.000042
Mean	75292	0.002514	0.220842	0.000130	30.279488	30.51	0.000082	0.007388	0.000004
Mean	75992	0.001645	0.159891	0.000300	23.797704	23.96	0.000069	0.006800	0.000013
Mean	00193	0.006032	0.576933	-0.000089	81.152072	81.74	0.000077	0.007195	-0.000001
Mean	00491	0.000959	0.090523	-0.000010	12.400294	12.49	0.000080	0.007395	-0.000001
Mean	00997	0.001007	0.090575	0.000003	13.065899	13.16	0.000080	0.007083	0.000001
Mean	0386	0.001679	0.166965	-0.000029	23.437865	23.61	0.000074	0.007214	-0.000001
Mean	03991	0.000280	0.023597	-0.000003	3.457899	3.48	0.000084	0.006911	0.000000
Mean	0487	0.002307	0.229160	0.000039	32.136804	32.37	0.000073	0.007228	0.000001
Mean	04991	0.000889	0.064038	-0.000015	9.141401	9.21	0.000101	0.007109	-0.000001
Mean	06291	0.002267	0.131077	-0.000025	18.812863	18.95	0.000124	0.007057	-0.000001
Mean	06491	0.004060	0.365647	-0.000037	49.889794	50.26	0.000083	0.007432	0.000000
Mean	07391	0.004960	0.792897	0.010058	284.521224	285.33	0.000018	0.002828	0.000035
Mean	07991	0.001841	0.157668	0.000708	25.292882	25.45	0.000076	0.006328	0.000028
Mean	308-P-2	0.004325	0.374310	0.000038	51.934531	52.32	0.000087	0.007333	0.000001
Mean	B205589	0.023926	2.088546	-0.000125	286.951277	289.07	0.000057	0.007372	0.000000
Mean	B208689	0.012263	1.036906	-0.000099	142.741327	143.78	0.000089	0.007361	0.000000
Mean	B210489	0.004071	0.416713	0.000469	56.925560	57.35	0.000074	0.007402	0.000008
Mean	B302089	0.003974	0.318883	0.000038	43.340371	43.66	0.000088	0.007460	0.000001
Mean	P114389	0.000624	0.055216	0.000004	7.836517	7.90	0.000080	0.007135	0.000001

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Table 8-3 Summary of Original ICP/MS Isotope Data (updated) continued

Sample	Sample Location	U-234 (µg/l)	U-235(µg/l)	U-236(µg/l)	U-238(µg/l)	U (µg/l)	U-234/U-238	U-235/U-238	U-236/U-238
Mean	P207689	0.002197	0.221469	0.000032	30.780470	31.00	0.000075	0.007288	0.000001
Mean	P209189	0.000343	0.043935	0.000236	8.061863	8.11	0.000043	0.005478	0.000028
Mean	P209489	0.002230	0.248488	0.002235	38.496034	38.76	0.000062	0.006437	0.000059
Mean	P209589	0.035912	3.735736	0.018045	379.244690	383.04	0.000097	0.009934	0.000046
Mean	P209889	0.007202	0.674696	0.000106	94.217603	94.90	0.000079	0.007250	0.000001
Single Value	42993	0.242410	26.983200	0.187029	2960.249000	2987.70	0.000083	0.009230	0.000064
Single Value	B102289	0.000030	0.003200	-0.000005	0.445000	0.40	0.000078	0.007360	-0.000012
Single Value	B201589	0.000120	0.014900	0.000000	2.062000	2.10	0.000061	0.007330	0.000000
Single Value	B203189	0.000370	0.027600	-0.000006	3.888000	3.90	0.000096	0.007190	-0.000001
Single Value	B302789	0.000170	0.020700	-0.000008	2.839000	2.90	0.000062	0.007380	-0.000003
Single Value	B305389	0.000560	0.061800	0.000002	8.590000	8.70	0.000066	0.007290	0.000000
Single Value	B405489	0.000300	0.017100	-0.000002	2.420000	2.40	0.000128	0.007170	-0.000001
					Mean		0.000103	0.007056	0.000007
Instrument Detection Limits					Std Dev		0.000206	0.001058	0.000016
U234: .000015 - .000033					Mean Plus one Std Dev		0.000309	0.008114	0.000023
U235: .000030 - .000031					Mean Minus one Std Dev		-0.000103	0.005997	-0.000009
U236: .0000035 -.0000071					Mean Plus .5 Std Dev		0.000206	0.007585	0.000015
U238: .00095 -.00135					Mean Minus .5 Std Dev		0.000000	0.006526	-0.000001

Based on the initial results of the ICP/MS investigation, eight additional wells were selected for a single round of sampling. Well 90099 was chosen because it is downgradient of well 07391, which had a depleted uranium signature. Well 41199 was chosen to provide additional data on the possible migration of anthropogenic uranium from Building 886, which was also the reason for sampling well 22996 in the previous sample rounds. Building 886 was a former uranium research laboratory. Well 5287 was selected to provide additional characterization of the uranium in groundwater near Building 881, which will augment data from well 5387, which was sampled in the initial rounds. Building 881 was a former uranium processing building. Sample location SW13494 is the footing drain sump that is monitored as part of Building 881 D&D monitoring. Well 10894 is in the Walnut Creek drainage, upstream of well 41691, which had a slight depleted uranium signature from the previous sampling. Well B206989 is a well that monitors groundwater downgradient of the Present Landfill. Sample location SW097 is the effluent from the leachate collection system for the Present Landfill. These samples augment previous samples collected from wells 4087, 52894 and 53194 to help characterize the relatively high uranium found in drainage wells in No-Name Gulch. Well 00897 is a performance monitoring well downgradient of the Mound and Trench T-1 source areas. It would be expected that depleted uranium might be found in this area because it was a prime component of the T-1 source removal action.

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Table 8-4 Summary ICP/MS Isotope Data – Additional Wells

Sample	Well	U-234 (µg/L)	U-235 (µg/L)	U-236 (µg/L)	U-238 (µg/L)	U (µg/L)	U234/ U238	U235/ U238	U236/ U238
Single Value	B206989	0.009216	0.754844	<0.000070	103.769	104.533	0.000090	0.007367	0.000000
Single Value	41199	0.001449	0.152875	0.000302	11.337	11.492	0.000130	0.013657	0.000027
Single Value	5287	0.002456	0.267679	0.000062	36.580	36.850	0.000068	0.007411	0.000002
Single Value	00897	0.000598	0.048298	0.000013	6.982	7.030	0.000087	0.007006	0.000002
Single Value	10894	0.000341	0.032761	0.000038	5.029	5.062	0.000069	0.006598	0.000008
Single Value	SW097	0.000022	0.002140	0.000013	0.319	0.321	0.000071	0.006793	0.000040
Single Value	SW13494	0.000544	0.059385	0.000050	8.307	8.367	0.000067	0.007240	0.000006
Single Value	90099	0.000729	0.073175	<0.000007	10.120	10.194	0.000073	0.007323	0.000000

Interpretation of these ICP/MS values is complicated by the fact that groundwater is the medium being investigated. Groundwater can encounter both natural uranium as well as anthropogenic uranium as it migrates through the subsurface. This potential mixing of sources complicates the determination of anthropogenic influence based strictly on the ratios observed. In addition, historic processes at RFETS involved both depleted and enriched uranium, which may hamper ratio determination if these wastes accumulated in the same area (e.g., Solar Ponds). As a first approach to data analysis, the U-235/U-238 data was screened using the mean plus one standard deviation to identify those values that clearly fall outside the 70% area of the distribution (assuming normal distribution). To identify those wells where mixing of natural and anthropogenic sources may have occurred, the mean plus 1/2 standard deviation was used. These estimations are coupled with known information on radionuclide spills at RFETS to evaluate the results of the ICP/MS sampling.

The additional sample data for wells 07391, 00997 and 37991 did not appreciably change the U-235/U-238 and U-236 signatures compiled in the 1999 Annual report. Wells 5287, 00897, 10894, B206989, 90099 and surface water sample location SW13494 all show values that suggest a natural uranium ratio for U-235/U-238 and no appreciable U-236 concentration. Well 41199 has a U-235/U-236 ratio that suggests an enriched uranium signature and is the highest U-235/U-238 ratio obtained so far. The U-236/U-238 ratio is also above the mean plus 1 standard deviation suggesting the association of some U-236 with the source. Well 41199 is a D&D monitoring well located due east (downgradient) of Building 886. This location is near the main uranium solution holding tank area in the building, so it is not surprising that the location could have a contribution of anthropogenic uranium. The total uranium concentration in this sample is relatively low (11.5 µg/L) compared to the average concentration for the ICP/MS data set, which is approximately 100 µg/L. This suggests that though some anthropogenic uranium is found in groundwater at this location, at present there is a small volume of material that is migrating out from the building. Sample location SW097 has a U-236/U-238 ratio that is higher than the mean + 1 standard deviation point, suggesting the possibility that some material containing U-236 may exist in the Present Landfill. Typically, the higher U-236 values are accompanied by a U235/U-236 ratio that suggests depleted or enriched affinities. The fact that this is not seen in this sample is interesting and additional sampling may be warranted to confirm this result.

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As a result of the ICP/MS project, recommendations can be made about monitoring uranium in the groundwater at RFETS. The additional data confirm the earlier observations that the majority of uranium in groundwater is natural. There are small areas of RFETS that do show the effects of anthropogenic uranium. The ICP/MS data can be used to reduce remediation concerns related to the presence of uranium at levels exceeding current RFCA action levels. Additional locations for ICP/MS sampling may be chosen in the future to better determine where these areas of anthropogenic uranium are with respect to groundwater, but additional sampling efforts will be dependent upon available funding.

8.3 Central Industrial Area Plume Investigation

A groundwater evaluation was proposed in the early part of 2001 to identify potential source areas of groundwater contamination in the Central Industrial Area Plume (CIAP) and to refine the definition of the interior and higher concentration portions of the plume. This evaluation is designed to help assess future monitoring needs, to evaluate the potential for plume degradation, and to provide data for possible remediation of the plume. The proposed investigation is described in a SAP that has been submitted to state and federal regulatory agencies for review and comments. To date, the SAP has been reviewed by the CDPHE and is currently under review by the EPA. 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 IA plume 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 IA plume 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, carbon tetrachloride, and vinyl chloride. Existing sampling data are insufficient to accurately define the lateral extent of the interior regions of the plume and whether the highest concentration areas are related to single or multiple sources. The SAP proposes installing 13 wells to monitor groundwater quality in the IA plume area and utilizing existing wells within the area that have not been sampled since the mid 1990s. Proposed monitoring well locations have been selected along groundwater flow path(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 flow path(s).

8.4 PU&D yard Plume Investigation

8.4.1 Well Installations

A Sampling and Analysis Plan was developed and approved by the Agencies to implement new well installations and sampling at and adjacent to the PU&D Yard (RMRS 2000e). The SAP focused on the distal margins of the plume in order to evaluate potential preferential pathways of groundwater towards surface water, especially in areas of sparse well coverage. The SAP also addressed well installations in two anticipated source areas. Potential

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surface water receptors include North Walnut Creek, in particular the reach between the Material Storage Tanks (MSTs) on the east and the PU&D Yard on the west; and No Name Gulch via the Landfill Pond.

Field activities commenced in the third quarter of 2000. A line of wells was installed beyond what was understood to be the extent of the plume, along its southeastern, eastern, and northeastern margins. In addition, a well (30800) was installed upgradient of a potential source area located south of the easternmost extent of the Present Landfill. Another well (30900) was installed adjacent to PU&D Yard source area borehole BH17497, samples from which exhibited the highest levels of contamination found during the subsurface soil sampling performed in 1997 (RMRS 2000e). The hillside southeast of the PU&D Yard features several seeps that can act as pathways to surface water, but one was not previously monitored; to address this gap in coverage, a temporary well point (SW00495) was installed within that seep.

Wells 30100, 30200, and 30300 are located on a large slump block that is immediately west of the MSTs and north of the PACS 3 parking lot. These wells monitor potential groundwater pathways to North Walnut Creek. The screened interval in each of these wells is long enough to bridge the interface between the slump block and the relatively undisturbed material beneath the slump block. Monitoring wells 30400 and 30500 were placed north of the MSTs, beyond what was previously understood to be the easternmost edge of the plume. The wells fill gaps in the well coverage that might have allowed a narrow extension of the plume, occupying a discrete pathway, to pass previously existing wells undetected. Wells 30600 and 30700 are located between the previously mapped PU&D Yard plume and the westernmost portion of the Landfill Pond to monitor the pathway to No Name Gulch via the Landfill Pond.

At several of the new well locations, the bedrock contact is so shallow that the screened interval does not extend upward into the Rocky Flats Alluvium. Those wells are screened entirely in the UHSU bedrock. This includes wells 30200, which has a bedrock contact at 1.8 feet bgs; well 30600, with a bedrock contact at 1.8 feet bgs; and well 30700, with a bedrock contact at 1.0 feet bgs. Several other wells are screened predominantly within UHSU bedrock, with the screened interval extending only a foot or so upward into the alluvium.

Temporary well point SW00495 consists of a slotted stainless steel pipe that was hand-driven two to three feet into the soil at the seep. Existing well points 61495, 61595, and 61695 monitor other seeps to the west of, and closer to the PU&D Yard than, SW00495. The seep at SW00495 was not flowing at the time of installation and only appeared damp (not producing visible flow) during most sampling attempts.

8.4.2 Sampling

The new wells, except for the temporary well point at seep location SW00495, were developed following installation and prior to sampling. The new wells and others in the immediate area (see Table 8-4) were then sampled for VOCs. Most wells produced sufficient water for a full suite of VOCs, although some were dry and others had been destroyed, particularly members of the existing line of wells along the North Patrol Road. That line of wells has often been dry on previous occasions and many remaining wells there were dry during this sampling.

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Table 8-4 displays the wells sampled in support of this PU&D Yard Plume evaluation, as prescribed by the SAP (RMRS 2000e), and whether the well produced samples. The analytical suite consisted of VOCs and, where required, a radiation screen.

Following receipt of results from this initial sampling round, five wells were selected for monitored natural attenuation. The five wells were 01097 (upgradient), 30900 (source), 01497 (nearby, downgradient), 70693 (downgradient), and 02097 (downgradient, near the distal end of the plume).

Table 8-5 Wells sampled for PU&D Yard plume evaluation

Sampling Location	Purpose based on SAP	Sampled Successfully?	Comments
00597	Suspected in-plume location	Yes	
01297	Suspected in-plume location	Yes	Actually upgradient
01397	Suspected in-plume location	Yes	
01497	Suspected in-plume location	Yes	
01897	Suspected in-plume location	Yes	
02097	Suspected in-plume location	Yes	
70393	Suspected in-plume location	Yes	
70693	Suspected in-plume location	Yes	
61495	Suspected in-plume location	Yes	
01797	Suspected in-plume location	Yes	
5887	Crossgradient location	Yes	
01097	Upgradient location	Yes	
01197	Crossgradient location	Yes	
01597	Crossgradient location	Yes	
21197	Crossgradient location	Yes	
21297	Crossgradient location	No	Well destroyed
21397	Crossgradient location	No	Well destroyed
B206689	Downgradient location	No	Dry well
77392	Downgradient location	No	Dry well

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Table 8-5 Wells sampled for PU&D Yard plume evaluation (continued)

Sampling Location	Purpose based on SAP	Sampled Successfully?	Comments
308-P-1	Downgradient location	Yes	
01997	Downgradient location	No	Dry well
61595	Downgradient location	Yes	
61695	Downgradient location	Yes	
01697	Downgradient location	Yes	
00397	Downgradient location	No	Dry well
21497	Downgradient location	Yes	
21597	Downgradient location	Yes	
21697	Downgradient location	Yes	
21797	Downgradient location	No	Well destroyed
21897	Downgradient location	No	Well destroyed
21997	Downgradient location	No	Dry well
22097	Downgradient location	No	Dry well
22197	Downgradient location	No	Dry well
22297	Downgradient location	Yes	
22497	Downgradient location	No	Well destroyed
30100	Downgradient location	Yes	New well
30200	Downgradient location	Yes	New well
30300	Downgradient location	Yes	New well
30400	Downgradient location	Yes	New well
30500	Downgradient location	Yes	New well
30600	Downgradient location	Yes	New well
30700	Downgradient location	Yes	New well
30800	Suspected in-plume location	Yes	New well
30900	Suspected in-plume location	Yes	New well
SW00495	Downgradient location	Yes	New seep location

8.4.3 Results

Data from the PU&D Yard plume investigation samples, together with data from additional wells in the area (including many that have been abandoned), were reviewed for display. Five compounds were selected for figures, including 1,1,1-TCA; 1,1-DCE; carbon tetrachloride; PCE; and TCE. These compounds were chosen because they comprise the most common VOCs present in these wells and/or are of particular interest, and because some of these are the daughter products of the main source contaminants (PCE and TCE).

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The analytical data were plotted on maps and contoured; the resulting maps are presented as Figures 8-10 through 8-14. These figures include data from the newest wells together with data from pre-existing and, in many cases, abandoned wells. The method used to construct the maps is consistent with that used to create the Combined VOC plume map (Plate 12; see discussion in Section 8.5), in that the most recent data available for each well was used. This allows for a better picture of current conditions.

While the overall sampling success was very good, it was poor at the wells along the North Patrol Road because of a combination of dry and destroyed wells. However, results from the 1997 sampling effort, in which every member of this line of wells was sampled, produced no VOC detections; this indicated the area in which this line of wells is located does not support a significant pathway to surface water (RMRS 1998). Results from the 2000 sampling effort, as presented on Figures 8-10 through 8-14, confirmed that this has not changed; the wells along this road that produced samples show no VOC detections with the exception of an estimated concentration of TCE (0.1μg/l) in well 21197.

In addition, well 01997, which is located at the southeastern corner of the electrical substation east of the PU&D Yard, was dry during this investigation. Therefore, data shown on the Figures for this well are from the previous sampling effort in September 1997.

In general outline, the PU&D Yard plume was not found to extend farther east than it had been previously mapped. However, maps of individual VOC distribution do show some variation from the extent previously understood and shown on maps included in the PU&D Yard Plume Investigation SAP (RMRS 2000e). Most of the data used for the SAP maps was collected in 1997 or earlier.

1,1,1-Trichloroethane

Figure 8-10 shows the distribution of 1,1,1-TCA in UHSU groundwater at and around the PU&D Yard. The general outline of the 1,1,1-TCA distribution is similar to that shown in the 1,1,1-TCA map included in the PU&D Yard plume investigation SAP (RMRS 2000e). Figure 8-10 shows that current levels of 1,1,1-TCA in UHSU groundwater have decreased relative to those shown on the older map. Also, the highest detection currently reported (94 μg/L) is from well 01497, whereas the earlier map showed a concentration of 170 μg/l there and the highest concentration (253.2 μg/l) at well 70693 (RMRS 2000e). The apparent source of this compound appears to be in the vicinity of well 01497, from which a plume of 1,1,1-TCA-contaminated groundwater extends to the east some 1500 feet. However, levels of this compound in wells on the hillside to the south – the most direct route to North Walnut Creek – have decreased from a high of 54 μg/l in well 61495 on the SAP map to a high of 14.2 μg/l in the same well during this investigation. Given the lack of detections of 1,1,1-TCA in wells along the North Perimeter Road, a viable pathway to surface water in this area is not indicated.

The Tier II level for 1,1,1-TCA is 200 μg/l; this value was not exceeded by any PU&D Yard area well sampled for this investigation.

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1,1-Dichloroethene

Figure 8-11 shows the distribution of 1,1-DCE. While similar to the older version presented in the SAP, more variation is evident than with the 1,1,1-TCA maps. In the previous version of this map, well 01497 showed the highest levels of 1,1-DCE (80 µg/l) and well 70693 produced the next highest level (65.6 µg/l). These two wells again produced samples with the highest levels of 1,1-DCE, but the concentrations were 79 and 25 µg/l, respectively. This may indicate that the source for 1,1-DCE is most likely in the vicinity of well 01497, where concentrations of this compound in groundwater are essentially unchanged. Concentrations of 1,1-DCE within the rest of the plume appear to have decreased.

The distribution of 1,1-DCE (Figure 8-11) shows a plume extending approximately 1500 feet to the east of well 01497. As with 1,1,1-TCA, this compound is present in wells on the hillside south of the PU&D Yard; wells 61495 and 61595 both produced samples containing elevated levels of 1,1-DCE. While the map presented in the PU&D Yard SAP (RMRS 2000e) showed that well 61495 produced waters having a 1,1-DCE concentration of 15 µg/l, for this investigation those concentrations had fallen to 8.5 µg/l. Well 61595 most recently reported a concentration of 7.5 µg/l of 1,1-DCE, while on the SAP map there was no data posted for this well. Because of the lack of detections in wells along the North Perimeter Road, a viable pathway to surface water is not indicated in this area.

The Tier II level for 1,1-DCE is 7 µg/l. All UHSU wells within the plume presented on Figure 8-11 exceed the 7 µg/l concentration.

Carbon Tetrachloride

The distribution of carbon tetrachloride is shown in Figure 8-12. This distribution is very different from that presented in the PU&D Yard SAP (RMRS 2000e). As reported in that document, three wells previously produced samples with concentrations of carbon tetrachloride equal to or exceeding 5 µg/l. In the recent investigation, however, only one of these wells – 01497 – continued to produce samples with carbon tetrachloride in this range (at 7 µg/l).

The Tier II level for carbon tetrachloride is 5 µg/l; well 01497 was the only well that exceeded this concentration. Figure 8-12 indicates this compound is not reaching surface water at concentrations exceeding action levels.

Tetrachloroethene

Figure 8-13 shows the distribution of PCE, which strongly resembles that depicted on the corresponding map in the PU&D Yard plume investigation SAP (RMRS 2000e). The distribution of PCE is essentially unchanged although wells 70393 and 01297, depicted on the earlier map as being within the 5 µg/l contour, are now excluded because the concentration of PCE in those wells fell below 5 µg/l.

The highest concentrations of PCE in the SAP (RMRS 2000e) were listed at 1700 µg/l, but that groundwater sample was collected from borehole BH17497. New well 30900 twins this borehole and well 31001 is located 10 feet east

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(downgradient) of the borehole. These wells produced samples with the highest concentrations of PCE in the PU&D Yard investigation (180 and 130 µg/l, respectively). A second source was previously thought to exist in the vicinity of abandoned well B206389, which was located on the southeastern edge of the Present Landfill. This well produced a sample containing 140 µg/l of PCE in April 1993. New wells 30600 and 30700 are located 300 to 400 feet downgradient (northeast) of well B206389; both reported no detections of PCE. It is not clear if this point source is still present at well B206389.

The Tier II level for PCE is 5 µg/l. All wells within the plume boundaries depicted on Figure 8-13 equal or exceed this concentration. The results for wells 30600 and 30700, together with results from wells along the hillside south and east of the PU&D Yard, indicate this compound is not reaching surface water at concentrations exceeding action levels.

Trichloroethene

Figure 8-14 shows the distribution of TCE. Once again, it is very similar to the TCE map included in the PU&D Yard SAP (RMRS 2000e). This compound appears to have the greatest distribution of the five VOCs selected for presentation.

The mapped distribution of TCE indicates there may be a widely disseminated plume of this contaminant in the area located south and slightly southwest of the Present Landfill. This may be because of plume degradation associated with the apparent PCE source near well 30900. The Figure also indicates there was or is a more concentrated TCE source around the southeastern corner of the Present Landfill in the vicinity of abandoned well B206389. TCE concentrations were highest in that abandoned well, with the most recent concentration reported as 190 µg/l in April 1993. Abandoned wells 7287 and B206489, both located on the other side (south) of the slurry wall from B206389, also showed elevated levels of TCE (68 and 11 µg/l, respectively, in January 1995). This distribution could be interpreted as an indication that there is groundwater flow from north to south across the slurry wall, but water level data for the three wells indicate a gradient from south to north (RMRS 2000e). Therefore, the distribution of TCE among these three wells is most likely the result of a TCE source existing on both sides of the wall. New wells 30600 and 30700 reported no detections of TCE.

The Tier II level for TCE is 5 µg/l; all wells within the plume boundaries shown on Figure 8-14 equal or exceed this concentration. The most likely route for TCE from the PU&D Yard area to reach surface water is toward the south, in particular in the area south of new well 30100. This well produced a sample with 12.3 µg/l of TCE; there is no monitoring location between this well and the nearest surface water receptor, North Walnut Creek. Farther west, well 01697 produced a sample with TCE at 6.8 µg/l, but the lack of detections in wells along the North Perimeter Road indicates this area is probably not currently acting as a viable pathway to surface water.

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8.4.4 Conclusions and Recommendations

Investigation of the PU&D Yard plume was undertaken to better define the nature and extent of the plume constituents, to determine the potential for impacts on surface water quality by the PU&D Yard plume, and to evaluate the efficacy of monitored plume degradation.

Figures 8-10 through 8-14 suggest the presence of three distinct source areas. Within the PU&D Yard IHSSs 170 and 174A, wells 30900 and 31001 indicate the presence of a PCE source. Farther east, well 01497 suggests a source of 1,1,1-TCA and 1,1-DCE, as well as carbon tetrachloride, may exist in this area. Finally, a source of PCE and TCE appears to be located in the vicinity of now-abandoned well B206389, although conditions may have changed since samples were last collected there in 1993. TCE is also present in a more widespread, non-focused area of the PU&D Yard, possibly a result of ongoing degradation of the PCE detected in the source area monitored by wells 30900 and 31001. PCE and TCE degradation may also be responsible for some of the 1,1-DCE observed downgradient of the well 30900 and 31001 source area. Given the distribution of 1,1-DCE, and the presence of carbon tetrachloride and 1,1,1-TCA (neither of which are members of the PCE degradation series), it is probable that a separate source of these three contaminants is present in the vicinity of well 01497.

Figures 8-10 through 8-14 provide the best available delineation of major plume constituents to date. There is room for significant improvement, however. Most importantly, understanding of the distribution of VOCs would be greatly enhanced if wells that have not been sampled in many years were to be sampled for VOCs. This would be especially valuable for those wells in which VOCs have previously been detected. There are 29 wells represented on these Figures by data older than 1997, though only 8 still exist – the others have been abandoned. Of these eight, three (1086, 76792, and B206689) are in locations of interest to the PU&D Yard investigation and sampling these three wells for VOCs is recommended.

The wells installed in 2000 were positioned to determine the boundaries of the PU&D Yard plume and whether it may be impacting surface waters in the North Walnut Creek and No Name Gulch drainages. The resulting data indicate that a significant impact is probably not occurring. However, detections of 1,1,1-TCA; 1,1-DCE; and TCE in samples from wells along the southern hillside indicate the distal, low concentration edges of the PU&D Yard plume may be reaching North Walnut Creek in the vicinity of the main PACS 3 parking lot. Samples from wells to the south of 61495 and 61595, within the North Perimeter Road line, did not include detections of these VOCs. However, these wells may not be located most advantageously. Groundwater may not pass beneath the North Perimeter Road to join the engineered portion of North Walnut Creek, both because of the shallow bedrock beneath the road and the presence of a small ditch located north of the road. Instead, it is feasible that the ditch running along the north side of the road diverts this flow. Because the ditch is typically dry, flow would be generally restricted to the subsurface.

The new wells and other wells along the hillside south of the PU&D Yard were only sampled once for this investigation. Because of the VOCs reported in samples from several of these locations, it is recommended that wells 61495, 61595, 61695, SW00495, 30100, 30200, 30300, 308-P-1, 30400, 77392, 30500, 30600, and 30700 be

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visited twice more for confirmatory sampling of VOCs. Sampling should be performed for all wells as a group, and during relatively high as well as relatively low groundwater conditions. The resulting data would be most useful if sampling was timed to coincide with routine plume degradation monitoring conducted in the PU&D Yard area. Also, temporary well SW00495 should be made into a permanent monitoring well; if access issues prevent its replacement using a Geoprobe, a shallow (2-4 feet deep), hand-driven borehole should be advanced and a PVC well constructed within it.

If the follow-up samples confirm the southward plume migration indicated at wells 61495, 61595, and 30100, it is recommended that one well each be installed south and east of wells 61495 and 61595, and one to two new wells be installed south and east of well 30100. These wells should be installed at the toe of the hillside and be fully-penetrating, with a screened interval across surficial and into weathered bedrock materials, and of sufficient depth to afford the required storage volume for successful sampling. Such additions to the network would provide detailed information on whether contamination is reaching the valley fill alluvium. If more general information is deemed sufficient, one to two wells designed as above and located adjacent to the ditch – one north of the Portal 3 parking lot and/or one below the road to the MSTs – should indicate whether groundwater contamination is threatening North Walnut Creek.

While below action levels, the concentration of carbon tetrachloride in samples from well 30600 (4 μg/l) indicates this well should be routinely sampled. If later data indicate contamination may be approaching the Landfill Pond in the area of wells 30600 and/or 30700, it is recommended that one to two new wells be installed north-northwest of those wells, just south of the pond. Alternatively, a surface water sampling station could be established at the southern edge of the pond in a location that is downgradient of wells 30600 and 30700.

If samples confirm any other locations where the PU&D Yard plume is extending beyond the well coverage, additional well locations shall be evaluated. However, those positioned to monitor pathways to surface water should be given immediate consideration.

Also, based on the results of this proposed confirmatory sampling, together with the results of ongoing plume degradation monitoring, selected wells should be considered for inclusion in the routine monitoring program to ensure that pathways to surface water, in particular, are monitored. If the proposed confirmatory sampling is not conducted, the wells proposed for addition to the routine monitoring program include 61495, 61595, 30100, and 30600. If confirmatory sampling is conducted, resulting data should be evaluated and wells selected for routine monitoring.

Finally, the possible existence of multiple VOC sources warrants further investigation. Ongoing plume degradation monitoring will provide additional data that can be used to evaluate this possibility, but several more wells should be sampled for VOCs. This sampling should be conducted during the same time frame as the plume degradation sampling, and should at least include wells 30800 (as the nearest existing well, though upgradient, to the source apparently located in the vicinity of abandoned well B206389) and 01397 (near source-area wells 30900 and 31001).

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Installation of at least one additional well should be considered. It would be located near the previous location of B206389 but outside the area of the constructed cap of the Present Landfill.

8.5 Discussion of VOC, Nitrate, and Uranium Groundwater Plumes

For the 2000 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 these plumes have changed over time. In previous Annual RFCA Groundwater Monitoring Reports (e.g., DOE 1998a, RMRS 1999m, and RMRS 2000d), the composite VOC and nitrate plumes were based on averaged data that was collected from 1991 through 1997. This basis was then updated annually by using new data for that year, which predominantly refined plume edges. For the 2000 Report, data were not averaged. Instead, the most recent data for each well were considered: if they included detections of mapped compounds exceeding Tier I or Tier II action levels, that well was included within the appropriate plume boundaries; if below these levels, the well was excluded from the plumes. Where available, data from 2001 were also considered. Wells reporting non detects were excluded from plumes.

Data from each UHSU well (for each of the VOCs discussed and nitrate) were evaluated in this manner. The most recent and highest result with respect to these action levels was used to construct the composite plume map (Plate 12). If older data showed exceedances yet newer data did not; the newer data were honored. Wells monitoring the LHSU were not considered for this evaluation.

There were two exceptions to the process described above. First, data that appeared spurious were omitted from the evaluation. The determination as to whether data were spurious was made following a review of the balance of the data for the well and analyte in question. If the result appeared to represent an outlier, with respect to the overall pattern of similar analyses, the result was not considered for the map. If the most recent data for a well was identified as spurious, the preceding (non-spurious) result was used. Spurious data were extremely rare in the data set examined, and essentially absent from the most recent data, so this issue was largely not applicable.

A second exception was made in cases where wells with recent data contradicted conditions indicated by other wells represented only by older data. That is, if a well was most recently represented by data from the early 1990s, yet recent data from another well nearby was sharply different, the newer data were honored. However, if the separation of the wells was too great or if the reported variation in conditions seemed reasonable, both data were honored. The clearest example of this exception pertains to the Present Landfill area and is discussed in Section 8.5.1 below.

By using the most recent data available for each well, the plumes can reflect not only variations along their margins, but also within their interiors. Also, by omitting spurious results and not averaging data, a more realistic configuration of the plumes resulted. However, because all wells within the plumes may not have been sampled as a group, and some have not been sampled for many years, some error is inherent in the method. That is, by mapping data from the early 1990s alongside data from 2000, inconsistencies may arise. Even so, these inconsistencies are

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seen as minor compared to those that are intrinsic to a map constructed using a data set that includes both multi-year averaged data (including non detects and outliers) and single data points.

The composite VOC plumes that will be generated for the 2001 Annual RFCA Groundwater Monitoring Report will show a significant improvement over those presented in this report. Much new data will be available for the 2001 Annual Report, allowing for significant improvements to plume configurations. These new data will represent wells sampled south of the Industrial Area plume (predominantly between the South Interceptor Ditch and Woman Creek) and new and existing wells within the IA (as discussed in Section 8.4).

8.5.1 Composite VOC Plumes

As with recent composite VOC plumes presented in previous Annual RFCA Groundwater Monitoring Reports (e.g., RMRS 2000d), analytical data for carbon tetrachloride, tetrachloroethene, trichloroethene, and vinyl chloride were evaluated because these VOCs are the ones of greatest concern at RFETS. (Tier I and Tier II action levels are 500 µg/l and 5 µg/l, respectively, for carbon tetrachloride, tetrachloroethene, and trichloroethene; 200 µg/l and 2 µg/l, respectively, for vinyl chloride.)

In general, the plume configurations seen in calendar year 2000 (Plate 12) are very similar to those of previous Annual RFCA Groundwater Monitoring Reports. A large portion of the IA contains groundwater contaminated with various VOCs. The 903 Pad, East Trenches, Mound, and surrounding areas are also dominated by a plume of VOCs. The PU&D Yard and the Present Landfill continue to show the presence of VOC-contaminated groundwater toward the eastern portion of the PU&D Yard and the southern margin of the landfill.

This current composite plume map (Plate 12) shows several changes from the plume map presented in the 1999 Report (RMRS 2000d). Some changes may be directly attributable to the new method of constructing this map, wherein data were not averaged. Using averaged data incorporating high-concentration outliers and half-detection-limit values for non detects can result in erroneous plume configurations. Other changes are the result of the installation and sampling of new wells.

The southern portion of the IA plume contains an area in which the contaminant concentrations of the four VOCs evaluated for this map have decreased to below Tier II levels. In previous Annual Reports, this area was above Tier II; it encompasses wells 40399, P313489, and P414189. Well 40099, on the west side of Building 444, continues to produce samples that exceed Tier I levels. Samples from the other wells around this building do not exceed Tier I.

The large area of Tier I concentrations located around and south of Building 559 is smaller than in previous years, when it extended farther to the south to enclose well P320089. Concentrations in this well, however, were most recently below Tier I levels, though still exceeding Tier II levels.

The Tier I area centered on IHSS 118.1 has also shrunk, largely because of lower concentrations (below Tier I) in well 18699 and new wells 00100, 00500, and 00600. Data from these four wells, all located east of IHSS 118.1, indicates that eastward migration of Tier I concentration groundwater is truncated. Tier I concentrations were

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detected in samples from new well 00700, located on the northern side of Building 776 just southwest of IHSS 118.1.

Newer (1999) and older wells installed around the eastern portion of the Building 771 complex produced samples below Tier II levels. Those along the southern and northwestern edges of Building 771 generally produced samples that did exceed Tier II levels.

The portion of the plume coinciding with the Solar Ponds largely reflects data from 1995 and earlier, in particular the Tier I data for well P210189. New wells 00100 and 02500, located between the Solar Ponds and the Building 779 foundation, produced samples with lower concentrations of the four VOCs of interest. These wells and others in the immediate vicinity of well P210189 yielded data consistently below Tier I and in many cases below Tier II levels. This indicates the Tier I level shown at P210189 may no longer be accurate.

New D&D well 00300, located near the southeastern corner of Building 707, produced VOC samples exceeding Tier II levels.

The outline of the other large composite VOC plume, which encompasses the Mound, Ryan's Pit, 903 Pad, and East Trenches areas (hereafter referred to collectively as the "OU2 plume"), remains largely unchanged from the previous year (RMRS 2000d). Tier I levels are still exceeded in several places, most notably at and downgradient of the 903 Pad and Ryan's Pit, the Mound, and in several areas coinciding with disposal trenches. Many areas of the OU2 plume are based largely or entirely on 1995 and earlier data. Newer data indicate this plume is diminishing in several areas. Most notably, much of the Tier I concentration portion of the plume shown in the 1999 Report (RMRS 2000d) is eliminated, being replaced by several separated areas of Tier I concentration groundwater. Wells between these areas support this separation. In one case (UHSU bedrock well 12491), data were consistently below Tier II, with a few of the older data equaling or slightly exceeding Tier II levels. Based on the bulk of the data as well as the most recent values, this well is mapped as below Tier II concentration despite its appearance as an isolated area of below Tier II concentration within the plume. Lower concentrations in this well may be related to the screened interval being entirely within the bedrock. Data from a line of now-abandoned wells installed in 1997 along the present location of the East Trenches Plume Treatment System were used to define the northern outline of the OU2 plume as it intersects this system. These data also include several locations from which Tier I exceedances had been reported; they are still shown as exceeding Tier I levels.

The southern portion of the OU2 plume – that part containing the 903 Pad, Ryan's Pit, and the area generally southeast of these locations – is presented differently from the version shown in the 1999 Annual Report (RMRS 2000d). Part of this difference is because of the diminishing Tier I portion of the plume, as described above. Another reason for the difference is an alternate interpretation of the data. The Ryan's Pit contamination, as seen in data for well 07391, is predominantly TCE. The 903 Pad contamination, as shown in data for well 13191, is predominantly carbon tetrachloride. To the southeast of these source areas, well 90099 detects both of these species, with TCE exceeding Tier I and carbon tetrachloride occasionally approaching Tier I levels. Therefore, the Tier I

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plume outline is shaped in such a way as to show the commingling of Tier I levels of contamination from both sources.

The composite VOC plume at the Present Landfill is similar to, but smaller than, that depicted in the previous Annual RFCA Groundwater Monitoring Report (RMRS 2000d). The change is largely due to decreasing VOCs in the wells in the western and northwestern portion of the PU&D Yard well network. Once again, 1995 and earlier data – in this case from wells that no longer exist – cause the extension of this plume into the Present Landfill. The eastern part of this plume had been based on 1995 and earlier data from now-abandoned wells, but new well 30800 confirms its presence. New data from both older and newly installed wells along the southern and eastern margins of the Present Landfill plume have allowed the elimination of a southward-trending extension of the plume at location 61495. A smaller extension encompasses new well 30100. Other new wells installed to monitor the boundaries of the PU&D Yard plume did not report data above Tier II levels.

As described in the discussion of exceptions to the methodology used to construct the plume map (Section 8.5), newer data were allowed to overrule older data. The best example of this pertains to an area southeast of the Present Landfill. Abandoned wells 6474 and 6574 were most recently sampled in 1993; both produced samples exceeding Tier II levels for vinyl chloride. However, wells 77392 and 02197 bracket the locations of the abandoned wells, and they both produced samples below Tier II (vinyl chloride was not detected). Therefore, the area was omitted from the plume.

Additional small plumes persist in several areas. On the 881 Hillside, 1995 data from two wells (4387 and 32591) at IHSS 119.1 include contaminants above Tier I levels. Recent data from two other nearby wells are below Tier I levels. This may indicate groundwater in this area is no longer above Tier I. In addition, a small plume is identified by several wells on the hillside south of Building 460, but as these data all date to 1995, conditions may have changed. The Building 881 footing drain outfall sampling point, SW13494, and well 5187 (with 1995 data) indicate the presence of a small Tier II concentration plume shown on the south side of that building. Because the footing drain is designed to route groundwater around the building, the source of contamination detected in samples from SW13494 is presumably located elsewhere. However, available data for the upgradient wells nearest Building 881 do not include similar exceedances.

8.5.2 Nitrate Plumes

Nitrate plumes have also been redrawn using the methodology described above. Plate 12 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 (e.g., DOE 1997b, DOE 1998a, RMRS 1999m, and RMRS 2000d), the Solar Ponds are the source of the main nitrate plume at RFETS. The 2000 Solar Ponds nitrate plume is similar in extent and configuration to previous years, but with some notable adjustments.

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The northeastern extension of this plume is now shown to extend to well B208289, which is located next to a small pond and wetland and has consistently produced samples exceeding Tier II levels of nitrate. Only one well – B208189 – is represented by data over the time period of interest and is located between well B208289 and the bulk of the Solar Ponds Plume. Data for B208189 are below Tier II levels. Therefore, although the plume is drawn to extend from the Solar Ponds to well B208289, nitrate contamination around that well may be more correctly represented by a small, separate plume encompassing the one well. The northwestern extension of the Solar Ponds nitrate plume has been reduced in size because data from several wells was reported at less than Tier II levels. The western portion of the Tier II plume outline, in the vicinity of the Building 771 complex and Building 779 foundation, is also reduced in size. Wells P219089 and 42393 both produced samples below Tier II levels for nitrate; they are situated near the northeast corner of the Building 771 complex and at the western edge of the Solar Ponds, respectively. New wells 00100, 00500, 00600, and 02500, and existing well 42893, report nitrate results below Tier II. These wells are all located along the northeast side of the Building 777 and the northern edge of the Building 779 foundation. Both 43593 and 5687, which are located between 00100 and 02500, produced samples in 1997 that exceeded Tier II nitrate concentrations. Other wells in the area (typically small-diameter well points, installed during 1995, which are not capable of producing sufficient volume for nitrate samples) are not represented by data for the time period of interest.

The Tier I portion of the Solar Ponds nitrate plume has been reduced in size because several wells recently produced samples with nitrate concentrations below the Tier I level. Many of the wells north of and within the old Interceptor Trench System (ITS) have not been sampled or are not represented by nitrate data. In most cases, these locations are well points completed with Teflon tubing which are incapable of producing the water volume required for a sample. Also, many or most of these well points and piezometers were removed during installation of the Solar Ponds Plume Treatment System. South of the ITS, the Tier I nitrate concentration area depicted on Plate 12 is almost unchanged from that presented in the 1999 Annual RFCA Groundwater Monitoring Report (RMRS 2000d).

A relatively small plume exceeding the Tier II nitrate level is indicated by data from wells in the 903 Pad/Ryan's Pit area. This plume is mapped differently than in the 1999 Annual RFCA Groundwater Monitoring Report (RMRS 2000d) because of the different methods used to evaluate and contour the data.

Smaller plumes of groundwater contaminated with nitrates above Tier II levels also occur. Downgradient of the Landfill Pond, at the base of the dam, wells B206889 and B206989 define an area exceeding the Tier II level for nitrate. Wells 40599 and 41499, near the northwest corner of Building 771, define a small Tier II level plume. Wells P416789 and 56994 define a small plume located south and east of Building 440. Wells 37891, 39191, and 32591 identify a small plume, using 1995 and earlier data, in the IHSS 119.1 area of the 881 Hillside.

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8.5.3 Uranium Plumes

Isotopic uranium (U) values have been plotted, mapped, and discussed as part of the ongoing Actinide Migration Evaluation (AME) project. Data used for that project were also used to create a map for this Annual Report (Plate 14) showing the distribution of combined U at RFETS. Plate 14 was constructed from the results of analyses of field filtered groundwater samples. The sample results used for this discussion are all from UHSU wells.

The AME project is using averaged values of the activity-concentration for each of the isotopes U-233/234, U-235, and U-238. The values are the results of the analysis of groundwater samples collected from 1991 through 1999 at the various wells listed on Plate 14. To construct Plate 14, the AME averages were summed, plotted, and contoured. The averaged values of each of the listed U-isotopes were summed for each well, resulting in an average value essentially equal to the total U activity-concentration. The results are not true total U values because certain isotopes (with essentially negligible activity-concentrations) that are not routinely analyzed have been omitted; therefore, the resulting data are termed "combined U" values.

Combined background levels and combined Action Levels were used as the basis for the contour intervals presented on Plate 14. The value of the combined background-level contour, 104.29 pCi/L, equals the sum of the background levels of U-233/234, U-235, and U-238. Similarly, the combined Tier II action level contour value, 2.847 pCi/L, is a sum of the Tier II action levels for the individual isotopes. Because of the highly variable pattern of combined U values (i.e., wells next to each other may report combined U activity-concentrations that differ by tens to over one hundred pCi/L), some contour details are purposely omitted in favor of the more general pattern.

As shown on Plate 14, areas of elevated U activity-concentrations are most obvious at the Solar Ponds. The Solar Ponds were used during the production era at RFETS to contain process fluids including uranium-rich wastes. As a result, maps of this area have routinely featured groundwater plumes of elevated U activity-concentrations (EG&G 1995c). The combined U activity-concentrations here exceed the combined background levels and Tier II action levels. Three of these wells (05093, 05193, and P209589) exhibit the highest combined U activity-concentrations of all, exceeding a contour with the value of combined Tier I action levels (100 times the combined Tier II action levels).

Another dominant feature of Plate 14 is the general increase in combined U in a downgradient (eastward) direction. This is shown by a roughly north-south trending contour that bisects RFETS. To the east of this contour, combined U activity-concentrations are higher than the combined Tier II action levels; to the west, they are lower than the combined Tier II action levels. There are exceptions to this pattern, with some eastern wells below and some western wells above this activity-concentration, but the exceptions are few when compared to the overall data set. The contour is inferred where data are sparse in the northern and southern Buffer Zone. Where data are plentiful, this contour weaves and changes direction dramatically on a local scale from the general north-south trend, but the overall pattern of an eastward increase in combined U activity-concentration is maintained.

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This eastward increase in U is a result of natural processes, not anthropogenic U contamination; as groundwater flows through the subsurface, its chemistry evolves as a result of water-rock interactions. Generally, this results in increasing concentrations of certain ions, as well as TDS, in a downgradient direction from the point of recharge. Because U mineralization is naturally present within the Rocky Mountains and Front Range and its geochemistry allows dissolution and transport in the dissolved phase, U activity-concentrations can be expected to increase in a downgradient direction as shown on Plate 14.

This explanation for the eastward increase in U is supported by a recent site-wide sampling program, conducted as a joint venture between CDPHE and RFETS, which focused on distinguishing between anthropogenic and natural U in groundwater. Samples were collected from selected wells across RFETS for analysis of selected U-isotopes by the ICP/MS analytical method (RMRS 2000d). The results of that study indicated elevated levels of U are typically not related to the former weapons production mission at RFETS.

Plate 14 also shows isolated locations where the combined U values are elevated with respect to surrounding locations. These are highlighted within the 50 pCi/L contour. Two of these are wells 07391 (located downgradient of Ryan's Pit) and 61093 (located at the Old Landfill), which were identified in the ICP/MS study as containing elevated U-236, a man-made isotope. Other isolated wells showing greater than 50 pCi/L combined U include D&D well 41099 at Building 886 and well 5287 at Building 881; both of these buildings were involved in weapons manufacturing and uranium components. Well B206989 near the Present Landfill Pond; well 00193 at Pond C-2; well 10594 at Pond A-1; and well 3786 at Pond B-5 (now abandoned and replaced by well 00997, which does not show high levels of combined U) also appear as isolated locations of combined U that is elevated with respect to surrounding wells. Similarly, wells B303089 (now abandoned) and 10294, both at the southeastern corner of RFETS and thought to be impacted by a pre-RFETS domestic landfill (EG&G 1994a), mark a localized area of elevated combined U activity concentrations. Well B205589, above easternmost Rock Creek (and consistently producing elevated activity-concentrations of U), and well 0586 near the easternmost extent of No Name Gulch in the vicinity of Pond A-4 also mark localized areas of elevated combined U activity concentrations.

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8.6 Evaluation of Metals Anomalies in Groundwater

Nickel concentrations in wells 1386, 6486, and 6586 have increased significantly over the last several years above RFCA Tier II action levels of 140 µg/L (Figures 8.6-1 to 8.6-3). Initially, elevated nickel concentrations were considered to be the result of spurious laboratory analyses. However, further evaluation of the laboratory data indicated that the results were real and not an artifact of the laboratory analyses. In addition to laboratory artifacts, speculation for the increase in nickel concentrations has also focused on the possibility that the wells themselves were causing elevated nickel concentrations via corrosion since the wells were constructed with stainless steel casing and screen and installed in 1986.

The composition of stainless steel varies depending on the type and manufacturer but is generally composed of various percentages of iron, chromium, nickel, molybdenum and carbon. The above listed wells were probably constructed of stainless steel type 316L. This type of stainless steel was then among the most corrosion-resistant material on the market for well construction (Driscoll 1987). The material is comprised of 16 percent chromium, 10 percent nickel, 2 percent molybdenum, 0.03 percent carbon, and 72 percent iron. Based on these percentages, one would expect to see both elevated iron and chromium levels if corrosion or dissolution of the casing was occurring. While concomitant increases in iron have occurred to some degree in wells 6486 (Figure 8.6-2) and 6586 (Figure 8.6-3), consistently high levels of iron in the samples would tend to be present if corrosion were occurring. Chromium levels have also remained consistently below Tier II levels in these wells.

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Figure 8.6-1 Nickel Trend Plot for Well 1386

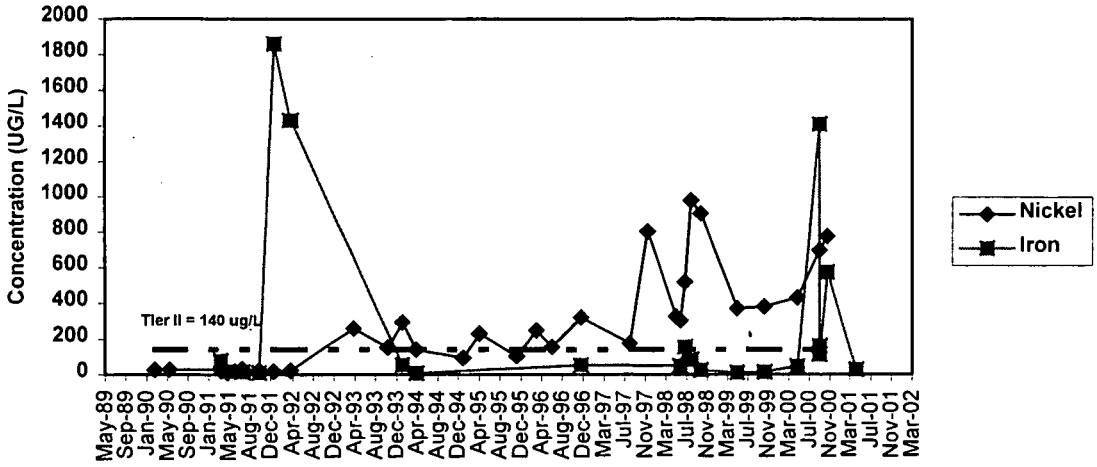

Figure 8.6-2 Nickel Trend Plot for Well 6486

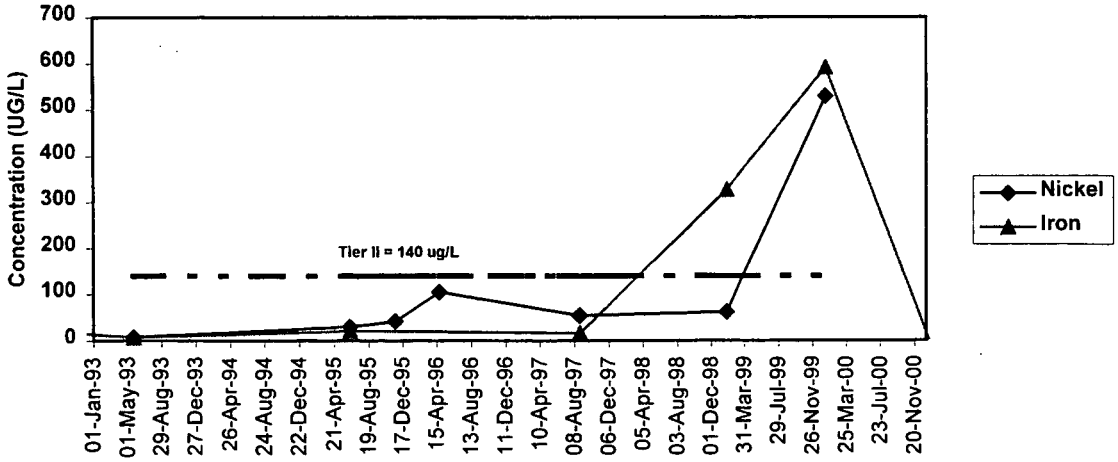

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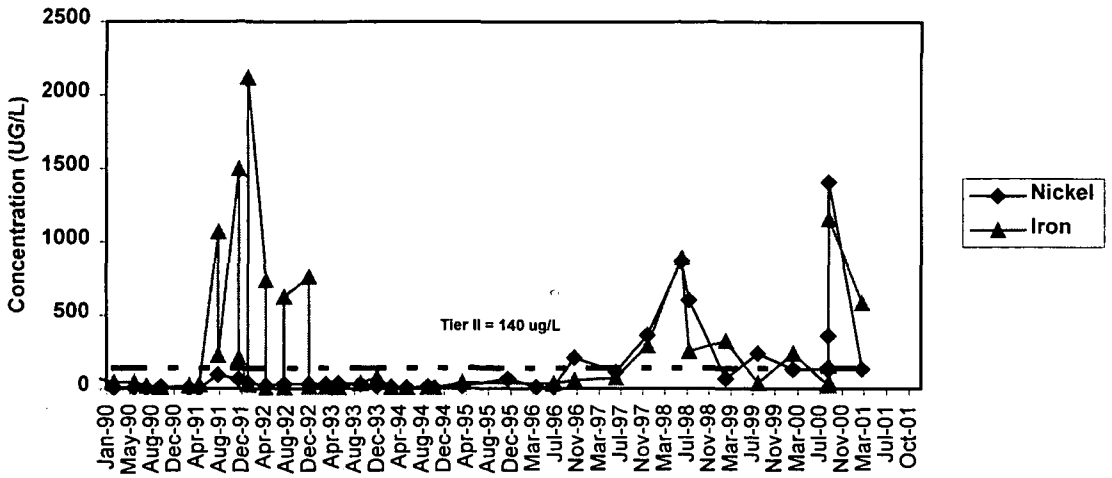
Figure 8.6-2 Nickel Trend Plot for Well 6586



To test the premise that corrosion of well materials has adversely impacted groundwater quality, an attempt was made to show a possible connection between purge volumes evacuated during sampling and corresponding nickel concentrations. If the casing and screen materials were responsible for the elevated nickel concentrations, it was anticipated that higher concentrations would be associated with lower purge volumes and conversely, as purge volumes increased and became more representative of ambient groundwater conditions, nickel concentrations would decline.

Plots of nickel concentrations versus purge volumes are show below on Figures 8.6-4 to 8.6-6 and indicate that while a downward trend is apparent in wells 1386 and 6586, there is little or no correlation between these two variables. The low R^2 value suggests that a more complex relationship possibly is likely, rather than the simple linear regression analysis that is shown on these figures. No apparent trend for this relationship in well 6486 is present as illustrated by the wide scatter of the data and the subsequent very low R^2.

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Figure 8.6-4 Nickel Concentrations Versus Purge Volumes in Well 1386

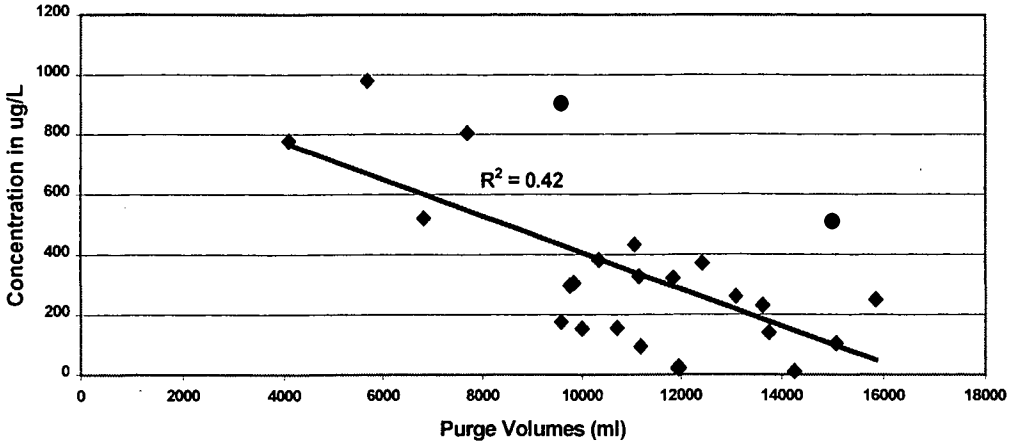

Figure 8.6-5 Nickel Concentrations Versus Purge Volumes in Well 6486

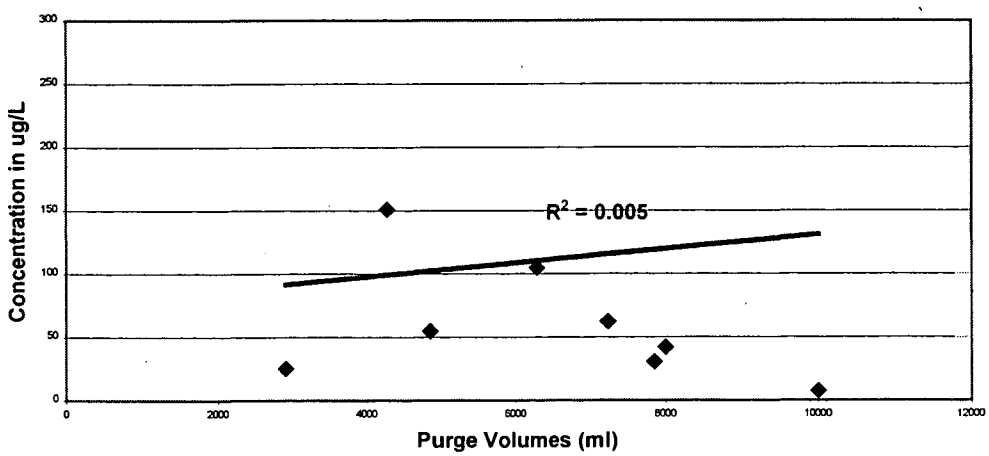

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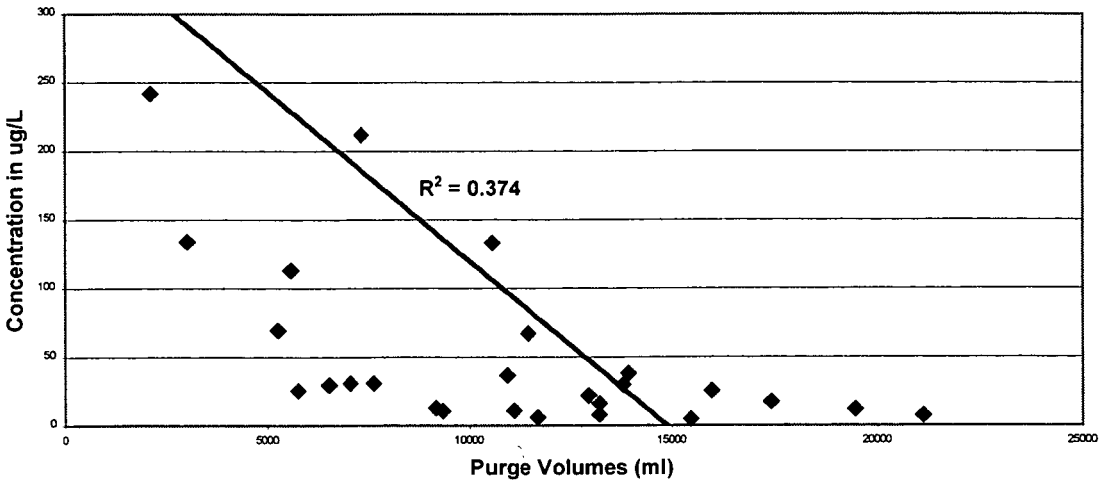
Figure 8.6-6 Nickel Concentrations Versus Purge Volumes in Well 6586



Corrosion results from either chemical or electrochemical processes and, as such, only occurs when certain chemical and geochemical conditions in the groundwater environment exist. However, even under these conditions, corrosion-resistant metals such as stainless steel tend to prevent or inhibit this process from occurring. Corrosive conditions may include the following:

- A low or very high pH environment is requisite for chemical corrosion to occur. Groundwater at RFETS is typically in the neutral range from approximately pH 6.6 to 7.5. Alkalinity values are moderately high (ranging from approximately 200 to 1000 µg/L) suggesting that the water is sufficiently buffered to resist significant pH changes due to acidity.

- Hydrogen sulfide concentrations can be readily detected by its characteristic "rottten egg" odor. Less that 1 mg/L can cause severe corrosion in wells. Conversations with the samplers in the Groundwater Program and a review of sampling logs indicates that hydrogen sulfide, as indicated by this odor, has not been detected in these wells.

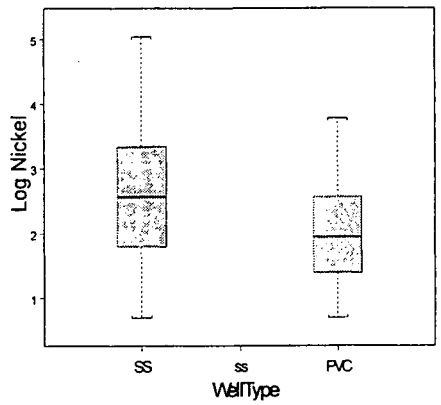
- Dissolved oxygen (DO) concentrations greater than 2 mg/L may induce corrosive processes. Historic DO data at RFETS has been generally unreliable and should not be used as a corrosion indicator.

- Total dissolved solids (TDS) greater than 1,000 mg/l causes high electrical conductivity and may cause serious electrolytic corrosion. TDS values in these wells average around 600 mg/l.

- Chloride content is another indicator of potential corrosion problems. Concentrations in excess of 500 mg/l indicate corrosion can be expected. Chloride concentrations in these wells are low, generally less than 100 mg/l.

Sampling data from other monitoring wells suggest that some source other than the well casing may be responsible for high nickel concentrations. Three newer monitoring wells (22896, 07391, and 41591), constructed with PVC casing, also have high nickel concentrations. Figure 8.6-7 shows box and whisker plots of nickel concentrations in wells constructed with stainless steel and PVC casing; four stainless steel and four PVC wells were used in this statistical comparison. The wells are located on the western portion of the Site and are completed in the Rocky Flats Alluvium. Because of their upgradient location, these wells essentially represent background groundwater conditions. Prior to construction of the box plot, the data in each well group were transformed using a natural log transformation and then were statistically evaluated using a non-parametric test of the medians (Kruskal-Wallis). The results of this test indicated that there is no difference statistically in nickel concentrations within each group of wells. Data from each group were then combined into two groups representing nickel concentrations in stainless steel and PVC wells. The results of the box plot below (Figure 8.6-7) indicate there is no difference statistically between nickel concentrations in wells constructed with these materials.

Figure 8.6-7 Box and Whisker Plot of Nickel in Wells With Stainless Steel and PVC Casing



Documented information indicates that nickel has been used historically at the site for plating weapons components (ChemRisk 1992). Plating using nickel carbonyl occurred in Buildings 444, 771, 776/777, and 779 from the early 1950s until the early 1970s. The plating process involved creating solutions by mixing metal salts with acids. Nickel plating by nickel carbonyl decomposition was used for uranium and alloyed plutonium.

Given the fact that nickel was used onsite for 20 years or more, it is not unlikely that nickel contamination may have occurred both in the soil and groundwater. Although wells 1386, 6486, and 6586 are located close to either Walnut or Woman and Creeks, there is no indication from surface water monitoring stations that nickel is present in these drainages at elevated concentrations. However, nickel may be present in very localized reaches of these creeks. To further evaluate the lateral extent of these high nickel concentrations in their respective drainages and potential

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source areas, Water Programs recommends that wells 54793, 54693, 30991, and 29795 be sampled. These wells are located along Woman and Walnut Creeks. It is also possible that some temporary wells may need to be installed to fully understand the source of the nickel in these areas.

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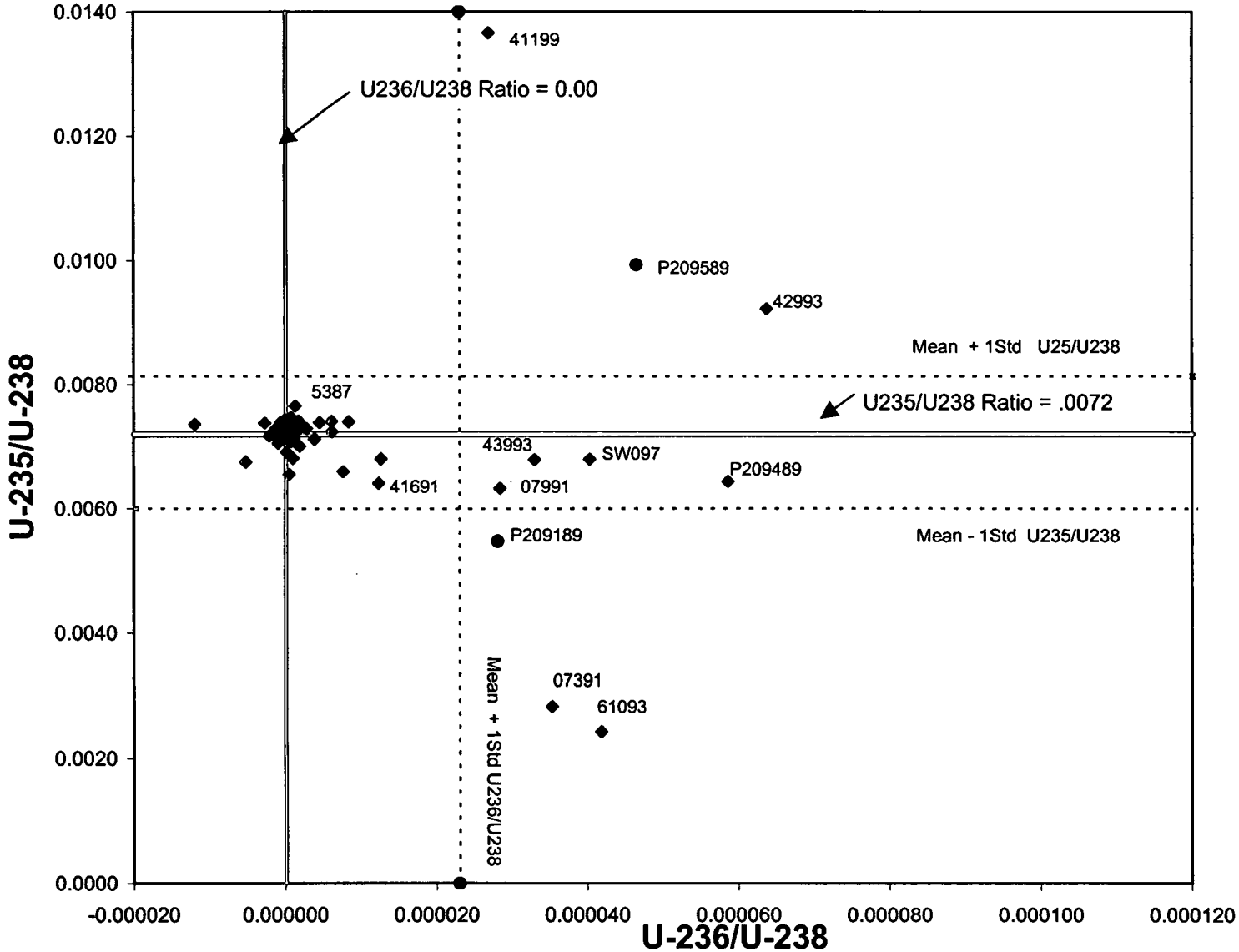
Figure 8-7 U-235/U-238 Ratio vs. U-236/U-238 Ratio



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9.0 GROUNDWATER CHARACTERIZATION ACTIVITIES

9.1 Actinide Migration

9.1.1 Background

The potential migration of Pu-239/240 and Am-241 from surface soils to groundwater at RFETS is being considered as part of the long-term remedial strategy currently under evaluation for Site closure implementation by DOE, the K-H Team, and the Actinide Migration Evaluation group. Existing data on actinide migration at RFETS was summarized for the development of a conceptual model designed to gain an understanding of actinide transport pathways active at the Site (DOE 1997a). Over 30 monitoring wells at RFETS were found to contain mean 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 stream drainages and is eventually discharged to surface water via seeps, streams or 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 (DOE 1997, EG&G 1995e, CDPHE 1996; 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 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 increased 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.

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 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

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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 casing techniques offer a means to minimize or eliminate 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 special 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. Non-paired, specially-cased 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 special surface casing techniques were not paired with existing monitoring wells to validate or invalidate radionuclide detections found in the original well.

9.1.2 Type and Extent of Contamination

Soils

Actinide transport to groundwater from contaminated surficial soils is a primary concern at RFETS. As shown in Figure 9-1, widespread areas of the Buffer Zone and localized areas in the IA have received windblown Pu-239/240 surface soil contamination. Vertical soil profiles of Pu-239/240 activity-concentrations for the uppermost 96 cm (3 feet) of RFETS soils presented in RMRS (1998f) and Litaor et al (1994) indicate that plutonium movement is mainly restricted to the top 20 to 25 cm of soil. Pu-239/240 activity-concentrations decline exponentially below a depth of about 12 cm (Litaor et al, 1994) to less than 1 pCi/g at 72 cm. Elevated plutonium activity-concentrations were detected in soil macropores (i.e., root channels) compared to the surrounding soil matrix, but extensive macropore development was not observed below a depth of 120 cm (3.9 feet) (Litaor et al, 1994). This depth roughly corresponds with the average depth of most RFETS grass and forb root systems as reported in Weaver (1920). According to Weaver (1920), many grassland plants have root systems that can exceed a depth of 5 feet and some can attain maximum depths in excess of 10 feet. This information suggests that deep soil macropores may be present at RFETS, but these macropores should be relatively unimportant as a source medium for drilling-artifact contamination.

Groundwater

Figure 9-1 illustrates that wells containing unfiltered Pu-239/240 contamination (colored dots) are generally associated with surface soil contamination areas (color-shaded contours). The highest groundwater unfiltered Pu-239/240 activity-concentrations are found in alluvial wells at and east of the 903 Pad. Elevated unfiltered Pu-

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239/240 activity-concentrations are also found in certain bedrock wells in this area, including well 11791, as described in RMRS (1998f).

Activity-concentration plots of unfiltered Pu-239/240 and Am-241 for wells 1587, 06991, 11791,,and P313489 presented in RMRS (1998f) indicate that, with the exception of well 1587, Pu-239/240 and Am-241 activity-concentrations have generally declined with time. The reason for this decline is thought to result from the flushing of contaminants in the borehole disturbed zone caused by routine high-energy (bailer) sampling activities.

9.1.3 Project Approach

The following conditions were considered in the development of the sampling strategy for the Actinide Drilling-Artifact Contamination Project:

- The operating history of the former 903 Pad Drum Storage Area and other sites indicate that actinide contaminants, specifically Pu-239 and Am-241, have been released to the environment and transported by wind action and runoff to surface soils adjacent to the source.
- The physical and chemical properties of the contaminants, vertical soil actinide activity-concentration profiles, and drilling and well installation documentation indicate that cross-contamination from surface soil materials probably accounts for much, if not all, of the actinide contamination found in groundwater samples collected from 903 Pad and surrounding area wells.
- Existing groundwater analytical data indicate that actinide contamination occurs principally in the colloidal and particulate phase.
- Seasonally variable hydrologic conditions can affect well development effectiveness and sampling program success.

Additional details on project approach and sampling strategy were presented in the Actinide Drilling-Artifact Contamination Project sampling and analysis plan (SAP) (RMRS 1999c).

9.1.4 Monitoring Well Locations and Rationale

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 903 Pad and Lip Area. The fourth well is associated with surface soil contamination in the IHSS 160 area (Building 444 parking lot). Figure 9-2 illustrates the location of these wells. The rationale for each monitoring well location is summarized in Table 9-1.

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Table 9-1 Actinide Drilling-Artifact Contamination Monitoring Well Location Rationale

Well Number	Location	Rationale
50099	10 feet west of paired well 1587	Upgradient location from well 1587 for evaluating historical actinide groundwater contamination. Groundwater at well 1587 has an apparent increasing Pu-239/240 trend; has a partially saturated screened interval; and was the focus of previous USGS research.
50199	10 feet west of paired well 06991	Upgradient location from well 06991 for evaluating historical actinide groundwater contamination. Well 06991 has the highest average Pu-239/240 concentration of all wells not located on the 903 Pad and has a partially saturated screened interval.
50299	10 feet north of paired well 11791	Upgradient location from well 11791 for evaluating historical actinide groundwater contamination. Well 11791 is completed in weathered bedrock materials in an area thought to be a bedrock groundwater discharge area. It has a fully saturated screened interval.
50399	10 feet northeast of paired well P313489	Cross gradient location from well P313489 for evaluating historical actinide groundwater contamination. Well P313489 is located in the IA outside of the 903 Pad Soil Contamination Area and has a fully saturated screened interval.

9.1.5 Well Design and Installation

Well Design

Monitoring well designs selected for the program were consistent with the construction specifications prescribed in PRO-1059-WELL-118, Rev. 0, *Monitoring Well Installation.* These wells were designed with screened intervals that closely approximate the paired well, except that the top of the screened or filter-packed interval for certain wells were set deeper than the original well to provide additional well intake zone protection. To ensure that these wells excluded drilling-artifact contamination, all wells were installed using dual ("aseptic") casing construction methods described in PRO.114, *Drilling and Sampling Using Hollow-Stem and Rotary Drilling and Rock Coring Techniques*, and as modified in the SAP (RMRS 1999c).

The depth of actinide contamination in surface soils was an important consideration for well design. Surface casing must prevent contaminated soils from entering the borehole and contaminating deeper materials. As most Pu-239/240 is mainly limited to the top 40 to 60 cm of soil, a surface casing depth of 65 cm (2.1 feet) below original grade was chosen to isolate the majority of contamination while permitting sufficient room for excess soil removal and casing cleaning. A target activity-concentration of 1 pCi/g was adopted for determining whether the 65 cm isolation casing depth was adequate for excluding gross surface soil contamination from potentially entering the wellbore. Pu-239/240 or Am-241 activity-concentrations found to be higher than this criterion would result in analysis of deeper soil samples to document contamination conditions of the well intake zone and allow an assessment of cross-contamination potential for the well.

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Typical well construction materials consisted of a 2.5 foot section of 16-inch ID steel surface casing and concrete pad, and 2-inch ID, schedule 40 or 80 PVC riser and factory cut (0.010-inch slot width) well screen with an approximately 0.4 foot long PVC threaded bottom cap. Protective casing consisting of a 6-inch ID or larger steel riser with locking cap and lock was set in concrete to a depth of about 2 to 3 feet. Caution was exercised during each step of the well construction process to prevent surface contaminants from entering the borehole. All downhole equipment, including augers, rods, tools, and casing, were decontaminated and radiologically surveyed prior to advancing past the base of the isolation casing and into the well intake zone.

Borehole Drilling and Logging

Prior to drilling at each site, the uppermost 3 to 4 inches of soil was removed from a 3 x 3 foot square area surrounding the hole location. The excavated surface was then securely covered with plastic sheeting to prevent grossly contaminated soils from entering the immediate drill hole area. Surficial soil sampling, hand excavating, and drilling was initiated through a pre-cut 16 to 20-inch hole cut in the plastic sheeting at the center of the square excavated area. This square area was later used for well pad construction in conjunction with cementing-in the surface isolation casing.

At each drill site, a 20-inch diameter borehole was hand excavated to a depth of about 1.8 feet below the excavated soil surface (a total of 2.1 feet bgs) in preparation for surface isolation casing installation. All soil cuttings were carefully removed in 4 to 6-inch lifts using freshly decontaminated tools in preparation for isolation casing installation. Steel surface casings were placed and seated in the boreholes to an approximate depth of 2.1 feet below original ground surface, with a 0.4 foot stick-up, to prevent potentially contaminated surface soil from entering the borehole. After sealing the top of the surface casing with plastic and duct tape, concrete was placed into the casing annulus, while causing as little disturbance to the borehole wall as possible. Once the annulus was filled, the plastic sheeting was removed from the 3 x 3 foot square and the remainder of the pad was poured to a finished dimension of 3 x 3 feet wide by 6-inches thick using a wooden frame.

After allowing for a 24 hour or longer cement set-up time, the plastic sheeting used to cover the surface casing was removed for final clean out and sampling. The auger string was then advanced to the estimated target total depth in the SAP based on drilling results obtained from the existing paired well. During drilling, continuous soil cores were obtained at two-foot increments using a split spoon sampler.

Well Installation

Groundwater monitoring wells were installed in accordance with GT.06, *Monitoring Wells and Piezometer Installation* and the project SAP (RMRS 1999c). Generally, the wells were installed in accordance with the design specifications set forth in the SAP, although adjustments for screen depth (wells 50199 and 50299) and screen length (well 50199) were made to account for unexpected variations in bedrock depth. Table 9-2 contains the as-built specifications for the wells.

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Table 9-2 Well Construction Specifications for Actinide Drilling-Artifact Contamination Wells

Well Number	Paired Well Number	Surface Isolation Casing Depth (ft)	Depth to Bedrock (ft)	Top of Well Intake (filter pack) (ft)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Total Depth (ft)
50099	1587	2.1	20.4	9.7	10.7	20.7	21.0
50199	06991	2.1	N/A	9.5	10.7	20.7	21.0
50299	11791	2.1	<2.4	9.1	9.3	14.3	14.6
50399	P313489	2.1	20.7	15.8	17.1	22.1	22.5

Note: All depths are reported from original ground surface

Well Development

Monitoring wells were developed prior to sampling using the procedures specified in PRO.106, *Well Development*, as modified by the SAP. The main objectives of well development were to improve well yields and reduce turbidity levels, thus ensuring that any groundwater samples obtained were as representative as possible of undisturbed conditions. All water produced during well development was handled as uncharacterized development water in accordance with FO.05, *Handling Purge and Development Water.*

9.1.6 Sample Collection

Soil Samples

Soil samples collected at new drilling sites consisted of a set of five, depth-discrete surface and subsurface samples for documentation of Pu-239/249 and Am-241 contaminant conditions for drilling-artifact contamination evaluation. Surface soil samples were collected from each new well location site using the grab sampling method specified in GT.08, *Surface Soil Sampling*. After the uppermost 3 to 4-inch layer of soil was removed, a soil sample was collected from the borehole area to a depth of approximately 5 to 6-inches below the excavated soil surface. Following surface isolation casing installation and clean out, a subsurface soil sample was collected from the base of this casing to a depth approximately 1 to 2-inches below the casing point using hand tools, as specified in GT.08, *Surface Soil Sampling*. These samples were submitted for analysis to document the efficacy of the isolation casing in excluding surface soil contamination. Additional subsurface soil samples were collected from the 4.0 to 5.0 foot depth interval, slough at the top of the well intake zone, and from undisturbed soils in the upper 1-foot of the well intake zone. These samples were initially stored (and subsequently analyzed) pending the results of the uppermost soil and groundwater samples.

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Groundwater Samples

Groundwater samples from all well pairs were collected during the 3rd/4th quarters of 1999 and during the 2nd quarter of 2000. These periods were chosen to coincide with low and high water table conditions, respectively, for evaluating the potentially episodic nature of actinide transport caused by spring recharge, as postulated by Harnish et. al. (1994). Generally, higher actinide activity-concentrations have been observed in some RFETS wells during the spring recharge season. It is not known, however, whether the elevated values result from natural actinide transport through unsaturated soils, sampling variability, or sample contact with infrequently saturated (and thus poorly developed) portions of cross-contaminated well intake zones.

For the initial sampling event, groundwater sampling began after the well fully recovered from the well development process. Pu-239/240, Am-241, and TSS samples were collected from each of the wells in well pairs 11791/50299, P313489/50399, 1587/50099, and 06991/50199 using the bailer method, as specified in PRO.108, *Measurement of Groundwater Field Parameters*, and PRO.113, *Groundwater Sampling*. Bailing was selected because this method typically generates a large quantity of particles and colloids from the local well intake environment compared to ambient conditions in the surrounding aquifer. Another consideration was that it be consistent with previous sampling methods to allow for comparison with historical results. During sample collection, having the same crewmember collect samples from both wells in a pair minimized variability in operator technique. Well purging focused on turbidity monitoring to a greater degree than routine sampling because plutonium and americium are strongly particle-reactive and excessive turbidity levels might compromise paired comparisons. Turbidity levels in groundwater were monitored and allowed to stabilize prior to sampling. At the time of sampling, final turbidity levels ranged from 2 to 149 (clear to cloudy) NTUs (turbidity units) in the new wells and 0 to 239 NTUs in the existing wells. All wells yielded adequate sample volumes for the collection of complete sample suites. As a cautionary note, it is important to recognize that bailed sample results are not appropriate for application involving colloid-facilitated transport problems, as the resulting particle loads and size distributions are not representative of actual *in situ* groundwater conditions.

Based on the results of the initial sampling event, the 2nd quarter 2000 sampling event was expanded to include groundwater sampling techniques that more closely represent lateral colloid transport in a saturated aquifer. In addition to bailer sampling, each well pair was sampled in a quiescent mode using low flow-rate pumping techniques (approximate pumping rate of 100 ml/min) that eliminated water column disturbances and minimized drawdown, thereby limiting flow distortions at the well. An additional sample collected at a higher pumping rate (300 ml/min versus 100 ml/min) was undertaken at well 1587 to determine whether the 300 ml/min rate used by Harnish et al (1996) was the cause of elevated actinide concentrations compared to the Harnish et al (1994) results, which were based on a 100 ml/min rate. Furthermore, wells 90099 and 90399, located on the hillside southeast of the 903 Pad, above the SID, were sampled to evaluate potential lateral transport along a well-defined groundwater flow pathway that originates at the 903 Pad. These wells were installed using the same surface isolation casing techniques employed for the 500-series well pairs. Samples collected at wells 90099 and 90399 were obtained using low flow-rate pumping techniques only.

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Pumping was accomplished by lowering a sample tube to the approximate midpoint of the saturated interval, and extracting groundwater with a peristaltic pump. A sample manifold was used to split the pumped water into equal discharge streams for the simultaneous collection of primary, filtered, and QC samples (duplicate and split). Pumping rates typically ranged from 75 to 100 ml/min during well purging and sampling with drawdown limited to 25 percent of the water column, where possible. At wells 11791 and 50299, repeated sampling visits were made to collect enough water for analysis because of excessive drawdown and low well yields. To check RFETS contract laboratory results, a set of split samples was collected from seven wells and submitted to Texas A&M University (Texas A&M) for Pu-239/240 and Am-241 analyses. This sample set was ordered after the 3rd/4th quarter 1999 analytical results for the existing wells failed to detect the elevated activity-concentrations that were characteristic of historical values.

Sample suites were identical to those collected during the 3rd/4th quarter event, except that additional filtered Pu-239/240 and Am-241 samples were collected from some pumped wells to evaluate whether actinides were associated with the sub 0.45 micron fraction of the sample. Final turbidity levels in the new wells ranged from 74.7 to 214 NTUs (bailed) and 0.31 to 0.80 NTUs (pumped). In the preexisting wells, final turbidity ranged from 13.5 to 308 NTUs (bailed) and 0.38 to 1.24 NTUs (pumped). This data clearly indicates that particle loads of the bailed samples are induced by sampling disturbances inside the well rather than by transport conditions occurring in the aquifer. The low turbidity measurements are consistent with the results of Harnish et al (1996), who found low turbidity levels (2.6 NTUs) and suspended particle/colloid concentrations (1.32 mg/L) during low flow-rate pump sampling of well 1587 in 1992.

9.1.7 Sampling Results

Soils

Table 9-3 presents the results of Pu-239/240 and Am-241 analyses for soil samples collected at each new well site. Samples collected at the excavated soil surface (3 to 4-inches below original grade) 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) prior to surface isolation casing installation. Soil activity-concentrations at the base of the isolation 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 isolation casing. For this reason, the deeper soil samples from this borehole were subsequently submitted for analysis to further examine the possibility that surface contamination may have been introduced to the well intake zone. In all of the deeper samples, Pu-239/240 was not detected in any of the well intake zone or slough samples, thus verifying that clean drilling conditions were maintained below the surface isolation casing point. Based on this information, it is reasonable to assume that any Pu-239/240 or Am-241 contamination detected in

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groundwater samples collected from these wells are the result of natural rather than the drilling and well installation processes.

Groundwater

The results of 3rd/4th quarter 1999 groundwater sampling for all paired wells and 903 Pad Hillside wells are contained in Table 9-4. 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-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 (1997) and shown in Figures 9-3 through 9-6. Further discussion of this situation is presented below in the discussion of the 2nd quarter 2000 data.

Table 9-5 presents the results of groundwater sampling for the 2nd quarter 2000 event. Generally, the data for bailed samples in this table 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 (Figure 9-7) 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 real (0.148 pCi/L) versus duplicate (0.0179 pCi/L) Pu-239/240 values reported for well 50099 indicates that a potential for sample heterogeneity or analytical error 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.

As the 2nd quarter 2000 bailed data for the existing wells has remained inconsistent with historical trends at these wells, it is difficult to draw any meaningful conclusions about cross-contamination from the paired well data. This situation exists because the experimental design assumes that historically elevated Pu-239/240 and Am-241 activity-concentrations will persist in the existing wells. The reason for this inconsistency is unknown, but may stem from either anomalous sampling conditions, analytical errors, or both. Nevertheless, it appears certain that groundwater Pu-239/240 and Am-241 activity-concentrations in these wells are very low to non detect, which tends to dispel the notion that significant amounts of contamination have migrated from surface soils through the unsaturated zone and impacted groundwater, as suggested by the historical data. Because Pu-239/240 and Am-241 were detected in groundwater from some of the new wells, migration of these actinides in small amounts from surface soils through the unsaturated zone to groundwater appears to be the most likely explanation. Consequently, this process represents a viable pathway that must be considered for saturated zone transport analysis. This possibility will be evaluated in the following discussion of low flow-rate pumping results.

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Low flow-rate pumping is currently the standard industry technique used for sampling colloids in groundwater. The results of unfiltered and filtered low flow-rate pumped samples collected during the 2nd quarter 2000 are listed in Table 9-5. For the most part, the Pu-239/240 and Am-241 activity-concentration of samples analyzed by contract laboratories, including those that were filtered, appear to be similar to the bailed sample results, after considering the analytical uncertainty associated with the analysis. This conclusion is highlighted by the Pu-239/240 results from well 50099, where three different pumped sample analyses for unfiltered pumped (100 ml/min), filtered pumped (100 ml/min), and unfiltered pumped (300 ml/min) exceed the Tier II action level of 0.15 pCi/L. Variability in Pu-239/240 activity-concentration is observed in duplicate sample pairs from wells 06991 (0.037 and 0.0779 pCi/L) and 50099 (0.175 and 0.085 pCi/L).

There appears to be no appreciable difference in the unfiltered and filtered Pu-239/240 and Am-241 paired data, except in well 50099, where the filtered value exceeds the unfiltered value. The results at well 50099 appear to directly disagree with the conclusion of RMRS (1998) and Harnish et al (1996) that most groundwater plutonium and americium is associated with the >0.45 micron fraction of the sample. Some of the contract laboratory results also sharply disagree with the Texas A&M split sample results, notably for wells 50199 (bailed, unfiltered) and 11791 (bailed, unfiltered). For well 50199, the contract laboratory reported a Pu-239/240 activity-concentration of 0.0279 pCi/L compared to a Texas A&M result ranging from 0.2665 to 0.5492 pCi/L (real and duplicate sample). For well 11791, the contract laboratory reported a Pu-239/240 activity-concentration of 0.0418 pCi/L compared to a Texas A&M result ranging from 0.4549 to 0.5356 pCi/L (real and duplicate sample, respectively). In the case of well 11791, the Texas A&M Pu-239/240 result is more consistent with the historical data, which indicates bailed sample values ranging from 2 to 6 pCi/L. Neither the contract laboratory nor Texas A&M Pu-239/240 result is consistent with the sample history at well 06991 (1 to 4 pCi/L). The unexpectedly high Texas A&M result of 0.2665 to 0.5492 pCi/L at new well 50199 is much higher than might be expected from comparable analyses at well 06991. The significance of the disparity between the split sample analytical results is currently unresolved, and may require that further sampling and analysis be performed to ascertain analytical reliability.

9.1.8 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 small.

Pu-239/240 and Am-241 are found in low activity-concentrations (<0.15 pCi/L) in UHSU wells usually associated with surface and near-surface soil contamination areas. Pu-239/240 and Am-241 groundwater contamination is generally not found in areas outside of surface soil contamination areas, including the RFETS IA. This situation

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indicates that widespread contamination from potential underground IA actinide sources, such as process waste lines and 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. Additional areas of localized contamination may still be discovered as D&D monitoring programs for individual building closures are implemented during Site closure.

Recent sampling results from the actinide drilling-artifact contamination investigation confirm that trace activity-concentrations of these actinides are found in UHSU groundwater associated with surface-contaminated soils. These results are generally below Tier II action levels and are significantly lower than activity-concentrations previously reported for older companion 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.

Vertical migration of Pu-239/240 and Am-241 from surficial aquifers to the Laramie-Fox Hills Aquifer is not implicated as a significant transport pathway. For LHSU groundwater to be contaminated, it follows that the overlying UHSU groundwater must also be contaminated. Until the source and concentration levels of Pu-239/240 and Am-241 in the UHSU are confidently established, the issue of contamination in the LHSU can not be completely addressed. Nevertheless, the available LHSU hydrogeologic and environmental isotope data indicate that Pu-239/240 and Am-241 should not have been transported deep into the groundwater flow system beneath the Site, except possibly by cross-contamination of surficial soils during drilling and well installation. The lack of consistent and repeatable detections of these actinides in LHSU wells showing contamination is further reason to doubt their presence in deep groundwater.

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Table 9-3 Actinide Soil Sampling Results from New Actinide Drilling-Artifact Contamination Wells

Location	Sample Date	Depth Interval (ft)	Bottle #	Analyte	Result	Unit	Lab Qual	Valid	Detect Limit	2 Sigma Error
50099	10/20/99	0.0-0.5	00D0544-002.002	AMERICIUM-241	104.5068	PCI/G			0.0501	2.7246
50099	10/22/99	2.3-2.4	00D0544-003.002	AMERICIUM-241	1.0666	PCI/G			0.1031	0.3948
50099	10/22/99	4.0-4.8	00D1345-007.002	AMERICIUM-241	0.134	PCI/G	J		0.0452	0.0925
50099	10/25/99	9.7-10.8	00D1345-008.002	AMERICIUM-241	0.0768	PCI/G	J		0.0347	0.0614
50099	10/26/99	11.2-12.0	00D1345-009.002	AMERICIUM-241	0.0519	PCI/G	J		0.0469	0.0587
50199	10/21/99	0.3-0.5	00D0544-008.002	AMERICIUM-241	66.7397	PCI/G			0.1443	2.6733
50199	10/28/99	2.3-2.4	00D0544-009.002	AMERICIUM-241	0.0302	PCI/G	U		0.1851	0.0765
50199	10/28/99	4.0-4.6	00D1345-010.002	AMERICIUM-241	0.0428	PCI/G	J		0.0387	0.0484
50199	11/1/99	13.0-13.3	00D1345-011.002	AMERICIUM-241	0.0585	PCI/G	J		0.0396	0.0573
50199	11/1/99	13.3-14.5	00D1345-012.002	AMERICIUM-241	0.0684	PCI/G	J		0.0463	0.067
50299	8/25/99	0.4-0.5	99D0069-002.002	AMERICIUM-241	26.4967	PCI/G		V1	0.0945	1.8839
50299	8/26/99	2.2-2.4	99D0069-003.002	AMERICIUM-241	0.0637	PCI/G	J	V1	0.0575	0.0721
50299	8/26/99	4.0-5.0	00D1345-001.002	AMERICIUM-241	0.0184	PCI/G	U		0.105	0.0472
50299	8/26/99	7.6-8.2	00D1345-002.002	AMERICIUM-241	0.0469	PCI/G	U		0.0807	0.0543
50299	8/26/99	8.2-8.8	00D1345-003.002	AMERICIUM-241	0.0548	PCI/G	U		0.0733	0.0548
50399	8/16/99	0.4-0.5	99D9513-001.002	AMERICIUM-241	0.6885	PCI/G		V1	0.0433	0.2056
50399	8/17/99	2.2-2.8	99D9513-003.002	AMERICIUM-241	0.0477	PCI/G	U	V1	0.0646	0.0661
50399	8/18/99	3.5-4.2	00D1345-004.002	AMERICIUM-241	0.0808	PCI/G	J		0.0747	0.0657
50399	8/18/99	16.0-16.6	00D1345-005.002	AMERICIUM-241	0.00638	PCI/G	U		0.137	0.0549
50399	8/18/99	16.7-17.7	00D1345-006.002	AMERICIUM-241	0.0678	PCI/G	J		0.0306	0.0542
50099	10/20/99	0.0-0.5	00D0544-002.002	PLUTONIUM-239/240	489.2946	PCI/G			0.2145	12.1989
50099	10/22/99	2.3-2.4	00D0544-003.002	PLUTONIUM-239/240	6.0409	PCI/G			0.2041	0.6721
50099	10/22/99	4.0-4.8	00D1345-007.002	PLUTONIUM-239/240	0.69	PCI/G			0.152	0.251
50099	10/25/99	9.7-10.8	00D1345-008.002	PLUTONIUM-239/240	0.0232	PCI/G	U		0.121	0.0563
50099	10/26/99	11.2-12.0	00D1345-009.002	PLUTONIUM-239/240	-0.0093	PCI/G	U		0.175	0.0591
50199	10/21/99	0.3-0.5	00D0544-008.002	PLUTONIUM-239/240	360.1567	PCI/G			0.2064	6.5475
50199	10/28/99	2.3-2.4	00D0544-009.002	PLUTONIUM-239/240	0.189	PCI/G	U		0.2902	0.1903
50199	10/28/99	4.0-4.6	00D1345-010.002	PLUTONIUM-239/240	0.0461	PCI/G	U		0.135	0.0743
50199	11/1/99	13.0-13.3	00D1345-011.002	PLUTONIUM-239/240	-0.00799	PCI/G	U		0.074	0.0157
50199	11/1/99	13.3-14.5	00D1345-012.002	PLUTONIUM-239/240	0	PCI/G	U		0.0379	0

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Table 9-3 Actinide Soil Sampling Results from New Actinide Drilling-Artifact Contamination Wells (continued)

Location	Sample Date	Depth Interval (ft)	Bottle #	Analyte	Result	Unit	Lab Qual	Valid	Detect Limit	2 Sigma Error
50299	8/25/99	0.4-0.5	99D0069-002.002	PLUTONIUM-239/240	160.9394	PCI/G		V1	0.2471	3.794
50299	8/26/99	2.2-2.4	99D0069-003.002	PLUTONIUM-239/240	0.084	PCI/G	U	V1	0.2456	0.1304
50299	8/26/99	4.0-5.0	00D1345-001.002	PLUTONIUM-239/240	-0.0117	PCI/G	U		0.14	0.023
50299	8/26/99	7.6-8.2	00D1345-002.002	PLUTONIUM-239/240	0.0269	PCI/G	U		0.0729	0.0527
50299	8/26/99	8.2-8.8	00D1345-003.002	PLUTONIUM-239/240	0	PCI/G	U		0.0751	0
50399	8/16/99	0.4-0.5	99D9513-001.002	PLUTONIUM-239/240	2.8632	PCI/G		V1	0.0725	0.5424
50399	8/17/99	2.2-2.8	99D9513-003.002	PLUTONIUM-239/240	0.1505	PCI/G	J	V1	0.0582	0.1115
50399	8/18/99	3.5-4.2	00D1345-004.002	PLUTONIUM-239/240	-0.000257	PCI/G	U		0.19	0.0618
50399	8/18/99	16.0-16.6	00D1345-005.002	PLUTONIUM-239/240	0	PCI/G	U		0.0977	0
50399	8/18/99	16.7-17.7	00D1345-006.002	PLUTONIUM-239/240	0.0423	PCI/G	U		0.171	0.0836

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Table 9-4 3rd and 4th Quarter 1999 Groundwater Sampling Results from Actinide Drilling-Artifact Contamination Well Pairs

Location	Sample Date	Bottle#	Analyte	Result	Unit	Lab Qual	Detect Limit	Valid	2 Sigma Error	Sample Type
06991	11/29/99	00D0838-001.003	AMERICIUM-241	0.01837	PCI/L	J	0.0123	V	0.011796	Bail
50199	11/19/99	00D0822-001.003	AMERICIUM-241	0.00338	PCI/L	U	0.01243	V	0.006610	Bail
06991	11/29/99	00D0838-001.003	PLUTONIUM-239/240	0.00681	PCI/L	U	0.01836	V	0.010553	Bail
50199	11/19/99	00D0822-001.003	PLUTONIUM-239/240	0.03873	PCI/L		0.01297	V	0.016902	Bail
06991	11/29/99	00D0838-001.002	TOTAL SUSPENDED SOLIDS	13	MG/L		5	V		Bail
50199	11/19/99	00D0822-001.002	TOTAL SUSPENDED SOLIDS	31	MG/L		5	V		Bail
11791	9/21/99	99D0350-002.003	AMERICIUM-241	0.0709	PCI/L		0.0061	V	0.024900	Bail
50299	9/21/99	99D0350-001.003	AMERICIUM-241	0.0086	PCI/L	J	0.0058	V	0.008400	Bail
11791	9/21/99	99D0350-002.003	PLUTONIUM-239/240	0.0773	PCI/L		0.0269	V	0.029700	Bail
50299	9/21/99	99D0350-001.003	PLUTONIUM-239/240	0.0154	PCI/L	J	0.0069	V	0.012300	Bail
11791	9/21/99	99D0350-002.002	TOTAL SUSPENDED SOLIDS	27	MG/L		5	V		Bail
50299	9/21/99	99D0350-001.002	TOTAL SUSPENDED SOLIDS	160	MG/L		5	V		Bail
1587	11/10/99	00D0752-002.003	AMERICIUM-241	0.0465	PCI/L		0.0163	V	0.020800	Bail
50099	11/10/99	00D0752-001.003	AMERICIUM-241	0.0154	PCI/L	U	0.0162	V	0.012900	Bail
1587	11/10/99	00D0752-002.003	PLUTONIUM-239/240	0.1067	PCI/L		0.019	V	0.030100	Bail
50099	11/10/99	00D0752-001.003	PLUTONIUM-239/240	0.0601	PCI/L		0.0233	V	0.023700	Bail
1587	11/10/99	00D0752-002.002	TOTAL SUSPENDED SOLIDS	190	MG/L		5	V		Bail
50099	11/10/99	00D0752-001.002	TOTAL SUSPENDED SOLIDS	5	MG/L	U	5	V		Bail
P313489	9/10/99	99D0286-002.003	AMERICIUM-241	0.1321	PCI/L		0.017	V	0.034800	Bail
50399	9/10/99	99D0286-001.003	AMERICIUM-241	0.0097	PCI/L	U	0.0179	V	0.011700	Bail
P313489	9/10/99	99D0286-002.003	PLUTONIUM-239/240	0.042	PCI/L		0.0081	V	0.022000	Bail
50399	9/10/99	99D0286-001.003	PLUTONIUM-239/240	0.0021	PCI/L	U	0.0202	V	0.009500	Bail
P313489	9/10/99	99D0286-002.002	TOTAL SUSPENDED SOLIDS	150	MG/L		5	V		Bail
50399	9/10/99	99D0286-001.002	TOTAL SUSPENDED SOLIDS	100	MG/L		5	V		Bail

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Table 9-5 2nd Quarter 2000 Groundwater Sampling Results from Actinide Drilling-Artifact Contamination Well Pairs

Location	Sample Date	Sample Time	Bottle #	Analyte	Result	Units	Lab Qual	Detect Limit	Valid-ation	2 Sigma Error[1]	Sample Type[2]
Plutonium-239, 240											
06991	6/14/00	1248	00D1288-010.001	PLUTONIUM-239/240	0.0217	PCI/L	J	0.00735		0.015	Bail
06991	6/14/00	1248	TAMU3 Bottle 1	PLUTONIUM-239/240	0.0827	PCI/L				0.0073	Bail/split
06991	6/14/00	1248	TAMU3 Bottle 2	PLUTONIUM-239/240	0.0927	PCI/L				0.0099	Bail/split dup
50199	6/13/00	1025	00D1288-005.001	PLUTONIUM-239/240	0.0279	PCI/L	J	0.0206		0.019	Bail
50199	6/13/00	1025	TAMU2 Bottle 1	PLUTONIUM-239/240	0.5492	PCI/L				0.0211	Bail/split
50199	6/13/00	1025	TAMU2 Bottle 2	PLUTONIUM-239/240	0.2665	PCI/L				0.0163	Bail/split dup
06991	6/13/00	1418	00D1288-010.002	PLUTONIUM-239/240	0.037	PCI/L		0.00716		0.0194	Pump
06991	6/13/00	1418	00D1288-010.003	PLUTONIUM-239/240	0.0779	PCI/L		0.0284		0.0296	Pump/ dup
06991	6/13/00	1418	TAMU1 Bottle 1	PLUTONIUM-239/240	0.0510	PCI/L				0.0033	Pump/split
06991	6/13/00	1418	TAMU1 Bottle 2	PLUTONIUM-239/240	0.0517	PCI/L				0.0036	Pump/ split dup
50199	6/14/00	1406	00D1288-005.003	PLUTONIUM-239/240	0.0143	PCI/L	J	0.00777		0.0126	Pump
50199	6/14/00	1406	00D1288-005.002	PLUTONIUM-239/240	0.00772	PCI/L	J	0.00697		0.00874	Pump/filter
50199	6/14/00	1406	TAMU5 Bottle 1	PLUTONIUM-239/240	0.0131	PCI/L				0.0029	Pump/split
50199	6/14/00	1406	TAMU5 Bottle 2	PLUTONIUM-239/240	0.0200	PCI/L				0.0025	Pump/split dup
11791	6/15/00	1130	00D1288-004.001	PLUTONIUM-239/240	0.0418	PCI/L		0.0192		0.0217	Bail
11791	6/15/00	1130	TAMU6 Bottle 1	PLUTONIUM-239/240	0.4549	PCI/L				0.0233	Bail/split
11791	6/15/00	1130	TAMU6 Bottle 2	PLUTONIUM-239/240	0.5356	PCI/L				0.0239	Bail/split dup
50299	6/1/00	1322	00D1288-003.001	PLUTONIUM-239/240	0.00394	PCI/L	U	0.0212		0.0109	Bail
11791	6/5/00	1149	00D1288-004.002	PLUTONIUM-239/240	0	PCI/L	U	0.00818		0	Pump
50299	6/5/00	1510	00D1288-003.002	PLUTONIUM-239/240	0.00304	PCI/L	U	0.00824		0.00596	Pump
50299	6/5/00	1505	00D1288-003.003	PLUTONIUM-239/240	0	PCI/L	U	0.0247		0.0104	Pump/filter
1587	6/7/00	1035	00D1288-006.001	PLUTONIUM-239/240	0.0373	PCI/L		0.00632		0.0183	Bail
50099	6/6/00	1335	00D1395-020.001	PLUTONIUM-239/240	0.148	PCI/L		0.01350	V	0.0293	Bail
50099	6/6/00	1336	00D1288-008.001	PLUTONIUM-239/240	0.0179	PCI/L	U	0.0188		0.015	Bail/dup
50099	6/6/00	1501	00D1288-009.001	PLUTONIUM-239/240	0	PCI/L	U	0.0205		0.00772	Rinse
1587	6/6/00	1356	00D1288-006.002	PLUTONIUM-239/240	0.176	PCI/L		0.0183		0.0416	Pump
50099	6/7/00	1416	00D1288-007.003	PLUTONIUM-239/240	0.0903	PCI/L		0.00679		0.0295	Pump
50099	6/7/00	1415	00D1288-007.002	PLUTONIUM-239/240	0.152	PCI/L		0.025		0.0455	Pump/filter
50099	6/8/00	1144	00D1288-007.005	PLUTONIUM-239/240	0.175	PCI/L		0.0276		0.0462	Pump(300 ml/min)
50099	6/8/00	1144	00D1288-007.004	PLUTONIUM-239/240	0.085	PCI/L		0.0072		0.0295	Pump/dup(30 0 ml/min)
P313489	5/30/00	1126	00D1288-002.001	PLUTONIUM-239/240	0.023	PCI/L	J	0.0154		0.0148	Bail
50399	5/23/00	1521	00D1288-001.001	PLUTONIUM-239/240	0.00658	PCI/L	J	0.00594		0.00744	Bail
P313489	5/24/00	1433	00D1288-002.002	PLUTONIUM-239/240	0.00917	PCI/L	U	0.0169		0.011	Pump
50399	5/23/00	1259	00D1288-001.003	PLUTONIUM-239/240	0.00453	PCI/L	U	0.0167		0.00887	Pump
50399	5/23/00	1300	00D1288-001.002	PLUTONIUM-239/240	0.00756	PCI/L	U	0.0176		0.0105	Pump/filter
90099	7/20/00	1343	00D1371-004.001	PLUTONIUM-239/240	-0.004	PCI/L	U		V	0.007	Pump
90099	7/20/00	1343	TAMU7	PLUTONIUM-239/240	-0.0031	PCI/L				0.0017	Pump/split
90399	7/18/00	1000	00D1371-007.001	PLUTONIUM-239/240	0.017	PCI/L	J		V	0.012	Pump
90399	7/18/00	1000	00D1371-015.001	PLUTONIUM-239/240	0.001	PCI/L	U		V	0.002	Pump/dup
90399	7/18/00	1000	TAMU8	PLUTONIUM-239/240	0.0026	PCI/L				0.0021	Pump/split
90399	7/18/00	1000	00D1371-016.001	PLUTONIUM-239/240	0.003	PCI/L	U		V	0.004	Rinse
Americium-241											
06991	6/14/00	1248	00D1288-010.001	AMERICIUM-241	0.029	PCI/L	J	0.00872		0.0189	Bail
06991	6/14/00	1248	TAMU3 Bottle 1	AMERICIUM-241	0.1565	PCI/L				0.0427	Bail/split
06991	6/14/00	1248	TAMU3 Bottle 2	AMERICIUM-241	0.0096	PCI/L				0.0043	Bail/split dup

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Table 9-5 2nd Quarter 2000 Groundwater Sampling Results from Actinide Drilling-Artifact Contamination Well Pairs (continued)

Location	Sample Date	Sample Time	Bottle #	Analyte	Result	Units	Lab Qual	Detect Limit	Valid-ation	2 Sigma Error[1]	Sample Type[2]
50199	6/13/00	1025	00D1288-005.001	AMERICIUM-241	0.0246	PCI/L	J	0.0181		0.0167	Bail
50199	6/13/00	1025	TAMU2 Bottle 1	AMERICIUM-241	0.0695	PCI/L				0.0322	Bail/split
50199	6/13/00	1025	TAMU2 Bottle 2	AMERICIUM-241	0.2027	PCI/L				0.0452	Bail/split dup
06991	6/13/00	1418	00D1288-010.002	AMERICIUM-241	0.0313	PCI/L	B	0.0077		0.0185	Pump
06991	6/13/00	1418	00D1288-010.003	AMERICIUM-241	0.0552	PCI/L	B	0.00679		0.023	Pump/ dup
06991	6/13/00	1418	TAMU1 Bottle 1	AMERICIUM-241	0.0168	PCI/L				0.0031	Pump/split
06991	6/13/00	1418	TAMU1 Bottle 2	AMERICIUM-241	0.1816	PCI/L				0.0305	Pump/split dup
50199	6/14/00	1406	00D1288-005.003	AMERICIUM-241	0.0146	PCI/L	J	0.00657		0.0116	Pump
50199	6/14/00	1406	00D1288-005.002	AMERICIUM-241	0.023	PCI/L	J	0.00567		0.0136	Pump/filter
50199	6/14/00	1406	TAMU5 Bottle 1	AMERICIUM-241	0.0007	PCI/L				0.0044	Pump/split
50199	6/14/00	1406	TAMU5 Bottle 2	AMERICIUM-241	0.0018	PCI/L				0.0029	Pump/split dup
11791	6/15/00	1130	00D1288-004.001	AMERICIUM-241	0.0805	PCI/L	B	0.0303		0.0312	Bail
11791	6/15/00	1130	TAMU6 Bottle 1	AMERICIUM-241	0.0888	PCI/L				0.0083	Bail/split
11791	6/15/00	1130	TAMU6 Bottle 2	AMERICIUM-241	0.2888	PCI/L				0.0298	Bail/split dup
50299	6/1/00	1322	00D1288-003.001	AMERICIUM-241	0.0127	PCI/L	J	0.00571		0.0101	Bail
11791	6/5/00	1149	00D1288-004.002	AMERICIUM-241	0.0179	PCI/L	J	0.0165		0.0139	Pump
50299	6/5/00	1510	00D1288-003.002	AMERICIUM-241	0.0206	PCI/L	J	0.00796		0.0152	Pump
50299	6/5/00	1505	00D1288-003.003	AMERICIUM-241	0.0494	PCI/L	B	0.0255		0.0252	Pump/filter
1587	6/7/00	1035	00D1288-006.001	AMERICIUM-241	0.126	PCI/L	B	0.00543		0.0312	Bail
50099	6/6/00	1335	00D1395-020.001	AMERICIUM-241	0.0382	PCI/L		0.00134	V	0.0171	Bail
50099	6/6/00	1336	00D1288-008.001	AMERICIUM-241	0.0401	PCI/L	B	0.0197		0.0216	Bail/dup
50099	6/6/00	1501	00D1288-009.001	AMERICIUM-241	0.0113	PCI/L	U	0.0208		0.0136	Rinse
1587	6/6/00	1356	00D1288-006.002	AMERICIUM-241	0.0886	PCI/L	B	0.0225		0.0333	Pump
50099	6/7/00	1416	00D1288-007.003	AMERICIUM-241	0.0526	PCI/L		0.00712		0.023	Pump
50099	6/7/00	1415	00D1288-007.002	AMERICIUM-241	0.0804	PCI/L		0.0104		0.0344	Pump/filter
50099	6/8/00	1144	00D1288-007.005	AMERICIUM-241	0.0881	PCI/L		0.00823		0.0321	Pump(300 ml/min)
50099	6/8/00	1144	00D1288-007.004	AMERICIUM-241	1.72	PCI/L		0.0288		0.161	Pump/dup(300 ml/min)
P313489	5/30/00	1126	00D1288-002.001	AMERICIUM-241	0.0268	PCI/L	J	0.00605		0.0152	Bail
50399	5/23/00	1521	00D1288-001.001	AMERICIUM-241	0.00837	PCI/L	U	0.0259		0.0145	Bail
P313489	5/24/00	1433	00D1288-002.002	AMERICIUM-241	0.0184	PCI/L	J	0.00622		0.0127	Pump
50399	5/23/00	1259	00D1288-001.003	AMERICIUM-241	0.0297	PCI/L	J	0.0182		0.0181	Pump
50399	5/23/00	1300	00D1288-001.002	AMERICIUM-241	0.0212	PCI/L	J	0.0174		0.0153	Pump/filter
90099	7/20/00	1343	00D1371-004.001	AMERICIUM-241	0	PCI/L	U		V	0	Pump
90099	7/20/00	1343	TAMU7	AMERICIUM-241	-0.0034	PCI/L				0.0026	Pump/split
90399	7/18/00	1000	00D1371-007.001	AMERICIUM-241	0.005	PCI/L	U		V	0.007	Pump
90399	7/18/00	1000	00D1371-015.001	AMERICIUM-241	0.005	PCI/L	J		V	0.005	Pump/dup
90399	7/18/00	1000	TAMU8	AMERICIUM-241	-0.0034	PCI/L				0.0026	Pump/split
90399	7/18/00	1000	00D1371-016.001	AMERICIUM-241	0.001	PCI/L	U		V	0.005	Rinse

[1] SCA results reported as total propagated uncertainty

[2] Pumped samples collected at an average rate of 100 ml/min unless otherwise indicated.

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9.2 Site Wide Water Balance

The Site Wide Water Balance (SWWB) project is being performed to provide information for Site closure design decisions. The specific goal of the SWWB is to develop a management tool capable of generating predictions of surface water and groundwater response to proposed closure scenarios. Closure activities and post closure conditions have the potential to alter groundwater and surface water flow at RFETS. Because many Site closure decisions cannot be made without first considering quantified predictions of closure effects on groundwater and surface water flow, a Site water balance is necessary to assess current conditions as well as various closure scenarios. The SWWB will address the problem of determining to what degree Site closure affects surface water and groundwater flow in the Woman Creek and Walnut Creek drainages. This information will be utilized to assess a number of Site closure issues including, but not limited to, compliance with surface water action levels, impacts to biological resources, and post closure land configuration design.

The SWWB will serve to quantify surface water and UHSU groundwater flow and interactions occurring within the IA, in the drainage pathways immediately downstream, and within the eastern Buffer Zone. More specifically, modeling will focus on the Woman Creek and Walnut Creek drainages and associated upgradient groundwater seep areas within the RFETS property boundary. The Rock Creek drainage and the underlying deep regional aquifer systems are excluded from consideration because of their hydrological isolation from potential IA sources and closure actions and their effects.

During 1999 the SWWB data quality objectives (DQOs) were identified. In the spring of 2000, 13 monitoring wells were equipped with In-Situ Inc. Hermits® or Trolls® for continuous water level monitoring. In addition, 72 wells were activated for quarterly water level measurements. All of these measurements are in addition to the regularly scheduled groundwater monitoring specified in the IMP and measurements taken by the real time groundwater monitoring network described in Section 3.4. Data collection activities for the calibration data period (FY 2000) have been completed.

The SWWB team selected the physically based integrated modeling code, Mike SHE, created by the Danish Hydrologic Institute, to generate a hydrologic model for the Site. Details of the code selection process are presented in the Model Code and Scenario Selection Report (K-H 2001).

The initial construction of the model has been completed. The model is set on a uniform 200-ft. x 200-ft. grid. The geologic structure of the model consists of four layers, and was based on available depth to bedrock information as well as utility line, utility trench, and building basement information. The surface water model includes major drainages and tributaries within the model boundary, as well as Site ponds and other relevant anthropogenic structures. The potential evapotranspiration and precipitation (spatially distributed) time series files have also been prepared and included in the model. Finally, initial values were entered into the soil and vegetation databases based on the available data previously collected at the Site.

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The SWWB team is currently in the process of calibrating the model to the calibration data set. As part of the calibration process, a sensitivity analysis will be performed. Simulating the May 1995 RFETS site precipitation event will validate the model. Following validation, the closure scenarios and climate scenarios described in the Model Code and Scenario Selection Report (K-H 2001) will be run and an interpretation of the results will follow.

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10.0 OTHER GROUNDWATER PROGRAM ACTIVITIES

10.1 Well Abandonment and Installation

During calendar year 2000, 17 monitoring wells were installed at RFETS. Table 10-1 lists these wells and summarizes their purpose. Figure 10-1 presents the locations of the 2000 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.

No wells were abandoned in 2000. However, an extensive Well Abandonment and Replacement Program (WARP) will begin in FY02 and is anticipated to continue through FY05. During this project, most of the wells currently in place at RFETS will be abandoned. Some may be abandoned due to D&D activities, then reinstalled after those activities have concluded. These efforts will culminate in the final, post-Closure network of groundwater monitoring wells.

Table 10-1 Calendar Year 2000 Monitoring Well Installations

Well No.	Purpose of Well
00100	Additional D&D monitoring for Building 779
00200	D&D monitoring for Building 707
00300	D&D monitoring for Building 707
00400	D&D monitoring for Building 776/777
00500	D&D monitoring for Building 776/777
00600	D&D monitoring for Building 776/777
00700	D&D monitoring for Building 776/777
02500	Replacement D&D monitoring well for Building 779 (replaces well 02297, destroyed during D&D activities)
30100	PU&D Yard plume evaluation
30200	PU&D Yard plume evaluation
30300	PU&D Yard plume evaluation
30400	PU&D Yard plume evaluation
30500	PU&D Yard plume evaluation
30600	PU&D Yard plume evaluation
30700	PU&D Yard plume evaluation
30800	PU&D Yard plume evaluation
30900	PU&D Yard plume evaluation (source-area well)

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11.0 GROUNDWATER DATA QUALITY ASSESSMENT

All Section 11.0 Tables are found in Appendix E. Also see Tables 2-1, 2-2 and 2-3.

11.1 Methods

The quality of the analytical data is assessed in this section in terms of five data-quality parameters: precision, accuracy (bias), representativeness, completeness, and comparability (PARCC) as outlined by RMRS 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. This section summarizes the types of data available to assess the PARCC parameters. Data used to evaluate the PARCC parameters are presented in full in the Quarterly Groundwater Monitoring Reports (RMRS 2000a, 2000b, 2001a and 2001b).

Prior to the evaluations made in the Quarterly Groundwater Reports, the Kaiser Hill-Analytical Services Division (KH-ASD) team performs its own data quality assessment on metals, radionuclides, volatile organic compounds, polychlorinated biphenyls and water quality parameters results that are derived from groundwater. The nature and extent of these verification and validation activities are based upon program and customer-specified requirements and requirements of KH-ASD to evaluate contract laboratory performance against Statement of Work (SOW) requirements. Verification-validation criteria are generally based on government-published standards and guidelines, primarily EPA Contract Laboratory Procedures (CLP) and SW-846 method guidelines for organic and inorganic data evaluation and review. Verification-validation is a graded process 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; and it is a more thorough assessment process than verification. All laboratory generated components of the following PARCC evaluation such as matrix spikes, laboratory control samples and detection limits are considered in generating the verification and validation qualifiers. The quality of the verification-validation process should be considered to be a major influence on the quality of the PARCC assessment.

The RFETS groundwater monitoring program, as established in the 2000 IMP, consists of 171 wells and locations that are sampled at a quarterly or semi-annual frequency (K-H 1999a). Included in this group and report are data from eight D&D wells installed in 2000, after publication of the IMP list (the 00100-00700 series wells and replacement well 02500) and five building footing drains used as D&D sampling sites. Three wells not in the IMP are also considered here because rinsate results derived from sampling events at the wells are associated with sampling at IMP wells. A total of 351 sampling attempts were made during CY 2000. This represents all required visits and does not reflect multiple visits to locations that were dry or only provide water on a limited basis. Except

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in the case of damaged wells 2987 and 02297 (later replaced by 02500), all samples specified in the IMP were collected unless well disposition was prohibitive (i.e., dry, or went dry during sampling). During 2000, 2216 samples were scheduled for collection; the actual number collected was 1522 because of dry conditions, wells with insufficient water, or well damage. Table 2-1 presents a summary of sample collection and well disposition. Table 11-8 gives a summary of sampling success throughout the year.

Quality Control (QC) samples consisting of real/duplicate pairs were collected from 19 locations and rinsate samples were collected from 20 locations. The frequency for field duplicate sampling of 1 in 9.0 (11.1%) locations exceeded the target rate of 1 location in 20 (5%) for the 2000 sampling program. Similarly, the frequency for field rinsate sampling of 1 location in 8.6 (11.7%) exceeded the target rate of 1 in 20 (5%) for 2000. PARCC analysis of the 2000 QC data 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 water quality parameters (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

Similarly with respect to radionuclide analyses the RFETS Groundwater Program uses the following Duplicate Error Ratio (DER) equation to express their precision.

$$DER = \frac{|S-D|}{[(TPU_S^2 + TPU_D^2)]^{1/2}}$$

where, TPU_S = Total Propagated Uncertainty of the Real Sample
TPU_D = Total Propagated Uncertainty of the Duplicate Sample
S = Activity of Real Sample
D = Activity of Duplicate Result

Because TPU is seldom reported for radionuclides (except possibly for tritium analyses) in the laboratory data records, 2-Sigma Error or random counting error has been substituted for TPU in the uranium, americium/plutonium and strontium calculations made for this report. TPU was not reported in 2000 for tritium analyses, so 2-Sigma Error was also substituted in DER calculations.

A compilation of RPD/DER calculations for 2000 can be found in Tables 11-1 (RPDs) and 11-2 (DERs). The overall QC criterion for groundwater RPDs is ≤30%, for DERs the criterion is ≤1.96. Table 11-3 gives a summary of the Overall Precision Compliance for RPDs and DERs for each quarter.

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Accuracy

Accuracy is the degree of agreement for 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 (see above), by assigning a qualifier, is the principal means for evaluating the accuracy of analytical results. 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 contract required detection limits (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 VOCs, metals, WQPs and PCBs are given in Table 11-5 and LCS recoveries for radionuclides are given in Table 11-6. These tables include all the matrix spike and LCS data for 2000 because these data were either corrected at a later date from those included in the Quarterly Reports or were not reported properly as in the case of the LCS results. Note that the criteria for evaluation of matrix spikes and LCS samples were modified in the Fourth Quarter of 2000. Please see the Accuracy discussion in Section 7 of the *Fourth Quarter RFCA Groundwater Monitoring Report for Calendar Year 2000* (RMRS 2001b) for a discussion of the modifications and corrections made in that report to these evaluations.

Acceptable criteria for matrix spikes cover a broad range depending on the analyte, analytical method and the individual laboratory. Laboratory control samples are evaluated if they are outside a QC range of 75-125 % recovery. According to the K-H ASD, laboratories will commonly 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 KH-ASD laboratory contracts are examined by the validators for acceptability on an analyte by analyte basis.

Representativeness

The discussion of 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 assess the efficacy of the decontamination process and possible cross-contamination between environmental samples. They are samples of VOC free "distilled" water that have been poured over and/or through decontaminated sampling equipment and subsequently handled in the same manner as environmental samples.

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 and are, consequently, also good indicators of potential contamination introduced during any of these steps. Because rinsate samples are judged to be adequate to assess introduced contamination, the groundwater program does not use trip blanks.

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Other aspects of representativeness, such as numbers of samples and spatial distribution, are fixed in the Groundwater Integrated Monitoring Plan (K-H 2000a). All well visits that were required by the IMP were completed in 2000. Plate 1 presents the locations sampled for reference to 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 2000 to the required number of samples. As a result of dry locations or locations with such low productivity as to prohibit sample collection, the completeness goal of 90% was not met for any analyte group.

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 2000 quarterly reports (RMRS 2000a, 2000b, 2001a and 2001b). A completeness metric was calculated using the following formula:

Completeness = $Dp_u = \frac{DP_t - DP_n}{DP_t} \times 100$ (in percent) (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 2000 planned analytical methods for VOCs, metals, WQPs and radionuclides remained consistent over the entire year. 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 methods for the various analytes. Data developed under the groundwater program are collected using RFETS SOPs, transported using both RFETS SOPs and US-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.

11.2 Discussion of Analyte Groups

11.2.1 Metals

Precision

There were 27 duplicate sampling events paired compared with 217 real sampling events in the data set for metals in 2000 (1 in 8.0, 12.4%). For the 27-real/duplicate pairs there were 736 records for analyses. Relative percent differences for metals are displayed in Table 11-1; criteria for display are given in Table 11-3. Six hundred forty-eight (648) of the calculated RPDs were within the RPD-QC criterion of $\leq$30% (Table 11-3). With 88.0% of the

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RPDs meeting the QC criterion, precision for metal analyses was 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 2000, 18 of 102 wells sampled were analyzed for metals as real/duplicate pairs, a ratio of 1 in 5.7 (17.6%). Thus, duplicate sample frequency was within the requirements on both a per-well and per-analysis basis.

Accuracy

All metal analyses were performed using contract-required methods during 2000. The contract required methods, as indicated in Table 11-4, stipulate that the CLP-SOW methods be used for analysis of dissolved and total metals. Note that 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 2000 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 contract required detection limits (CRDLs) for metals analyses. Detection limits for 21 of 28 metals were at or below CRDLs for all the analyses performed. Seven metals had detection limits for which some analyses were above CRDLs. The analytes were antimony with acceptable detection limits in 98% of the analyses, arsenic (98%), cadmium (98%), lead (74%), selenium (40%), silver (27%), and thallium (27%). Discussion and data accuracy evaluations for specific samples and analyses are presented in the quarterly reports.

Table 11-5 gives matrix spike results for metals analyses in 2000. There are 1158 matrix spike records in the table where 11 records are below a percent recovery of 75% and 23 records are above 125%. Thus, 1% of the matrix spikes for metals are low and 2% are high. Low recovery analytes (number of records in parentheses) include calcium (3), iron (1), mercury (1), sodium (1), strontium (4) and zinc (1). High recovery analytes include calcium (9), lithium (9), mercury (1), potassium (1) and sodium (3). The numerous analyses meeting the quality control (QC) criterion of 75-125% 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 2000. Metals analyses for 2000 are accurate with respect to matrix interference.

Representativeness

There were 626 rinsate records versus 6657 real and duplicate sample records combined for metals in 2000 (1 in 10.6). Most metals rinsate results were either "U" (non-detect) or "B" (detection was less than the CRDL but greater than the IDL) qualified, indicating that in general no metal contamination was introduced during sampling and/or shipping activities. As shown on Table 11-6, metals were detected in five rinsate analyses. These metal rinsate detections were well below both Tier II and Background M2SD levels where these limits are defined. Note that these data do not include rinsate results from 891COLGAL and 891COLWEL, which were erroneously collected and actually contained sample water. See the note in Table 11-7 and discussion in Section 7.1 of the Third Quarter Groundwater Report (RMRS 2001a).

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Completeness

The 2000 Integrated Monitoring Plan (K-H 2000) requires that samples be analyzed for metals at 285 locations. Metal sampling was attempted at all required locations during 2000 (Table 11-8). Seventy-four locations were dry or went dry during metal sampling, such that samples could not be collected. Two samples could not be collected because of damaged well casings (wells 2987 and 02297). Of the 285 metal sample events required by the IMP, 209 were successfully completed during 2000, a success rate of 73.3% (Table 11-8). The goal, which assumes adequate groundwater production from the monitoring locations, is to have at least 90% successfully sampled.

All metals sampling records were either validated or verified in 2000. Updated validation/verification results are presented in Table 11-9. Of 7280 metals analyses, 122 were rejected (1.7%=R/R1-validated/verified). Therefore, 7158 analyses (98.3%) were judged to be acceptable and valid. The rejections were because of reasons related to laboratory activities, primarily out of date instrument calibrations and calibration blank errors. Details of the rejections are contained in the Quarterly Groundwater Monitoring Reports (RMRS 2000a, 2000b, 2001a and 2001b). Validation (as opposed to verification) of metals records was performed on 37.4% (2720 of 7280 analyses), which is well above the 25% criterion defined in the IMP.

Comparability

No changes were made to analytical procedures during 2000. Thus analyses from 2000 are comparable to previous analyses.

11.2.2 Radionuclides

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 81 duplicate sampling events versus 579 real events (1 in 7.1). Duplicate samples were collected at 18 of 118 locations sampled for radionuclides (1 in 6.6). 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 gives display criteria for Table 11-2. Duplicate Error Ratios for 135 of the 136 real/duplicate analytical pairs were acceptable (DER $\leq$ 1.96). The only DER exceeding the $\leq$ 1.96 criterion was a uranium isotope U-233/234 from the first quarter. As shown in Table 11-3, the precision metric was met in 99.3% of radionuclide real/duplicate samples. Precision for radionuclide analyses is good.

Accuracy

All radionuclide analyses were performed using the proper contract required methods during 2000 (Table 11-4). Required detection limits for the 1264 radionuclide analyses performed during 2000 were met except for six analyses: three americium, one plutonium, one uranium (isotope U-233/234), and one strontium-90 were performed with detection limits greater than those specified in the contract. One americium was rejected in validation because tracer requirements at the laboratory were not met. The remaining two americium analyses and the plutonium and strontium analyses had analytical results that were well below the quoted detection limits and Tier II action levels.

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They were qualified as non-detects by the laboratories. The uranium detection limit was 1.103 pCi/L versus the required limit of 1.0 pCi/L; the result was 2.4 pCi/l, which, while over the Tier II action level (1.06 pCi/L) is well below the Background M2SD (60.7 pCi/L). As such, the accuracy of radionuclide analyses is generally good.

Table 11-6 gives LCS results for radionuclide analyses performed in 2000. All 236 LCS results are within the 75-125% recovery QC criterion (see Result/LCS Yield Fraction column). Note that LCS results reported in the 1st through 3rd Quarter Groundwater Monitoring Reports (RMRS 2000a, 2000b and 2001a) were not drawn from the correct data field. Table 11-6 contains the correct data for the whole calendar year. With respect to LCS samples radionuclide analyses in 2000 are accurate.

Representativeness

There are 114 rinsate records for radionuclides compared to 1146 real and duplicate records 2000 (1 in 10.0). Rinsate samples were collected at 17 locations in 2000 (1 in 6.9). Fifteen rinsate analyses yielded detectable values (Table 11-7). Five of the detected rinsates are from locations 891COLGAL and 891COLWEL, where sample water was erroneously substituted for rinsate water. These rinsates are discounted here. Detections remain in four americium rinsates, five plutonium rinsates and a strontium-90 rinsate. All are below Tier II action levels. Seven are estimates based on laboratory qualifiers. Based on 10 of 109 (90.8%) rinsate results being undetected, there is little indication that introduced contamination during sampling activities is a concern for 2000 radionuclide data.

Completeness

As shown on Table 11-8, 196 plutonium/americium, 293 U-isotope, 116 tritium, 46 strontium-89/90, 12 cesium-137 and 24 neptunium-237 samples were to have been collected for analyses. All the required samples were collected or attempted. The success rate varied because of dry wells or wells that went dry during sampling. Four samples could not be collected because wells 02297 and 2987 are damaged. The percentages of successful sample collection were 60.2% for Pu/Am, 69.6% for U-isotopes, 66.48% for tritium, 50.0% for strontium-89/90, 58.3% for cesium-137 and 20.8% for neptunium-237. The goal is 90%, groundwater conditions permitting.

All radionuclide results (1264) except for 9 cesium-137 were either validated or verified. Cesium analyses are performed under a special contract and are not validated or verified at this time. Of the validated/verified results (a total of 1255) 35.5% (445) were validated and 64.5% (810) were verified. The percentage for validation is well above the 25% QC criterion needed for compliance. Only one americium analyses was rejected, because of tracer failure at the laboratory. As shown in Table 11-9, 100% of the uranium, tritium, strontium-89/90, and neptunium-237 radionuclide analyses are usable. Ninety-nine percent of the plutonium/americium analyses are usable. In general, the radionuclide analyses are thought to be complete.

Comparability

No changes were made to analytical procedures during 2000. Thus, the radionuclide analyses presented here are assumed to be comparable to previous analyses.

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11.2.3 Volatile Organic Compounds and Semi-Volatile Organic Compounds

Precision

There were 31 duplicate sampling events versus 294 real sampling events for VOCs and dissolved gases (methane, ethane and ethene) in 2000 representing a ratio of 1 in 10.1 events. Duplicate samples were collected at 18 of 142 VOC or dissolved gas sampling locations (1 in 7.9). Relative percent differences for 1791 of the 1801 duplicate/real pairs met the QC criterion of $\leq$ 30%. Table 11-1 lists those pairs with detections as defined in Table 11-3. Ten RPD values were less than the QC criterion of 30% (Table 11-1). As indicated by the "Real-" and "Dup Lab Qual" columns of Table 11-1, dilution procedures or contamination of the analytical instrument as indicated by method blanks are common reasons for duplicate/real pairs to exceed the 30% QC criterion. In any case, the analyses of VOCs for 2000 meet the overall precision compliance goal of 85% and are, therefore, adequately precise.

Accuracy

All VOC and dissolved gas analyses performed in 2000 employed contract-required methods EPA 524.2 and either Method 8015 or 8015 Modified, respectively (Table 11-4). With respect to analytical methods, the results are accurate.

In 2000 there were 71 analyses (not counting dilution runs) out of 336 real/duplicate/rinse analyses (1 in 4.7) that did not meet the 1 µg/l contract required detection limit (CRDLs) for VOCs. These 71 analyses represent 38 different sampling locations. Five locations (5 analyses) contained little or no evidence of contaminants of concern and did not warrant detection limits in excess of the CRDL (concentrations were generally less than 10 µg/l). Seventeen locations (37 analyses) contained concentrations of contaminants (principally carbon tetrachloride, PCE and TCE) that while elevated may not warrant detection limits in excess of the CRDL. In general, concentrations in these sampling events were under 800 µg/l. Four locations represented by six analyses contained concentrations of contaminants that probably did warrant exceeding the CRDL; concentrations in these cases were between 800 and 1800 µg/l. Eleven locations (21 analyses) had contaminants with concentrations greater than 10,000 µg/l. Meeting the CRDL in these locations is essentially impossible. The following table summarizes the figures discussed here.

Number of Locations (Total = 38)	Number of Analyses (Total = 71)	Concentration Range of Driving Analyte (carbon tetrachloride, PCE, TCE)	Was Excess Detection Limit/Dilution Warranted?
5	5	< 10 µg/l	No
17	37	30-800 µg/l	Probably not
4	6	800-1800 µg/l	Probably
11	21	> 10000 µg/l	Yes
1	2 (Real and Duplicate pairs ->)	1st Quarter = 1700 & 1400 µg/l 3rd Quarter = 12 & 15 µg/l	Yes No

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In order to protect instrumentation when using the EPA 524.2 method, the laboratories do not run 1x detection limits on the samples from wells having significant VOC contamination. In order to decrease the frequency of cases where detection limits are above CRDLs and the magnitude of specific dilutions, the Groundwater Program has been working with the KH-ASD team, which in turn is informing the laboratories of Groundwater Program needs. Note that at the suggestion of CDPHE in the 2nd Quarter of 2001, the VOC analytical method was switched from EPA 524.2 to SW-846 Method 8260. Method 8260 has an analyte suite that encompasses the 524.2 suite with three additional analytes. More importantly, it requires a screening analysis by the laboratory that is hoped will decrease excessive dilution and exceedance of the CRDLs. Further discussion and additional data are provided in the quarterly reports (RMRS 2000a, 2000b, 2001a and 2001b).

Despite the problems with dilutions and detection limits, VOC and dissolved gas analyses in 2000 are thought to be acceptable.

Matrix spike data for VOC analyses for 2000 are presented in Table 11-5. No matrix spike analyses were performed for dissolved gases. From the 2192 VOC results in Table 11-5, 88 matrix spike records are less than the 75% recovery and 47 are greater than 125%. Thus 6.2% of matrix spikes do not meet the QC criterion of 75-125% recovery. Examination of Table 11-5 indicates that no one compound dominates the group of results outside the QC criterion. Most matrix spikes that do not meet the criterion are not associated with contaminants of concern. In many cases, where an analyte is a contaminant of concern (carbon tetrachloride, chloroform, methylene chloride, PCE or TCE) at a given location, the contamination causes the matrix spike analysis to be outside the QC criterion. There does not appear to be matrix spike interference for VOC analyses in 2000. Accuracy of VOC analyses with respect to matrix spikes is good. Again, further discussion and additional data are provided in the quarterly reports (RMRS 2000a, 2000b, 2001a and 2001b).

Representativeness

There were 26 rinsate-sampling events from 18 wells for VOCs in 2000. All of these events were analyzed using the EPA 524.2 method. Of the 1507 resulting records, 37 rinsate analyses contained VOCs at detectable concentrations (Table 11-7). Nine of the records in Table 11-7 are from locations 891COLGAL and 891COLWEL. In the 3rd quarter, sample water was accidentally substituted for rinsate water, as indicated by comparing analytical results for the real, duplicate and rinse samples from that quarter (RMRS 2001a). These rinsate results are not considered in the following discussion.

Twenty-eight rinsate detections are present in Table 11-5. Results of all the 28 are below Tier II action levels. Chloromethane and dichlorodifluoromethane, which appear in rinsates, are not contaminants of concern. It is unclear why they are reported as detections. The methylene chloride and naphthalene rinsate results are tainted by method blank contamination and in any case have concentrations less than or equal to 1 μg/l. Similarly, PCE and TCE are below 1 μg/l and are "J" qualified as estimated concentrations. Considering all rinsate analyses, 98.0% yielded non-detects. Individual results are discussed in the quarterly reports (RMRS 2000a, 2000b, 2001a and 2001b). Based on the high percentage of non-detects in the rinsate samples, the VOC samples are judged to be representative.

Completeness

During 2000, the required 346 VOC and 17 dissolved gas sample sites were visited (Table 11-8). From these, 272 VOC and 14 dissolved gas samples were collected, yielding success rates of 78.6% and 82.4%, respectively. In general, dry well conditions precluded collection of samples; the goal of 90.0% was not reached for VOCs or dissolved gases in 2000. Two damaged wells (2987 and 02297) could not be sampled for VOCs.

There were 19,475 VOC analytical records returned in 2000. All VOC records were either validated or verified. Of these, 41.3% of the analyses (8050) were validated, and 58.7% (11,425) were verified (Table 11-8). These percentages are well within the required criterion for a minimum of 25% validation. Of the analyses for which validation or verification was performed, 0.3% (60) were rejected and are considered unusable data. All 60 rejections were for propane-1,2-dibromo-3-chloro (not a contaminant of concern), and were from the first quarter of 2000. These were rejected for reasons associated with the laboratory (see RMRS 2000a). Overall, 99.7% of VOC analyses are usable. VOC analyses are complete with respect to validation and verification.

Because dissolved gas analyses are performed under special contracts as needed they are not validated or verified at this time.

Comparability

As stated above, no changes were made to analytical procedures during 2000. Thus VOC analyses presented here are assumed to be comparable to previous analyses.

11.2.4 Water Quality Parameters

Precision

For the water quality parameters chloride, total cyanide, fluoride, nitrate, nitrate/nitrite, dissolved organic carbon, total organic carbon, total dissolved solids, sulfate, sulfide, there were 81 duplicate sample records versus 591 real sample records collected during 2000 (1 in 7.3). Total petroleum hydrocarbons (TPH) have been included in this discussion. Seventy-six of the RPDs calculated from the 81 real/duplicate pairs (93.8%) were less than the QC criterion of 30% and, therefore, acceptable (Tables 11-1 and 11-3). The five real/duplicate pairs with RPDs that were greater than the criterion were distributed over total cyanide (1), fluoride (1), nitrate/nitrite (2) and dissolved organic carbon (1). Overall, the data indicates good precision for water quality parameter plus TPH analyses.

Accuracy

All water quality parameter analyses were performed using the proper contract required analytical methods in 2000 (Table 11-4). Analytical data indicate that the contract-required detection limits were met for 99.4% (717 of 721 records) of water quality parameter analyses in 2000 (Table 11-3). Two fluoride and one sulfate analysis did not meet CRDL requirements. One fluoride analysis was a non-detect for both TR1 and TR2 results that were below Tier II. The second fluoride was above the Tier II action level (4 mg/l) at the detection limit (5 mg/l). The sulfate result (2750 mg/l, detection limit = 125 mg/l, dilution = 500) was also above Tier II (500 mg/l). In general, with respect to methods and detection limits, water quality parameter plus TPH results for 2000 are accurate.

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Matrix spikes for chloride, total cyanide, fluoride, nitrate, nitrate/nitrite, dissolved organic carbon, total organic carbon and sulfate are given in Table 11-5. All 208 records for water quality parameters in Table 11-5 are within a range of 75-125% recovery. There does not appear to be any matrix interference affecting water quality parameters.

Representativeness

There were 50 equipment rinsate analyses for water quality parameters in 2000 (total cyanide, fluoride, nitrate/nitrite, total dissolved solids, sulfate, and TPH). Thirty-five of the analyses (70.0%) were non-detects. As shown in Table 11-6, one total cyanide, three nitrate/nitrite, and eleven TDS rinsate analyses had detectable concentrations. The results for these analyses are low and none of the results were above Tier II action levels where such levels are defined. The TDS rinsate results are an order of magnitude (10X) below results for real and duplicate analyses. No significant introduced contamination is indicated.

Completeness

As shown in Table 11-8, 17 chloride, 26 total cyanide, 80 fluoride, 17 nitrate, 261 nitrate/nitrite, 8 dissolved organic carbon, 17 total organic carbon, 142 sulfate, 17 sulfide, 253 total dissolved solids and 14 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 wells were damaged (02297 and 2987). The percentages of successful sample collection were 82.4% for chloride, 76.9% for total cyanide, 55.0% for fluoride, 82.4% for nitrate, 74.3% for nitrate/nitrite, 62.5% for dissolved organic carbon, 82.4% for total organic carbon, 76.5% for sulfate, 76.9% for sulfide, 68.4% for total dissolved solids and 50.0% for TPH. The QC goal is 90%, groundwater conditions permitting.

All of the 724 water quality parameter analyses performed in 2000 were validated or verified (Table 11-9). Validation was done on 39.1% (283) of the results, verification was done on 60.9% (440). As shown in Table 11-9, all of the 2000 WQP analyses provided usable data points.

Comparability

As stated above no changes were made to analytical procedures during 2000. Thus, the water quality parameter analyses presented here are assumed to be comparable to previous analyses. In 1999, TRPH analyses were performed under a line item code for Waste Characterization. In 2000, a different line item code was selected for the same analytical procedure (Method EPA 418.1) where the analyte name is TPH. The TRPH and TPH results are comparable.

11.2.5 Polychlorinated Biphenyls (Pesticides-PCBs)

Precision

A duplicate sample for Polychlorinated Biphenyls (PCBs) was collected from one of the ten PCB sampling locations in 2000. There are seven different PCBs per sample. 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-

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1. PCBs analyses are included in the summary Table 11-3. PCB analyses are acceptable with respect to precision in 2000.

Accuracy

Contract required detection limits were met for all PCB analyses in 2000 (Table 11-4). The electronic data files submitted by General Engineering Laboratories show that all PCB analyses were performed using the SW-846, Method 8080A/8081. However, the hard copy laboratory reports say that EPA SW-846 Third Edition, Method 8082 was used. As shown in Table 11-3 the contract required detection limits are specified for SW-846 Method 8082. Electronic and hardcopy analyses submitted by Lionville Laboratories, Inc. (formerly Recra Labnet, Philadelphia-RECRL) both indicate the method employed was SW-846, Method 8082. With respect to detection limits and analytical methods, PCB analyses in 2000 are acceptable.

No matrix spike analyses were performed for PCBs in 2000. While accuracy quantification for PCB analyses could have been better, because all the results were non-detects, analyses for PCBs are judged to be accurate for 2000.

Representativeness

A rinsate sample was collected at one of the ten sampling locations. The seven rinsate records were all non-detects. There is no evidence of introduced PCB contamination because of the sampling procedures in 2000. Real and duplicate analyses are considered to be representative for 2000.

Completeness

Because of the lack of water, only 10 of 29 wells could be sampled for PCBs (34.5%). All of the 84 results returned were classified as usable data points. Validations were made 33.3% of the time while verifications were made the remaining 66.7% of the time. Sampling was incomplete because of dry conditions; however, it was complete with respect to gathering usable data.

Comparability

Calendar year 2000 PCB analyses are comparable to previous analyses (1999). 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 2000 and set projects in motion that will be accomplished in 2001. The following conclusions can be made with respect to the groundwater program based on the detailed discussions found elsewhere in this report.

Data collection and data quality for groundwater samples collected during 2000 have maintained good results based on the PARCC summary presented in Section 11.0. Almost all of the data was 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 will be seen in samples analyzed in 2001.

With respect to groundwater reporting, the changes implemented for the 1999 Annual RFCA Groundwater Report have been maintained in the 2000 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 EDDIE web pages.

The Building D&D monitoring program was expanded with the addition of Buildings 776/777 and 707 to the monitoring network. D&D monitoring well installations for Buildings 371/374, 883, 865, 881, 991 and 559 will be completed in 2001.

The largest programmatic improvement for groundwater has been in the characterization and quantification of groundwater plume nature and extent. Evaluation of the East Industrial Area Plume resulted in a better understanding of the possible effects of a large utility corridor on plume migration. The additional well installations for the PU&D Yard Plume have increased understanding of plume extent and allowed the companion plume degradation evaluation to be conducted more effectively. Plume degradation assessment activities were also initiated for the Ryan's Pit/903 Pad Plume with special sampling for biodegradation parameters.

In 2001, an evaluation of the IA plume will be expanded and will attempt to identify the sources for the groundwater contamination such that multiple plumes may be identified.

Improvements were also made in 2000 for the understanding of the nature and extent of radionuclide contamination in groundwater. A total uranium plume map was prepared which will be used by Water Programs and the Actinide Migration Project to understand uranium concentrations in groundwater. The final sets of ICP/MS uranium analyses were also incorporated into the 2000 Annual Report, which will help differentiate the areas of anthropogenic uranium in groundwater. Also, the update to the data collected from monitoring wells installed in 1999 for assessing Pu/Am in groundwater will aid actinide migration studies.

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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 be done in FY 2002. The evaluation will be part of the Well Abandonment and Replacement Project, which will start in FY 2002. This project will help focus on 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.

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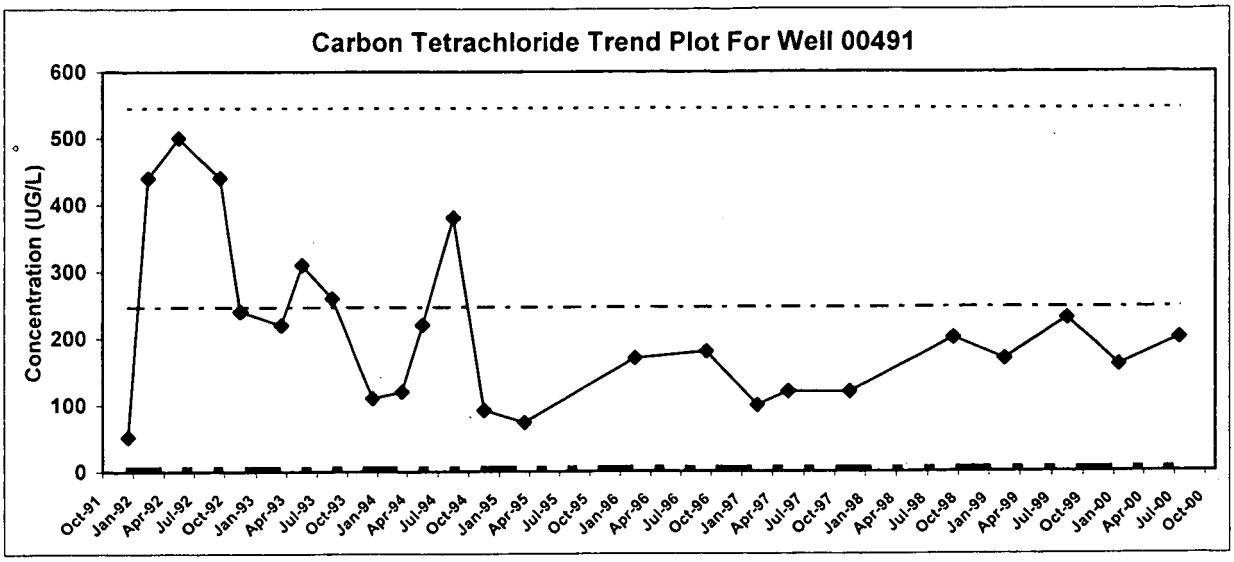
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

A-1



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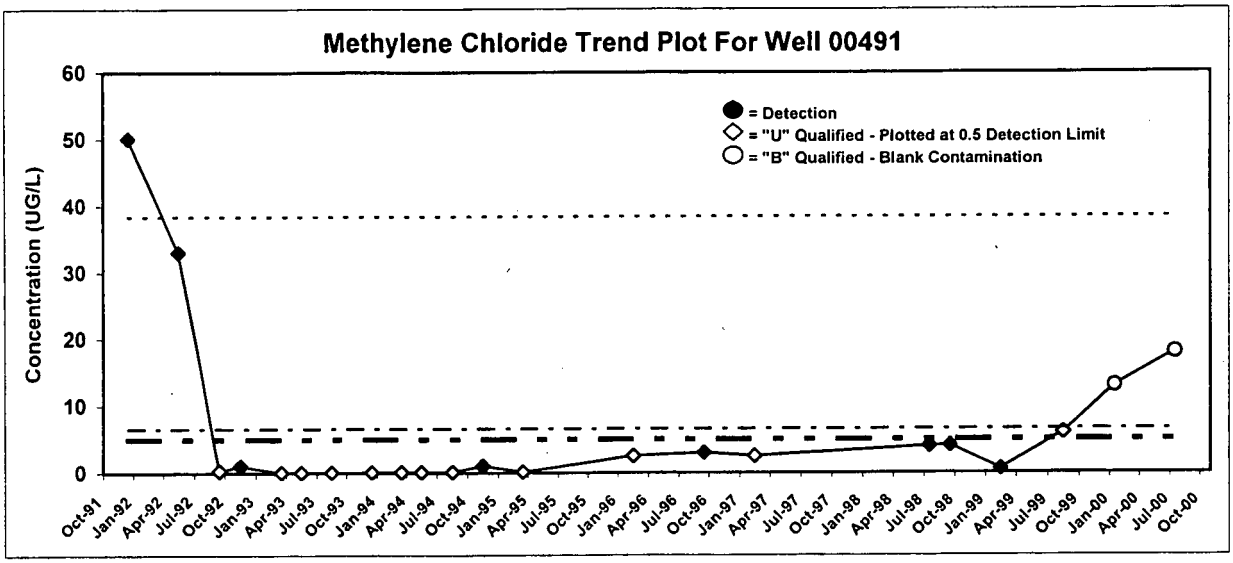

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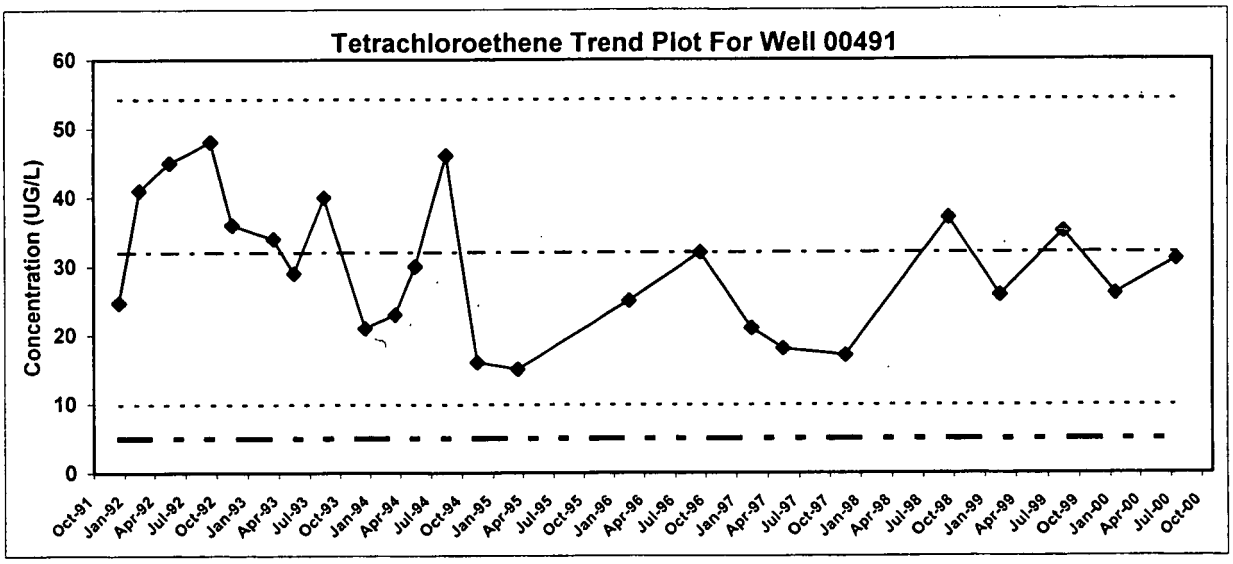

Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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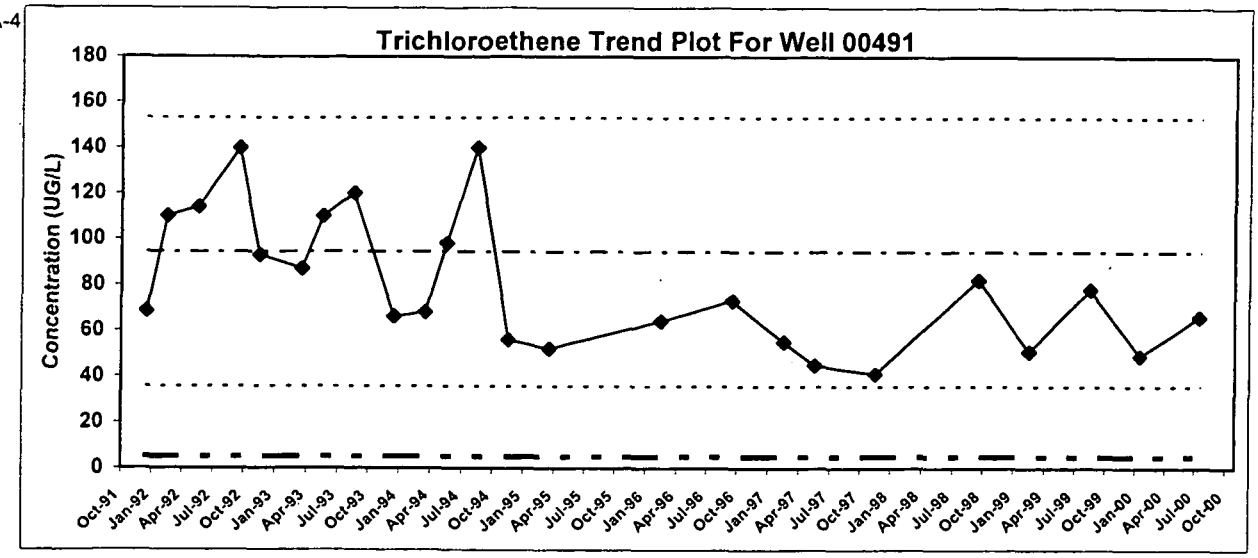
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

A-4



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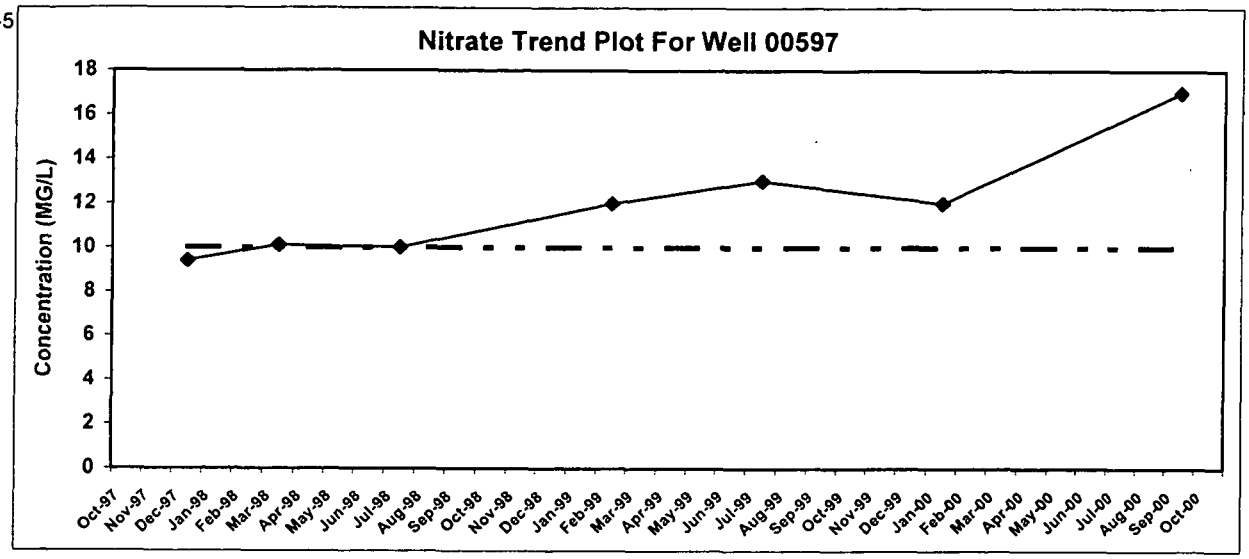

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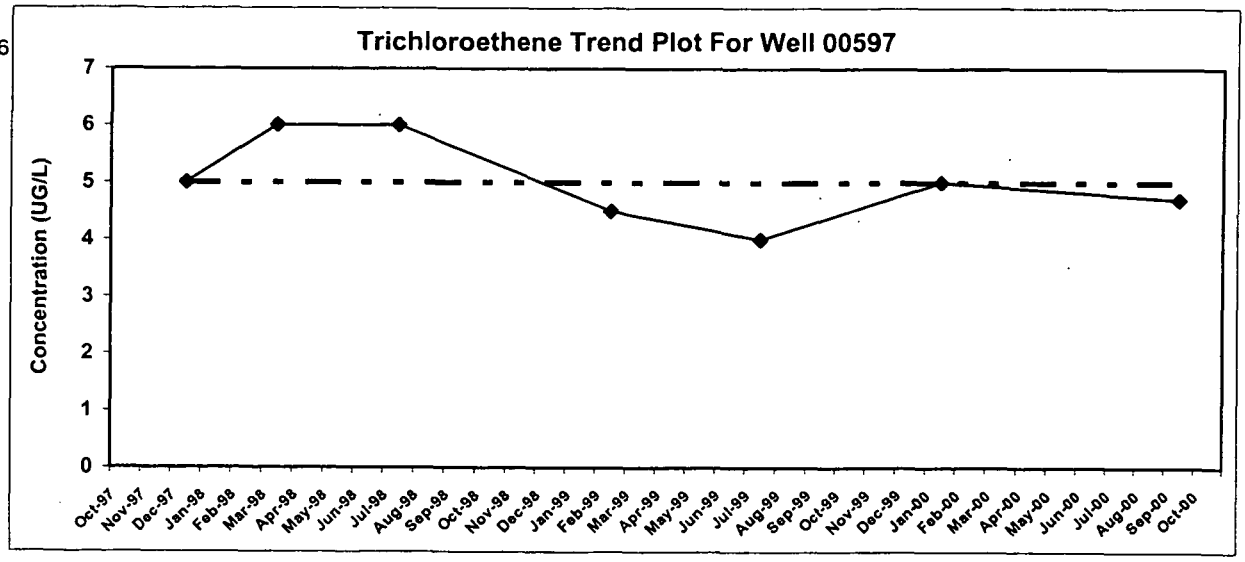
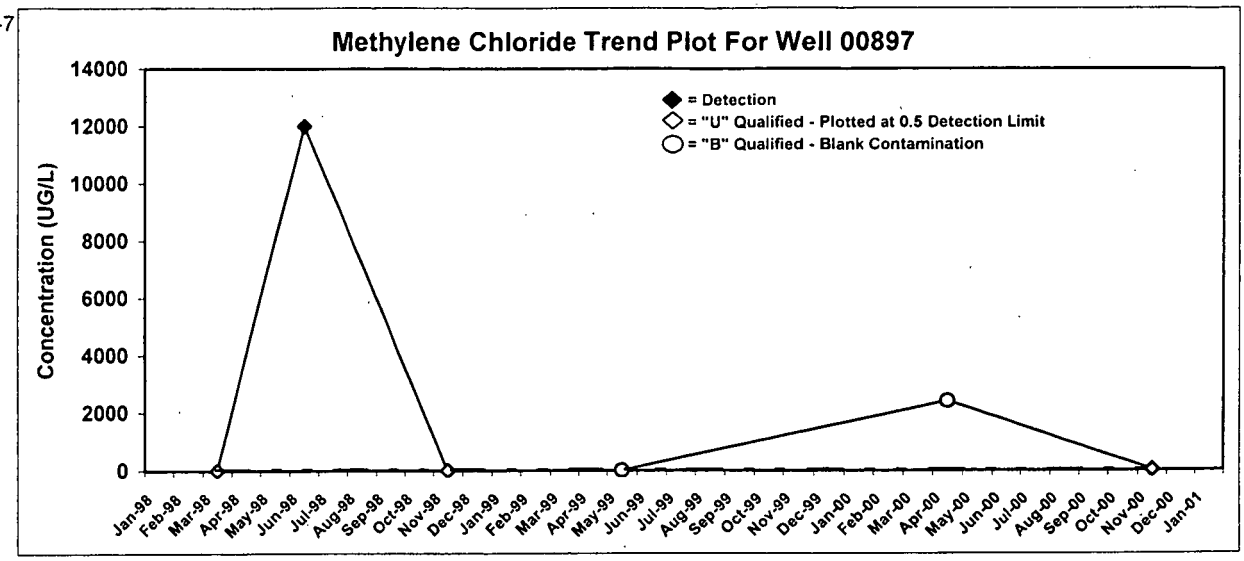


Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

A-7



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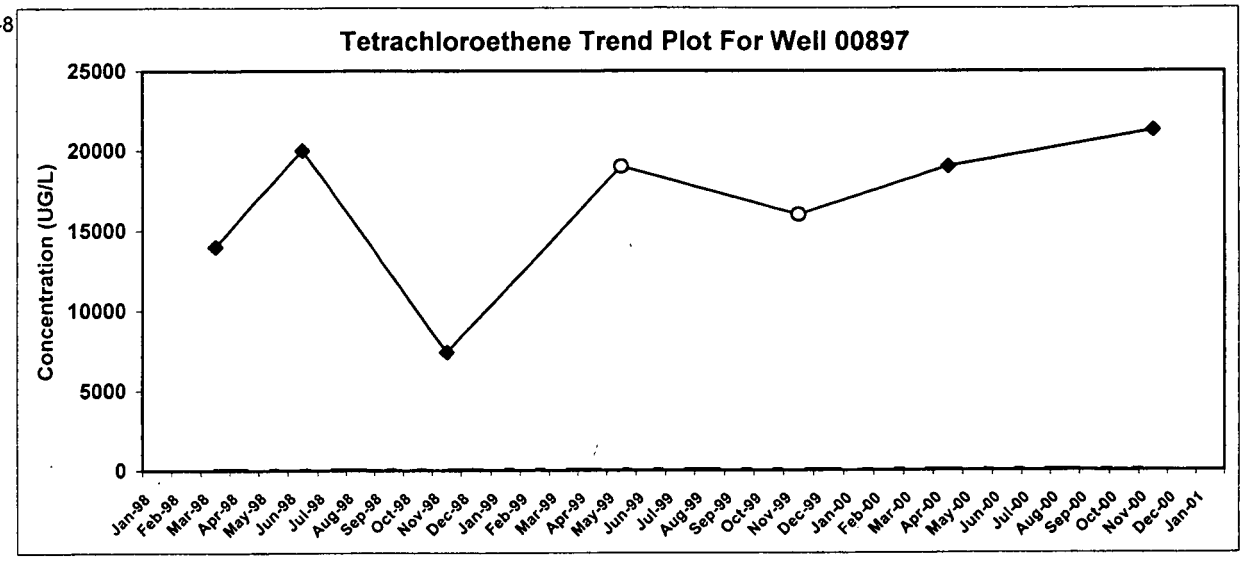

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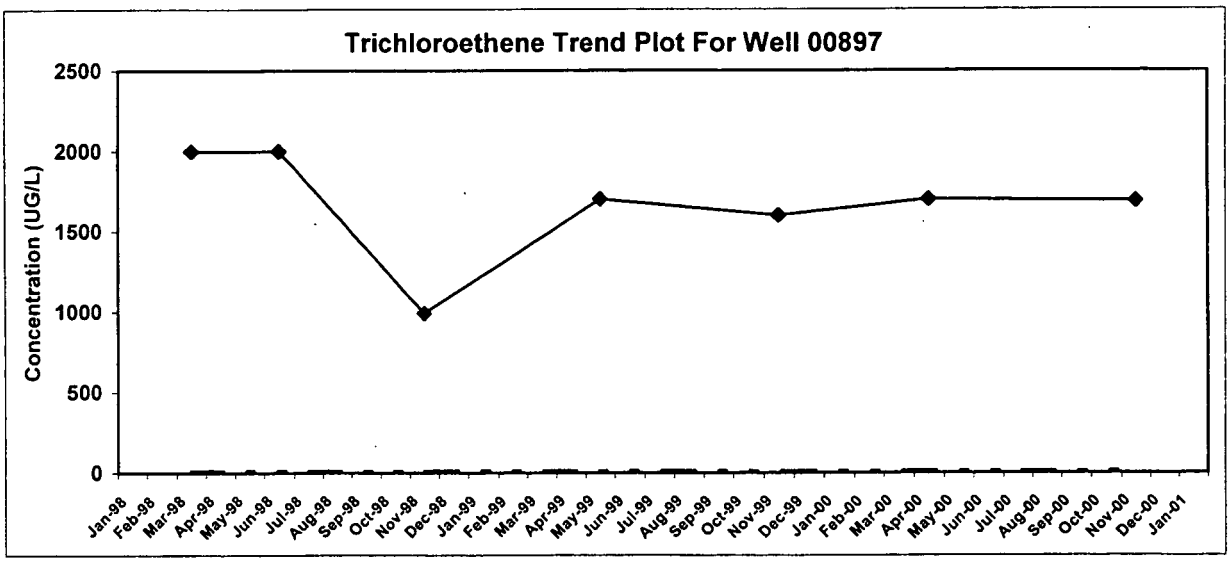
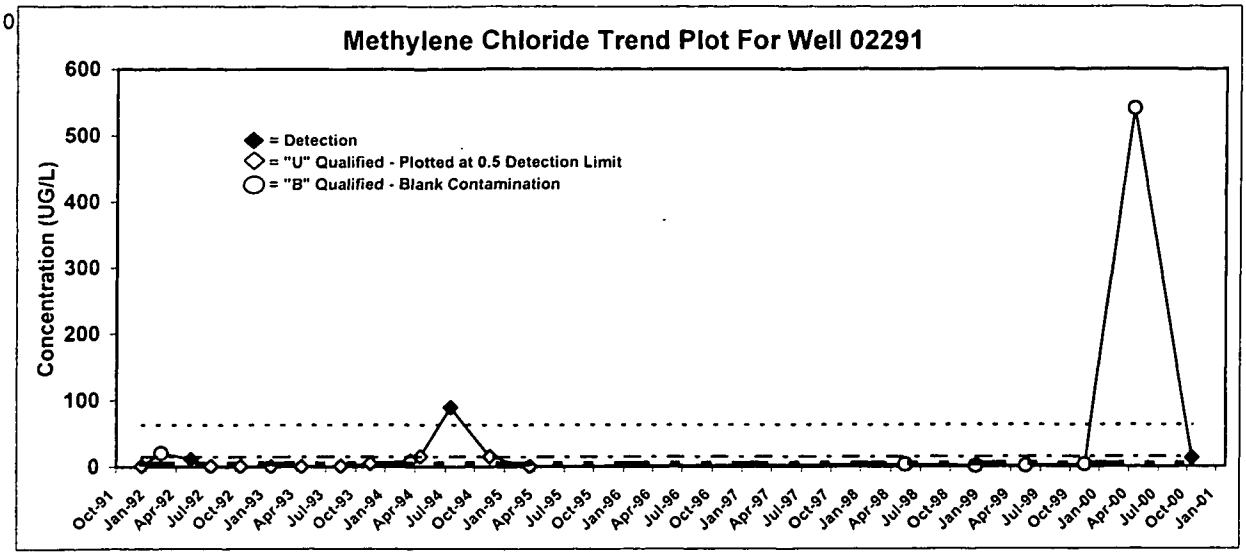


Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

A-10



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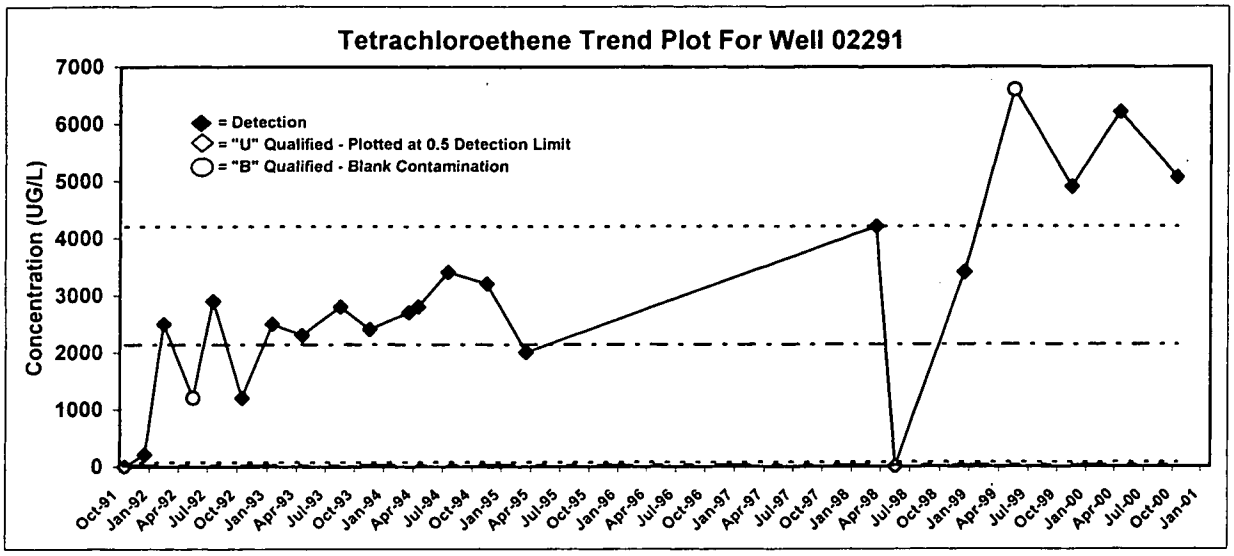

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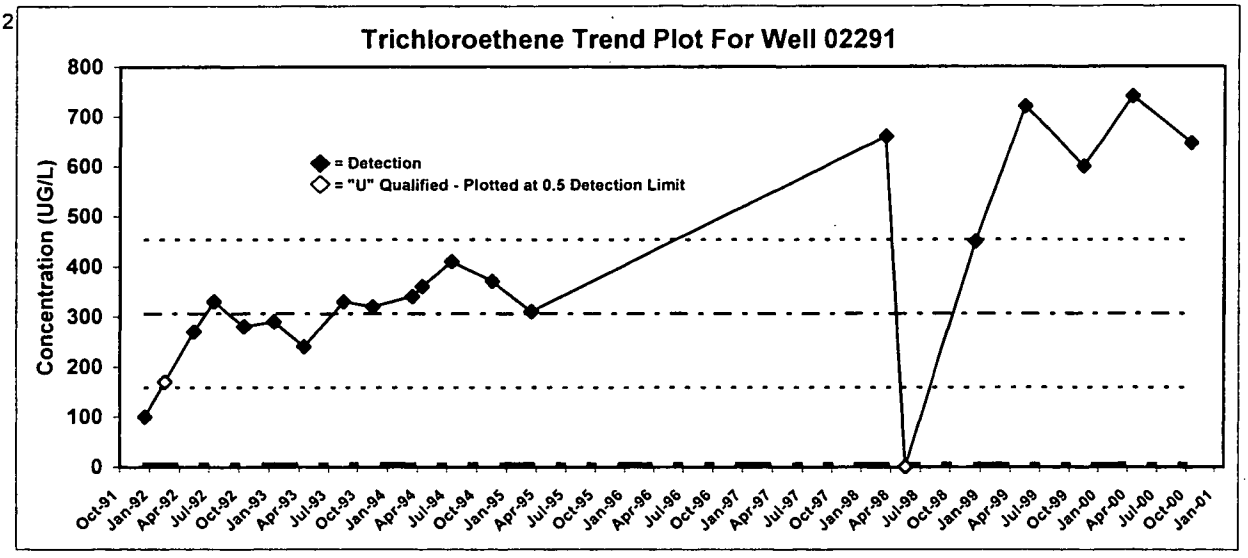

Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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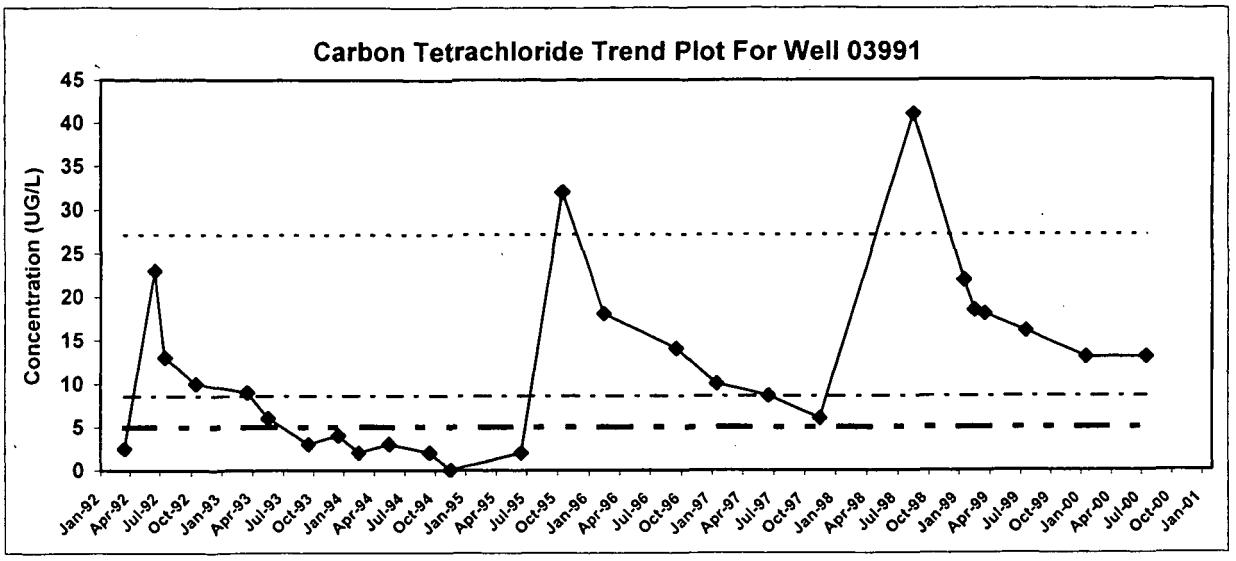
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

A-13



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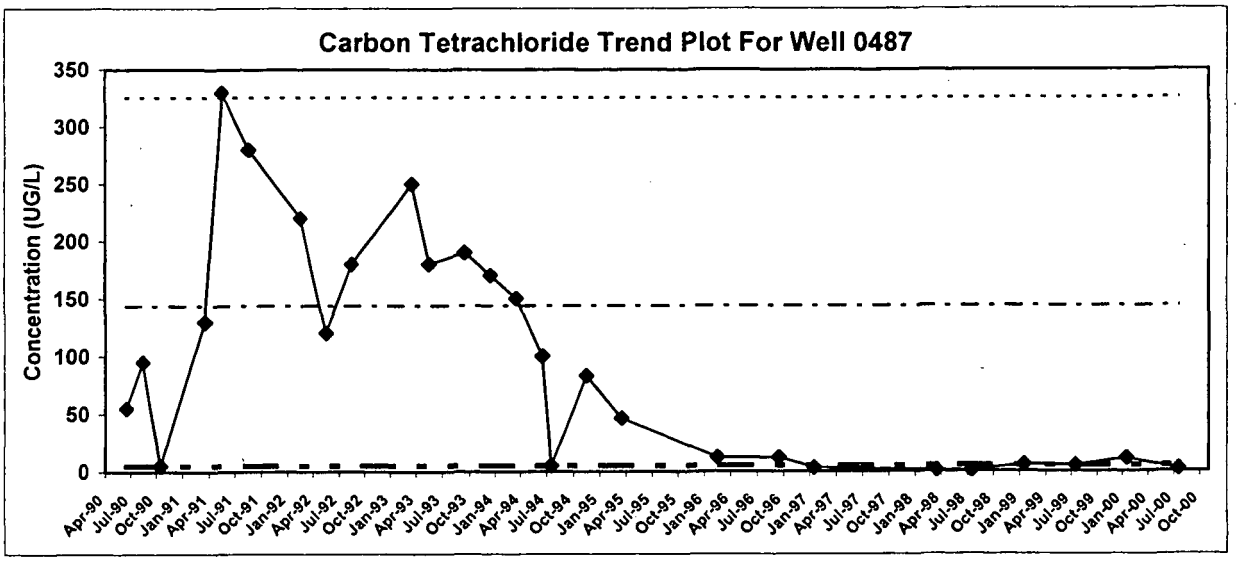

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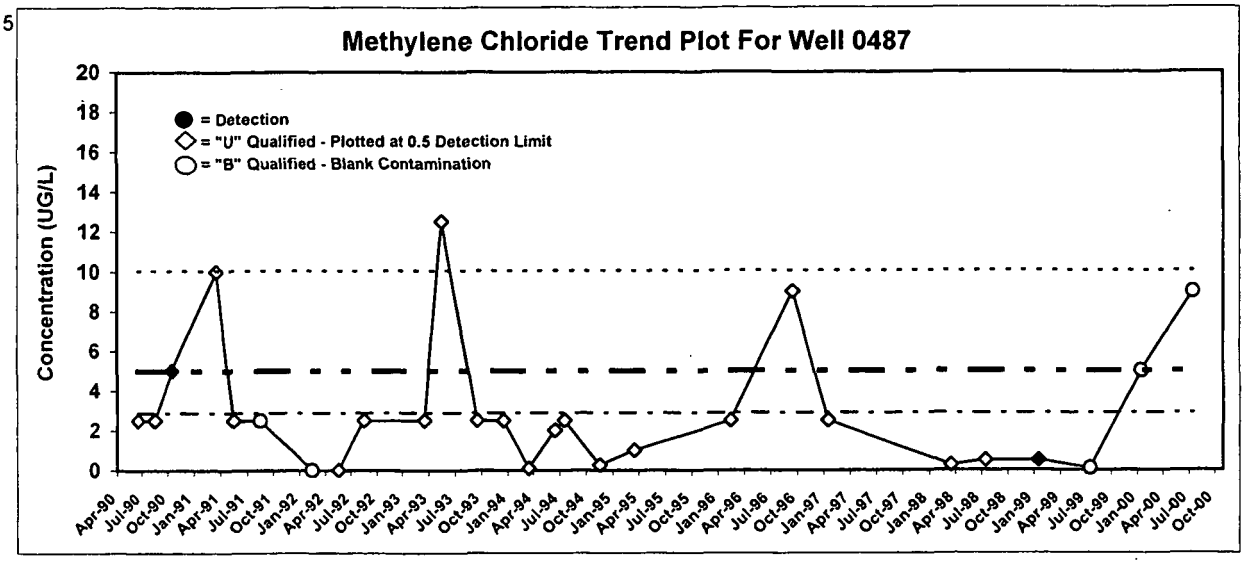

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Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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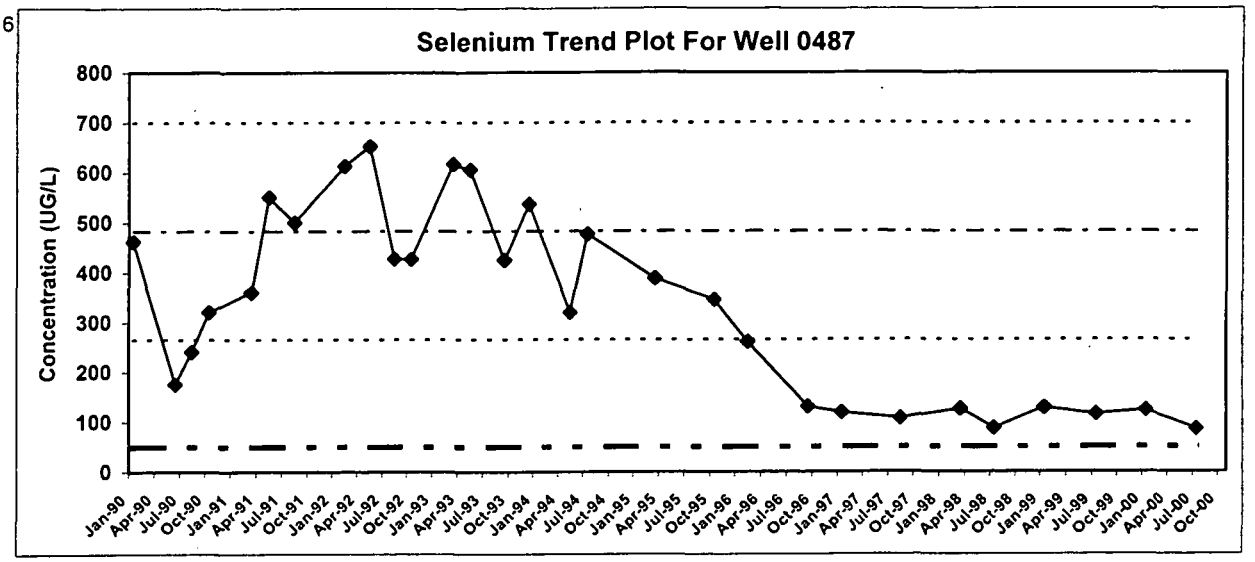
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

A-16



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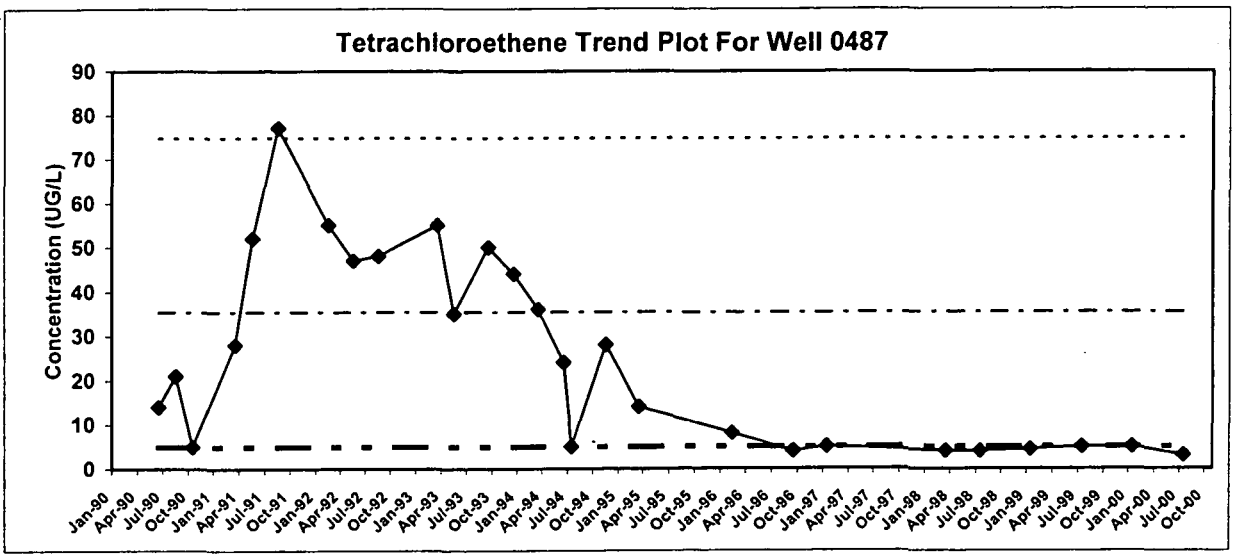

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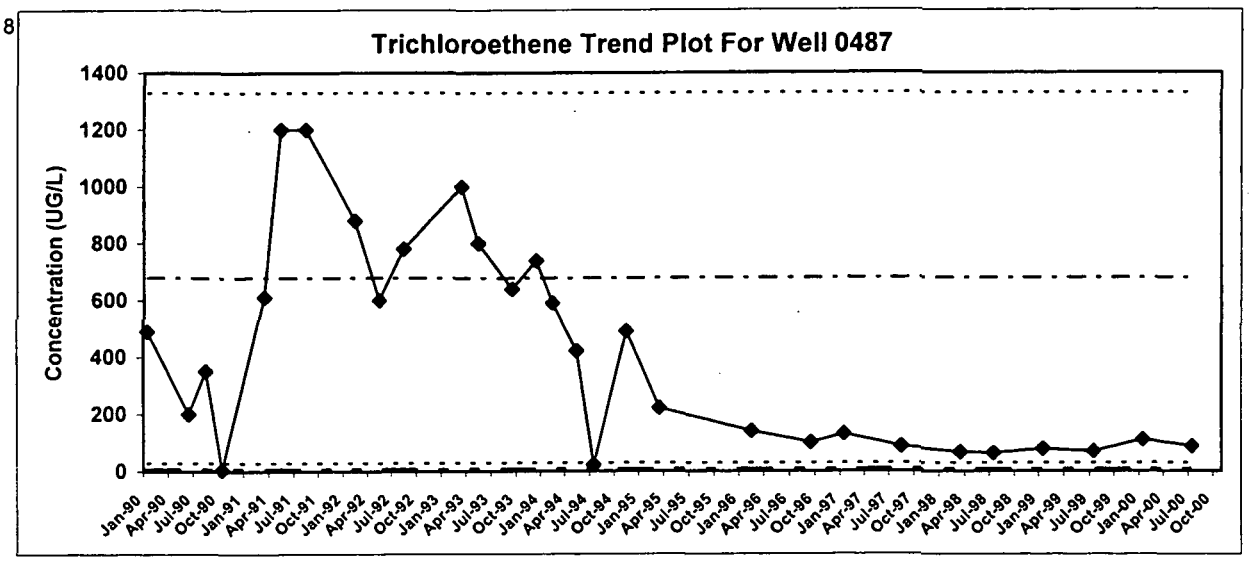

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Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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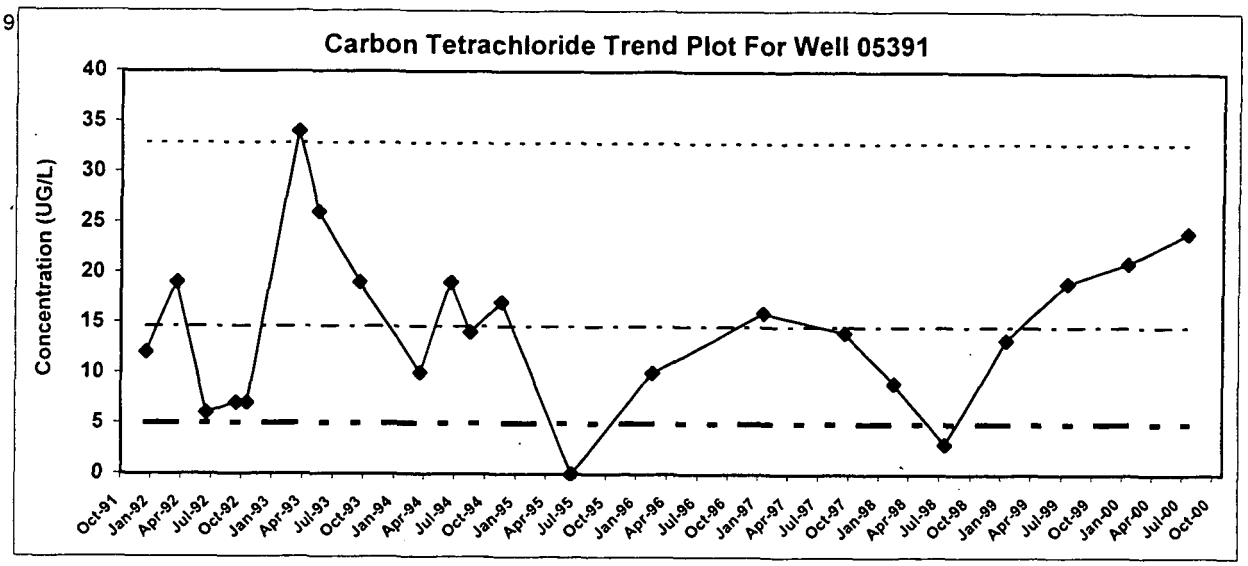
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

A-19



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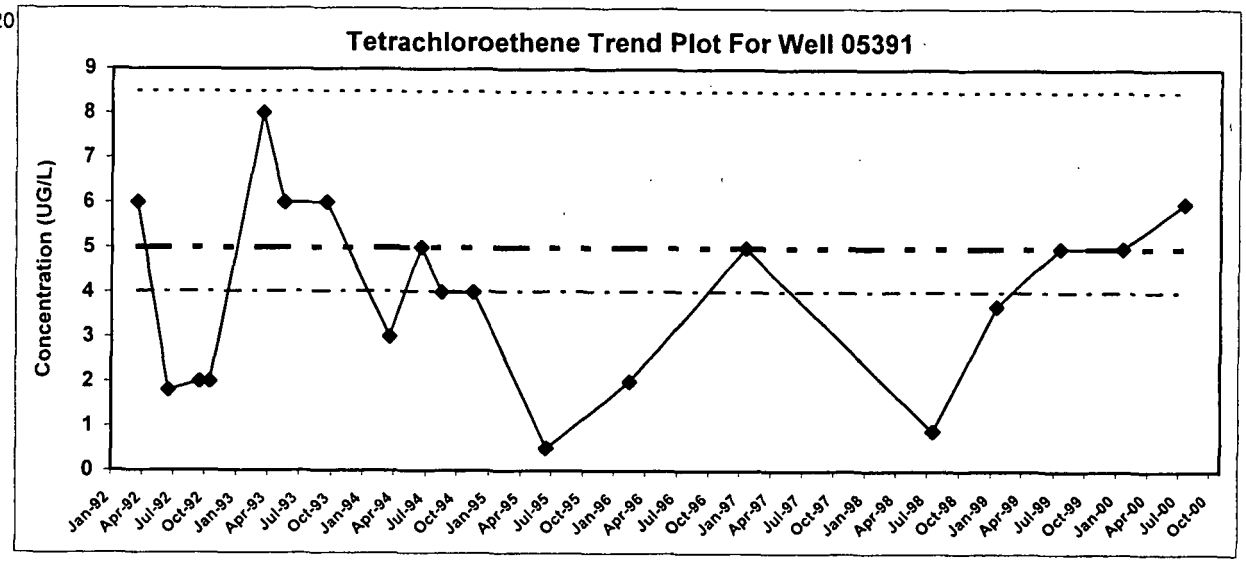

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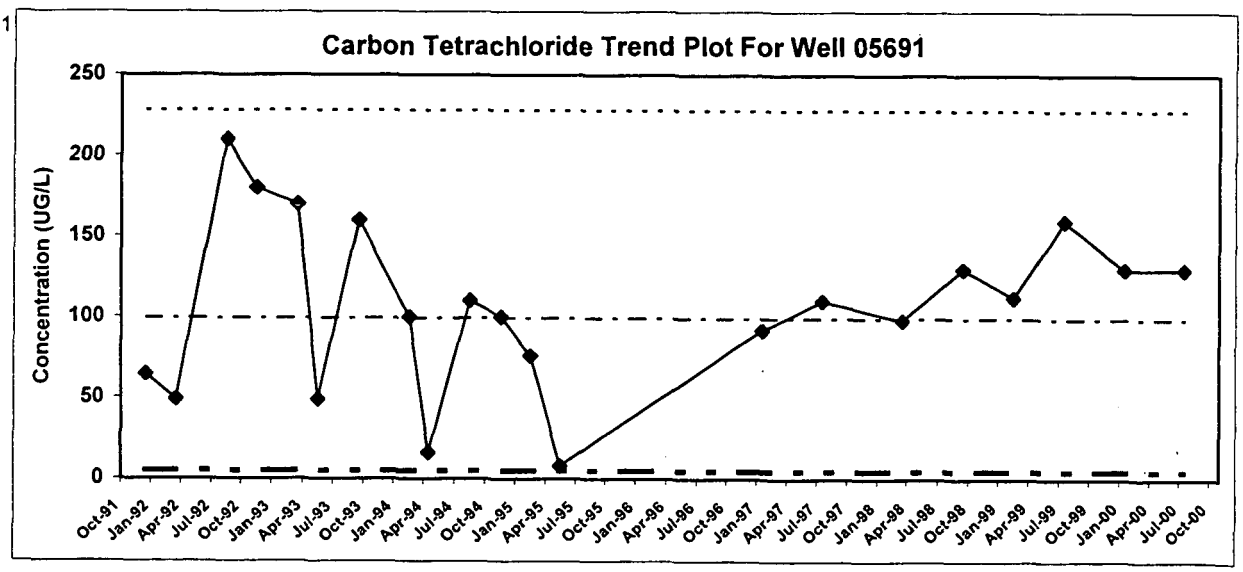

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Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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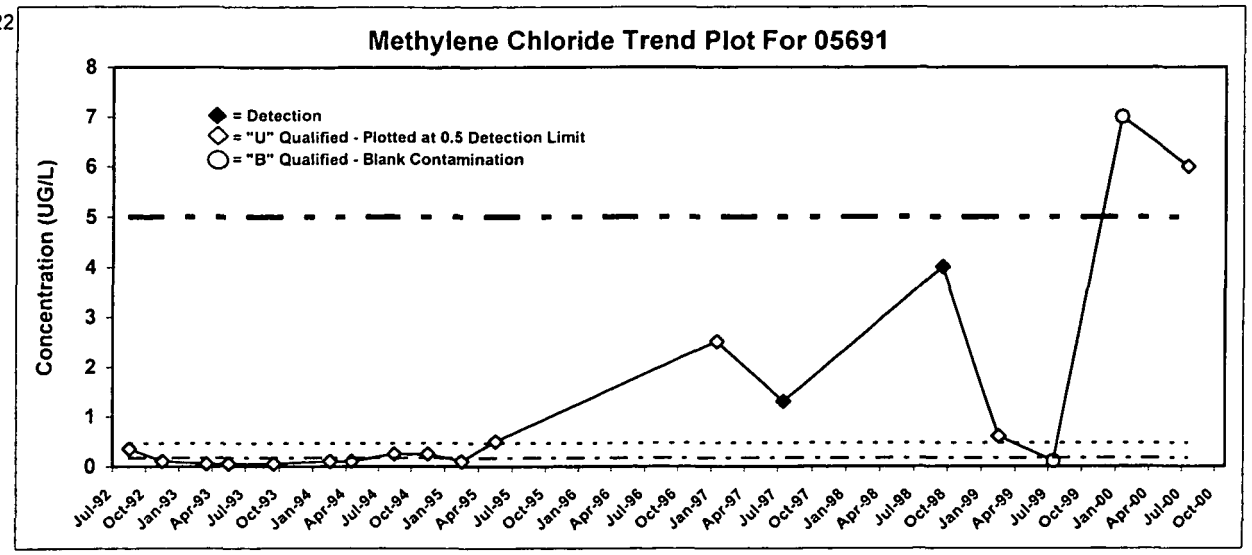
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

A-22



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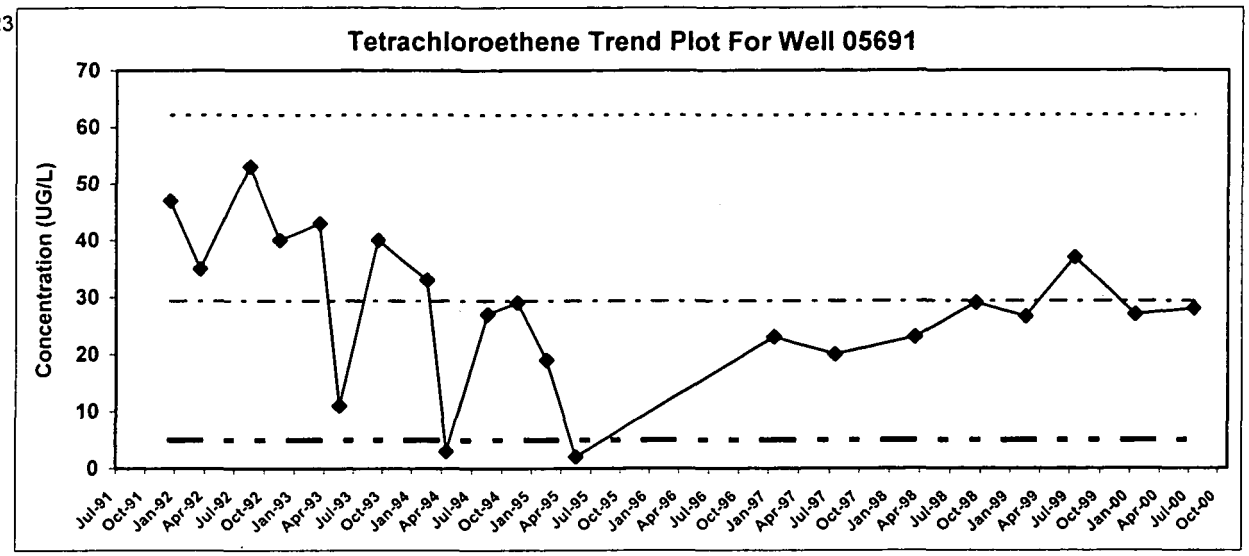

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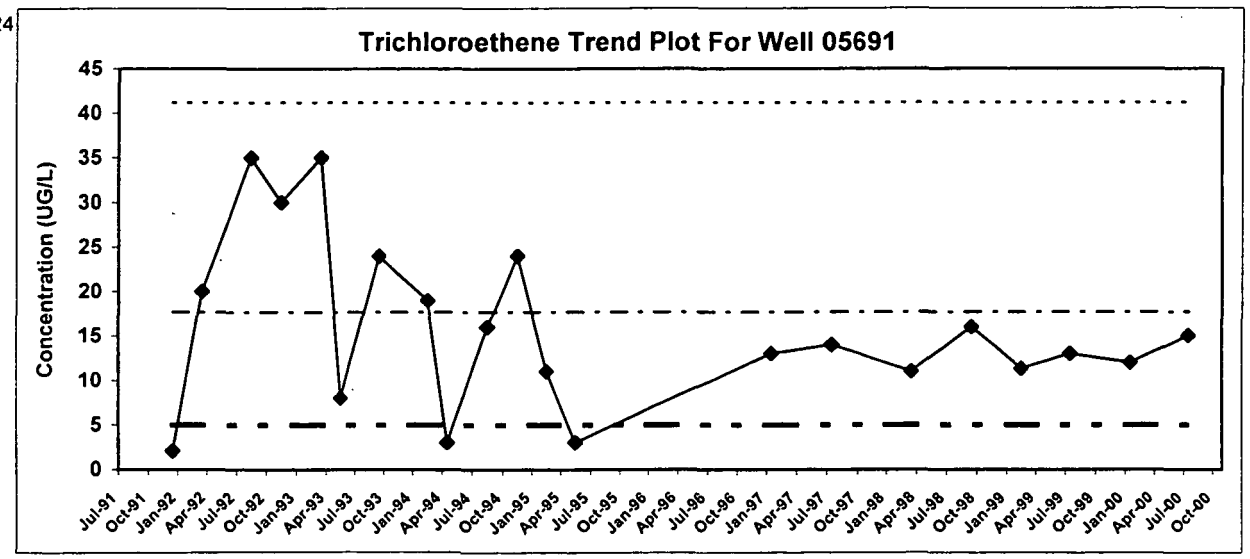

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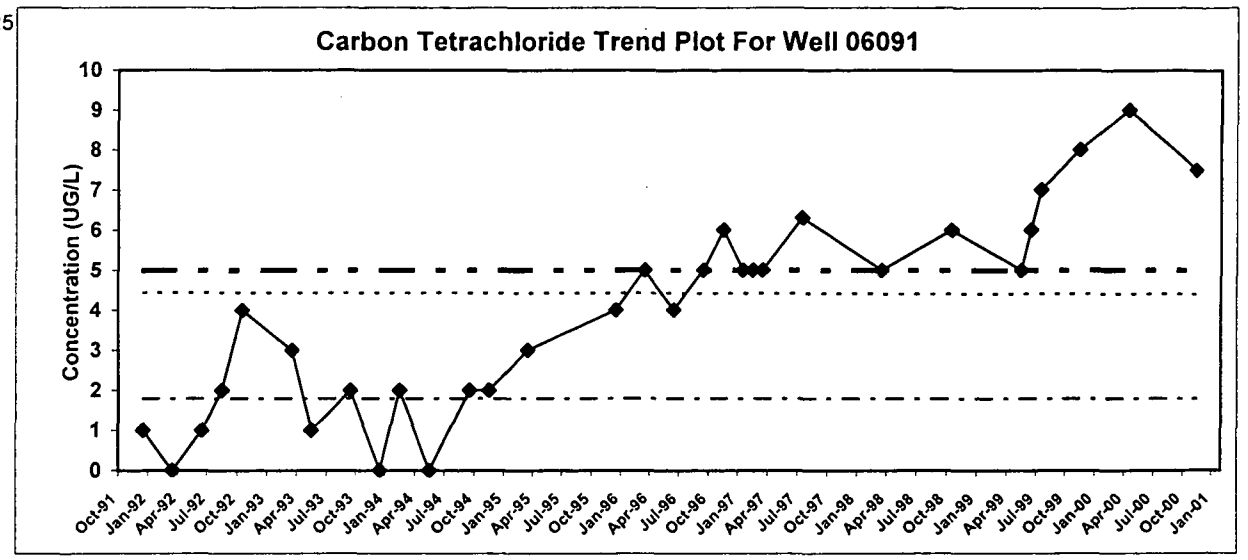
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

A-25



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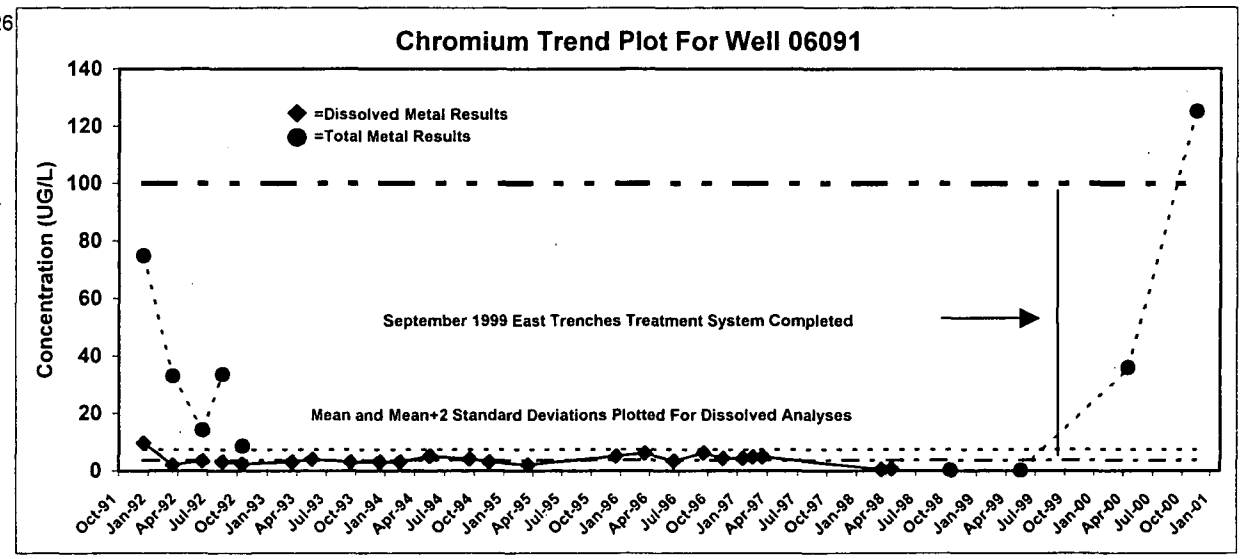

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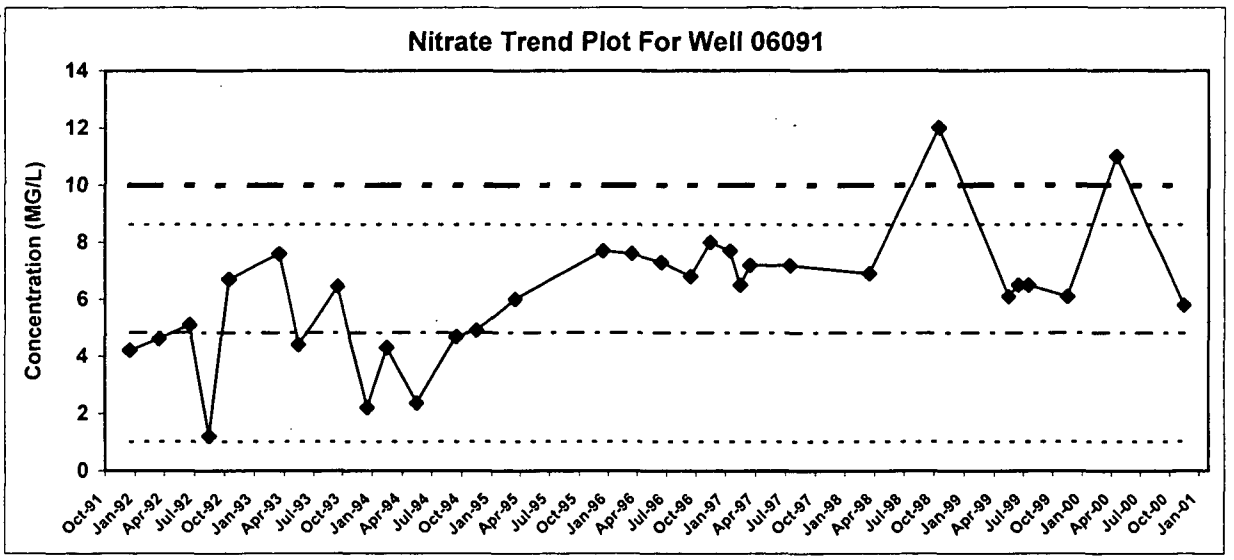

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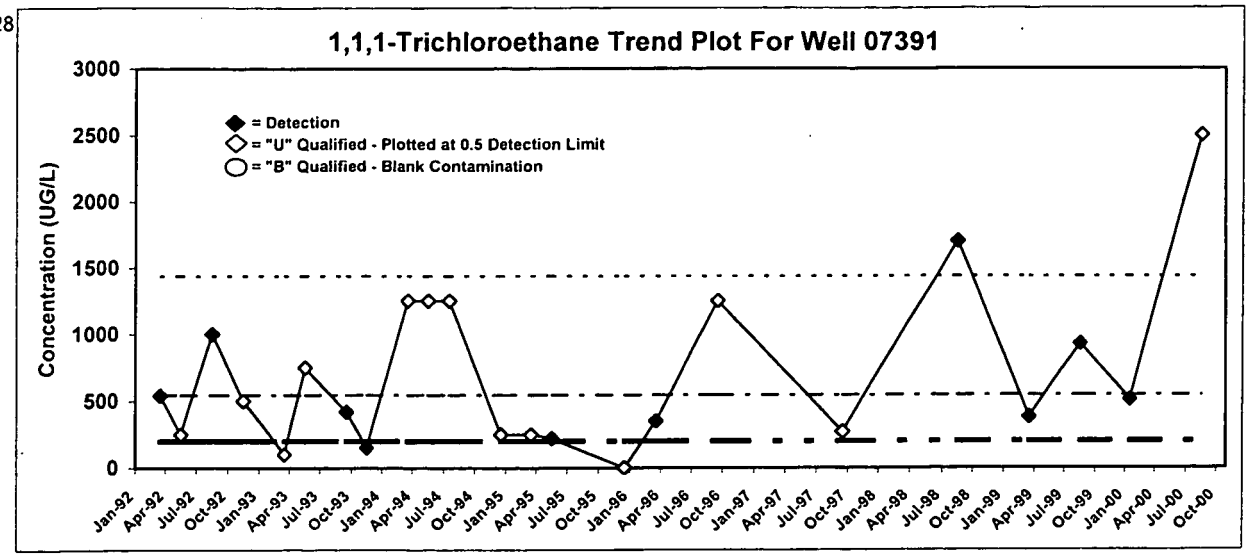
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

A-28



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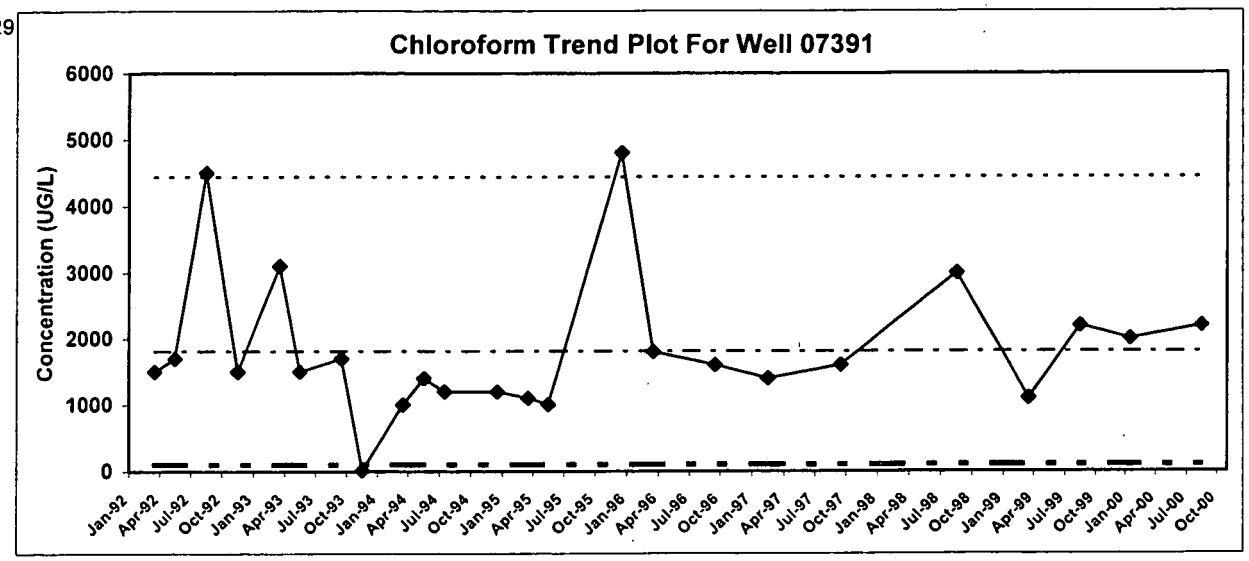

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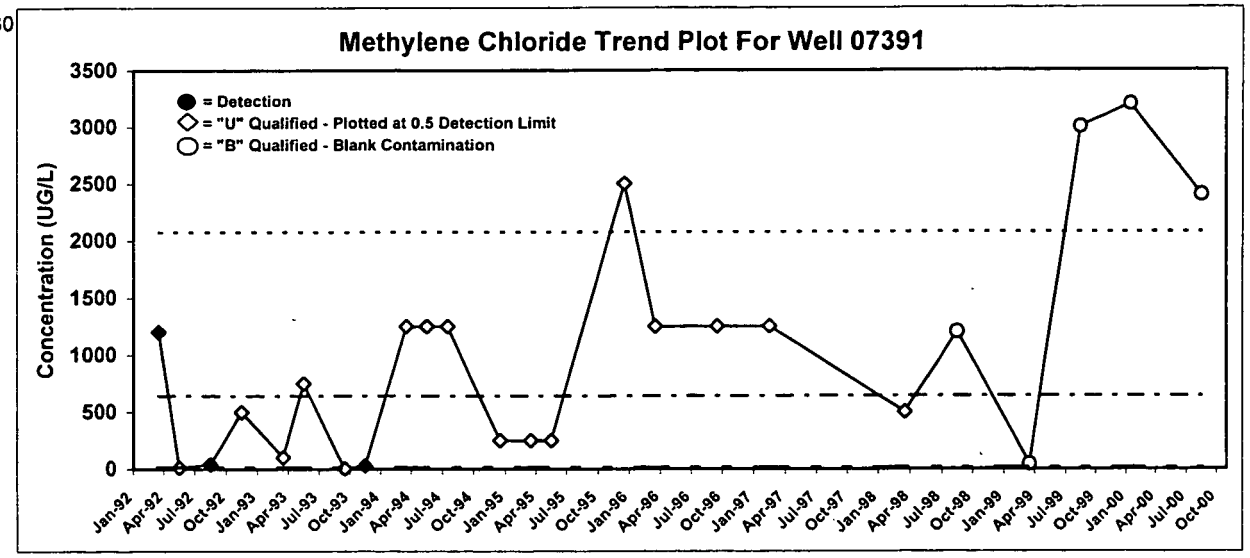

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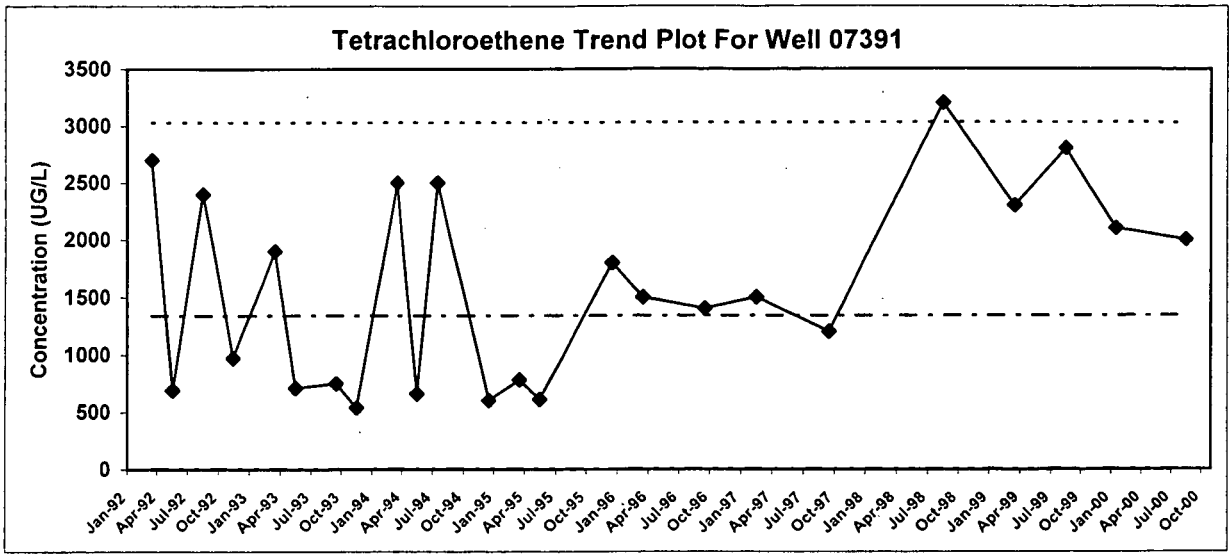
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

A-31



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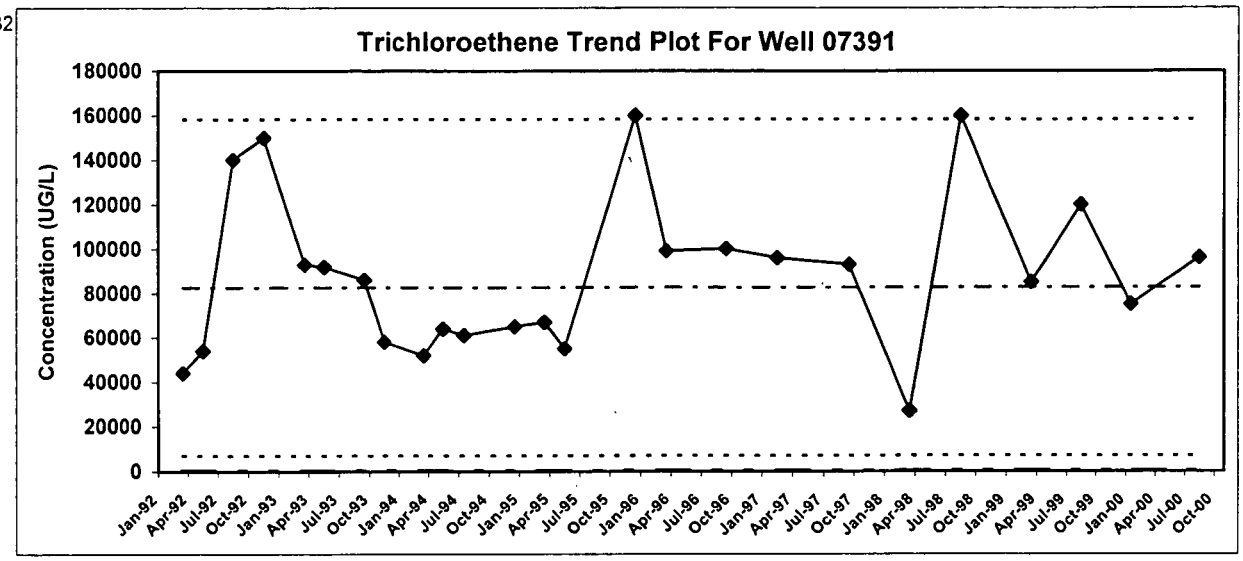

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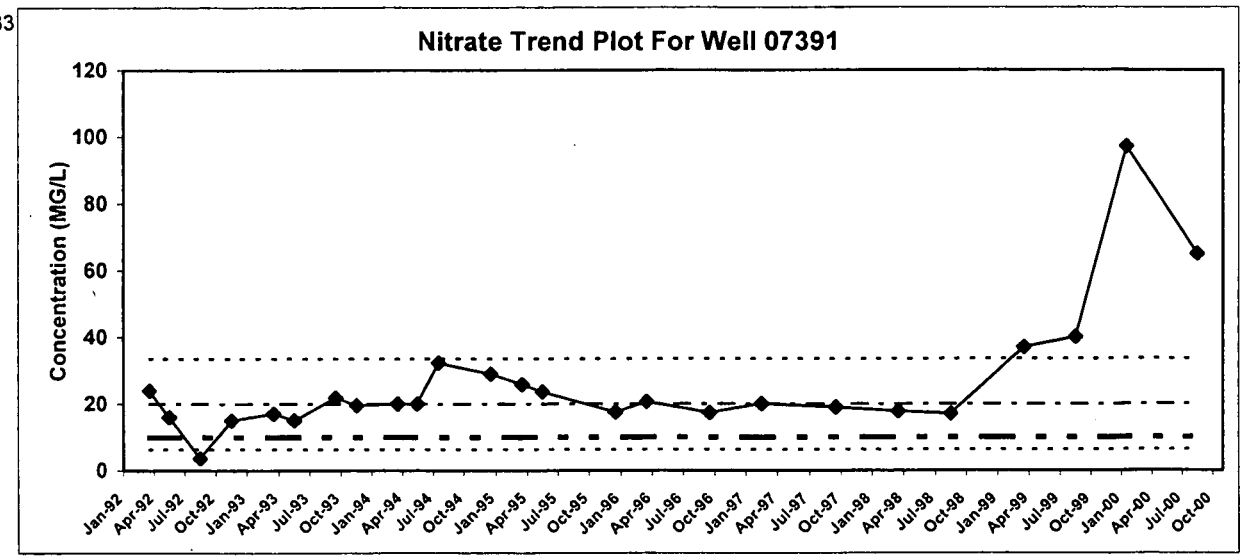

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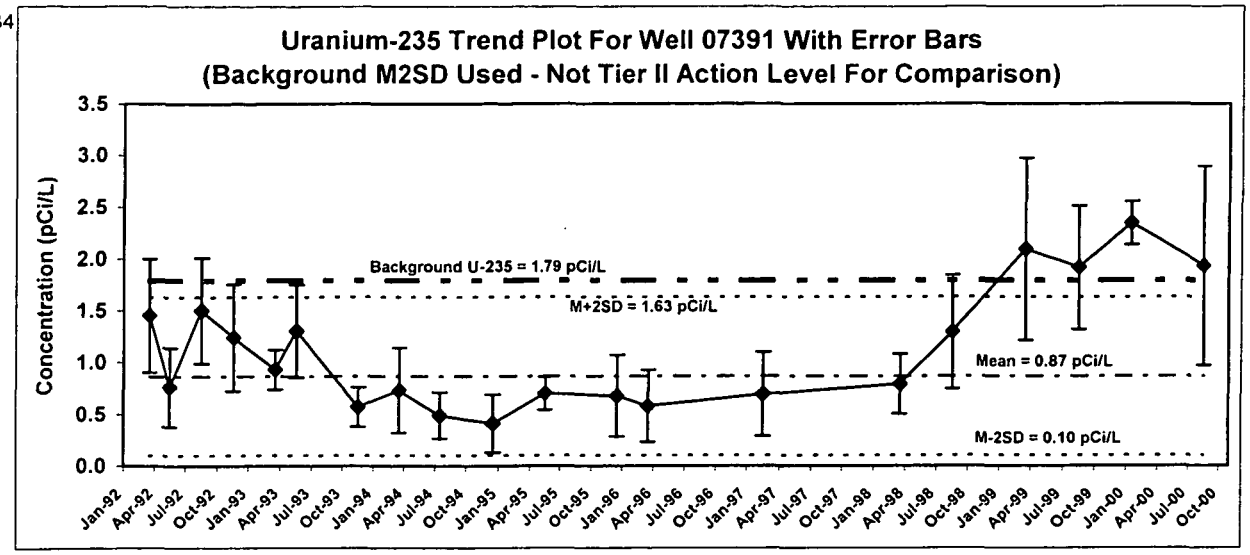
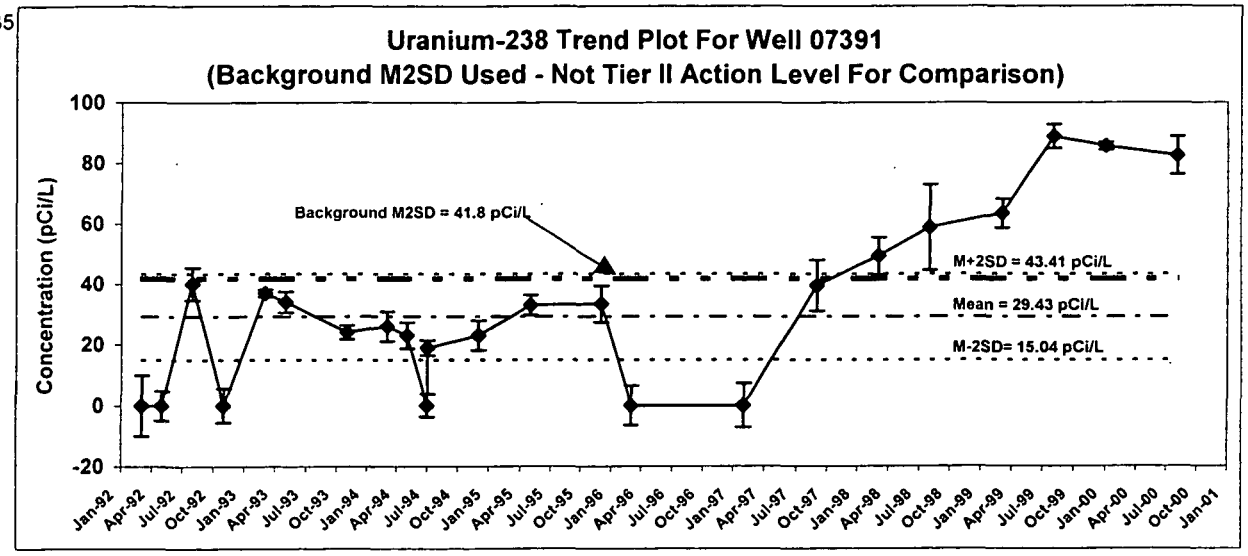
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

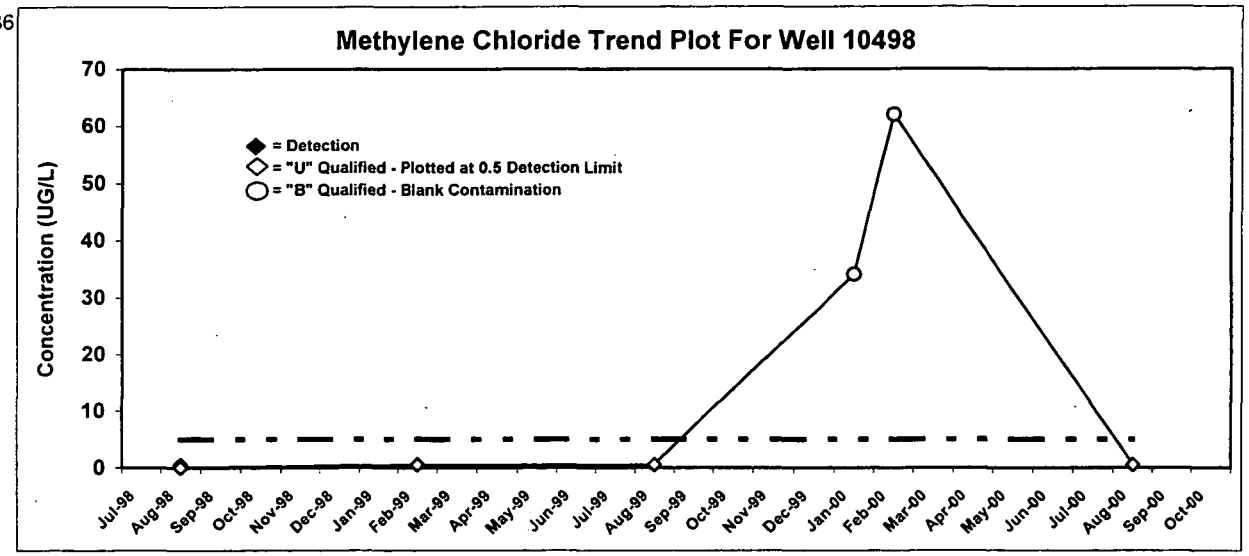
A-34



A-35



A-36



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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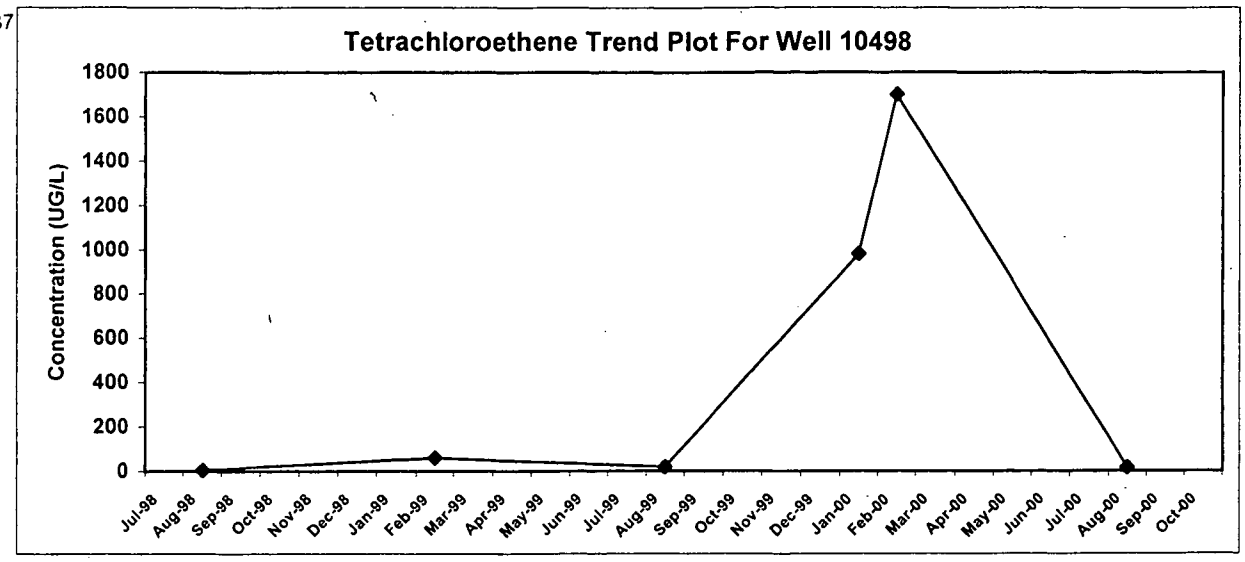
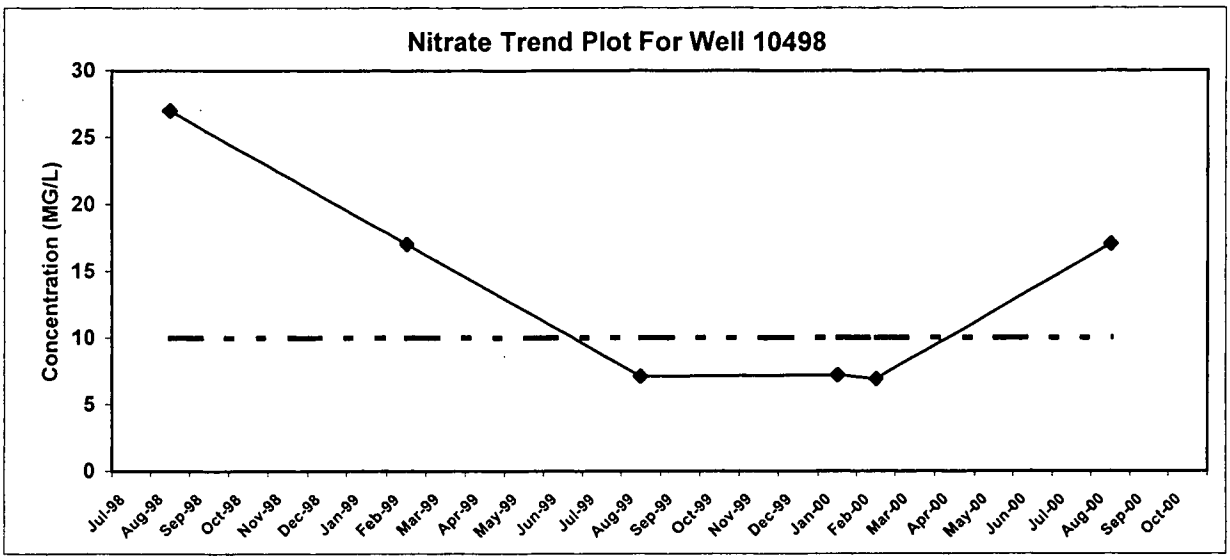
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

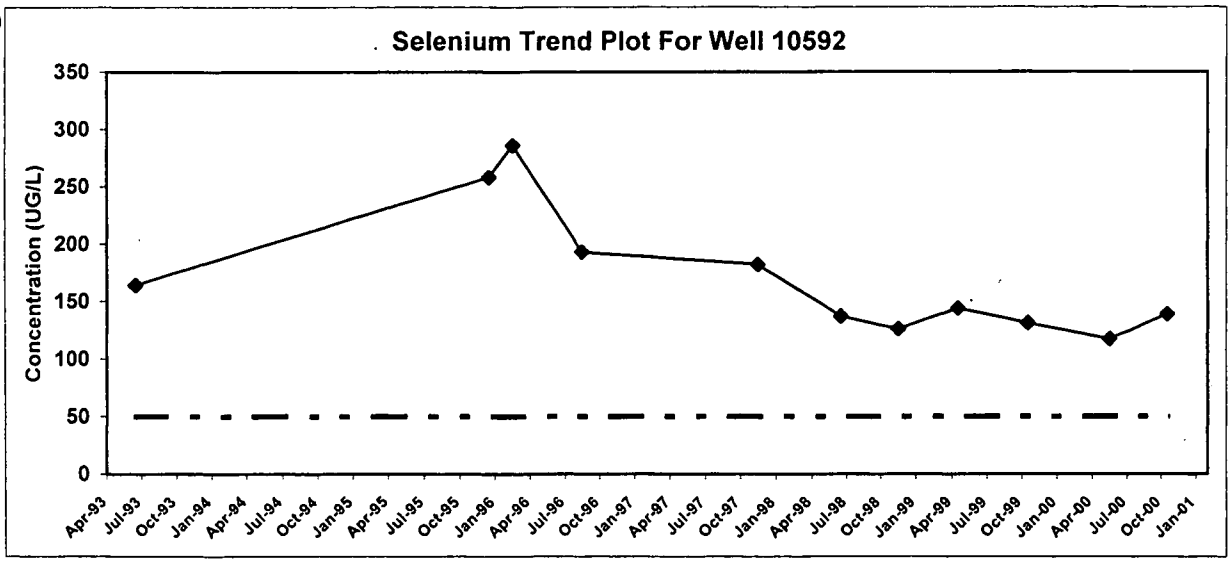
A-37



A-38



A-39

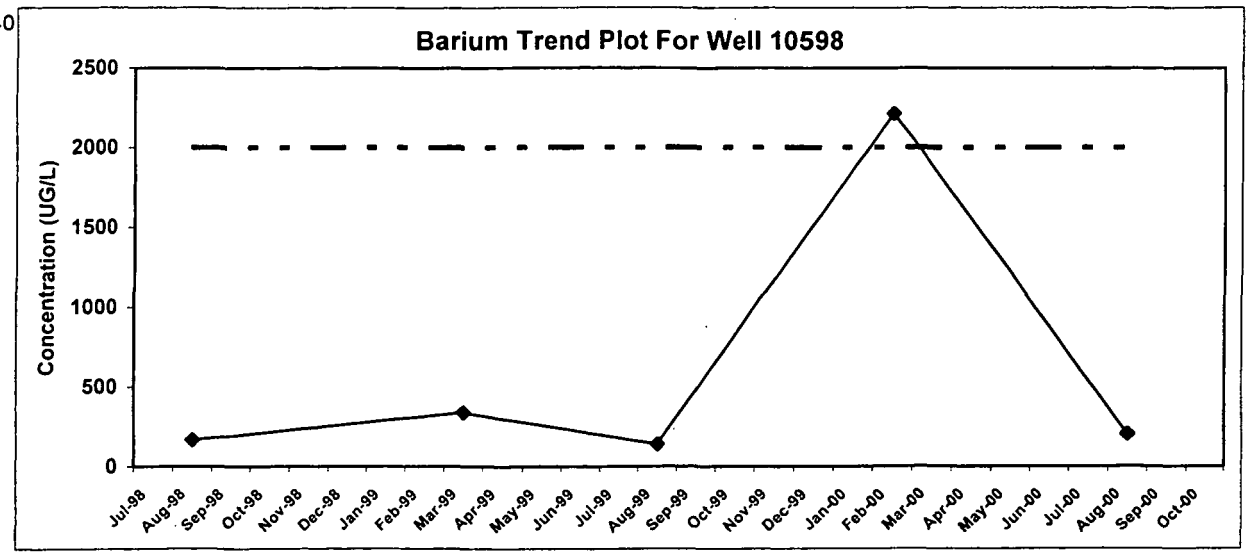


Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

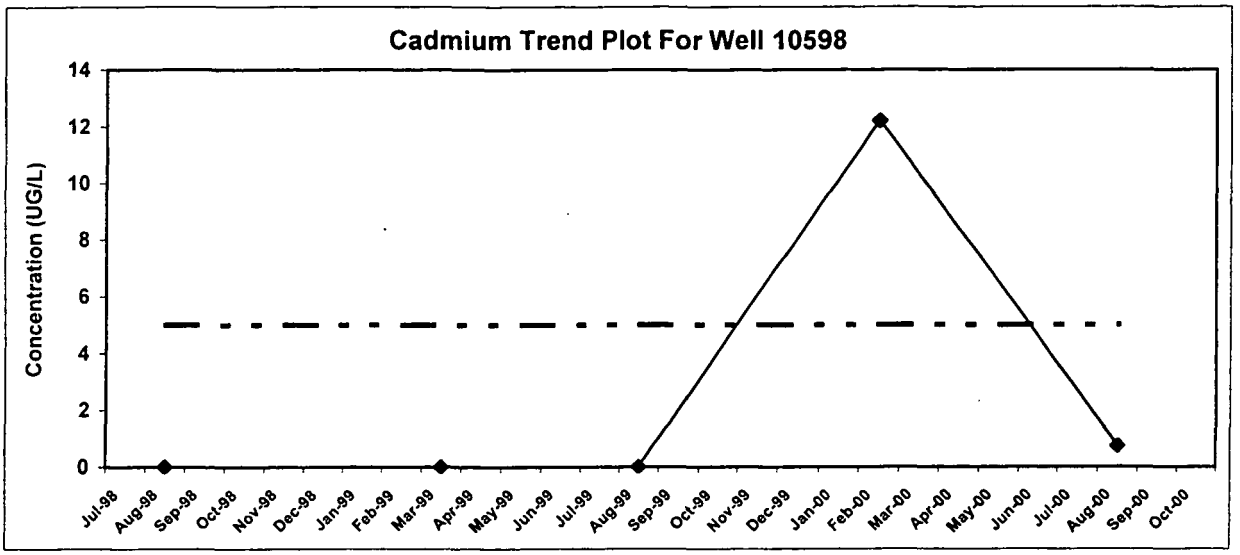
350

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

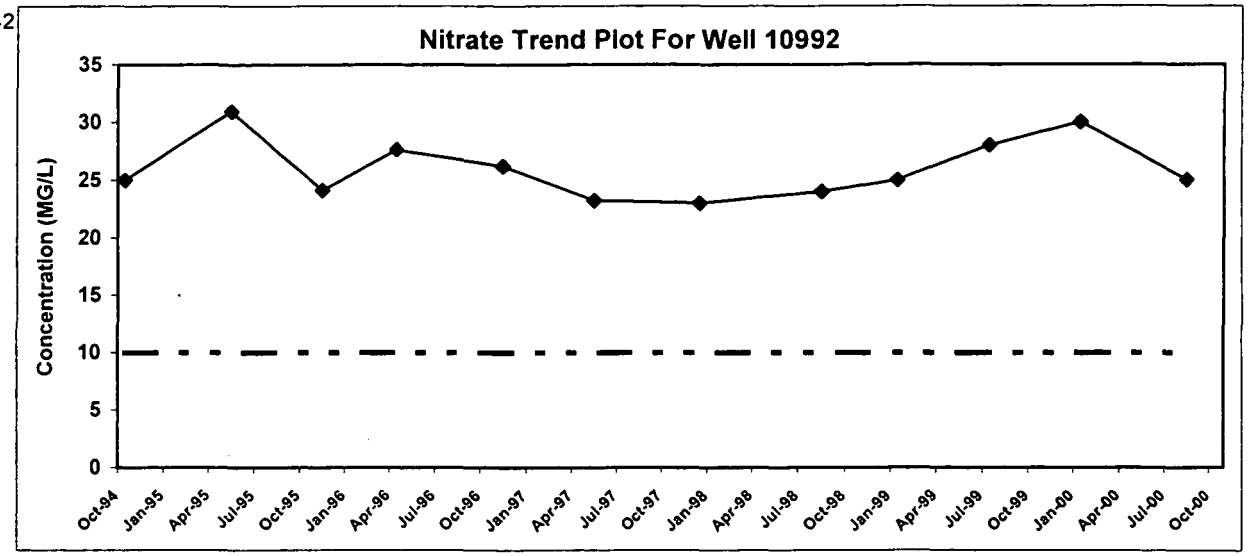
A-40



A-41



A-42

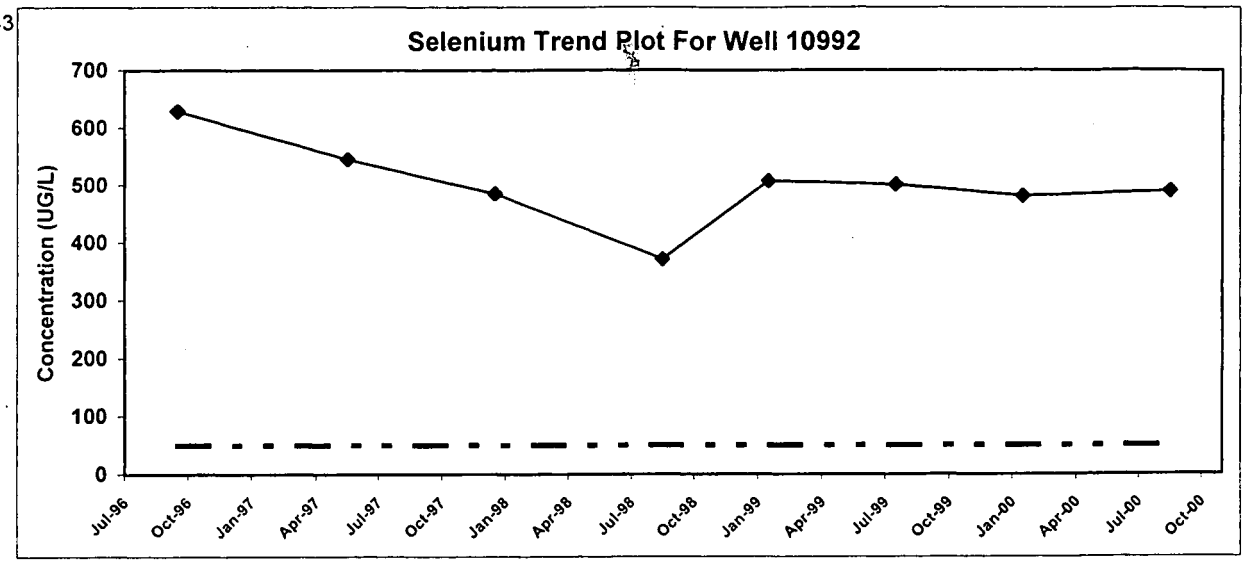


Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

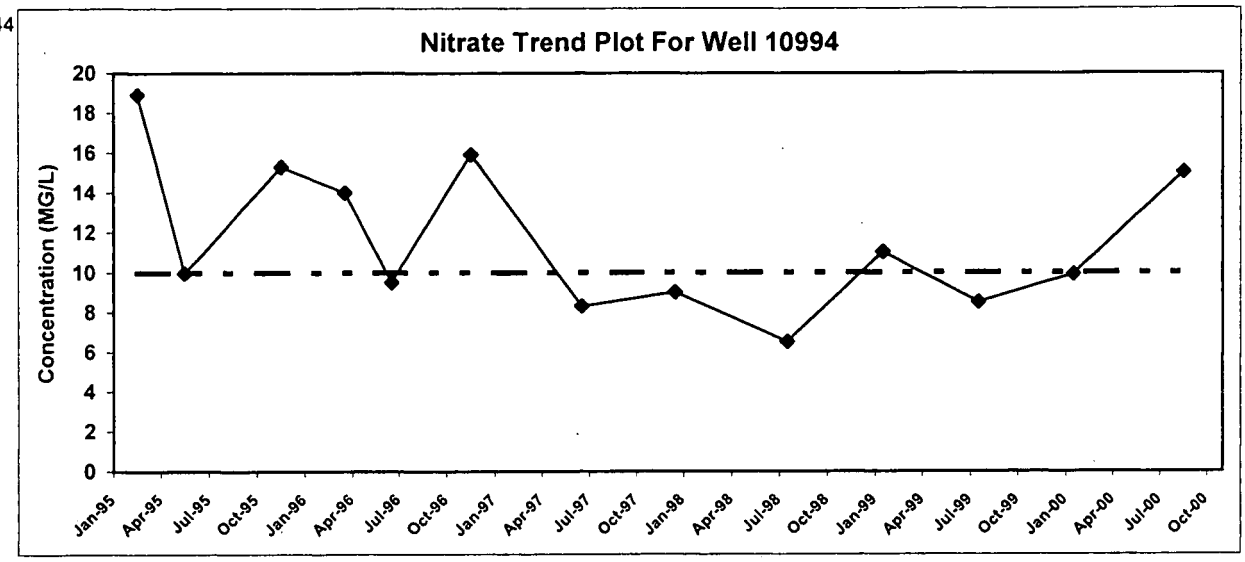
351

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

A-43



A-44



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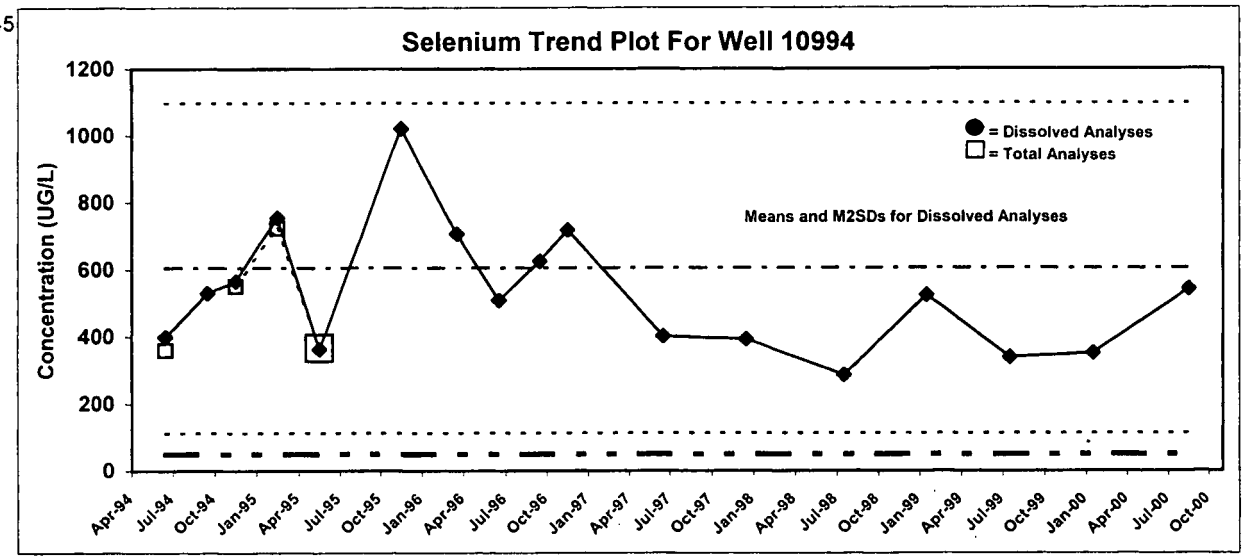
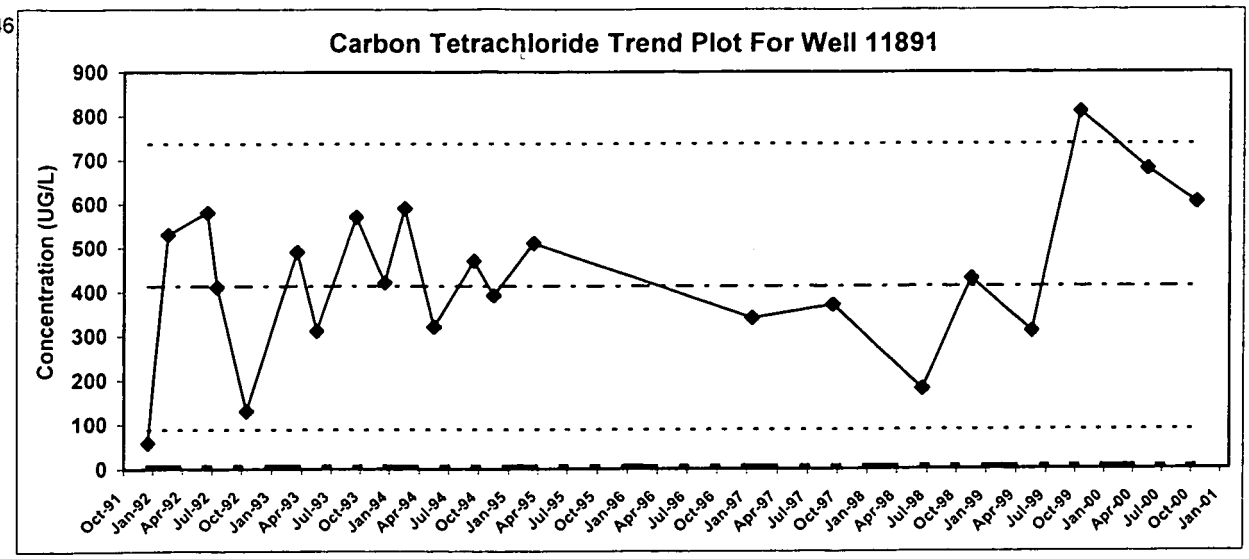


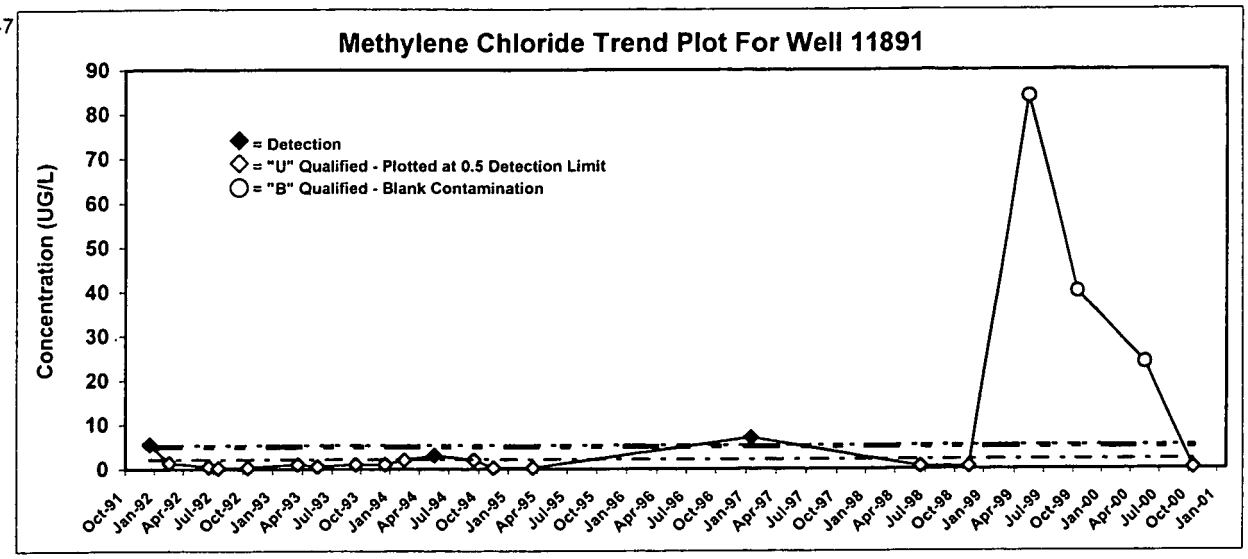
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

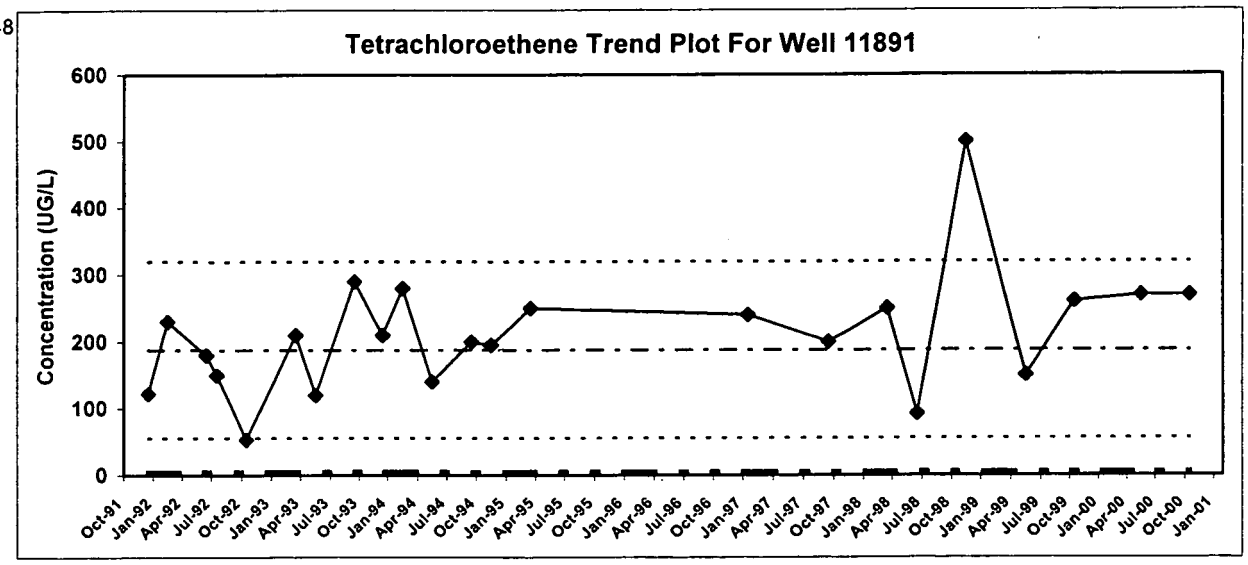
A-46



A-47



A-48



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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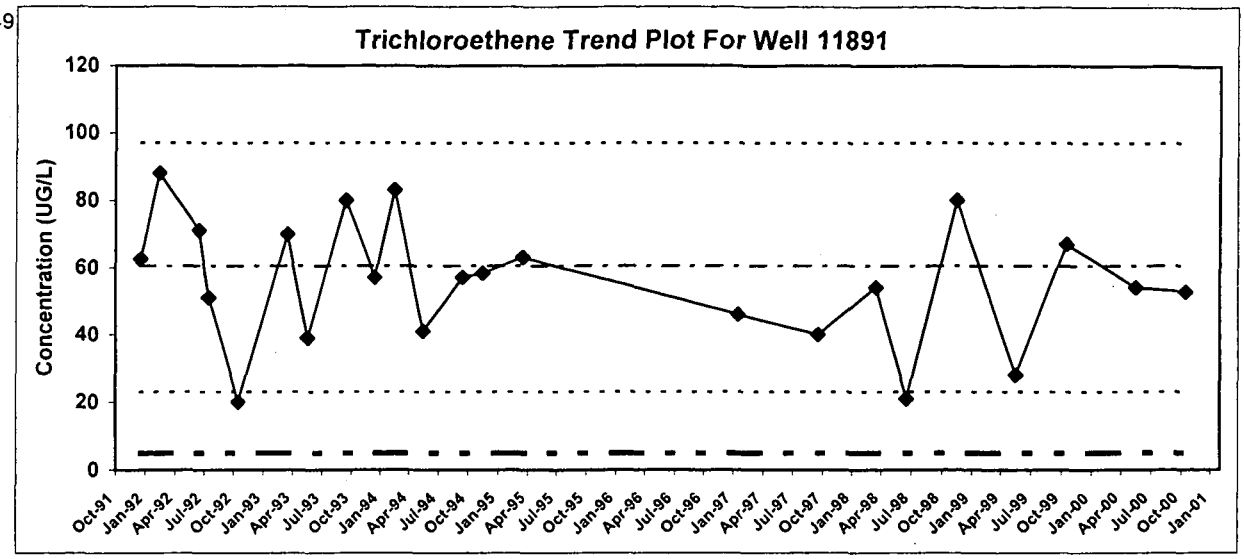
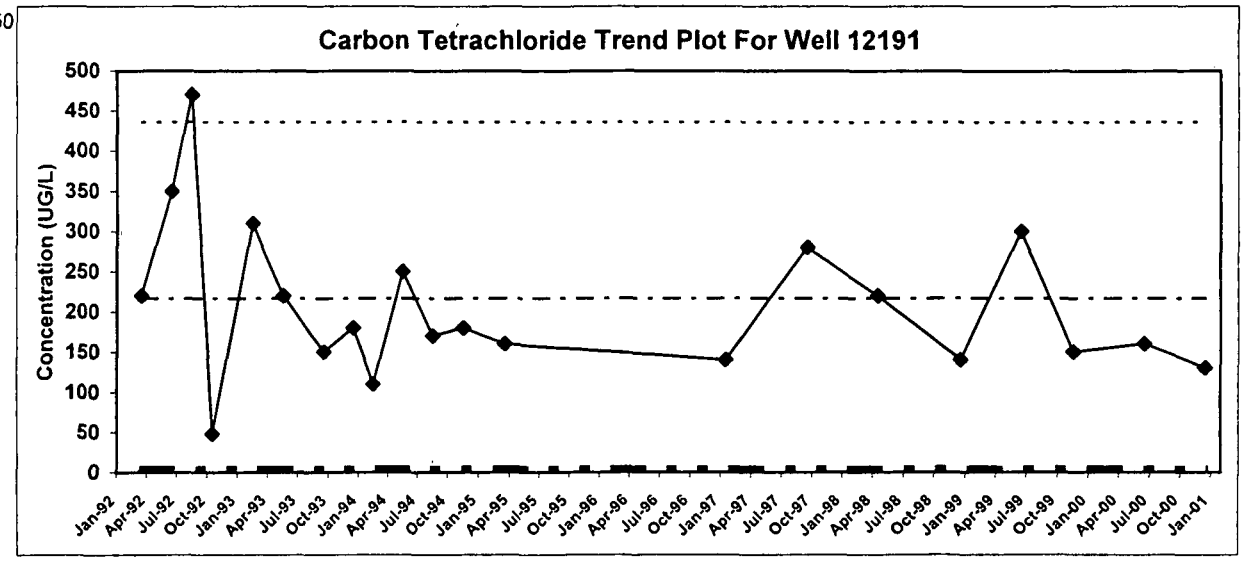
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

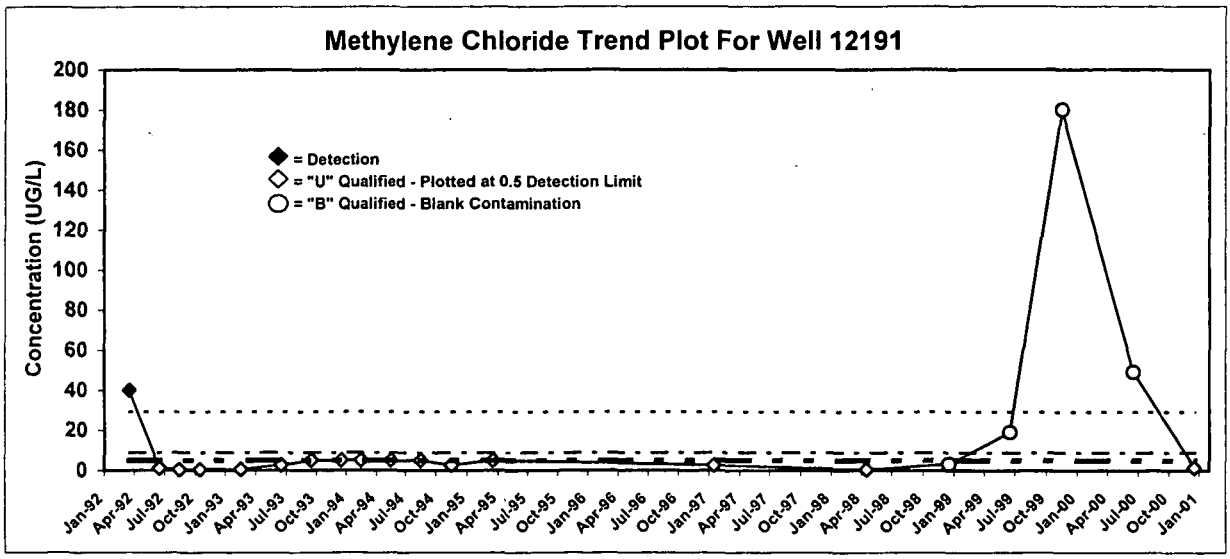
A-49



A-50



A-51



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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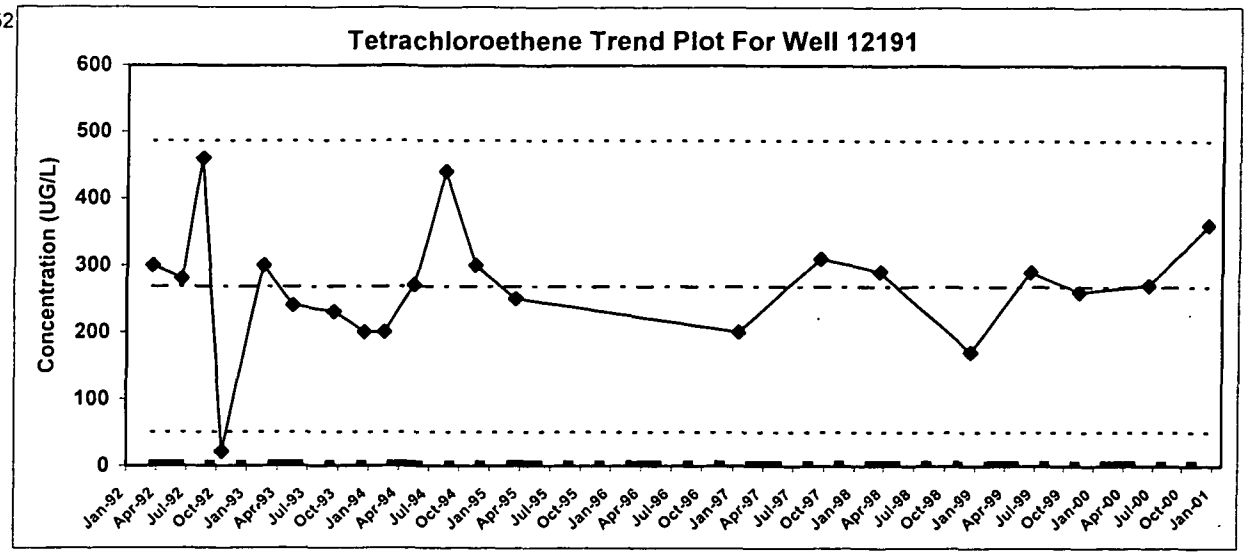
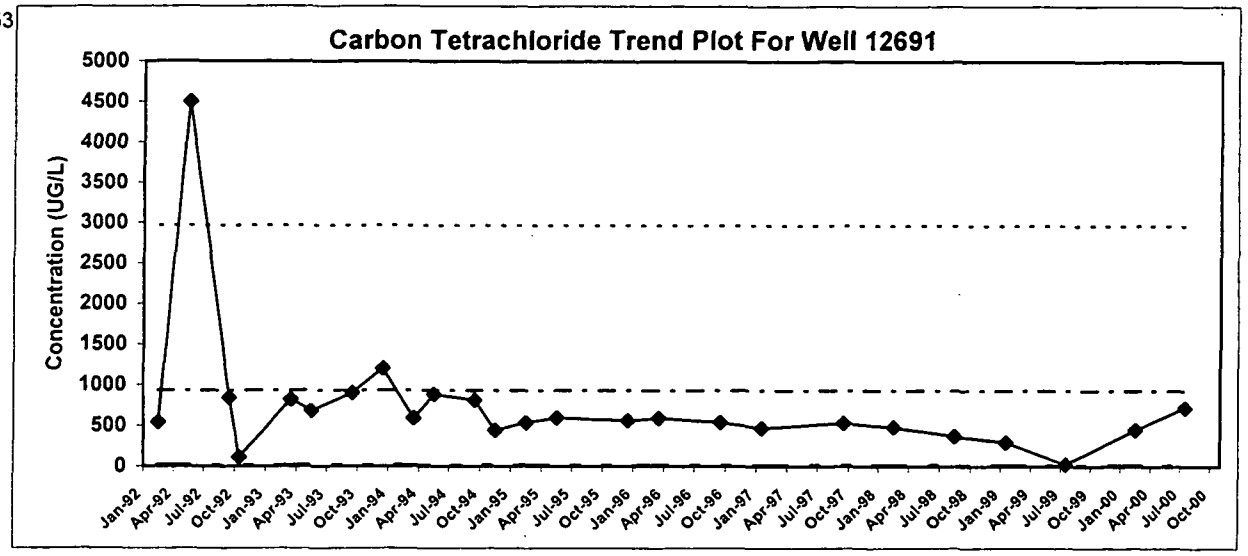
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

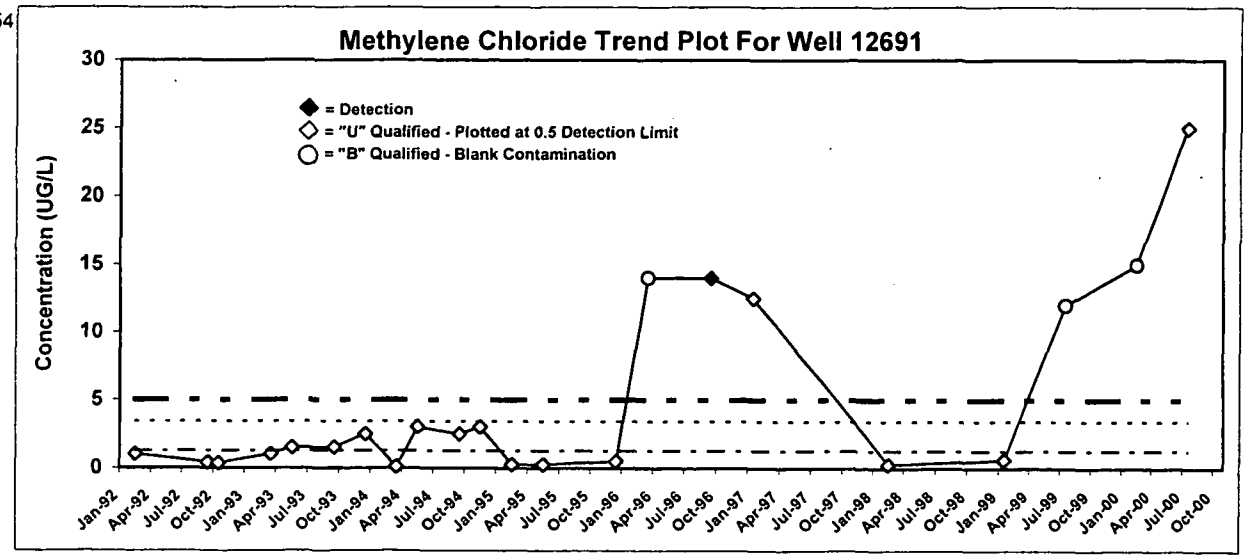
A-52



A-53



A-54



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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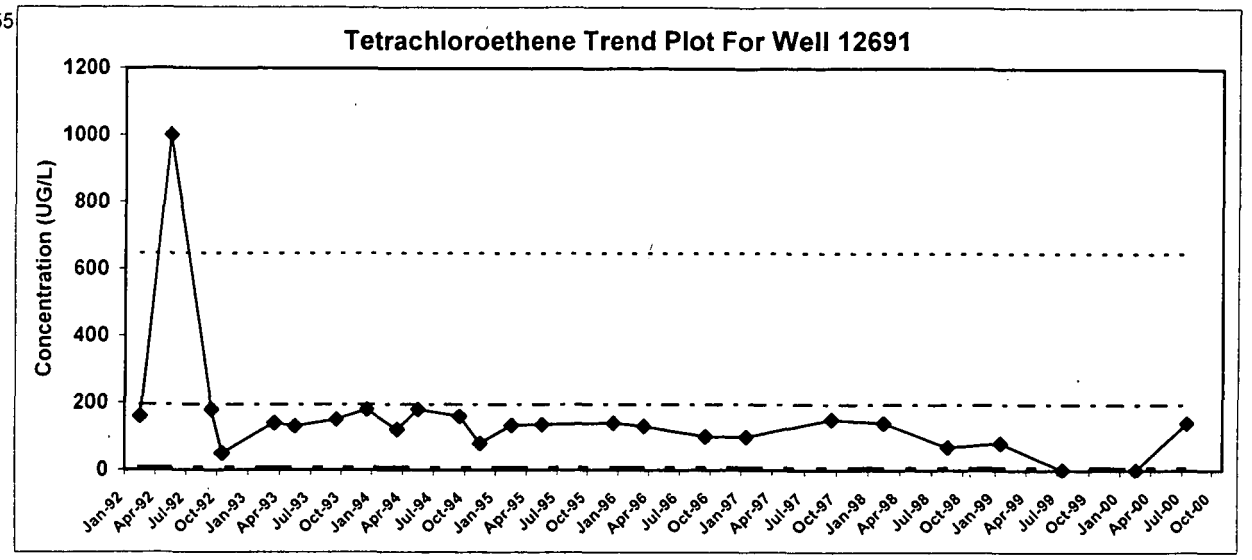
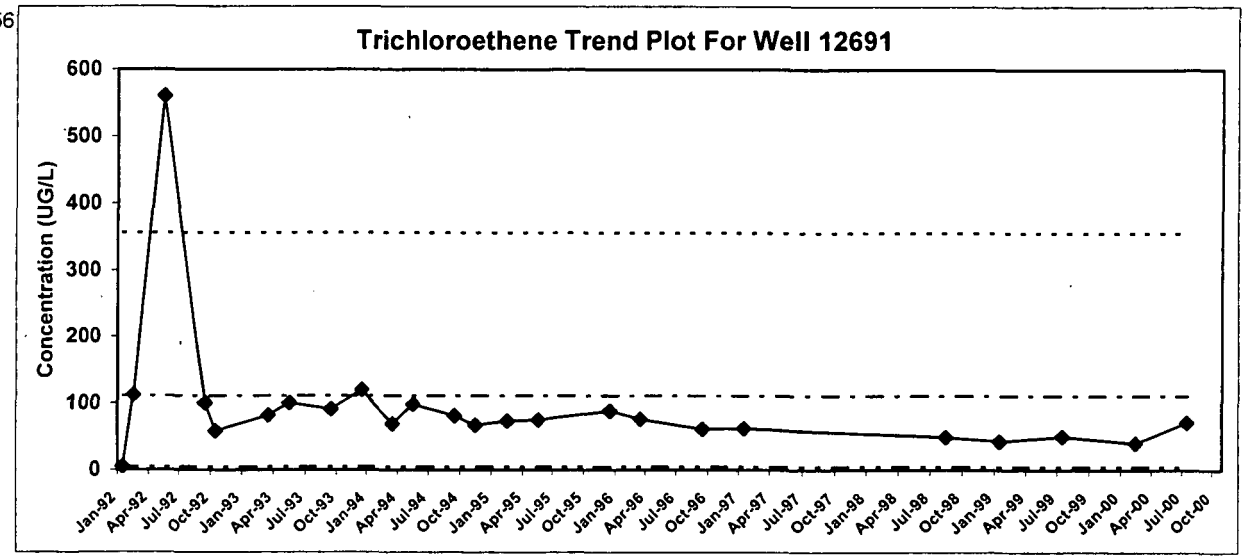
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

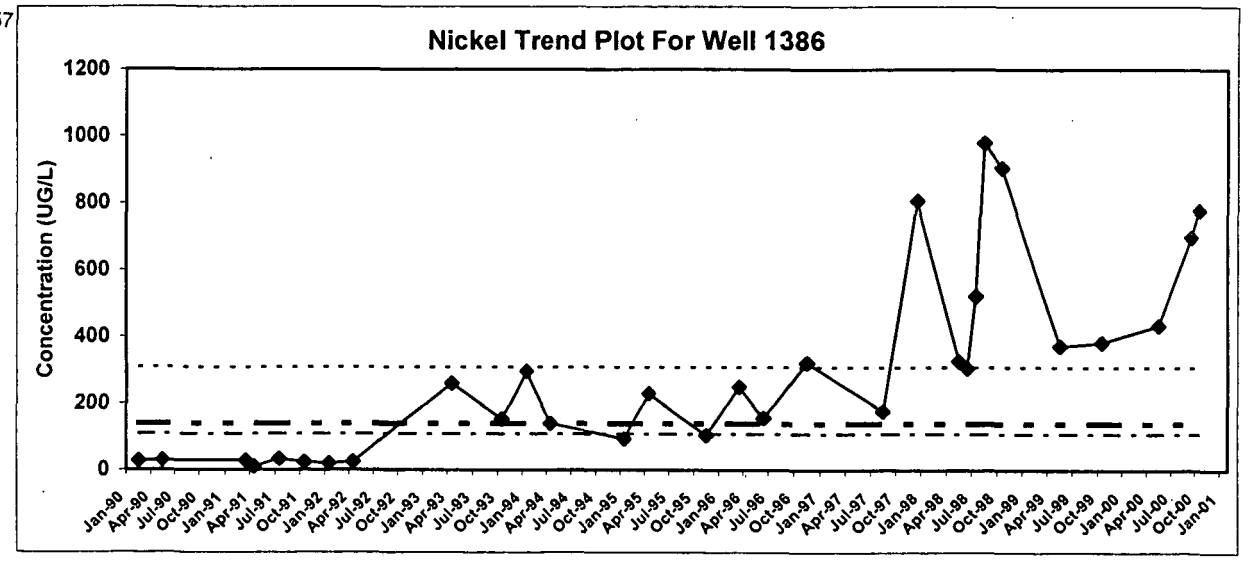
A-55



A-56



A-57



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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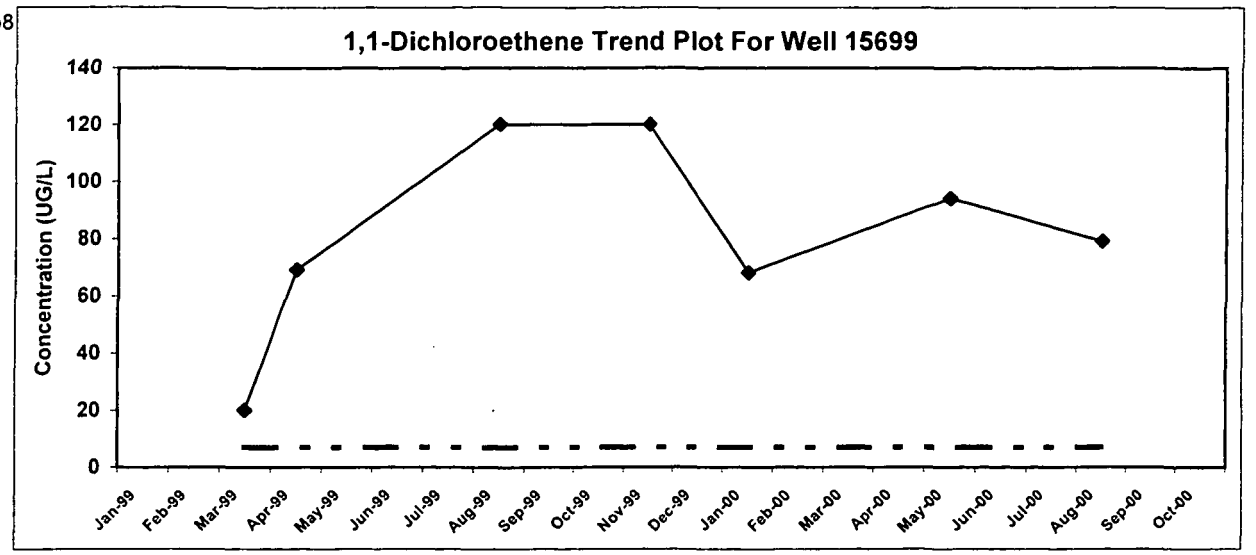
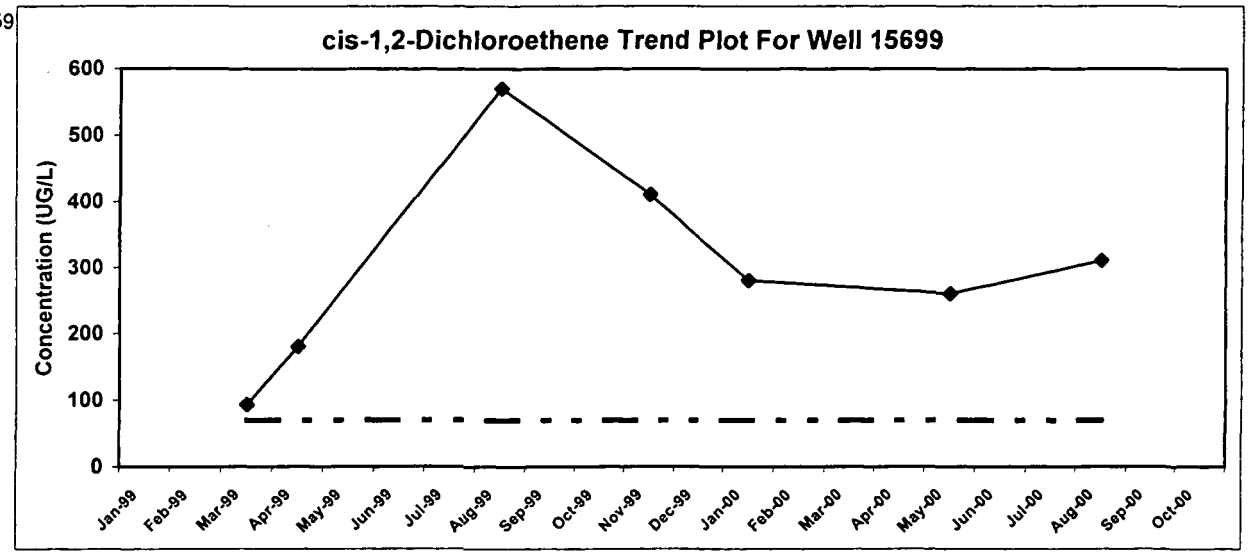
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

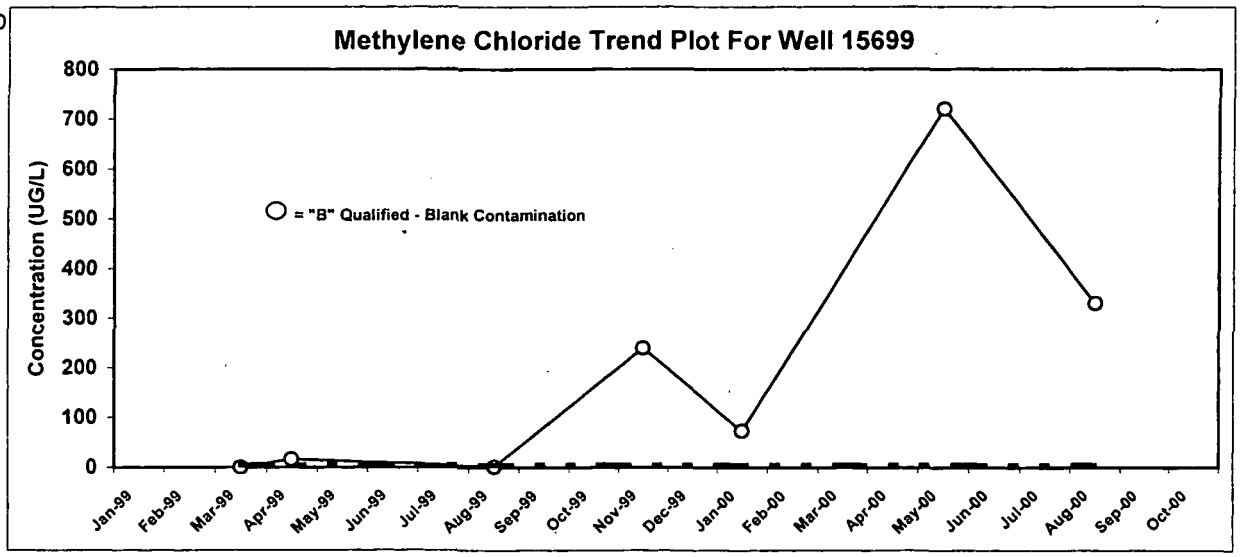
A-58



A-59



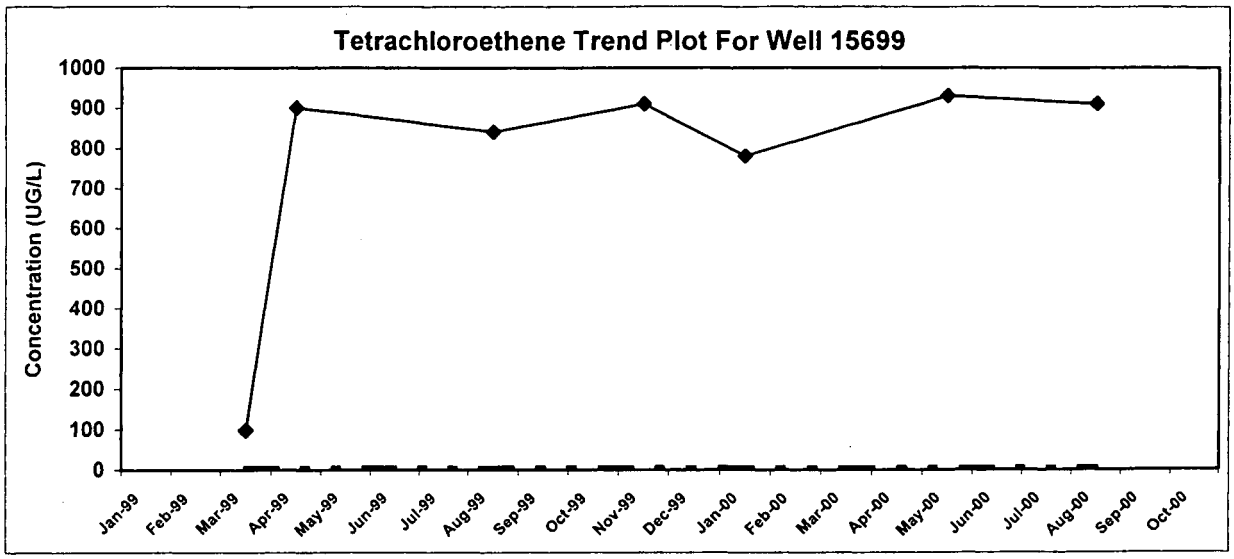
A-60



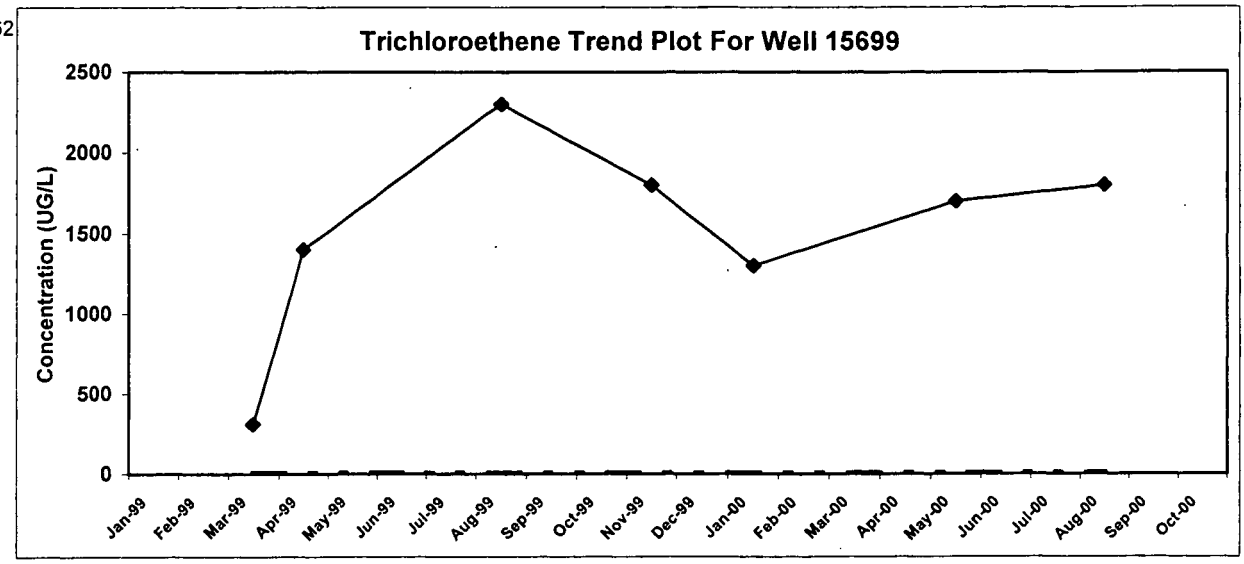
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

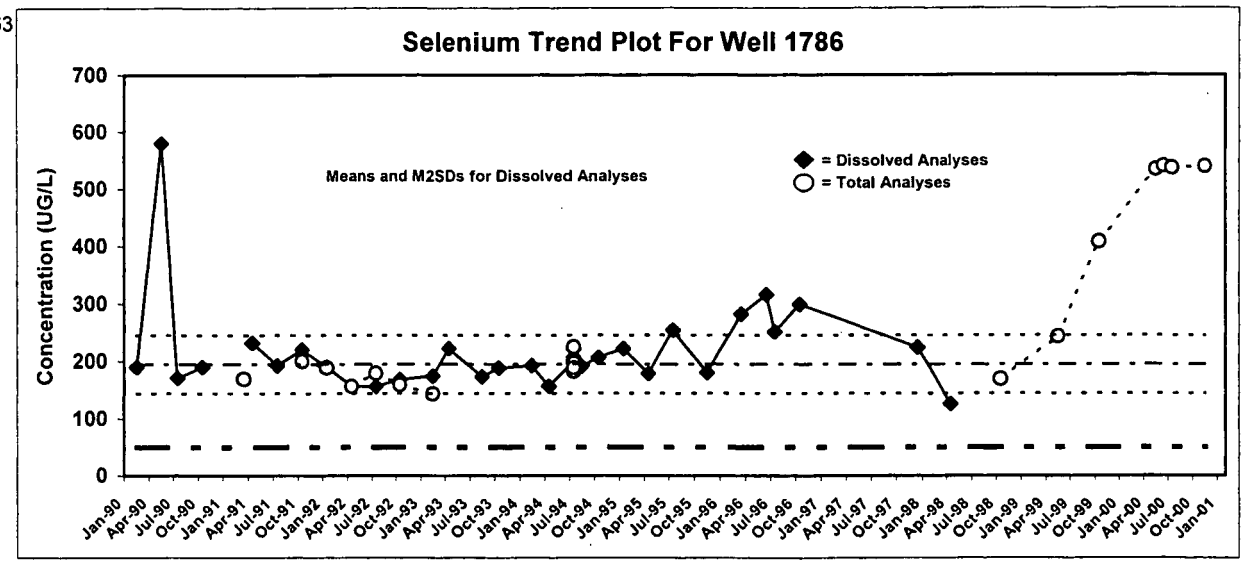
A-61



A-62



A-63



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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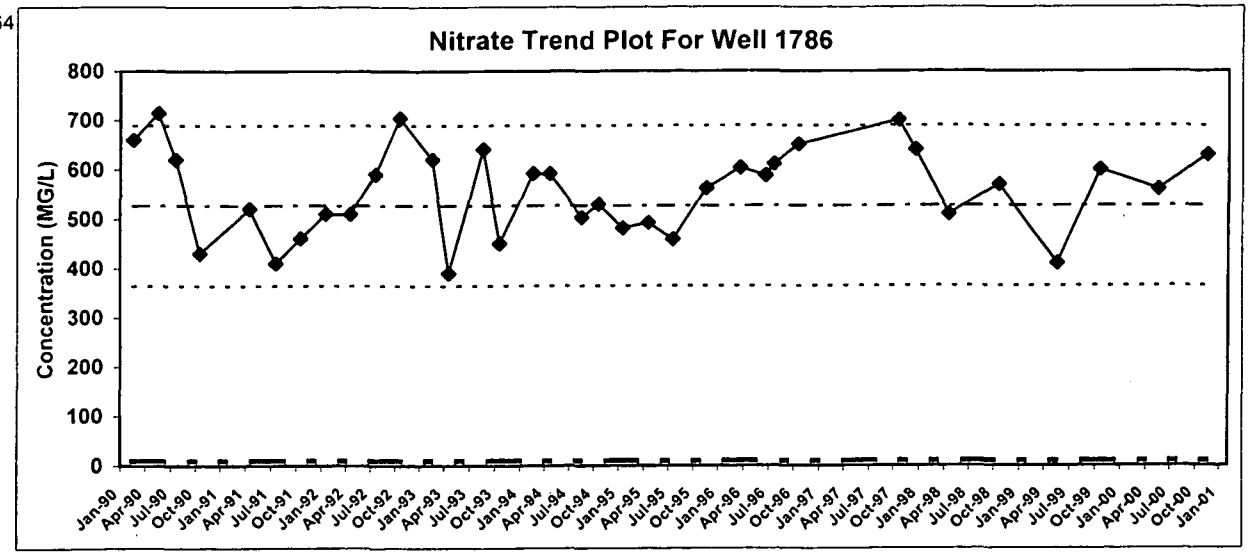
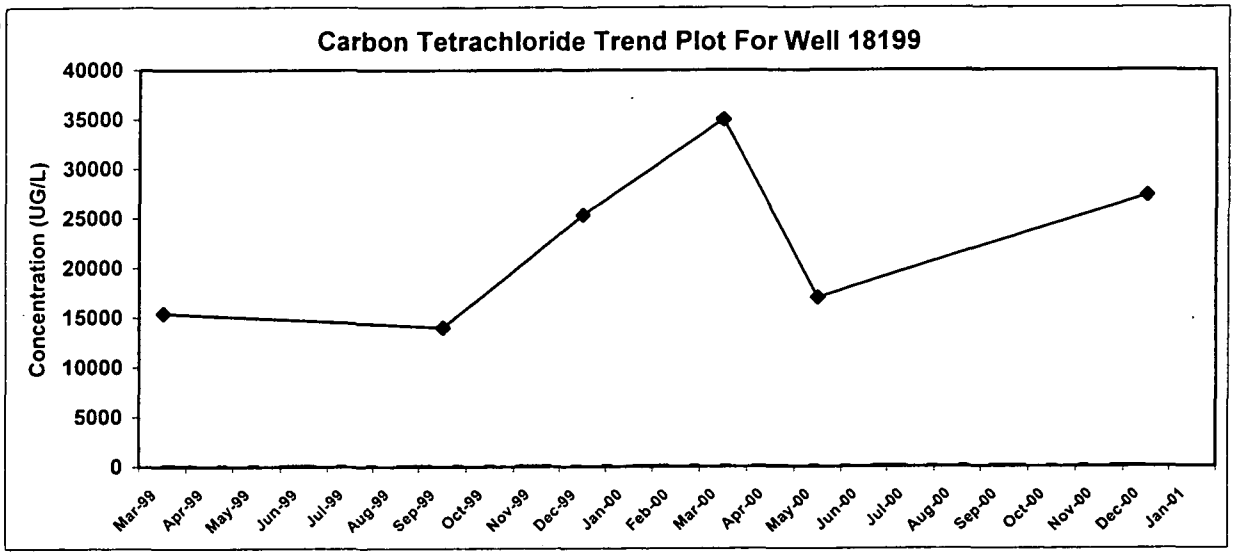
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

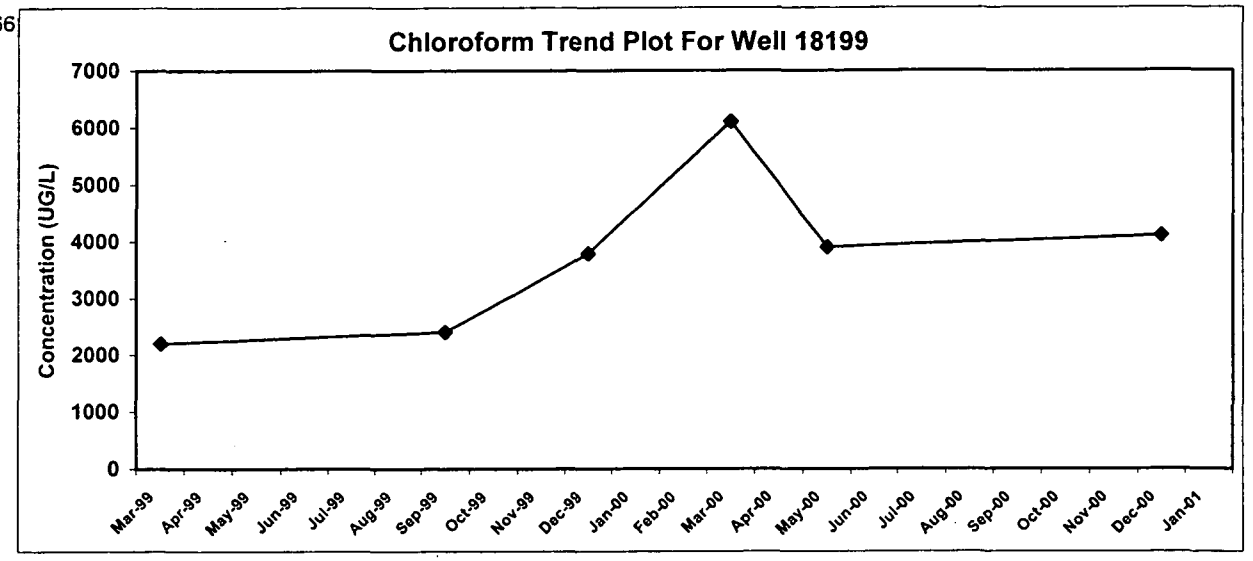
A-64



A-65



A-66



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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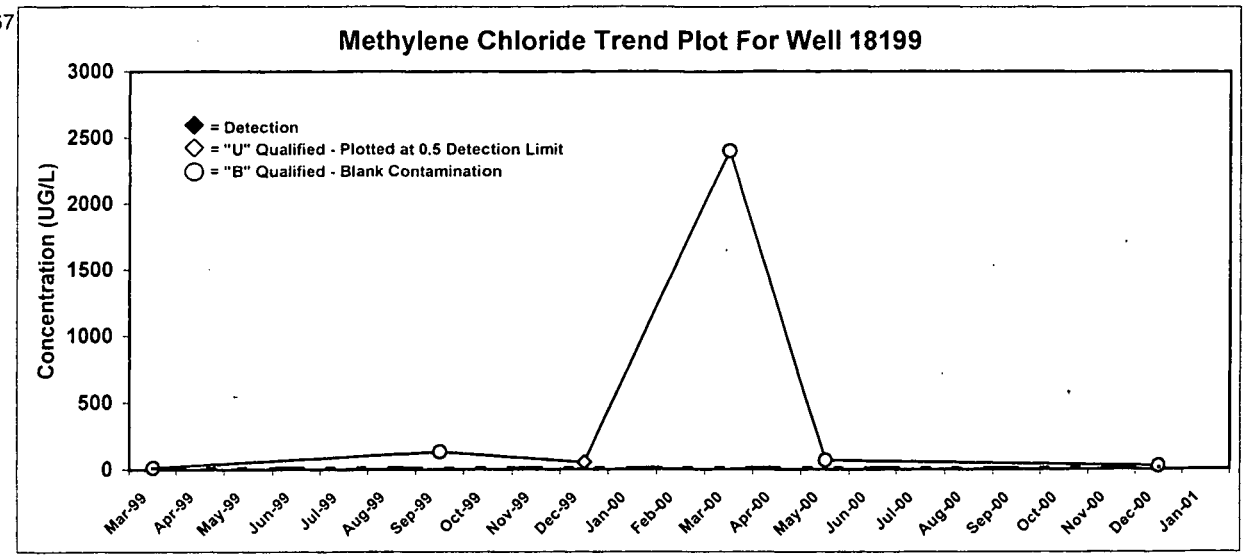
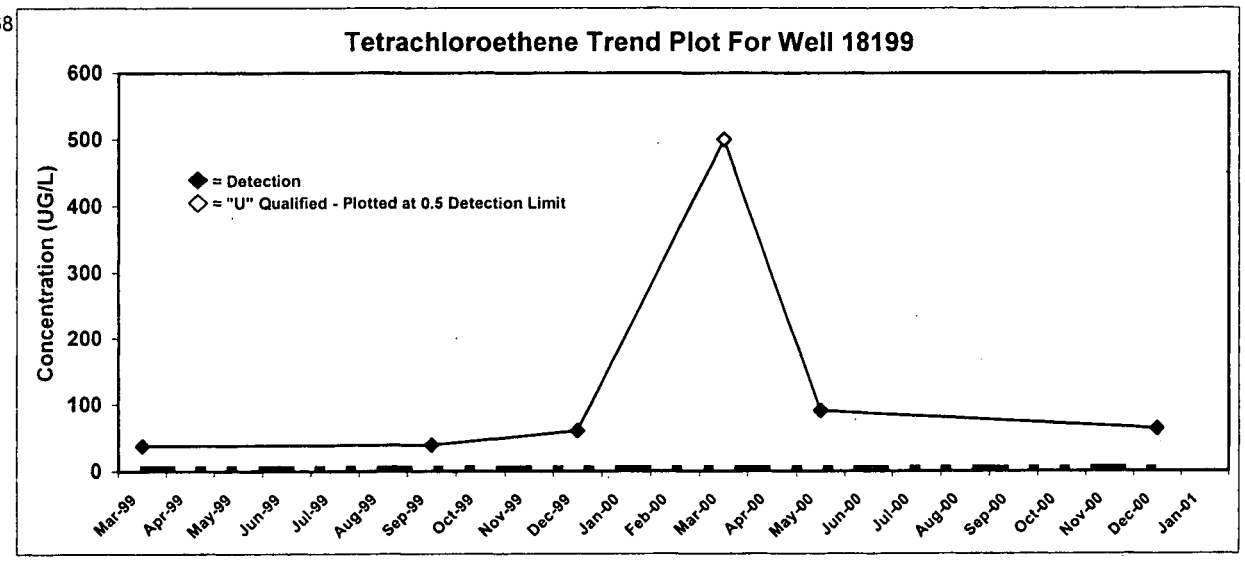
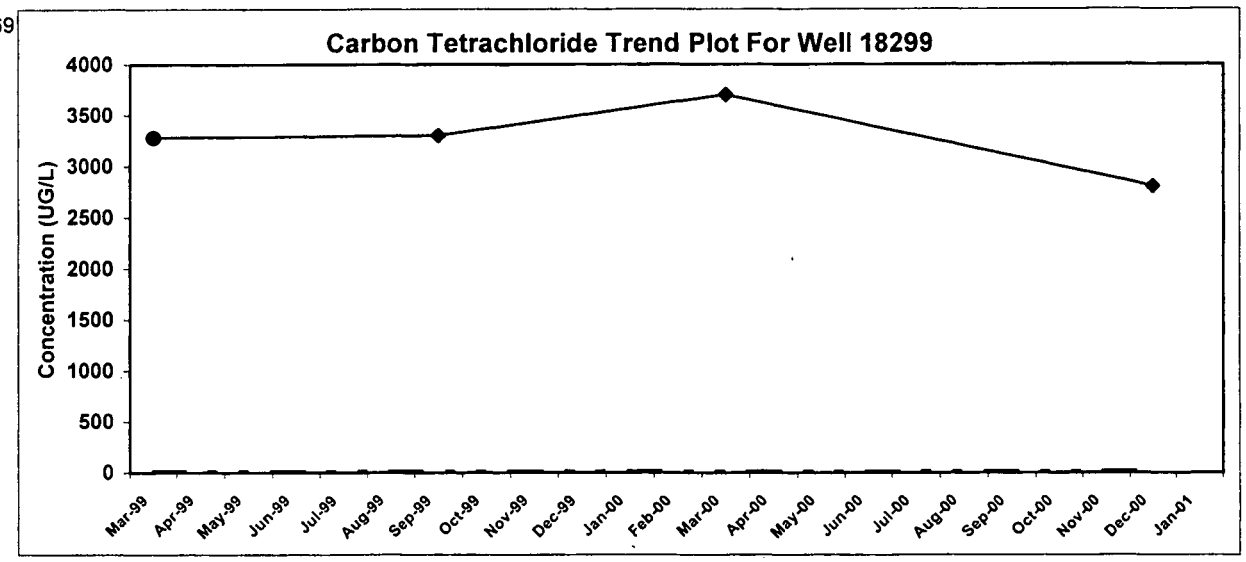
A-67



A-68



A-69



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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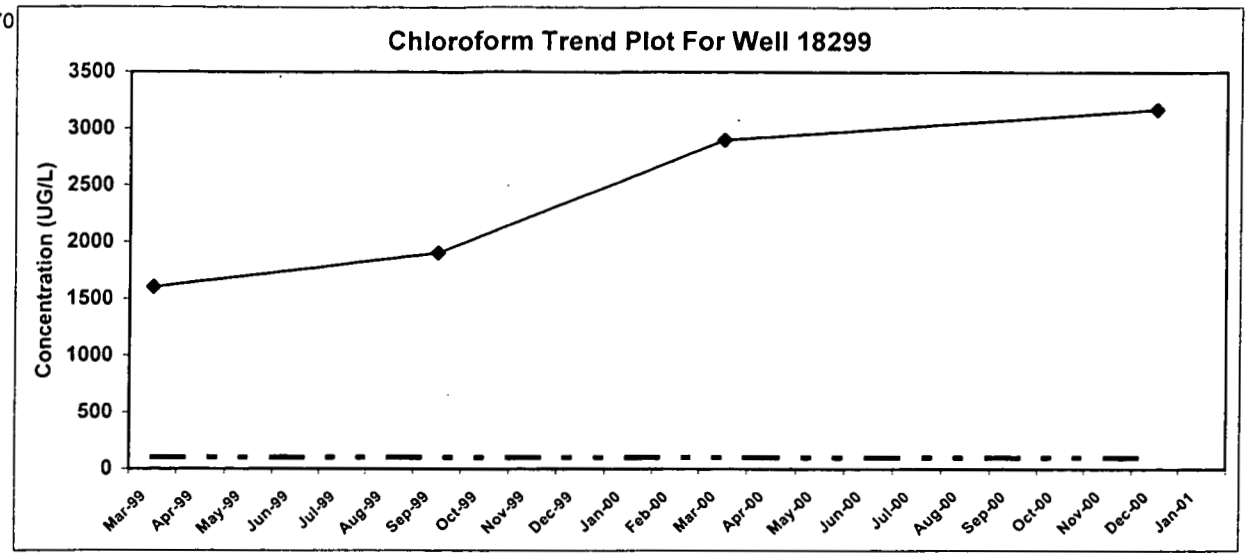
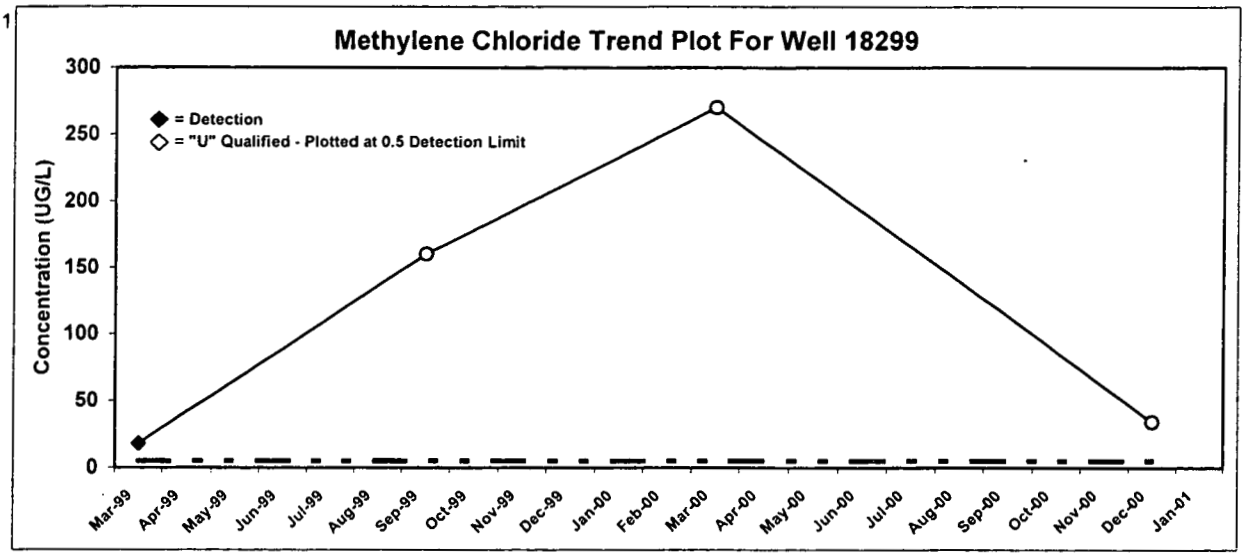
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

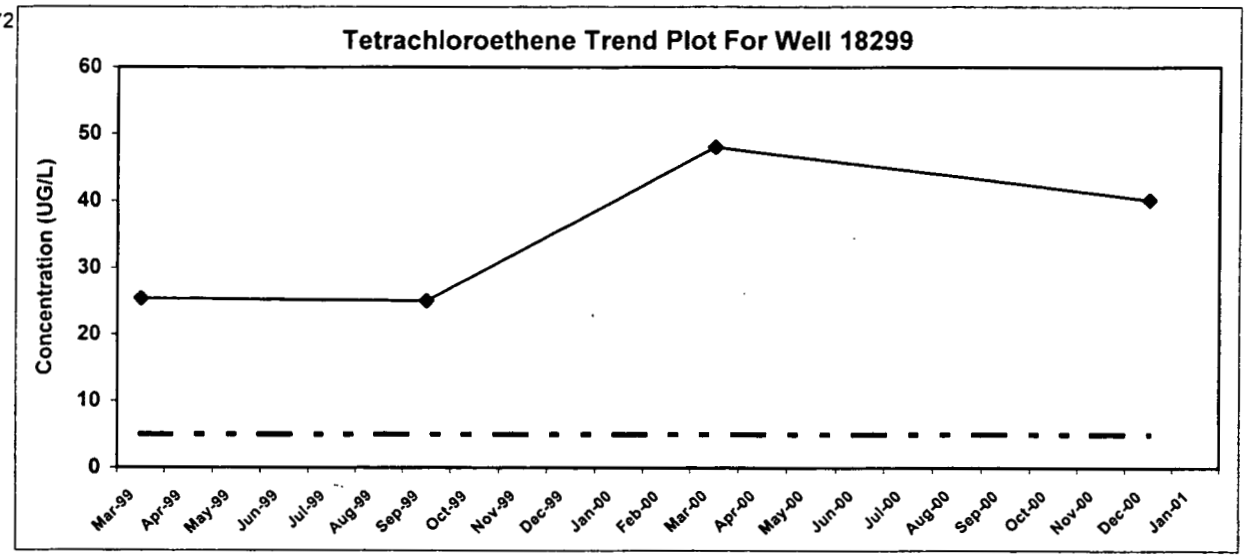
A-70



A-71



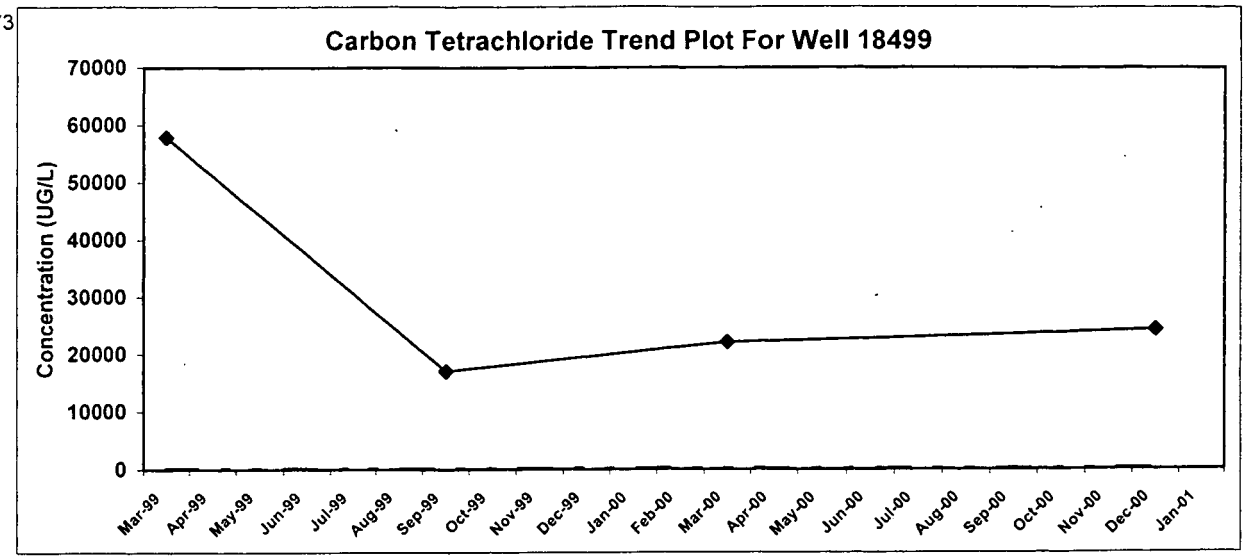
A-72



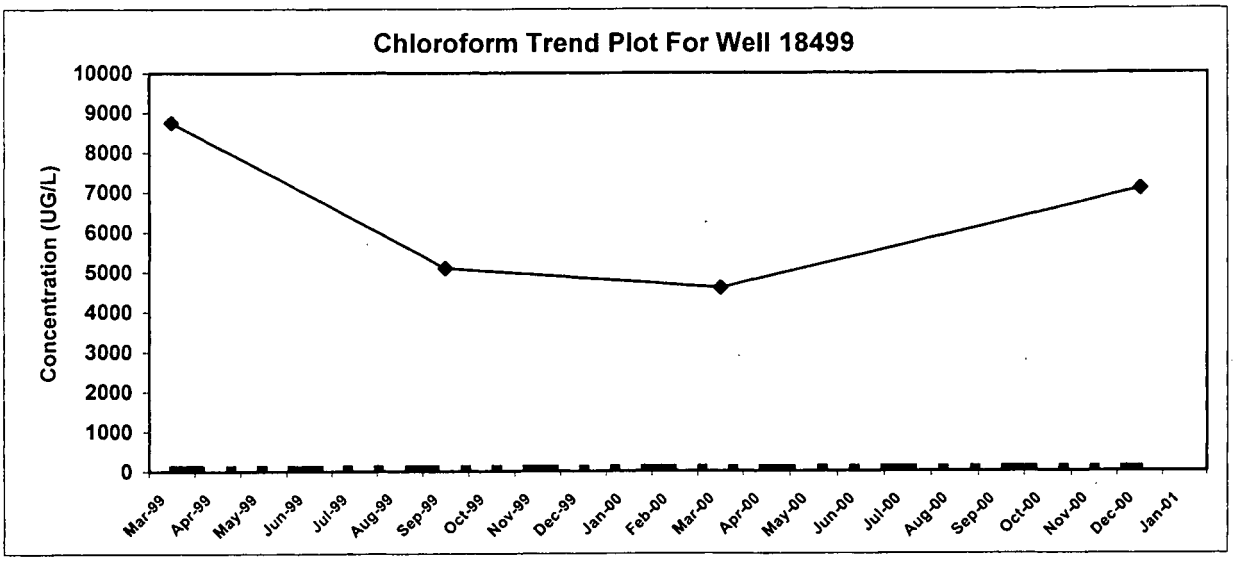
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

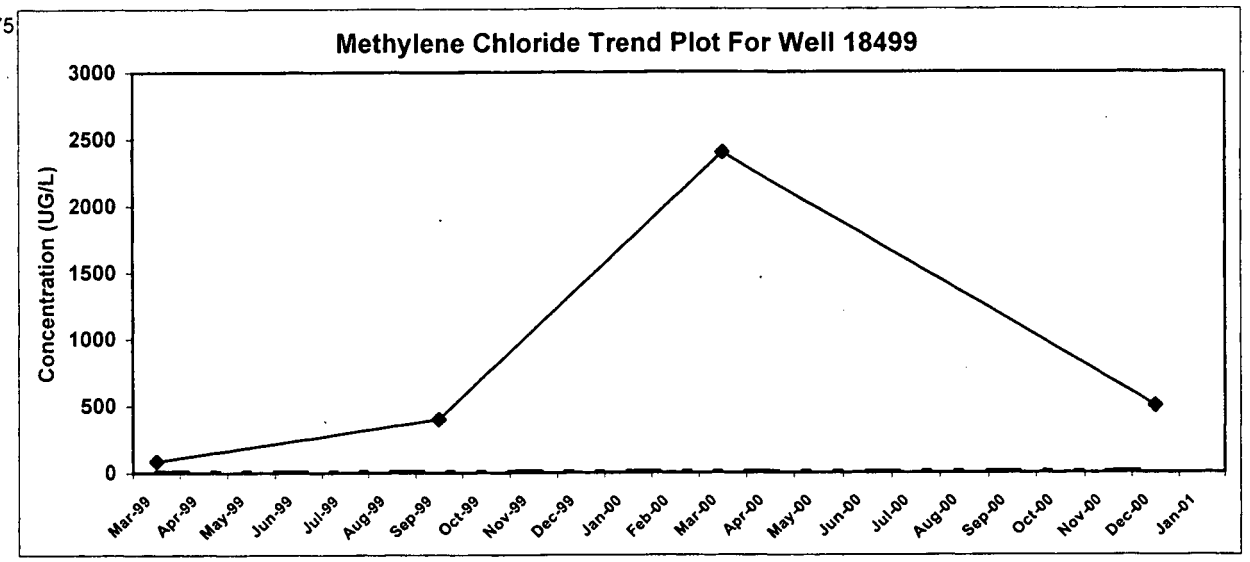
A-73



A-74



A-75



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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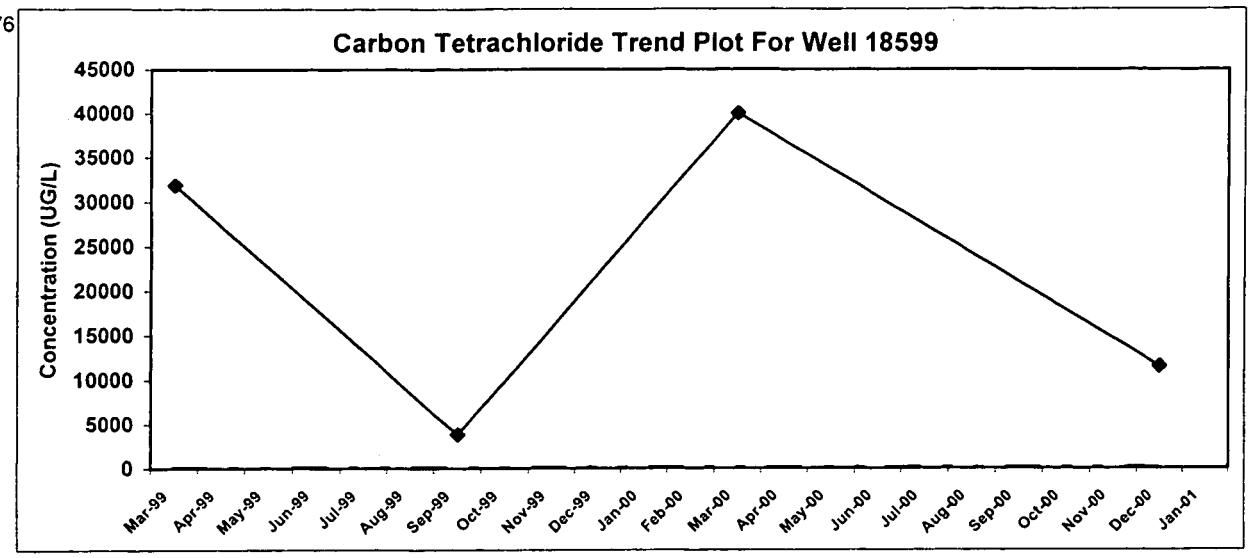
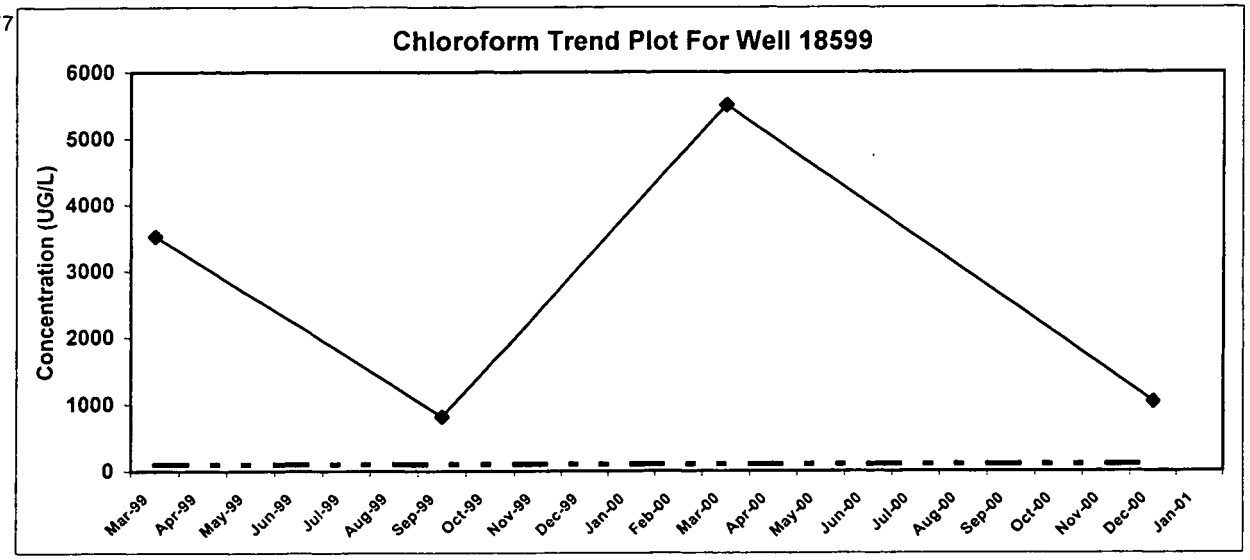
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

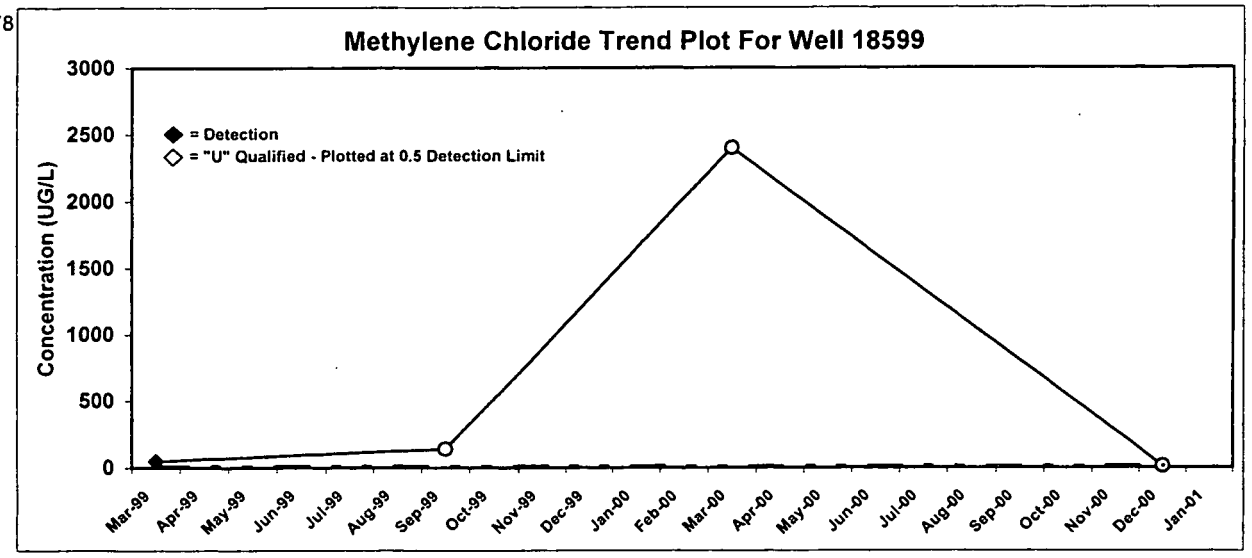
A-76



A-77



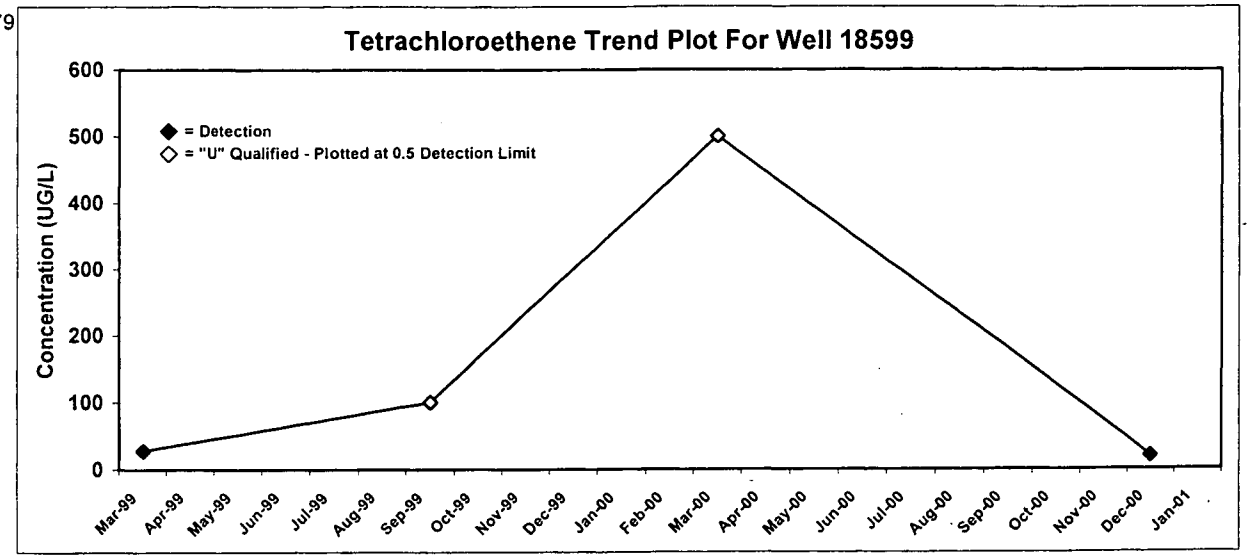
A-78



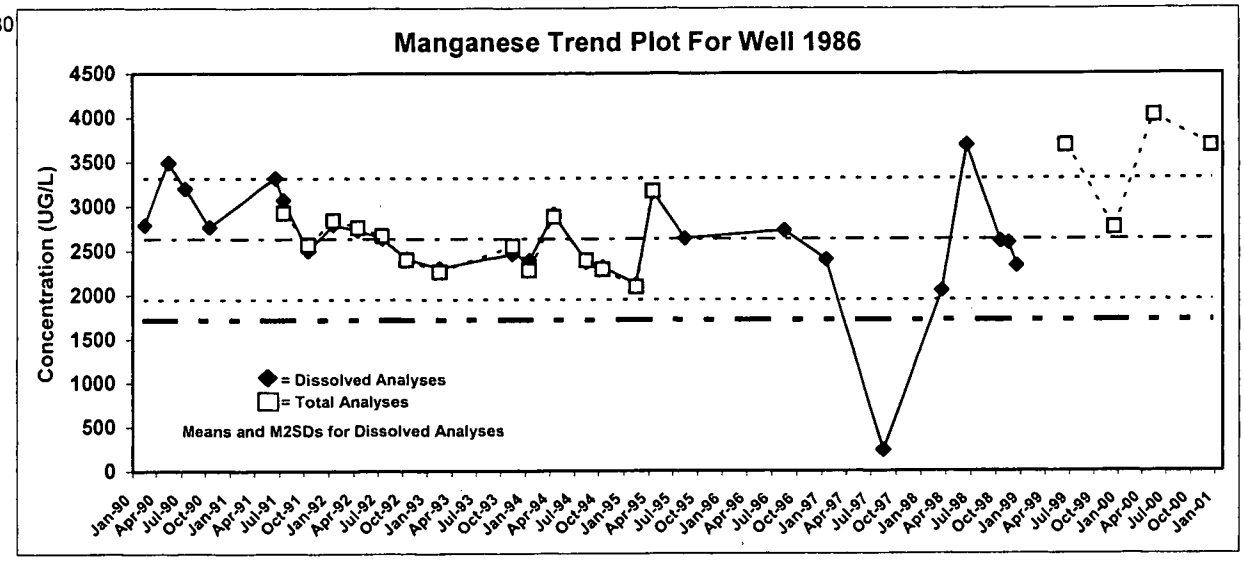
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

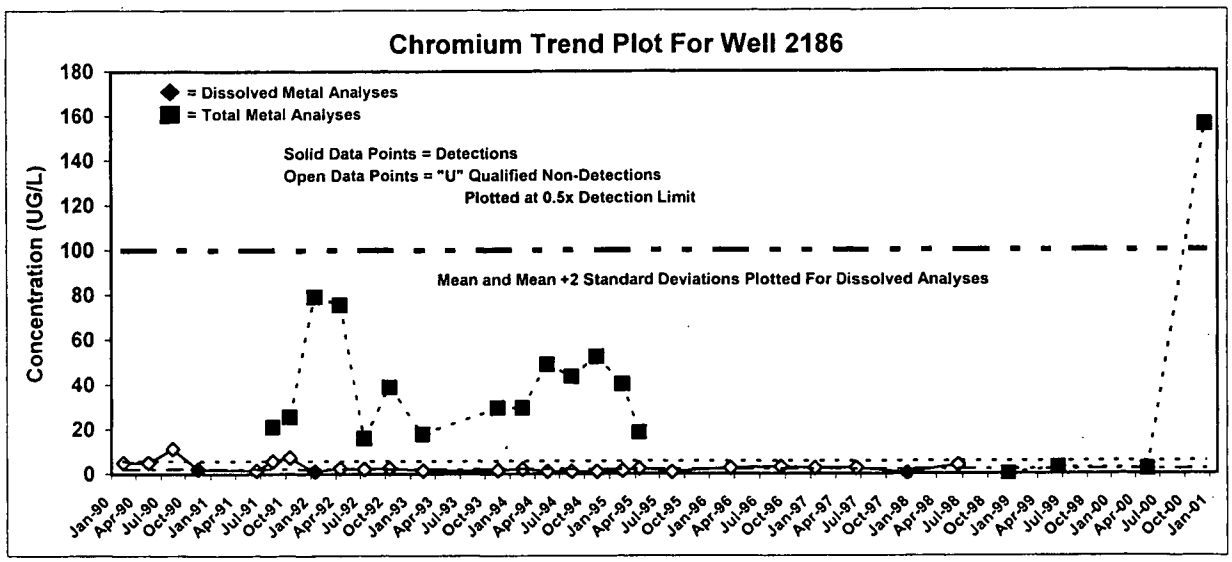
A-79



A-80



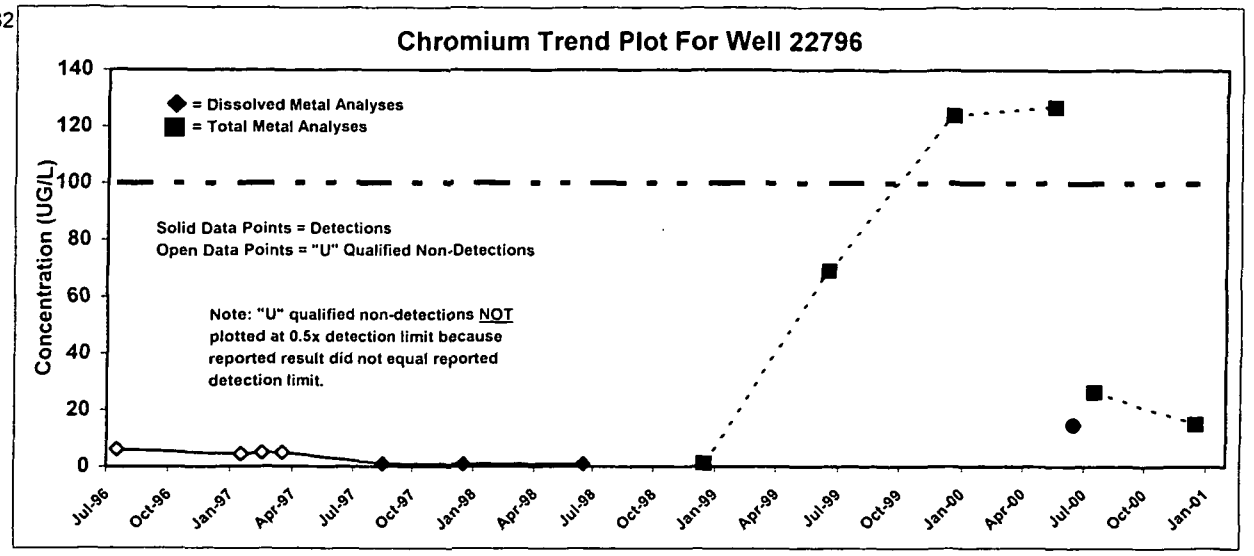
A-81



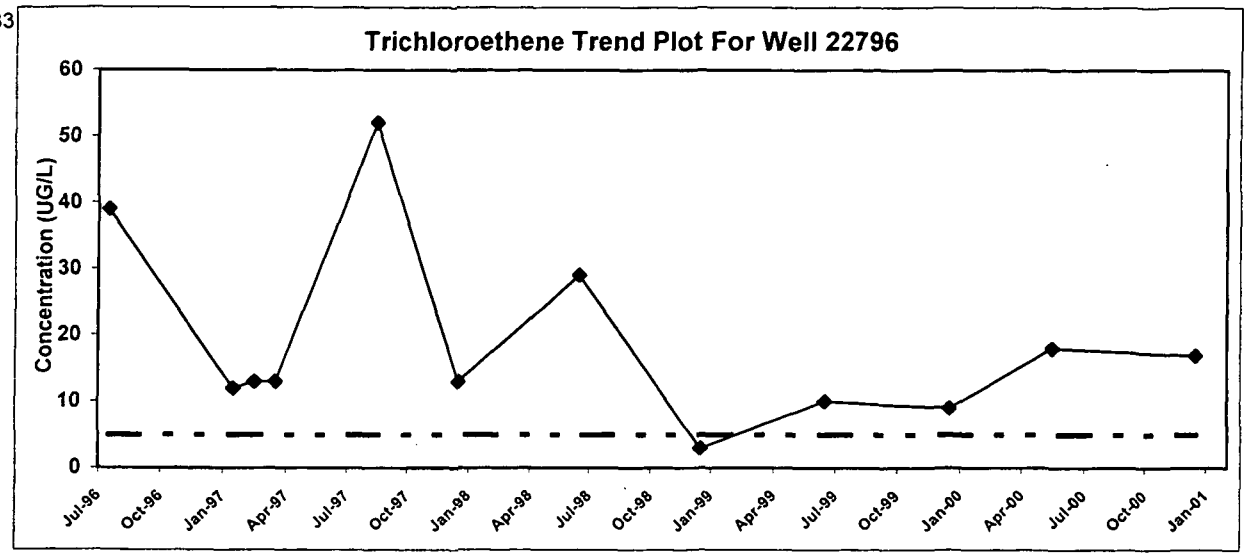
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

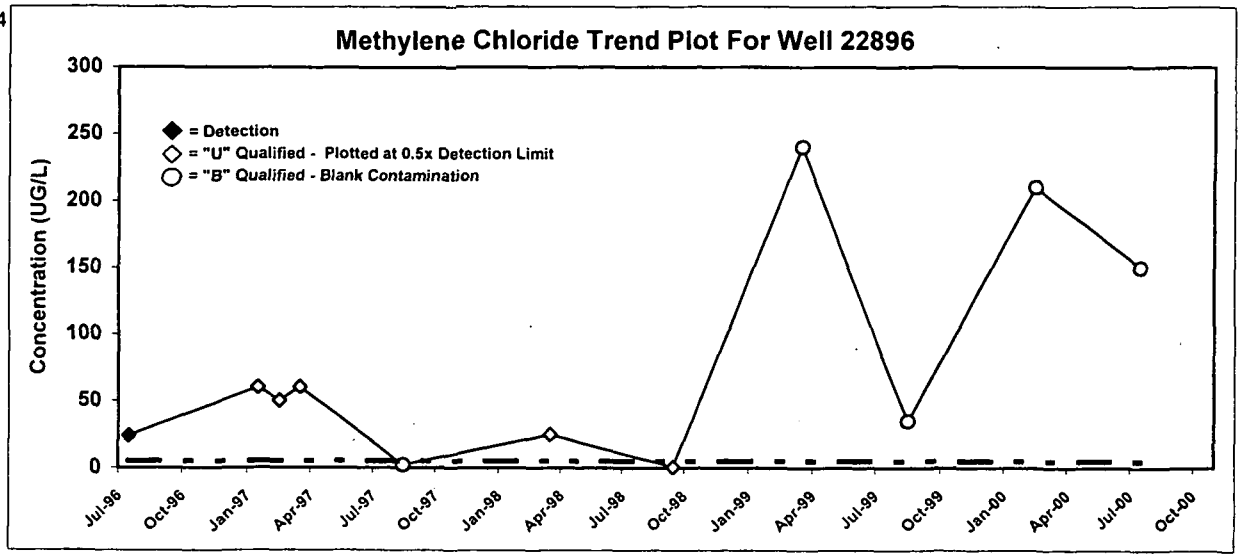
A-82



A-83



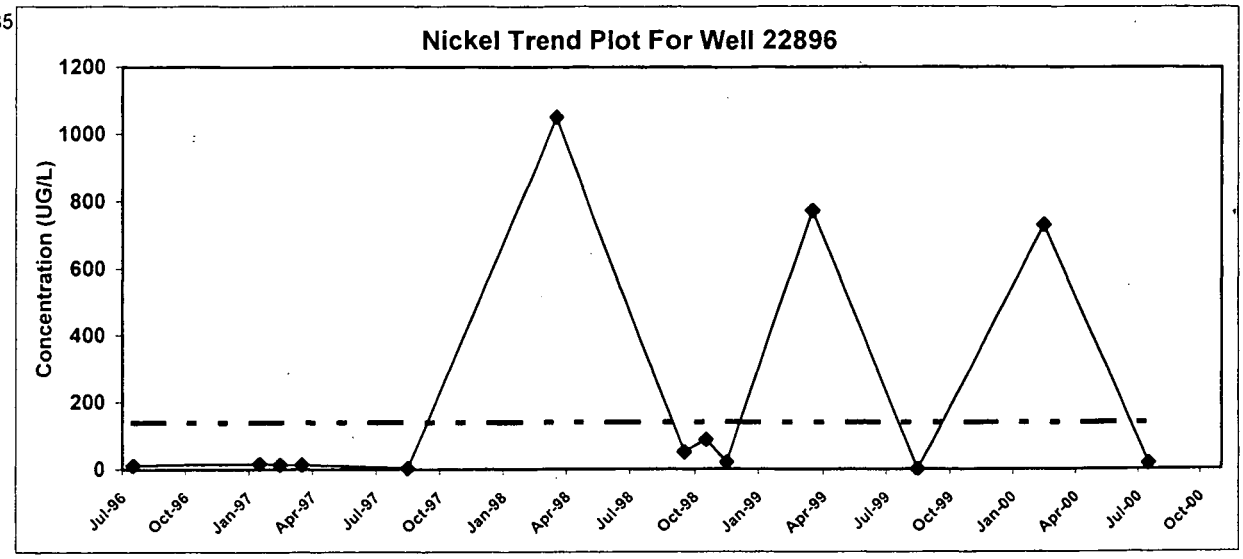
A-84



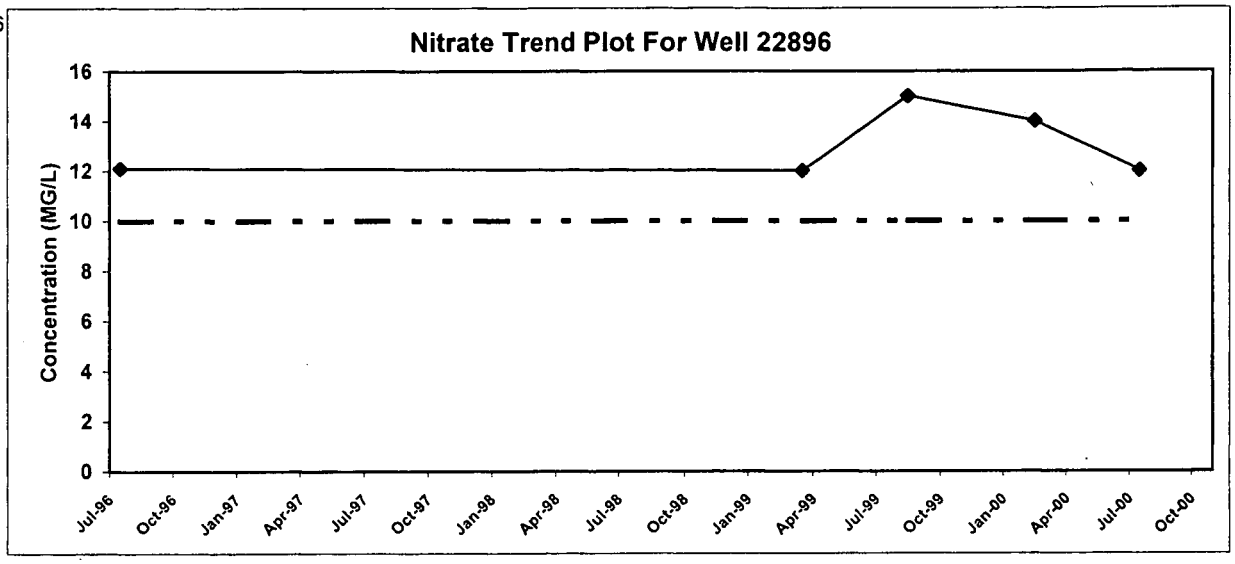
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

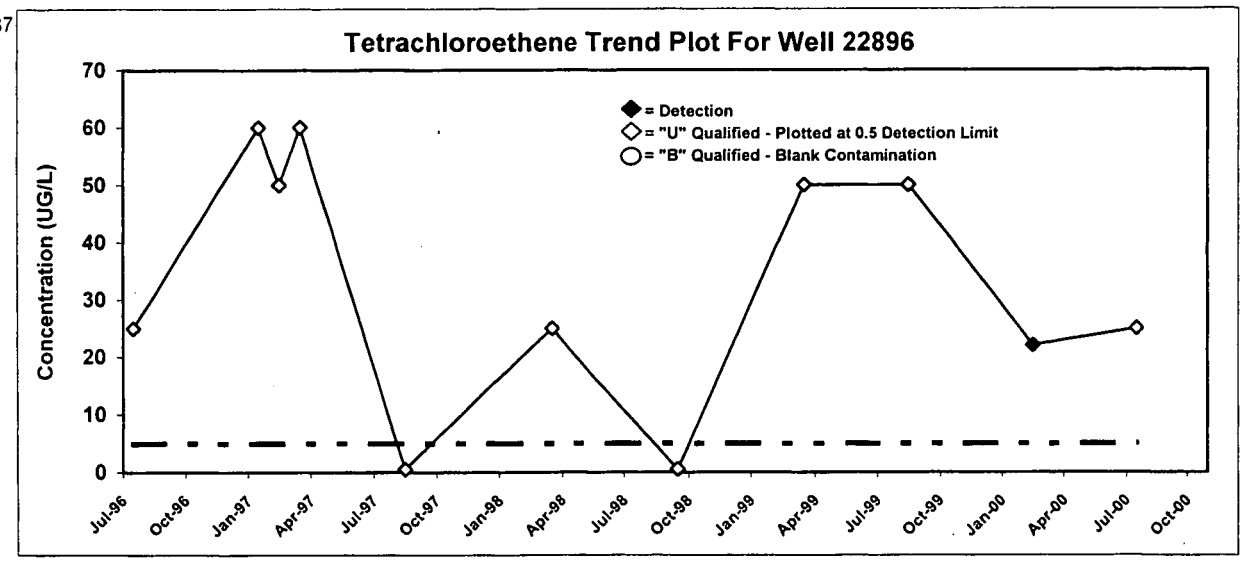
A-85



A-86



A-87



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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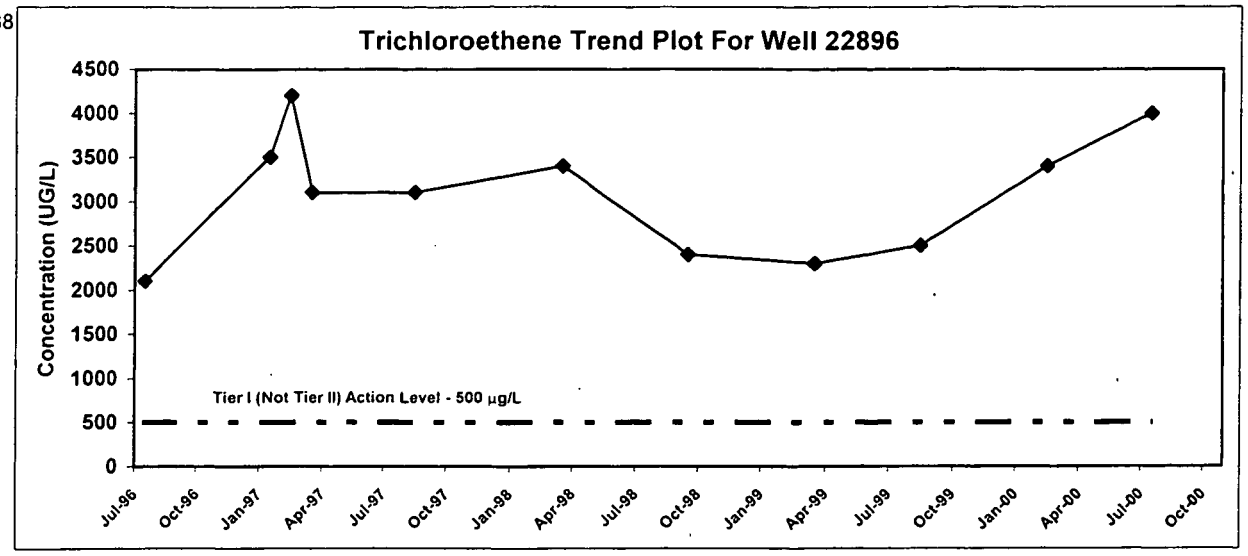
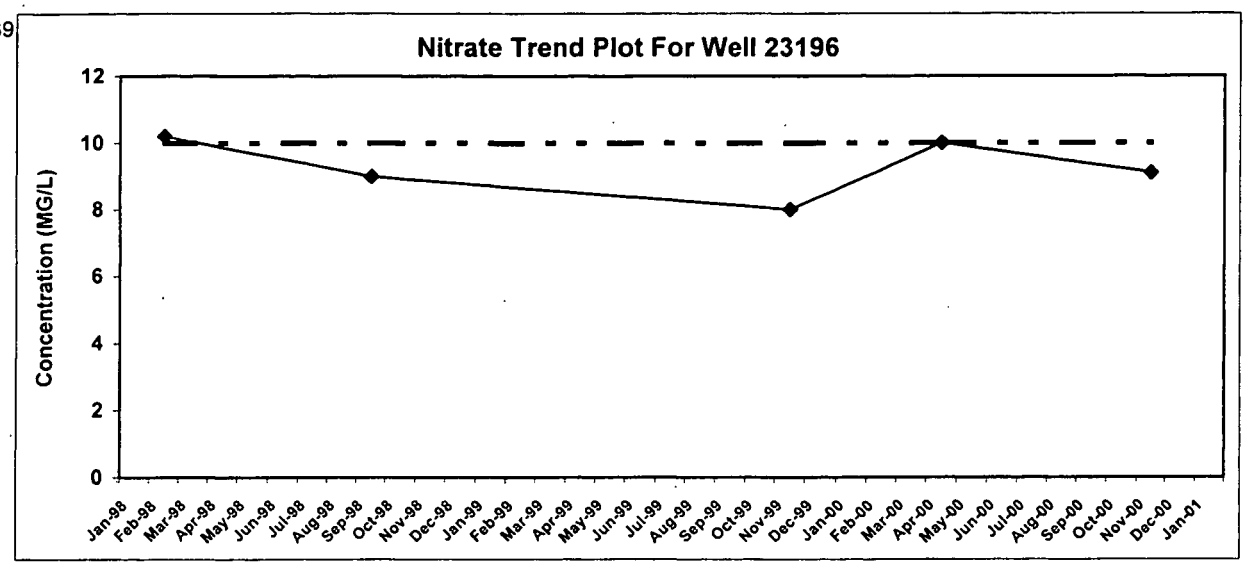
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

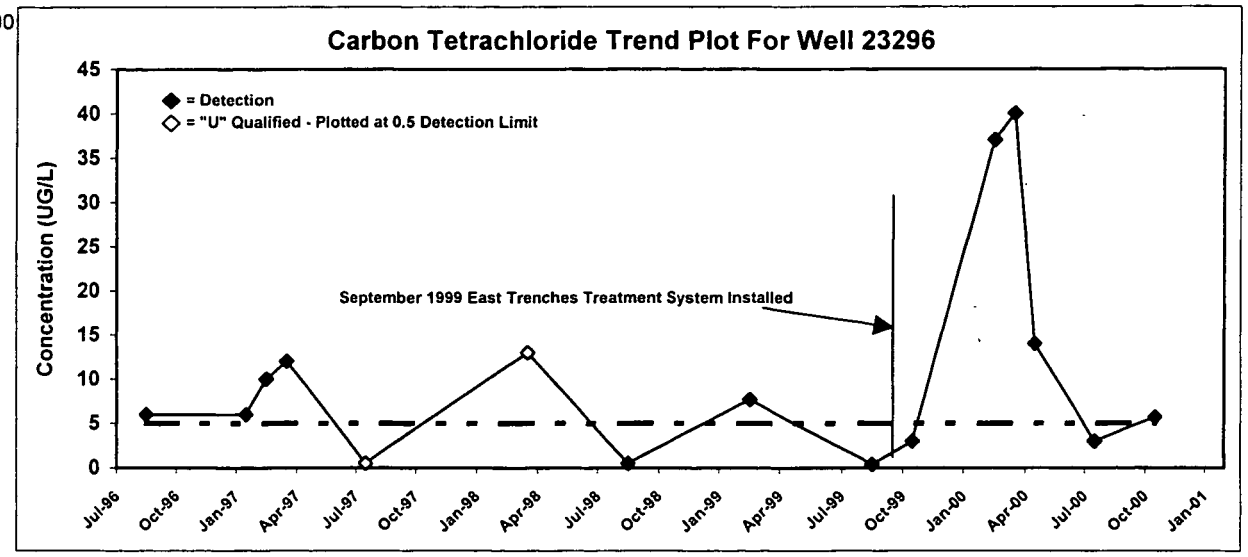
A-88



A-89



A-90

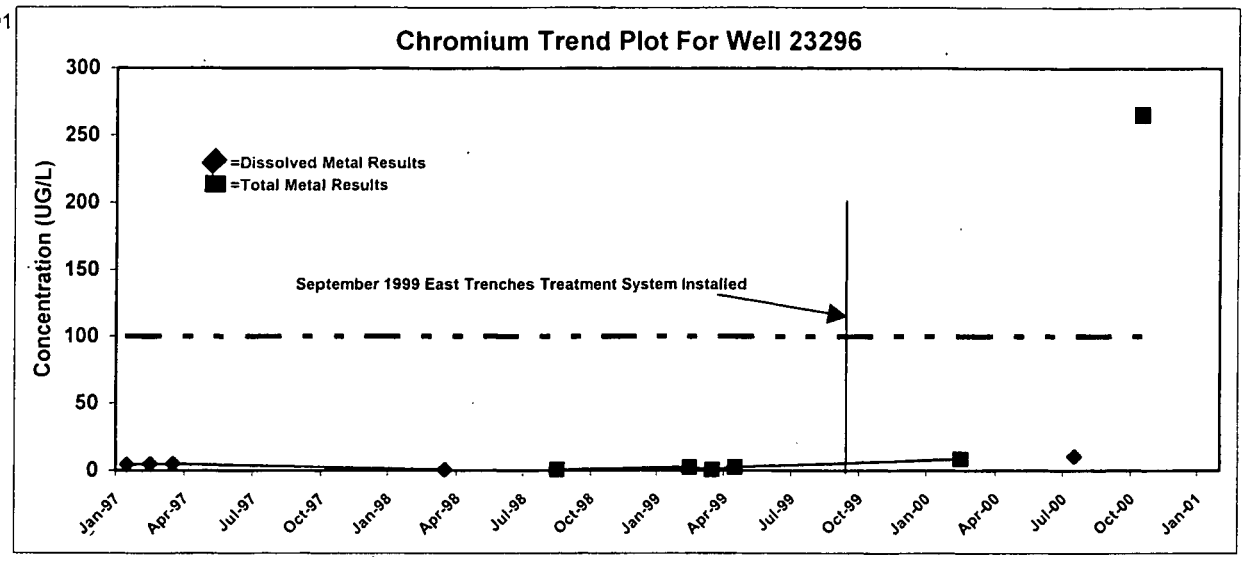


Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

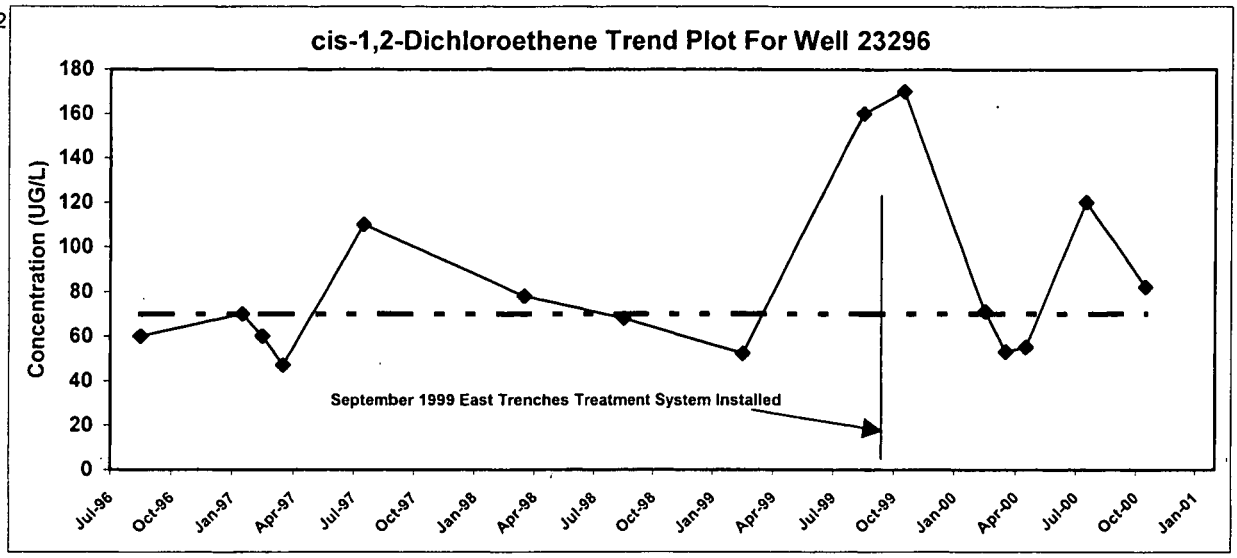
367

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

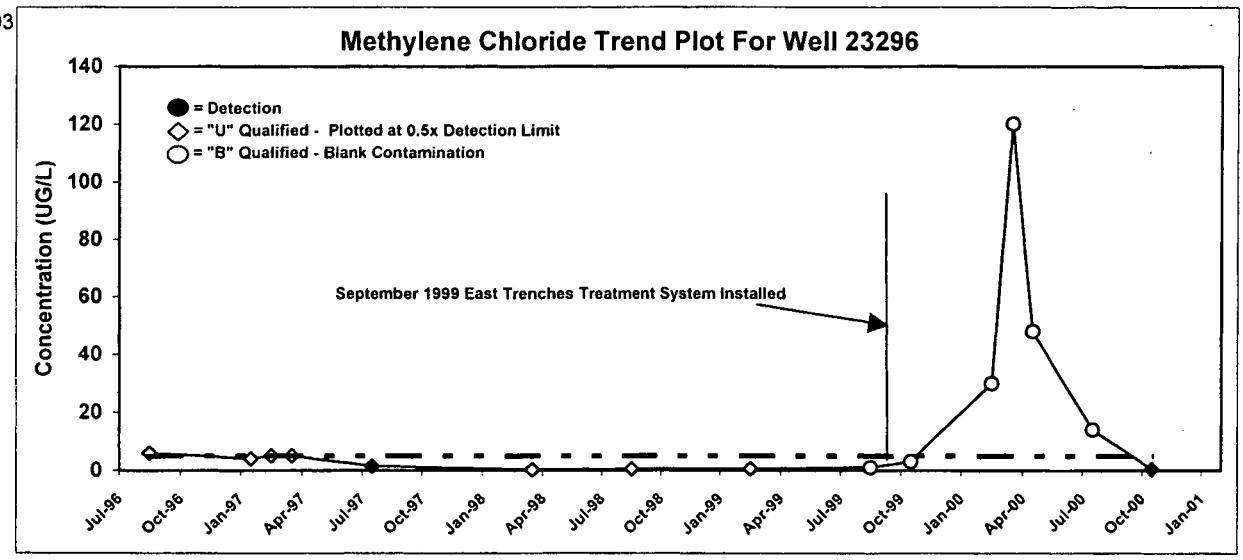
A-91



A-92



A-93



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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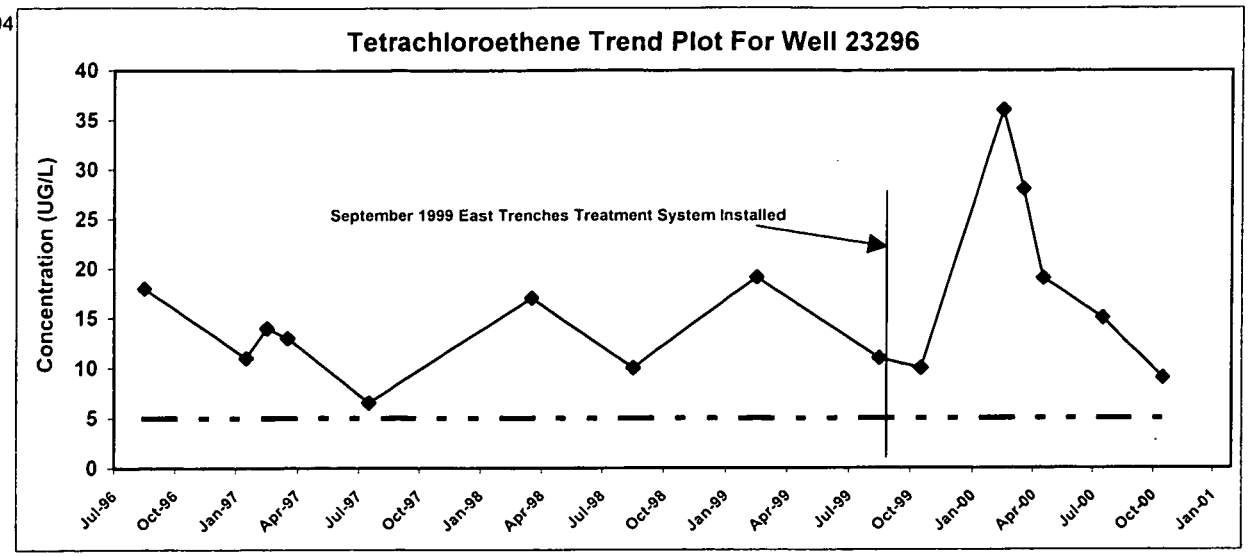
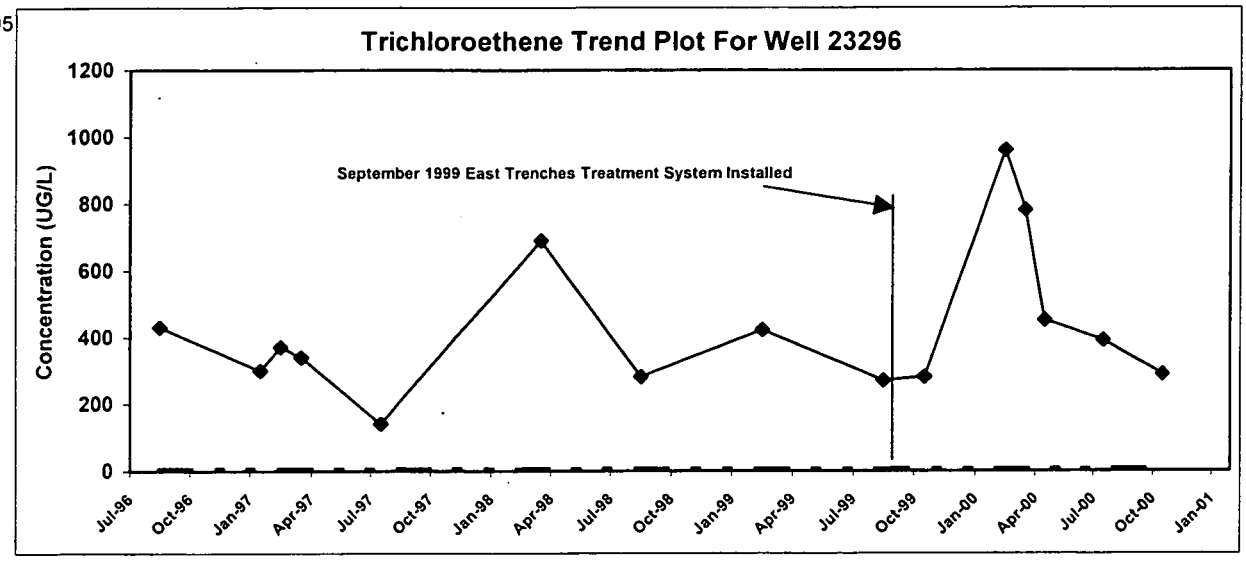
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

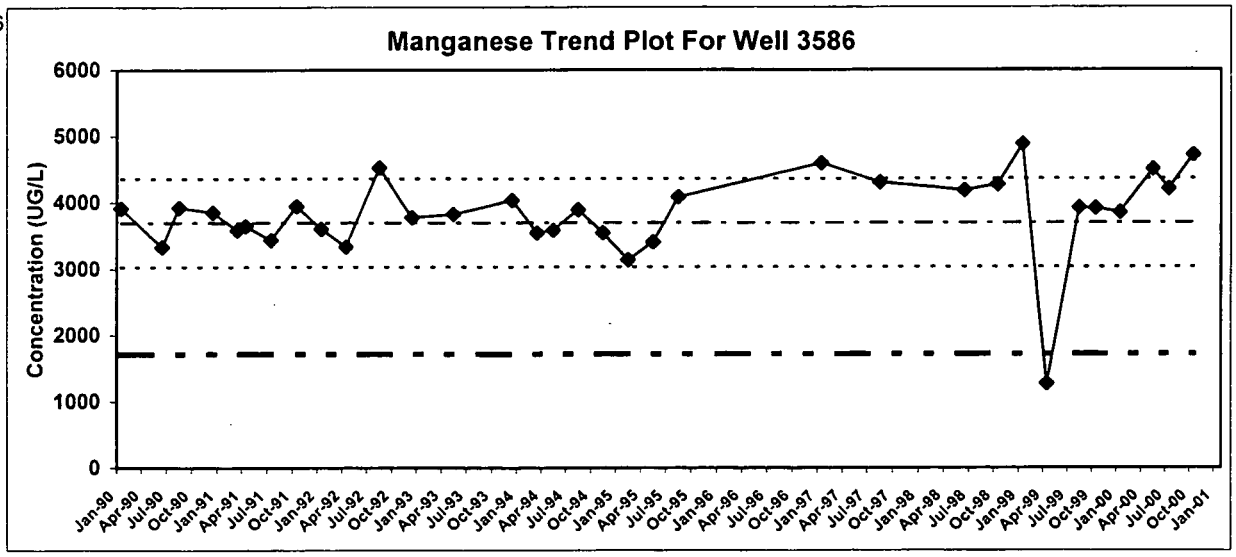
A-94



A-95



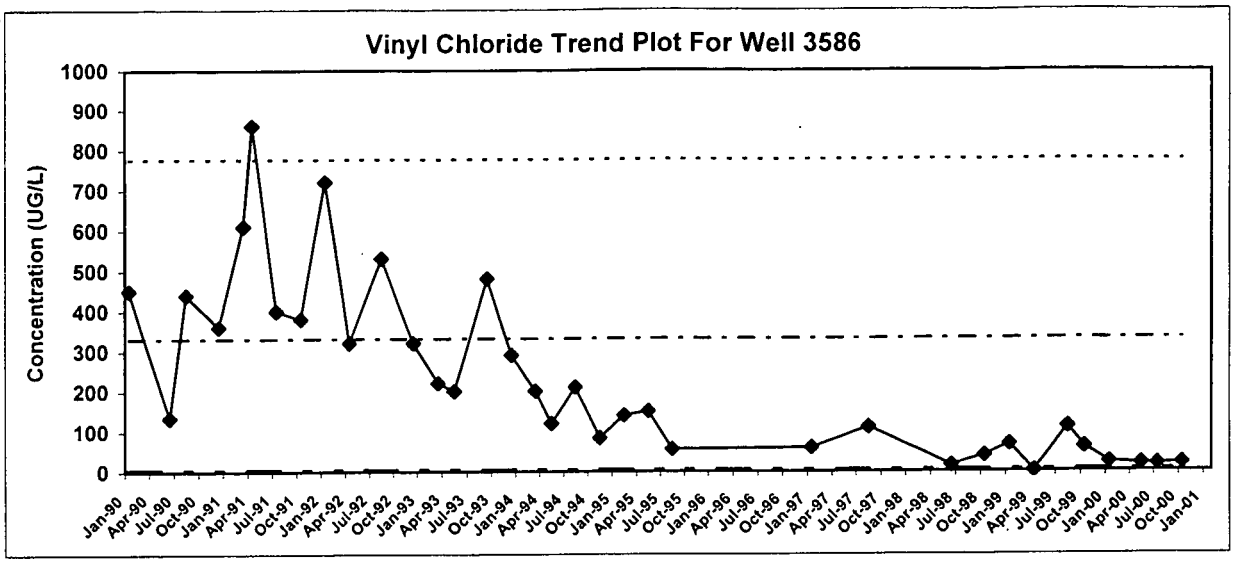
A-96



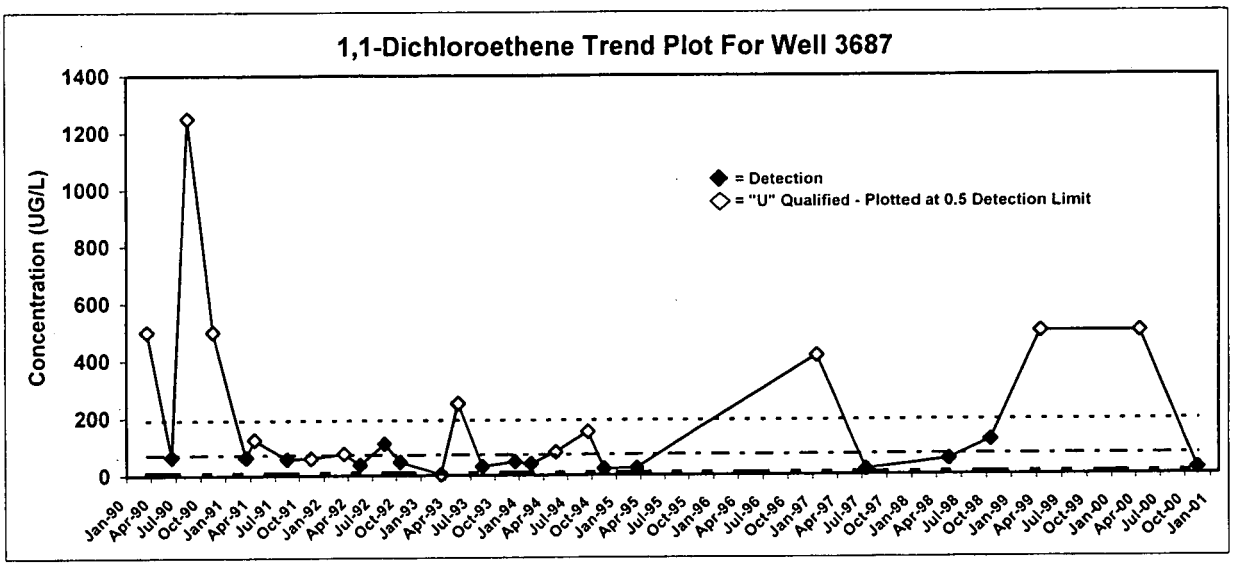
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

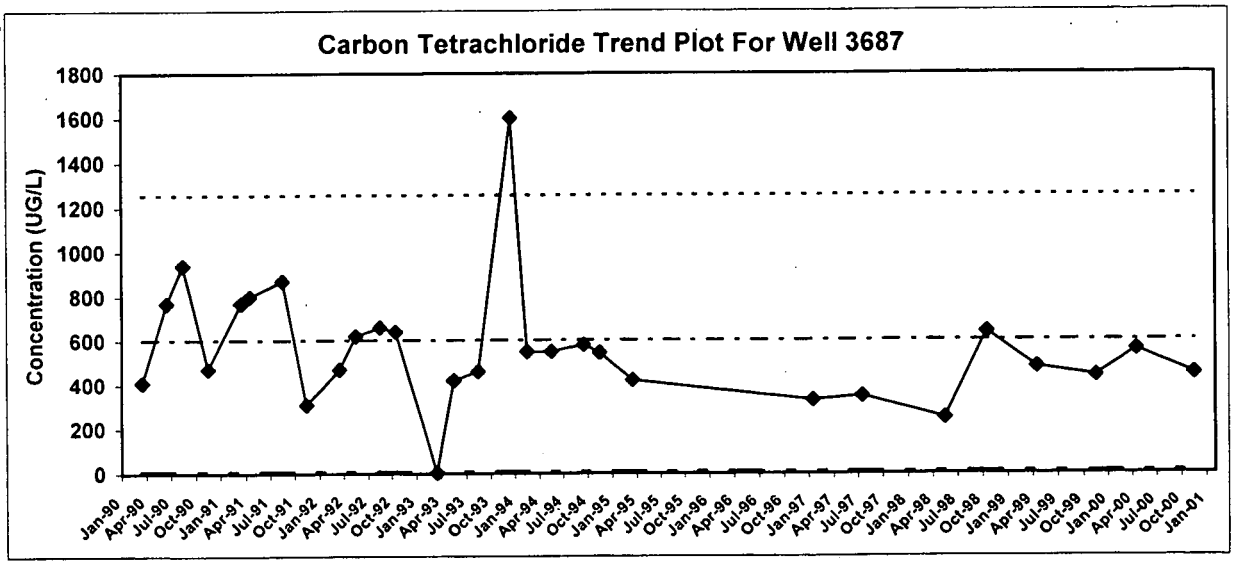
A-97



A-98



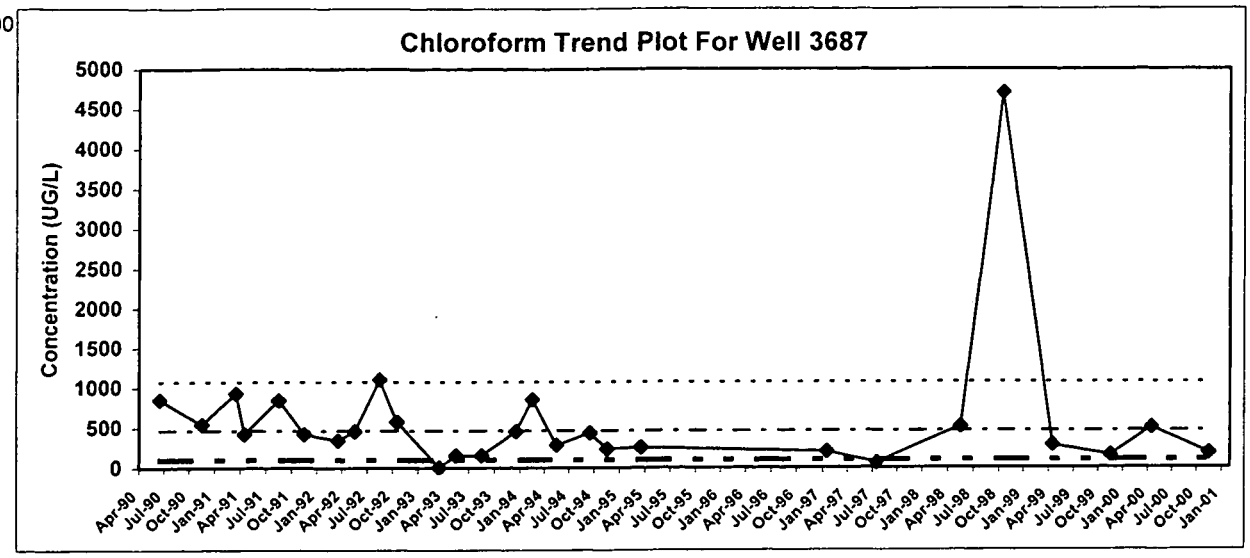
A-99



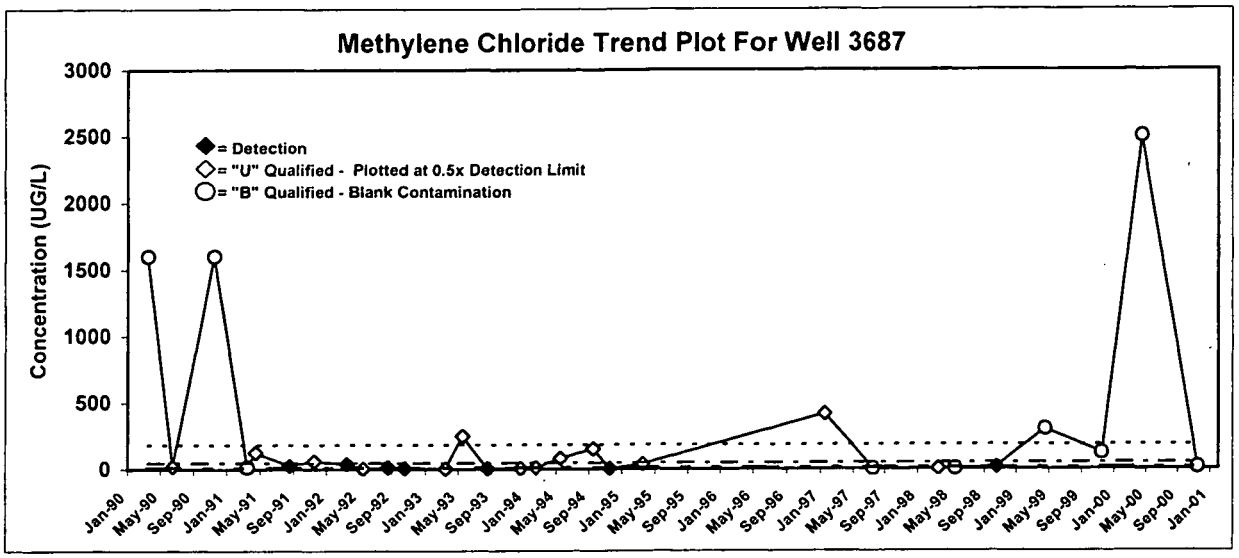
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

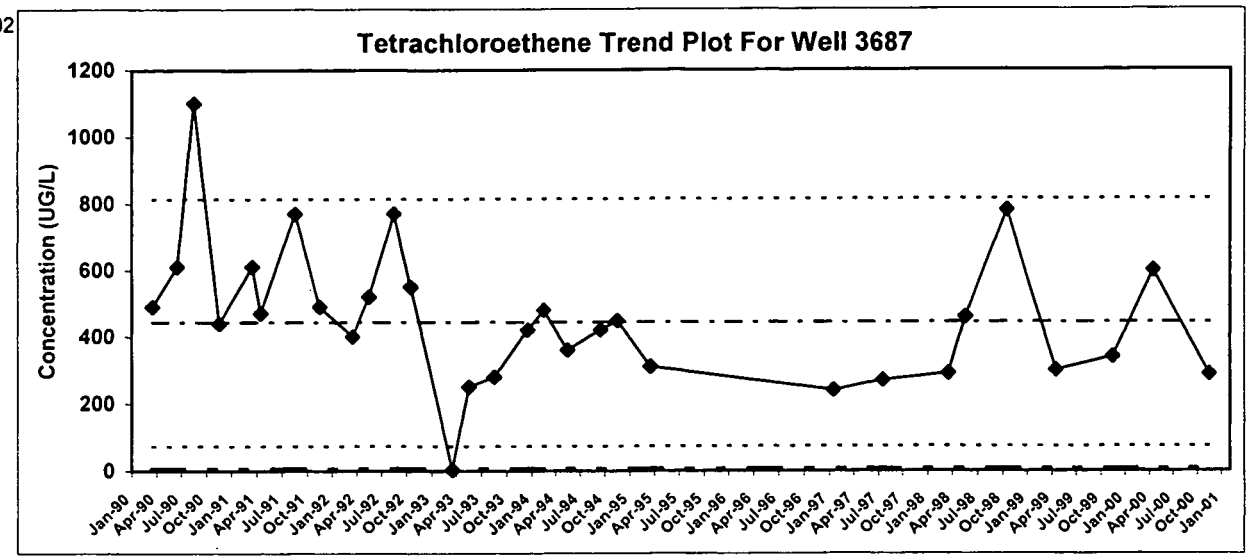
A-100



A-101



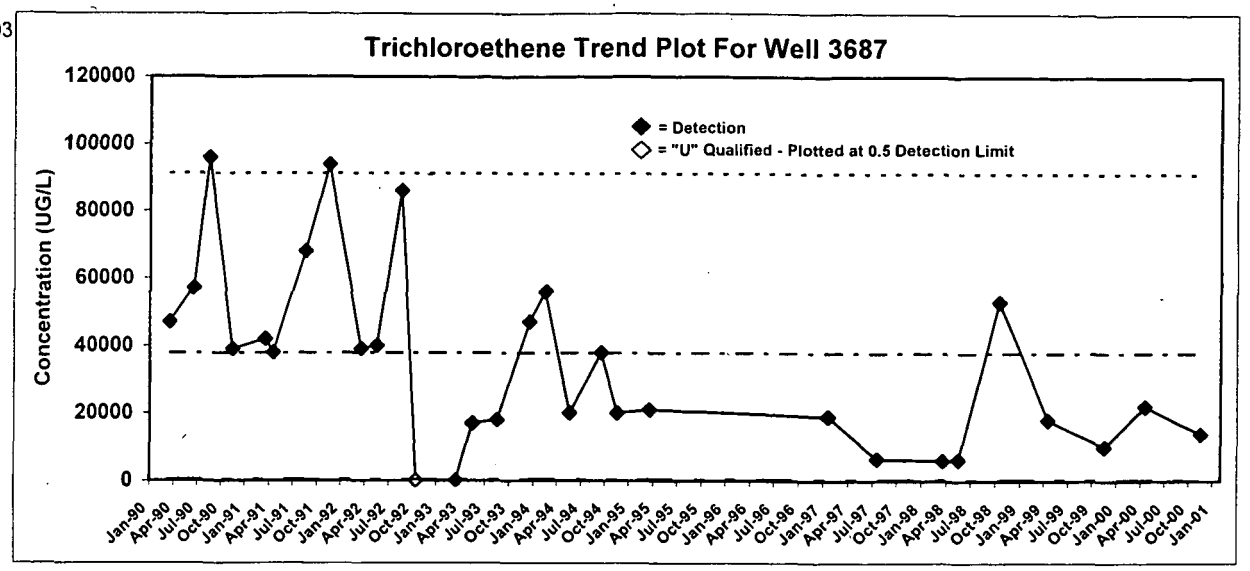
A-102



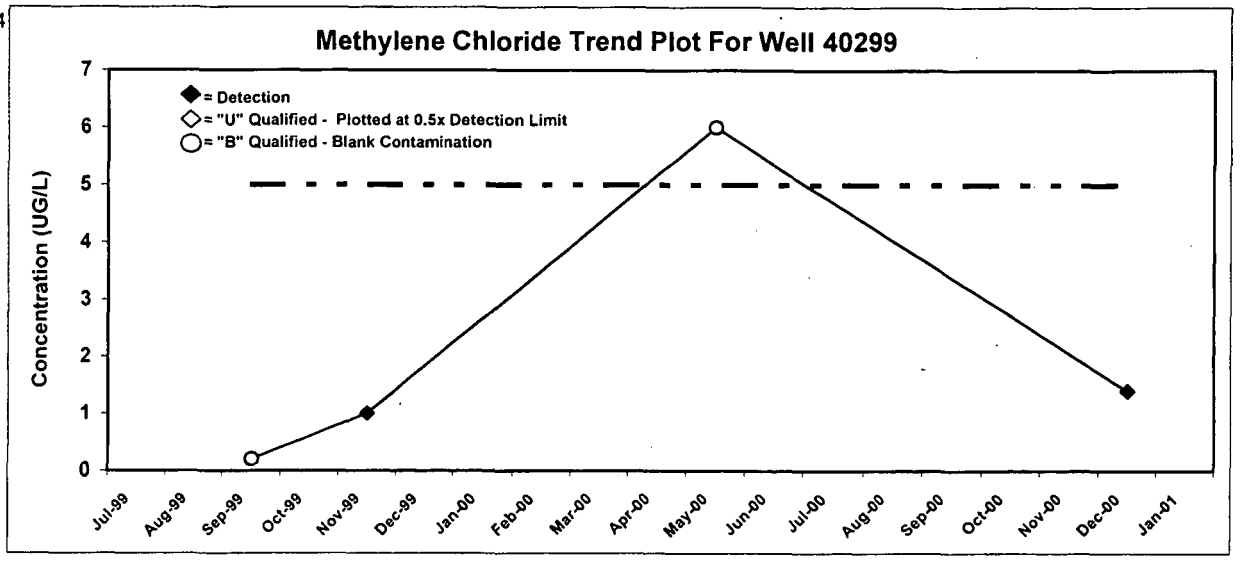
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

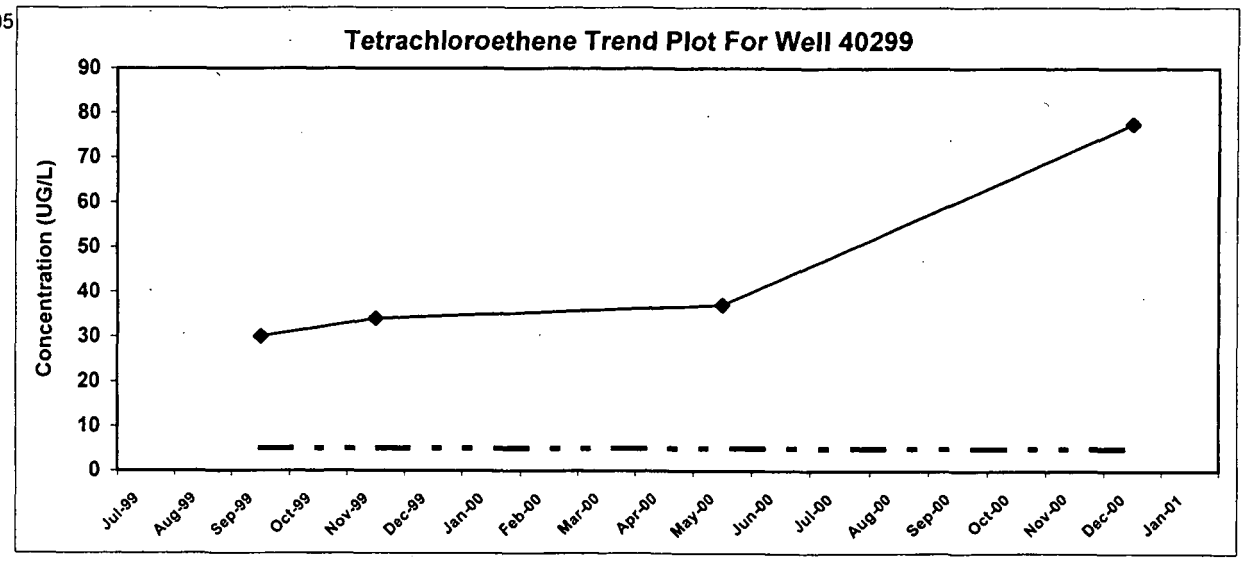
A-103



A-104



A-105



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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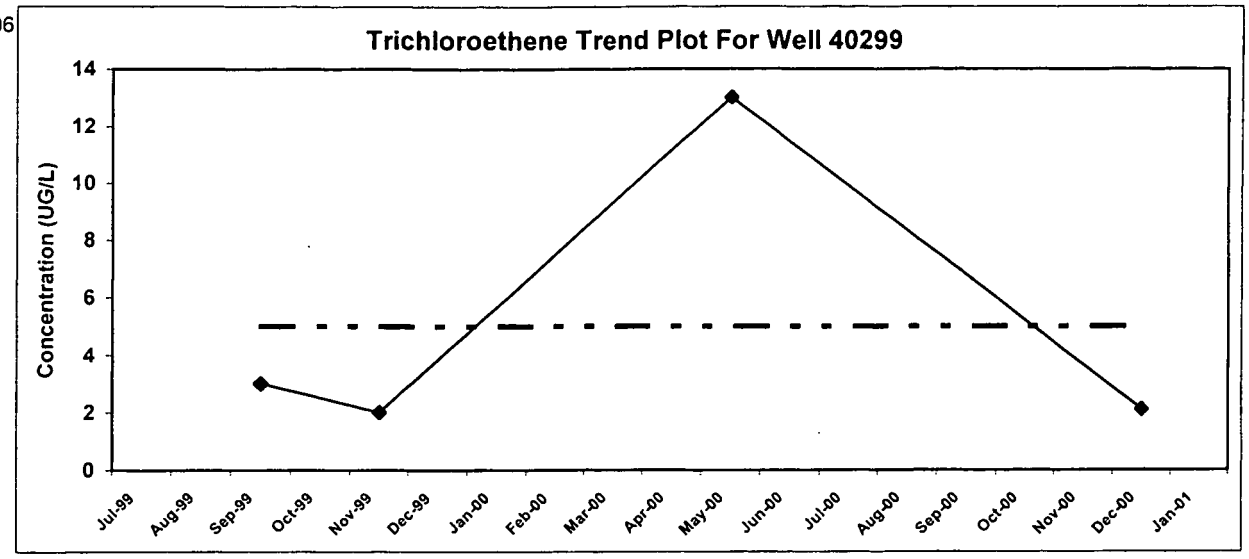
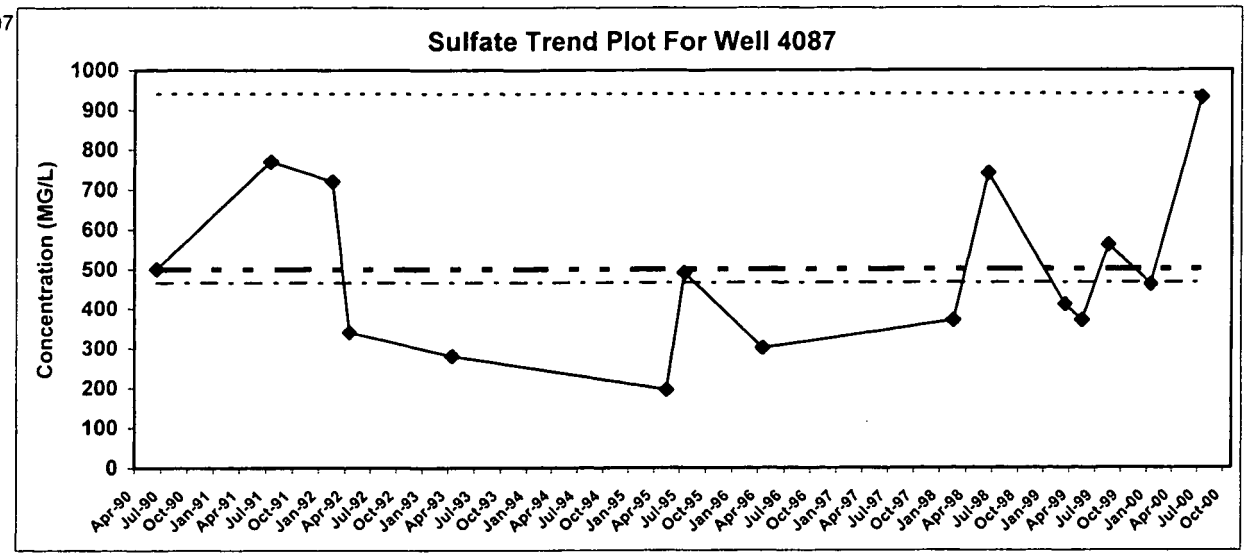
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

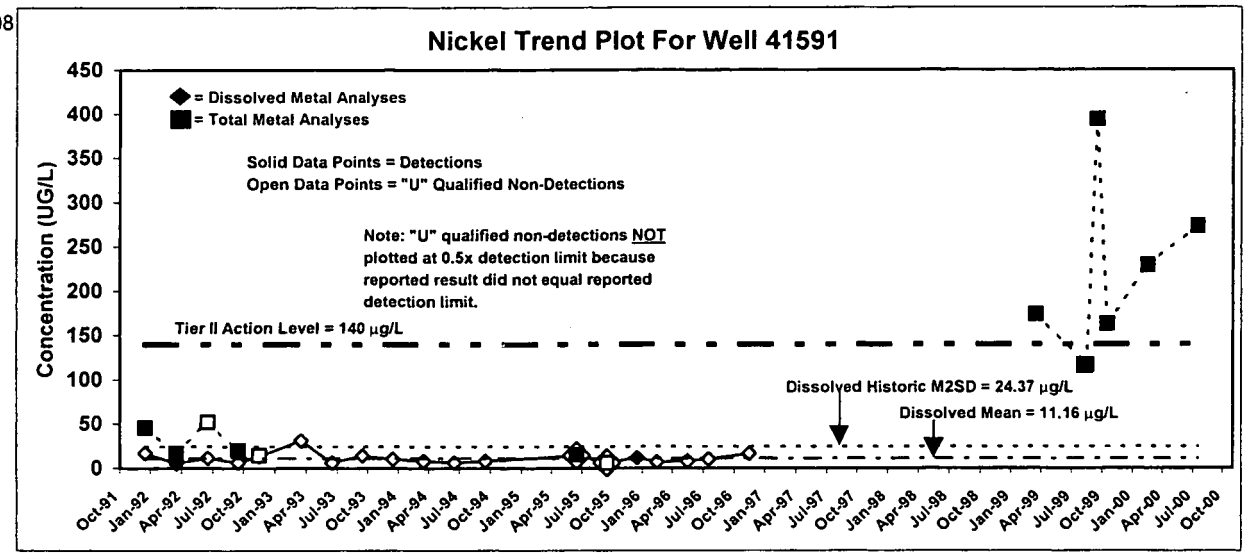
A-106



A-107



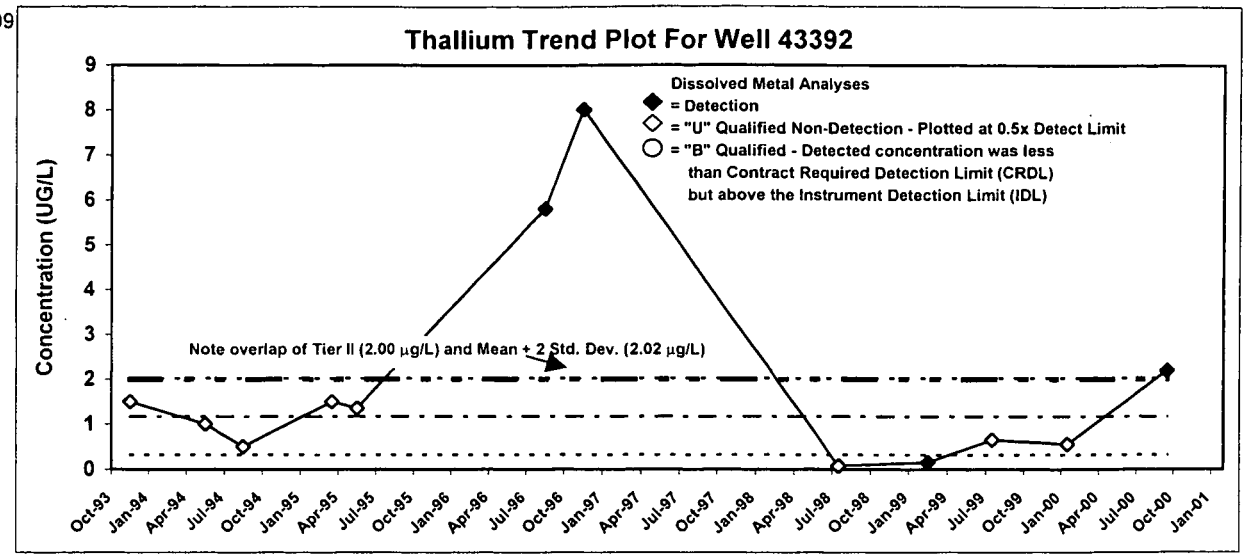
A-108



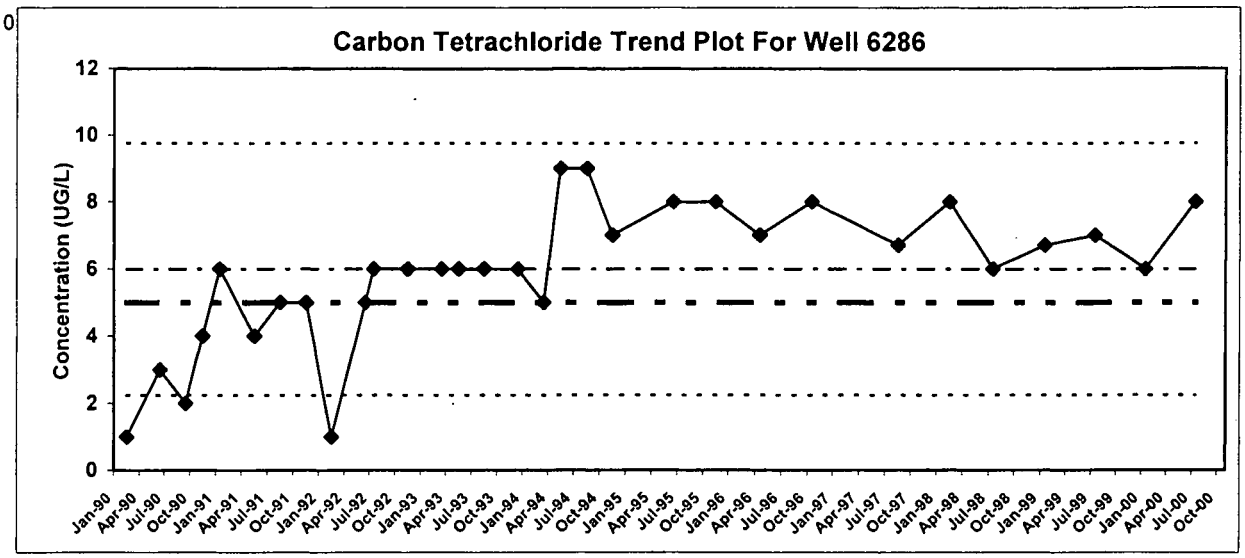
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

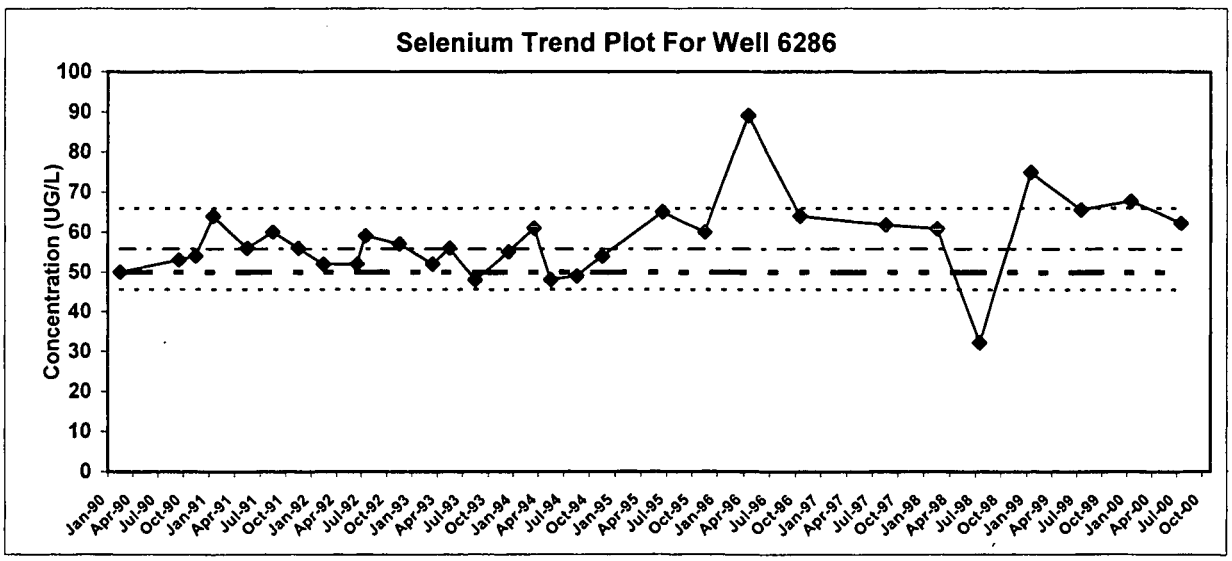
A-109



A-110



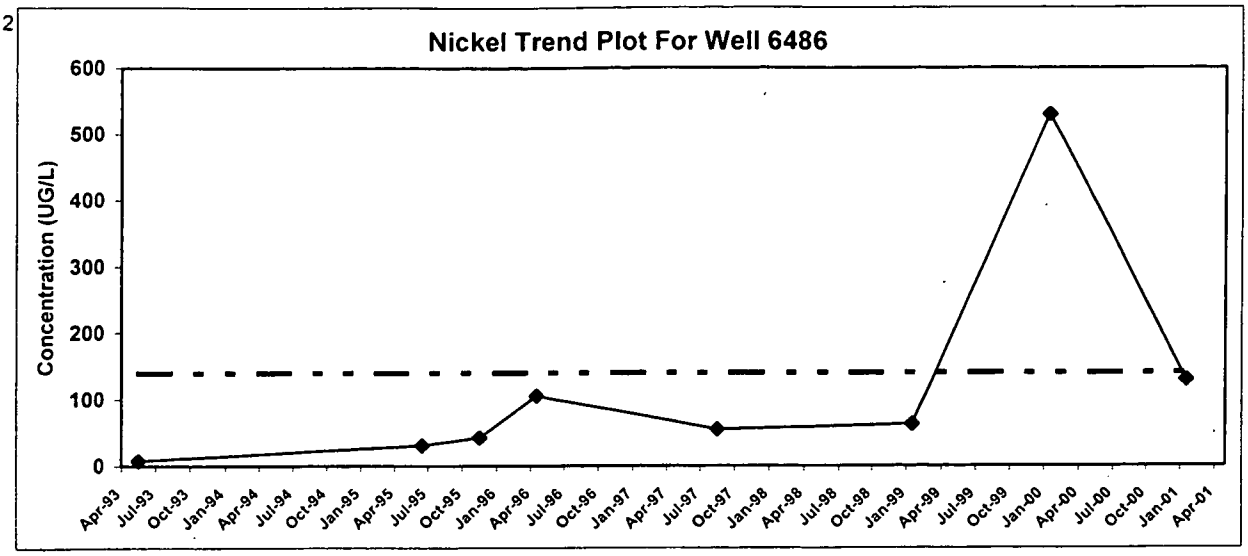
A-111



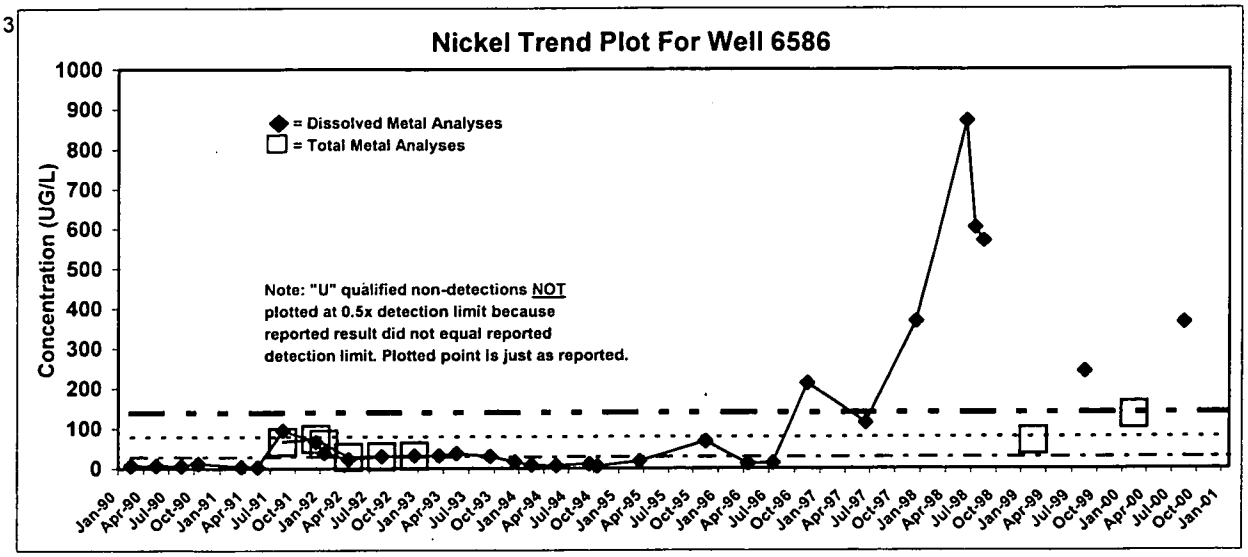
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

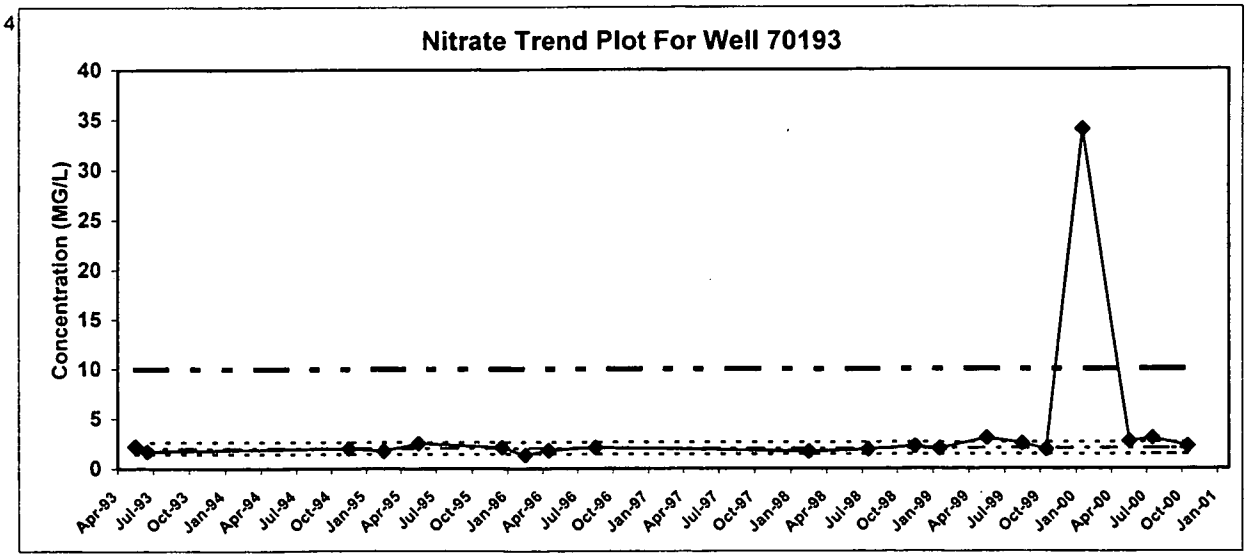
A-112



A-113



A-114



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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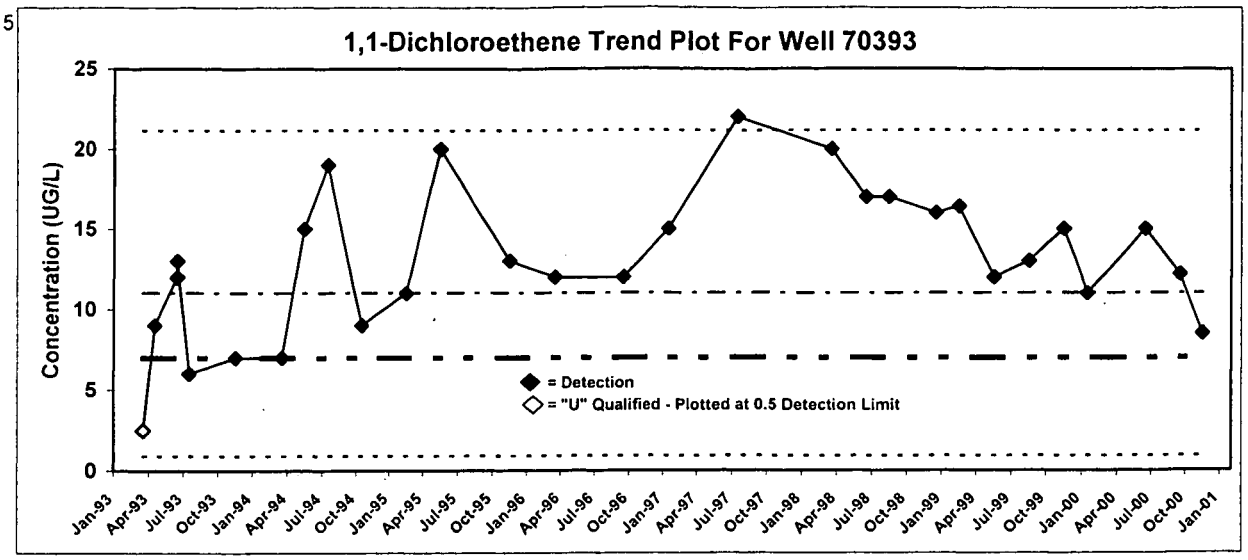
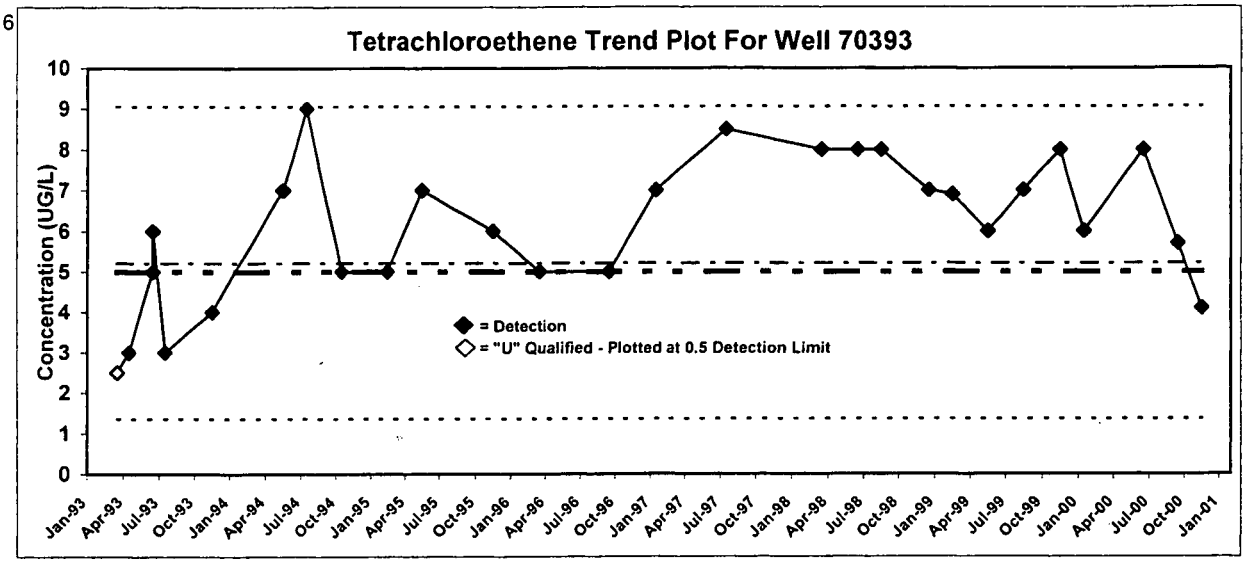
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

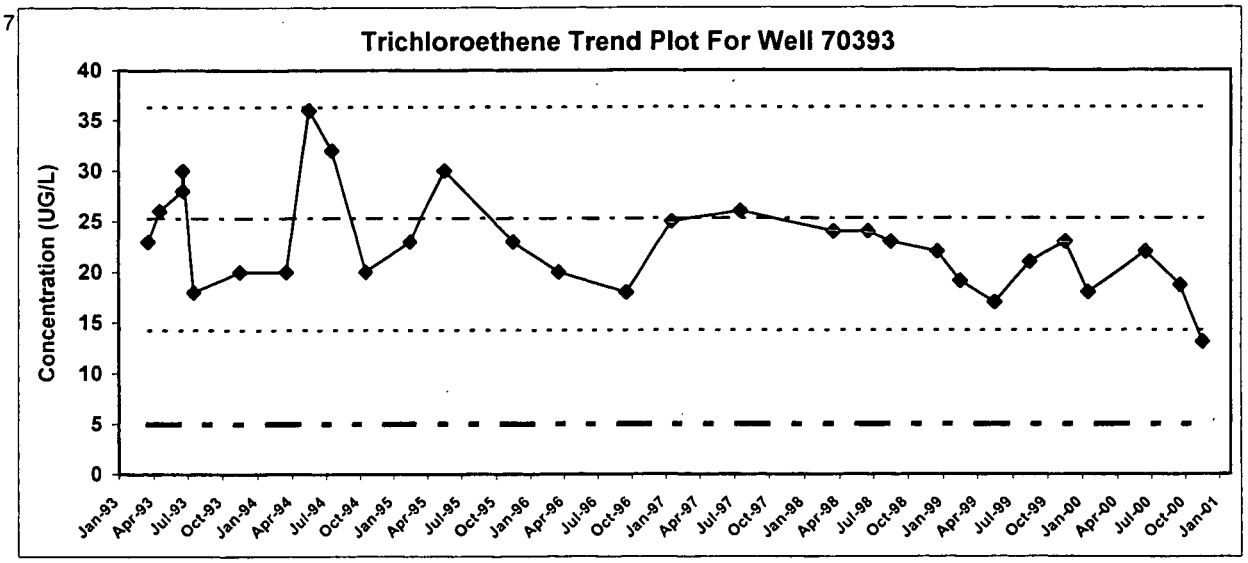
A-115



A-116



A-117



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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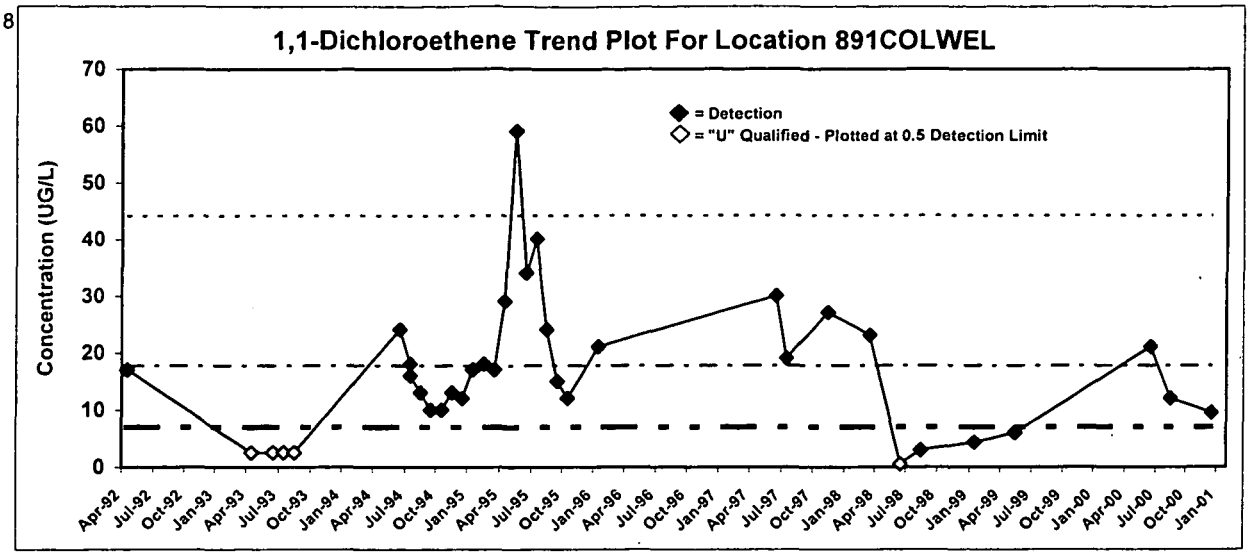
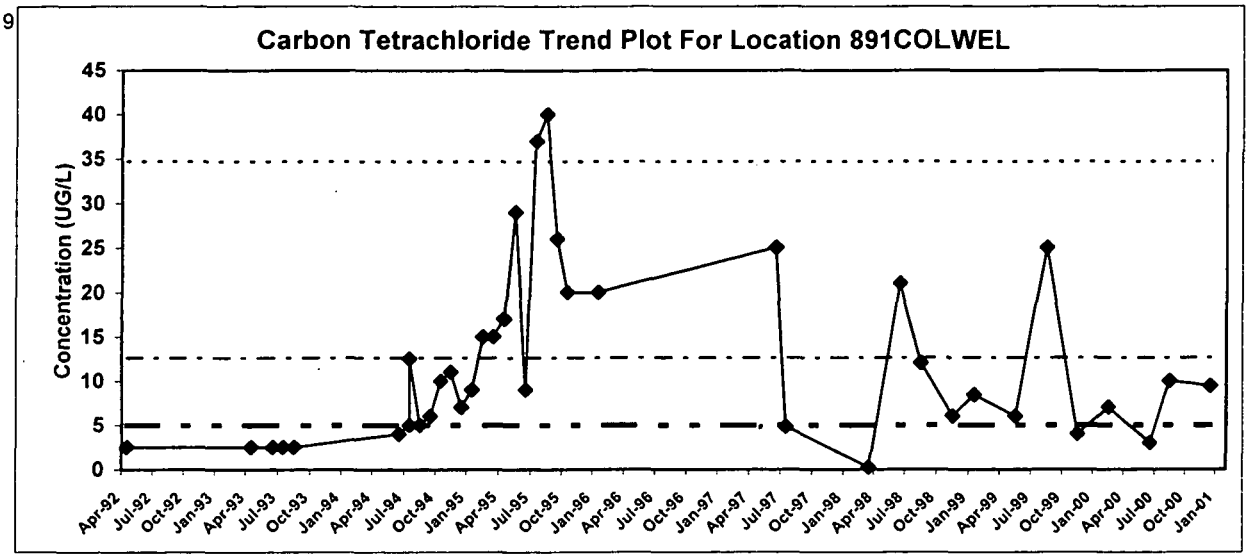
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

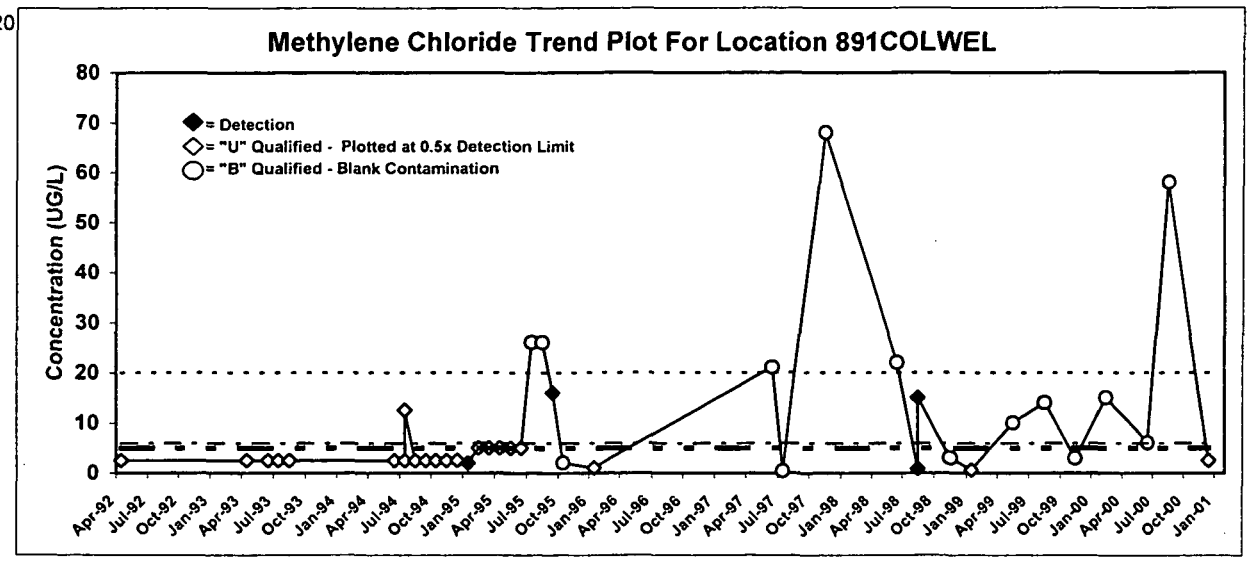
A-118



A-119



A-120



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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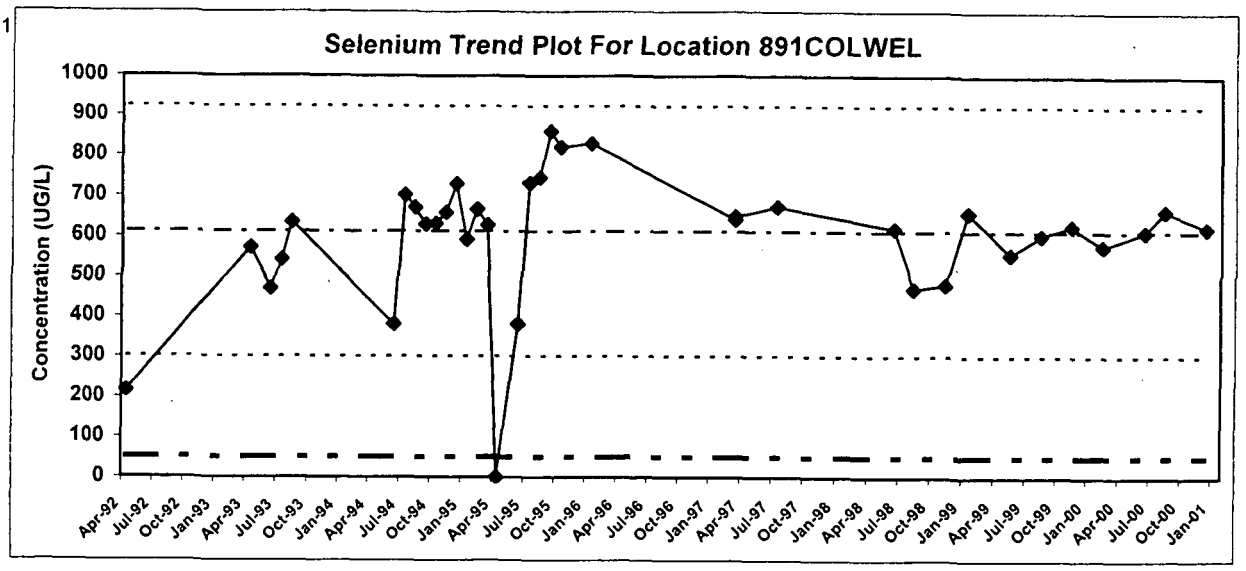
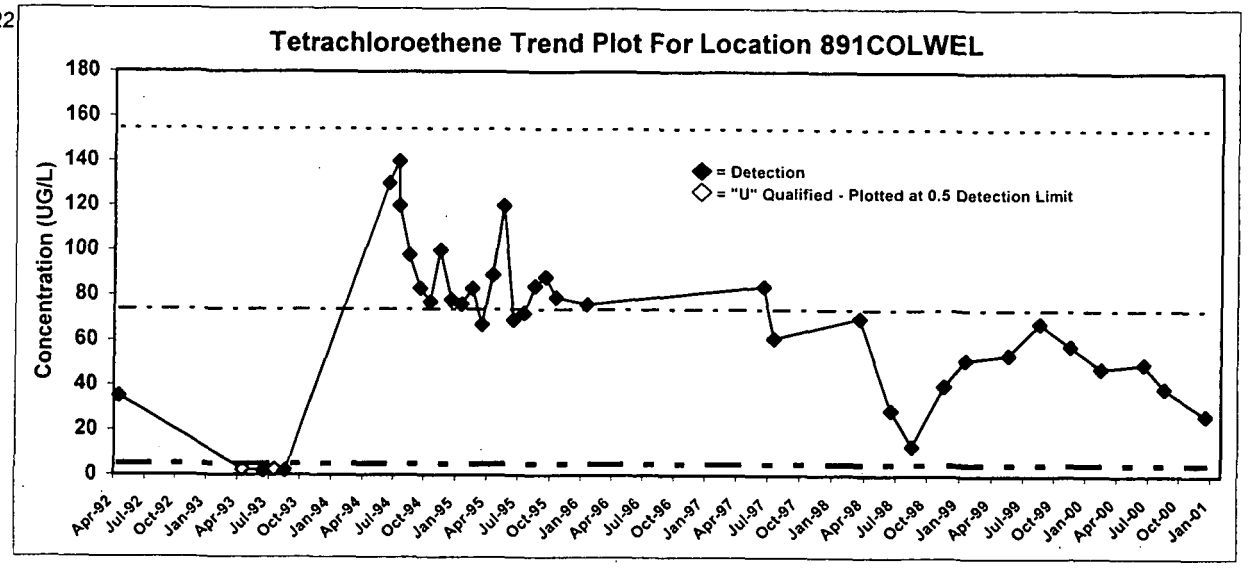
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

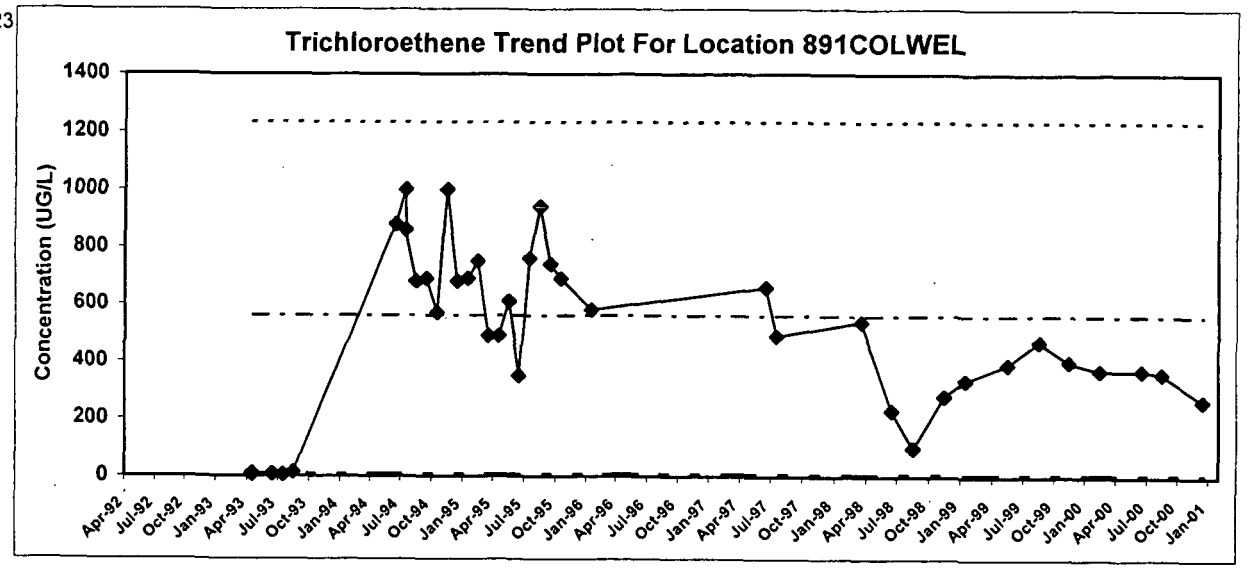
A-121



A122



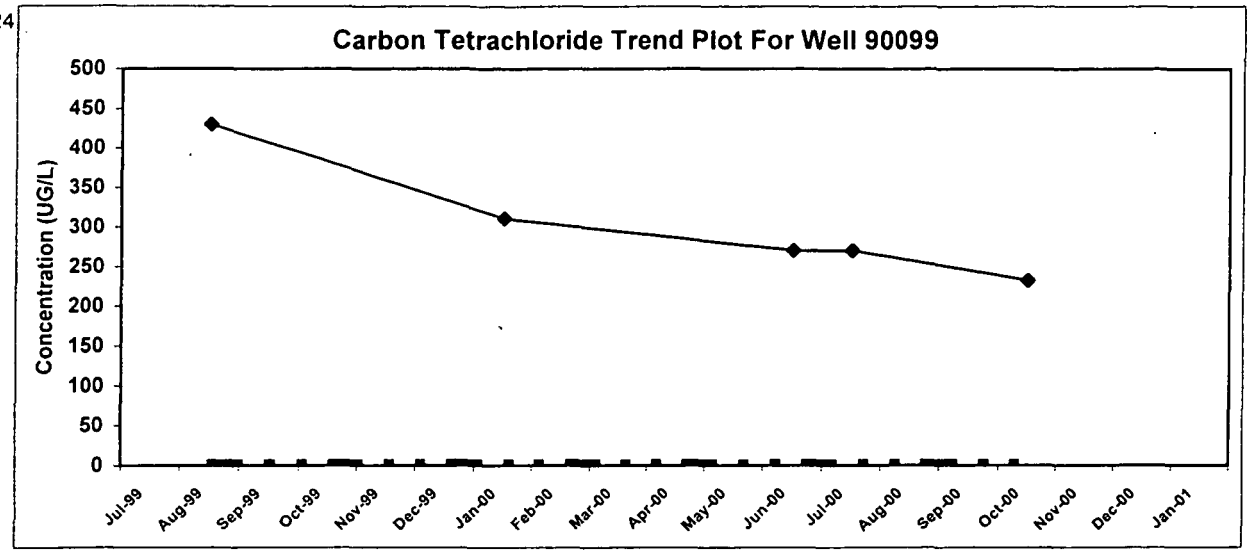
A-123



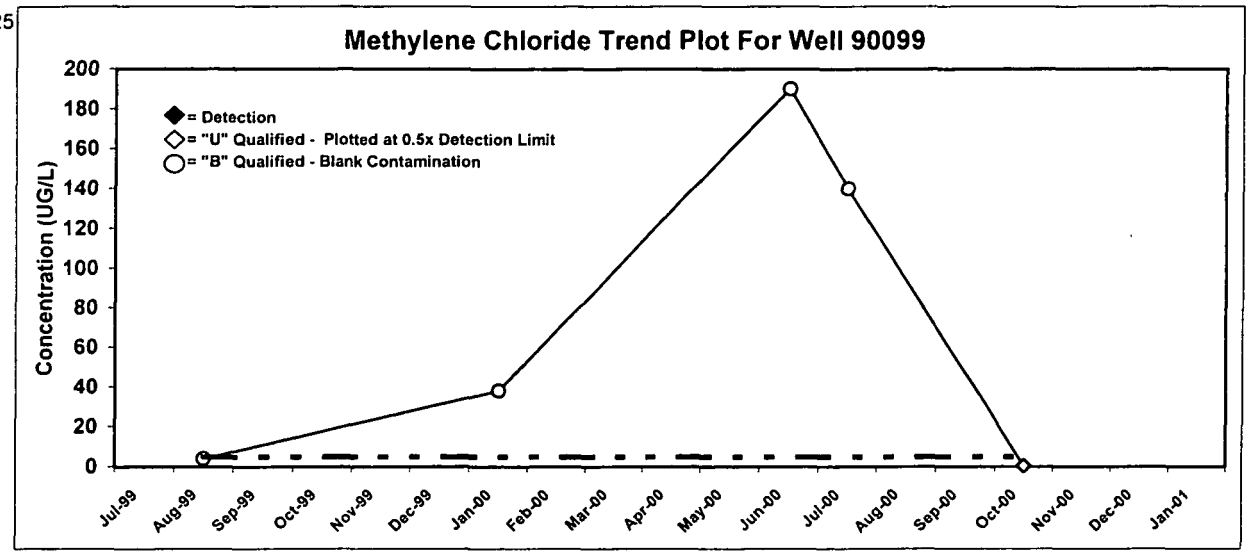
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

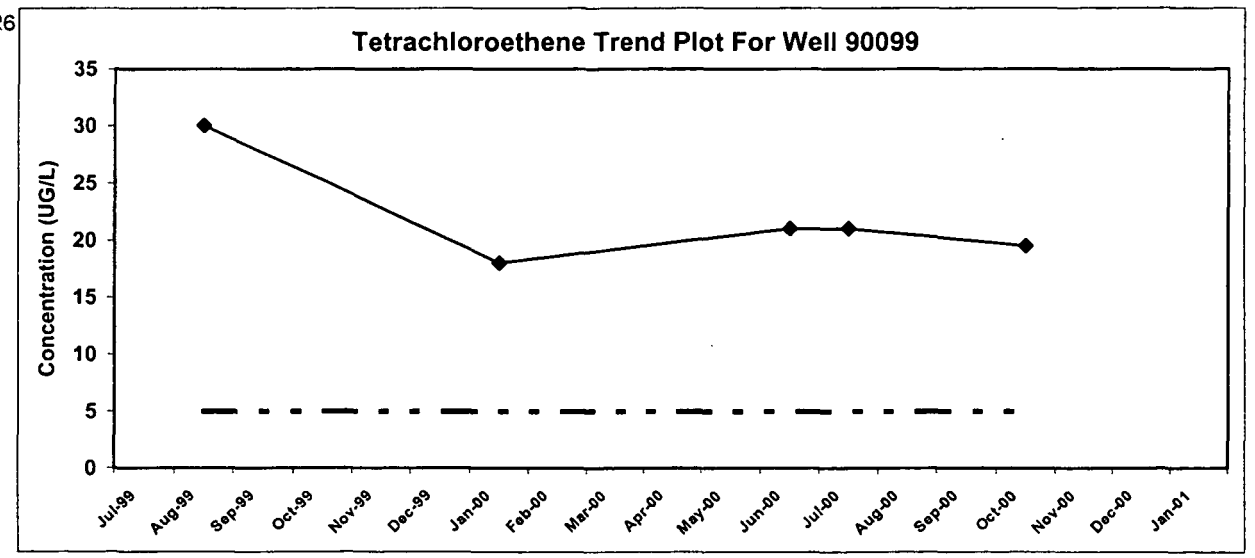
A-124



A-125



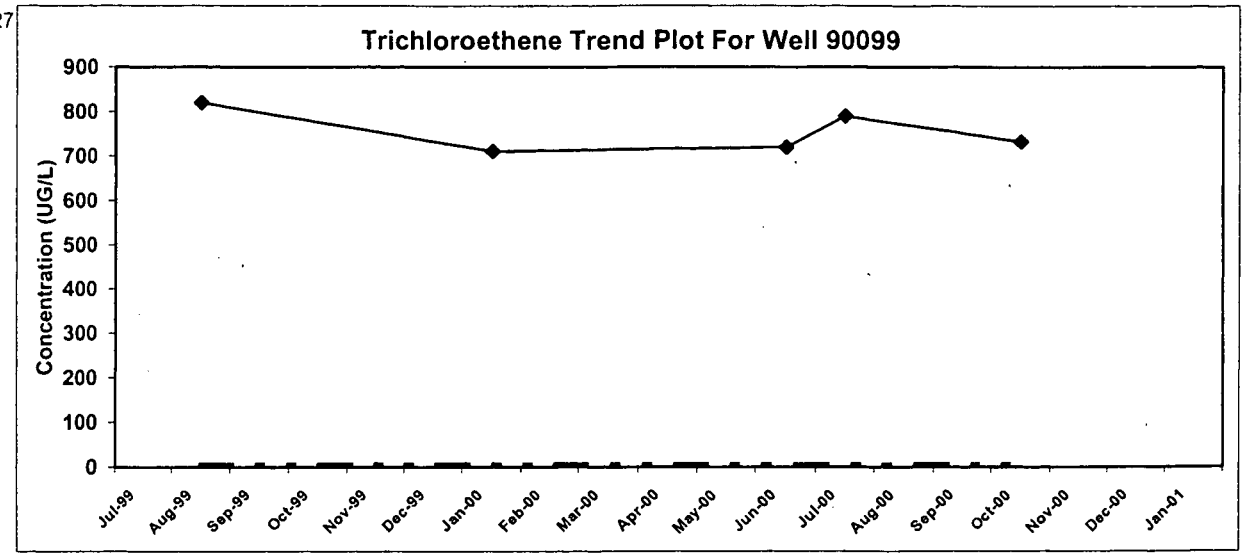
A-126



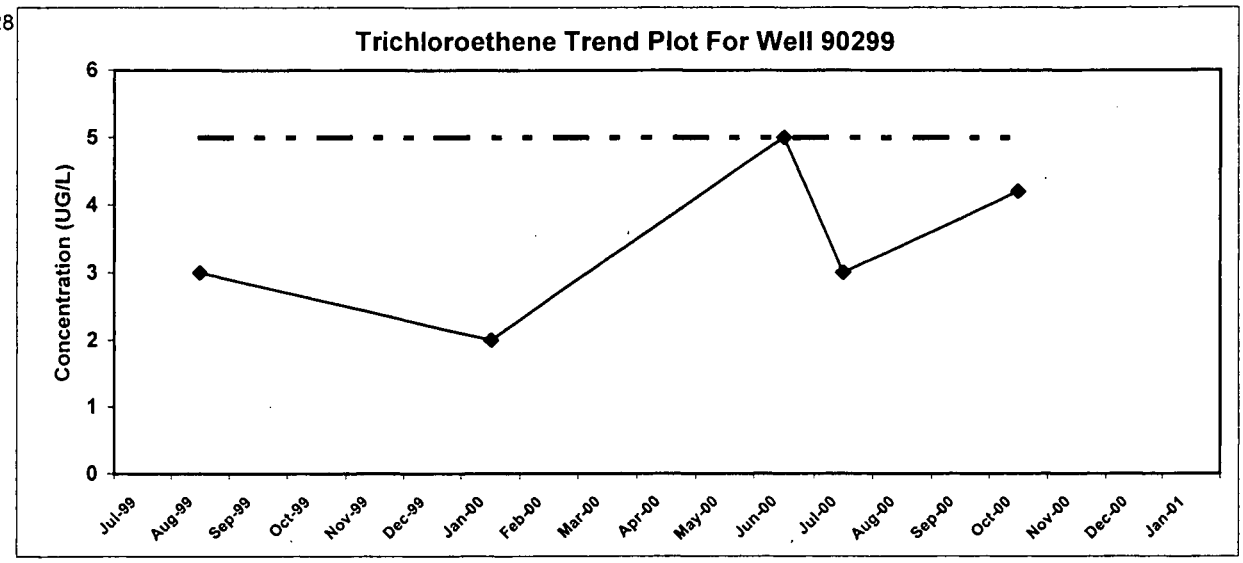
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

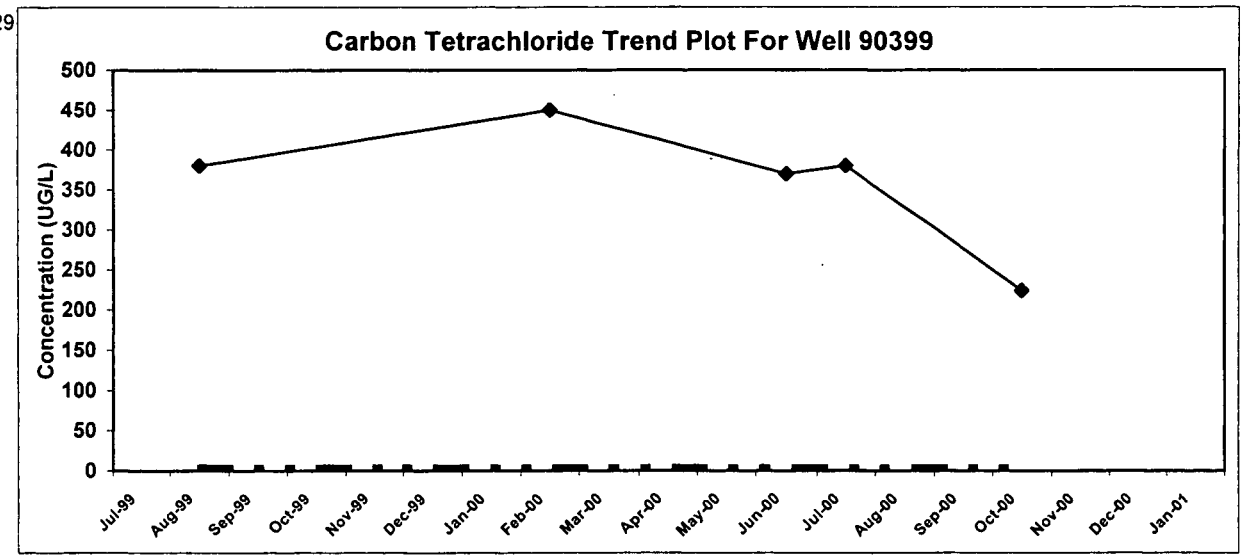
A-127



A-128



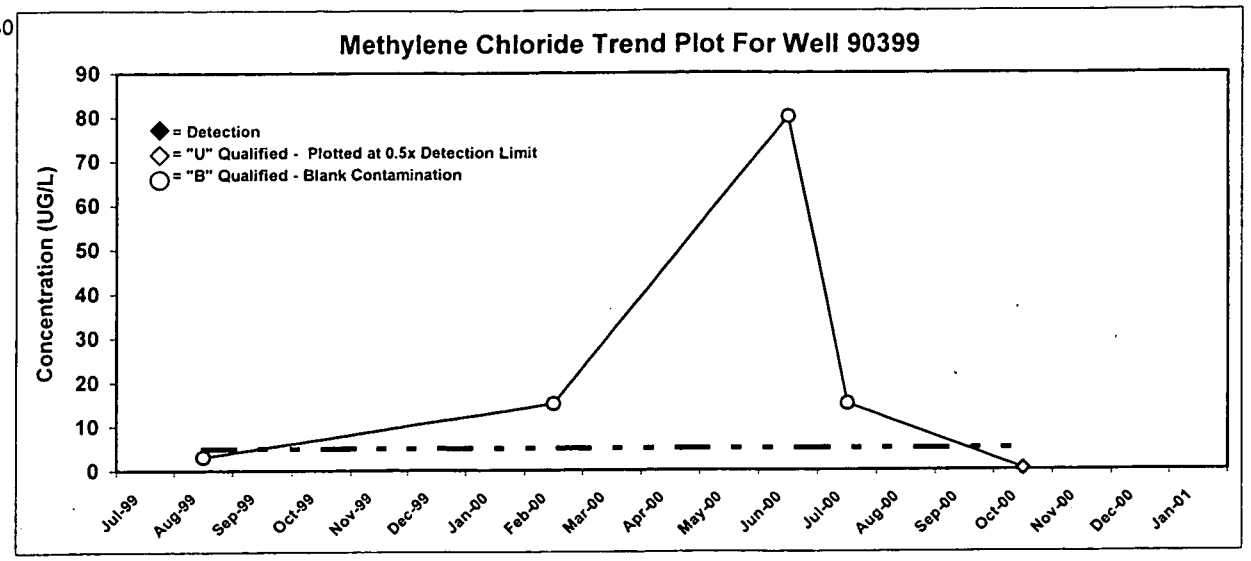
A-129



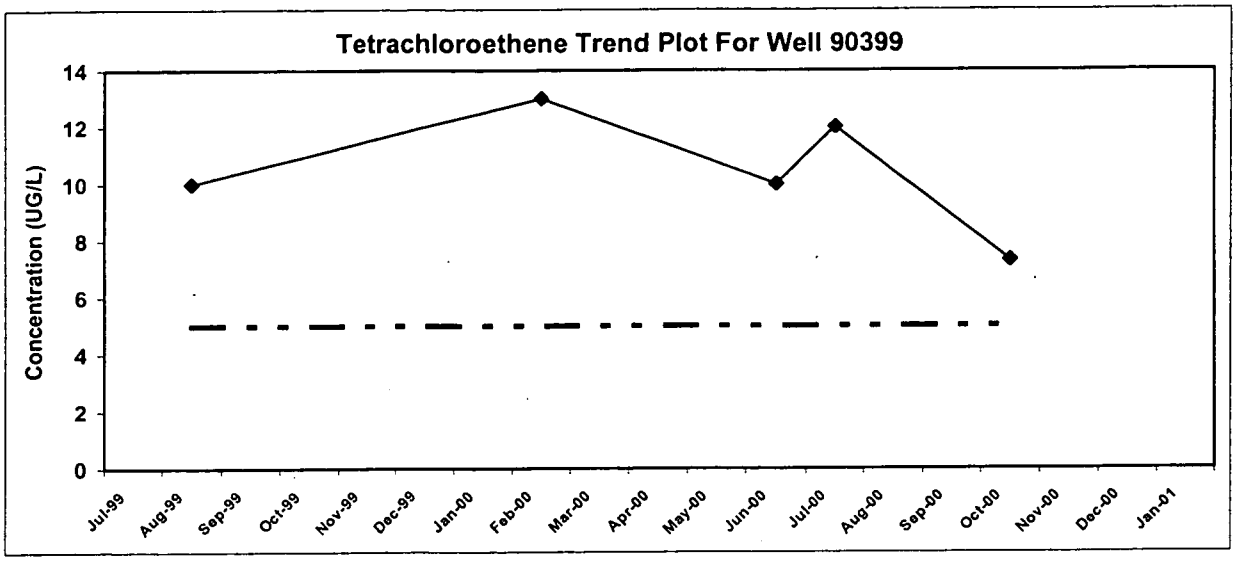
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

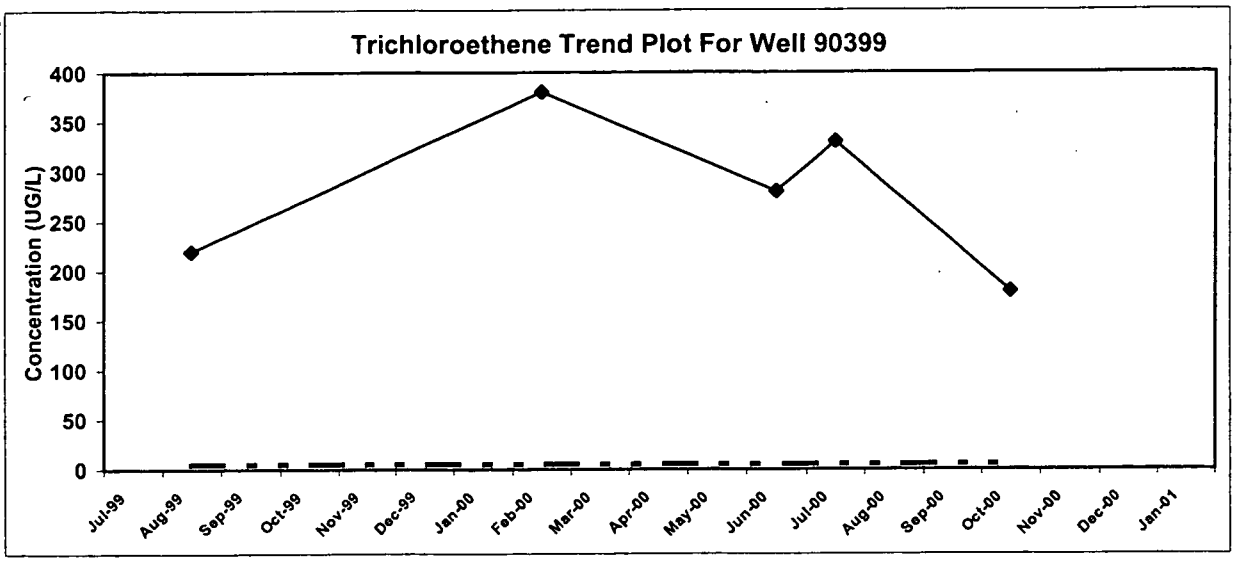
A-130



A-131



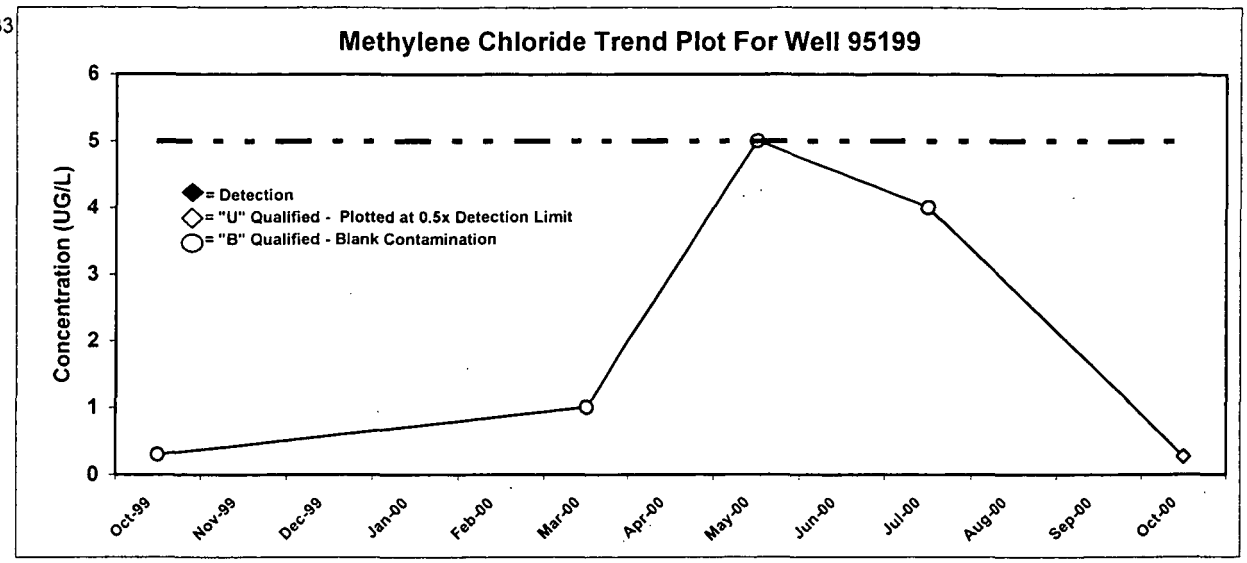
A-132



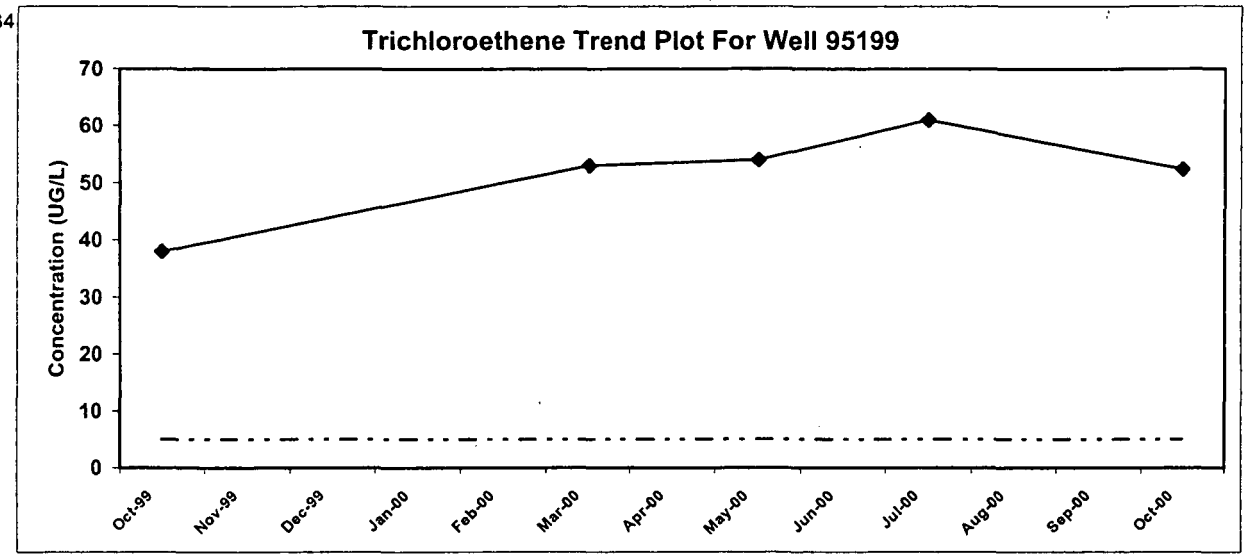
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

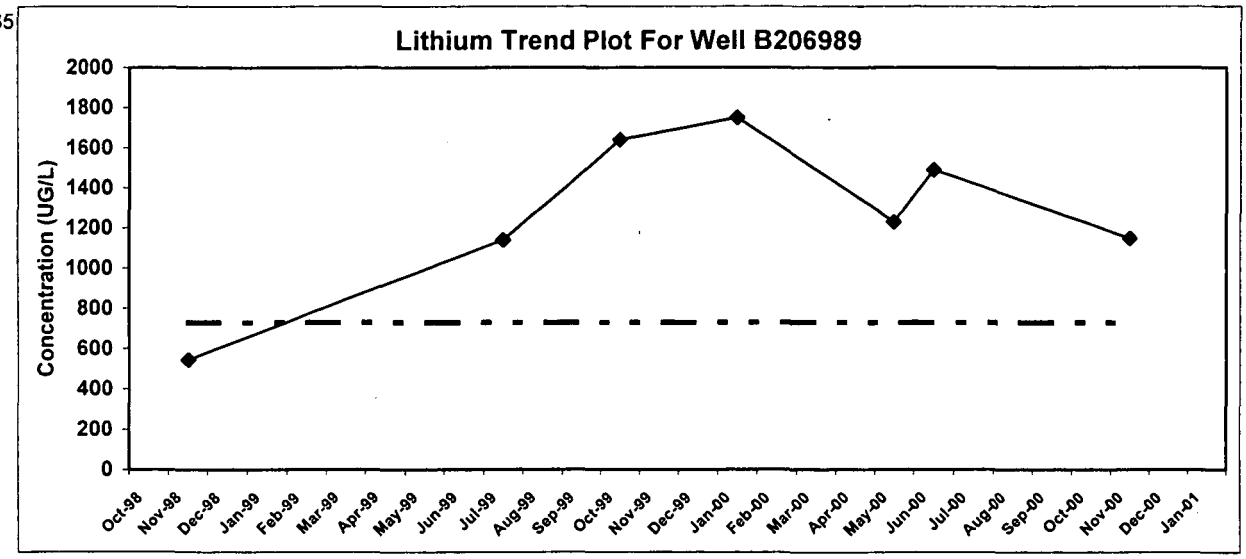
A-133



A-134



A-135



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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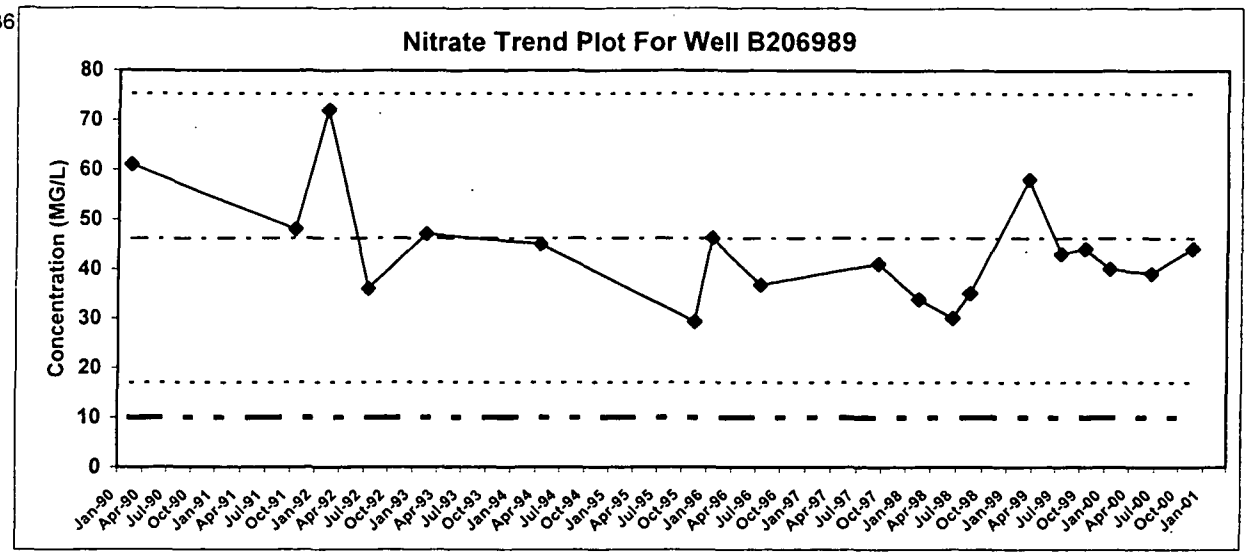
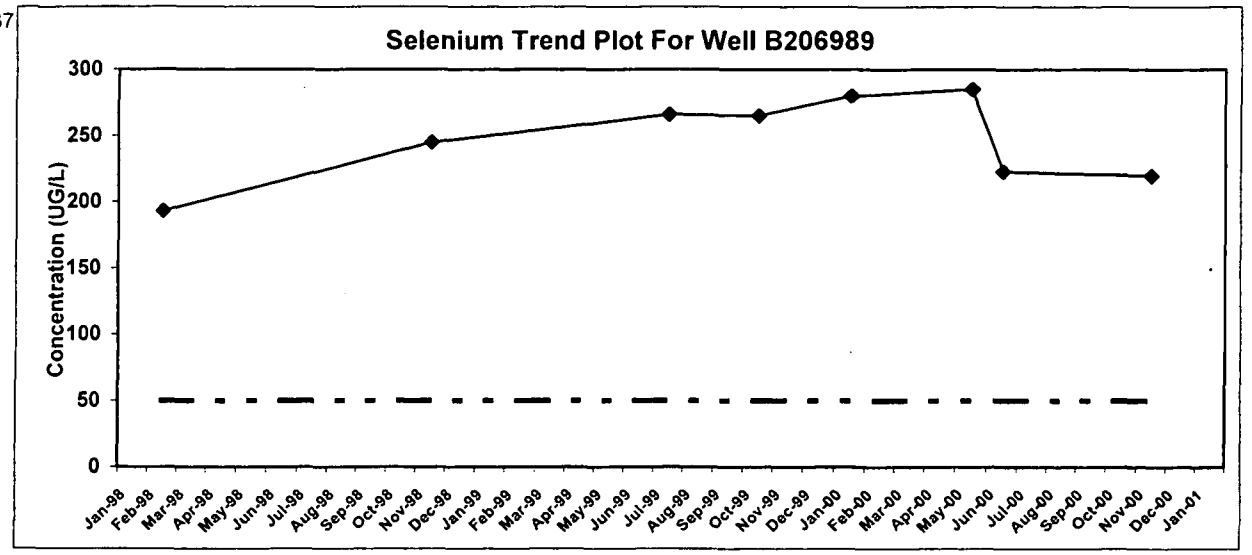
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

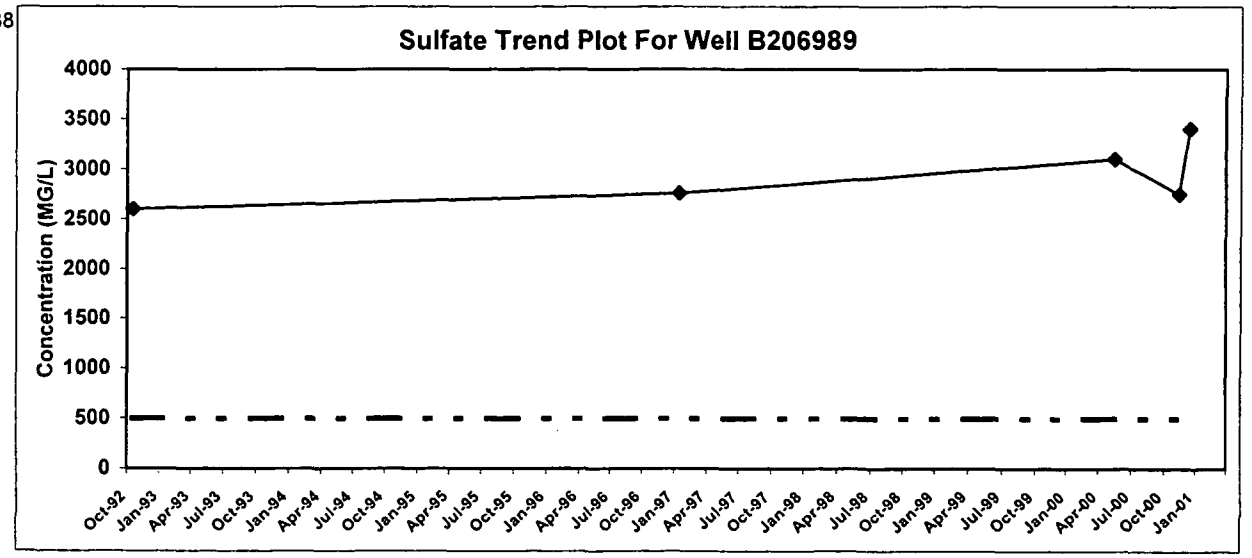
A-136



A-137



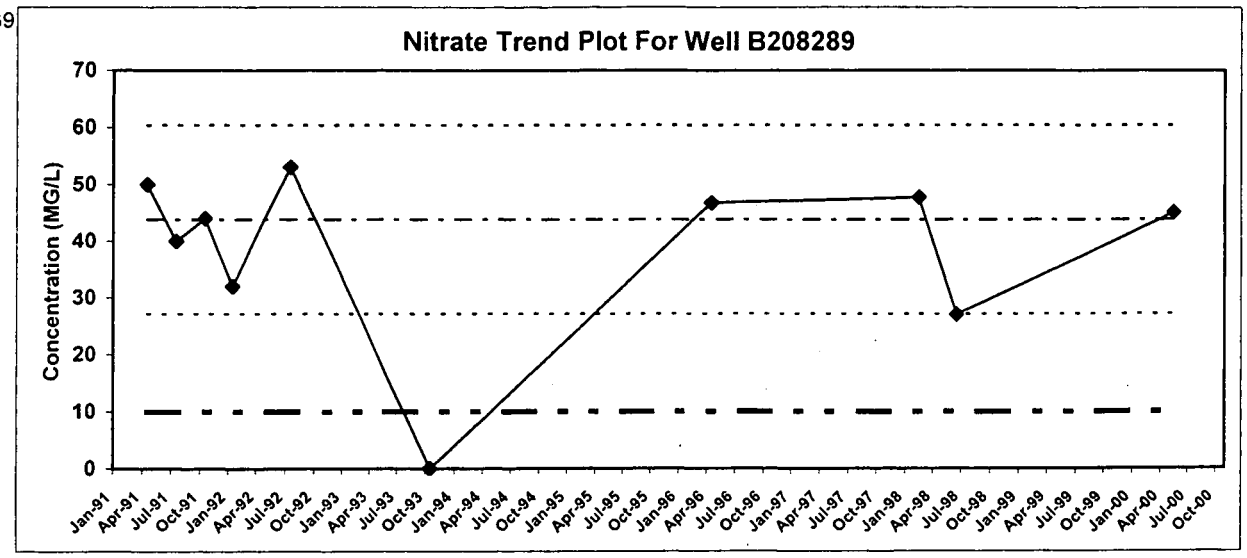
A-138



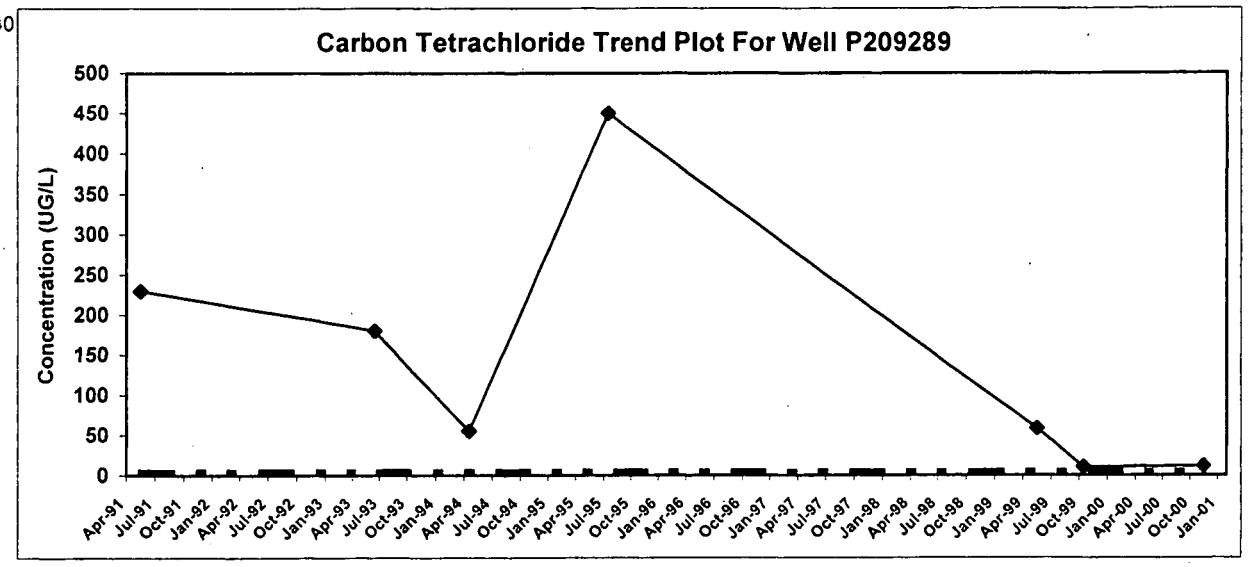
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

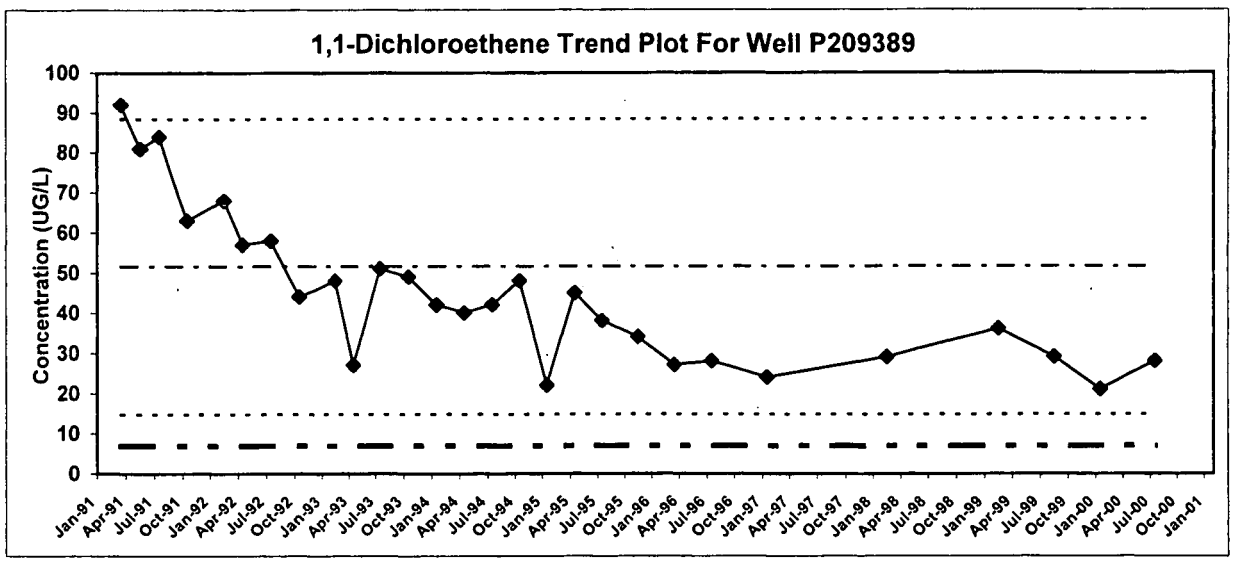
A-139



A-140



A-141



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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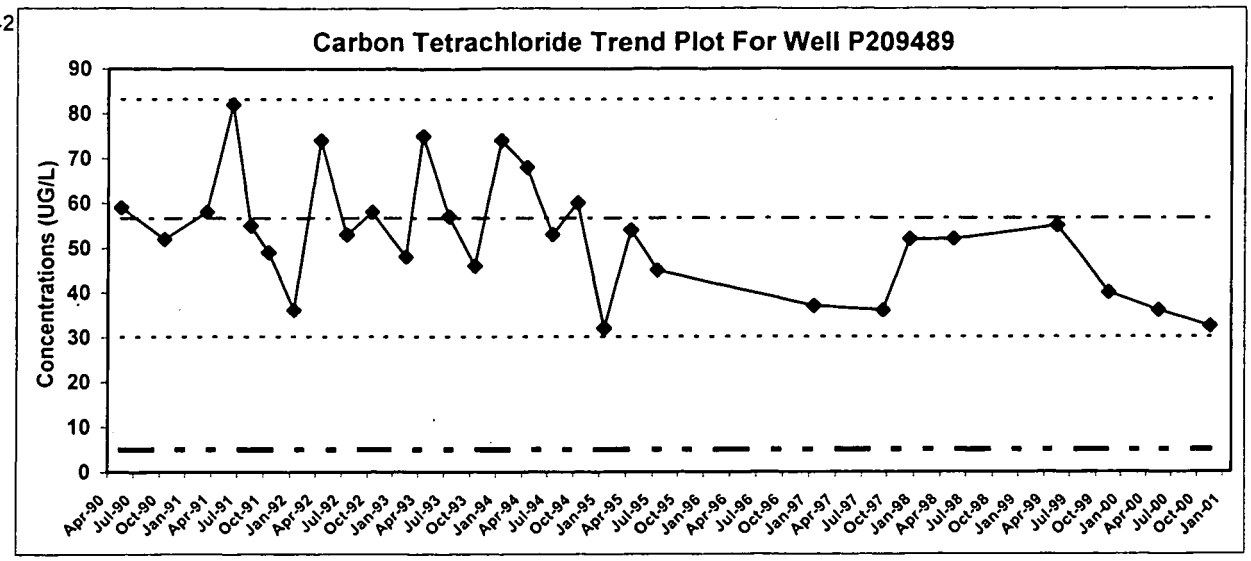
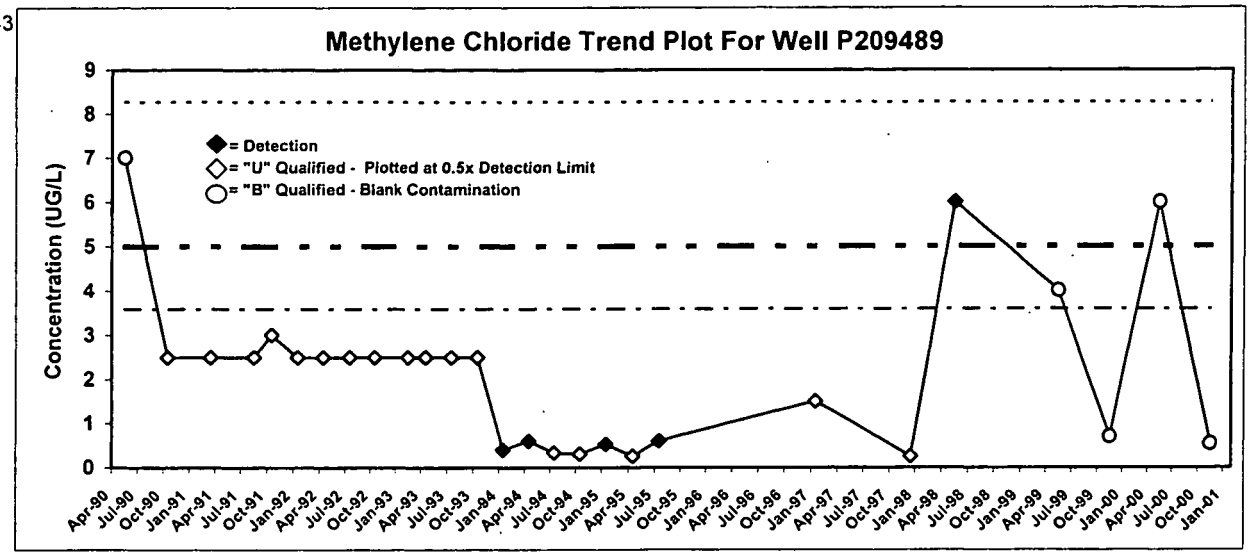
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

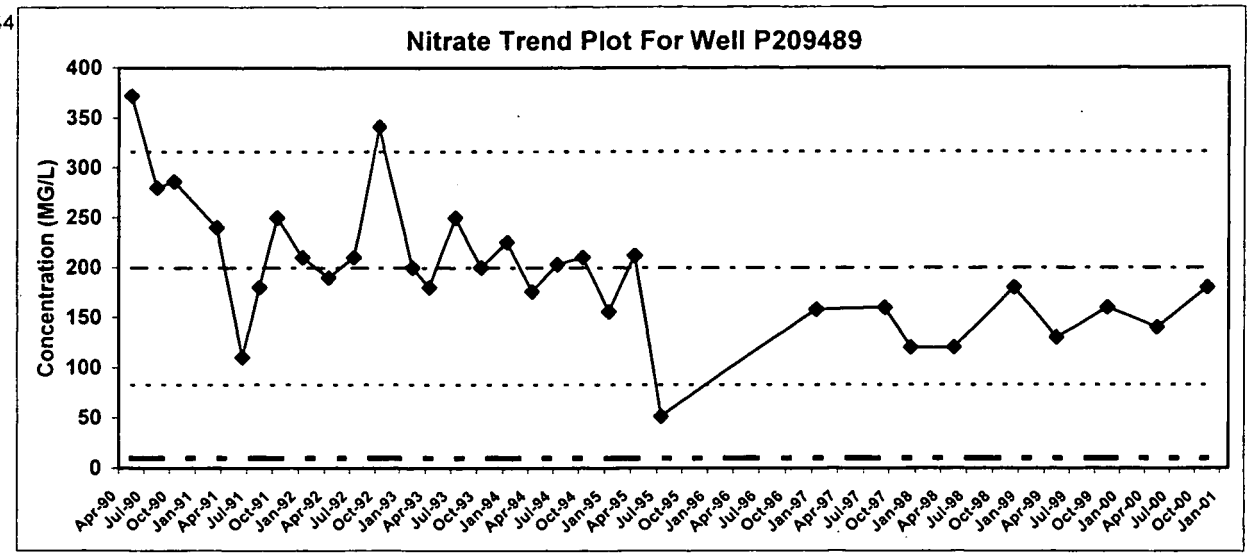
A-142



A-143



A-144



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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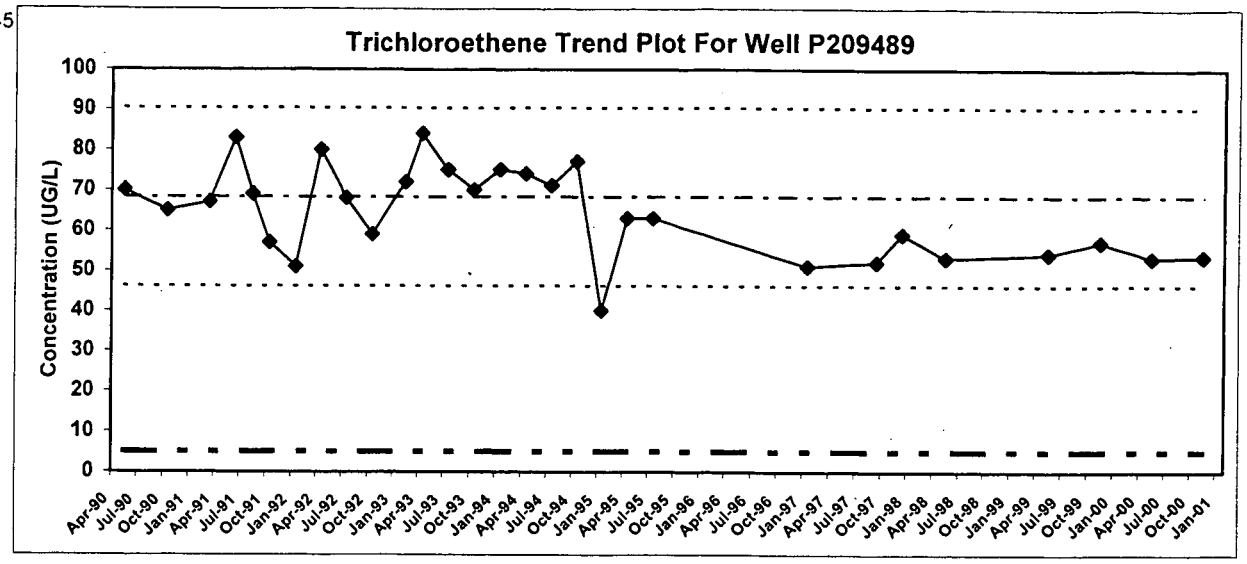
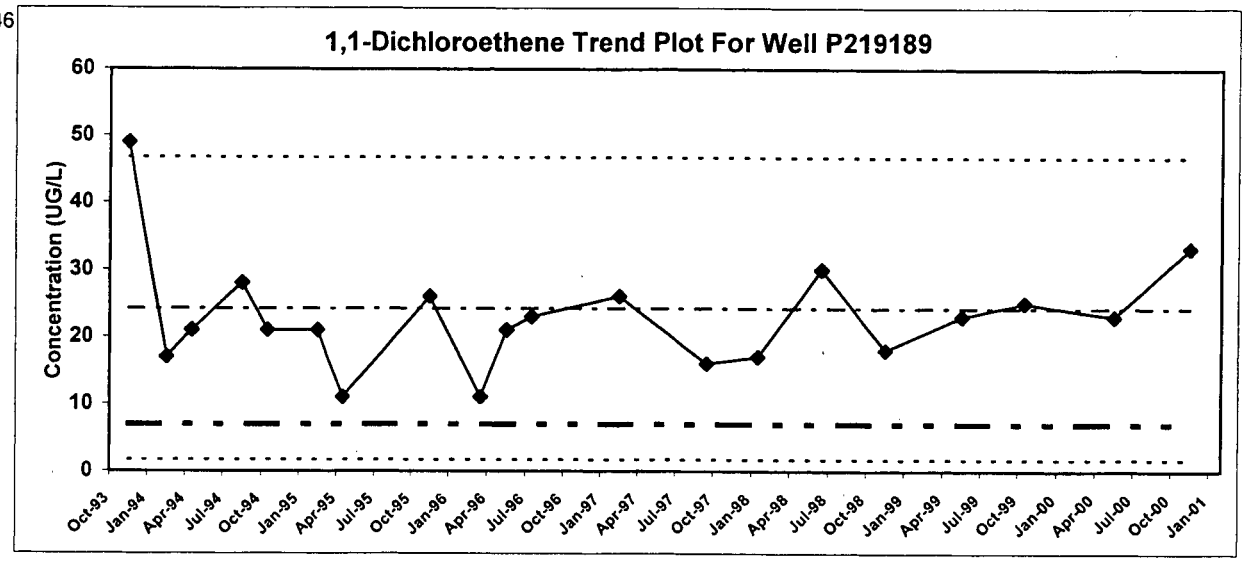
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

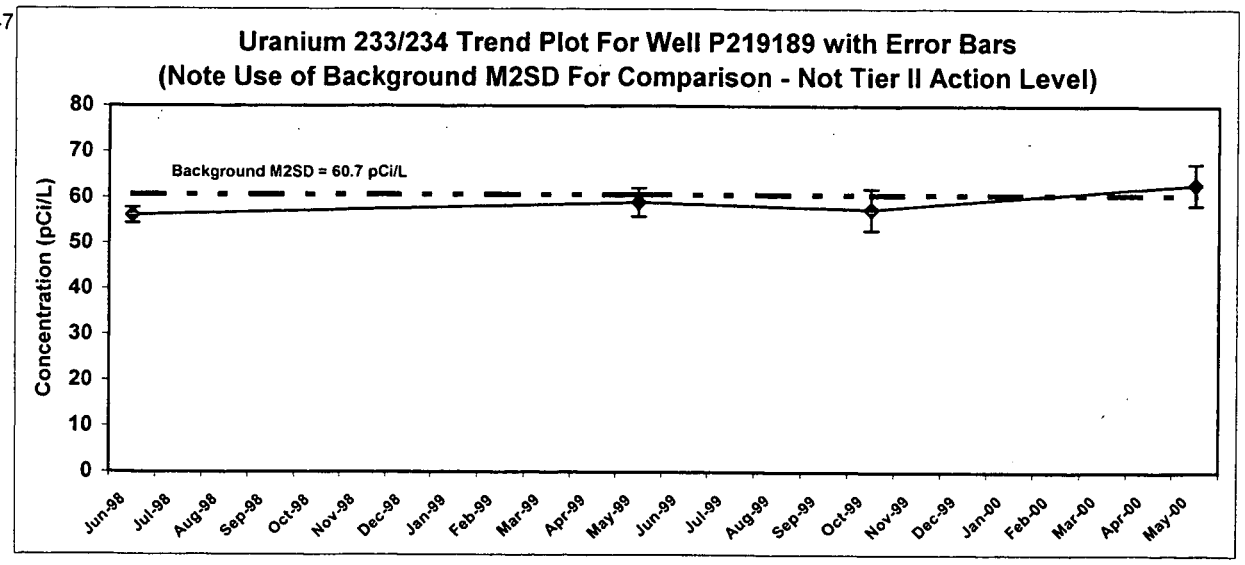
A-145



A-146



A-147



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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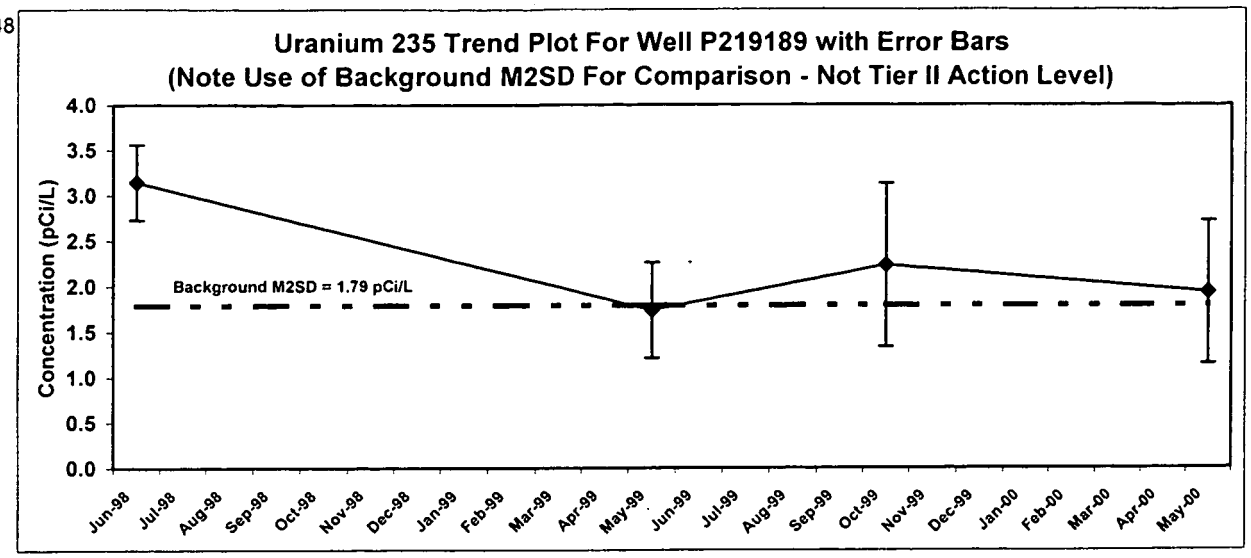
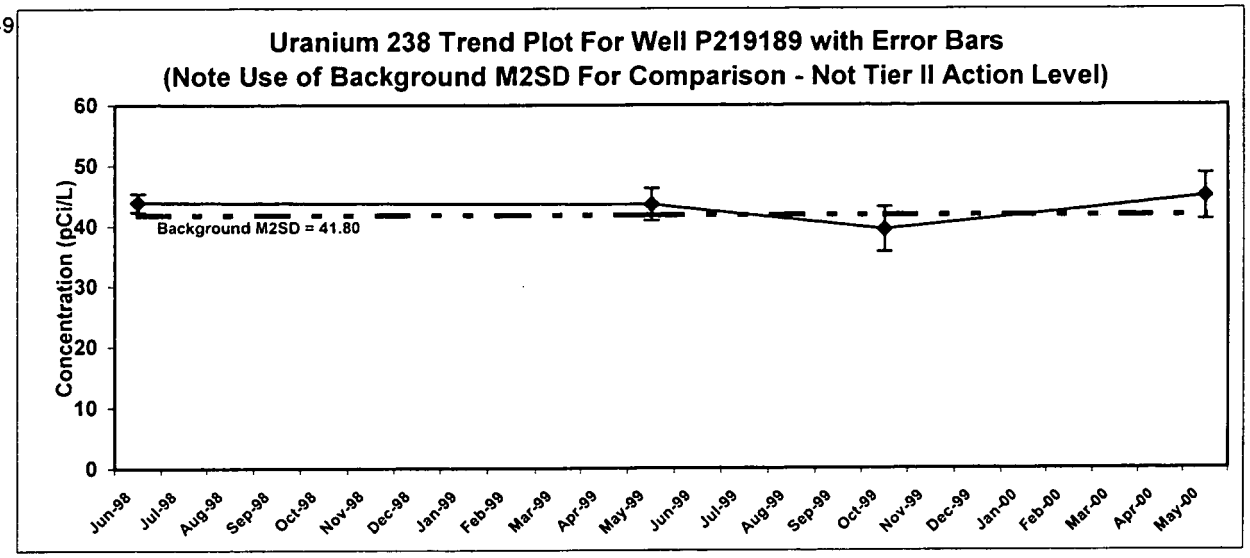
Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

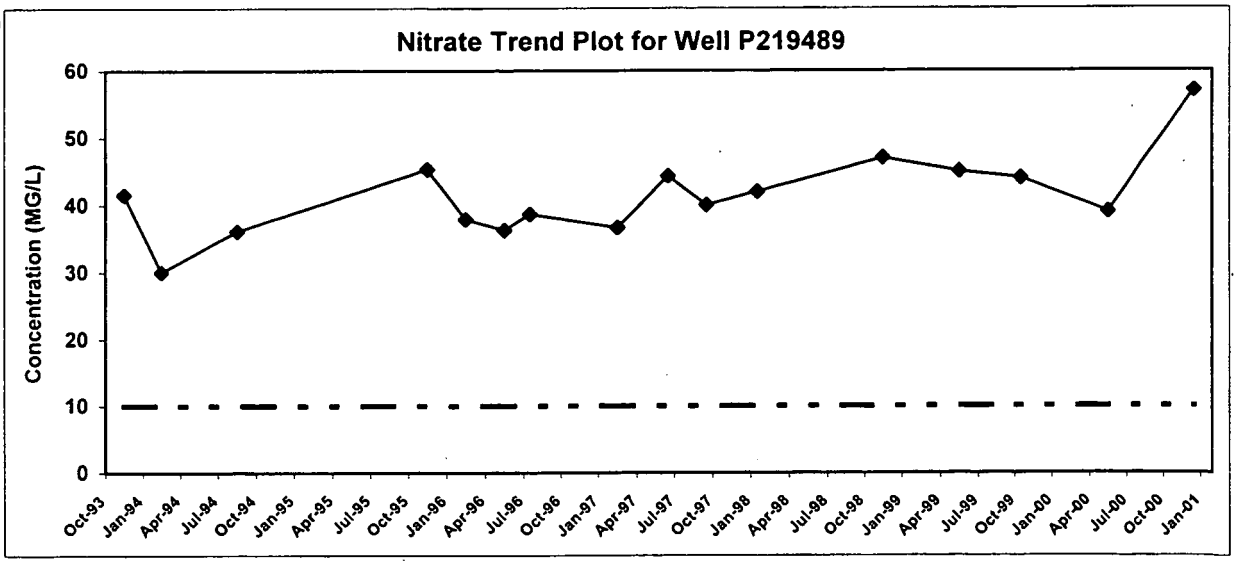
A-148



A-149



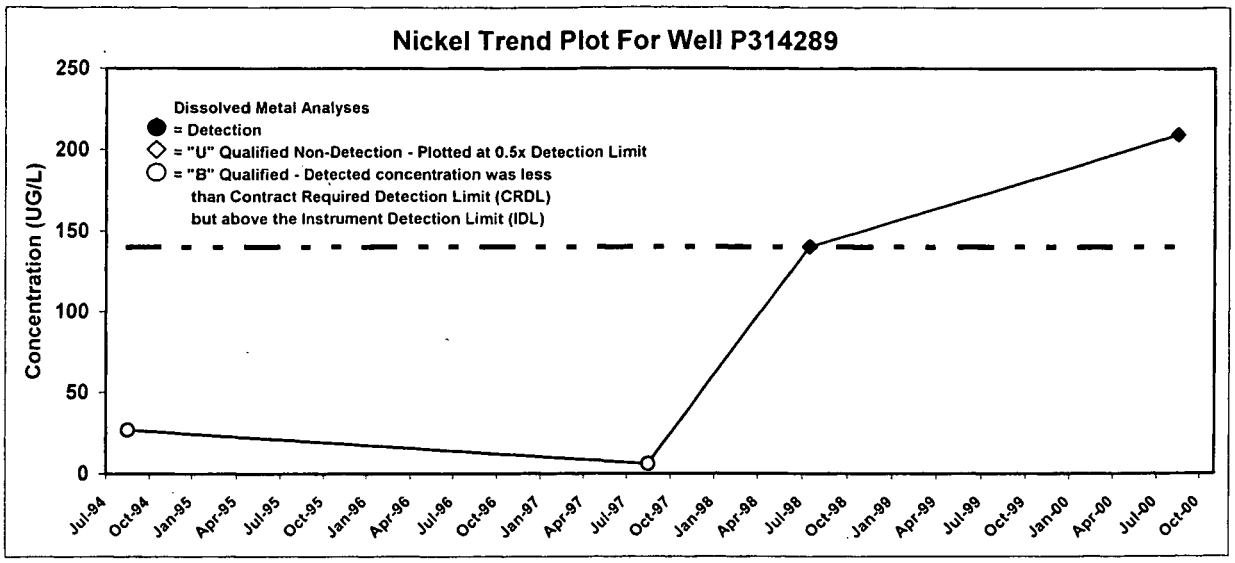
A-150



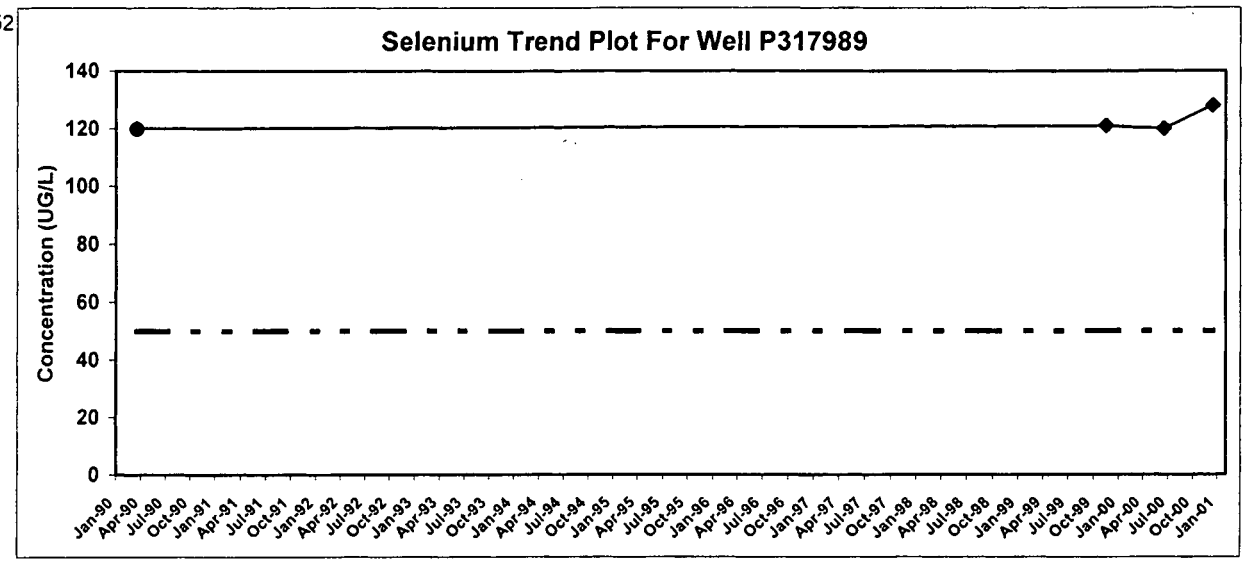
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

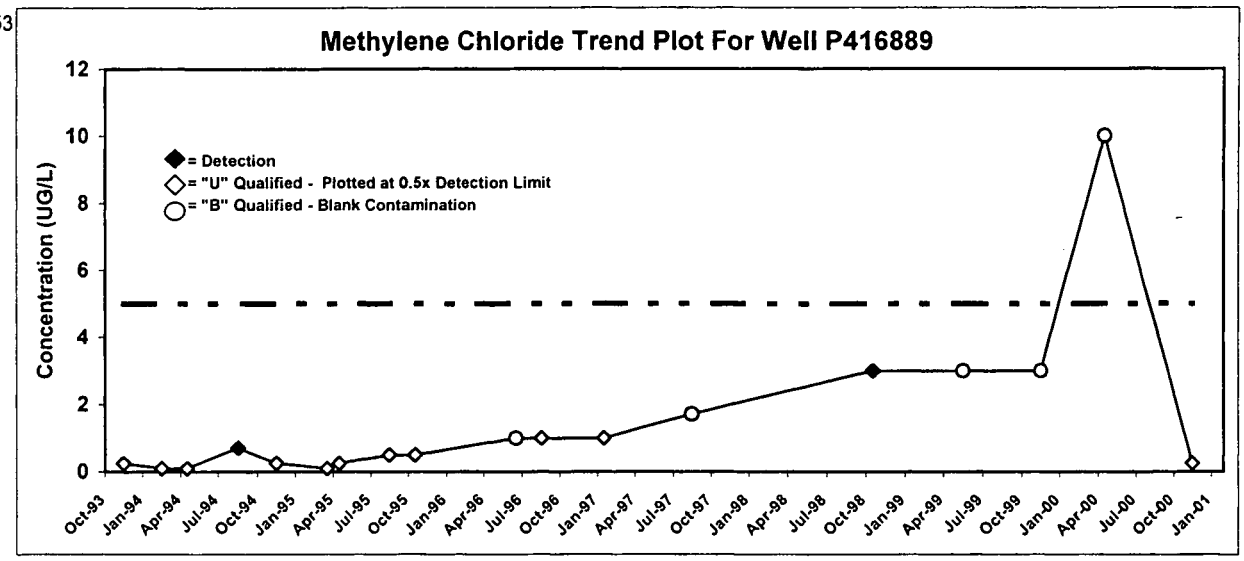
A-151



A-152



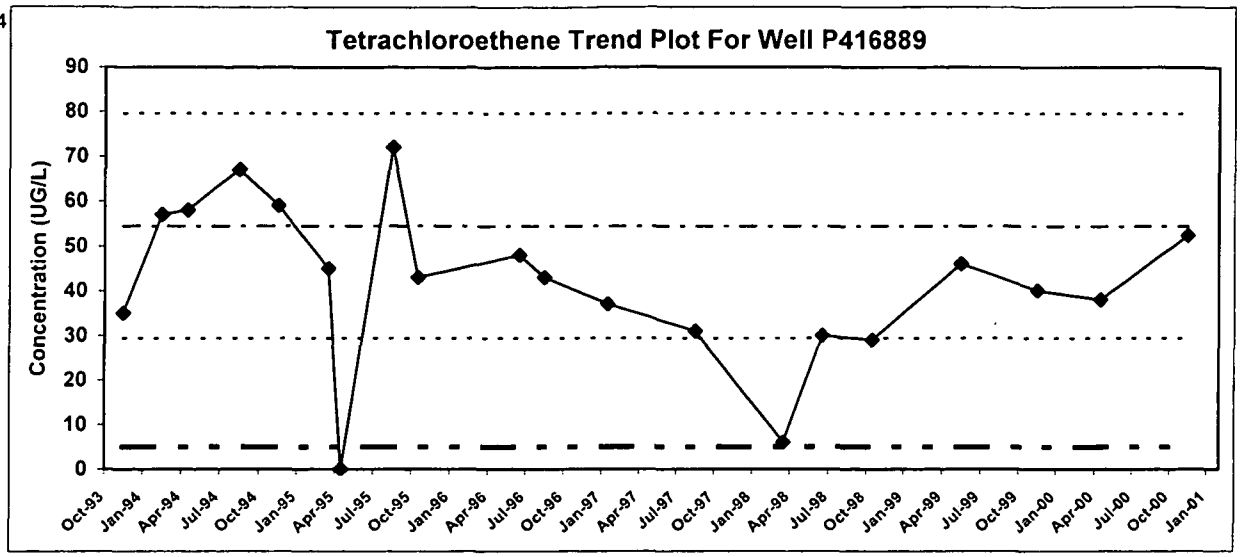
A-153



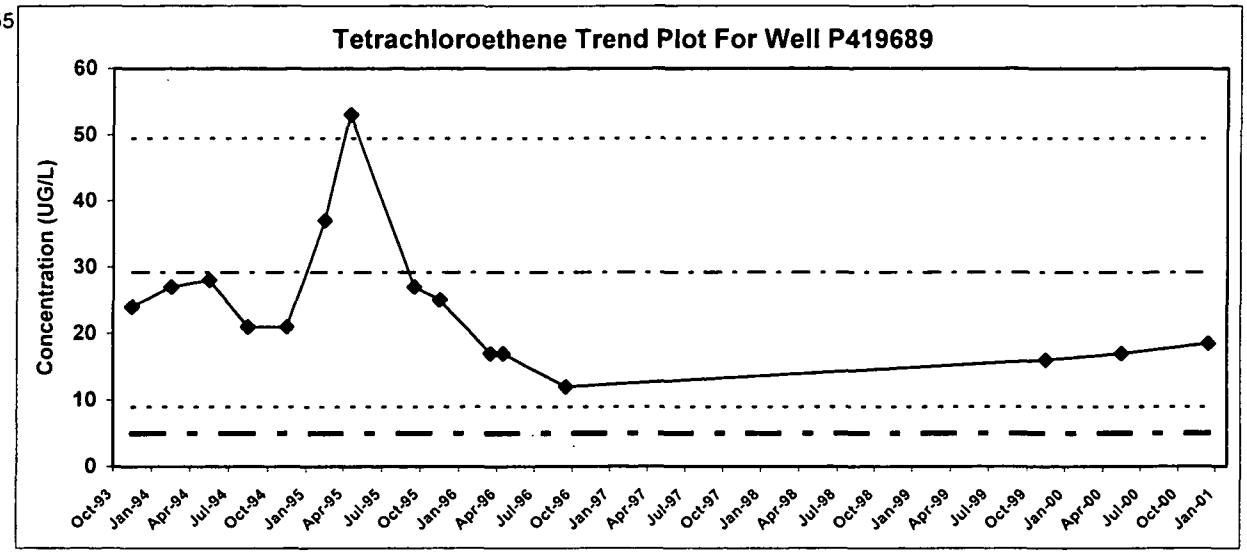
Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

Appendix A: Figures A-1 Through A-156
Trend Plots For Selected Analytes and Wells

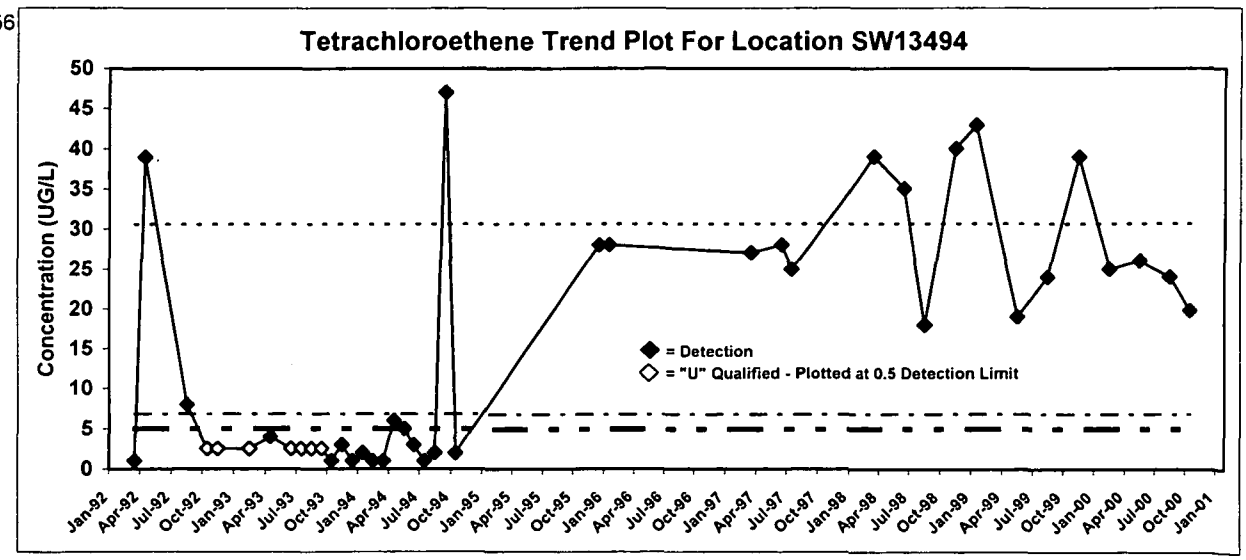
A-154



A-155



A-156



Heavy Horizontal Dashed Line = Tier II Action Levels
Light Horizontal Dashed Lines = 1991-95 Historic Mean and +/- 2 Standard Deviations (+/-M2SD)

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
00100	10/9/00	4.68	5972.79		5946.28
00191	4/12/00	17.92	5952.52		5943.86
00191	10/10/00	18.6	5951.84		5943.86
00197	1/5/00			Dry	5917.6
00197	4/3/00			Dry	5917.6
00197	7/5/00			Dry	5917.6
00197	10/1/00			Dry	5917.6
00293	1/4/00	24.99	6027.45		6002.2
00293	2/1/00	25.7	6026.74		6002.2
00293	3/2/00	25.99	6026.45		6002.2
00293	4/5/00	26.03	6026.41		6002.2
00293	5/4/00	25.47	6026.97		6002.2
00293	5/5/00	25.35	6027.09		6002.2
00293	11/28/00	26.39	6026.05		6002.2
00297	1/10/00			Dry	5964.7
00297	4/10/00	11.5	5963.42	Technically Dry	5964.7
00297	7/12/00	11.07	5963.85	Technically Dry	5964.7
00297	10/9/00	11.66	5963.26	Technically Dry	5964.7
00397	1/3/00			Dry	5928
00397	4/12/00	12.16	5925.87	Technically Dry	5928
00397	7/5/00			Dry	5928
00397	10/2/00			Dry	5928
00400	10/11/00	8.75	5978.72		5968.18
00491	1/10/00	14.92	5890.05		5885.97
00491	4/11/00	14.55	5890.42		5885.97
00491	7/11/00			Dry to top pump	5885.97
00491	10/6/00			Dry to top pump	5885.97
00500	10/11/00	7.11	5974.78		5962.2
00597	1/3/00	12.54	5971.99		5962.1
00597	4/11/00	8.92	5975.61		5962.1
00597	7/5/00	12.06	5972.47		5962.1
00597	10/2/00	12.1	5972.43		5962.1
00600	10/11/00	4.04	5979.88		5964.67
00697	1/5/00	10.53	5965.51	Technically Dry	5966
00697	4/4/00	10.76	5965.28	Technically Dry	5966
00697	7/5/00	10.88	5965.16	Technically Dry	5966
00697	10/4/00	11.3	5964.74	Technically Dry	5966
00700	10/11/00	8.45	5976.09		5954.12
00797	1/10/00	17.27	5923.73		5912.2
00797	4/5/00	21.28	5919.72		5912.2
00797	7/10/00	16.84	5924.16		5912.2
00797	10/4/00	22.68	5918.32		5912.2
00897	1/3/00	21.96	5945.64		5937.5
00897	4/3/00	22.73	5944.87		5937.5
00897	7/10/00	20.85	5946.75		5937.5
00897	10/5/00	20.9	5946.7		5937.5
00997	1/3/00	7.79	5794.11		5789.6
00997	2/2/00	10.1	5791.8		5789.6
00997	3/1/00	7.29	5794.61		5789.6
00997	4/13/00	6.04	5795.86		5789.6
00997	5/2/00	8.41	5793.49		5789.6
00997	6/2/00	7.06	5794.84		5789.6
00997	7/10/00	6.44	5795.46		5789.6
00997	8/1/00	12.18	5789.72		5789.6

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
00997	9/5/00	6.87	5795.03		5789.6
00997	10/4/00	6.37	5795.53		5789.6
00997	11/1/00	6.34	5795.56		5789.6
00997	12/4/00	6.62	5795.28		5789.6
01097	4/25/00	23.33	6005.67		5987.2
01097	10/2/00	24.81	6004.19		5987.2
01197	4/25/00	12.45	6002.83		5985
01197	10/2/00	16.33	5998.95		5985
01291	4/4/00	15.28	5837.57	Technically Dry	5837.91
01291	10/4/00	15.5	5837.35	Technically Dry	5837.91
01297	4/25/00	12.56	6003.54		5980
01297	10/2/00	14.77	6001.33		5980
01391	1/3/00	11.15	5964.15		5959.7
01391	2/3/00	11.65	5963.65		5959.7
01391	3/1/00	11.5	5963.8		5959.7
01391	4/3/00	10.93	5964.37		5959.7
01391	5/1/00	10.44	5964.86		5959.7
01391	6/5/00	10.41	5964.89		5959.7
01391	7/10/00	10.66	5964.64		5959.7
01391	8/1/00	10.7	5964.6		5959.7
01391	9/8/00	10.71	5964.59		5959.7
01391	10/5/00	10.74	5964.56		5959.7
01391	11/2/00	10.78	5964.52		5959.7
01391	12/5/00	11.32	5963.98		5959.7
01397	4/25/00	8.29	5998.65		5982.8
01397	10/2/00	12.45	5994.49		5982.8
01497	4/25/00	11.02	5992.88		5978.9
01497	10/2/00	15.26	5988.64		5978.9
01597	4/25/00	17.28	5989.08		5974.4
01597	10/2/00	19.03	5987.33		5974.4
01697	4/25/00	22.7	5976.26		5969.8
01697	10/2/00	25.26	5973.7		5969.8
01797	4/25/00	21.81	5975.19		5973
01797	10/2/00	24.18	5972.82	Technically Dry	5973
01897	4/25/00	16.02	5974.48		5967.2
01897	10/2/00	17.85	5972.65		5967.2
0190	1/4/00	37.49	6008.39		5999.8
0190	2/1/00	38.06	6007.82		5999.8
0190	3/2/00	38.35	6007.53		5999.8
0190	4/5/00	37.91	6007.97		5999.8
0190	5/4/00	36.95	6008.93		5999.8
0190	6/2/00	37.48	6008.4		5999.8
0190	7/5/00	37.43	6008.45		5999.8
0190	8/2/00	37.28	6008.6		5999.8
0190	9/6/00	37.81	6008.07		5999.8
0190	10/4/00	37.97	6007.91		5999.8
0190	11/2/00	38.36	6007.52		5999.8
0190	12/4/00	38.78	6007.1		5999.8
01997	4/25/00	12.83	5973.07		5972
01997	10/2/00	14.1	5971.8	Technically Dry	5972
02097	4/25/00			Kinked at 0.7 ft.	5963.07
02097	10/2/00	7.56	5968.19		5963.07
02197	1/3/00	13.32	5947.38	Technically Dry	5948.1
02197	4/11/00	13.59	5947.11	Technically Dry	5948.1

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
02197	7/6/00	13.69	5947.01	Technically Dry	5948.1
02197	10/3/00	13.68	5947.02	Technically Dry	5948.1
02297	1/6/00	11.37	5967.28		5965.98
02297	4/6/00			Destroyed	5965.98
02297	7/13/00			Destroyed	5965.98
02397	1/6/00	10.63	5976.18		5975.03
02397	4/10/00	9.69	5977.12		5975.03
02397	7/13/00	10.5	5976.31		5975.03
02397	10/9/00	9.43	5977.38		5975.03
02397	12/6/00			Dry	5975.03
02497	1/6/00	7.51	5971.91		5968.05
02497	4/6/00	7.8	5971.62		5968.05
02497	7/13/00	6.95	5972.47		5968.05
02497	10/9/00	6.39	5973.03		5968.05
02497	12/5/00	10.3	5969.12		5968.05
02500	10/9/00	6.4	5971.15		5963.2
02500	12/6/00	6.65	5970.9		5963.2
02591	4/13/00	40.68	5884.66		5874.47
02591	7/14/00	41	5884.34		5874.47
02591	10/5/00	41.1	5884.24		5874.47
0290	1/4/00	46.98	6003.67		5990.8
0290	2/1/00	47.33	6003.32		5990.8
0290	3/2/00	47.54	6003.11		5990.8
0290	4/5/00	47.65	6003		5990.8
0290	5/5/00	47.65	6003		5990.8
0290	6/2/00	47.7	6002.95		5990.8
0290	7/5/00	47.74	6002.91		5990.8
0290	8/2/00	47.79	6002.86		5990.8
0290	9/6/00	47.91	6002.74		5990.8
0290	10/4/00	47.94	6002.71		5990.8
0290	11/2/00	48.12	6002.53		5990.8
0290	12/4/00	48.18	6002.47		5990.8
03191	4/11/00	21.81	5930.21		5929.15
03191	10/5/00	22.95	5929.07	Technically Dry	5929.15
0386	1/4/00	16.35	5661.51		5652.57
0386	2/1/00	16.46	5661.4		5652.57
0386	3/1/00	16.53	5661.33		5652.57
0386	4/10/00	16.64	5661.22		5652.57
0386	5/1/00	16.68	5661.18		5652.57
0386	6/2/00	16.75	5661.11		5652.57
0386	7/11/00	16.81	5661.05		5652.57
0386	8/3/00	16.86	5661		5652.57
0386	9/6/00	16.91	5660.95		5652.57
0386	10/5/00	16.98	5660.88		5652.57
0386	11/2/00	17.02	5660.84		5652.57
0386	12/5/00	17.05	5660.81		5652.57
0390	1/4/00	54.14	6024.99		6010.4
0390	2/1/00	54.55	6024.58		6010.4
0390	3/2/00	54.7	6024.43		6010.4
0390	4/5/00	54.76	6024.37		6010.4
0390	5/2/00	54.94	6024.19		6010.4
0390	6/2/00	55.31	6023.82		6010.4
0390	7/5/00	55.29	6023.84		6010.4
0390	8/2/00	55.32	6023.81		6010.4

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
0390	9/6/00	55.38	6023.75		6010.4
0390	10/4/00	55.36	6023.77		6010.4
0390	11/2/00	55.58	6023.55		6010.4
0390	12/1/00	55.71	6023.42		6010.4
03991	1/10/00	35.93	5900.94		5897.77
03991	4/11/00	36.35	5900.52		5897.77
03991	7/14/00	36.35	5900.52		5897.77
03991	10/5/00	36.48	5900.39		5897.77
04091	1/10/00	37.4	5892.74		5892.52
04091	4/12/00	37.49	5892.65		5892.52
04091	7/14/00	37.49	5892.65		5892.52
04091	10/5/00	37.53	5892.61		5892.52
04191	4/12/00	17.72	5939.27		5938.48
04191	10/9/00	17.93	5939.06		5938.48
04591	1/6/00	44.98	5905.27		5904.59
04591	4/12/00	45.11	5905.14		5904.59
04591	7/12/00	45.19	5905.06		5904.59
04591	10/9/00	45.24	5905.01		5904.59
0487	1/10/00	12.87	5898.71		5890.65
0487	2/3/00	13.11	5898.47		5890.65
0487	3/1/00	13.12	5898.46		5890.65
0487	4/4/00	10.22	5901.36		5890.65
0487	5/2/00	10.99	5900.59		5890.65
0487	6/5/00	11.56	5900.02		5890.65
0487	7/10/00	12.85	5898.73		5890.65
0487	9/6/00	14.09	5897.49		5890.65
0487	10/4/00	14.27	5897.31		5890.65
0487	11/1/00	14.89	5896.69		5890.65
0487	12/6/00	15.79	5895.79		5890.65
04991	1/6/00	41.25	5897.38		5896.64
04991	4/4/00	41.62	5897.01		5896.64
04991	7/10/00	42.13	5896.5	Technically dry	5896.64
04991	10/4/00	41.78	5896.85		5896.64
05091	1/6/00	43.12	5896.12		5893.63
05091	4/4/00	43.75	5895.49		5893.63
05091	7/10/00	44.02	5895.22		5893.63
05091	10/4/00	44.22	5895.02		5893.63
05193	1/10/00	12.15	5958.43		5957
05193	2/2/00	12.26	5958.32		5957
05193	3/6/00	12.25	5958.33		5957
05193	4/10/00	10.92	5959.66		5957
05193	5/1/00	10.56	5960.02		5957
05193	6/1/00	10.97	5959.61		5957
05193	7/12/00	12.05	5958.53		5957
05193	8/1/00	12.31	5958.27		5957
05193	9/6/00	12.57	5958.01		5957
05193	10/9/00	12.61	5957.97		5957
05193	11/3/00	12.73	5957.85		5957
05193	12/6/00	12.91	5957.67		5957
05291	4/12/00	36.84	5906.16		5906.13
05291	10/9/00	36.99	5906.01		5906.13
05293	12/5/00	9.79	5973.32		5973
05391	1/10/00	35.43	5906.24		5905.09
05391	4/11/00	35.56	5906.11		5905.09

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
05391	7/14/00	35.56	5906.11		5905.09
05391	10/5/00	35.86	5905.81		5905.09
05691	1/10/00	31.03	5917.96		5912.51
05691	4/11/00	31.57	5917.42		5912.51
05691	7/14/00	32.58	5916.41		5912.51
05691	10/5/00	33.18	5915.81		5912.51
06091	1/10/00	37.13	5894.47		5889.38
06091	2/1/00	37.28	5894.32		5889.38
06091	3/7/00	37.48	5894.12		5889.38
06091	4/12/00	37.72	5893.88		5889.38
06091	5/1/00	37.75	5893.85		5889.38
06091	6/5/00	37.8	5893.8		5889.38
06091	7/14/00	37.87	5893.73		5889.38
06091	8/2/00	37.94	5893.66		5889.38
06091	9/7/00	38.01	5893.59		5889.38
06091	10/5/00	38.1	5893.5		5889.38
06091	11/2/00	38.18	5893.42		5889.38
06091	12/4/00	38.11	5893.49		5889.38
06191	4/12/00	33.84	5886.88	Technically dry	5887.11
06191	10/5/00	34.01	5886.71	Technically dry	5887.11
06291	1/10/00	31.77	5867.51		5865
06291	2/1/00	31.5	5867.78		5865
06291	3/7/00	33.36	5865.92		5865
06291	4/12/00	32.94	5866.34		5865
06291	5/1/00	32.74	5866.54		5865
06291	6/5/00	32.41	5866.87		5865
06291	7/17/00	33.66	5865.62		5865
06291	8/2/00	33.49	5865.79		5865
06291	9/8/00	30.12	5869.16		5865
06291	10/5/00	32.82	5866.46		5865
06291	11/2/00	32.47	5866.81		5865
06291	12/4/00	32.05	5867.23		5865
06491	1/5/00	13.47	5659.78		5655.55
06491	4/10/00	14.5	5658.75		5655.55
06491	7/11/00	14.59	5658.66		5655.55
06491	10/5/00	15.9	5657.35		5655.55
06591	4/12/00	18.67	5961.11		5930.28
06591	7/12/00	19.58	5960.2		5930.28
06591	10/10/00	19.11	5960.67		5930.28
06991	4/12/00	16.04	5958.53		5943.91
06991	10/10/00	17.67	5956.9		5943.91
07291	1/6/00	21.12	5957.68		5956.67
07291	2/2/00	21.21	5957.59		5956.67
07291	3/7/00	21.32	5957.48		5956.67
07291	4/12/00	21.02	5957.78		5956.67
07291	5/3/00	20.75	5958.05		5956.67
07291	6/7/00	20.57	5958.23		5956.67
07291	7/12/00	20.81	5957.99		5956.67
07291	8/2/00	20.26	5958.54		5956.67
07291	9/7/00	20.56	5958.24		5956.67
07291	10/10/00	20.56	5958.24		5956.67
07291	11/6/00	20.77	5958.03		5956.67
07291	12/5/00	20.94	5957.86		5956.67
07391	1/6/00	9.16	5941.45		5937.74

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
07391	4/5/00	8.7	5941.91		5937.74
07391	7/12/00	11.66	5938.95		5937.74
07391	10/5/00	9.56	5941.05		5937.74
0790	5/5/00	13.51	6085.28		6047.9
0790	11/21/00	16.67	6082.12		6047.9
08091	1/6/00	19.99	5929.52	Technically dry	5931.6
08091	4/12/00	19.99	5929.52	Technically dry	5931.6
08091	7/12/00	19.98	5929.53	Technically dry	5931.6
08091	10/9/00	19.99	5929.52	Technically dry	5931.6
0990	1/4/00	6.42	6077.06		6045.5
0990	2/1/00	7.01	6076.47		6045.5
0990	3/2/00	6.98	6076.5		6045.5
0990	4/3/00	5	6078.48		6045.5
0990	5/2/00	4.99	6078.49		6045.5
0990	6/5/00	5.99	6077.49		6045.5
0990	7/5/00	6.87	6076.61		6045.5
0990	8/1/00	6.89	6076.59		6045.5
0990	9/5/00	6.21	6077.27		6045.5
0990	10/4/00	6.43	6077.05		6045.5
0990	11/1/00	6.88	6076.6		6045.5
0990	12/5/00	7.64	6075.84		6045.5
10098	1/3/00	5.85	6029.65		6027.3
10098	2/2/00	6.18	6029.32		6027.3
10098	3/1/00	6.19	6029.31		6027.3
10098	4/4/00	3.41	6032.09		6027.3
10098	5/1/00	6.93	6028.57		6027.3
10098	6/5/00	5.12	6030.38		6027.3
10098	7/11/00	5.56	6029.94		6027.3
10098	8/1/00	5.06	6030.44		6027.3
10098	9/8/00	4.95	6030.55		6027.3
10098	10/4/00	4.15	6031.35		6027.3
10098	11/2/00	5.49	6030.01		6027.3
10098	12/5/00	6.48	6029.02		6027.3
10194	1/10/00	38.83	5901.55		5897.5
10194	4/11/00	39.01	5901.37		5897.5
10194	7/11/00	39.13	5901.25		5897.5
10194	10/6/00	39.25	5901.13		5897.5
10198	1/3/00	4.65	6030.85		6022.9
10198	4/4/00	2.91	6032.59		6022.9
10198	7/11/00	4.05	6031.45		6022.9
10198	10/6/00	3.68	6031.82		6022.9
10294	1/4/00	4.2	5602		5589.4
10294	4/10/00	4.32	5601.88		5589.4
10294	7/10/00	6.48	5599.72		5589.4
10294	10/4/00	6.89	5599.31		5589.4
10298	1/6/00	4.67	6024.73		6014.4
10298	4/4/00	4.33	6025.07		6014.4
10298	7/14/00	4.52	6024.88		6014.4
10298	10/11/00	3.63	6025.77		6014.4
10394	1/4/00	4.72	5628.41		5621.8
10394	4/10/00	4.71	5628.42		5621.8
10394	7/10/00			Dry to top pump	5621.8
10394	10/4/00			Dry to top pump	5621.8
10398	1/3/00	5.42	6025.08		6019.9

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
10398	4/4/00	6.49	6024.01		6019.9
10398	7/11/00	5.17	6025.33		6019.9
10398	10/6/00	4.64	6025.86		6019.9
10498	1/3/00	5.78	6026.72		6021.1
10498	4/4/00	4.76	6027.74		6021.1
10498	7/11/00	5.61	6026.89		6021.1
10498	10/6/00	4.86	6027.64		6021.1
10592	1/10/00	20.95	5916.98		5912.15
10592	4/5/00	23.15	5914.78		5912.15
10592	7/10/00	23.86	5914.07		5912.15
10592	10/4/00	21.62	5916.31		5912.15
10594	4/12/00	8.7	5812.25		5810.12
10594	10/3/00	11.58	5809.37	Technically dry	5810.12
10598	1/3/00	5.79	6027.61		6025.9
10598	4/4/00	3.36	6030.04		6025.9
10598	7/11/00	5.27	6028.13		6025.9
10598	10/6/00	2.15	6031.25		6025.9
10692	1/10/00	6.27	5937.33		5922.1
10692	4/5/00	4.74	5938.86		5922.1
10692	7/10/00	7.21	5936.39		5922.1
10692	10/4/00	8.1	5935.5		5922.1
10694	4/12/00	5.53	5754.7		5751.59
10694	10/3/00	5.65	5754.58		5751.59
10792	1/10/00	24.41	5892.69		5892.61
10792	4/5/00	23.92	5893.18		5892.61
10792	7/10/00	24.57	5892.53		5892.61
10792	10/4/00	23.91	5893.19		5892.61
1087	4/7/00			Dry	5969.95
1087	10/9/00			Dry	5969.95
10894	4/7/00	4.98	5663.93		5658.75
10894	10/5/00	6.03	5662.88		5658.75
10991	4/11/00	44.58	5897.06		5889.01
10991	7/11/00	44.73	5896.91		5889.01
10991	10/6/00	44.83	5896.81		5889.01
10992	1/10/00	22.14	5876.42		5867.41
10992	4/5/00	27.67	5870.89		5867.41
10992	7/10/00	24.54	5874.02		5867.41
10992	10/4/00	25.49	5873.07		5867.41
10994	1/5/00	15.95	5901.53		5898.21
10994	4/4/00	15.8	5901.68		5898.21
10994	7/5/00	16.27	5901.21		5898.21
10994	10/4/00	16.55	5900.93		5898.21
11092	1/10/00	21.89	5873.42	Technically dry	5874.33
11092	4/5/00	21.74	5873.57	Technically dry	5874.33
11092	7/10/00	21.64	5873.67	Technically dry	5874.33
11092	10/4/00	21.6	5873.71	Technically dry	5874.33
11294	1/4/00	22.36	6151.14		6095.2
11294	2/1/00	22.76	6150.74		6095.2
11294	3/1/00	22.93	6150.57		6095.2
11294	4/5/00	22.13	6151.37		6095.2
11294	5/3/00	21.29	6152.21		6095.2
11294	6/5/00	21.15	6152.35		6095.2
11294	7/5/00	21.19	6152.31		6095.2
11294	8/2/00	21.22	6152.28		6095.2

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
11294	9/5/00	21.36	6152.14		6095.2
11294	10/5/00	21.55	6151.95		6095.2
11294	11/1/00	21.61	6151.89		6095.2
11294	12/1/00	22.59	6150.91		6095.2
11594	1/4/00	59.86	6056.47		6049.98
11594	2/1/00	59.95	6056.38		6049.98
11594	3/1/00	60.01	6056.32		6049.98
11594	4/5/00	60.12	6056.21		6049.98
11594	5/4/00	60.21	6056.12		6049.98
11594	6/5/00	60.28	6056.05		6049.98
11594	7/5/00	60.37	6055.96		6049.98
11594	8/2/00	60.34	6055.99		6049.98
11594	9/5/00	60.33	6056		6049.98
11594	10/5/00	60.3	6056.03		6049.98
11594	11/1/00	60.27	6056.06		6049.98
11594	12/1/00	60.33	6056		6049.98
11891	1/10/00	26.32	5921.12		5917.51
11891	4/11/00	26.21	5921.23		5917.51
11891	7/14/00	26.58	5920.86		5917.51
11891	10/5/00	26.56	5920.88		5917.51
11994	5/9/00	4.11	5623.43		5619.28
12094	4/12/00	6.16	5756.91		5749.99
12094	7/17/00	9.64	5753.43		5749.99
12094	10/4/00	10.61	5752.46		5749.99
12191	1/6/00	27.37	5930.82		5923.49
12191	4/12/00	28.39	5929.8		5923.49
12191	7/12/00	28.29	5929.9		5923.49
12191	10/5/00	28.2	5929.99		5923.49
12391	4/11/00	50.87	5890.83		5871.67
12391	7/14/00	51.38	5890.32		5871.67
12391	10/5/00	51.96	5889.74		5871.67
12691	1/10/00	35.12	5915.96		5886.58
12691	4/11/00	36.45	5914.63		5886.58
12691	7/14/00	36.86	5914.22		5886.58
12691	10/5/00	37.21	5913.87		5886.58
1290	4/10/00	26.03	5988.84		5977.4
1290	10/4/00	26.72	5988.15		5977.4
13091	4/12/00	18.72	5956.48		5952.38
13091	10/10/00	19.66	5955.54		5952.38
13291	4/12/00	17.68	5962.29	Technically dry	5962.78
13291	7/12/00	17.67	5962.3	Technically dry	5962.78
13291	10/10/00	17.68	5962.29	Technically dry	5962.78
13391	4/13/00	38.41	5886.94		5884.83
13391	10/5/00	38.64	5886.71		5884.83
13491	4/11/00	23.17	5940.25		5932.92
13491	10/5/00	23.5	5939.92		5932.92
13591	4/12/00			Dry	5949.92
13591	10/9/00			Dry	5949.92
1386	1/3/00	5.38	5837.21		5830.97
1386	2/2/00	5.33	5837.26		5830.97
1386	3/1/00	5.37	5837.22		5830.97
1386	4/12/00	5.32	5837.27		5830.97
1386	5/2/00	5.37	5837.22		5830.97
1386	6/1/00	6.25	5836.34		5830.97

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
1386	7/6/00	6.74	5835.85		5830.97
1386	8/1/00	7.17	5835.42		5830.97
1386	9/5/00	8.03	5834.56		5830.97
1386	10/3/00	10.99	5831.6		5830.97
1386	11/1/00	9.57	5833.02		5830.97
1386	12/4/00	6.51	5836.08		5830.97
1390	4/10/00	30.3	5990.32		5978.5
1390	10/4/00	30.65	5989.97		5978.5
1490	1/4/00	53.04	6018.24		6009.4
1490	2/1/00	53.63	6017.65		6009.4
1490	3/2/00	53.9	6017.38		6009.4
1490	4/5/00	54.05	6017.23		6009.4
1490	5/11/00	53.9	6017.38		6009.4
1490	6/2/00	54.19	6017.09		6009.4
1490	7/5/00	54.11	6017.17		6009.4
1490	8/2/00	54.15	6017.13		6009.4
1490	9/6/00	54.27	6017.01		6009.4
1490	10/4/00	54.27	6017.01		6009.4
1490	11/2/00	54.59	6016.69		6009.4
1490	12/4/00	54.86	6016.42		6009.4
15199	1/3/00	7.07	5920.93		5916.7
15199	4/3/00	6.99	5921.01		5916.7
15199	7/10/00	7.8	5920.2		5916.7
15199	10/5/00	9.87	5918.13		5916.7
15299	1/3/00	11.18	5916.82	Technically dry	5917
15299	4/3/00	11.27	5916.73	Technically dry	5917
15299	7/10/00	11.38	5916.62	Technically dry	5917
15299	10/5/00	12.15	5915.85	Technically dry	5917
15399	1/3/00	4.5	5919.5		5914.7
15399	4/3/00	4.44	5919.56		5914.7
15399	7/10/00	5.31	5918.69		5914.7
15399	10/5/00	6.48	5917.52		5914.7
15499	1/3/00	4.13	5919.87		5911.5
15499	4/3/00	3.03	5920.97		5911.5
15499	7/10/00	4.21	5919.79		5911.5
15499	10/5/00	5.26	5918.74		5911.5
15599	1/3/00			Dry	5909
15599	4/3/00			Dry	5909
15599	7/10/00			Dry	5909
15599	10/5/00			Dry	5909
15699	1/3/00	9.57	5909.43		5908.1
15699	4/3/00	7.96	5911.04		5908.1
15699	7/10/00	9.69	5909.31		5908.1
15699	10/5/00	11.75	5907.25	Technically dry	5908.1
15799	1/3/00	10.8	5911.2	Technically dry	5911.6
15799	4/3/00	10.67	5911.33	Technically dry	5911.6
15799	7/10/00	11.45	5910.55	Technically dry	5911.6
15799	10/5/00	11.25	5910.75	Technically dry	5911.6
1786	1/5/00	5.67	5863.9		5854.45
1786	2/2/00	5.75	5863.82		5854.45
1786	3/1/00	5.84	5863.73		5854.45
1786	4/12/00	5.57	5864		5854.45
1786	5/2/00	5.59	5863.98		5854.45
1786	6/1/00	5.84	5863.73		5854.45

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
1786	7/6/00	5.93	5863.64		5854.45
1786	8/1/00	5.69	5863.88		5854.45
1786	9/5/00	5.57	5864		5854.45
1786	10/3/00	5.43	5864.14		5854.45
1786	11/1/00	5.31	5864.26		5854.45
1786	12/4/00	5.61	5863.96		5854.45
18199	1/6/00	13.66	5973.9		5964.66
18199	7/14/00			Dry to top pump	5964.66
18199	10/11/00	10.97	5976.59		5964.66
18299	1/6/00	12.28	5975.22		5966.1
18299	7/14/00	11.9	5975.6		5966.1
18299	10/11/00	9.19	5978.31		5966.1
18399	1/6/00			Dry to top pump	5972.06
18399	4/7/00	9.67	5975.19		5972.06
18399	7/14/00			Dry to top pump	5972.06
18399	10/11/00	8.16	5976.7		5972.06
18499	1/6/00	10.8	5975.15		5964.45
18499	7/13/00	10.33	5975.62		5964.45
18499	10/11/00	7.62	5978.33		5964.45
18599	1/6/00	10.35	5975.21		5964.26
18599	4/6/00	7.31	5978.25		5964.26
18599	7/13/00	9.91	5975.65		5964.26
18599	10/11/00	7.21	5978.35		5964.26
18699	1/6/00	10.57			5969.93
18699	4/6/00	4.56			5969.93
18699	7/13/00	9.5			5969.93
18699	10/11/00	5.67			5969.93
18799	1/6/00			Dry	5975.01
18799	7/13/00	7.7	5977.71		5975.01
18799	10/11/00	6.88	5978.53		5975.01
1886	4/12/00			Dry	5878.25
1886	10/3/00			Dry	5878.25
18899	1/6/00	8.36	5977.21		5976.97
18899	4/6/00	8.74	5976.83	Technically dry	5976.97
18899	7/13/00	7.85	5977.72		5976.97
18899	10/11/00	6.56	5979.01		5976.97
1986	1/6/00	3.01	5940.85		5930.83
1986	2/2/00	2.94	5940.92		5930.83
1986	3/6/00	2.91	5940.95		5930.83
1986	4/7/00	2.62	5941.24		5930.83
1986	5/1/00	2.76	5941.1		5930.83
1986	6/1/00	3.52	5940.34		5930.83
1986	7/12/00	4.11	5939.75		5930.83
1986	8/1/00	4.07	5939.79		5930.83
1986	9/6/00	3.66	5940.2		5930.83
1986	10/9/00	3.05	5940.81		5930.83
1986	11/3/00	2.94	5940.92		5930.83
1986	12/7/00	2.8	5941.06		5930.83
1987	4/3/00	12.05	5957.86		5956.79
1987	10/5/00	10.97	5958.94		5956.79
20098	4/7/00	8.38	5924.17		5911
20098	7/12/00	11.19	5921.36		5911
20098	10/9/00	7.62	5924.93		5911
20196	4/5/00	42.51	5998.58		5973.66

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
20196	10/4/00	42.74	5998.35		5973.66
20291	1/10/00	30.88	5917.7		5914.19
20291	2/1/00	31.38	5917.2		5914.19
20291	3/7/00	32.21	5916.37		5914.19
20291	4/11/00	31.41	5917.17		5914.19
20291	5/1/00	31.64	5916.94		5914.19
20291	6/5/00	32.02	5916.56		5914.19
20291	7/14/00	32.43	5916.15		5914.19
20291	8/2/00	32.59	5915.99		5914.19
20291	9/7/00	32.86	5915.72		5914.19
20291	10/5/00	33.03	5915.55		5914.19
20291	11/2/00	32.88	5915.7		5914.19
20291	12/4/00	33.03	5915.55		5914.19
20296	4/5/00	37.35	5998.86		5978.59
20296	10/4/00	37.44	5998.77		5978.59
20298	4/7/00	7.7	5927.88		5924.8
20298	7/12/00	7.65	5927.93		5924.8
20298	10/9/00	7.26	5928.32		5924.8
20396	4/5/00	34.45	6002.65		5984.27
20396	10/4/00	34.57	6002.53		5984.27
20496	4/5/00	46.75	6019.13		5999.5
20496	10/4/00	46.7	6019.18		5999.5
20498	4/7/00	10.68	5928.79		5918
20498	7/12/00	11.75	5927.72		5918
20498	10/9/00	11.21	5928.26		5918
20596	4/5/00	55.1	6026.06		6007.9
20596	10/4/00	55.55	6025.61		6007.9
20696	1/4/00	44.07	6011.95		5983.56
20696	2/1/00	44.54	6011.48		5983.56
20696	3/2/00	44.84	6011.18		5983.56
20696	4/5/00	44.89	6011.13		5983.56
20696	5/11/00	44.18	6011.84		5983.56
20696	6/2/00	44.5	6011.52		5983.56
20696	7/5/00	44.57	6011.45		5983.56
20696	8/2/00	44.56	6011.46		5983.56
20696	9/6/00	44.8	6011.22		5983.56
20696	10/4/00	44.91	6011.11		5983.56
20696	11/2/00	45.12	6010.9		5983.56
20696	12/4/00	45.44	6010.58		5983.56
20698	4/7/00	18.52	5924.18		5921.4
20698	7/12/00	19.34	5923.36		5921.4
20698	10/9/00	19.06	5923.64		5921.4
20791	4/10/00	20.03	5949.46		5933.4
20791	7/14/00	20.49	5949		5933.4
20791	10/9/00	19.6	5949.89		5933.4
20796	4/5/00	46.26	6009.84		5974
20796	10/4/00	46.42	6009.68		5974
20898	4/10/00	5.81	5939.69		5930.2
20898	7/17/00	4.48	5941.02		5930.2
20898	7/26/00	5.4	5940.1		5930.2
20898	10/9/00	5.47	5940.03		5930.2
20998	1/10/00	9.62	5945.28		5943.4
20998	4/7/00	9.42	5945.48		5943.4
20998	7/12/00	10.39	5944.51		5943.4

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
20998	10/9/00	10.41	5944.49		5943.4
21098	4/7/00	9.7	5949.3		5939.1
21098	7/12/00	11.96	5947.04		5939.1
21098	10/9/00	10.53	5948.47		5939.1
21197	4/25/00	5.08	5932.39		5929.69
21197	10/4/00			Destroyed	5929.69
21197	10/10/00	7.45	5930.02		5929.69
21297	4/25/00			Kinked at 0.94 ft.	5973.15
21297	4/25/00			Kinked at 0.94 ft.	5973.15
21297	10/4/00			Kinked at 0.94 ft.	5973.15
21298	4/7/00	7.18	5951.52		5939.3
21298	7/12/00	11.04	5947.66		5939.3
21298	10/9/00	9.39	5949.31		5939.3
21397	4/25/00			Kinked at 1.2 ft.	5969.16
21397	10/3/00			Kinked at 4.2 ft.	5969.16
21497	4/25/00	2.33	5968.07		5962.61
21497	10/3/00	6.7	5963.7		5962.61
21498	4/7/00	2.34	5962.26		5954.3
21498	7/12/00	4.53	5960.07		5954.3
21498	10/10/00	3.48	5961.12		5954.3
21597	4/25/00	3.45	5962.22		5959.86
21597	10/3/00	5.23	5960.44		5959.86
21697	4/25/00	5.04	5956.5		5952.3
21697	10/3/00	4.35	5957.19		5952.3
21698	4/7/00	5.56	5968.34		5957.5
21698	7/12/00	7.8	5966.1		5957.5
21698	10/10/00	5.55	5968.35		5957.5
21797	4/25/00			Kinked at surface	5951.2
21797	10/2/00			Kinked at surface	5951.2
2186	1/6/00	31.57	5974.39		5937.52
2186	4/6/00	31.62	5974.34		5937.52
2186	7/12/00	31.99	5973.97		5937.52
2186	10/11/00	32.4	5973.56		5937.52
2187	4/10/00	3.19	5926.5		5918.025
2187	10/9/00	3.67	5926.02		5918.025
21897	4/25/00			Destroyed	5946.1
21897	10/2/00			Destroyed	5946.1
21898	4/7/00	16.71	5971.89		5967.3
21898	7/12/00	18.19	5970.41		5967.3
21898	10/10/00	17.61	5970.99		5967.3
21997	4/25/00	7.94	5942.56	Technically dry	5942.6
21997	10/2/00			Dry	5942.6
22097	4/25/00	5.26	5942.24		5940.1
22097	10/2/00			Dry	5940.1
22098	4/7/00	10.57	5989.03		5975.3
22098	7/12/00	10.83	5988.77		5975.3
22098	10/10/00	10.08	5989.52		5975.3
22197	4/25/00	5.52	5938.98		5937.7
22197	10/2/00	6.09	5938.41		5937.7
22297	4/25/00	1.71	5938.94		5937.02
22297	10/2/00	2.11	5938.54		5937.02
22298	4/7/00	10.25	5920.35		5914.9
22298	7/12/00	13.2	5917.4		5914.9
22298	10/9/00	10.48	5920.12		5914.9

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

4/01

Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
22397	4/25/00			Destroyed	5932.15
22397	10/3/00			Destroyed	5932.15
22497	4/25/00			Destroyed	5936.1
22497	10/2/00			Destroyed	5936.1
22596	1/6/00			Dry to top pump	5981
22596	2/2/00			Dry to top pump	5981
22596	3/6/00			Dry to top pump	5981
22596	4/6/00	24.49	5985.31		5981
22596	5/2/00	24.95	5984.85		5981
22596	6/1/00	25.21	5984.59		5981
22596	7/12/00	25.8	5984		5981
22596	8/1/00	24.61	5985.19		5981
22596	9/6/00	24.12	5985.68		5981
22596	10/11/00	23.78	5986.02		5981
22596	11/3/00	24.89	5984.91		5981
22596	12/6/00	24.43	5985.37		5981
22696	1/6/00	19.38	5963.2		5962.5
22696	4/6/00	19.72	5962.86		5962.5
22696	7/12/00	18.75	5963.83		5962.5
22696	10/9/00	19.65	5962.93		5962.5
22696	12/6/00	19.56	5963.02		5962.5
22796	1/6/00	15.02	5929.48		5925
22796	4/7/00	13.35	5931.15		5925
22796	7/12/00	14.65	5929.85		5925
22796	10/11/00	13.83	5930.67		5925
2286	1/6/00	9.15	5970.4		5967.57
2286	2/2/00			Dry to top pump	5967.57
2286	3/6/00			Dry to top pump	5967.57
2286	4/6/00	8.25	5971.3		5967.57
2286	5/1/00	8.95	5970.6		5967.57
2286	6/1/00	8.63	5970.92		5967.57
2286	7/13/00	8.61	5970.94		5967.57
2286	8/1/00	8.32	5971.23		5967.57
2286	10/9/00	7.87	5971.68		5967.57
2286	11/3/00	8.81	5970.74		5967.57
2286	12/5/00			Dry to top pump	5967.57
22896	1/10/00	21.65	5979.77		5975.7
22896	4/6/00	19.23	5982.19		5975.7
22896	7/12/00	21.44	5979.98		5975.7
22896	10/10/00	20.61	5980.81		5975.7
22896	12/6/00	19.46	5981.96		5975.7
22996	1/3/00	7.4	5981.1		5977.5
22996	2/7/00			Dry to top pump	5977.5
22996	3/1/00	6.38	5982.12		5977.5
22996	4/10/00	5.27	5983.23		5977.5
22996	5/1/00	5.64	5982.86		5977.5
22996	6/6/00	6.37	5982.13		5977.5
22996	7/14/00			Dry to top pump	5977.5
22996	8/1/00	6.9	5981.6		5977.5
22996	9/8/00	6.92	5981.58		5977.5
22996	10/9/00	6.36	5982.14		5977.5
22996	11/2/00	7.16	5981.34		5977.5
22996	12/5/00			Dry to top pump	5977.5
23096	1/5/00	12.78	5825.02		5822

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
23096	4/4/00	8.67	5829.13		5822
23096	7/10/00	13.56	5824.24		5822
23096	10/4/00	11.48	5826.32		5822
23196	1/5/00	27.49	5789.18	Technically dry	5790
23196	4/4/00	26.43	5790.24		5790
23196	7/10/00	26.79	5789.88	Technically dry	5790
23196	10/4/00	26.37	5790.3		5790
23296	1/3/00	5.45	5852.55		5848
23296	2/2/00	5.41	5852.59		5848
23296	3/1/00	5.4	5852.6		5848
23296	4/12/00	4.82	5853.18		5848
23296	5/2/00	5.02	5852.98		5848
23296	6/1/00	5.37	5852.63		5848
23296	7/10/00	6.45	5851.55		5848
23296	8/1/00	6.34	5851.66		5848
23296	9/5/00	6.5	5851.5		5848
23296	10/3/00	6	5852		5848
23296	11/1/00	5.49	5852.51		5848
23296	12/4/00	5.61	5852.39		5848
2486	4/10/00			Dry	5975
2486	10/9/00			Dry	5975
2487	4/11/00			Dry	5944.69
2487	10/6/00			Dry	5944.69
2686	4/10/00	11.97	5965.2		5964.42
2686	10/9/00	12.28	5964.89		5964.42
2687	4/12/00			Dry	5940.83
2687	10/9/00			Dry	5940.83
2986	4/10/00			Dry	5950.81
2986	10/9/00			Dry	5950.81
2987	1/5/00			Dry to top pump	5792.31
2987	4/4/00	12.49	5801.8		5792.31
2987	4/12/00			Dry to top pump	5792.31
2987	7/10/00			Dry to top pump	5792.31
30100	10/2/00	8.24	5954.96		5936.38
30200	10/2/00	8.24	5951.84		5931.18
30300	10/2/00	9.03	5948.87		5937.16
30400	10/2/00	30.18	5937.05		5936.36
30500	10/12/00			Dry	5931.81
30600	10/4/00			Dry	5914.46
30700	10/3/00			Dry	5907.34
30800	10/12/00	6.43	5965.55		5949.17
3087	1/5/00	26.55	5785.22		5715.77
3087	4/4/00	25.15	5786.62		5715.77
3087	7/10/00	26.16	5785.61		5715.77
3087	10/4/00	25.14	5786.63		5715.77
308-P-1	10/2/00	24.57	5919.54		5902.07
308-P-2	10/4/00	27.11	5916.91		5901.97
30900	10/2/00	13.21	5993.55		5974.81
3287	4/12/00	47.81	5900.16		5899.8
3287	10/9/00	47.98	5899.99		5899.8
3386	1/10/00			Dry	5944.06
3386	2/2/00			Dry	5944.06
3386	3/6/00			Dry	5944.06
3386	4/13/00			Dry	5944.06

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
3386	5/1/00			Dry	5944.06
3386	5/9/00			Dry	5944.06
3386	6/1/00			Dry to top troll	5944.06
3387	4/12/00			Dry	5925.78
3387	10/9/00			Dry	5925.78
34791	4/5/00	2.92	5950.99		5943.39
34791	10/10/00	5.2	5948.71		5943.39
3586	1/3/00	8.08	5904.68		5899.15
3586	2/2/00	8.1	5904.66		5899.15
3586	3/1/00	7.98	5904.78		5899.15
3586	4/3/00	7.24	5905.52		5899.15
3586	5/1/00	7.75	5905.01		5899.15
3586	6/5/00	8.07	5904.69		5899.15
3586	7/10/00	8.24	5904.52		5899.15
3586	8/1/00	8.2	5904.56		5899.15
3586	9/8/00	8.12	5904.64		5899.15
3586	10/5/00	8.11	5904.65		5899.15
3586	11/2/00	8.18	5904.58		5899.15
3586	12/5/00	8.32	5904.44		5899.15
35991	4/7/00	16.76	5959.69		5959.55
35991	7/11/00	16.82	5959.63		5959.55
35991	10/6/00	16.88	5959.57		5959.55
3687	1/10/00	36.63	5914.48		5886.32
3687	4/11/00	37.71	5913.4		5886.32
3687	7/14/00	38.02	5913.09		5886.32
3687	10/5/00	38.32	5912.79		5886.32
37191	4/5/00	10.04	5938.25		5924.84
37191	10/10/00	12.25	5936.04		5924.84
37691	4/10/00	16.64	5968.6		5967.96
37691	10/9/00	16.28	5968.96		5967.96
37791	4/7/00	19.97	5984.21		5981.56
37791	4/10/00	19.9	5984.28		5981.56
37791	10/6/00	18.4	5985.78		5981.56
38591	1/5/00	8.42	5858.2		5857.06
38591	4/4/00	7.74	5858.88		5857.06
38591	7/5/00	10.04	5856.58	Technically dry	5857.06
38591	10/4/00	10.11	5856.51	Technically dry	5857.06
39691	4/7/00	10.93	5997.44		5997.26
39691	7/11/00	10.89	5997.48		5997.26
39691	10/6/00	9.07	5999.3		5997.26
40099	1/3/00	17.6	6008.37		5998.18
40099	4/5/00	16.8	6009.17		5998.18
40099	7/11/00	17.16	6008.81		5998.18
40099	10/6/00	16.52	6009.45		5998.18
40199	1/3/00	15.42	6008		5996.02
40199	4/5/00	12.27	6011.15		5996.02
40199	7/11/00	14.54	6008.88		5996.02
40199	10/6/00	14	6009.42		5996.02
40299	1/3/00	19.42	6004.74		5997.09
40299	4/5/00	18.23	6005.93		5997.09
40299	7/11/00	19.06	6005.1		5997.09
40299	10/6/00	18.73	6005.43		5997.09
40399	1/4/00	13.75	6006.16		5996.08
40399	4/5/00	16.86	6003.05		5996.08

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
40399	7/11/00	13.05	6006.86		5996.08
40399	10/6/00	12.1	6007.81		5996.08
40499	1/3/00	14.76	6005.82		5996.31
40499	4/5/00	12.12	6008.46		5996.31
40499	7/11/00	13.98	6006.6		5996.31
40499	10/6/00	13.13	6007.45		5996.31
40599	1/6/00	9.05	5935.49		5933.69
40599	1/6/00	10.5	5934.04		5933.69
40599	4/7/00	8.72	5935.82		5933.69
40599	4/7/00	10.51	5934.03		5933.69
40599	7/14/00	9.34	5935.2		5933.69
40599	7/14/00	10.51	5934.03		5933.69
40599	7/26/00	8.91	5935.63		5933.69
40599	7/26/00	10.51	5934.03		5933.69
40599	10/11/00	7.38	5937.16		5933.69
40599	10/11/00	10.49	5934.05		5933.69
40699	1/6/00	12.87	5928.97		5927.69
40699	1/6/00	13.52	5928.32		5927.69
40699	4/7/00	12.96	5928.88		5927.69
40699	4/7/00	13.54	5928.3		5927.69
40699	7/14/00	12.46	5929.38		5927.69
40699	7/14/00	13.51	5928.33		5927.69
40699	10/11/00	11.69	5930.15		5927.69
40699	10/11/00	13.52	5928.32		5927.69
40799	1/6/00	7.34	5937.29		5934.58
40799	1/6/00	9.67	5934.96		5934.58
40799	4/7/00	4.3	5940.33		5934.58
40799	4/7/00	9.69	5934.94		5934.58
40799	7/14/00	6.05	5938.58		5934.58
40799	7/14/00	9.68	5934.95		5934.58
40799	10/11/00	3.65	5940.98		5934.58
40799	10/11/00	9.67	5934.96		5934.58
4087	1/3/00	4.55	5880.06		5876.54
4087	1/3/00	8.44	5876.17	Technically dry	5876.54
4087	2/2/00	4.58	5880.03		5876.54
4087	2/2/00	8.45	5876.16	Technically dry	5876.54
4087	3/1/00	4.44	5880.17		5876.54
4087	3/1/00	8.43	5876.18	Technically dry	5876.54
4087	4/12/00	3.14	5881.47		5876.54
4087	4/12/00	8.44	5876.17	Technically dry	5876.54
4087	5/2/00	3.8	5880.81		5876.54
4087	5/2/00	8.39	5876.22	Technically dry	5876.54
4087	6/1/00	5.66	5878.95		5876.54
4087	6/1/00	8.41	5876.2	Technically dry	5876.54
4087	7/6/00	6.79	5877.82		5876.54
4087	7/6/00	8.42	5876.19	Technically dry	5876.54
4087	8/1/00	8.04	5876.57		5876.54
4087	8/1/00	8.46	5876.15	Technically dry	5876.54
4087	9/5/00	8.03	5876.58		5876.54
4087	9/5/00	8.41	5876.2	Technically dry	5876.54
4087	10/3/00			Dry	5876.54
4087	10/3/00	8.4	5876.21	Technically dry	5876.54
4087	11/1/00			Dry	5876.54
4087	11/1/00	8.4	5876.21	Technically dry	5876.54

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
4087	12/4/00			Dry	5876.54
4087	12/4/00	8.39	5876.22	Technically dry	5876.54
40899	1/6/00			Dry	5964.73
40899	4/10/00	13.04	5966.2		5964.73
40899	6/15/00			Dry	5964.73
40899	7/14/00			Dry	5964.73
40899	10/11/00			Dry	5964.73
40999	1/4/00	5.75	5983.03		5981.41
40999	4/7/00	4.63	5984.15		5981.41
40999	7/11/00	6.26	5982.52		5981.41
40999	10/9/00	5.51	5983.27		5981.41
41091	1/3/00	10.1	5711.75		5709.56
41091	2/2/00	2.23	5719.62		5709.56
41091	3/1/00	10.1	5711.75		5709.56
41091	4/13/00	8.81	5713.04		5709.56
41091	5/2/00	9.63	5712.22		5709.56
41091	6/2/00	10.05	5711.8		5709.56
41091	7/10/00	9.33	5712.52		5709.56
41091	8/1/00	10.04	5711.81		5709.56
41091	9/5/00	10.77	5711.08		5709.56
41091	10/4/00	10.85	5711		5709.56
41091	11/1/00	10.74	5711.11		5709.56
41091	12/4/00	8.26	5713.59		5709.56
41099	1/4/00	5.24	5981.2		5974.59
41099	4/7/00	3.06	5983.38		5974.59
41099	7/11/00	5.53	5980.91		5974.59
41099	10/9/00	4.12	5982.32		5974.59
41199	1/4/00	4.91	5982.6		5975.86
41199	4/10/00	4.18	5983.33		5975.86
41199	7/14/00	5.78	5981.73		5975.86
41199	10/9/00	4.07	5983.44		5975.86
41299	1/3/00	14.96	6004.72		5995.62
41299	4/5/00	13.37	6006.31		5995.62
41299	7/11/00	14.41	6005.27		5995.62
41299	10/6/00	13.85	6005.83		5995.62
41499	1/6/00	11.61	5931.96		5929.67
41499	5/17/00	10.63	5932.94		5929.67
41499	7/14/00	10.22	5933.35		5929.67
41499	10/11/00	9.3	5934.27		5929.67
41591	1/5/00			Dry to top pump	5714.54
41591	2/1/00			Dry to top pump	5714.54
41591	3/1/00			Dry to top pump	5714.54
41591	4/10/00	7.83	5719.44		5714.54
41591	5/1/00	8.48	5718.79		5714.54
41591	6/2/00	8.74	5718.53		5714.54
41591	7/10/00			Dry to top pump	5714.54
41591	8/3/00			Dry to top pump	5714.54
41591	9/6/00			Dry to top pump	5714.54
41591	10/5/00			Dry to top pump	5714.54
41591	11/2/00			Dry to top pump	5714.54
41591	12/5/00			Dry to top pump	5714.54
41599	1/6/00	13.12	5934.01		5932.23
41599	4/7/00	11.7	5935.43		5932.23
41599	7/14/00	12.67	5934.46		5932.23

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
41599	10/11/00	12.37	5934.76		5932.23
41691	1/4/00	9.06	5636.82		5629.25
41691	2/1/00	8.35	5637.53		5629.25
41691	3/1/00	9.05	5636.83		5629.25
41691	4/7/00	8.1	5637.78		5629.25
41691	5/1/00	8.03	5637.85		5629.25
41691	6/2/00	9.71	5636.17		5629.25
41691	7/11/00	9.45	5636.43		5629.25
41691	8/3/00	9.75	5636.13		5629.25
41691	9/6/00	9.67	5636.21		5629.25
41691	10/5/00	9	5636.88		5629.25
41691	11/2/00	10.19	5635.69		5629.25
41691	12/5/00	8.21	5637.67		5629.25
4286	1/10/00	24.18	5933.69		5926.57
4286	2/1/00	25.2	5932.67		5926.57
4286	3/7/00	27.06	5930.81		5926.57
4286	4/11/00	26.31	5931.56		5926.57
4286	5/1/00	24.86	5933.01		5926.57
4286	6/5/00	24.84	5933.03		5926.57
4286	7/14/00	25.52	5932.35		5926.57
4286	8/2/00	25.11	5932.76		5926.57
4286	9/7/00	25.15	5932.72		5926.57
4286	10/5/00	24.79	5933.08		5926.57
4286	11/3/00	24.58	5933.29		5926.57
4286	12/4/00	25.38	5932.49		5926.57
42993	4/10/00	10.15	5970.6		5962.05
42993	7/12/00	11.28	5969.47		5962.05
42993	10/9/00	10.49	5970.26		5962.05
43392	1/5/00	30.02	6013.42		6011.61
43392	4/3/00	30.55	6012.89		6011.61
43392	7/12/00	29.95	6013.49		6011.61
43392	10/5/00	29.96	6013.48		6011.61
43593	4/13/00	6.74	5973.2		5967
43593	7/12/00	7.23	5972.71		5967
43593	10/9/00	6.24	5973.7		5967
4386	1/3/00	18.57	5955.89	Technically Dry	5956.16
4386	2/2/00			Dry	5956.16
4386	3/1/00			Dry	5956.16
4386	4/3/00	17.13	5957.33		5956.16
4386	5/1/00	16.94	5957.52		5956.16
4386	6/5/00	17.61	5956.85		5956.16
4386	7/10/00			Dry	5956.16
4386	8/1/00	18.1	5956.36		5956.16
4386	9/8/00	17.64	5956.82		5956.16
4386	10/5/00	17.33	5957.13		5956.16
4386	11/2/00	18	5956.46		5956.16
4386	12/5/00			Dry	5956.16
4387	4/5/00	9.57	5916.84		5912.81
4387	10/10/00	10.61	5915.8		5912.81
4486	4/5/00	6.19	6015.77		5993.68
4486	10/6/00	6.68	6015.28		5993.68
45793	4/10/00	7.14	5945.98	Technically Dry	5946.4
45793	10/9/00	7.17	5945.95	Technically Dry	5946.4
46292	4/5/00	53.76	6043.48		6004.8

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
46292	10/5/00	53.97	6043.27		6004.8
46392	4/5/00	33.21	6031.82		5983.7
46392	7/5/00	32.28	6032.75		5983.7
46392	10/5/00	32.8	6032.23		5983.7
46492	4/5/00	27.6	6029.21		6011.5
46492	10/5/00	26.88	6029.93		6011.5
4787	1/10/00			Dry	5875.51
4787	4/5/00	6.08	5878.56		5875.51
4787	7/10/00			Dry	5875.51
4787	10/4/00			Dry	5875.51
4887	1/10/00			Dry	5899.62
4887	4/5/00	11.15	5900.26		5899.62
4887	7/10/00			Dry	5899.62
4887	10/1/00			Dry	5899.62
50494	4/5/00	25.97	6068.37	Technically Dry	6070.6
50494	10/5/00	25.97	6068.37	Technically Dry	6070.6
50694	4/5/00	23.42	6064.08		6058.7
50694	10/5/00	20.88	6066.62		6058.7
51094	4/5/00	43.93	6049.32		6033.5
51094	10/5/00	43.9	6049.35		6033.5
51194	4/5/00	38.57	6034.74		6021.4
51194	10/5/00	37.98	6035.33		6021.4
51294	1/4/00	21.4	6043.28		6027.8
51294	2/1/00	22.26	6042.42		6027.8
51294	3/2/00	22.61	6042.07		6027.8
51294	4/5/00	22.37	6042.31		6027.8
51294	5/4/00	21.51	6043.17		6027.8
51294	6/2/00	21.34	6043.34		6027.8
51294	7/5/00	21.42	6043.26		6027.8
51294	8/2/00	21.4	6043.28		6027.8
51294	9/6/00	21.51	6043.17		6027.8
51294	10/5/00	21.88	6042.8		6027.8
51294	11/2/00	22.01	6042.67		6027.8
51294	12/1/00	22.97	6041.71		6027.8
51594	1/4/00	12.51	6086.98		6077.5
51594	2/1/00	12.94	6086.55		6077.5
51594	3/2/00	13.31	6086.18		6077.5
51594	4/5/00	13.4	6086.09		6077.5
51594	5/3/00	10.92	6088.57		6077.5
51594	6/2/00	9.71	6089.78		6077.5
51594	7/5/00	9.42	6090.07		6077.5
51594	8/2/00	9.73	6089.76		6077.5
51594	9/6/00	10.22	6089.27		6077.5
51594	10/5/00	10.96	6088.53		6077.5
51594	11/1/00	11.28	6088.21		6077.5
51594	12/1/00	12.55	6086.94		6077.5
5187	4/7/00	15.59	5949.63		5949.43
5187	7/11/00	15.47	5949.75		5949.43
5187	10/6/00	15.59	5949.63		5949.43
5286	5/5/00	128.08	6016.36		6016.34
5286	11/29/00	72.38	6072.06		6016.34
5287	1/3/00	10.02	5959.55		5947.6
5287	2/2/00	9.96	5959.61		5947.6
5287	3/1/00	9.87	5959.7		5947.6

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
5287	4/7/00	9.53	5960.04		5947.6
5287	5/1/00	9.68	5959.89		5947.6
5287	6/5/00	9.93	5959.64		5947.6
5287	7/11/00	9.9	5959.67		5947.6
5287	8/1/00	9.97	5959.6		5947.6
5287	9/8/00	9.95	5959.62		5947.6
5287	10/6/00	9.81	5959.76		5947.6
5287	11/2/00	9.96	5959.61		5947.6
5287	12/5/00	10.16	5959.41		5947.6
52894	4/12/00	4.7	5866.05	Technically Dry	5866.18
52894	7/6/00			Dry	5866.18
52894	10/3/00	7.98	5862.77	Technically Dry	5866.18
52994	1/3/00			Dry	5857.94
52994	4/12/00			Dry	5857.94
52994	7/6/00			Dry	5857.94
52994	10/3/00			Dry	5857.94
5386	5/5/00	5.54	6061.09		6057.95
5386	11/20/00	8.26	6058.37		6057.95
5387	1/10/00	6.73	5955.08		5950.94
5387	4/5/00	4.75	5957.06		5950.94
5387	7/10/00	9.97	5951.84		5950.94
5387	10/4/00	10.25	5951.56		5950.94
5587	1/4/00	9.1	5850.99	Technically Dry	5851.04
5587	2/3/00	9.15	5850.94	Technically Dry	5851.04
5587	3/1/00	9.23	5850.86	Technically Dry	5851.04
5587	4/4/00	9.26	5850.83	Technically Dry	5851.04
5587	5/2/00	9.21	5850.88	Technically Dry	5851.04
5587	6/2/00	9.2	5850.89	Technically Dry	5851.04
5587	7/5/00	9.21	5850.88	Technically Dry	5851.04
5587	8/1/00	9.31	5850.78	Technically Dry	5851.04
5587	9/6/00			Dry	5851.04
5587	10/4/00			Dry	5851.04
5587	11/1/00			Dry	5851.04
5587	12/6/00			Dry	5851.04
5686	1/4/00	7.11	5981.82		5977.86
5686	2/3/00	6.89	5982.04		5977.86
5686	3/2/00	6.92	5982.01		5977.86
5686	4/3/00	4.8	5984.13		5977.86
5686	5/2/00	6.9	5982.03		5977.86
5686	6/5/00	6.98	5981.95		5977.86
5686	7/5/00	7.08	5981.85		5977.86
5686	8/1/00	7.76	5981.17		5977.86
5686	9/5/00	6.9	5982.03		5977.86
5686	10/4/00	6.95	5981.98		5977.86
5686	11/1/00	7.1	5981.83		5977.86
5686	12/6/00	7.4	5981.53		5977.86
56994	4/3/00	18.14	6003.49		5995.3
56994	10/5/00	18.15	6003.48		5995.3
57094	4/3/00	33.52	5938.6		5936.2
57094	7/5/00	33.95	5938.17		5936.2
57094	10/1/00	34.52	5937.6		5936.2
58793	4/3/00	13.23	6000.97		5987.8
58793	7/5/00	12.91	6001.29		5987.8
58793	10/4/00	14.56	5999.64		5987.8

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
5887	1/3/00	13.08	5983.69		5973.2
5887	4/12/00	8.53	5988.24		5973.2
5887	7/6/00	12.26	5984.51		5973.2
5887	10/2/00	12.67	5984.1		5973.2
59493	4/3/00	4.53	5987.87		5977.86
59493	10/5/00	10.25	5982.15		5977.86
59594	4/3/00	30.39	6018.52		6009.1
59594	10/5/00	30.33	6018.58		6009.1
59893	4/4/00	1.9	5944.5		5931.66
59893	7/5/00	10.9	5935.5		5931.66
59893	10/10/00	12.42	5933.98		5931.66
60099	1/6/00			Dry	
60099	3/6/00			Dry	
60099	4/6/00			Dry	
60099	7/13/00			Dry	
60099	10/11/00			Dry	
60099	12/6/00	9.03	5973.72		5972.95
60195	1/4/00			Dry	5888.5
60195	2/2/00			Dry	5888.5
60195	3/1/00			Dry	5888.5
60195	4/12/00			Dry	5888.5
60195	5/2/00			Dry	5888.5
60195	6/1/00			Dry	5888.5
60195	7/10/00			Dry	5888.5
60195	8/1/00			Dry	5888.5
60195	9/5/00			Dry	5888.5
60195	10/3/00			Dry	5888.5
60195	11/1/00			Dry	5888.5
60195	12/4/00			Dry	5888.5
60199	1/6/00	6.09	5980.59		5976.98
60199	4/6/00	4.27	5982.41		5976.98
60199	7/13/00	5.4	5981.28		5976.98
60199	10/11/00	5.44	5981.24		5976.98
60294	4/12/00	8.11	5913.72		
60294	10/9/00			Dry	
60299	1/6/00	8.69	5978.19		5977.18
60299	4/6/00	7.54	5979.34		5977.18
60299	7/13/00	7.75	5979.13		5977.18
60299	10/11/00	7.55	5979.33		5977.18
60299	12/6/00	8.84	5978.04		5977.18
60395	4/12/00			Dry	5878.1
60395	10/30/00			Dry	5878.1
60399	1/10/00	6.18	5980.05		5975.18
60399	4/6/00	9.09	5977.14		5975.18
60399	7/13/00	5.45	5980.78		5975.18
60399	10/10/00	9.07	5977.16		5975.18
60499	1/10/00	8.89	5982.13		5976.07
60499	4/6/00	8.21	5982.81		5976.07
60499	7/13/00	8.53	5982.49		5976.07
60499	10/10/00	8.9	5982.12		5976.07
60599	1/10/00	4.5	5983.41		5978.01
60599	4/6/00	4.35	5983.56		5978.01
60599	7/13/00	4.03	5983.88		5978.01
60599	10/10/00	4.85	5983.06		5978.01

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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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.)
60693	4/3/00	14.91	6008.79		6005.81
60693	10/5/00	15.55	6008.15		6005.81
60695	4/12/00	9.75	5875.25		5871.1
60695	10/6/00	9.98	5875.02		5871.1
60699	1/10/00	7.12	5979.8		5976.85
60699	4/6/00	7.9	5979.02		5976.85
60699	7/13/00	3.85	5983.07		5976.85
60699	10/10/00	3.99	5982.93		5976.85
60699	12/6/00	5.67	5981.25		5976.85
60795	4/13/00			Dry	5833.9
60795	10/6/00			Dry	5833.9
60799	1/10/00	6.92	5986.22		5983.4
60799	4/6/00	7.64	5985.5		5983.4
60799	7/13/00	5.43	5987.71		5983.4
60799	10/10/00	5.23	5987.91		5983.4
6087	4/12/00	8.82	5977.14		5956.97
6087	10/3/00	12.22	5973.74		5956.97
60899	1/4/00	8.48	5987.19		5983.47
60899	4/7/00	7.91	5987.76		5983.47
60899	7/11/00	8.35	5987.32		5983.47
60899	10/9/00	7.92	5987.75		5983.47
60994	4/12/00	9.81	5922.26		5919.88
60994	10/9/00	10.97	5921.1		5919.88
61099	1/4/00	9.92	5991.89		5985.86
61099	4/7/00	8.35	5993.46		5985.86
61099	7/11/00	9.5	5992.31		5985.86
61099	10/9/00	8.99	5992.82		5985.86
61199	1/4/00	9.95	5992.85		5983.5
61199	4/7/00	8.49	5994.31		5983.5
61199	7/11/00	9.61	5993.19		5983.5
61199	10/9/00	9.18	5993.62		5983.5
61293	4/3/00	2.15	5984.55		5977.03
61293	7/5/00	7.76	5978.94		5977.03
61293	10/4/00	9.03	5977.67		5977.03
61295	4/4/00	2.99	5864.01		5856.6
61295	7/5/00	4.29	5862.71		5856.6
61295	10/4/00	4.2	5862.8		5856.6
61299	1/4/00	7.61	5995.87		5991.47
61299	4/7/00	5.32	5998.16		5991.47
61299	7/11/00	7.55	5995.93		5991.47
61299	10/9/00	7.1	5996.38		5991.47
61399	1/10/00	3.99	5979.9		5974.01
61399	4/6/00	3.53	5980.36		5974.01
61399	7/13/00	3.13	5980.76		5974.01
61399	10/10/00	6.94	5976.95		5974.01
61495	4/11/00	4.44	5973.56		5965.3
61495	10/2/00	7.26	5970.74		5965.3
61499	1/6/00	8.51	5977.82		5976.4
61499	3/6/00			Dry	5976.4
61499	4/10/00	8.23	5978.1		5976.4
61499	7/13/00	7.5	5978.83		5976.4
61499	10/9/00	7.85	5978.48		5976.4
61595	4/11/00	2.14	5970.86		5961.7
61595	10/2/00	4.26	5968.74		5961.7

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
61695	4/11/00	3.36	5984.64		5973.1
61695	10/2/00	6.52	5981.48		5973.1
6186	1/3/00	10.45	5990.15		5987.47
6186	4/7/00	8.86	5991.74		5987.47
6186	7/11/00	10.22	5990.38		5987.47
6186	10/9/00	9.74	5990.86		5987.47
62393	4/3/00	0.1	6064		6058.23
62393	7/5/00	0.7	6063.4		6058.23
62393	10/10/00	1.7	6062.4		6058.23
62593	1/5/00	4.24	6043.56		6039.18
62593	2/3/00	4.93	6042.87		6039.18
62593	3/2/00	4.48	6043.32		6039.18
62593	4/3/00	2.82	6044.98		6039.18
62593	5/3/00	8.57	6039.23		6039.18
62593	6/6/00	4.2	6043.6		6039.18
62593	7/12/00	1.94	6045.86		6039.18
62593	8/2/00	1.6	6046.2		6039.18
62593	9/7/00	7.25	6040.55		6039.18
62593	10/5/00	5.96	6041.84		6039.18
62593	11/6/00	5.8	6042		6039.18
62593	12/5/00	5.68	6042.12		6039.18
62693	1/5/00	3.11	6038.69		6033
62693	2/3/00	4.56	6037.24		6033
62693	3/2/00	3.35	6038.45		6033
62693	4/3/00	0.7	6041.1		6033
62693	5/3/00	0.82	6040.98		6033
62693	6/6/00	3.82	6037.98		6033
62693	7/12/00	8.52	6033.28		6033
62693	8/2/00	1.91	6039.89		6033
62693	9/7/00	5.27	6036.53		6033
62693	10/5/00	5.38	6036.42		6033
62693	11/6/00	5.1	6036.7		6033
62693	12/5/00	5.7	6036.1		6033
6286	1/10/00	28.46	5874.72		5866.82
6286	4/4/00	28.91	5874.27		5866.82
6286	7/10/00	29.31	5873.87		5866.82
6286	10/4/00	29.46	5873.72		5866.82
62893	4/3/00	0	5995.2		5980.23
62893	10/10/00	0.72	5994.48		5980.23
63395	4/12/00	7.76	5892.24		5891.5
63395	10/3/00			Dry	5891.5
63495	4/11/00	2.59	6008.41		6002.6
63495	10/2/00	3.75	6007.25		6002.6
6386	1/10/00	15.79	5886.22		5885.84
6386	4/4/00	16.83	5885.18	Technically Dry	5885.84
6386	7/10/00			Dry	5885.84
6386	10/4/00			Dry	5885.84
6486	1/5/00	7.18	5833.87		5830.06
6486	2/3/00	7.23	5833.82		5830.06
6486	3/1/00	7.1	5833.95		5830.06
6486	4/4/00	6.43	5834.62		5830.06
6486	5/2/00	7.11	5833.94		5830.06
6486	6/2/00	7.76	5833.29		5830.06
6486	7/10/00	9.79	5831.26		5830.06

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
6486	8/1/00	11.17	5829.88	Technically Dry	5830.06
6486	9/6/00			Dry	5830.06
6486	10/4/00			Dry	5830.06
6486	11/1/00	10.83	5830.22		5830.06
6486	12/6/00	7.32	5833.73		5830.06
6586	1/5/00	6.67	5781.6		5778.66
6586	2/3/00			Dry to top pump	5778.66
6586	3/1/00			Dry to top pump	5778.66
6586	4/4/00	5.86	5782.41		5778.66
6586	5/2/00			Dry to top pump	5778.66
6586	6/2/00			Dry to top pump	5778.66
6586	7/10/00			Dry to top pump	5778.66
6586	8/1/00			Dry to top pump	5778.66
6586	9/6/00	6.51	5781.76		5778.66
6586	10/4/00	6.33	5781.94		5778.66
6586	11/1/00	6.26	5782.01		5778.66
6586	12/6/00	6.3	5781.97		5778.66
6686	1/4/00	4.42	5689.78		5686.07
6686	2/1/00	4.68	5689.52		5686.07
6686	3/1/00	4.78	5689.42		5686.07
6686	4/10/00	4.88	5689.32		5686.07
6686	5/1/00	4.98	5689.22		5686.07
6686	6/2/00	5.71	5688.49		5686.07
6686	7/10/00	7.46	5686.74		5686.07
6686	8/3/00	7.97	5686.23		5686.07
6686	9/6/00			Dry	5686.07
6686	10/4/00	5.72	5688.48		5686.07
6686	11/2/00	4.85	5689.35		5686.07
6686	12/5/00	4.67	5689.53		5686.07
6786	4/10/00			Technically Dry	5787.58
6786	10/6/00			Dry	5787.58
68194	4/3/00	7.19	6019.91		6009.11
68194	7/11/00	6.97	6020.13		6009.11
68194	10/10/00	6.61	6020.49		6009.11
70099	4/12/00	18.17	5878.98		5876.45
70099	5/2/00	17.58	5879.57		5876.45
70099	6/1/00	16.87	5880.28		5876.45
70099	7/6/00	20.84	5876.31	Technically Dry	5876.45
70099	8/1/00	20.1	5877.05		5876.45
70099	9/5/00	19.03	5878.12		5876.45
70099	10/3/00	18.22	5878.93		5876.45
70099	11/1/00	22.03	5875.12	Technically Dry	5876.45
70099	12/4/00	21.2	5875.95	Technically Dry	5876.45
70193	1/3/00	13.72	5978.28		5952.7
70193	4/12/00	10.36	5981.64		5952.7
70193	7/6/00	12.78	5979.22		5952.7
70193	10/2/00	13.31	5978.69		5952.7
70299	4/12/00	20.2	5876.98		5861.08
70299	5/2/00	20.27	5876.91		5861.08
70299	6/1/00	20.41	5876.77		5861.08
70299	7/6/00	20.73	5876.45		5861.08
70299	8/1/00	20.63	5876.55		5861.08
70299	9/5/00	20.4	5876.78		5861.08
70299	10/3/00	20.07	5877.11		5861.08

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
70299	11/1/00	21.48	5875.7		5861.08
70299	12/4/00	19.88	5877.3		5861.08
70393	1/3/00	13.28	5986.82		5975.1
70393	4/12/00	9.44	5990.66		5975.1
70393	7/6/00	11.92	5988.18		5975.1
70393	10/2/00	13.75	5986.35		5975.1
70493	1/3/00	13.08	5986.92		5954
70493	4/12/00	11.77	5988.23		5954
70493	7/6/00	12.36	5987.64		5954
70493	10/2/00	12.93	5987.07		5954
70693	4/12/00	13.64	5979.06		5962.8
70693	10/2/00	18.48	5974.22		5962.8
7086	1/5/00	3.43	5935.96		5929.79
7086	4/3/00	2.75	5936.64		5929.79
7086	7/5/00			Dry to top pump	5929.79
7086	10/4/00	3.59	5935.8		5929.79
71494	4/4/00	27.31	5972.49		5957.7
71494	7/12/00	28.42	5971.38		5957.7
71494	10/5/00	28.21	5971.59		5957.7
7187	4/12/00	6.11	5959.38		5950.38
7187	10/3/00	8.05	5957.44		5950.38
75092	4/13/00	9.44	5715.96		5708.7
75092	7/10/00	8.39	5717.01		5708.7
75092	10/4/00	10.18	5715.22		5708.7
75292	1/3/00	5.97	5750.93		5747.3
75292	2/2/00	4.35	5752.55		5747.3
75292	3/1/00	5.85	5751.05		5747.3
75292	4/13/00	5.51	5751.39		5747.3
75292	5/2/00	4.48	5752.42		5747.3
75292	6/2/00	8.17	5748.73		5747.3
75292	7/10/00	6.51	5750.39		5747.3
75292	8/1/00	8.86	5748.04		5747.3
75292	9/5/00	8.85	5748.05		5747.3
75292	10/4/00	7.35	5749.55		5747.3
75292	11/1/00	8.86	5748.04		5747.3
75292	12/4/00	6.37	5750.53		5747.3
75992	1/3/00	8.29	5890.81		5887.1
75992	4/12/00	7.61	5891.49		5887.1
75992	7/6/00	11.02	5888.08		5887.1
75992	10/3/00	7.22	5891.88		5887.1
76792	4/11/00	6.91	5938.59		5938
76792	10/3/00	7.2	5938.3		5938
76992	1/3/00	12.23	5945.77		5945.6
76992	4/11/00	12.12	5945.88		5945.6
76992	7/6/00	12.08	5945.92		5945.6
76992	10/3/00	13.59	5944.41	Technically dry	5945.6
77392	1/3/00	10.17	5955.33	Technically dry	5955.6
77392	4/11/00	10.15	5955.35	Technically dry	5955.6
77392	7/5/00	10.16	5955.34	Technically dry	5955.6
77392	10/2/00	10.16	5955.34	Technically dry	5955.6
90099	1/5/00	16.63	5839.19		5836.45
90099	4/4/00	16.7	5839.12		5836.45
90099	7/10/00	17.14	5838.68		5836.45
90099	10/4/00	17.37	5838.45		5836.45

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
90199	1/5/00			Dry	5820.72
90199	4/4/00			Dry	5820.72
90199	7/10/00			Dry	5820.72
90199	7/14/00			Dry	5820.72
90199	10/4/00			Dry	5820.72
90299	1/5/00	15.73	5809.49		5804.93
90299	4/4/00	13.33	5811.89		5804.93
90299	6/1/00			Dry	5804.93
90299	7/10/00	16.74	5808.48		5804.93
90299	10/4/00	18.42	5806.8		5804.93
90399	1/5/00	17.23	5823.4		5819.53
90399	4/4/00	13.03	5827.6		5819.53
90399	7/10/00	17.4	5823.23		5819.53
90399	10/4/00	16.28	5824.35		5819.53
95099	1/3/00	13.7	5849.62		5842.32
95099	2/2/00	13.68	5849.64		5842.32
95099	2/15/00	13.67	5849.65		5842.32
95099	3/1/00	13.86	5849.46		5842.32
95099	4/13/00	19.37	5843.95		5842.32
95099	5/2/00	16.04	5847.28		5842.32
95099	6/1/00	20.93	5842.39		5842.32
95099	7/10/00	15.61	5847.71		5842.32
95099	8/1/00	20.97	5842.35		5842.32
95099	9/5/00	15.8	5847.52		5842.32
95099	10/3/00	14.07	5849.25		5842.32
95099	11/1/00	21.55	5841.77	Technically dry	5842.32
95099	12/4/00	17.02	5846.3		5842.32
95199	1/3/00	9.82	5872.08		5859.9
95199	2/2/00	10.14	5871.76		5859.9
95199	2/15/00	10.27	5871.63		5859.9
95199	3/1/00	10.4	5871.5		5859.9
95199	4/12/00	10.54	5871.36		5859.9
95199	5/2/00	10.41	5871.49		5859.9
95199	6/1/00	13.76	5868.14		5859.9
95199	7/10/00	11.78	5870.12		5859.9
95199	8/1/00	14.02	5867.88		5859.9
95199	9/5/00	11.88	5870.02		5859.9
95199	10/3/00	11.62	5870.28		5859.9
95199	11/1/00	18.77	5863.13		5859.9
95199	12/4/00	11.17	5870.73		5859.9
95299	1/3/00			Dry	5891.85
95299	2/2/00			Dry	5891.85
95299	2/15/00			Dry	5891.85
95299	3/1/00			Dry	5891.85
95299	4/13/00			Dry	5891.85
95299	5/2/00			Dry	5891.85
95299	6/6/00			Dry	5891.85
95299	7/10/00			Dry	5891.85
95299	8/1/00			Dry	5891.85
95299	9/5/00			Dry	5891.85
95299	10/3/00			Dry	5891.85
95299	11/1/00			Dry	5891.85
95299	12/4/00			Dry	5891.85
B102289	4/5/00	2.98	5977.08		5965.83

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
B102289	10/4/00	2.82	5977.24		5965.83
B102389	4/10/00	5.52	5935.66		5928.6
B102389	10/4/00	7.13	5934.05		5928.6
B110889	4/5/00	36.14	6041.63		6010.82
B110889	10/5/00	35.81	6041.96		6010.82
B110989	1/4/00	46.9	6037.46		6016.69
B110989	2/1/00	47.93	6036.43		6016.69
B110989	3/2/00	47.95	6036.41		6016.69
B110989	4/5/00	48.18	6036.18		6016.69
B110989	5/4/00	47.89	6036.47		6016.69
B110989	6/2/00	47.95	6036.41		6016.69
B110989	7/5/00	47.77	6036.59		6016.69
B110989	8/2/00	47.76	6036.6		6016.69
B110989	9/6/00	47.86	6036.5		6016.69
B110989	10/5/00	48.07	6036.29		6016.69
B110989	11/2/00	48.08	6036.28		6016.69
B110989	12/1/00	46.68	6037.68		6016.69
B111189	1/4/00	56.45	6051.07		6033.12
B111189	2/1/00	56.75	6050.77		6033.12
B111189	3/1/00	56.71	6050.81		6033.12
B111189	4/5/00	56.83	6050.69		6033.12
B111189	5/4/00	57.09	6050.43		6033.12
B111189	6/2/00	57.47	6050.05		6033.12
B111189	7/5/00	57.38	6050.14		6033.12
B111189	8/2/00	57.41	6050.11		6033.12
B111189	9/6/00	57.46	6050.06		6033.12
B111189	10/5/00	57.59	6049.93		6033.12
B111189	11/1/00	57.28	6050.24		6033.12
B111189	12/1/00	57.83	6049.69		6033.12
B203189	4/10/00	24.83	5945.29		5923.3
B203189	7/5/00	24.72	5945.4		5923.3
B203189	10/4/00	24.73	5945.39		5923.3
B206689	4/11/00	10.14	5951.06		5941.14
B206689	7/6/00	9.02	5952.18		5941.14
B206689	10/3/00	11.05	5950.15		5941.14
B206989	1/3/00	22.66	5861.66		5861.12
B206989	2/2/00	23.85	5860.47	Technically dry	5861.12
B206989	4/12/00	22.47	5861.85		5861.12
B206989	7/6/00	23.74	5860.58	Technically dry	5861.12
B206989	10/3/00	21.38	5862.94		5861.12
B208089	1/3/00	13.92	5923.15		5922.5
B208089	2/7/00	14.14	5922.93		5922.5
B208089	3/1/00	14.28	5922.79		5922.5
B208089	4/12/00	13.22	5923.85		5922.5
B208089	5/2/00	13.83	5923.24		5922.5
B208089	6/1/00	13.85	5923.22		5922.5
B208089	7/6/00	13.98	5923.09		5922.5
B208089	8/1/00	13.73	5923.34		5922.5
B208089	9/5/00	13.91	5923.16		5922.5
B208089	10/3/00	13.97	5923.1		5922.5
B208089	11/1/00	14.05	5923.02		5922.5
B208089	12/4/00	14.28	5922.79		5922.5
B208289	1/5/00	16.72	5836.23		5835.28
B208289	4/12/00	16.61	5836.34		5835.28

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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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.)
B208289	7/6/00			Dry	5835.28
B208289	10/3/00	17.72	5835.23	Technically dry	5835.28
B208689	4/12/00	14.61	5854.99		5845.8
B208689	7/6/00	15.37	5854.23		5845.8
B208689	10/3/00	8.1	5861.5		5845.8
B208789	1/3/00	4.09	5904.94		5896.17
B208789	4/12/00	3.01	5906.02		5896.17
B208789	7/6/00	12.57	5896.46		5896.17
B208789	10/3/00	7.19	5901.84		5896.17
B302889	11/28/00	12.95	5720.21	Technically dry	5720.28
B304789	4/4/00	24.83	5844.73		5830.23
B304789	7/5/00	24.76	5844.8		5830.23
B304789	10/4/00	24.8	5844.76		5830.23
B304889	4/10/00	7.59	5724.97		5706.46
B304889	7/11/00	7.95	5724.61		5706.46
B304889	10/4/00	8.82	5723.74		5706.46
B400189	5/5/00	25.3	6098.85		6072.6
B400189	11/21/00	28.52	6095.63		6072.6
B400389	1/4/00	23.87	6100.13		6073
B400389	2/1/00	25	6099		6073
B400389	3/2/00	25.67	6098.33		6073
B400389	4/3/00	24.89	6099.11		6073
B400389	5/2/00	22.86	6101.14		6073
B400389	6/2/00	23.26	6100.74		6073
B400389	7/5/00	24.36	6099.64		6073
B400389	8/1/00	24.26	6099.74		6073
B400389	9/5/00	23.62	6100.38		6073
B400389	10/4/00	24.57	6099.43		6073
B400389	11/1/00	25.5	6098.5		6073
B400389	12/5/00	26.83	6097.17		6073
B402689	1/4/00	4.53	6042.54		6042.12
B402689	2/1/00	4.59	6042.48		6042.12
B402689	3/2/00	4.48	6042.59		6042.12
B402689	4/3/00	3.3	6043.77		6042.12
B402689	5/2/00	3.84	6043.23		6042.12
B402689	5/5/00	3.98	6043.09		6042.12
B402689	11/20/00	4.85	6042.22		6042.12
B405489	11/21/00	22.54	6095.13		6067.33
B405889	4/3/00	9.88	6016.99		5979.4
B405889	7/5/00	13.6	6013.27		5979.4
B405889	10/4/00	12.88	6013.99		5979.4
B405989	4/3/00	5.85	6020.21		6016.9
B405989	7/5/00	8.89	6017.17		6016.9
B405989	10/4/00	9.57	6016.49	Technically dry	6016.9
B410589	1/4/00	52.67	6061.13		6051.76
B410589	2/1/00	53.04	6060.76		6051.76
B410589	3/1/00	53.21	6060.59		6051.76
B410589	4/5/00	53.34	6060.46		6051.76
B410589	5/3/00	53.54	6060.26		6051.76
B410589	6/2/00	53.73	6060.07		6051.76
B410589	7/5/00	53.62	6060.18		6051.76
B410589	8/2/00	53.56	6060.24		6051.76
B410589	9/5/00	53.56	6060.24		6051.76
B410589	10/5/00	53.83	6059.97		6051.76

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
B410589	11/1/00	53.63	6060.17		6051.76
B410589	12/1/00	54.12	6059.68		6051.76
B410689	4/12/00	43.48	6050.23		6041.65
B410689	10/5/00	43.34	6050.37		6041.65
B410789	4/5/00	37.37	6046.29		6037.07
B410789	10/5/00	37.11	6046.55		6037.07
B411289	1/4/00	60.94	6066.36		6057.01
B411289	2/1/00	61.13	6066.17		6057.01
B411289	3/1/00	61.15	6066.15		6057.01
B411289	4/5/00	61.33	6065.97		6057.01
B411289	5/4/00	61.55	6065.75		6057.01
B411289	6/2/00	61.95	6065.35		6057.01
B411289	7/5/00	61.86	6065.44		6057.01
B411289	8/2/00	61.96	6065.34		6057.01
B411289	9/6/00	61.93	6065.37		6057.01
B411289	10/5/00	61.95	6065.35		6057.01
B411289	11/1/00	61.66	6065.64		6057.01
B411289	12/1/00	62.2	6065.1		6057.01
P114389	1/3/00	7.57	5985.6		5976.7
P114389	2/2/00	7.9	5985.27		5976.7
P114389	3/1/00	7.45	5985.72		5976.7
P114389	4/11/00	6.45	5986.72		5976.7
P114389	5/1/00	6.81	5986.36		5976.7
P114389	6/5/00	7.27	5985.9		5976.7
P114389	7/5/00	7.4	5985.77		5976.7
P114389	8/1/00	7.95	5985.22		5976.7
P114389	9/8/00	7.65	5985.52		5976.7
P114389	10/2/00	7.69	5985.48		5976.7
P114389	11/2/00	7.92	5985.25		5976.7
P114389	12/5/00	7.92	5985.25		5976.7
P114489	4/3/00	14.07	6021.36		5984.6
P114489	10/10/00	14.55	6020.88		5984.6
P114589	4/3/00	2.88	6023.02		5987.6
P114589	10/5/00	7.34	6018.56		5987.6
P114689	4/3/00	9.12	5996.64		5981.76
P114689	7/10/00	11.39	5994.37		5981.76
P114689	10/5/00	10.63	5995.13		5981.76
P114789	4/3/00	8.47	6003.93		5984.47
P114789	7/10/00	10.23	6002.17		5984.47
P114789	10/5/00	9.63	6002.77		5984.47
P114989	4/4/00	15.05	6016.79		5991.8
P114989	10/10/00	12.18	6019.66		5991.8
P115089	1/3/00	16.2	6023.9		5997.4
P115089	2/2/00	17.1	6023		5997.4
P115089	3/1/00	17.28	6022.82		5997.4
P115089	4/4/00	15.01	6025.09		5997.4
P115089	5/1/00	14.15	6025.95		5997.4
P115089	6/5/00	14.73	6025.37		5997.4
P115089	7/10/00	15.35	6024.75		5997.4
P115089	8/1/00	15.32	6024.78		5997.4
P115089	9/8/00	15.68	6024.42		5997.4
P115089	10/10/00	15.65	6024.45		5997.4
P115089	11/2/00	16.31	6023.79		5997.4
P115089	12/5/00	17.36	6022.74		5997.4

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
P115589	4/3/00	5.95	6009.82		5984.62
P115589	10/5/00	5.78	6009.99		5984.62
P115689	4/3/00	8.52	6000.19		5986.7
P115689	7/10/00	11.42	5997.29		5986.7
P115689	10/5/00	10.95	5997.76		5986.7
P207389	4/10/00	6.66	5976.11		5965.84
P207389	7/14/00	8.42	5974.35		5965.84
P207389	10/11/00	7.36	5975.41		5965.84
P207689	4/10/00	6.69	5961.19		5953.22
P207689	10/9/00	8.7	5959.18		5953.22
P207889	4/10/00	10.2	5954.7	Technically dry	5955.12
P207889	10/9/00	10.18	5954.72	Technically dry	5955.12
P209289	1/6/00			Dry	5968.93
P209289	4/10/00	13.39	5970.03		5968.93
P209289	7/12/00	14.69	5968.73	Technically dry	5968.93
P209289	10/9/00	9.96	5973.46		5968.93
P209389	1/6/00	19.5	5963.89		5952.67
P209389	4/10/00	17.31	5966.08		5952.67
P209389	7/12/00	18.63	5964.76		5952.67
P209389	10/9/00	14.93	5968.46		5952.67
P209489	1/10/00	29.39	5950.71		5942.98
P209489	4/10/00	29.35	5950.75		5942.98
P209489	7/12/00	29.34	5950.76		5942.98
P209489	10/9/00	28.71	5951.39		5942.98
P209689	4/10/00	17.22	5947.21		5935.96
P209689	7/12/00	16.62	5947.81		5935.96
P209689	10/9/00	16.1	5948.33		5935.96
P209789	4/10/00	9.51	5955.43		5950.32
P209789	10/9/00	13.11	5951.83		5950.32
P213689	12/6/00	10.22	5985.82		5980.8
P215789	4/3/00	14.83	5988.83		5983.5
P215789	7/10/00	16.13	5987.53		5983.5
P215789	10/5/00	15.7	5987.96		5983.5
P215789	12/6/00	16.67	5986.99		5983.5
P218089	4/10/00	5.24	5982.31		5978.37
P218089	10/10/00	4.65	5982.9		5978.37
P218289	4/4/00	6.39	6011.81		5993.4
P218289	10/6/00	8.09	6010.11		5993.4
P218389	1/10/00	14.81	5943.64	Technically dry	5943.7
P218389	2/2/00	14.82	5943.63	Technically dry	5943.7
P218389	3/6/00	14.83	5943.62	Technically dry	5943.7
P218389	4/10/00	13.93	5944.52		5943.7
P218389	5/1/00	14.75	5943.7	Technically dry	5943.7
P218389	6/1/00	14.79	5943.66	Technically dry	5943.7
P218389	7/12/00	14.8	5943.65	Technically dry	5943.7
P218389	8/1/00	14.76	5943.69	Technically dry	5943.7
P218389	9/6/00	14.77	5943.68	Technically dry	5943.7
P218389	10/9/00	14.77	5943.68	Technically dry	5943.7
P218389	11/3/00	13.8	5944.65		5943.7
P218389	12/6/00	14.8	5943.65	Technically dry	5943.7
P219089	4/10/00	9.15	5940.75		5934.66
P219089	7/14/00	9.25	5940.65		5934.66
P219089	10/11/00	8.78	5941.12		5934.66
P219189	1/6/00	13.16	5929.99		5929.7

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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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.)
P219189	2/2/00	12.95	5930.2		5929.7
P219189	3/6/00	12.62	5930.53		5929.7
P219189	4/7/00	12.19	5930.96		5929.7
P219189	5/1/00	11.84	5931.31		5929.7
P219189	6/1/00	14.35	5928.8	Technically dry	5929.7
P219189	7/12/00	13.38	5929.77		5929.7
P219189	8/1/00	13.1	5930.05		5929.7
P219189	9/6/00	12.67	5930.48		5929.7
P219189	10/11/00	12.14	5931.01		5929.7
P219189	11/3/00	11.92	5931.23		5929.7
P219189	12/6/00	14.27	5928.88	Technically dry	5929.7
P219189	12/7/00	14.21	5928.94	Technically dry	5929.7
P219489	1/10/00	23.95	5937.2		5936.6
P219489	4/10/00	22.85	5938.3		5936.6
P219489	7/12/00	24.26	5936.89		5936.6
P219489	10/9/00	23.12	5938.03		5936.6
P313489	4/4/00	12.44	6001.14		5990.6
P313489	10/5/00	14.64	5998.94		5990.6
P313589	1/3/00	9.6	6000.51		5996
P313589	2/7/00	10.28	5999.83		5996
P313589	3/1/00	10.22	5999.89		5996
P313589	4/5/00	8.14	6001.97		5996
P313589	5/1/00	8.57	6001.54		5996
P313589	6/5/00	9.07	6001.04		5996
P313589	7/11/00	8.1	6002.01		5996
P313589	8/1/00	8.31	6001.8		5996
P313589	9/8/00	8.73	6001.38		5996
P313589	10/6/00	8.18	6001.93		5996
P313589	12/5/00	10.14	5999.97		5996
P314089	4/7/00	8.39	5990.1		5986.91
P314089	7/11/00	8.87	5989.62		5986.91
P314089	10/9/00	8.59	5989.9		5986.91
P314289	1/3/00	14.75	5997.02		5996.59
P314289	2/2/00			Dry	5996.59
P314289	3/1/00			Dry	5996.59
P314289	4/5/00	16.43	5995.34	Technically dry	5996.59
P314289	5/1/00	15.2	5996.57	Technically dry	5996.59
P314289	6/5/00	15	5996.77		5996.59
P314289	7/11/00	13.65	5998.12		5996.59
P314289	8/1/00	13.11	5998.66		5996.59
P314289	9/8/00	15.22	5996.55	Technically dry	5996.59
P314289	10/5/00	15.18	5996.59	Technically dry	5996.59
P314289	11/2/00	14.25	5997.52		5996.59
P314289	12/5/00	14.53	5997.24		5996.59
P317989	1/4/00	9.7	5983.14	Technically dry	5983.41
P317989	4/7/00	7.16	5985.68		5983.41
P317989	7/14/00			Dry	5983.41
P317989	10/9/00	9.11	5983.73		5983.41
P320089	4/4/00	12.81	5999.06		5991.09
P320089	10/5/00	14.33	5997.54		5991.09
P415989	4/4/00	5.86	6040.85		6018.17
P415989	10/10/00	7.68	6039.03		6018.17
P416089	1/3/00	10.75	6043.2		6017.7
P416089	2/2/00	13.85	6040.1		6017.7

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
P416089	3/1/00	14.06	6039.89		6017.7
P416089	4/4/00	6.12	6047.83		6017.7
P416089	5/1/00	6.01	6047.94		6017.7
P416089	6/5/00	8.48	6045.47		6017.7
P416089	7/11/00	10.75	6043.2		6017.7
P416089	8/1/00	10.51	6043.44		6017.7
P416089	9/8/00	37	6016.95	Technically dry	6017.7
P416089	10/10/00	9.5	6044.45		6017.7
P416089	11/2/00	11.65	6042.3		6017.7
P416089	12/5/00	15.46	6038.49		6017.7
P416189	4/4/00	7.96	6039.99		6015.94
P416189	5/5/00	8.29	6039.66		6015.94
P416189	11/29/00	14.12	6033.83		6015.94
P416289	4/4/00	14.41	6025.81		6015.1
P416289	10/5/00	14.02	6026.2		6015.1
P416389	4/4/00	10.65	6046.49		6025.3
P416389	10/5/00	16.05	6041.09		6025.3
P416489	1/3/00	10.57	6039.58		6022.8
P416489	2/2/00	21.17	6028.98		6022.8
P416489	3/1/00	21.53	6028.62		6022.8
P416489	4/4/00	15.45	6034.7		6022.8
P416489	5/1/00	15.58	6034.57		6022.8
P416489	6/5/00	17.03	6033.12		6022.8
P416489	7/11/00	18.71	6031.44		6022.8
P416489	8/1/00	18.46	6031.69		6022.8
P416489	9/5/00	18.85	6031.3		6022.8
P416489	10/5/00	18.55	6031.6		6022.8
P416489	11/2/00	19.14	6031.01		6022.8
P416489	12/5/00	21.66	6028.49		6022.8
P416689	1/3/00	29.85	6006.7		6002.5
P416689	2/2/00	30.15	6006.4		6002.5
P416689	3/1/00	30.31	6006.24		6002.5
P416689	4/4/00	29.79	6006.76		6002.5
P416689	5/1/00	29.51	6007.04		6002.5
P416689	6/5/00	30.75	6005.8		6002.5
P416689	7/11/00	29.75	6006.8		6002.5
P416689	8/1/00	29.59	6006.96		6002.5
P416689	9/5/00	29.65	6006.9		6002.5
P416689	10/5/00	29.65	6006.9		6002.5
P416689	10/6/00	29.7	6006.85		6002.5
P416689	11/2/00	29.71	6006.84		6002.5
P416689	12/5/00	30.06	6006.49		6002.5
P416789	1/3/00	27.61	6001.66		6000.9
P416789	2/2/00	27.91	6001.36		6000.9
P416789	3/1/00	28.03	6001.24		6000.9
P416789	4/4/00	25.68	6003.59		6000.9
P416789	5/1/00	26.69	6002.58		6000.9
P416789	6/5/00	27.05	6002.22		6000.9
P416789	7/11/00	27.37	6001.9		6000.9
P416789	8/1/00	27.08	6002.19		6000.9
P416789	9/8/00	27.12	6002.15		6000.9
P416789	10/5/00	26.91	6002.36		6000.9
P416789	11/2/00	27.38	6001.89		6000.9
P416789	12/5/00	27.74	6001.53		6000.9

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

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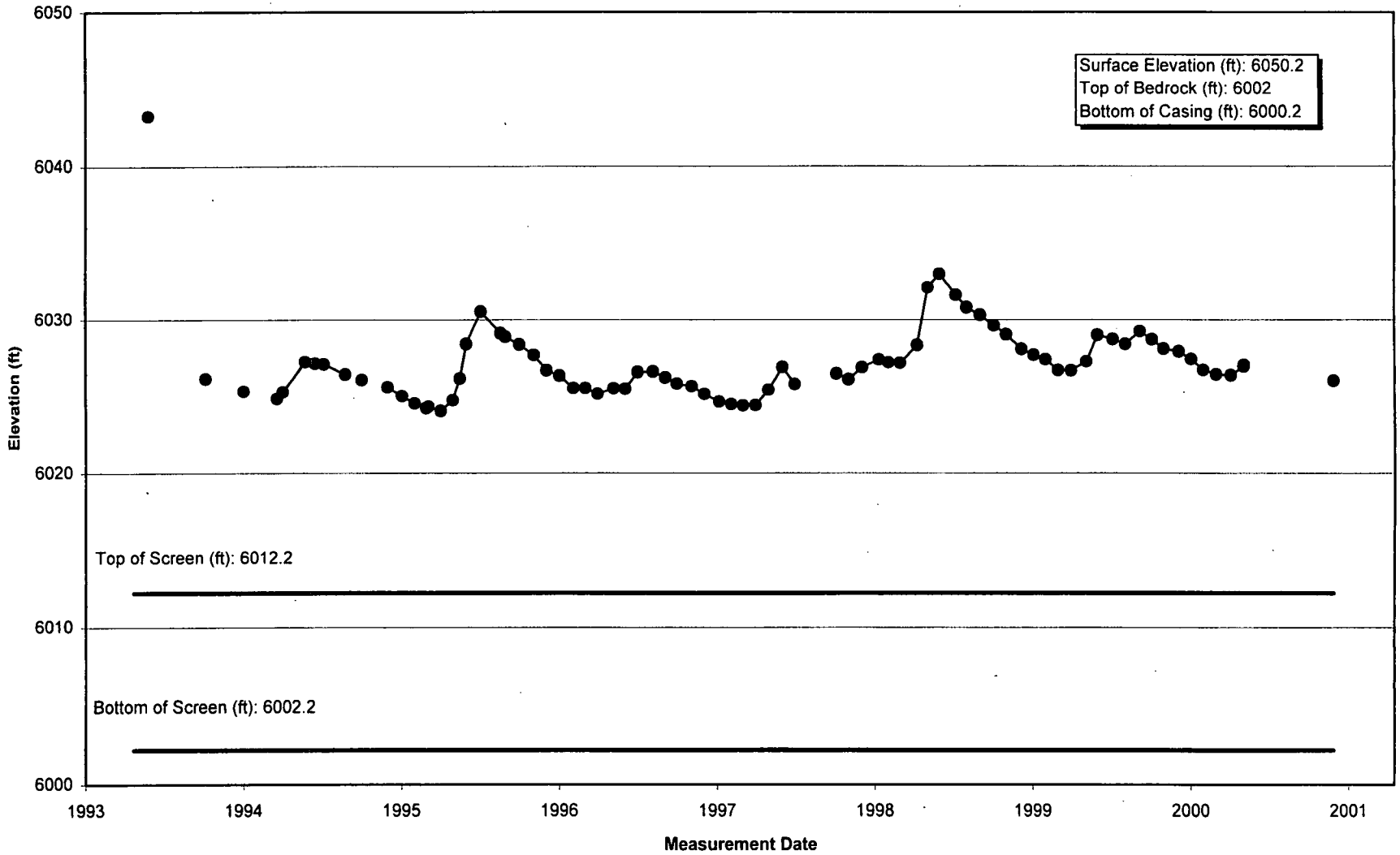
Appendix B: Water Level Data
Groundwater 2000

Location	Sample Date	Water Level from TOC (ft.)	Water Level Elevation (ft.)	Dry or Technically Dry (W.L. below screen)	Bottom Screen Elevation (ft.)
P416889	1/3/00	18.6	6000.19		5997.13
P416889	2/2/00			Dry to top pump	5997.13
P416889	3/1/00			Dry to top pump	5997.13
P416889	4/4/00	16.24	6002.55		5997.13
P416889	5/1/00	17.39	6001.4		5997.13
P416889	6/5/00	17.98	6000.81		5997.13
P416889	7/11/00	18.28	6000.51		5997.13
P416889	8/1/00	17.98	6000.81		5997.13
P416889	9/8/00	17.98	6000.81		5997.13
P416889	10/5/00	17.72	6001.07		5997.13
P416889	11/2/00	18.25	6000.54		5997.13
P416889	12/5/00	18.68	6000.11		5997.13
P416989	4/4/00	38.27	6009.28		5889.59
P416989	10/10/00	38.33	6009.22		5889.59
P419689	1/4/00	20.12	6003.3		5998.9
P419689	4/5/00	17.14	6006.28		5998.9
P419689	7/11/00	19.62	6003.8		5998.9
P419689	10/6/00	18.78	6004.64		5998.9

Missing Water Level Elevation or Bottom Screen Elevation means no Top of Casing Elevation available.

422

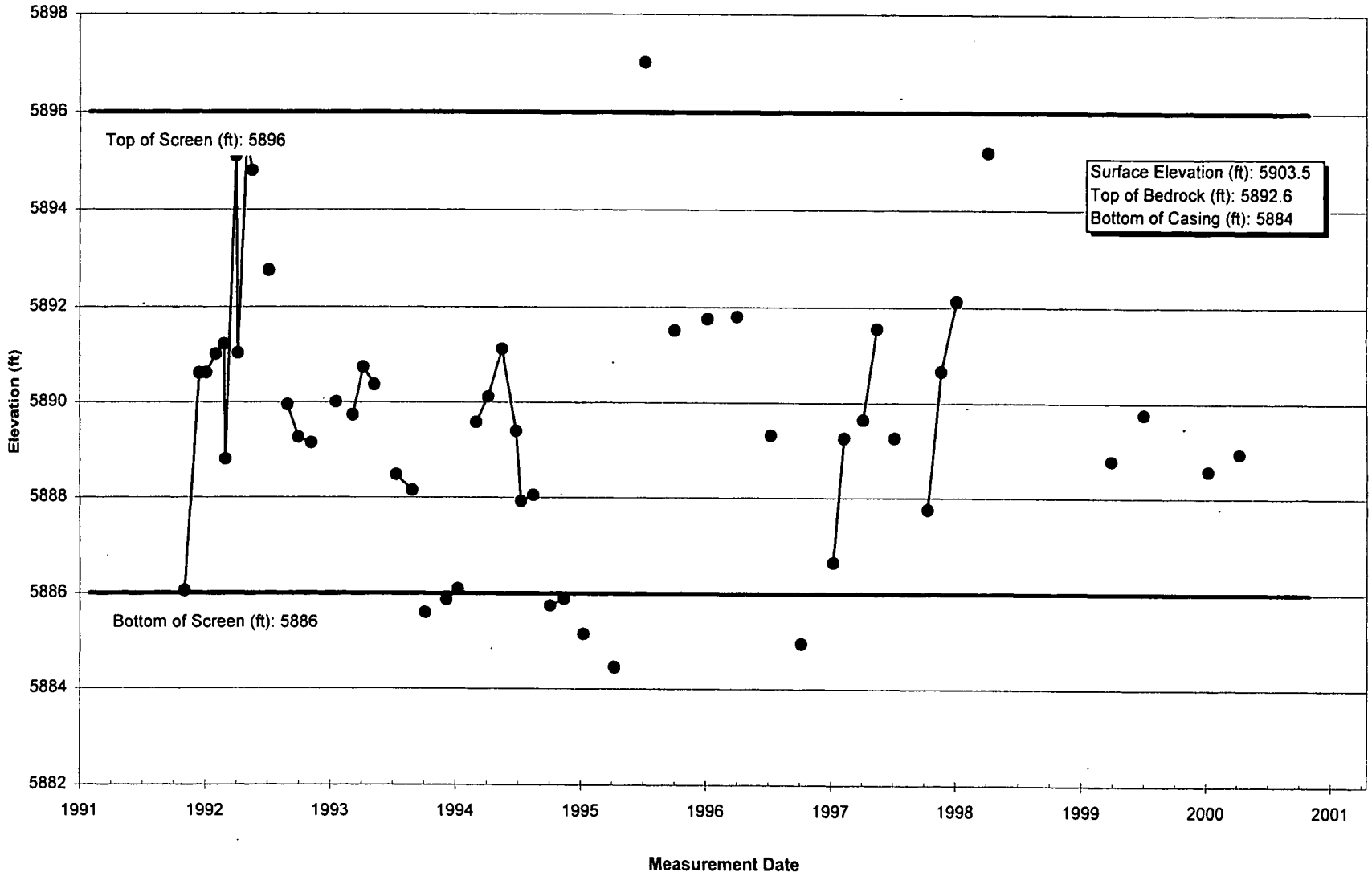
Hydrograph 00293



423

HG-Master S01_wjb 00293 9/26/01

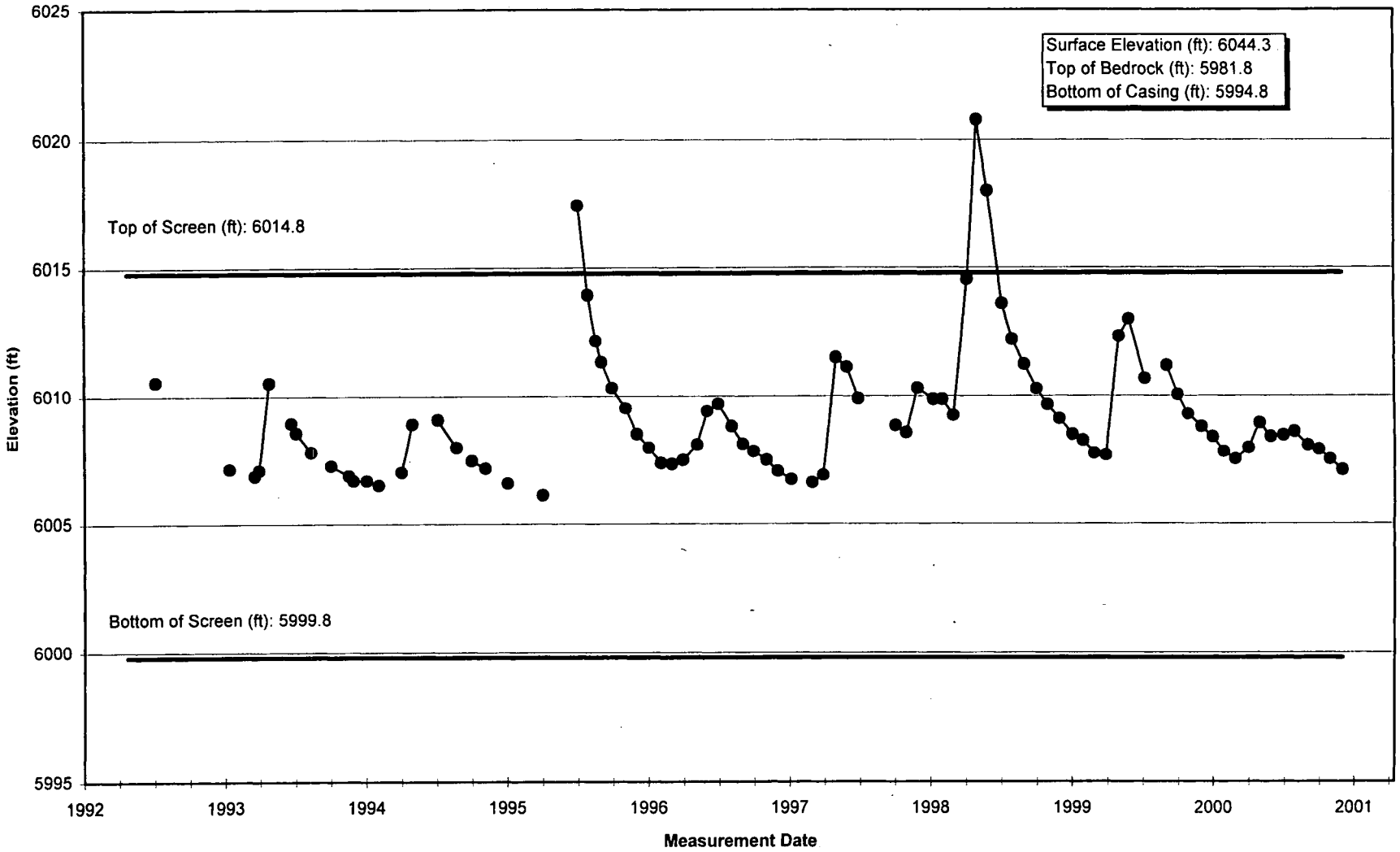
Hydrograph 00491



4/24

HG-Master S01_wjb 00491 9/26/01

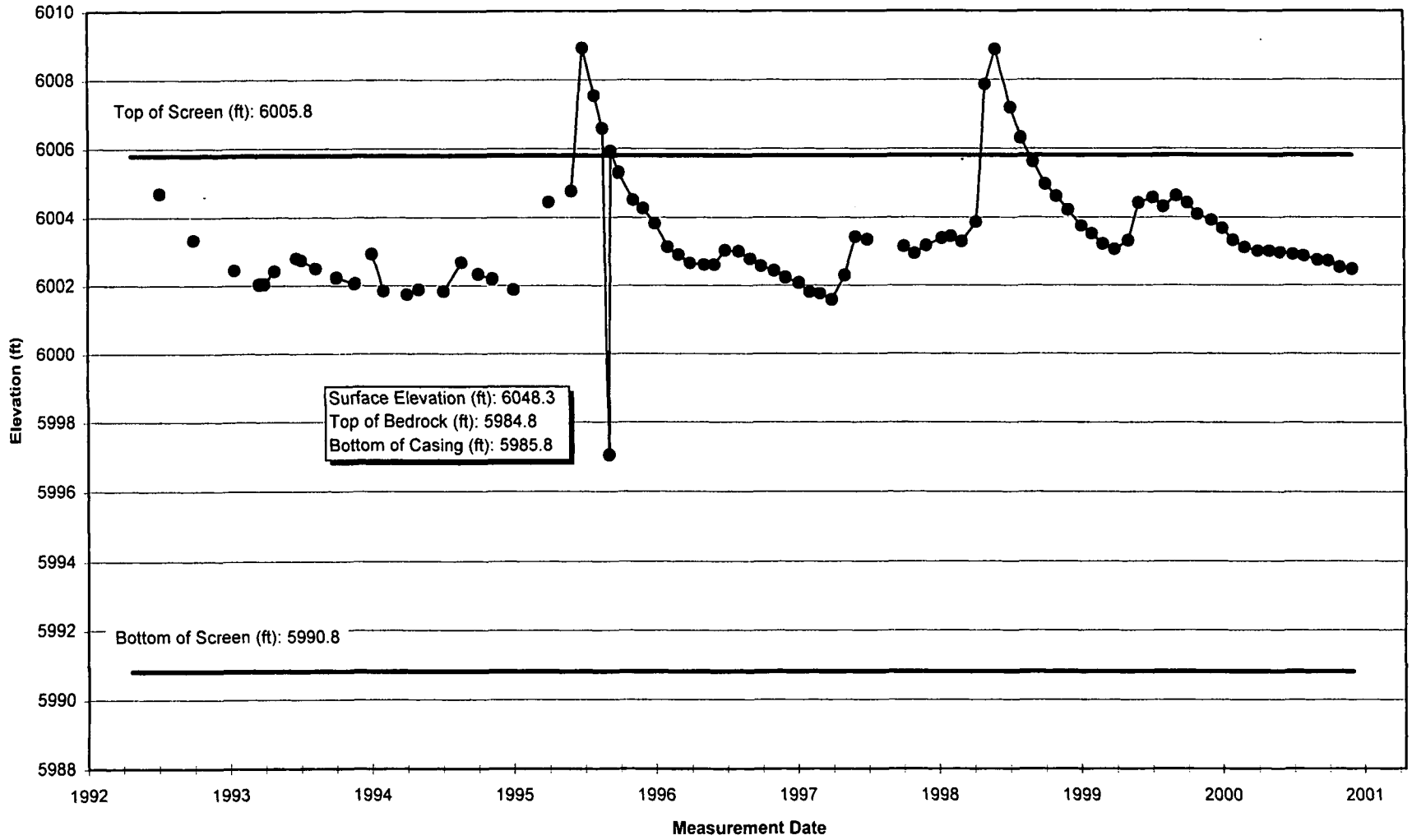
Hydrograph 0190



HG-Master S01_wjb 0190 9/26/01

425

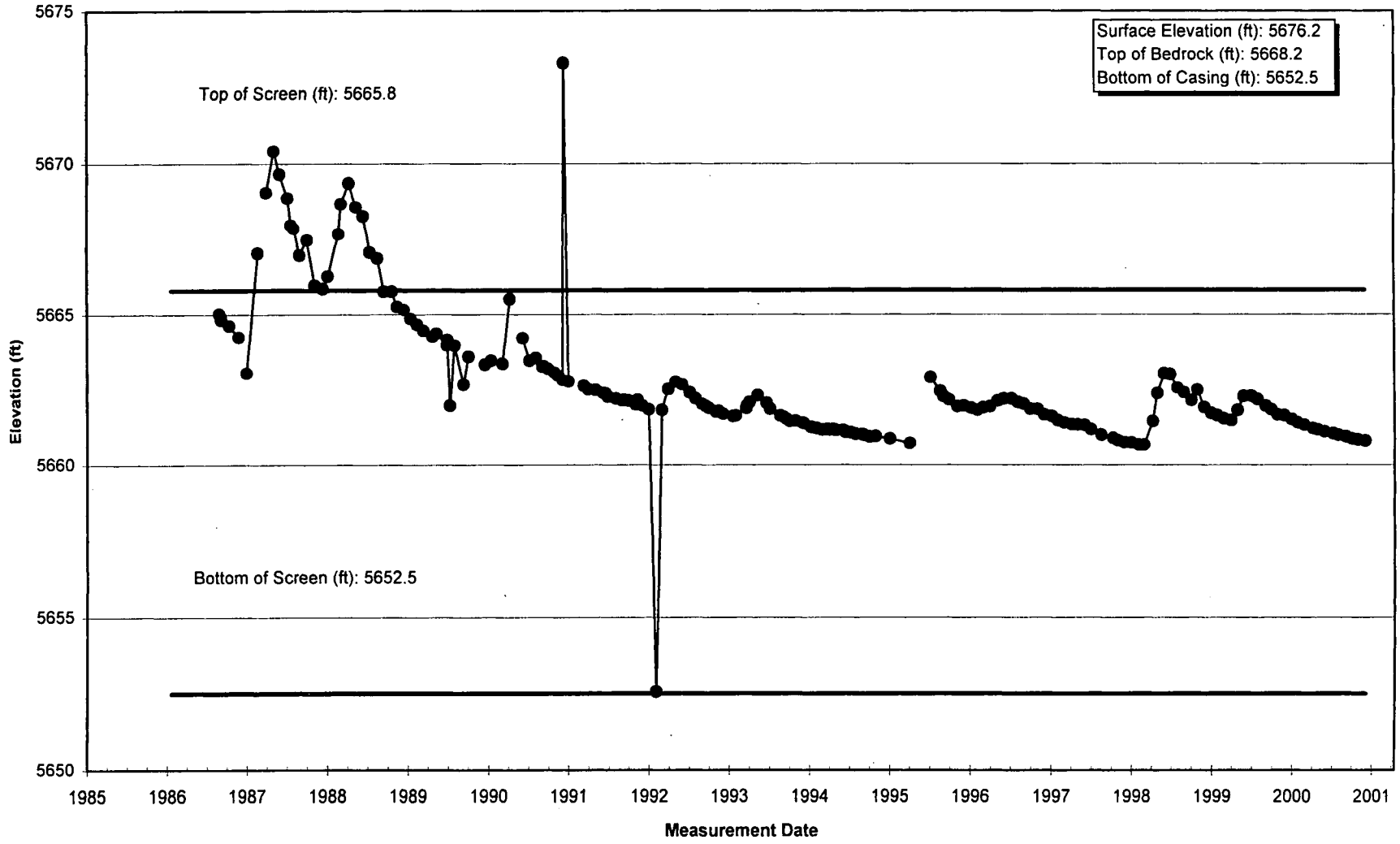
Hydrograph 0290



HG-Master S02 0290 9/21/01

426

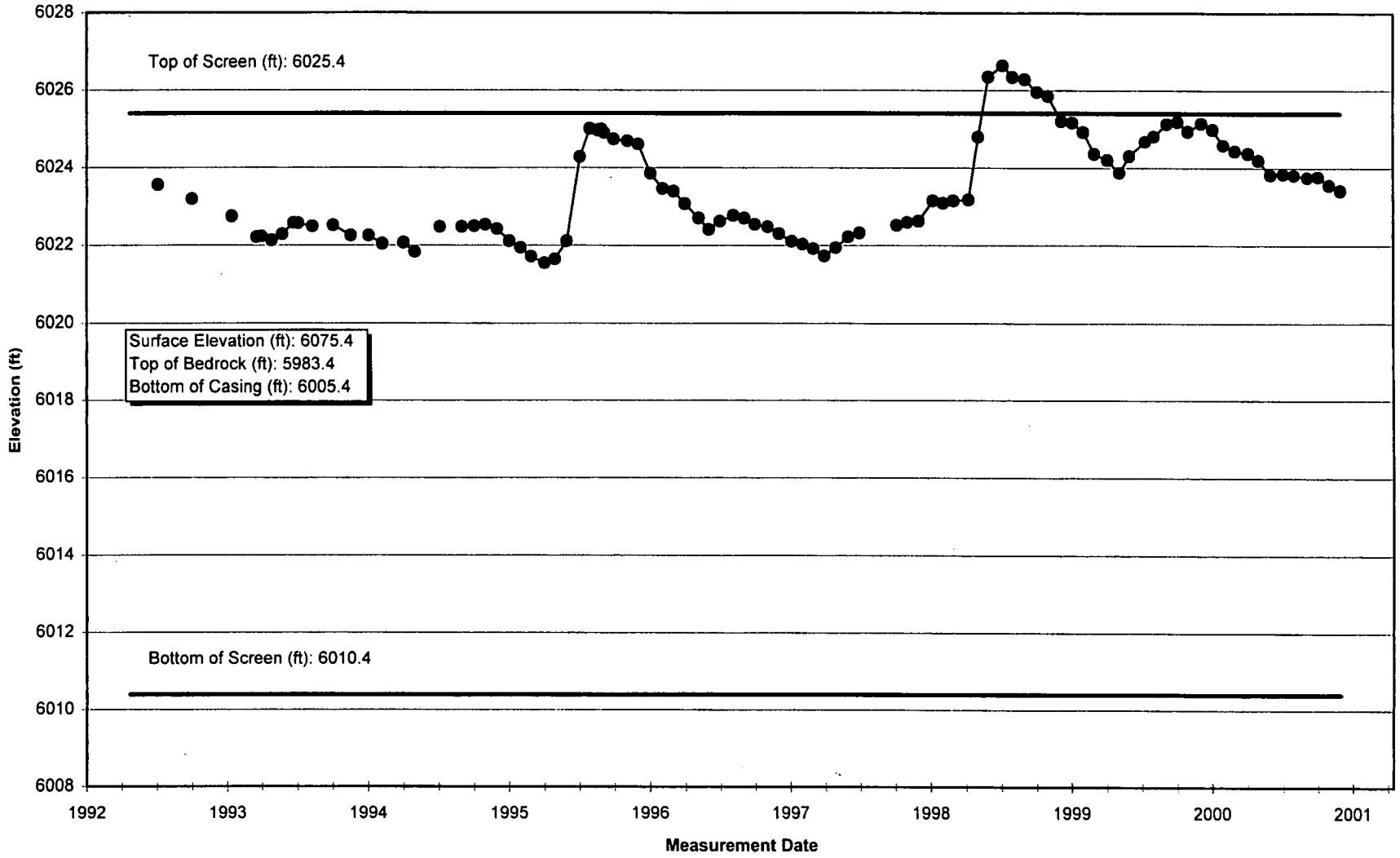
Hydrograph 0386



427

HG-Master S02_wjb 0386 9/26/01

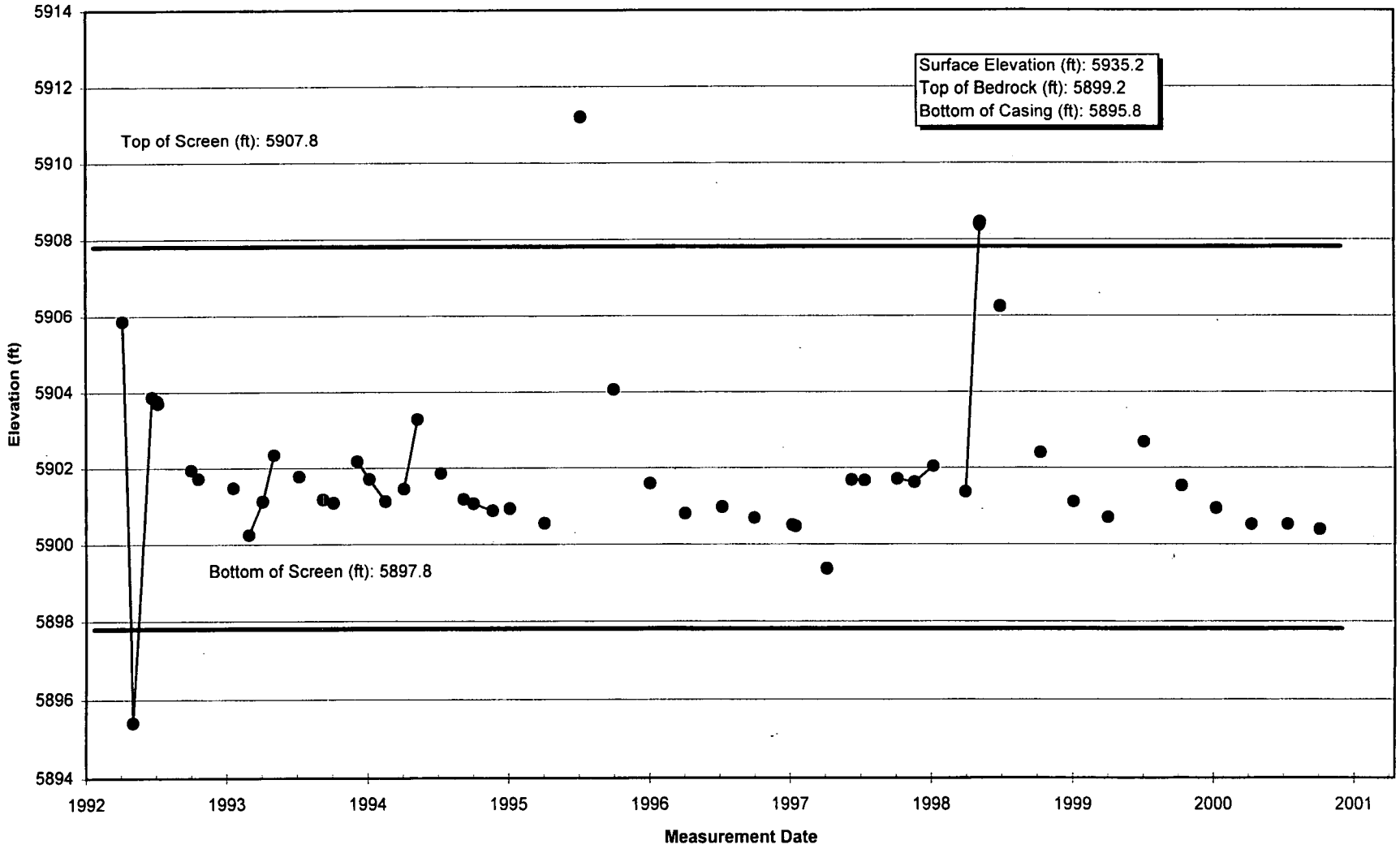
Hydrograph 0390



4/28

HG-Master S02 0390 9/21/01

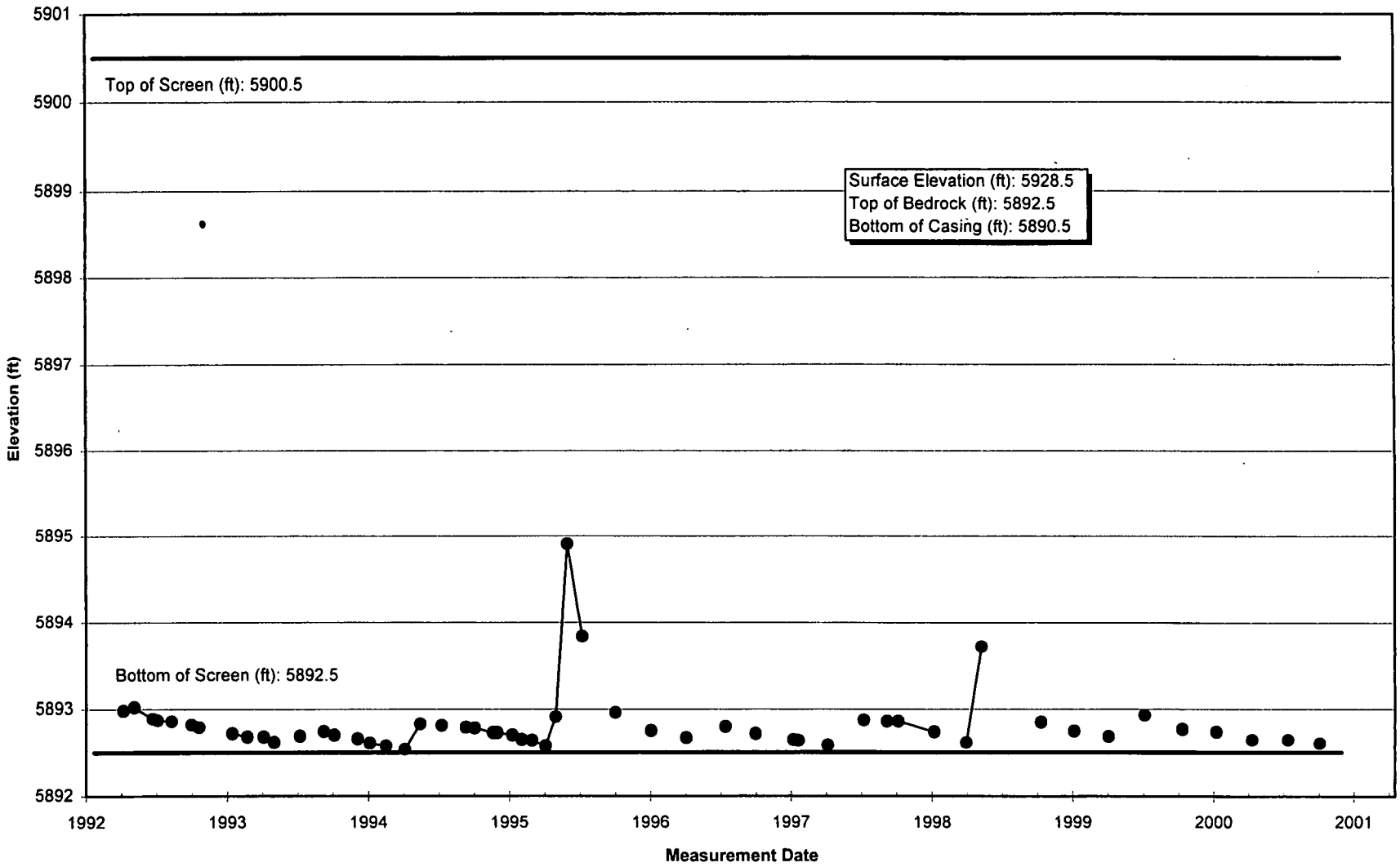
Hydrograph 03991



4/29

HG-Master S02 03991 9/21/01

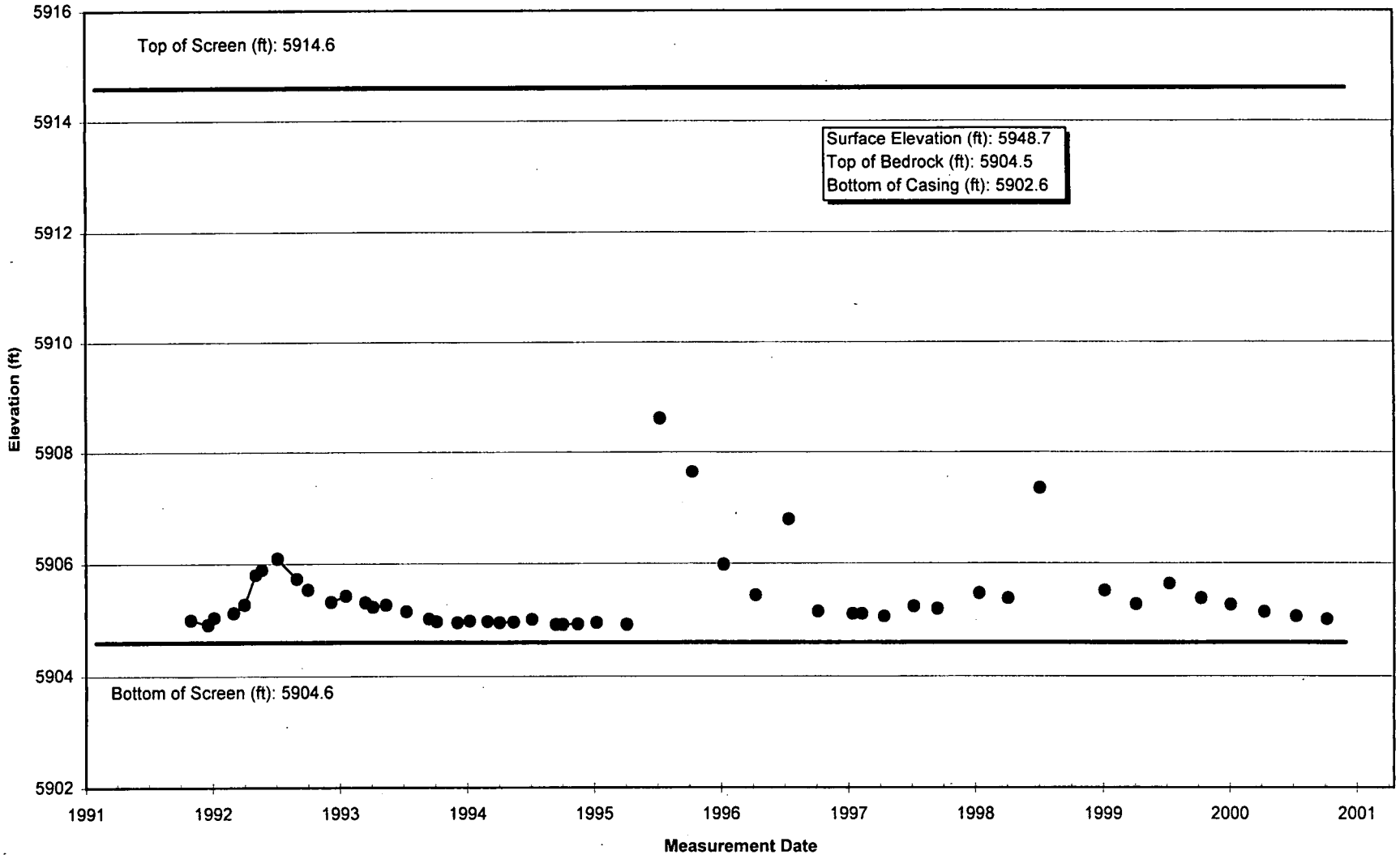
Hydrograph 04091



430

HG-Master S02 04091 9/21/01

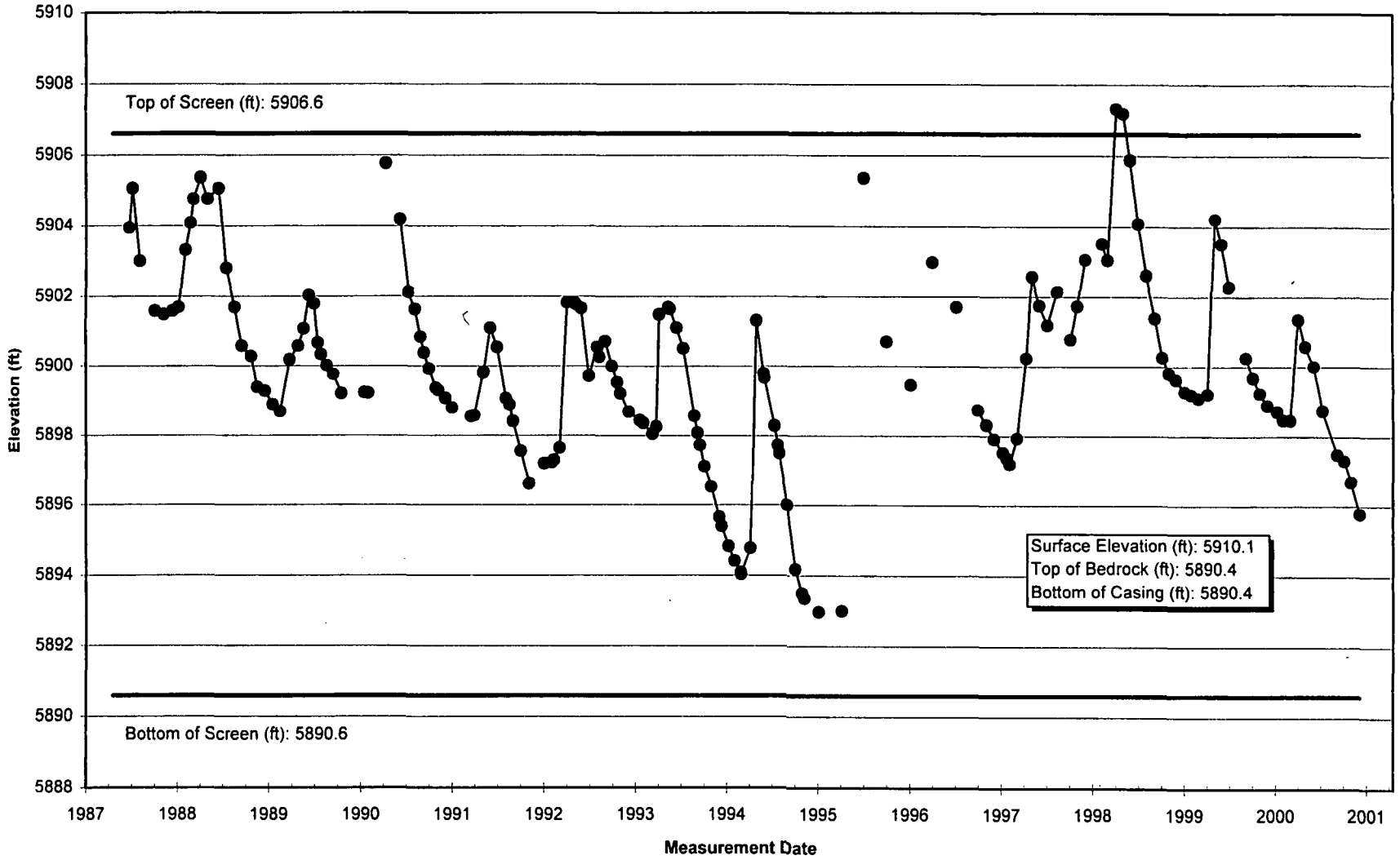
Hydrograph 04591



431

HG-Master S03 04591 9/21/01

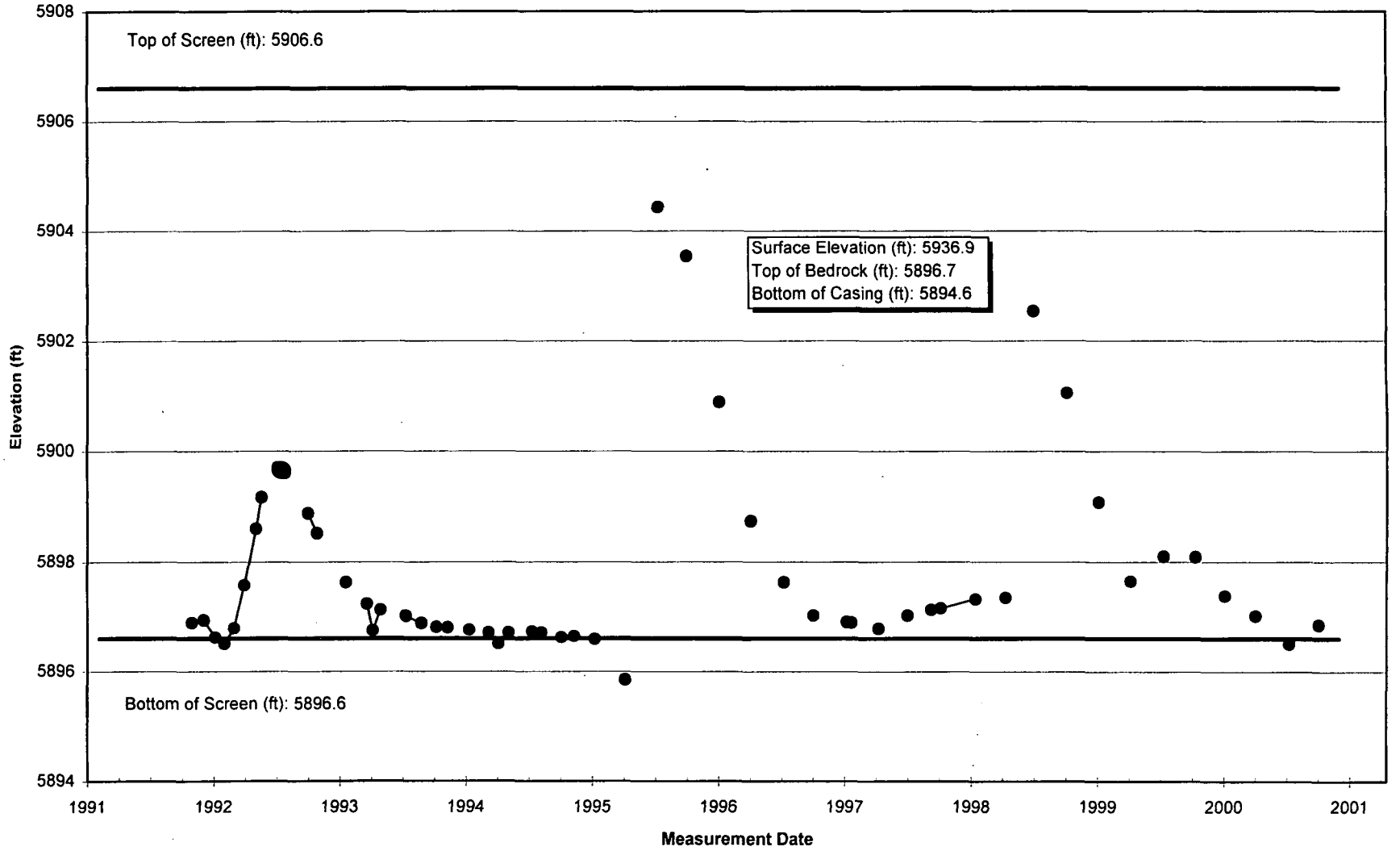
Hydrograph 0487



4/32

HG-Master S03_wjb 0487 9/26/01

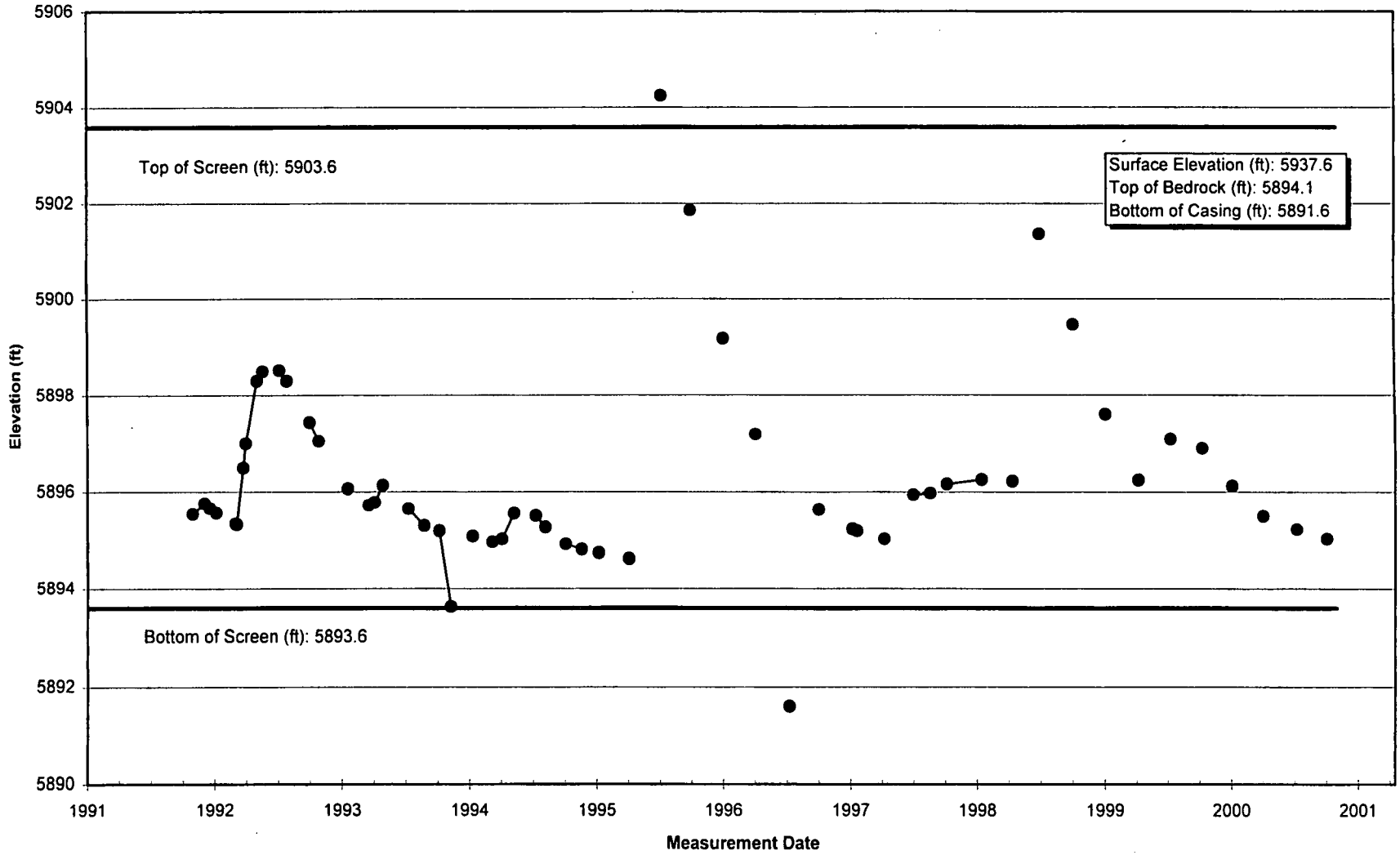
Hydrograph 04991



433

HG-Master S03 04991 9/24/01

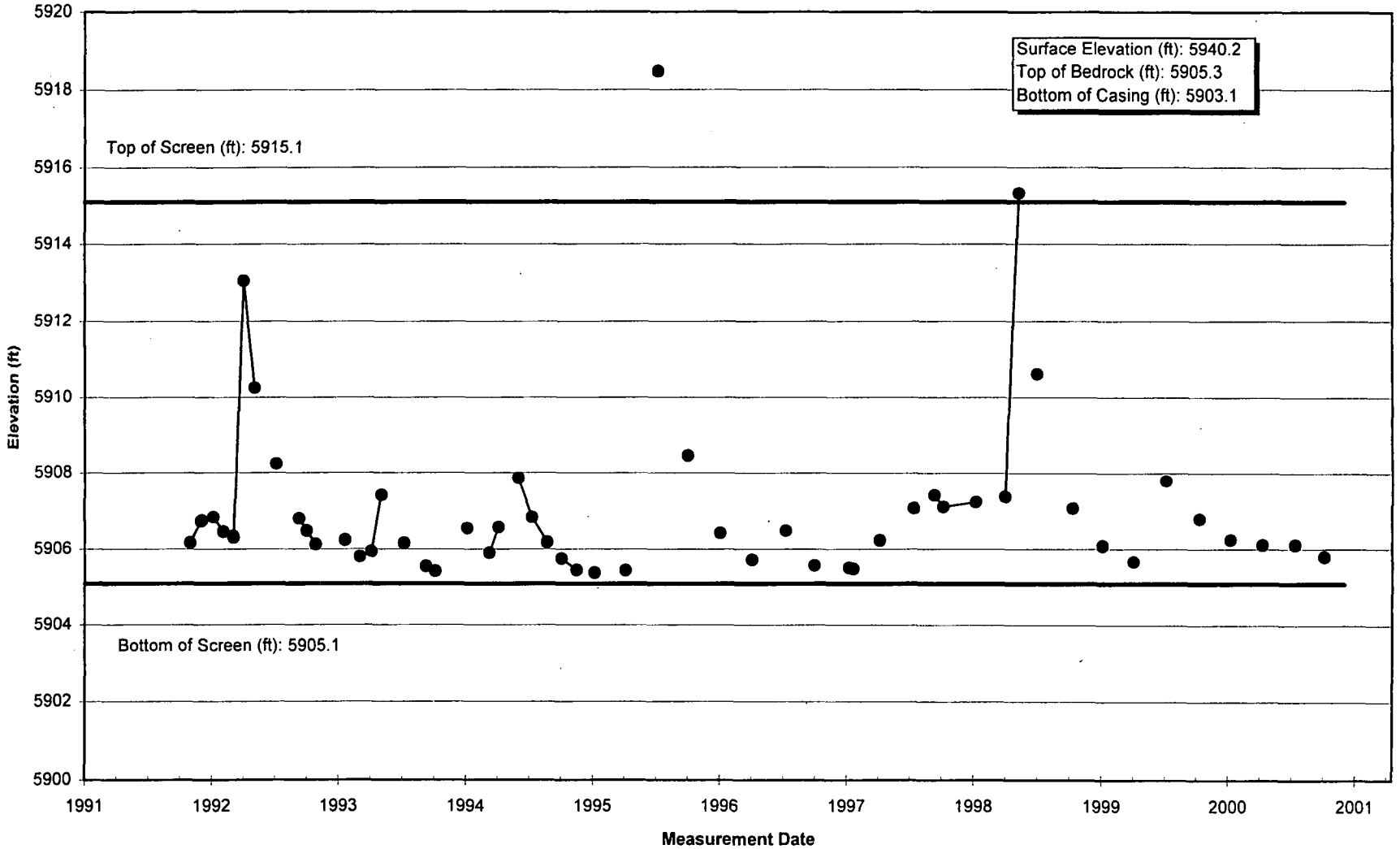
Hydrograph 05091



HG-Master S03_wjb 05091 9/26/01

434

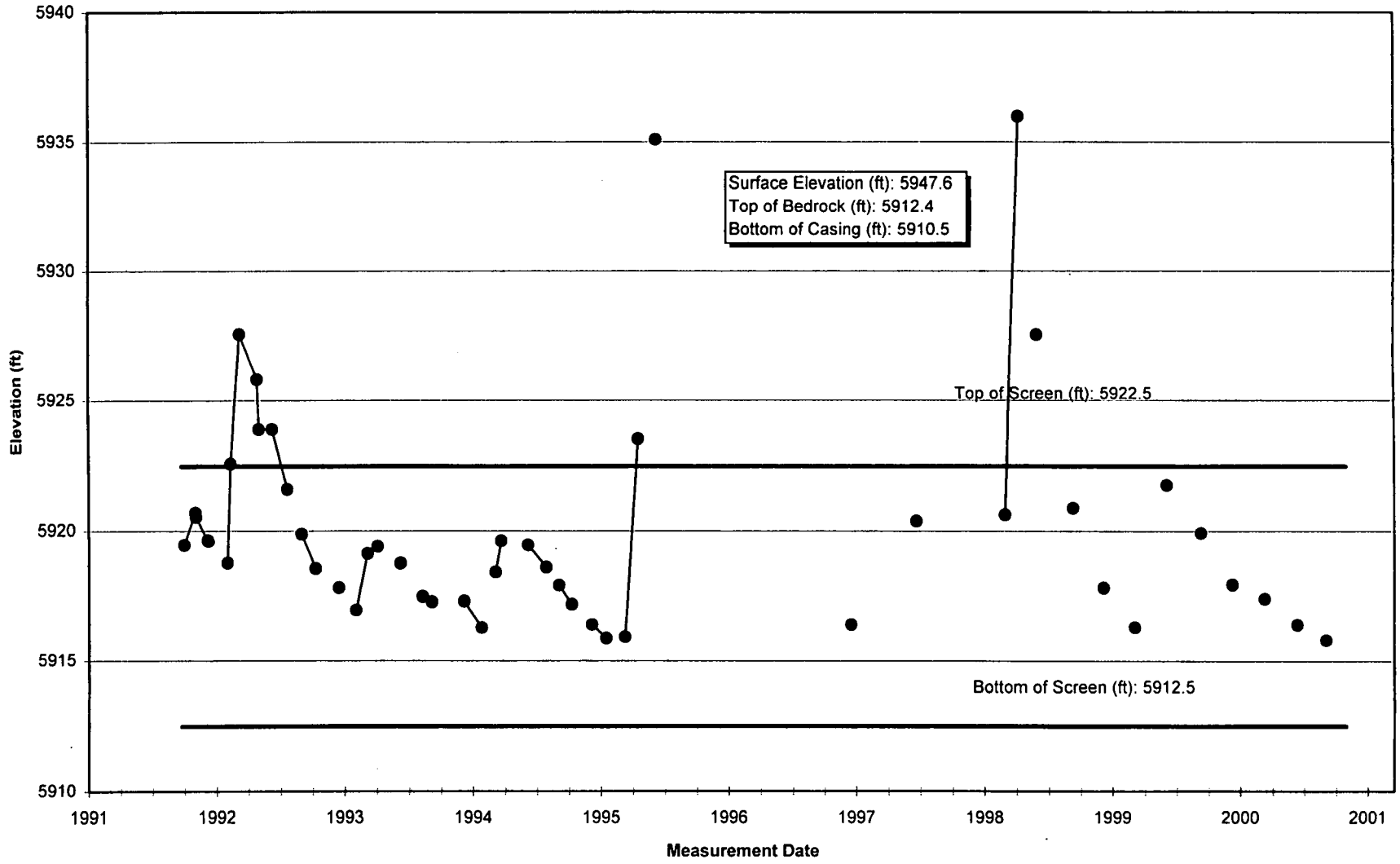
Hydrograph 05391



HG-Master S03 05391 9/24/01

435

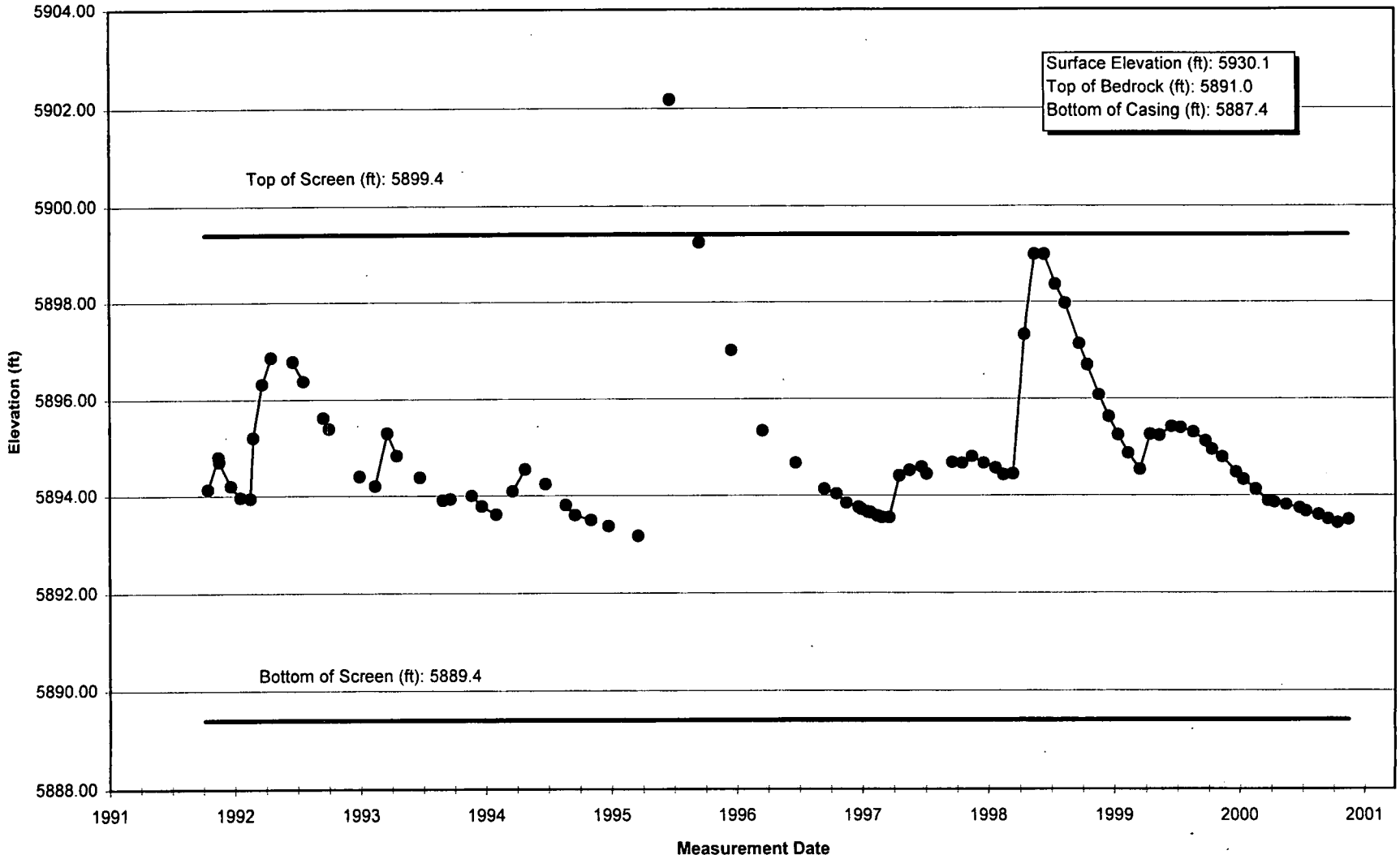
Hydrograph 05691



436

HG-Master.S03 05691 9/24/01

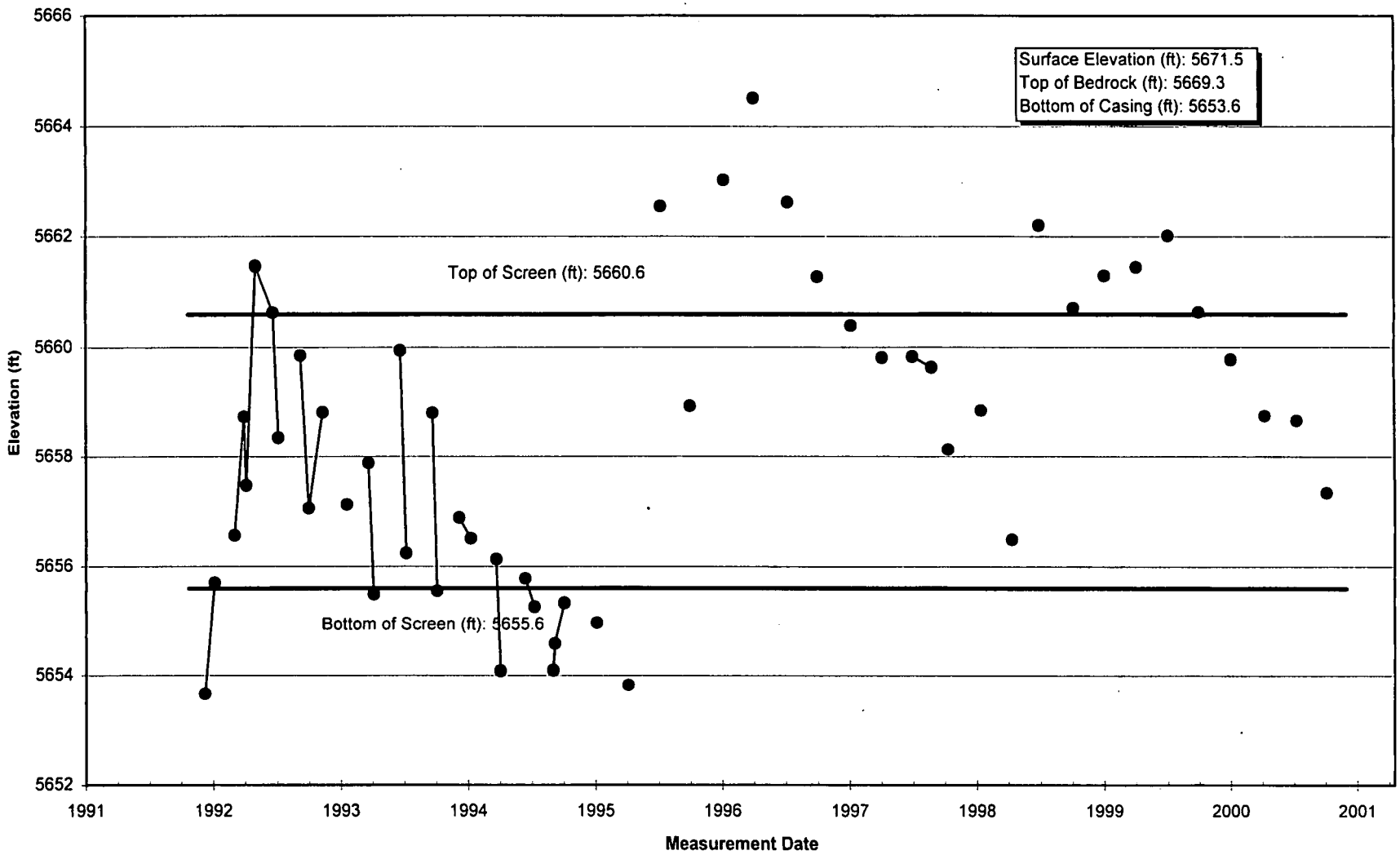
Hydrograph 06091



437

HG-Master S03 06091 9/24/01

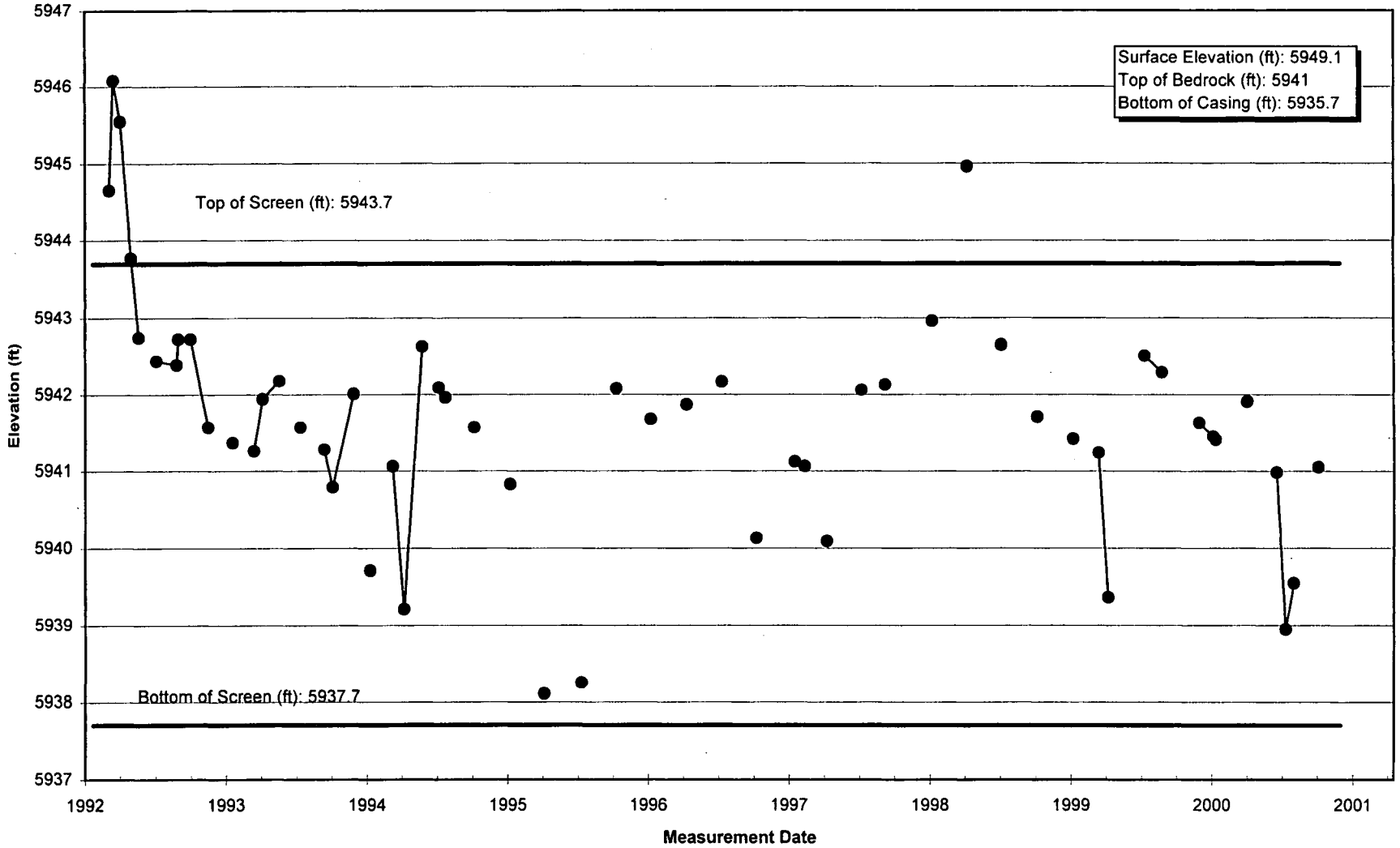
Hydrograph 06491



HG-Master S04 06491 9/24/01

438

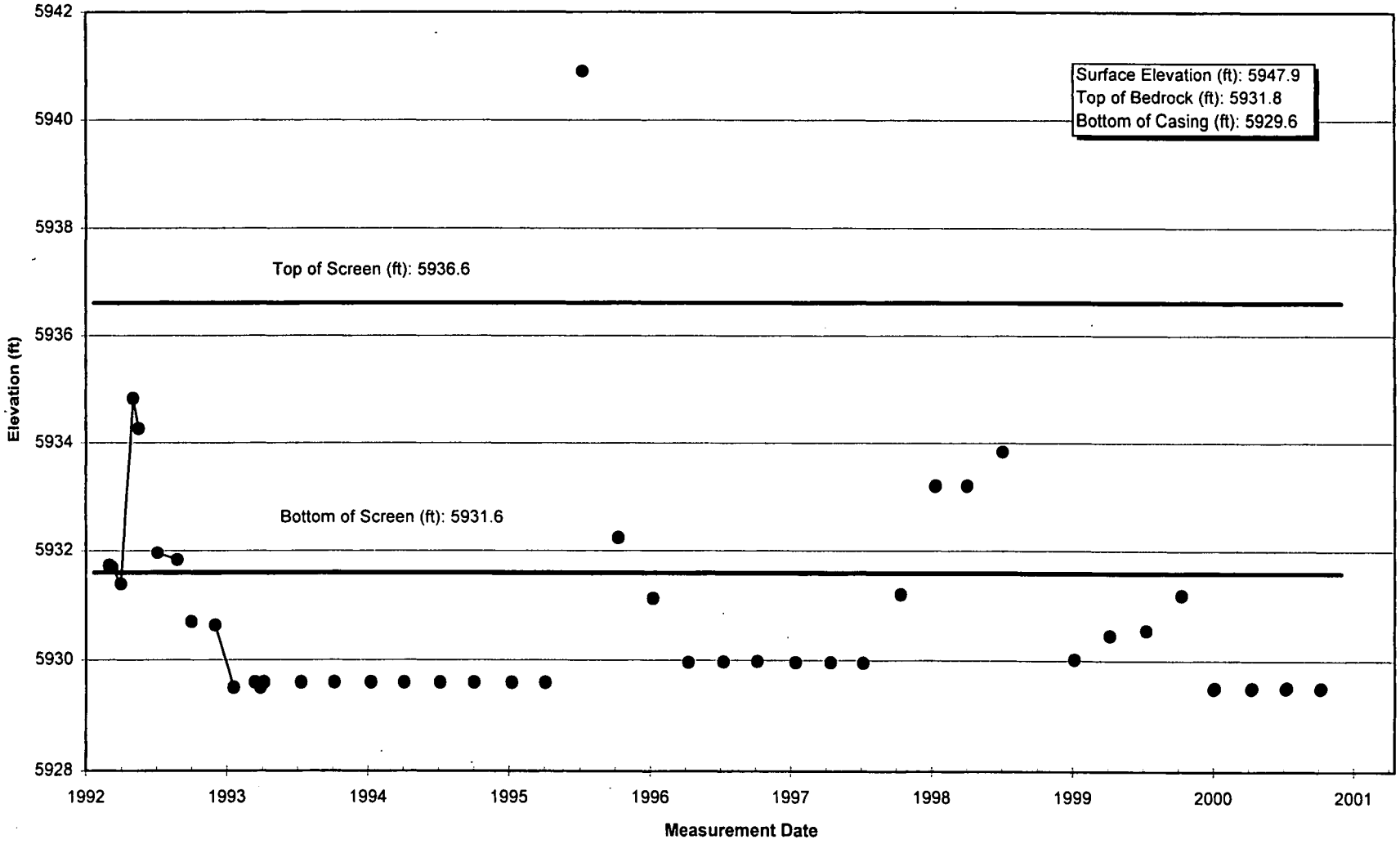
Hydrograph 07391



439

HG-Master S04_wjb 07391 9/26/01

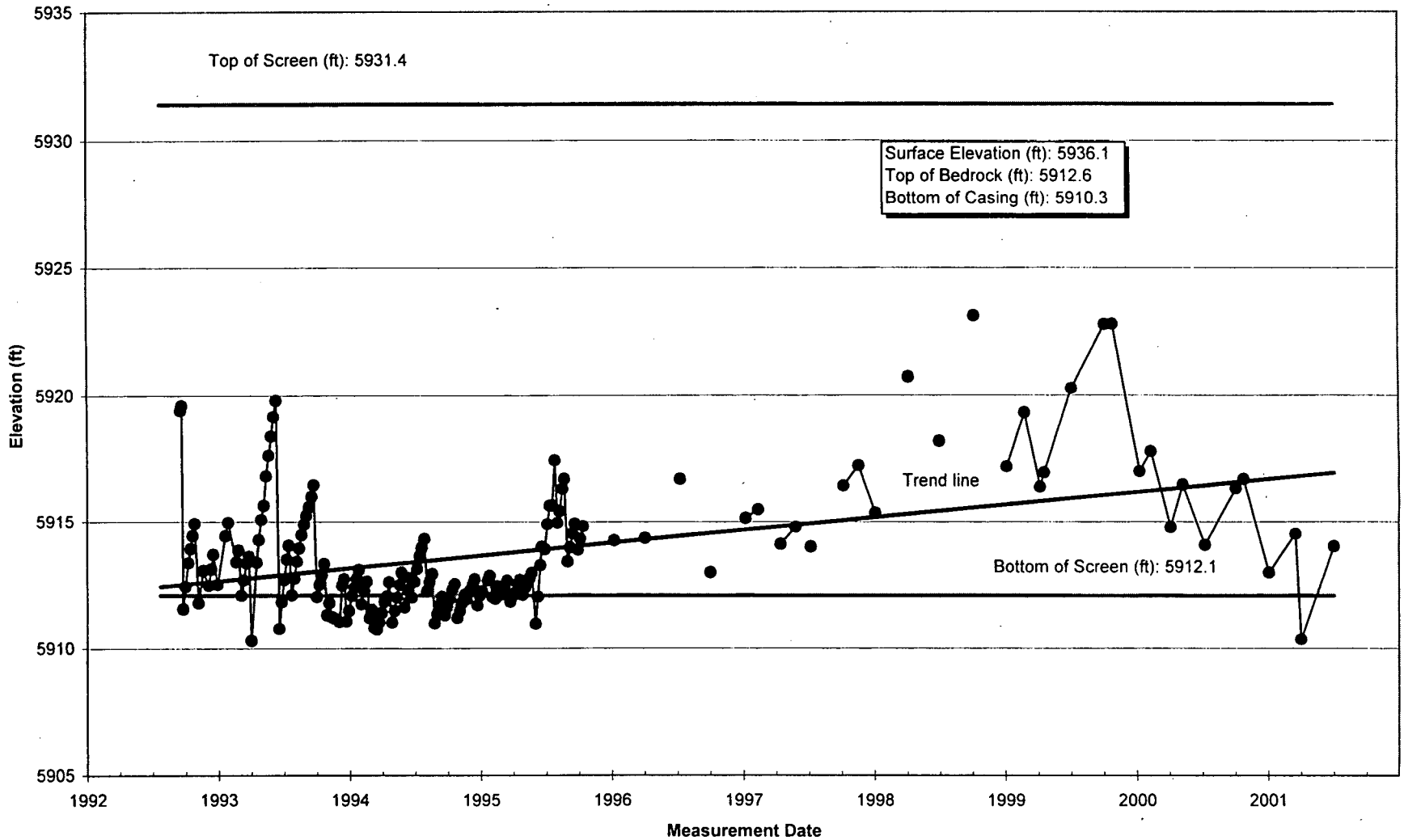
Hydrograph 08091



440

HG-Master S04 08091 9/24/01

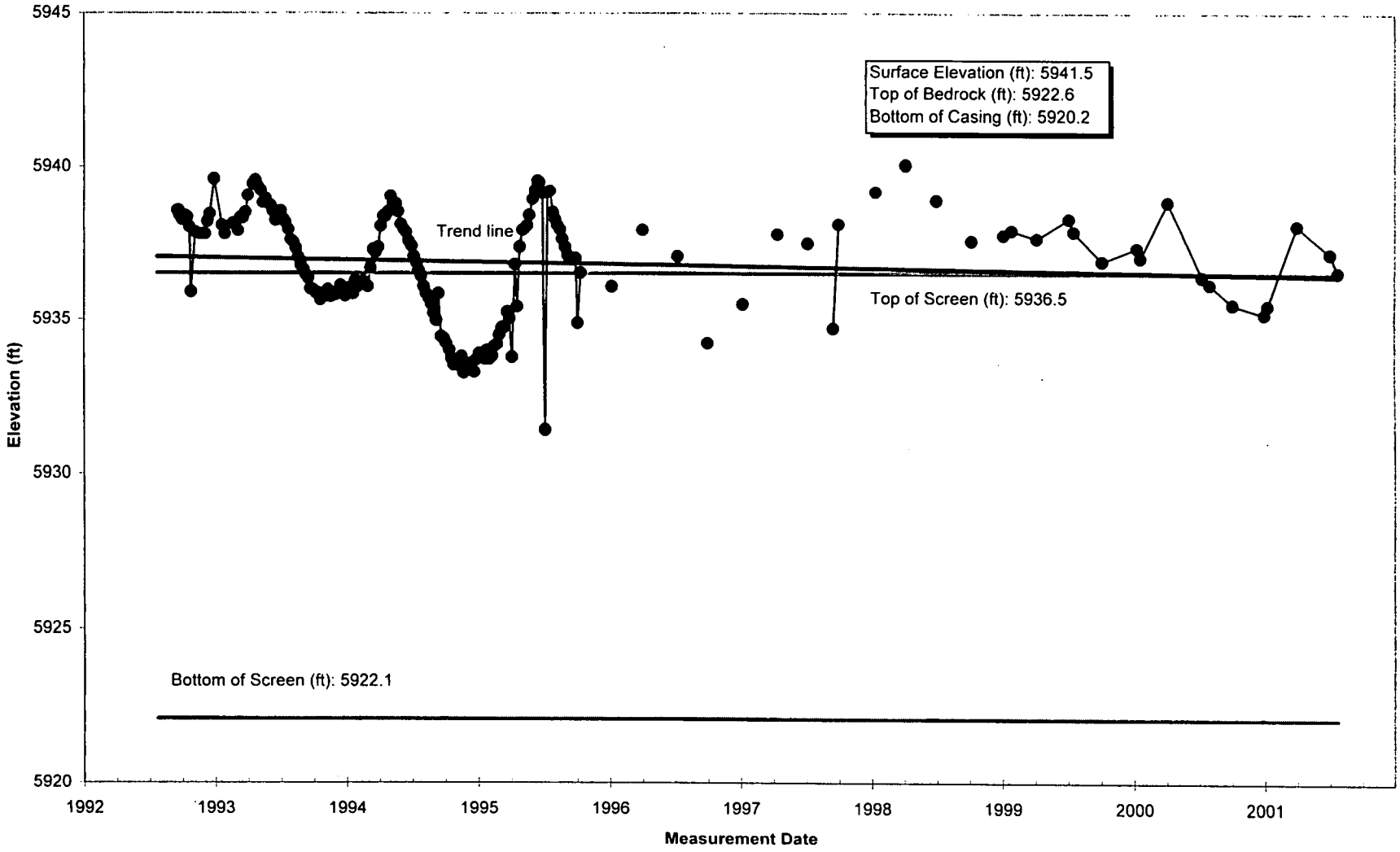
Hydrograph 10592



HG-Master S05.xls 10592 11/5/01

441

Hydrograph 10692



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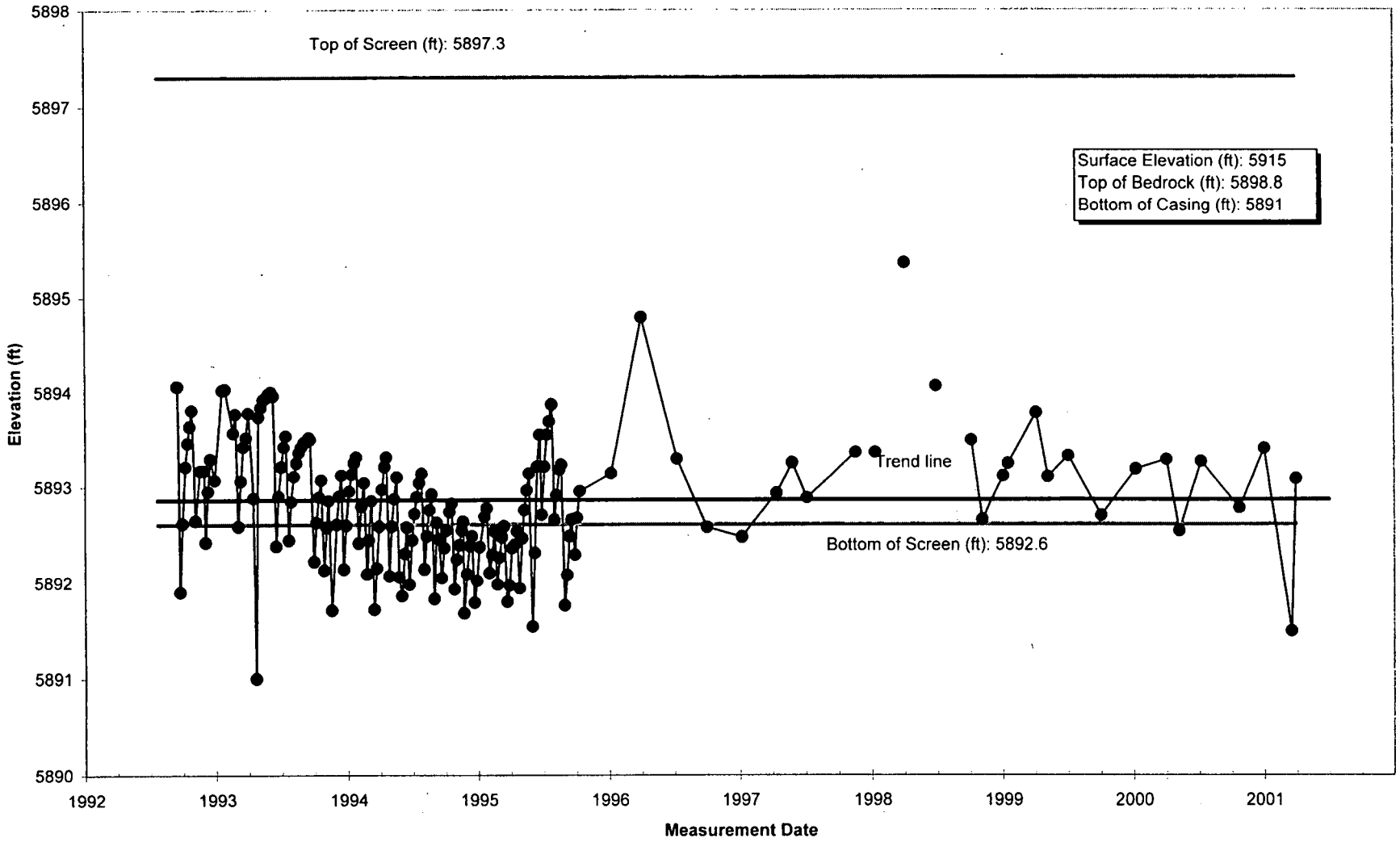
HG-Master S05.xls 10692 11/5/01

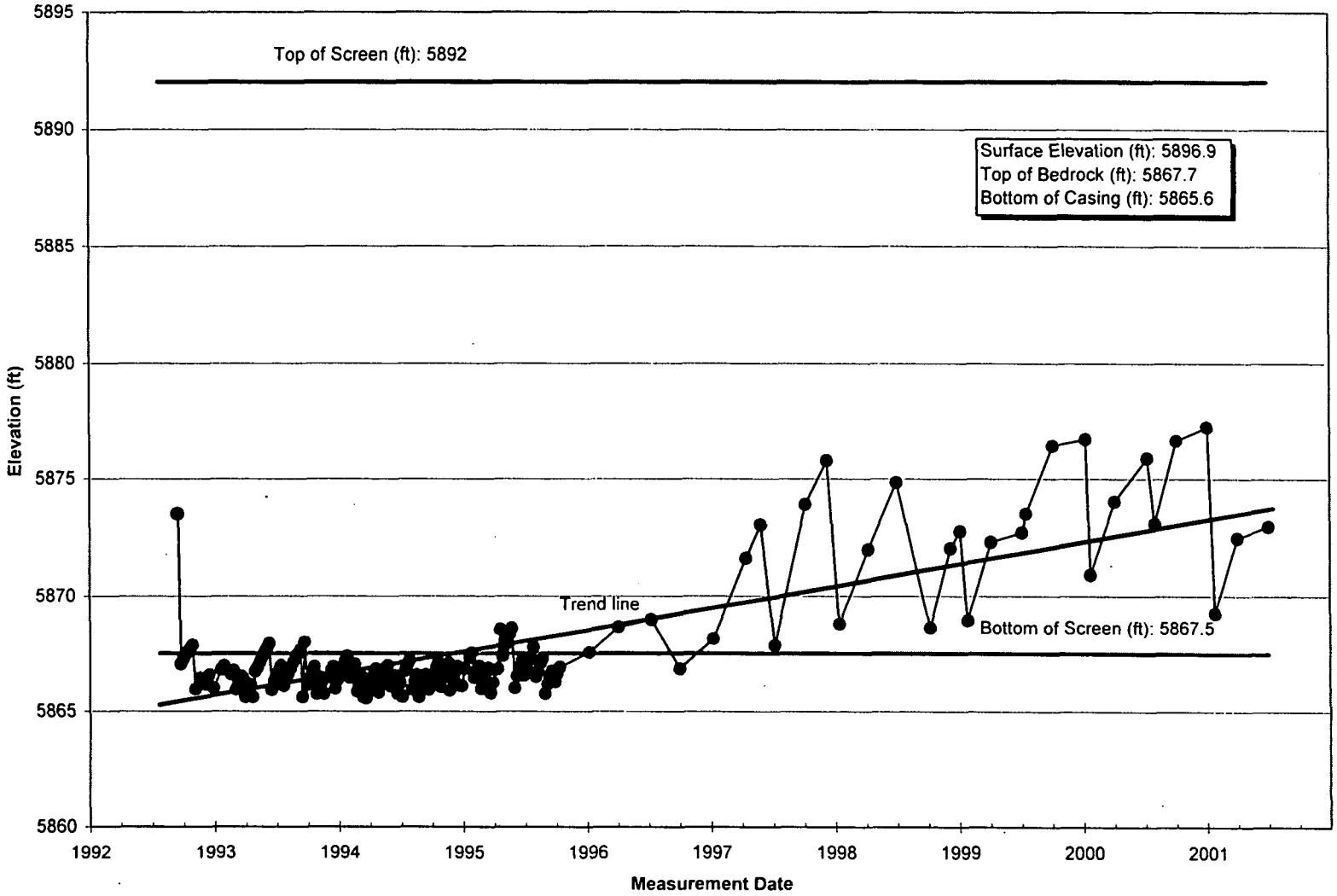
Hydrograph 10792



443

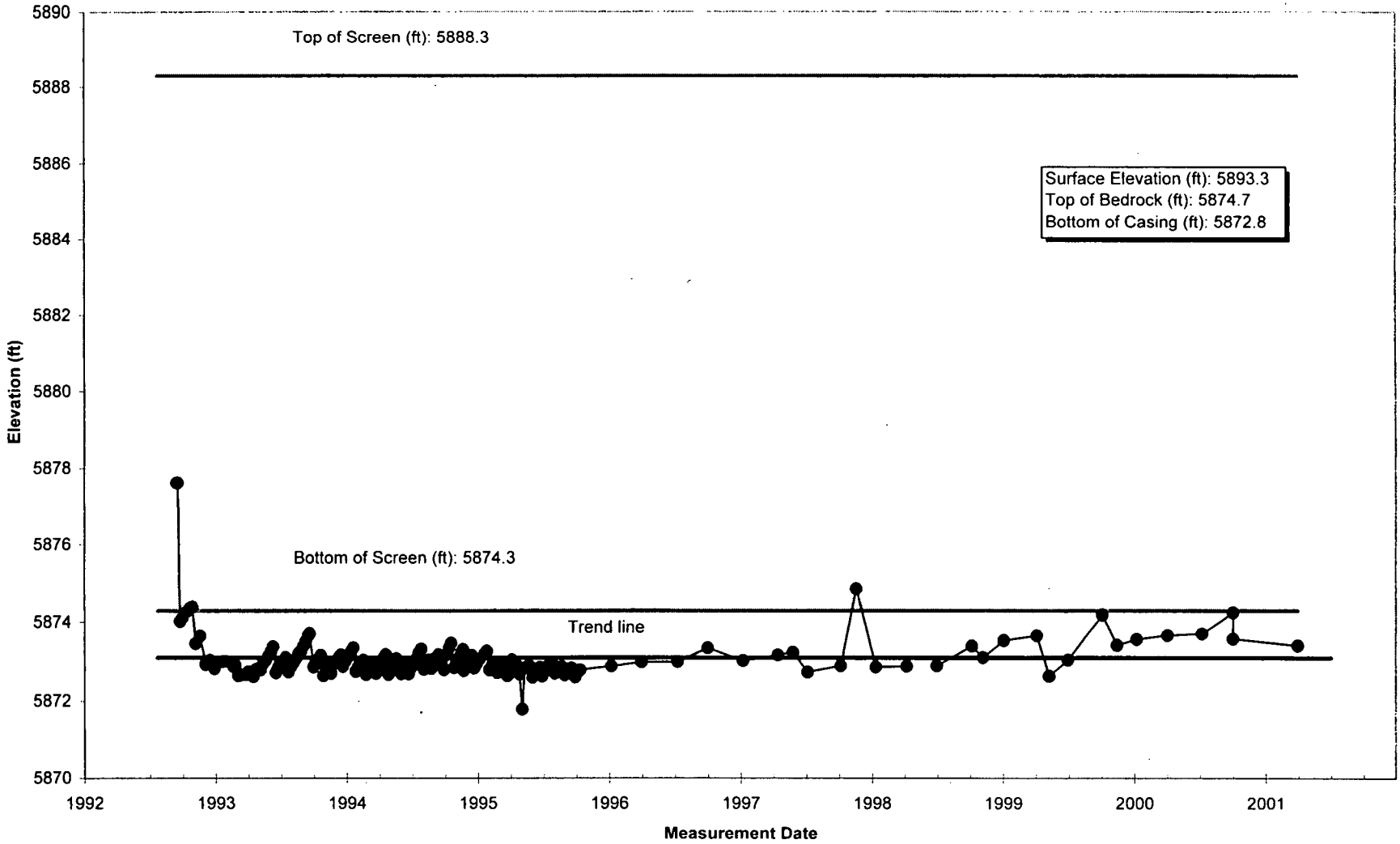
HG-Master S05.xls 10792 11/5/01

Hydrograph 10992



444 HG-Master S05.xls 10992 11/5/01

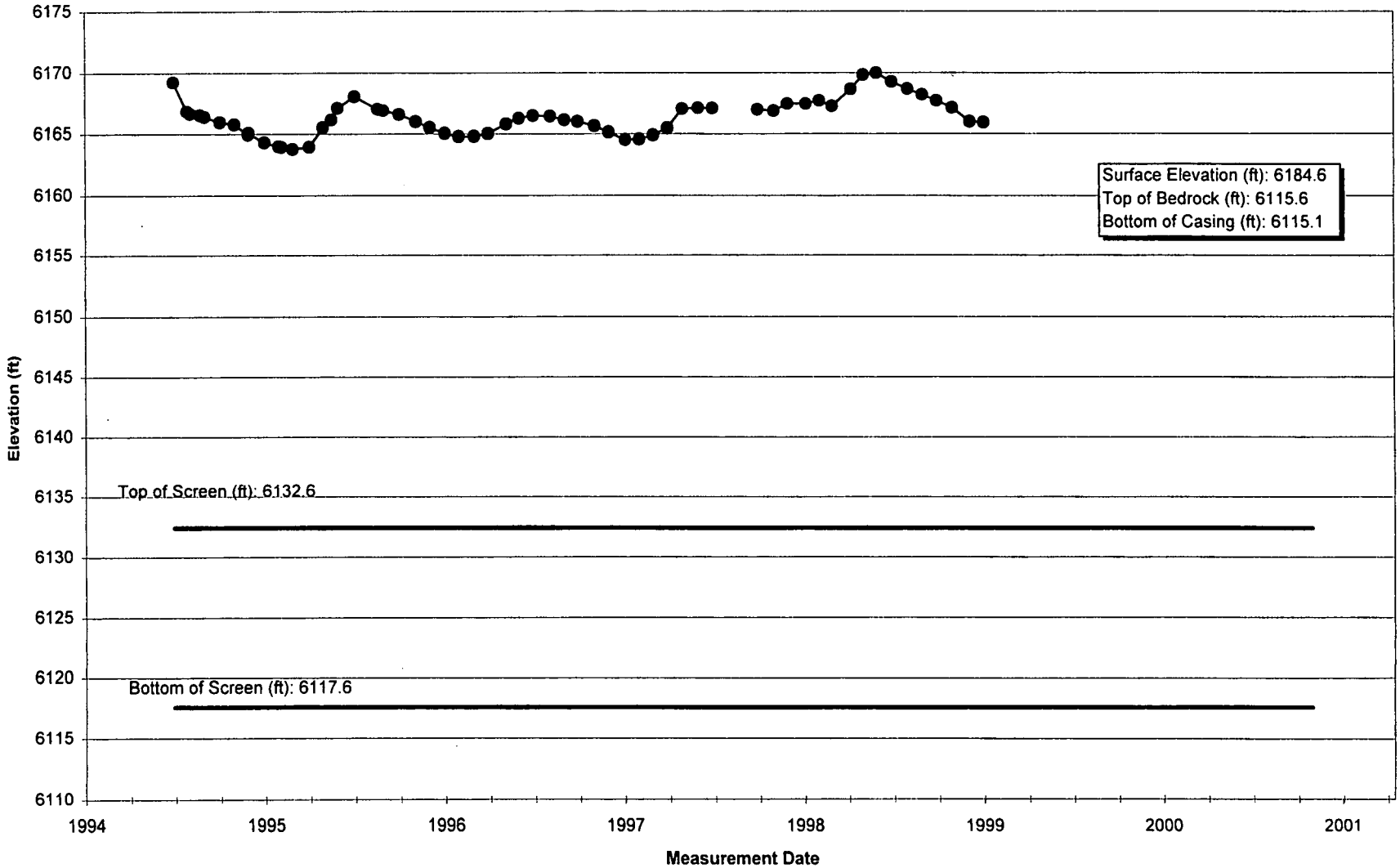
Hydrograph 11092



4/45

HG-Master S05.xls 11092 11/5/01

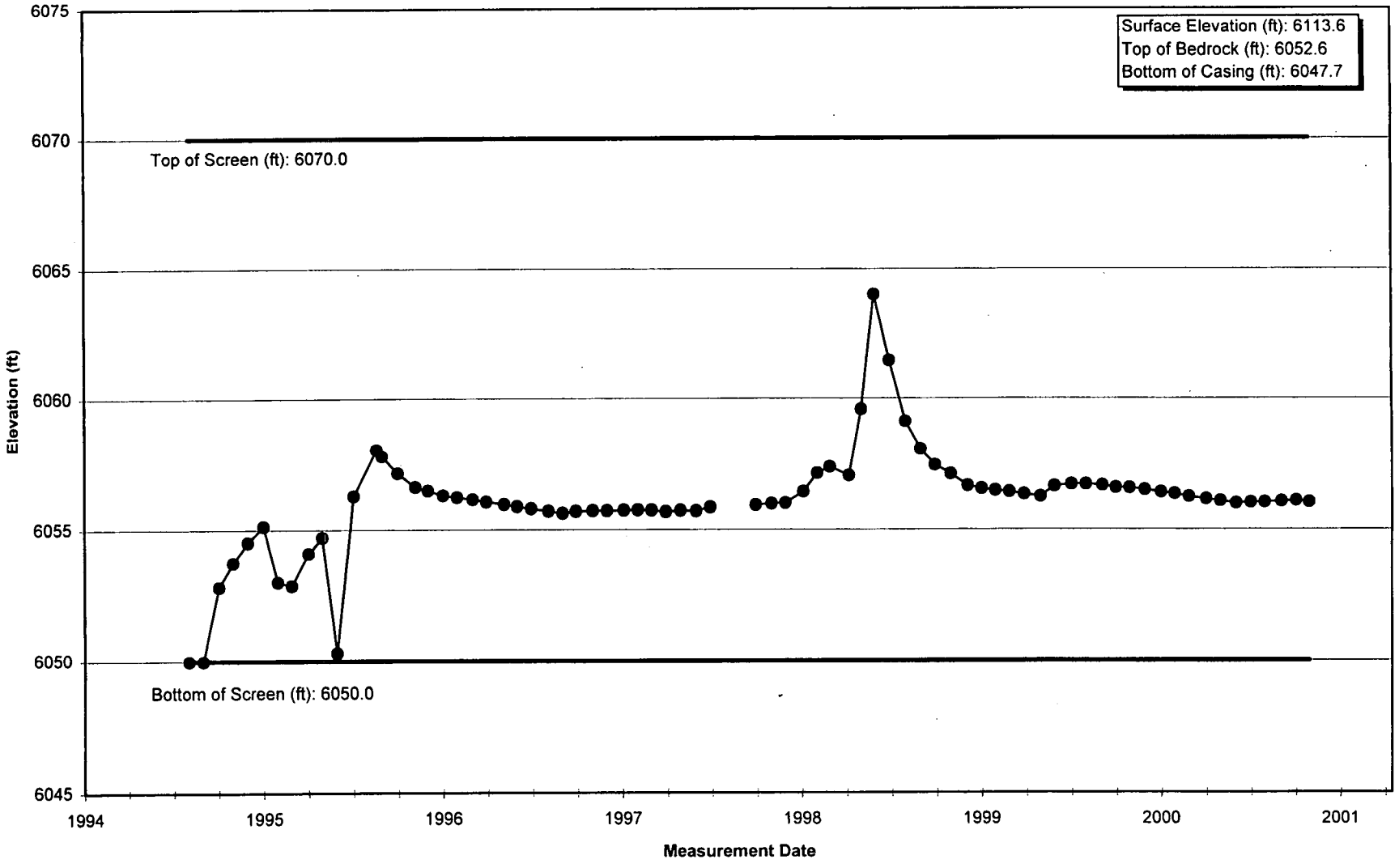
Hydrograph 11494



446

HG-Master S05_wjb 11494 9/26/01

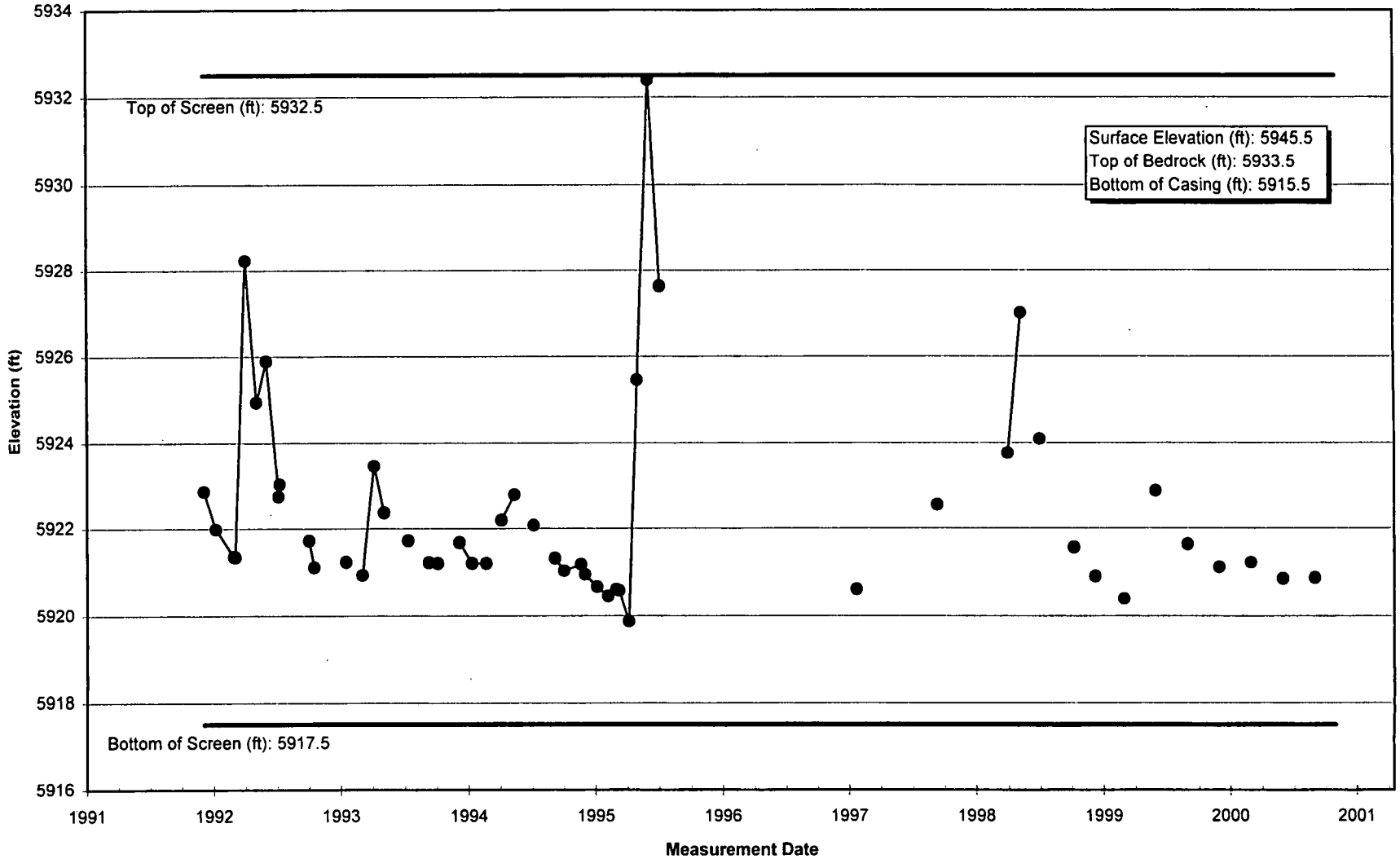
Hydrograph 11594



447

HG-Master S05_wjb 11594 9/26/01

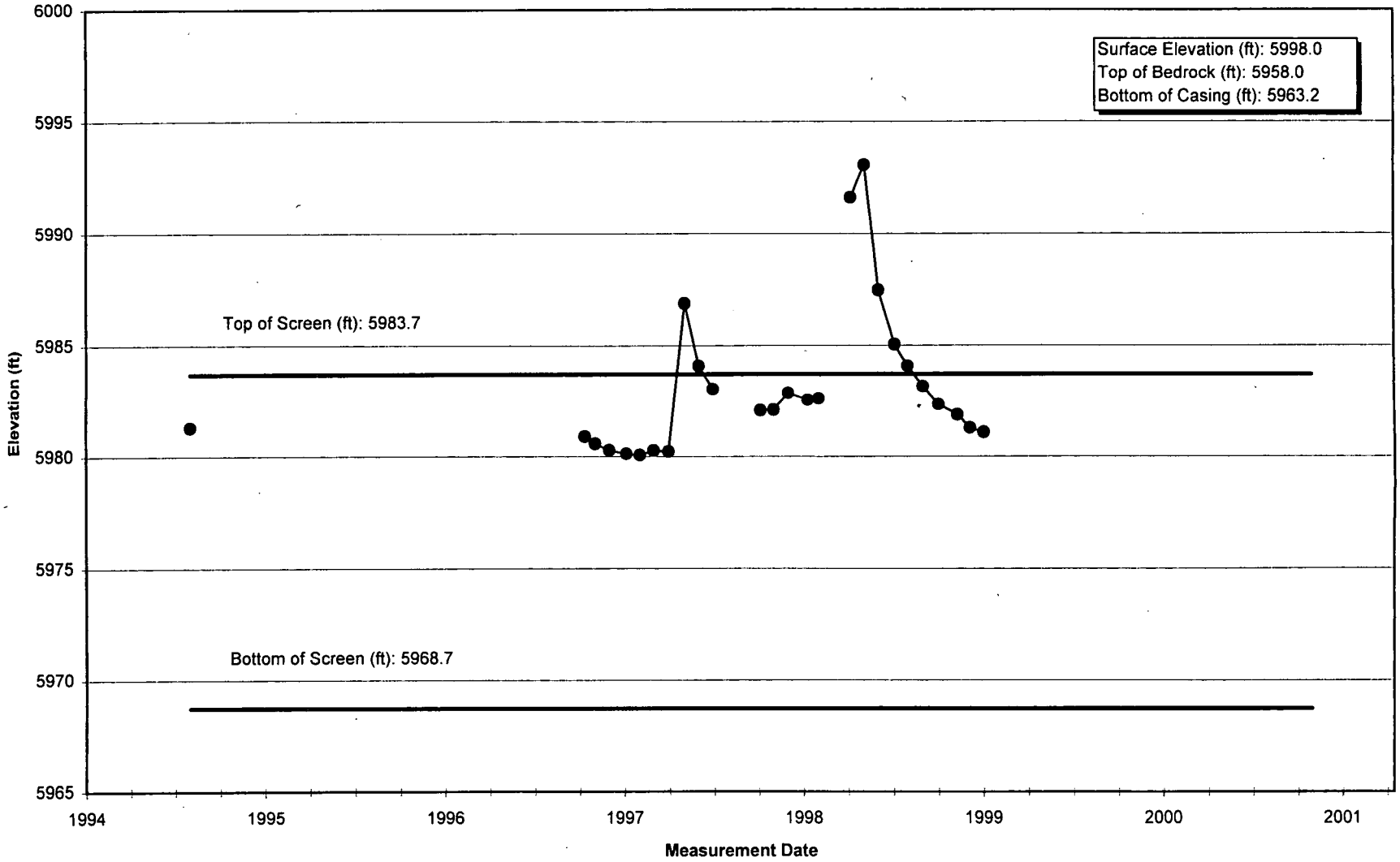
Hydrograph 11891



448

HG-Master S05 11891 9/24/01

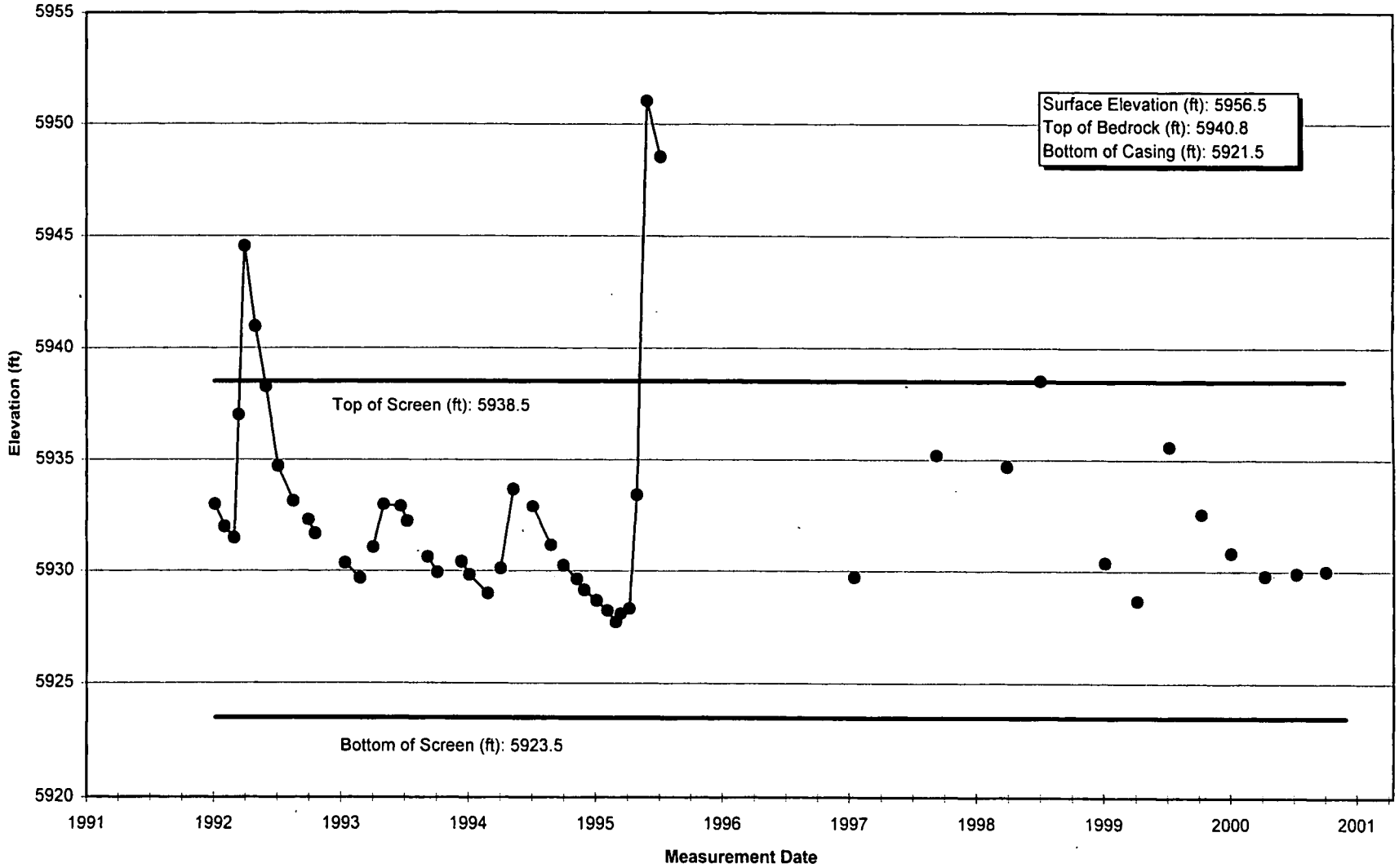
Hydrograph 1190



4/19

HG-Master S05 1190 9/24/01

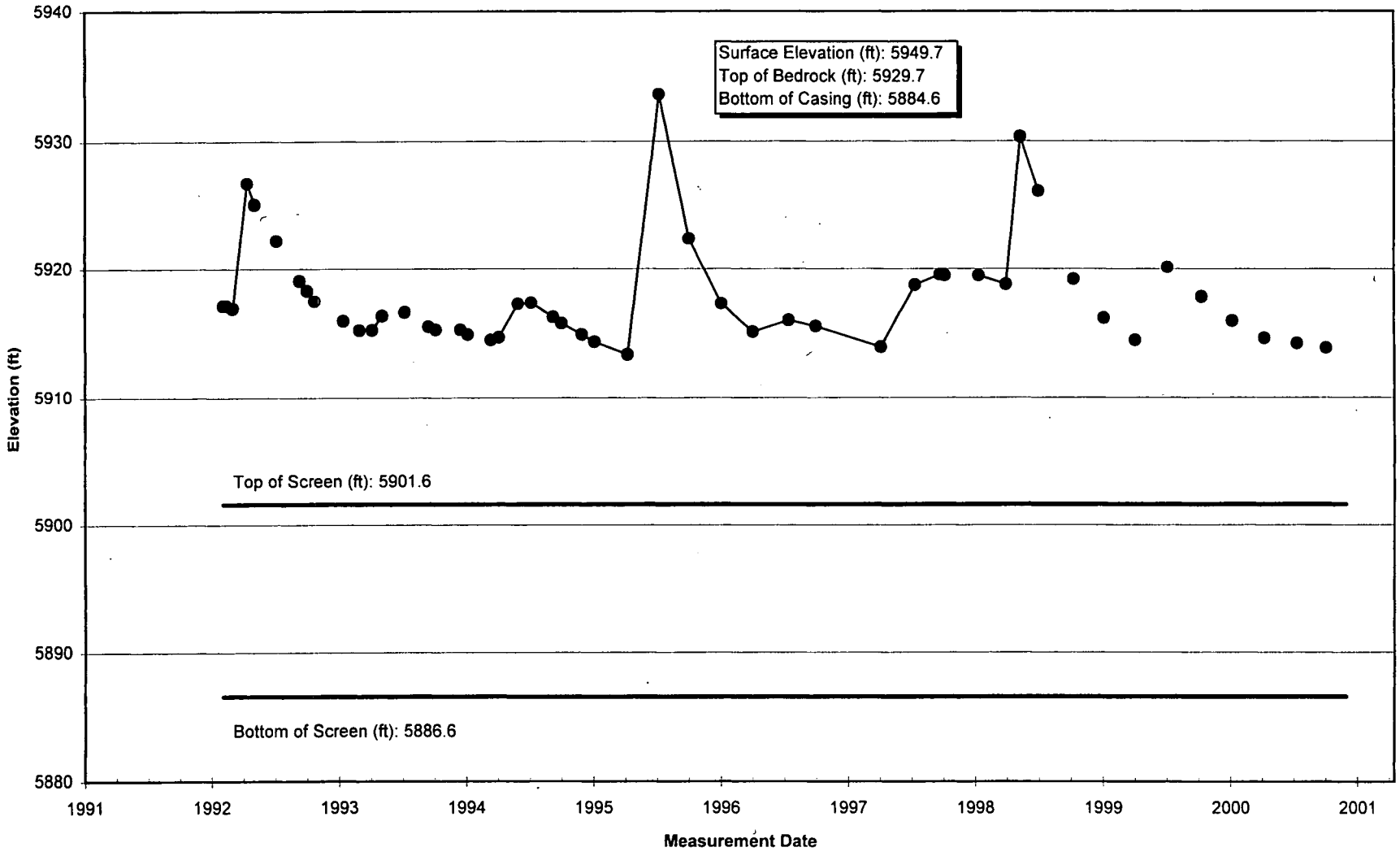
Hydrograph 12191



450

HG-Master S06 12191 9/25/01

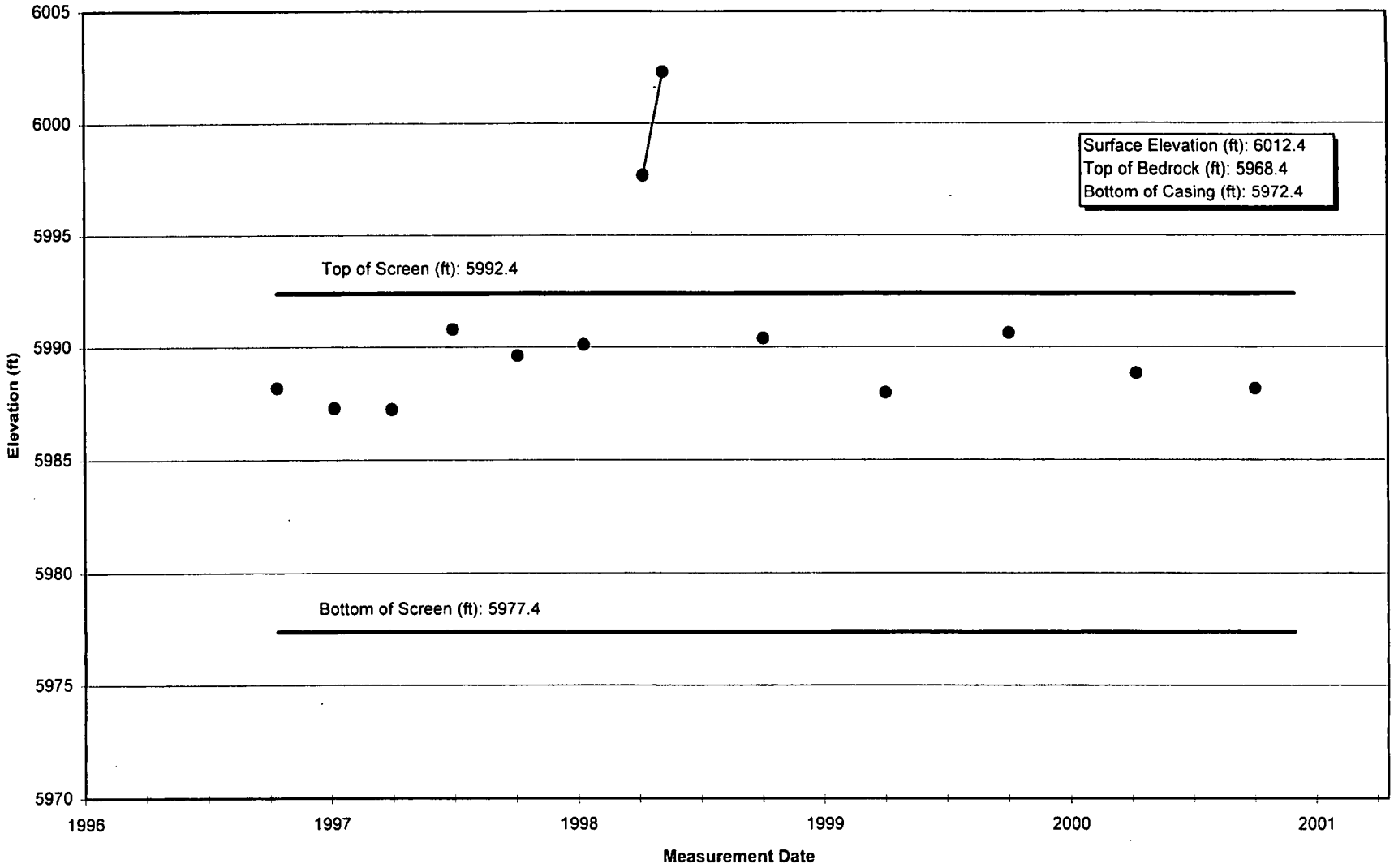
Hydrograph 12691



451

HG-Master S06 12691 9/25/01

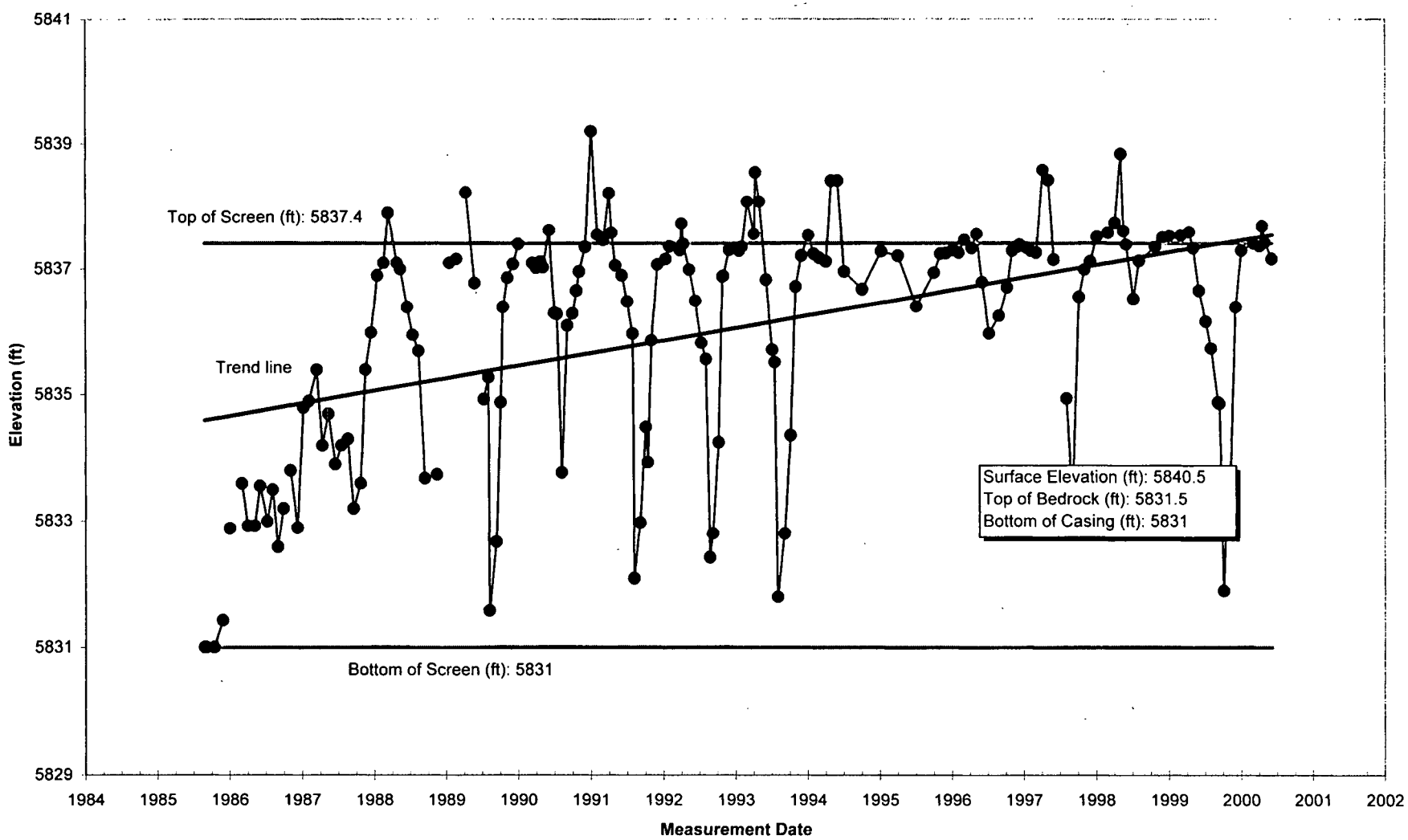
Hydrograph 1290



452

HG-Mas[illegible]06 1290 9/25/01

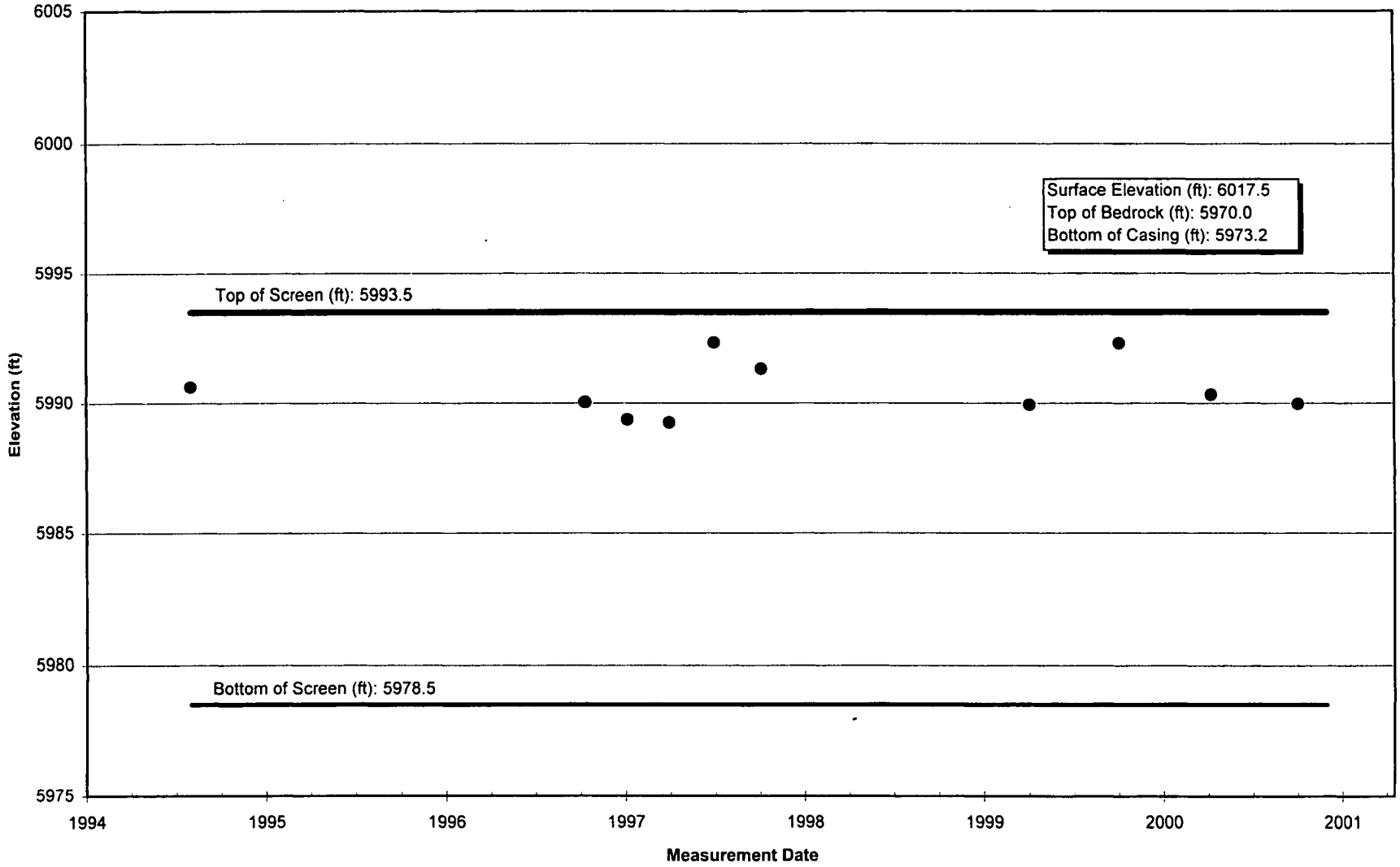
Hydrograph 1386



HG-Master S06.xls 1386 11/7/01

453

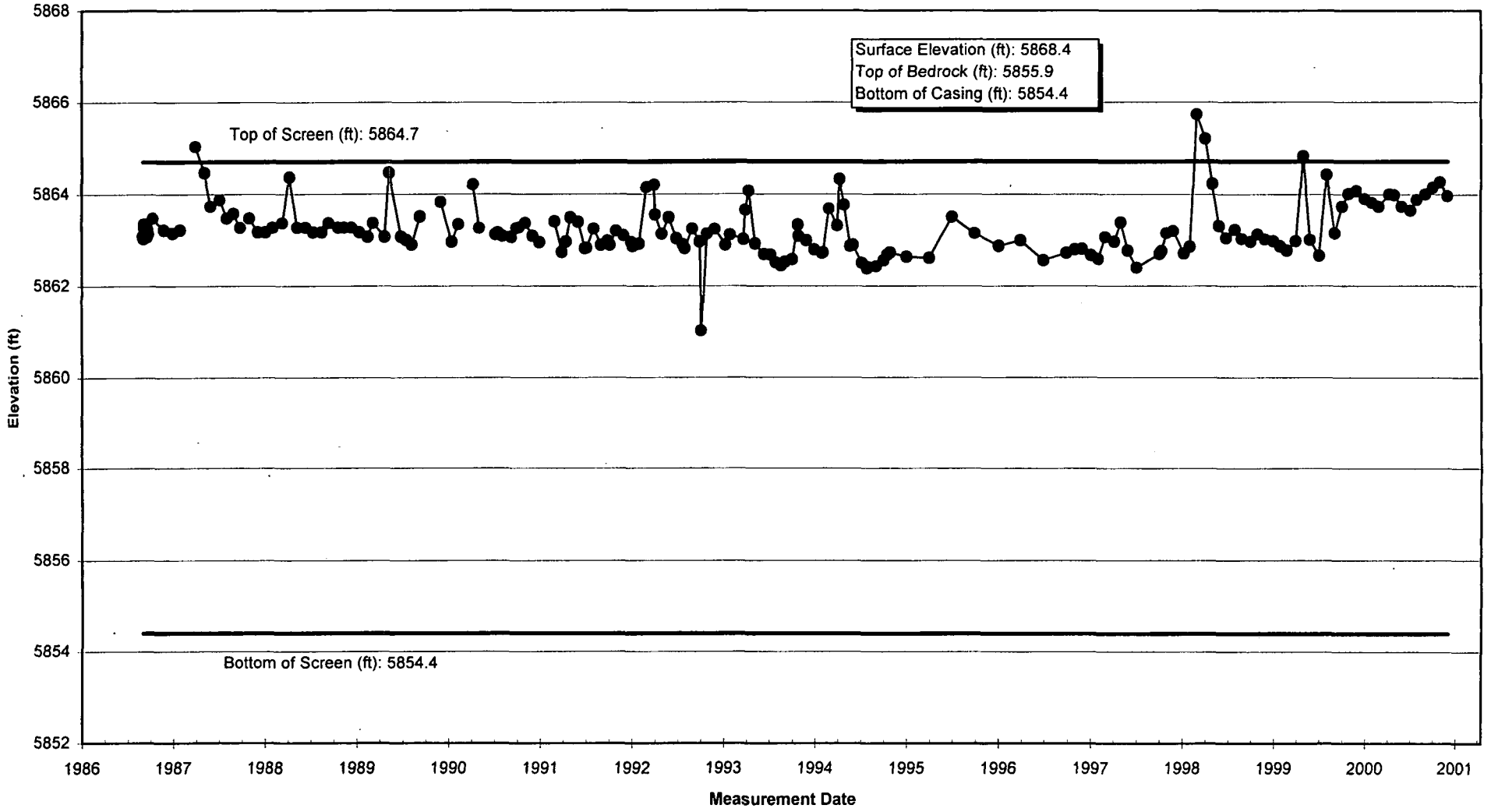
Hydrograph 1390



454

HG-Master S06 1390 9/25/01

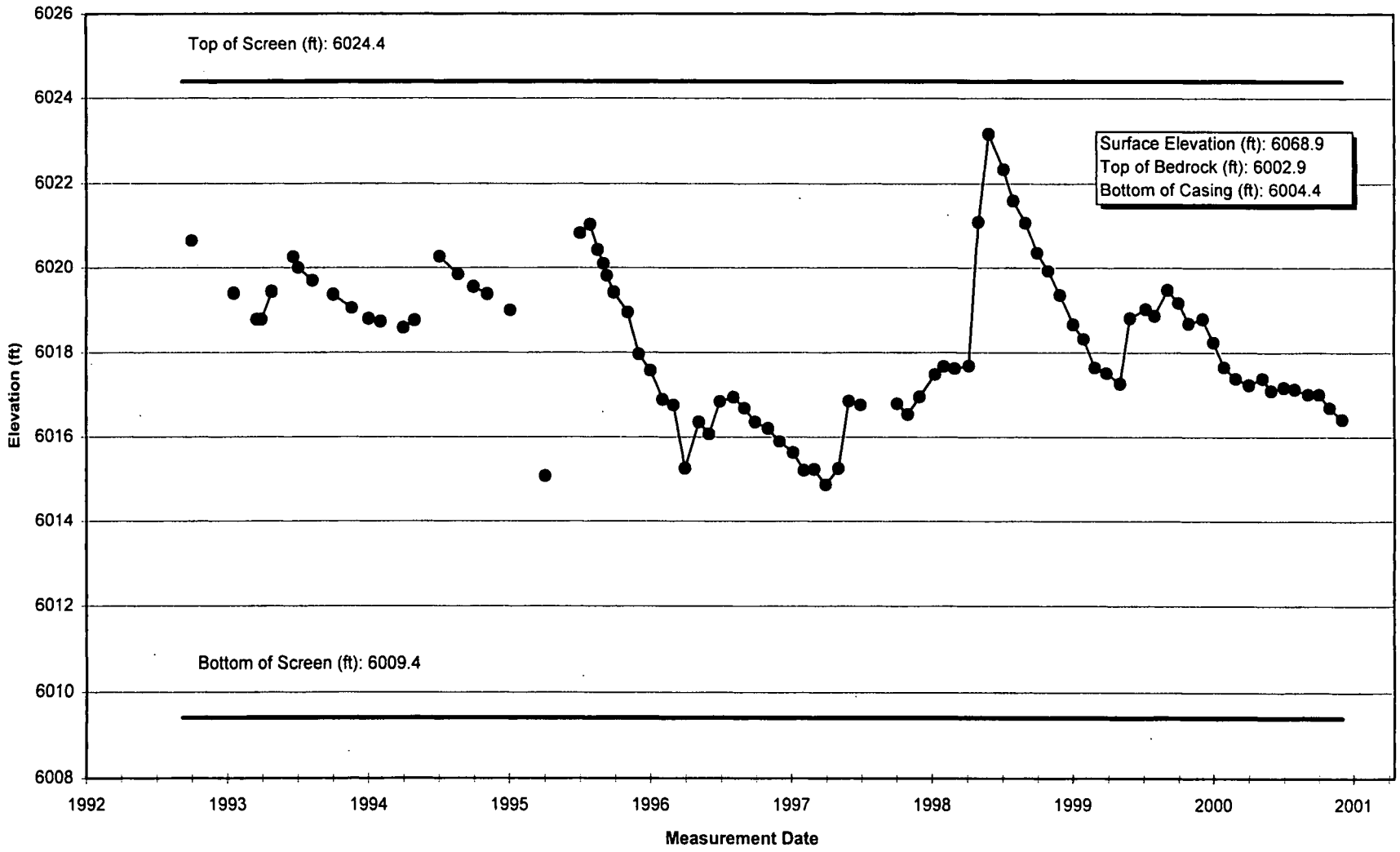
Hydrograph 1786



455

HG-Master S06 1786 9/25/01

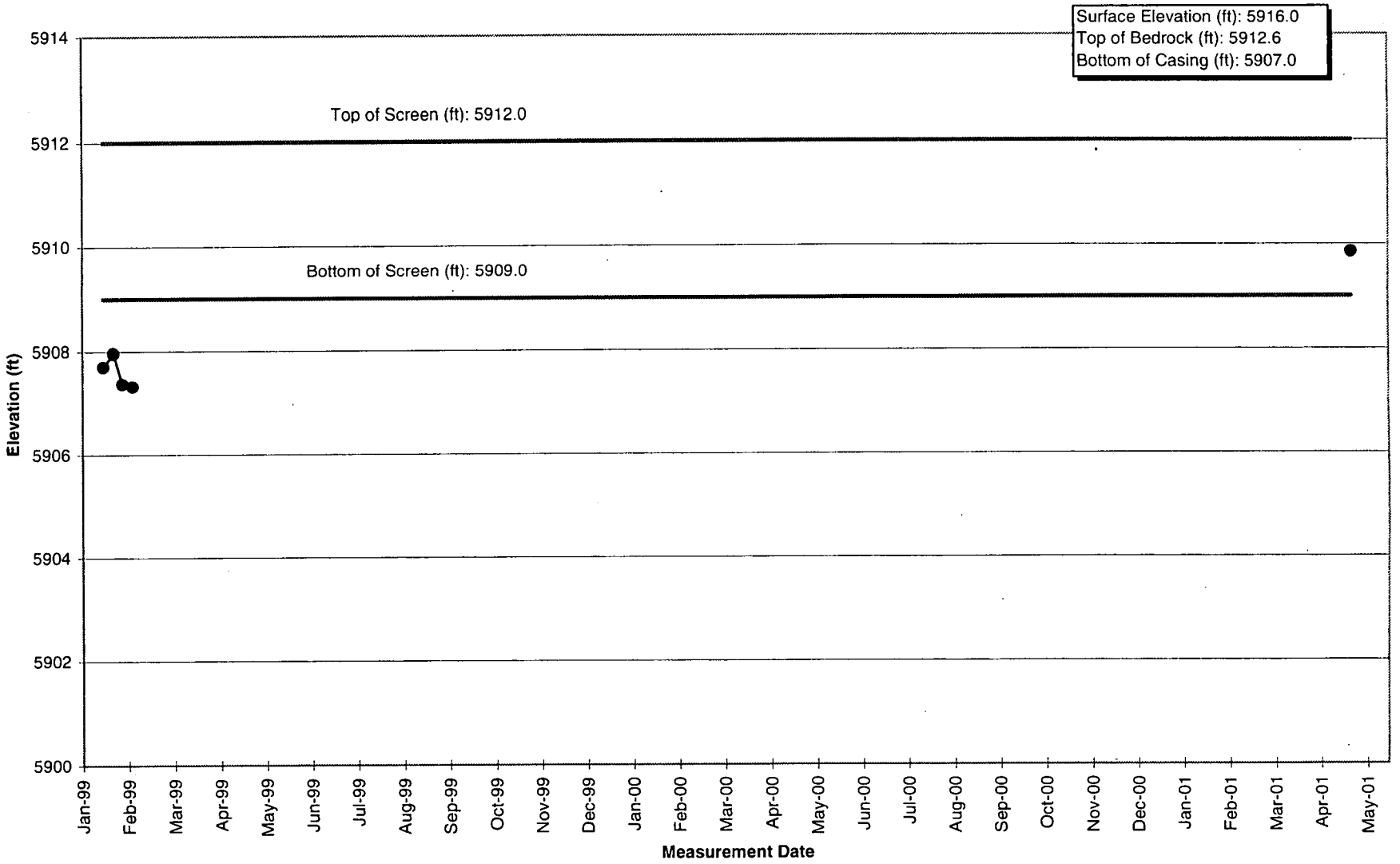
Hydrograph 1490



456

HG-Master S06_wjb 1490 9/26/01

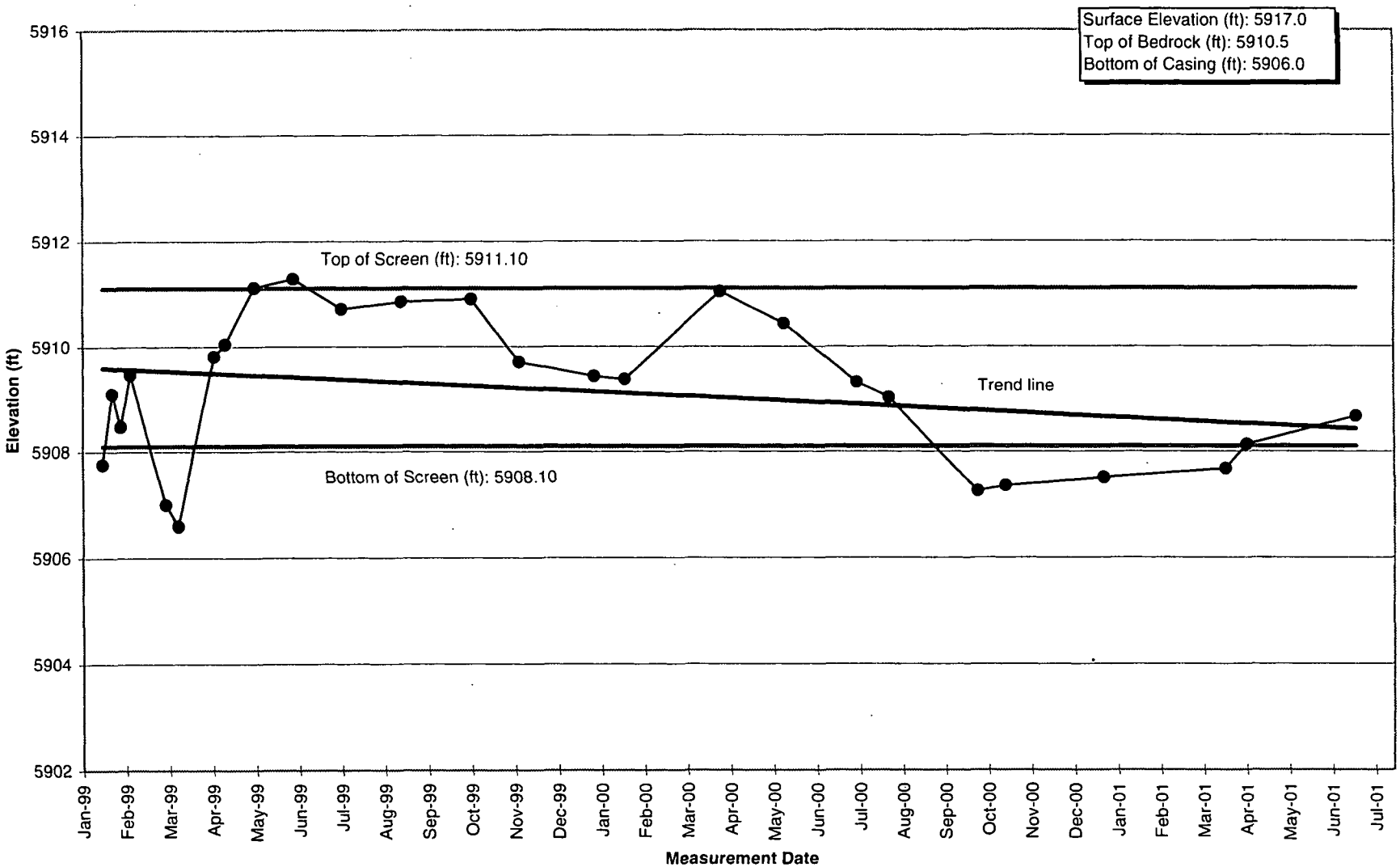
Hydrograph 15599



457

HG-Master S06.xls 15599 11/5/01

Hydrograph 15699



458

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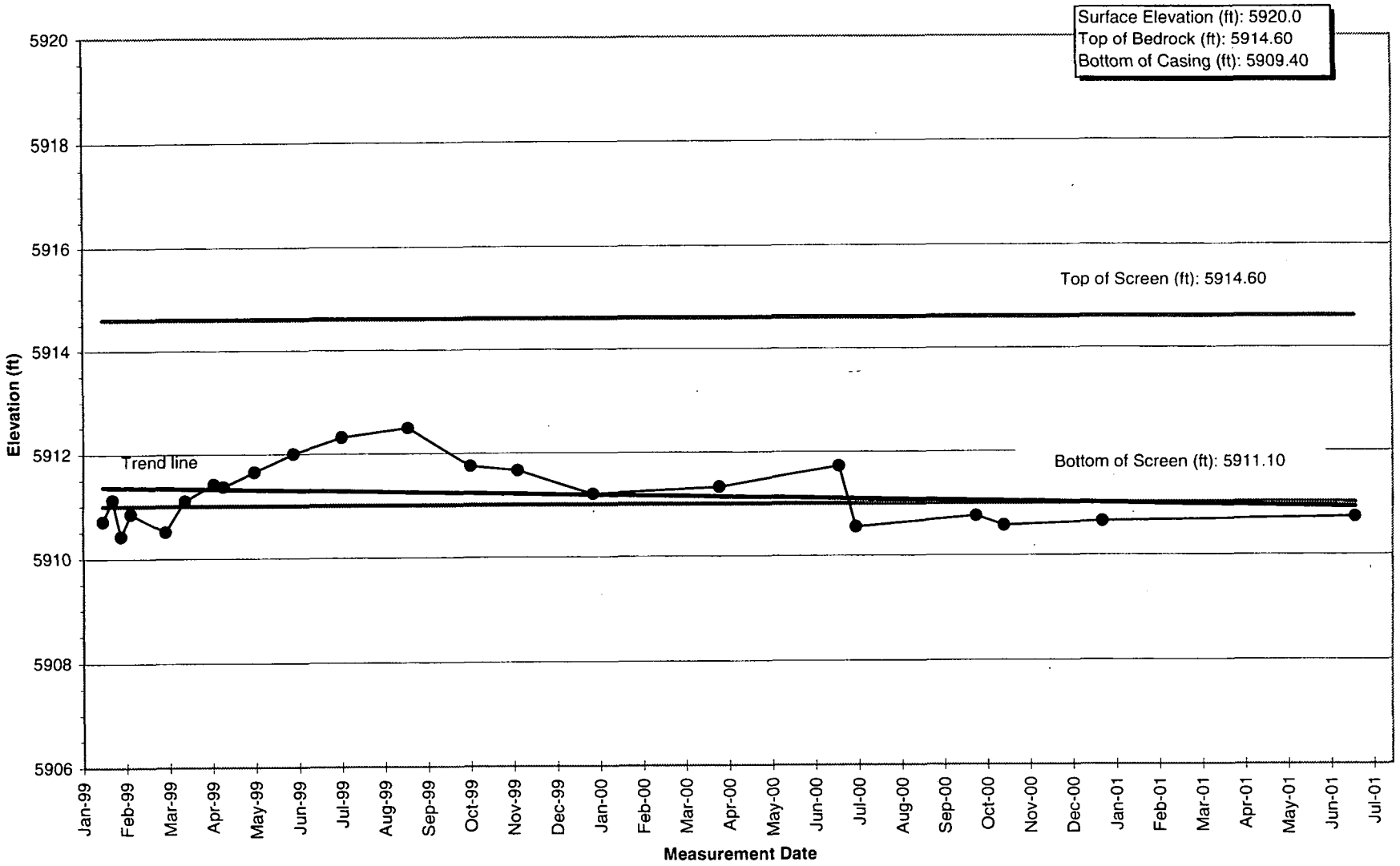
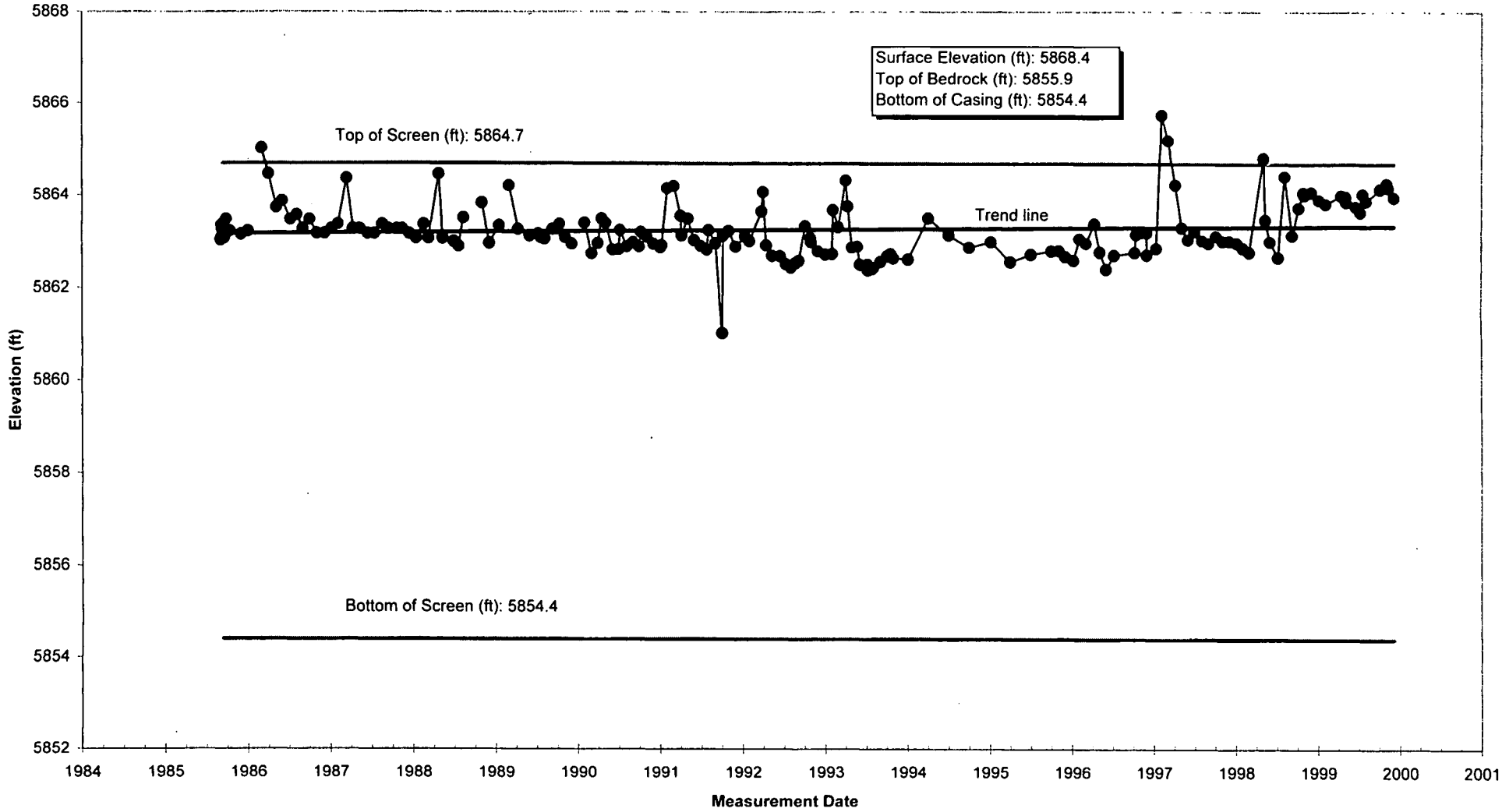


459

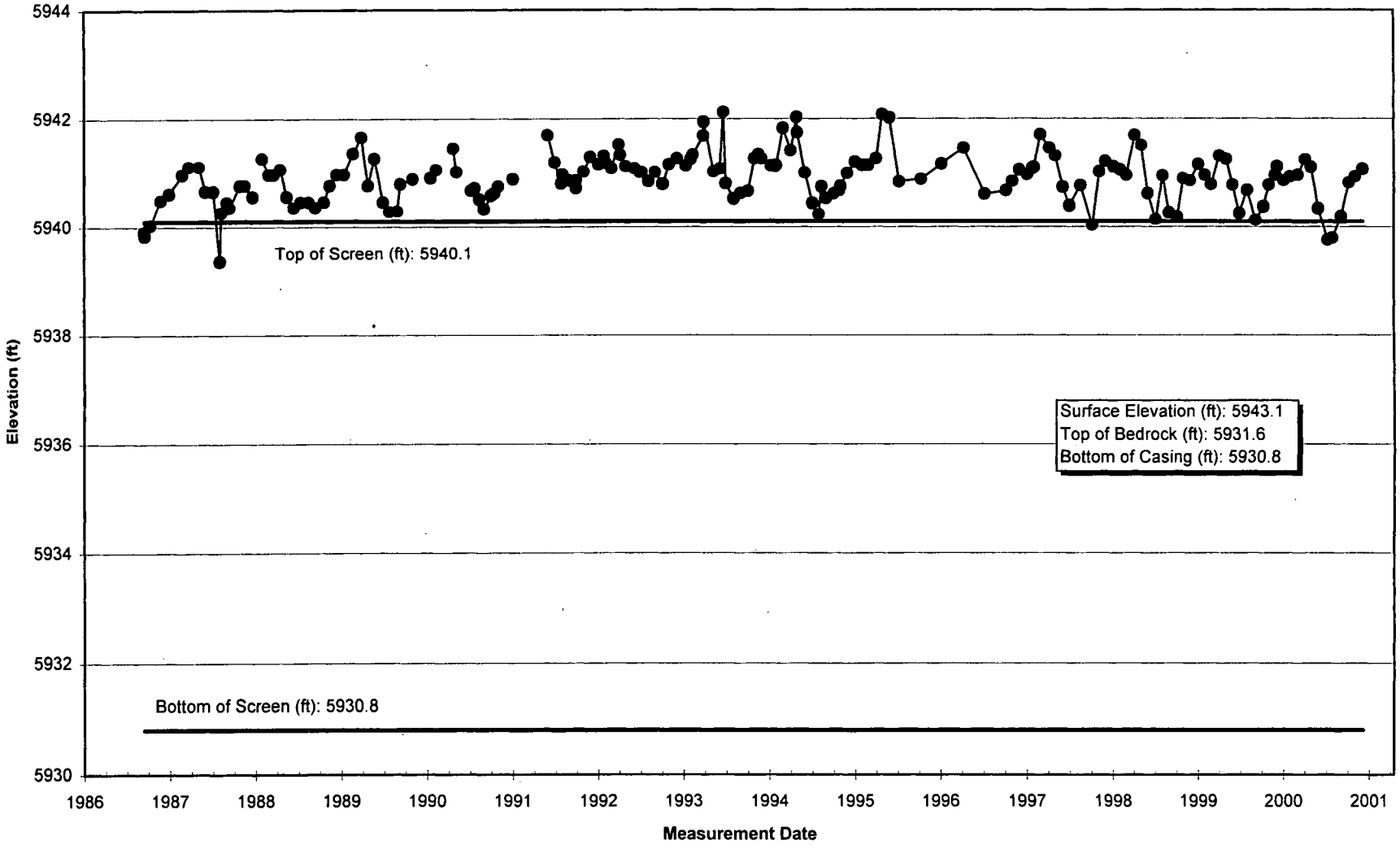
HG-Master S06.xls 15799 11/5/01

Hydrograph 1786



4160

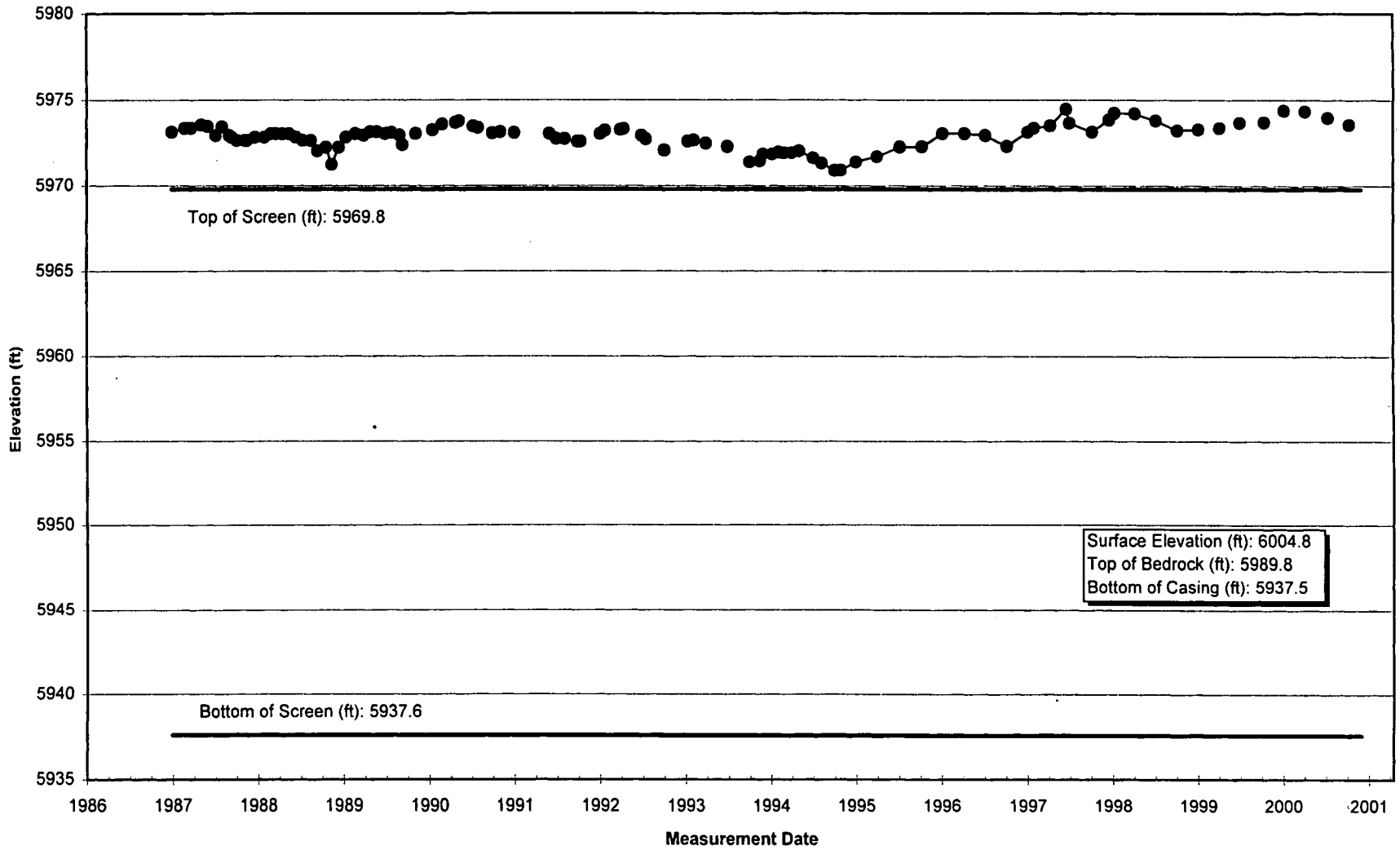
Hydrograph 1986



HG-Master S07 1986 9/25/01

461

Hydrograph 2186



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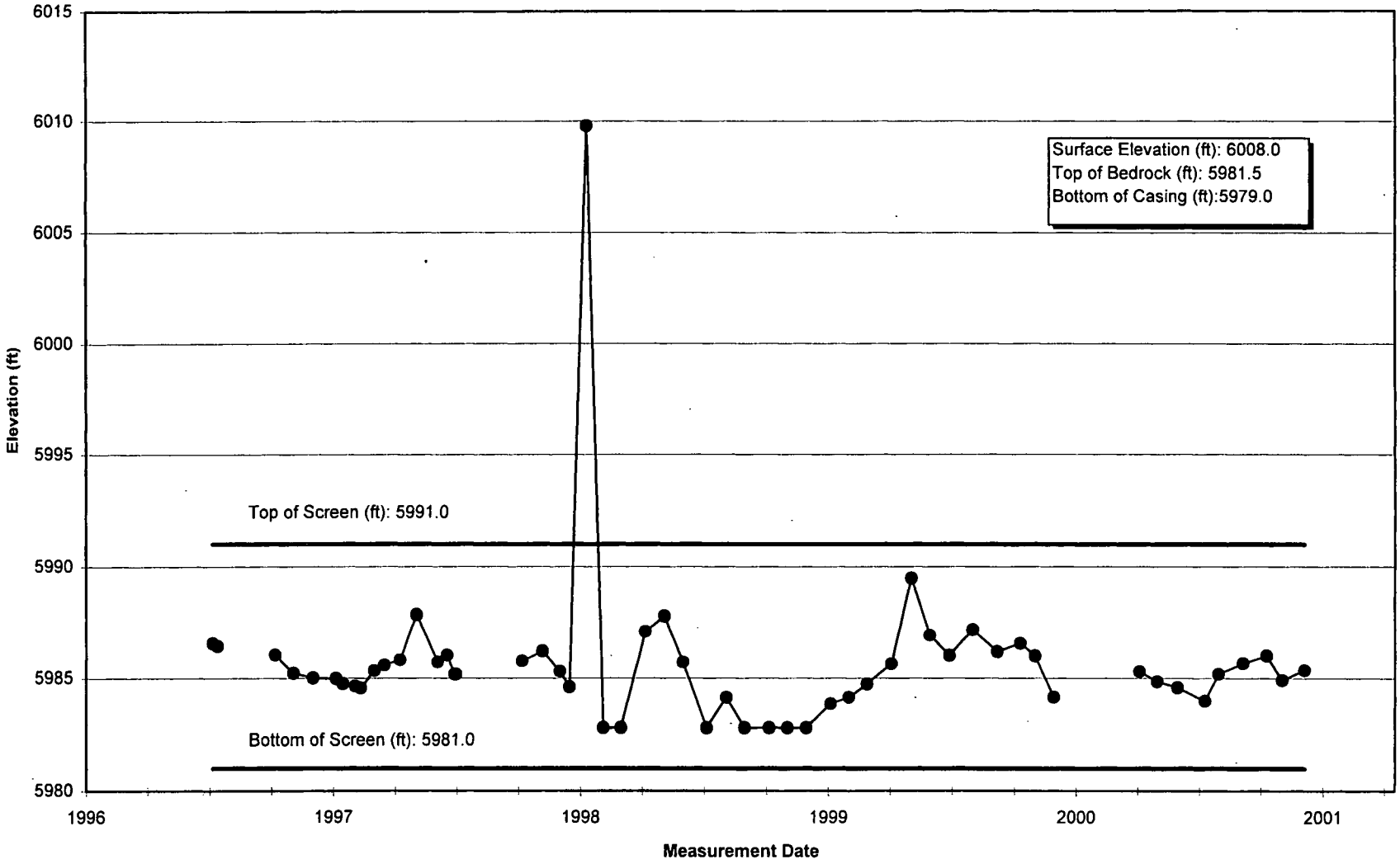
HG-Master S07 2186 9/25/01

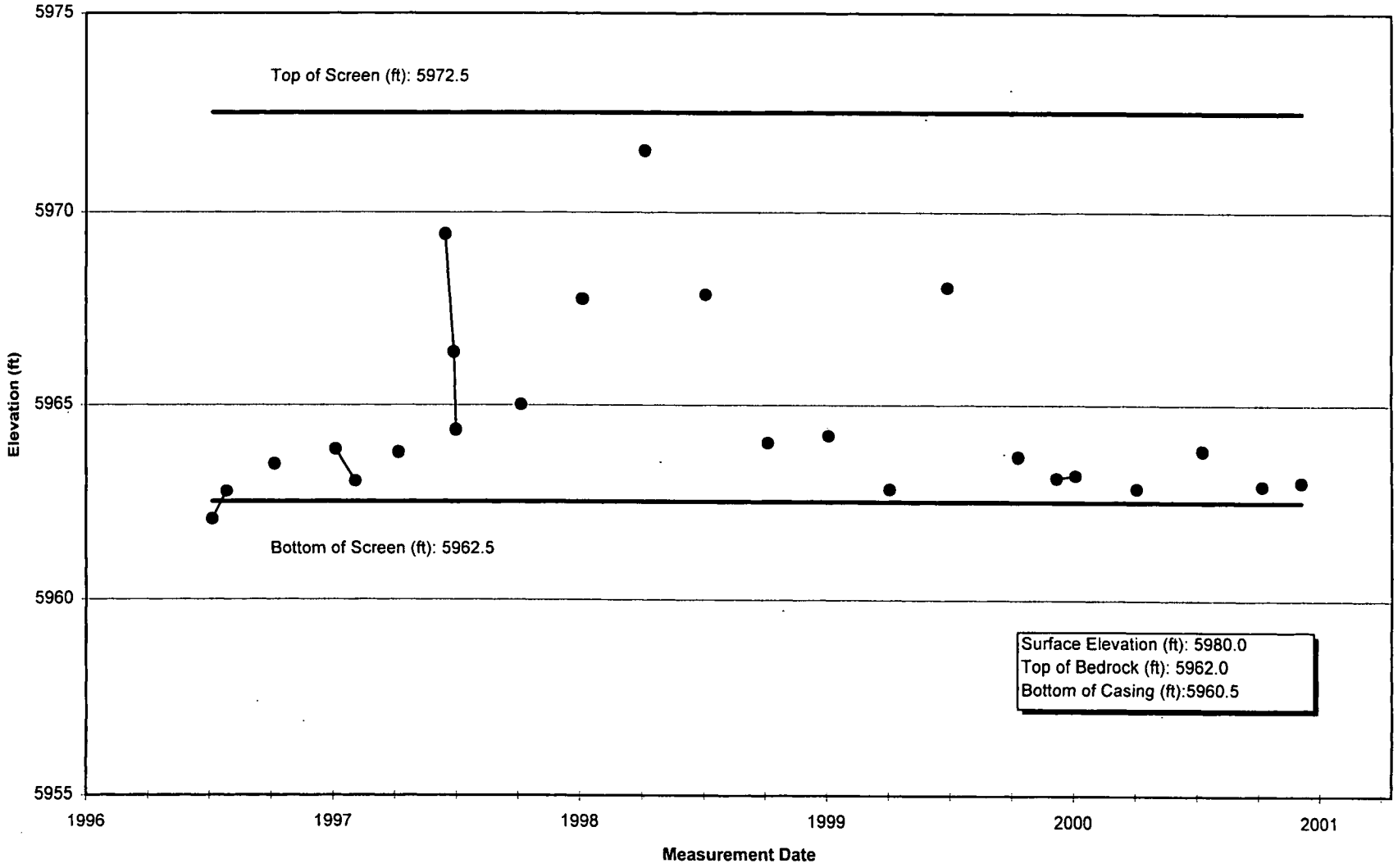
Hydrograph 22596



HG-Master S07 22596 9/25/01

463

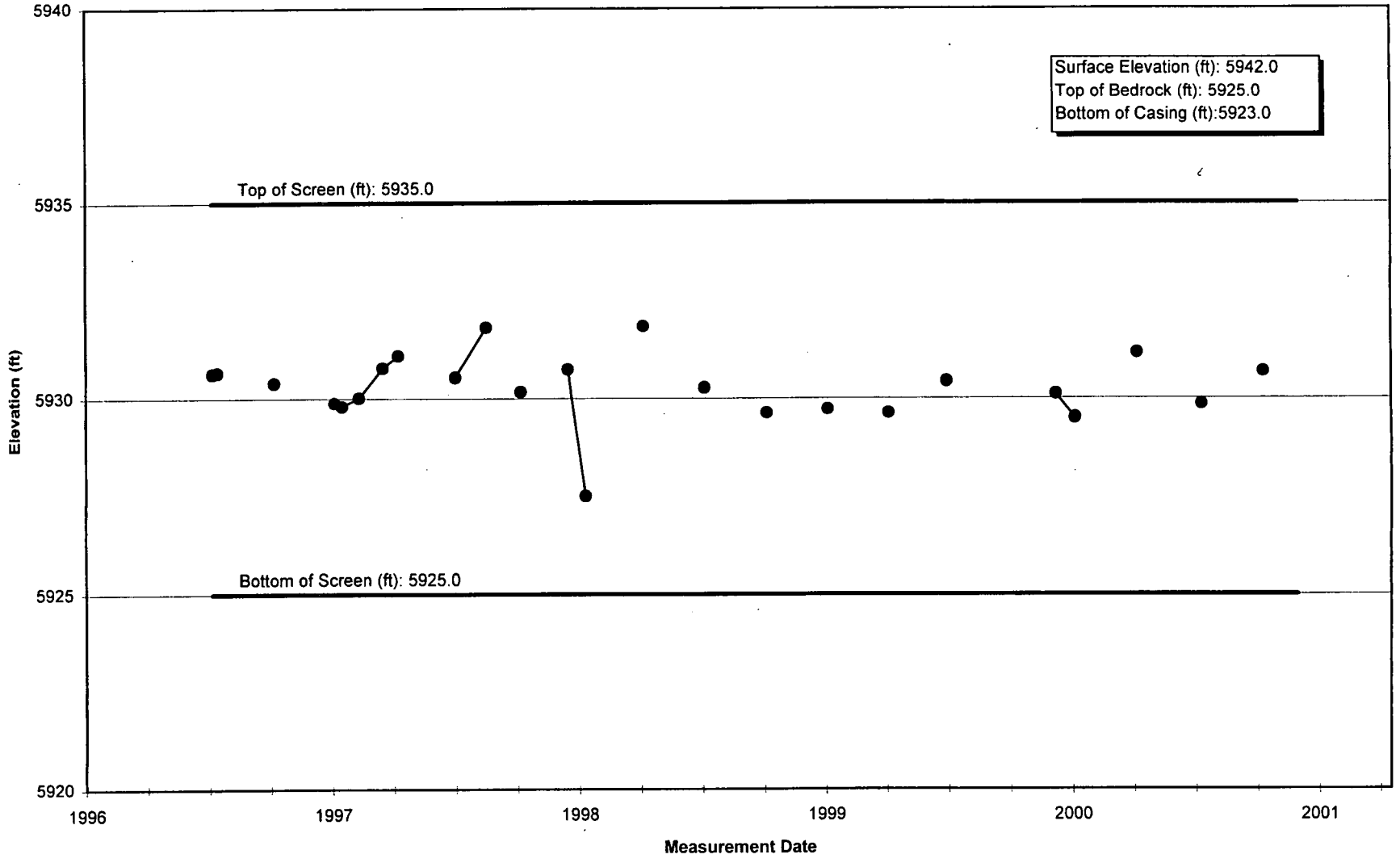
Hydrograph 22696



464

HG-Master S07 22696 9/25/01

Hydrograph 22796



465

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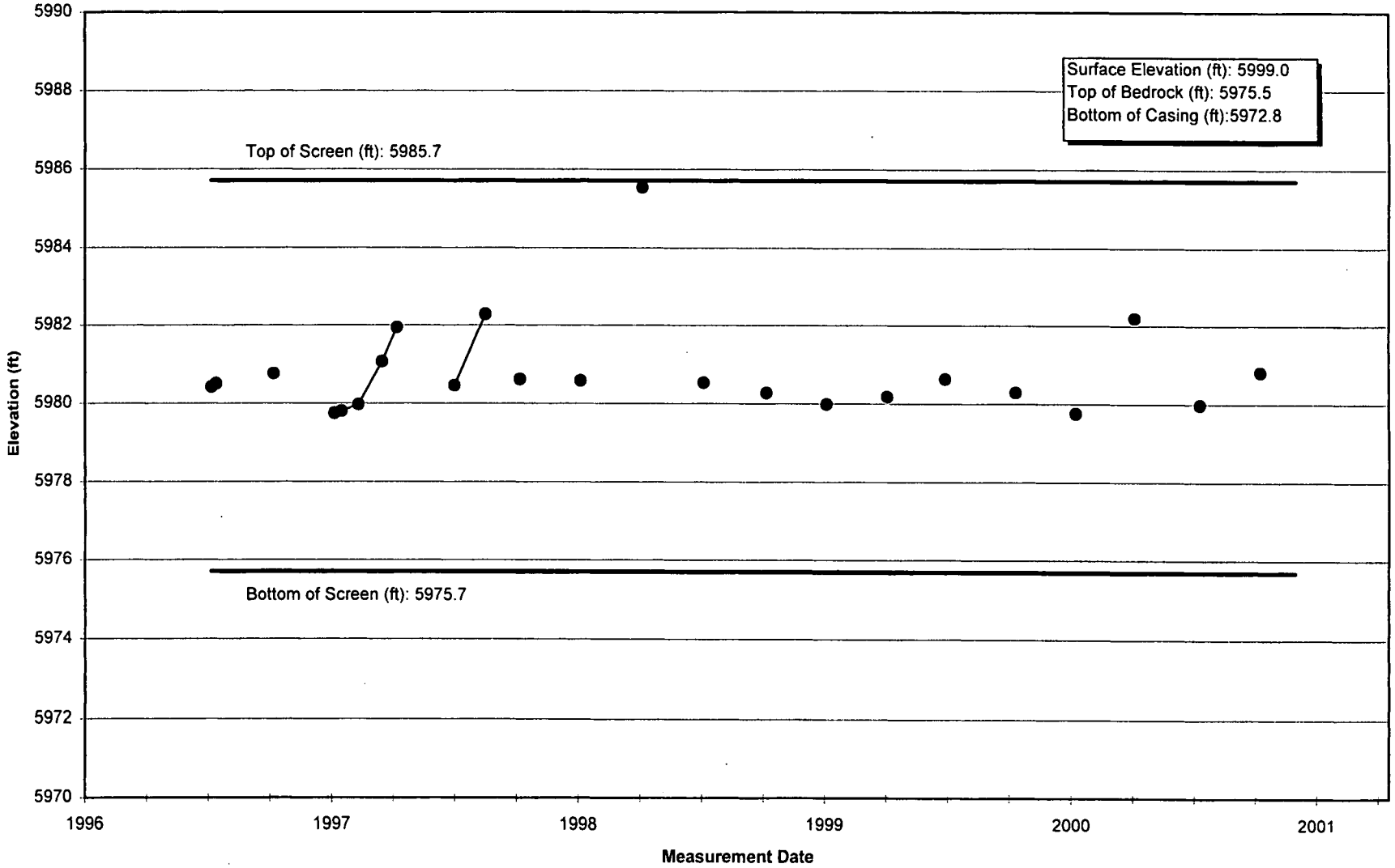
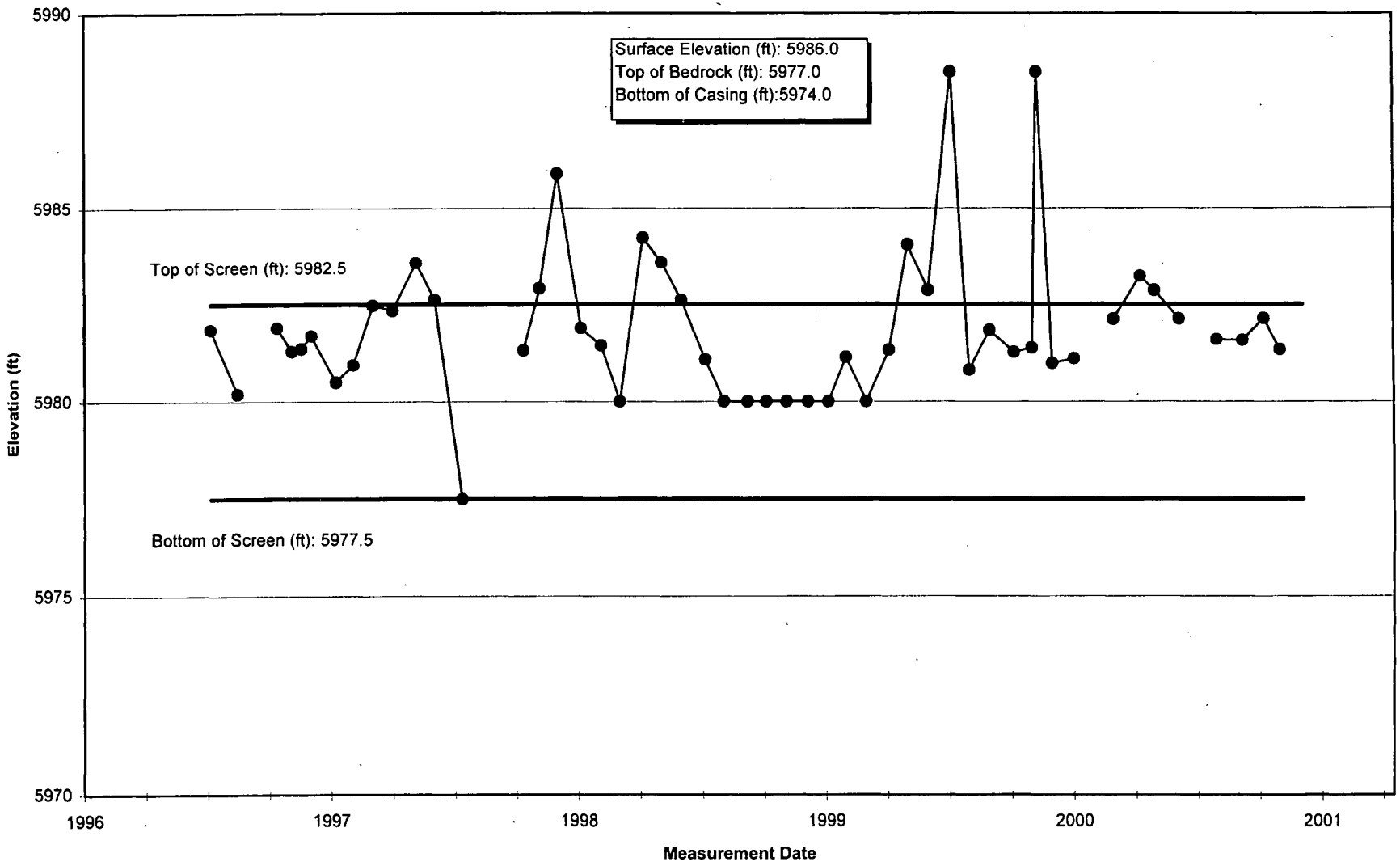


466

HG-Master S07 22896 9/25/01

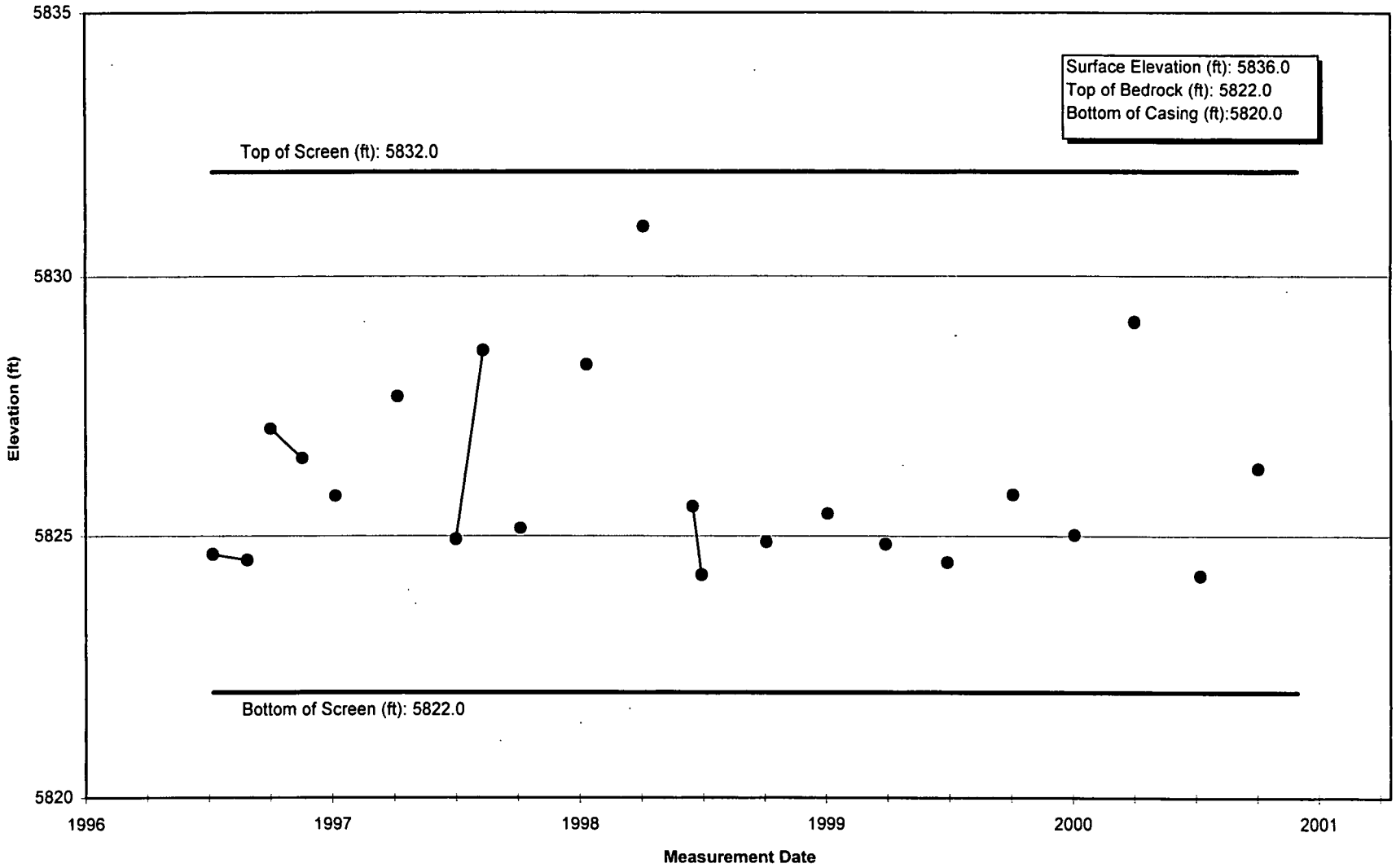
Hydrograph 22996



HG-Master S07 22996 9/25/01

467

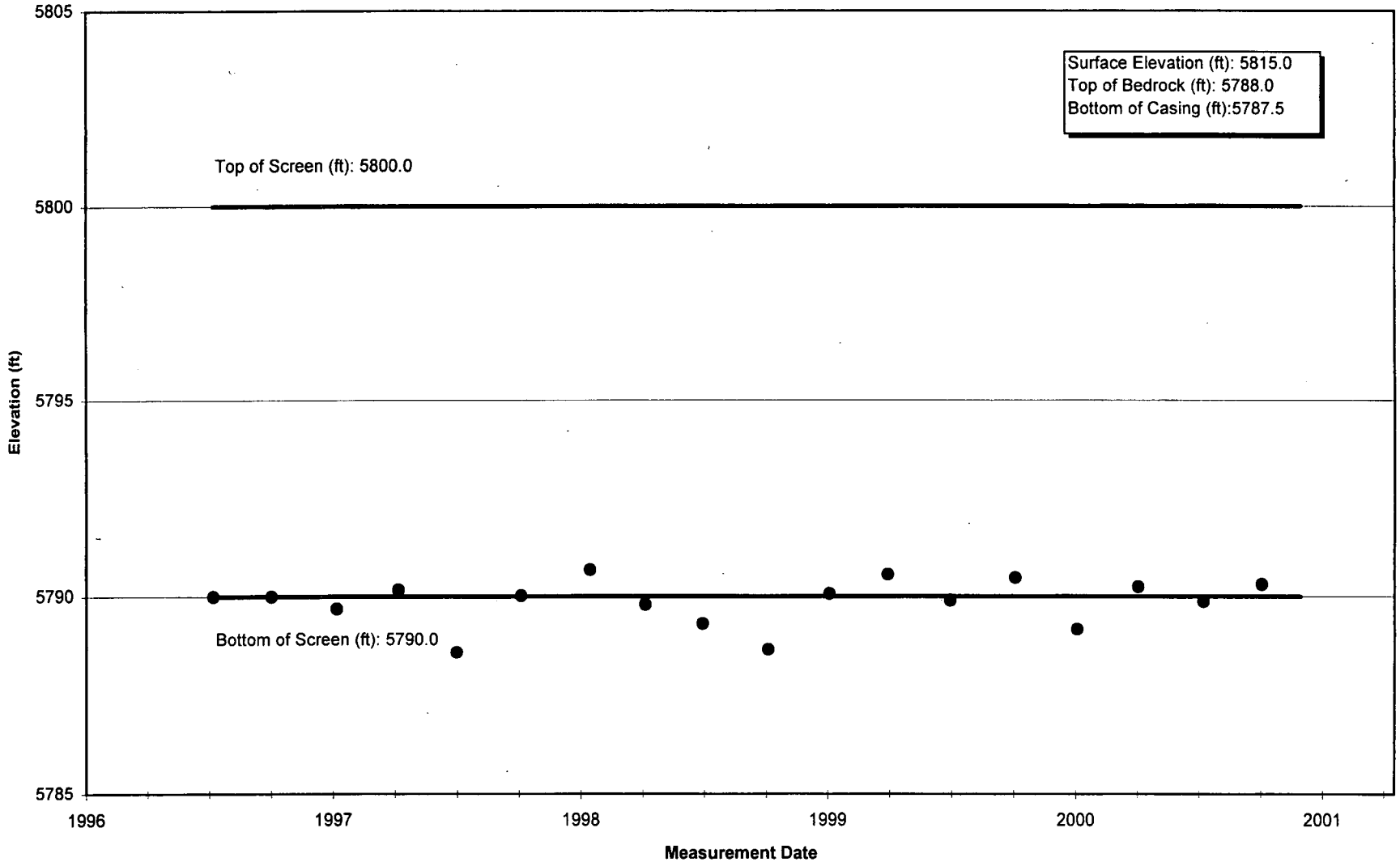
Hydrograph 23096



468

HG-Master 507 23096 9/25/01

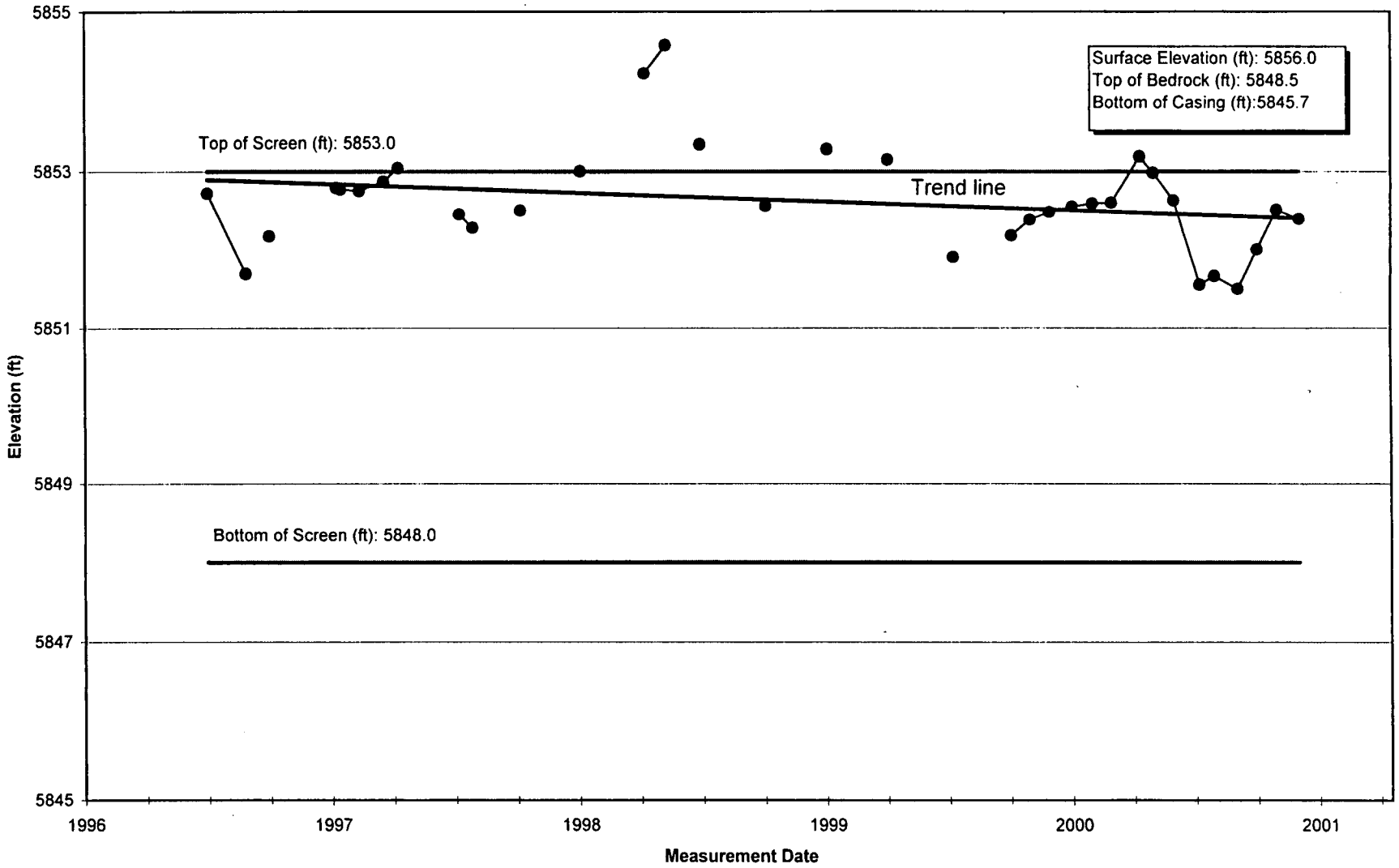
Hydrograph 23196



469

HG-Master S07 23196 9/25/01

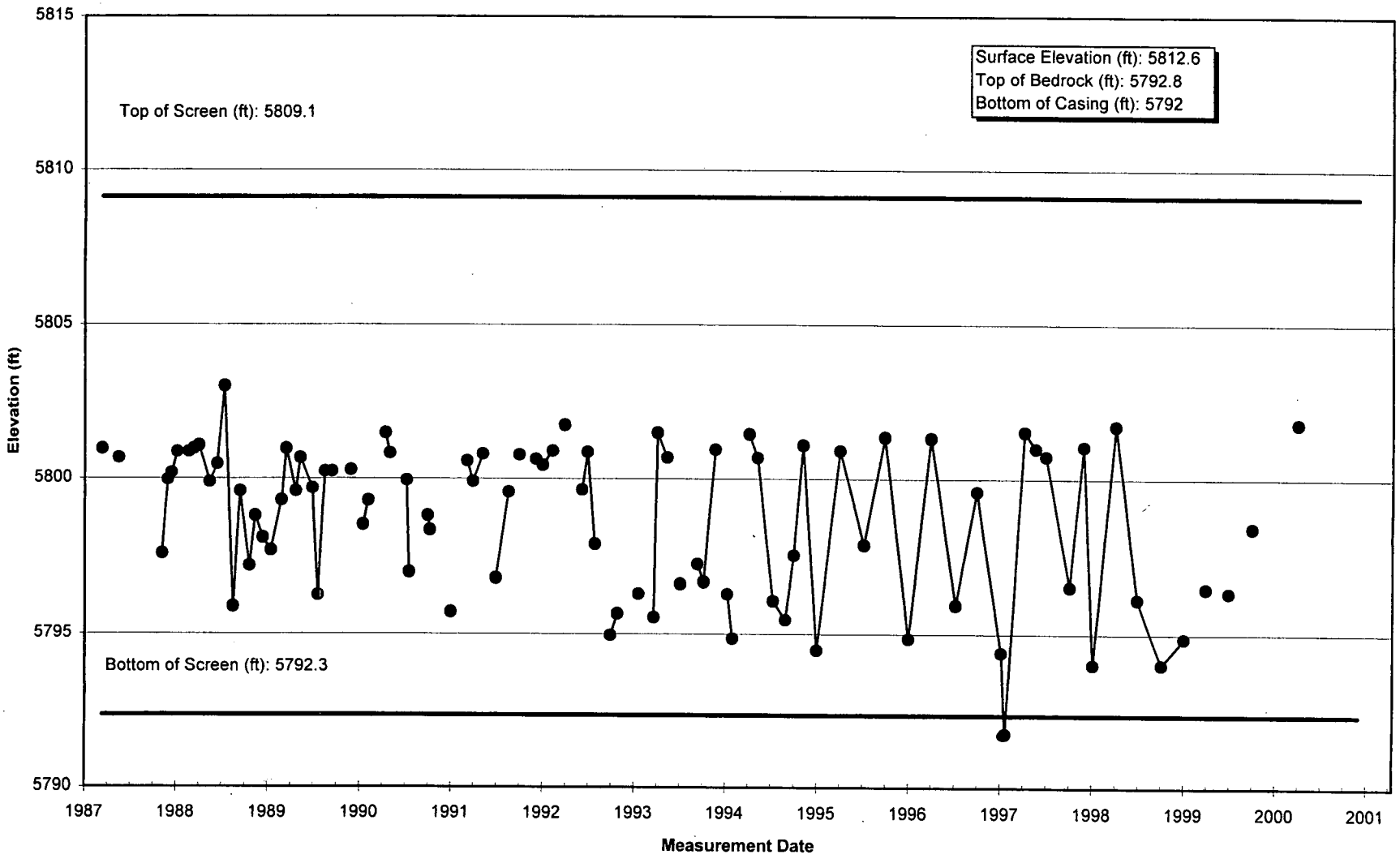
Hydrograph 23296



470

HG-Master S03_wib.xls 23296 11/7/01

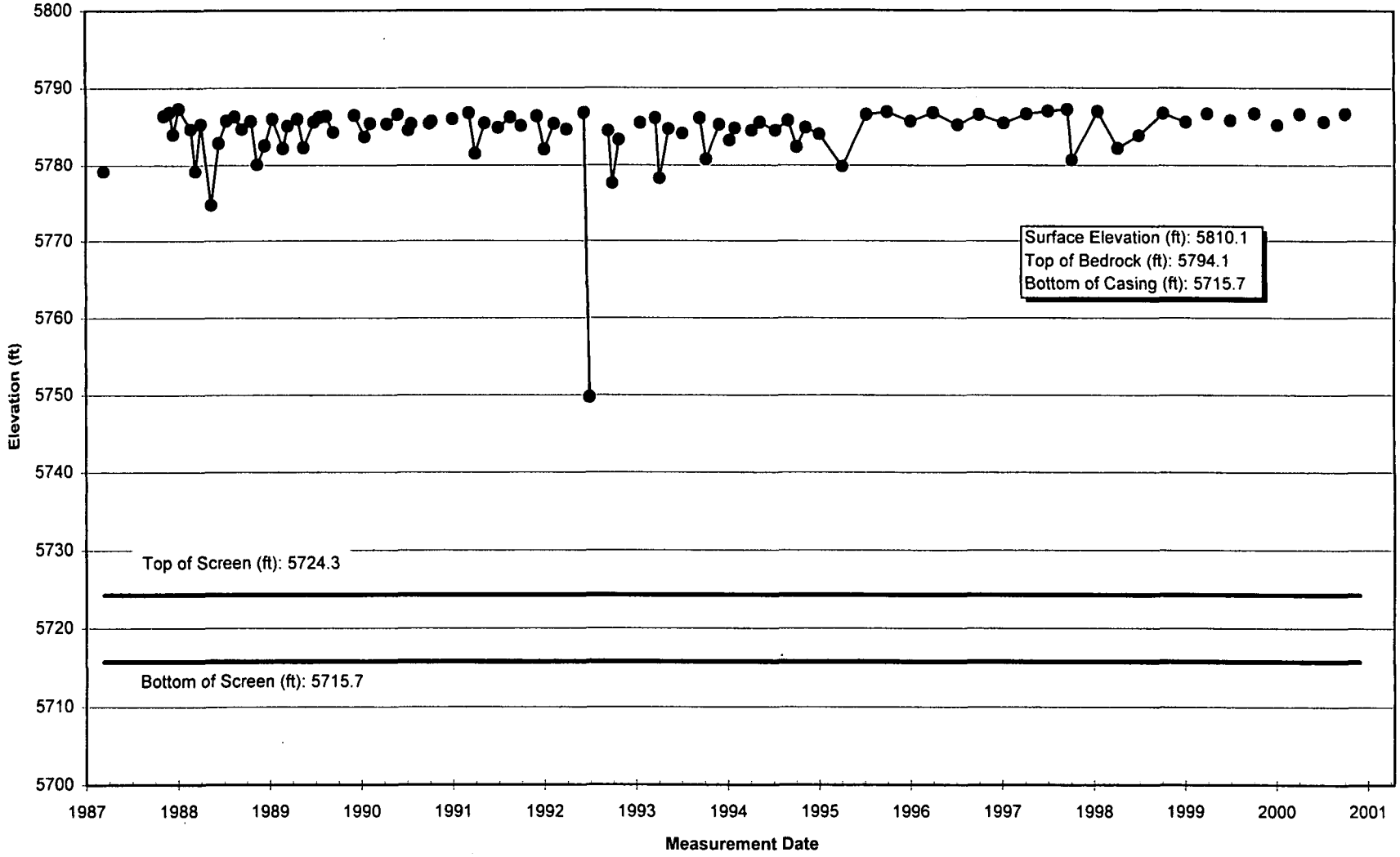
Hydrograph 2987



HG-Master S08 2987 9/26/01

471

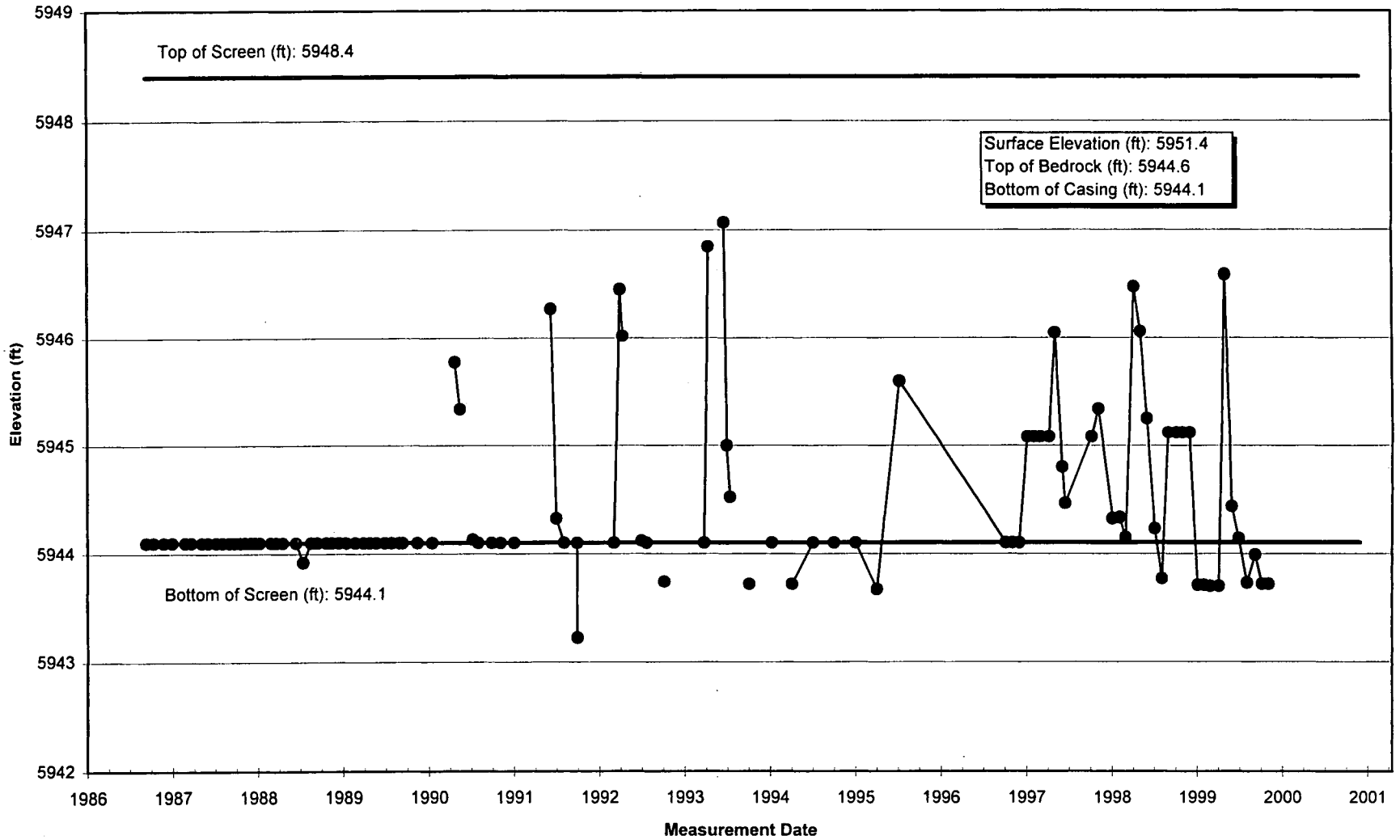
Hydrograph 3087



472

HG-Master S08 3087 9/25/01

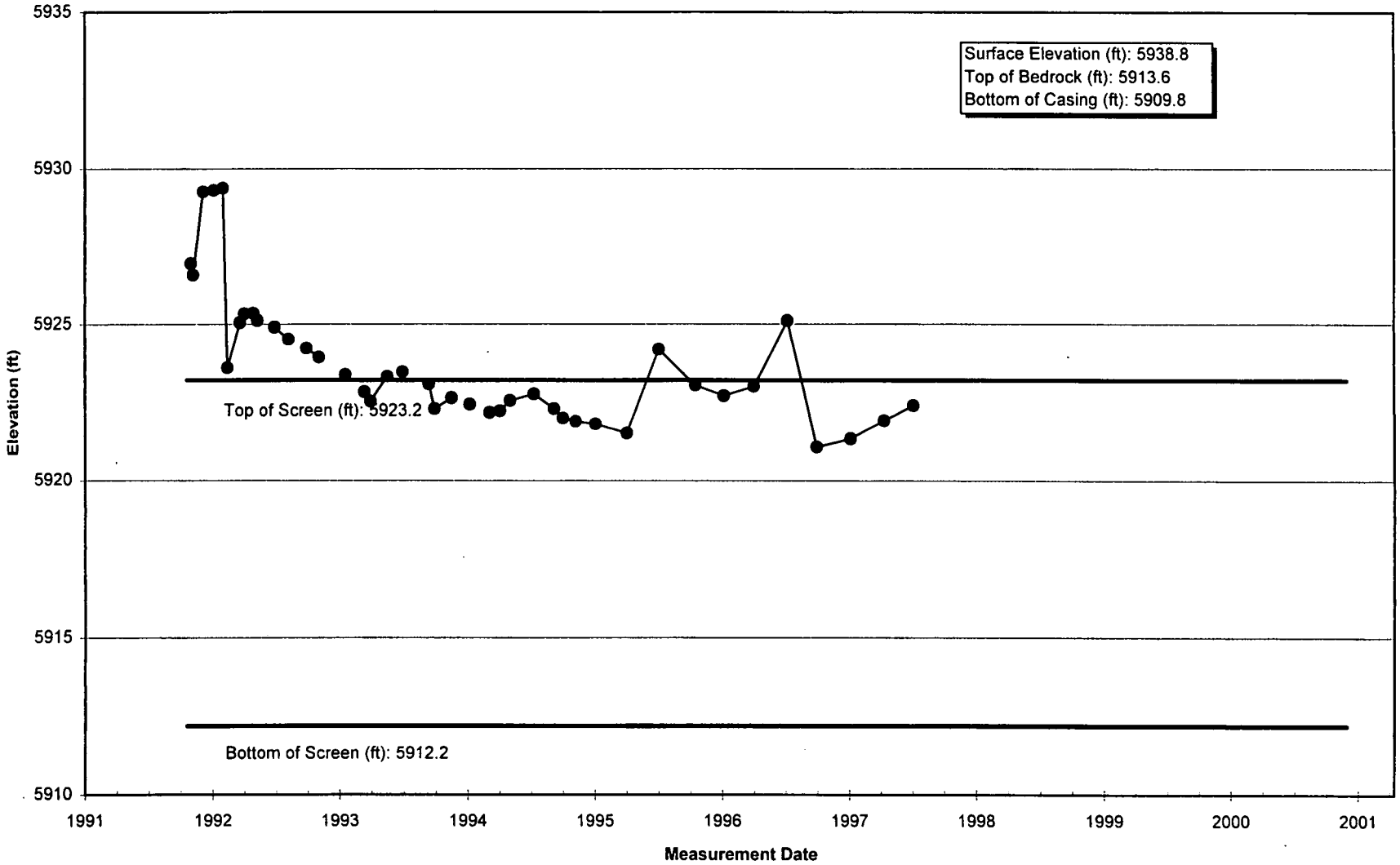
Hydrograph 3386



HG-Master S09 3386 9/25/01

473

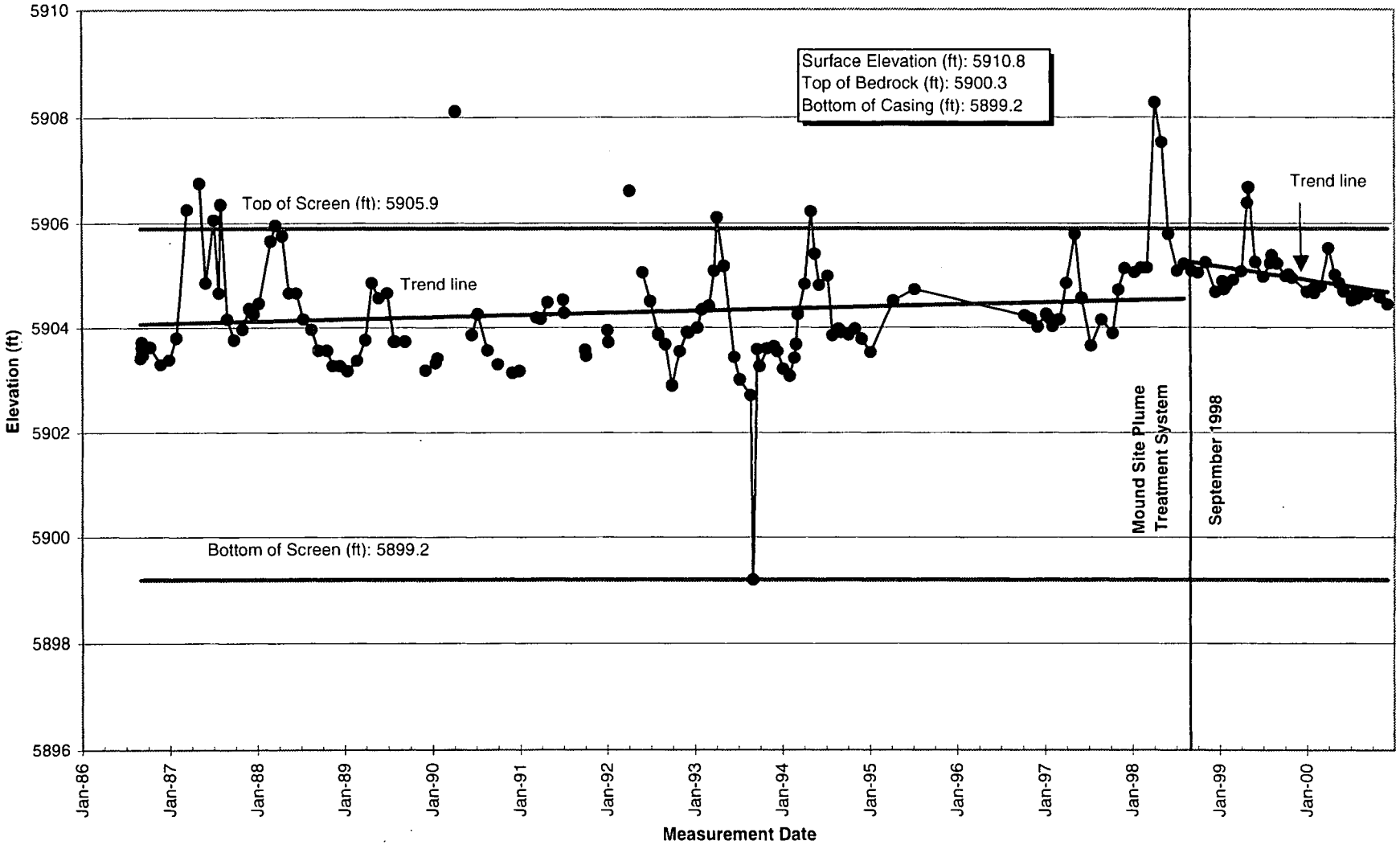
Hydrograph 35691



474

HG-Master-S09_wjb 35691 9/26/01

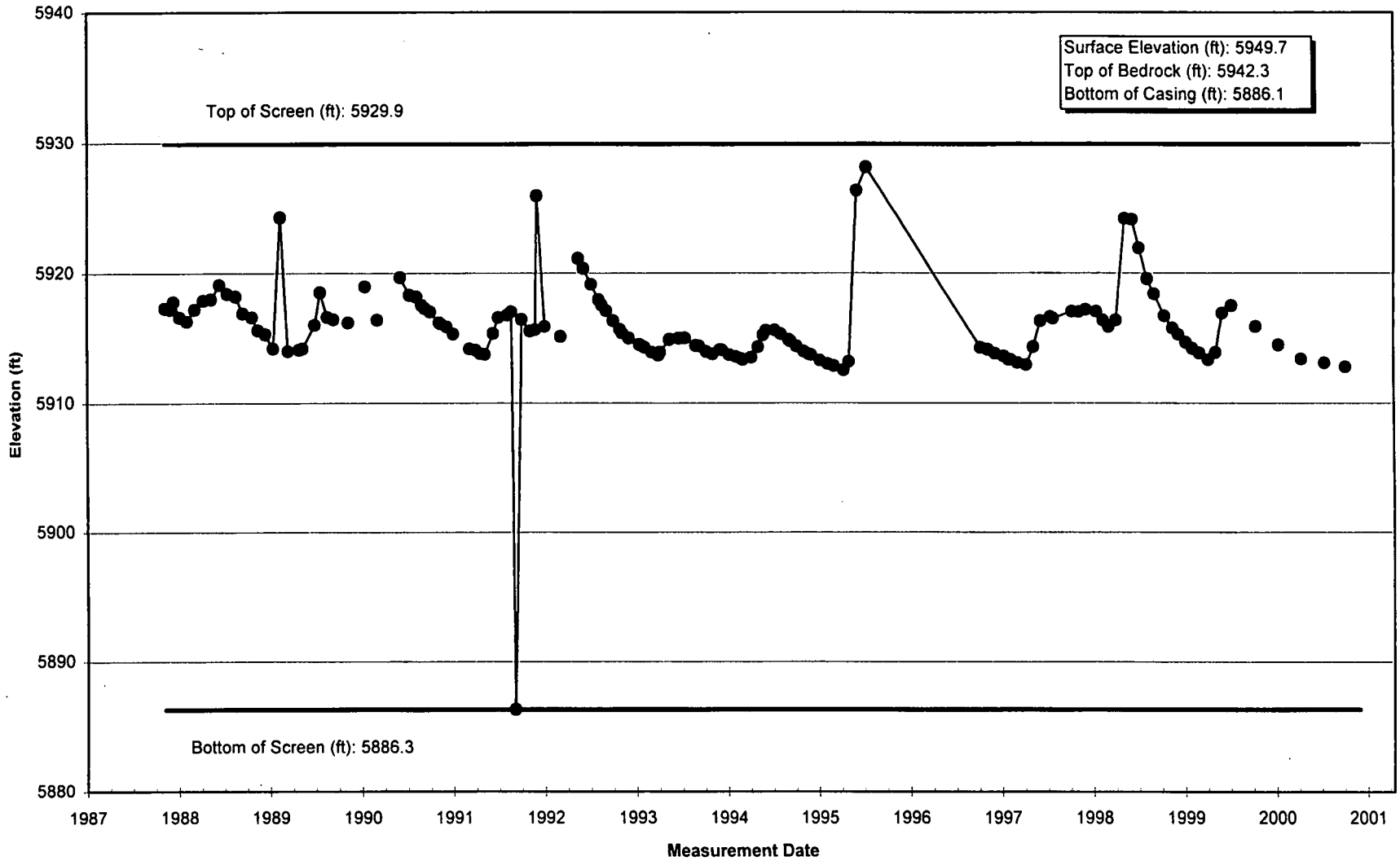
Hydrograph 3586



HG-Master S09.xls 3586 11/7/01

475

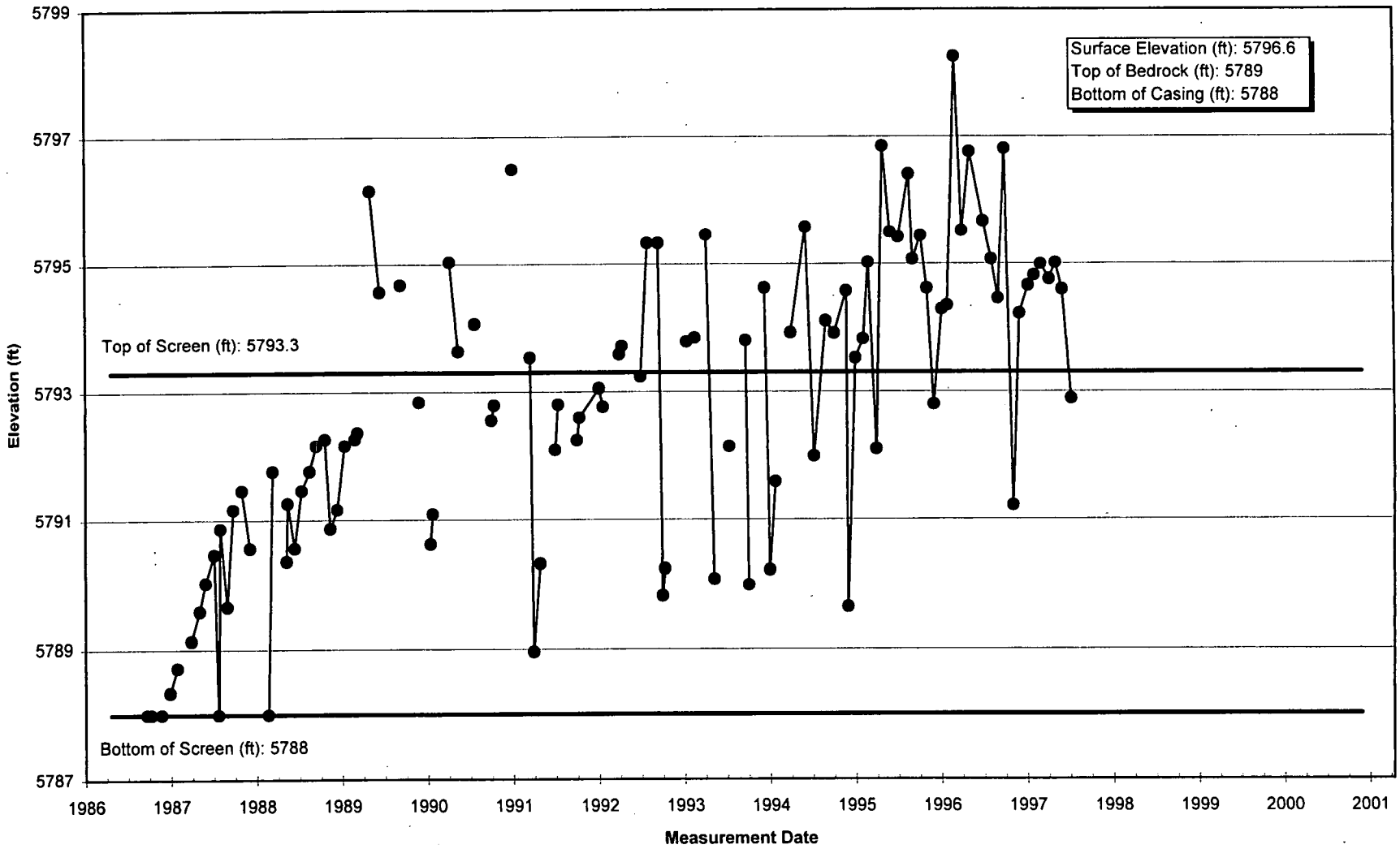
Hydrograph 3687



476

HG-Mast_609_wjb 3687 9/26/01

Hydrograph 3786



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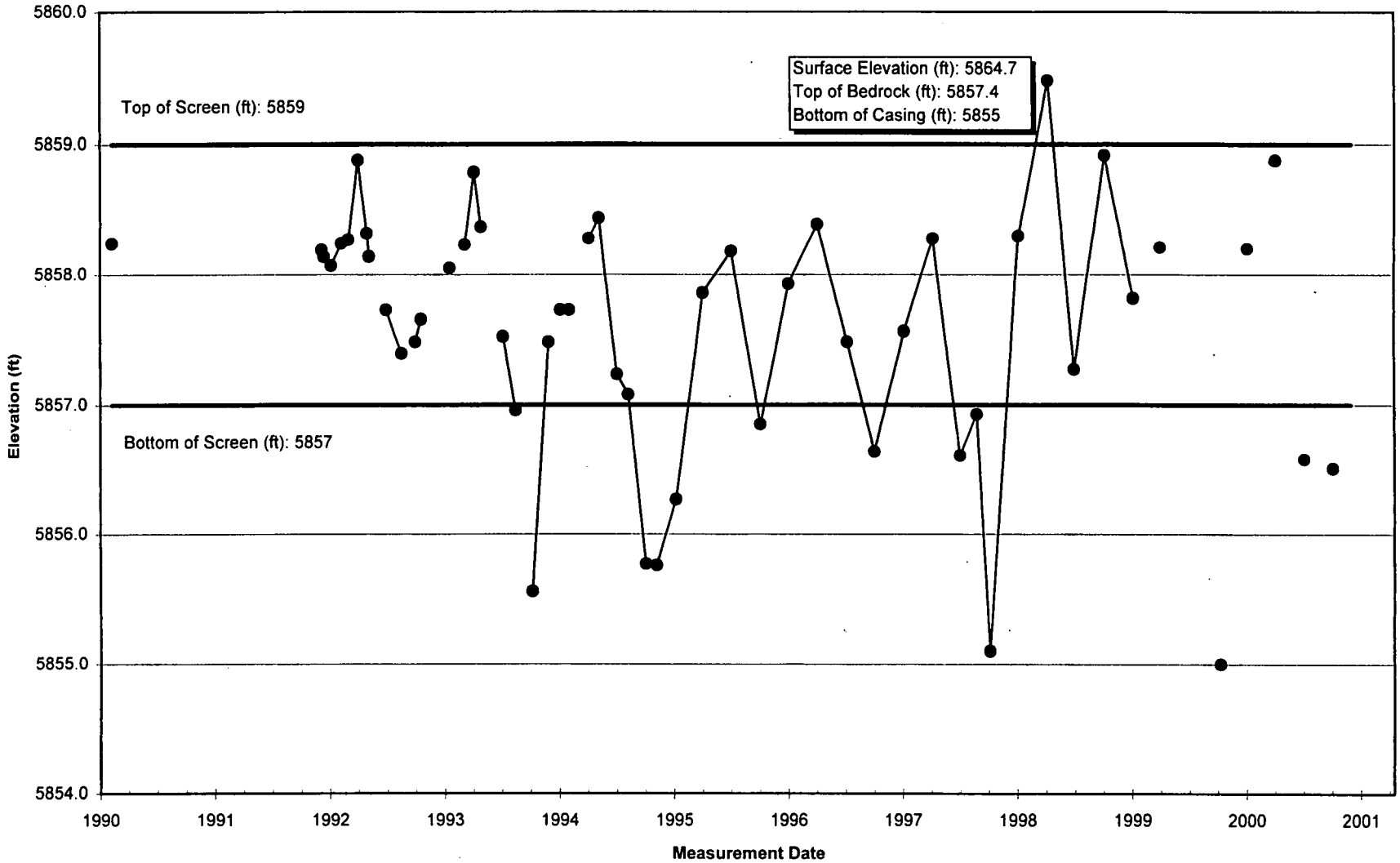
477

Hydrograph 38591



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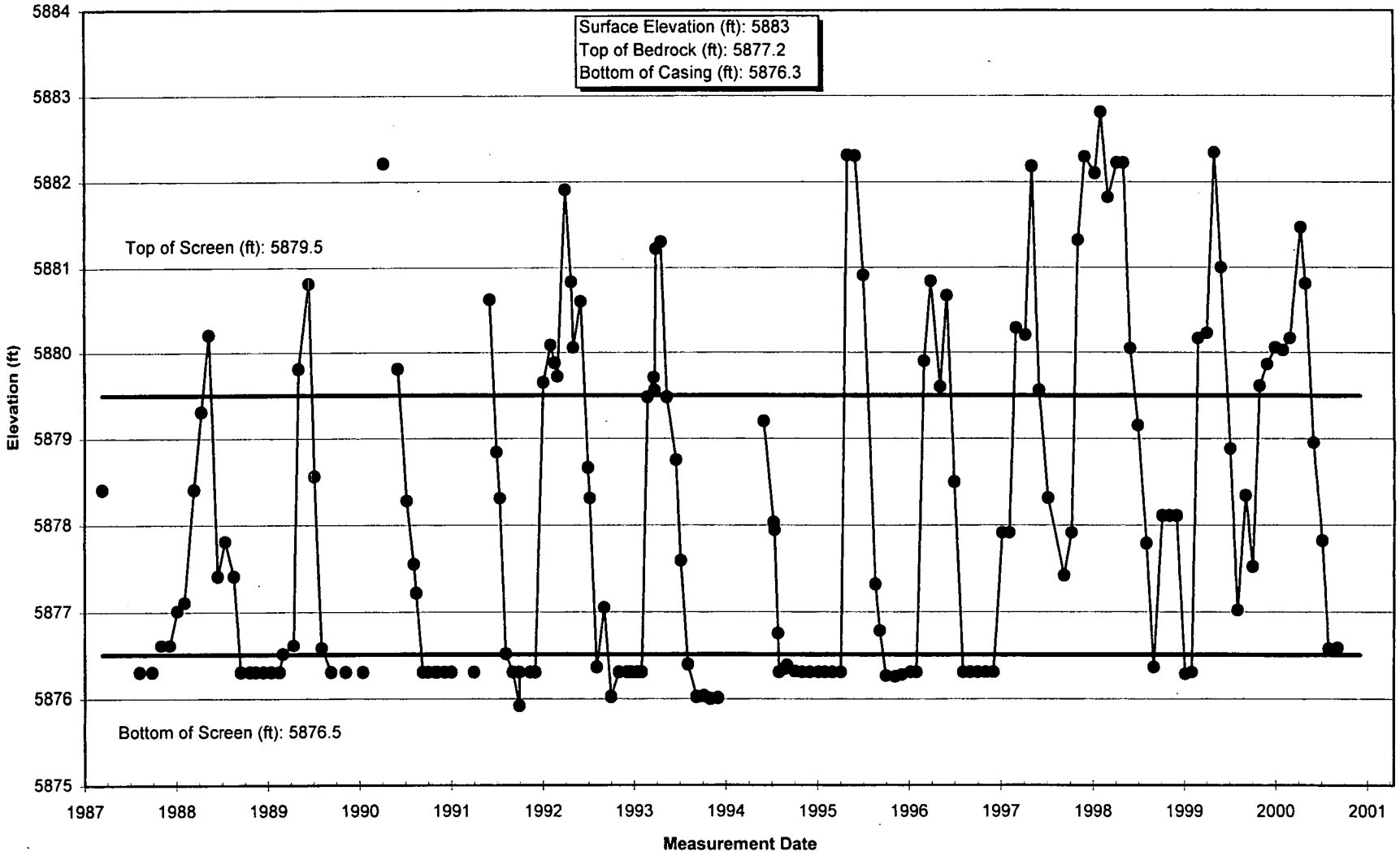
HG-Master S10 38591 9/25/01

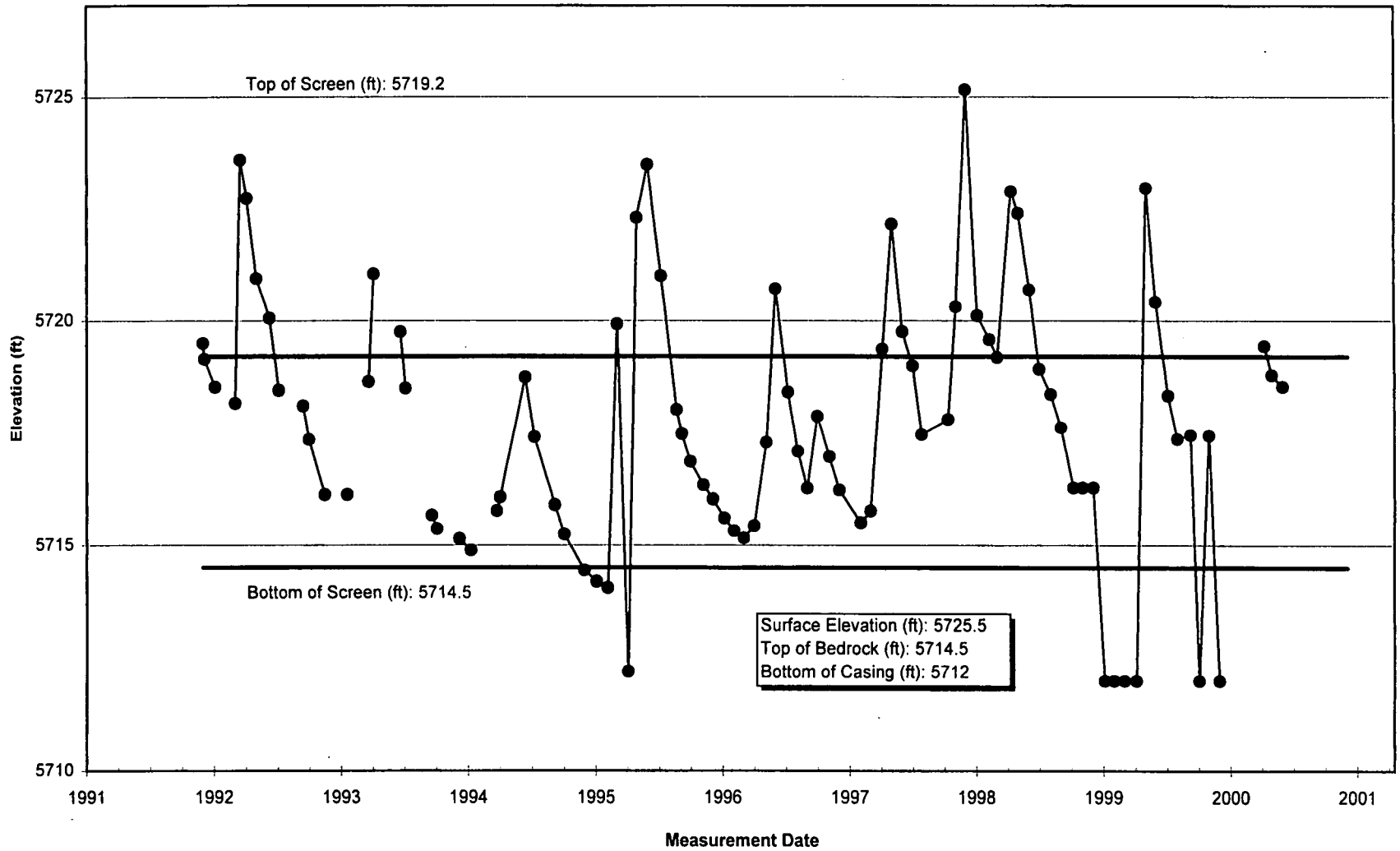
Hydrograph 4087



HG-Master S10 4087 9/25/01

479

Hydrograph 41591



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HG-Master S11_wjb 41591 9/26/01

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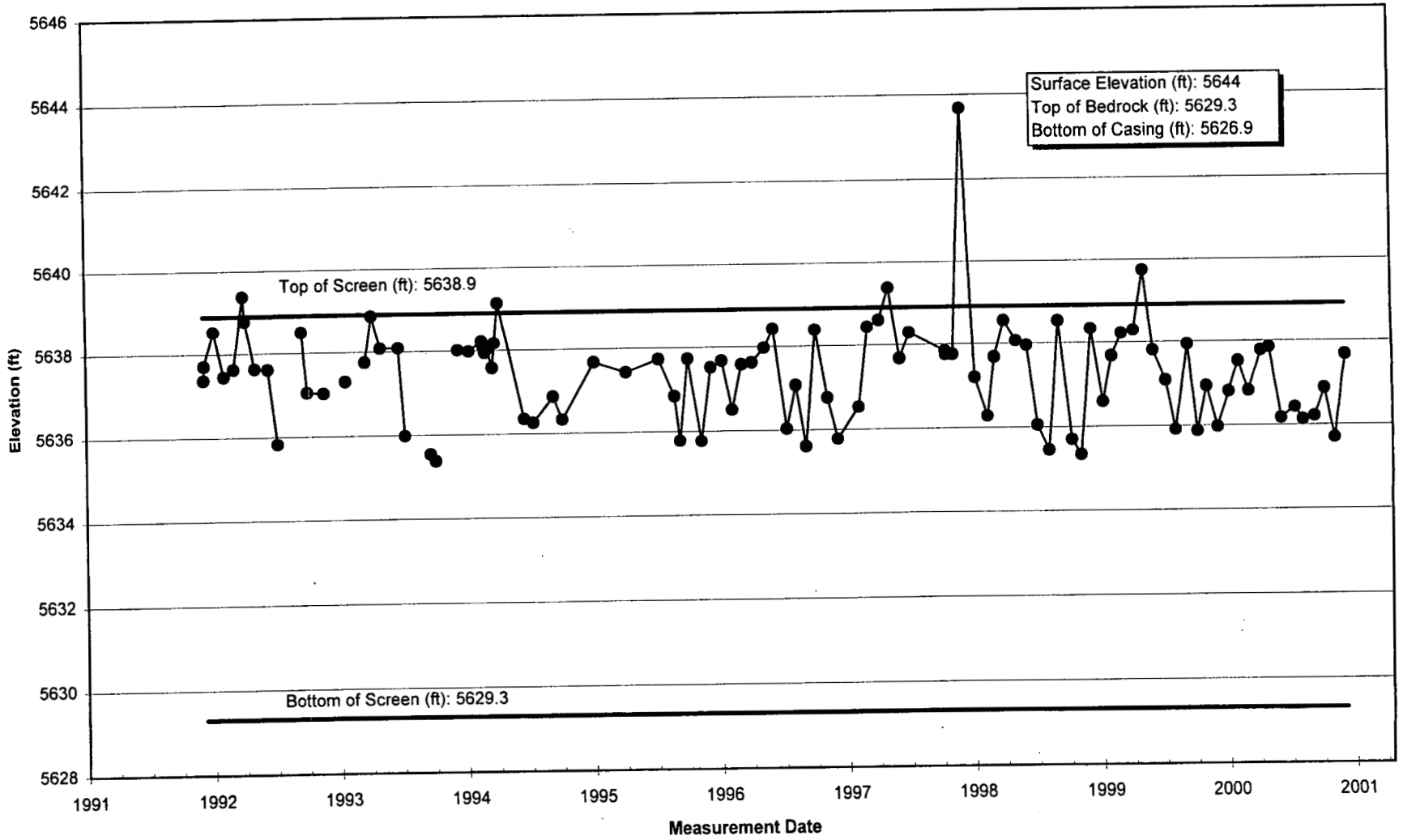

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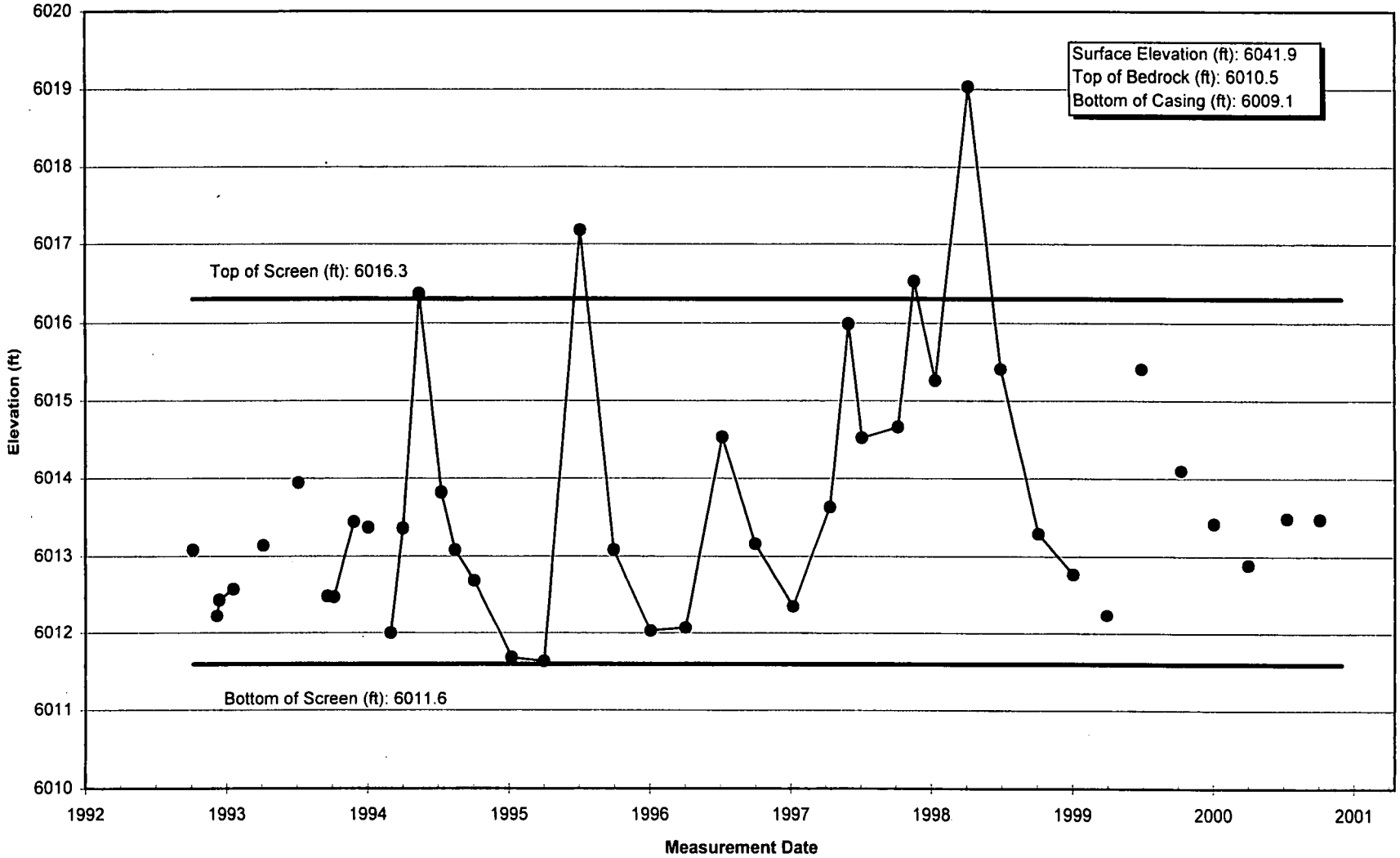
481

Hydrograph 43392



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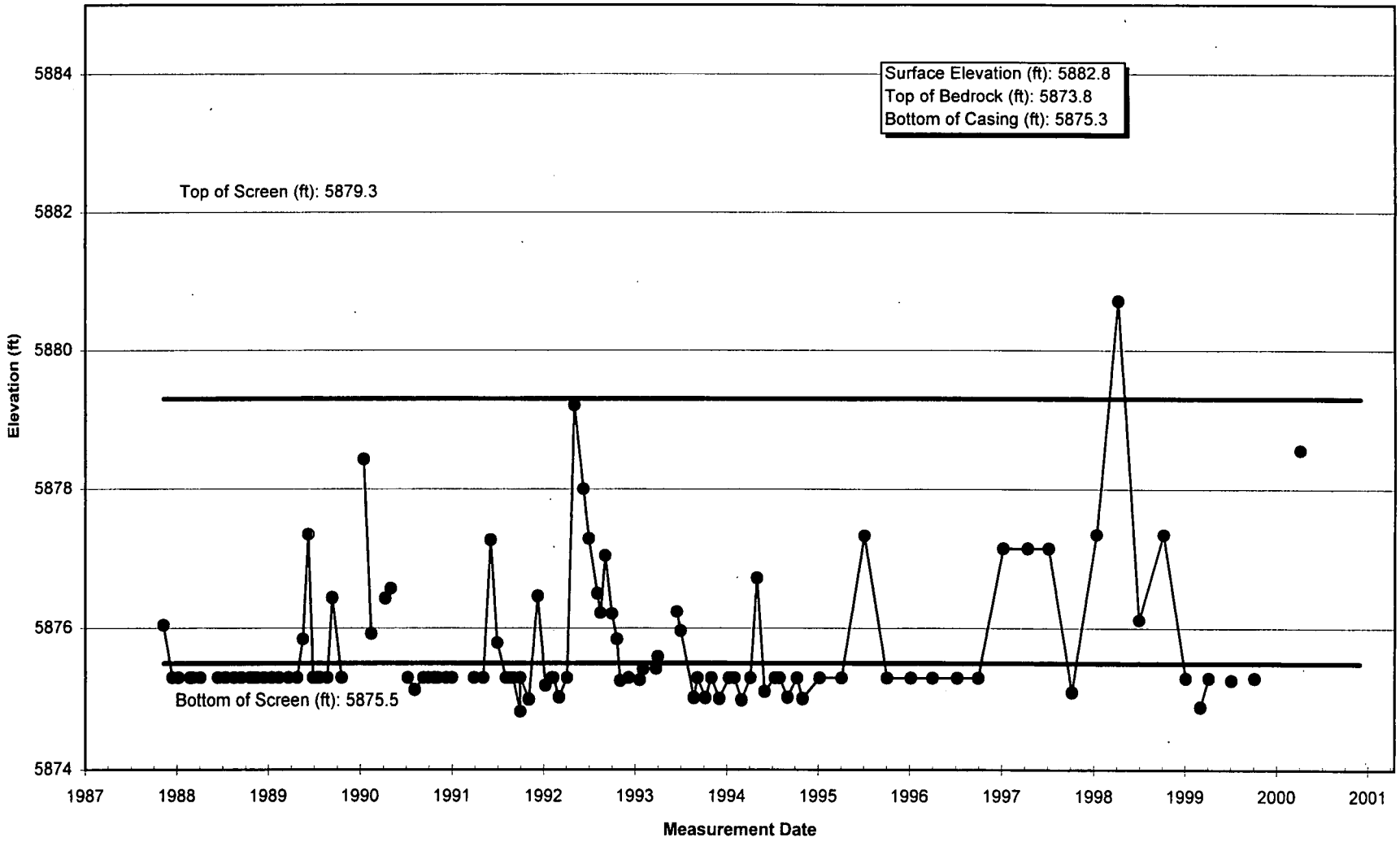
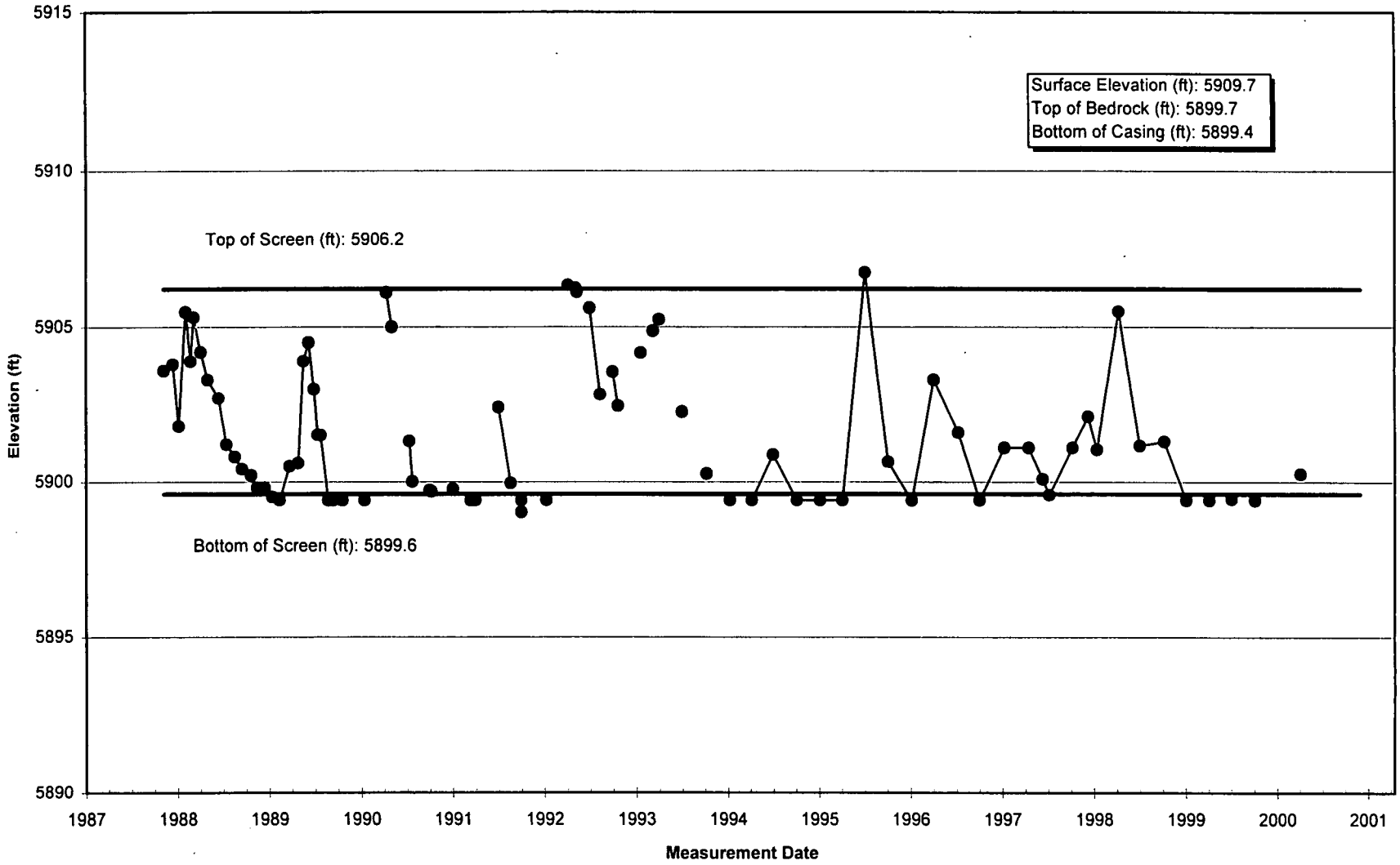
Hydrograph 4787



HG-Master S13_wjb 4787 9/26/01

483

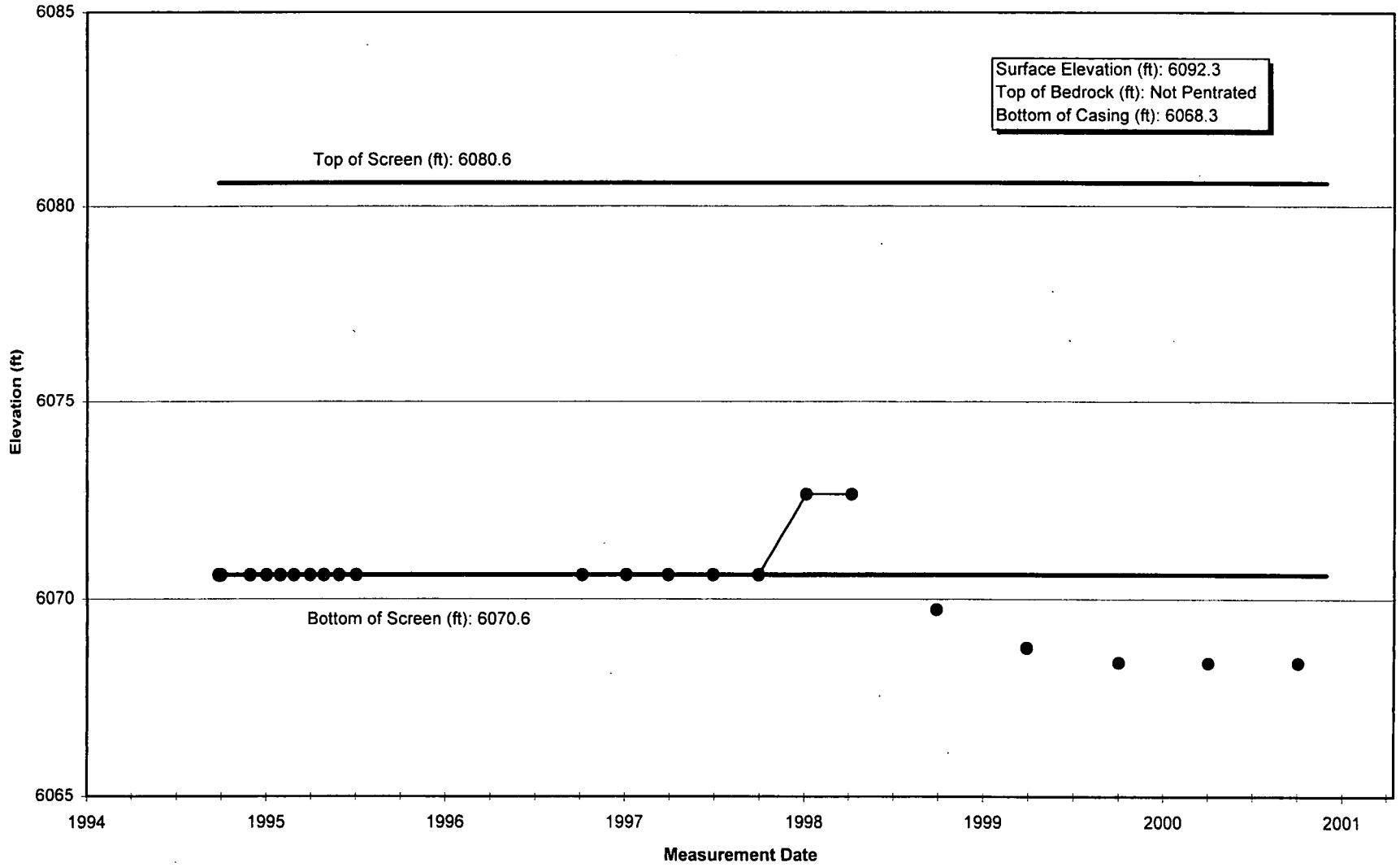
Hydrograph 4887



HG-Master S13_wjb 4887 9/26/01

484

Hydrograph 50494



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485

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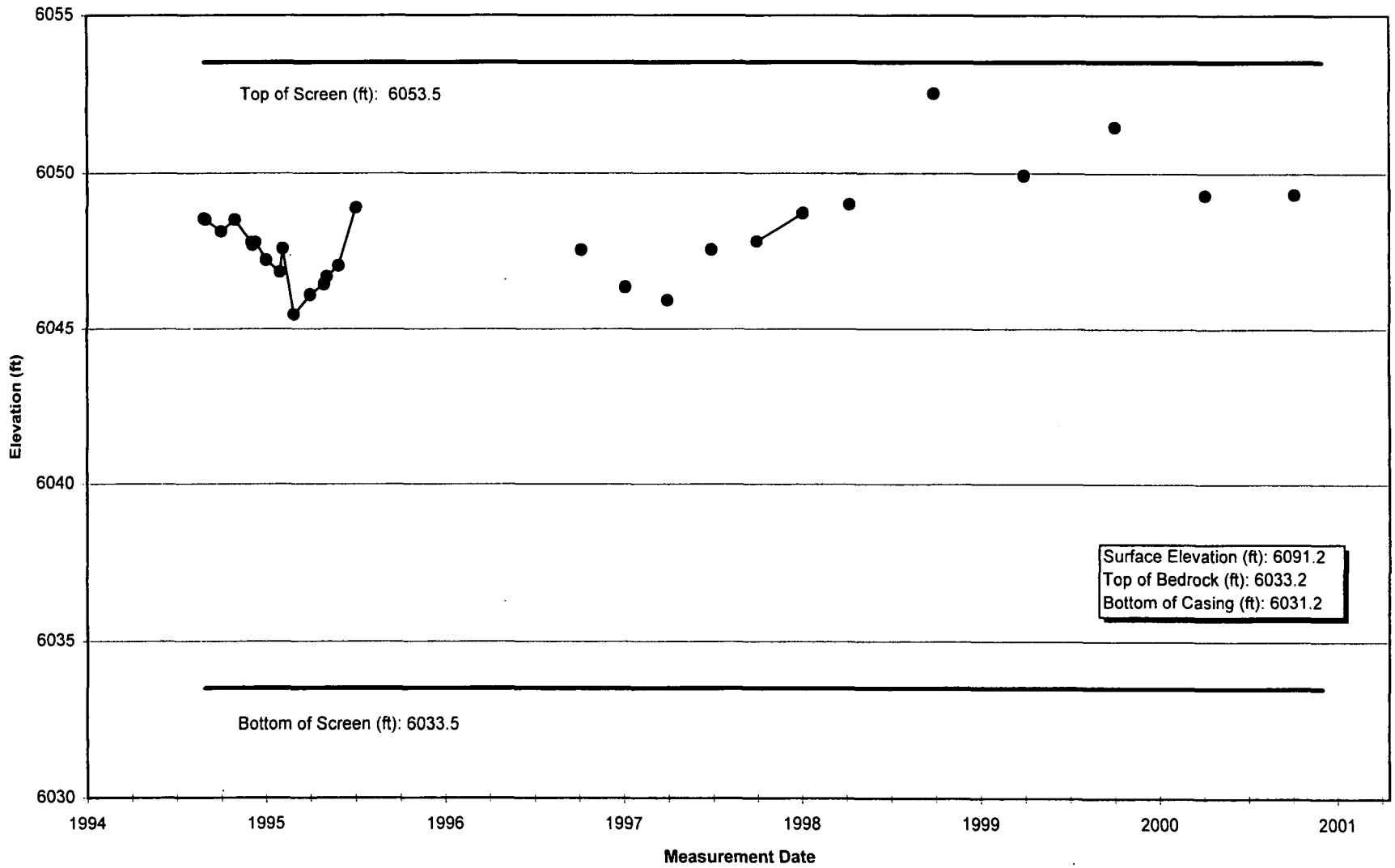

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486

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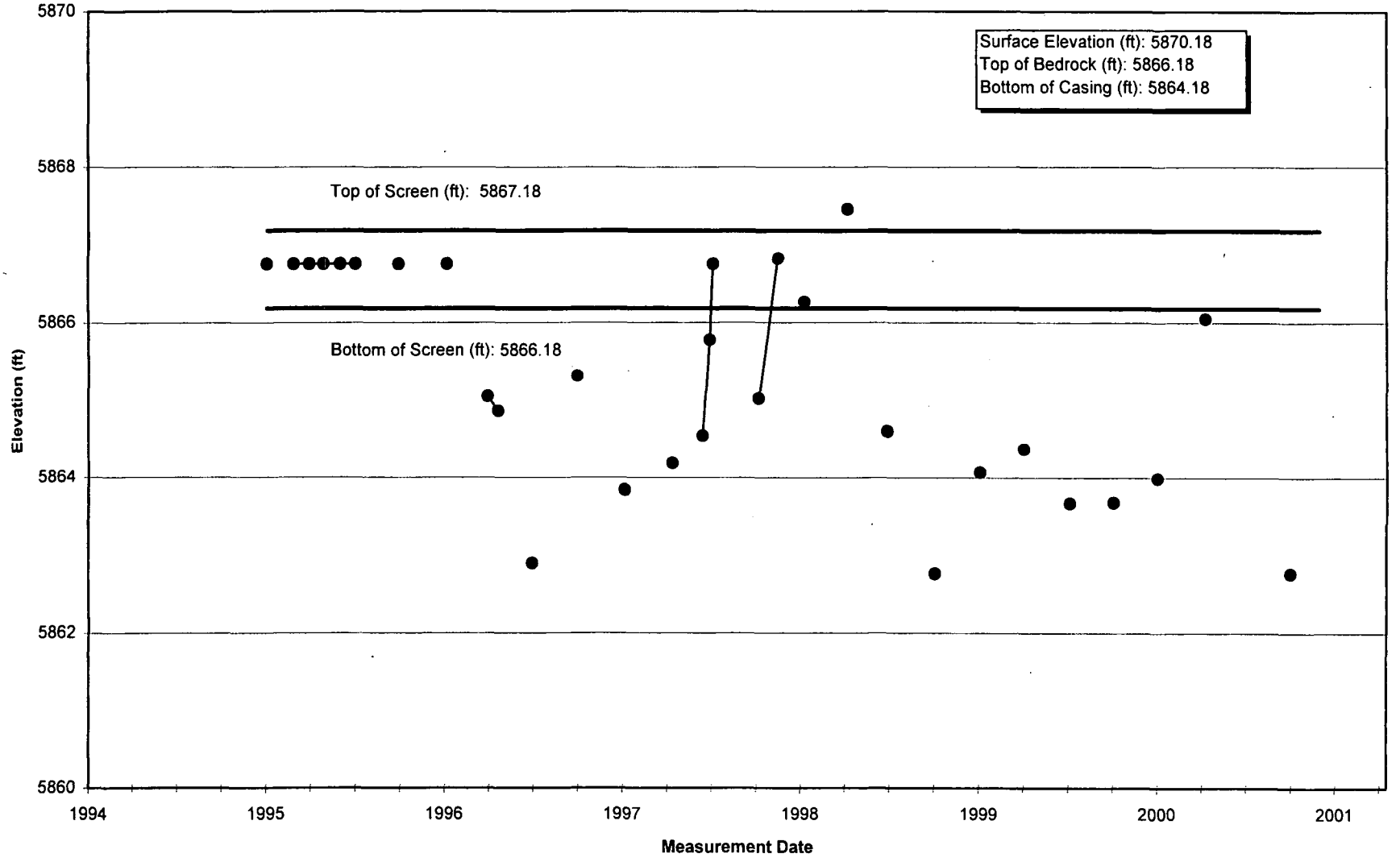

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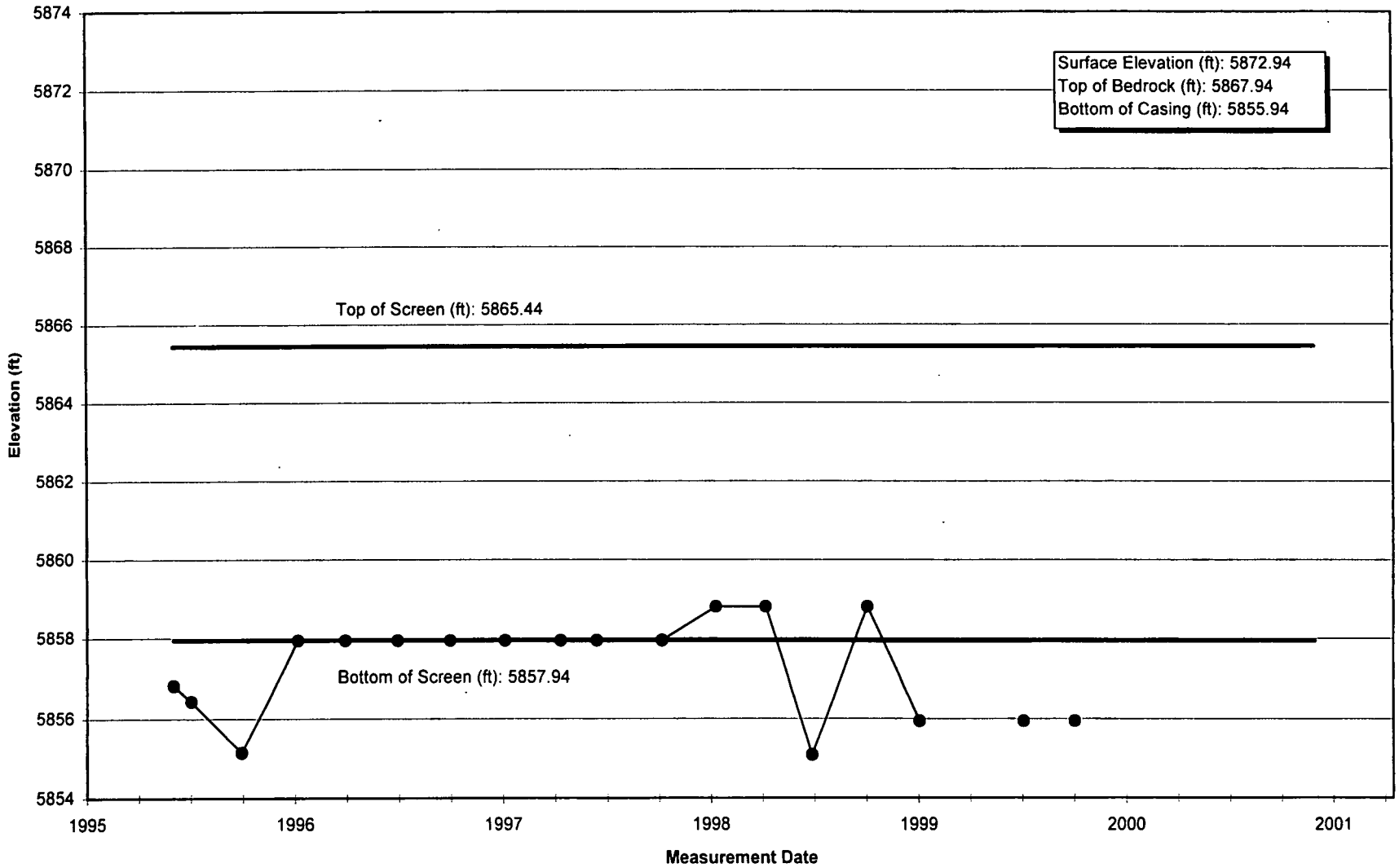
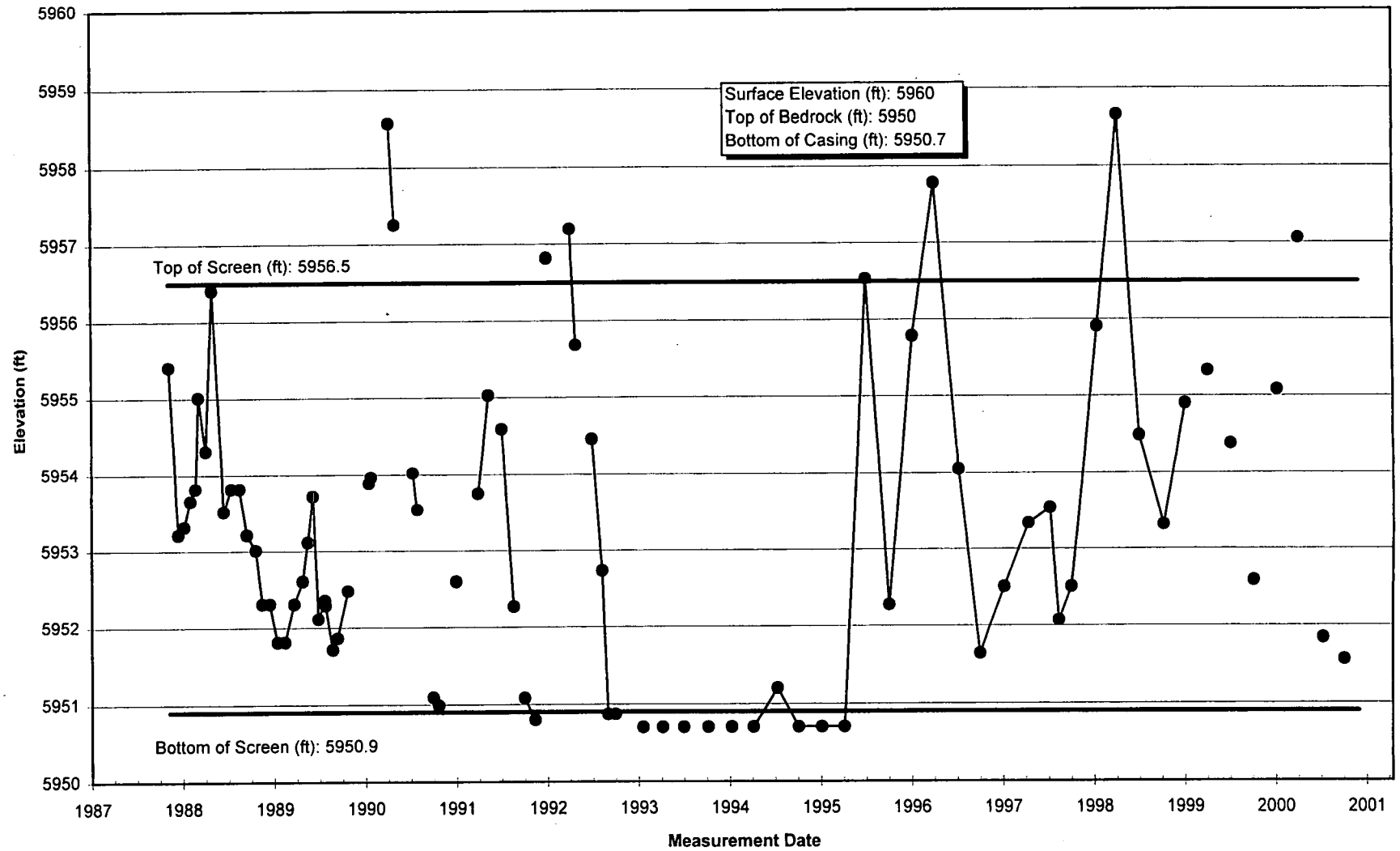
4/87

Hydrograph 52994



488 HG-Master 13 52994 9/25/01

Hydrograph 5387



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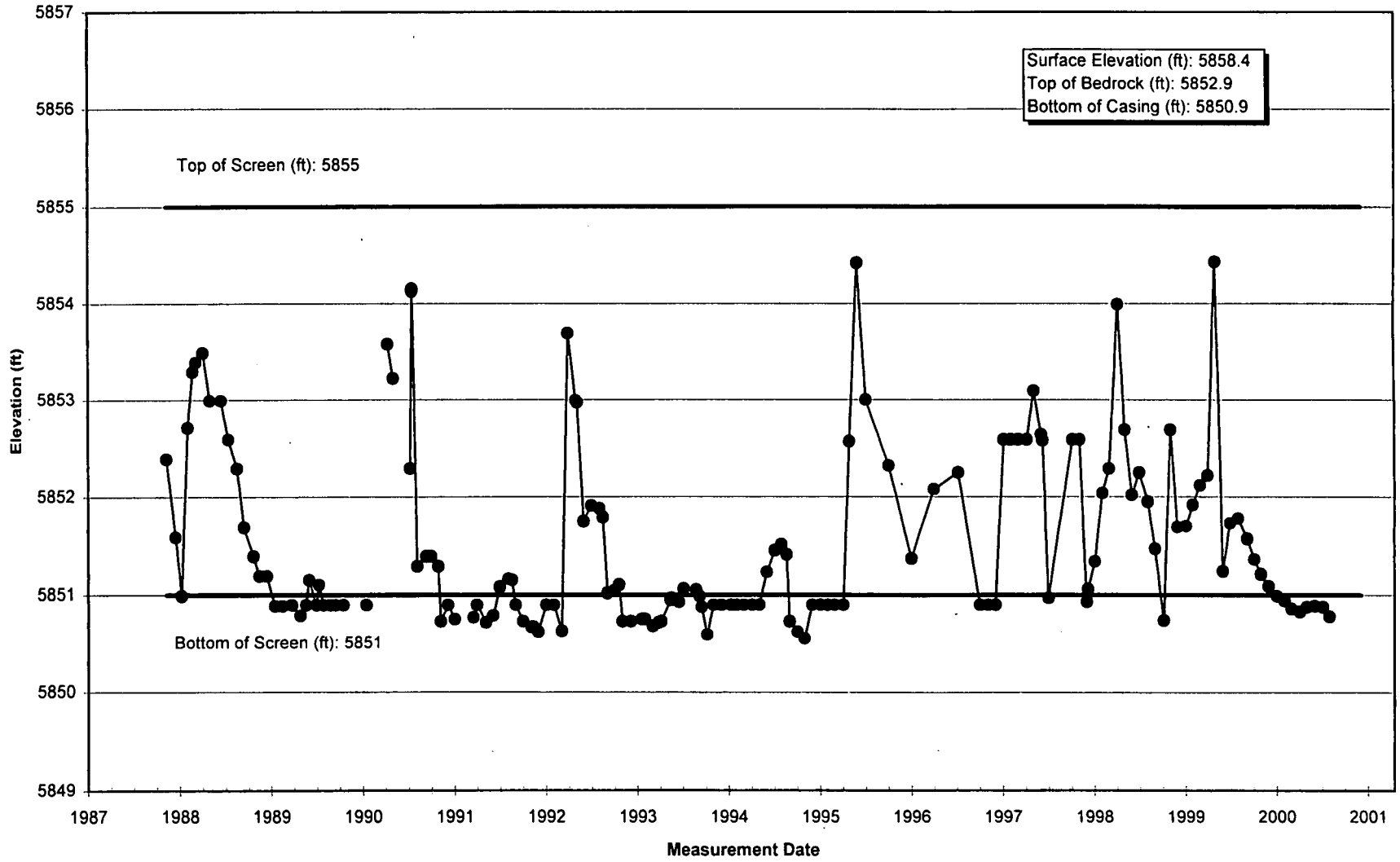
Hydrograph 5587



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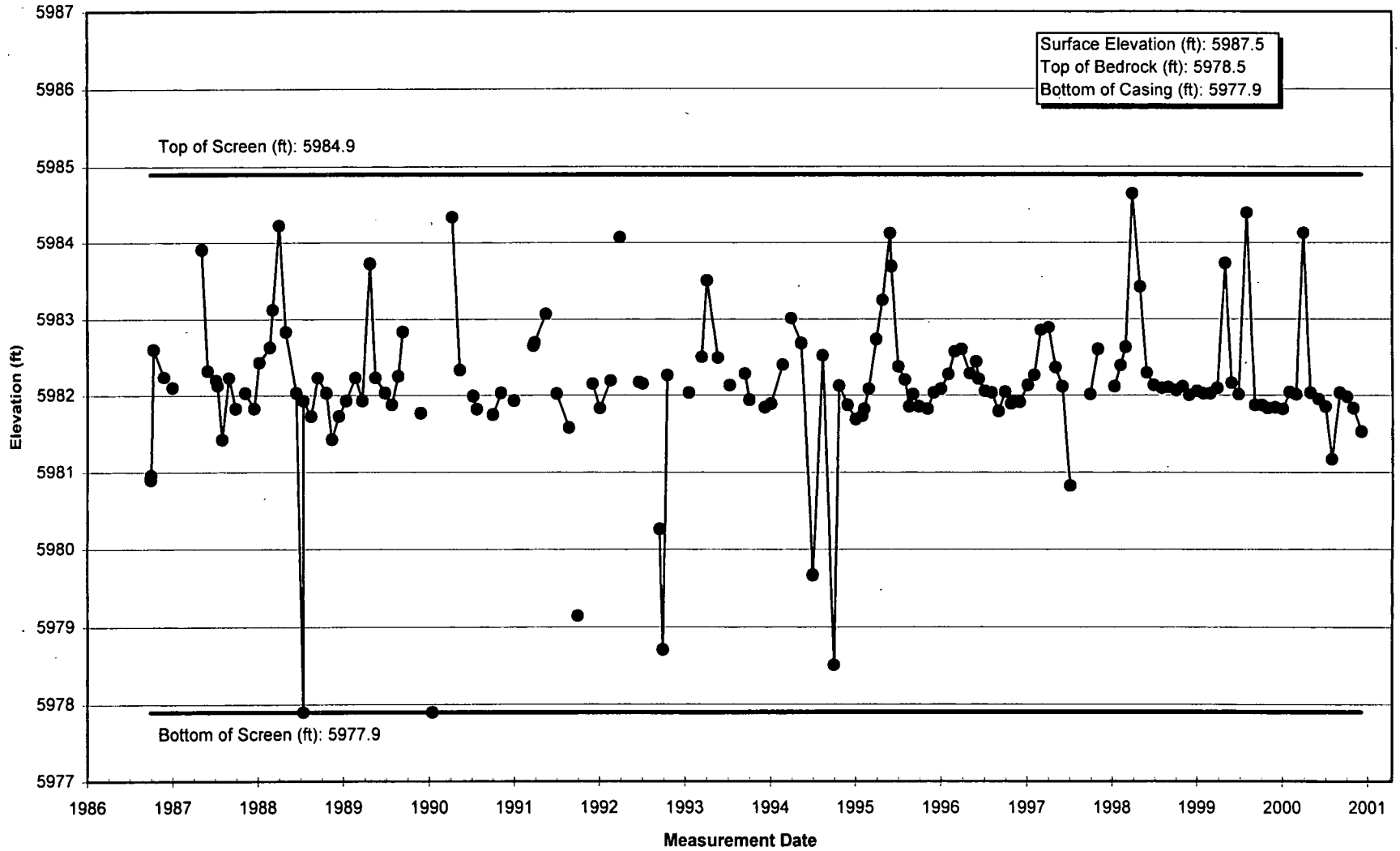
490

Hydrograph 5686



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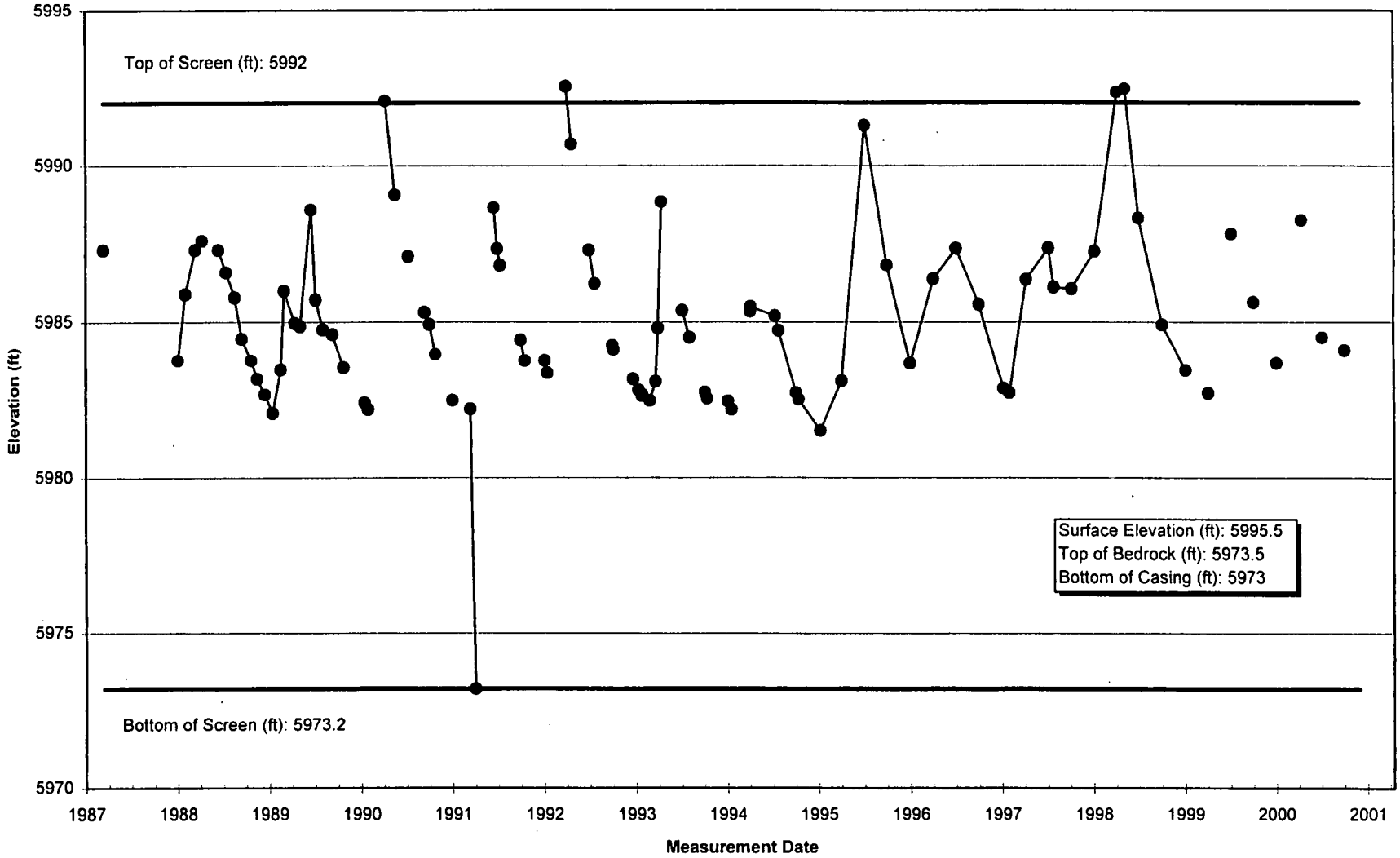
Hydrograph 5887



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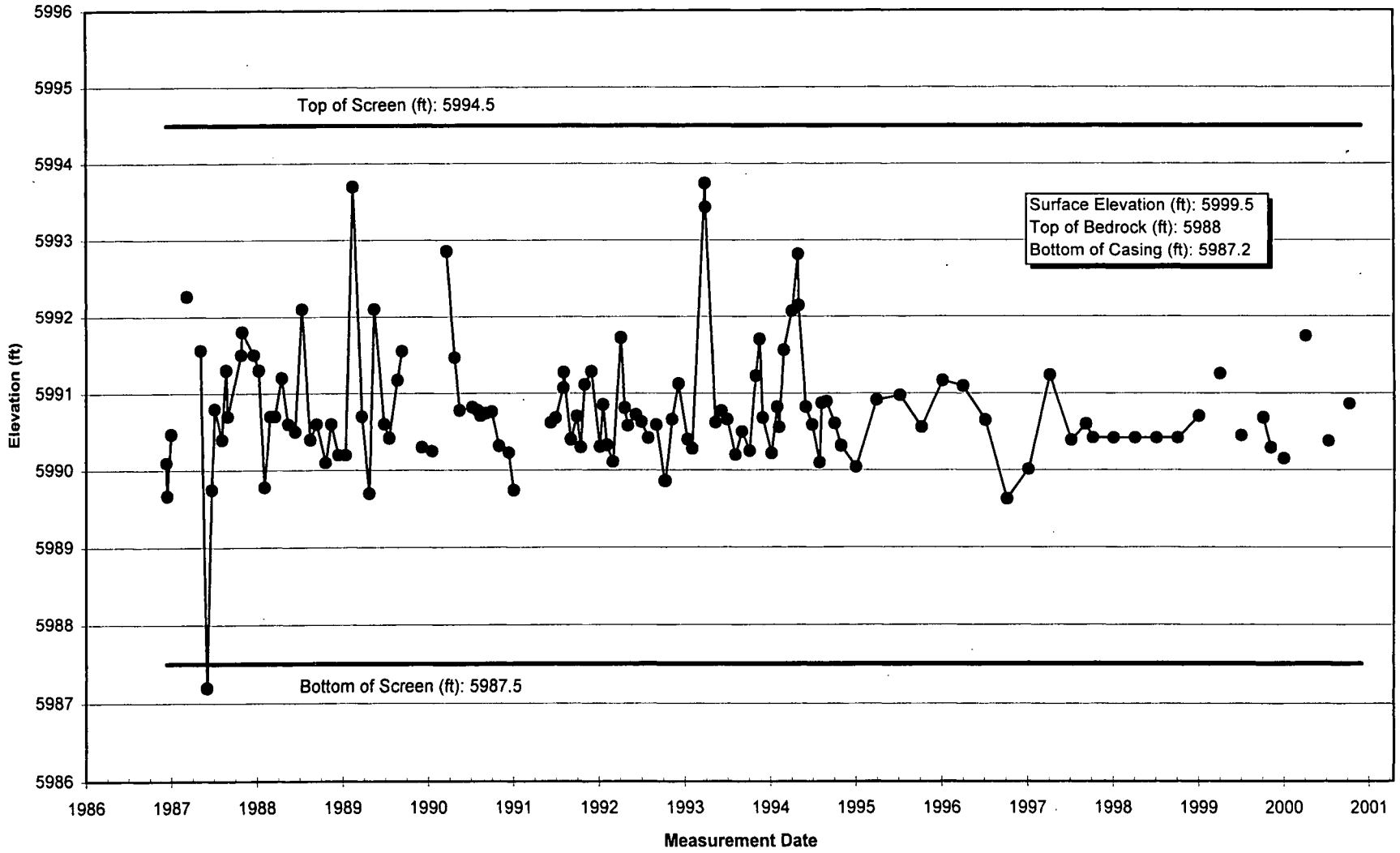
HG-Master 14 5887 9/25/01

Hydrograph 6186



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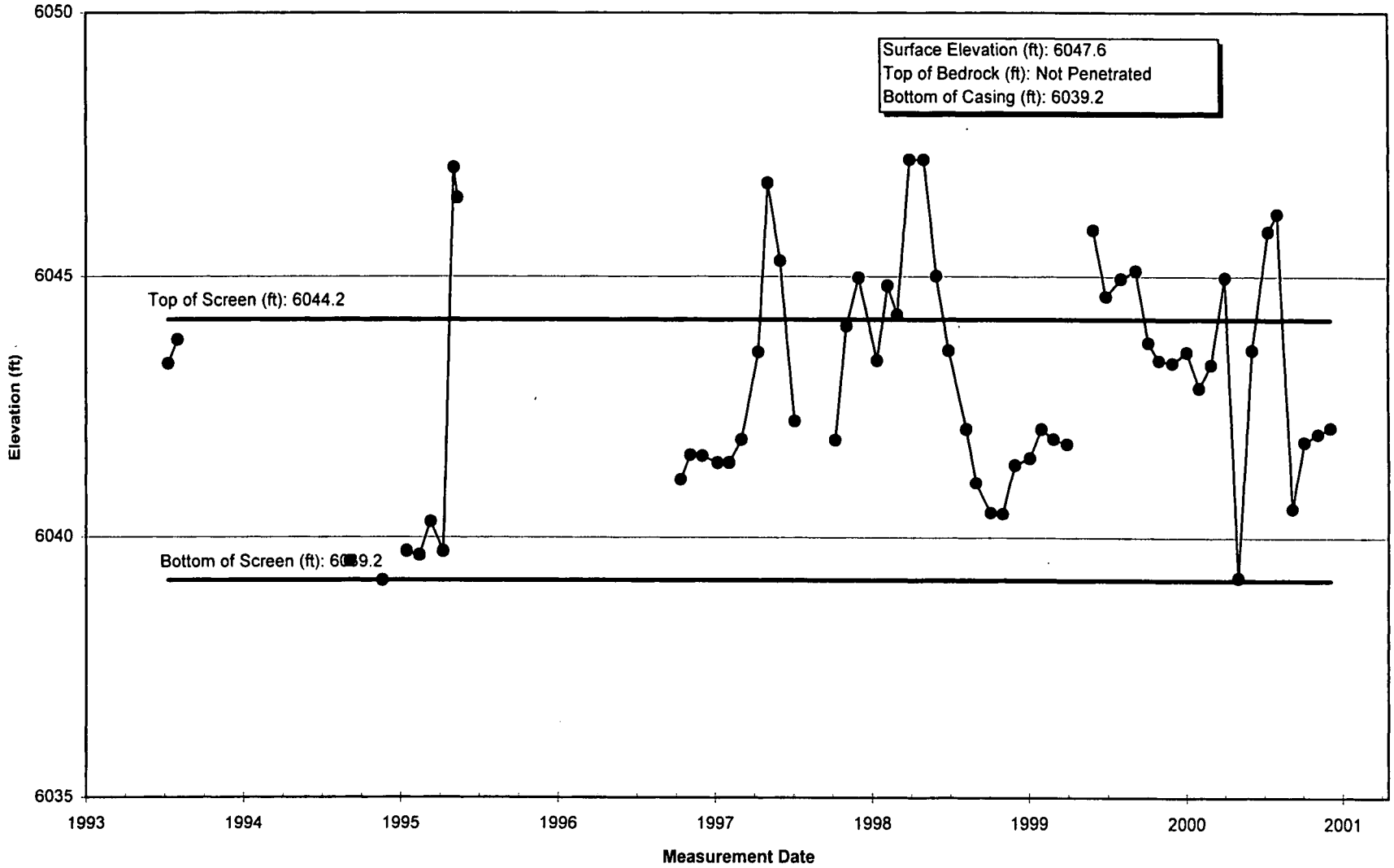
493

Hydrograph 62593



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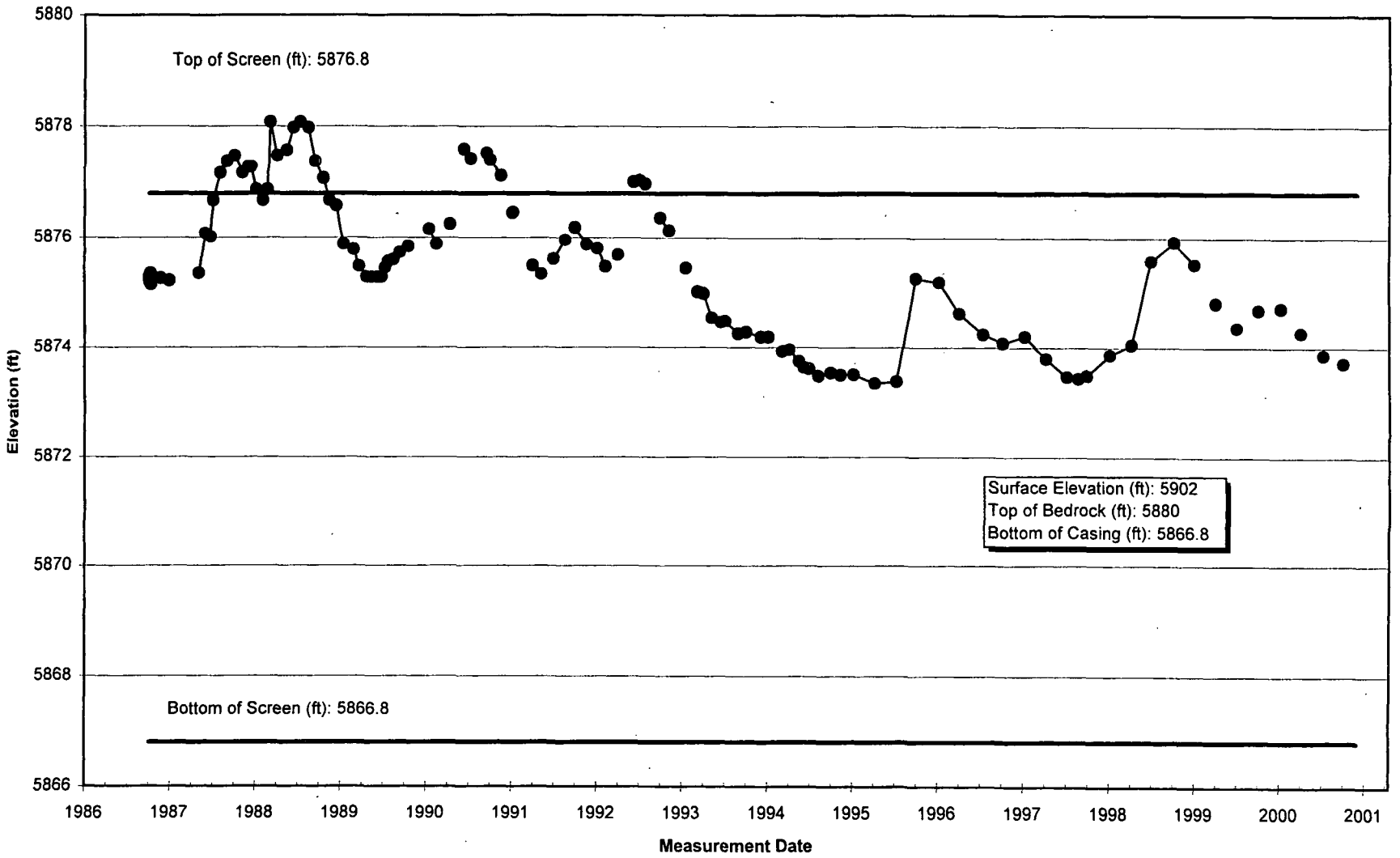
Hydrograph 6286



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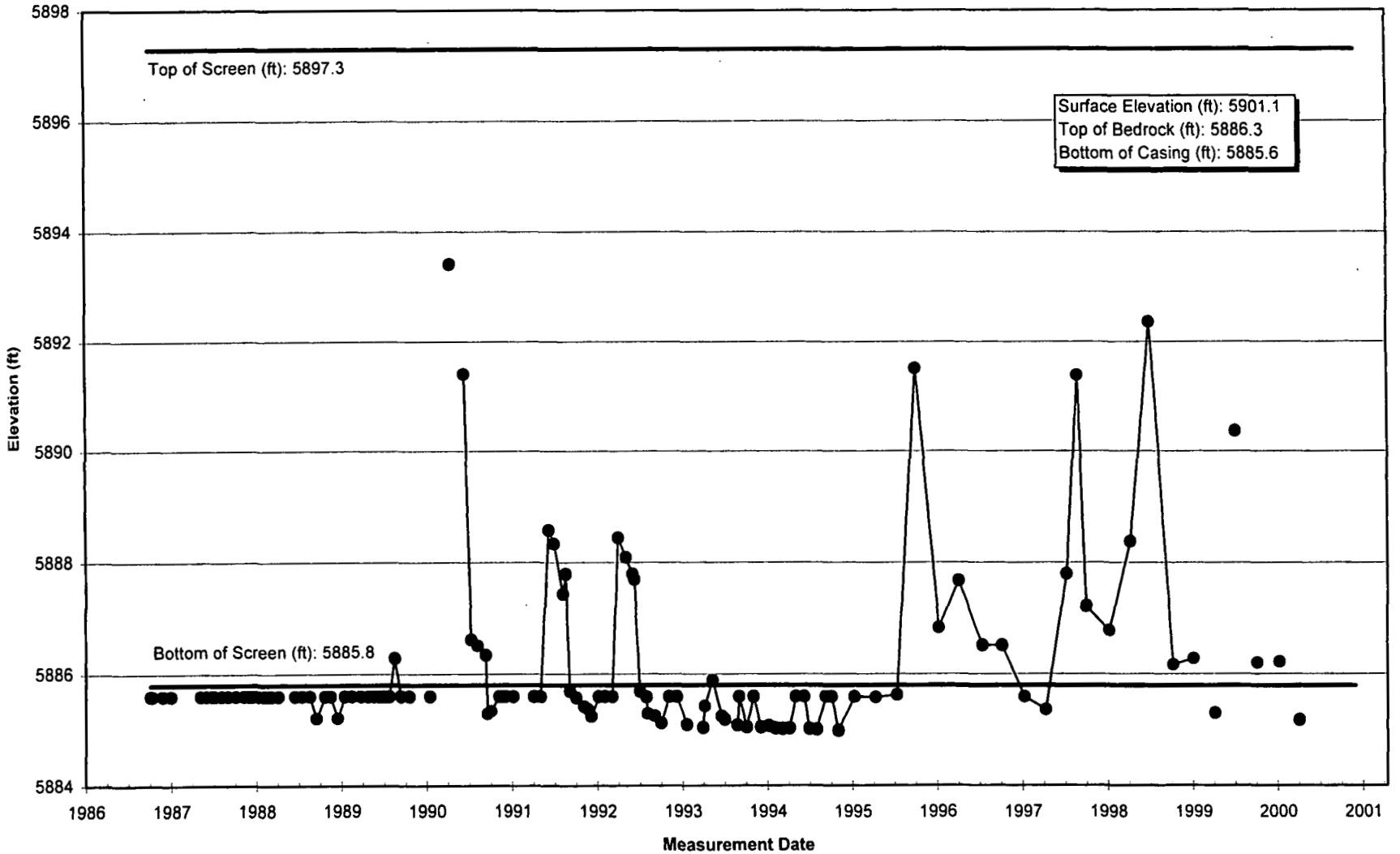
Hydrograph 6386



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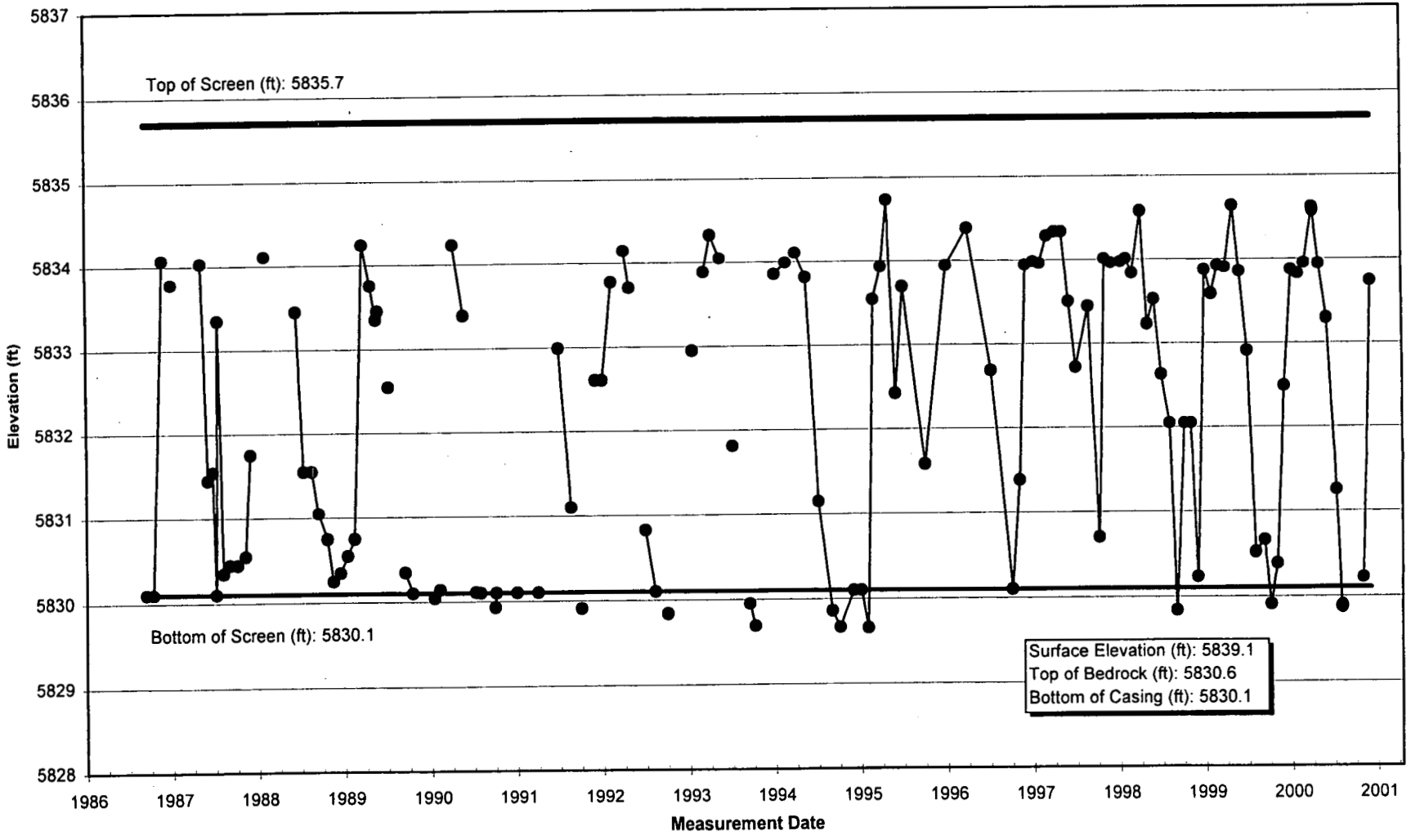
Hydrograph 6486



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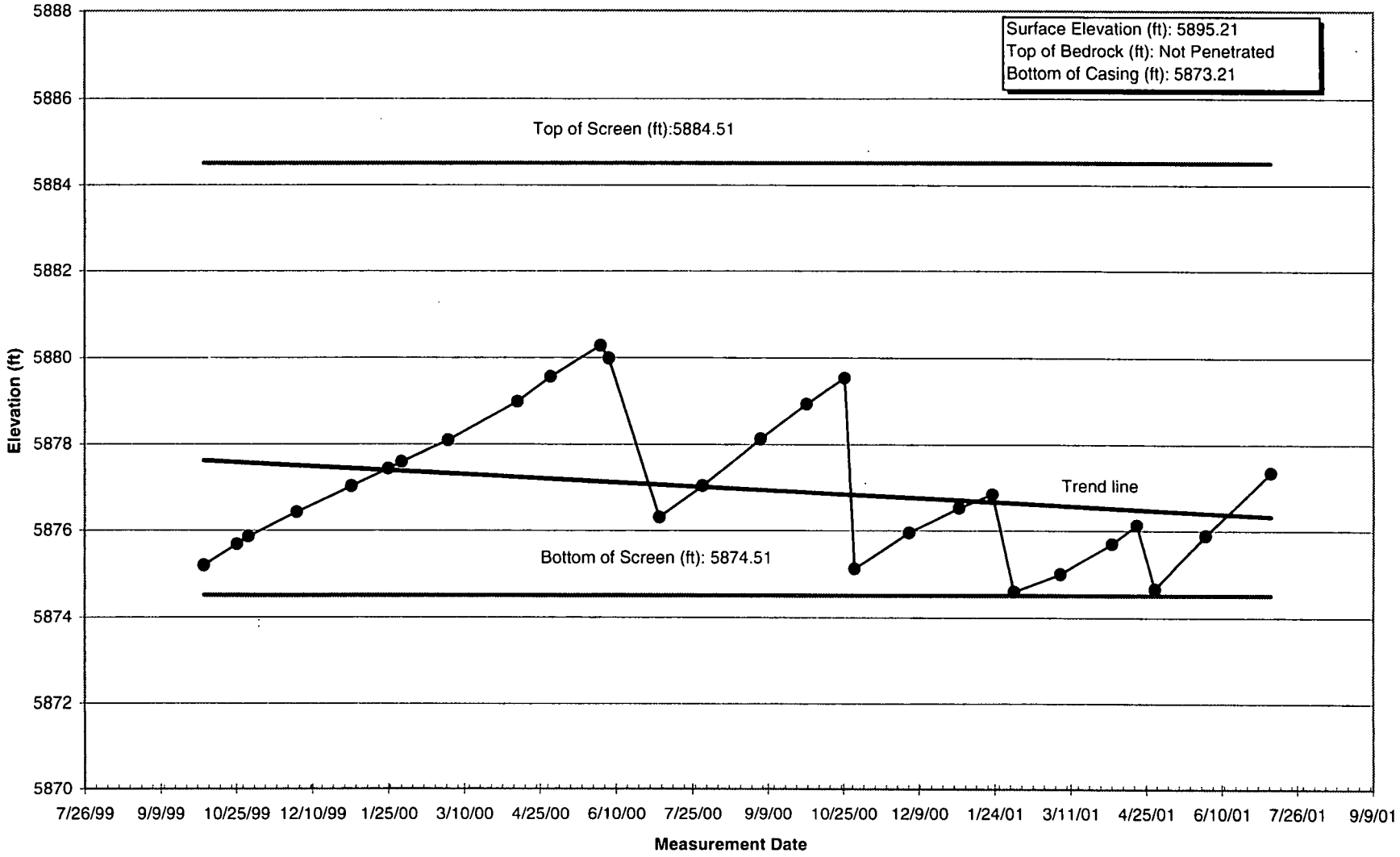
497

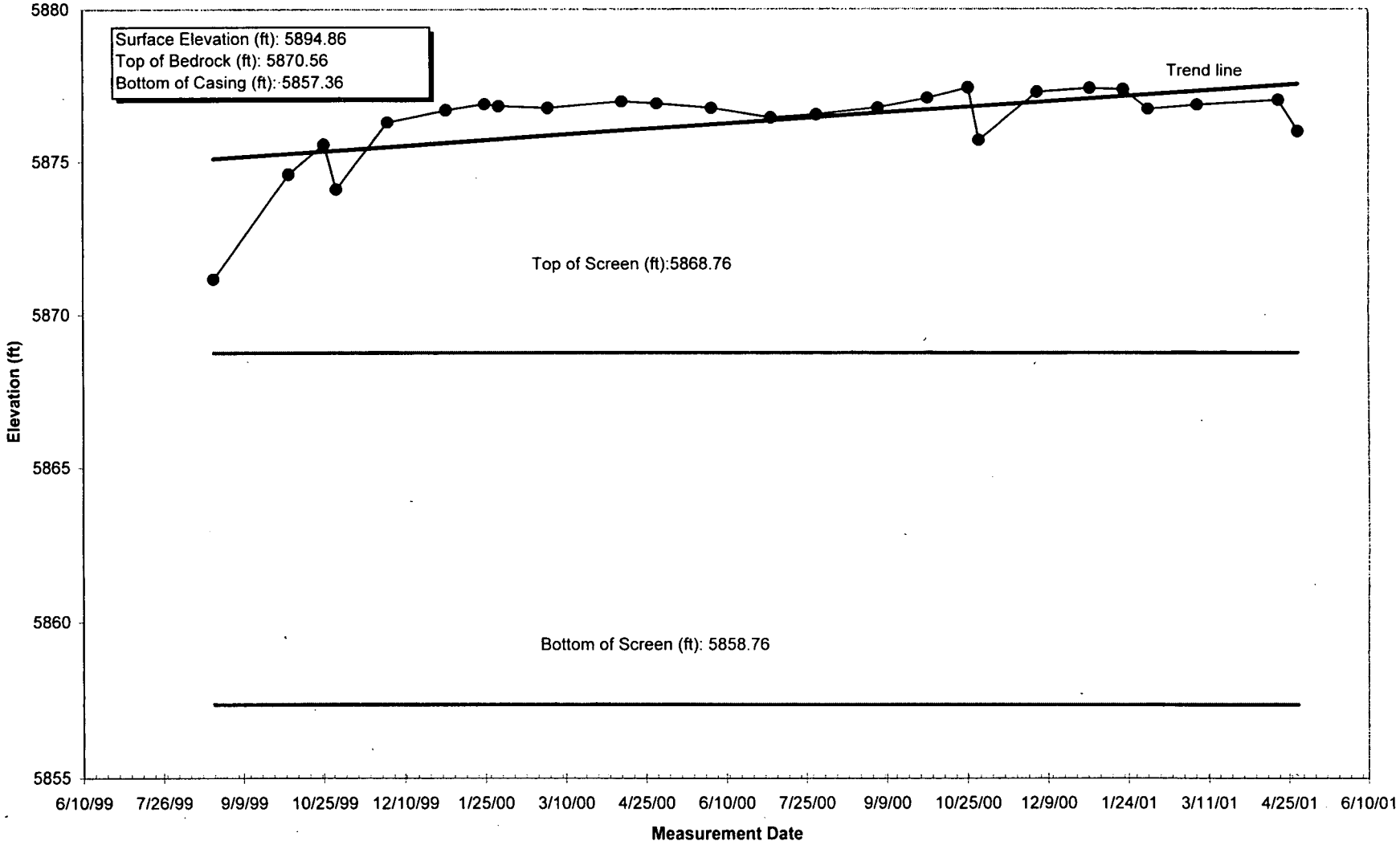
Hydrograph 70099



4/98

HG-Master S15.xls 70099 11/7/01

Hydrograph 70299



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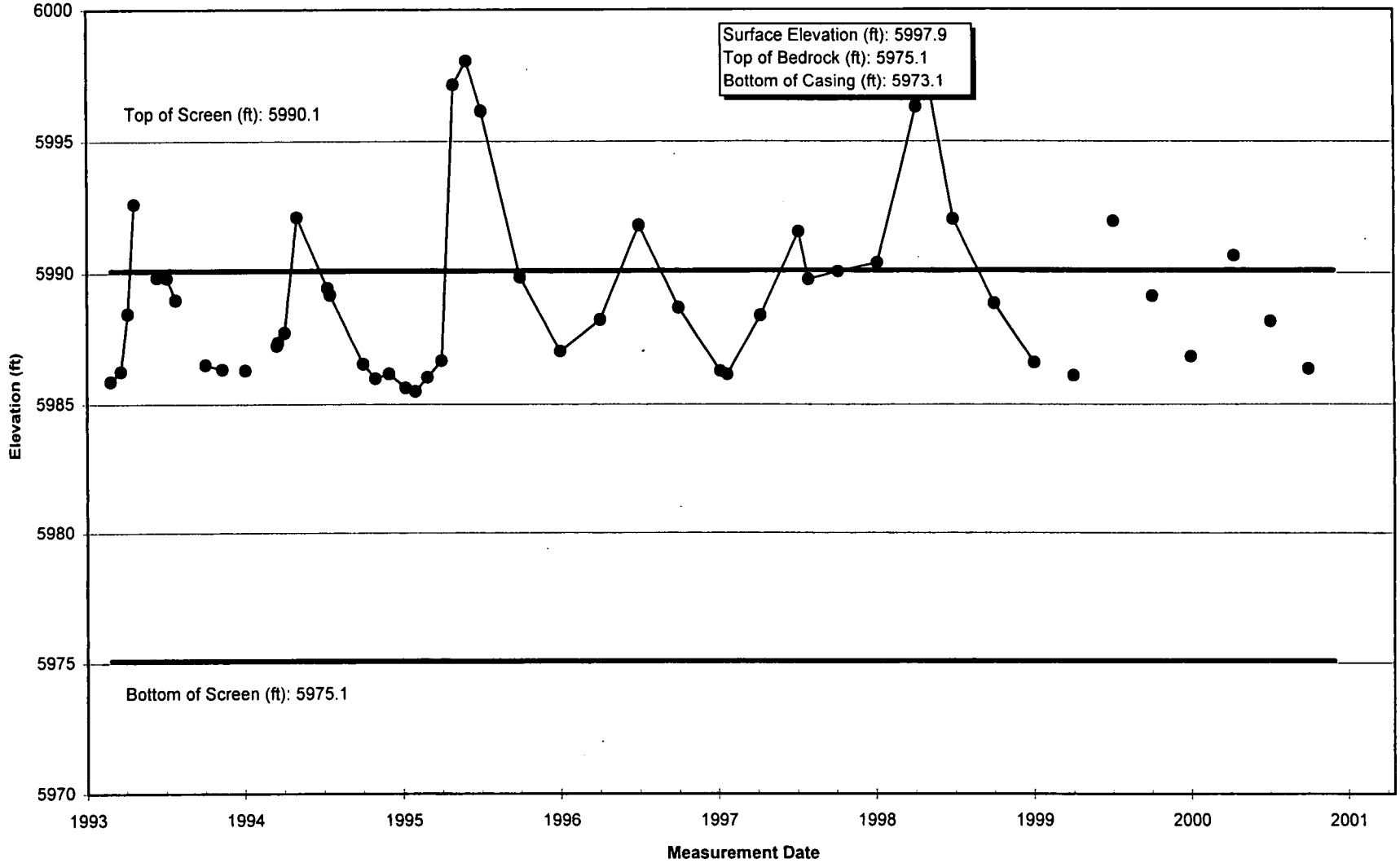
499

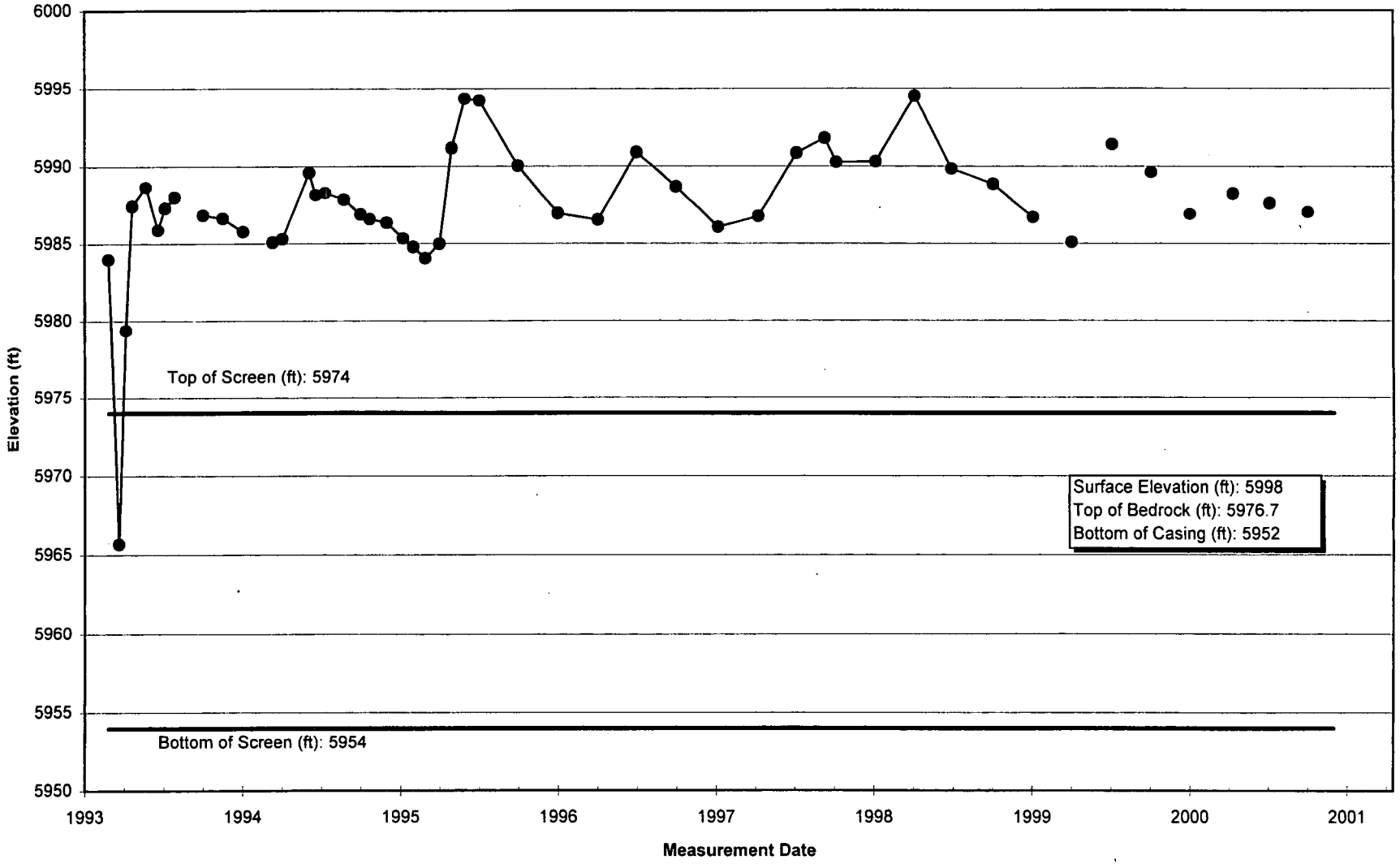
Hydrograph 70393



HG-Mast 615 70393 9/25/01

500

Hydrograph 70493



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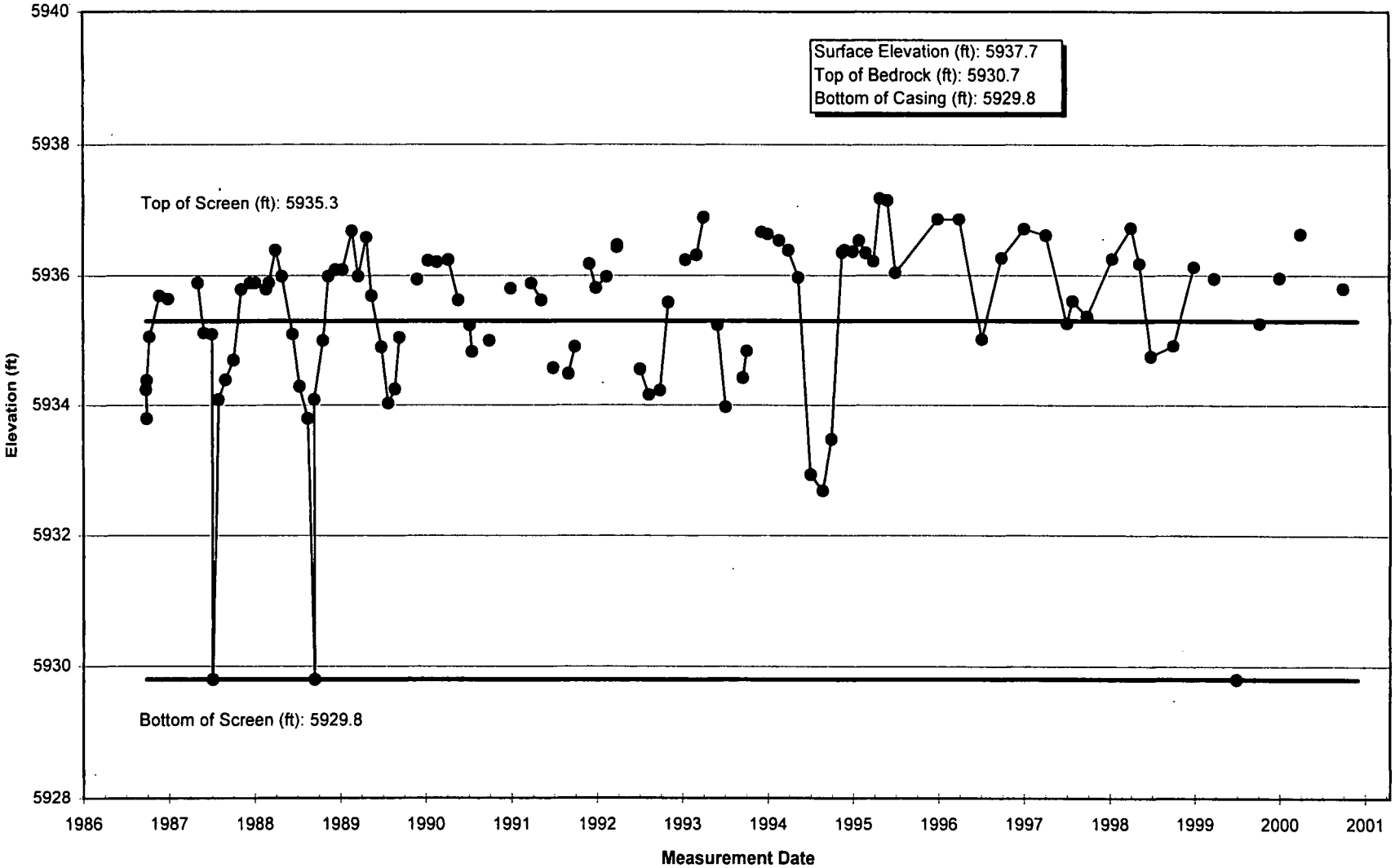
Hydrograph 7086



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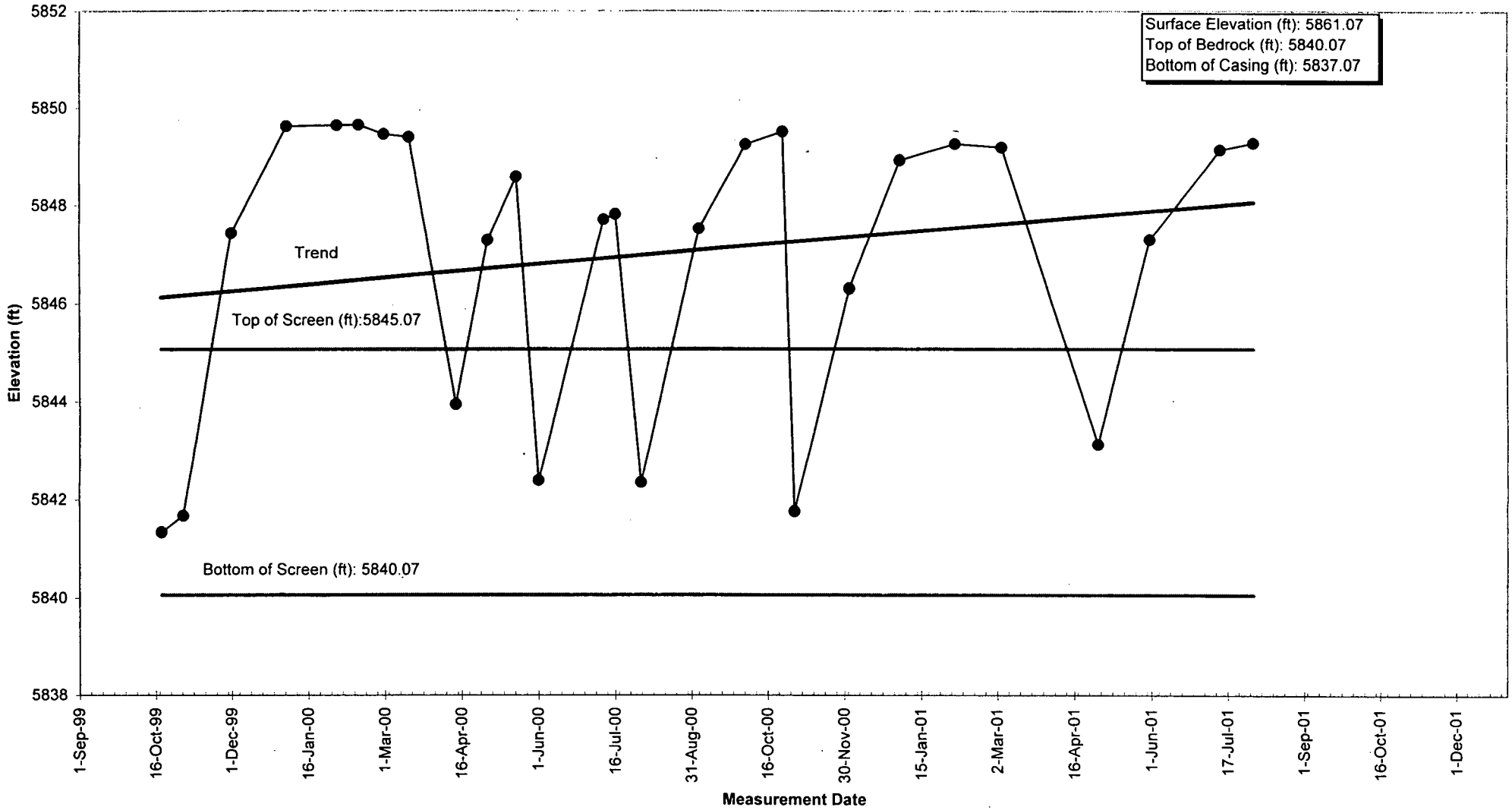

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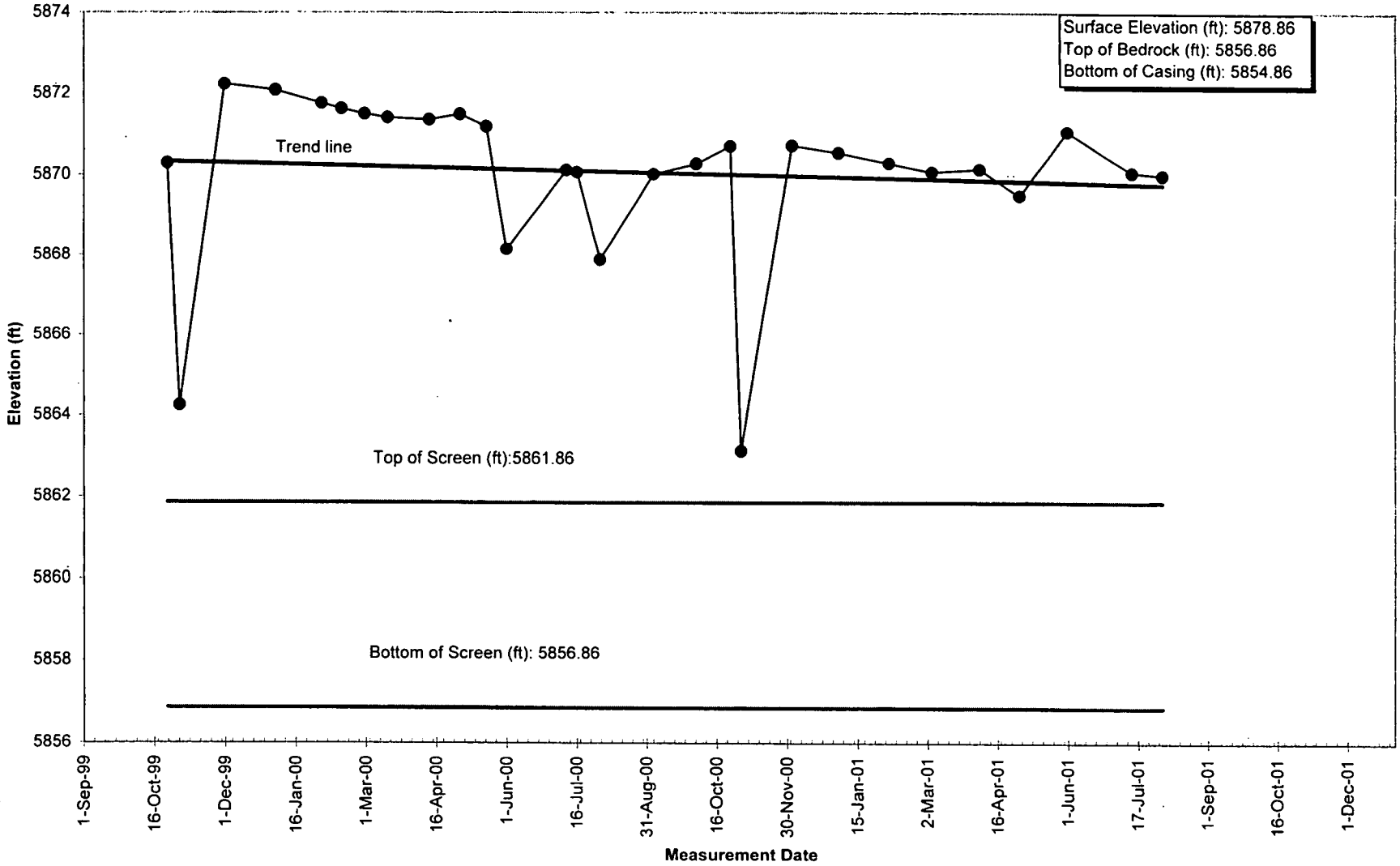
503

Hydrograph 95199



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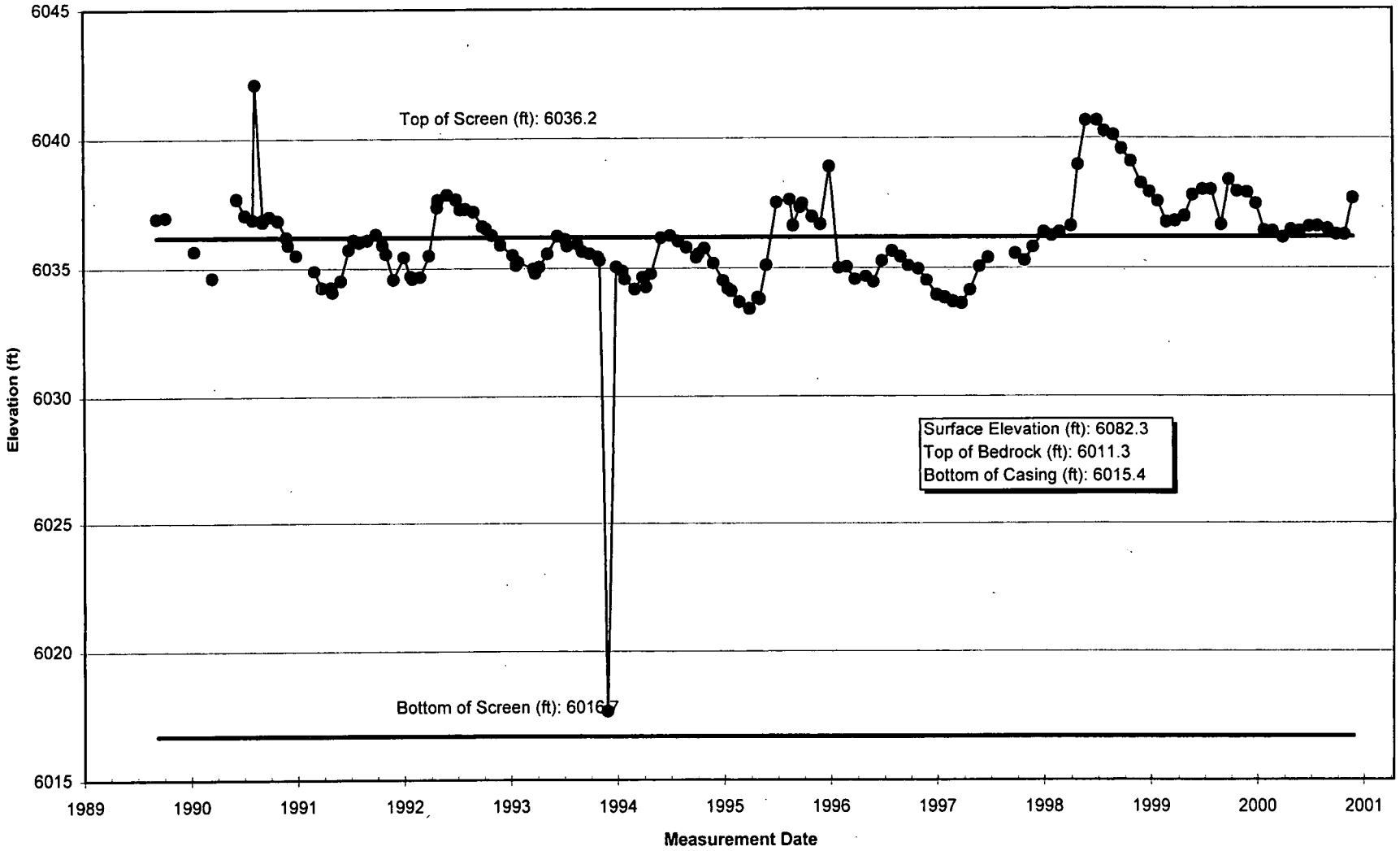
Hydrograph B110989



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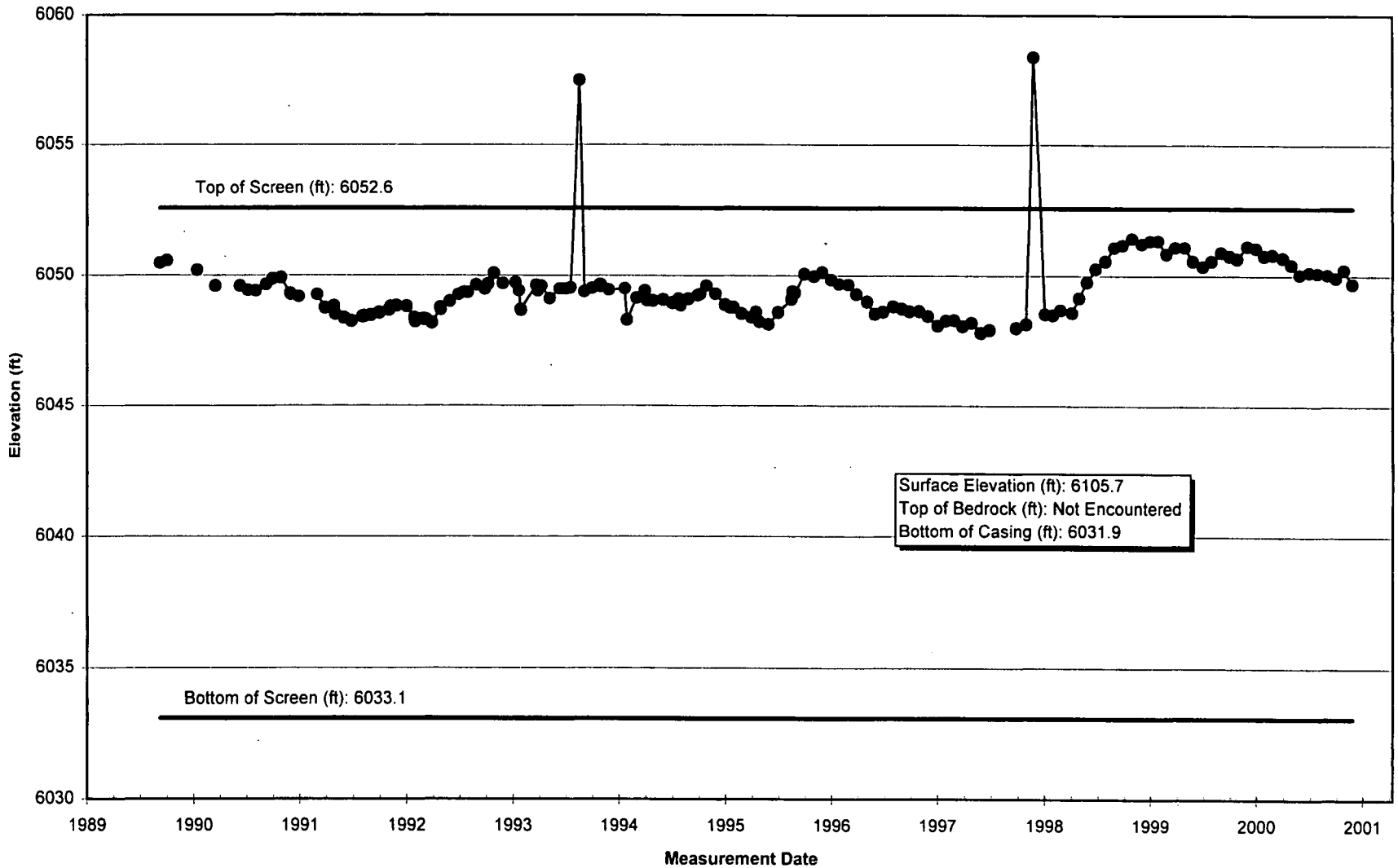
Hydrograph B111189



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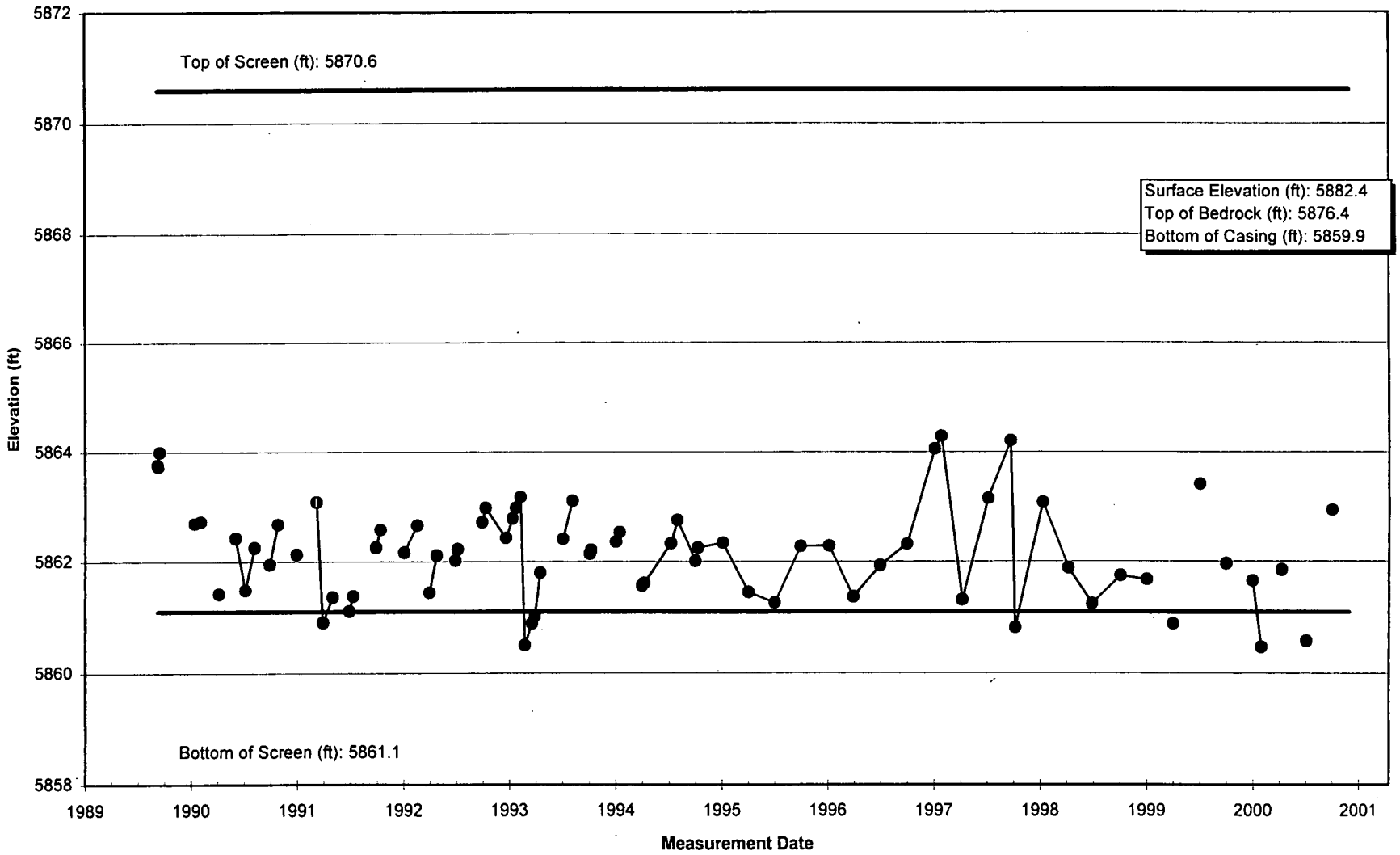
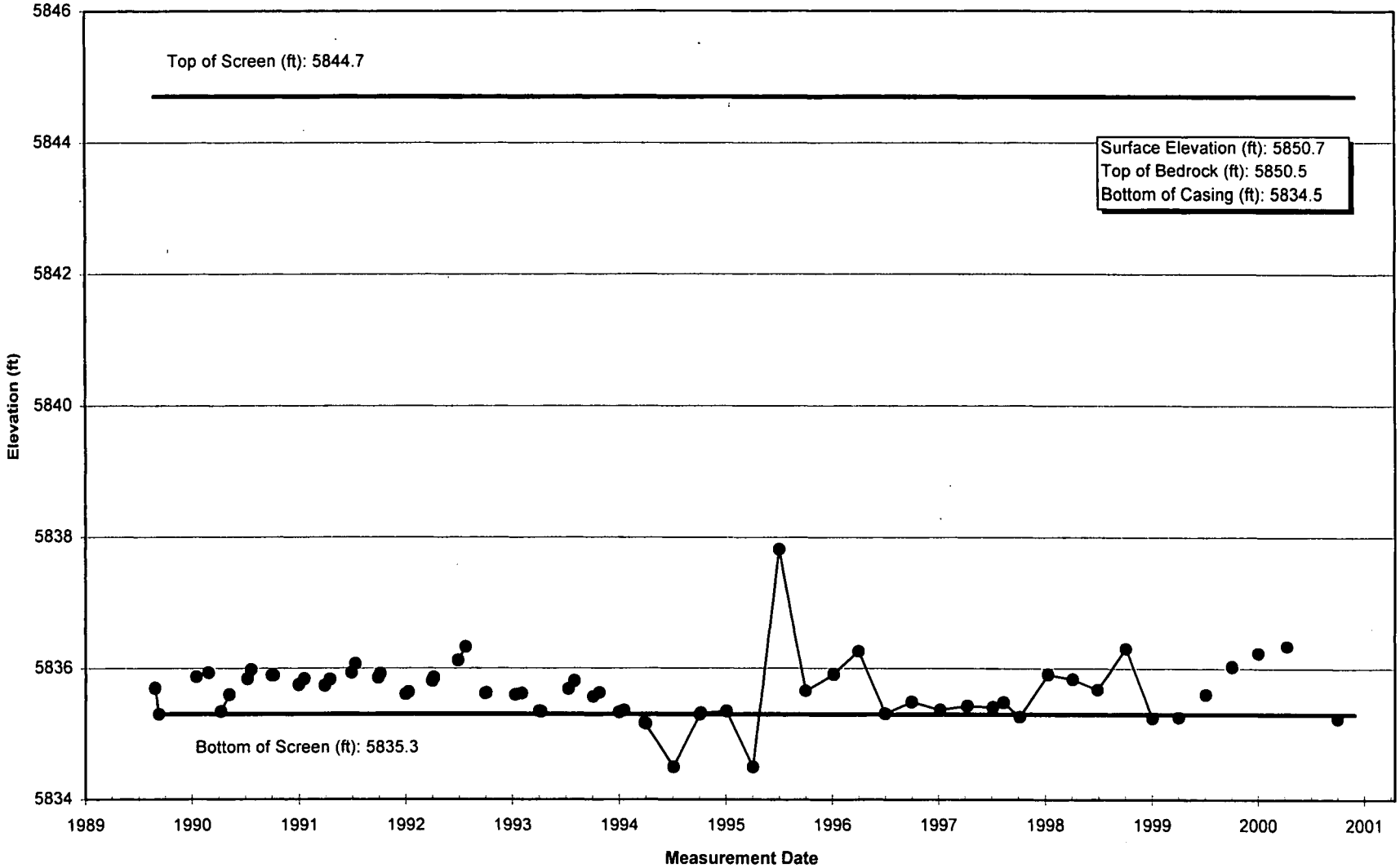
Hydrograph B206989



HG-Master S18 B206989 9/25/01

507

Hydrograph B208289



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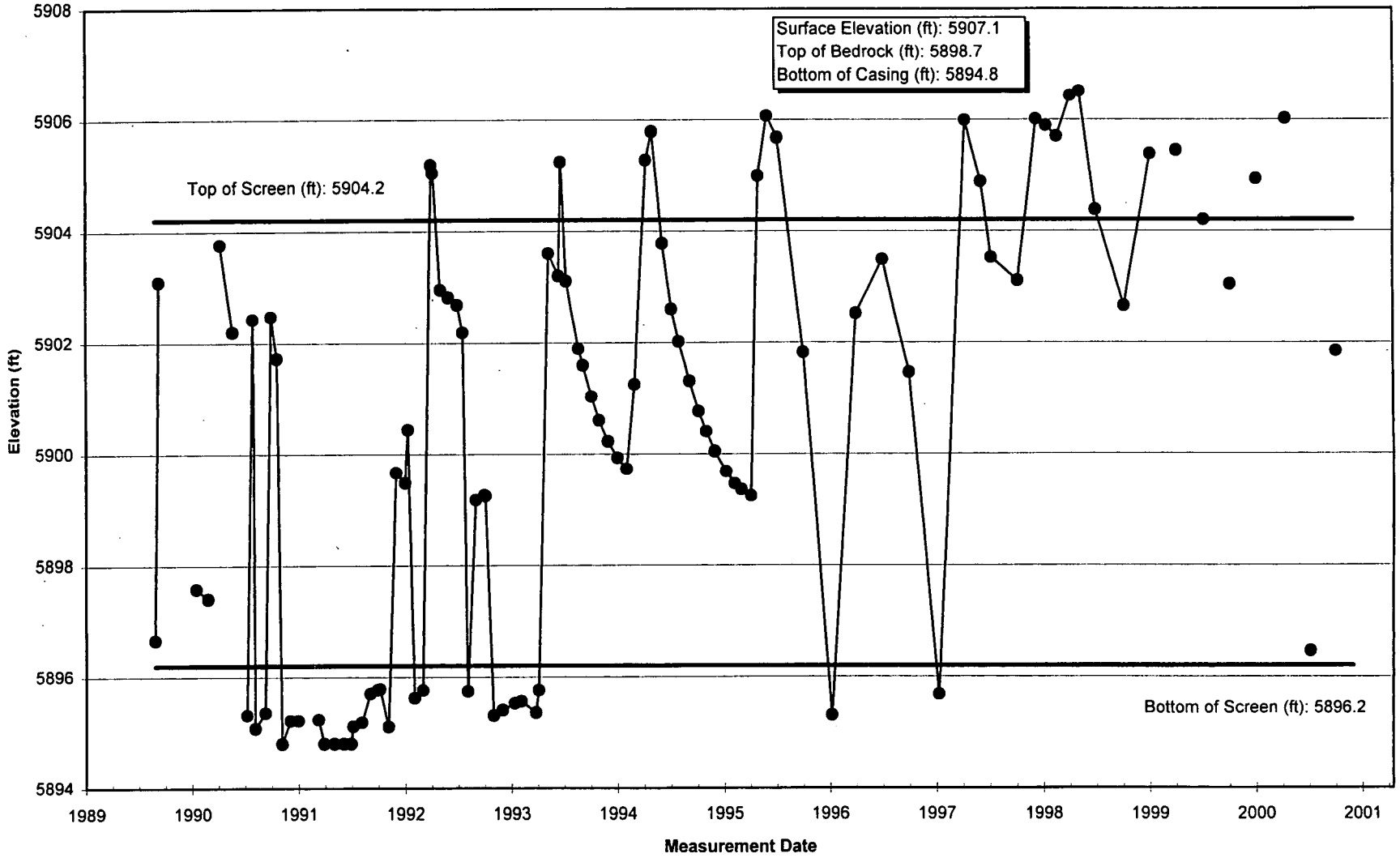

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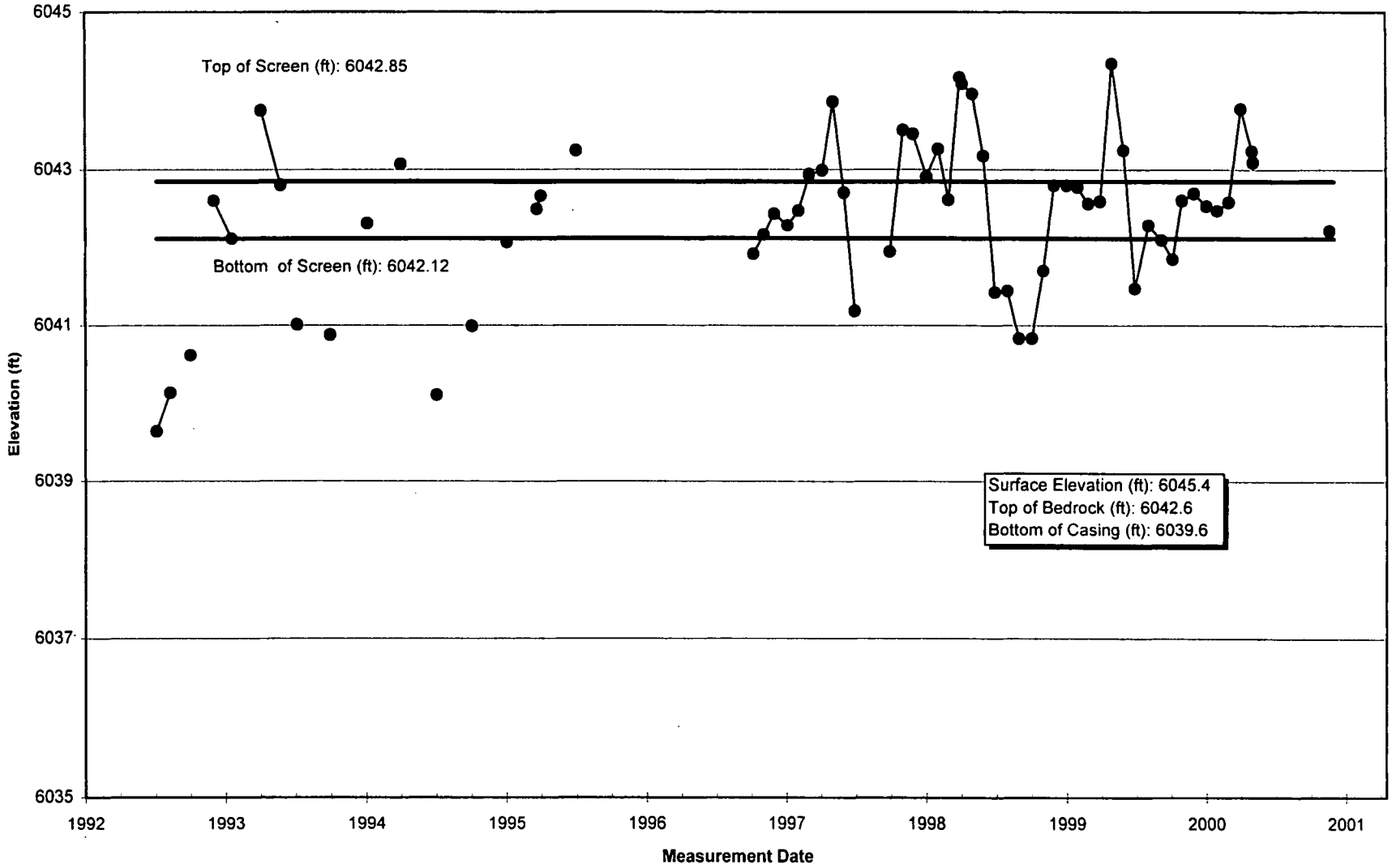

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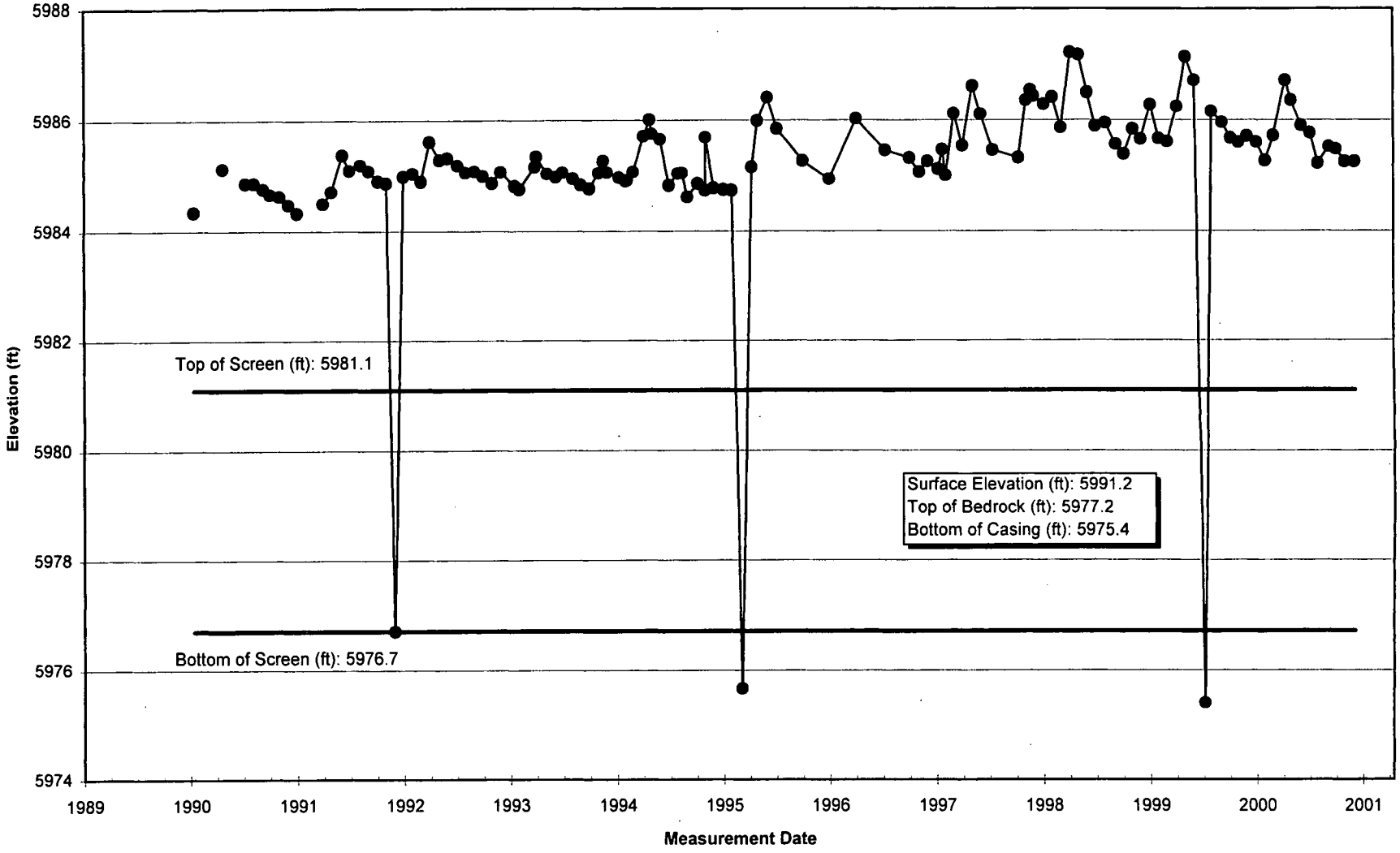
Hydrograph P114389



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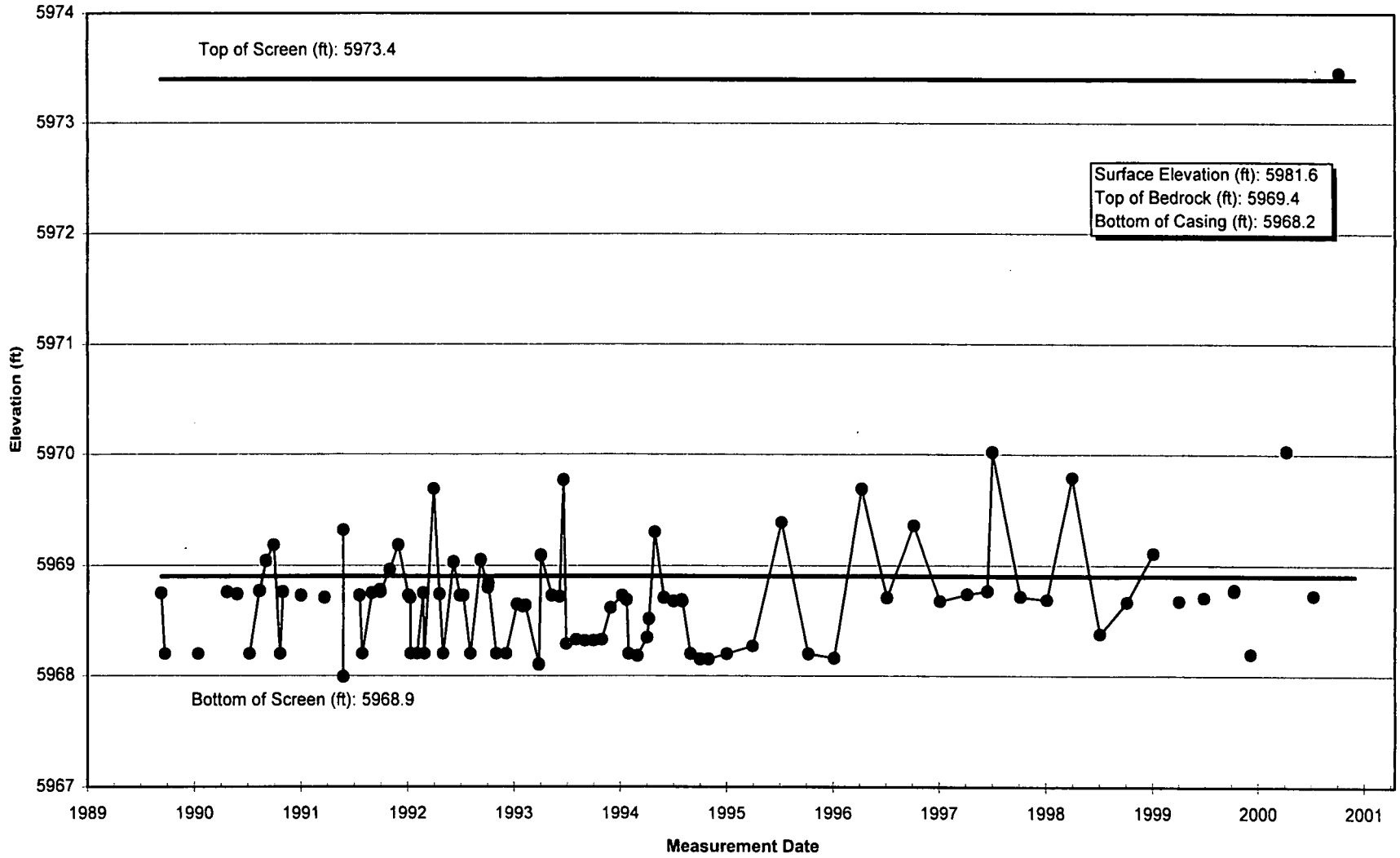
HG-Master S20 P114389 9/25/01

Hydrograph P209289



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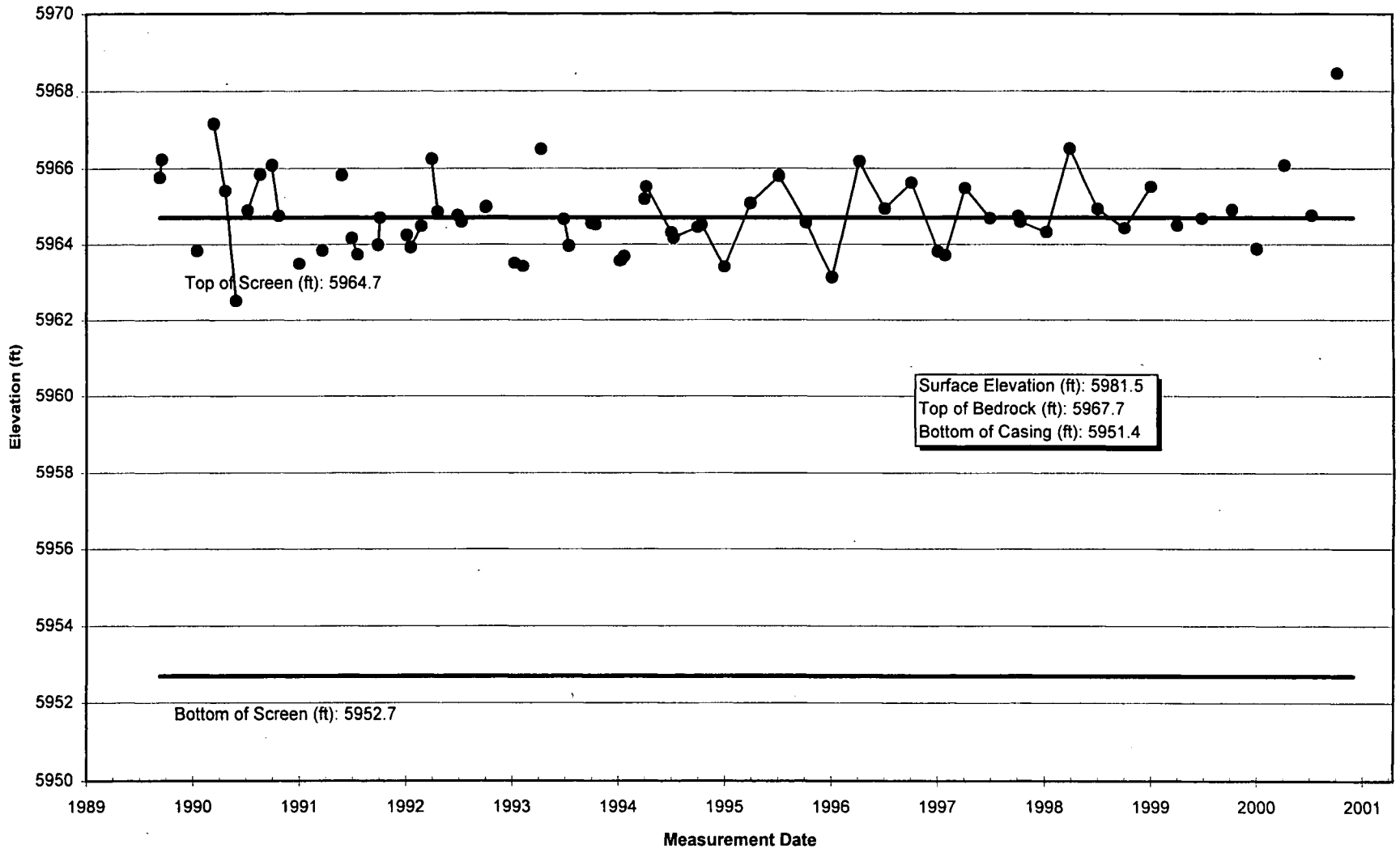
HG-Master S21 P209289 9/25/01

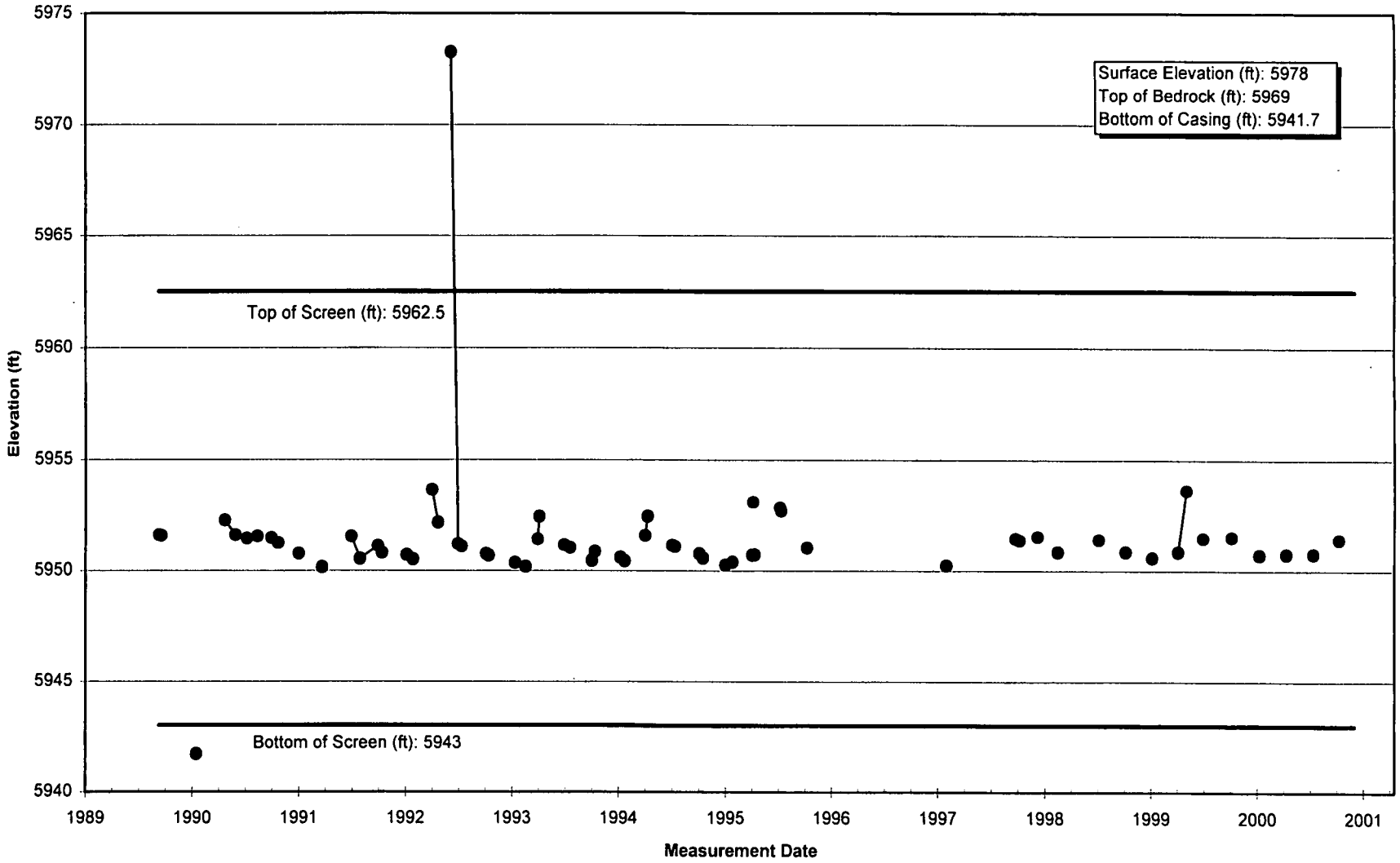
Hydrograph P209389



HG-Master S21 P209389 9/25/01

513

Hydrograph P209489



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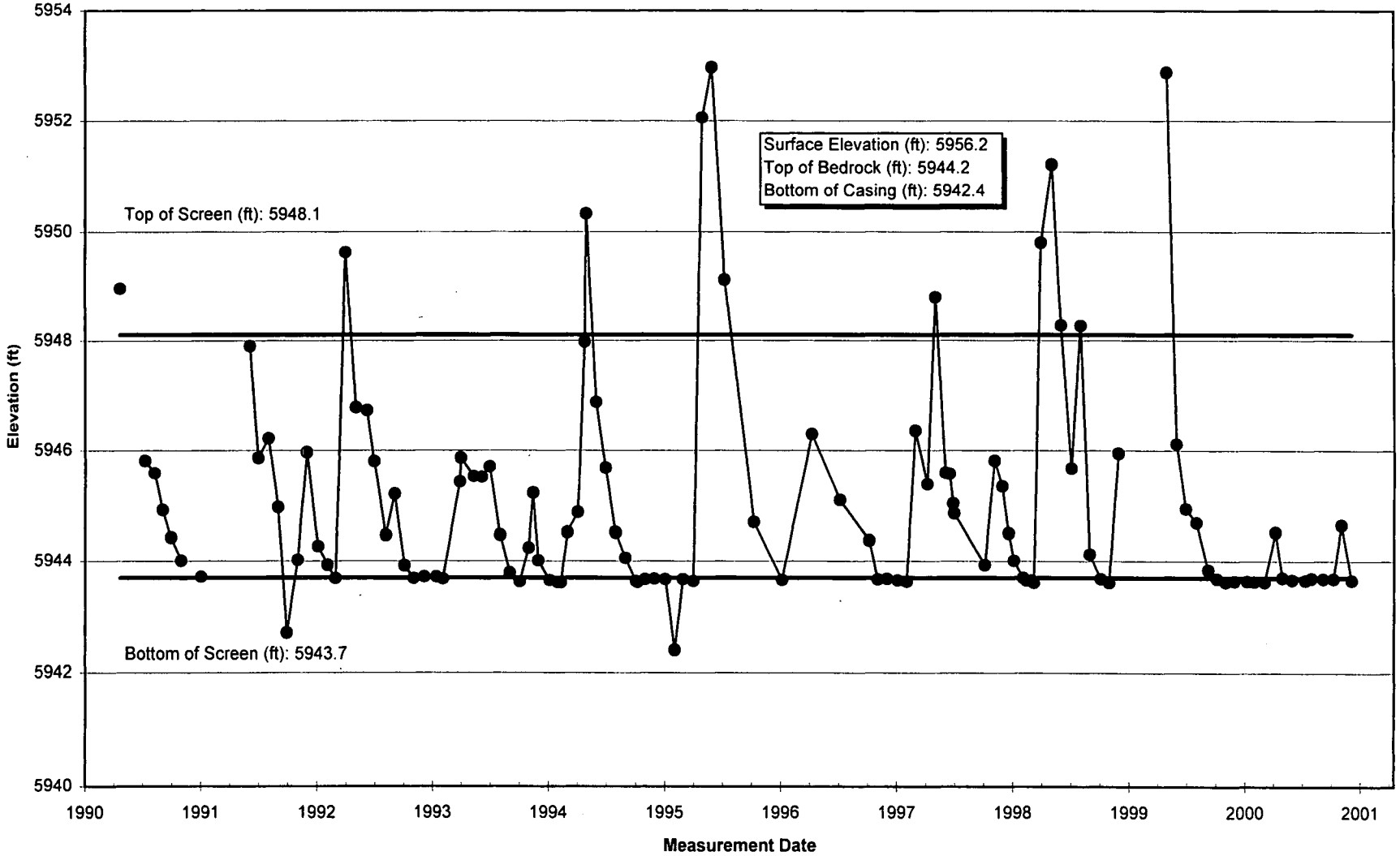
Hydrograph P218389



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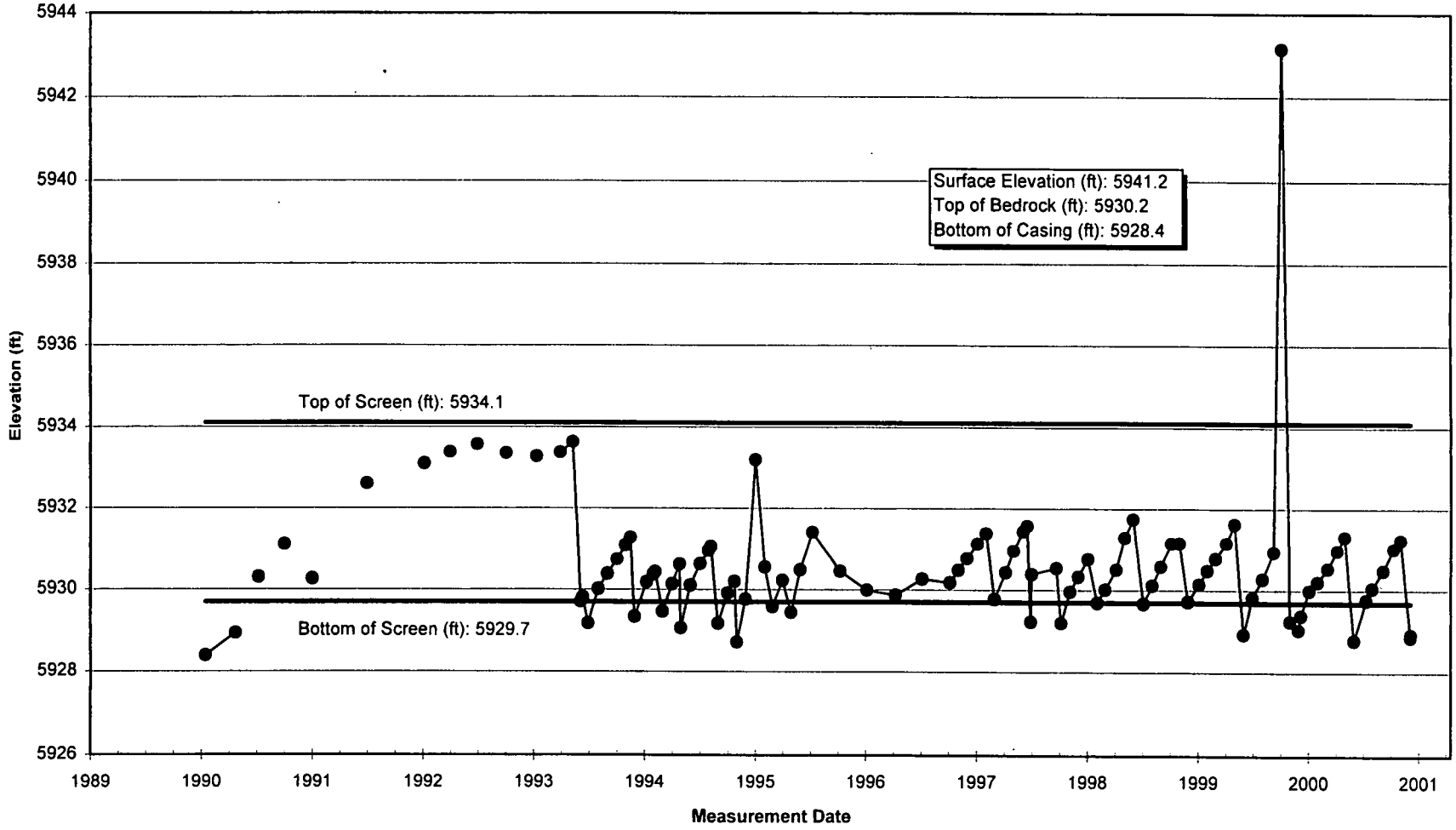
Hydrograph P219189



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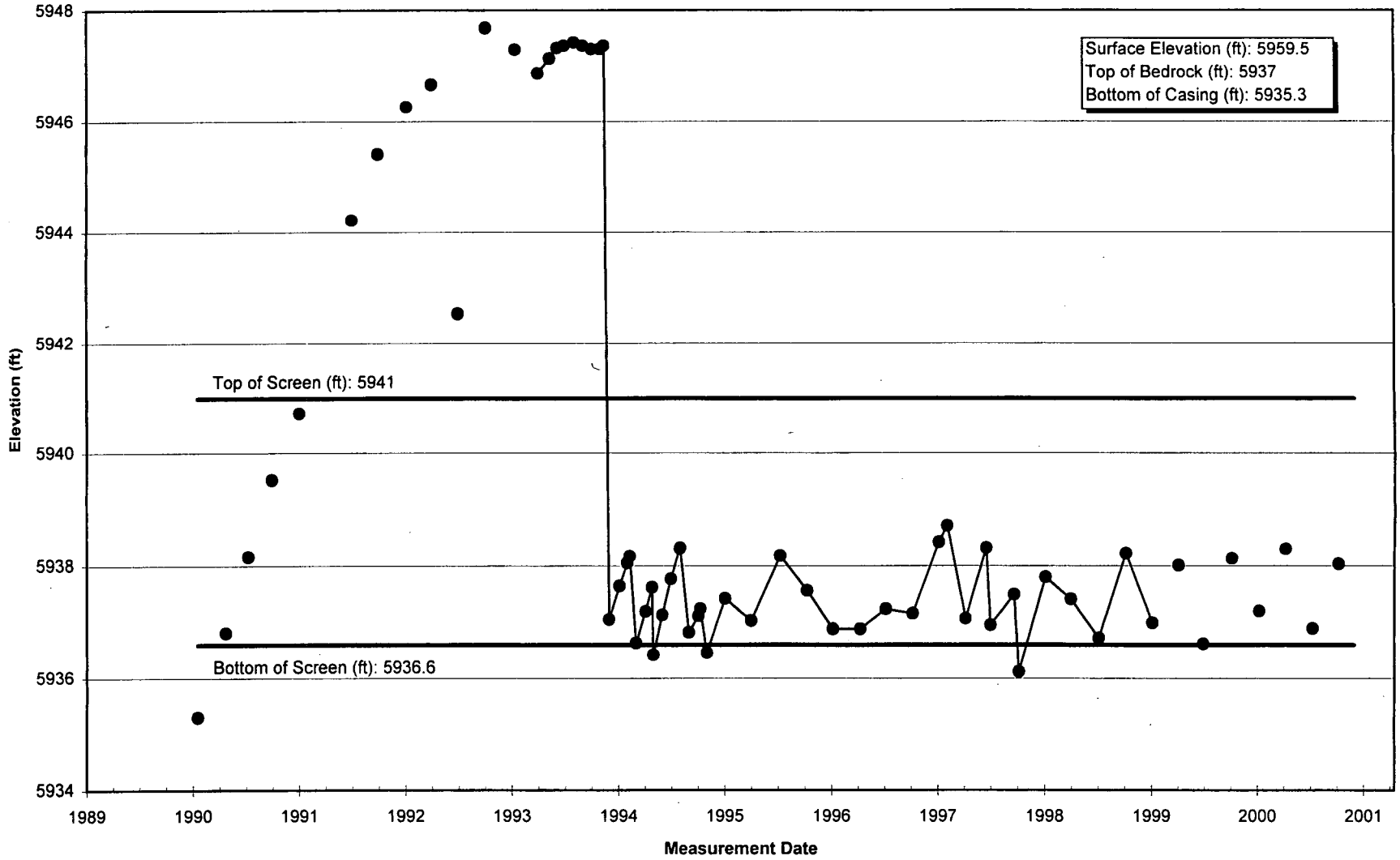
Hydrograph P219489



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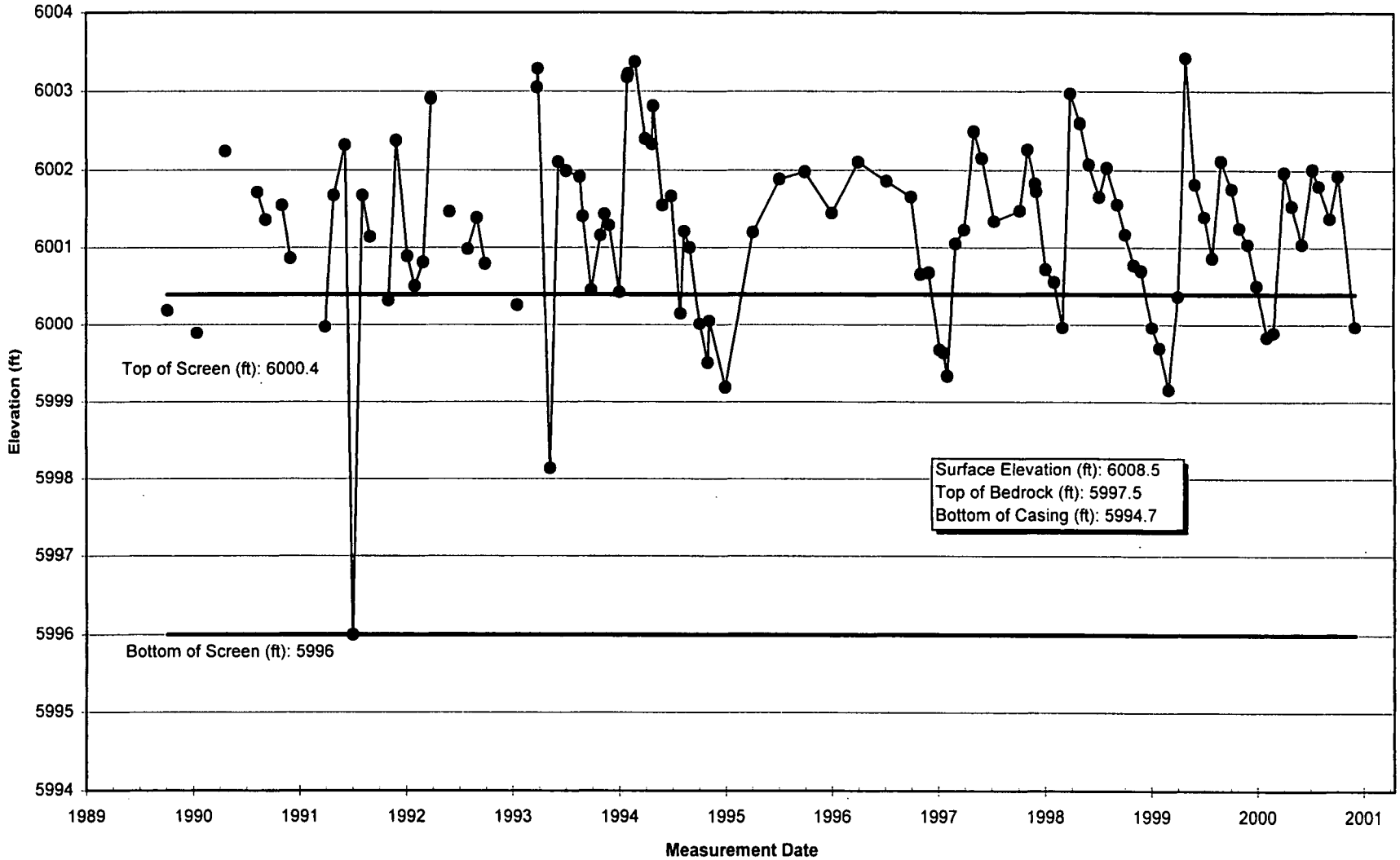
Hydrograph P313589



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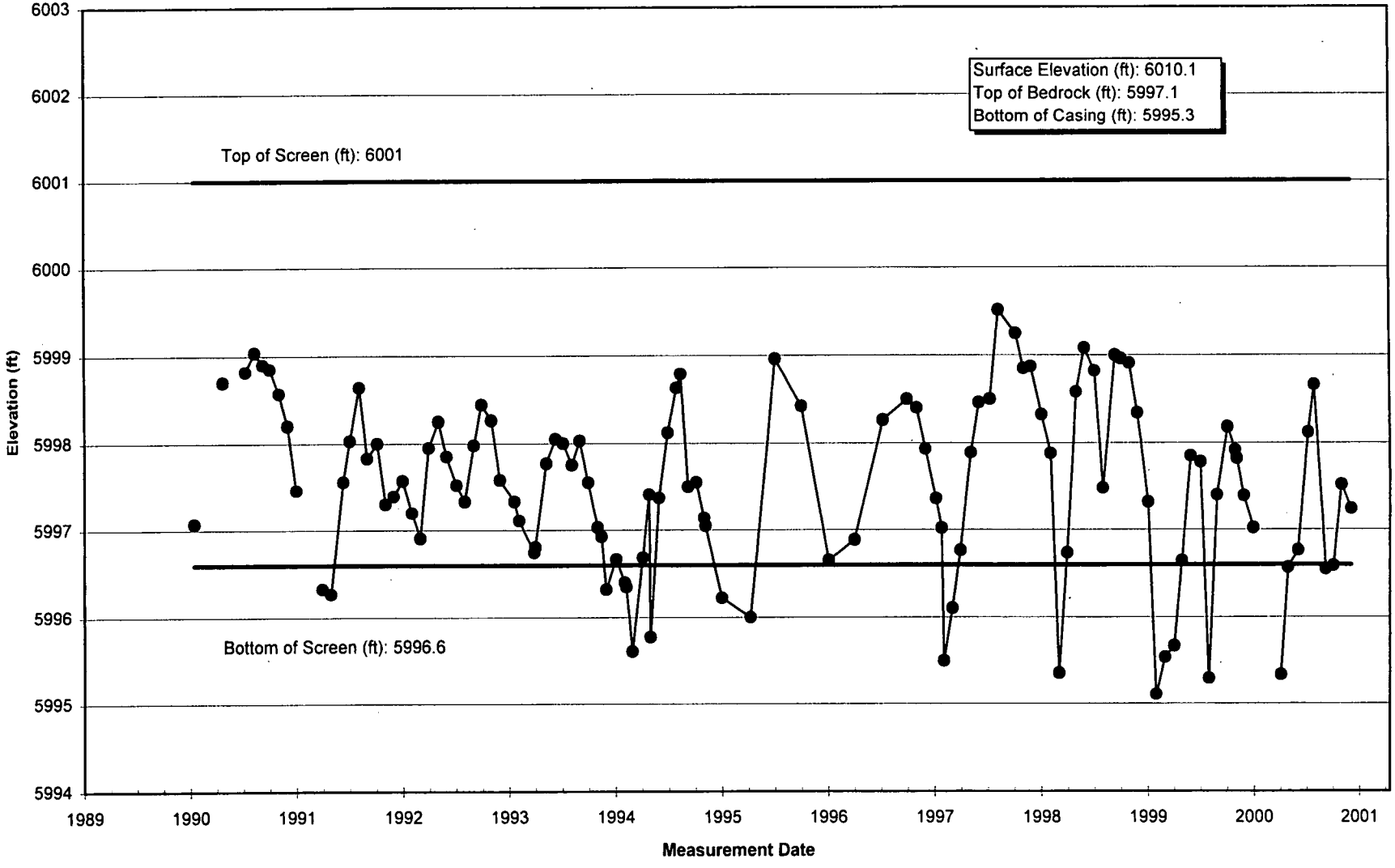

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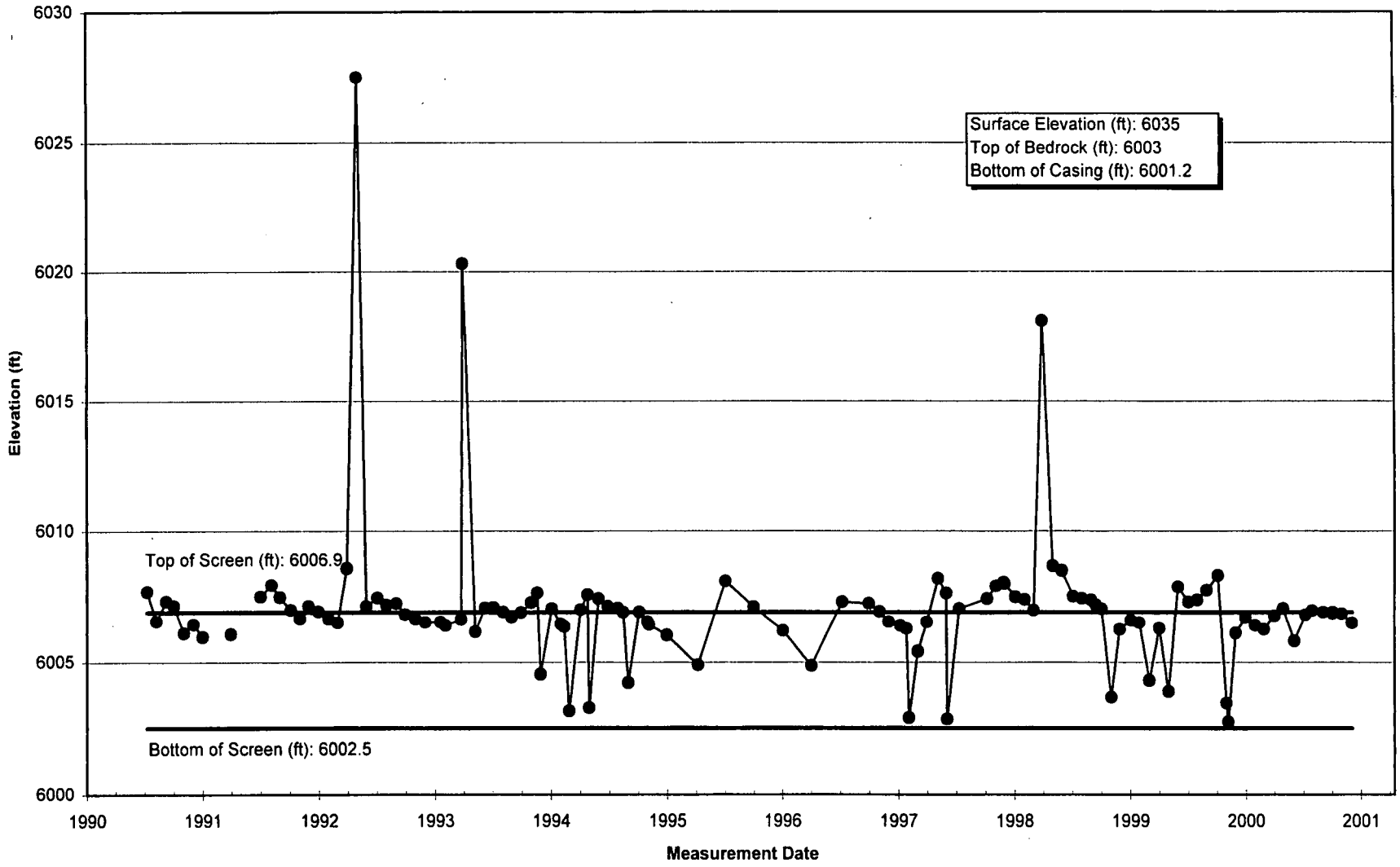
Hydrograph P416689



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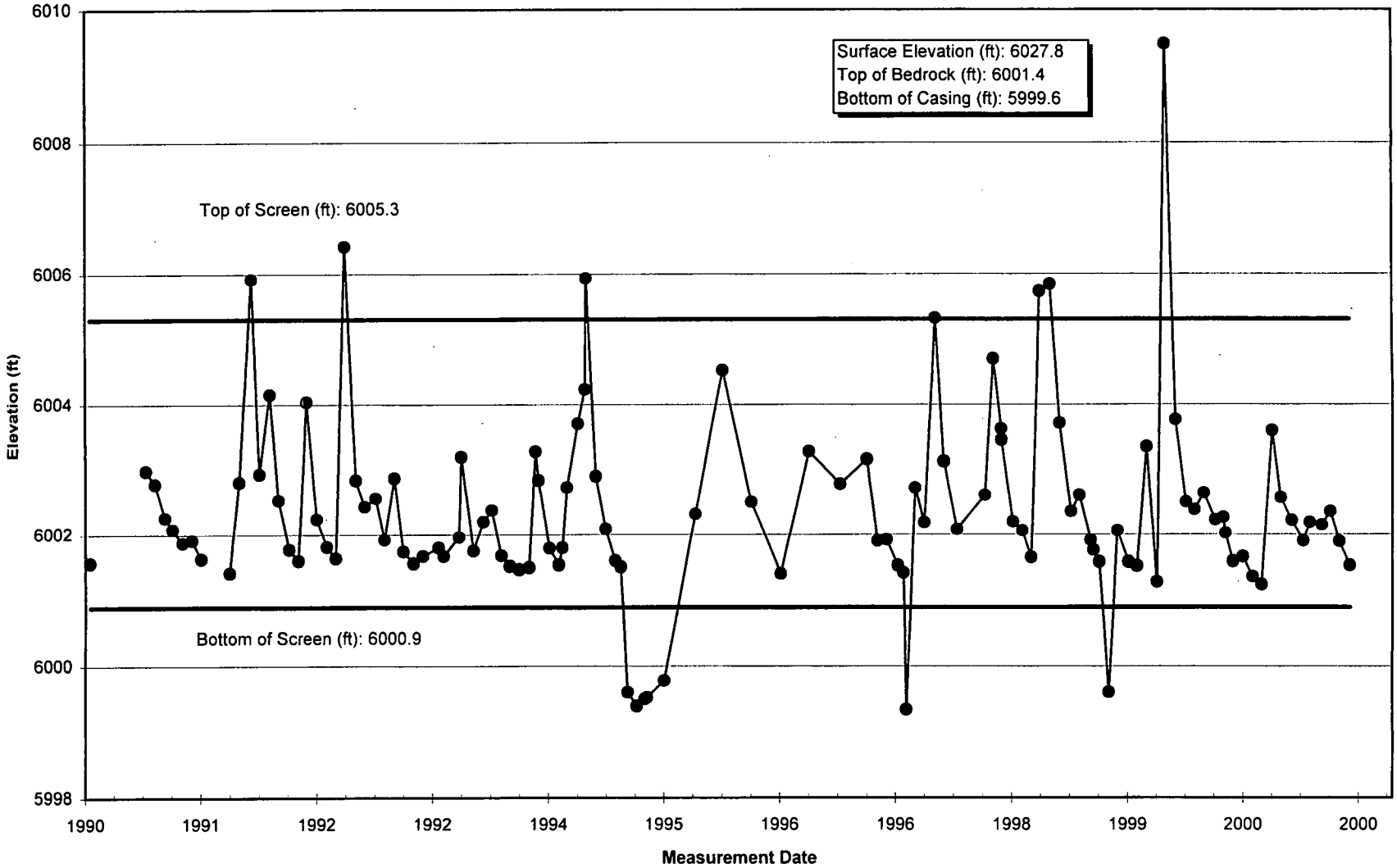
HG-Master S22 P416689 9/25/01

Hydrograph P416789



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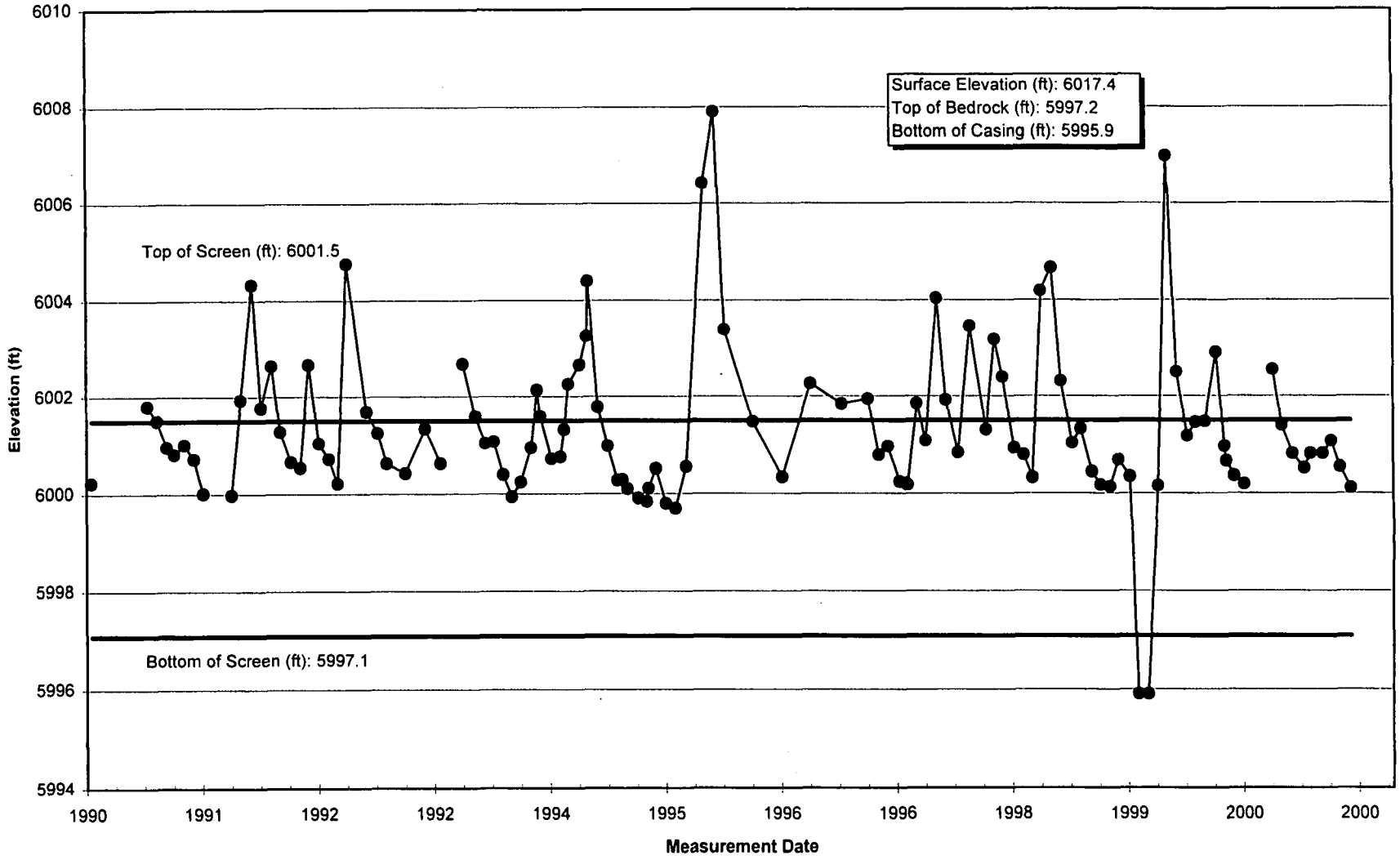
HG-Master S22 P416789 9/25/01

Hydrograph P416889



522

HG-Master 622 P416889 9/25/01

STATE PLANE COORDINATES AREA:
NORTH: 750667.64
EAST: 2084438.5
PROJECT: RFETS Geological Db
REMARKS:

GRND ELEV. (FT): 5977.88
TOTAL DEPTH (FT): 31.70
COMPLETION DATE: 8/23/00

CASING DIA (IN):
BH DIA. (IN):
GRID LOCATOR:

GEOLOGIST: John Boylan w/B.Walsh,P.Graham,E.Francis

LOG OF BORING NUMBER: 00100

Elev (Ft)	Depth (Ft)	Well or Piezometer Construction and Materials	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
	1				
5978	0				NO RECOVERY: 0.0-1.4 - No Recovery. Hand dug for flush mount installation.
5977	1	Protective Casing, Sch 40-PVC, 2 in. ID. Seal, Granular Bentonite			
5976	2	Casing, Sch 40-PVC, 0.75 in. ID.			SM: 1.4-2.3 - Gravelly SAND with silt to clayey GRAVEL. Very dark grayish brown to dark brown (10 YR 3/2-3/3) from 1.4' to 1.7', SM. From 1.7' to 2.3' very dark gray (10 YR 3/1), GC. Contains fibrous material (fur/hairs) in GC. Slightly moist.
					GC: 1.7-2.3 - See GC description above.
5975	3	Filter Pack, 16-40 silica sand + some cave-in			CL: 2.3-3.5 - CLAY with traces of sand and gravel. Dark reddish brown (2.5 YR 3/4) to dark reddish brown (5 YR 3/3) scattered angular gravel with occasional roots, trace sand and silt, slightly moist.
5974	4	Borehole Dia. 2 in.			GC: 3.5-5.0 - Clayey GRAVEL to sandy-clayey GRAVEL. Dark reddish brown (2.5 YR 3/4 to 5 YR 3/3) to yellowish brown (10 YR 5/4). Color grades from former to latter w/depth. Caliche inclusions inc. with color changes as does sand content. Cobbles (1.0" to 1.25" dia.) at 4.15'-4.40', quartzite.
5973	5				GC-GM: 5.0-5.9 - CLAYEY GRAVELS to silty-SANDY GRAVELS with some rock flour, extrememly mottled; dominant clay color is green (5 YR 4/3) olive. Slightly moist to dry (fractured gravels are dry). Gravels (quartzite) > 1". Rotted gravels common. Occasional caliche flecks in pockets.
5972	6				NO RECOVERY: 5.9-7.0 - No Recovery.
5971	7	Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots			GC-GM: 7.0-8.0 - CLAYEY GRAVELS to silty, SANDY GRAVELS. Same as above (5.0'-5.9') with more sand from 7.6' to 8.0'. Dominant color of sand is strong brown (7.5 YR 4/6): to SC (sand

523

Elev (Ft)	Depth (Ft)	Lithologic Description
		clay mixtures) in this interval. Trace caliche stringers and trace to some mottled caliche.
5970	8	GM: 8.0-8.8 - Silty, sandy GRAVEL to GRAVEL (with trace silt), 1" to 1.5" diameter quartzite. Strong brown (7.5 YR 4/6) grading light brownish gray (10 YR 6/2) at bottom of interval.
5969	9	NO RECOVERY: 8.8-9.0 - No Recovery.
5968	10	GC-GM: 9.0-10.5 - CLAYEY GRAVELS to silty, SANDY GRAVELS. Same as above (5.0'-8.8') with decreasing clay below 9.7'. Slightly moist to moist. 9.4' to 9.7' - caliche mottled. Quartzite cobbles (1.5" dia.) at 4.7' to 10.1'. Angular quartzite cobbles (1.2" dia.) from 10.2' to 10.5', reddish brown (2.5 YR 4/4).
5967	11	CLAYSTONE: 10.5-12.0 - CLAYSTONE to SILTY CLAYSTONE with trace very fine grained sand. Color is olive gray (5 Y 6/2) to yellowish brown (10 YR 5/6). Claystone grading to SILTY CLAYSTONE at 11.5'. Fe-staining. Caliche clasts at 11.1', carbonaceous/MnO flecks occasional, silty lenses, no bedding observed, slightly moist, mottled coloring. TOP OF BEDROCK at 10.5', ABRUPT CONTACT.
5966	12	SILTY CLAYSTONE: 11.5-12.0 - SILTY CLAYSTONE, see description above (10.5'-12.0').
5965	13	CLAYSTONE: 12.0-15.0 - CLAYSTONE with silt to clayey siltstone with sand. Color is yellowish brown (10 Y 5/6). Also gray (2.5 Y 6/1) where fresh. Caliche layer at 14.7'. Slightly moist, scattered carbonaceous/MnO most notably at 13.3'. Sandy intervals at 12.8' to 13 .1' and 14.2'. (Latter is a discreet lamina approx. 0.5" thick. Orientation is approximately 45 deg to the horizontal.) Trace sand is also noted elsewhere throughout column, but above-listed depths are where trace sand is most prevalent.
5964	14	
5963	15	CLAYSTONE: 15.0-17.0 - CLAYSTONE with silt to clayey siltstone, same as above (12.0'-15.0') with sandy lens from 16.8' to 17.0'. Slightly moist to moist at bottom. Color is (2.5 Y 6/1) gray to (2.5 YR 5/4) light olive brown.
5962	16	
5961	17	SILTY CLAYSTONE: 17.0-18.0 - SILTY CLAYSTONE to clayey siltstone to clayey-sandy siltstone. Moist to saturated (especially

524

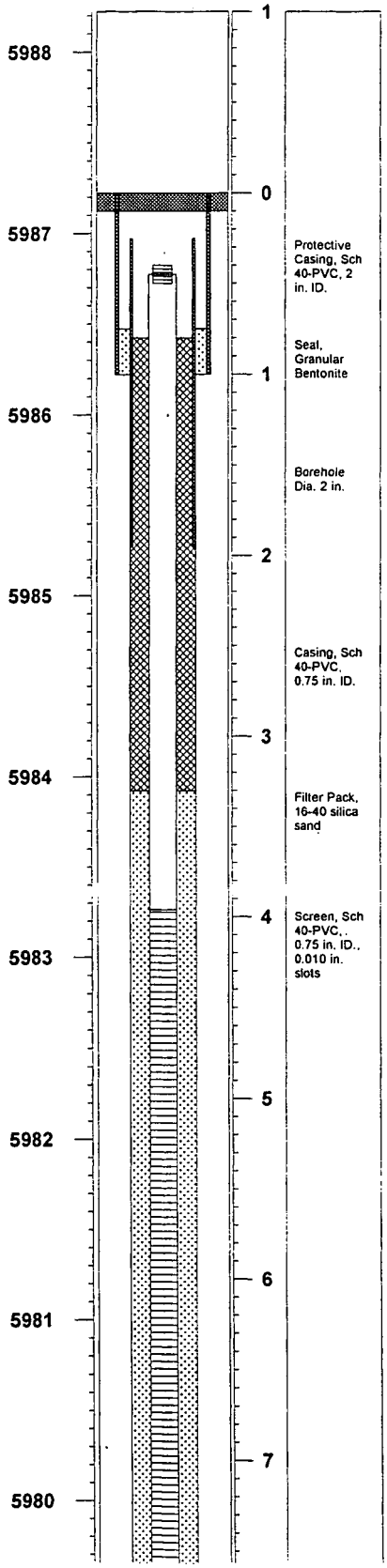
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					towards bottom of run). Slightly coarser than 10.5' to 17.0' with pure clay rare.
5960		18			CLAYSTONE: 18.0-21.0 - CLAYSTONE same as above (10.5'-18.0'), fining to silty claystone at bottom of core run.
5959		19			
5958		20			
5957		21			NO RECOVERY: 21.0-22.0 - No Recovery.
5956		22			CLAYEY SILTSTONE: 22.0-23.3 - CLAYEY SILTSTONE, gray (GLEY1 5/N), un-weathered, argillaceous cement, occasionally grading to very-fine grained sandstone, some silty clay layers, slightly moist to moist.
5955		23			
5954		24			CLAYEY SANDSTONE: 23.3-26.5 - Silty-CLAYEY SANDSTONE, yellowish brown (10 YR 5/6), pervasive Fe-staining, trace mottled to streaked light gray to white, very fine grained, subangular to subrounded, well sorted, 40-60% silty-clayey matrix, slightly moist to moist, occasional thin siltstone and claystone layers.
5953		25			
5952		26			
5951		27			CLAYSTONE: 26.5-29.1 - CLAYSTONE, grayish brown (10 YR 5/2), occasionally mottled with yellow brown (10 YR 5/6) Fe-stain. Trace thin horizontal streaks and inclusions of black carbonaceous

525

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					material. Some slightly silty, slightly moist.
5950		28			
5949		29			SILTY CLAYSTONE: 29.1-30.0 - SILTY CLAYSTONE, yellowish brown (10 YR 5/4), occasional blending to grayish brown (10 YR 5/2). Slightly moist.
5948		30			SILTY CLAYSTONE: 30.0-30.8 - SILTY CLAYSTONE, as above (29.1'-30.0').
5947		31			NO RECOVERY: 30.8-31.7 - No Recovery. NOTE; 2 in. dia. stainless Geoprobe expendable cutting shoe at bottom of hole.
5946	Bottom Cap-Sump, Sch 40-PVC, 0.75 in. ID., w/rivets	32			

526

STATE PLANE COORDINATES AREA: NORTH: 750097.31 EAST: 2084020.29 PROJECT: Borehole & Well REMARKS:	GRND ELEV. (FT): 5987.22 TOTAL DEPTH (FT): 20.00 COMPLETION DATE: 10/16/00 GEOLOGIST: Brian Walsh	CASING DIA (IN): BH DIA. (IN): GRID LOCATOR:	LOG OF BORING NUMBER: **00200**



Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		NO RECOVERY: 0.0-1.2 - No Recovery, flush mount installation.
		SW: 1.2-3.5 - Gravelly SAND, grayish brown (10 YR 5/2). Predominantly medium to coarse grained. Occasionally fine to very fine grained. Well graded. Subangular, som e subround. Gravel, 10-20%, quartzite and granitic, subround. Loose unconsolidated grains. Good interparticle porosity. Moist. Very minor silt/clay intergranular fill.
		CL: 3.5-3.7 - Sandy CLAY, see description at 5.0'-5.3'.
		NO RECOVERY: 3.7-5.0 - No Recovery.
		CL: 5.0-5.3 - Sandy CLAY, reddish brown (5 YR 5/4), soft-firm, gritty texture. 10-20% sand-silt. Slightly moist.
		SC: 5.3-5.9 - Clayey SAND, yellowish red (5 YR 5/6). Predominantly fine grained, some very fine and medium grained, subangular-subround. Moderately graded. Some intergranular clay and sand. Loose/unconsolidated. Slightly moist.
		CL: 5.9-7.1 - CLAY, dark red (2.5 YR 3/6). Firm to crumbly. Rough to smooth texture. Slightly to moderately sandy. Slightly moist. Trace quartzite gravel to 1.0".
		SILTSTONE: 7.1-7.7 - Clayey-sandy SILTSTONE, see description below (9.0'-12.2).

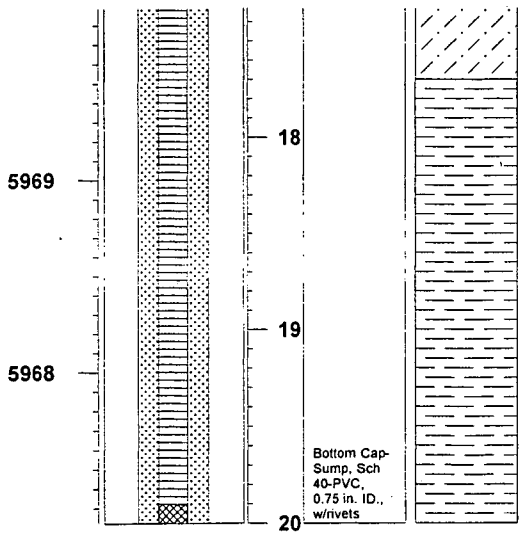
527

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		8			SM-GM: 7.7-9.0 - No Recovery.
5979					
		9			SILTSTONE: 9.0-12.2 - Clayey-sandy SILTSTONE, pale brown (10 YR 6/3) to yellowish brown (10 YR 5/8), occasionally mottled light gray (10 YR 7/1). Some clayey and sandy zones. Sandy zones are loose and crumbly. Occasional thin san laminations. Zones are smooth textured. Slightly moist. 9.0'-10.0' some grading to very fine grained sandstone.
5978					
		10			
5977					
		11			
5976					
		12			
5975					CLAYSTONE: 12.2-12.6 - CLAYSTONE, yellowish brown (10 YR 5/6) to grayish brown (10 YR 5/2). Firm. Tight-dense. Slightly silty. Slightly moist.
		13			NO RECOVERY: 12.6-13.0 - No Recovery.
5974					SILTSTONE: 13.0-13.5 - SILTSTONE, gray (10 YR 5/1). Firm. Clayey. Occasional black carbonaceous inclusions. Slightly moist.
		14			CLAYSTONE: 13.5-16.5 - CLAYSTONE, yellowish brown (10 YR 5/6) to light olive brown (2.5 Y 5/3). Firm to very firm. Dense. Tight. Occasional thin sandy-silty zones. Slightly moist. Sandy drapes may be rip-up clasts.
5973					
		15			
5972					
		16			
5971					
		17			CLAYSTONE: 16.5-17.2 - CLAYSTONE, gray (2.5 Y 5/1). Very firm. Dense. Tight. Smooth texture. Not weathered. Slightly moist.
5970					

528

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description

LOG OF BORING NUMBER: 00200



SILTSTONE: 17.2-17.7 - SILTSTONE, reddish yellow (7.5 YR 6/8). Occasional light gray streaks/laminations. Fe-stained. Slightly moist.

CLAYSTONE: 17.7-20.0 - CLAYSTONE, yellowish brown (10 YR 5/6) to grayish brown (2.5 Y 5/2). Very firm. Dense.Tight. Smooth texture. Light gray thin sandy laminations at 18.5' and 19.5'. Occasionally slightly silty. Slightly moist.

529

STATE PLANE COORDINATES AREA: NORTH: 749785.18 EAST: 2084024.93 PROJECT: Borehole & Well REMARKS:	GRND ELEV. (FT): 5986.27 TOTAL DEPTH (FT): 20.34 COMPLETION DATE: 10/19/00 GEOLOGIST: Brian Walsh	CASING DIA (IN): BH DIA. (IN): GRID LOCATOR:	LOG OF BORING NUMBER: **00300**

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5987		1			
5986	Protective Casing, Sch 40-PVC, 2 in. ID. Seal, Granular Bentonite	0 1			NO RECOVERY: 0.0-1.2 - No Recovery, flush mount installation.
5985	Casing, Sch 40-PVC, 0.75 in. ID. Borehole Dia. 2 in.				CL: 1.2-2.0 - Sandy CLAY, brown (7.5 YR 5/3). Slightly firm. 20% fine to coarse sand. A few pebbles up to 1.5". Moist. Gritty texture.
5984	Filter Pack, 16-40 silica sand Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots	2			CLAYSTONE: 2.0-5.6 - CLAYSTONE, olive brown (2.5 Y 4/3) to light olive brown (2.5 Y 5/4) to gray (5 Y 5/1) in decending order. Occasional white caliche inclusions. Slightly moist to moist. Trace black carbonaceous inclusions. Abrupt color change occurs at about 3.5'. TOP BEDROCK AT 2.0', SHARP CONTACT.
5983		3			
5982		4			
5981		5			
					CALICHE: 5.6-5.8 - CALICHE, white (2.5 Y 8/1), crumbly and granular. Some light brownish gray (2.5 Y 6/2). Limey inclusions. Slightly moist.
5980		6			IRONSTONE: 5.8-7.0 - IRONSTONE, strong brown (7.5 YR 4/6), occasionally very dark gray (7.5 YR 3/1) to reddish yellow (7.5 YR 6/8). Firm. Broken fragments. Angular curved fragments. Fe-stain. Dry.
5979		7			CLAYSTONE: 7.0-10.0 - CLAYSTONE, strong brown (7.5 YR 5/6) from 7.0' to 7.8', light olive brown (2.5 Y 5/3) from 7.8' to 10.0'. Firm. Dense. Tight. Smooth-waxy texture. Some black streaks

530

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		8			(carbonaceous?). A few yellowish brown patches (10 YR 5/4). Slightly moist.
5978					
		9			
5977					
		10			CLAYSTONE: 10.0-14.7 - CLAYSTONE, grayish brown (10 YR 5/2). Mottled brownish yellow (10 YR 6/8) from 12.5' to 13.5'. Firm to very firm. Dense. Tight. Smooth-waxy texture. Some black carbonaceous inclusions/streaks/laminations. Slightly moist. Predominantly unweathered. Horizontal fracture at 14.1'. Fracture is dry and lined with dark reddish brown (5 YR 3/4) oxidized material. Color changes at about 13.0' and 14.3'.
5976					
		11			
5975					
		12			
5974					
		13			
5973					
		14			
5972					
		15			CLAYSTONE: 14.7-17.0 - CLAYSTONE, yellowish brown (10 YR 5/6). Firm to very firm. Dense. Tight. Smooth-waxy texture. Some with rough texture. Trace gray mottling streaks. Slightly moist.
5971					
		16			
5970					
		17			CLAYSTONE: 17.0-17.9 - CLAYSTONE, light brownish gray (10 YR
5969					

531

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					6/2). Firm to slightly crumbly. Rough texture. Trace yellowish brown mottling. Slightly moist. Color change at about 17.3'.
5968		18			CLAYSTONE: 17.9-18.8 - CLAYSTONE, brownish yellow (10 YR 6/6). Firm to very firm. Dense. Tight. Smooth to rough texture. Weathered. Slightly moist. Color change at about 18.0'.
5967		19			CLAYSTONE: 18.8-20.3 - CLAYSTONE, gray (10 YR 5/1). Firm. Crumbly. Dense and tight. Slightly moist to dry. Non-weathered. Color change at about 19.1'.
5966		20	Bottom Cap-Sump, Sch 40-PVC, 0.75 in. ID., w/rivets		

532

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5988.08	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 750369.53	TOTAL DEPTH (FT): 20.00	BH DIA. (IN):	00400
EAST: 2083965.62	COMPLETION DATE: 9/7/00	GRID LOCATOR:	
PROJECT: Borehole & Well	GEOLOGIST: Brian Walsh		
REMARKS:			

Elev (Ft)	Depth (Ft)	Well or Piezometer Construction and Materials	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5989	1				
5988	0	Protective Casing, Sch 40-PVC, 2 in. ID.			NO RECOVERY: 0.0-1.5 - No Recovery, flush mount installation.
5987	1	Seal, Granular Bentonite			
		Borehole Dia. 2 in. ID.			CL: 1.5-2.5 - Silty CLAY, fill material, very dark grayish brown (2.5 Y 3/2), moist, minor sand and gravel.
5986	2	Casing, Sch 40-PVC, 0.75 in. ID.			
5985	3				CL: 2.5-4.0 - Gravelly CLAY, dark yellowish brown (10 YR 4/6), some yellowish red near top. Some quartzite gravel to 1.0" diameter, very slightly sandy to silty. Very pale brown (10 YR 8/3) caliche near base, slightly moist.
5984	4	Filter Pack, 16-40 silica sand			NO RECOVERY: 4.0-5.5 - No Recovery.
5983	5				
		Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots			CL: 5.5-6.7 - Sandy-gravelly CLAY to clayey SAND, dark yellowish brown (10 YR 4/6)-strong brown (7.5 YR 4/6)-light greenish gray (GLEY1 7/1) in decending order. Some scattered thin bedded caliche, occasional black carbonaceous inclusions, slightly moist.
5982	6				SC: See description above, mixed lithology interval.
5981	7				GM: 6.7-8.0 - Sandy-silty GRAVEL, varicolored olive (5 Y 5/4) to yellowish brown (10 YR 5/8). Quartzite gravel to 1.5" diameter in a well graded silt-sand matrix. Some clayey matrix, slightly moist.

533

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5980		8			CLAYSTONE: 8.0-9.5 - CLAYSTONE, greenish gray (GLEY2 6/1) mottled yellowish brown (10 YR 5/8). Some light gray caliche at top and some scattered throughout. Occasionally slightly silty. Tight and dense, slightly moist. TOP BEDROCK AT 8.0".
5979		9			
					NO RECOVERY: 9.5-10.0 - No Recovery (core over driven 0.5').
5978		10			CLAYSTONE: 10.0-12.1 - CLAYSTONE, as above (8.7'-10.0'), occasional silty zones, slightly moist to moist.
5977		11			
5976		12			SILTSTONE: 12.8-13.5 - SILTSTONE, strong brown (7.5 YR 4/6), weathered/oxidized, some clayey matrix although very friable. An iron nodule observed. Slightly moist.
5975		13			SILTY SANDSTONE: 12.1-12.8 - SILTY SANDSTONE, yellowish brown (10 YR 5/6), occasionally mottled light gray, very fine-occasionally fine grained, subangular, moderately sorted, weathered, some silty matrix, slightly moist to moist.
5974		14			SILTSTONE: 13.5-14.4 - SILTSTONE, as above, increase in clayey matrix, sharp color change at contact with underlying material.
5973		15			CLAYSTONE: 14.4-15.5 - CLAYSTONE, gray (GLEY1 6/), occasionally mottled reddish yellow (7.5 YR 6/6), slightly weathered/oxidized. Tight, dense, thin white caliche lense, slightly moist.
5972		16			CLAYSTONE: 15.5-18.5 - CLAYSTONE, yellowish brown (10 YR 5/4), occasionally mottled gray (GLEY1 6/), tight, dense, slightly moist.
5971		17			

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Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5970		18			
					SILTY CLAYSTONE: 18.5-19.0 - SILTY CLAYSTONE, light gray (2.5 Y 7/1) to light yellowish brown (2.5 Y 6/3), crumbly, grading to clayey siltstone, slightly moist.
5969		19			CLAYEY SILTSTONE: 19.0-19.6 - CLAYEY SILTSTONE, light gray (2.5 Y 7/1), friable, moderate clayey matrix, slightly moist, non-weathered.
	Bottom Cap-Sump, Sch 40-PVC, 0.75 in. iD., w/rivets	20			SILTY CLAYSTONE: 19.6-20.0 - SILTY CLAYSTONE, light yellowish brown, slightly moist.

LOG OF BORING NUMBER:
00400

535

STATE PLANE COORDINATES AREA:
NORTH: 750693.49
EAST: 2084209.82
PROJECT: Borehole & Well
REMARKS:

GRND ELEV. (FT): 5982.30
TOTAL DEPTH (FT): 20.20
COMPLETION DATE: 9/12/00
GEOLOGIST: Brian Walsh/E.A. Francisco

CASING DIA (IN):
BH DIA. (IN):
GRID LOCATOR:

LOG OF BORING NUMBER: 00500

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5983, 5982, 5981, 5980, 5979, 5978, 5977, 5976, 5975	Protective Casing, Sch 40-PVC, 2 in. ID.; Seal, Granular Bentonite; Borehole Dia. 2 in.; Casing, Sch 40-PVC, 0.75 in. ID.; Filter Pack, 16-40 silica sand; Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots	1, 0, 1, 2, 3, 4, 5, 6, 7			NO RECOVERY: 0.0-1.2 - No Recovery, flush mount installation, asphalt and artificial fill.
					CL: 1.2-4.0 - Gravelly CLAY, reddish brown (5 YR 4/3) occasionally mottled dark greenish gray (GLEY 24/10G), slightly sandy to silty. 10% gravel, predominantly subround quartzite. Slightly moist.
					CL: 4.0-4.5 - Sandy-gravelly CLAY, dark greenish gray (GLEY1 4/1), 10% gravel, 10% sand. Some light gray caliche inclusions to 2mm, slightly moist.
					NO RECOVERY: 4.0-4.5 - No Recovery.
					CL: 5.0-5.4 - Sandy-gravelly CLAY, same as above (4.0'-4.5').
					SM: 5.4-7.9 - SILTY SAND, with some clay and gravel, reddish brown (5 YR 5/4) to yellowish red (5 YR 5/6). Sandy CLAY layer 5.8' to 6.4 ft, greenish gray. Caliche inclusions. 20% gravel, subangular to subround quartzite up to 0.1' (-ft.). Slightly moist; to clayey sand.
					CL: 5.8-6.4 - SANDY CLAY, see description 5.4'-7.9' above.
					SC: 5.8-6.4 - CLAYEY SAND, see description 5.4'-7.9' above.
					SM: 6.4-7.9 - SILTY SAND, see description 5.4'-7.9' above.

536

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5974		8			GC: 7.9-8.7 - Clayey GRAVEL, dark greenish gray (GLEY1 4/1). Slightly silty to sandy clay matrix. Slightly moist, 50-60% broken quartzite fragments.
5973		9			NO RECOVERY: 8.7-9.4 - No Recovery
5972		10			GC: 9.4-10.5 - Clayey GRAVEL as above (7.9'-8.4'). 60-70% broken quartzite fragments. Moist matrix.
5971		11			GP: 10.5-10.8 - GRAVEL, gray (GLEY1 6/4), angular, (broken) quartzite fragments to 0.1' (ft.). Some light gray powder produced by coring. <5% silt-sand-clay matrix, slightly moist. NOTE: Coring refusal at 10.8', offsets 2' east (#1) and 3' east (#2).
5970		12			GC: 10.8-12.8 - Clayey GRAVEL, dark greenish gray (GLeY1 4/1) to dark reddish brown (5 YR 3/2). Angular, broken quartzite fragments up to 0.10' (ft.) in size.
5969		13			NO RECOVERY: 12.8-13.0 - No Recovery.
5968		14			SAND: 13.0-14.8 - SAND, greenish gray (GLEY1 5/1) to light olive brown (2.5 Y 3/2). Poorly graded, fine w/trace of medium grains, subrounded w/some subangular. Trace of Fe-staining and silty clay layers from 13.7 to 14.0. Slightly moist to moist. Sand is very friable w/abundant loose grains.
5967		15			CLAYEY SAND: 14.8-15.2 - CLAYEY SAND, light olive brown (2.5 Y 5/6), trending to silty clay-olive brown (2.5 Y 4/3). Some Fe-staining w/sand lenses.
5966		16			SAND: 15.2-16.7 - Silty-clayey SAND, light yellowish brown (2.5 Y 6/3). Poorly graded, very fine grained with traces of fine grained. Clay zones at 15.2' and 16.5'. Some Fe-staining throuhout interval. Slightly moist.
5965		17			NO RECOVERY: 16.7-17.0 - No Recovery.
					SAND: 17.0-18.0 - SAND as above (13.0'-14.8'), grades to silty-clayey

537

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					sand at bottom of interval, yellowish brown (10 YR 5/8).
		18			NO RECOVERY: 18.0-18.5 - No Recovery.
5964					
5963		19			CLAYEY SILTSTONE: 18.5-20.2 - CLAYEY SILTSTONE, light yellowish brown (2.5 Y 6/3) to brownish yellow (10 YR 6/8). Clay zones at 18.6'-18.9', 19.2' and 20.0', olive gray (5 Y 5/2) the dominant color. Some Fe-staining throughout, as well as traces of carbonaceous staining in clay zones. Trace to some very fine grained sand lenses. Slightly moist.
	Bottom Cap-Sump, Sch 40-PVC, 0.75 in. ID., w/rivets	20			

538

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5984.52	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 750718.71	TOTAL DEPTH (FT): 20.00	BH DIA. (IN):	00600
EAST: 2084000.88	COMPLETION DATE: 9/11/00	GRID LOCATOR:	
PROJECT: Borehole & Well	GEOLOGIST: Brian Walsh/E.A. Francisco		
REMARKS:			

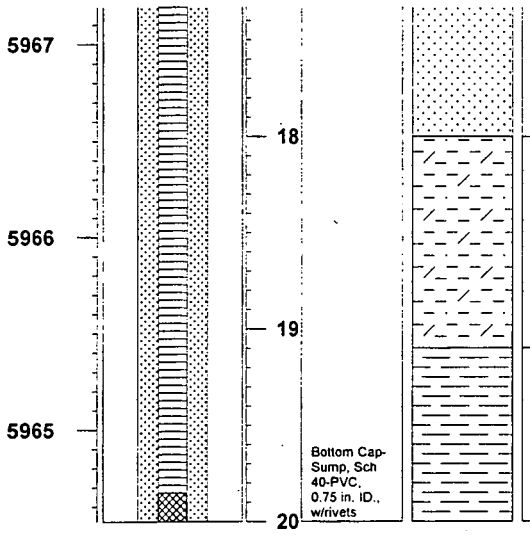
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5985		1			
		0			NO RECOVERY: 0.0-1.2 - No Recovery, flush mount installation, gravel, sand, silt and clay.
5984	Protective Casing, Sch 40-PVC, 2 in. ID.				
	Seal, Granular Bentonite	1			
5983	Casing, Sch 40-PVC, 0.75 in. ID.				CL: 1.2-4.1 - Gravelly-sandy CLAY, dark reddish bown (2.5 YR 3/4) to yellowish brown (10 YR 5/4), 10-20% broken quartzite fragments, occasional sandy-silty zones; 0.2' (ft.) very dark brown organic soil at top, slightly moist.
	Borehole Dia. 2 in. ID.	2			
5982					
		3			
5981					
	Filter Pack, 16-40 silica sand	4			
5980					SC: 4.1-6.4 - Clayey SAND with gravel, yellowish brown (10 YR 5/6)-strong brown (7.5 YR 5/6), fine-coarse grained, well graded, subangular, moderate clay-occasional silty matrix. 10% angular (broken) quartzite fragments to 0.1' (ft.). Slightly moist.
		5			
5979	Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots				
		6			
5978					CLAYSTONE: 6.4-6.8 - CLAYSTONE, light yellowish brown (2.5 Y 6/4), occasionally mottled yellowish brown (10 YR 5/8), tight, dense, some slightly silty, slightly moist. TOP BEDROCK AT 6.4'.
		7			SILTSTONE: 6.8-7.5 - SILTSTONE, light yellowish brown (2.5 Y 6/4), some mottled yellowish brown (10 YR 5/8), slight-moderate clayey matrix, slightly moist.
5977					

539

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		8			SANDSTONE: 7.5-8.3 - SANDSTONE, light yellowish brown (2.5 Y 6/4), some mottled yellowish brown (10 YR 5/8). Very fine-fine grained, poorly graded, subangular. Some silty-trace clayey matrix. Slightly moist. Trace black carbonaceous inclusions.
5976					SILTSTONE: 8.3-9.3 - SILTSTONE, yellowish brown (10 YR 5/8)-light olive brown (2.5 Y 5/3). Predominantly weathered, some clayey zones. some grading to very fine grained sandstone. Slightly moist.
		9			
5975					SILTY CLAYSTONE: 9.3-9.5 - SILTY CLAYSTONE, pale brown (10 YR 7/3), slightly moist.
		10			SILTY SANDSTONE: 9.5-10.0 - SILTY SANDSTONE, very pale brown (10 YR 7/3), very fine grained-some grading to silt, poorly graded, subangular, occasional intergranular clay, slightly moist.
5974					NO RECOVERY: 10.0-10.5 - No Recovery.
		11			SILTY SANDSTONE: 10.5-11.5 - SILTY SANDSTONE, as above (9.5'-10.0').
5973					CLAYSTONE: 11.5-13.0 - Silty-sandy CLAYSTONE, yellowish brown (10 YR 5/6), occasionally mottled light gray (10 YR 7/1), some sandy-silty zones, weathered/oxidized. Thin sandstone lens at 12.5' (ft.). Slightly moist.
		12			
5972					
		13			CLAYSTONE: 13.0-13.3 - Silty-sandy CLAYSTONE, as above (11.5'-13.0').
5971					SILTY SANDSTONE: 13.3-14.6 - SILTY SANDSTONE, olive (5 Y 5/2) with some light olive gray (5 Y 6/2) lenses. Occasional mottled yellowigh brown Fe-staining. Very fine to fine grained sand, moderately sorted, subangular. Predominantly clay cementing, some clean zones. Slightly moist to moist.
		14			
5970					SANDSTONE: 14.6-16.0 - SANDSTONE, olive (5 Y 5/2) to dark yellowish brown (Fe-stains, 10 YR 4/6) with some clean zones (light gray). Very fine to fine grained, moderately sorted, subangular. Some silty to clayey zones. Slightly moist.
		15			
5969					
		16			SANDSTONE: 16.0-18.0 - SANDSTONE, gray (5 Y 6/1) tending to dark yellowish brown (10 YR 4/6) from 17.3'-18.0'. Includes clean zones. Very fine to fine grained, moderately sorted, subangular. Silty/clayey zone at 17.3'. Some Fe-staining throughout interval. Slightly moist.
5968					
		17			

540

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					LOG OF BORING NUMBER: **00600**



SILTY CLAYSTONE: 18.0-19.1 - SILTY CLAYSTONE, yellowish brown (10 YR 5/8) to dark yellowish brown (10 Y 3/6). With some fine to very fine grained sands to 18.3'. Much Fe-staining and Fe-nodules throughout to 18.1'. Very moist (core pushed Friday, core extracted Monday).

CLAYSTONE: 19.1-20.0 - CLAYSTONE, olive brown (2.5 YR 4/2) to dark gray (5 Y 4/1). Some Fe-staining at 19.1' changing to unweathered by 19.5'.

541

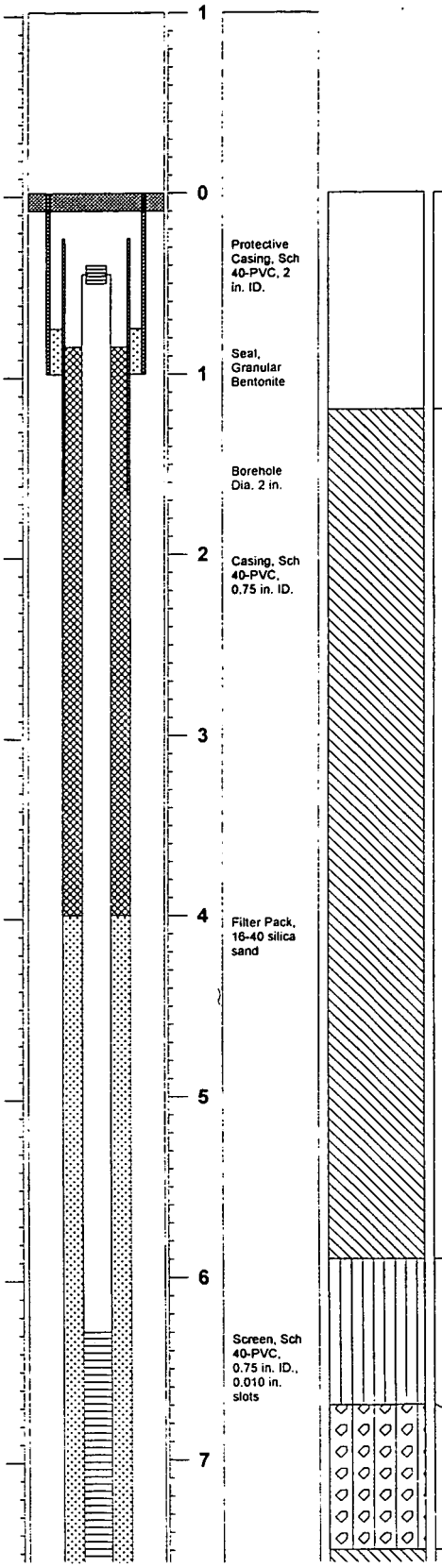
STATE PLANE COORDINATES AREA:
NORTH: 750641.54
EAST: 2083744.34
PROJECT: Borehole & Well
REMARKS:

GRND ELEV. (FT): 5985.02
TOTAL DEPTH (FT): 31.26
COMPLETION DATE: 9/6/00
GEOLOGIST: Brian Walsh

CASING DIA (IN):
BH DIA. (IN):
GRID LOCATOR:

LOG OF BORING NUMBER: 00700

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5986		1			
5985		0			NO RECOVERY: 0.0-1.2 - No Recovery, flush mount installation, 0.4' asphalt and 0.8' gravelly clay.
5984		1			CL: 1.2-5.9 - Gravelly CLAY to clayey SAND (see below), clay with silt and sand, yellow (10 YR 7/6)-light olive gray (5 Y 6/2), occasional zones of broken angular quartzite fragments to 0.15' (ft.), some caliche inclusions throughout clay. Red-yellow Fe-staining 4.5'-5.0', slightly moist. Clayey SAND, light olive gray (5 Y 6/2) predominantly medium grained, some fine and coarse grained, well graded, subangular, clay matrix.
5983		2			
5982		3			
5981		4			
5980		5			
5979		6			ML: 5.9-6.7 - Clayey SILT with gravel, yellowish red (5 YR 5/8) at top, light olive gray (5 Y 6/2) at middle and lower, some subround-subangular quartzite gravel to 0.075' (ft.), trace caliche inclusions, slightly moist.
5978		7			SM: 6.7-7.5 - Silty SAND, yellowish red (5 YR 5/6), very fine to fine grained, subangular, poorly graded, some silty matrix, slightly moist to moist.



542

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5977		8			CL: 7.5-9.7 - Sandy-gravelly CLAY, reddish yellow (7.5 YR 6/6)-light brown (7.5 YR 6/3)-yellowish brown (10 YR 5/8), 5-15% sand, occasional gravel to 0.1', trace silt, trace caliche inclusions, slightly moist, some granitic pebbles at base.
5976		9			
5975		10			CLAYSTONE: 9.7-11.9 - Silty CLAYSTONE, greenish gray (GLEY1 6/1), some mottled yellowish red (5 YR 5/8) with Fe-staining. Occasional moderate to very silty zones (some grading to clayey SILTSTONE), some black carbonaceous laminations/inclusions-11'-12', slightly moist. TOP BEDROCK AT 9.7', SHARP UPPER CONTACT.
5974		11			
5973		12			NO RECOVERY: 11.9-12.0 - No Recovery.
					SILTY CLAYSTONE: 12.0-12.8 - SILTY CLAYSTONE, gray (10 YR 5/1)-grayish brown (10 YR 5/2), occasionally mottled yellowish red, slightly to moderately silty, tight, dense, slightly moist.
5972		13			SILTSTONE: 12.8-13.3 - SILTSTONE, yellowish brown (10 YR 5/6), Fe-stained, friable to sticky with clayey matrix, trace mottled light gray (GLEY1 7/), slightly moist.
					SILTY CLAYSTONE: 13.3-14.1 - SILTY CLAYSTONE, as above (12.0'-12.8').
5971		14			SILTY SANDSTONE: 14.1-14.6 - SILTSTONE w/sand to SANDY SILTSTONE, brownish yellow (10 YR 6/8), very fine grained, well sorted, subangular, clayey cement and minor clayey matrix, moderately friable, slightly moist.
5970		15			SILTSTONE: 14.6-15.5 - SILTSTONE, light greenish gray (GLEY1 7/1), slight-moderate clay matrix, non-weathered, slightly moist.
5969		16			SANDSTONE: 15.5-19.5 - Silty-clayey SANDSTONE, reddish yellow (7.5 YR 6/8)-yellowish brown (10 YR 5/4), very fine-fine grained, moderate-well sorted, subangular, some clayey matrix, argillaceous cement, friable, Fe-stained, moist. Occasional siltstone and silty claystone interbeds at 17.5' and 18.5'.
5968		17			

543

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5967		18			
5966		19			
5965		20			SILTY CLAYSTONE: 19.5-22.6 - SILTY CLAYSTONE, brownish yellow (10 YR 6/8)-pale brown (10 YR 6/3), some mottled gray (10 YR 6/1). Predominantly weathered (Fe-stain), some very silty zones. Occasional light gray (GLEY1 7/) lamination. Slightly moist. Non-silty 22.0'-22.6'.
5964		21			
5963		22			
5962		23			SILTSTONE: 22.6-24.7 - Sandy SILTSTONE, strong brown (7.5 YR 5/8), argillaceous matrix and cement, friable, occasionally grading to very fine grained sandstone, Fe-stained, slightly moist. Becoming gray (7.5 YR 6/1)-light gray (7.5 YR 7/1) at 24.3'-24.7'. Some thin claystone layers.
5961		24			
5960		25			NO RECOVERY: 24.7-25.0 - No Recovery.
5959		26			CLAYEY SILTSTONE: 25.0-28.0 - CLAYEY SILTSTONE, yellowish brown (10 YR 5/8)-light hellowish brown (10 YR 6/4), clayey matrix and occasional thin claystone zones. Reddish brown (5 YR 4/4) horizontal fracture at 25.7'. Slightly moist, weathered.
5958		27			

544

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					LOG OF BORING NUMBER: **00700**
5957		28			SILTSTONE: 28.0-28.5 - SILTSTONE, strong brown (7.5 YR 4/6), friable-loose, argillaceous cement, Fe-stain, slightly moist.
					CLAYEY SILTSTONE: 28.5-28.8 - CLAYEY SILTSTONE, yellowish brown (10 YR 5/8)-light brownish gray (2.5 Y 6/2), occasional carbonaceous black inclusions, slightly moist.
5956		29			CLAYSTONE: 28.8-30.2 - CLAYSTONE, light olive brown (2.5 Y 5/6)-olive brown (2.5 Y 4/4), some slightly silty, predominantly tight and dense, occasional black carbonaceous inclusions, slightly moist.
5955		30			
5954	Slip Cap-Sump, Sch 40-PVC, 0.75 in. ID., w/rivets Backfill = Native material	31			CLAYSTONE: 30.2-31.0 - CLAYSTONE, grayish brown (5.2 Y 5/2), dense, tight, occasional yellowish brown mottling (Fe-stain), predominantly unweathered, trace black carbonaceous inclusions, slightly moist.

545

STATE PLANE COORDINATES AREA:
NORTH:750490
EAST: 2084531
PROJECT: RFETS Geological Db
REMARKS:

GRND ELEV. (FT):5978.00
TOTAL DEPTH (FT): 18.50
COMPLETION DATE: 8/16/00
GEOLOGIST: J.Boylan, w/B.Walsh,P.Graham,A.Francis

CASING DIA (IN):
BH DIA. (IN):
GRID LOCATOR:

LOG OF BORING NUMBER: 02500

Elev (Ft)	Depth (Ft)	Well or Piezometer Construction and Materials	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5979	1				
5978	0	Protective Casing, Sch 40-PVC, 2 in. ID.			NO RECOVERY: 0.0-1.0 - No Recovery, flush mount installation, hand-dug, noticed several scattered clasts of fiber bearing aggregate.
5977	1	Seal, Granular Bentonite			CL: 1.0-4.0 - CLAY to sandy clay with gravel, dark brown to dark yellowish brown (10 YR 3/3 to 10 YR 4/6, respectively). Mottled coloring. Trace to some gravel, <0.5" to >1". Slightly moist. Scattered flecks of caliche. Occasional FE-staining. No observable bedding.
5976	2	Borehole Dia. 2 in.			
5975	3	Casing, Sch 40-PVC, 0.75 in. ID.			
5974	4	Filter Pack, 16-40 silica sand			CL: 4.0-7.0 - Silty CLAY with some gravel, light olive brown (2.5 Y 5/4); caliche rich zone 5.5' to 6.7'-very pale brown (10 YR 8/4). Trace to some gravel, subangular, to 0.15' (ft.). Caliche zone is very clayey and contains gravel toward base, moist.
5973	5	Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots			
5972	6				
5971	7				GM: 7.0-8.8 - Sandy-silty GRAVEL with clay, brown (7.5 YR 4/6), some white caliche and Fe-stain. Gravel is subround to 0.1' (ft.) and predominantly quartzite. Slightly moist to moist below 8.6'.

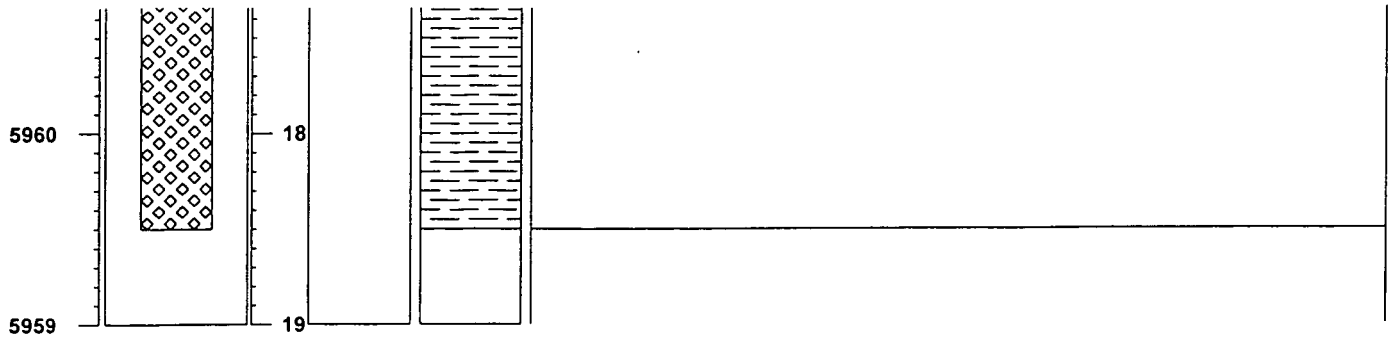
546

Elev (Ft)	Depth (Ft)	Well or Piezometer Construction and Materials	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5970	8				
5969	9				NO RECOVERY: 8.8-10.0 - No Recovery.
5968	10				GM: 10.0-10.6 - Sandy-silty GRAVEL with clay, same as above (7.0'-8.8'), saturated, more gravels.
5967	11				CLAYSTONE: 10.6-11.6 - CLAYSTONE, light olive gray to brownish yellow (5 YR 6/2 - 10 YR 6/8 respectively). Fe-staining/mottling (brownish yellow). Trace black flecks to inclusions. Slightly moist to moist. TOP BEDROCK at 10.6'.
5966	12				NO RECOVERY: 11.6-13.0 - No Recovery.
5965	13				CLAYSTONE: 13.0-15.0 - CLAYSTONE to silty claystone, yellowish brown (10 YR 6/8), mottled, Fe-stained, with pockets and streaks to light brownish gray (2.5 Y 6/2). Occasional siltstone/clayey siltstone lens. Occasional carbonaceous flecks, streaks. Slightly moist to moist. Extra recovery may represent lost recovery from 11.6'-13.0', it is also claystone to silty claystone, measures 1.5' long.
5964	14				
5963	15	Bottom Cap-Sump, Sch 40-PVC, 0.75 in. ID., w/rivets			CLAYSTONE: 15.0-16.7 - CLAYSTONE to silty claystone, as above (13.0'-15.0').
5962	16	Backfill - Native Material			
					NO RECOVERY: 16.7-17.0 - No Recovery.
5961	17				CLAYSTONE: 17.0-18.5 - CLAYSTONE to silty claystone, same as

547

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description

LOG OF BORING NUMBER:
02500



5/8

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5962.28	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 751832.86	TOTAL DEPTH (FT): 26.00	BH DIA. (IN):	30100
EAST: 2083639.37	COMPLETION DATE: 9/22/00	GRID LOCATOR:	
PROJECT: Borehole & Well	GEOLOGIST: Paul Graham		
REMARKS:			

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5964		2			
5963		1			
	Surface Casing, Sch 40-PVC, 2 in. ID.	0			
5962					OL: 0.0-0.3' - Silty CLAY, [10YR 3/2] dark grayish brown, slightly moist, organic debris present.
	Borehole Dia. 2 in.				CL: 0.3-3.7' - Silty CLAY [10YR 4/4] dark yellowish brown, firm to very firm. Moderately silty to slightly sandy. Trace gravels to 0.50" in size. Dry to slightly moist. Trace black carbonaceous inclusions in top 6" to 8".
5961	Casing, Sch 40-PVC, 0.75 in. ID.	1			
	Seal, Granular bentonite				
5960		2			
5959		3			
					NO RECOVERY: 3.7-4.0' - No Recovery.
5958		4			ML: 4.0-5.2' - Clayey SILT [7.5 YR5/8] strong brown, dry to slightly moist. Trace black inclusions. Low plasticity clay with trace fine-grained sands.
	Filter Pack, 16-40 silica sand				
5957	Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots	5			GW: 5.2-5.8' - Well graded GRAVELS, clean quartzite, 1.0"-0.25" in size. Angular, broken fragments and chips of quartzite. Some rock powder within fragments.
5956		6			CL: 5.8-6.8' - Sandy gravelly CLAY [7.5 YR5/6] strong brown, slightly moist to moist. Black gravel 1.0"-0.25" in size (10-20% gravel). Trace to some subangular sands dispersed throughout.

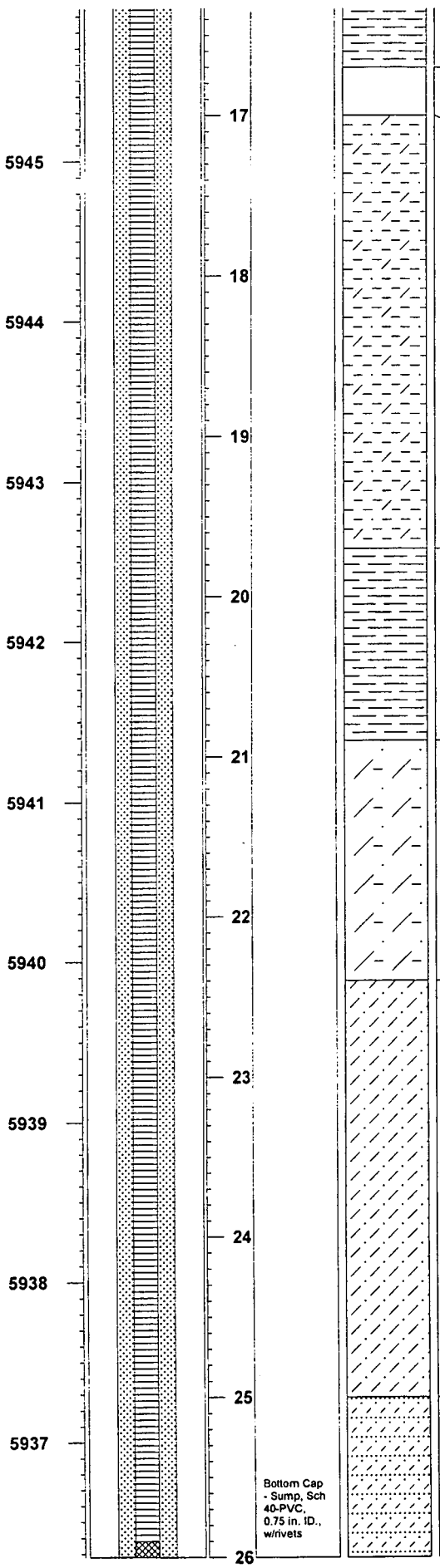
549

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		7			NO RECOVERY: 6.8-8.0' - No Recovery.
5955					
		8			CL: 8.0-8.3' - Sandy, gravelly CLAY, same as above (5.8-6.8').
5954					SILTY CLAYSTONE: 8.3-10.7' - Silty CLAYSTONE [2.5 Y 6/2] light brownish gray, to clayey siltstone [10 YR 5/8] yellowish brown. Trace to some sandy-silty zones. Weathered and dry to slightly moist. TOP OF BEDROCK AT 8.3'.
		9			
5953					
		10			
5952					
					NO RECOVERY: 10.7-11.0' - No Recovery.
		11			SILTY CLAYSTONE: 11.0-11.9' - Silty CLAYSTONE [10 YR 5/8] with some clayey to sandy lenses, weathered (to 11.9') to clayey siltstone.
5951					
		12			CLAYSTONE: 11.9-12.9' - CLAYSTONE, less weathered [2.5 Y 5.2] grayish brown, occasionally mottled, dry to slightly moist.
5950					
		13			CLAYSTONE: 12.9-13.6 - CLAYSTONE, yellowish brown [10 YR 5/8], dry to slightly moist.
5949					
					NO RECOVERY: 13.6-14.0' - No Recovery.
		14			CLAYSTONE: 14.0-16.7' - CLAYSTONE [10 YR 5/6] yellowish brown. Dry to slightly moist. Highly oxidized zone at 14.3'. Possible fracture/slip zone indicator.
5948					
		15			
5947					
		16			
5946					

550

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description

LOG OF BORING NUMBER: 30100



NO RECOVERY: 16.7-17.0' - No Recovery.

SILTY CLAYSTONE: 17.0-19.7' - Silty CLAYSTONE [2.5 Y 3/3] dark olive brown. Trace to some black carbonaceous inclusions. Slightly moist to moist. Increasing amount of silt from 17.5' to 19.7', unweathered, dense, tight.

CLAYSTONE: 19.7-20.9' - CLAYSTONE [2.5 Y3/3] dark olive brown. Slightly moist.

CLAYEY SILTSTONE: 20.9-22.4' - Clayey SILTSTONE to SILTSTONE [2.5 Y 3/3] to [5 Y 7/3] with occasional sandy zones. Dry, crumbly, carbonaceous flecks and chunks are present, scattered throughout, especially at 21.9'.

SILTSTONE: 22.4-25.0' - SILTSTONE [5 Y 7/3] pale yellow, dry to slightly moist. Trace sands.

SANDY SILTSTONE: 25.0-26.0' - Sandy SILTSTONE [5 Y 7/2] light gray. Dry to slightly moist. Occasional sandy zones.

551

STATE PLANE COORDINATES AREA: NORTH: 751884.08 EAST: 2083852.07 PROJECT: Borehole & Well REMARKS:	GRND ELEV. (FT): 5959.08 TOTAL DEPTH (FT): 28.00 COMPLETION DATE: 9/26/00 GEOLOGIST: Brian Walsh	CASING DIA (IN): BH DIA. (IN): GRID LOCATOR:	LOG OF BORING NUMBER: **30200**

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5961		2			
5960		1			
5959	Surface Casing, Sch 40-PVC, 2 in. ID.	0			OL: 0.0-0.4' - Clayey SILTSTONE, dark brown (7.5 YR 3/2), some gravel and sand, organic, moist.
	Borehole Dia. 2 in.				CL: 0.4-1.0' - CLAY, brown (10 YR 5/3), some sandy zones, trace gravel, oxidized fractures at base, slightly moist.
5958	Seal, Granular Bentonite Casing, Sch 40-PVC, 0.75 in. ID.	1			SC: 1.0-1.8' - Clayey SAND, yellowish brown (10 YR 5/8)-light gray (10 YR 7/1), fine-coarse grained, subangular-subround, well graded, clayey-silty intergranular matrix, occasional gravel to 0.75", dry-slightly moist.
5957		2			CLAYSTONE: 1.8-4.8' - CLAYSTONE (weathered), yellowish brown (10 YR 5/4), firm, tight, dense, smooth, slightly silty, trace black carbonaceous inclusions, trace caliche toward top, slightly moist. BEDROCK TOP @ 1.8' (ABRUPT)
5956		3			
5955		4			
	Filter Pack, 16/40 silica sand				
5954	Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots	5			CLAYSTONE: 4.8-7.3' - CLAYSTONE, light gray (2.5 Y 7/1), occasionally mottled brownish yellow (10 YR 6/6), predominantly tight and dense, smooth texture, trace slightly silty, thin sandy-silty zones at 7.0', some dark brown streaks-inclusions in sandy zones. Slightly moist. Unweathered.
5953		6			

552

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5952		7			
					CLAYSTONE: 7.3-8.0' - CLAYSTONE (weathered) as above 1.8-4.8'.
5951		8			SANDSTONE: 8.0-8.3' - SANDSTONE, brownish yellow (10 YR 6/6) - light gray (10 YR 7/1), very fine grained, well sorted, subangular, some grading to siltstone, slightly moist.
					CLAYSTONE: 8.3-10.0' - CLAYSTONE, yellowish brown (10 YR 5/8), 8.3-8.9' gray (10 YR 6/1), below 8.9' unweathered. Mostly tight and dense, a few silty-sandy lenses. Slightly moist.
5950		9			
5949		10			CLAYSTONE: 10.0-11.5' - CLAYSTONE, as above 8.9-10.0' (gray and unweathered), very minor yellowish brown mottling.
5948		11			
					SANDSTONE: 11.5-11.9' - SANDSTONE, light gray (10 YR 7/1)-grayish brown (2.5 Y 5/3), very fine grained, well sorted, subangular, some silty-clayey zones, slightly moist.
5947		12			CLAYSTONE: 11.9-14.0' - CLAYSTONE, yellowish brown (10 YR 5/4)-light brownish gray (10 YR 6/2). Predominantly tight and dense, some thin silty-slightly sandy zones. Mostly slightly moist. Note: At 12.8-13.0' is an oxidized (strong brown 7.5 YR 5/8) zone that is broken/fractured and WET. Zone contains an increase in silt.
5946		13			
5945		14			CLAYSTONE: 14.0-17.0' - Silty CLAYSTONE, light yellowish brown (2.5 Y 6/4)-gray (2.5 Y 6/1), firm, moderately silty, occasional thin sandy lenses-laminations (like 14.5-15.1'), slightly moist. Trace caliche flecks.
5944		15			
5943		16			

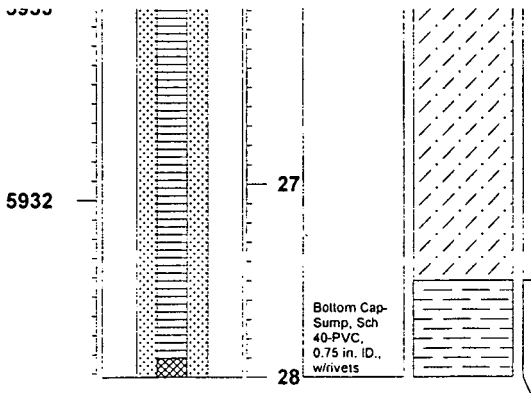
563

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5942		17			CLAYSTONE: 17.0-19.1' - CLAYSTONE, strong brown (7.5 YR 5/6)-yellowish brown (10 YR 5/4)-gray (10 YR 6/1), firm, dense, tight, smooth texture, very slightly silty. Three oxidized horizontal fractures at 18.8, 19.0 and 19.2'. Slightly moist.
5941		18			
5940		19			SILT: 19.1-20.0' - Sandy-clayey SILT, gray (10 YR 6/1)-light gray (10 YR 7/1) occasionally mottled pale brown (10 YR 6/3). Some very fine grained sandstone lenses and thin claystone layers, slightly moist.
5939		20			SILT: 20.0-20.9' - Sandy-clayey SILT, as above 19.1-20.0', breaks apart in blocky chunks. Decrease in sandy lenses.
5938		21			CLAYSTONE: 20.9-23.0' - CLAYSTONE, pale brown (10 YR 6/3) @ 20.9-21.4', very dark grayish brown (10 YR 3/2) @ 21.4-21.8, dark grayish brown (10YR 4/2), mottled dark yellowish brown (10 YR 4/6) @ 21.8-22.5'. Tight, dense, and smooth textured 20.9-21.8'. Crumbly below 21.8'. Some black carbonaceous streaks 21.4-21.8'. Slightly moist. Some slightly silty zones (22.5-23.0').
5937		22			
5936		23			CLAYSTONE: 23.0-24.9' - CLAYSTONE, grayish brown (10 YR 5/2) firm-very firm, tight, dense, smooth-rough texture, very slightly silty, slightly moist.
5935		24			
5934		25			SILTSTONE: 24.9-26.0' - SILTSTONE, light gray (10 YR 7/1), occasionally mottled yellow (10 YR 7/6)-very pale brown (10 YR 7/4). Very firm, some clayey matrix, trace grading to very fine grained sandstone, slightly moist.
5933		26			

554

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description

LOG OF BORING NUMBER: 30200



SILTSTONE: 26.0-27.5' - SILTSTONE as above 24.9-26.0'. Very crumbly, friable, slightly moist-dry.

CLAYSTONE: 27.5-28.0' - CLAYSTONE, dark gray (10 YR 4/1)-dark grayish brown (10 YR 4/2), very firm, tight, dense, dry. Trace white calcareous fracture fill.

555

STATE PLANE COORDINATES AREA: NORTH: 751952.4 EAST: 2084010.17 PROJECT: Borehole & Well REMARKS:	GRND ELEV. (FT): 5957.06 TOTAL DEPTH (FT): 20.00 COMPLETION DATE: 9/20/00 GEOLOGIST: Brian Walsh	CASING DIA (IN): BH DIA. (IN): GRID LOCATOR:	LOG OF BORING NUMBER: **30300**

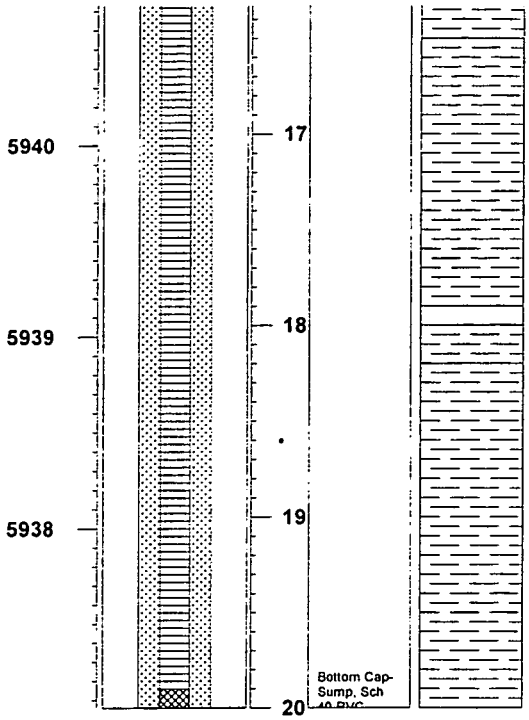
Elev (Ft)	Depth (Ft)	Well or Piezometer Construction and Materials	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5959	2				
5958	1				
5957	0	Surface Casing, Sch 40-PVC, 2 in. ID.			OL: 0.0-0.5' - Silty CLAY, dark brown (10 YR 3/3), firm organic, moderately silty, slightly sandy, slightly moist.
5956	1	Borehole Dia. 2 in. Casing, Sch 40-PVC, 0.75 in. ID.			ML: 0.5-3.3' - Sandy SILT, reddish brown (2.5 YR 4/4)-yellowish red (5 YR 5/6), firm, organic material, moderately sandy, occasional pebbles (gravel) to 0.75". Thin zone with some caliche.Slightly moist-dry. Friable.
5955	2	Seal, Granular Bentonite			
5954	3				NO RECOVERY: 3.3-4.0' - No Recovery
5953	4				ML: 4.3-9.2' - Clayey SILT, yellowish red (5 YR 4/6), firm, intergranular clay/matrix, slightly-moderately sandy, trace gravel to 0.5" (quartzite). Moist. Some grading to silty clay.
5952	5	Filter Pack, 16-40 silica sand Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots			
5951	6				

556

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5950		7			
5949		8			
5948		9			
					CL: 9.2-11.0' - Silty CLAY, reddish brown (5 YR 4/4), firm, moderately silty, slightly sandy, trace gravel to 0.5". Moist. Trace black inclusions.
5947		10			
5946		11			ML: 11.0-13.3' - Sandy-clayey SILT, yellowish red (5 YR 4/6), firm, some very fine grained sand, occasional medium-coarse grained sand, trace gravel to 0.75". Some intergranular clay. Some clay matrix. Occasionally grading to clayey-silty sand. Moist.
5945		12			
5944		13			
					CL: 13.3-14.0' - Silty CLAY, reddish brown (5 YR 4/3), firm, moderately silty, slightly sandy, trace black carbonaceous inclusions, moist.
5943		14			NO RECOVERY: 14.0-14.6' - No Recovery
5942		15			GC: 14.6-15.9' - Clayey GRAVEL, 70-80% gray (GLEY1 6/N) angular (broken) quartzite fragments to 1.5". 20-30% clay matrix: yellowish red (5 YR 5/6), silty-sandy. Very moist.
5941		16			CLAYSTONE: 15.9-16.5' - CLAYSTONE, yellowish brown (10 YR 5/4) upper weathered zone (15.9-16.2'). Grayish brown (2.5 Y 5/2) below

557

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 30300 Lithologic Description	Page 3 of 3



16.2'. Tight, dense, waxy texture, slighly moist. TOP BEDROCK @ 15.9'.

CLAYSTONE: 16.5-17.9' - CLAYSTONE as above (15.9-16.5'), yellowish brown (10 YR 5/4) 16.5-17.0', grayish brown (2.5 Y 5.2) 17.0-18.2'.

NO RECOVERY: 17.9-18.0' - No Recovery

CLAYSTONE: 18.0-18.2' - CLAYSTONE as above (16.5-17.9').

CLAYSTONE: 18.2-20.0' - CLAYSTONE (unweathered), dark gray (2.5 Y 4/1), tight, dense, waxy texture, slightly moist toward top. Slightly moist-dry and crumbly below 19.2'.

558

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5966.26	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 752127.28	TOTAL DEPTH (FT): 30.00	BH DIA. (IN):	30400
EAST: 2084237.36	COMPLETION DATE: 9/27/00	GRID LOCATOR:	
PROJECT: Borehole & Well	GEOLOGIST: Paul Graham		
REMARKS:			

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5968		2			
5967		1			
	Surface Casing, Sch 40-PVC, 2 in. ID.				
5966		0			OL: 0.0-0.9' - Black organic (material) fine grained SANDS and SILTS. (7.5 YR 2.5/1) Dry to slightly moist.
	Borehole Dia. 2 in.				
5965		1			GM: 0.9-3.9' - Sandy GRAVELS to 1.5'. Angular broken quartzite with some fine grained sands. Caliche also present. (10 YR 8/1) Dry. Some clay (lenses?) interspersed in run.
	Casing, Sch 40-PVC, 0.75 in. ID.				
	Seal, Granular Bentonite				
5964		2			
5963		3			
5962		4			NO RECOVERY: 3.9-4.0' - No Recovery.
					GM: 4.0-5.4' - GRAVELS, same as above (1.0-3.9'), with some clay lenses.
	Filter Pack, 16/40 silica sand				
5961		5			
	Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots				CLAYSTONE: 5.4-6.9' - CLAYSTONE, gray (2.5 Y 6/1). Smooth, tight clay, dry to slightly moist. No noticable fracturing. Traces black carbonaceous inclusions and orange mottling. Some caliche at top. TOP BEDROCK @ 5.4'
		6			
5960					

559

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5959		7			NO RECOVERY: 6.9-8.0' - No Recovery
5958		8			CLAYSTONE: 8.0-10.0' - CLAYSTONE, gray (5 Y 6/1). Dry, crumbles easily. Brownish orange weathering/mottling present throughout. Occasionally slightly silty. Caliche rich zone at 8.5-8.7'.
5957		9			
5956		10			CLAYSTONE: 10.0-11.0' - CLAYSTONE, gray (5 Y 6/1). Dry, crumbling claystone with brown/orange mottling. Slightly silty in some areas. Fe-oxide-stained zone at 10.0-10.7'. (Fracture/slump plane???)
5955		11			CLAYSTONE: 11.0-14.5' - CLAYSTONE, same as above (8.0-11.0'). Caliche zone at bottom of run (14.4'), occasional clasts elsewhere. Occasional carbonaceous flecks. Incresased Fe-oxides below 13.0'; disseminated at 13.0 w/some discrete stringers (possible fracture fill
5954		12			
5953		13			
5952		14			
5951		15			CLAYSTONE: 14.5-18.0' - CLAYSTONE, same as above (8.0-14.5'). Decreasing caliche. Occasional silt. Very dry and crumbles easily. Fe-oxide staining more common.
5950		16			

560

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		17			
5949					
		18			CLAYSTONE: 18.0-20.0' - CLAYSTONE, same as above (8.0-18.0'). Trace silt, becoming slightly moist 19.5-20.0'. Fe-oxide staining predominant.
5948					
		19			
5947					
		20			CLAYSTONE: 20.0-21.2' - CLAYSTONE, same as above. More weathered areas are brownish orange, smooth, clean, and tight clay. Silty sandstone rip-up clasts 20.2-20.3'.
5946					
		21			
5945					CLAYSTONE: 21.2-22.0' - CLAYSTONE, very dark grayish brown (10 YR 3/2), unweathered, black steaks/inclusions. Dry to slightly moist.
		22			CLAYSTONE: 22.0-22.9' - CLAYSTONE, same as above (21.2-22.0'). Slightly moist, with black inclusions.
5944					
		23			CLAYSTONE: 22.9-24.0' - Silty CLAYSTONE, gray (10 YR 6/1), very dry, crumbles easily. Color grades to light olive brown (2.5 Y 5.3) with increased Fe-oxides.
5943					
		24			CLAYSTONE: 24.0-25.0' - Silty CLAYSTONE, gray (10 YR 6/1), with some very silty and some slightly sandy lenses. Trace black carbonaceous inclusions, dry to slightly moist in clay. Slight Fe-oxide staining below 24.7'.
5942					
		25			CLAYSTONE: 25.0-26.0' - Silty CLAYSTONE and Clayey SILTSTONE, same as above (24.0-25.0'), with zones that are silty, zones that are sandy. Slight Fe-oxide staining throughout.
5941					
		26			

561

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5940					CLAYSTONE: 26.0-27.7' - Silty CLAYSTONE, same as above (22.9-26.0'). Dry to slightly moist. Localized increase of fine sands.
5939		27			
					NO RECOVERY: 27.7-28.0' - No Recovery.
5938		28			CLAYSTONE: 28.0-30.0' - Silty CLAYSTONE, same as above (22.9-27.7'). Dry to slightly moist. Trace to some sand @ 29.0-30.0'. Increased Fe-oxide staining relative to 26.0-27.7' material.
5937		29			
	Bottom Cap-Sump, Sch 40-PVC, 0.75 in. ID., w/rivets	30			

562

STATE PLANE COORDINATES AREA:
NORTH: 752424.9
EAST: 2084368.87
PROJECT: Borehole & Well
REMARKS:

GRND ELEV. (FT): 5962.71
TOTAL DEPTH (FT): 31.00
COMPLETION DATE: 10/12/00
GEOLOGIST: Brian Walsh

CASING DIA (IN):
BH DIA. (IN):
GRID LOCATOR:

LOG OF BORING NUMBER: 30500

Elev (Ft)	Depth (Ft)	Well or Piezometer Construction and Materials	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5964, 5963, 5962, 5961, 5960, 5959, 5958, 5957	2, 1, 0, 1, 2, 3, 4, 5, 6	Surface Casing, Sch 40-PVC, 2 in. ID.; Borehole Dia. 2 in.; Casing, Sch 40-PVC, 0.75 in. ID.; Seal, Granular Bentonite; Filter Pack, 16/40 silica sand; Csreen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots			
					OL: 0.0-0.6' - Silty-gravelly CLAY, dark brown (7.5 YR 3/2), organic, some plant material, moist.
					SC: 0.6-3.4' - Gravelly-clayey SAND, pinkish gray (7.5 YR 7/2), fine-coarse grained, well graded, subangular. Slightly moist. Some clayey matrix, 20% quartzite gravel up to 1.0". Some intergranular-patchy light gray caliche.
					NO RECOVERY: 3.4-4.0' - No Recovery
					SC: 4.0-4.5' - Gravelly-clayey SAND, as above (0.6-3.4').
					GC: 4.5-5.9' - Sandy-clayey GRAVEL, reddish yellow (7.5 YR 6/8) matrix. Gray (7.5 YR 6/1) quartzite gravel to 1.5", broken angular fragments. 20-30% sandy-clayey matrix. Slightly moist.
					CLAYSTONE: 5.9-7.0' - CLAYSTONE, greenish gray (GLEY1 5/1), firm, dense-tight, smooth texture, slightly moist. Trace black horizontal streaks toward top (possibly sample collection modified un-oriented inclusions).

563

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5956					
		7			NO RECOVERY: 7.0-8.0' - No Recovery.
5955					
		8			CLAYSTONE: 8.0-10.0' - CLAYSTONE, greenish gray (GLEY 1 5/1), occasionally mottled light yellowish brown (10 YR 6/4)-yellowish brown (10 YR 6/6), firm, dense-tight, smooth texture, slightly moist.
5954					
		9			
5953					
		10			CLAYSTONE: 10.0-11.6' - CLAYSTONE, as above (8.0-10.0'), trace white caliche inclusion (0.5") @ 10.8-11.1'.
5952					
		11			
5951					CLAYSTONE: 11.6-14.3' - CLAYSTONE, gray (GLEY1 6/N), occasionally mottled light yellowish brown (2.5 Y 6.4), firm-very firm, dense-tight, slightly moist.
		12			
5950					
		13			
5949					
		14			
5948					CLAYSTONE: 14.3-17.1' - CLAYSTONE, brownish yellow (10 YR 6/8)-light yellowish brown (2.5 Y 6/4)-gray (2.5 Y 6/1). Most of the weathered areas are in patches-thin beds-small fracture surfaces. Firm-slightly crumbly, dense, tight, rough texture, very slightly moist.
		15			
5947					
		16			

564

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5946		17			
5945		18			CLAYSTONE: 17.1-18.1' - CLAYSTONE, dark gray (5 YR 4/1), firm, crumbly core section, rough texture, non-weathered, dry.
5944		19			CLAYSTONE: 18.1-20.0' - CLAYSTONE, yellowish brown (10 YR 5/4), occasionally mottled gray (10 YR 5/1), firm, rough texture, slightly moist-dry. Fe-oxidation deposition in some discrete stringers @ 18.0-18.6'.
5943		20			CLAYSTONE: 20.0-22.0' - CLAYSTONE, dark gray (10 YR 4/1), firm, crumbly, rough texture, dry.
5942		21			
5941		22			CLAYSTONE: 22.0-23.7' - CLAYSTONE, brownish yellow (10 YR 6/8), some gray (10 YR 6/1) mottling, firm, dense-tight, smooth waxy texture, weathered, moist.
5940		23			
5939		24			CLAYSTONE: 23.7-25.0' - CLAYSTONE, dark grayish brown (10 YR 4/2), some black carbonaceous streaks and inclusions, dense, tight, smooth-rough texture, slightly moist.
5938		25			CLAYSTONE: 25.0-26.0' - CLAYSTONE, yellowish brown (10 YR 5/4), occasionally mottled gary (10 YR 5/1), firm, dense, tight, rough texture, weathered, slightly moist-dry.
5937		26			

565

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5936		27			CLAYSTONE: 26.0-27.3' - CLAYSTONE, as above (23.7-25.0').
5935		28			CLAYSTONE: 27.3-28.1' - CLAYSTONE, yellowish brown (10 YR 5/6), some mottled grayish brown (10 YR 5/2), firm, crumbly, predominantly weathered (Fe-stained), slightly moist-dry.
5934		29			CLAYSTONE: 28.1-29.3' - CLAYSTONE, gray (10 YR 5/1), some yellowish brown fracture surfaces and thin zones (10 YR 5/8), firm, dense, smooth-rough texture.
5933		30			CLAYSTONE: 29.3-31.0' - CLAYSTONE, grayish brown (10 YR 5/2), very firm, dense, tight, smooth-rough texture. Some black carbonaceous inclusions and streaks. Slightly moist.
5932	Bottom Cap-Sump, Sch 40-PVC, 0.75 in. ID., w/rivets	31			

5646

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5945.36	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 752698.89	TOTAL DEPTH (FT): 31.00	BH DIA. (IN):	30600
EAST: 2084229.94	COMPLETION DATE: 10/3/00	GRID LOCATOR:	
PROJECT: Borehole & Well	GEOLOGIST: E. A. Francisco		
REMARKS:			

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5947		2			
		1			
5946	Surface Casing, Sch 40-PVC, 2 in. ID.				
		0			OL: 0.0-1.8' - Organic silty CLAY, dark grayish brown (10 YR 4/2) to very dark grayish brown (10 YR 3/2). Some gravel up to 0.10" in size @ 0.6-0.9' (broken angular quartzite fragments). Abundant fine grass roots throughout interval to 1.8'. Dry to slightly moist @ 0.5' trending to dry @ 1.8'.
5945	Borehole Dia. 2 in.				
	Seal, Granular Bentonite				
		1			
5944	Casing, Sch 40-PVC, 0.75 in. ID.				
		2			CLAYSTONE: 1.8-3.2' - CLAYSTONE, dark reddish brown (5 YR 3/3) to light olive brown (2.5 Y 5/4). Dark grayish brown (2.5 YR 4/2) @ 3.9'. Very firm, smooth, tight and dense. Trace of caliche @ bottom of interval. Slightly moist.
5943					
		3			NO RECOVERY: 3.2-4.0' - No Recovery.
5942					
		4			CLAYSTONE: 4.0-4.1' - CLAYSTONE, as above (1.8-3.2').
5941	Filter Pack, 16/40 silica sand				SILTSTONE: 4.1-4.7' - SILTSTONE, grayish brown (2.5 Y 5/2), firm, crumbly, friable. Some small caliche inclusions throughout. Dry.
		5			CLAYSTONE: 4.7-9.8' - CLAYSTONE, light yellowish brown (2.5 Y 6/4) to very dark gray (10 YR 3/1). Some oxidized zones @ 5.0' and 6.0-6.5'. Some silty intervals down to 7.0'. Some caliche inclusions throughout interval down to 7.0'. From 7.0' to 9.8' texture is tight , smooth and waxy. Dry to slightly moist throughout interval. Black carbonaceous inclusion @ 9.6'. Oxidized from 9.3-9.8'. NOTE: From 4.1-6.0', mottling & texture resemble brecciated or otherwise disrupted materials. May indicate zone of slumping/fault.
5940	Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots				
		6			
5939					

567

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		7			
5938					
		8			
5937					
		9			
5936					
		10			CLAYSTONE: 9.8-12.0' - CLAYSTONE, becomes weathered at 9.8', light brownish gray (10 YR 6/2) to dark gray (10 YR 4/1). Black carbonaceous lense @ 10.0' as well as trace carbonaceous inclusions throughout. Slight trace of Fe-stained fracture surfaces. Dry throughout, crumbly.
5935					
		11			
5934					
		12			CLAYSTONE: 12.0-15.0' - CLAYSTONE, same as above (9.8-12.0') but with fewer carbonaceous inclusions and less Fe-staining. Predominantly dark gray (10 YR 4/1), carbonaceous inclusions @ 12.1' looks like charcoal fragments whereas inclusion @ 15.0' seems to represent plant fragments (possible leaf stem).
5933					
		13			
5932					
		14			
5931					
		15			CLAYSTONE: 15.0-18.0' - CLAYSTONE, same as above (12.0-15.0'), however, dryness changes to slightly moist @ 17.5-18.0'. Carbonaceous inclusions from 17.4-18.0'.
5930					
		16			

568

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5929					
		17			
5928					
		18			CLAYSTONE: 18.0-21.0' - CLAYSTONE, same as above (12.0-15.0' and 15.0-18.0'), however, color changes from dark gray (10 YR 4/1) to pale brown (10 YR 6/3) @ 19.0'. Trace to some carbonaceous inclusions and trace caliche inclusions. Small caliche filled fracture @19.0'. Caliche encasing small carbonaceous "pocket" and 0.25" caliche clast @ 19.5' as well as caliche filled fractures approximately 70-90 degrees. Moderate to high angle fractures, oxidized or caliche filled at about 20.0, 20.5 and 20.9'. Carbonaceous inclusion @ about 20.9'.
5927					
		19			
5926					
		20			
5925					
		21			CLAYSTONE: 21.0-23.0' - CLAYSTONE, unweathered dark gray (2.5 Y 5/1) changing to weathered light olive brown (2.5 Y 5/3) @ 22.2'. Some Fe-staining throughout on fracture surfaces. Trace of moisture. Easily friable, crumbly. Abundant small, angle varying, fractures throughout interval. Mostly Fe-stained caliche inclusion @ 22.6 and 22.9'.
5924					
		22			
5923					
		23			CLAYSTONE: 23.0-25.0' - CLAYSTONE, unweathered grayish brown (2.5 Y 5/2) changing to weathered yellowish brown (10 YR 5/6). Some Fe-staining on fracture surfaces increasing with depth to abundant staining @ 25.0'. Easily friable and crumbly. Slightly more moisture @ 24.5'. Fracture angles range from 30-50 degrees @ 23.2' to smaller high angle oxidized fractures @ 24.5'. Caliche inclusion @ 24.2'.
5922					
		24			
5921					
		25			CLAYSTONE: 25.0-27.0 - CLAYSTONE, unweathered, grayish brown (2.5 Y 5/2). Trace to some Fe-staining throughout. Trace to some moisture, easily friable.
5920					
		26			

569

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5919					
		27			CLAYSTONE: 27.0-29.0 - CLAYSTONE, same as above (25.0-27.0 ft.), with noticable Fe-staining zone at 27.5'. Slightly more moist than interval from 25.0' to 27.0'.
5918					
		28			
5917					
		29			CLAYSTONE: 29.0-31.0 - CLAYSTONE, very dark gray (2.5 Y 3/1) to yellowish brown (10 YR 5/6). Abundant Fe-staining and some moisture from 29.8' to 30.4'. Moderately friable from 29.0' to 29.8' and 30.4' to 31.0'. Trace of moisture and highly friable. Caliche clasts at 29.0' and 30.0'.
5916					
		30			
5915					
	Bottom Cap-Sump, Sch 40-PVC, 0.75 in. ID., w/rivets	31			

570

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 5935.24	CASING DIA (IN):	**LOG OF BORING NUMBER:**
NORTH: 752743.96	TOTAL DEPTH (FT): 28.00	BH DIA. (IN):	**30700**
EAST: 2084089.48	COMPLETION DATE: 9/29/00	GRID LOCATOR:	
PROJECT: Borehole & Well	GEOLOGIST: Brian Walsh		
REMARKS:			

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5937		2			
5936	Surface Casing, Sch 40-PVC, 2 in. ID.	1			
5935	Borehole Dia. 2 in. ID.	0			CL: 0.0-1.0 - CLAY, light olive brown (2.5 Y 5/3)-dark brown (7.5 YR 3/2). Soft to firm, tight, dense, smooth texture. Occasionally slightly silty. Moist (at top) to slightly moist.
5934	Seal, Granular Bentonite Casing, Sch 40-PVC, 0.75 in. ID.	1			CLAYSTONE: 1.0-4.6 - Silty CLAYSTONE, light brownish gray (2.5 Y 6/2)-dark gray (2.5 Y 4/1), firm, crumbly to blocky cores. Dry to slightly moist. Predominantly moderately silty. Very silty at 1'-2', becoming predominantly claystone at 2'.
5933		2			
5932		3			
5931		4			
5930	Filter Pack, 16/40 silica sand Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots	5			CLAYSTONE: 4.6-8.0 - CLAYSTONE, light olive brown (2.5 Y 5/3) with some yellowish brown (10 YR 5/6) mottling at 4.6'-5.7', dark gray (10 YR 4/1) at 5.7'-7.2'. Firm, crumbly, dry to slightly moist, very slightly silty, trace caliche.
5929		6			

511

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5928		7			
5927		8			CLAYSTONE: 8.0-10.0 - CLAYSTONE to CLAYSTONE w/silt, pale brown (10 YR 6/3), some reddish yellow mottling (7.5 YR 6/8) at 8.0'-9.0'. Firm, dry and crumbly. Blocky core fragments. NOTE: reddish yellow Fe-stained fractures.
5926		9			
5925		10			CLAYSTONE: 10.0-11.0 - CLAYSTONE, as above (8.0'-10.0'), but very firm and not as crumbly in core samples. Grades to claystone w/silt.
5924		11			CLAYSTONE: 11.0-13.0 - CLAYSTONE to CLAYSTONE w/silt, gray (2.5 Y 6/1)-dark gray (2.5 Y 4/1). Very crumbly in core samples. Slightly silty. Occasional yellowish brown (10 YR 5/8) laminations/fracture surfaces. Dry. Trace black carbonaceous inclusions at 12.6'-13.2'.
5923		12			
5922		13			CLAYSTONE: 13.0-16.1 - CLAYSTONE to CLAYSTONE w/silt, as above 11.0'-13.0'. Slight increase in yellowish brown laminations/fracture surfaces. Trace black carbonaceous inclusions 12.6'-13.2'.
5921		14			
5920		15			
5919		16			SILTSTONE: 16.1-17.5 - SILTSTONE, light brownish gray (2.5 Y 6/2),

572

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
		17			occasionally mottled reddish yellow (7.5 YR 6/8). Crumbly/friable. Some clayey matrix. Slightly moist to dry.
5918					
		18			CLAYSTONE: 17.5-20.0 - Silty CLAYSTONE, light yellowish brown (10 YR 6/4) at 17.5'-19.5', gray (10 YR 6/1) at 19.5'-20.0'. Crumbly core sample. Occasional reddish yellow (7.5 YR 6/8) laminations/fracture surfaces. Moderately silty. Some black carbonaceous streaks/inclusions to 1.0". Dry to slightly moist.
5917					
		19			
5916					
		20			CLAYSTONE: 20.0-22.0 - CLAYSTONE, dark grayish brown (10 YR 4/2)-very dark grayish brown (10 YR 3/2). Occasional reddish yellow (7.5 YR 6/8) laminations/fracture surfaces/inclusions. Rough texture. Dry to slightly moist. Trace small caliche inclusions.
5915					
		21			
5914					
		22			CLAYSTONE: 22.0-24.6 - CLAYSTONE, grayish brown (10 YR 5/2). Yellowish brown (10 YR 5/6) layers at 23.0'-23.5'. Firm-very firm, rough texture. Occasionally slightly silty. Dry to slightly moist.
5913					
		23			
5912					
		24			
5911					
		25			CLAYSTONE: 24.6-26.5 - CLAYSTONE, olive gray (5 Y 5/2), some reddish yellow (7.5 YR 6/8) laminations/fracture surfaces/inclusions. Trace white caliche. Slightly moist to moist.
5910					
		26			

573

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5909					
		27			CLAYSTONE: 26.5-28.0 - CLAYSTONE, very dark grayish brown (10 YR 3/2) to black (2.5 Y 2.5/1) at 27.5', firm to very firm, rough texture, dry to slightly moist.
5908					
	Bottom Cap-Sump, Sch 40-PVC, 0.75 in. ID., w/rivets	28			

LOG OF BORING NUMBER:
30700

574

STATE PLANE COORDINATES AREA: NORTH:752371.83 EAST: 2083873.67 PROJECT: Borehole & Well REMARKS:	GRND ELEV. (FT):5971.07 TOTAL DEPTH (FT): 22.00 COMPLETION DATE: 10/4/00 GEOLOGIST: Brian Walsh	CASING DIA (IN): BH DIA. (IN): GRID LOCATOR:	LOG OF BORING NUMBER: **30800**

Elev (Ft)	Depth (Ft)	Well or Piezometer Construction and Materials	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5973	2				
5972	1	Surface Casing, Sch 40-PVC, 2 in. ID.			
5971	0	Borehole Dia. 2 in. ID.			OL: 0.0-0.5 - Silty CLAY, brown (7.5 YR 4/4), organic. Occasional gravel to 0.5". Crumbly. Slightly moist.
5970	1	Seal, Granular Bentonite Casing, Sch 40-PVC, 0.75 in. ID.			ML: 0.5-1.9 - Clayey-gravelly SILT, light brown (7.5 YR 6/4), crumbly to friable. Clayey matrix. 10% gravel to 0.75". Slightly moist.
5969	2	Filter Pack, 16/40 silica sand			SM: 1.9-3.4 - Gravelly SAND, very pale brown (10 YR 7/3), very fine-coarse grained, well graded, subangular, friable. 20-30% quartzite gravel to 1.0". Some silty-clayey matrix. Slightly moist.
5968	3	Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots			NO RECOVERY: 3.4-4.0 - No Recovery.
5967	4				GM: 4.0-4.6 - Silty-sandy GRAVEL, yellowish brown (10 YR 5/4). Angular-broken quartzite fragments to 1.5". 30-40% silty-sandy matrix. Loose. Slightly moist.
5966	5				SP: 4.6-6.0 - SAND, light yellowish brown (10 YR 6/4). Predominantly medium grained. Some fine and coarse grained. Moderately to poorly graded, subangular, loose, trace silty-clayey intergranular fill. Some dark gray quartzite gravel toward base, wet.
5965	6				CL: 6.0-6.5 - CLAY, light yellowish brown (2.5 Y 6/3). Firm, dense, tight, slightly silty, moist.

575

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					SC: 6.5-6.9 - Clayey SAND, light olive brown (2.5 Y 6/3). Very fine to coarse grained, well graded, subangular, some clayey matrix, moist, trace caliche.
5964		7			CLAYSTONE: 6.9-7.4 - CLAYSTONE, pale olive (5 Y 6/3). Tight, dense, moist.
					NO RECOVERY: 7.4-8.0 - No Recovery.
5963		8			CLAYSTONE: 8.0-10.6 - CLAYSTONE, light olive gray (5 Y 6/2), some mottled brownish yellow (10 YR 6/6), firm, tight, dense, smooth-waxy texture, slightly moist, partially weathered. Trace caliche at 8.1'.
5962		9			
5961		10			
5960		11			CLAYSTONE: 10.6-11.6 - CLAYSTONE, gray (10 YR 6/1), occasionally mottled light yellowish brown (2.5 Y 6/4), firm to very firm, tight, dense, waxy texture. Trace black horizontal streaks. Slightly moist.
					NO RECOVERY: 11.6-12.0 - No Recovery.
5959		12			CLAYSTONE: 12.0-12.5 - CLAYSTONE, gray (10 YR 5/1), firm to very firm, dense, some black horizontal streaks, slightly moist.
					NO RECOVERY: 12.5-15.0 - No Recovery.
5958		13			
5957		14			
5956		15			CLAYSTONE: 15.0-15.7 - CLAYSTONE, yellowish brown (10 YR 5/4), weathered, dense, tight, trace slightly silty, slightly moist.
					NO RECOVERY: 15.7-16.0 - No Recovery.
5955		16			CLAYSTONE: 16.0-17.0 - CLAYSTONE, brown (10 YR 5/3) to

576

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					yellowish brown (10 YR 5/6), firm to very firm, dense, tight, smooth texture, slightly moist.
5954		17			CLAYSTONE: 17.0-19.0 - CLAYSTONE, yellowish brown (10 YR 5/8) from 17.0'-18.1', gray (10 YR 5/1) below 18.1'. Firm, dense, tight, smooth texture. Trace dark gray and orange fracture surfaces. Slightly moist, predominantly weathered below 18.1'.
5953		18			
5952		19			CLAYSTONE: 19.0-19.4 - CLAYSTONE, as above, occasionally mottled light yellowish brown (2.5 Y 6/4).
					NO RECOVERY: 19.4-20.5 - No Recovery.
5951		20			
5950		21			CLAYSTONE: 20.5-22.0 - CLAYSTONE, yellowish brown (10 YR 5/6), occasionally mottled gray (10 YR 6/1), grayish brown (10 YR 5/2) at 21.7'-22.0'. Firm to very firm, dense, tight, some horizontal black streaks, slightly moist.
		22			

Bottom Cap-Sump, Sch 40-PVC, 0.75 in. ID., w/rivets

577

STATE PLANE COORDINATES AREA:	GRND ELEV. (FT): 6005.71	CASING DIA (IN):	LOG OF BORING NUMBER:
NORTH: 751766.8	TOTAL DEPTH (FT): 31.00	BH DIA. (IN):	30900
EAST: 2082019.83	COMPLETION DATE: 9/19/00	GRID LOCATOR:	
PROJECT: Borehole & Well	GEOLOGIST: Paul Graham		
REMARKS:			

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
6007	Surface Casing, Sch 40-PVC, 2 in. ID.	2			
6006		1			
6005	Seal, Granular Bentonite	0			NO RECOVERY: 0.0-15.0 - No Recovery. Solid point driven to 15.0'. No core logged from 0.0'-15.0' due to proximity of 30900 to existing boreholes, BH#17397 to the east and BH#17497 to the west.
6004	Casing, Sch 40-PVC, 0.75 in. ID.	1			
6003	Borehole Dia. 2 in. ID.	2			
6002		3			
6001		4			
6000	Filter Pack, 16/40 silica sand	5			
	Screen, Sch 40-PVC, 0.75 in. ID., 0.010 in. slots	6			

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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:
30900

5999
7
5998
8
5997
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5996
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5995
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5994
12
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13
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14
5991
15
5990
16

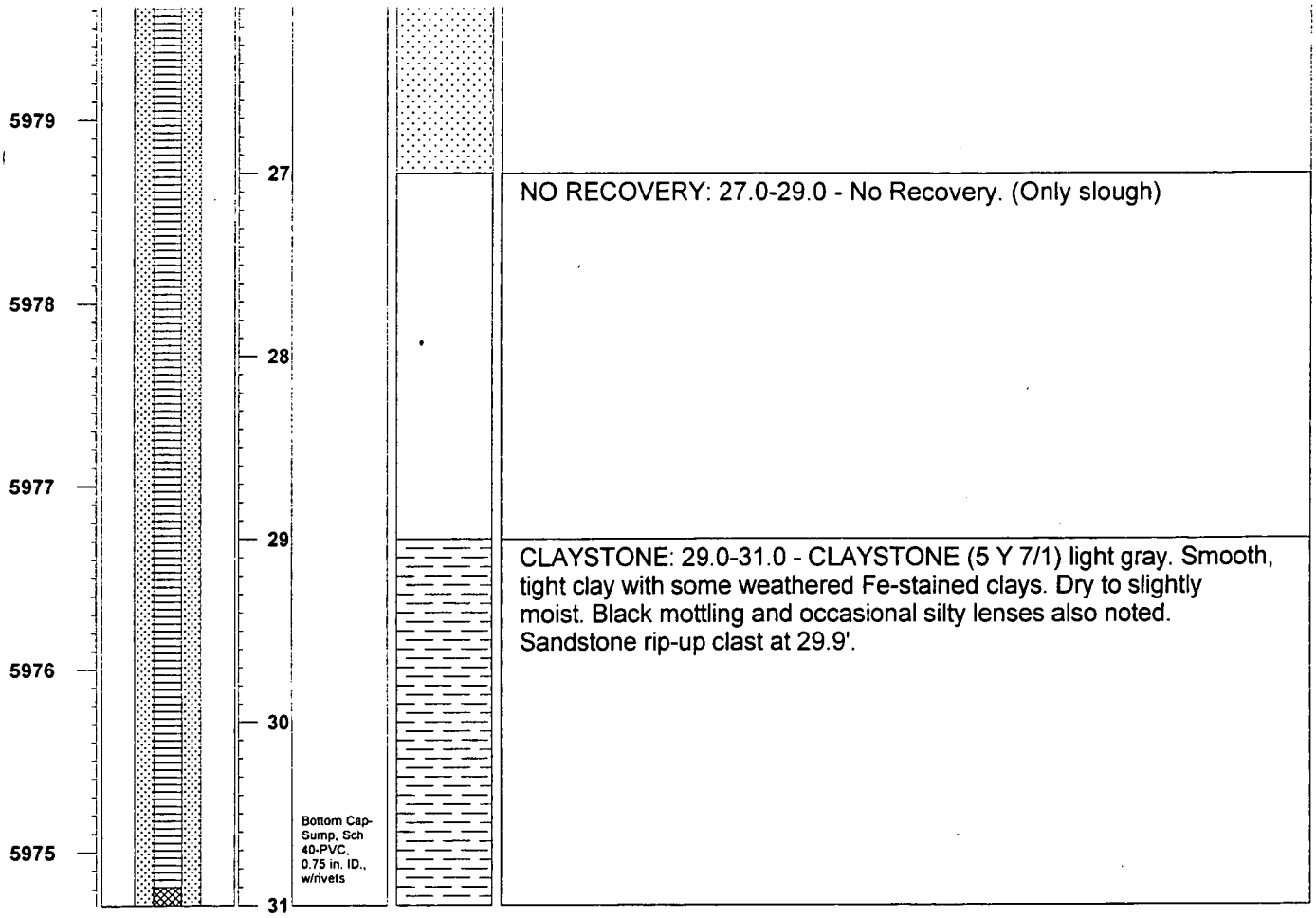
GM: 15.0-16.5 - Sandy silty GRAVEL to gravelly clayey SAND (10 YR 5/6) yellowish brown. Very fine to coarse grained sand, well graded, subangular, moist to very moist. Gravels up to 0.1" in size. Trace to come clay.

579

Elev (Ft)	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5989	17			SC-SM: 16.5-18.0 - SILTY to CLAYEY SANDS (5 YR 5/6) yellowish red. Fine to medium grained, subangular, moderately graded. Moist to very moist, some Fe-staining.
5988	18			GC: 18.0-19.0 - CLAYEY GRAVEL (10 YR 5/6) yellowish brown. Trace caliche grains. Black carbonaceous flecks or Fe/Mn oxide at 18.7' to 19.0'.
5987	19			CL: 19.0-20.0 - CLAY with trace medium grained sands and gravel (10 YR 5/6) yellowish brown to (5 Y 6/4) pale olive. Dry to slightly moist. Black carbonaceous flecks or Fe/Mn oxide to 19.8'. Some as carbonaceous flecks at 18.7' to 19.0'.
5986	20			CL: 20.0-21.5 - CLAY with trace medium grained sands and gravel (10 YR 5/6) yellowish brown to (5 Y 6/4) pale olive. Gravels include rounded limestone pieces to 3/4". Also contains pockets of caliche below 20.9'. Black coal-looking clasts are scattered in column especially below 20.6'.
5985	21			
5984	22			SILTY SANDSTONE: 21.5-23.0 - SILTY SANDSTONE to SANDY SILTSTONE (2.5 Y 7/1) light gray. Well sorted with some thin clay lenses. Subangular to subrounded, very fine grained. Trace to some Fe-staining. Slightly moist to moist. Occasional traces of MnO staining. TOP OF BEDROCK at 21.5'.
5983	23			SILTY SANDSTONE: 23.0-24.6 - SILTY SANDSTONE to SANDY SILTSTONE, (2.5 Y 7/1), same as above 21.5'-23.0'. Dry to slightly moist.
5982	24			
5981	25			SANDSTONE: 24.6-27.0 - Very fine SANDSTONE with some silt. Well sorted, subangular, dry to slightly moist (5 Y 7/1) light gray. Occasional Fe-staining.
5980	26			

580

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					LOG OF BORING NUMBER: **30900**



NO RECOVERY: 27.0-29.0 - No Recovery. (Only slough)

CLAYSTONE: 29.0-31.0 - CLAYSTONE (5 Y 7/1) light gray. Smooth, tight clay with some weathered Fe-stained clays. Dry to slightly moist. Black mottling and occasional silty lenses also noted. Sandstone rip-up clast at 29.9'.

581

Table 11-1
Relative Percent Differences (RPDs) for Groundwater
Calendar Year 2000

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid	Dup Result	Dup Lab Qual	Dup Valid	Units	Absolute Value (Real-Dup)	Average (Real+Dup)/2	RPD AbsVal/AveX100
		Volatile Organic Compounds										
11891	10/24/00	1,1,1-TRICHLOROETHANE	2.4		V1	2.3		V1	UG/L	0.1	2.4	4.3
3586	5/18/00	1,1,1-TRICHLOROETHANE	1	J	V1	1		V1	UG/L	0.00	1.00	0.00
3586	10/25/00	1,1,1-TRICHLOROETHANE	0.84		V1	0.63		V1	UG/L	0.2	0.7	28.6
70393	6/1/00	1,1,1-TRICHLOROETHANE	23		V	21		J	UG/L	2.00	22.00	9.09
891COLWEL	8/24/00	1,1,1-TRICHLOROETHANE	2	J	J1	2	J	J1	UG/L	0.00	2.00	0.00
3586	5/18/00	1,1-DICHLOROETHANE	30	D	V1	33	D	V1	UG/L	3.00	31.50	9.52
3586	10/25/00	1,1-DICHLOROETHANE	29.4		V1	28.2		V1	UG/L	1.2	28.8	4.2
41299	12/12/00	1,1-DICHLOROETHANE	2.2	J	V1	2.1	J	V1	UG/L	0.1	2.2	4.7
10294	7/25/00	1,1-DICHLOROETHENE	1		V	1	U	V	UG/L	0.00	1.00	0.00
11891	10/24/00	1,1-DICHLOROETHENE	3.9		V1	3.7		V1	UG/L	0.2	3.8	5.3
12691	7/27/00	1,1-DICHLOROETHENE	1		V	20	U	V	UG/L	19.00	10.50	180.95
41299	12/12/00	1,1-DICHLOROETHENE	9.4		V1	10		V1	UG/L	0.6	9.7	6.2
70393	6/1/00	1,1-DICHLOROETHENE	14		V	15		J	UG/L	1.00	14.50	6.90
891COLWEL	8/24/00	1,1-DICHLOROETHENE	10	J	J1	12	J	J1	UG/L	2.00	11.00	18.18
P209389	1/18/00	1,1-DICHLOROETHENE	20		V	21		V	UG/L	1.00	20.50	4.88
P209389	7/31/00	1,1-DICHLOROETHENE TR2/TR2	22	D	V1	28	D	V1	UG/L	6.00	25.00	24.00
3586	10/25/00	1,2-DICHLOROETHANE	0.73		V1	0.69		V1	UG/L	0.0	0.7	5.6
3586	10/25/00	BENZENE	0.56		J1	0.53		J1	UG/L	0.0	0.5	5.5
11891	5/5/00	CARBON TETRACHLORIDE	640		V	680		V	UG/L	40.00	660.00	6.06
11891	10/24/00	CARBON TETRACHLORIDE	580	D	1	604	D	1	UG/L	24.0	592.0	4.1
12691	2/2/00	CARBON TETRACHLORIDE	450		V1	440		V1	UG/L	10.00	445.00	2.25
18199	3/14/00	CARBON TETRACHLORIDE	35000	D	V1	39000	D	V1	UG/L	4000.00	37000.00	10.81
18199	12/5/00	CARBON TETRACHLORIDE	27300	D		27300	D		UG/L	0.0	27300.0	0.0
23296	10/30/00	CARBON TETRACHLORIDE	5.7		V1	5.4	D	1	UG/L	0.3	5.6	5.4
891COLWEL	8/24/00	CARBON TETRACHLORIDE	10	J	J1	9	J	J1	UG/L	1.00	9.50	10.53
P209389	1/18/00	CARBON TETRACHLORIDE	2		V	2		V	UG/L	0.00	2.00	0.00
P209389	7/31/00	CARBON TETRACHLORIDE TR1/TR1	2		J1	2		J1	UG/L	0.00	2.00	0.00
12691	7/27/00	CARBON TETRACHLORIDE TR2/TR2	680	D	V	720	D	V	UG/L	40.00	700.00	5.71
P209389	7/31/00	CARBON TETRACHLORIDE TR2/TR2	1	JD	1	2	JD	1	UG/L	1.00	1.50	66.67
11891	5/5/00	CHLOROFORM	20	J	V	21	J	V	UG/L	1.00	20.50	4.88
11891	10/24/00	CHLOROFORM	16		V1	16.2	D	1	UG/L	0.2	16.1	1.2
12691	2/2/00	CHLOROFORM	29		V1	27		V1	UG/L	2.00	28.00	7.14
18199	3/14/00	CHLOROFORM	4900		V1	5200		V1	UG/L	300.00	5050.00	5.94
18199	3/14/00	CHLOROFORM	5500	D	1	6100	D	1	UG/L	600.00	5800.00	10.34
18199	12/5/00	CHLOROFORM	4110			3930	D		UG/L	180.0	4020.0	4.5
23296	10/30/00	CHLOROFORM	12.8	D	1	12.6	D	1	UG/L	0.2	12.7	1.6
P209389	1/18/00	CHLOROFORM	4		V	4		V	UG/L	0.00	4.00	0.00
P209389	7/31/00	CHLOROFORM TR1/TR1	3		V1	3		V1	UG/L	0.00	3.00	0.00
12691	7/27/00	CHLOROFORM TR2/TR2	34	JD	V	35	JD	1	UG/L	1.00	34.50	2.90
P209389	7/31/00	CHLOROFORM TR2/TR2	3	JD	1	3	JD	1	UG/L	0.00	3.00	0.00
18199	12/5/00	CHLOROMETHANE	25	U		25	U		UG/L	0.0	25.0	0.0
11891	5/5/00	cis-1,2-DICHLOROETHENE	24	J	V	24	J	V	UG/L	0.00	24.00	0.00
11891	10/24/00	cis-1,2-DICHLOROETHENE	25.8		V1	24.7		V1	UG/L	1.1	25.3	4.4
12691	2/2/00	cis-1,2-DICHLOROETHENE	33		V1	33		V1	UG/L	0.00	33.00	0.00
23296	10/30/00	cis-1,2-DICHLOROETHENE	80.4	D	1	82	D	1	UG/L	1.6	81.2	2.0
3586	5/18/00	cis-1,2-DICHLOROETHENE	3		V1	3		V1	UG/L	0.00	3.00	0.00
3586	10/25/00	cis-1,2-DICHLOROETHENE	6.7		V1	2.9		V1	UG/L	3.8	4.8	79.2
41299	12/12/00	cis-1,2-DICHLOROETHENE	31.4		V1	31.3		V1	UG/L	0.1	31.4	0.3
SW13494	8/22/00	cis-1,2-DICHLOROETHENE	1		V1	1		V1	UG/L	0.00	1.00	0.00
12691	7/27/00	cis-1,2-DICHLOROETHENE TR2/TR2	64	D	V	62	D	1	UG/L	2.00	63.00	3.17
18199	12/18/00	METHANE	156	D		190	D		UG/L	34.0	173.0	19.7
10498	2/17/00	METHYLENE CHLORIDE	62	JB	JB1	15	JB	JB1	UG/L	47.00	38.50	122.08
11891	5/5/00	METHYLENE CHLORIDE	24	JB	JB	24	JB	JB	UG/L	0.00	24.00	0.00
12691	2/2/00	METHYLENE CHLORIDE	15	JB	JB1	14	JB	JB1	UG/L	1.00	14.50	6.90
18199	3/14/00	METHYLENE CHLORIDE	2400	B	UJ1	2500	B	UJ1	UG/L	100.00	2450.00	4.08
18199	12/5/00	METHYLENE CHLORIDE	23.3	JB		20.8	JB		UG/L	2.5	22.1	11.3
41299	12/12/00	METHYLENE CHLORIDE	3.6	B	JB1	2.9	B	JB1	UG/L	0.7	3.3	21.5
41591	2/16/00	METHYLENE CHLORIDE	0.2	JB	JB1	0.1	JB	JB1	UG/L	0.10	0.15	66.67
891COLWEL	8/24/00	METHYLENE CHLORIDE	57	B	UJ1	58	B	UJ1	UG/L	1.00	57.50	1.74
12691	7/27/00	METHYLENE CHLORIDE TR1/TR1	0.2	JB	JB	25	B	UJ	UG/L	24.80	12.60	196.83

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Table 11-1
Relative Percent Differences (RPDs) for Groundwater
Calendar Year 2000

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid	Dup Result	Dup Lab Qual	Dup Valid	Units	Absolute Value (Real-Dup)	Average (Real+Dup)/2	RPD AbsVal/AveX100
P209389	7/31/00	METHYLENE CHLORIDE TR1/TR1	1	U	V1	1	U	V1	UG/L	0.00	1.00	0.00
12691	7/27/00	METHYLENE CHLORIDE TR2/TR2	59	BD	1	59	BD	1	UG/L	0.00	59.00	0.00
P209389	7/31/00	METHYLENE CHLORIDE TR2/TR2	3	JD	1	49	BD	1	UG/L	46.00	26.00	176.92
10498	2/17/00	TETRACHLOROETHENE	1400		V1	1700		V1	UG/L	300.00	1550.00	19.35
10498	8/9/00	TETRACHLOROETHENE	15		V	12		V	UG/L	3.00	13.50	22.22
11891	5/5/00	TETRACHLOROETHENE	270		V	260		V	UG/L	10.00	265.00	3.77
11891	10/24/00	TETRACHLOROETHENE	270	D	1	249	D	1	UG/L	21.0	259.5	8.1
12691	2/2/00	TETRACHLOROETHENE	77		V1	76		V1	UG/L	1.00	76.50	1.31
18199	12/5/00	TETRACHLOROETHENE	63.7			60.6			UG/L	3.1	62.2	5.0
23296	10/30/00	TETRACHLOROETHENE	9		V1	8.8	D	1	UG/L	0.2	8.9	2.2
41299	12/12/00	TETRACHLOROETHENE	216		V1	206		V1	UG/L	10.0	211.0	4.7
70393	6/1/00	TETRACHLOROETHENE	8		V	8		J	UG/L	0.00	8.00	0.00
891COLWEL	8/24/00	TETRACHLOROETHENE	37		V1	39		V1	UG/L	2.00	38.00	5.26
P209389	1/18/00	TETRACHLOROETHENE	1		V	1		V	UG/L	0.00	1.00	0.00
SW13494	8/22/00	TETRACHLOROETHENE	24		V1	23		V1	UG/L	1.00	23.50	4.26
P209389	7/31/00	TETRACHLOROETHENE TR1/TR1	1		V1	1		V1	UG/L	0.00	1.00	0.00
12691	7/27/00	TETRACHLOROETHENE TR2/TR2	130	D	V	140	D	1	UG/L	10.00	135.00	7.41
P209389	7/31/00	TETRACHLOROETHENE TR2/TR2	1	JD	1	2	JD	1	UG/L	1.00	1.50	66.67
11891	5/5/00	TRICHLOROETHENE	53		V	54		V	UG/L	1.00	53.50	1.87
11891	10/24/00	TRICHLOROETHENE	52.7		V1	50.8	D	1	UG/L	1.9	51.8	3.7
12691	2/2/00	TRICHLOROETHENE	40		V1	38		V1	UG/L	2.00	39.00	5.13
23296	10/30/00	TRICHLOROETHENE	288	D	UJ1	284	D	UJ1	UG/L	4.0	286.0	1.4
41299	12/12/00	TRICHLOROETHENE	27.2		V1	26.3		V1	UG/L	0.9	26.8	3.4
70393	6/1/00	TRICHLOROETHENE	22		V	22		J	UG/L	0.00	22.00	0.00
891COLGAL	8/24/00	TRICHLOROETHENE	1		V1	1		V1	UG/L	0.00	1.00	0.00
891COLWEL	8/24/00	TRICHLOROETHENE	350		V1	360		V1	UG/L	10.00	355.00	2.82
SW13494	8/22/00	TRICHLOROETHENE	3		V1	2		V1	UG/L	1.00	2.50	40.00
12691	7/27/00	TRICHLOROETHENE TR2/TR2	71	D	V	71	D	1	UG/L	0.00	71.00	0.00
P209389	7/31/00	TRICHLOROETHENE TR2/TR2	1	JD	1	1	JD	1	UG/L	0.00	1.00	0.00
3586	5/18/00	VINYL CHLORIDE	17		V1	18	D	1	UG/L	1.00	17.50	5.71
3586	10/25/00	VINYL CHLORIDE	19.2		V1	10.3		V1	UG/L	8.9	14.8	60.3
		Metals										
10498	2/21/00	ALUMINUM, Dissolved	171		V1	143		V1	UG/L	28.00	157.00	17.83
10498	8/9/00	ALUMINUM, Dissolved	373		1	49		UJ	UG/L	324.00	211.00	153.55
11891	5/5/00	ALUMINUM, Dissolved	50	B	UJ	44.4		UJ	UG/L	5.60	47.20	11.86
12691	2/2/00	ALUMINUM, Dissolved	639		J1	739		J1	UG/L	100.00	689.00	14.51
12691	7/27/00	ALUMINUM, Dissolved	4.8	B	J	5.4	B	J	UG/L	0.60	5.10	11.76
3586	5/18/00	ALUMINUM, Dissolved	29.9		UJ	28.5		UJ	UG/L	1.40	29.20	4.79
70193	1/11/00	ALUMINUM, Dissolved	24.3		J1	25.2		J1	UG/L	0.90	24.75	3.64
70193	5/10/00	ALUMINUM, Dissolved	26.3		UJ1	21.9		UJ1	UG/L	4.40	24.10	18.26
70193	7/26/00	ALUMINUM, Dissolved	8.4	B	J	5.6	B	J	UG/L	2.80	7.00	40.00
891COLGAL	8/24/00	ALUMINUM, Dissolved	25.2		UJ	21		UJ	UG/L	4.20	23.10	18.18
891COLWEL	8/24/00	ALUMINUM, Dissolved	28.9		V	34.3		V	UG/L	5.40	31.60	17.09
P209389	1/18/00	ALUMINUM, Dissolved	11.4	B	R1	6.9	U	V1	UG/L	4.50	9.15	49.18
P209389	7/31/00	ALUMINUM, Dissolved	23.7		UJ1	33.7		UJ1	UG/L	10.00	28.70	34.84
SW13494	8/22/00	ALUMINUM, Dissolved	39.2		V	26.8		V	UG/L	12.40	33.00	37.58
0386	2/10/00	ALUMINUM, Total	19.5		V1	25.5		V1	UG/L	6.00	22.50	26.67
10294	1/19/00	ALUMINUM, Total	16.7	B	R1	12.2	B	R1	UG/L	4.50	14.45	31.14
10294	7/25/00	ALUMINUM, Total	59.7		J	27		J	UG/L	32.70	43.35	75.43
18199	12/5/00	ALUMINUM, Total	31		UJ1	33.7		UJ1	UG/L	2.7	32.4	8.3
23296	10/30/00	ALUMINUM, Total	96.3			147			UG/L	50.7	121.7	41.7
41591	2/16/00	ALUMINUM, Total	94.2		V	107		V	UG/L	12.80	100.60	12.72
5887	10/30/00	ALUMINUM, Total	7.6	U		8.37	B		UG/L	0.8	8.0	9.6
5887	5/5/00	ALUMINUM, Total	22		UJ	29.4		UJ	UG/L	7.40	25.70	28.79
70393	6/1/00	ALUMINUM, Total	18.5		UJ1	18.3		UJ1	UG/L	0.20	18.40	1.09
10498	2/21/00	ANTIMONY, Dissolved	0.45	U	V1	0.76	B	V1	UG/L	0.31	0.61	51.24
11891	5/5/00	ANTIMONY, Dissolved	0.55	U	V	0.6	B	V	UG/L	0.05	0.58	8.70
12691	2/2/00	ANTIMONY, Dissolved	0.52	U	V1	0.99	B	V1	UG/L	0.47	0.76	62.25
70193	1/11/00	ANTIMONY, Dissolved	0.62	B	V1	0.52	U	V1	UG/L	0.10	0.57	17.54
P209389	1/18/00	ANTIMONY, Dissolved	0.52	U	V1	0.81	B	UJ1	UG/L	0.29	0.67	43.61
SW13494	8/22/00	ANTIMONY, Dissolved	0.52	U	V	0.7	B	V	UG/L	0.18	0.61	29.51

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Table 11-1
Relative Percent Differences (RPDs) for Groundwater
Calendar Year 2000

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid	Dup Result	Dup Lab Qual	Dup Valid	Units	Absolute Value (Real-Dup)	Average (Real+Dup)/2	RPD AbsVal/AveX100
0386	2/10/00	ANTIMONY, Total	0.79	B	UJ1	0.67	B	UJ1	UG/L	0.12	0.73	16.44
10294	1/19/00	ANTIMONY, Total	0.83	B	UJ1	1.1	B	UJ1	UG/L	0.27	0.97	27.98
18199	12/5/00	ANTIMONY, Total	3.58		UJ1	2.91	B	UJ1	UG/L	0.7	3.2	20.6
23296	10/30/00	ANTIMONY, Total	2.36	B		2.24	U		UG/L	0.1	2.3	5.2
41591	2/16/00	ANTIMONY, Total	0.9	B	UJ	0.51	B	UJ	UG/L	0.39	0.71	55.32
5887	10/30/00	ANTIMONY, Total	2.3	B		2.24	U		UG/L	0.1	2.3	2.6
10498	2/21/00	ARSENIC, Dissolved	1.1	B	V1	0.72	U	V1	UG/L	0.38	0.91	41.76
12691	2/2/00	ARSENIC, Dissolved	1.3	B	UJ1	1.3	B	UJ1	UG/L	0.00	1.30	0.00
3586	5/18/00	ARSENIC, Dissolved	3.7	B	V	3.9	B	V	UG/L	0.20	3.80	5.26
3586	10/25/00	ARSENIC, Dissolved	3.62	B	J	2.46	U	J	UG/L	1.2	3.0	38.2
70193	1/11/00	ARSENIC, Dissolved	0.68	U	V1	0.68	U	V1	UG/L	0.00	0.68	0.00
891COLGAL	8/24/00	ARSENIC, Dissolved	1.4	B	V	0.85	U	V	UG/L	0.55	1.13	48.89
891COLWEL	8/24/00	ARSENIC, Dissolved	0.97	B	V	0.85	U	V	UG/L	0.12	0.91	13.19
0386	2/10/00	ARSENIC, Total	0.94	B	UJ1	0.72	U	V1	UG/L	0.22	0.83	26.51
10294	1/19/00	ARSENIC, Total	3.3	B	V1	3.4	B	V1	UG/L	0.10	3.35	2.99
10294	7/25/00	ARSENIC, Total	1.3	B	J	1.3	B	J	UG/L	0.00	1.30	0.00
41591	2/16/00	ARSENIC, Total	0.99	B	V	0.72	U	V	UG/L	0.27	0.86	31.58
10498	2/21/00	BARIUM, Dissolved	46.8	B	V1	48.5	B	V1	UG/L	1.70	47.65	3.57
10498	8/9/00	BARIUM, Dissolved	83.9	B	V	85.5	B	V	UG/L	1.60	84.70	1.89
11891	5/5/00	BARIUM, Dissolved	247		V	240		V	UG/L	7.00	243.50	2.87
11891	10/24/00	BARIUM, Dissolved	247		V	256		V	UG/L	9.0	251.5	3.6
12691	2/2/00	BARIUM, Dissolved	237		V1	241		V1	UG/L	4.00	239.00	1.67
12691	7/27/00	BARIUM, Dissolved	262		V	213		V	UG/L	49.00	237.50	20.63
3586	5/18/00	BARIUM, Dissolved	79.2	B	V	79	B	V	UG/L	0.20	79.10	0.25
3586	10/25/00	BARIUM, Dissolved	94.5	B	V	95.3	B	V	UG/L	0.8	94.9	0.8
41299	12/12/00	BARIUM, Dissolved	217		J1	219		J1	UG/L	2.0	218.0	0.9
70193	1/11/00	BARIUM, Dissolved	82.2	B	V1	80.3	B	V1	UG/L	1.90	81.25	2.34
70193	5/10/00	BARIUM, Dissolved	90.5	B	V1	92	B	V1	UG/L	1.50	91.25	1.64
70193	7/26/00	BARIUM, Dissolved	66.8	B	V	74.6	B	V	UG/L	7.80	70.70	11.03
70193	10/31/00	BARIUM, Dissolved	86	B	V1	89	B	V1	UG/L	3.0	87.5	3.4
891COLGAL	8/24/00	BARIUM, Dissolved	166		V	164		V	UG/L	2.00	165.00	1.21
891COLWEL	8/24/00	BARIUM, Dissolved	70.5	B	V	69.1	B	V	UG/L	1.40	69.80	2.01
P209389	1/18/00	BARIUM, Dissolved	79.6	B	V1	88.1	B	V1	UG/L	8.50	83.85	10.14
P209389	7/31/00	BARIUM, Dissolved	106		V1	107		V1	UG/L	1.00	106.50	0.94
SW13494	8/22/00	BARIUM, Dissolved	174		V	178		V	UG/L	4.00	176.00	2.27
0386	2/10/00	BARIUM, Total	202		V1	203		V1	UG/L	1.00	202.50	0.49
10294	1/19/00	BARIUM, Total	56	B	V1	55	B	V1	UG/L	1.00	55.50	1.80
10294	7/25/00	BARIUM, Total	61.8	B	V	55.5	B	V	UG/L	6.30	58.65	10.74
18199	12/5/00	BARIUM, Total	112		V1	111		V1	UG/L	1.0	111.5	0.9
23296	10/30/00	BARIUM, Total	144			144			UG/L	0.0	144.0	0.0
41591	2/16/00	BARIUM, Total	173		V	174		V	UG/L	1.00	173.50	0.58
5887	10/30/00	BARIUM, Total	76.7	B		79.1	B		UG/L	2.4	77.9	3.1
5887	5/5/00	BARIUM, Total	56.4	B	V	56.8	B	V	UG/L	0.40	56.60	0.71
70393	6/1/00	BARIUM, Total	45.7	B	V1	61.7	B	V1	UG/L	16.00	53.70	29.80
10498	2/21/00	BERYLLIUM, Dissolved	0.03	B	V1	0.03	B	V1	UG/L	0.00	0.03	0.00
11891	5/5/00	BERYLLIUM, Dissolved	0.07	B	UJ	0.8	B	UJ	UG/L	0.73	0.44	167.82
12691	2/2/00	BERYLLIUM, Dissolved	0.06	B	UJ1	0.1	B	UJ1	UG/L	0.04	0.08	50.00
3586	5/18/00	BERYLLIUM, Dissolved	0.03	B	V	0.02	U	V	UG/L	0.01	0.03	40.00
70193	1/11/00	BERYLLIUM, Dissolved	0.04	B	UJ1	0.05	B	UJ1	UG/L	0.01	0.05	22.22
891COLGAL	8/24/00	BERYLLIUM, Dissolved	0.03	B	UJ	0.03	B	UJ	UG/L	0.00	0.03	0.00
891COLWEL	8/24/00	BERYLLIUM, Dissolved	0.03	B	UJ	0.04	B	UJ	UG/L	0.01	0.04	28.57
P209389	1/18/00	BERYLLIUM, Dissolved	0.05	B	UJ1	0.05	B	UJ1	UG/L	0.00	0.05	0.00
P209389	7/31/00	BERYLLIUM, Dissolved	0.04	B	UJ1	0.04	B	UJ1	UG/L	0.00	0.04	0.00
SW13494	8/22/00	BERYLLIUM, Dissolved	0.03	B	UJ	0.03	B	UJ	UG/L	0.00	0.03	0.00
0386	2/10/00	BERYLLIUM, Total	0.08	B	UJ1	0.07	B	UJ1	UG/L	0.01	0.08	13.33
10294	1/19/00	BERYLLIUM, Total	0.05	B	UJ1	0.05	B	UJ1	UG/L	0.00	0.05	0.00
10294	7/25/00	BERYLLIUM, Total	0.02	U	V	0.04	B	V	UG/L	0.02	0.03	66.67
41591	2/16/00	BERYLLIUM, Total	0.1	B	UJ	0.07	B	UJ	UG/L	0.03	0.09	35.29
5887	5/5/00	BERYLLIUM, Total	0.06	B	UJ	0.07	B	UJ	UG/L	0.01	0.07	15.38
70393	6/1/00	BERYLLIUM, Total	0.05	B	V1	0.07	B	V1	UG/L	0.02	0.06	33.33
10498	2/21/00	CADMIUM, Dissolved	0.69	B	V1	0.5	B	V1	UG/L	0.19	0.60	31.93

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Table 11-1
Relative Percent Differences (RPDs) for Groundwater
Calendar Year 2000

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid	Dup Result	Dup Lab Qual	Dup Valid	Units	Absolute Value (Real-Dup)	Average (Real+Dup)/2	RPD AbsVal/AveX100
10498	8/9/00	CADMIUM, Dissolved	0.47	B	V	0.26	B	V	UG/L	0.21	0.37	57.53
11891	5/5/00	CADMIUM, Dissolved	0.12	B	J	0.15	B	V	UG/L	0.03	0.14	22.22
12691	2/2/00	CADMIUM, Dissolved	0.1	U	V1	0.14	B	J1	UG/L	0.04	0.12	33.33
12691	7/27/00	CADMIUM, Dissolved	0.08	B	J	0.11	B	J	UG/L	0.03	0.10	31.58
3586	5/18/00	CADMIUM, Dissolved	0.16	B	V	0.16	B	V	UG/L	0.00	0.16	0.00
41299	12/12/00	CADMIUM, Dissolved	0.361	U	V1	0.368	B	J1	UG/L	0.0	0.4	1.9
70193	1/11/00	CADMIUM, Dissolved	0.16	B	V1	0.13	B	V1	UG/L	0.03	0.15	20.69
P209389	1/18/00	CADMIUM, Dissolved	0.32	B	V1	0.32	B	V1	UG/L	0.00	0.32	0.00
P209389	7/31/00	CADMIUM, Dissolved	0.25	B	J1	0.2	B	J1	UG/L	0.05	0.23	22.22
SW13494	8/22/00	CADMIUM, Dissolved	0.08	U	V	0.12	B	V	UG/L	0.04	0.10	40.00
0386	2/10/00	CADMIUM, Total	0.08	U	V1	0.08	B	V1	UG/L	0.00	0.08	0.00
10294	1/19/00	CADMIUM, Total	0.23	B	V1	0.14	B	V1	UG/L	0.09	0.19	48.65
10294	7/25/00	CADMIUM, Total	0.15	B	J	0.14	B	J	UG/L	0.01	0.15	6.90
10498	2/21/00	CALCIUM, Dissolved	21700		V1	25000		V1	UG/L	3300.00	23350.00	14.13
10498	8/9/00	CALCIUM, Dissolved	33200		V	39400		V	UG/L	6200.00	36300.00	17.08
11891	5/5/00	CALCIUM, Dissolved	149000		J	148000	E	J	UG/L	1000.00	148500.00	0.67
11891	10/24/00	CALCIUM, Dissolved	133000		V	134000		V	UG/L	1000.0	133500.0	0.7
12691	2/2/00	CALCIUM, Dissolved	153000		V1	157000		V1	UG/L	4000.00	155000.00	2.58
12691	7/27/00	CALCIUM, Dissolved	171000		V	139000		V	UG/L	32000.00	155000.00	20.65
3586	5/18/00	CALCIUM, Dissolved	142000		V	144000		V	UG/L	2000.00	143000.00	1.40
3586	10/25/00	CALCIUM, Dissolved	152000		V	153000		V	UG/L	1000.0	152500.0	0.7
41299	12/12/00	CALCIUM, Dissolved	113000		V1	114000		V1	UG/L	1000.0	113500.0	0.9
70193	1/11/00	CALCIUM, Dissolved	22100		V1	21600		V1	UG/L	500.00	21850.00	2.29
70193	5/10/00	CALCIUM, Dissolved	24200		V1	24300		V1	UG/L	100.00	24250.00	0.41
70193	7/26/00	CALCIUM, Dissolved	19500		V	21200		V	UG/L	1700.00	20350.00	8.35
70193	10/31/00	CALCIUM, Dissolved	23700		V1	25000		V1	UG/L	1300.0	24350.0	5.3
891COLGAL	8/24/00	CALCIUM, Dissolved	157000		V	161000		V	UG/L	4000.00	159000.00	2.52
891COLWEL	8/24/00	CALCIUM, Dissolved	195000		V	186000		V	UG/L	9000.00	190500.00	4.72
P209389	1/18/00	CALCIUM, Dissolved	96700		V1	107000		V1	UG/L	10300.00	101850.00	10.11
P209389	7/31/00	CALCIUM, Dissolved	142000		V1	145000		V1	UG/L	3000.00	143500.00	2.09
SW13494	8/22/00	CALCIUM, Dissolved	103000		V	110000		V	UG/L	7000.00	106500.00	6.57
0386	2/10/00	CALCIUM, Total	76600		V1	77000		V1	UG/L	400.00	76800.00	0.52
10294	1/19/00	CALCIUM, Total	102000		V1	101000		V1	UG/L	1000.00	101500.00	0.99
10294	7/25/00	CALCIUM, Total	110000		V	114000		V	UG/L	4000.00	112000.00	3.57
18199	12/5/00	CALCIUM, Total	76000		V1	74900		V1	UG/L	1100.0	75450.0	1.5
23296	10/30/00	CALCIUM, Total	168000			167000			UG/L	1000.0	167500.0	0.6
41591	2/16/00	CALCIUM, Total	53600		V	52800		V	UG/L	800.00	53200.00	1.50
5887	10/30/00	CALCIUM, Total	25600			26200			UG/L	600.0	25900.0	2.3
5887	5/5/00	CALCIUM, Total	19800		J	20500		J	UG/L	700.00	20150.00	3.47
70393	6/1/00	CALCIUM, Total	16200		V1	21700		V1	UG/L	5500.00	18950.00	29.02
10498	2/21/00	CHROMIUM, Dissolved	3.4		V1	2.9		V1	UG/L	0.50	3.15	15.87
10498	8/9/00	CHROMIUM, Dissolved	1.24	B	1	0.61	B	V	UG/L	0.63	0.93	68.11
11891	5/5/00	CHROMIUM, Dissolved	0.15	U	V	0.18	B	V	UG/L	0.03	0.17	18.18
12691	2/2/00	CHROMIUM, Dissolved	1	B	V1	1.1	B	V1	UG/L	0.10	1.05	9.52
41299	12/12/00	CHROMIUM, Dissolved	470		V1	462		V1	UG/L	8.0	466.0	1.7
70193	1/11/00	CHROMIUM, Dissolved	0.24	B	V1	0.24	B	V1	UG/L	0.00	0.24	0.00
70193	5/10/00	CHROMIUM, Dissolved	0.25	B	V1	0.23	B	V1	UG/L	0.02	0.24	8.33
891COLGAL	8/24/00	CHROMIUM, Dissolved	0.22	U	V	0.3	B	J	UG/L	0.08	0.26	30.77
891COLWEL	8/24/00	CHROMIUM, Dissolved	0.59	B	J	0.5	B	J	UG/L	0.09	0.55	16.51
P209389	1/18/00	CHROMIUM, Dissolved	0.3	B	UJ1	0.18	U	V1	UG/L	0.12	0.24	50.00
SW13494	8/22/00	CHROMIUM, Dissolved	0.43	B	V	0.46	B	V	UG/L	0.03	0.45	6.74
0386	2/10/00	CHROMIUM, Total	3		V1	2.7		V1	UG/L	0.30	2.85	10.53
10294	1/19/00	CHROMIUM, Total	0.34	B	UJ1	0.31	B	UJ1	UG/L	0.03	0.33	9.23
10294	7/25/00	CHROMIUM, Total	0.26	B	J	0.35	B	J	UG/L	0.09	0.31	29.51
23296	10/30/00	CHROMIUM, Total	182			265			UG/L	83.0	223.5	37.1
41591	2/16/00	CHROMIUM, Total	52.2		V	59.1		V	UG/L	6.90	55.65	12.40
5887	10/30/00	CHROMIUM, Total	2.21			2.13			UG/L	0.1	2.2	3.7
5887	5/5/00	CHROMIUM, Total	0.93	B	V	0.99	B	V	UG/L	0.06	0.96	6.25
70393	6/1/00	CHROMIUM, Total	0.16	B	J1	0.52	B	J1	UG/L	0.36	0.34	105.88
10498	2/21/00	COBALT, Dissolved	0.22	B	V1	0.39	B	V1	UG/L	0.17	0.31	55.74
10498	8/9/00	COBALT, Dissolved	0.66	B	1	0.37	B	V	UG/L	0.29	0.52	56.31

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Table 11-1
Relative Percent Differences (RPDs) for Groundwater
Calendar Year 2000

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid	Dup Result	Dup Lab Qual	Dup Valid	Units	Absolute Value (Real-Dup)	Average (Real+Dup)/2	RPD AbsVal/AveX100
12691	2/2/00	COBALT, Dissolved	0.44	B	V1	0.51	B	V1	UG/L	0.07	0.48	14.74
12691	7/27/00	COBALT, Dissolved	0.38	B	J	0.59	B	J	UG/L	0.21	0.49	43.30
3586	5/18/00	COBALT, Dissolved	12.8	B	V	12.7	B	V	UG/L	0.10	12.75	0.78
3586	10/25/00	COBALT, Dissolved	12.9	B	V	13.1	B	V	UG/L	0.2	13.0	1.5
P209389	1/18/00	COBALT, Dissolved	0.18	U	V1	0.18	U	V1	UG/L	0.00	0.18	0.00
P209389	7/31/00	COBALT, Dissolved	0.2	U	V1	0.26	B	UJ1	UG/L	0.06	0.23	26.09
10294	1/19/00	COBALT, Total	3.4	B	V1	3.2	B	V1	UG/L	0.20	3.30	6.06
10294	7/25/00	COBALT, Total	2.4	B	V	2.3	B	V	UG/L	0.10	2.35	4.26
18199	12/5/00	COBALT, Total	0.67	B	V1	0.669	U	V1	UG/L	0.0	0.7	0.1
23296	10/30/00	COBALT, Total	0.733	B		0.669	U		UG/L	0.1	0.7	9.1
41591	2/16/00	COBALT, Total	0.47	B	V	0.43	B	V	UG/L	0.04	0.45	8.89
10498	2/21/00	COPPER, Dissolved	2.5	B	V1	1.9	B	V1	UG/L	0.60	2.20	27.27
10498	8/9/00	COPPER, Dissolved	2.9	B	V	2	B	V	UG/L	0.90	2.45	36.73
12691	2/2/00	COPPER, Dissolved	1.6	B	V1	1.6	B	V1	UG/L	0.00	1.60	0.00
12691	7/27/00	COPPER, Dissolved	0.35	B	J	0.3	B	J	UG/L	0.05	0.33	15.38
3586	5/18/00	COPPER, Dissolved	0.68	B	J	0.56	B	J	UG/L	0.12	0.62	19.35
41299	12/12/00	COPPER, Dissolved	28.1		V1	1.54	U	V1	UG/L	26.6	14.8	179.2
70193	1/11/00	COPPER, Dissolved	0.44	B	J1	0.24	B	J1	UG/L	0.20	0.34	58.82
70193	5/10/00	COPPER, Dissolved	0.23	B	V1	0.2	U	V1	UG/L	0.03	0.22	13.95
891COLGAL	8/24/00	COPPER, Dissolved	1.1	B	J	1.1	B	J	UG/L	0.00	1.10	0.00
891COLWEL	8/24/00	COPPER, Dissolved	0.67	B	J	0.82	B	J	UG/L	0.15	0.75	20.13
P209389	1/18/00	COPPER, Dissolved	2.1	B	V1	1.8	B	V1	UG/L	0.30	1.95	15.38
P209389	7/31/00	COPPER, Dissolved	1.8	B	J1	1.8	B	J1	UG/L	0.00	1.80	0.00
SW13494	8/22/00	COPPER, Dissolved	0.49	B	J	0.42	B	J	UG/L	0.07	0.46	15.38
0386	2/10/00	COPPER, Total	0.66	B	J1	0.63	B	J1	UG/L	0.03	0.65	4.65
10294	1/19/00	COPPER, Total	1.9	B	V1	1.8	B	V1	UG/L	0.10	1.85	5.41
10294	7/25/00	COPPER, Total	1.3	B	J	1.4	B	J	UG/L	0.10	1.35	7.41
23296	10/30/00	COPPER, Total	1.58	B		1.64	B		UG/L	0.1	1.6	3.7
41591	2/16/00	COPPER, Total	1.8	B	V	1.9	B	V	UG/L	0.10	1.85	5.41
5887	10/30/00	COPPER, Total	1.67	B		1.71	B		UG/L	0.0	1.7	2.4
5887	5/5/00	COPPER, Total	1.8	B	J	1.9	B	J	UG/L	0.10	1.85	5.41
70393	6/1/00	COPPER, Total	0.2	U	J1	0.63	B	J1	UG/L	0.43	0.42	103.61
10498	2/21/00	IRON, Dissolved	113		V1	70.5	B	V1	UG/L	42.50	91.75	46.32
10498	8/9/00	IRON, Dissolved	200		1	23.5	B	UJ	UG/L	176.50	111.75	157.94
11891	5/5/00	IRON, Dissolved	17.7	B	UJ	20	B	UJ	UG/L	2.30	18.85	12.20
11891	10/24/00	IRON, Dissolved	22.2	B	UJ	21.9	B	UJ	UG/L	0.3	22.1	1.4
12691	2/2/00	IRON, Dissolved	501		V1	594		V1	UG/L	93.00	547.50	16.99
12691	7/27/00	IRON, Dissolved	2.5	B	UJ	1.9	B	UJ	UG/L	0.60	2.20	27.27
3586	5/18/00	IRON, Dissolved	2130		V	2140		V	UG/L	10.00	2135.00	0.47
3586	10/25/00	IRON, Dissolved	2600		V	2620		V	UG/L	20.0	2610.0	0.8
70193	1/11/00	IRON, Dissolved	12.4	B	UJ1	14.8	B	UJ1	UG/L	2.40	13.60	17.65
70193	5/10/00	IRON, Dissolved	11.1	B	V1	9.5	B	V1	UG/L	1.60	10.30	15.53
70193	7/26/00	IRON, Dissolved	12.2	B	V	6.2	B	UJ	UG/L	6.00	9.20	65.22
70193	10/31/00	IRON, Dissolved	5.38	B	UJ1	4.82	B	UJ1	UG/L	0.6	5.1	11.0
891COLGAL	8/24/00	IRON, Dissolved	10.8	B	V	9.3	B	V	UG/L	1.50	10.05	14.93
891COLWEL	8/24/00	IRON, Dissolved	20	B	V	16.8	B	V	UG/L	3.20	18.40	17.39
P209389	1/18/00	IRON, Dissolved	8.5	B	UJ1	3.4	U	V1	UG/L	5.10	5.95	85.71
SW13494	8/22/00	IRON, Dissolved	8.8	B	V	4.1	U	V	UG/L	4.70	6.45	72.87
0386	2/10/00	IRON, Total	24	B	UJ1	20	B	UJ1	UG/L	4.00	22.00	18.18
10294	1/19/00	IRON, Total	713		V1	677		V1	UG/L	36.00	695.00	5.18
10294	7/25/00	IRON, Total	108		V	95.5	B	V	UG/L	12.50	101.75	12.29
18199	12/5/00	IRON, Total	133		V1	145		V1	UG/L	12.0	139.0	8.6
23296	10/30/00	IRON, Total	1050			1030			UG/L	20.0	1040.0	1.9
41591	2/16/00	IRON, Total	168		V	194		V	UG/L	26.00	181.00	14.36
5887	5/5/00	IRON, Total	12.4	B	UJ	10.5	B	UJ	UG/L	1.90	11.45	16.59
70393	6/1/00	IRON, Total	20.3	B	J1	9.8	B	UJ1	UG/L	10.50	15.05	69.77
10498	2/21/00	LEAD, Dissolved	3.2		UJ1	1.1	B	UJ1	UG/L	2.10	2.15	97.67
12691	2/2/00	LEAD, Dissolved	0.96	B	V1	0.67	B	V1	UG/L	0.29	0.82	35.58
3586	5/18/00	LEAD, Dissolved	0.68	B	V	0.58	U	V	UG/L	0.10	0.63	15.87
70193	1/11/00	LEAD, Dissolved	0.52	U	V1	0.53	B	V1	UG/L	0.01	0.53	1.90
891COLGAL	8/24/00	LEAD, Dissolved	1.5	B	J	1.4	B	J	UG/L	0.10	1.45	6.90

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Table 11-1
Relative Percent Differences (RPDs) for Groundwater
Calendar Year 2000

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid	Dup Result	Dup Lab Qual	Dup Valid	Units	Absolute Value (Real-Dup)	Average (Real+Dup)/2	RPD AbsVal/AveX100
P209389	1/18/00	LEAD, Dissolved	4.5		UJ1	0.52	U	V1	UG/L	3.98	2.51	158.57
0386	2/10/00	LEAD, Total	0.79	B	UJ1	0.65	B	UJ1	UG/L	0.14	0.72	19.44
10294	1/19/00	LEAD, Total	1.3	B	UJ1	0.52	U	V1	UG/L	0.78	0.91	85.71
10498	2/21/00	LITHIUM, Dissolved	0.63	B	V1	0.8	B	V1	UG/L	0.17	0.72	23.78
10498	8/9/00	LITHIUM, Dissolved	1.3	B	1	1.7	B	V	UG/L	0.40	1.50	26.67
11891	5/5/00	LITHIUM, Dissolved	8.7	B	J	8.6	B	V	UG/L	0.10	8.65	1.16
11891	10/24/00	LITHIUM, Dissolved	7.34	B	V	7.51	B	V	UG/L	0.2	7.4	2.3
12691	2/2/00	LITHIUM, Dissolved	10.5	B	J1	10.7	B	J1	UG/L	0.20	10.60	1.89
12691	7/27/00	LITHIUM, Dissolved	10.7	B	J	8.6	B	J	UG/L	2.10	9.65	21.76
3586	5/18/00	LITHIUM, Dissolved	21.7	B	J	21.5	B	J	UG/L	0.20	21.60	0.93
3586	10/25/00	LITHIUM, Dissolved	18	B	V	18.3	B	V	UG/L	0.3	18.2	1.7
41299	12/12/00	LITHIUM, Dissolved	8.04	B	J1	7.83	B	J1	UG/L	0.2	7.9	2.6
70193	1/11/00	LITHIUM, Dissolved	9.1	B	J1	8.9	B	J1	UG/L	0.20	9.00	2.22
70193	5/10/00	LITHIUM, Dissolved	9.2	B	J1	9.3	B	J1	UG/L	0.10	9.25	1.08
70193	7/26/00	LITHIUM, Dissolved	6.9	B	J	7.7	B	J	UG/L	0.80	7.30	10.96
70193	10/31/00	LITHIUM, Dissolved	8.89	B	V1	8.78	B	V1	UG/L	0.1	8.8	1.2
891COLGAL	8/24/00	LITHIUM, Dissolved	35.4	B	UJ	35.2	B	UJ	UG/L	0.20	35.30	0.57
891COLWEL	8/24/00	LITHIUM, Dissolved	39.5	B	UJ	38.8	B	UJ	UG/L	0.70	39.15	1.79
P209389	1/18/00	LITHIUM, Dissolved	18.7	B	V1	21	B	V1	UG/L	2.30	19.85	11.59
P209389	7/31/00	LITHIUM, Dissolved	21.3	B	J1	21.5	B	J1	UG/L	0.20	21.40	0.93
SW13494	8/22/00	LITHIUM, Dissolved	17.8	B	UJ	18.2	B	UJ	UG/L	0.40	18.00	2.22
0386	2/10/00	LITHIUM, Total	115	B	J1	115		J1	UG/L	0.00	115.00	0.00
10294	1/19/00	LITHIUM, Total	85.3	B	V1	83.6	B	V1	UG/L	1.70	84.45	2.01
10294	7/25/00	LITHIUM, Total	97.4	B	J	100		J	UG/L	2.60	98.70	2.63
18199	12/5/00	LITHIUM, Total	5.83	B	V1	6	B	V1	UG/L	0.2	5.9	2.9
23296	10/30/00	LITHIUM, Total	48.7	B		48.8	B		UG/L	0.1	48.8	0.2
41591	2/16/00	LITHIUM, Total	183		V	179		V	UG/L	4.00	181.00	2.21
5887	10/30/00	LITHIUM, Total	4.86	B		4.9	B		UG/L	0.0	4.9	0.8
5887	5/5/00	LITHIUM, Total	2.8	B	V	2.9	B	V	UG/L	0.10	2.85	3.51
70393	6/1/00	LITHIUM, Total	5.3	B	V1	7.1	B	V1	UG/L	1.80	6.20	29.03
10498	2/21/00	MAGNESIUM, Dissolved	3390	B	V1	3840	B	V1	UG/L	450.00	3615.00	12.45
10498	8/9/00	MAGNESIUM, Dissolved	4970	B	V	5800		V	UG/L	830.00	5385.00	15.41
11891	5/5/00	MAGNESIUM, Dissolved	11000		J	11200		J	UG/L	200.00	11100.00	1.80
11891	10/24/00	MAGNESIUM, Dissolved	12500		V	12600		V	UG/L	100.0	12550.0	0.8
12691	2/2/00	MAGNESIUM, Dissolved	11300		V1	11500		V1	UG/L	200.00	11400.00	1.75
12691	7/27/00	MAGNESIUM, Dissolved	11000		V	8900		V	UG/L	2100.00	9950.00	21.11
3586	5/18/00	MAGNESIUM, Dissolved	37400		V	37100		V	UG/L	300.00	37250.00	0.81
3586	10/25/00	MAGNESIUM, Dissolved	40500		V	40800		V	UG/L	300.0	40650.0	0.7
41299	12/12/00	MAGNESIUM, Dissolved	13800		V1	13900		V1	UG/L	100.0	13850.0	0.7
70193	1/11/00	MAGNESIUM, Dissolved	4680	B	J1	4570	B	J1	UG/L	110.00	4625.00	2.38
70193	5/10/00	MAGNESIUM, Dissolved	5140		V1	5170		V1	UG/L	30.00	5155.00	0.58
70193	7/26/00	MAGNESIUM, Dissolved	3750	B	V	4220	B	V	UG/L	470.00	3985.00	11.79
70193	10/31/00	MAGNESIUM, Dissolved	4970	B	V1	5230		V1	UG/L	260.0	5100.0	5.1
891COLGAL	8/24/00	MAGNESIUM, Dissolved	41800		UJ	41400		UJ	UG/L	400.00	41600.00	0.96
891COLWEL	8/24/00	MAGNESIUM, Dissolved	39100		UJ	38600		UJ	UG/L	500.00	38850.00	1.29
P209389	1/18/00	MAGNESIUM, Dissolved	15000		V1	16700		V1	UG/L	1700.00	15850.00	10.73
P209389	7/31/00	MAGNESIUM, Dissolved	20200		V1	20400		V1	UG/L	200.00	20300.00	0.99
SW13494	8/22/00	MAGNESIUM, Dissolved	24300		UJ	24800		UJ	UG/L	500.00	24550.00	2.04
0386	2/10/00	MAGNESIUM, Total	30900		V1	31000	B	V1	UG/L	100.00	30950.00	0.32
10294	1/19/00	MAGNESIUM, Total	56900		V1	55900		V1	UG/L	1000.00	56400.00	1.77
10294	7/25/00	MAGNESIUM, Total	61500		V	65200		V	UG/L	3700.00	63350.00	5.84
18199	12/5/00	MAGNESIUM, Total	11100		V1	10900		V1	UG/L	200.0	11000.0	1.8
23296	10/30/00	MAGNESIUM, Total	39600			39400			UG/L	200.0	39500.0	0.5
41591	2/16/00	MAGNESIUM, Total	111000		V	109000		V	UG/L	2000.00	110000.00	1.82
5887	10/30/00	MAGNESIUM, Total	5270			5390			UG/L	120.0	5330.0	2.3
5887	5/5/00	MAGNESIUM, Total	4030	B	J	4050	B	J	UG/L	20.00	4040.00	0.50
70393	6/1/00	MAGNESIUM, Total	3140	B	V1	4210	B	V1	UG/L	1070.00	3675.00	29.12
10498	2/21/00	MANGANESE, Dissolved	11.8	B	V1	22		V1	UG/L	10.20	16.90	60.36
10498	8/9/00	MANGANESE, Dissolved	10.2	B	V	17.5		V	UG/L	7.30	13.85	52.71
11891	5/5/00	MANGANESE, Dissolved	0.62	B	J	0.86	B	V	UG/L	0.24	0.74	32.43
11891	10/24/00	MANGANESE, Dissolved	1.72	B	V	1.74	B	V	UG/L	0.0	1.7	1.2

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Table 11-1
Relative Percent Differences (RPDs) for Groundwater
Calendar Year 2000

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid	Dup Result	Dup Lab Qual	Dup Valid	Units	Absolute Value (Real-Dup)	Average (Real+Dup)/2	RPD AbsVal/AveX100
12691	2/2/00	MANGANESE, Dissolved	6.7	B	V1	7.4	B	V1	UG/L	0.70	7.05	9.93
12691	7/27/00	MANGANESE, Dissolved	0.07	B	UJ	0.28	B	UJ	UG/L	0.21	0.18	120.00
3586	5/18/00	MANGANESE, Dissolved	4500		V	4470		V	UG/L	30.00	4485.00	0.67
3586	10/25/00	MANGANESE, Dissolved	4660		V	4710		V	UG/L	50.0	4685.0	1.1
41299	12/12/00	MANGANESE, Dissolved	4.81	B	V1	3.86	B	V1	UG/L	1.0	4.3	21.9
70193	1/11/00	MANGANESE, Dissolved	0.83	B	V1	0.75	B	V1	UG/L	0.08	0.79	10.13
70193	5/10/00	MANGANESE, Dissolved	0.65	B	V1	0.35	B	UJ1	UG/L	0.30	0.50	60.00
70193	7/26/00	MANGANESE, Dissolved	0.68	B	V	0.35	B	UJ	UG/L	0.33	0.52	64.08
70193	10/31/00	MANGANESE, Dissolved	0.477	U	V1	0.564	B	UJ1	UG/L	0.1	0.5	16.7
891COLWEL	8/24/00	MANGANESE, Dissolved	0.74	B	V	0.61	B	V	UG/L	0.13	0.68	19.26
P209389	1/18/00	MANGANESE, Dissolved	0.99	B	J1	0.74	B	J1	UG/L	0.25	0.87	28.90
P209389	7/31/00	MANGANESE, Dissolved	2.8	B	V1	3.1	B	V1	UG/L	0.30	2.95	10.17
SW13494	8/22/00	MANGANESE, Dissolved	0.99	B	V	0.98	B	V	UG/L	0.01	0.99	1.02
0386	2/10/00	MANGANESE, Total	3.2	B	V1	3.3	B	V1	UG/L	0.10	3.25	3.08
10294	1/19/00	MANGANESE, Total	698		J1	682		J1	UG/L	16.00	690.00	2.32
10294	7/25/00	MANGANESE, Total	686		V	670		V	UG/L	16.00	678.00	2.36
18199	12/5/00	MANGANESE, Total	335		V1	330		V1	UG/L	5.0	332.5	1.5
23296	10/30/00	MANGANESE, Total	36.3			39.4			UG/L	3.1	37.9	8.2
41591	2/16/00	MANGANESE, Total	5.7	B	V	5	B	V	UG/L	0.70	5.35	13.08
5887	10/30/00	MANGANESE, Total	1.43	B		1.74	B		UG/L	0.3	1.6	19.6
5887	5/5/00	MANGANESE, Total	1	B	V	0.88	B	V	UG/L	0.12	0.94	12.77
70393	6/1/00	MANGANESE, Total	0.8	B	V1	0.86	B	V1	UG/L	0.06	0.83	7.23
10498	8/9/00	MERCURY, Dissolved	0.13		1	0.12		V	UG/L	0.01	0.13	8.00
10498	2/21/00	MOLYBDENUM, Dissolved	7.3	B	V1	10.8	B	V1	UG/L	3.50	9.05	38.67
10498	8/9/00	MOLYBDENUM, Dissolved	6.2	B	1	12.5	B	V	UG/L	6.30	9.35	67.38
11891	5/5/00	MOLYBDENUM, Dissolved	0.41	B	V	0.49	B	V	UG/L	0.08	0.45	17.78
11891	10/24/00	MOLYBDENUM, Dissolved	2.15	B	UJ	1.62	B	UJ	UG/L	0.5	1.9	28.1
12691	2/2/00	MOLYBDENUM, Dissolved	0.28	U	J1	0.38	B	J1	UG/L	0.10	0.33	30.30
12691	7/27/00	MOLYBDENUM, Dissolved	0.42	B	UJ	0.22	U	J	UG/L	0.20	0.32	62.50
3586	5/18/00	MOLYBDENUM, Dissolved	0.32	B	V	0.53	B	V	UG/L	0.21	0.43	49.41
3586	10/25/00	MOLYBDENUM, Dissolved	1.42	B	UJ	1.44	B	UJ	UG/L	0.0	1.4	1.4
41299	12/12/00	MOLYBDENUM, Dissolved	2.23	B	UJ1	1.94	B	UJ1	UG/L	0.3	2.1	13.9
70193	1/11/00	MOLYBDENUM, Dissolved	0.93	B	V1	0.84	B	V1	UG/L	0.09	0.89	10.17
70193	5/10/00	MOLYBDENUM, Dissolved	1.1	B	V1	1	B	V1	UG/L	0.10	1.05	9.52
70193	7/26/00	MOLYBDENUM, Dissolved	0.71	B	UJ	0.93	B	UJ	UG/L	0.22	0.82	26.83
891COLGAL	8/24/00	MOLYBDENUM, Dissolved	1.3	B	V	1.1	B	V	UG/L	0.20	1.20	16.67
891COLWEL	8/24/00	MOLYBDENUM, Dissolved	3	B	V	3.1	B	V	UG/L	0.10	3.05	3.28
P209389	1/18/00	MOLYBDENUM, Dissolved	0.5	B	V1	0.66	B	V1	UG/L	0.16	0.58	27.59
P209389	7/31/00	MOLYBDENUM, Dissolved	0.55	B	UJ1	0.56	B	UJ1	UG/L	0.01	0.56	1.80
SW13494	8/22/00	MOLYBDENUM, Dissolved	2	B	V	2	B	V	UG/L	0.00	2.00	0.00
0386	2/10/00	MOLYBDENUM, Total	3.6	B	V1	3.4	B	V1	UG/L	0.20	3.50	5.71
10294	1/19/00	MOLYBDENUM, Total	3.6	B	V1	3.6	B	V1	UG/L	0.00	3.60	0.00
10294	7/25/00	MOLYBDENUM, Total	4.2	B	V	4.3	B	V	UG/L	0.10	4.25	2.35
23296	10/30/00	MOLYBDENUM, Total	7.49	B		9.15	B		UG/L	1.7	8.3	20.0
41591	2/16/00	MOLYBDENUM, Total	6.9	B	V	5.9	B	V	UG/L	1.00	6.40	15.63
5887	5/5/00	MOLYBDENUM, Total	0.48	B	V	0.52	B	V	UG/L	0.04	0.50	8.00
10498	2/21/00	NICKEL, Dissolved	2.2	B	V1	1.7	B	V1	UG/L	0.50	1.95	25.64
10498	8/9/00	NICKEL, Dissolved	1.9	B	V	1.6	B	V	UG/L	0.30	1.75	17.14
11891	5/5/00	NICKEL, Dissolved	0.37	B	V	0.52	B	V	UG/L	0.15	0.45	33.71
11891	10/24/00	NICKEL, Dissolved	1.07	B	UJ	1.03	U	V	UG/L	0.0	1.1	3.8
12691	2/2/00	NICKEL, Dissolved	1.4	B	V1	1.4	B	V1	UG/L	0.00	1.40	0.00
3586	5/18/00	NICKEL, Dissolved	15	B	V	14.7	B	V	UG/L	0.30	14.85	2.02
3586	10/25/00	NICKEL, Dissolved	15	B	V	15.5	B	V	UG/L	0.5	15.3	3.3
41299	12/12/00	NICKEL, Dissolved	1.54	B	V1	1.03	U	V1	UG/L	0.5	1.3	39.7
70193	1/11/00	NICKEL, Dissolved	0.6	B	V1	0.67	B	V1	UG/L	0.07	0.64	11.02
70193	5/10/00	NICKEL, Dissolved	0.84	B	V1	0.68	B	V1	UG/L	0.16	0.76	21.05
891COLGAL	8/24/00	NICKEL, Dissolved	4.5	B	V	4.4	B	V	UG/L	0.10	4.45	2.25
891COLWEL	8/24/00	NICKEL, Dissolved	12.3	B	V	12.1	B	V	UG/L	0.20	12.20	1.64
P209389	1/18/00	NICKEL, Dissolved	1.6	B	V1	1.7	B	V1	UG/L	0.10	1.65	6.06
P209389	7/31/00	NICKEL, Dissolved	2.2	B	J1	2.2	B	J1	UG/L	0.00	2.20	0.00
SW13494	8/22/00	NICKEL, Dissolved	0.44	B	V	0.5	B	V	UG/L	0.06	0.47	12.77

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Table 11-1
Relative Percent Differences (RPDs) for Groundwater
Calendar Year 2000

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid	Dup Result	Dup Lab Qual	Dup Valid	Units	Absolute Value (Real-Dup)	Average (Real+Dup)/2	RPD AbsVal/AveX100
0386	2/10/00	NICKEL, Total	8.7	B	V1	8.7	B	V1	UG/L	0.00	8.70	0.00
10294	1/19/00	NICKEL, Total	6.8	B	V1	6.7	B	V1	UG/L	0.10	6.75	1.48
10294	7/25/00	NICKEL, Total	9.9	B	V	11	B	V	UG/L	1.10	10.45	10.53
18199	12/5/00	NICKEL, Total	3.14	B	V1	3.79	B	V1	UG/L	0.7	3.5	18.8
23296	10/30/00	NICKEL, Total	77.3			73.5			UG/L	3.8	75.4	5.0
41591	2/16/00	NICKEL, Total	229		V	159		V	UG/L	70.00	194.00	36.08
5887	10/30/00	NICKEL, Total	3.06	B		2.95	B		UG/L	0.1	3.0	3.7
5887	5/5/00	NICKEL, Total	1.6	B	V	1.7	B	V	UG/L	0.10	1.65	6.06
70393	6/1/00	NICKEL, Total	1.2	B	V1	1.4	B	V1	UG/L	0.20	1.30	15.38
10498	2/21/00	POTASSIUM, Dissolved	5020		V1	4350	B	V1	UG/L	670.00	4685.00	14.30
10498	8/9/00	POTASSIUM, Dissolved	9270		J	6640		J	UG/L	2630.00	7955.00	33.06
11891	5/5/00	POTASSIUM, Dissolved	1100	B	J	970	B	J	UG/L	130.00	1035.00	12.56
11891	10/24/00	POTASSIUM, Dissolved	1250	B	V	1250	B	V	UG/L	0.0	1250.0	0.0
12691	2/2/00	POTASSIUM, Dissolved	1530	B	J1	1610	B	J1	UG/L	80.00	1570.00	5.10
12691	7/27/00	POTASSIUM, Dissolved	1430	B	J	1150	B	J	UG/L	280.00	1290.00	21.71
3586	5/18/00	POTASSIUM, Dissolved	1120	B	V	1130	B	V	UG/L	10.00	1125.00	0.89
3586	10/25/00	POTASSIUM, Dissolved	875	B	V	875	B	V	UG/L	0.0	875.0	0.0
41299	12/12/00	POTASSIUM, Dissolved	969	B	V1	961	B	V1	UG/L	8.0	965.0	0.8
70193	1/11/00	POTASSIUM, Dissolved	1250	B	V1	1220	B	V1	UG/L	30.00	1235.00	2.43
70193	5/10/00	POTASSIUM, Dissolved	1260	B	V1	1260	B	V1	UG/L	0.00	1260.00	0.00
70193	7/26/00	POTASSIUM, Dissolved	947	B	J	1040	B	J	UG/L	93.00	993.50	9.36
70193	10/31/00	POTASSIUM, Dissolved	1150	B	V1	1200	B	V1	UG/L	50.0	1175.0	4.3
891COLGAL	8/24/00	POTASSIUM, Dissolved	2280	B	UJ	2270	B	UJ	UG/L	10.00	2275.00	0.44
891COLWEL	8/24/00	POTASSIUM, Dissolved	1230	B	UJ	1200	B	UJ	UG/L	30.00	1215.00	2.47
P209389	1/18/00	POTASSIUM, Dissolved	1580	B	V1	1760	B	V1	UG/L	180.00	1670.00	10.78
P209389	7/31/00	POTASSIUM, Dissolved	1870	B	J1	1890	B	J1	UG/L	20.00	1880.00	1.06
SW13494	8/22/00	POTASSIUM, Dissolved	4100	B	UJ	4190	B	UJ	UG/L	90.00	4145.00	2.17
0386	2/10/00	POTASSIUM, Total	3370	B	J1	3340	B	J1	UG/L	30.00	3355.00	0.89
10294	1/19/00	POTASSIUM, Total	5000	B	V1	4930	B	V1	UG/L	70.00	4965.00	1.41
10294	7/25/00	POTASSIUM, Total	3730	B	J	3990	B	J	UG/L	260.00	3860.00	6.74
18199	12/5/00	POTASSIUM, Total	1790	B	V1	1800	B	V1	UG/L	10.0	1795.0	0.6
23296	10/30/00	POTASSIUM, Total	2260	B		2250	B		UG/L	10.0	2255.0	0.4
41591	2/16/00	POTASSIUM, Total	647	B	J	641	B	J	UG/L	6.00	644.00	0.93
5887	10/30/00	POTASSIUM, Total	1090	B		1030	B		UG/L	60.0	1060.0	5.7
5887	5/5/00	POTASSIUM, Total	667	B	J	664	B	J	UG/L	3.00	665.50	0.45
70393	6/1/00	POTASSIUM, Total	381	B	V1	514	B	V1	UG/L	133.00	447.50	29.72
10498	2/21/00	SELENIUM, Dissolved	1.9	B	V1	2.8	B	V1	UG/L	0.90	2.35	38.30
10498	8/9/00	SELENIUM, Dissolved	3.5		J	2.5	B	J	UG/L	1.00	3.00	33.33
11891	5/5/00	SELENIUM, Dissolved	1.1	U	V	1.2	B	V	UG/L	0.10	1.15	8.70
12691	2/2/00	SELENIUM, Dissolved	1.5	B	J1	1.6	B	J1	UG/L	0.10	1.55	6.45
12691	7/27/00	SELENIUM, Dissolved	1.1	U	J	1.3	B	J	UG/L	0.20	1.20	16.67
70193	1/11/00	SELENIUM, Dissolved	3.1		V1	2.3	B	V1	UG/L	0.80	2.70	29.63
70193	5/10/00	SELENIUM, Dissolved	11.7		J1	11.6		J1	UG/L	0.10	11.65	0.86
70193	7/26/00	SELENIUM, Dissolved	5.8		J	7.3		J	UG/L	1.50	6.55	22.90
70193	10/31/00	SELENIUM, Dissolved	10.1		V1	11.2		V1	UG/L	1.1	10.7	10.3
891COLGAL	8/24/00	SELENIUM, Dissolved	19.9		V	19.7		V	UG/L	0.20	19.80	1.01
891COLWEL	8/24/00	SELENIUM, Dissolved	664		V	654		V	UG/L	10.00	659.00	1.52
SW13494	8/22/00	SELENIUM, Dissolved	2.5	B	V	2.6	B	V	UG/L	0.10	2.55	3.92
0386	2/10/00	SELENIUM, Total	37.9		V1	38		V1	UG/L	0.10	37.95	0.26
23296	10/30/00	SELENIUM, Total	7.53			4.99			UG/L	2.5	6.3	40.6
41591	2/16/00	SELENIUM, Total	9.9		V	8.8		J	UG/L	1.10	9.35	11.76
41591	2/16/00	SILVER, Total	0.49	B	V	0.22	U	V	UG/L	0.27	0.36	76.06
10498	2/21/00	SODIUM, Dissolved	65700		V1	65800		V1	UG/L	100.00	65750.00	0.15
10498	8/9/00	SODIUM, Dissolved	90300	B	V	41800	B	V	UG/L	48500.00	66050.00	73.43
11891	5/5/00	SODIUM, Dissolved	15300		J	15300		J	UG/L	0.00	15300.00	0.00
11891	10/24/00	SODIUM, Dissolved	17000		V	17500		V	UG/L	500.0	17250.0	2.9
12691	2/2/00	SODIUM, Dissolved	14900		J1	15100		J1	UG/L	200.00	15000.00	1.33
12691	7/27/00	SODIUM, Dissolved	15300	B	V	12300	B	V	UG/L	3000.00	13800.00	21.74
3586	5/18/00	SODIUM, Dissolved	152000		V	155000		V	UG/L	3000.00	153500.00	1.95
3586	10/25/00	SODIUM, Dissolved	199000		V	199000		V	UG/L	0.0	199000.0	0.0
41299	12/12/00	SODIUM, Dissolved	21100		V1	20800		V1	UG/L	300.0	20950.0	1.4

Table 11-1
Relative Percent Differences (RPDs) for Groundwater
Calendar Year 2000

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid	Dup Result	Dup Lab Qual	Dup Valid	Units	Absolute Value (Real-Dup)	Average (Real+Dup)/2	RPD AbsVal/AveX100
70193	1/11/00	SODIUM, Dissolved	11700		V1	11500		V1	UG/L	200.00	11600.00	1.72
70193	5/10/00	SODIUM, Dissolved	13000		V1	13100		V1	UG/L	100.00	13050.00	0.77
70193	7/26/00	SODIUM, Dissolved	10700		V	11100		V	UG/L	400.00	10900.00	3.67
70193	10/31/00	SODIUM, Dissolved	13500		V1	14000		V1	UG/L	500.0	13750.0	3.6
891COLGAL	8/24/00	SODIUM, Dissolved	112000		V	114000		V	UG/L	2000.00	113000.00	1.77
891COLWEL	8/24/00	SODIUM, Dissolved	144000		V	135000		V	UG/L	9000.00	139500.00	6.45
P209389	1/18/00	SODIUM, Dissolved	49700		V1	56700		V1	UG/L	7000.00	53200.00	13.16
P209389	7/31/00	SODIUM, Dissolved	62500		V1	63600		V1	UG/L	1100.00	63050.00	1.74
SW13494	8/22/00	SODIUM, Dissolved	57400		V	60800		V	UG/L	3400.00	59100.00	5.75
0386	2/10/00	SODIUM, Total	53200		V1	53400		V1	UG/L	200.00	53300.00	0.38
10294	1/19/00	SODIUM, Total	226000		V1	224000		V1	UG/L	2000.00	225000.00	0.89
10294	7/25/00	SODIUM, Total	254000		V	270000		V	UG/L	16000.00	262000.00	6.11
18199	12/5/00	SODIUM, Total	26500		J1	26400		J1	UG/L	100.0	26450.0	0.4
23296	10/30/00	SODIUM, Total	98900			97800			UG/L	1100.0	98350.0	1.1
41591	2/16/00	SODIUM, Total	157000		V	155000		V	UG/L	2000.00	156000.00	1.28
5887	10/30/00	SODIUM, Total	11300			11500			UG/L	200.0	11400.0	1.8
5887	5/5/00	SODIUM, Total	6170		J	6280		J	UG/L	110.00	6225.00	1.77
70393	6/1/00	SODIUM, Total	9040		V1	12000		V1	UG/L	2960.00	10520.00	28.14
10498	2/21/00	STRONTIUM, Dissolved	112	B	V1	123	B	V1	UG/L	11.00	117.50	9.36
10498	8/9/00	STRONTIUM, Dissolved	185	B	V	200		V	UG/L	15.00	192.50	7.79
11891	5/5/00	STRONTIUM, Dissolved	459		V	449		V	UG/L	10.00	454.00	2.20
11891	10/24/00	STRONTIUM, Dissolved	482		V	499		V	UG/L	17.0	490.5	3.5
12691	2/2/00	STRONTIUM, Dissolved	439		V1	446		V1	UG/L	7.00	442.50	1.58
12691	7/27/00	STRONTIUM, Dissolved	486		J	396		J	UG/L	90.00	441.00	20.41
3586	5/18/00	STRONTIUM, Dissolved	880		V	877		V	UG/L	3.00	878.50	0.34
3586	10/25/00	STRONTIUM, Dissolved	992		V	1000		V	UG/L	8.0	996.0	0.8
41299	12/12/00	STRONTIUM, Dissolved	427		V1	431		V1	UG/L	4.0	429.0	0.9
70193	1/11/00	STRONTIUM, Dissolved	147	B	V1	143	B	V1	UG/L	4.00	145.00	2.76
70193	5/10/00	STRONTIUM, Dissolved	161	B	V1	162	B	V1	UG/L	1.00	161.50	0.62
70193	7/26/00	STRONTIUM, Dissolved	122	B	J	136	B	J	UG/L	14.00	129.00	10.85
70193	10/31/00	STRONTIUM, Dissolved	160	B	V1	167	B	V1	UG/L	7.0	163.5	4.3
891COLGAL	8/24/00	STRONTIUM, Dissolved	1230		V	1210		V	UG/L	20.00	1220.00	1.64
891COLWEL	8/24/00	STRONTIUM, Dissolved	1290		V	1270		V	UG/L	20.00	1280.00	1.56
P209389	1/18/00	STRONTIUM, Dissolved	449		V1	498		V1	UG/L	49.00	473.50	10.35
P209389	7/31/00	STRONTIUM, Dissolved	618		V1	621		V1	UG/L	3.00	619.50	0.48
SW13494	8/22/00	STRONTIUM, Dissolved	746		V	764		V	UG/L	18.00	755.00	2.38
0386	2/10/00	STRONTIUM, Total	1390		V1	1390		V1	UG/L	0.00	1390.00	0.00
10294	1/19/00	STRONTIUM, Total	1530		V1	1500		V1	UG/L	30.00	1515.00	1.98
10294	7/25/00	STRONTIUM, Total	1840		J	1920		J	UG/L	80.00	1880.00	4.26
18199	12/5/00	STRONTIUM, Total	305		V1	303		V1	UG/L	2.0	304.0	0.7
23296	10/30/00	STRONTIUM, Total	1280			1280			UG/L	0.0	1280.0	0.0
41591	2/16/00	STRONTIUM, Total	2600		V	2570		V	UG/L	30.00	2585.00	1.16
5887	10/30/00	STRONTIUM, Total	154	B		158	B		UG/L	4.0	156.0	2.6
5887	5/5/00	STRONTIUM, Total	122	B	V	124	B	V	UG/L	2.00	123.00	1.63
70393	6/1/00	STRONTIUM, Total	85.8	B	V1	116	B	V1	UG/L	30.20	100.90	29.93
11891	10/24/00	THALLIUM, Dissolved	5.72		V	4.56		V	UG/L	1.2	5.1	22.6
3586	5/18/00	THALLIUM, Dissolved	0.95	U	V	1.3	B	V	UG/L	0.35	1.13	31.11
3586	10/25/00	THALLIUM, Dissolved	4.6		V	3.86	B	V	UG/L	0.7	4.2	17.5
41299	12/12/00	THALLIUM, Dissolved	3.76	B	J1	5.37		J1	UG/L	1.6	4.6	35.3
18199	12/5/00	THALLIUM, Total	3.54	B	UJ1	8.23		UJ1	UG/L	4.7	5.9	79.7
12691	2/2/00	TIN, Dissolved	0.91	B	V1	0.65	U	V1	UG/L	0.26	0.78	33.33
41299	12/12/00	TIN, Dissolved	2.57	B	V1	2.38	U	V1	UG/L	0.2	2.5	7.7
11891	10/24/00	URANIUM, Total	5.14	B	J	0.723	U	J	UG/L	4.4	2.9	150.7
23296	10/30/00	URANIUM, Total	42.1	B		42.8	B		UG/L	0.7	42.5	1.6
3586	10/25/00	URANIUM, Total	1.6	B	J	9.46	B	V	UG/L	7.9	5.5	142.1
41299	12/12/00	URANIUM, Total	19	B	UJ1	21	B	UJ1	UG/L	2.0	20.0	10.0
5887	10/30/00	URANIUM, Total	17	B		13.8	B		UG/L	3.2	15.4	20.8
70193	10/31/00	URANIUM, Total	15.1	B	UJ1	17.8	B	UJ1	UG/L	2.7	16.5	16.4
10498	2/21/00	VANADIUM, Dissolved	1.6	B	V1	1.5	B	V1	UG/L	0.10	1.55	6.45
10498	8/9/00	VANADIUM, Dissolved	3.1	B	V	2.1	B	V	UG/L	1.00	2.60	38.46
11891	5/5/00	VANADIUM, Dissolved	0.46	B	J	0.36	B	V	UG/L	0.10	0.41	24.39

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Table 11-1
Relative Percent Differences (RPDs) for Groundwater
Calendar Year 2000

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid	Dup Result	Dup Lab Qual	Dup Valid	Units	Absolute Value (Real-Dup)	Average (Real+Dup)/2	RPD AbsVal/AveX100
11891	10/24/00	VANADIUM, Dissolved	0.792	B	V	0.504	B	V	UG/L	0.3	0.6	44.4
12691	2/2/00	VANADIUM, Dissolved	2	B	V1	2.4	B	V1	UG/L	0.40	2.20	18.18
12691	7/27/00	VANADIUM, Dissolved	1.1	B	J	0.9	B	J	UG/L	0.20	1.00	20.00
3586	5/18/00	VANADIUM, Dissolved	0.41	B	UJ	0.36	B	UJ	UG/L	0.05	0.39	12.99
3586	10/25/00	VANADIUM, Dissolved	0.455	U	V	0.477	B	V	UG/L	0.0	0.5	4.7
41299	12/12/00	VANADIUM, Dissolved	1.02	B	V1	0.862	B	V1	UG/L	0.2	0.9	16.8
70193	1/11/00	VANADIUM, Dissolved	0.23	B	UJ1	0.23	B	UJ1	UG/L	0.00	0.23	0.00
70193	5/10/00	VANADIUM, Dissolved	0.43	B	UJ1	0.52	B	UJ1	UG/L	0.09	0.48	18.95
891COLGAL	8/24/00	VANADIUM, Dissolved	0.93	B	V	0.96	B	V	UG/L	0.03	0.95	3.17
891COLWEL	8/24/00	VANADIUM, Dissolved	2.3	B	V	2.4	B	V	UG/L	0.10	2.35	4.26
SW13494	8/22/00	VANADIUM, Dissolved	1.1	B	V	1	B	V	UG/L	0.10	1.05	9.52
18199	12/5/00	VANADIUM, Total	0.508	B	V1	0.455	U	V1	UG/L	0.1	0.5	11.0
23296	10/30/00	VANADIUM, Total	3.39	B		4.24	B		UG/L	0.9	3.8	22.3
41591	2/16/00	VANADIUM, Total	1.8	B	V	2	B	V	UG/L	0.20	1.90	10.53
70393	6/1/00	VANADIUM, Total	0.18	U	J1	0.28	B	J1	UG/L	0.10	0.23	43.48
10498	2/21/00	ZINC, Dissolved	12.7	B	V1	8.5	B	V1	UG/L	4.20	10.60	39.62
10498	8/9/00	ZINC, Dissolved	8.3	B	J	5.1	B	J	UG/L	3.20	6.70	47.76
11891	5/5/00	ZINC, Dissolved	5.6	B	V	5.5	B	V	UG/L	0.10	5.55	1.80
11891	10/24/00	ZINC, Dissolved	3.69	B	UJ	2.91	B	UJ	UG/L	0.8	3.3	23.6
12691	2/2/00	ZINC, Dissolved	5.8	B	V1	6.5	B	V1	UG/L	0.70	6.15	11.38
12691	7/27/00	ZINC, Dissolved	7.4	B	V	6.5	B	V	UG/L	0.90	6.95	12.95
3586	5/18/00	ZINC, Dissolved	7.5	B	V	7.3	B	V	UG/L	0.20	7.40	2.70
3586	10/25/00	ZINC, Dissolved	8.53	B	V	7.42	B	UJ	UG/L	1.1	8.0	13.9
41299	12/12/00	ZINC, Dissolved	7.53	B	V1	10.6	B	V1	UG/L	3.1	9.1	33.9
70193	1/11/00	ZINC, Dissolved	11.9	B	R1	5.9	B	R1	UG/L	6.00	8.90	67.42
70193	5/10/00	ZINC, Dissolved	5.3	B	UJ1	5.4	B	UJ1	UG/L	0.10	5.35	1.87
70193	7/26/00	ZINC, Dissolved	2.9	B	V	2.3	B	V	UG/L	0.60	2.60	23.08
70193	10/31/00	ZINC, Dissolved	5.96	B	V1	6.59	B	V1	UG/L	0.6	6.3	10.0
891COLGAL	8/24/00	ZINC, Dissolved	95.2		V	93.1		V	UG/L	2.10	94.15	2.23
891COLWEL	8/24/00	ZINC, Dissolved	6.6	B	V	11.2	B	V	UG/L	4.60	8.90	51.69
P209389	1/18/00	ZINC, Dissolved	2.6	B	J1	1.1	B	J1	UG/L	1.50	1.85	81.08
P209389	7/31/00	ZINC, Dissolved	4.2	B	J1	4.4	B	J1	UG/L	0.20	4.30	4.65
SW13494	8/22/00	ZINC, Dissolved	53.8		V	56		V	UG/L	2.20	54.90	4.01
0386	2/10/00	ZINC, Total	3.2	B	UJ1	3.2	B	UJ1	UG/L	0.00	3.20	0.00
10294	1/19/00	ZINC, Total	3.5	B	J1	1.2	B	J1	UG/L	2.30	2.35	97.87
10294	7/25/00	ZINC, Total	2.4	B	V	2.5	B	V	UG/L	0.10	2.45	4.08
18199	12/5/00	ZINC, Total	3.09	B	V1	3.53	B	V1	UG/L	0.4	3.3	13.3
23296	10/30/00	ZINC, Total	4.75	B		6.47	B		UG/L	1.7	5.6	30.7
41591	2/16/00	ZINC, Total	2.4	B	UJ	1.1	B	UJ	UG/L	1.30	1.75	74.29
5887	10/30/00	ZINC, Total	10.2	B		10.8	B		UG/L	0.6	10.5	5.7
5887	5/5/00	ZINC, Total	5.9	B	V	5	B	V	UG/L	0.90	5.45	16.51
70393	6/1/00	ZINC, Total	3.4	B	V1	3.5	B	V1	UG/L	0.10	3.45	2.90
Water Quality Parameters												
18199	3/14/00	CHLORIDE	76		V	78		V	MG/L	2.00	77.00	2.60
18199	12/5/00	CHLORIDE	69		V1	67		V1	MG/L	2.0	68.0	2.9
10498	2/21/00	CYANIDE	0.011		V1	0.041		V1	MG/L	0.03	0.03	115.38
18199	3/14/00	DISSOLVED ORGANIC CARBON	5		V	3		V	MG/L	2.00	4.00	50.00
10294	7/25/00	FLUORIDE	2		V	2.3		V	MG/L	0.30	2.15	13.95
41591	2/16/00	FLUORIDE	3		V1	3		V1	MG/L	0.00	3.00	0.00
5887	5/5/00	FLUORIDE	0.12		V1	0.16		V1	MG/L	0.04	0.14	28.57
5887	10/30/00	FLUORIDE	0.23		1	0.23		1	MG/L	0.0	0.2	0.0
70193	1/11/00	FLUORIDE	0.5		V1	0.51		V1	MG/L	0.01	0.51	1.98
70193	5/10/00	FLUORIDE	0.31		V1	0.3		V1	MG/L	0.01	0.31	3.28
70193	7/26/00	FLUORIDE	0.29		V	0.3		V	MG/L	0.01	0.30	3.39
70193	10/31/00	FLUORIDE	0.46		V	0.44		V	MG/L	0.0	0.5	4.4
70393	6/1/00	FLUORIDE	0.13		V1	0.24		V1	MG/L	0.11	0.19	59.46
P209389	7/31/00	FLUORIDE	0.28		V	0.31		V	MG/L	0.03	0.30	10.17
18199	3/14/00	NITRATE	0.69		J	0.73		J	MG/L	0.04	0.71	5.63
18199	12/5/00	NITRATE	0.74		J1	0.71		J1	MG/L	0.0	0.7	4.1
0386	2/10/00	NITRATE/NITRITE	3.6		V1	3.9		V1	MG/L	0.30	3.75	8.00
10498	2/21/00	NITRATE/NITRITE	6.9		V1	6.5		V1	MG/L	0.40	6.70	5.97

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Table 11-1
Relative Percent Differences (RPDs) for Groundwater
Calendar Year 2000

Location	Sample Date	Analyte	Real Result	Real Lab Qual	Real Valid	Dup Result	Dup Lab Qual	Dup Valid	Units	Absolute Value (Real-Dup)	Average (Real+Dup)/2	RPD AbsVal/AveX100
10498	8/9/00	NITRATE/NITRITE	9.5		V	10		V	MG/L	0.50	9.75	5.13
11891	5/5/00	NITRATE/NITRITE	4.6		V	5.4		V	MG/L	0.80	5.00	16.00
11891	10/24/00	NITRATE/NITRITE	5.4		1	5.5		1	MG/L	0.1	5.5	1.8
12691	2/2/00	NITRATE/NITRITE	6.4		V1	5.4		V1	MG/L	1.00	5.90	16.95
12691	7/27/00	NITRATE/NITRITE	6.8		V	6.7		V	MG/L	0.10	6.75	1.48
23296	10/30/00	NITRATE/NITRITE	0.7		1	0.62		1	MG/L	0.1	0.7	12.1
3586	10/25/00	NITRATE/NITRITE	0.06		1	0.09		1	MG/L	0.0	0.1	40.0
41299	12/12/00	NITRATE/NITRITE	4.2		V1	3.7		V1	MG/L	0.5	4.0	12.7
41591	2/16/00	NITRATE/NITRITE	0.88		V	0.79		V	MG/L	0.09	0.84	10.78
5887	5/5/00	NITRATE/NITRITE	3.7		V	3.8		V	MG/L	0.10	3.75	2.67
5887	10/30/00	NITRATE/NITRITE	4.7		1	4.4		1	MG/L	0.3	4.6	6.6
70193	1/11/00	NITRATE/NITRITE	30		V1	34		V1	MG/L	4.00	32.00	12.50
70193	5/10/00	NITRATE/NITRITE	2.7		V1	2.6		V1	MG/L	0.10	2.65	3.77
70193	7/26/00	NITRATE/NITRITE	3		V	2.4		V	MG/L	0.60	2.70	22.22
70193	10/31/00	NITRATE/NITRITE	2.2		V	0.48		V	MG/L	1.7	1.3	128.4
70393	6/1/00	NITRATE/NITRITE	5.1		V	4.9		V	MG/L	0.20	5.00	4.00
P209389	1/18/00	NITRATE/NITRITE	5.7		V1	5.6		V1	MG/L	0.10	5.65	1.77
P209389	7/31/00	NITRATE/NITRITE	3.6		V	3.6		V	MG/L	0.00	3.60	0.00
10294	7/25/00	SULFATE	450		J	400		V	MG/L	50.00	425.00	11.76
18199	3/14/00	SULFATE	29		V	29		V	MG/L	0.00	29.00	0.00
18199	12/5/00	SULFATE	27		V1	27		V1	MG/L	0.0	27.0	0.0
41591	2/16/00	SULFATE	110		V1	100		V1	MG/L	10.00	105.00	9.52
5887	5/5/00	SULFATE	27		V1	27		V1	MG/L	0.00	27.00	0.00
5887	10/30/00	SULFATE	31		1	31		1	MG/L	0.0	31.0	0.0
70193	1/11/00	SULFATE	22		V1	23		V1	MG/L	1.00	22.50	4.44
70193	5/10/00	SULFATE	23		V1	23		V1	MG/L	0.00	23.00	0.00
70193	7/26/00	SULFATE	22		V	22		V	MG/L	0.00	22.00	0.00
70193	10/31/00	SULFATE	22		UJ	21		UJ	MG/L	1.0	21.5	4.7
70393	6/1/00	SULFATE	31		V1	32		V1	MG/L	1.00	31.50	3.17
P209389	7/31/00	SULFATE	150		V	160		V	MG/L	10.00	155.00	6.45
18199	3/14/00	SULFIDE	0.004		V	0.003		V	MG/L	0.00	0.00	28.57
0386	2/10/00	TOTAL DISSOLVED SOLIDS	530		V1	510		V1	MG/L	20.00	520.00	3.85
10294	1/19/00	TOTAL DISSOLVED SOLIDS	1200		V1	1200		V1	MG/L	0.00	1200.00	0.00
10294	7/25/00	TOTAL DISSOLVED SOLIDS	1400		V	1400		V	MG/L	0.00	1400.00	0.00
10498	2/21/00	TOTAL DISSOLVED SOLIDS	290		J	280		J	MG/L	10.00	285.00	3.51
10498	8/9/00	TOTAL DISSOLVED SOLIDS	400		V1	370		V1	MG/L	30.00	385.00	7.79
11891	5/5/00	TOTAL DISSOLVED SOLIDS	480		V1	480		V1	MG/L	0.00	480.00	0.00
11891	10/24/00	TOTAL DISSOLVED SOLIDS	500		1	510		1	MG/L	10.0	505.0	2.0
12691	2/2/00	TOTAL DISSOLVED SOLIDS	710	*	J1	630	*	J1	MG/L	80.00	670.00	11.94
12691	7/27/00	TOTAL DISSOLVED SOLIDS	690		V	690		V	MG/L	0.00	690.00	0.00
18199	12/5/00	TOTAL DISSOLVED SOLIDS	350		V1	360		V1	MG/L	10.0	355.0	2.8
23296	10/30/00	TOTAL DISSOLVED SOLIDS	900		1	880		1	MG/L	20.0	890.0	2.2
3586	5/18/00	TOTAL DISSOLVED SOLIDS	960		V	950		V	MG/L	10.00	955.00	1.05
3586	10/25/00	TOTAL DISSOLVED SOLIDS	980		1	1000		1	MG/L	20.0	990.0	2.0
41299	12/12/00	TOTAL DISSOLVED SOLIDS	560		V1	520		V1	MG/L	40.0	540.0	7.4
41591	2/16/00	TOTAL DISSOLVED SOLIDS	1100		J1	1100		J1	MG/L	0.00	1100.00	0.00
5887	5/5/00	TOTAL DISSOLVED SOLIDS	130		V1	110		V1	MG/L	20.00	120.00	16.67
5887	10/30/00	TOTAL DISSOLVED SOLIDS	170		1	170		1	MG/L	0.0	170.0	0.0
70193	1/11/00	TOTAL DISSOLVED SOLIDS	230		V1	240		V1	MG/L	10.00	235.00	4.26
70193	5/10/00	TOTAL DISSOLVED SOLIDS	190		V1	210		V1	MG/L	20.00	200.00	10.00
70193	7/26/00	TOTAL DISSOLVED SOLIDS	160		V	170		V	MG/L	10.00	165.00	6.06
70193	10/31/00	TOTAL DISSOLVED SOLIDS	220		V	210		V	MG/L	10.0	215.0	4.7
70393	6/1/00	TOTAL DISSOLVED SOLIDS	140		V1	130		V1	MG/L	10.00	135.00	7.41
P209389	1/18/00	TOTAL DISSOLVED SOLIDS	620		V1	630		V1	MG/L	10.00	625.00	1.60
P209389	7/31/00	TOTAL DISSOLVED SOLIDS	700		V	660		V	MG/L	40.00	680.00	5.88
18199	3/14/00	TOTAL ORGANIC CARBON	3		V	3		V	MG/L	0.00	3.00	0.00
18199	12/5/00	TOTAL ORGANIC CARBON	3		V1	3		V1	MG/L	0.0	3.0	0.0
Polychlorinated Biphenyls (PCBs)												
18199	12/5/00	Seven Real-Duplicate Pairs for PCBs were analyzed and all were "U" laboratory qualified as non-detects.										
		No PCB-RPDs are presented here.										

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Table 11-2
Duplicate Error Ratios (DERs) For Radionuclides
Calendar Year 2000

Location	Sample Date	Analyte	Real Result	Real 2 Sigma	Real LabQ / Valid	Dup Result	Dup 2 Sigma	Dup LabQ / Valid	Units	Absolute Value (Real-Dup)	Square Root of $(2SigR)^2+(2SigD)^2$	DER AbsVal/SqRt
Radionuclides												
10294	1/19/00	PLUTONIUM-239/240	0.035	0.023	/V	0.02	0.02	J/V	PCI/L	0.02	0.03	0.63
0386	2/10/00	TRITIUM	409.600	176.500	/V1	504.70	182.00	/V1	PCI/L	95.10	253.53	0.38
0386	2/10/00	URANIUM-233,-234	8.834	0.292	/V1	8.94	0.31	/V1	PCI/L	0.10	0.43	0.24
10294	1/19/00	URANIUM-233,-234	10.366	0.372	/V1	10.99	0.38	/V1	PCI/L	0.62	0.53	1.18
10498	2/21/00	URANIUM-233,-234	1.147	0.363	/V1	0.90	0.29	J/V1	PCI/L	0.25	0.47	0.53
12691	2/2/00	URANIUM-233,-234	2.433	0.703	/V1	2.67	0.71	/V1	PCI/L	0.24	1.00	0.24
41591	2/16/00	URANIUM-233,-234	8.553	0.318	/V1	9.52	0.31	/V1	PCI/L	0.97	0.44	**2.18**
0386	2/10/00	URANIUM-238	6.696	0.252	/V1	6.69	0.27	/V1	PCI/L	0.01	0.37	0.02
10294	1/19/00	URANIUM-238	8.507	0.337	/V1	9.04	0.34	/V1	PCI/L	0.54	0.48	1.12
10498	2/21/00	URANIUM-238	1.191	0.367	/V1	0.91	0.29	J/V1	PCI/L	0.28	0.47	0.60
12691	2/2/00	URANIUM-238	1.700	0.571	/V1	1.84	0.58	/V1	PCI/L	0.14	0.81	0.18
41591	2/16/00	URANIUM-238	7.231	0.292	J/V1	7.74	0.28	/V1	PCI/L	0.51	0.40	1.26
11891	5/5/00	U233234	2.460	0.307	/V1	2.51	0.36	/V1	PCI/L	0.05	0.47	0.11
11891	5/5/00	U238	1.340	0.226	/V1	1.52	0.28	/V1	PCI/L	0.18	0.36	0.50
3586	5/18/00	U233234	2.601	0.576	/V	2.54	0.61	/V	PCI/L	0.06	0.84	0.08
3586	5/18/00	U238	1.574	0.448	/V	1.78	0.53	/V	PCI/L	0.21	0.69	0.30
10294	7/25/00	Uranium-233/234	13.7	1.78	/V	16.7	2.03	/V	PCI/L	3.00	2.70	1.11
10294	7/25/00	Uranium-238	11.6	1.65	/V	13	1.78	/V	PCI/L	1.40	2.43	0.58
10498	8/9/00	Uranium-233/234	1.14	0.279	/J1	0.959	0.29	J/J1	PCI/L	0.18	0.40	0.45
10498	8/9/00	Uranium-238	0.885	0.236	J/J1	1.1	0.314	/J1	PCI/L	0.22	0.39	0.55
12691	7/27/00	Uranium-233/234	2.39	0.781	/V	2.6	0.793	/V	PCI/L	0.21	1.11	0.19
12691	7/27/00	Uranium-238	1.79	0.695	/V	1.52	0.592	/V	PCI/L	0.27	0.91	0.30
891COLGAL	8/24/00	Uranium-233/234	7.28	0.863	/V1	6.87	0.921	/V1	PCI/L	0.41	1.26	0.32
891COLGAL	8/24/00	Uranium-238	4.9	0.707	/V1	4.93	0.779	/V1	PCI/L	0.03	1.05	0.03
891COLWEL	8/24/00	Uranium-233/234	10	1.17	/V1	10.2	1.06	/V1	PCI/L	0.20	1.58	0.13
891COLWEL	8/24/00	Uranium-238	7.01	0.975	/V1	6.63	0.861	/V1	PCI/L	0.38	1.30	0.29
P209389	7/31/00	Strontium-90	-0.183	0.161	/V1	-0.0065	0.168	/V1	PCI/L	0.18	0.23	0.76
SW13494	8/22/00	Uranium-233/234	3.36	0.555	/V1	2.96	0.581	/V1	PCI/L	0.40	0.80	0.50
SW13494	8/22/00	Uranium-238	2.26	0.458	/V1	2.29	0.508	/V1	PCI/L	0.03	0.68	0.04
11891	10/24/00	PLUTONIUM-239/240	0.012	0.010	U/V	0.03	0.01	/V	PCI/L	0.0	0.0	1.1
11891	10/24/00	URANIUM-233,-234	2.400	0.260	/V	2.10	0.23	/V	PCI/L	0.3	0.3	0.9
11891	10/24/00	URANIUM-238	1.500	0.210	/V	1.50	0.20	/V	PCI/L	0.0	0.3	0.0
23296	10/30/00	URANIUM-233,-234	15.000	0.660	/V	15.00	0.63	/V	PCI/L	0.0	0.9	0.0
23296	10/30/00	URANIUM-238	12.000	0.580	/V	12.00	0.56	/V	PCI/L	0.0	0.8	0.0
3586	10/25/00	URANIUM-233,-234	2.000	0.240	/V	2.30	0.25	/V	PCI/L	0.3	0.3	0.9
3586	10/25/00	URANIUM-238	1.500	0.210	/V	1.60	0.20	/V	PCI/L	0.1	0.3	0.3
41299	12/12/00	URANIUM-233,-234	1.100	0.180	/UJ1	1.30	0.19	/UJ1	PCI/L	0.2	0.3	0.8
41299	12/12/00	URANIUM-238	0.470	0.120	/UJ1	0.58	0.13	/UJ1	PCI/L	0.1	0.2	0.6

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Table 11-3
Summary of RPD and DER Results
Groundwater
Calendar Year 2000

Analyte Group	QC Criterion for Acceptable RPD or DER Value	Original Number of Available Real/Dup Pairs					Number of Acceptable RPDs/DERs 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%	467	290	580	464	1801	465	290	574	462	1791	99.6%	100.0%	99.0%	99.6%	99.4%	17	14	30	30	91
Metals	less than 30%	189	135	216	196	736	155	123	187	183	648	82.0%	91.1%	86.6%	93.4%	88.0%	153	89	143	113	498
PCBs	less than 30%				7	7				7	7				100.0%	100.0%				0	0
Radionuclides	less than 1.96	39	22	41	34	136	38	22	41	34	135	97.4%	100.0%	100.0%	100.0%	99.3%	12	4	13	9	38
Water Quality Parameters	less than 30%	25	16	17	23	81	23	15	17	21	76	92.0%	93.8%	100.0%	91.3%	93.8%	24	15	15	21	75

Calculation and Display Criteria for Tables 11-1 and 11-2	Lab Qualifier = "U"		Lab Qualifier = "B"		Lab Qualifier = "J"	
	Meaning	Action	Meaning	Action	Meaning	Action
Radionuclides	Non-detect	If both real and dup are "U", DER is not displayed in 7-1 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 7-1	Result is estimate.	If both real and dup are "J", or if one "U" and one "J", DER is not displayed in 7-1 and value is counted as acceptable if results are less than CRDLs for both real and dup.
Organics	Non-detect	If both real and dup are "U", RPD is not displayed in 7-1 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 7-1	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 7-1 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 7-1 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 7-1	Result is estimate.	If both real and dup are "J", or if one "U" and one "J", DER is not displayed in 7-1 and value is counted as acceptable if results are less than CRDLs for both real and dup.
Water Quality Parameters and Polychlorinated Biphenyls (PCBs)	Non-detect	If both real and dup are "U", RPD is not displayed in 7-1 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 7-1	Result is estimate.	If both real and dup are "J", or if one "U" and one "J", DER is not displayed in 7-1 and value is counted as acceptable if results are less than CRDLs for both real and dup.

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Table 11-4

Contract Required Detection Limits (CRDLs) for Groundwater Analytes - Calendar Year 2000

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
		Volatile Organic Compounds		
630-20-6	1,1,1,2-Tetrachloroethane	EPA 524.2	1	µg/L
71-55-6	1,1,1-Trichloroethane	EPA 524.2	1	µg/L
79-34-5	1,1,2,2-Tetrachloroethane	EPA 524.2	1	µg/L
79-00-5	1,1,2-Trichloroethane	EPA 524.2	1	µg/L
75-34-3	1,1-Dichloroethane	EPA 524.2	1	µg/L
75-35-4	1,1-Dichloroethene	EPA 524.2	1	µg/L
563-58-6	1,1-Dichloropropene	EPA 524.2	1	µg/L
87-61-6	1,2,3-Trichlorobenzene	EPA 524.2	1	µg/L
96-18-4	1,2,3-Trichloropropane	EPA 524.2	1	µg/L
120-82-1	1,2,4-Trichlorobenzene	EPA 524.2	1	µg/L
95-63-6	1,2,4-Trimethylbenzene	EPA 524.2	1	µg/L
96-12-8	1,2-Dibromo-3-chloropropane	EPA 524.2	1	µg/L
106-93-4	1,2-Dibromoethane	EPA 524.2	1	µg/L
95-50-1	1,2-Dichlorobenzene	EPA 524.2	1	µg/L
107-06-2	1,2-Dichloroethane	EPA 524.2	1	µg/L
78-87-5	1,2-Dichloropropane	EPA 524.2	1	µg/L
108-67-8	1,3,5-Trimethylbenzene	EPA 524.2	1	µg/L
541-73-1	1,3-Dichlorobenzene	EPA 524.2	1	µg/L
142-28-9	1,3-Dichloropropane	EPA 524.2	1	µg/L
106-46-7	1,4-Dichlorobenzene	EPA 524.2	1	µg/L
594-20-7	2,2-Dichloropropane	EPA 524.2	1	µg/L
95-49-8	2-Chlorotoluene	EPA 524.2	1	µg/L
106-43-4	4-Chlorotoluene	EPA 524.2	1	µg/L
71-43-2	Benzene	EPA 524.2	1	µg/L
108-86-1	Bromobenzene	EPA 524.2	1	µg/L
74-97-5	Bromochloromethane	EPA 524.2	1	µg/L
75-27-4	Bromodichloromethane	EPA 524.2	1	µg/L
75-25-2	Bromoform	EPA 524.2	1	µg/L
74-83-9	Bromomethane	EPA 524.2	1	µg/L
56-23-5	Carbon Tetrachloride	EPA 524.2	1	µg/L
108-90-7	Chlorobenzene	EPA 524.2	1	µg/L
75-00-3	Chloroethane	EPA 524.2	1	µg/L
67-66-3	Chloroform	EPA 524.2	1	µg/L
74-87-3	Chloromethane	EPA 524.2	1	µg/L
156-59-2	cis-1,2-Dichloroethene	EPA 524.2	1	µg/L
10061-01-5	cis-1,3-Dichloropropene	EPA 524.2	1	µg/L
124-48-1	Dibromochloromethane	EPA 524.2	1	µg/L
74-95-3	Dibromomethane	EPA 524.2	1	µg/L
75-71-8	Dichlorodifluoromethane	EPA 524.2	1	µg/L
100-41-4	Ethylbenzene	EPA 524.2	1	µg/L
87-68-3	Hexachlorobutadiene	EPA 524.2	1	µg/L
98-82-8	Isopropylbenzene	EPA 524.2	1	µg/L
75-09-2	Methylene Chloride	EPA 524.2	1	µg/L
91-20-3	Naphthalene	EPA 524.2	1	µg/L
104-51-8	n-Butylbenzene	EPA 524.2	1	µg/L
103-65-1	n-Propylbenzene	EPA 524.2	1	µg/L
1330-20-7	Total Xylenes	EPA 524.2	1	µg/L
99-87-6	p-Isopropyltoluene	EPA 524.2	1	µg/L
135-98-8	sec-Butylbenzene	EPA 524.2	1	µg/L
100-42-5	Styrene	EPA 524.2	1	µg/L
98-06-6	tert-Butylbenzene	EPA 524.2	1	µg/L
127-18-4	Tetrachloroethene	EPA 524.2	1	µg/L
108-88-3	Toluene	EPA 524.2	1	µg/L
156-60-5	trans-1,2-Dichloroethene	EPA 524.2	1	µg/L
10061-02-6	trans-1,3-Dichloropropene	EPA 524.2	1	µg/L
79-01-6	Trichloroethene	EPA 524.2	1	µg/L
75-69-4	Trichlorofluoromethane	EPA 524.2	1	µg/L
75-01-4	Vinyl chloride	EPA 524.2	1	µg/L

ND = Achievable RDL Not Determined.
Task Order = Determined by individual Task Order for specialized analyses.

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Table 11-4

Contract Required Detection Limits (CRDLs) for Groundwater Analytes - Calendar Year 2000

CAS #	Analyte	Required Method	RDL	Units
	Volatile Organic Compounds			
630-20-6	1,1,1,2-Tetrachloroethane	SW-846 Method 8260	5	µg/L
71-55-6	1,1,1-Trichloroethane	SW-846 Method 8260	5	µg/L
79-34-5	1,1,2,2-Tetrachloroethane	SW-846 Method 8260	5	µg/L
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	SW-846 Method 8260	5	µg/L
79-00-5	1,1,2-Trichloroethane	SW-846 Method 8260	5	µg/L
75-34-3	1,1-Dichloroethane	SW-846 Method 8260	5	µg/L
75-35-4	1,1-Dichloroethene	SW-846 Method 8260	5	µg/L
563-58-6	1,1-Dichloropropene	SW-846 Method 8260	5	µg/L
87-61-6	1,2,3-Trichlorobenzene	SW-846 Method 8260	5	µg/L
96-18-4	1,2,3-Trichloropropane	SW-846 Method 8260	5	µg/L
120-82-1	1,2,4-Trichlorobenzene	SW-846 Method 8260	5	µg/L
95-63-6	1,2,4-Trimethylbenzene	SW-846 Method 8260	5	µg/L
96-12-8	1,2-Dibromo-3-chloropropane	SW-846 Method 8260	5	µg/L
106-93-4	1,2-Dibromoethane	SW-846 Method 8260	5	µg/L
95-50-1	1,2-Dichlorobenzene	SW-846 Method 8260	5	µg/L
107-06-2	1,2-Dichloroethane	SW-846 Method 8260	5	µg/L
78-87-5	1,2-Dichloropropane	SW-846 Method 8260	5	µg/L
108-67-8	1,3,5-Trimethylbenzene	SW-846 Method 8260	5	µg/L
541-73-1	1,3-Dichlorobenzene	SW-846 Method 8260	5	µg/L
142-28-9	1,3-Dichloropropane	SW-846 Method 8260	5	µg/L
106-46-7	1,4-Dichlorobenzene	SW-846 Method 8260	5	µg/L
594-20-7	2,2-Dichloropropane	SW-846 Method 8260	5	µg/L
78-93-3	2-Butanone	SW-846 Method 8260	10	µg/L
95-49-8	2-Chlorotoluene	SW-846 Method 8260	5	µg/L
591-78-1	2-Hexanone	SW-846 Method 8260	50	µg/L
106-43-4	4-Chlorotoluene	SW-846 Method 8260	5	µg/L
108-10-1	4-Methyl-2-pentanone	SW-846 Method 8260	50	µg/L
67-64-1	Acetone	SW-846 Method 8260	100	µg/L
71-43-2	Benzene	SW-846 Method 8260	5	µg/L
108-86-1	Bromobenzene	SW-846 Method 8260	5	µg/L
74-97-5	Bromochloromethane	SW-846 Method 8260	5	µg/L
75-27-4	Bromodichloromethane	SW-846 Method 8260	5	µg/L
75-25-2	Bromoform	SW-846 Method 8260	5	µg/L
74-83-9	Bromomethane	SW-846 Method 8260	5	µg/L
75-15-0	Carbon Disulfide	SW-846 Method 8260	5	µg/L
56-23-5	Carbon Tetrachloride	SW-846 Method 8260	5	µg/L
108-90-7	Chlorobenzene	SW-846 Method 8260	5	µg/L
75-00-3	Chloroethane	SW-846 Method 8260	5	µg/L
67-66-3	Chloroform	SW-846 Method 8260	5	µg/L
74-87-3	Chloromethane	SW-846 Method 8260	5	µg/L
156-59-2	cis-1,2-Dichloroethene	SW-846 Method 8260	5	µg/L
10061-01-5	cis-1,3-Dichloropropene	SW-846 Method 8260	5	µg/L
124-48-1	Dibromochloromethane	SW-846 Method 8260	5	µg/L
74-95-3	Dibromomethane	SW-846 Method 8260	5	µg/L
75-71-8	Dichlorodifluoromethane	SW-846 Method 8260	5	µg/L
100-41-4	Ethylbenzene	SW-846 Method 8260	5	µg/L
87-68-3	Hexachlorobutadiene	SW-846 Method 8260	5	µg/L
98-82-8	Isopropylbenzene	SW-846 Method 8260	5	µg/L
75-09-2	Methylene Chloride	SW-846 Method 8260	5	µg/L
91-20-3	Naphthalene	SW-846 Method 8260	5	µg/L
104-51-8	n-Butylbenzene	SW-846 Method 8260	5	µg/L
103-65-1	n-Propylbenzene	SW-846 Method 8260	5	µg/L
99-87-6	p-Isopropyltoluene	SW-846 Method 8260	5	µg/L
135-98-8	sec-Butylbenzene	SW-846 Method 8260	5	µg/L
100-42-5	Styrene	SW-846 Method 8260	5	µg/L
98-06-6	tert-Butylbenzene	SW-846 Method 8260	5	µg/L
127-18-4	Tetrachloroethene	SW-846 Method 8260	5	µg/L
108-88-3	Toluene	SW-846 Method 8260	5	µg/L
1330-20-7	Total Xylenes	SW-846 Method 8260	5	µg/L
156-60-5	trans-1,2-Dichloroethene	SW-846 Method 8260	5	µg/L
10061-02-6	trans-1,3-Dichloropropene	SW-846 Method 8260	5	µg/L
79-01-6	Trichloroethene	SW-846 Method 8260	5	µg/L
75-69-4	Trichlorofluoromethane	SW-846 Method 8260	5	µg/L
75-01-4	Vinyl chloride	SW-846 Method 8260	5	µg/L

ND = Achievable RDL Not Determined.
Task Order = Determined by Individual Task Order for specialized analyses.

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Table 11-4

Contract Required Detection Limits (CRDLs) for Groundwater Analytes - Calendar Year 2000

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-Dissolved/Total	17	µg/L
7440-36-0	Antimony	CLP-SOW-Dissolved/Total	3	µg/L
7440-38-2	Arsenic	CLP-SOW-Dissolved/Total	5	µg/L
7440-39-3	Barium	CLP-SOW-Dissolved/Total	100	µg/L
7440-41-7	Beryllium	CLP-SOW-Dissolved/Total	1	µg/L
7440-43-9	Cadmium	CLP-SOW-Dissolved/Total	1	µg/L
7440-70-2	Calcium	CLP-SOW-Dissolved/Total	5000	µg/L
7440-47-3	Chromium	CLP-SOW-Dissolved/Total	2	µg/L
7440-48-4	Cobalt	CLP-SOW-Dissolved/Total	50	µg/L
7440-50-8	Copper	CLP-SOW-Dissolved/Total	3	µg/L
7439-89-6	Iron	CLP-SOW-Dissolved/Total	100	µg/L
7439-92-1	Lead	CLP-SOW-Dissolved/Total	2	µg/L
7439-93-2	Lithium	CLP-SOW-Dissolved/Total	100	µg/L
7439-95-4	Magnesium	CLP-SOW-Dissolved/Total	5000	µg/L
7439-96-5	Manganese	CLP-SOW-Dissolved/Total	15	µg/L
7439-97-6	Mercury	CLP-SOW-Dissolved/Total	0.1	µg/L
7439-98-7	Molybdenum	CLP-SOW-Dissolved/Total	30	µg/L
7440-02-0	Nickel	CLP-SOW-Dissolved/Total	20	µg/L
7440-09-7	Potassium	CLP-SOW-Dissolved/Total	5000	µg/L
7782-49-2	Selenium	CLP-SOW-Dissolved/Total	3	µg/L
7440-22-4	Silver	CLP-SOW-Dissolved/Total	1	µg/L
7440-23-5	Sodium	CLP-SOW-Dissolved/Total	5000	µg/L
7440-24-6	Strontium	CLP-SOW-Dissolved/Total	200	µg/L
7440-28-0	Thallium	CLP-SOW-Dissolved/Total	4	µg/L
7440-31-5	Tin	CLP-SOW-Dissolved/Total	200	µg/L
7440-61-1	Uranium	CLP-SOW-Dissolved/Total	No Value	µg/L
7440-62-2	Vanadium	CLP-SOW-Dissolved/Total	40	µg/L
7440-66-6	Zinc	CLP-SOW-Dissolved/Total	20	µg/L

ND = Achievable RDL Not Determined.
Task Order = Determined by individual Task Order for specialized analyses.

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Table 11-4

Contract Required Detection Limits (CRDLs) for Groundwater Analytes - Calendar Year 2000

CAS #	Analyte	Required Method	RDL	Units
	Water Quality Parameters			
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 VOC - Metal - WQP - PCB Samples

Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Ba
Volatile Organic Compounds (EPA 524.2)													
GEL	00500	11/8/00	01D0218-002.004	1,1-DICHLOROETHENE	MS1	94	%REC			0.5	1	1000131869	54202
GEL	00500	11/8/00	01D0218-002.004	1,1-DICHLOROETHENE	MD1	96	%REC			0.5	1	1000131870	54202
GEL	00500	11/8/00	01D0218-002.004	BENZENE	MS1	94	%REC			0.5	1	1000131869	54202
GEL	00500	11/8/00	01D0218-002.004	BENZENE	MD1	96	%REC			0.5	1	1000131870	54202
GEL	00500	11/8/00	01D0218-002.004	CHLOROBENZENE	MS1	88	%REC			0.5	1	1000131869	54202
GEL	00500	11/8/00	01D0218-002.004	CHLOROBENZENE	MD1	92	%REC			0.5	1	1000131870	54202
GEL	00500	11/8/00	01D0218-002.004	TOLUENE	MS1	96	%REC			0.5	1	1000131869	54202
GEL	00500	11/8/00	01D0218-002.004	TOLUENE	MD1	100	%REC			0.5	1	1000131870	54202
GEL	00500	11/8/00	01D0218-002.004	TRICHLOROETHENE	MD1	90	%REC			0.5	1	1000131870	54202
GEL	00500	11/8/00	01D0218-002.004	TRICHLOROETHENE	MS1	90	%REC			0.5	1	1000131869	54202
GEL	01097	9/18/00	00D1514-001.004	1,1-DICHLOROETHENE	MD1	114	%REC			0.5	1	1000110522	46681
GEL	01097	9/18/00	00D1514-001.004	1,1-DICHLOROETHENE	MS1	114	%REC			0.5	1	1000110521	46681
GEL	01097	9/18/00	00D1514-001.004	BENZENE	MD1	110	%REC			0.5	1	1000110522	46681
GEL	01097	9/18/00	00D1514-001.004	BENZENE	MS1	112	%REC			0.5	1	1000110521	46681
GEL	01097	9/18/00	00D1514-001.004	CHLOROBENZENE	MD1	104	%REC			0.5	1	1000110522	46681
GEL	01097	9/18/00	00D1514-001.004	CHLOROBENZENE	MS1	106	%REC			0.5	1	1000110521	46681
GEL	01097	9/18/00	00D1514-001.004	TOLUENE	MD1	102	%REC			0.5	1	1000110522	46681
GEL	01097	9/18/00	00D1514-001.004	TOLUENE	MS1	106	%REC			0.5	1	1000110521	46681
GEL	01097	9/18/00	00D1514-001.004	TRICHLOROETHENE	MD1	108	%REC			0.5	1	1000110522	46681
GEL	01097	9/18/00	00D1514-001.004	TRICHLOROETHENE	MS1	110	%REC			0.5	1	1000110521	46681
RECRL	0487	1/18/00	00D1077-015.001	1,1,1,2-TETRACHLOROETHANE	MS1	107	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,1,1,2-TETRACHLOROETHANE	MS2	109	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,1,1-TRICHLOROETHANE	MS1	112	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,1,1-TRICHLOROETHANE	MS2	114	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,1,2,2-TETRACHLOROETHANE	MS1	105	%REC				10	0001L277-015	00LVK
RECRL	0487	1/18/00	00D1077-015.001	1,1,2,2-TETRACHLOROETHANE	MS2	107	%REC				10	0001L277-015	00LV
RECRL	0487	1/18/00	00D1077-015.001	1,1,2-TRICHLOROETHANE	MS1	114	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,1,2-TRICHLOROETHANE	MS2	116	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,1-DICHLOROETHANE	MS1	112	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,1-DICHLOROETHANE	MS2	115	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,1-DICHLOROETHENE	MS2	102	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,1-DICHLOROETHENE	MS1	104	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,1-DICHLOROPROPENE	MS1	109	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,1-DICHLOROPROPENE	MS2	114	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2,3-TRICHLOROBENZENE	MS1	88	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2,3-TRICHLOROBENZENE	MS2	100	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2,3-TRICHLOROPROPANE	MS2	110	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2,3-TRICHLOROPROPANE	MS1	111	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2,4-TRICHLOROBENZENE	MS1	82	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2,4-TRICHLOROBENZENE	MS2	96	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2-DIBROMOETHANE	MS1	106	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2-DIBROMOETHANE	MS2	110	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2-DICHLOROBENZENE	MS1	99	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2-DICHLOROBENZENE	MS2	101	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2-DICHLOROETHANE	MS1	112	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2-DICHLOROETHANE	MS2	123	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2-DICHLOROPROPANE	MS1	101	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,2-DICHLOROPROPANE	MS2	111	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,3-DICHLOROBENZENE	MS1	102	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,3-DICHLOROBENZENE	MS2	106	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,3-DICHLOROPROPANE	MS1	106	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	1,3-DICHLOROPROPANE	MS2	115	%REC				10	0001L277-015	00LV
RECRL	0487	1/18/00	00D1077-015.001	1,4-DICHLOROBENZENE	MS1	105	%REC				10	0001L277-015	00LV
RECRL	0487	1/18/00	00D1077-015.001	1,4-DICHLOROBENZENE	MS2	112	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	2,2-DICHLOROPROPANE	MS1	100	%REC				10	0001L277-015	00LVK052

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	0487	1/18/00	00D1077-015.001	2,2-DICHLOROPROPANE	MS2	101	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	4-ISOPROPYLTOLUENE	MS1	93	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	4-ISOPROPYLTOLUENE	MS2	104	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BENZENE	MS1	101	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BENZENE	MS2	110	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BENZENE, 1,2,4-TRIMETHYL	MS1	95	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BENZENE, 1,2,4-TRIMETHYL	MS2	101	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	96	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BENZENE, 1,3,5-TRIMETHYL-	MS2	107	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BROMOBENZENE	MS2	109	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BROMOBENZENE	MS1	109	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BROMOCHLOROMETHANE	MS2	102	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BROMOCHLOROMETHANE	MS1	104	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BROMODICHLOROMETHANE	MS1	111	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BROMODICHLOROMETHANE	MS2	113	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BROMOFORM	MS1	103	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BROMOFORM	MS2	104	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BROMOMETHANE	MS1	96	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	BROMOMETHANE	MS2	98	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	CARBON TETRACHLORIDE	MS1	116	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	CARBON TETRACHLORIDE	MS2	118	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	CHLOROBENZENE	MS1	106	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	CHLOROBENZENE	MS2	108	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	CHLOROETHANE	MS2	102	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	CHLOROETHANE	MS1	104	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	CHLOROFORM	MS1	110	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	CHLOROFORM	MS2	116	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	CHLOROMETHANE	MS1	85	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	CHLOROMETHANE	MS2	106	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	cis-1,2-DICHLOROETHENE	MS1	98	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	cis-1,2-DICHLOROETHENE	MS2	104	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	cis-1,3-DICHLOROPROPENE	MS1	99	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	cis-1,3-DICHLOROPROPENE	MS2	108	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	DIBROMOCHLOROMETHANE	MS1	110	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	DIBROMOCHLOROMETHANE	MS2	114	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	DIBROMOMETHANE	MS1	100	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	DIBROMOMETHANE	MS2	107	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	DICHLORODIFLUOROMETHANE	MS1	90	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	DICHLORODIFLUOROMETHANE	MS2	97	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	ETHYLBENZENE	MS1	107	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	ETHYLBENZENE	MS2	112	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	HEXACHLOROBUTADIENE	MS1	86	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	HEXACHLOROBUTADIENE	MS2	96	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	ISOPROPYLBENZENE	MS1	105	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	ISOPROPYLBENZENE	MS2	106	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	METHYLENE CHLORIDE	MS1	54	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	METHYLENE CHLORIDE	MS2	63	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	NAPHTHALENE	MS1	78	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	NAPHTHALENE	MS2	98	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	n-BUTYLBENZENE	MS1	77	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	n-BUTYLBENZENE	MS2	95	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	n-PROPYLBENZENE	MS1	100	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	n-PROPYLBENZENE	MS2	103	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	o-CHLOROTOLUENE	MS1	103	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	o-CHLOROTOLUENE	MS2	107	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	p-CHLOROTOLUENE	MS1	100	%REC				10	0001L277-015	00LVK052

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Lab Sample #	Lab Ba
RECRL	0487	1/18/00	00D1077-015.001	p-CHLOROTOLUENE	MS2	110	%REC				10	0001L277-015	00LVK
RECRL	0487	1/18/00	00D1077-015.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	89	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS2	96	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	sec-BUTYLBENZENE	MS1	94	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	sec-BUTYLBENZENE	MS2	103	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	STYRENE	MS1	99	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	STYRENE	MS2	104	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	tert-BUTYLBENZENE	MS1	101	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	tert-BUTYLBENZENE	MS2	107	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	TETRACHLOROETHENE	MS1	95	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	TETRACHLOROETHENE	MS2	96	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	TOLUENE	MS1	106	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	TOLUENE	MS2	112	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	TOTAL XYLENES	MS1	108	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	TOTAL XYLENES	MS2	109	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	trans-1,2-DICHLOROETHENE	MS2	101	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	trans-1,2-DICHLOROETHENE	MS1	101	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	trans-1,3-DICHLOROPROPENE	MS1	99	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	trans-1,3-DICHLOROPROPENE	MS2	105	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	TRICHLOROETHENE	MS1	126	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	TRICHLOROETHENE	MS2	131	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	TRICHLOROFLUOROMETHANE	MS2	112	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	TRICHLOROFLUOROMETHANE	MS1	113	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	VINYL CHLORIDE	MS1	73	%REC				10	0001L277-015	00LVK052
RECRL	0487	1/18/00	00D1077-015.001	VINYL CHLORIDE	MS2	93	%REC				10	0001L277-015	00LVK052
RECRL	0487	7/20/00	00D1385-005.001	1,1,1,2-TETRACHLOROETHANE	MD1	106	%REC				5	0007L020-002	00LVK31
RECRL	0487	7/20/00	00D1385-005.001	1,1,1,2-TETRACHLOROETHANE	MS1	109	%REC				5	0007L020-002	00LV
RECRL	0487	7/20/00	00D1385-005.001	1,1,1-TRICHLOROETHANE	MS1	112	%REC				5	0007L020-002	00LVK31
RECRL	0487	7/20/00	00D1385-005.001	1,1,1-TRICHLOROETHANE	MD1	113	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,1,2,2-TETRACHLOROETHANE	MD1	103	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,1,2,2-TETRACHLOROETHANE	MS1	106	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,1,2-TRICHLOROETHANE	MS1	103	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,1,2-TRICHLOROETHANE	MD1	106	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,1-DICHLOROETHANE	MS1	108	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,1-DICHLOROETHANE	MD1	110	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,1-DICHLOROETHENE	MS1	111	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,1-DICHLOROETHENE	MD1	111	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,1-DICHLOROPROPENE	MS1	99	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,1-DICHLOROPROPENE	MD1	105	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2,3-TRICHLOROBENZENE	MS1	103	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2,3-TRICHLOROBENZENE	MD1	112	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2,3-TRICHLOROPROPANE	MS1	104	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2,3-TRICHLOROPROPANE	MD1	105	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2,4-TRICHLOROBENZENE	MS1	101	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2,4-TRICHLOROBENZENE	MD1	104	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2-DIBROMOETHANE	MS1	101	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2-DIBROMOETHANE	MD1	102	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2-DICHLOROBENZENE	MS1	109	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2-DICHLOROBENZENE	MD1	112	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2-DICHLOROETHANE	MD1	105	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2-DICHLOROETHANE	MS1	111	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2-DICHLOROPROPANE	MS1	105	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,2-DICHLOROPROPANE	MD1	106	%REC				5	0007L020-002	00LVK
RECRL	0487	7/20/00	00D1385-005.001	1,3-DICHLOROBENZENE	MS1	109	%REC				5	0007L020-002	00LV
RECRL	0487	7/20/00	00D1385-005.001	1,3-DICHLOROBENZENE	MD1	112	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,3-DICHLOROPROPANE	MS1	97	%REC				5	0007L020-002	00LVK312

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	0487	7/20/00	00D1385-005.001	1,3-DICHLOROPROPANE	MD1	99	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,4-DICHLOROBENZENE	MS1	112	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	1,4-DICHLOROBENZENE	MD1	115	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	2,2-DICHLOROPROPANE	MD1	103	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	2,2-DICHLOROPROPANE	MS1	105	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	4-ISOPROPYLTOLUENE	MS1	104	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	4-ISOPROPYLTOLUENE	MD1	105	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BENZENE	MS1	108	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BENZENE	MD1	111	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BENZENE, 1,2,4-TRIMETHYL	MS1	105	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BENZENE, 1,2,4-TRIMETHYL	MD1	108	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	116	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BENZENE, 1,3,5-TRIMETHYL-	MD1	121	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BROMOBENZENE	MS1	102	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BROMOBENZENE	MD1	106	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BROMOCHLOROMETHANE	MS1	111	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BROMOCHLOROMETHANE	MD1	112	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BROMODICHLOROMETHANE	MS1	109	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BROMODICHLOROMETHANE	MD1	110	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BROMOFORM	MS1	102	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BROMOFORM	MD1	103	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BROMOMETHANE	MD1	89	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	BROMOMETHANE	MS1	91	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	CARBON TETRACHLORIDE	MS1	129	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	CARBON TETRACHLORIDE	MD1	131	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	CHLOROBENZENE	MD1	106	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	CHLOROBENZENE	MS1	107	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	CHLOROETHANE	MD1	85	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	CHLOROETHANE	MS1	119	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	CHLOROFORM	MS1	110	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	CHLOROFORM	MD1	113	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	CHLOROMETHANE	MS1	111	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	CHLOROMETHANE	MD1	118	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	cis-1,2-DICHLOROETHENE	MS1	104	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	cis-1,2-DICHLOROETHENE	MD1	106	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	cis-1,3-DICHLOROPROPENE	MS1	102	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	cis-1,3-DICHLOROPROPENE	MD1	103	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	DIBROMOCHLOROMETHANE	MD1	112	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	DIBROMOCHLOROMETHANE	MS1	112	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	DIBROMOMETHANE	MS1	109	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	DIBROMOMETHANE	MD1	111	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	DICHLORODIFLUOROMETHANE	MD1	108	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	DICHLORODIFLUOROMETHANE	MS1	108	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	ETHYLBENZENE	MD1	112	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	ETHYLBENZENE	MS1	112	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	HEXACHLOROBUTADIENE	MS1	107	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	HEXACHLOROBUTADIENE	MD1	108	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	ISOPROPYLBENZENE	MS1	104	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	ISOPROPYLBENZENE	MD1	108	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	METHYLENE CHLORIDE	MD1	56	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	METHYLENE CHLORIDE	MS1	82	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	NAPHTHALENE	MS1	86	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	NAPHTHALENE	MD1	98	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	n-BUTYLBENZENE	MS1	102	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	n-BUTYLBENZENE	MD1	107	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	n-PROPYLBENZENE	MD1	111	%REC				5	0007L020-002	00LVK312

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch
RECRL	0487	7/20/00	00D1385-005.001	n-PROPYLBENZENE	MS1	111	%REC				5	0007L020-002	00LVK
RECRL	0487	7/20/00	00D1385-005.001	o-CHLOROTOLUENE	MS1	101	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	o-CHLOROTOLUENE	MD1	112	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	p-CHLOROTOLUENE	MD1	109	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	p-CHLOROTOLUENE	MS1	111	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	98	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	101	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	sec-BUTYLBENZENE	MS1	104	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	sec-BUTYLBENZENE	MD1	110	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	STYRENE	MS1	103	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	STYRENE	MD1	111	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	tert-BUTYLBENZENE	MS1	114	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	tert-BUTYLBENZENE	MD1	116	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	TETRACHLOROETHENE	MS1	109	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	TETRACHLOROETHENE	MD1	113	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	TOLUENE	MD1	107	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	TOLUENE	MS1	108	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	TOTAL XYLENES	MS1	108	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	TOTAL XYLENES	MD1	110	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	trans-1,2-DICHLOROETHENE	MS1	108	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	trans-1,2-DICHLOROETHENE	MD1	114	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	trans-1,3-DICHLOROPROPENE	MS1	94	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	trans-1,3-DICHLOROPROPENE	MD1	96	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	TRICHLOROETHENE	MS1	131	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	TRICHLOROETHENE	MD1	158	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	TRICHLOROFLUOROMETHANE	MS1	120	%REC				5	0007L020-002	00LVK312
RECRL	0487	7/20/00	00D1385-005.001	TRICHLOROFLUOROMETHANE	MD1	122	%REC				5	0007L020-002	00LVK
RECRL	0487	7/20/00	00D1385-005.001	VINYL CHLORIDE	MS1	109	%REC				5	0007L020-002	00LVK
RECRL	0487	7/20/00	00D1385-005.001	VINYL CHLORIDE	MD1	113	%REC				5	0007L020-002	00LVK312
RECRL	05391	1/11/00	00D1062-009.001	1,1,1,2-TETRACHLOROETHANE	MS1	102	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1,1,2-TETRACHLOROETHANE	MS2	104	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1,1-TRICHLOROETHANE	MS1	107	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1,1-TRICHLOROETHANE	MS2	115	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1,2,2-TETRACHLOROETHANE	MS2	100	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1,2,2-TETRACHLOROETHANE	MS1	101	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1,2-TRICHLOROETHANE	MS1	101	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1,2-TRICHLOROETHANE	MS2	103	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1-DICHLOROETHANE	MS1	104	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1-DICHLOROETHANE	MS2	112	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1-DICHLOROETHENE	MS1	99	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1-DICHLOROETHENE	MS2	108	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1-DICHLOROPROPENE	MS1	106	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,1-DICHLOROPROPENE	MS2	108	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,2,3-TRICHLOROBENZENE	MS2	103	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,2,3-TRICHLOROBENZENE	MS1	103	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,2,3-TRICHLOROPROPANE	MS2	96	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,2,3-TRICHLOROPROPANE	MS1	101	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,2,4-TRICHLOROBENZENE	MS1	92	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,2,4-TRICHLOROBENZENE	MS2	101	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,2-DIBROMOETHANE	MS1	97	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,2-DIBROMOETHANE	MS2	97	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,2-DICHLOROBENZENE	MS1	100	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,2-DICHLOROBENZENE	MS2	101	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,2-DICHLOROETHANE	MS1	104	%REC		1		1	0001L203-008	99LVK
RECRL	05391	1/11/00	00D1062-009.001	1,2-DICHLOROETHANE	MS2	113	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,2-DICHLOROPROPANE	MS1	100	%REC		1		1	0001L203-008	99LVK022

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	05391	1/11/00	00D1062-009.001	1,2-DICHLOROPROPANE	MS2	101	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,3-DICHLOROBENZENE	MS2	99	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,3-DICHLOROBENZENE	MS1	102	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,3-DICHLOROPROPANE	MS2	97	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,3-DICHLOROPROPANE	MS1	99	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,4-DICHLOROBENZENE	MS1	97	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	1,4-DICHLOROBENZENE	MS2	102	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	2,2-DICHLOROPROPANE	MS1	111	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	2,2-DICHLOROPROPANE	MS2	111	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	4-ISOPROPYLTOLUENE	MS1	104	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	4-ISOPROPYLTOLUENE	MS2	107	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BENZENE	MS1	100	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BENZENE	MS2	102	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BENZENE, 1,2,4-TRIMETHYL	MS1	102	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BENZENE, 1,2,4-TRIMETHYL	MS2	103	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BENZENE, 1,3,5-TRIMETHYL-	MS2	102	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	106	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BROMOBENZENE	MS2	101	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BROMOBENZENE	MS1	106	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BROMOCHLOROMETHANE	MS1	97	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BROMOCHLOROMETHANE	MS2	104	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BROMODICHLOROMETHANE	MS1	109	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BROMODICHLOROMETHANE	MS2	110	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BROMOFORM	MS1	104	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BROMOFORM	MS2	105	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BROMOMETHANE	MS1	95	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	BROMOMETHANE	MS2	114	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	CARBON TETRACHLORIDE	MS1	0	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	CARBON TETRACHLORIDE	MS2	162	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	CHLOROBENZENE	MS2	95	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	CHLOROBENZENE	MS1	96	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	CHLOROETHANE	MS2	112	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	CHLOROETHANE	MS1	114	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	CHLOROFORM	MS1	89	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	CHLOROFORM	MS2	108	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	CHLOROMETHANE	MS1	90	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	CHLOROMETHANE	MS2	113	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	cis-1,2-DICHLOROETHENE	MS1	95	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	cis-1,2-DICHLOROETHENE	MS2	107	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	cis-1,3-DICHLOROPROPENE	MS1	94	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	cis-1,3-DICHLOROPROPENE	MS2	98	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	DIBROMOCHLOROMETHANE	MS1	105	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	DIBROMOCHLOROMETHANE	MS2	105	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	DIBROMOMETHANE	MS1	102	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	DIBROMOMETHANE	MS2	104	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	DICHLORODIFLUOROMETHANE	MS2	74	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	DICHLORODIFLUOROMETHANE	MS1	84	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	ETHYLBENZENE	MS2	95	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	ETHYLBENZENE	MS1	98	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	HEXACHLOROBUTADIENE	MS1	98	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	HEXACHLOROBUTADIENE	MS2	104	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	ISOPROPYLBENZENE	MS2	99	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	ISOPROPYLBENZENE	MS1	100	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	METHYLENE CHLORIDE	MS2	94	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	METHYLENE CHLORIDE	MS1	129	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	NAPHTHALENE	MS1	66	%REC		1		1	0001L203-008	99LVK022

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	05391	1/11/00	00D1062-009.001	NAPHTHALENE	MS2	68	%REC		1		1	0001L203-008	99LVK
RECRL	05391	1/11/00	00D1062-009.001	n-BUTYLBENZENE	MS1	106	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	n-BUTYLBENZENE	MS2	108	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	n-PROPYLBENZENE	MS2	100	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	n-PROPYLBENZENE	MS1	103	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	o-CHLOROTOLUENE	MS1	100	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	o-CHLOROTOLUENE	MS2	101	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	p-CHLOROTOLUENE	MS2	98	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	p-CHLOROTOLUENE	MS1	100	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	90	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS2	92	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	sec-BUTYLBENZENE	MS1	111	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	sec-BUTYLBENZENE	MS2	117	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	STYRENE	MS1	98	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	STYRENE	MS2	98	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	tert-BUTYLBENZENE	MS1	104	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	tert-BUTYLBENZENE	MS2	108	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	TETRACHLOROETHENE	MS1	0	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	TETRACHLOROETHENE	MS2	63	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	TOLUENE	MS1	94	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	TOLUENE	MS2	94	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	TOTAL XYLENES	MS2	97	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	TOTAL XYLENES	MS1	100	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	trans-1,2-DICHLOROETHENE	MS1	99	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	trans-1,2-DICHLOROETHENE	MS2	107	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	trans-1,3-DICHLOROPROPENE	MS2	90	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	trans-1,3-DICHLOROPROPENE	MS1	91	%REC		1		1	0001L203-008	99LVK
RECRL	05391	1/11/00	00D1062-009.001	TRICHLOROETHENE	MS1	73	%REC		1		1	0001L203-008	99LVK
RECRL	05391	1/11/00	00D1062-009.001	TRICHLOROETHENE	MS2	102	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	TRICHLOROFLUOROMETHANE	MS1	110	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	TRICHLOROFLUOROMETHANE	MS2	110	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	VINYL CHLORIDE	MS1	89	%REC		1		1	0001L203-008	99LVK022
RECRL	05391	1/11/00	00D1062-009.001	VINYL CHLORIDE	MS2	107	%REC		1		1	0001L203-008	99LVK022
RECRL	10294	7/25/00	00D1394-005.001	1,1,1,2-TETRACHLOROETHANE	MD1	100	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1,1,2-TETRACHLOROETHANE	MS1	107	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1,1-TRICHLOROETHANE	MD1	101	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1,1-TRICHLOROETHANE	MS1	113	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1,2,2-TETRACHLOROETHANE	MD1	102	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1,2,2-TETRACHLOROETHANE	MS1	103	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1,2-TRICHLOROETHANE	MD1	95	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1,2-TRICHLOROETHANE	MS1	100	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1-DICHLOROETHANE	MD1	100	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1-DICHLOROETHANE	MS1	113	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1-DICHLOROETHENE	MD1	93	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1-DICHLOROETHENE	MS1	110	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1-DICHLOROPROPENE	MD1	96	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,1-DICHLOROPROPENE	MS1	105	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,2,3-TRICHLOROBENZENE	MS1	81	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,2,3-TRICHLOROBENZENE	MD1	88	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,2,3-TRICHLOROPROPANE	MD1	97	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,2,3-TRICHLOROPROPANE	MS1	101	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,2,4-TRICHLOROBENZENE	MS1	88	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,2,4-TRICHLOROBENZENE	MD1	92	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,2-DIBROMOETHANE	MS1	98	%REC				1	0008L038-005	00LVK
RECRL	10294	7/25/00	00D1394-005.001	1,2-DIBROMOETHANE	MD1	99	%REC				1	0008L038-005	00LVK
RECRL	10294	7/25/00	00D1394-005.001	1,2-DICHLOROBENZENE	MD1	97	%REC				1	0008L038-005	00LVK314

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

[redacted]	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	10294	7/25/00	00D1394-005.001	1,2-DICHLOROBENZENE	MS1	102	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,2-DICHLOROETHANE	MD1	101	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,2-DICHLOROETHANE	MS1	106	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,2-DICHLOROPROPANE	MD1	100	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,2-DICHLOROPROPANE	MS1	110	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,3-DICHLOROBENZENE	MD1	94	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,3-DICHLOROBENZENE	MS1	102	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,3-DICHLOROPROPANE	MD1	89	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,3-DICHLOROPROPANE	MS1	93	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,4-DICHLOROBENZENE	MD1	93	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	1,4-DICHLOROBENZENE	MS1	103	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	2,2-DICHLOROPROPANE	MD1	98	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	2,2-DICHLOROPROPANE	MS1	112	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	4-ISOPROPYLTOLUENE	MD1	97	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	4-ISOPROPYLTOLUENE	MS1	98	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BENZENE	MD1	102	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BENZENE	MS1	113	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BENZENE, 1,2,4-TRIMETHYL	MD1	97	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BENZENE, 1,2,4-TRIMETHYL	MS1	97	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BENZENE, 1,3,5-TRIMETHYL-	MD1	103	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	114	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BROMOBENZENE	MD1	97	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BROMOBENZENE	MS1	101	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BROMOCHLOROMETHANE	MD1	91	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BROMOCHLOROMETHANE	MS1	108	%REC				1	0008L038-005	00LVK314
[redacted]	10294	7/25/00	00D1394-005.001	BROMODICHLOROMETHANE	MD1	99	%REC				1	0008L038-005	00LVK314
[redacted]	10294	7/25/00	00D1394-005.001	BROMODICHLOROMETHANE	MS1	110	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BROMOFORM	MD1	98	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BROMOFORM	MS1	100	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BROMOMETHANE	MD1	84	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	BROMOMETHANE	MS1	90	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	CARBON TETRACHLORIDE	MD1	112	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	CARBON TETRACHLORIDE	MS1	123	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	CHLOROBENZENE	MD1	101	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	CHLOROBENZENE	MS1	104	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	CHLOROETHANE	MD1	113	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	CHLOROETHANE	MS1	124	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	CHLOROFORM	MD1	100	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	CHLOROFORM	MS1	112	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	CHLOROMETHANE	MS1	106	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	CHLOROMETHANE	MD1	109	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	cis-1,2-DICHLOROETHENE	MD1	98	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	cis-1,2-DICHLOROETHENE	MS1	103	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	cis-1,3-DICHLOROPROPENE	MD1	90	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	cis-1,3-DICHLOROPROPENE	MS1	98	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	DIBROMOCHLOROMETHANE	MD1	91	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	DIBROMOCHLOROMETHANE	MS1	103	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	DIBROMOMETHANE	MD1	97	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	DIBROMOMETHANE	MS1	108	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	DICHLORODIFLUOROMETHANE	MD1	93	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	DICHLORODIFLUOROMETHANE	MS1	107	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	ETHYLBENZENE	MD1	94	%REC				1	0008L038-005	00LVK314
[redacted]	10294	7/25/00	00D1394-005.001	ETHYLBENZENE	MS1	106	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	HEXACHLOROBUTADIENE	MD1	99	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	HEXACHLOROBUTADIENE	MS1	102	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	ISOPROPYLBENZENE	MD1	95	%REC				1	0008L038-005	00LVK314

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch
RECRL	10294	7/25/00	00D1394-005.001	ISOPROPYLBENZENE	MS1	102	%REC				1	0008L038-005	00LVK
RECRL	10294	7/25/00	00D1394-005.001	METHYLENE CHLORIDE	MD1	84	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	METHYLENE CHLORIDE	MS1	150	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	NAPHTHALENE	MD1	69	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	NAPHTHALENE	MS1	69	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	n-BUTYLBENZENE	MD1	92	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	n-BUTYLBENZENE	MS1	104	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	n-PROPYLBENZENE	MD1	101	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	n-PROPYLBENZENE	MS1	105	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	o-CHLOROTOLUENE	MS1	71	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	o-CHLOROTOLUENE	MD1	100	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	p-CHLOROTOLUENE	MD1	78	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	p-CHLOROTOLUENE	MS1	104	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	91	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	92	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	sec-BUTYLBENZENE	MD1	98	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	sec-BUTYLBENZENE	MS1	101	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	STYRENE	MD1	95	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	STYRENE	MS1	95	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	tert-BUTYLBENZENE	MD1	99	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	tert-BUTYLBENZENE	MS1	106	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	TETRACHLOROETHENE	MD1	105	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	TETRACHLOROETHENE	MS1	109	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	TOLUENE	MD1	101	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	TOLUENE	MS1	105	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	TOTAL XYLENES	MD1	102	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	TOTAL XYLENES	MS1	105	%REC				1	0008L038-005	00LVK
RECRL	10294	7/25/00	00D1394-005.001	trans-1,2-DICHLOROETHENE	MD1	107	%REC				1	0008L038-005	00LVK
RECRL	10294	7/25/00	00D1394-005.001	trans-1,2-DICHLOROETHENE	MS1	117	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	trans-1,3-DICHLOROPROPENE	MD1	92	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	trans-1,3-DICHLOROPROPENE	MS1	95	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	TRICHLOROETHENE	MD1	107	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	TRICHLOROETHENE	MS1	116	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	TRICHLOROFLUOROMETHANE	MD1	109	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	TRICHLOROFLUOROMETHANE	MS1	122	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	VINYL CHLORIDE	MD1	104	%REC				1	0008L038-005	00LVK314
RECRL	10294	7/25/00	00D1394-005.001	VINYL CHLORIDE	MS1	114	%REC				1	0008L038-005	00LVK314
RECRL	12691	2/2/00	00D1101-006.001	1,1,1,2-TETRACHLOROETHANE	MS2	99	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1,1,2-TETRACHLOROETHANE	MS1	100	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1,1-TRICHLOROETHANE	MS1	108	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1,1-TRICHLOROETHANE	MS2	113	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1,2,2-TETRACHLOROETHANE	MS2	102	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1,2,2-TETRACHLOROETHANE	MS1	102	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1,2-TRICHLOROETHANE	MS2	102	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1,2-TRICHLOROETHANE	MS1	105	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1-DICHLOROETHANE	MS1	106	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1-DICHLOROETHANE	MS2	109	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1-DICHLOROETHENE	MS1	97	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1-DICHLOROETHENE	MS2	104	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1-DICHLOROPROPENE	MS1	102	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,1-DICHLOROPROPENE	MS2	107	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,2,3-TRICHLOROBENZENE	MS1	94	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,2,3-TRICHLOROBENZENE	MS2	103	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,2,3-TRICHLOROPROPANE	MS1	97	%REC		1		25	0002L371-006	00LVK
RECRL	12691	2/2/00	00D1101-006.001	1,2,3-TRICHLOROPROPANE	MS2	101	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,2,4-TRICHLOROBENZENE	MS1	83	%REC		1		25	0002L371-006	00LVK065

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	12691	2/2/00	00D1101-006.001	1,2,4-TRICHLOROBENZENE	MS2	94	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,2-DIBROMOETHANE	MS2	94	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,2-DIBROMOETHANE	MS1	96	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,2-DICHLOROBENZENE	MS2	99	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,2-DICHLOROBENZENE	MS1	102	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,2-DICHLOROETHANE	MS1	112	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,2-DICHLOROETHANE	MS2	114	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,2-DICHLOROPROPANE	MS1	99	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,2-DICHLOROPROPANE	MS2	103	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,3-DICHLOROBENZENE	MS2	97	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,3-DICHLOROBENZENE	MS1	104	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,3-DICHLOROPROPANE	MS1	100	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,3-DICHLOROPROPANE	MS2	101	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,4-DICHLOROBENZENE	MS1	84	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	1,4-DICHLOROBENZENE	MS2	98	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	2,2-DICHLOROPROPANE	MS1	107	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	2,2-DICHLOROPROPANE	MS2	112	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	4-ISOPROPYLTOLUENE	MS1	84	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	4-ISOPROPYLTOLUENE	MS2	99	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BENZENE	MS1	103	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BENZENE	MS2	105	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BENZENE, 1,2,4-TRIMETHYL	MS1	96	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BENZENE, 1,2,4-TRIMETHYL	MS2	98	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	99	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BENZENE, 1,3,5-TRIMETHYL-	MS2	102	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BROMOBENZENE	MS2	103	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BROMOBENZENE	MS1	104	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BROMOCHLOROMETHANE	MS1	102	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BROMOCHLOROMETHANE	MS2	104	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BROMODICHLOROMETHANE	MS1	106	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BROMODICHLOROMETHANE	MS2	111	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BROMOFORM	MS1	97	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BROMOFORM	MS2	99	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BROMOMETHANE	MS1	108	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	BROMOMETHANE	MS2	116	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	CARBON TETRACHLORIDE	MS1	87	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	CARBON TETRACHLORIDE	MS2	109	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	CHLOROBENZENE	MS1	99	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	CHLOROBENZENE	MS2	100	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	CHLOROETHANE	MS1	106	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	CHLOROETHANE	MS2	139	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	CHLOROFORM	MS2	112	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	CHLOROFORM	MS1	113	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	CHLOROMETHANE	MS1	110	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	CHLOROMETHANE	MS2	113	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	cis-1,2-DICHLOROETHENE	MS2	104	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	cis-1,2-DICHLOROETHENE	MS1	105	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	cis-1,3-DICHLOROPROPENE	MS2	94	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	cis-1,3-DICHLOROPROPENE	MS1	97	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	DIBROMOCHLOROMETHANE	MS2	102	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	DIBROMOCHLOROMETHANE	MS1	103	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	DIBROMOMETHANE	MS2	105	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	DIBROMOMETHANE	MS1	105	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	DICHLORODIFLUOROMETHANE	MS2	82	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	DICHLORODIFLUOROMETHANE	MS1	96	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	ETHYLBENZENE	MS1	99	%REC		1		25	0002L371-006	00LVK065

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	12691	2/2/00	00D1101-006.001	ETHYLBENZENE	MS2	103	%REC		1		25	0002L371-006	00LV[illegible]
RECRL	12691	2/2/00	00D1101-006.001	HEXACHLOROBUTADIENE	MS1	93	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	HEXACHLOROBUTADIENE	MS2	104	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	ISOPROPYLBENZENE	MS1	99	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	ISOPROPYLBENZENE	MS2	101	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	METHYLENE CHLORIDE	MS1	68	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	METHYLENE CHLORIDE	MS2	78	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	NAPHTHALENE	MS1	82	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	NAPHTHALENE	MS2	97	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	n-BUTYLBENZENE	MS1	91	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	n-BUTYLBENZENE	MS2	97	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	n-PROPYLBENZENE	MS1	97	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	n-PROPYLBENZENE	MS2	99	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	o-CHLOROTOLUENE	MS2	97	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	o-CHLOROTOLUENE	MS1	100	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	p-CHLOROTOLUENE	MS2	97	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	p-CHLOROTOLUENE	MS1	100	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	88	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS2	96	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	sec-BUTYLBENZENE	MS1	98	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	sec-BUTYLBENZENE	MS2	99	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	STYRENE	MS1	93	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	STYRENE	MS2	98	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	tert-BUTYLBENZENE	MS1	96	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	tert-BUTYLBENZENE	MS2	97	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	TETRACHLOROETHENE	MS2	92	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	TETRACHLOROETHENE	MS1	94	%REC		1		25	0002L371-006	00LV[illegible]
RECRL	12691	2/2/00	00D1101-006.001	TOLUENE	MS2	98	%REC		1		25	0002L371-006	00LV[illegible]
RECRL	12691	2/2/00	00D1101-006.001	TOLUENE	MS1	101	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	TOTAL XYLENES	MS2	102	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	TOTAL XYLENES	MS1	103	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	trans-1,2-DICHLOROETHENE	MS1	100	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	trans-1,2-DICHLOROETHENE	MS2	103	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	trans-1,3-DICHLOROPROPENE	MS2	90	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	trans-1,3-DICHLOROPROPENE	MS1	93	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	TRICHLOROETHENE	MS1	99	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	TRICHLOROETHENE	MS2	108	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	TRICHLOROFLUOROMETHANE	MS1	113	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	TRICHLOROFLUOROMETHANE	MS2	115	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	VINYL CHLORIDE	MS1	86	%REC		1		25	0002L371-006	00LVK065
RECRL	12691	2/2/00	00D1101-006.001	VINYL CHLORIDE	MS2	94	%REC		1		25	0002L371-006	00LVK065
GEL	18199	12/5/00	01D0213-001.004	1,1-DICHLOROETHENE	MD1	110	%REC		1	250	500	1000143553	58370
GEL	18199	12/5/00	01D0213-001.004	1,1-DICHLOROETHENE	MS1	122	%REC		1	250	500	1000143552	58370
GEL	18199	12/5/00	01D0213-001.004	BENZENE	MD1	101	%REC		1	250	500	1000143553	58370
GEL	18199	12/5/00	01D0213-001.004	BENZENE	MS1	113	%REC		1	250	500	1000143552	58370
GEL	18199	12/5/00	01D0213-001.004	CHLOROBENZENE	MD1	102	%REC		1	250	500	1000143553	58370
GEL	18199	12/5/00	01D0213-001.004	CHLOROBENZENE	MS1	116	%REC		1	250	500	1000143552	58370
GEL	18199	12/5/00	01D0213-001.004	TOLUENE	MD1	102	%REC		1	250	500	1000143553	58370
GEL	18199	12/5/00	01D0213-001.004	TOLUENE	MS1	115	%REC		1	250	500	1000143552	58370
GEL	18199	12/5/00	01D0213-001.004	TRICHLOROETHENE	MD1	100	%REC		1	250	500	1000143553	58370
GEL	18199	12/5/00	01D0213-001.004	TRICHLOROETHENE	MS1	113	%REC		1	250	500	1000143552	58370
RECRL	18299	3/14/00	00D1166-004.002	1,1,1,2-TETRACHLOROETHANE	MD1	106	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,1,1,2-TETRACHLOROETHANE	MS1	109	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,1,1-TRICHLOROETHANE	MD1	107	%REC		1	500	500	0003L744-004	00LV[illegible]
RECRL	18299	3/14/00	00D1166-004.002	1,1,1-TRICHLOROETHANE	MS1	108	%REC		1	500	500	0003L744-004	00LVK12[illegible]
RECRL	18299	3/14/00	00D1166-004.002	1,1,2,2-TETRACHLOROETHANE	MD1	104	%REC		1	500	500	0003L744-004	00LVK120

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	18299	3/14/00	00D1166-004.002	1,1,2,2-TETRACHLOROETHANE	MS1	114	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,1,2-TRICHLOROETHANE	MD1	103	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,1,2-TRICHLOROETHANE	MS1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,1-DICHLOROETHANE	MD1	109	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,1-DICHLOROETHANE	MS1	110	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,1-DICHLOROETHENE	MD1	89	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,1-DICHLOROETHENE	MS1	94	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,1-DICHLOROPROPENE	MD1	102	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,1-DICHLOROPROPENE	MS1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2,3-TRICHLOROBENZENE	MD1	106	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2,3-TRICHLOROBENZENE	MS1	112	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2,3-TRICHLOROPROPANE	MD1	106	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2,3-TRICHLOROPROPANE	MS1	110	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2,4-TRICHLOROBENZENE	MS1	97	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2,4-TRICHLOROBENZENE	MD1	101	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2-DIBROMOETHANE	MS1	101	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2-DIBROMOETHANE	MD1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2-DICHLOROBENZENE	MD1	112	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2-DICHLOROBENZENE	MS1	114	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2-DICHLOROETHANE	MS1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2-DICHLOROETHANE	MD1	111	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2-DICHLOROPROPANE	MD1	103	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,2-DICHLOROPROPANE	MS1	106	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,3-DICHLOROBENZENE	MD1	105	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,3-DICHLOROBENZENE	MS1	112	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,3-DICHLOROPROPANE	MS1	101	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,3-DICHLOROPROPANE	MD1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,4-DICHLOROBENZENE	MS1	96	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	1,4-DICHLOROBENZENE	MD1	108	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	2,2-DICHLOROPROPANE	MD1	98	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	2,2-DICHLOROPROPANE	MS1	102	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	4-ISOPROPYLTOLUENE	MD1	112	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	4-ISOPROPYLTOLUENE	MS1	112	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BENZENE	MD1	103	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BENZENE	MS1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BENZENE, 1,2,4-TRIMETHYL	MS1	107	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BENZENE, 1,2,4-TRIMETHYL	MD1	109	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BENZENE, 1,3,5-TRIMETHYL-	MS1	107	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BENZENE, 1,3,5-TRIMETHYL-	MD1	111	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BROMOBENZENE	MD1	108	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BROMOBENZENE	MS1	108	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BROMOCHLOROMETHANE	MS1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BROMOCHLOROMETHANE	MD1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BROMODICHLOROMETHANE	MS1	107	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BROMODICHLOROMETHANE	MD1	108	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BROMOFORM	MD1	98	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BROMOFORM	MS1	103	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BROMOMETHANE	MD1	113	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	BROMOMETHANE	MS1	125	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	CARBON TETRACHLORIDE	MS1	0	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	CARBON TETRACHLORIDE	MD1	0	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	CHLOROBENZENE	MS1	103	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	CHLOROBENZENE	MD1	105	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	CHLOROETHANE	MS1	88	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	CHLOROETHANE	MD1	98	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	CHLOROFORM	MS1	8	%REC		1	500	500	0003L744-004	00LVK120

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5

Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples

Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	18299	3/14/00	00D1166-004.002	CHLOROFORM	MD1	8	%REC		1	500	500	0003L744-004	00LVK
RECRL	18299	3/14/00	00D1166-004.002	CHLOROMETHANE	MD1	91	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	CHLOROMETHANE	MS1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	cis-1,2-DICHLOROETHENE	MS1	101	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	cis-1,2-DICHLOROETHENE	MD1	107	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	cis-1,3-DICHLOROPROPENE	MS1	99	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	cis-1,3-DICHLOROPROPENE	MD1	99	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	DIBROMOCHLOROMETHANE	MS1	109	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	DIBROMOCHLOROMETHANE	MD1	114	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	DIBROMOMETHANE	MS1	102	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	DIBROMOMETHANE	MD1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	DICHLORODIFLUOROMETHANE	MD1	103	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	DICHLORODIFLUOROMETHANE	MS1	109	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	ETHYLBENZENE	MS1	105	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	ETHYLBENZENE	MD1	114	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	HEXACHLOROBUTADIENE	MS1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	HEXACHLOROBUTADIENE	MD1	105	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	ISOPROPYLBENZENE	MD1	102	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	ISOPROPYLBENZENE	MS1	103	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	METHYLENE CHLORIDE	MD1	25	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	METHYLENE CHLORIDE	MS1	26	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	NAPHTHALENE	MD1	100	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	NAPHTHALENE	MS1	102	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	n-BUTYLBENZENE	MS1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	n-BUTYLBENZENE	MD1	112	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	n-PROPYLBENZENE	MD1	107	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	n-PROPYLBENZENE	MS1	110	%REC		1	500	500	0003L744-004	00LVK
RECRL	18299	3/14/00	00D1166-004.002	o-CHLOROTOLUENE	MD1	106	%REC		1	500	500	0003L744-004	00LVK
RECRL	18299	3/14/00	00D1166-004.002	o-CHLOROTOLUENE	MS1	106	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	p-CHLOROTOLUENE	MD1	106	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	p-CHLOROTOLUENE	MS1	108	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	117	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	sec-BUTYLBENZENE	MS1	102	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	sec-BUTYLBENZENE	MD1	108	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	STYRENE	MS1	102	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	STYRENE	MD1	104	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	tert-BUTYLBENZENE	MS1	106	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	tert-BUTYLBENZENE	MD1	111	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	TETRACHLOROETHENE	MD1	21	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	TETRACHLOROETHENE	MS1	21	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	TOLUENE	MS1	108	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	TOLUENE	MD1	109	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	TOTAL XYLENES	MS1	108	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	TOTAL XYLENES	MD1	111	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	trans-1,2-DICHLOROETHENE	MS1	106	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	trans-1,2-DICHLOROETHENE	MD1	110	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	trans-1,3-DICHLOROPROPENE	MD1	98	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	trans-1,3-DICHLOROPROPENE	MS1	105	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	TRICHLOROETHENE	MS1	100	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	TRICHLOROETHENE	MD1	112	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	TRICHLOROFLUOROMETHANE	MD1	101	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	TRICHLOROFLUOROMETHANE	MS1	105	%REC		1	500	500	0003L744-004	00LVK120
RECRL	18299	3/14/00	00D1166-004.002	VINYL CHLORIDE	MS1	97	%REC		1	500	500	0003L744-004	00LVK
RECRL	18299	3/14/00	00D1166-004.002	VINYL CHLORIDE	MD1	109	%REC		1	500	500	0003L744-004	00LVK12
GEL	21697	9/26/00	00D1536-003.002	1,1-DICHLOROETHENE	MS1	104	%REC		1	0.5	1	1000114609	48115

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[illegible]	21697	9/26/00	00D1536-003.002	1,1-DICHLOROETHENE	MD1	108	%REC		1	0.5	1	1000114610	48115
GEL	21697	9/26/00	00D1536-003.002	BENZENE	MS1	102	%REC		1	0.5	1	1000114609	48115
GEL	21697	9/26/00	00D1536-003.002	BENZENE	MD1	102	%REC		1	0.5	1	1000114610	48115
GEL	21697	9/26/00	00D1536-003.002	CHLOROBENZENE	MS1	96	%REC		1	0.5	1	1000114609	48115
GEL	21697	9/26/00	00D1536-003.002	CHLOROBENZENE	MD1	98	%REC		1	0.5	1	1000114610	48115
GEL	21697	9/26/00	00D1536-003.002	TOLUENE	MS1	94	%REC		1	0.5	1	1000114609	48115
GEL	21697	9/26/00	00D1536-003.002	TOLUENE	MD1	96	%REC		1	0.5	1	1000114610	48115
GEL	21697	9/26/00	00D1536-003.002	TRICHLOROETHENE	MS1	100	%REC		1	0.5	1	1000114609	48115
GEL	21697	9/26/00	00D1536-003.002	TRICHLOROETHENE	MD1	102	%REC		1	0.5	1	1000114610	48115
RECRL	22896	7/28/00	00D1410-007.001	1,1,1,2-TETRACHLOROETHANE	MD1	107	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1,1,2-TETRACHLOROETHANE	MS1	108	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1,1-TRICHLOROETHANE	MS1	111	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1,1-TRICHLOROETHANE	MD1	113	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1,2,2-TETRACHLOROETHANE	MD1	99	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1,2,2-TETRACHLOROETHANE	MS1	100	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1,2-TRICHLOROETHANE	MS1	104	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1,2-TRICHLOROETHANE	MD1	106	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1-DICHLOROETHANE	MS1	108	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1-DICHLOROETHANE	MD1	111	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1-DICHLOROETHENE	MS1	104	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1-DICHLOROETHENE	MD1	106	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1-DICHLOROPROPENE	MS1	88	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,1-DICHLOROPROPENE	MD1	102	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,2,3-TRICHLOROBENZENE	MS1	102	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,2,3-TRICHLOROBENZENE	MD1	110	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,2,3-TRICHLOROPROPANE	MD1	99	%REC		1		50	0008L093-007	00LVK315
[illegible]RL	22896	7/28/00	00D1410-007.001	1,2,3-TRICHLOROPROPANE	MS1	102	%REC		1		50	0008L093-007	00LVK315
[illegible]RL	22896	7/28/00	00D1410-007.001	1,2,4-TRICHLOROBENZENE	MS1	97	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,2,4-TRICHLOROBENZENE	MD1	105	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,2-DIBROMOETHANE	MD1	98	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,2-DIBROMOETHANE	MS1	100	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,2-DICHLOROBENZENE	MS1	104	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,2-DICHLOROBENZENE	MD1	106	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,2-DICHLOROETHANE	MD1	106	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,2-DICHLOROETHANE	MS1	112	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,2-DICHLOROPROPANE	MS1	103	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,2-DICHLOROPROPANE	MD1	108	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,3-DICHLOROBENZENE	MS1	106	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,3-DICHLOROBENZENE	MD1	109	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,3-DICHLOROPROPANE	MD1	92	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,3-DICHLOROPROPANE	MS1	93	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,4-DICHLOROBENZENE	MS1	103	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	1,4-DICHLOROBENZENE	MD1	105	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	2,2-DICHLOROPROPANE	MS1	95	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	2,2-DICHLOROPROPANE	MD1	95	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	4-ISOPROPYLTOLUENE	MS1	95	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	4-ISOPROPYLTOLUENE	MD1	99	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	BENZENE	MS1	110	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	BENZENE	MD1	112	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	BENZENE, 1,2,4-TRIMETHYL	MD1	103	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	BENZENE, 1,2,4-TRIMETHYL	MS1	104	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	BENZENE, 1,3,5-TRIMETHYL-	MD1	97	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	107	%REC		1		50	0008L093-007	00LVK315
[illegible]RL	22896	7/28/00	00D1410-007.001	BROMOBENZENE	MD1	100	%REC		1		50	0008L093-007	00LVK315
[illegible]RL	22896	7/28/00	00D1410-007.001	BROMOBENZENE	MS1	101	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	BROMOCHLOROMETHANE	MS1	111	%REC		1		50	0008L093-007	00LVK315

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch
RECRL	22896	7/28/00	00D1410-007.001	BROMOCHLOROMETHANE	MD1	115	%REC		1		50	0008L093-007	00LVK
RECRL	22896	7/28/00	00D1410-007.001	BROMODICHLOROMETHANE	MS1	111	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	BROMODICHLOROMETHANE	MD1	117	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	BROMOFORM	MD1	99	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	BROMOFORM	MS1	104	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	BROMOMETHANE	MD1	90	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	BROMOMETHANE	MS1	93	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	CARBON TETRACHLORIDE	MD1	120	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	CARBON TETRACHLORIDE	MS1	122	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	CHLOROBENZENE	MS1	104	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	CHLOROBENZENE	MD1	105	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	CHLOROETHANE	MS1	118	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	CHLOROETHANE	MD1	118	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	CHLOROFORM	MS1	112	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	CHLOROFORM	MD1	117	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	CHLOROMETHANE	MS1	110	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	CHLOROMETHANE	MD1	113	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	cis-1,2-DICHLOROETHENE	MS1	112	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	cis-1,2-DICHLOROETHENE	MD1	115	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	cis-1,3-DICHLOROPROPENE	MD1	93	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	cis-1,3-DICHLOROPROPENE	MS1	94	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	DIBROMOCHLOROMETHANE	MS1	108	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	DIBROMOCHLOROMETHANE	MD1	109	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	DIBROMOMETHANE	MS1	114	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	DIBROMOMETHANE	MD1	116	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	DICHLORODIFLUOROMETHANE	MD1	87	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	DICHLORODIFLUOROMETHANE	MS1	94	%REC		1		50	0008L093-007	00LVK
RECRL	22896	7/28/00	00D1410-007.001	ETHYLBENZENE	MS1	105	%REC		1		50	0008L093-007	00LVK
RECRL	22896	7/28/00	00D1410-007.001	ETHYLBENZENE	MD1	106	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	HEXACHLOROBUTADIENE	MD1	105	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	HEXACHLOROBUTADIENE	MS1	105	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	ISOPROPYLBENZENE	MD1	99	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	ISOPROPYLBENZENE	MS1	104	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	METHYLENE CHLORIDE	MS1	0	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	METHYLENE CHLORIDE	MD1	0	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	NAPHTHALENE	MS1	80	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	NAPHTHALENE	MD1	88	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	n-BUTYLBENZENE	MS1	94	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	n-BUTYLBENZENE	MD1	108	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	n-PROPYLBENZENE	MD1	104	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	n-PROPYLBENZENE	MS1	105	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	o-CHLOROTOLUENE	MD1	105	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	o-CHLOROTOLUENE	MS1	109	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	p-CHLOROTOLUENE	MS1	99	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	p-CHLOROTOLUENE	MD1	108	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	90	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	98	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	sec-BUTYLBENZENE	MS1	100	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	sec-BUTYLBENZENE	MD1	104	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	STYRENE	MS1	98	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	STYRENE	MD1	102	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	tert-BUTYLBENZENE	MS1	107	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	tert-BUTYLBENZENE	MD1	109	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	TETRACHLOROETHENE	MD1	107	%REC		1		50	0008L093-007	00LVK
RECRL	22896	7/28/00	00D1410-007.001	TETRACHLOROETHENE	MS1	109	%REC		1		50	0008L093-007	00LVK3
RECRL	22896	7/28/00	00D1410-007.001	TOLUENE	MS1	103	%REC		1		50	0008L093-007	00LVK315

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5

Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples

Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	22896	7/28/00	00D1410-007.001	TOLUENE	MD1	104	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	TOTAL XYLENES	MS1	106	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	TOTAL XYLENES	MD1	107	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	trans-1,2-DICHLOROETHENE	MS1	113	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	trans-1,2-DICHLOROETHENE	MD1	117	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	trans-1,3-DICHLOROPROPENE	MS1	90	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	trans-1,3-DICHLOROPROPENE	MD1	90	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	TRICHLOROETHENE	MS1	0	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	TRICHLOROETHENE	MD1	0	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	TRICHLOROFLUOROMETHANE	MD1	116	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	TRICHLOROFLUOROMETHANE	MS1	121	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	VINYL CHLORIDE	MS1	104	%REC		1		50	0008L093-007	00LVK315
RECRL	22896	7/28/00	00D1410-007.001	VINYL CHLORIDE	MD1	105	%REC		1		50	0008L093-007	00LVK315
GEL	30300	10/18/00	01D0179-001.004	1,1-DICHLOROETHENE	MS1	90	%REC			0.5	1	1000123477	51281
GEL	30300	10/18/00	01D0179-001.004	1,1-DICHLOROETHENE	MD1	92	%REC			0.5	1	1000123478	51281
GEL	30300	10/18/00	01D0179-001.004	BENZENE	MS1	88	%REC			0.5	1	1000123477	51281
GEL	30300	10/18/00	01D0179-001.004	BENZENE	MD1	88	%REC			0.5	1	1000123478	51281
GEL	30300	10/18/00	01D0179-001.004	CHLOROBENZENE	MS1	83	%REC			0.5	1	1000123477	51281
GEL	30300	10/18/00	01D0179-001.004	CHLOROBENZENE	MD1	87	%REC			0.5	1	1000123478	51281
GEL	30300	10/18/00	01D0179-001.004	TOLUENE	MS1	84	%REC			0.5	1	1000123477	51281
GEL	30300	10/18/00	01D0179-001.004	TOLUENE	MD1	88	%REC			0.5	1	1000123478	51281
GEL	30300	10/18/00	01D0179-001.004	TRICHLOROETHENE	MS1	86	%REC			0.5	1	1000123477	51281
GEL	30300	10/18/00	01D0179-001.004	TRICHLOROETHENE	MD1	87	%REC			0.5	1	1000123478	51281
GEL	70493	10/30/00	01D0197-001.002	1,1-DICHLOROETHENE	MS1	94	%REC			0.5	1	1000127797	52781
GEL	70493	10/30/00	01D0197-001.002	1,1-DICHLOROETHENE	MD1	94	%REC			0.5	1	1000127798	52781
GEL	70493	10/30/00	01D0197-001.002	BENZENE	MD1	88	%REC			0.5	1	1000127798	52781
GEL	70493	10/30/00	01D0197-001.002	BENZENE	MS1	90	%REC			0.5	1	1000127797	52781
GEL	70493	10/30/00	01D0197-001.002	CHLOROBENZENE	MD1	84	%REC			0.5	1	1000127798	52781
GEL	70493	10/30/00	01D0197-001.002	CHLOROBENZENE	MS1	86	%REC			0.5	1	1000127797	52781
GEL	70493	10/30/00	01D0197-001.002	TOLUENE	MD1	88	%REC			0.5	1	1000127798	52781
GEL	70493	10/30/00	01D0197-001.002	TOLUENE	MS1	90	%REC			0.5	1	1000127797	52781
GEL	70493	10/30/00	01D0197-001.002	TRICHLOROETHENE	MD1	78	%REC			0.5	1	1000127798	52781
GEL	70493	10/30/00	01D0197-001.002	TRICHLOROETHENE	MS1	82	%REC			0.5	1	1000127797	52781
GEL	70693	10/24/00	01D0188-001.003	1,1-DICHLOROETHENE	MD1	86	%REC		1	0.5	1	1000125887	52091
GEL	70693	10/24/00	01D0188-001.003	1,1-DICHLOROETHENE	MS1	96	%REC		1	0.5	1	1000125886	52091
GEL	70693	10/24/00	01D0188-001.003	BENZENE	MD1	98	%REC		1	0.5	1	1000125887	52091
GEL	70693	10/24/00	01D0188-001.003	BENZENE	MS1	100	%REC		1	0.5	1	1000125886	52091
GEL	70693	10/24/00	01D0188-001.003	CHLOROBENZENE	MD1	95	%REC		1	0.5	1	1000125887	52091
GEL	70693	10/24/00	01D0188-001.003	CHLOROBENZENE	MS1	96	%REC		1	0.5	1	1000125886	52091
GEL	70693	10/24/00	01D0188-001.003	TOLUENE	MD1	92	%REC		1	0.5	1	1000125887	52091
GEL	70693	10/24/00	01D0188-001.003	TOLUENE	MS1	94	%REC		1	0.5	1	1000125886	52091
GEL	70693	10/24/00	01D0188-001.003	TRICHLOROETHENE	MD1	84	%REC		1	0.5	1	1000125887	52091
GEL	70693	10/24/00	01D0188-001.003	TRICHLOROETHENE	MS1	90	%REC		1	0.5	1	1000125886	52091
GEL	70693	10/24/00	01D0188-001.003	TRICHLOROFLUOROMETHANE	MS1	3.3	UG/L			0.5	1	1000125886	52091
GEL	70693	10/24/00	01D0188-001.003	TRICHLOROFLUOROMETHANE	MD1	3.4	UG/L			0.5	1	1000125887	52091
GEL	70693	10/24/00	01D0188-001.003	VINYL CHLORIDE	MS1	4.3	UG/L			0.5	1	1000125886	52091
GEL	70693	10/24/00	01D0188-001.003	VINYL CHLORIDE	MD1	4.5	UG/L			0.5	1	1000125887	52091
RECRL	783 N	5/23/00	00D1279-024.002	1,1,1,2-TETRACHLOROETHANE	MS1	78	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,1,1,2-TETRACHLOROETHANE	MD1	88	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,1,1-TRICHLOROETHANE	MD1	104	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,1,1-TRICHLOROETHANE	MS1	110	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,1,2,2-TETRACHLOROETHANE	MD1	83	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,1,2,2-TETRACHLOROETHANE	MS1	86	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,1,2-TRICHLOROETHANE	MD1	95	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,1,2-TRICHLOROETHANE	MS1	95	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,1-DICHLOROETHANE	MD1	118	%REC		1		100	0005L445-008	00LVK200

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Bat
RECRL	783 N	5/23/00	00D1279-024.002	1,1-DICHLOROETHANE	MS1	131	%REC		1		100	0005L445-008	00LVK
RECRL	783 N	5/23/00	00D1279-024.002	1,1-DICHLOROETHENE	MD1	111	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,1-DICHLOROETHENE	MS1	113	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,1-DICHLOROPROPENE	MS1	91	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,1-DICHLOROPROPENE	MD1	105	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2,3-TRICHLOROBENZENE	MD1	84	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2,3-TRICHLOROBENZENE	MS1	89	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2,3-TRICHLOROPROPANE	MD1	92	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2,3-TRICHLOROPROPANE	MS1	108	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2,4-TRICHLOROBENZENE	MD1	93	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2,4-TRICHLOROBENZENE	MS1	102	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2-DIBROMOETHANE	MS1	90	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2-DIBROMOETHANE	MD1	117	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2-DICHLOROBENZENE	MD1	102	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2-DICHLOROBENZENE	MS1	122	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2-DICHLOROETHANE	MD1	93	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2-DICHLOROETHANE	MS1	115	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2-DICHLOROPROPANE	MD1	99	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,2-DICHLOROPROPANE	MS1	100	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,3-DICHLOROBENZENE	MD1	104	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,3-DICHLOROBENZENE	MS1	123	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,3-DICHLOROPROPANE	MD1	86	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,3-DICHLOROPROPANE	MS1	88	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,4-DICHLOROBENZENE	MD1	103	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	1,4-DICHLOROBENZENE	MS1	123	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	2,2-DICHLOROPROPANE	MD1	86	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	2,2-DICHLOROPROPANE	MS1	94	%REC		1		100	0005L445-008	00LVK
RECRL	783 N	5/23/00	00D1279-024.002	4-ISOPROPYLTOLUENE	MD1	99	%REC		1		100	0005L445-008	00LVK
RECRL	783 N	5/23/00	00D1279-024.002	4-ISOPROPYLTOLUENE	MS1	131	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BENZENE	MD1	110	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BENZENE	MS1	113	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BENZENE, 1,2,4-TRIMETHYL	MD1	102	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BENZENE, 1,2,4-TRIMETHYL	MS1	128	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BENZENE, 1,3,5-TRIMETHYL-	MD1	16	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BENZENE, 1,3,5-TRIMETHYL-	MS1	106	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BROMOBENZENE	MD1	98	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BROMOBENZENE	MS1	107	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BROMOCHLOROMETHANE	MD1	100	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BROMOCHLOROMETHANE	MS1	116	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BROMODICHLOROMETHANE	MD1	85	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BROMODICHLOROMETHANE	MS1	85	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BROMOFORM	MS1	34	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BROMOFORM	MD1	52	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BROMOMETHANE	MD1	57	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	BROMOMETHANE	MS1	76	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	CARBON TETRACHLORIDE	MS1	86	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	CARBON TETRACHLORIDE	MD1	88	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	CHLOROBENZENE	MD1	98	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	CHLOROBENZENE	MS1	100	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	CHLOROETHANE	MD1	91	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	CHLOROETHANE	MS1	140	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	CHLOROFORM	MD1	109	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	CHLOROFORM	MS1	124	%REC		1		100	0005L445-008	00LVK20
RECRL	783 N	5/23/00	00D1279-024.002	CHLOROMETHANE	MD1	149	%REC		1		100	0005L445-008	00LVK
RECRL	783 N	5/23/00	00D1279-024.002	CHLOROMETHANE	MS1	227	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	cis-1,2-DICHLOROETHENE	MD1	102	%REC		1		100	0005L445-008	00LVK200

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5

Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples

Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	783 N	5/23/00	00D1279-024.002	cis-1,2-DICHLOROETHENE	MS1	113	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	cis-1,3-DICHLOROPROPENE	MS1	73	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	cis-1,3-DICHLOROPROPENE	MD1	81	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	DIBROMOCHLOROMETHANE	MS1	58	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	DIBROMOCHLOROMETHANE	MD1	70	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	DIBROMOMETHANE	MD1	101	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	DIBROMOMETHANE	MS1	119	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	DICHLORODIFLUOROMETHANE	MD1	98	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	DICHLORODIFLUOROMETHANE	MS1	148	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	ETHYLBENZENE	MS1	104	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	ETHYLBENZENE	MD1	111	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	HEXACHLOROBUTADIENE	MD1	103	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	HEXACHLOROBUTADIENE	MS1	132	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	ISOPROPYLBENZENE	MS1	107	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	ISOPROPYLBENZENE	MD1	108	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	METHYLENE CHLORIDE	MD1	70	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	METHYLENE CHLORIDE	MS1	99	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	NAPHTHALENE	MS1	76	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	NAPHTHALENE	MD1	100	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	n-BUTYLBENZENE	MD1	96	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	n-BUTYLBENZENE	MS1	145	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	n-PROPYLBENZENE	MD1	115	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	n-PROPYLBENZENE	MS1	125	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	o-CHLOROTOLUENE	MD1	112	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	o-CHLOROTOLUENE	MS1	118	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	p-CHLOROTOLUENE	MD1	111	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	p-CHLOROTOLUENE	MS1	117	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	70	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	78	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	sec-BUTYLBENZENE	MD1	115	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	sec-BUTYLBENZENE	MS1	141	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	STYRENE	MD1	109	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	STYRENE	MS1	109	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	tert-BUTYLBENZENE	MD1	115	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	tert-BUTYLBENZENE	MS1	133	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	TETRACHLOROETHENE	MS1	102	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	TETRACHLOROETHENE	MD1	108	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	TOLUENE	MS1	100	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	TOLUENE	MD1	105	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	TOTAL XYLENES	MD1	109	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	TOTAL XYLENES	MS1	110	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	trans-1,2-DICHLOROETHENE	MD1	107	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	trans-1,2-DICHLOROETHENE	MS1	116	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	trans-1,3-DICHLOROPROPENE	MS1	69	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	trans-1,3-DICHLOROPROPENE	MD1	80	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	TRICHLOROETHENE	MD1	109	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	TRICHLOROETHENE	MS1	113	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	TRICHLOROFLUOROMETHANE	MD1	101	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	TRICHLOROFLUOROMETHANE	MS1	102	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	VINYL CHLORIDE	MD1	113	%REC		1		100	0005L445-008	00LVK200
RECRL	783 N	5/23/00	00D1279-024.002	VINYL CHLORIDE	MS1	161	%REC		1		100	0005L445-008	00LVK200
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1,1,2-TETRACHLOROETHANE	MS1	111	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1,1,2-TETRACHLOROETHANE	MD1	111	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1,1-TRICHLOROETHANE	MD1	107	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1,1-TRICHLOROETHANE	MS1	108	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1,2,2-TETRACHLOROETHANE	MS1	98	%REC				1	0006L668-015	00LVK260

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1,2,2-TETRACHLOROETHANE	MD1	105	%REC				1	0006L668-015	00LVK[illegible]
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1,2-TRICHLOROETHANE	MS1	103	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1,2-TRICHLOROETHANE	MD1	104	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1-DICHLOROETHANE	MD1	100	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1-DICHLOROETHANE	MS1	100	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1-DICHLOROETHENE	MD1	90	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1-DICHLOROETHENE	MS1	99	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1-DICHLOROPROPENE	MS1	98	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,1-DICHLOROPROPENE	MD1	98	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2,3-TRICHLOROBENZENE	MS1	99	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2,3-TRICHLOROBENZENE	MD1	107	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2,3-TRICHLOROPROPANE	MS1	104	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2,3-TRICHLOROPROPANE	MD1	113	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2,4-TRICHLOROBENZENE	MS1	95	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2,4-TRICHLOROBENZENE	MD1	100	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2-DIBROMOETHANE	MS1	100	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2-DIBROMOETHANE	MD1	101	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2-DICHLOROBENZENE	MD1	104	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2-DICHLOROBENZENE	MS1	111	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2-DICHLOROETHANE	MD1	111	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2-DICHLOROETHANE	MS1	112	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2-DICHLOROPROPANE	MD1	98	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,2-DICHLOROPROPANE	MS1	100	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,3-DICHLOROBENZENE	MS1	103	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,3-DICHLOROBENZENE	MD1	104	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,3-DICHLOROPROPANE	MS1	93	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,3-DICHLOROPROPANE	MD1	94	%REC				1	0006L668-015	00LVK[illegible]
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,4-DICHLOROBENZENE	MS1	101	%REC				1	0006L668-015	00LVK[illegible]
RECRL	891COLGAL	6/20/00	00D1306-034.001	1,4-DICHLOROBENZENE	MD1	104	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	2,2-DICHLOROPROPANE	MD1	99	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	2,2-DICHLOROPROPANE	MS1	99	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	4-ISOPROPYLTOLUENE	MD1	95	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	4-ISOPROPYLTOLUENE	MS1	97	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BENZENE	MS1	100	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BENZENE	MD1	101	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BENZENE, 1,2,4-TRIMETHYL	MS1	93	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BENZENE, 1,2,4-TRIMETHYL	MD1	96	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BENZENE, 1,3,5-TRIMETHYL-	MD1	107	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	109	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BROMOBENZENE	MS1	94	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BROMOBENZENE	MD1	95	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BROMOCHLOROMETHANE	MS1	108	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BROMOCHLOROMETHANE	MD1	113	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BROMODICHLOROMETHANE	MS1	107	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BROMODICHLOROMETHANE	MD1	108	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BROMOFORM	MS1	109	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BROMOFORM	MD1	110	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BROMOMETHANE	MD1	96	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	BROMOMETHANE	MS1	97	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	CARBON TETRACHLORIDE	MS1	104	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	CARBON TETRACHLORIDE	MD1	107	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	CHLOROBENZENE	MS1	99	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	CHLOROBENZENE	MD1	100	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	CHLOROETHANE	MD1	94	%REC				1	0006L668-015	00LVK[illegible]
RECRL	891COLGAL	6/20/00	00D1306-034.001	CHLOROETHANE	MS1	98	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	CHLOROFORM	MD1	103	%REC				1	0006L668-015	00LVK260

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	891COLGAL	6/20/00	00D1306-034.001	CHLOROFORM	MS1	105	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	CHLOROMETHANE	MD1	93	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	CHLOROMETHANE	MS1	95	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	cis-1,2-DICHLOROETHENE	MS1	97	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	cis-1,2-DICHLOROETHENE	MD1	100	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	cis-1,3-DICHLOROPROPENE	MD1	91	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	cis-1,3-DICHLOROPROPENE	MS1	93	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	DIBROMOCHLOROMETHANE	MD1	108	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	DIBROMOCHLOROMETHANE	MS1	110	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	DIBROMOMETHANE	MS1	122	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	DIBROMOMETHANE	MD1	122	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	DICHLORODIFLUOROMETHANE	MD1	91	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	DICHLORODIFLUOROMETHANE	MS1	95	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	ETHYLBENZENE	MS1	97	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	ETHYLBENZENE	MD1	97	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	HEXACHLOROBUTADIENE	MS1	101	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	HEXACHLOROBUTADIENE	MD1	103	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	ISOPROPYLBENZENE	MD1	93	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	ISOPROPYLBENZENE	MS1	96	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	METHYLENE CHLORIDE	MD1	78	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	METHYLENE CHLORIDE	MS1	92	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	NAPHTHALENE	MS1	80	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	NAPHTHALENE	MD1	90	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	n-BUTYLBENZENE	MS1	91	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	n-BUTYLBENZENE	MD1	92	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	n-PROPYLBENZENE	MD1	96	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	n-PROPYLBENZENE	MS1	97	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	o-CHLOROTOLUENE	MS1	98	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	o-CHLOROTOLUENE	MD1	98	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	p-CHLOROTOLUENE	MS1	98	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	p-CHLOROTOLUENE	MD1	100	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	98	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	100	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	sec-BUTYLBENZENE	MS1	98	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	sec-BUTYLBENZENE	MD1	98	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	STYRENE	MS1	95	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	STYRENE	MD1	95	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	tert-BUTYLBENZENE	MD1	101	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	tert-BUTYLBENZENE	MS1	103	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	TETRACHLOROETHENE	MD1	105	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	TETRACHLOROETHENE	MS1	107	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	TOLUENE	MD1	95	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	TOLUENE	MS1	98	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	TOTAL XYLENES	MD1	96	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	TOTAL XYLENES	MS1	97	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	trans-1,2-DICHLOROETHENE	MS1	100	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	trans-1,2-DICHLOROETHENE	MD1	102	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	trans-1,3-DICHLOROPROPENE	MS1	95	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	trans-1,3-DICHLOROPROPENE	MD1	99	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	TRICHLOROETHENE	MS1	102	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	TRICHLOROETHENE	MD1	109	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	TRICHLOROFLUOROMETHANE	MD1	111	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	TRICHLOROFLUOROMETHANE	MS1	113	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	VINYL CHLORIDE	MD1	86	%REC				1	0006L668-015	00LVK260
RECRL	891COLGAL	6/20/00	00D1306-034.001	VINYL CHLORIDE	MS1	86	%REC				1	0006L668-015	00LVK260
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1,1,2-TETRACHLOROETHANE	MS2	103	%REC	U		25	25	0002L509-003	00LVK090

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1,1,2-TETRACHLOROETHANE	MS1	105	%REC			25	25	0002L509-003	00LVK[illegible]
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1,1-TRICHLOROETHANE	MS2	112	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1,1-TRICHLOROETHANE	MS1	114	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1,2,2-TETRACHLOROETHANE	MS1	104	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1,2,2-TETRACHLOROETHANE	MS2	104	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1,2-TRICHLOROETHANE	MS2	104	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1,2-TRICHLOROETHANE	MS1	104	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1-DICHLOROETHANE	MS2	110	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1-DICHLOROETHANE	MS1	114	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1-DICHLOROETHENE	MS2	103	%REC	J		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1-DICHLOROETHENE	MS1	105	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1-DICHLOROPROPENE	MS2	101	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,1-DICHLOROPROPENE	MS1	108	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2,3-TRICHLOROBENZENE	MS2	102	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2,3-TRICHLOROBENZENE	MS1	106	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2,3-TRICHLOROPROPANE	MS1	107	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2,3-TRICHLOROPROPANE	MS2	108	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2,4-TRICHLOROBENZENE	MS1	91	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2,4-TRICHLOROBENZENE	MS2	105	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2-DIBROMOETHANE	MS1	106	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2-DIBROMOETHANE	MS2	107	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2-DICHLOROBENZENE	MS2	101	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2-DICHLOROBENZENE	MS1	102	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2-DICHLOROETHANE	MS2	109	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2-DICHLOROETHANE	MS1	111	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2-DICHLOROPROPANE	MS2	108	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,2-DICHLOROPROPANE	MS1	110	%REC			25	25	0002L509-003	00LVK[illegible]
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,3-DICHLOROBENZENE	MS1	102	%REC			25	25	0002L509-003	00LVK[illegible]
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,3-DICHLOROBENZENE	MS2	107	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,3-DICHLOROPROPANE	MS1	98	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,3-DICHLOROPROPANE	MS2	100	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,4-DICHLOROBENZENE	MS1	100	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	1,4-DICHLOROBENZENE	MS2	104	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	2,2-DICHLOROPROPANE	MS2	106	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	2,2-DICHLOROPROPANE	MS1	107	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	4-ISOPROPYLTOLUENE	MS1	101	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	4-ISOPROPYLTOLUENE	MS2	106	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BENZENE	MS1	102	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BENZENE	MS2	107	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BENZENE, 1,2,4-TRIMETHYL	MS1	87	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BENZENE, 1,2,4-TRIMETHYL	MS2	104	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	109	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BENZENE, 1,3,5-TRIMETHYL-	MS2	109	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BROMOBENZENE	MS1	104	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BROMOBENZENE	MS2	106	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BROMOCHLOROMETHANE	MS1	106	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BROMOCHLOROMETHANE	MS2	110	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BROMODICHLOROMETHANE	MS1	114	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BROMODICHLOROMETHANE	MS2	115	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BROMOFORM	MS1	105	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BROMOFORM	MS2	106	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BROMOMETHANE	MS2	101	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	BROMOMETHANE	MS1	109	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	CARBON TETRACHLORIDE	MS2	97	%REC	J		25	25	0002L509-003	00LVK[illegible]
RECRL	891COLWEL	2/14/00	00D1126-002.001	CARBON TETRACHLORIDE	MS1	100	%REC			25	25	0002L509-003	00LVK[illegible]
RECRL	891COLWEL	2/14/00	00D1126-002.001	CHLOROBENZENE	MS1	104	%REC			25	25	0002L509-003	00LVK090

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	891COLWEL	2/14/00	00D1126-002.001	CHLOROBENZENE	MS2	107	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	CHLOROETHANE	MS2	89	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	CHLOROETHANE	MS1	100	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	CHLOROFORM	MS1	111	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	CHLOROFORM	MS2	114	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	CHLOROMETHANE	MS1	96	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	CHLOROMETHANE	MS2	101	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	cis-1,2-DICHLOROETHENE	MS2	100	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	cis-1,2-DICHLOROETHENE	MS1	108	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	cis-1,3-DICHLOROPROPENE	MS1	95	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	cis-1,3-DICHLOROPROPENE	MS2	97	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	DIBROMOCHLOROMETHANE	MS2	107	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	DIBROMOCHLOROMETHANE	MS1	108	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	DIBROMOMETHANE	MS1	105	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	DIBROMOMETHANE	MS2	110	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	DICHLORODIFLUOROMETHANE	MS1	84	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	DICHLORODIFLUOROMETHANE	MS2	90	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	ETHYLBENZENE	MS1	105	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	ETHYLBENZENE	MS2	107	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	HEXACHLOROBUTADIENE	MS2	98	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	HEXACHLOROBUTADIENE	MS1	101	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	ISOPROPYLBENZENE	MS1	103	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	ISOPROPYLBENZENE	MS2	104	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	METHYLENE CHLORIDE	MS1	72	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	METHYLENE CHLORIDE	MS2	76	%REC	JB		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	NAPHTHALENE	MS1	87	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	NAPHTHALENE	MS2	100	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	n-BUTYLBENZENE	MS1	99	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	n-BUTYLBENZENE	MS2	108	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	n-PROPYLBENZENE	MS1	108	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	n-PROPYLBENZENE	MS2	108	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	o-CHLOROTOLUENE	MS1	100	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	o-CHLOROTOLUENE	MS2	106	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	p-CHLOROTOLUENE	MS1	99	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	p-CHLOROTOLUENE	MS2	105	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	101	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS2	102	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	sec-BUTYLBENZENE	MS1	103	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	sec-BUTYLBENZENE	MS2	107	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	STYRENE	MS1	99	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	STYRENE	MS2	104	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	tert-BUTYLBENZENE	MS1	101	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	tert-BUTYLBENZENE	MS2	105	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	TETRACHLOROETHENE	MS1	97	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	TETRACHLOROETHENE	MS2	107	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	TOLUENE	MS2	98	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	TOLUENE	MS1	100	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	TOTAL XYLENES	MS1	0	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	TOTAL XYLENES	MS2	107	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	trans-1,2-DICHLOROETHENE	MS1	108	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	trans-1,2-DICHLOROETHENE	MS2	109	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	trans-1,3-DICHLOROPROPENE	MS2	91	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	trans-1,3-DICHLOROPROPENE	MS1	93	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	TRICHLOROETHENE	MS2	111	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	TRICHLOROETHENE	MS1	111	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	TRICHLOROFLUOROMETHANE	MS2	115	%REC	U		25	25	0002L509-003	00LVK090

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	891COLWEL	2/14/00	00D1126-002.001	TRICHLOROFLUOROMETHANE	MS1	117	%REC			25	25	0002L509-003	00LVK[illegible]
RECRL	891COLWEL	2/14/00	00D1126-002.001	VINYL CHLORIDE	MS2	92	%REC	U		25	25	0002L509-003	00LVK090
RECRL	891COLWEL	2/14/00	00D1126-002.001	VINYL CHLORIDE	MS1	98	%REC			25	25	0002L509-003	00LVK090
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1,1,2-TETRACHLOROETHANE	MD1	100	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1,1,2-TETRACHLOROETHANE	MS1	108	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1,1-TRICHLOROETHANE	MS1	105	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1,1-TRICHLOROETHANE	MD1	110	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1,2,2-TETRACHLOROETHANE	MD1	116	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1,2,2-TETRACHLOROETHANE	MS1	117	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1,2-TRICHLOROETHANE	MS1	111	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1,2-TRICHLOROETHANE	MD1	116	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1-DICHLOROETHANE	MS1	105	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1-DICHLOROETHANE	MD1	108	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1-DICHLOROETHENE	MS1	97	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1-DICHLOROETHENE	MD1	101	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1-DICHLOROPROPENE	MS1	99	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,1-DICHLOROPROPENE	MD1	109	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2,3-TRICHLOROBENZENE	MS1	102	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2,3-TRICHLOROBENZENE	MD1	107	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2,3-TRICHLOROPROPANE	MD1	116	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2,3-TRICHLOROPROPANE	MS1	119	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2,4-TRICHLOROBENZENE	MS1	102	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2,4-TRICHLOROBENZENE	MD1	102	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2-DIBROMOETHANE	MD1	99	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2-DIBROMOETHANE	MS1	112	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2-DICHLOROBENZENE	MS1	103	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2-DICHLOROBENZENE	MD1	105	%REC		1		1	0008L409-008	00LVK3[illegible]
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2-DICHLOROETHANE	MS1	106	%REC		1		1	0008L409-008	00LVK[illegible]
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2-DICHLOROETHANE	MD1	125	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2-DICHLOROPROPANE	MS1	67	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,2-DICHLOROPROPANE	MD1	118	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,3-DICHLOROBENZENE	MD1	106	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,3-DICHLOROBENZENE	MS1	109	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,3-DICHLOROPROPANE	MS1	90	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,3-DICHLOROPROPANE	MD1	117	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,4-DICHLOROBENZENE	MS1	86	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	1,4-DICHLOROBENZENE	MD1	102	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	2,2-DICHLOROPROPANE	MS1	101	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	2,2-DICHLOROPROPANE	MD1	103	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	4-ISOPROPYLTOLUENE	MS1	100	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	4-ISOPROPYLTOLUENE	MD1	102	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BENZENE	MS1	106	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BENZENE	MD1	111	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BENZENE, 1,2,4-TRIMETHYL	MS1	101	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BENZENE, 1,2,4-TRIMETHYL	MD1	104	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BENZENE, 1,3,5-TRIMETHYL-	MD1	104	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	107	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BROMOBENZENE	MS1	107	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BROMOBENZENE	MD1	108	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BROMOCHLOROMETHANE	MS1	104	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BROMOCHLOROMETHANE	MD1	115	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BROMODICHLOROMETHANE	MS1	109	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BROMODICHLOROMETHANE	MD1	121	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	BROMOFORM	MS1	109	%REC		1		1	0008L409-008	00LVK[illegible]
RECRL	891COLWEL	8/24/00	00D1456-010.001	BROMOFORM	MD1	109	%REC		1		1	0008L409-008	00LVK3[illegible]
RECRL	891COLWEL	8/24/00	00D1456-010.001	BROMOMETHANE	MS1	91	%REC		1		1	0008L409-008	00LVK375

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	891COLWEL	8/24/00	00D1456-010.001	BROMOMETHANE	MD1	99	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	CARBON TETRACHLORIDE	MD1	105	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	CARBON TETRACHLORIDE	MS1	106	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	CHLOROBENZENE	MS1	102	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	CHLOROBENZENE	MD1	105	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	CHLOROETHANE	MS1	90	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	CHLOROETHANE	MD1	101	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	CHLOROFORM	MS1	112	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	CHLOROFORM	MD1	118	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	CHLOROMETHANE	MS1	86	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	CHLOROMETHANE	MD1	90	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	cis-1,2-DICHLOROETHENE	MS1	105	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	cis-1,2-DICHLOROETHENE	MD1	106	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	cis-1,3-DICHLOROPROPENE	MS1	112	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	cis-1,3-DICHLOROPROPENE	MD1	112	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	DIBROMOCHLOROMETHANE	MS1	111	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	DIBROMOCHLOROMETHANE	MD1	111	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	DIBROMOMETHANE	MS1	112	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	DIBROMOMETHANE	MD1	115	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	DICHLORODIFLUOROMETHANE	MS1	69	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	DICHLORODIFLUOROMETHANE	MD1	72	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	ETHYLBENZENE	MS1	99	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	ETHYLBENZENE	MD1	100	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	HEXACHLOROBUTADIENE	MS1	95	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	HEXACHLOROBUTADIENE	MD1	99	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	ISOPROPYLBENZENE	MS1	97	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	ISOPROPYLBENZENE	MD1	97	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	METHYLENE CHLORIDE	MS1	0	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	METHYLENE CHLORIDE	MD1	0	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	NAPHTHALENE	MS1	97	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	NAPHTHALENE	MD1	101	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	n-BUTYLBENZENE	MS1	99	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	n-BUTYLBENZENE	MD1	99	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	n-PROPYLBENZENE	MD1	99	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	n-PROPYLBENZENE	MS1	101	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	o-CHLOROTOLUENE	MS1	98	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	o-CHLOROTOLUENE	MD1	105	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	p-CHLOROTOLUENE	MD1	105	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	p-CHLOROTOLUENE	MS1	107	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	105	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	113	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	sec-BUTYLBENZENE	MS1	91	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	sec-BUTYLBENZENE	MD1	99	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	STYRENE	MS1	99	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	STYRENE	MD1	103	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	tert-BUTYLBENZENE	MS1	102	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	tert-BUTYLBENZENE	MD1	113	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	TETRACHLOROETHENE	MD1	92	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	TETRACHLOROETHENE	MS1	116	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	TOLUENE	MD1	101	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	TOLUENE	MS1	108	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	TOTAL XYLENES	MS1	100	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	TOTAL XYLENES	MD1	100	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	trans-1,2-DICHLOROETHENE	MS1	103	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	trans-1,2-DICHLOROETHENE	MD1	104	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	trans-1,3-DICHLOROPROPENE	MS1	101	%REC		1		1	0008L409-008	00LVK375

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Bat
RECRL	891COLWEL	8/24/00	00D1456-010.001	trans-1,3-DICHLOROPROPENE	MD1	112	%REC		1		1	0008L409-008	00LVK
RECRL	891COLWEL	8/24/00	00D1456-010.001	TRICHLOROETHENE	MD1	100	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	TRICHLOROETHENE	MS1	118	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	TRICHLOROFLUOROMETHANE	MS1	99	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	TRICHLOROFLUOROMETHANE	MD1	105	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	VINYL CHLORIDE	MS1	89	%REC		1		1	0008L409-008	00LVK375
RECRL	891COLWEL	8/24/00	00D1456-010.001	VINYL CHLORIDE	MD1	94	%REC		1		1	0008L409-008	00LVK375
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1,1,2-TETRACHLOROETHANE	MS1	103	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1,1,2-TETRACHLOROETHANE	MS2	111	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1,1-TRICHLOROETHANE	MS2	117	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1,1-TRICHLOROETHANE	MS1	119	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1,2,2-TETRACHLOROETHANE	MS1	99	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1,2,2-TETRACHLOROETHANE	MS2	103	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1,2-TRICHLOROETHANE	MS2	106	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1,2-TRICHLOROETHANE	MS1	106	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1-DICHLOROETHANE	MS1	113	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1-DICHLOROETHANE	MS2	116	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1-DICHLOROETHENE	MS1	81	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1-DICHLOROETHENE	MS2	96	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1-DICHLOROPROPENE	MS1	91	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,1-DICHLOROPROPENE	MS2	100	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2,3-TRICHLOROBENZENE	MS1	101	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2,3-TRICHLOROBENZENE	MS2	104	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2,3-TRICHLOROPROPANE	MS1	107	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2,3-TRICHLOROPROPANE	MS2	112	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2,4-TRICHLOROBENZENE	MS1	102	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2,4-TRICHLOROBENZENE	MS2	107	%REC				200	0004L058-002	00LVK
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2-DIBROMOETHANE	MS1	102	%REC				200	0004L058-002	00LVK
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2-DIBROMOETHANE	MS2	106	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2-DICHLOROBENZENE	MS1	101	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2-DICHLOROBENZENE	MS2	107	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2-DICHLOROETHANE	MS1	115	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2-DICHLOROETHANE	MS2	117	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2-DICHLOROPROPANE	MS1	104	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,2-DICHLOROPROPANE	MS2	115	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,3-DICHLOROBENZENE	MS1	105	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,3-DICHLOROBENZENE	MS2	109	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,3-DICHLOROPROPANE	MS1	97	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,3-DICHLOROPROPANE	MS2	101	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,4-DICHLOROBENZENE	MS1	104	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	1,4-DICHLOROBENZENE	MS2	107	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	2,2-DICHLOROPROPANE	MS1	100	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	2,2-DICHLOROPROPANE	MS2	102	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	4-ISOPROPYLTOLUENE	MS1	100	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	4-ISOPROPYLTOLUENE	MS2	103	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BENZENE	MS1	100	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BENZENE	MS2	106	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BENZENE, 1,2,4-TRIMETHYL	MS1	104	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BENZENE, 1,2,4-TRIMETHYL	MS2	105	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BENZENE, 1,3,5-TRIMETHYL-	MS1	102	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BENZENE, 1,3,5-TRIMETHYL-	MS2	107	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BROMOBENZENE	MS1	103	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BROMOBENZENE	MS2	109	%REC				200	0004L058-002	00LVK14
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BROMOCHLOROMETHANE	MS1	105	%REC				200	0004L058-002	00LVK
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BROMOCHLOROMETHANE	MS2	108	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BROMODICHLOROMETHANE	MS1	110	%REC				200	0004L058-002	00LVK144

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BROMODICHLOROMETHANE	MS2	115	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BROMOFORM	MS1	99	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BROMOFORM	MS2	105	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BROMOMETHANE	MS1	51	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	BROMOMETHANE	MS2	59	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	CARBON TETRACHLORIDE	MS1	110	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	CARBON TETRACHLORIDE	MS2	114	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	CHLOROBENZENE	MS1	103	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	CHLOROBENZENE	MS2	105	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	CHLOROETHANE	MS2	67	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	CHLOROETHANE	MS1	72	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	CHLOROFORM	MS1	109	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	CHLOROFORM	MS2	121	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	CHLOROMETHANE	MS1	21	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	CHLOROMETHANE	MS2	29	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	cis-1,2-DICHLOROETHENE	MS2	94	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	cis-1,2-DICHLOROETHENE	MS1	98	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	cis-1,3-DICHLOROPROPENE	MS1	95	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	cis-1,3-DICHLOROPROPENE	MS2	102	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	DIBROMOCHLOROMETHANE	MS1	107	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	DIBROMOCHLOROMETHANE	MS2	113	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	DIBROMOMETHANE	MS1	103	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	DIBROMOMETHANE	MS2	110	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	DICHLORODIFLUOROMETHANE	MS1	0	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	DICHLORODIFLUOROMETHANE	MS2	0	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	ETHYLBENZENE	MS1	102	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	ETHYLBENZENE	MS2	103	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	HEXACHLOROBUTADIENE	MS1	105	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	HEXACHLOROBUTADIENE	MS2	107	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	ISOPROPYLBENZENE	MS1	105	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	ISOPROPYLBENZENE	MS2	108	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	METHYLENE CHLORIDE	MS1	66	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	METHYLENE CHLORIDE	MS2	80	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	NAPHTHALENE	MS1	93	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	NAPHTHALENE	MS2	101	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	n-BUTYLBENZENE	MS1	102	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	n-BUTYLBENZENE	MS2	107	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	n-PROPYLBENZENE	MS2	109	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	n-PROPYLBENZENE	MS1	111	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	o-CHLOROTOLUENE	MS2	107	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	o-CHLOROTOLUENE	MS1	108	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	p-CHLOROTOLUENE	MS1	93	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	p-CHLOROTOLUENE	MS2	107	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	98	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS2	100	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	sec-BUTYLBENZENE	MS1	105	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	sec-BUTYLBENZENE	MS2	106	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	STYRENE	MS1	100	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	STYRENE	MS2	104	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	tert-BUTYLBENZENE	MS1	89	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	tert-BUTYLBENZENE	MS2	107	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	TETRACHLOROETHENE	MS1	93	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	TETRACHLOROETHENE	MS2	99	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	TOLUENE	MS1	99	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	TOLUENE	MS2	102	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	TOTAL XYLENES	MS1	106	%REC				200	0004L058-002	00LVK144

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	TOTAL XYLENES	MS2	111	%REC				200	0004L058-002	00LV[illegible]
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	trans-1,2-DICHLOROETHENE	MS1	97	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	trans-1,2-DICHLOROETHENE	MS2	102	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	trans-1,3-DICHLOROPROPENE	MS1	95	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	trans-1,3-DICHLOROPROPENE	MS2	101	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	TRICHLOROETHENE	MS1	59	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	TRICHLOROETHENE	MS2	97	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	TRICHLOROFLUOROMETHANE	MS1	94	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	TRICHLOROFLUOROMETHANE	MS2	97	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	VINYL CHLORIDE	MS2	30	%REC				200	0004L058-002	00LVK144
RECRL	ET INFLUENT	4/17/00	00D1214-002.002	VINYL CHLORIDE	MS1	31	%REC				200	0004L058-002	00LVK144
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1,1,2-TETRACHLOROETHANE	MS2	101	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1,1,2-TETRACHLOROETHANE	MS1	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1,1-TRICHLOROETHANE	MS2	101	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1,1-TRICHLOROETHANE	MS1	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1,2,2-TETRACHLOROETHANE	MS2	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1,2,2-TETRACHLOROETHANE	MS1	109	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1,2-TRICHLOROETHANE	MS2	110	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1,2-TRICHLOROETHANE	MS1	113	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1-DICHLOROETHANE	MS2	102	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1-DICHLOROETHANE	MS1	107	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1-DICHLOROETHENE	MS2	90	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1-DICHLOROETHENE	MS1	93	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1-DICHLOROPROPENE	MS2	101	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,1-DICHLOROPROPENE	MS1	102	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2,3-TRICHLOROBENZENE	MS1	101	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2,3-TRICHLOROBENZENE	MS2	107	%REC		1		10	0001L318-002	00LVK[illegible]
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2,3-TRICHLOROPROPANE	MS2	96	%REC		1		10	0001L318-002	00LVK[illegible]
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2,3-TRICHLOROPROPANE	MS1	97	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2,4-TRICHLOROBENZENE	MS1	91	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2,4-TRICHLOROBENZENE	MS2	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2-DIBROMOETHANE	MS2	98	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2-DIBROMOETHANE	MS1	100	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2-DICHLOROBENZENE	MS1	98	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2-DICHLOROBENZENE	MS2	102	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2-DICHLOROETHANE	MS1	97	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2-DICHLOROETHANE	MS2	101	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2-DICHLOROPROPANE	MS1	101	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,2-DICHLOROPROPANE	MS2	102	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,3-DICHLOROBENZENE	MS2	99	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,3-DICHLOROBENZENE	MS1	99	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,3-DICHLOROPROPANE	MS1	101	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,3-DICHLOROPROPANE	MS2	102	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,4-DICHLOROBENZENE	MS1	91	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	1,4-DICHLOROBENZENE	MS2	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	2,2-DICHLOROPROPANE	MS2	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	2,2-DICHLOROPROPANE	MS1	108	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	4-ISOPROPYLTOLUENE	MS1	91	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	4-ISOPROPYLTOLUENE	MS2	107	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BENZENE	MS1	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BENZENE	MS2	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BENZENE, 1,2,4-TRIMETHYL	MS1	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BENZENE, 1,2,4-TRIMETHYL	MS2	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BENZENE, 1,3,5-TRIMETHYL-	MS1	103	%REC		1		10	0001L318-002	00LVK[illegible]
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BENZENE, 1,3,5-TRIMETHYL-	MS2	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BROMOBENZENE	MS1	104	%REC		1		10	0001L318-002	00LVK062

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BROMOBENZENE	MS2	108	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BROMOCHLOROMETHANE	MS2	97	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BROMOCHLOROMETHANE	MS1	100	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BROMODICHLOROMETHANE	MS2	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BROMODICHLOROMETHANE	MS1	106	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BROMOFORM	MS2	95	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BROMOFORM	MS1	98	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BROMOMETHANE	MS2	99	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	BROMOMETHANE	MS1	109	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	CARBON TETRACHLORIDE	MS2	49	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	CARBON TETRACHLORIDE	MS1	76	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	CHLOROBENZENE	MS2	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	CHLOROBENZENE	MS1	105	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	CHLOROETHANE	MS1	110	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	CHLOROETHANE	MS2	125	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	CHLOROFORM	MS2	86	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	CHLOROFORM	MS1	95	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	CHLOROMETHANE	MS1	96	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	CHLOROMETHANE	MS2	107	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	cis-1,2-DICHLOROETHENE	MS2	78	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	cis-1,2-DICHLOROETHENE	MS1	94	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	cis-1,3-DICHLOROPROPENE	MS2	101	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	cis-1,3-DICHLOROPROPENE	MS1	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	DIBROMOCHLOROMETHANE	MS1	105	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	DIBROMOCHLOROMETHANE	MS2	107	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	DIBROMOMETHANE	MS1	99	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	DIBROMOMETHANE	MS2	100	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	DICHLORODIFLUOROMETHANE	MS1	69	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	DICHLORODIFLUOROMETHANE	MS2	85	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	ETHYLBENZENE	MS2	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	ETHYLBENZENE	MS1	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	HEXACHLOROBUTADIENE	MS1	98	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	HEXACHLOROBUTADIENE	MS2	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	ISOPROPYLBENZENE	MS2	102	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	ISOPROPYLBENZENE	MS1	106	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	METHYLENE CHLORIDE	MS1	77	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	METHYLENE CHLORIDE	MS2	84	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	NAPHTHALENE	MS1	88	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	NAPHTHALENE	MS2	98	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	n-BUTYLBENZENE	MS1	102	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	n-BUTYLBENZENE	MS2	107	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	n-PROPYLBENZENE	MS1	102	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	n-PROPYLBENZENE	MS2	105	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	o-CHLOROTOLUENE	MS2	100	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	o-CHLOROTOLUENE	MS1	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	p-CHLOROTOLUENE	MS2	100	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	p-CHLOROTOLUENE	MS1	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	95	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS2	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	sec-BUTYLBENZENE	MS1	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	sec-BUTYLBENZENE	MS2	106	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	STYRENE	MS2	100	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	STYRENE	MS1	101	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	tert-BUTYLBENZENE	MS1	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	tert-BUTYLBENZENE	MS2	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	TETRACHLOROETHENE	MS2	0	%REC		1		10	0001L318-002	00LVK062

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	TETRACHLOROETHENE	MS1	27	%REC		1		10	0001L318-002	00LVK[illegible]
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	TOLUENE	MS2	103	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	TOLUENE	MS1	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	TOTAL XYLENES	MS2	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	TOTAL XYLENES	MS1	105	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	trans-1,2-DICHLOROETHENE	MS2	97	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	trans-1,2-DICHLOROETHENE	MS1	101	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	trans-1,3-DICHLOROPROPENE	MS2	102	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	trans-1,3-DICHLOROPROPENE	MS1	102	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	TRICHLOROETHENE	MS2	23	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	TRICHLOROETHENE	MS1	36	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	TRICHLOROFLUOROMETHANE	MS1	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	TRICHLOROFLUOROMETHANE	MS2	105	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	VINYL CHLORIDE	MS2	92	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	1/27/00	00D1087-003.002	VINYL CHLORIDE	MS1	104	%REC		1		10	0001L318-002	00LVK062
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1,1,2-TETRACHLOROETHANE	MS1	106	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1,1,2-TETRACHLOROETHANE	MD1	109	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1,1-TRICHLOROETHANE	MS1	104	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1,1-TRICHLOROETHANE	MD1	123	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1,2,2-TETRACHLOROETHANE	MS1	103	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1,2,2-TETRACHLOROETHANE	MD1	107	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1,2-TRICHLOROETHANE	MS1	114	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1,2-TRICHLOROETHANE	MD1	122	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1-DICHLOROETHANE	MS1	115	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1-DICHLOROETHANE	MD1	129	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1-DICHLOROETHENE	MS1	95	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1-DICHLOROETHENE	MD1	110	%REC				10	0003L702-004	00LVK[illegible]
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1-DICHLOROPROPENE	MS1	105	%REC				10	0003L702-004	00LVK[illegible]
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,1-DICHLOROPROPENE	MD1	118	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2,3-TRICHLOROBENZENE	MS1	82	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2,3-TRICHLOROBENZENE	MD1	98	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2,3-TRICHLOROPROPANE	MS1	108	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2,3-TRICHLOROPROPANE	MD1	114	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2,4-TRICHLOROBENZENE	MS1	87	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2,4-TRICHLOROBENZENE	MD1	89	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2-DIBROMOETHANE	MS1	96	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2-DIBROMOETHANE	MD1	102	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2-DICHLOROBENZENE	MS1	104	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2-DICHLOROBENZENE	MD1	107	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2-DICHLOROETHANE	MS1	116	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2-DICHLOROETHANE	MD1	119	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2-DICHLOROPROPANE	MS1	112	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,2-DICHLOROPROPANE	MD1	125	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,3-DICHLOROBENZENE	MS1	99	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,3-DICHLOROBENZENE	MD1	104	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,3-DICHLOROPROPANE	MS1	104	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,3-DICHLOROPROPANE	MD1	114	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,4-DICHLOROBENZENE	MS1	98	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	1,4-DICHLOROBENZENE	MD1	105	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	2,2-DICHLOROPROPANE	MD1	112	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	2,2-DICHLOROPROPANE	MS1	113	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	4-ISOPROPYLTOLUENE	MS1	98	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	4-ISOPROPYLTOLUENE	MD1	104	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BENZENE	MS1	106	%REC				10	0003L702-004	00LVK[illegible]
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BENZENE	MD1	117	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BENZENE, 1,2,4-TRIMETHYL	MS1	106	%REC				10	0003L702-004	00LVK110

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BENZENE, 1,2,4-TRIMETHYL	MD1	109	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	103	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BENZENE, 1,3,5-TRIMETHYL-	MD1	109	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BROMOBENZENE	MS1	108	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BROMOBENZENE	MD1	114	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BROMOCHLOROMETHANE	MS1	98	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BROMOCHLOROMETHANE	MD1	103	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BROMODICHLOROMETHANE	MS1	111	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BROMODICHLOROMETHANE	MD1	125	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BROMOFORM	MS1	96	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BROMOFORM	MD1	99	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BROMOMETHANE	MS1	102	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	BROMOMETHANE	MD1	129	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	CARBON TETRACHLORIDE	MS1	39	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	CARBON TETRACHLORIDE	MD1	113	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	CHLOROBENZENE	MS1	100	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	CHLOROBENZENE	MD1	105	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	CHLOROETHANE	MD1	127	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	CHLOROETHANE	MS1	131	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	CHLOROFORM	MS1	100	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	CHLOROFORM	MD1	116	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	CHLOROMETHANE	MD1	91	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	CHLOROMETHANE	MS1	102	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	cis-1,2-DICHLOROETHENE	MD1	93	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	cis-1,2-DICHLOROETHENE	MS1	95	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	cis-1,3-DICHLOROPROPENE	MS1	96	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	cis-1,3-DICHLOROPROPENE	MD1	103	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	DIBROMOCHLOROMETHANE	MS1	102	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	DIBROMOCHLOROMETHANE	MD1	113	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	DIBROMOMETHANE	MS1	100	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	DIBROMOMETHANE	MD1	111	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	DICHLORODIFLUOROMETHANE	MS1	94	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	DICHLORODIFLUOROMETHANE	MD1	116	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	ETHYLBENZENE	MS1	106	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	ETHYLBENZENE	MD1	108	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	HEXACHLOROBUTADIENE	MS1	93	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	HEXACHLOROBUTADIENE	MD1	96	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	ISOPROPYLBENZENE	MS1	104	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	ISOPROPYLBENZENE	MD1	106	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	METHYLENE CHLORIDE	MD1	73	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	METHYLENE CHLORIDE	MS1	97	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	NAPHTHALENE	MS1	75	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	NAPHTHALENE	MD1	86	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	n-BUTYLBENZENE	MS1	92	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	n-BUTYLBENZENE	MD1	95	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	n-PROPYLBENZENE	MD1	102	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	n-PROPYLBENZENE	MS1	102	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	o-CHLOROTOLUENE	MS1	99	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	o-CHLOROTOLUENE	MD1	104	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	p-CHLOROTOLUENE	MS1	99	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	p-CHLOROTOLUENE	MD1	106	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	99	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	101	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	sec-BUTYLBENZENE	MS1	103	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	sec-BUTYLBENZENE	MD1	105	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	STYRENE	MS1	99	%REC				10	0003L702-004	00LVK110

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	STYRENE	MD1	105	%REC				10	0003L702-004	00LVK
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	tert-BUTYLBENZENE	MS1	98	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	tert-BUTYLBENZENE	MD1	102	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	TETRACHLOROETHENE	MS1	70	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	TETRACHLOROETHENE	MD1	102	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	TOLUENE	MS1	104	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	TOLUENE	MD1	111	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	TOTAL XYLENES	MS1	109	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	TOTAL XYLENES	MD1	110	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	trans-1,2-DICHLOROETHENE	MS1	108	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	trans-1,2-DICHLOROETHENE	MD1	126	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	trans-1,3-DICHLOROPROPENE	MS1	96	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	trans-1,3-DICHLOROPROPENE	MD1	103	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	TRICHLOROETHENE	MS1	1	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	TRICHLOROETHENE	MD1	92	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	TRICHLOROFLUOROMETHANE	MS1	121	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	TRICHLOROFLUOROMETHANE	MD1	130	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	VINYL CHLORIDE	MS1	103	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	3/7/00	00D1154-003.001	VINYL CHLORIDE	MD1	125	%REC				10	0003L702-004	00LVK110
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1,1,2-TETRACHLOROETHANE	MS1	107	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1,1,2-TETRACHLOROETHANE	MD1	118	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1,1-TRICHLOROETHANE	MD1	86	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1,1-TRICHLOROETHANE	MS1	91	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1,2,2-TETRACHLOROETHANE	MS1	111	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1,2,2-TETRACHLOROETHANE	MD1	121	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1,2-TRICHLOROETHANE	MS1	117	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1,2-TRICHLOROETHANE	MD1	127	%REC		1		10	0005L379-001	00LVK
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1-DICHLOROETHANE	MD1	91	%REC		1		10	0005L379-001	00LVK
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1-DICHLOROETHANE	MS1	92	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1-DICHLOROETHENE	MD1	91	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1-DICHLOROETHENE	MS1	94	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1-DICHLOROPROPENE	MD1	88	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,1-DICHLOROPROPENE	MS1	89	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2,3-TRICHLOROBENZENE	MS1	96	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2,3-TRICHLOROBENZENE	MD1	107	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2,3-TRICHLOROPROPANE	MS1	113	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2,3-TRICHLOROPROPANE	MD1	119	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2,4-TRICHLOROBENZENE	MS1	96	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2,4-TRICHLOROBENZENE	MD1	108	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2-DIBROMOETHANE	MS1	112	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2-DIBROMOETHANE	MD1	119	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2-DICHLOROBENZENE	MS1	94	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2-DICHLOROBENZENE	MD1	105	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2-DICHLOROETHANE	MD1	101	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2-DICHLOROETHANE	MS1	106	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2-DICHLOROPROPANE	MD1	104	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,2-DICHLOROPROPANE	MS1	104	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,3-DICHLOROBENZENE	MS1	94	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,3-DICHLOROBENZENE	MD1	102	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,3-DICHLOROPROPANE	MS1	107	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,3-DICHLOROPROPANE	MD1	116	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,4-DICHLOROBENZENE	MS1	85	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	1,4-DICHLOROBENZENE	MD1	99	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	2,2-DICHLOROPROPANE	MD1	87	%REC		1		10	0005L379-001	00LVK
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	2,2-DICHLOROPROPANE	MS1	90	%REC		1		10	0005L379-001	00LVK
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	4-ISOPROPYLTOLUENE	MS1	92	%REC		1		10	0005L379-001	00LVK187

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	4-ISOPROPYLTOLUENE	MD1	99	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BENZENE	MD1	99	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BENZENE	MS1	99	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BENZENE, 1,2,4-TRIMETHYL	MS1	91	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BENZENE, 1,2,4-TRIMETHYL	MD1	102	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	92	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BENZENE, 1,3,5-TRIMETHYL-	MD1	101	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BROMOBENZENE	MS1	98	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BROMOBENZENE	MD1	106	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BROMOCHLOROMETHANE	MD1	99	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BROMOCHLOROMETHANE	MS1	102	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BROMODICHLOROMETHANE	MD1	98	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BROMODICHLOROMETHANE	MS1	99	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BROMOFORM	MS1	107	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BROMOFORM	MD1	115	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BROMOMETHANE	MS1	102	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	BROMOMETHANE	MD1	103	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	CARBON TETRACHLORIDE	MD1	69	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	CARBON TETRACHLORIDE	MS1	97	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	CHLOROBENZENE	MS1	100	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	CHLOROBENZENE	MD1	107	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	CHLOROETHANE	MS1	91	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	CHLOROETHANE	MD1	93	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	CHLOROFORM	MD1	89	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	CHLOROFORM	MS1	96	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	CHLOROMETHANE	MD1	63	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	CHLOROMETHANE	MS1	63	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	cis-1,2-DICHLOROETHENE	MD1	80	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	cis-1,2-DICHLOROETHENE	MS1	99	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	cis-1,3-DICHLOROPROPENE	MS1	109	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	cis-1,3-DICHLOROPROPENE	MD1	117	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	DIBROMOCHLOROMETHANE	MS1	107	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	DIBROMOCHLOROMETHANE	MD1	121	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	DIBROMOMETHANE	MD1	101	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	DIBROMOMETHANE	MS1	101	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	DICHLORODIFLUOROMETHANE	MD1	65	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	DICHLORODIFLUOROMETHANE	MS1	68	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	ETHYLBENZENE	MS1	99	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	ETHYLBENZENE	MD1	104	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	HEXACHLOROBUTADIENE	MS1	82	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	HEXACHLOROBUTADIENE	MD1	94	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	ISOPROPYLBENZENE	MS1	90	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	ISOPROPYLBENZENE	MD1	98	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	METHYLENE CHLORIDE	MS1	80	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	METHYLENE CHLORIDE	MD1	96	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	NAPHTHALENE	MS1	102	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	NAPHTHALENE	MD1	113	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	n-BUTYLBENZENE	MS1	87	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	n-BUTYLBENZENE	MD1	100	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	n-PROPYLBENZENE	MS1	90	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	n-PROPYLBENZENE	MD1	98	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	o-CHLOROTOLUENE	MS1	92	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	o-CHLOROTOLUENE	MD1	100	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	p-CHLOROTOLUENE	MS1	98	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	p-CHLOROTOLUENE	MD1	110	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	98	%REC		1		10	0005L379-001	00LVK187

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	103	%REC		1		10	0005L379-001	00LVK
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	sec-BUTYLBENZENE	MS1	84	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	sec-BUTYLBENZENE	MD1	93	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	STYRENE	MS1	97	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	STYRENE	MD1	107	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	tert-BUTYLBENZENE	MS1	95	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	tert-BUTYLBENZENE	MD1	105	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	TETRACHLOROETHENE	MD1	83	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	TETRACHLOROETHENE	MS1	104	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	TOLUENE	MS1	101	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	TOLUENE	MD1	106	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	TOTAL XYLENES	MS1	95	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	TOTAL XYLENES	MD1	102	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	trans-1,2-DICHLOROETHENE	MD1	94	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	trans-1,2-DICHLOROETHENE	MS1	95	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	trans-1,3-DICHLOROPROPENE	MS1	117	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	trans-1,3-DICHLOROPROPENE	MD1	128	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	TRICHLOROETHENE	MD1	68	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	TRICHLOROETHENE	MS1	108	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	TRICHLOROFLUOROMETHANE	MD1	82	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	TRICHLOROFLUOROMETHANE	MS1	83	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	VINYL CHLORIDE	MS1	78	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	5/15/00	00D1269-001.001	VINYL CHLORIDE	MD1	79	%REC		1		10	0005L379-001	00LVK187
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1,1,2-TETRACHLOROETHANE	MS1	121	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1,1,2-TETRACHLOROETHANE	MD1	127	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1,1-TRICHLOROETHANE	MD1	118	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1,1-TRICHLOROETHANE	MS1	123	%REC		1		10	0008L298-001	00LVK
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1,2,2-TETRACHLOROETHANE	MS1	109	%REC		1		10	0008L298-001	00LVK
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1,2,2-TETRACHLOROETHANE	MD1	117	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1,2-TRICHLOROETHANE	MS1	110	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1,2-TRICHLOROETHANE	MD1	118	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1-DICHLOROETHANE	MD1	114	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1-DICHLOROETHANE	MS1	118	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1-DICHLOROETHENE	MD1	102	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1-DICHLOROETHENE	MS1	104	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1-DICHLOROPROPENE	MS1	104	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,1-DICHLOROPROPENE	MD1	105	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2,3-TRICHLOROBENZENE	MS1	105	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2,3-TRICHLOROBENZENE	MD1	119	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2,3-TRICHLOROPROPANE	MD1	113	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2,3-TRICHLOROPROPANE	MS1	117	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2,4-TRICHLOROBENZENE	MS1	108	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2,4-TRICHLOROBENZENE	MD1	115	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2-DIBROMOETHANE	MS1	105	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2-DIBROMOETHANE	MD1	109	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2-DICHLOROBENZENE	MS1	123	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2-DICHLOROBENZENE	MD1	130	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2-DICHLOROETHANE	MD1	117	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2-DICHLOROETHANE	MS1	121	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2-DICHLOROPROPANE	MD1	111	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,2-DICHLOROPROPANE	MS1	114	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,3-DICHLOROBENZENE	MS1	121	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,3-DICHLOROBENZENE	MD1	130	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,3-DICHLOROPROPANE	MS1	99	%REC		1		10	0008L298-001	00LVK
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,3-DICHLOROPROPANE	MD1	105	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,4-DICHLOROBENZENE	MS1	119	%REC		1		10	0008L298-001	00LVK362

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	1,4-DICHLOROBENZENE	MD1	127	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	2,2-DICHLOROPROPANE	MD1	124	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	2,2-DICHLOROPROPANE	MS1	125	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	4-ISOPROPYLTOLUENE	MS1	108	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	4-ISOPROPYLTOLUENE	MD1	119	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BENZENE	MD1	112	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BENZENE	MS1	115	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BENZENE, 1,2,4-TRIMETHYL	MS1	119	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BENZENE, 1,2,4-TRIMETHYL	MD1	121	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	119	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BENZENE, 1,3,5-TRIMETHYL-	MD1	127	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BROMOBENZENE	MS1	114	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BROMOBENZENE	MD1	123	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BROMOCHLOROMETHANE	MS1	114	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BROMOCHLOROMETHANE	MD1	115	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BROMODICHLOROMETHANE	MD1	122	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BROMODICHLOROMETHANE	MS1	127	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BROMOFORM	MS1	112	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BROMOFORM	MD1	117	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BROMOMETHANE	MS1	76	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	BROMOMETHANE	MD1	82	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	CARBON TETRACHLORIDE	MD1	74	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	CARBON TETRACHLORIDE	MS1	89	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	CHLOROBENZENE	MS1	114	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	CHLOROBENZENE	MD1	120	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	CHLOROETHANE	MD1	107	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	CHLOROETHANE	MS1	119	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	CHLOROFORM	MD1	106	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	CHLOROFORM	MS1	123	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	CHLOROMETHANE	MS1	118	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	CHLOROMETHANE	MD1	118	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	cis-1,2-DICHLOROETHENE	MD1	99	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	cis-1,2-DICHLOROETHENE	MS1	104	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	cis-1,3-DICHLOROPROPENE	MS1	98	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	cis-1,3-DICHLOROPROPENE	MD1	100	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	DIBROMOCHLOROMETHANE	MS1	127	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	DIBROMOCHLOROMETHANE	MD1	132	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	DIBROMOMETHANE	MD1	117	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	DIBROMOMETHANE	MS1	121	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	DICHLORODIFLUOROMETHANE	MD1	110	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	DICHLORODIFLUOROMETHANE	MS1	114	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	ETHYLBENZENE	MS1	119	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	ETHYLBENZENE	MD1	122	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	HEXACHLOROBUTADIENE	MS1	119	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	HEXACHLOROBUTADIENE	MD1	129	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	ISOPROPYLBENZENE	MS1	117	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	ISOPROPYLBENZENE	MD1	122	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	METHYLENE CHLORIDE	MD1	40	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	METHYLENE CHLORIDE	MS1	54	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	NAPHTHALENE	MS1	84	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	NAPHTHALENE	MD1	96	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	n-BUTYLBENZENE	MS1	112	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	n-BUTYLBENZENE	MD1	115	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	n-PROPYLBENZENE	MS1	119	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	n-PROPYLBENZENE	MD1	126	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	o-CHLOROTOLUENE	MS1	122	%REC		1		10	0008L298-001	00LVK362

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	o-CHLOROTOLUENE	MD1	129	%REC		1		10	0008L298-001	00LV
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	p-CHLOROTOLUENE	MS1	113	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	p-CHLOROTOLUENE	MD1	132	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	101	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	113	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	sec-BUTYLBENZENE	MS1	112	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	sec-BUTYLBENZENE	MD1	118	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	STYRENE	MS1	112	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	STYRENE	MD1	120	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	tert-BUTYLBENZENE	MS1	117	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	tert-BUTYLBENZENE	MD1	131	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	TETRACHLOROETHENE	MS1	69	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	TETRACHLOROETHENE	MD1	82	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	TOLUENE	MS1	108	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	TOLUENE	MD1	112	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	TOTAL XYLENES	MS1	120	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	TOTAL XYLENES	MD1	123	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	trans-1,2-DICHLOROETHENE	MS1	113	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	trans-1,2-DICHLOROETHENE	MD1	114	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	trans-1,3-DICHLOROPROPENE	MS1	98	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	trans-1,3-DICHLOROPROPENE	MD1	102	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	TRICHLOROETHENE	MD1	71	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	TRICHLOROETHENE	MS1	84	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	TRICHLOROFLUOROMETHANE	MD1	131	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	TRICHLOROFLUOROMETHANE	MS1	135	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	VINYL CHLORIDE	MD1	106	%REC		1		10	0008L298-001	00LVK362
RECRL	MOUND R1-0	8/16/00	00D1431-001.001	VINYL CHLORIDE	MS1	111	%REC		1		10	0008L298-001	00LV
GEL	MOUND R1-0	9/13/00	00D1507-001.002	1,1-DICHLOROETHENE	MS1	101	%REC		1	1	2	1000107305	45616
GEL	MOUND R1-0	9/13/00	00D1507-001.002	1,1-DICHLOROETHENE	MD1	102	%REC		1	1	2	1000107306	45616
GEL	MOUND R1-0	9/13/00	00D1507-001.002	BENZENE	MS1	91	%REC		1	1	2	1000107305	45616
GEL	MOUND R1-0	9/13/00	00D1507-001.002	BENZENE	MD1	96	%REC		1	1	2	1000107306	45616
GEL	MOUND R1-0	9/13/00	00D1507-001.002	CHLOROBENZENE	MS1	88	%REC		1	1	2	1000107305	45616
GEL	MOUND R1-0	9/13/00	00D1507-001.002	CHLOROBENZENE	MD1	93	%REC		1	1	2	1000107306	45616
GEL	MOUND R1-0	9/13/00	00D1507-001.002	TOLUENE	MS1	86	%REC		1	1	2	1000107305	45616
GEL	MOUND R1-0	9/13/00	00D1507-001.002	TOLUENE	MD1	90	%REC		1	1	2	1000107306	45616
GEL	MOUND R1-0	9/13/00	00D1507-001.002	TRICHLOROETHENE	MD1	221	%REC		1	1	2	1000107306	45616
GEL	MOUND R1-0	9/13/00	00D1507-001.002	TRICHLOROETHENE	MS1	231	%REC		1	1	2	1000107305	45616
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1,1,2-TETRACHLOROETHANE	MS1	105	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1,1,2-TETRACHLOROETHANE	MD1	108	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1,1-TRICHLOROETHANE	MD1	88	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1,1-TRICHLOROETHANE	MS1	93	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1,2,2-TETRACHLOROETHANE	MS1	99	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1,2,2-TETRACHLOROETHANE	MD1	103	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1,2-TRICHLOROETHANE	MS1	110	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1,2-TRICHLOROETHANE	MD1	117	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1-DICHLOROETHANE	MD1	87	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1-DICHLOROETHANE	MS1	89	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1-DICHLOROETHENE	MD1	83	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1-DICHLOROETHENE	MS1	90	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1-DICHLOROPROPENE	MS1	82	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,1-DICHLOROPROPENE	MD1	85	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2,3-TRICHLOROBENZENE	MS1	98	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2,3-TRICHLOROBENZENE	MD1	112	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2,3-TRICHLOROPROPANE	MS1	95	%REC		1	5	5	0006L607-002	00LV
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2,3-TRICHLOROPROPANE	MD1	107	%REC		1	5	5	0006L607-002	00LVK
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2,4-TRICHLOROBENZENE	MS1	90	%REC		1	5	5	0006L607-002	00LVK226

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5

Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples

Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2,4-TRICHLOROBENZENE	MD1	107	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2-DIBROMOETHANE	MS1	97	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2-DIBROMOETHANE	MD1	100	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2-DICHLOROBENZENE	MS1	105	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2-DICHLOROBENZENE	MD1	110	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2-DICHLOROETHANE	MS1	91	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2-DICHLOROETHANE	MD1	96	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2-DICHLOROPROPANE	MD1	84	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,2-DICHLOROPROPANE	MS1	87	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,3-DICHLOROBENZENE	MS1	100	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,3-DICHLOROBENZENE	MD1	113	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,3-DICHLOROPROPANE	MS1	95	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,3-DICHLOROPROPANE	MD1	99	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,4-DICHLOROBENZENE	MS1	106	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	1,4-DICHLOROBENZENE	MD1	112	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	2,2-DICHLOROPROPANE	MD1	82	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	2,2-DICHLOROPROPANE	MS1	84	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	4-ISOPROPYLTOLUENE	MS1	104	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	4-ISOPROPYLTOLUENE	MD1	110	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BENZENE	MD1	89	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BENZENE	MS1	94	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BENZENE, 1,2,4-TRIMETHYL	MS1	102	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BENZENE, 1,2,4-TRIMETHYL	MD1	107	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	110	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BENZENE, 1,3,5-TRIMETHYL-	MD1	121	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BROMOBENZENE	MS1	99	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BROMOBENZENE	MD1	105	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BROMOCHLOROMETHANE	MS1	88	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BROMOCHLOROMETHANE	MD1	88	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BROMODICHLOROMETHANE	MD1	88	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BROMODICHLOROMETHANE	MS1	91	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BROMOFORM	MD1	103	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BROMOFORM	MS1	104	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BROMOMETHANE	MD1	109	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	BROMOMETHANE	MS1	115	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	CARBON TETRACHLORIDE	MD1	92	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	CARBON TETRACHLORIDE	MS1	96	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	CHLOROBENZENE	MS1	105	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	CHLOROBENZENE	MD1	105	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	CHLOROETHANE	MD1	88	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	CHLOROETHANE	MS1	95	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	CHLOROFORM	MD1	78	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	CHLOROFORM	MS1	81	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	CHLOROMETHANE	MS1	105	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	CHLOROMETHANE	MD1	106	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	cis-1,2-DICHLOROETHENE	MD1	61	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	cis-1,2-DICHLOROETHENE	MS1	75	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	cis-1,3-DICHLOROPROPENE	MS1	95	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	cis-1,3-DICHLOROPROPENE	MD1	99	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	DIBROMOCHLOROMETHANE	MS1	112	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	DIBROMOCHLOROMETHANE	MD1	114	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	DIBROMOMETHANE	MS1	92	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	DIBROMOMETHANE	MD1	92	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	DICHLORODIFLUOROMETHANE	MD1	91	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	DICHLORODIFLUOROMETHANE	MS1	97	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	ETHYLBENZENE	MS1	105	%REC		1	5	5	0006L607-002	00LVK226

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	ETHYLBENZENE	MD1	111	%REC		1	5	5	0006L607-002	00LV[illegible]
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	HEXACHLOROBUTADIENE	MS1	103	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	HEXACHLOROBUTADIENE	MD1	111	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	ISOPROPYLBENZENE	MS1	102	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	ISOPROPYLBENZENE	MD1	106	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	METHYLENE CHLORIDE	MD1	49	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	METHYLENE CHLORIDE	MS1	52	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	NAPHTHALENE	MS1	83	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	NAPHTHALENE	MD1	96	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	n-BUTYLBENZENE	MS1	103	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	n-BUTYLBENZENE	MD1	109	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	n-PROPYLBENZENE	MS1	105	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	n-PROPYLBENZENE	MD1	110	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	o-CHLOROTOLUENE	MD1	100	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	o-CHLOROTOLUENE	MS1	104	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	p-CHLOROTOLUENE	MS1	103	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	p-CHLOROTOLUENE	MD1	107	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	102	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	102	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	sec-BUTYLBENZENE	MS1	100	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	sec-BUTYLBENZENE	MD1	106	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	STYRENE	MS1	97	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	STYRENE	MD1	105	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	tert-BUTYLBENZENE	MS1	106	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	tert-BUTYLBENZENE	MD1	112	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	TETRACHLOROETHENE	MD1	79	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	TETRACHLOROETHENE	MS1	80	%REC		1	5	5	0006L607-002	00LV[illegible]
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	TOLUENE	MS1	105	%REC		1	5	5	0006L607-002	00LV[illegible]
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	TOLUENE	MD1	108	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	TOTAL XYLENES	MS1	105	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	TOTAL XYLENES	MD1	108	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	trans-1,2-DICHLOROETHENE	MD1	90	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	trans-1,2-DICHLOROETHENE	MS1	93	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	trans-1,3-DICHLOROPROPENE	MS1	100	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	trans-1,3-DICHLOROPROPENE	MD1	101	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	TRICHLOROETHENE	MD1	44	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	TRICHLOROETHENE	MS1	74	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	TRICHLOROFLUOROMETHANE	MD1	100	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	TRICHLOROFLUOROMETHANE	MS1	105	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	VINYL CHLORIDE	MD1	90	%REC		1	5	5	0006L607-002	00LVK226
RECRL	MOUND R1-1	6/14/00	00D1319-002.001	VINYL CHLORIDE	MS1	93	%REC		1	5	5	0006L607-002	00LVK226
GEL	P209289	11/27/00	01D0268-002.003	1,1-DICHLOROETHENE	MS1	114	%REC		1	1	2	1000136855	55987
GEL	P209289	11/27/00	01D0268-002.003	1,1-DICHLOROETHENE	MD1	119	%REC		1	1	2	1000136856	55987
GEL	P209289	11/27/00	01D0268-002.003	BENZENE	MD1	108	%REC		1	1	2	1000136856	55987
GEL	P209289	11/27/00	01D0268-002.003	BENZENE	MS1	108	%REC		1	1	2	1000136855	55987
GEL	P209289	11/27/00	01D0268-002.003	CHLOROBENZENE	MD1	100	%REC		1	1	2	1000136856	55987
GEL	P209289	11/27/00	01D0268-002.003	CHLOROBENZENE	MS1	102	%REC		1	1	2	1000136855	55987
GEL	P209289	11/27/00	01D0268-002.003	TOLUENE	MD1	102	%REC		1	1	2	1000136856	55987
GEL	P209289	11/27/00	01D0268-002.003	TOLUENE	MS1	104	%REC		1	1	2	1000136855	55987
GEL	P209289	11/27/00	01D0268-002.003	TRICHLOROETHENE	MD1	100	%REC		1	1	2	1000136856	55987
GEL	P209289	11/27/00	01D0268-002.003	TRICHLOROETHENE	MS1	102	%REC		1	1	2	1000136855	55987
RECRL	P209489	5/3/00	00D1243-003.001	1,1,1,2-TETRACHLOROETHANE	MD1	108	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,1,1,2-TETRACHLOROETHANE	MS1	108	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,1,1-TRICHLOROETHANE	MD1	105	%REC				5	0005L217-003	00LV[illegible]
RECRL	P209489	5/3/00	00D1243-003.001	1,1,1-TRICHLOROETHANE	MS1	108	%REC				5	0005L217-003	00LVK[illegible]
RECRL	P209489	5/3/00	00D1243-003.001	1,1,2,2-TETRACHLOROETHANE	MS1	108	%REC				5	0005L217-003	00LVK160

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	P209489	5/3/00	00D1243-003.001	1,1,2,2-TETRACHLOROETHANE	MD1	110	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,1,2-TRICHLOROETHANE	MS1	107	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,1,2-TRICHLOROETHANE	MD1	108	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,1-DICHLOROETHANE	MD1	106	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,1-DICHLOROETHANE	MS1	107	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,1-DICHLOROETHENE	MS1	88	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,1-DICHLOROETHENE	MD1	90	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,1-DICHLOROPROPENE	MD1	99	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,1-DICHLOROPROPENE	MS1	103	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2,3-TRICHLOROBENZENE	MS1	97	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2,3-TRICHLOROBENZENE	MD1	101	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2,3-TRICHLOROPROPANE	MD1	106	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2,3-TRICHLOROPROPANE	MS1	111	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2,4-TRICHLOROBENZENE	MS1	96	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2,4-TRICHLOROBENZENE	MD1	99	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2-DIBROMOETHANE	MS1	105	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2-DIBROMOETHANE	MD1	106	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2-DICHLOROBENZENE	MS1	99	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2-DICHLOROBENZENE	MD1	105	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2-DICHLOROETHANE	MS1	109	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2-DICHLOROETHANE	MD1	115	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2-DICHLOROPROPANE	MD1	108	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,2-DICHLOROPROPANE	MS1	109	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,3-DICHLOROBENZENE	MD1	104	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,3-DICHLOROBENZENE	MS1	104	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,3-DICHLOROPROPANE	MS1	100	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,3-DICHLOROPROPANE	MD1	102	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,4-DICHLOROBENZENE	MS1	104	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	1,4-DICHLOROBENZENE	MD1	109	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	2,2-DICHLOROPROPANE	MS1	95	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	2,2-DICHLOROPROPANE	MD1	97	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	4-ISOPROPYLTOLUENE	MD1	98	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	4-ISOPROPYLTOLUENE	MS1	101	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BENZENE	MS1	106	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BENZENE	MD1	110	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BENZENE, 1,2,4-TRIMETHYL	MS1	97	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BENZENE, 1,2,4-TRIMETHYL	MD1	98	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BENZENE, 1,3,5-TRIMETHYL-	MD1	102	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BENZENE, 1,3,5-TRIMETHYL-	MS1	106	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BROMOBENZENE	MD1	105	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BROMOBENZENE	MS1	111	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BROMOCHLOROMETHANE	MS1	101	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BROMOCHLOROMETHANE	MD1	103	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BROMODICHLOROMETHANE	MS1	109	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BROMODICHLOROMETHANE	MD1	109	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BROMOFORM	MD1	109	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BROMOFORM	MS1	111	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BROMOMETHANE	MS1	99	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	BROMOMETHANE	MD1	99	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	CARBON TETRACHLORIDE	MD1	78	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	CARBON TETRACHLORIDE	MS1	107	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	CHLOROBENZENE	MD1	102	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	CHLOROBENZENE	MS1	102	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	CHLOROETHANE	MS1	95	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	CHLOROETHANE	MD1	98	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	CHLOROFORM	MD1	89	%REC				5	0005L217-003	00LVK160

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Ba
RECRL	P209489	5/3/00	00D1243-003.001	CHLOROFORM	MS1	99	%REC				5	0005L217-003	00LVK
RECRL	P209489	5/3/00	00D1243-003.001	CHLOROMETHANE	MD1	89	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	CHLOROMETHANE	MS1	99	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	cis-1,2-DICHLOROETHENE	MD1	98	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	cis-1,2-DICHLOROETHENE	MS1	100	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	cis-1,3-DICHLOROPROPENE	MD1	107	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	cis-1,3-DICHLOROPROPENE	MS1	108	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	DIBROMOCHLOROMETHANE	MS1	113	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	DIBROMOCHLOROMETHANE	MD1	114	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	DIBROMOMETHANE	MD1	105	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	DIBROMOMETHANE	MS1	107	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	DICHLORODIFLUOROMETHANE	MD1	93	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	DICHLORODIFLUOROMETHANE	MS1	94	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	ETHYLBENZENE	MS1	105	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	ETHYLBENZENE	MD1	106	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	HEXACHLOROBUTADIENE	MS1	95	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	HEXACHLOROBUTADIENE	MD1	97	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	ISOPROPYLBENZENE	MD1	102	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	ISOPROPYLBENZENE	MS1	102	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	METHYLENE CHLORIDE	MS1	98	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	METHYLENE CHLORIDE	MD1	106	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	NAPHTHALENE	MD1	87	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	NAPHTHALENE	MS1	87	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	n-BUTYLBENZENE	MD1	96	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	n-BUTYLBENZENE	MS1	98	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	n-PROPYLBENZENE	MD1	100	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	n-PROPYLBENZENE	MS1	103	%REC				5	0005L217-003	00LV
RECRL	P209489	5/3/00	00D1243-003.001	o-CHLOROTOLUENE	MS1	101	%REC				5	0005L217-003	00LVK
RECRL	P209489	5/3/00	00D1243-003.001	o-CHLOROTOLUENE	MD1	103	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	p-CHLOROTOLUENE	MD1	123	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	p-CHLOROTOLUENE	MS1	125	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MD1	104	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	PROPANE, 1,2-DIBROMO-3-CHLORO-	MS1	110	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	sec-BUTYLBENZENE	MD1	101	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	sec-BUTYLBENZENE	MS1	101	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	STYRENE	MD1	102	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	STYRENE	MS1	102	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	tert-BUTYLBENZENE	MD1	109	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	tert-BUTYLBENZENE	MS1	110	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	TETRACHLOROETHENE	MD1	97	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	TETRACHLOROETHENE	MS1	99	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	TOLUENE	MD1	99	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	TOLUENE	MS1	101	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	TOTAL XYLENES	MD1	105	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	TOTAL XYLENES	MS1	107	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	trans-1,2-DICHLOROETHENE	MS1	96	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	trans-1,2-DICHLOROETHENE	MD1	101	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	trans-1,3-DICHLOROPROPENE	MS1	108	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	trans-1,3-DICHLOROPROPENE	MD1	111	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	TRICHLOROETHENE	MD1	50	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	TRICHLOROETHENE	MS1	73	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	TRICHLOROFLUOROMETHANE	MD1	99	%REC				5	0005L217-003	00LVK160
RECRL	P209489	5/3/00	00D1243-003.001	TRICHLOROFLUOROMETHANE	MS1	100	%REC				5	0005L217-003	00LVK
RECRL	P209489	5/3/00	00D1243-003.001	VINYL CHLORIDE	MS1	102	%REC				5	0005L217-003	00LVK
RECRL	P209489	5/3/00	00D1243-003.001	VINYL CHLORIDE	MD1	105	%REC				5	0005L217-003	00LVK160
GEL	P218089	12/5/00	01D0280-002.003	1,1-DICHLOROETHENE	MS1	103	%REC		1	1	2	1000140058	57145

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
GEL	P218089	12/5/00	01D0280-002.003	1,1-DICHLOROETHENE	MD1	111	%REC		1	1	2	1000140059	57145
GEL	P218089	12/5/00	01D0280-002.003	BENZENE	MS1	92	%REC		1	1	2	1000140058	57145
GEL	P218089	12/5/00	01D0280-002.003	BENZENE	MD1	99	%REC		1	1	2	1000140059	57145
GEL	P218089	12/5/00	01D0280-002.003	CHLOROBENZENE	MS1	87	%REC		1	1	2	1000140058	57145
GEL	P218089	12/5/00	01D0280-002.003	CHLOROBENZENE	MD1	96	%REC		1	1	2	1000140059	57145
GEL	P218089	12/5/00	01D0280-002.003	TOLUENE	MS1	99	%REC	B	1	1	2	1000140058	57145
GEL	P218089	12/5/00	01D0280-002.003	TOLUENE	MD1	105	%REC	B	1	1	2	1000140059	57145
GEL	P218089	12/5/00	01D0280-002.003	TRICHLOROETHENE	MS1	92	%REC		1	1	2	1000140058	57145
GEL	P218089	12/5/00	01D0280-002.003	TRICHLOROETHENE	MD1	100	%REC		1	1	2	1000140059	57145
Dissolved and Total Metals													
GEL	00200	11/27/00	01D0268-006.005	ALUMINUM	MS1	107.3	%REC		1	7.6	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	ALUMINUM	MD1	109.3	%REC		1	7.6	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	ANTIMONY	MS1	108.6	%REC		1	2.24	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	ANTIMONY	MD1	103.4	%REC		1	2.24	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	ARSENIC	MS1	103	%REC		1	2.46	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	ARSENIC	MD1	104.4	%REC		1	2.46	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	BARIUM	MS1	109.7	%REC		1	0.487	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	BARIUM	MD1	111.7	%REC		1	0.487	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	BERYLLIUM	MS1	104.4	%REC		1	0.212	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	BERYLLIUM	MD1	106.4	%REC		1	0.212	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	CADMIUM	MS1	104.3	%REC		1	0.361	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	CADMIUM	MD1	105.9	%REC		1	0.361	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	CALCIUM	MS1	92	%REC		1	8.19	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	CALCIUM	MD1	106	%REC		1	8.19	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	CHROMIUM	MS1	110.4	%REC		1	0.697	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	CHROMIUM	MD1	104.8	%REC		1	0.697	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	COBALT	MS1	106.2	%REC		1	0.669	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	COBALT	MD1	107.8	%REC		1	0.669	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	COPPER	MS1	111.2	%REC		1	1.54	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	COPPER	MD1	105.4	%REC		1	1.54	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	IRON	MS1	104.6	%REC		1	2.37	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	IRON	MD1	106.4	%REC		1	2.37	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	LEAD	MS1	106.6	%REC		1	2.25	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	LEAD	MD1	108	%REC		1	2.25	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	LITHIUM	MS1	104.4	%REC	B	1	0.076	1	1000136728	56201
GEL	00200	11/27/00	01D0268-006.005	LITHIUM	MD1	105.2	%REC	B	1	0.076	1	1000136729	56201
GEL	00200	11/27/00	01D0268-006.005	MAGNESIUM	MS1	105	%REC		1	4.55	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	MAGNESIUM	MD1	109	%REC		1	4.55	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	MANGANESE	MS1	110.3	%REC		1	0.477	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	MANGANESE	MD1	104.1	%REC		1	0.477	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	MERCURY	MS1	133	%REC	N	1	0.048	1	1000136578	56159
GEL	00200	11/27/00	01D0268-006.005	MERCURY	MD1	72	%REC	N	1	0.048	1	1000136579	56159
GEL	00200	11/27/00	01D0268-006.005	MOLYBDENUM	MS1	110.2	%REC		1	1.39	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	MOLYBDENUM	MD1	104.6	%REC		1	1.39	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	NICKEL	MS1	110	%REC		1	1.03	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	NICKEL	MD1	104.2	%REC		1	1.03	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	POTASSIUM	MS1	104.6	%REC		1	0.496	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	POTASSIUM	MD1	104.8	%REC		1	0.496	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	SELENIUM	MS1	106.6	%REC		1	2.37	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	SELENIUM	MD1	101	%REC		1	2.37	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	SILVER	MS1	100.2	%REC		1	0.618	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	SILVER	MD1	101.8	%REC		1	0.618	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	SODIUM	MS1	104	%REC		1	10.6	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	SODIUM	MD1	108	%REC		1	10.6	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	STRONTIUM	MS1	106.2	%REC		1	0.205	1	1000136741	56203

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Ba
GEL	00200	11/27/00	01D0268-006.005	STRONTIUM	MD1	108.8	%REC		1	0.205	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	THALLIUM	MS1	108.6	%REC		1	3.26	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	THALLIUM	MD1	102	%REC		1	3.26	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	TIN	MS1	108.2	%REC		1	2.38	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	TIN	MD1	101.8	%REC		1	2.38	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	URANIUM, TOTAL	MS1	111.5	%REC		1	0.723	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	URANIUM, TOTAL	MD1	105.9	%REC		1	0.723	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	VANADIUM	MS1	110.4	%REC		1	0.455	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	VANADIUM	MD1	104.4	%REC		1	0.455	1	1000136742	56203
GEL	00200	11/27/00	01D0268-006.005	ZINC	MS1	108.8	%REC		1	0.504	1	1000136741	56203
GEL	00200	11/27/00	01D0268-006.005	ZINC	MD1	104.2	%REC		1	0.504	1	1000136742	56203
RECRL	00491	1/20/00	00D1088-001.001	ALUMINUM	MS1	107.9	%REC		1		1	0001L327-001	99L0977
RECRL	00491	1/20/00	00D1088-001.001	ANTIMONY	MS1	103.2	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	ARSENIC	MS1	102.7	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	BARIUM	MS1	102	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	BERYLLIUM	MS1	104.6	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	CADMIUM	MS1	94.5	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	CHROMIUM	MS1	100.4	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	COBALT	MS1	98	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	COPPER	MS1	104.3	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	IRON	MS1	101.1	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	LEAD	MS1	96.6	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	LITHIUM	MS1	126.4	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	MANGANESE	MS1	102.9	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	MERCURY	MS1	96.4	%REC		1		1	0001L327-001	00C0029
RECRL	00491	1/20/00	00D1088-001.001	MOLYBDENUM	MS1	101.8	%REC		1		1	0001L327-001	99L09
RECRL	00491	1/20/00	00D1088-001.001	NICKEL	MS1	96.3	%REC		1		1	0001L327-001	99L0
RECRL	00491	1/20/00	00D1088-001.001	SELENIUM	MS1	100.3	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	SILVER	MS1	104.8	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	STRONTIUM	MS1	94.8	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	THALLIUM	MS1	97.9	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	TIN	MS1	101.7	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	VANADIUM	MS1	102.9	%REC		1		1	0001L327-001	99L0970
RECRL	00491	1/20/00	00D1088-001.001	ZINC	MS1	99.8	%REC		1		1	0001L327-001	99L0970
GEL	00597	9/22/00	00D1514-005.004	LITHIUM	MS1	110.2	%REC	B	1	0.01	1	1000109660	46684
GEL	00597	9/22/00	00D1514-005.004	LITHIUM	MD1	116.6	%REC	B	1	0.01	1	1000109661	46684
GEL	00597	9/22/00	00D1514-005.004	MERCURY	MS1	106	%REC		1	0.043	1	1000109146	46537
GEL	00597	9/22/00	00D1514-005.004	MERCURY	MD1	108	%REC		1	0.043	1	1000109147	46537
RECRL	00997	7/28/00	00D1411-001.001	ALUMINUM	MS1	107.8	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	ANTIMONY	MS1	105.9	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	ARSENIC	MS1	105.2	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	BARIUM	MS1	102.9	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	BERYLLIUM	MS1	104.3	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	CADMIUM	MS1	100.5	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	CHROMIUM	MS1	101.4	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	COBALT	MS1	99	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	COPPER	MS1	102.9	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	IRON	MS1	102.8	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	LEAD	MS1	99.2	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	LITHIUM	MS1	130	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	MANGANESE	MS1	104	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	MERCURY	MS1	100	%REC		1		1	0008L225-001	00C0269
RECRL	00997	7/28/00	00D1411-001.001	MOLYBDENUM	MS1	100.1	%REC		1		1	0008L225-001	99L15
RECRL	00997	7/28/00	00D1411-001.001	NICKEL	MS1	97	%REC		1		1	0008L225-001	99L15
RECRL	00997	7/28/00	00D1411-001.001	SELENIUM	MS1	105.5	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	SILVER	MS1	104.9	%REC		1		1	0008L225-001	99L1550

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	00997	7/28/00	00D1411-001.001	STRONTIUM	MS1	104.9	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	THALLIUM	MS1	98.9	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	TIN	MS1	101.6	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	VANADIUM	MS1	102.2	%REC		1		1	0008L225-001	99L1550
RECRL	00997	7/28/00	00D1411-001.001	ZINC	MS1	102.7	%REC		1		1	0008L225-001	99L1550
GEL	02291	10/20/00	01D0179-006.004	ALUMINUM	MS1	113	%REC		1	7.6	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	ALUMINUM	MD1	117	%REC		1	7.6	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	ANTIMONY	MS1	105.8	%REC		1	2.24	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	ANTIMONY	MD1	108.8	%REC		1	2.24	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	ARSENIC	MS1	102.8	%REC		1	2.46	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	ARSENIC	MD1	105.4	%REC		1	2.46	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	BARIUM	MS1	104.6	%REC		1	0.487	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	BARIUM	MD1	107.4	%REC		1	0.487	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	BERYLLIUM	MS1	105.2	%REC		1	0.212	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	BERYLLIUM	MD1	108.4	%REC		1	0.212	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	CADMIUM	MS1	103.6	%REC		1	0.361	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	CADMIUM	MD1	106.6	%REC		1	0.361	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	CALCIUM	MS1	88	%REC		1	8.19	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	CALCIUM	MD1	120	%REC		1	8.19	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	CHROMIUM	MS1	106	%REC		1	0.697	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	CHROMIUM	MD1	108.8	%REC		1	0.697	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	COBALT	MS1	105.4	%REC		1	0.669	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	COBALT	MD1	108.4	%REC		1	0.669	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	COPPER	MS1	103.2	%REC		1	1.54	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	COPPER	MD1	105.8	%REC		1	1.54	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	IRON	MS1	103.7	%REC		1	2.37	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	IRON	MD1	106.7	%REC		1	2.37	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	LEAD	MS1	104.6	%REC		1	2.25	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	LEAD	MD1	107.6	%REC		1	2.25	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	LITHIUM	MS1	96.4	%REC	B	1	0.076	1	1000122479	51236
GEL	02291	10/20/00	01D0179-006.004	LITHIUM	MD1	100.2	%REC	B	1	0.076	1	1000122480	51236
GEL	02291	10/20/00	01D0179-006.004	MAGNESIUM	MS1	102	%REC		1	4.55	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	MAGNESIUM	MD1	112	%REC		1	4.55	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	MANGANESE	MS1	103.9	%REC		1	0.477	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	MANGANESE	MD1	106.7	%REC		1	0.477	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	MERCURY	MS1	95	%REC		1	0.048	1	1000122013	51018
GEL	02291	10/20/00	01D0179-006.004	MERCURY	MD1	91	%REC		1	0.048	1	1000122014	51018
GEL	02291	10/20/00	01D0179-006.004	MOLYBDENUM	MS1	104.8	%REC		1	1.39	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	MOLYBDENUM	MD1	107	%REC		1	1.39	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	NICKEL	MS1	104.9	%REC		1	1.03	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	NICKEL	MD1	107.9	%REC		1	1.03	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	POTASSIUM	MS1	102	%REC		1	0.496	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	POTASSIUM	MD1	105	%REC		1	0.496	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	SELENIUM	MS1	98.8	%REC		1	2.37	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	SELENIUM	MD1	101.6	%REC		1	2.37	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	SILVER	MS1	103.8	%REC		1	0.618	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	SILVER	MD1	106	%REC		1	0.618	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	SODIUM	MS1	106	%REC		1	10.6	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	SODIUM	MD1	118	%REC		1	10.6	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	STRONTIUM	MS1	101.2	%REC		1	0.205	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	STRONTIUM	MD1	107.2	%REC		1	0.205	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	THALLIUM	MS1	104.2	%REC		1	3.26	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	THALLIUM	MD1	108	%REC		1	3.26	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	TIN	MS1	104.8	%REC		1	2.38	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	TIN	MD1	107.2	%REC		1	2.38	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	URANIUM, TOTAL	MS1	105.1	%REC		1	0.723	1	1000122511	51239

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Lab Sample #	Lab Ba
GEL	02291	10/20/00	01D0179-006.004	URANIUM, TOTAL	MD1	108.5	%REC		1	0.723	1	1000122512	5123
GEL	02291	10/20/00	01D0179-006.004	VANADIUM	MS1	103.5	%REC		1	0.455	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	VANADIUM	MD1	105.9	%REC		1	0.455	1	1000122512	51239
GEL	02291	10/20/00	01D0179-006.004	ZINC	MS1	99.9	%REC		1	0.504	1	1000122511	51239
GEL	02291	10/20/00	01D0179-006.004	ZINC	MD1	102.5	%REC		1	0.504	1	1000122512	51239
GEL	02500	11/15/00	01D0229-006.005	LITHIUM	MS1	105.8	%REC	B	1	0.076	1	1000131851	54456
GEL	02500	11/15/00	01D0229-006.005	LITHIUM	MD1	103.4	%REC	B	1	0.076	1	1000131852	54456
RECRL	0386	7/25/00	00D1395-001.001	ALUMINUM	MS1	107.8	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	ANTIMONY	MS1	105.9	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	ARSENIC	MS1	105.2	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	BARIUM	MS1	102.9	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	BERYLLIUM	MS1	104.3	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	CADMIUM	MS1	100.5	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	CHROMIUM	MS1	101.4	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	COBALT	MS1	99	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	COPPER	MS1	102.9	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	IRON	MS1	102.8	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	LEAD	MS1	99.2	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	LITHIUM	MS1	130	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	MANGANESE	MS1	104	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	MERCURY	MS1	100	%REC				1	0008L139-001	00C0263
RECRL	0386	7/25/00	00D1395-001.001	MOLYBDENUM	MS1	100.1	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	NICKEL	MS1	97	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	SELENIUM	MS1	105.5	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	SILVER	MS1	104.9	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	STRONTIUM	MS1	104.9	%REC				1	0008L139-001	99L153
RECRL	0386	7/25/00	00D1395-001.001	THALLIUM	MS1	98.9	%REC				1	0008L139-001	99L1
RECRL	0386	7/25/00	00D1395-001.001	TIN	MS1	101.6	%REC				1	0008L139-001	99L153
RECRL	0386	7/25/00	00D1395-001.001	VANADIUM	MS1	102.2	%REC				1	0008L139-001	99L1535
RECRL	0386	7/25/00	00D1395-001.001	ZINC	MS1	102.7	%REC				1	0008L139-001	99L1535
RECRL	03991	1/24/00	00D1088-015.001	ALUMINUM	MS1	101.4	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	ANTIMONY	MS1	95.9	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	ARSENIC	MS1	93.6	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	BARIUM	MS1	92.2	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	BERYLLIUM	MS1	94.2	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	CADMIUM	MS1	85.7	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	CHROMIUM	MS1	100.4	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	COBALT	MS1	89.7	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	COPPER	MS1	95.6	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	IRON	MS1	90.2	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	LEAD	MS1	89.9	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	LITHIUM	MS1	117.7	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	MANGANESE	MS1	94.5	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	MOLYBDENUM	MS1	91.6	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	NICKEL	MS1	90.2	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	SELENIUM	MS1	93	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	SILVER	MS1	93.7	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	STRONTIUM	MS1	86.8	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	THALLIUM	MS1	87.6	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	TIN	MS1	93.2	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	VANADIUM	MS1	93.59	%REC		1		1	0001L328-001	99L0971
RECRL	03991	1/24/00	00D1088-015.001	ZINC	MS1	89.6	%REC		1		1	0001L328-001	99L0971
RECRL	04591	3/6/00	00D1155-001.001	MERCURY	MS1	95	%REC		1		1	0003L701-001	00C0
GEL	06091	11/2/00	01D0209-001.004	ALUMINUM	MS1	108.4	%REC			7.6	1	1000129283	5366
GEL	06091	11/2/00	01D0209-001.004	ALUMINUM	MD1	106.2	%REC			7.6	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	ANTIMONY	MS1	106	%REC			2.24	1	1000129283	53666

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5

Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples

Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
GEL	06091	11/2/00	01D0209-001.004	ANTIMONY	MD1	103.8	%REC			2.24	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	ARSENIC	MS1	98.2	%REC			2.46	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	ARSENIC	MD1	98	%REC			2.46	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	BARIUM	MS1	112.4	%REC			0.487	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	BARIUM	MD1	107.8	%REC			0.487	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	BERYLLIUM	MS1	101.6	%REC			0.212	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	BERYLLIUM	MD1	101	%REC			0.212	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	CADMIUM	MS1	98.2	%REC			0.361	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	CADMIUM	MD1	99.2	%REC			0.361	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	CALCIUM	MS1	140	%REC			8.19	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	CALCIUM	MD1	180	%REC			8.19	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	CHROMIUM	MS1	105	%REC			0.697	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	CHROMIUM	MD1	104.6	%REC			0.697	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	COBALT	MS1	101.2	%REC			0.669	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	COBALT	MD1	101	%REC			0.669	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	COPPER	MS1	106.4	%REC			1.54	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	COPPER	MD1	103.2	%REC			1.54	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	IRON	MS1	105.1	%REC			2.37	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	IRON	MD1	104.3	%REC			2.37	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	LEAD	MS1	100.2	%REC			2.25	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	LEAD	MD1	100.8	%REC			2.25	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	LITHIUM	MS1	108.8	%REC	B		0.076	1	1000129287	53667
GEL	06091	11/2/00	01D0209-001.004	LITHIUM	MD1	108.6	%REC	B		0.076	1	1000129288	53667
GEL	06091	11/2/00	01D0209-001.004	MAGNESIUM	MS1	106	%REC			4.55	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	MAGNESIUM	MD1	114	%REC			4.55	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	MANGANESE	MS1	104	%REC			0.477	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	MANGANESE	MD1	102.6	%REC			0.477	1	1000129284	53666
RECRL	06091	4/18/00	00D1215-004.001	MERCURY	MS1	95	%REC		1		1	0004L117-001	00C0144
GEL	06091	11/2/00	01D0209-001.004	MERCURY	MS1	107	%REC			0.048	1	1000128787	53355
GEL	06091	11/2/00	01D0209-001.004	MERCURY	MD1	107	%REC			0.048	1	1000128788	53355
GEL	06091	11/2/00	01D0209-001.004	MOLYBDENUM	MS1	110.3	%REC			1.39	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	MOLYBDENUM	MD1	108.3	%REC			1.39	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	NICKEL	MS1	100.5	%REC			1.03	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	NICKEL	MD1	100.7	%REC			1.03	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	POTASSIUM	MS1	102.2	%REC			0.496	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	POTASSIUM	MD1	100.6	%REC			0.496	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	SELENIUM	MS1	102	%REC			2.37	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	SELENIUM	MD1	101.4	%REC			2.37	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	SILVER	MS1	99.5	%REC			0.618	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	SILVER	MD1	98.3	%REC			0.618	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	SODIUM	MS1	110	%REC			10.6	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	SODIUM	MD1	112	%REC			10.6	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	STRONTIUM	MS1	112.4	%REC			0.205	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	STRONTIUM	MD1	106.4	%REC			0.205	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	THALLIUM	MS1	102.8	%REC			3.26	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	THALLIUM	MD1	102.4	%REC			3.26	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	TIN	MS1	102.8	%REC			2.38	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	TIN	MD1	102.6	%REC			2.38	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	URANIUM, TOTAL	MS1	105	%REC			0.723	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	URANIUM, TOTAL	MD1	104.8	%REC			0.723	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	VANADIUM	MS1	108	%REC			0.455	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	VANADIUM	MD1	106	%REC			0.455	1	1000129284	53666
GEL	06091	11/2/00	01D0209-001.004	ZINC	MS1	104.3	%REC			0.504	1	1000129283	53666
GEL	06091	11/2/00	01D0209-001.004	ZINC	MD1	101.7	%REC			0.504	1	1000129284	53666
RECRL	10098	2/16/00	00D1124-001.001	ALUMINUM	MS1	107.7	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	ANTIMONY	MS1	101.1	%REC					0003L769-001	99L1102

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Ba
RECRL	10098	2/16/00	00D1124-001.001	ARSENIC	MS1	102.7	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	BARIUM	MS1	100.3	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	BERYLLIUM	MS1	100.6	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	CADMIUM	MS1	93.6	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	CALCIUM	MS1	145.4	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	CHROMIUM	MS1	96.7	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	COBALT	MS1	93.9	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	COPPER	MS1	103	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	IRON	MS1	94.7	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	LEAD	MS1	93.9	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	LITHIUM	MS1	135.7	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	MAGNESIUM	MS1	99.9	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	MANGANESE	MS1	99.8	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	MOLYBDENUM	MS1	99.2	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	NICKEL	MS1	92.2	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	POTASSIUM	MS1	144.2	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	SELENIUM	MS1	101.4	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	SILVER	MS1	104.8	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	SODIUM	MS1	119.8	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	STRONTIUM	MS1	101	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	THALLIUM	MS1	92.7	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	TIN	MS1	98	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	VANADIUM	MS1	99.9	%REC					0003L769-001	99L1102
RECRL	10098	2/16/00	00D1124-001.001	ZINC	MS1	99.8	%REC					0003L769-001	99L1102
RECRL	10498	8/9/00	00D1422-003.001	ALUMINUM	MS1	112.9	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	ANTIMONY	MS1	104.6	%REC				1	0008L297-001	99L15
RECRL	10498	8/9/00	00D1422-003.001	ARSENIC	MS1	104.3	%REC				1	0008L297-001	99L1
RECRL	10498	8/9/00	00D1422-003.001	BARIUM	MS1	101.3	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	BERYLLIUM	MS1	104.3	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	CADMIUM	MS1	99.4	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	CHROMIUM	MS1	101.4	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	COBALT	MS1	100.8	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	COPPER	MS1	103.2	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	IRON	MS1	102.8	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	LEAD	MS1	99.8	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	LITHIUM	MS1	125	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	MANGANESE	MS1	103.4	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	MERCURY	MS1	99	%REC				1	0008L297-001	00C0280
RECRL	10498	8/9/00	00D1422-003.001	MOLYBDENUM	MS1	100.9	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	NICKEL	MS1	97.4	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	SELENIUM	MS1	103.7	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	SILVER	MS1	106.1	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	STRONTIUM	MS1	100.6	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	THALLIUM	MS1	100.6	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	TIN	MS1	103.5	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	VANADIUM	MS1	103.5	%REC				1	0008L297-001	99L1546
RECRL	10498	8/9/00	00D1422-003.001	ZINC	MS1	102.1	%REC				1	0008L297-001	99L1546
GEL	11891	10/24/00	01D0188-006.006	ALUMINUM	MS1	105.8	%REC			7.6	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	ALUMINUM	MD1	104	%REC			7.6	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	ANTIMONY	MS1	108.6	%REC			2.24	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	ANTIMONY	MD1	105.2	%REC			2.24	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	ARSENIC	MS1	103.6	%REC			2.46	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	ARSENIC	MD1	101	%REC			2.46	1	1000125117	5229
GEL	11891	10/24/00	01D0188-006.006	BARIUM	MS1	107	%REC			0.487	1	1000125116	5229
GEL	11891	10/24/00	01D0188-006.006	BARIUM	MD1	104	%REC			0.487	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	BERYLLIUM	MS1	104.6	%REC			0.212	1	1000125116	52295

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

[illegible]	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	Lab Sample #	Lab Batch #
GEL	11891	10/24/00	01D0188-006.006	BERYLLIUM	MD1	102	%REC			0.212	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	CADMIUM	MS1	101.8	%REC			0.361	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	CADMIUM	MD1	99.2	%REC			0.361	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	CALCIUM	MS1	20	%REC			8.19	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	CALCIUM	MD1	-20	%REC			8.19	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	CHROMIUM	MS1	105.6	%REC			0.697	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	CHROMIUM	MD1	102.8	%REC			0.697	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	COBALT	MS1	104.2	%REC			0.669	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	COBALT	MD1	101.6	%REC			0.669	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	COPPER	MS1	107	%REC			1.54	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	COPPER	MD1	104.4	%REC			1.54	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	IRON	MS1	104	%REC			2.37	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	IRON	MD1	101.6	%REC			2.37	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	LEAD	MS1	104.6	%REC			2.25	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	LEAD	MD1	102.2	%REC			2.25	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	LITHIUM	MS1	106.3	%REC	B		0.076	1	1000125625	52479
GEL	11891	10/24/00	01D0188-006.006	LITHIUM	MD1	107.9	%REC	B		0.076	1	1000125626	52479
GEL	11891	10/24/00	01D0188-006.006	MAGNESIUM	MS1	98	%REC			4.55	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	MAGNESIUM	MD1	92	%REC			4.55	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	MANGANESE	MS1	104.5	%REC			0.477	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	MANGANESE	MD1	101.5	%REC			0.477	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	MERCURY	MS1	109	%REC			0.048	1	1000125403	52545
GEL	11891	10/24/00	01D0188-006.006	MERCURY	MD1	109	%REC			0.048	1	1000125404	52545
GEL	11891	10/24/00	01D0188-006.006	MOLYBDENUM	MS1	106	%REC			1.39	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	MOLYBDENUM	MD1	103.4	%REC			1.39	1	1000125117	52295
[illegible]	11891	10/24/00	01D0188-006.006	NICKEL	MS1	104.2	%REC			1.03	1	1000125116	52295
[illegible]	11891	10/24/00	01D0188-006.006	NICKEL	MD1	101	%REC			1.03	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	POTASSIUM	MS1	105.4	%REC			0.496	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	POTASSIUM	MD1	103.4	%REC			0.496	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	SELENIUM	MS1	103	%REC			2.37	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	SELENIUM	MD1	100.8	%REC			2.37	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	SILVER	MS1	103	%REC			0.618	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	SILVER	MD1	101	%REC			0.618	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	SODIUM	MS1	102	%REC			10.6	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	SODIUM	MD1	96	%REC			10.6	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	STRONTIUM	MS1	103.6	%REC			0.205	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	STRONTIUM	MD1	100.4	%REC			0.205	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	THALLIUM	MS1	101.7	%REC			3.26	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	THALLIUM	MD1	100.1	%REC			3.26	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	TIN	MS1	105.2	%REC			2.38	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	TIN	MD1	101.8	%REC			2.38	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	URANIUM, TOTAL	MS1	110.2	%REC			0.723	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	URANIUM, TOTAL	MD1	107	%REC			0.723	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	VANADIUM	MS1	105.2	%REC			0.455	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	VANADIUM	MD1	102.4	%REC			0.455	1	1000125117	52295
GEL	11891	10/24/00	01D0188-006.006	ZINC	MS1	102.1	%REC			0.504	1	1000125116	52295
GEL	11891	10/24/00	01D0188-006.006	ZINC	MD1	99.5	%REC			0.504	1	1000125117	52295
GEL	1386	9/11/00	00D1494-003.003	ALUMINUM	MS1	105	%REC		1	12.2	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	ALUMINUM	MD1	105.4	%REC		1	12.2	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	ANTIMONY	MS1	104.4	%REC		1	1.61	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	ANTIMONY	MD1	105	%REC		1	1.61	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	ARSENIC	MS1	101.2	%REC		1	2.92	1	1000104928	45416
[illegible]	1386	9/11/00	00D1494-003.003	ARSENIC	MD1	100.8	%REC		1	2.92	1	1000104929	45416
[illegible]	1386	9/11/00	00D1494-003.003	BARIUM	MS1	107	%REC		1	0.457	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	BARIUM	MD1	107.4	%REC		1	0.457	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	BERYLLIUM	MS1	102.6	%REC		1	0.456	1	1000104928	45416

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Ba
GEL	1386	9/11/00	00D1494-003.003	BERYLLIUM	MD1	102.6	%REC		1	0.456	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	CADMIUM	MS1	101.2	%REC		1	0.686	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	CADMIUM	MD1	101.4	%REC		1	0.686	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	CALCIUM	MS1	100	%REC		1	8.32	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	CALCIUM	MD1	120	%REC		1	8.32	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	CHROMIUM	MS1	105.1	%REC		1	0.871	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	CHROMIUM	MD1	105.5	%REC		1	0.871	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	COBALT	MS1	102.6	%REC		1	0.914	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	COBALT	MD1	102.6	%REC		1	0.914	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	COPPER	MS1	103.9	%REC		1	1.63	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	COPPER	MD1	104.1	%REC		1	1.63	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	IRON	MS1	103.3	%REC		1	8.6	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	IRON	MD1	103.7	%REC		1	8.6	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	LEAD	MS1	102.2	%REC		1	1.38	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	LEAD	MD1	101.8	%REC		1	1.38	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	LITHIUM	MS1	115.4	%REC	B	1	0.01	1	1000105684	45823
GEL	1386	9/11/00	00D1494-003.003	LITHIUM	MD1	119.6	%REC		1	0.01	1	1000105685	45823
GEL	1386	9/11/00	00D1494-003.003	MAGNESIUM	MS1	110	%REC		1	5.99	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	MAGNESIUM	MD1	114	%REC		1	5.99	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	MANGANESE	MS1	103.8	%REC		1	0.937	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	MANGANESE	MD1	104.2	%REC		1	0.937	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	MERCURY	MS1	107	%REC		1	0.043	1	1000105017	45139
GEL	1386	9/11/00	00D1494-003.003	MERCURY	MD1	107	%REC		1	0.043	1	1000105018	45139
GEL	1386	9/11/00	00D1494-003.003	MOLYBDENUM	MS1	111.7	%REC		1	1.46	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	MOLYBDENUM	MD1	112.7	%REC		1	1.46	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	NICKEL	MS1	103.8	%REC		1	1.29	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	NICKEL	MD1	103.8	%REC		1	1.29	1	1000104929	4541
GEL	1386	9/11/00	00D1494-003.003	POTASSIUM	MS1	104	%REC		1	21.5	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	POTASSIUM	MD1	104.8	%REC		1	21.5	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	SELENIUM	MS1	101.4	%REC		1	2.14	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	SELENIUM	MD1	102.4	%REC		1	2.14	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	SILVER	MS1	100.8	%REC		1	0.935	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	SILVER	MD1	102.8	%REC		1	0.935	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	SODIUM	MS1	120	%REC		1	12.2	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	SODIUM	MD1	120	%REC		1	12.2	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	STRONTIUM	MS1	102	%REC		1	0.451	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	STRONTIUM	MD1	104	%REC		1	0.451	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	THALLIUM	MS1	102.6	%REC		1	2.11	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	THALLIUM	MD1	103	%REC		1	2.11	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	TIN	MS1	103.8	%REC		1	3.09	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	TIN	MD1	104	%REC		1	3.09	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	URANIUM, TOTAL	MS1	111.8	%REC		1	17.9	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	URANIUM, TOTAL	MD1	113.6	%REC		1	17.9	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	VANADIUM	MS1	107.4	%REC		1	1.42	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	VANADIUM	MD1	107.8	%REC		1	1.42	1	1000104929	45416
GEL	1386	9/11/00	00D1494-003.003	ZINC	MS1	102.9	%REC		1	2.19	1	1000104928	45416
GEL	1386	9/11/00	00D1494-003.003	ZINC	MD1	103.3	%REC		1	2.19	1	1000104929	45416
GEL	1386	10/26/00	01D0203-009.001	ALUMINUM	MS1	100.6	%REC		1	7.6	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	ALUMINUM	MD1	99.6	%REC		1	7.6	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	ANTIMONY	MS1	104	%REC		1	2.24	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	ANTIMONY	MD1	103	%REC		1	2.24	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	ARSENIC	MS1	101	%REC		1	2.46	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	ARSENIC	MD1	100.2	%REC		1	2.46	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	BARIUM	MS1	108.6	%REC		1	0.487	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	BARIUM	MD1	107.4	%REC		V1	0.487	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	BERYLLIUM	MS1	103.4	%REC		1	0.212	1	1000131169	54454

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
GEL	1386	10/26/00	01D0203-009.001	BERYLLIUM	MD1	102.6	%REC		1	0.212	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	CADMIUM	MS1	102.3	%REC		1	0.361	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	CADMIUM	MD1	101.5	%REC		1	0.361	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	CALCIUM	MS1	120	%REC		1	8.19	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	CALCIUM	MD1	120	%REC		1	8.19	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	CHROMIUM	MS1	105.9	%REC		1	0.697	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	CHROMIUM	MD1	105.1	%REC		1	0.697	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	COBALT	MS1	106.3	%REC		1	0.669	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	COBALT	MD1	105.4	%REC		1	0.669	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	COPPER	MS1	105.6	%REC		1	1.54	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	COPPER	MD1	104.6	%REC		1	1.54	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	IRON	MS1	101.1	%REC		1	2.37	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	IRON	MD1	100.3	%REC		1	2.37	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	LEAD	MS1	102.2	%REC		1	2.25	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	LEAD	MD1	102	%REC		1	2.25	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	LITHIUM	MS1	98	%REC	B	1	0.076	1	1000130463	54021
GEL	1386	10/26/00	01D0203-009.001	LITHIUM	MD1	98.8	%REC	B	1	0.076	1	1000130464	54021
GEL	1386	10/26/00	01D0203-009.001	MAGNESIUM	MS1	112	%REC		1	4.55	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	MAGNESIUM	MD1	108	%REC		1	4.55	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	MANGANESE	MS1	105	%REC		1	0.477	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	MANGANESE	MD1	103.8	%REC		1	0.477	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	MERCURY	MS1	106	%REC		1	0.048	1	1000130544	54682
GEL	1386	10/26/00	01D0203-009.001	MERCURY	MD1	106	%REC		1	0.048	1	1000130545	54682
GEL	1386	10/26/00	01D0203-009.001	MOLYBDENUM	MS1	103.9	%REC		1	1.39	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	MOLYBDENUM	MD1	103.1	%REC		1	1.39	1	1000131170	54454
[illegible]	1386	10/26/00	01D0203-009.001	NICKEL	MS1	104.4	%REC		1	1.03	1	1000131169	54454
[illegible]	1386	10/26/00	01D0203-009.001	NICKEL	MD1	104.4	%REC		1	1.03	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	POTASSIUM	MS1	101.2	%REC		1	0.496	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	POTASSIUM	MD1	100.4	%REC		1	0.496	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	SELENIUM	MS2	93.1	%REC		1	2.37	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	SELENIUM	MD2	91.1	%REC		1	2.37	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	SILVER	MS1	104.8	%REC		1	0.618	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	SILVER	MD1	103.8	%REC		1	0.618	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	SODIUM	MS1	140	%REC		1	10.6	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	SODIUM	MD1	120	%REC		1	10.6	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	STRONTIUM	MS1	106	%REC		1	0.205	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	STRONTIUM	MD1	106	%REC		1	0.205	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	THALLIUM	MS1	101.4	%REC		1	3.26	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	THALLIUM	MD1	101.6	%REC		1	3.26	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	TIN	MS1	99	%REC		1	2.38	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	TIN	MD1	97.6	%REC		1	2.38	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	URANIUM, TOTAL	MS1	104.8	%REC		1	0.723	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	URANIUM, TOTAL	MD1	105.2	%REC		1	0.723	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	VANADIUM	MS1	101.4	%REC		1	0.455	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	VANADIUM	MD1	100.6	%REC		1	0.455	1	1000131170	54454
GEL	1386	10/26/00	01D0203-009.001	ZINC	MS1	102.7	%REC		1	0.504	1	1000131169	54454
GEL	1386	10/26/00	01D0203-009.001	ZINC	MD1	101.9	%REC		1	0.504	1	1000131170	54454
RECRL	1786	7/18/00	00D1386-001.001	ALUMINUM	MS1	83.1	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	ANTIMONY	MS1	90.2	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	ARSENIC	MS1	92.1	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	BARIUM	MS1	85.7	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	BERYLLIUM	MS1	83.9	%REC		1		1	0007L019-001	99L1511
[illegible]RL	1786	7/18/00	00D1386-001.001	CADMIUM	MS1	77.9	%REC		1		1	0007L019-001	99L1511
[illegible]RL	1786	7/18/00	00D1386-001.001	CHROMIUM	MS1	82.9	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	COBALT	MS1	79.3	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	COPPER	MS1	92.5	%REC		1		1	0007L019-001	99L1511

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Ba
RECRL	1786	7/18/00	00D1386-001.001	IRON	MS1	72.2	%REC		1		1	0007L019-001	99L15
RECRL	1786	7/18/00	00D1386-001.001	LEAD	MS1	80.2	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	LITHIUM	MS1	119.4	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	MANGANESE	MS1	85.6	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	MERCURY	MS1	94	%REC		1		1	0007L019-001	00C0251
RECRL	1786	7/18/00	00D1386-001.001	MOLYBDENUM	MS1	83.9	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	NICKEL	MS1	76.5	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	SELENIUM	MS1	85	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	SILVER	MS1	95.4	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	STRONTIUM	MS1	0	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	THALLIUM	MS1	77.8	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	TIN	MS1	83.7	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	VANADIUM	MS1	86.3	%REC		1		1	0007L019-001	99L1511
RECRL	1786	7/18/00	00D1386-001.001	ZINC	MS1	64.3	%REC		1		1	0007L019-001	99L1511
GEL	18199	12/5/00	01D0213-001.005	ALUMINUM	MS1	101.4	%REC		1	7.6	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	ALUMINUM	MD1	102.2	%REC		1	7.6	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	ANTIMONY	MS1	104.1	%REC		1	2.24	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	ANTIMONY	MD1	104.7	%REC		1	2.24	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	ARSENIC	MS1	99.6	%REC		1	2.46	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	ARSENIC	MD1	101	%REC		1	2.46	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	BARIUM	MS1	103.4	%REC		1	0.487	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	BARIUM	MD1	105	%REC		1	0.487	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	BERYLLIUM	MS1	99.6	%REC		1	0.212	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	BERYLLIUM	MD1	100.8	%REC		1	0.212	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	CADMIUM	MS1	98.4	%REC		1	0.361	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	CADMIUM	MD1	99	%REC		1	0.361	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	CALCIUM	MS1	132	%REC		1	8.19	1	1000143846	5877
GEL	18199	12/5/00	01D0213-001.005	CALCIUM	MD1	148	%REC		1	8.19	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	CHROMIUM	MS1	101.8	%REC		1	0.697	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	CHROMIUM	MD1	101.8	%REC		1	0.697	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	COBALT	MS1	99.9	%REC		1	0.669	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	COBALT	MD1	100.1	%REC		1	0.669	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	COPPER	MS1	101.4	%REC		1	1.54	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	COPPER	MD1	102.8	%REC		1	1.54	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	IRON	MS1	98.5	%REC		1	2.37	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	IRON	MD1	99.9	%REC		1	2.37	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	LEAD	MS1	100.8	%REC		1	2.25	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	LEAD	MD1	101.2	%REC		1	2.25	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	MAGNESIUM	MS1	106	%REC		1	4.55	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	MAGNESIUM	MD1	108	%REC		1	4.55	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	MANGANESE	MS1	101.6	%REC		1	0.477	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	MANGANESE	MD1	103.4	%REC		1	0.477	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	MERCURY	MS1	103	%REC		1	0.048	1	1000143351	58518
GEL	18199	12/5/00	01D0213-001.005	MERCURY	MD1	103	%REC		1	0.048	1	1000143352	58518
GEL	18199	12/5/00	01D0213-001.005	MOLYBDENUM	MS1	102	%REC		1	1.39	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	MOLYBDENUM	MD1	102.6	%REC		1	1.39	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	NICKEL	MS1	101.6	%REC		1	1.03	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	NICKEL	MD1	102.6	%REC		1	1.03	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	POTASSIUM	MS1	99.6	%REC		1	0.496	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	POTASSIUM	MD1	101.6	%REC		1	0.496	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	SELENIUM	MS1	99	%REC		1	2.37	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	SELENIUM	MD1	99	%REC		1	2.37	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	SILVER	MS1	101	%REC		1	0.618	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	SILVER	MD1	101.2	%REC		1	0.618	1	1000143847	5877
GEL	18199	12/5/00	01D0213-001.005	SODIUM	MS1	110	%REC		1	10.6	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	SODIUM	MD1	120	%REC		1	10.6	1	1000143847	58778

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
GEL	18199	12/5/00	01D0213-001.005	STRONTIUM	MS1	101.8	%REC		1	0.205	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	STRONTIUM	MD1	104.2	%REC		1	0.205	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	THALLIUM	MS1	100.1	%REC		1	3.26	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	THALLIUM	MD1	101.9	%REC		1	3.26	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	TIN	MS1	102.2	%REC		1	2.38	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	TIN	MD1	100.6	%REC		1	2.38	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	URANIUM, TOTAL	MS1	106.2	%REC		1	0.723	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	URANIUM, TOTAL	MD1	108.2	%REC		1	0.723	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	VANADIUM	MS1	99.9	%REC		1	0.455	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	VANADIUM	MD1	99.9	%REC		1	0.455	1	1000143847	58778
GEL	18199	12/5/00	01D0213-001.005	ZINC	MS1	99	%REC		1	0.504	1	1000143846	58778
GEL	18199	12/5/00	01D0213-001.005	ZINC	MD1	100.2	%REC		1	0.504	1	1000143847	58778
RECRL	1986	5/8/00	00D1261-001.001	MERCURY	MS1	87	%REC		1		1	0005L309-001	00C0163
RECRL	22596	2/21/00	00D1136-001.001	ALUMINUM	MS1	103.6	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	ANTIMONY	MS1	98.8	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	ARSENIC	MS1	97	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	BARIUM	MS1	96.7	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	BERYLLIUM	MS1	101.7	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	CADMIUM	MS1	93.7	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	CHROMIUM	MS1	96.2	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	COBALT	MS1	95.7	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	COPPER	MS1	99.8	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	IRON	MS1	108.3	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	LEAD	MS1	96.3	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	LITHIUM	MS1	119.2	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	MANGANESE	MS1	92.4	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	MERCURY	MS1	84	%REC		1		1	0002L570-001	00C0063
RECRL	22596	2/21/00	00D1136-001.001	MOLYBDENUM	MS1	97.5	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	NICKEL	MS1	95.5	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	SELENIUM	MS1	98.1	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	SILVER	MS1	99.1	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	STRONTIUM	MS1	92.8	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	THALLIUM	MS1	95.7	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	TIN	MS1	97.5	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	VANADIUM	MS1	97.9	%REC		1		1	0002L570-001	99L1041
RECRL	22596	2/21/00	00D1136-001.001	ZINC	MS1	96.2	%REC		1		1	0002L570-001	99L1041
RECRL	23096	1/10/00	00D1063-001.001	MERCURY	MS1	94.1	%REC		1		1	0001L239-001	00C0019
GEL	23196	11/30/00	01D0298-008.002	MERCURY	MS1	109	%REC		1	0.048	1	1000144863	58984
GEL	23196	11/30/00	01D0298-008.002	MERCURY	MD1	104	%REC		1	0.048	1	1000144864	58984
RECRL	40499	5/24/00	00D1280-016.001	ALUMINUM	MS1	98.6	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	ANTIMONY	MS1	100.2	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	ARSENIC	MS1	101.1	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	BARIUM	MS1	100.8	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	BERYLLIUM	MS1	104	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	CADMIUM	MS1	98.4	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	CALCIUM	MS1	154.7	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	CHROMIUM	MS1	99.7	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	COBALT	MS1	96.6	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	COPPER	MS1	100.4	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	IRON	MS1	95.5	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	LEAD	MS1	96.1	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	LITHIUM	MS1	119.2	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	MAGNESIUM	MS1	96.1	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	MANGANESE	MS1	102.1	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	MERCURY	MS1	92.5	%REC		1			0005L441-001	00C0175
RECRL	40499	5/24/00	00D1280-016.001	MOLYBDENUM	MS1	101.1	%REC		1			0005L441-001	99L1314

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab B[illegible]
RECRL	40499	5/24/00	00D1280-016.001	NICKEL	MS1	96.3	%REC		1			0005L441-001	99L131[illegible]
RECRL	40499	5/24/00	00D1280-016.001	POTASSIUM	MS1	93.7	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	SELENIUM	MS1	98.2	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	SILVER	MS1	99.2	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	SODIUM	MS1	103.2	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	STRONTIUM	MS1	99.9	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	THALLIUM	MS1	95.8	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	TIN	MS1	100.3	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	VANADIUM	MS1	100.7	%REC		1			0005L441-001	99L1314
RECRL	40499	5/24/00	00D1280-016.001	ZINC	MS1	87.4	%REC		1			0005L441-001	99L1314
RECRL	4087	4/20/00	00D1233-001.001	MERCURY	MS1	85	%REC				1	0004L119-001	00C0152
GEL	41199	11/30/00	01D0283-007.001	LITHIUM	MS1	108.2	%REC	B	1	0.076	1	1000143872	58774
GEL	41199	11/30/00	01D0283-007.001	LITHIUM	MD1	106.6	%REC	B	1	0.076	1	1000143873	58774
GEL	52894	9/25/00	00D1522-005.004	ALUMINUM	MS1	109.9	%REC			7.6	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	ALUMINUM	MD1	110.9	%REC			7.6	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	ANTIMONY	MS1	99	%REC			2.24	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	ANTIMONY	MD1	101	%REC			2.24	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	ARSENIC	MS1	97.2	%REC			2.46	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	ARSENIC	MD1	99	%REC			2.46	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	BARIUM	MS1	99.1	%REC			0.487	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	BARIUM	MD1	98.7	%REC			0.487	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	BERYLLIUM	MS1	98.8	%REC			0.212	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	BERYLLIUM	MD1	99.8	%REC			0.212	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	CADMIUM	MS1	98.4	%REC			0.361	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	CADMIUM	MD1	98.4	%REC			0.361	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	CALCIUM	MS1	92	%REC			8.19	1	1000110702	4709[illegible]
GEL	52894	9/25/00	00D1522-005.004	CALCIUM	MD1	106	%REC			8.19	1	1000110703	470[illegible]
GEL	52894	9/25/00	00D1522-005.004	CHROMIUM	MS1	100.4	%REC			0.697	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	CHROMIUM	MD1	102.4	%REC			0.697	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	COBALT	MS1	100.3	%REC			0.669	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	COBALT	MD1	101.1	%REC			0.669	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	COPPER	MS1	99.2	%REC			1.54	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	COPPER	MD1	100.8	%REC			1.54	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	IRON	MS1	99.8	%REC			2.37	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	IRON	MD1	101.2	%REC			2.37	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	LEAD	MS1	98.9	%REC			2.25	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	LEAD	MD1	100.5	%REC			2.25	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	LITHIUM	MS1	108	%REC			0.01	1	1000110743	47793
GEL	52894	9/25/00	00D1522-005.004	LITHIUM	MD1	92	%REC			0.01	1	1000110744	47793
GEL	52894	9/25/00	00D1522-005.004	MAGNESIUM	MS1	100	%REC			4.55	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	MAGNESIUM	MD1	106	%REC			4.55	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	MANGANESE	MS1	98.2	%REC			0.477	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	MANGANESE	MD1	100.6	%REC			0.477	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	MERCURY	MS1	111	%REC			0.048	1	1000110767	46991
GEL	52894	9/25/00	00D1522-005.004	MERCURY	MD1	109	%REC			0.048	1	1000110768	46991
GEL	52894	9/25/00	00D1522-005.004	MOLYBDENUM	MS1	103.3	%REC			1.39	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	MOLYBDENUM	MD1	105.3	%REC			1.39	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	NICKEL	MS1	100	%REC			1.03	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	NICKEL	MD1	101.2	%REC			1.03	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	POTASSIUM	MS1	100.6	%REC			0.496	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	POTASSIUM	MD1	102	%REC			0.496	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	SELENIUM	MS1	95.4	%REC			2.37	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	SELENIUM	MD1	97.2	%REC			2.37	1	1000110703	4709[illegible]
GEL	52894	9/25/00	00D1522-005.004	SILVER	MS1	99.2	%REC			0.618	1	1000110702	4709[illegible]
GEL	52894	9/25/00	00D1522-005.004	SILVER	MD1	99.8	%REC			0.618	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	SODIUM	MS1	40	%REC			10.6	1	1000110702	47091

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
GEL	52894	9/25/00	00D1522-005.004	SODIUM	MD1	80	%REC			10.6	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	STRONTIUM	MS1	94.2	%REC			0.205	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	STRONTIUM	MD1	93.4	%REC			0.205	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	THALLIUM	MS1	100.6	%REC			3.26	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	THALLIUM	MD1	102.4	%REC			3.26	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	TIN	MS1	100	%REC			2.38	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	TIN	MD1	102	%REC			2.38	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	URANIUM, TOTAL	MS1	104.2	%REC			0.723	1	1000120417	50460
GEL	52894	9/25/00	00D1522-005.004	URANIUM, TOTAL	MD1	109.2	%REC			0.723	1	1000120418	50460
GEL	52894	9/25/00	00D1522-005.004	VANADIUM	MS1	99.2	%REC			0.455	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	VANADIUM	MD1	101	%REC			0.455	1	1000110703	47091
GEL	52894	9/25/00	00D1522-005.004	ZINC	MS1	96.3	%REC			0.504	1	1000110702	47091
GEL	52894	9/25/00	00D1522-005.004	ZINC	MD1	97.3	%REC			0.504	1	1000110703	47091
RECRL	5887	1/17/00	00D1078-004.001	ALUMINUM	MS1	96.5	%REC		1		1	0001L276-002	99L0977
RECRL	5887	1/17/00	00D1078-004.001	ANTIMONY	MS1	91.2	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	ARSENIC	MS1	89.3	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	BARIUM	MS1	90.9	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	BERYLLIUM	MS1	92	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	CADMIUM	MS1	84.7	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	CHROMIUM	MS1	90.4	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	COBALT	MS1	89.3	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	COPPER	MS1	92.5	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	IRON	MS1	94	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	LEAD	MS1	92.1	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	LITHIUM	MS1	103.4	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	MANGANESE	MS1	92.6	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	MOLYBDENUM	MS1	88.8	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	NICKEL	MS1	87.8	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	SELENIUM	MS1	88.3	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	SILVER	MS1	90.4	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	STRONTIUM	MS1	91.1	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	THALLIUM	MS1	89.1	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	TIN	MS1	91.1	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	VANADIUM	MS1	91.4	%REC		1		1	0001L276-002	99L0961
RECRL	5887	1/17/00	00D1078-004.001	ZINC	MS1	89	%REC		1		1	0001L276-002	99L0961
RECRL	6586	8/23/00	00D1457-001.001	ALUMINUM	MS1	106.9	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	ANTIMONY	MS1	103.9	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	ARSENIC	MS1	104.5	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	BARIUM	MS1	101.9	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	BERYLLIUM	MS1	102.1	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	CADMIUM	MS1	97.8	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	CHROMIUM	MS1	99.1	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	COBALT	MS1	96.7	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	COPPER	MS1	102.1	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	IRON	MS1	98	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	LEAD	MS1	96.9	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	LITHIUM	MS1	127.9	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	MANGANESE	MS1	100.6	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	MERCURY	MS1	83	%REC				1	0009L493-001	00C0294
RECRL	6586	8/23/00	00D1457-001.001	MOLYBDENUM	MS1	98.8	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	NICKEL	MS1	94.5	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	SELENIUM	MS1	103.9	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	SILVER	MS1	103.7	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	STRONTIUM	MS1	97.5	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	THALLIUM	MS1	96.8	%REC				1	0009L493-001	99L1601
RECRL	6586	8/23/00	00D1457-001.001	TIN	MS1	100.6	%REC				1	0009L493-001	99L1601

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Ba
RECRL	6586	8/23/00	00D1457-001.001	VANADIUM	MS1	102.4	%REC				1	0009L493-001	99L160
RECRL	6586	8/23/00	00D1457-001.001	ZINC	MS1	102	%REC				1	0009L493-001	99L1601
GEL	70393	9/22/00	00D1514-018.004	ALUMINUM	MS1	103.2	%REC		1	12.2	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	ALUMINUM	MD1	104	%REC		1	12.2	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	ANTIMONY	MS1	103.6	%REC		1	1.61	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	ANTIMONY	MD1	105.6	%REC		1	1.61	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	ARSENIC	MS1	103.6	%REC		1	2.92	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	ARSENIC	MD1	104.2	%REC		1	2.92	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	BARIUM	MS1	106.3	%REC		1	0.457	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	BARIUM	MD1	107.7	%REC		1	0.457	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	BERYLLIUM	MS1	105.8	%REC		1	0.456	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	BERYLLIUM	MD1	107.4	%REC		1	0.456	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	CADMIUM	MS1	107.2	%REC		1	0.686	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	CADMIUM	MD1	108.6	%REC		1	0.686	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	CALCIUM	MS1	104	%REC		1	8.32	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	CALCIUM	MD1	116	%REC		1	8.32	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	CHROMIUM	MS1	106.6	%REC		1	0.871	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	CHROMIUM	MD1	108.2	%REC		1	0.871	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	COBALT	MS1	107	%REC		1	0.914	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	COBALT	MD1	108.2	%REC		1	0.914	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	COPPER	MS1	103.4	%REC		1	1.63	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	COPPER	MD1	104.8	%REC		1	1.63	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	IRON	MS1	104.6	%REC		1	8.6	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	IRON	MD1	105.8	%REC		1	8.6	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	LEAD	MS1	105.4	%REC		1	1.38	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	LEAD	MD1	106.4	%REC		1	1.38	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	MAGNESIUM	MS1	104.8	%REC		1	5.99	1	1000109099	4671
GEL	70393	9/22/00	00D1514-018.004	MAGNESIUM	MD1	107.6	%REC		1	5.99	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	MANGANESE	MS1	104.9	%REC		1	0.937	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	MANGANESE	MD1	106.5	%REC		1	0.937	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	MOLYBDENUM	MS1	110.6	%REC		1	1.46	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	MOLYBDENUM	MD1	112	%REC		1	1.46	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	NICKEL	MS1	106.6	%REC		1	1.29	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	NICKEL	MD1	108.4	%REC		1	1.29	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	POTASSIUM	MS1	100.9	%REC		1	21.5	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	POTASSIUM	MD1	101.3	%REC		1	21.5	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	SELENIUM	MS1	102.6	%REC		1	2.14	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	SELENIUM	MD1	104.4	%REC		1	2.14	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	SILVER	MS1	100.8	%REC		1	0.935	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	SILVER	MD1	102	%REC		1	0.935	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	SODIUM	MS1	96	%REC		1	12.2	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	SODIUM	MD1	102	%REC		1	12.2	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	STRONTIUM	MS1	104.2	%REC		1	0.451	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	STRONTIUM	MD1	105.8	%REC		1	0.451	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	THALLIUM	MS1	106.4	%REC		1	2.11	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	THALLIUM	MD1	107.2	%REC		1	2.11	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	TIN	MS1	105.6	%REC		1	3.09	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	TIN	MD1	106.4	%REC		1	3.09	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	URANIUM, TOTAL	MS1	106.3	%REC		1	17.9	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	URANIUM, TOTAL	MD1	107.3	%REC		1	17.9	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	VANADIUM	MS1	104.6	%REC		1	1.42	1	1000109099	46718
GEL	70393	9/22/00	00D1514-018.004	VANADIUM	MD1	106.4	%REC		1	1.42	1	1000109100	46718
GEL	70393	9/22/00	00D1514-018.004	ZINC	MS1	102.6	%REC		1	2.19	1	1000109099	4671
GEL	70393	9/22/00	00D1514-018.004	ZINC	MD1	104.6	%REC		1	2.19	1	1000109100	4671
GEL	70493	10/30/00	01D0197-001.004	ALUMINUM	MS1	104.8	%REC		V1	7.6	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	ALUMINUM	MD1	101	%REC		V1	7.6	1	1000126503	52506

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
GEL	70493	10/30/00	01D0197-001.004	ANTIMONY	MS1	107	%REC		V1	2.24	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	ANTIMONY	MD1	103.2	%REC		V1	2.24	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	ARSENIC	MS1	102.6	%REC		V1	2.46	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	ARSENIC	MD1	99.8	%REC		V1	2.46	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	BARIUM	MS1	108.4	%REC		V1	0.487	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	BARIUM	MD1	103.8	%REC		V1	0.487	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	BERYLLIUM	MS1	105	%REC		V1	0.212	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	BERYLLIUM	MD1	100.6	%REC		V1	0.212	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	CADMIUM	MS1	105	%REC		V1	0.361	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	CADMIUM	MD1	100.6	%REC		V1	0.361	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	CALCIUM	MS1	128	%REC		V1	8.19	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	CALCIUM	MD1	96	%REC		V1	8.19	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	CHROMIUM	MS1	107.4	%REC		V1	0.697	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	CHROMIUM	MD1	102.8	%REC		V1	0.697	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	COBALT	MS1	106.2	%REC		V1	0.669	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	COBALT	MD1	101.6	%REC		V1	0.669	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	COPPER	MS1	115.6	%REC		V1	1.54	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	COPPER	MD1	101.4	%REC		V1	1.54	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	IRON	MS1	105.2	%REC		V1	2.37	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	IRON	MD1	101	%REC		V1	2.37	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	LEAD	MS1	106	%REC		V1	2.25	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	LEAD	MD1	101.8	%REC		V1	2.25	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	LITHIUM	MS1	113.6	%REC	B	V1	0.076	1	1000126525	52500
GEL	70493	10/30/00	01D0197-001.004	LITHIUM	MD1	109.8	%REC	B	V1	0.076	1	1000126526	52500
GEL	70493	10/30/00	01D0197-001.004	MAGNESIUM	MS1	113.2	%REC		V1	4.55	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	MAGNESIUM	MD1	103.2	%REC		V1	4.55	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	MANGANESE	MS1	105.8	%REC		V1	0.477	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	MANGANESE	MD1	101.6	%REC		V1	0.477	1	1000126503	52506
RECRL	70493	1/17/00	00D1078-003.001	MERCURY	MS1	91.9	%REC		1		1	0001L276-001	00C0025
GEL	70493	10/30/00	01D0197-001.004	MERCURY	MS1	107	%REC		V1	0.048	1	1000126987	52904
GEL	70493	10/30/00	01D0197-001.004	MERCURY	MD1	106	%REC		V1	0.048	1	1000126988	52904
GEL	70493	10/30/00	01D0197-001.004	MOLYBDENUM	MS1	110.2	%REC		V1	1.39	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	MOLYBDENUM	MD1	105.2	%REC		V1	1.39	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	NICKEL	MS1	106.4	%REC		V1	1.03	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	NICKEL	MD1	101.8	%REC		V1	1.03	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	POTASSIUM	MS1	103.2	%REC		V1	0.496	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	POTASSIUM	MD1	100	%REC		V1	0.496	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	SELENIUM	MS1	101.6	%REC		V1	2.37	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	SELENIUM	MD1	97.6	%REC		V1	2.37	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	SILVER	MS1	102	%REC		V1	0.618	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	SILVER	MD1	98.2	%REC		V1	0.618	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	SODIUM	MS1	120	%REC		V1	10.6	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	SODIUM	MD1	104	%REC		V1	10.6	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	STRONTIUM	MS1	106.6	%REC		V1	0.205	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	STRONTIUM	MD1	101	%REC		V1	0.205	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	THALLIUM	MS1	106.4	%REC		V1	3.26	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	THALLIUM	MD1	102.2	%REC		V1	3.26	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	TIN	MS1	106.8	%REC		V1	2.38	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	TIN	MD1	102.4	%REC		V1	2.38	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	URANIUM, TOTAL	MS1	109.8	%REC		V1	0.723	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	URANIUM, TOTAL	MD1	104.6	%REC		V1	0.723	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	VANADIUM	MS1	106.4	%REC		V1	0.455	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	VANADIUM	MD1	102.2	%REC		V1	0.455	1	1000126503	52506
GEL	70493	10/30/00	01D0197-001.004	ZINC	MS1	105.2	%REC		V1	0.504	1	1000126502	52506
GEL	70493	10/30/00	01D0197-001.004	ZINC	MD1	100	%REC		V1	0.504	1	1000126503	52506
RECRL	7086	2/7/00	00D1114-006.001	ALUMINUM	MS1	97.2	%REC		1		1	0002L443-001	99L1009

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	7086	2/7/00	00D1114-006.001	ANTIMONY	MS1	99.5	%REC		1		1	0002L443-001	99L1[illegible]
RECRL	7086	2/7/00	00D1114-006.001	ARSENIC	MS1	98.7	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	BARIUM	MS1	100.6	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	BERYLLIUM	MS1	102.3	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	CADMIUM	MS1	94.3	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	CHROMIUM	MS1	98.4	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	COBALT	MS1	96.9	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	COPPER	MS1	102.2	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	IRON	MS1	95.7	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	LEAD	MS1	96.8	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	LITHIUM	MS1	126.7	%REC	N	1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	MANGANESE	MS1	100.7	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	MERCURY	MS1	97	%REC		1		1	0002L443-001	00C0051
RECRL	7086	2/7/00	00D1114-006.001	MOLYBDENUM	MS1	98.5	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	NICKEL	MS1	96	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	SELENIUM	MS1	96.7	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	SILVER	MS1	98.9	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	STRONTIUM	MS1	97.7	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	THALLIUM	MS1	96.7	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	TIN	MS1	98	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	VANADIUM	MS1	99.6	%REC		1		1	0002L443-001	99L1009
RECRL	7086	2/7/00	00D1114-006.001	ZINC	MS1	95.3	%REC		1		1	0002L443-001	99L1009
RECRL	B206989	1/12/00	00D1078-003.001	MERCURY	MS1	91.9	%REC		1		1	0001L276-001	00C0025
RECRL	MOUND R	3/7/00	00D1155-003.002	ALUMINUM	MS1	110.2	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	ANTIMONY	MS1	106.1	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	ARSENIC	MS1	108.1	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	BARIUM	MS1	103.4	%REC		1		1	0003L701-004	99L1[illegible]
RECRL	MOUND R	3/7/00	00D1155-003.002	BERYLLIUM	MS1	106.1	%REC		1		1	0003L701-004	99L10[illegible]
RECRL	MOUND R	3/7/00	00D1155-003.002	CADMIUM	MS1	101	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	CHROMIUM	MS1	101.7	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	COBALT	MS1	97.9	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	COPPER	MS1	105.1	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	IRON	MS1	99.1	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	LEAD	MS1	99	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	LITHIUM	MS1	134.2	%REC	N	1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	MANGANESE	MS1	105.7	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	MERCURY	MS1	95	%REC		1		1	0003L701-004	00C0090
RECRL	MOUND R	3/7/00	00D1155-003.002	MOLYBDENUM	MS1	103.8	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	NICKEL	MS1	97.2	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	SELENIUM	MS1	106.8	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	SILVER	MS1	107.6	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	STRONTIUM	MS1	101.2	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	THALLIUM	MS1	97.7	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	TIN	MS1	103.6	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	VANADIUM	MS1	104.4	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	3/7/00	00D1155-003.002	ZINC	MS1	103.1	%REC		1		1	0003L701-004	99L1082
RECRL	MOUND R	5/15/00	00D1270-001.001	ALUMINUM	MS1	94.6	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	ANTIMONY	MS1	101	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	ARSENIC	MS1	102.8	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	BARIUM	MS1	98.8	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	BERYLLIUM	MS1	100.8	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	CADMIUM	MS1	94.9	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	CHROMIUM	MS1	97.4	%REC				1	0005L380-001	99L13[illegible]
RECRL	MOUND R	5/15/00	00D1270-001.001	COBALT	MS1	94.9	%REC				1	0005L380-001	99L1[illegible]
RECRL	MOUND R	5/15/00	00D1270-001.001	COPPER	MS1	102	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	IRON	MS1	97.2	%REC				1	0005L380-001	99L1304

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
RECRL	MOUND R	5/15/00	00D1270-001.001	LEAD	MS1	94.7	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	LITHIUM	MS1	120.2	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	MANGANESE	MS1	93.1	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	MERCURY	MS1	91	%REC				1	0005L380-001	00C0170
RECRL	MOUND R	5/15/00	00D1270-001.001	MOLYBDENUM	MS1	99.6	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	NICKEL	MS1	91.9	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	SELENIUM	MS1	102.5	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	SILVER	MS1	103.1	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	STRONTIUM	MS1	82.5	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	THALLIUM	MS1	97.4	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	TIN	MS1	98.3	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	VANADIUM	MS1	101.4	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	5/15/00	00D1270-001.001	ZINC	MS1	97	%REC				1	0005L380-001	99L1304
RECRL	MOUND R	6/14/00	00D1320-001.001	ALUMINUM	MS1	102.2	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	ANTIMONY	MS1	102.4	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	ARSENIC	MS1	102.1	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	BARIUM	MS1	100	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	BERYLLIUM	MS1	102.6	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	CADMIUM	MS1	94.1	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	CHROMIUM	MS1	97.5	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	COBALT	MS1	93.3	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	COPPER	MS1	99.1	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	IRON	MS1	95.4	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	LEAD	MS1	92.6	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	LITHIUM	MS1	111.7	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	MANGANESE	MS1	100	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	MOLYBDENUM	MS1	101.1	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	NICKEL	MS1	92	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	SELENIUM	MS1	102	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	SILVER	MS1	100.1	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	STRONTIUM	MS1	94.3	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	THALLIUM	MS1	89.9	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	TIN	MS1	98.9	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	VANADIUM	MS1	100	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	6/14/00	00D1320-001.001	ZINC	MS1	97.3	%REC		1		1	0006L606-001	99L1351
RECRL	MOUND R	7/19/00	00D1383-004.001	ALUMINUM	MS1	94	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	ANTIMONY	MS1	102.8	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	ARSENIC	MS1	105	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	BARIUM	MS1	101.6	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	BERYLLIUM	MS1	102.6	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	CADMIUM	MS1	97.9	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	CHROMIUM	MS1	96.4	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	COBALT	MS1	97.2	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	COPPER	MS1	102.6	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	IRON	MS1	88.6	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	LEAD	MS1	100.2	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	LITHIUM	MS1	134.9	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	MANGANESE	MS1	101.8	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	MERCURY	MS1	93	%REC		1		1	0007L933-001	00C0248
RECRL	MOUND R	7/19/00	00D1383-004.001	MOLYBDENUM	MS1	100.4	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	NICKEL	MS1	95.6	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	SELENIUM	MS1	105.4	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	SILVER	MS1	104.2	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	STRONTIUM	MS1	98.8	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	THALLIUM	MS1	97.8	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	7/19/00	00D1383-004.001	TIN	MS1	100.7	%REC		1		1	0007L933-001	99L1502

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Ba
RECRL	MOUND R	7/19/00	00D1383-004.001	VANADIUM	MS1	101.5	%REC		1		1	0007L933-001	99L15
RECRL	MOUND R	7/19/00	00D1383-004.001	ZINC	MS1	93.5	%REC		1		1	0007L933-001	99L1502
RECRL	MOUND R	8/16/00	00D1431-001.004	ALUMINUM	MS1	99.9	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	ANTIMONY	MS1	101.9	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	ARSENIC	MS1	101.4	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	BARIUM	MS1	100	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	BERYLLIUM	MS1	100.1	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	CADMIUM	MS1	94.9	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	CHROMIUM	MS1	97.8	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	COBALT	MS1	95.64	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	COPPER	MS1	100.4	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	IRON	MS1	98	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	LEAD	MS1	95.5	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	LITHIUM	MS1	125	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	MANGANESE	MS1	100.3	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	MERCURY	MS1	101	%REC		1		1	0008L298-002	00C0288
RECRL	MOUND R	8/16/00	00D1431-001.004	MOLYBDENUM	MS1	97.9	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	NICKEL	MS1	92.3	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	SELENIUM	MS1	100.3	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	SILVER	MS1	102.1	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	STRONTIUM	MS1	100.1	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	THALLIUM	MS1	97.1	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	TIN	MS1	99.6	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	VANADIUM	MS1	100.6	%REC		1		1	0008L298-002	99L1568
RECRL	MOUND R	8/16/00	00D1431-001.004	ZINC	MS1	98.5	%REC		1		1	0008L298-002	99L1568
GEL	MOUND R	9/13/00	00D1507-001.005	LITHIUM	MS1	107.2	%REC	B	1	0.01	1	1000106252	45796
GEL	MOUND R	9/13/00	00D1507-001.005	LITHIUM	MD1	106.2	%REC	B	1	0.01	1	1000106253	4579
GEL	MOUND R	9/13/00	00D1507-001.005	MERCURY	MS1	108	%REC		1	0.043	1	1000106196	45524
GEL	MOUND R	9/13/00	00D1507-001.005	MERCURY	MD1	104	%REC		1	0.043	1	1000106197	45524
GEL	MOUND R	9/13/00	00D1507-007.007	ALUMINUM	MS1	102.4	%REC		1	12.2	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	ALUMINUM	MD1	105	%REC		1	12.2	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	ANTIMONY	MS1	100	%REC		1	1.61	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	ANTIMONY	MD1	102.6	%REC		1	1.61	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	ARSENIC	MS1	99.8	%REC		1	2.92	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	ARSENIC	MD1	101.8	%REC		1	2.92	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	BARIUM	MS1	102.7	%REC		1	0.457	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	BARIUM	MD1	105.7	%REC		1	0.457	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	BERYLLIUM	MS1	101.4	%REC		1	0.456	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	BERYLLIUM	MD1	104.2	%REC		1	0.456	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	CADMIUM	MS1	101.8	%REC		1	0.686	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	CADMIUM	MD1	104.6	%REC		1	0.686	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	CALCIUM	MS1	103.2	%REC		1	8.32	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	CALCIUM	MD1	106.4	%REC		1	8.32	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	CHROMIUM	MS1	105.2	%REC		1	0.871	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	CHROMIUM	MD1	107.6	%REC		1	0.871	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	COBALT	MS1	104.8	%REC		1	0.914	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	COBALT	MD1	107.4	%REC		1	0.914	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	COPPER	MS1	101.2	%REC		1	1.63	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	COPPER	MD1	103.8	%REC		1	1.63	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	IRON	MS1	104.1	%REC		1	8.6	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	IRON	MD1	106.7	%REC		1	8.6	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	LEAD	MS1	104.4	%REC		1	1.38	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	LEAD	MD1	107.2	%REC		1	1.38	1	1000106237	4578
GEL	MOUND R	9/13/00	00D1507-007.007	MAGNESIUM	MS1	98	%REC		1	5.99	1	1000106236	4578
GEL	MOUND R	9/13/00	00D1507-007.007	MAGNESIUM	MD1	104	%REC		1	5.99	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	MANGANESE	MS1	103.5	%REC		1	0.937	1	1000106236	45781

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
GEL	MOUND R	9/13/00	00D1507-007.007	MANGANESE	MD1	106.1	%REC		1	0.937	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	MOLYBDENUM	MS1	108.8	%REC		1	1.46	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	MOLYBDENUM	MD1	111.4	%REC		1	1.46	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	NICKEL	MS1	102.2	%REC		1	1.29	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	NICKEL	MD1	105.2	%REC		1	1.29	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	POTASSIUM	MS1	102.6	%REC		1	21.5	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	POTASSIUM	MD1	105.4	%REC		1	21.5	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	SELENIUM	MS1	100.6	%REC		1	2.14	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	SELENIUM	MD1	102.6	%REC		1	2.14	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	SILVER	MS1	98.8	%REC		1	0.935	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	SILVER	MD1	101.4	%REC		1	0.935	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	SODIUM	MS1	46	%REC		1	12.2	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	SODIUM	MD1	66	%REC		1	12.2	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	STRONTIUM	MS1	101.2	%REC		1	0.451	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	STRONTIUM	MD1	104	%REC		1	0.451	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	THALLIUM	MS1	103	%REC		1	2.11	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	THALLIUM	MD1	105	%REC		1	2.11	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	TIN	MS1	108	%REC		1	3.09	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	TIN	MD1	110	%REC		1	3.09	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	URANIUM, TOTAL	MS1	97.1	%REC		1	17.9	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	URANIUM, TOTAL	MD1	99.3	%REC		1	17.9	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	VANADIUM	MS1	105.8	%REC		1	1.42	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	VANADIUM	MD1	108.2	%REC		1	1.42	1	1000106237	45781
GEL	MOUND R	9/13/00	00D1507-007.007	ZINC	MS1	102.2	%REC		1	2.19	1	1000106236	45781
GEL	MOUND R	9/13/00	00D1507-007.007	ZINC	MD1	104.2	%REC		1	2.19	1	1000106237	45781
GEL	P209289	11/27/00	01D0269-002.001	ALUMINUM	MS1	104.4	%REC		1	7.6	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	ALUMINUM	MD1	104.4	%REC		1	7.6	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	ANTIMONY	MS1	110.4	%REC		1	2.24	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	ANTIMONY	MD1	110.4	%REC		1	2.24	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	ARSENIC	MS1	110.4	%REC		1	2.46	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	ARSENIC	MD1	110.8	%REC		1	2.46	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	BARIUM	MS1	108.6	%REC		1	0.487	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	BARIUM	MD1	108.8	%REC		1	0.487	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	BERYLLIUM	MS1	111.6	%REC		1	0.212	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	BERYLLIUM	MD1	112	%REC		1	0.212	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	CADMIUM	MS1	110.7	%REC		1	0.361	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	CADMIUM	MD1	111.1	%REC		1	0.361	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	CALCIUM	MS1	220	%REC		1	8.19	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	CALCIUM	MD1	260	%REC		1	8.19	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	CHROMIUM	MS1	111.8	%REC		1	0.697	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	CHROMIUM	MD1	111.4	%REC		1	0.697	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	COBALT	MS1	109.8	%REC		1	0.669	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	COBALT	MD1	110.2	%REC		1	0.669	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	COPPER	MS1	105.6	%REC		1	1.54	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	COPPER	MD1	104.6	%REC		1	1.54	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	IRON	MS1	108.7	%REC		1	2.37	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	IRON	MD1	108.9	%REC		1	2.37	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	LEAD	MS1	111.4	%REC		1	2.25	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	LEAD	MD1	111.2	%REC		1	2.25	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	LITHIUM	MS1	113.8	%REC	B	1	0.076	1	1000142937	58267
GEL	P209289	11/27/00	01D0269-002.001	LITHIUM	MD1	116	%REC	B	1	0.076	1	1000142938	58267
GEL	P209289	11/27/00	01D0269-002.001	MAGNESIUM	MS1	114.8	%REC		1	4.55	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	MAGNESIUM	MD1	116.8	%REC		1	4.55	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	MANGANESE	MS1	109.5	%REC		1	0.477	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	MANGANESE	MD1	109.1	%REC		1	0.477	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	MERCURY	MS1	113	%REC		1	0.048	1	1000142875	58313

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab B[illegible]
GEL	P209289	11/27/00	01D0269-002.001	MERCURY	MD1	112.5	%REC		1	0.048	1	1000142876	5831[illegible]
GEL	P209289	11/27/00	01D0269-002.001	MOLYBDENUM	MS1	112.5	%REC		1	1.39	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	MOLYBDENUM	MD1	111.7	%REC		1	1.39	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	NICKEL	MS1	112	%REC		1	1.03	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	NICKEL	MD1	111.4	%REC		1	1.03	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	POTASSIUM	MS1	108.7	%REC		1	0.496	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	POTASSIUM	MD1	109.1	%REC		1	0.496	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	SELENIUM	MS1	107.2	%REC		1	2.37	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	SELENIUM	MD1	107.4	%REC		1	2.37	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	SILVER	MS1	102.8	%REC		1	0.618	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	SILVER	MD1	102.8	%REC		1	0.618	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	SODIUM	MS1	180	%REC		1	10.6	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	SODIUM	MD1	208	%REC		1	10.6	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	STRONTIUM	MS1	106.4	%REC		1	0.205	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	STRONTIUM	MD1	107.2	%REC		1	0.205	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	THALLIUM	MS1	110.3	%REC		1	3.26	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	THALLIUM	MD1	109.9	%REC		1	3.26	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	TIN	MS1	114.6	%REC		1	2.38	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	TIN	MD1	114.2	%REC		1	2.38	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	URANIUM, TOTAL	MS1	110.1	%REC		1	0.723	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	URANIUM, TOTAL	MD1	108.7	%REC		1	0.723	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	VANADIUM	MS1	109.5	%REC		1	0.455	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	VANADIUM	MD1	109.1	%REC		1	0.455	1	1000142933	58263
GEL	P209289	11/27/00	01D0269-002.001	ZINC	MS1	109.1	%REC		1	0.504	1	1000142932	58263
GEL	P209289	11/27/00	01D0269-002.001	ZINC	MD1	108.5	%REC		1	0.504	1	1000142933	58263
RECRL	P209489	5/3/00	00D1244-003.001	MERCURY	MS1	81.2	%REC					0005L444-001	00C0[illegible]
GEL	P219089	11/6/00	01D0204-008.001	ALUMINUM	MS1	100.8	%REC		1	7.6	1	1000132663	550[illegible]
GEL	P219089	11/6/00	01D0204-008.001	ALUMINUM	MD1	103.8	%REC		1	7.6	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	ANTIMONY	MS1	103.6	%REC		1	2.24	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	ANTIMONY	MD1	106.8	%REC		1	2.24	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	ARSENIC	MS1	100.9	%REC		1	2.46	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	ARSENIC	MD1	103.5	%REC		1	2.46	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	BARIUM	MS1	103	%REC		1	0.487	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	BARIUM	MD1	106.8	%REC		1	0.487	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	BERYLLIUM	MS1	101.8	%REC		1	0.212	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	BERYLLIUM	MD1	105	%REC		1	0.212	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	CADMIUM	MS1	100.8	%REC		1	0.361	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	CADMIUM	MD1	103.8	%REC		1	0.361	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	CALCIUM	MS1	60	%REC		1	8.19	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	CALCIUM	MD1	86	%REC		1	8.19	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	CHROMIUM	MS1	105.1	%REC		1	0.697	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	CHROMIUM	MD1	107.7	%REC		1	0.697	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	COBALT	MS1	102.8	%REC		1	0.669	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	COBALT	MD1	105.8	%REC		1	0.669	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	COPPER	MS1	103	%REC		1	1.54	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	COPPER	MD1	105.6	%REC		1	1.54	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	IRON	MS1	100.7	%REC		1	2.37	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	IRON	MD1	103.9	%REC		1	2.37	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	LEAD	MS1	103	%REC		1	2.25	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	LEAD	MD1	105.8	%REC		1	2.25	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	MAGNESIUM	MS1	92	%REC		1	4.55	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	MAGNESIUM	MD1	102	%REC		1	4.55	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	MANGANESE	MS1	103.4	%REC		1	0.477	1	1000132663	5509[illegible]
GEL	P219089	11/6/00	01D0204-008.001	MANGANESE	MD1	106.2	%REC		1	0.477	1	1000132664	5509[illegible]
GEL	P219089	11/6/00	01D0204-008.001	MERCURY	MS1	102	%REC		1	0.048	1	1000131809	54686
GEL	P219089	11/6/00	01D0204-008.001	MERCURY	MD1	103	%REC		1	0.048	1	1000131810	54686

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
GEL	P219089	11/6/00	01D0204-008.001	MOLYBDENUM	MS1	104.8	%REC		1	1.39	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	MOLYBDENUM	MD1	108.2	%REC		1	1.39	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	NICKEL	MS1	104.2	%REC		1	1.03	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	NICKEL	MD1	107	%REC		1	1.03	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	POTASSIUM	MS1	100.8	%REC		1	0.496	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	POTASSIUM	MD1	104.8	%REC		1	0.496	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	SELENIUM	MS1	101	%REC		1	2.37	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	SELENIUM	MD1	102.8	%REC		1	2.37	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	SILVER	MS1	99.6	%REC		1	0.618	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	SILVER	MD1	102.6	%REC		1	0.618	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	SODIUM	MS1	40	%REC		1	10.6	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	SODIUM	MD1	100	%REC		1	10.6	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	STRONTIUM	MS1	96.8	%REC		1	0.205	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	STRONTIUM	MD1	102.8	%REC		1	0.205	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	THALLIUM	MS1	104	%REC		1	3.26	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	THALLIUM	MD1	106.8	%REC		1	3.26	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	TIN	MS1	103.4	%REC		1	2.38	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	TIN	MD1	106	%REC		1	2.38	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	URANIUM, TOTAL	MS1	105.4	%REC		1	0.723	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	URANIUM, TOTAL	MD1	108.6	%REC		1	0.723	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	VANADIUM	MS1	103.5	%REC		1	0.455	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	VANADIUM	MD1	106.3	%REC		1	0.455	1	1000132664	55090
GEL	P219089	11/6/00	01D0204-008.001	ZINC	MS1	99.4	%REC		1	0.504	1	1000132663	55090
GEL	P219089	11/6/00	01D0204-008.001	ZINC	MD1	101.8	%REC		1	0.504	1	1000132664	55090
GEL	P317989	12/13/00	01D0298-004.002	LITHIUM	MS1	144	%REC	N	1	0.076	1	1000144539	58944
GEL	P317989	12/13/00	01D0298-004.002	LITHIUM	MD1	106	%REC		1	0.076	1	1000144540	58944
RECRL	P416889	4/24/00	00D1233-002.001	ALUMINUM	MS1	104	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	ANTIMONY	MS1	100.8	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	ARSENIC	MS1	102.8	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	BARIUM	MS1	101.8	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	BERYLLIUM	MS1	104.1	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	CADMIUM	MS1	97	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	CHROMIUM	MS1	100.6	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	COBALT	MS1	97.2	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	COPPER	MS1	102.6	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	IRON	MS1	100.9	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	LEAD	MS1	97.2	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	LITHIUM	MS1	119.3	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	MANGANESE	MS1	102.7	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	MERCURY	MS1	85	%REC				1	0004L119-002	00C0152
RECRL	P416889	4/24/00	00D1233-002.001	MOLYBDENUM	MS1	101.3	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	NICKEL	MS1	96.1	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	SELENIUM	MS1	102	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	SILVER	MS1	103.1	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	STRONTIUM	MS1	99.8	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	THALLIUM	MS1	99.5	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	TIN	MS1	101.5	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	VANADIUM	MS1	102.7	%REC				1	0004L119-002	99L1265
RECRL	P416889	4/24/00	00D1233-002.001	ZINC	MS1	100.4	%REC				1	0004L119-002	99L1265
Water Quality Parameters													
RECRL	P209289	11/28/00	01D0284-001.001	FLUORIDE	MS1	106.1	%REC		1		5	0012L435-001	00LICA79
RECRL	P209289	11/28/00	01D0284-001.001	SULFATE	MS1	107.8	%REC		1		20	0012L435-001	00LICC79
ACCU				Alkalinity,Total as CaCO3	MS1	80	%REC			5		00-A20628S	4681110300
ACCU				Alkalinity,Total as CaCO3	MS1	95	%REC			5		00-A20601S	5021110800
ACCU				BICARBONATE AS CACO3	MS1	93	%REC		1	5		00-A1672S	944020100

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Ba
ACCU				BICARBONATE AS CACO3	MS1	95	%REC		1	5		00-A2532S	2145021700
ACCU				BICARBONATE AS CACO3	MS1	96	%REC		1	5		00-A4190S	4296031300
ACCU				BICARBONATE AS CACO3	MS1	99	%REC		1	5		00-A7163S	8150050300
ACCU				BICARBONATE AS CACO3	MS1	102	%REC		1	5		00-A7607S	8426050900
ACCU				BICARBONATE AS CACO3	MS1	83	%REC		1	5		00-A8761S	230052500
ACCU				BICARBONATE AS CACO3	MS1	114	%REC			5		00-A10631S	1573061900
ACCU				BICARBONATE AS CACO3	MS1	93	%REC		1	5		00-A13310S	4511072400
ACCU				BICARBONATE AS CACO3	MS1	75	%REC		1	5		00-A13307S	6800072500
ACCU				BICARBONATE AS CACO3	MS1	90	%REC		1	5		00-A15404S	8154082900
ACCU				BICARBONATE AS CACO3	MS1	90	%REC		1	5		00-A17467S	2828101700
ACCU				BROMIDE	MS1	102	%REC		1	0.1		00-A1661S	859020200
ACCU				BROMIDE	MS1	102	%REC		1	0.1		00-A2525S	2131022200
ACCU				BROMIDE	MS1	101	%REC		1	0.1		00-A4192S	4291031700
ACCU				BROMIDE	MS1	105	%REC		1	0.1		00-A7163S	8130060200
ACCU				BROMIDE	MS1	99	%REC		1	0.1		00-A8848S	426061100
ACCU				BROMIDE	MS1	109	%REC			0.1		00-A10627S	3133070700
ACCU				BROMIDE	MS1	105	%REC		1	0.1		00-A13308S	7379081700
ACCU				BROMIDE	MS1	100	%REC		1	0.1		00-A15392S	8437083000
ACCU				BROMIDE	MS1	89	%REC		1	0.1		00-A18179S	2221100300
ACCU				BROMIDE	MS1	93	%REC		1	0.1		00-A17467S	2292101000
ACCU				CHLORIDE	MS1	106	%REC		1	0.5		00-A1661S	859020200
ACCU				CHLORIDE	MS1	110	%REC		1	0.5		00-A2525S	2131022200
ACCU				CHLORIDE	MS1	109	%REC		1	0.5		00-A4192S	4291031700
ACCU				CHLORIDE	MS1	117	%REC			0.5		00-A4495S	6569032400
ACCU				CHLORIDE	MS1	107	%REC			0.5		00-A4856S	5047032400
ACCU				CHLORIDE	MS1	105	%REC		1	0.5		00-A7163S	8130[illegible]
ACCU				CHLORIDE	MS1	119	%REC		1	0.5		00-A8848S	4260[illegible]
ACCU				CHLORIDE	MS1	94	%REC			0.5		00-A10625S	2286070300
ACCU				CHLORIDE	MS1	98	%REC		1	0.5		00-A13308S	7457081000
ACCU				CHLORIDE	MS1	115	%REC		1	0.5		00-A15394S	7339082300
ACCU				CHLORIDE	MS1	116	%REC		1	0.5		00-A15392S	9765091400
ACCU				CHLORIDE	MS1	106	%REC		1	0.5		00-A18179S	2221100300
ACCU				CHLORIDE	MS1	112	%REC		1	0.5		00-A17467S	2292101000
ACCU				CHLORIDE	MS1	114	%REC		1	0.5		00-A17477S	2432101100
ACCU				CHLORIDE	MS1	118	%REC			0.5		00-A20601S	4455110600
ACCU				CHLORIDE	MS1	110	%REC		V1	0.5		00-A23855S	8755010201
ACCU				CYANIDE	MS1	85	%REC		1	0.005		00-A3237S	2942030100
ACCU				CYANIDE	MS1	99	%REC		1	0.005		00-A4741S	5341032800
ACCU				CYANIDE	MS1	92	%REC			0.005		00-A8838S	9777053000
ACCU				CYANIDE	MS1	98	%REC		1	0.005		00-A9247S	279060500
ACCU				CYANIDE	MS1	105	%REC			0.005		00-A15387S	7517082400
ACCU				CYANIDE	MS1	92	%REC		1	0.005		00-A15954S	8064082900
ACCU				CYANIDE	MS1	99	%REC		1	0.005		00-A23055S	8280121800
ACCU				CYANIDE	MS1	99	%REC		1	0.005		00-A23055S	8280121800
ACCU				DISSOLVED ORGANIC CARBON	MS1	100	%REC			1		00-A4497S	5238040500
ACCU				FLUORIDE	MS1	100	%REC		1	0.05		00-A556S	9364011400
ACCU				FLUORIDE	MS1	97	%REC			0.05		00-A980S	859020200
ACCU				FLUORIDE	MS1	97	%REC		1	0.05		00-A980S	859020200
ACCU				FLUORIDE	MS1	103	%REC			0.05		00-A1643S	859020200
ACCU				FLUORIDE	MS1	90	%REC		1	0.05		00-A1661S	859020200
ACCU				FLUORIDE	MS1	87	%REC		1	0.05		00-A2525S	2131022200
ACCU				FLUORIDE	MS1	88	%REC		1	0.05		00-A2820S	3558030800
ACCU				FLUORIDE	MS1	84	%REC		1	0.05		00-A4192S	4291[illegible]
ACCU				FLUORIDE	MS1	110	%REC			0.05		00-A7533S	8130[illegible]
ACCU				FLUORIDE	MS1	83	%REC		1	0.05		00-A7163S	8130060200
ACCU				FLUORIDE	MS1	87	%REC		1	0.05		00-A7839S	9738053000

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
[illegible]				FLUORIDE	MS1	90	%REC		1	0.05		00-A8762S	959061300
ACCU				FLUORIDE	MS1	100	%REC		1	0.05		00-A8353S	1576062000
ACCU				FLUORIDE	MS1	87	%REC		1	0.05		00-A7839S	9738053000
ACCU				FLUORIDE	MS1	90	%REC		1	0.05		00-A8848S	426061100
ACCU				FLUORIDE	MS1	89	%REC		1	0.05		00-A8848S	426061100
ACCU				FLUORIDE	MS1	97	%REC		1	0.05		00-A9955S	1576062000
ACCU				FLUORIDE	MS1	92	%REC		1	0.05		00-A10625S	2943062700
ACCU				FLUORIDE	MS1	88	%REC		1	0.05		00-A10627S	3133070700
ACCU				FLUORIDE	MS1	91	%REC			0.05		00-A10625S	2286070300
ACCU				FLUORIDE	MS1	94	%REC		1	0.05		00-A13583S	5551080300
ACCU				FLUORIDE	MS1	91	%REC			0.05		00-A13583S	5551080300
ACCU				FLUORIDE	MS1	95	%REC			0.05		00-A13841S	6032081700
ACCU				FLUORIDE	MS1	106	%REC			0.05		00-A14466S	6032081700
ACCU				FLUORIDE	MS1	87	%REC		1	0.05		00-A15394S	7339082300
ACCU				FLUORIDE	MS1	89	%REC		1	0.05		00-A15392S	8437083000
ACCU				FLUORIDE	MS1	97	%REC		1	0.05		00-A17467S	724092500
ACCU				FLUORIDE	MS1	96	%REC		1	0.05		00-A17467S	2292101000
ACCU				FLUORIDE	MS1	91	%REC		1	0.05		00-A18179S	1600100300
ACCU				FLUORIDE	MS1	91	%REC			0.05		00-A18179S	1600100300
ACCU				FLUORIDE	MS1	79	%REC		1	0.05		00-A20601S	4455110600
ACCU				FLUORIDE	MS1	93	%REC			0.05		00-A21596S	6230112000
ACCU				FLUORIDE	MS1	83	%REC		1	0.05		00-A21921S	6233112800
ACCU				FLUORIDE	MS1	95	%REC		V1	0.05		00-A23961	750011701
ACCU				FLUORIDE	MS1	76	%REC			0.05		00-A23074S	7971121500
ACCU				FLUORIDE	MS1	76	%REC		1	0.05		00-A23074S	7971121500
ACCU				NITRATE	MS1	122	%REC			0.05		00-A4495S	6527031700
[illegible]				NITRATE	MS1	114	%REC			0.05		00-A4856S	5047032400
[illegible]				NITRATE	MS1	92	%REC		J1	0.05		00-A23855S	8755010201
ACCU				NITRATE/NITRITE	MS1	107	%REC		1	0.05		00-A1012S	493012700
ACCU				NITRATE/NITRITE	MS1	100	%REC		1	0.05		00-A1006S	318012700
ACCU				NITRATE/NITRITE	MS1	107	%REC		1	0.05		00-A1012S	493012700
ACCU				NITRATE/NITRITE	MS1	115	%REC		1	0.05		00-A2822S	3423030700
ACCU				NITRATE/NITRITE	MS1	99	%REC		1	0.05		00-A996S	318012700
ACCU				NITRATE/NITRITE	MS1	104	%REC		1	0.05		00-A2773S	2969030100
ACCU				NITRATE/NITRITE	MS1	86	%REC		1	0.05		00-A1654S	2035021700
ACCU				NITRATE/NITRITE	MS1	116	%REC		1	0.05		00-A2037S	2516022300
ACCU				NITRATE/NITRITE	MS1	114	%REC		1	0.05		00-A2528S	2969030100
ACCU				NITRATE/NITRITE	MS1	106	%REC		1	0.05		00-A3233S	3936031300
ACCU				NITRATE/NITRITE	MS1	119	%REC		1	0.05		00-A4525S	5491033000
ACCU				NITRATE/NITRITE	MS1	115	%REC			0.05		00-A2822S	3423030700
ACCU				NITRATE/NITRITE	MS1	106	%REC		1	0.05		00-A3233S	3936031300
ACCU				NITRATE/NITRITE	MS1	112	%REC		1	0.05		00-A4203S	5491033000
ACCU				NITRATE/NITRITE	MS1	120	%REC		1	0.05		00-A7162S	8214050400
ACCU				NITRATE/NITRITE	MS1	102	%REC		1	0.05		00-A7152S	8387050800
ACCU				NITRATE/NITRITE	MS1	122	%REC		1	0.05		00-A7175S	8214050400
ACCU				NITRATE/NITRITE	MS1	102	%REC		1	0.05		00-A7152S	8387050800
ACCU				NITRATE/NITRITE	MS1	108	%REC			0.05		00-A7657S	9012051900
ACCU				NITRATE/NITRITE	MS1	110	%REC			0.05		00-A8369S	9426052400
ACCU				NITRATE/NITRITE	MS1	120	%REC			0.05		00-A9999S	1197061500
ACCU				NITRATE/NITRITE	MS1	92	%REC		1	0.05		00-A8600S	9639052600
ACCU				NITRATE/NITRITE	MS1	114	%REC		1	0.05		00-A8851S	355060600
ACCU				NITRATE/NITRITE	MS1	80	%REC		1	0.05		00-A8866S	524060800
ACCU				NITRATE/NITRITE	MS1	107	%REC			0.05		00-A9251S	525060800
[illegible]				NITRATE/NITRITE	MS1	120	%REC			0.05		00-A10000S	1197061500
ACCU				NITRATE/NITRITE	MS1	102	%REC		1	0.05		00-A11184S	2174062700
ACCU				NITRATE/NITRITE	MS1	106	%REC		1	0.05		00-A11796S	2784070600

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Ba
ACCU				NITRATE/NITRITE	MS1	108	%REC			0.05		00-A10624S	1464[illegible]
ACCU				NITRATE/NITRITE	MS1	119	%REC		1	0.05		00-A13299S	5937081000
ACCU				NITRATE/NITRITE	MS1	106	%REC		1	0.05		00-A13874S	5861080700
ACCU				NITRATE/NITRITE	MS1	114	%REC		1	0.05		00-A13744S	5937081000
ACCU				NITRATE/NITRITE	MS1	107	%REC		1	0.05		00-A13741S	6248081200
ACCU				NITRATE/NITRITE	MS1	106	%REC			0.05		00-A13976S	6251081200
ACCU				NITRATE/NITRITE	MS1	100	%REC			0.05		00-A14486S	6389081500
ACCU				NITRATE/NITRITE	MS1	104	%REC			0.05		00-A15437S	8000082900
ACCU				NITRATE/NITRITE	MS1	104	%REC			0.05		00-A15389S	8549090500
ACCU				NITRATE/NITRITE	MS1	102	%REC		1	0.05		00-A15401S	8684090600
ACCU				NITRATE/NITRITE	MS1	104	%REC			0.05		00-A15389S	8549090500
ACCU				NITRATE/NITRITE	MS1	108	%REC		1	0.05		00-A17071S	9698091400
ACCU				NITRATE/NITRITE	MS1	95	%REC		1	0.05		00-A17406S	601092400
ACCU				NITRATE/NITRITE	MS1	88	%REC		1	0.05		00-A17470S	586092300
ACCU				NITRATE/NITRITE	MS1	122	%REC		1	0.05		00-A18182S	2968101800
ACCU				NITRATE/NITRITE	MS1	100	%REC		1	0.05		00-A17348S	3195102000
ACCU				NITRATE/NITRITE	MS1	110	%REC			0.05		00-A18134S	2105100800
ACCU				NITRATE/NITRITE	MS1	122	%REC			0.05		00-A18182S	2968101800
ACCU				NITRATE/NITRITE	MS1	96	%REC		1	0.05		00-A20224S	3819102700
ACCU				NITRATE/NITRITE	MS1	96	%REC			0.05		00-A20224S	3819102700
ACCU				NITRATE/NITRITE	MS1	114	%REC			0.05		00-A20586S	4245110100
ACCU				NITRATE/NITRITE	MS1	114	%REC		1	0.05		00-A20586S	4245110100
ACCU				NITRATE/NITRITE	MS1	105	%REC			0.05		00-A21173S	5279111300
ACCU				NITRATE/NITRITE	MS1	105	%REC		1	0.05		00-A21173S	5279111300
ACCU				NITRATE/NITRITE	MS1	104	%REC		1	0.05		00-A21598S	5827112000
ACCU				NITRATE/NITRITE	MS1	105	%REC		1	0.05		00-A21173S	5279[illegible]
ACCU				NITRATE/NITRITE	MS1	104	%REC		1	0.05		00-A21598S	5827[illegible]
ACCU				NITRATE/NITRITE	MS1	96	%REC		1	0.05		00-A21841S	5827112000
ACCU				NITRATE/NITRITE	MS1	104	%REC			0.05		00-A21598S	5827112000
ACCU				NITRATE/NITRITE	MS1	96	%REC			0.05		00-A23382S	8642122100
ACCU				NITRATE/NITRITE	MS1	112	%REC			0.05		00-A23333S	8962122700
ACCU				NITRATE/NITRITE	MS1	96	%REC		1	0.05		00-A24038S	8821122300
ACCU				NITRATE/NITRITE	MS1	96	%REC		1	0.05		00-A24038S	8821122300
ACCU				NITRATE/NITRITE	MS1	112	%REC		1	0.05		00-A23333S	8962122700
ACCU				NITRATE/NITRITE	MS1	112	%REC		1	0.05		00-A23333S	8962122700
ACCU				NITRATE/NITRITE	MS1	112	%REC		1	0.05		00-A23333S	8962122700
ACCU				NITRATE/NITRITE	MS1	116	%REC		1	0.05		00-A23892S	8962122700
ACCU				SULFATE	MS1	87	%REC		1	1		00-A556S	9364011400
ACCU				SULFATE	MS1	95	%REC			1		00-A1643S	859020200
ACCU				SULFATE	MS1	107	%REC		1	1		00-A980S	859020200
ACCU				SULFATE	MS1	104	%REC			1		00-A1643S	859020200
ACCU				SULFATE	MS1	97	%REC			1		00-A2525 S	2131022200
ACCU				SULFATE	MS1	97	%REC		1	1		00-A1661S	859020200
ACCU				SULFATE	MS1	97	%REC		1	1		00-A2525S	2131022200
ACCU				SULFATE	MS1	97	%REC		1	1		00-A2525S	2131022200
ACCU				SULFATE	MS1	101	%REC		1	1		00-A2820S	3558030800
ACCU				SULFATE	MS1	104	%REC		1	1		00-A4192S	4291031700
ACCU				SULFATE	MS1	112	%REC			1		00-A4495S	6527031700
ACCU				SULFATE	MS1	112	%REC			1		00-A4856S	5047032400
ACCU				SULFATE	MS1	103	%REC			1		00-A7533S	8130060100
ACCU				SULFATE	MS1	96	%REC		1	1		00-A7163S	8130060200
ACCU				SULFATE	MS1	113	%REC		1	1		00-A7839S	9738053000
ACCU				SULFATE	MS1	94	%REC		1	1		00-A8762S	9590[illegible]
ACCU				SULFATE	MS1	113	%REC		1	1		00-A7839S	9738[illegible]
ACCU				SULFATE	MS1	111	%REC		1	1		00-A8353S	1576062000
ACCU				SULFATE	MS1	108	%REC		1	1		00-A8848S	426061100

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

Table 11-5
Matrix Spike Recovery For VOC - Metal - WQP - PCB Samples
Groundwater Calendar Year 2000

Lab	Location	Sample Date	Bottle #	Analyte	Result Type	Result	Units	Lab Qual	Validation	Detect Limit	Dilution	Lab Sample #	Lab Batch #
ACCU				SULFATE	MS1	108	%REC		1	1		00-A8848S	426061100
ACCU				SULFATE	MS1	112	%REC		1	1		00-A9955S	1576062000
ACCU				SULFATE	MS1	112	%REC		1	1		00-A10625S	2286070300
ACCU				SULFATE	MS1	103	%REC		1	1		00-A10627S	3133070700
ACCU				SULFATE	MS1	112	%REC			1		00-A10625S	2286070300
ACCU				SULFATE	MS1	94	%REC		1	1		00-A13583S	5551080300
ACCU				SULFATE	MS1	94	%REC			1		00-A13583S	5551080300
ACCU				SULFATE	MS1	89	%REC			1		00-A13313S	7457081000
ACCU				SULFATE	MS1	94	%REC			1		00-A13583S	5551080300
ACCU				SULFATE	MS1	100	%REC			1		00-A13834S	7457081000
ACCU				SULFATE	MS1	101	%REC			1		00-A13841S	6032081700
ACCU				SULFATE	MS1	102	%REC			1		00-A15696S	7339082300
ACCU				SULFATE	MS1	112	%REC			1		00-A14231S	6032081700
ACCU				SULFATE	MS1	95	%REC		1	1		00-A15394S	7339082300
ACCU				SULFATE	MS1	96	%REC		1	1		00-A15392S	8437083000
ACCU				SULFATE	MS1	102	%REC		1	1		00-A15696S	7339082300
ACCU				SULFATE	MS1	90	%REC		1	1		00-A17467S	724092500
ACCU				SULFATE	MS1	89	%REC		1	1		00-A17467S	2292101000
ACCU				SULFATE	MS1	120	%REC		1	1		00-A18179S	1600100300
ACCU				SULFATE	MS1	98	%REC			1		00-A18499S	2292101000
ACCU				SULFATE	MS1	101	%REC			1		00-A20601S	4455110600
ACCU				SULFATE	MS1	101	%REC		1	1		00-A20601S	4455110600
ACCU				SULFATE	MS1	104	%REC			1		00-A20869S	7207120500
ACCU				SULFATE	MS1	104	%REC		1	1		00-A20869S	7207120500
ACCU				SULFATE	MS1	112	%REC		V1	1		00-A23855S	8755010201
ACCU				SULFATE	MS1	108	%REC		V1	1		00-A23961S	750011701
ACCU				SULFATE	MS1	115	%REC		1	1		00-A21596S	6233112800
ACCU				SULFATE	MS1	107	%REC			1		00-A23074S	7971121500
ACCU				SULFATE	MS1	107	%REC		1	1		00-A23074S	7971121500
ACCU				SULFATE	MS1	108	%REC		1	1		00-A23961S	750011701
ACCU				SULFIDE	MS1	110	%REC			0.002		00-A4496S	4597032100
ACCU				SULFIDE	MS1	91	%REC		V1	0.002		00-A23549S	8609122000
ACCU				SULFIDE	MS1	86	%REC		V1	0.002		00-A24100S	9083122800
ACCU				TOTAL ORGANIC CARBON	MS1	108	%REC			1		00-A5024S	5237032700
ACCU				TOTAL ORGANIC CARBON	MS1	83	%REC		V1	1		00-A23556S	8941122700

Note: Some Locations are not in IMP. These Locations are included because analyses apply to results that are from IMP Locations.

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Table 11-6
Laboratory Control Sample Recovery For Radionuclides
Groundwater Calendar Year 2000

Lab	RIN	Analyte	Result Type	Result/ LCS Yield Fraction	Units	Analytical Result	Units	Lab Qual	Detect Limit	2 Sigma Error	Test Method	Lab Sample #	Lab Batch #
GEL	00D1063	AMERICIUM-241	LC1	97	%REC	2.04747	PCI/L		0.006	0.1317	ALPHA SPEC	1000021183	10002
GEL	00D1063	PLUTONIUM-239/240	LC1	100	%REC	2.22505	PCI/L		0.0274	0.1294	ALPHA SPEC	1000021186	10003
GEL	00D1063	STRONTIUM-89,90	LC1	88	%REC	35.7683	PCI/L		1.6619	1.7068	GAS PROP. COUNTER	1000023942	11259
GEL	00D1063	TRITIUM	LC1	99	%REC	5248.3	PCI/L		255.6	241.6	LIQUID SCINT. COUNT	1000023399	11014
GEL	00D1063	URANIUM-238	LC1	103	%REC	23.0969	PCI/L		0.488	3.041	ALPHA SPEC	1000021195	10007
GEL	00D1071	AMERICIUM-241	LC1	97	%REC	2.04747	PCI/L		0.006	0.1317	ALPHA SPEC	1000021183	10002
GEL	00D1071	PLUTONIUM-239/240	LC1	100	%REC	2.22505	PCI/L		0.0274	0.1294	ALPHA SPEC	1000021186	10003
GEL	00D1071	STRONTIUM-89,90	LC1	88	%REC	35.7683	PCI/L		1.6619	1.7068	GAS PROP. COUNTER	1000023942	11259
GEL	00D1071	TRITIUM	LC1	99	%REC	5248.3	PCI/L		255.6	241.6	LIQUID SCINT. COUNT	1000023399	11014
GEL	00D1071	TRITIUM	LC1	112	%REC	5902.8	PCI/L		262	371.5	LIQUID SCINT. COUNT	1000028755	13496
GEL	00D1071	URANIUM-238	LC1	103	%REC	23.0969	PCI/L		0.488	3.041	ALPHA SPEC	1000021195	10007
GEL	00D1071	URANIUM-238	LC1	90	%REC	10.2475	PCI/L		0.4429	1.4877	ALPHA SPEC	1000029588	13902
GEL	00D1071	URANIUM-238	LC1	95	%REC	10.7065	PCI/L		0.0575	0.3801	ALPHA SPEC	1000021189	10004
GEL	00D1078	AMERICIUM-241	LC1	97	%REC	2.04747	PCI/L		0.006	0.1317	ALPHA SPEC	1000021183	10002
GEL	00D1078	PLUTONIUM-239/240	LC1	100	%REC	2.22505	PCI/L		0.0274	0.1294	ALPHA SPEC	1000021186	10003
GEL	00D1078	STRONTIUM-89,90	LC1	88	%REC	35.7683	PCI/L		1.6619	1.7068	GAS PROP. COUNTER	1000023942	11259
GEL	00D1078	TRITIUM	LC1	99	%REC	5248.3	PCI/L		255.6	241.6	LIQUID SCINT. COUNT	1000023399	11014
GEL	00D1078	URANIUM-238	LC1	77	%REC	17.3624	PCI/L		0.4576	2.5535	ALPHA SPEC	1000021199	10008
GEL	00D1078	URANIUM-238	LC1	95	%REC	10.7065	PCI/L		0.0575	0.3801	ALPHA SPEC	1000021189	10004
GEL	00D1088	AMERICIUM-241	LC1	105	%REC	2.23308	PCI/L		0.0196	0.1513	ALPHA SPEC	1000023088	10887
GEL	00D1088	AMERICIUM-241	LC1	95	%REC	2.00785	PCI/L		0.0335	0.1145	ALPHA SPEC	1000029910	14024
GEL	00D1088	PLUTONIUM-239/240	LC1	100	%REC	2.23917	PCI/L		0.0159	0.1365	ALPHA SPEC	1000023085	10886
GEL	00D1088	PLUTONIUM-239/240	LC1	112	%REC	2.50018	PCI/L		0.0196	0.1323	ALPHA SPEC	1000029922	14027
GEL	00D1088	STRONTIUM-89,90	LC1	88	%REC	35.7683	PCI/L		1.6619	1.7068	GAS PROP. COUNTER	1000023942	11259
GEL	00D1088	TRITIUM	LC1	99	%REC	5248.3	PCI/L		255.6	241.6	LIQUID SCINT. COUNT	1000023399	11014
GEL	00D1088	URANIUM-238	LC1	104	%REC	11.664	PCI/L		0.129	1.4606	ALPHA SPEC	1000023082	10885
GEL	00D1088	URANIUM-238	LC1	83	%REC	9.3468	PCI/L		0.0277	0.3056	ALPHA SPEC	1000028060	13173
GEL	00D1102	AMERICIUM-241	LC1	102	%REC	2.16415	PCI/L		0.0775	0.2468	ALPHA SPEC	1000023079	10884
GEL	00D1102	AMERICIUM-241	LC1	95	%REC	2.00785	PCI/L		0.0335	0.1145	ALPHA SPEC	1000029910	14024
GEL	00D1102	PLUTONIUM-239/240	LC1	102	%REC	2.26661	PCI/L		0.0249	0.1421	ALPHA SPEC	1000023076	10883
GEL	00D1102	PLUTONIUM-239/240	LC1	112	%REC	2.50018	PCI/L		0.0196	0.1323	ALPHA SPEC	1000029922	14027
GEL	00D1102	URANIUM-238	LC1	107	%REC	12.1106	PCI/L		0.2794	1.5379	ALPHA SPEC	1000023073	10882
GEL	00D1102	URANIUM-238	LC1	83	%REC	9.3468	PCI/L		0.0277	0.3056	ALPHA SPEC	1000028060	13173
GEL	00D1114	AMERICIUM-241	LC1	95	%REC	2.00785	PCI/L		0.0335	0.1145	ALPHA SPEC	1000029910	14024
GEL	00D1114	PLUTONIUM-239/240	LC1	112	%REC	2.50018	PCI/L		0.0196	0.1323	ALPHA SPEC	1000029922	14027
GEL	00D1114	STRONTIUM-89,90	LC1	83	%REC	158.352	PCI/L		0.247	1.2348	GAS PROP. COUNTER	1000028224	13238
GEL	00D1114	TRITIUM	LC1	112	%REC	5902.8	PCI/L		262	371.5	LIQUID SCINT. COUNT	1000028755	13496
GEL	00D1114	URANIUM-238	LC1	90	%REC	10.2475	PCI/L		0.4429	1.4877	ALPHA SPEC	1000029588	13902
GEL	00D1114	URANIUM-238	LC1	83	%REC	9.3468	PCI/L		0.0277	0.3056	ALPHA SPEC	1000028060	13173
GEL	00D1124	AMERICIUM-241	LC1	89	%REC	1.87386	PCI/L		0.0047	0.1117	ALPHA SPEC	1000039797	18371
GEL	00D1124	PLUTONIUM-239/240	LC1	107	%REC	2.39076	PCI/L		0.0242	0.1738	ALPHA SPEC	1000039800	18372
GEL	00D1124	URANIUM-238	LC1	92	%REC	8.31456	PCI/L		0.1389	0.865	ALPHA SPEC	1000039803	18373
GEL	00D1127	AMERICIUM-241	LC1	95	%REC	2.00785	PCI/L		0.0335	0.1145	ALPHA SPEC	1000029910	14024
GEL	00D1127	PLUTONIUM-239/240	LC1	112	%REC	2.50018	PCI/L		0.0196	0.1323	ALPHA SPEC	1000029922	14027
GEL	00D1127	STRONTIUM-89,90	LC1	83	%REC	158.352	PCI/L		0.247	1.2348	GAS PROP. COUNTER	1000028224	13238
GEL	00D1127	TRITIUM	LC1	112	%REC	5902.8	PCI/L		262	371.5	LIQUID SCINT. COUNT	1000028755	13496
GEL	00D1127	URANIUM-238	LC1	90	%REC	10.2475	PCI/L		0.4429	1.4877	ALPHA SPEC	1000029588	13902
GEL	00D1127	URANIUM-238	LC1	83	%REC	9.3468	PCI/L		0.0277	0.3056	ALPHA SPEC	1000028060	13173
GEL	00D1136	AMERICIUM-241	LC1	106	%REC	2.21887	PCI/L		0.0212	0.1396	ALPHA SPEC	1000034730	16160
GEL	00D1136	PLUTONIUM-239/240	LC1	100	%REC	2.22083	PCI/L		0.0233	0.129	ALPHA SPEC	1000034727	16159
GEL	00D1136	URANIUM-238	LC1	99	%REC	11.2404	PCI/L		0.252	1.2797	ALPHA SPEC	1000034722	16158
GEL	00D1155	AMERICIUM-241	LC1	106	%REC	2.21887	PCI/L		0.0212	0.1396	ALPHA SPEC	1000034730	16160

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Table 11-6
Laboratory Control Sample Recovery For Radionuclides
Groundwater Calendar Year 2000

Lab	RIN	Analyte	Result Type	Result/ LCS Yield Fraction	Units	Analytical Result	Units	Lab Qual	Detect Limit	2 Sigma Error	Test Method	Lab Sample #	Lab Batch #
GEL	00D1155	PLUTONIUM-239/240	LC1	100	%REC	2.22083	PCI/L		0.0233	0.129	ALPHA SPEC	1000034727	16159
GEL	00D1155	URANIUM-238	LC1	99	%REC	11.2404	PCI/L		0.252	1.2797	ALPHA SPEC	1000034722	16158
GEL	00D1155	URANIUM-238	LC1	82	%REC	3.68877	PCI/L		0.118	0.502	ALPHA SPEC	1000034719	16157
GEL	00D1215	AMERICIUM-241	LC1	104	%REC	2.17648	PCI/L		0.0151	0.1311	ALPHA SPEC	1000062531	28086
GEL	00D1215	PLUTONIUM-239/240	LC1	96	%REC	2.5529	PCI/L		0.0144	0.1233	ALPHA SPEC	1000062528	28085
GEL	00D1215	URANIUM-238	LC1	99	%REC	11.155	PCI/L		0.1936	1.2895	ALPHA SPEC	1000062519	28082
GEL	00D1233	AMERICIUM-241	LC1	104	%REC	2.17648	PCI/L		0.0151	0.1311	ALPHA SPEC	1000062531	28086
GEL	00D1233	PLUTONIUM-239/240	LC1	96	%REC	2.5529	PCI/L		0.0144	0.1233	ALPHA SPEC	1000062528	28085
GEL	00D1233	TRITIUM	LC1	97	%REC	13440.9	PCI/L		263.6	543.5	LIQUID SCINT. COUNT	1000055308	25043
GEL	00D1233	URANIUM-238	LC1	90	%REC	10.2248	PCI/L		0.1664	1.1448	ALPHA SPEC	1000062522	28083
GEL	00D1233	URANIUM-238	LC1	99	%REC	11.155	PCI/L		0.1936	1.2895	ALPHA SPEC	1000062519	28082
GEL	00D1244	AMERICIUM-241	LC1	97	%REC	2.91	PCI/L		0.0176	0.167	ALPHA SPEC	1000070842	31718
GEL	00D1244	AMERICIUM-241	LC1	106	%REC	3.14	PCI/L		0.0167	0.17	ALPHA SPEC	1000073643	32940
GEL	00D1244	PLUTONIUM-239/240	LC1	99	%REC	3.19	PCI/L		0.0142	0.183	ALPHA SPEC	1000070845	31719
GEL	00D1244	STRONTIUM-89,90	LC1	95	%REC	227	PCI/L		0.826	2.65	GAS PROP. COUNTER	1000069603	31200
GEL	00D1244	TRITIUM	LC1	100	%REC	10300	PCI/L	J	257	473	LIQUID SCINT. COUNT	1000069135	30987
GEL	00D1244	URANIUM-238	LC1	92	%REC	6.91	PCI/L		0.0593	0.53	ALPHA SPEC	1000070855	31724
GEL	00D1244	URANIUM-238	LC1	82	%REC	9.21	PCI/L		0.287	1.31	ALPHA SPEC	1000081997	36556
GEL	00D1261	AMERICIUM-241	LC1	97	%REC	2.92	PCI/L		0.023	0.167	ALPHA SPEC	1000070842	31718
GEL	00D1261	PLUTONIUM-239/240	LC1	100	%REC	3.19	PCI/L		0.0552	0.183	ALPHA SPEC	1000070845	31719
GEL	00D1261	TRITIUM	LC1	100	%REC	10300	PCI/L	J	257	473	LIQUID SCINT. COUNT	1000069135	30987
GEL	00D1261	URANIUM-238	LC1	90	%REC	6.74	PCI/L		0.0566	0.449	ALPHA SPEC	1000070852	31723
GEL	00D1261	URANIUM-238	LC1	91	%REC	10.3	PCI/L		0.0837	0.798	ALPHA SPEC	1000074144	33200
GEL	00D1270	AMERICIUM-241	LC1	110	%REC	2.29511	PCI/L		0.0104	0.1118	ALPHA SPEC	1000063752	28623
GEL	00D1270	PLUTONIUM-239/240	LC1	93	%REC	2.45279	PCI/L		0.0049	0.13	ALPHA SPEC	1000063759	28627
GEL	00D1270	TRITIUM	LC1	97	%REC	13440.9	PCI/L		263.6	543.5	LIQUID SCINT. COUNT	1000055308	25043
GEL	00D1270	URANIUM-238	LC1	90	%REC	10.2248	PCI/L		0.1664	1.1448	ALPHA SPEC	1000062522	28083
GEL	00D1270	URANIUM-238	LC1	99	%REC	11.2335	PCI/L		0.2729	1.3316	ALPHA SPEC	1000062525	28084
GEL	00D1280	AMERICIUM-241	LC1	103	%REC	4.93	PCI/L		0.0134	0.306	ALPHA SPEC	1000064832	29118
GEL	00D1280	PLUTONIUM-239/240	LC1	100	%REC	2.65	PCI/L		0.0159	0.148	ALPHA SPEC	1000064826	29114
GEL	00D1280	TRITIUM	LC1	105	%REC	12407	PCI/L		277.1	596.9	LIQUID SCINT. COUNT	1000063287	28442
GEL	00D1280	URANIUM-238	LC1	103	%REC	11.6	PCI/L		0.221	1.29	ALPHA SPEC	1000064823	29113
GEL	00D1288	AMERICIUM-241	LC1	113	%REC	3.4	PCI/L	B	0.0075	0.19	ALPHA SPEC	1000073507	32872
GEL	00D1288	AMERICIUM-241	LC1	100	%REC	3.01	PCI/L		0.0192	0.155	ALPHA SPEC	1000075946	33961
GEL	00D1288	PLUTONIUM-239/240	LC1	107	%REC	3.4	PCI/L		0.0464	0.202	ALPHA SPEC	1000073510	32874
GEL	00D1288	PLUTONIUM-239/240	LC1	96	%REC	3.65	PCI/L		0.0178	0.164	ALPHA SPEC	1000075943	33960
GEL	00D1290	AMERICIUM-241	LC1	97	%REC	2.92	PCI/L		0.023	0.167	ALPHA SPEC	1000070842	31718
GEL	00D1290	NEPTUNIUM	LC1	112	%REC	9.91	PCI/L		0.11	0.841	ALPHA SPEC	1000072162	32309
GEL	00D1290	PLUTONIUM-239/240	LC1	100	%REC	3.19	PCI/L		0.0552	0.183	ALPHA SPEC	1000070845	31719
GEL	00D1290	TRITIUM	LC1	100	%REC	10300	PCI/L	J	257	473	LIQUID SCINT. COUNT	1000069135	30987
GEL	00D1290	URANIUM-238	LC1	90	%REC	6.74	PCI/L		0.0566	0.449	ALPHA SPEC	1000070852	31723
GEL	00D1307	AMERICIUM-241	LC1	100	%REC	3.01	PCI/L		0.0192	0.155	ALPHA SPEC	1000075946	33961
GEL	00D1307	PLUTONIUM-239/240	LC1	96	%REC	3.65	PCI/L		0.0178	0.164	ALPHA SPEC	1000075943	33960
GEL	00D1307	STRONTIUM-89,90	LC1	98	%REC	8.04	PCI/L		0.353	0.406	GAS PROP. COUNTER	1000078804	35182
GEL	00D1307	TRITIUM	LC1	100	%REC	8280	PCI/L	J	293	460	LIQUID SCINT. COUNT	1000075321	33675
GEL	00D1307	URANIUM-238	LC1	93	%REC	6.97	PCI/L		0.169	0.79	ALPHA SPEC	1000078055	34907
GEL	00D1307	URANIUM-238	LC1	94	%REC	7.09	PCI/L		0.066	0.814	ALPHA SPEC	1000075949	33962
GEL	00D1307	URANIUM-238	LC1	99	%REC	55.6	PCI/L		0.407	3.44	ALPHA SPEC	1000079828	35638
GEL	00D1320	AMERICIUM-241	LC1	97	%REC	2.92	PCI/L		0.023	0.167	ALPHA SPEC	1000070842	31718
GEL	00D1320	PLUTONIUM-239/240	LC1	100	%REC	3.19	PCI/L		0.0552	0.183	ALPHA SPEC	1000070845	31719
GEL	00D1320	URANIUM-238	LC1	90	%REC	6.74	PCI/L		0.0566	0.449	ALPHA SPEC	1000070852	31723
GEL	00D1320	URANIUM-238	LC1	92	%REC	6.91	PCI/L		0.0593	0.53	ALPHA SPEC	1000070855	31724

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Lab	RIN	Analyte	Result Type	Result/ LCS Yield Fraction	Units	Analytical Result	Units	Lab Qual	Detect Limit	2 Sigma Error	Test Method	Lab Sample #	Lab Batch #
GEL	00D1345	AMERICIUM-241	LC1	94	%REC	7.68	PCI/L	B	0.157	0.639	ALPHA SPEC	1000078077	34916
GEL	00D1345	AMERICIUM-241	LC1	93	%REC	7.54	PCI/L	B	0.0409	0.661	ALPHA SPEC	1000077593	34688
GEL	00D1345	PLUTONIUM-239/240	LC1	92	%REC	9.44	PCI/L		0.0317	0.651	ALPHA SPEC	1000078070	34912
GEL	00D1345	PLUTONIUM-239/240	LC1	97	%REC	10	PCI/L		0.389	0.958	ALPHA SPEC	1000077600	34690
GEL	00D1345	URANIUM-238	LC1	94	%REC	8.21	PCI/L		0.175	0.966	ALPHA SPEC	1000078066	34910
GEL	00D1345	URANIUM-238	LC1	93	%REC	8.1	PCI/L		0.18	0.918	ALPHA SPEC	1000077605	34691
SCA	00D1371	AMERICIUM-241	LC1	105	%REC	2.28	PCI/L		0.007	0.52	ALPHA SPEC	SCAQC-2014-LC1	2020
SCA	00D1371	PLUTONIUM-239/240	LC1	92	%REC	1.82	PCI/L		0.009	0.427	ALPHA SPEC	SCAQC-2014-LC1	2020
GEL	00D1383	AMERICIUM-241	LC1	82	%REC	1.73	PCI/L		0.0557	0.133	ALPHA SPEC	1000083814	37288
GEL	00D1383	PLUTONIUM-239/240	LC1	101	%REC	2.25	PCI/L	B	0.0136	0.126	ALPHA SPEC	1000083811	37287
GEL	00D1383	URANIUM-238	LC1	89	%REC	10	PCI/L		0.156	1.1	ALPHA SPEC	1000083808	37286
SCA	00D1386	AMERICIUM-241	LC1	101	%REC	2.19	PCI/L		0.007	0.494	ALPHA SPEC	SCAQC-2018-LC1	2018
SCA	00D1386	PLUTONIUM-239/240	LC1	106	%REC	2.09	PCI/L		0.016	0.474	ALPHA SPEC	SCAQC-2018-LC1	2018
SCA	00D1386	URANIUM-233,-234	LC1	107	%REC	3.86	PCI/L		0.023	0.927	ALPHA SPEC	SCAQC-2019-LC1	2019
SCA	00D1386	URANIUM-238	LC1	110	%REC	3.98	PCI/L		0.04	0.952	ALPHA SPEC	SCAQC-2019-LC1	2019
GEL	00D1395	AMERICIUM-241	LC1	102	%REC						ALPHA SPEC	1000093539	41022
GEL	00D1395	AMERICIUM-241	LC1	109	%REC						ALPHA SPEC	1000093547	41026
GEL	00D1395	PLUTONIUM-239/240	LC1	99	%REC						ALPHA SPEC	1000093544	41025
GEL	00D1395	PLUTONIUM-239/240	LC1	90	%REC						ALPHA SPEC	1000093559	41035
GEL	00D1395	STRONTIUM-89,90	LC1	86	%REC	7.48	PCI/L		0.299	0.332	GAS PROP. COUNTER	1000097236	42252
GEL	00D1395	TRITIUM	LC1	94	%REC	3860	PCI/L	J	351	418	LIQUID SCINT. COUNT	1000089114	39367
GEL	00D1395	URANIUM-238	LC1	99	%REC						ALPHA SPEC	1000093566	41038
GEL	00D1395	URANIUM-238	LC1	96	%REC						ALPHA SPEC	1000093563	41037
GEL	00D1411	AMERICIUM-241	LC1	94	%REC						ALPHA SPEC	1000107688	45754
GEL	00D1411	PLUTONIUM-239/240	LC1	102	%REC						ALPHA SPEC	1000107693	45755
GEL	00D1411	STRONTIUM-89,90	LC1	99	%REC	7.7	PCI/L		0.439	0.441	GAS PROP. COUNTER	1000108154	45917
GEL	00D1411	STRONTIUM-90	LC1	99	%REC	7.73	PCI/L		0.318	0.362	GAS PROP. COUNTER	1000111542	47069
GEL	00D1411	TRITIUM	LC1	103	%REC	8440	PCI/L	J	254	4.34	LIQUID SCINT. COUNT	1000108052	45879
GEL	00D1411	URANIUM-238	LC1	118	%REC						ALPHA SPEC	1000111588	47098
GEL	00D1411	URANIUM-238	LC1	94	%REC						ALPHA SPEC	1000120828	50355
PARA	00D1422	AMERICIUM-241	LC1	100	%REC	4.49	PCI/L		0.014	0.569	ALPHA SPEC	AS03721LCS1	AS03721
PARA	00D1422	PLUTONIUM-239/240	LC1	97	%REC	4.38	PCI/L		0.023	0.56	ALPHA SPEC	AS03721LCS1	AS03721
PARA	00D1422	URANIUM-233,-234	LC1	100	%REC	4.52	PCI/L		0.063	0.788	ALPHA SPEC	AS03721LCS1	AS03721
PARA	00D1422	URANIUM-238	LC1	106	%REC	4.78	PCI/L		0.074	0.825	ALPHA SPEC	AS03721LCS1	AS03721
SWLO	00D1431	AMERICIUM-241	LC1	105	%REC	2	PCI/L		0.048	0.16	ALPHA SPEC	0004131211-LCS	0009111211
SWLO	00D1431	PLUTONIUM-239/240	LC1	98	%REC	2	PCI/L		0.027	0.15	ALPHA SPEC	0004131211-LCS	0009111211
SWLO	00D1431	URANIUM-233,-234	LC1	102	%REC	2.5	PCI/L		0.02	0.16	ALPHA SPEC	0004131211-LCS	0009081211
SWLO	00D1431	URANIUM-238	LC1	108	%REC	2.6	PCI/L		0.0074	0.16	ALPHA SPEC	0004131211-LCS	0009081211
GEL	00D1441	AMERICIUM-241	LC1	94	%REC						ALPHA SPEC	1000107682	45752
GEL	00D1441	PLUTONIUM-239/240	LC1	109	%REC						ALPHA SPEC	1000107685	45753
GEL	00D1441	STRONTIUM-89,90	LC1	99	%REC	7.7	PCI/L		0.439	0.441	GAS PROP. COUNTER	1000108154	45917
GEL	00D1441	STRONTIUM-90	LC1	99	%REC	7.73	PCI/L		0.318	0.362	GAS PROP. COUNTER	1000111542	47069
GEL	00D1441	URANIUM-238	LC1	93	%REC						ALPHA SPEC	1000111605	47103
GEL	00D1457	AMERICIUM-241	LC1	94	%REC						ALPHA SPEC	1000107682	45752
GEL	00D1457	PLUTONIUM-239/240	LC1	109	%REC						ALPHA SPEC	1000107685	45753
GEL	00D1457	URANIUM-238	LC1	93	%REC						ALPHA SPEC	1000111605	47103
GEL	00D1494	AMERICIUM-241	LC1	94	%REC						ALPHA SPEC	1000107682	45752
GEL	00D1494	PLUTONIUM-239/240	LC1	109	%REC						ALPHA SPEC	1000107685	45753
GEL	00D1494	URANIUM-238	LC1	92	%REC						ALPHA SPEC	1000107705	45758
GEL	00D1507	AMERICIUM-241	LC1	94	%REC						ALPHA SPEC	1000107682	45752
GEL	00D1507	PLUTONIUM-239/240	LC1	109	%REC						ALPHA SPEC	1000107685	45753
GEL	00D1507	URANIUM-238	LC1	92	%REC						ALPHA SPEC	1000107705	45758

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Lab	RIN	Analyte	Result Type	Result/ LCS Yield Fraction	Units	Analytical Result	Units	Lab Qual	Detect Limit	2 Sigma Error	Test Method	Lab Sample #	Lab Batch #
GEL	00D1514	TRITIUM	LC1	105	%REC	8520	PCI/L		290	448	LIQUID SCINT. COUNT	1000114375	48043
GEL	00D1514	URANIUM-238	LC1	93	%REC						ALPHA SPEC	1000111605	47103
GEL	00D1522	TRITIUM	LC1	105	%REC	8520	PCI/L		290	448	LIQUID SCINT. COUNT	1000114375	48043
GEL	00D1522	URANIUM-238	LC1	100	%REC						ALPHA SPEC	1000117933	49293
SWLO	01D0188	AMERICIUM-241	LC1	97	%REC	1.9	PCI/L		0.037	0.12	ALPHA SPEC	0012071211-LCS	0012071211
SWLO	01D0188	PLUTONIUM-239/240	LC1	114	%REC	2.4	PCI/L		0.024	0.14	ALPHA SPEC	0012071211-LCS	0012071211
SWLO	01D0188	URANIUM-233,-234	LC1	105	%REC	2.5	PCI/L		0.0062	0.15	ALPHA SPEC	0012131211-LCS	0012131211
SWLO	01D0188	URANIUM-238	LC1	109	%REC	2.6	PCI/L		0.0062	0.15	ALPHA SPEC	0012131211-LCS	0012131211
SWLO	01D0196	AMERICIUM-241	LC1	101	%REC	1.9	PCI/L		0.05	0.13	ALPHA SPEC	0004131211-LCS	0012051212
SWLO	01D0196	PLUTONIUM-239/240	LC1	107	%REC	2.2	PCI/L		0.018	0.14	ALPHA SPEC	0004131211-LCS	0012051212
SWLO	01D0196	TRITIUM	LC1	94	%REC	750	PCI/L		2.8	14	LIQUID SCINT. COUNT	0011141291-LCS	0011141291
SWLO	01D0196	URANIUM-233,-234	LC1	95	%REC	2.3	PCI/L		0.016	0.14	ALPHA SPEC	0004131211-LCS	0012061211
SWLO	01D0196	URANIUM-238	LC1	93	%REC	2.2	PCI/L		0.0058	0.14	ALPHA SPEC	0004131211-LCS	0012061211
SWLO	01D0197	TRITIUM	LC1	94	%REC	750	PCI/L		2.8	14	LIQUID SCINT. COUNT	0011141291-LCS	0011141291
SWLO	01D0197	URANIUM-233,-234	LC1	103	%REC	2.5	PCI/L		0.0061	0.15	ALPHA SPEC	0004131211-LCS	0012051211
SWLO	01D0197	URANIUM-238	LC1	100	%REC	2.4	PCI/L		0.0061	0.14	ALPHA SPEC	0004131211-LCS	0012051211
SWLO	01D0203	AMERICIUM-241	LC1	100	%REC	1.9	PCI/L		0.045	0.15	ALPHA SPEC	0101151211-LCS	0101151211
SWLO	01D0203	PLUTONIUM-239/240	LC1	111	%REC	2.3	PCI/L		0.042	0.17	ALPHA SPEC	0101151211-LCS	0101151211
GEL	01D0203	STRONTIUM-89,90	LC1	103	%REC						GAS PROP. COUNTER	1000138138	56451
GEL	01D0203	STRONTIUM-90	LC1	108	%REC						GAS PROP. COUNTER	1000137950	56397
SWLO	01D0203	TRITIUM	LC1	90	%REC	710	PCI/L		2.6	14	LIQUID SCINT. COUNT	0101181291-LCS	0101181291
SWLO	01D0203	URANIUM-233,-234	LC1	107	%REC	2.6	PCI/L		0.0061	0.15	ALPHA SPEC	0101101211-LCS	0101101211
SWLO	01D0203	URANIUM-238	LC1	99	%REC	2.4	PCI/L		0.0061	0.14	ALPHA SPEC	0101101211-LCS	0101101211
SWLO	01D0204	AMERICIUM-241	LC1	88	%REC	1.7	PCI/L		0.019	0.12	ALPHA SPEC	0101251211-LCS	0101251211
SWLO	01D0204	PLUTONIUM-239/240	LC1	102	%REC	2.1	PCI/L		0.026	0.15	ALPHA SPEC	0101251211-LCS	0101251211
SWLO	01D0204	TRITIUM	LC1	87	%REC	680	PCI/L		2.7	13	LIQUID SCINT. COUNT	010119129-2-LCS	010119129-2
SWLO	01D0204	URANIUM-233,-234	LC1	104	%REC	2.5	PCI/L		0.0071	0.16	ALPHA SPEC	0101291212-LCS	0101291212
SWLO	01D0204	URANIUM-238	LC1	106	%REC	2.5	PCI/L		0.0071	0.16	ALPHA SPEC	0101291212-LCS	0101291212
SWLO	01D0209	AMERICIUM-241	LC1	101	%REC	1.9	PCI/L		0.05	0.13	ALPHA SPEC	0004131211-LCS	0012051212
SWLO	01D0209	PLUTONIUM-239/240	LC1	107	%REC	2.2	PCI/L		0.018	0.14	ALPHA SPEC	0004131211-LCS	0012051212
SWLO	01D0209	URANIUM-233,-234	LC1	103	%REC	2.5	PCI/L		0.0061	0.15	ALPHA SPEC	0004131211-LCS	0012051211
SWLO	01D0209	URANIUM-238	LC1	100	%REC	2.4	PCI/L		0.0061	0.14	ALPHA SPEC	0004131211-LCS	0012051211
SWLO	01D0213	AMERICIUM-241	LC1	79	%REC	1.5	PCI/L		0.017	0.1	ALPHA SPEC	0101301211-LCS	0101301211
SWLO	01D0213	PLUTONIUM-239/240	LC1	83	%REC	1.7	PCI/L		0.022	0.12	ALPHA SPEC	0101301211-LCS	0101301211
SWLO	01D0213	TRITIUM	LC1	87	%REC	680	PCI/L		2.7	13	LIQUID SCINT. COUNT	010119129-2-LCS	010119129-2
SWLO	01D0213	URANIUM-233,-234	LC1	108	%REC	2.6	PCI/L		0.0063	0.15	ALPHA SPEC	0101191211-LCS	0101191211
SWLO	01D0213	URANIUM-238	LC1	111	%REC	2.7	PCI/L		0.0063	0.15	ALPHA SPEC	0101191211-LCS	0101191211
SWLO	01D0219	AMERICIUM-241	LC1	100	%REC	1.9	PCI/L		0.045	0.15	ALPHA SPEC	0101151211-LCS	0101151211
SWLO	01D0219	PLUTONIUM-239/240	LC1	111	%REC	2.3	PCI/L		0.042	0.17	ALPHA SPEC	0101151211-LCS	0101151211
SWLO	01D0219	TRITIUM	LC1	90	%REC	710	PCI/L		2.6	14	LIQUID SCINT. COUNT	0101181291-LCS	0101181291
SWLO	01D0219	URANIUM-233,-234	LC1	107	%REC	2.6	PCI/L		0.0061	0.15	ALPHA SPEC	0101101211-LCS	0101101211
SWLO	01D0219	URANIUM-238	LC1	99	%REC	2.4	PCI/L		0.0061	0.14	ALPHA SPEC	0101101211-LCS	0101101211
SWLO	01D0229	AMERICIUM-241	LC1	100	%REC	1.9	PCI/L		0.045	0.15	ALPHA SPEC	0101151211-LCS	0101151211
SWLO	01D0229	PLUTONIUM-239/240	LC1	111	%REC	2.3	PCI/L		0.042	0.17	ALPHA SPEC	0101151211-LCS	0101151211
SWLO	01D0229	TRITIUM	LC1	90	%REC	710	PCI/L		2.6	14	LIQUID SCINT. COUNT	0101181291-LCS	0101181291
SWLO	01D0229	URANIUM-233,-234	LC1	107	%REC	2.6	PCI/L		0.0061	0.15	ALPHA SPEC	0101101211-LCS	0101101211
SWLO	01D0229	URANIUM-238	LC1	99	%REC	2.4	PCI/L		0.0061	0.14	ALPHA SPEC	0101101211-LCS	0101101211
SWLO	01D0269	AMERICIUM-241	LC1	79	%REC	1.5	PCI/L		0.017	0.1	ALPHA SPEC	0101301211-LCS	0101301211
SWLO	01D0269	PLUTONIUM-239/240	LC1	83	%REC	1.7	PCI/L		0.022	0.12	ALPHA SPEC	0101301211-LCS	0101301211
SWLO	01D0269	TRITIUM	LC1	85	%REC	660	PCI/L		2.9	13	LIQUID SCINT. COUNT	0103121291-LCS	0103121291
SWLO	01D0269	URANIUM-233,-234	LC1	104	%REC	2.5	PCI/L		0.0071	0.16	ALPHA SPEC	0101291212-LCS	0101291212
SWLO	01D0269	URANIUM-238	LC1	106	%REC	2.5	PCI/L		0.0071	0.16	ALPHA SPEC	0101291212-LCS	0101291212

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Lab	RIN	Analyte	Result Type	Result/ LCS Yield Fraction	Units	Analytical Result	Units	Lab Qual	Detect Limit	2 Sigma Error	Test Method	Lab Sample #	Lab Batch #
SWLO	01D0279	TRITIUM	LC1	89	%REC	700	PCI/L		2.4	14	LIQUID SCINT. COUNT	0101191291-LCS	0101191291
SWLO	01D0279	URANIUM-233,-234	LC1	85	%REC	2	PCI/L		0.076	0.36	ALPHA SPEC	0101261211-LCS	0101261211
SWLO	01D0279	URANIUM-238	LC1	105	%REC	2.5	PCI/L		0.076	0.4	ALPHA SPEC	0101261211-LCS	0101261211
SWLO	01D0281	AMERICIUM-241	LC1	88	%REC	1.7	PCI/L		0.019	0.12	ALPHA SPEC	0101251211-LCS	0101251211
SWLO	01D0281	PLUTONIUM-239/240	LC1	102	%REC	2.1	PCI/L		0.026	0.15	ALPHA SPEC	0101251211-LCS	0101251211
SWLO	01D0281	TRITIUM	LC1	90	%REC	710	PCI/L		2.6	14	LIQUID SCINT. COUNT	0101181291-LCS	0101181291
SWLO	01D0281	URANIUM-233,-234	LC1	102	%REC	2.5	PCI/L		0.035	0.35	ALPHA SPEC	0101291211-LCS	0101291211
SWLO	01D0281	URANIUM-238	LC1	107	%REC	2.6	PCI/L		0.06	0.36	ALPHA SPEC	0101291211-LCS	0101291211
SWLO	01D0283	AMERICIUM-241	LC1	79	%REC	1.5	PCI/L		0.017	0.1	ALPHA SPEC	0101301211-LCS	0101301211
SWLO	01D0283	PLUTONIUM-239/240	LC1	83	%REC	1.7	PCI/L		0.022	0.12	ALPHA SPEC	0101301211-LCS	0101301211
SWLO	01D0283	URANIUM-233,-234	LC1	107	%REC	2.6	PCI/L		0.029	0.15	ALPHA SPEC	0101251213-LCS	0101251213
SWLO	01D0283	URANIUM-238	LC1	108	%REC	2.6	PCI/L		0.0066	0.15	ALPHA SPEC	0101251213-LCS	0101251213
SWLO	01D0293	AMERICIUM-241	LC1	79	%REC	1.5	PCI/L		0.017	0.1	ALPHA SPEC	0101301211-LCS	0101301211
SWLO	01D0293	PLUTONIUM-239/240	LC1	83	%REC	1.7	PCI/L		0.022	0.12	ALPHA SPEC	0101301211-LCS	0101301211
SWLO	01D0293	URANIUM-233,-234	LC1	108	%REC	2.6	PCI/L		0.0063	0.15	ALPHA SPEC	0101191211-LCS	0101191211
SWLO	01D0293	URANIUM-238	LC1	111	%REC	2.7	PCI/L		0.0063	0.15	ALPHA SPEC	0101191211-LCS	0101191211
SWLO	01D0297	TRITIUM	LC1	89	%REC	700	PCI/L		2.4	14	LIQUID SCINT. COUNT	0101191291-LCS	0101191291
SWLO	01D0297	URANIUM-233,-234	LC1	108	%REC	2.6	PCI/L		0.0063	0.15	ALPHA SPEC	0101191211-LCS	0101191211
SWLO	01D0297	URANIUM-238	LC1	111	%REC	2.7	PCI/L		0.0063	0.15	ALPHA SPEC	0101191211-LCS	0101191211
SWLO	01D0306	AMERICIUM-241	LC1	79	%REC	1.5	PCI/L		0.017	0.1	ALPHA SPEC	0101301211-LCS	0101301211
SWLO	01D0306	PLUTONIUM-239/240	LC1	83	%REC	1.7	PCI/L		0.022	0.12	ALPHA SPEC	0101301211-LCS	0101301211
SWLO	01D0306	URANIUM-233,-234	LC1	108	%REC	2.6	PCI/L		0.0063	0.15	ALPHA SPEC	0101191211-LCS	0101191211
SWLO	01D0306	URANIUM-238	LC1	111	%REC	2.7	PCI/L		0.0063	0.15	ALPHA SPEC	0101191211-LCS	0101191211
GEL	01D0325	AMERICIUM-241	LC1	99	%REC						ALPHA SPEC	1000149871	60820
GEL	01D0325	NEPTUNIUM-237	LC1	113	%REC						ALPHA SPEC	1000149386	60609
GEL	01D0325	PLUTONIUM-239/240	LC1	101	%REC						ALPHA SPEC	1000149868	60819
GEL	01D0325	STRONTIUM-89,90	LC1	116	%REC						GAS PROP. COUNTER	1000148866	60415
GEL	01D0325	STRONTIUM-90	LC1	118	%REC						GAS PROP. COUNTER	1000148910	60429

Note: GEL (General Engineering Labs) does not perform LCS analyses for URANIUM-233/234 and URANIUM-235 but does do URANIUM-238.

Note: PARA (Paragon Labs) does not perform LCS analyses for URANIUM-235 but does do URANIUM-233/234 and URANIUM-238.

Note: SWLO (Southwest Lab of Oklahoma) does not perform LCS analyses for URANIUM-235 but does do URANIUM-233/234 and URANIUM-238.

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Table 11-7
Rinsate Quality Control Results - Detections Only
Groundwater 2000

Location	Sample Date	GW Sample #	Analyte	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	2 Sigma Error	Back-ground
Radionuclides												
10498	2/17/00	GW06678TE	AMERICIUM-241	0.01438	PCI/L	0.145	J	V1	0.00779		0.01259	
12691	7/27/00	GW07117RG	AMERICIUM-241	0.0354	PCI/L	0.145		V	0.00624		0.0168	
P209389	1/18/00	GW06758TE	AMERICIUM-241	0.04028	PCI/L	0.145		V	0.0052		0.01722	
P209389	7/31/00	GW07119RG	AMERICIUM-241	0.00628	PCI/L	0.145	J	V1	0.00628		0.00711	
10194	2/1/00	GW06672TE	PLUTONIUM-239/240	0.01961	PCI/L	0.151	J	V1	0.0059		0.01281	
10498	8/10/00	GW07021RG	PLUTONIUM-239/240	0.012	PCI/L	0.151	J	V1	0.005		0.01	
11891	10/24/00	GW07247RG	PLUTONIUM-239/240	0.0068	PCI/L	0.151	J	V	0.0031		0.0055	
12691	2/2/00	GW06811TE	PLUTONIUM-239/240	0.0084	PCI/L	0.151	J	V1	0.00759		0.00951	
P209389	7/31/00	GW07119RG	PLUTONIUM-239/240	0.00986	PCI/L	0.151	J	V1	0.00986		0.0112	
P209389	7/31/00	GW07119RG	STRONTIUM-90	0.094	PCI/L	0.852		V1	0.363		0.214	
891COLGAL	8/24/00	GW07129RG	URANIUM-233,-234	5.8	PCI/L	1.06		V1	0.158		0.818	60.7
891COLWEL	8/24/00	GW07127RG	URANIUM-233,-234	10.3	PCI/L	1.06		V1	0.15		1.06	60.7
891COLWEL	8/24/00	GW07127RG	URANIUM-235	0.285	PCI/L	1.01	J	V1	0.0852		0.177	1.79
891COLGAL	8/24/00	GW07129RG	URANIUM-238	4.6	PCI/L	0.768		V1	0.186		0.729	41.8
891COLWEL	8/24/00	GW07127RG	URANIUM-238	6.51	PCI/L	0.768		V1	0.0852		0.843	41.8
Volatile Organic Compounds												
891COLWEL	8/24/00	GW07127RG	1,1,1-TRICHLOROETHANE	1	UG/L	200	J	J1	20	20		
891COLWEL	8/24/00	GW07127RG	1,1-DICHLOROETHENE	6	UG/L	7	J	J1	20	20		
891COLWEL	8/24/00	GW07127RG	CARBON TETRACHLORIDE	8	UG/L	5	J	J1	20	20		
01097	9/18/00	GW07179RG	CHLOROMETHANE	1	UG/L	6.55		V	0.5	1		
11891	5/5/00	GW06845RG	CHLOROMETHANE	3	UG/L	6.55		V	1	1		
11891	10/24/00	GW07247RG	CHLOROMETHANE	2.2	UG/L	6.55		V1	0.5	1		
12191	6/19/00	GW06920RG	CHLOROMETHANE	2	UG/L	6.55		V	1	1		
30800	10/24/00	GW07174RG	CHLOROMETHANE	1.4	UG/L	6.55		V1	0.5	1		
70193	5/10/00	GW06889RG	CHLOROMETHANE	3	UG/L	6.55		V1	1	1		
SW00495	10/26/00	SW07217RG	CHLOROMETHANE	0.26	UG/L	6.55	J	V	0.5	1		
SW13494	8/22/00	SW07125RG	CHLOROMETHANE	0.3	UG/L	6.55	J	V1	1	1		
308-P-1	10/12/00	GW07206RG	DICHLORODIFLUOROMETHANE	1	UG/L			V1	1	1		
P209389	1/18/00	GW06758TE	DICHLORODIFLUOROMETHANE	0.2	UG/L		J	V	1	1		
04591	3/6/00	GW06694TE	METHYLENE CHLORIDE	0.1	UG/L	5	JB	JB	1			
10194	2/1/00	GW06672TE	METHYLENE CHLORIDE	0.2	UG/L	5	JB	JB1	1			
10498	8/10/00	GW07121RG	METHYLENE CHLORIDE	0.4	UG/L	5	JB	JB	1	1		
12691	2/2/00	GW06811TE	METHYLENE CHLORIDE	0.2	UG/L	5	JB	JB1	1			
12691	7/27/00	GW07117RG	METHYLENE CHLORIDE	0.3	UG/L	5	JB	JB	1	1		
15699	5/19/00	GW06892RG	METHYLENE CHLORIDE	0.2	UG/L	5	JB	JB1	1	1		
3586	5/18/00	GW06926RG	METHYLENE CHLORIDE	0.1	UG/L	5	JB	JB1	1	1		
41299	12/12/00	GW07332RG	METHYLENE CHLORIDE	0.94	UG/L	5	B	JB1	0.5	1		
70193	7/26/00	GW07123RG	METHYLENE CHLORIDE	0.2	UG/L	5	JB	JB	1	1		
891COLGAL	8/24/00	GW07129RG	METHYLENE CHLORIDE	0.5	UG/L	5	JB	JB1	1	1		
891COLWEL	8/24/00	GW07127RG	METHYLENE CHLORIDE	150	UG/L	5	B	J1	20	20		
P218089	12/5/00	GW07113RG	METHYLENE CHLORIDE	0.67	UG/L	5	JB	JB1	1	2		
P419689	5/23/00	GW06884RG	METHYLENE CHLORIDE	0.2	UG/L	5	JB	JB1	1	1		
SW13494	8/22/00	SW07125RG	METHYLENE CHLORIDE	0.2	UG/L	5	JB	JB1	1	1		
11891	10/24/00	GW07247RG	NAPHTHALENE	1	UG/L	1460	B	JB1	0.5	1		
10498	2/17/00	GW06678TE	TETRACHLOROETHENE	0.5	UG/L	5	J	V	1			
11891	5/5/00	GW06845RG	TETRACHLOROETHENE	0.1	UG/L	5	J	V	1	1		
15699	5/19/00	GW06892RG	TETRACHLOROETHENE	0.3	UG/L	5	J	V1	1	1		
891COLGAL	8/24/00	GW07129RG	TETRACHLOROETHENE	0.2	UG/L	5	J	V1	1	1		
891COLWEL	8/24/00	GW07127RG	TETRACHLOROETHENE	34	UG/L	5		V1	20	20		
12191	6/19/00	GW06920RG	TRICHLOROETHENE	0.1	UG/L	5	J	V	1	1		
15699	5/19/00	GW06892RG	TRICHLOROETHENE	0.2	UG/L	5	J	V1	1	1		
891COLGAL	8/24/00	GW07129RG	TRICHLOROETHENE	1	UG/L	5	J	V1	1	1		
891COLWEL	8/24/00	GW07127RG	TRICHLOROETHENE	320	UG/L	5		V1	20	20		

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Table 11-7
Rinsate Quality Control Results - Detections Only
Groundwater 2000

Location	Sample Date	GW Sample #	Analyte	Result	Units	Tier II	Lab Qual	Valid-ation	Detect Limit	Dilu-tion	2 Sigma Error	Back-ground
Dissolved and Total Metals												
11891	5/5/00	GE06845RG	ALUMINUM	24.5	UG/L	36500		UJ	4.7			234.1
891COLGAL	8/24/00	GW07129RG	ALUMINUM	23	UG/L	36500		UJ	2.6	1		234.1
891COLWEL	8/24/00	GW07127RG	ALUMINUM	32.8	UG/L	36500		V	2.6	1		234.1
P209389	7/31/00	GW07119RG	ALUMINUM	17.4	UG/L	36500		UJ1	2.6	1		234.1
P209389	1/18/00	GW06758TE	ANTIMONY	0.52	UG/L	6		V1	0.52	1		39.54
891COLGAL	8/24/00	GW07129RG	BARIUM	166	UG/L	2000		V	0.05	1		152.54
891COLGAL	8/24/00	GW07129RG	CALCIUM	155000	UG/L			V	27.5	10		120543
891COLWEL	8/24/00	GW07127RG	CALCIUM	197000	UG/L			V	27.5	10		120543
P209389	1/18/00	GW06758TE	LEAD	3.5	UG/L	15		UJ1	0.52	1		11.01
891COLGAL	8/24/00	GW07129RG	MAGNESIUM	41700	UG/L			UJ	2	1		26656
891COLWEL	8/24/00	GW07127RG	MAGNESIUM	39900	UG/L			UJ	2	1		26656
891COLGAL	8/24/00	GW07129RG	SELENIUM	20.4	UG/L	50		V	1.1	1		43.72
891COLWEL	8/24/00	GW07127RG	SELENIUM	676	UG/L	50		V	1.1	1		43.72
891COLGAL	8/24/00	GW07129RG	SODIUM	109000	UG/L			V	68	10		119349
891COLWEL	8/24/00	GW07127RG	SODIUM	143000	UG/L			V	68	10		119349
P209389	1/18/00	GW06758TE	SODIUM	282	UG/L			V1	7	1		119349
891COLGAL	8/24/00	GW07129RG	STRONTIUM	1220	UG/L	21900		V	0.02	1		930.76
891COLWEL	8/24/00	GW07127RG	STRONTIUM	1310	UG/L	21900		V	0.02	1		930.76
891COLGAL	8/24/00	GW07129RG	ZINC	105	UG/L	11000		V	0.1	1		49.77
891COLWEL	8/24/00	GW07127RG	ZINC	99	UG/L	11000		V	0.1	1		49.77
Water Quality Parameters												
10498	2/17/00	GW06678TE	CYANIDE	0.04	MG/L	200		V1	0.005			
11891	10/24/00	GW07247RG	NITRATE/NITRITE	0.05	MG/L	10		V	0.05			4.664
41299	12/12/00	GW07332RG	NITRATE/NITRITE	0.09	MG/L	10		V1	0.05			4.664
70193	10/31/00	GW07288RG	NITRATE/NITRITE	0.09	MG/L	10		V	0.05			4.664
10194	2/1/00	GW06672TE	TOTAL DISSOLVED SOLIDS	22	MG/L			V1	10			979.51
10498	2/17/00	GW06678TE	TOTAL DISSOLVED SOLIDS	12	MG/L			J	10			979.51
10498	8/10/00	GW07121RG	TOTAL DISSOLVED SOLIDS	16	MG/L			V1	10			979.51
12191	6/19/00	GW06920RG	TOTAL DISSOLVED SOLIDS	24	MG/L			V1	10			979.51
12691	7/27/00	GW07117RG	TOTAL DISSOLVED SOLIDS	38	MG/L			V	10			979.51
3586	5/18/00	GW06926RG	TOTAL DISSOLVED SOLIDS	20	MG/L			V	10			979.51
70193	1/11/00	GW06750TE	TOTAL DISSOLVED SOLIDS	10	MG/L			V1	10			979.51
70193	7/26/00	GW07123RG	TOTAL DISSOLVED SOLIDS	26	MG/L			V	10			979.51
70193	10/31/00	GW07288RG	TOTAL DISSOLVED SOLIDS	18	MG/L			V	10			979.51
P209389	1/18/00	GW06758TE	TOTAL DISSOLVED SOLIDS	18	MG/L			V1	10			979.51
P209389	7/31/00	GW70119RG	TOTAL DISSOLVED SOLIDS	32	MG/L			V	10			979.51

Gray filled cells for Locations 891COLGAL and 891COLWEL indicate case were "well" water was inappropriately collected and shipped as a RINSE sample. This situation represents an error in sample collection and has been addressed with the sampling crews. See Third Quarter 2000 Report.

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Table 11-8
RFCA Groundwater Monitoring Sample Comparison: Required versus Actual Calendar Year 2000

Sample Types	Required Number of Visits					Actual Number of Visits*					Actual Number of Samples Collected					Deviation					Success Ratio % Samples Collected (or Wells 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)	83	86	75	107	351	83	86	75	107	351	NA	NA	NA	NA		0	0	0	0	0	100.0	100.0	100.0	100.0	100.0	
VOC's	82	86	72	106	346	82	86	72	106	346	69	63	59	81	272	13	23	13	25	74	84.1	73.3	81.9	76.4	78.6	Dry / Insw / 2 Damaged
Metals	62	73	64	86	285	62	73	64	86	285	55	46	54	54	209	7	27	10	32	76	88.7	63.0	84.4	62.8	73.3	Dry / Insw / 2 Damaged
Dissolved Gasses	8			9	17	8			9	17	5			9	14	3			0	3	62.5			100.0	82.4	Dry
PCBs		13		16	29		13		16	29		5		5	10		8		11	19		38.5		31.3	34.5	Dry or Insw
Radionuclides																										
Pu/Am	42	49	44	61	196	42	49	44	61	196	32	23	32	31	118	10	26	12	30	78	76.2	46.9	72.7	50.8	60.2	Dry / Insw / 2 Damaged
U-isotope	65	76	64	88	293	65	76	64	88	293	54	48	51	51	204	11	28	13	37	89	83.1	63.2	79.7	58.0	69.6	Dry / Insw / 2 Damaged
Tritium	17	38	17	44	116	17	38	17	44	116	14	23	13	27	77	3	15	4	17	39	82.4	60.5	76.5	61.4	66.4	Dry or Insw
Strontium-89/90	10	14	9	13	46	10	14	9	13	46	10	4	5	4	23	0	10	4	9	23	100.0	28.6	55.6	30.8	50.0	Dry or Insw
Cesium-137	6		6		12	6		6		12	3		4		7	3		2		5	50.0		66.7		58.3	Insw
Neptunium-237		8		16	24		8		16	24		1		4	5		7		12	19		12.5		25.0	20.8	Dry or Insw
Water Quality Parameters																										
Chloride	8			9	17	8			9	17	5			9	14	3			0	3	62.5			100.0	82.4	Dry
Fluoride	17	23	17	23	80	17	23	17	23	80	10	11	13	10	44	4	12	4	13	33	58.8	47.8	76.5	43.5	55.0	Dry / Insw / Missed
Nitrate	8			9	17	8			9	17	5			9	14	3			0	3	62.5			100.0	82.4	Dry
Nitrate/Nitrite	58	70	57	76	261	58	70	57	76	261	51	48	47	48	194	7	22	10	28	67	87.9	68.6	82.5	63.2	74.3	Dry/Insw/2 Dmgd/1 Not Ship
Organic Carbon - Diss.	8				8	8				8	5				5	3				3	62.5				62.5	Dry
Organic Carbon - Total	8			9	17	8			9	17	5			9	14	3			0	3	62.5			100.0	82.4	Dry
Sulfate	40	31	32	39	142	40	31	32	39	142	27	13	23	22	85	22	18	9	17	66	67.5	41.9	71.9	56.4	59.9	Dry / Insw / Missed / 1Dmgd
Sulfide	8			9	17	8			9	17	5			8	13	3			1	4	62.5			88.9	76.5	Dry
Total Cyanide	6	7	6	7	26	6	7	6	7	26	3	7	3	7	20	3	0	3	0	6	50.0	100.0	50.0	100.0	76.9	Insw
Total Dissolved Solids	59	50	58	86	253	59	50	58	86	253	49	27	45	52	173	10	23	13	34	80	83.1	54.0	77.6	60.5	68.4	Dry / Insw / 2 Damaged
T. Petrol. Hydrocarbon		2		12	14		2		12	14		0		7	7	0	2		5	7		0.0		58.3	50.0	Dry or Insw
Totals	512	540	446	718	2216	512	540	446	718	2216	407	319	349	447	1522	111	221	97	271	700	79.5	59.1	78.3	62.3	68.7	

*Does not reflect multiple visits to dry wells.
Damaged (Dmgd) = Well damaged, sample could not be collected.
Dry = Well did not recharge after purging. No samples collected.
Insw = Insufficient water to complete sample suite.
Missed = Sample inadvertently not collected.
1 Not Shipped = Sample collected but lost during shipping.

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Table 11-9
Summary of Groundwater Validation / Verification Completeness
Calendar Year 2000

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		5205	4350	4234	5626	19415	60	0	0	0	60	5265	4350	4234	5626	19475	98.9	100	100	100	99.7					
Dissolved Gasses												27			42	69						27			42	69
Metals		1842	1566	1987	1763	7158	21	0	19	82	122	1863	1566	2006	1845	7280	98.9	100	99.1	95.6	98.3					
PCBs			35		49	84		0		0	0		35		49	84		100		100	100.0					
Radionuclides																										
	Pu / Am	86	58	85	75	304	0	0	0	1	1	86	58	85	76	305	100	100	100	98.7	99.7					
	U-isotopes	216	189	198	201	804	0	0	0	0	0	216	189	198	201	804	100	100	100	100	100.0					
	Tritium	22	28	18	33	101	0	0	0	0	0	22	28	18	33	101	100	100	100	100	100.0					
	Strontium-89/90	12	4	13	8	37	0	0	0	0	0	12	4	13	8	37	100	100	100	100	100.0					
	Cesium-137											3		6		9						3		6		9
	Neptunium-237		1		7	8		0		0	0		1		7	8		100		100	100.0					
Water Quality Parameters																										
	Chloride	6			10	16	0			0	0	6			10	16	100			100	100.0					
	Fluoride	13	16	18	13	60	0	0	0	0	0	13	16	18	13	60	100	100	100	100	100.0					
	Nitrate	6			10	16	0			0	0	6			10	16	100			100	100.0					
	Nitrate/Nitrite	65	60	57	60	242	0	0	0	0	0	65	60	57	60	242	100	100	100	100	100.0					
	Organic Carbon - Dissolved	6				6	0				0	6				6	100				100.0					
	Organic Carbon - Total	6			10	16	0			0	0	6			10	16	100			100	100.0					
	Sulfate	31	16	28	26	101	0	0	0	0	0	31	16	28	26	101	100	100	100	100	100.0					
	Sulfide	6			9	15	0			0	0	6			9	15	100			100	100.0					
	Total Cyanide	5	8	5	9	27	0	0	0	0	0	5	8	5	9	27	100	100	100	100	100.0					
	Total Dissolved Solids	62	36	54	63	215	0	0	0	0	0	62	36	54	63	215	100	100	100	100	100.0					
	Total Petroleum Hydrocarbons				10	10				0	0				10	10				100	100.0					
Totals		7589	6367	6697	7982	28635	81	0	19	83	183	7700	6367	6722	8107	28896	98.6	100	99.6	98.5	99.1	30	0	6	42	78

Usable data points include the following Validation/Verification qualifiers: J/J1, JB/JB1, U/U1, UJ/UJ1, V/V1.

Non-usable data points include the following Validation/Verification qualifiers: R/R1.

Because Cesium and Methane analyses are set up via special contracts they are not being validated at this time.

With respect to TR1-DL1 or TR1-TR2 analytical series, only one Result from a pair (with a validation qualifier) is counted here.

Completeness = $Dp_u = \frac{DP_t - DP_n}{DP_t} \times 100$ (in percent)

The acceptable QC criterion is **>90%.**

671/671

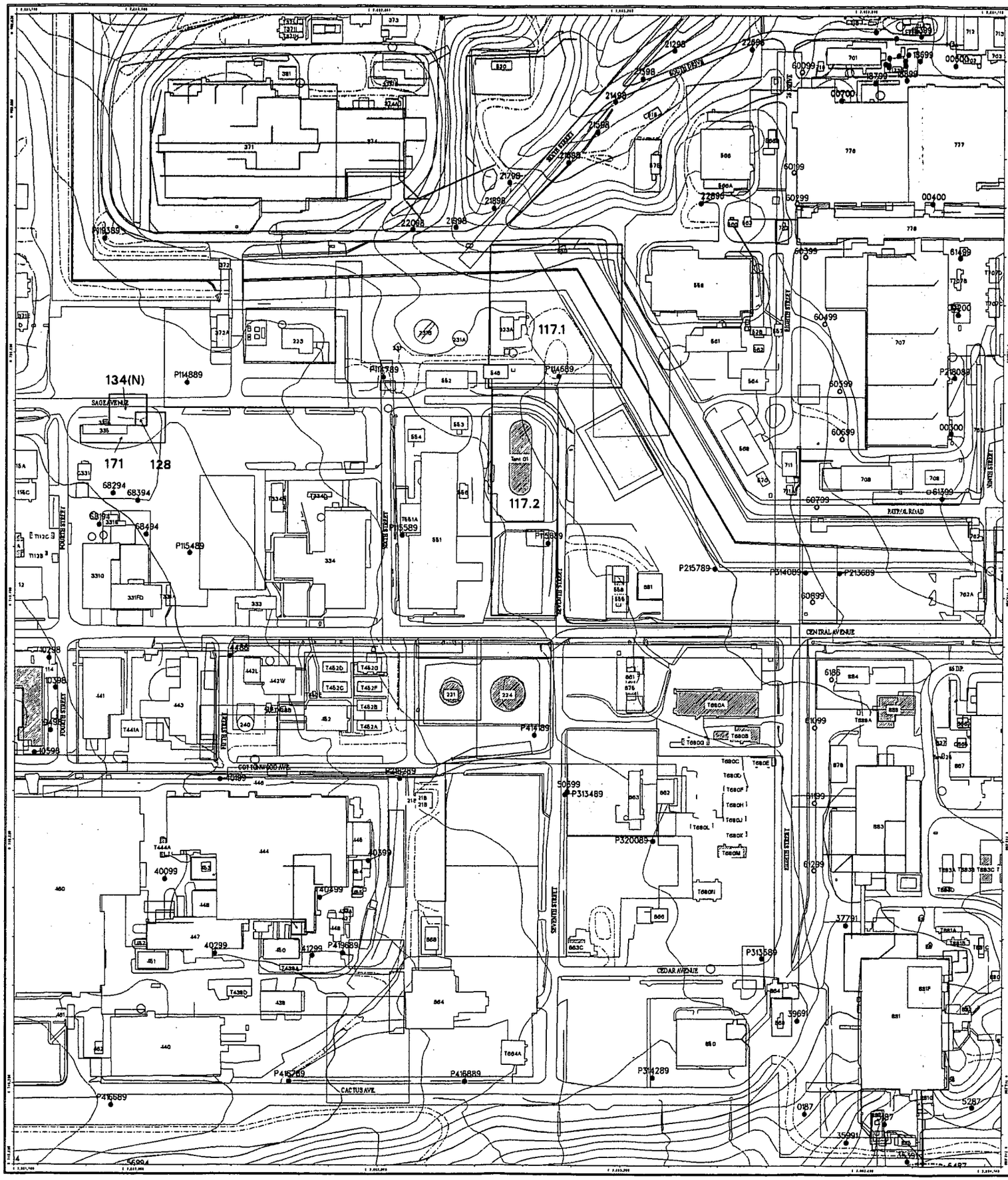

Figure 8-1

East Industrial Area Plume

Individual Hazardous Substance Sites Potential Areas Concern and Groundwater Monitoring Wells

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- East Area Industrial Plume Investigation Wells
- All Other Wells (Abandoned Wells Not Included)
- Foundation Drain
- IHSS (IHSSs of interest labeled)
- PAC

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:
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.

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Scale = 1 : 2500
1 inch represents approximately 283 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

MAP ID: 01-0931
November 01, 2001

NT_Svr w:/projects/fy2001/01-0931/zoom-gw-prop.aml

282

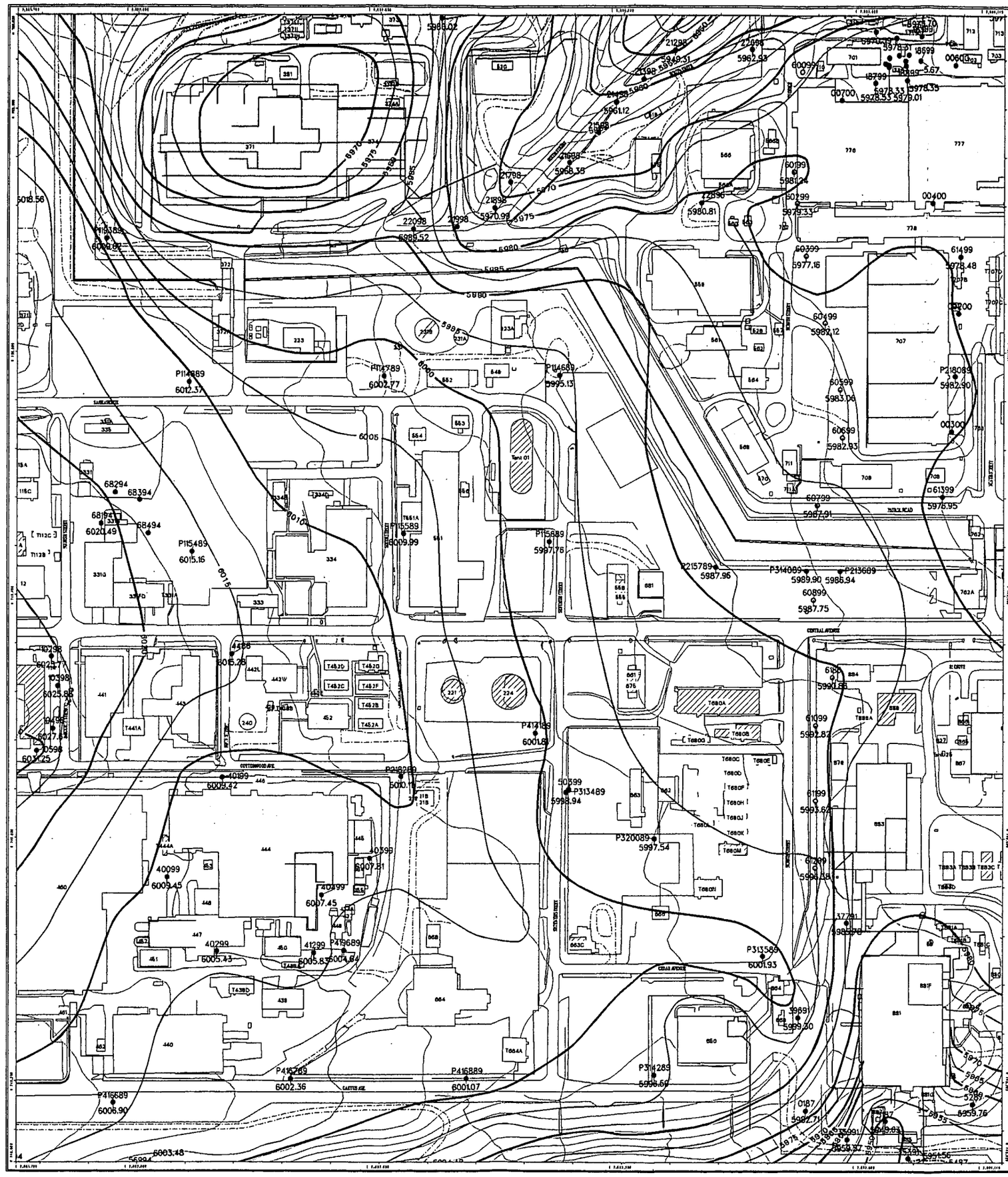

Figure 8-2

East Industrial Area Plume

Groundwater Surface Elevation
4th Quarter 2000

2000 Annual RFCA
Groundwater Monitoring Report

EXPLANATION

- East Area Industrial Plume Investigation Wells
- All Other Wells (Abandoned Wells Not Included)

Water Level Contours

- 10-Foot Index Potentiometric Contours
- 5-Foot Intermediate Potentiometric Contours

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
- Foundation Drain

DATA SOURCE BASE FEATURES:

Potentiometric Contours interpreted by RMRS 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.

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Scale = 1 : 3500
1 inch represents approximately 292 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

MAP ID: 01-0931

November 03, 2001

NT_Svr w:/projects/fy2001/01-0931/zoom-gw-potcon.aml

283

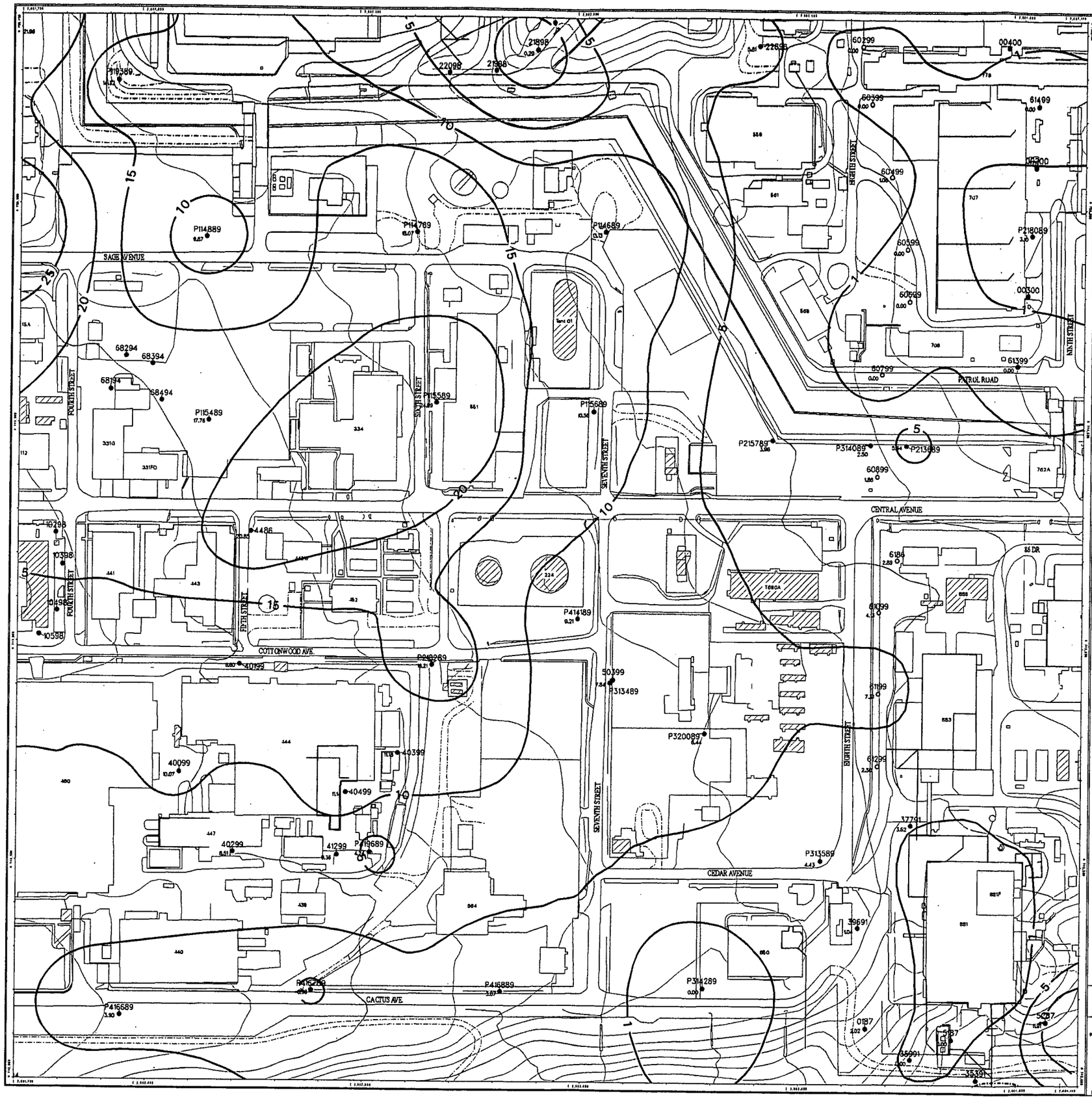

Figure 8-3

East Industrial Area Plume

Saturated Thickness of Unconsolidated Surficial Deposits 4th Quarter 2000

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- East Area Industrial Plume Investigation Wells
- All Other Wells (Abandoned Wells Not Included)

Water Level Contours

- Saturated Alluvial Thickness Contours

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
- Foundation Drain

DATA SOURCE BASE FEATURES:

Alluvial Contours Created Using Inverse Distance Weighting Parameters as directed by RMRS Subject Matter Expert, Joel Sobal:
Cell Size: 10 feet
Num of Samples: 10
Maximum Radius: 1500
Weighting Power: 3

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.

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Scale = 1 : 3010
1 inch represents approximately 251 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

MAP ID: 01-0931

November 03, 2001

NT_Svr w:/projects/fy2001/01-0931/zoom-gw-satcon.aml

284

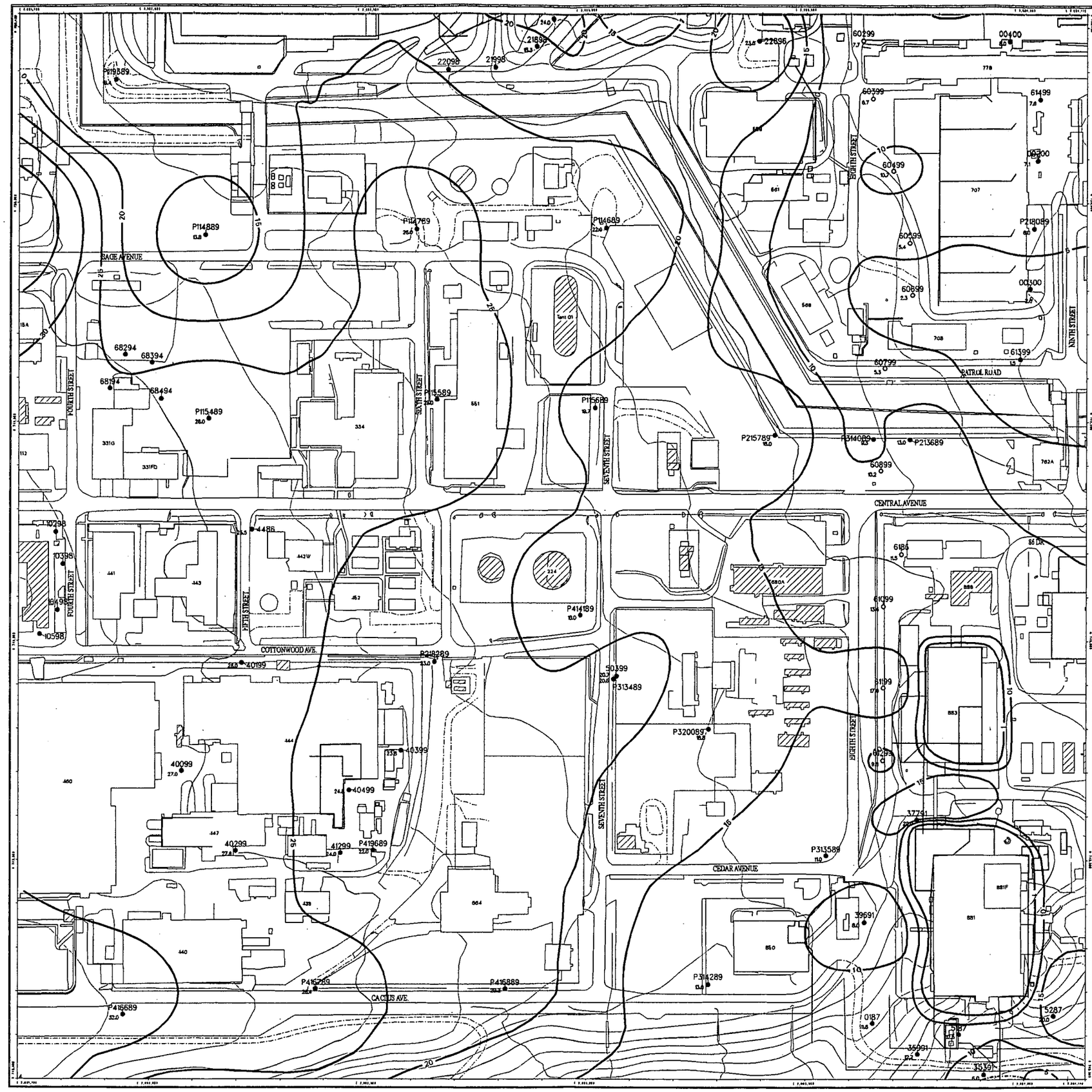

Figure 8-4

East Industrial Area Plume

Thickness of
Unconsolidated Surficial Deposits
4th Quarter 2000

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- East Area Industrial Plume Investigation Wells
- All Other Wells (Abandoned Wells Not Included)

Water Level Contours

- 5-Foot Alluvial Thickness Contours

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
- Foundation Drain

DATA SOURCE BASE FEATURES:

Alluvial Contours Created Using Inverse Distance Weighting Parameters as directed by RMRS Subject Matter Expert, Joel Sobol:
Cell Size: 10 feet
Num of Samples: 10
Maximum Radius: 1500
Weighting Power: 3

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.

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Scale = 1 : 2010
1 inch represents approximately 251 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

MAP ID: 01-0831

November 09, 2001

NT_Svr w:/projects/fy2001/01-0831/zoom-gw-altcon.aml

285

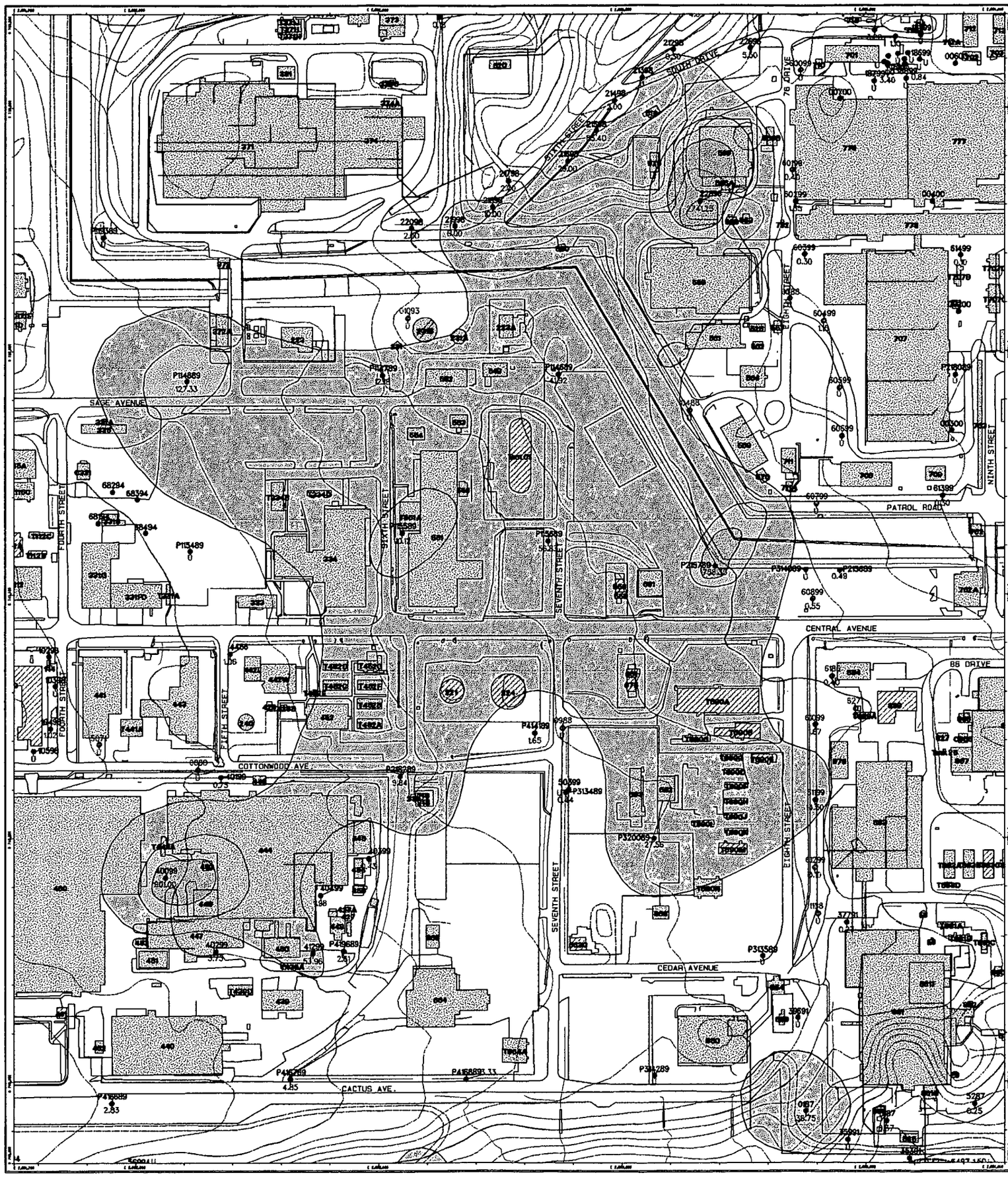

Figure 8-5

East Industrial Area Plume

Chemical Concentrations

Average Trichloroethene concentrations in groundwater from 1991-2000 in ug/L

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- East Area Industrial Plume Investigation Wells
- All Other Wells (Abandoned Wells Not Included)
- Abandoned Wells
- Foundation Drain

Concentrations

- 5 ug/L (Tier II)
- 100 ug/L
- 500 ug/L (Tier I)

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:

Subject Matter Expert: Joel Sobol x6788
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 Knudsen (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.

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Scale = 1 : 2000
1 inch represents approximately 333 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KHI — KAISER-HILL COMPANY

NT_Svr w:/projects/fy2001/01-0361/avgtce.aml

286

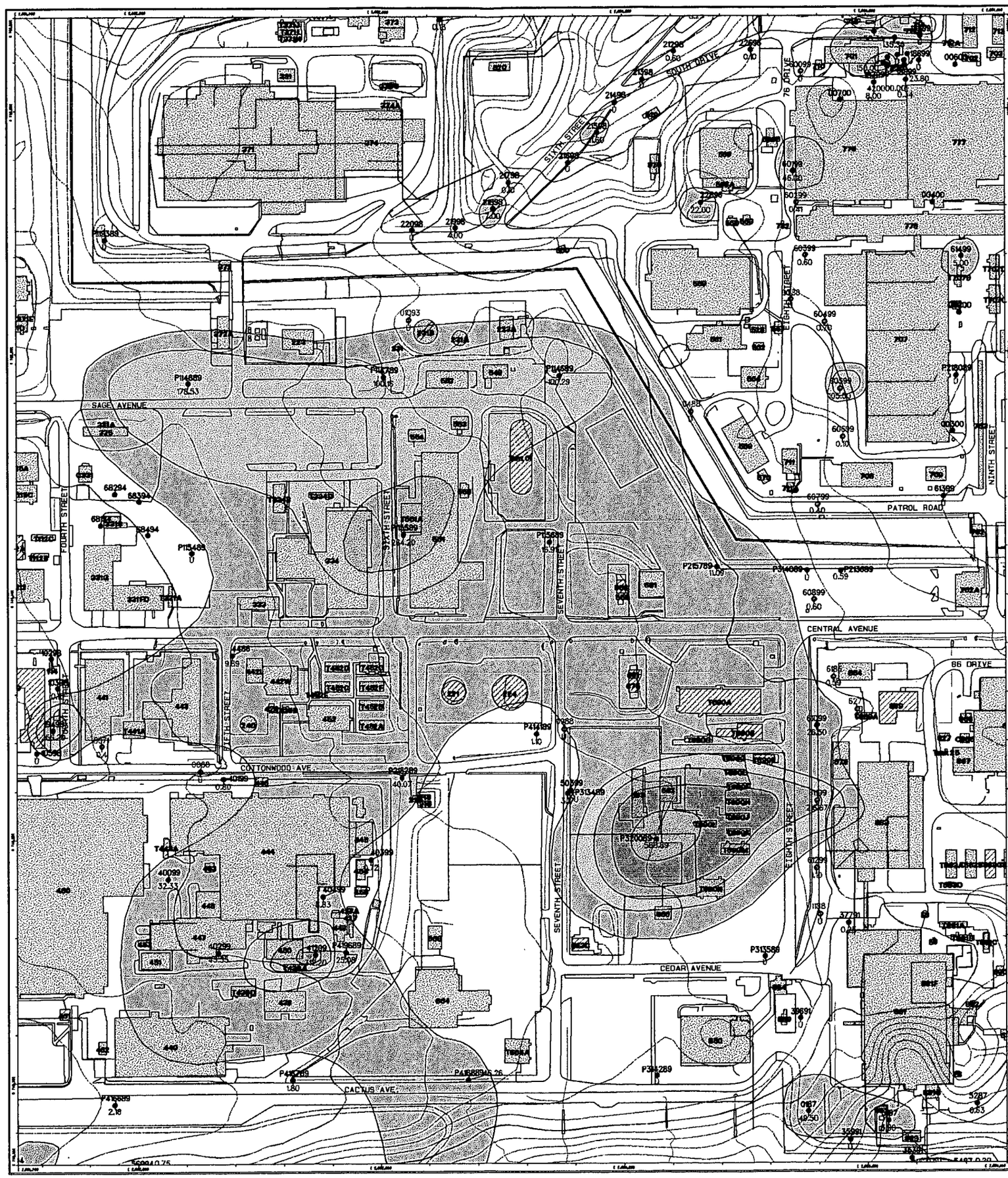

Figure 8-6

East Industrial Area Plume

Chemical Concentrations

Average Tetrachloroethene concentrations in groundwater from 1991-2000 in ug/L

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- East Area Industrial Plume Investigation Wells
- All Other Wells (Abandoned Wells Not Included)
- Abandoned Wells
- Foundation Drain

Concentrations

- 5 ug/L (Tier II)
- 100 ug/L
- 200 ug/L
- 300 ug/L
- 500 ug/L (Tier I)

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:

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.

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Scale = 1 : 2000
1 inch represents approximately 232 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KH — KAISER-HILL COMPANY

MAP ID: 01-0981 — November 08, 2001

NT_Svr w:/projects/fy2001/01-0981/avgpce.aml

287

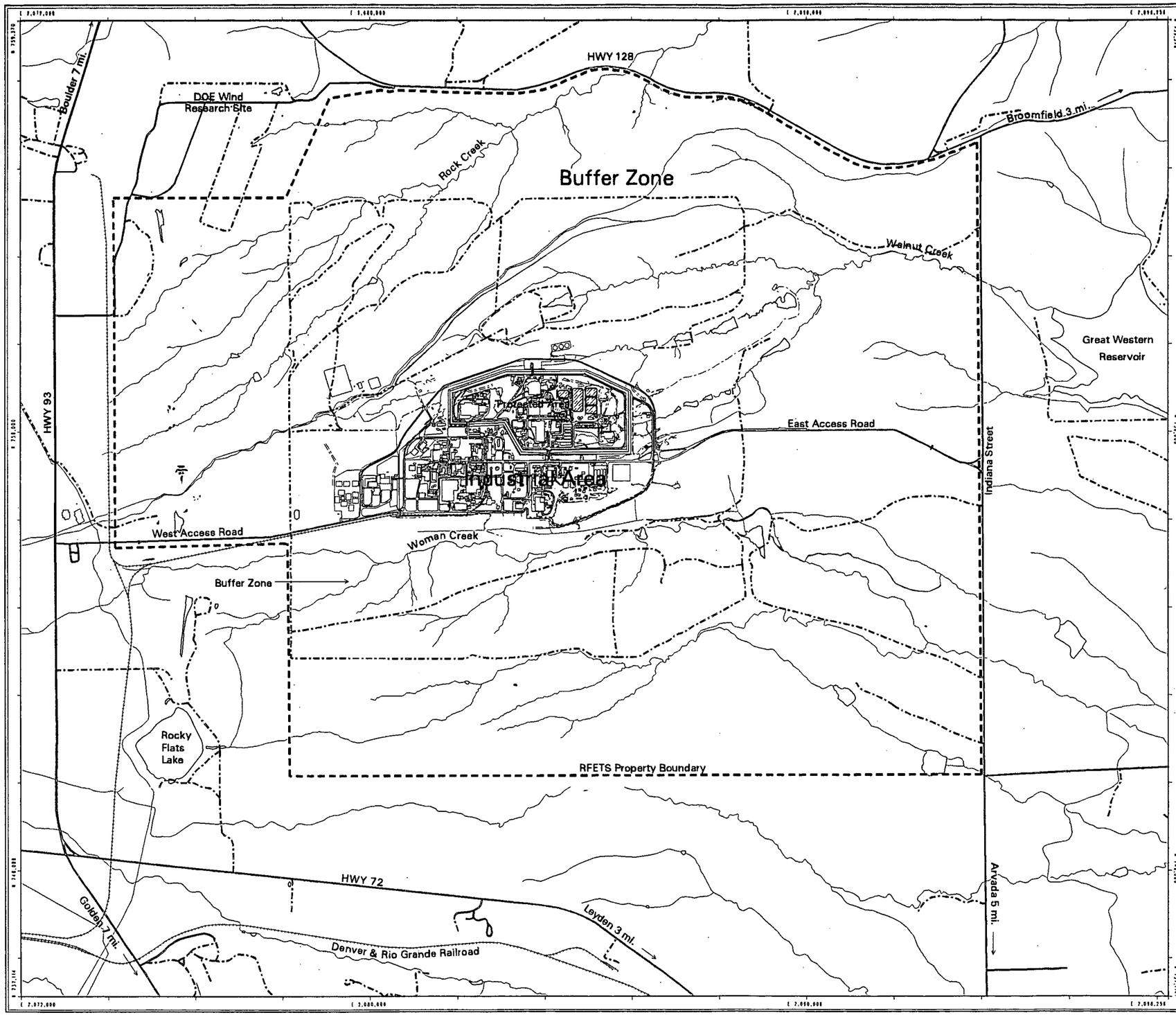

Figure 1-2

Rocky Flats Environmental Technology Site Map

2000 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 2800ft

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

MAP ID: 01-0927

November 02, 2001

NT_Svr w:/projects/fy2001/01-0927/fig1-2.aml

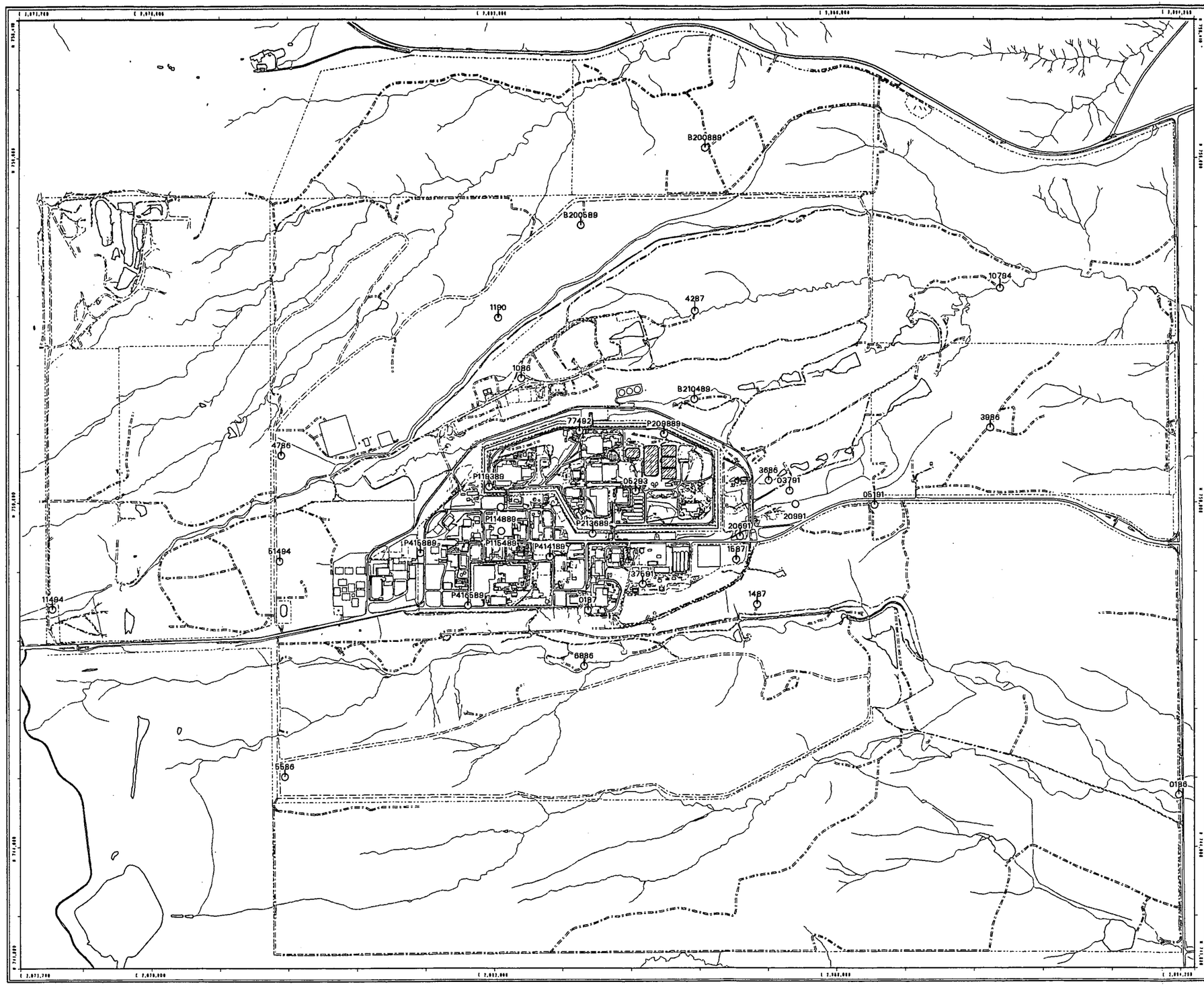

Figure 3-1
Real-Time Groundwater Monitoring Well Locations

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Groundwater well with real time water level monitoring
- Groundwater well added to real time water level monitoring program in 1999

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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Scale = 1 : 21330
1 inch represents approximately 1778 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

MAP ID: 01-0928 November 02, 2001

Original map contents are preserved. Logo and date have changed.

NT_Svr w:/projects/fy2001/01-0928/wtr-level-nt.aml

84

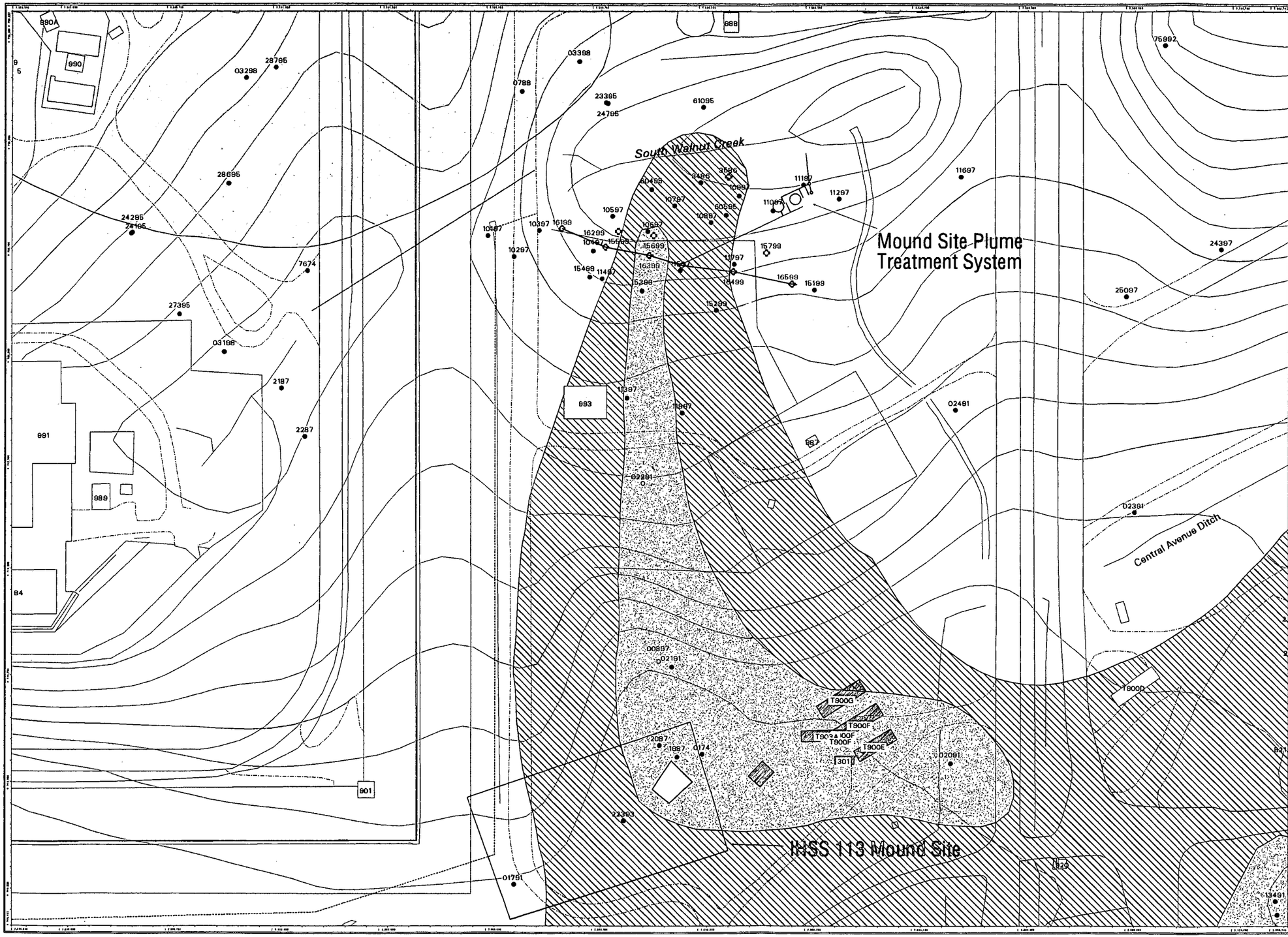

Figure 4-1

Mound Site Plume Area and Source Removal

2000 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 Piping and Treatment System
- 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)
- Rocky Flats boundary
- 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. 303-966-7707

Prepared for: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KAISER-HILL COMPANY

MAP ID: 01-0869

Original map content is preserved. Legs and data have changed.

November 07, 2001

NT_Svr w:/projects/fy2001/01-0869/moundsite.aml

151

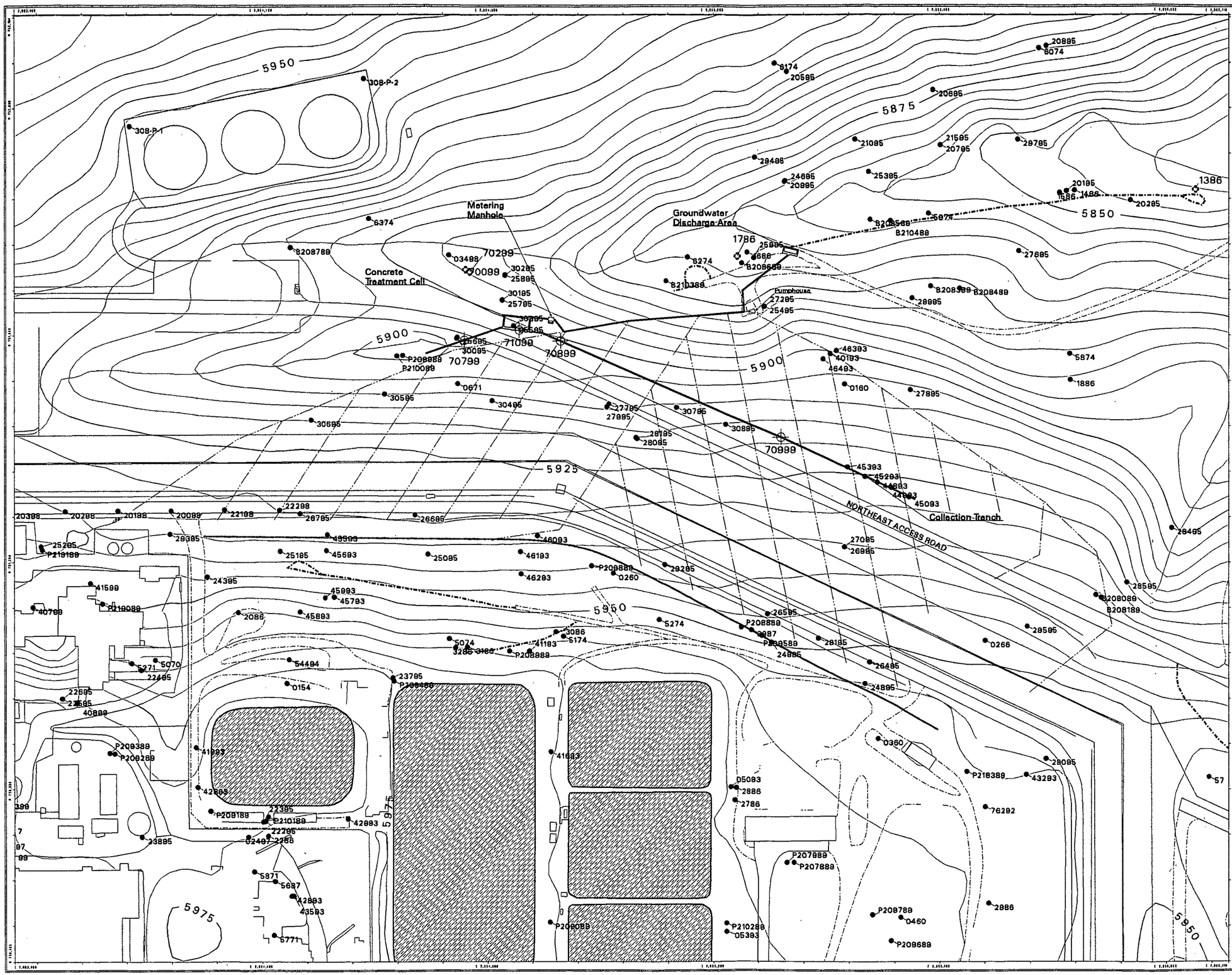

Figure 4-3

Solar Ponds Plume Treatment System Locations

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Old Interceptor Trench System
- New Interceptor Trench System (Installed 1999)
- Other Flow Monitoring Well
- In Trench Piezometer Location
- Plume Treatment System Monitoring Well

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

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 : 2020
1 inch represents approximately 168 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

MAP ID: 01-0871/solar_pond.aml

September 25, 2001

NT_Svr w:/projects/fy2001/01-0871/solar_pond.aml

153

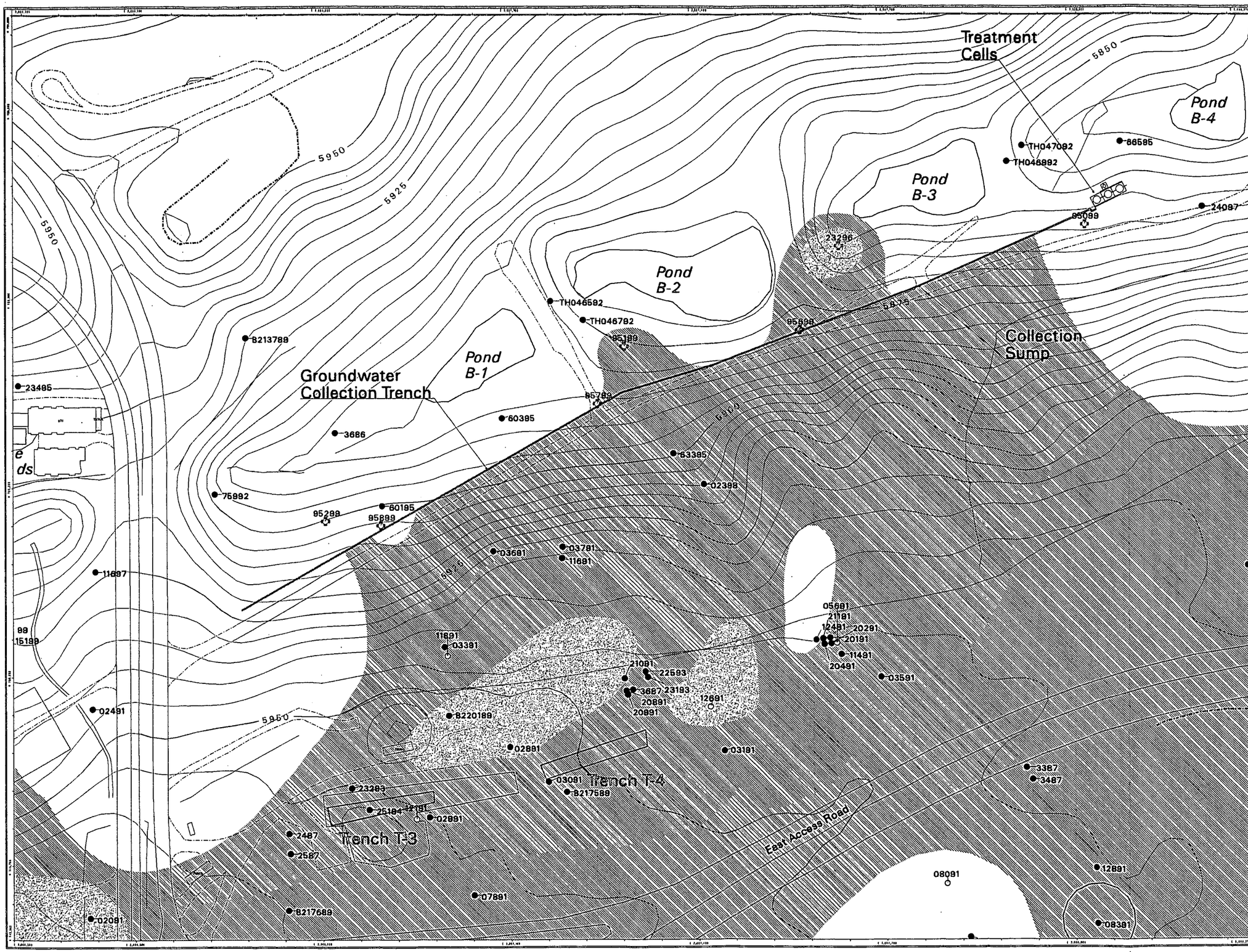

Figure 4-4

East Trenches Plume Treatment System Locations

2000 Annual RFCA Groundwater Monitoring Report

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 (100 X MCL)
- Composite VOC Groundwater Plume (concentration equal to MCL)

Standard Map Features

- Buildings and other structures
- 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, hydrographic 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 EGRI 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 : 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

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KAISER-HILL COMPANY

MAP ID: 01-0872east_trench.aml

September 25, 2001

NT_Svr w:/projects/fy2001/01-0872/east_trench.aml

154

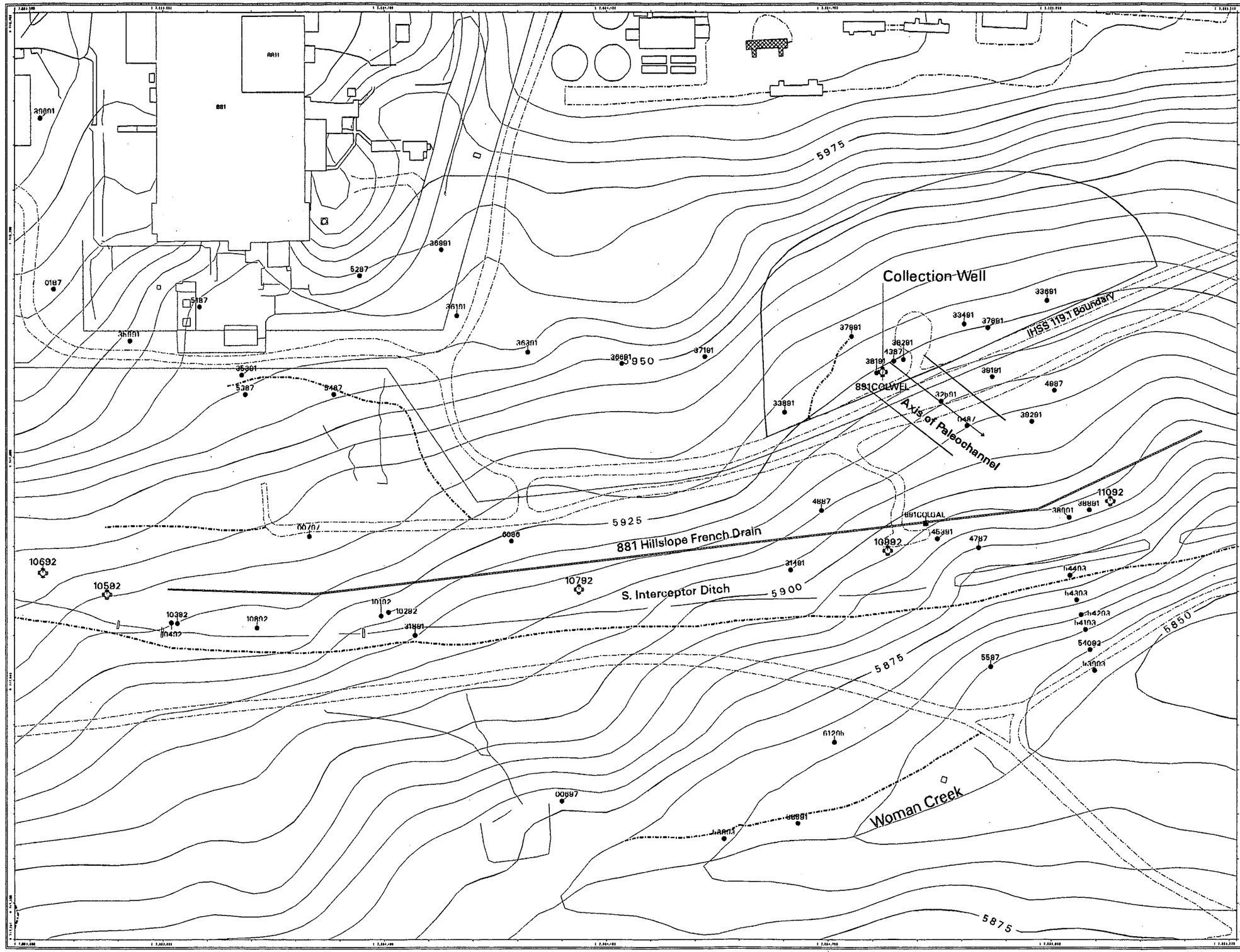

Figure 4-5

IHSS 119.1 Area

2000 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 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. 1/96
Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc 7.1N 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.
Data Source:
Borehole and Groundwater Well data - Approved by Steve Singer (RMRS, 303-966-3387).

Individual Hazardous Substance Site (IHSS) data Approved by Nick Demos (RMRS, 303-966-4006).

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Scale = 1 : 1640
1 inch represents approximately 136 feet

Rocky Mtn 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

MAP ID: 01-0873/hss119_1.aml

September 25, 2001

NT_Svr w:/projects/fy2001/01-0873/hss119_1.aml

136

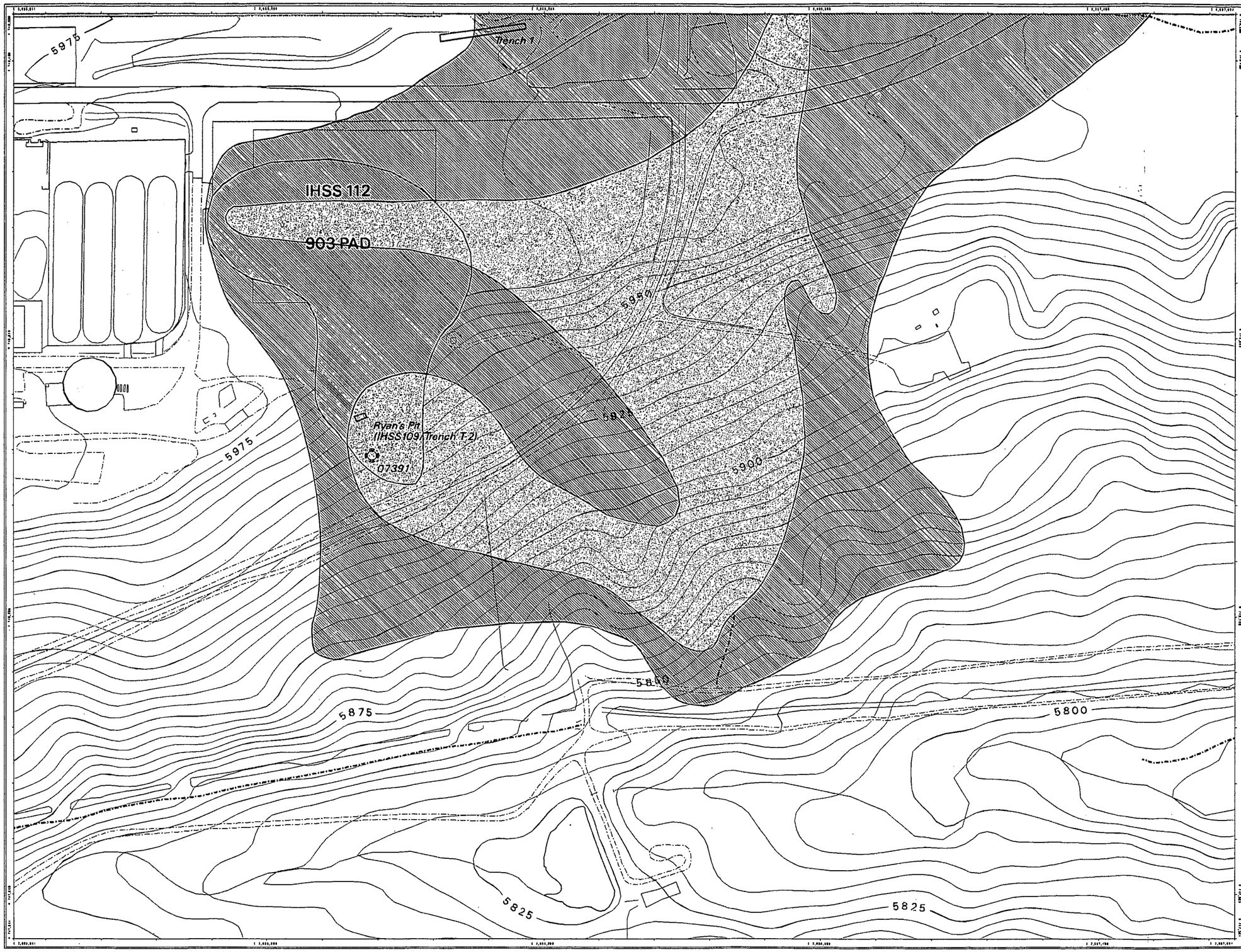

Figure 4-6

Ryan's Pit

Area Location Map

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Trench
- Ryan's Pit Performance Monitoring Well

Composite Plume Key

- 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)

Standard Map Features

- Buildings and other structures
- 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 F-O&G RSI, Las Vegas. Digitized from the orthophotographs. With 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 : 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

MAP ID: 01-0912

Original map contents are preserved. Logo and date have changed.

Saturday, April 25, 2001

NT_Str w:\projects\fy2001\01-0912\ryans-pit_loc.aml

157

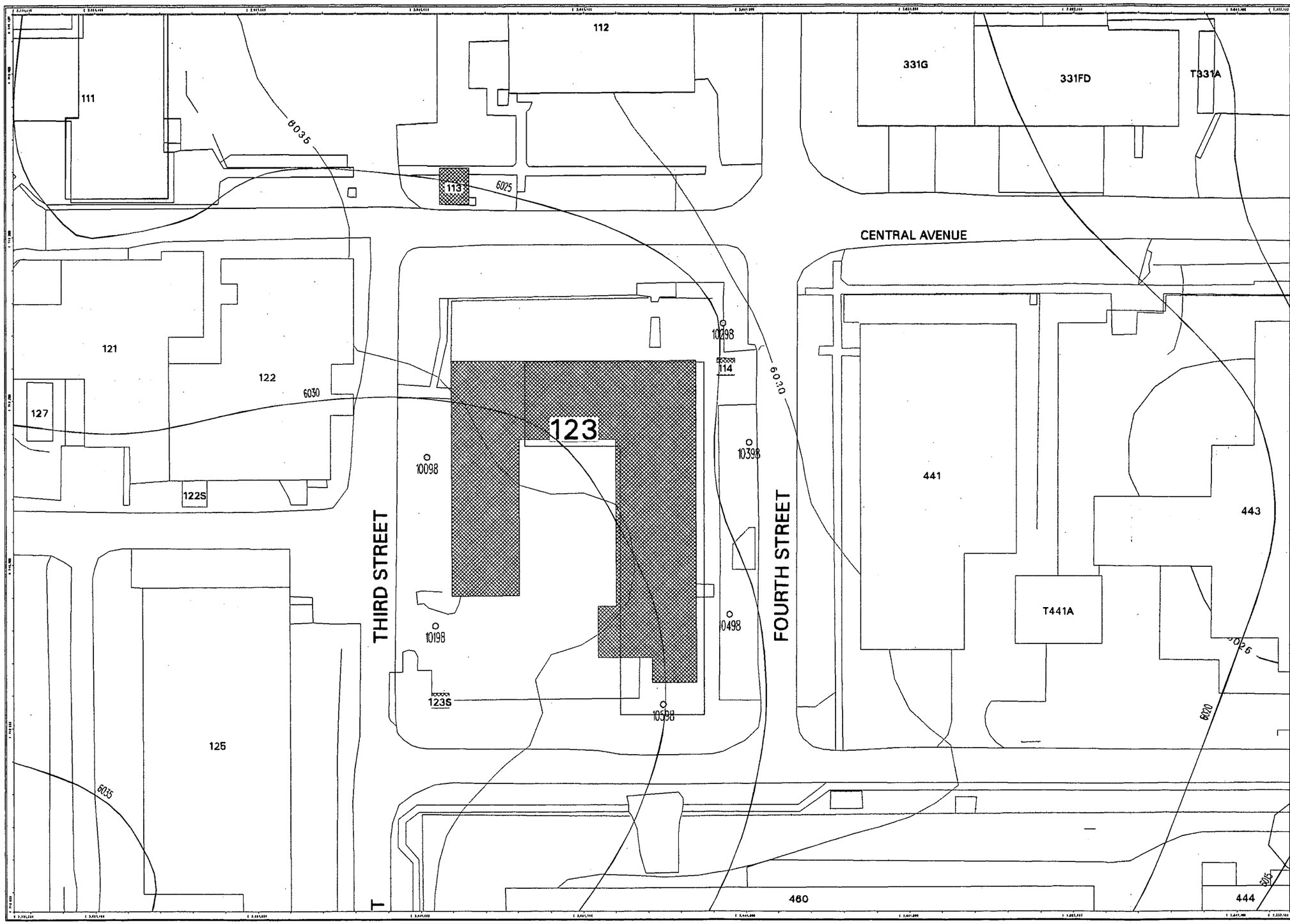

Figure 5-1
Building 123 Location Map with D&D Monitoring Wells

2000 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 2000

- 20-Foot Water Level Contour
- Dashed where inferred
- 5-Foot Intermediate Contour
- Dashed where inferred
- Foundation Drain
- Pertinent B123 IHSSs

Standard Map Features

- Buildings and other structures
- Demolished buildings
- 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, Las Vegas.
Digitized from the orthophotographs, 1995.
Topographic contours were derived from the 2 meter elevation model (DEM), data by Earthsat Radian (NAD using EGM Ave 1 M) and EG&G (NAVD). Previous the DEM data to use the 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV 1994 Accuracy: ±2 – 10 meter resolution. DEM post-processing performed by M.K. Weber 1997.

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Scale = 1:710
1 ft = 1 meter (in the units of Easting)

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

DynCorp
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KAISER-HILL COMPANY

MAP ID: 014.dgn

September 25, 2001

NT_Svr h:/projects/fy2001/01-0884/bldg_123-nt.aml

183

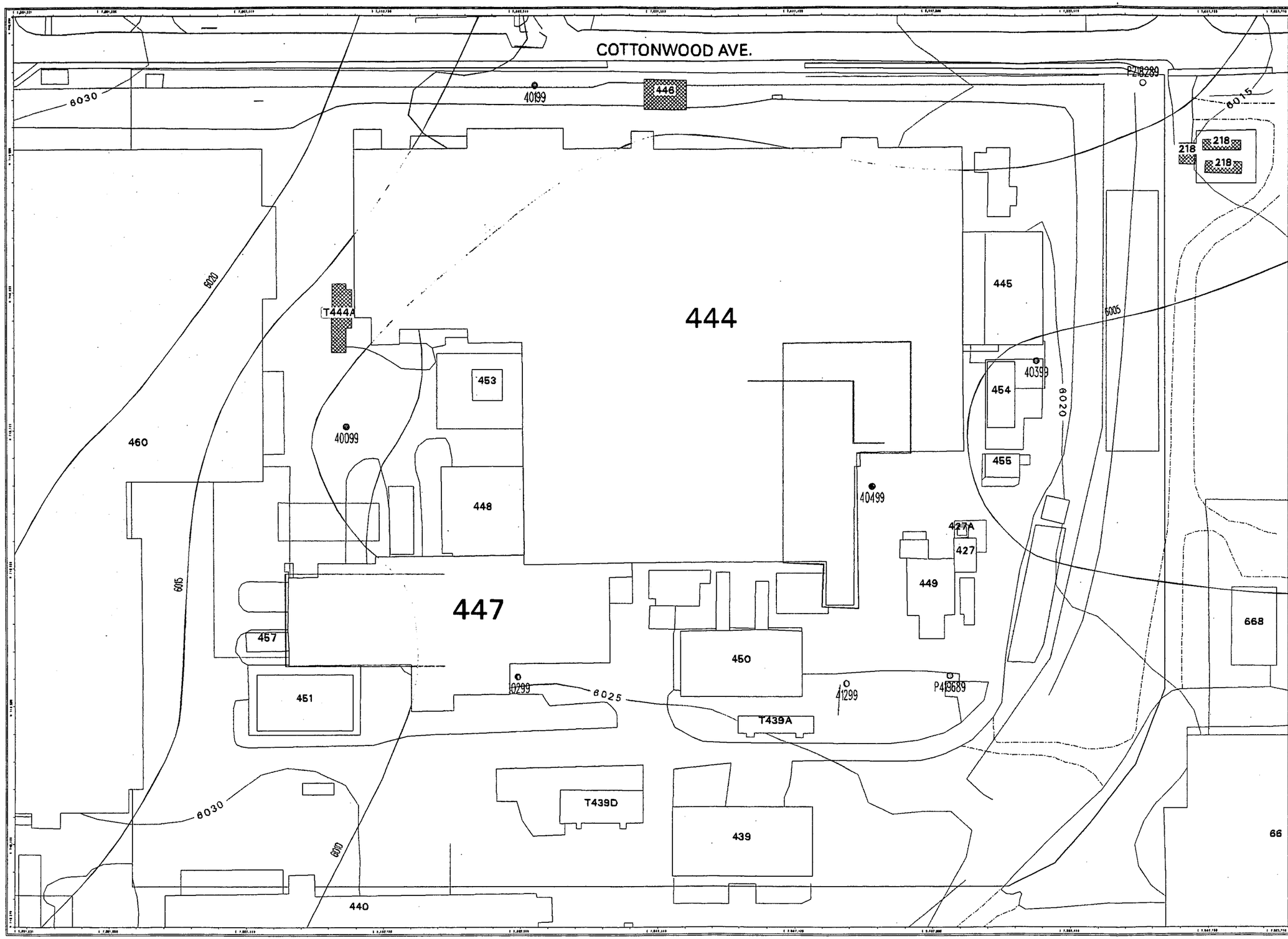

Figure 5-2
Building 444 Location Map with D&D Monitoring Wells
2000 Annual RFCA Groundwater Monitoring Report

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 2000

- 20-Foot Water Level Contour
- Dashed where inferred
- 5-Foot Intermediate Contour
- Dashed where inferred
- Foundation Drain
- Pertinant 8444 IHSSs
- D&D Building

Standard Map Features

- Buildings and other structures
- Demolished buildings
- 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 of site captured by LG&G RSL, Las Vegas.
Digitized from the orthophotographs 1995
Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and ESRI's TOPOGRID programs. The DEM data was created 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 1:1320
1 inch represents approximately 110 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

NT_Svr h:/projects/fy2001/01-0884/bldg_444-nt.aml

184

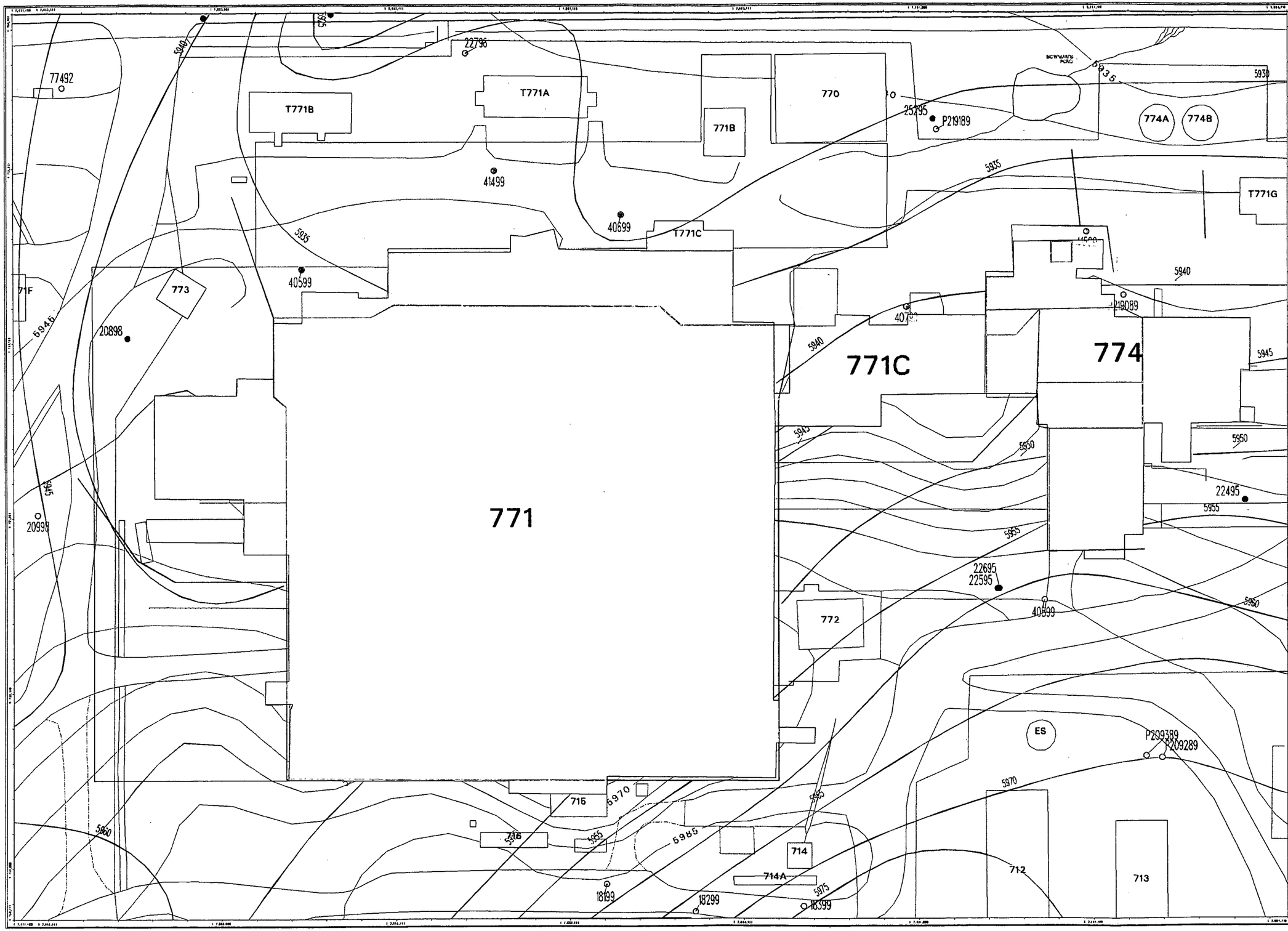

Figure 5-3
Building 771 Location Map with D&D Monitoring Wells

2000 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 2000

- 20-Foot Water Level Contour
- Dashed where inferred
- 5-Foot Intermediate Contour
- Dashed where inferred
- Foundation Drain
- Pertinent B771 IHSSs
- D&D Building

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, hydrographic roads and other [illegible] from TIGER and Hydrase data captured by EG&G RSL, Las Vegas.
Digitized from the orthophotographs. [illegible]
Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using MDI Arc INFO and ARTAS software. The TIGER data is on the 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, using Digital Ortho [illegible] DEM post processing performed by M.K. Weber (1997).

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Scale 1:1010
1 inch represents approximately 84 feet

Rain Zone Coordinate System
Colorado Central Zone
Feet (NAD27)

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared on: KAISER•HILL COMPANY

MAP ID: [illegible]

Best Viewed at 36" [illegible]

NT_Svr h:/projects/fy2001/01-0884/bldg_771-nt.aml

185

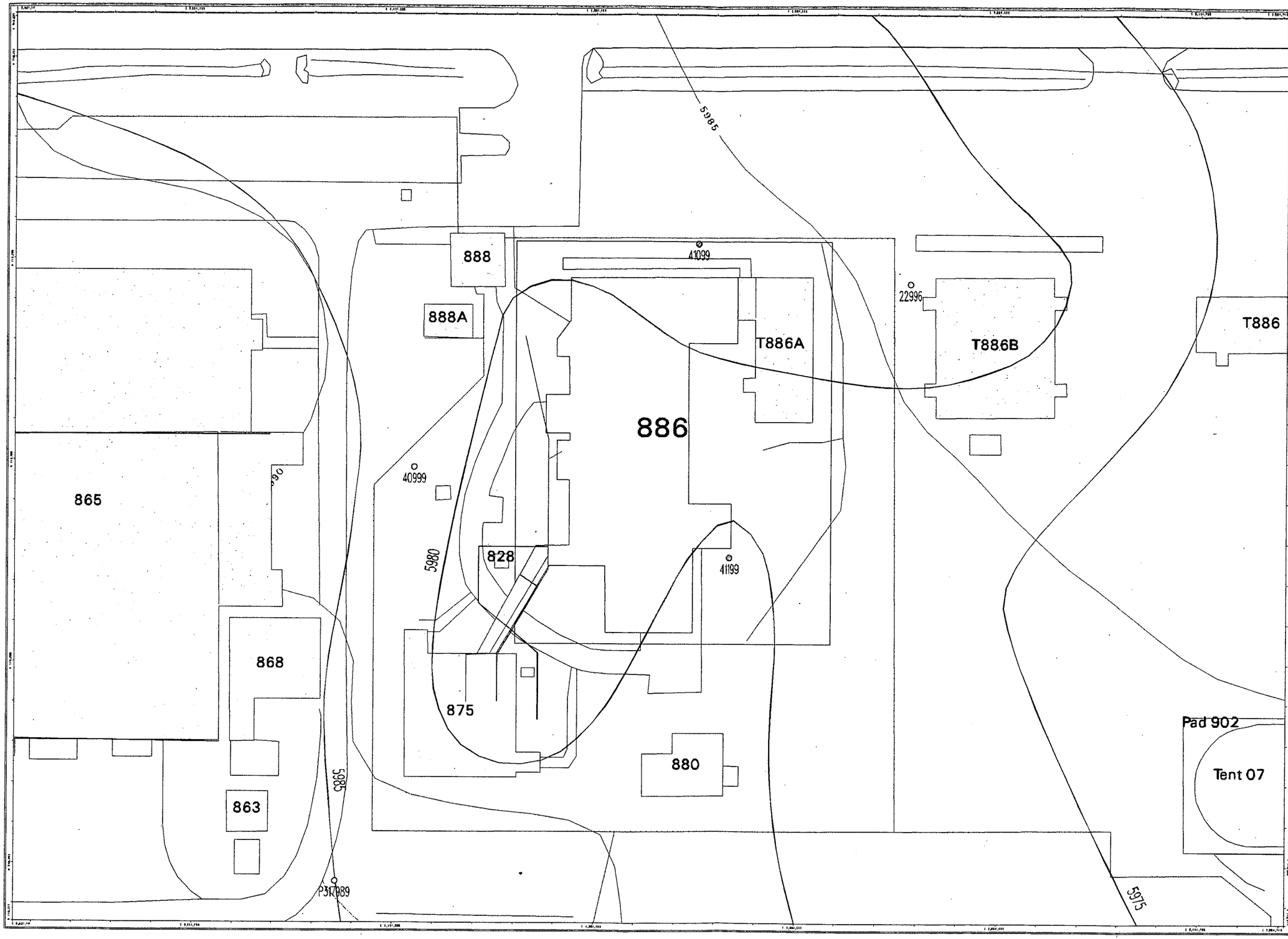

Figure 5-4
Building 886 Location Map with D&D Monitoring Wells

2000 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 2000

- 20-Foot Water Level Contour
- Dashed where inferred
- 5-Foot Intermediate Contour
- Dashed where inferred
- Foundation Drain
- Pertinant 886 IHSSs
- D&D Building

Standard Map Features

- Buildings and other structures
- Demolished buildings
- 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 attributes from 1994 aerial photo data exported by CDM-RSL, Las Vegas.
Digitized from the orthophotographs, 1:25
Topographic contours were derived from digital elevation model (DEM) data by Mesa Kaiser Kinetics (MKK) using ESRI Arc TIN and LAI ACS 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 Photos at ~ 40 meter resolution. GIS post processing performed by M.E. Winter, 2001.

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Scale = 1:1,000
1 inch represents approximately 0.1 (1/10) mile
0 25 50 100 Feet

Base Data Coordinate System
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Produced by:
DynCorp
THE ART OF TECHNOLOGY

Prepared for:
KAISER-HILL COMPANY

MAP ID: 71 FRM

Registered Feb 28, 2001

NT_Svr h:/projects/fy2001/01-0884/bldg_886-nt.aml

186

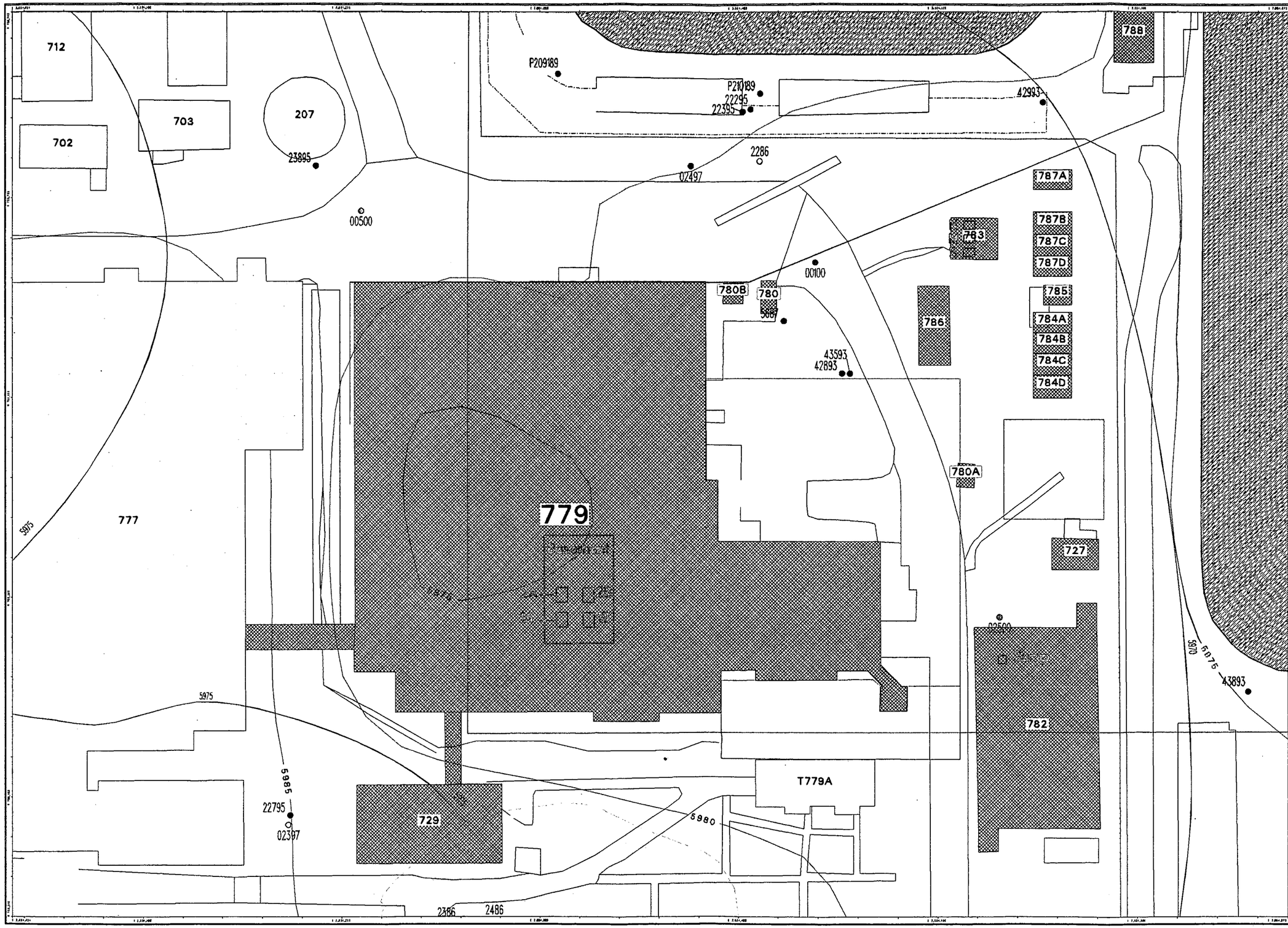

Figure 5-5
Building 779 Location Map with D&D Monitoring Wells

2000 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 2000

- 20-Foot Water Level Contour
- Dashed where inferred
- 5-Foot Intermediate Contour
- Dashed where inferred
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Pertinent B779 IHSSs

Standard Map Features

- Basements
- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:

[illegible]

NOTES:

Building 774 sub-basement vaults located directly below basement.

DISCLAIMER:

[illegible]

Scale = 1:[illegible]

1 inch represents [illegible] feet

State Plane Coordinate System Colorado Central Zone Datum: NAD 27

U.S. Department of Energy

Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7767

Prepared by:

DynCorp

THE ART OF TECHNOLOGY

Prepared for:

KAISER-HILL COMPANY

MAP ID: [illegible]

Modified: [illegible]

NT Svr h:/projects/fy2001/01-0884/bldg 779-nt.aml

187

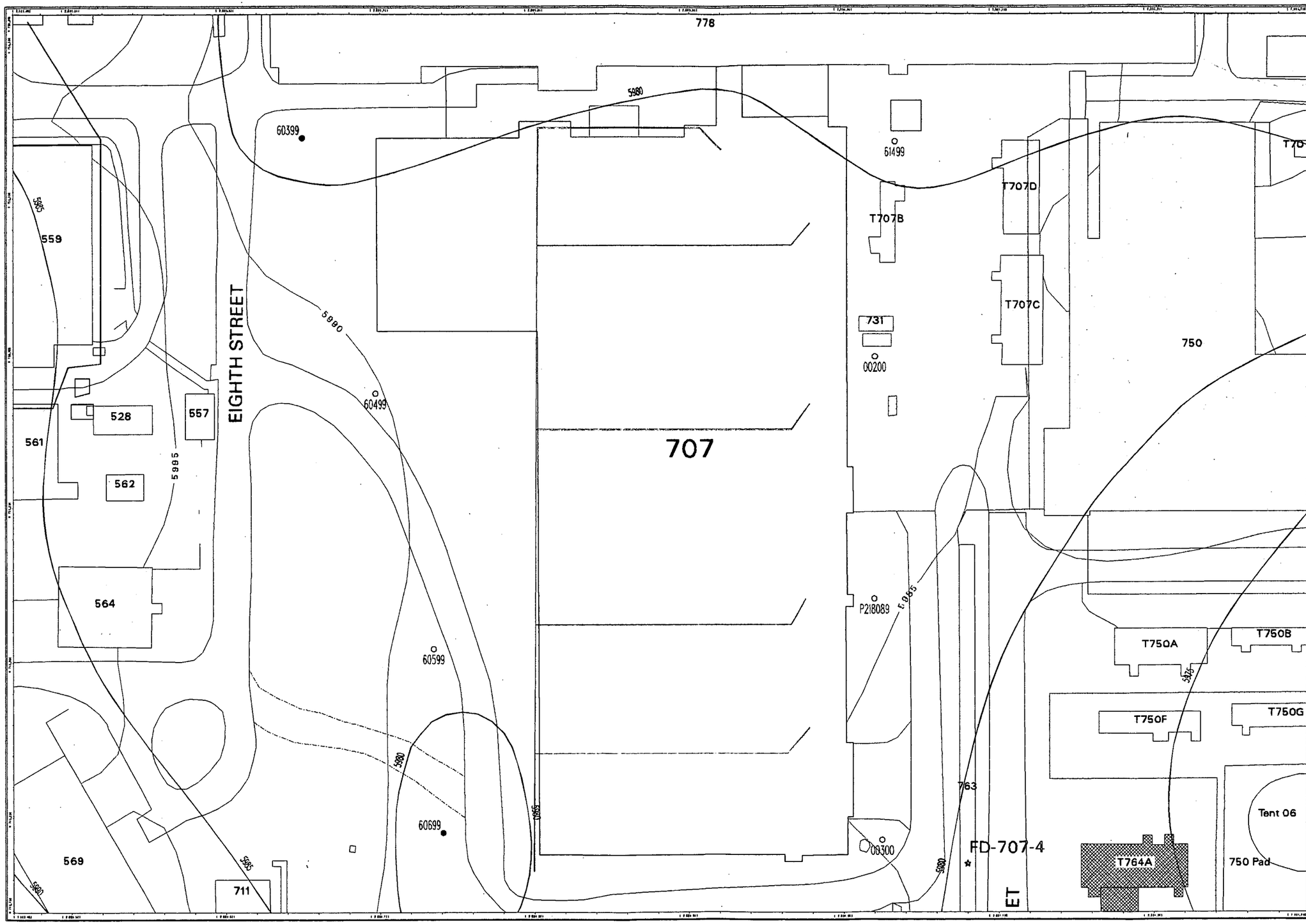

Figure 5-6
Building 707 Location Map with D&D Monitoring Wells

2000 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
- Surface Water Location

Water Level Contours Second Quarter 2000

- 20-Foot Water Level Contour
- Dashed where inferred
- 5-Foot Intermediate Contour
- Dashed where inferred
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Pertinant B707 IHSSs
- D&D Building

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:

DISCLAIMER:

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

DynCorp
THE ART OF TECHNOLOGY

KAISER-HILL COMPANY

NT_Svr h:/projects/fy2001/01-0884/bldg_707-nt.aml

188

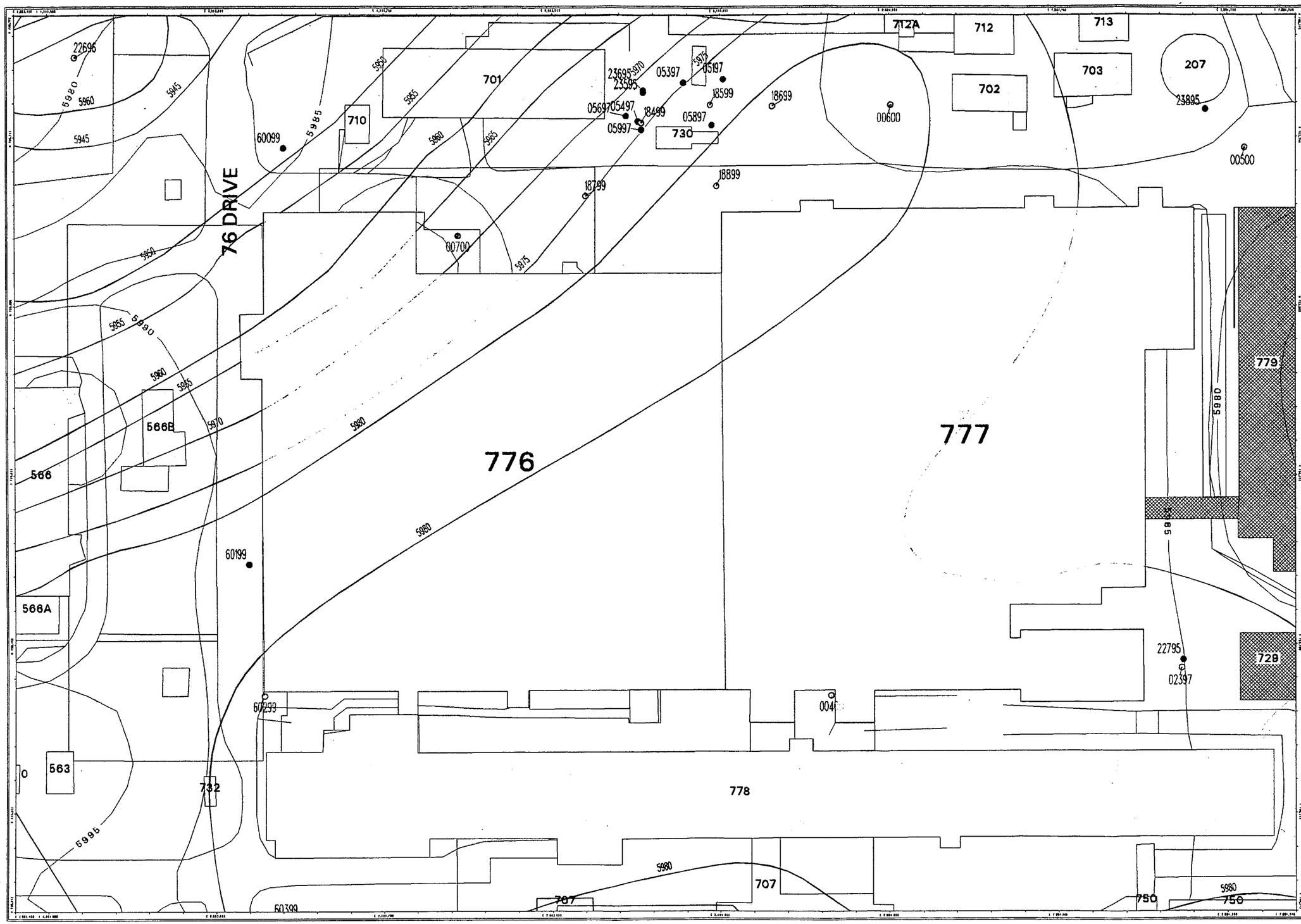

Figure 5-7
Building 776/777 Location Map with D&D Monitoring Wells
2000 Annual RFCA Groundwater Monitoring Report

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 2000

- 20-Foot Water Level Contour
- Dashed where inferred
- 5-Foot Intermediate Contour
- Dashed where inferred
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Pertinent 776/777 IHSSs
- D&D Building

Standard Map Features

- Buildings and other structures
- Demolished buildings
- 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 Point-world Systems data explored by EG&G RSL, Las Vegas.
Digitized from the orthophotographs. 1995 topographic contours were derived from digital elevation model (DEM) data by Horizon Knowledge (HK) using ESRI Arc TIN and LAI ICS to process the DEM data to create 5 foot contours. The DEM data was acquired by the Remote Sensing Lab, Las Vegas, NV, using Airborne Platform of 10 meter resolution. Data post processing performed by M.K. Vehler (DOJ).

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N

Scale = 1:1800
1 inch represents approx. 150 feet

Scale Factor Grid: 0.9996
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7767

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Reviewed by: KAISER-HILL COMPANY

NT Svr h:/projects/fy2001/01-0884/bldg 776-777-nt.aml

189

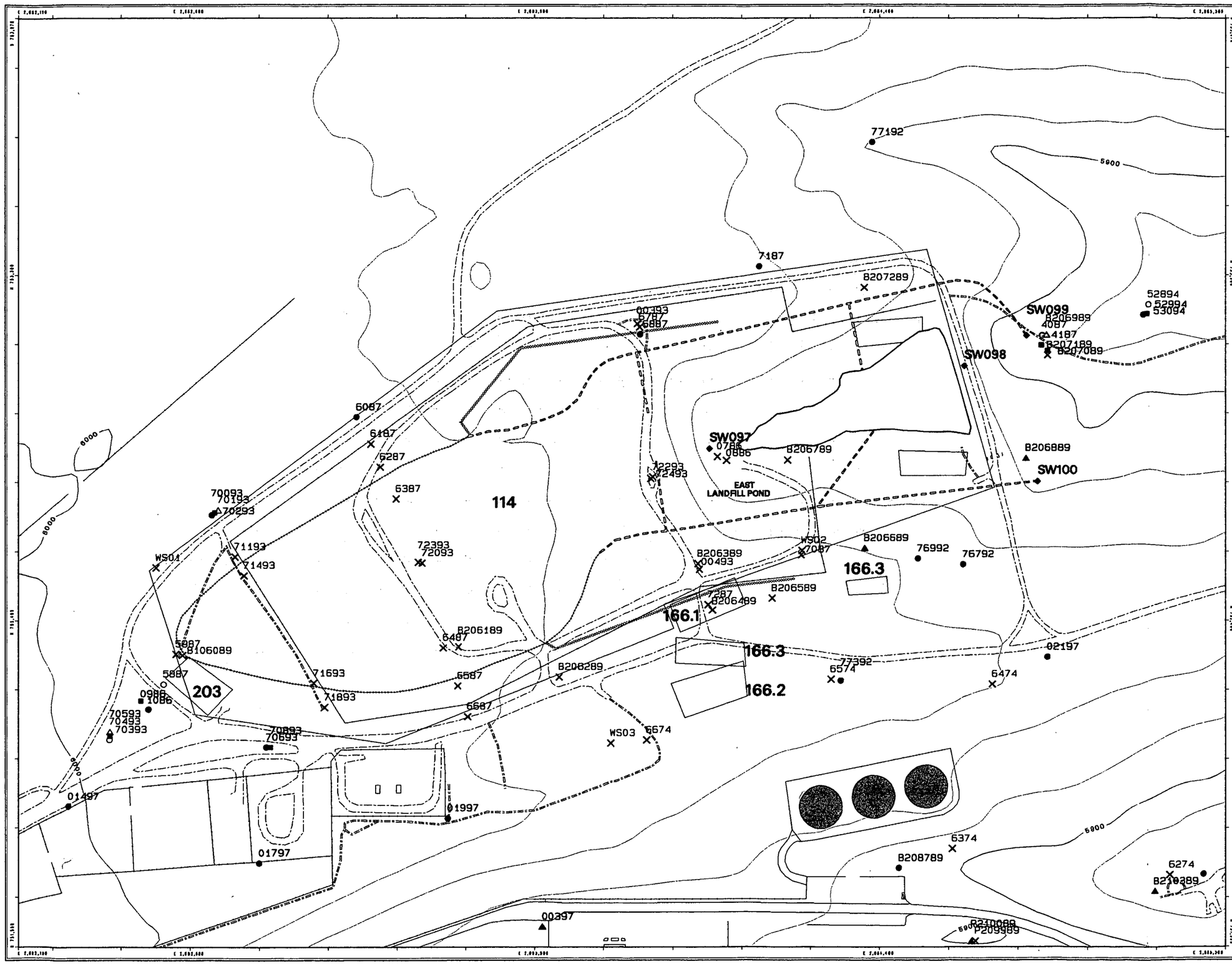


Figure 6-1

Groundwater Intercept and Diversion System Layout at the Present Sanitary Landfill

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Groundwater Monitor Well UHSU Surficial Material
- Groundwater Monitor Well UHSU Bedrock
- Groundwater Monitor Well LHSU Bedrock
- Surface Water Monitoring Locations
- Landfill Groundwater Monitoring Wells
- All Other Existing Wells
- Abandoned Wells
- 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

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

MAP ID: 01-0641/box_landfill

November 02, 2001

NT_Svr w:/projects/fy2001/01-0641/box_landfill/uhsu_well-loc.aml

211

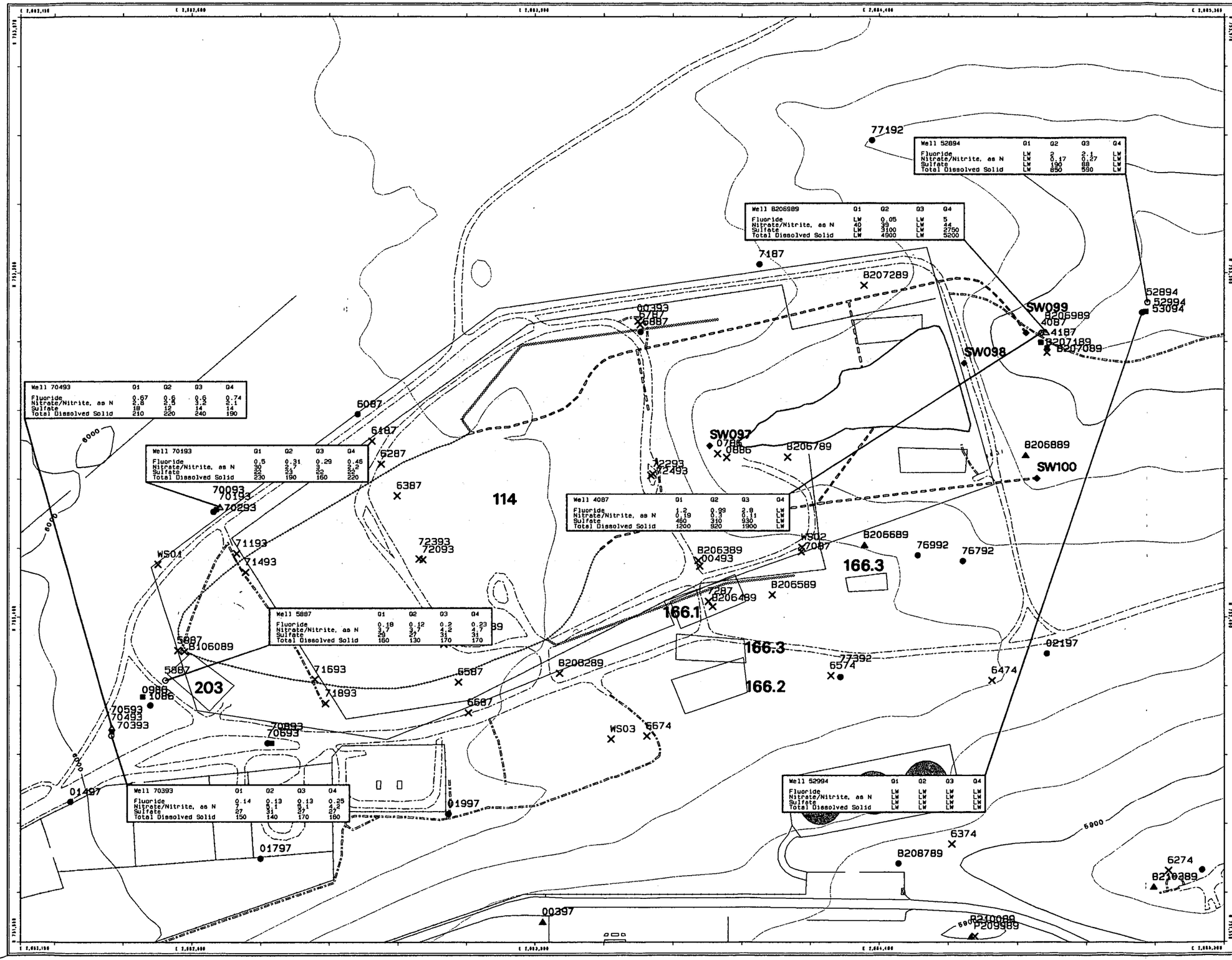


Figure 6-2

Water Quality Parameters (mg/L) at the Present Sanitary Landfill

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Groundwater Monitor Well UHSU Surficial Material
- Groundwater Monitor Well UHSU Bedrock
- Groundwater Monitor Well LHSU Bedrock
- Surface Water Monitoring Locations
- Landfill Groundwater Monitoring Wells
- All Other Existing Wells
- Abandoned Wells
- 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:
LW - Locked Water
NS - Not Sampled/Dry Conditions

Source of GIS data available upon request.

Scale = 1 : 2970
1 inch represents approximately 248 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

Prepared by: DynCorp THE ART OF TECHNOLOGY

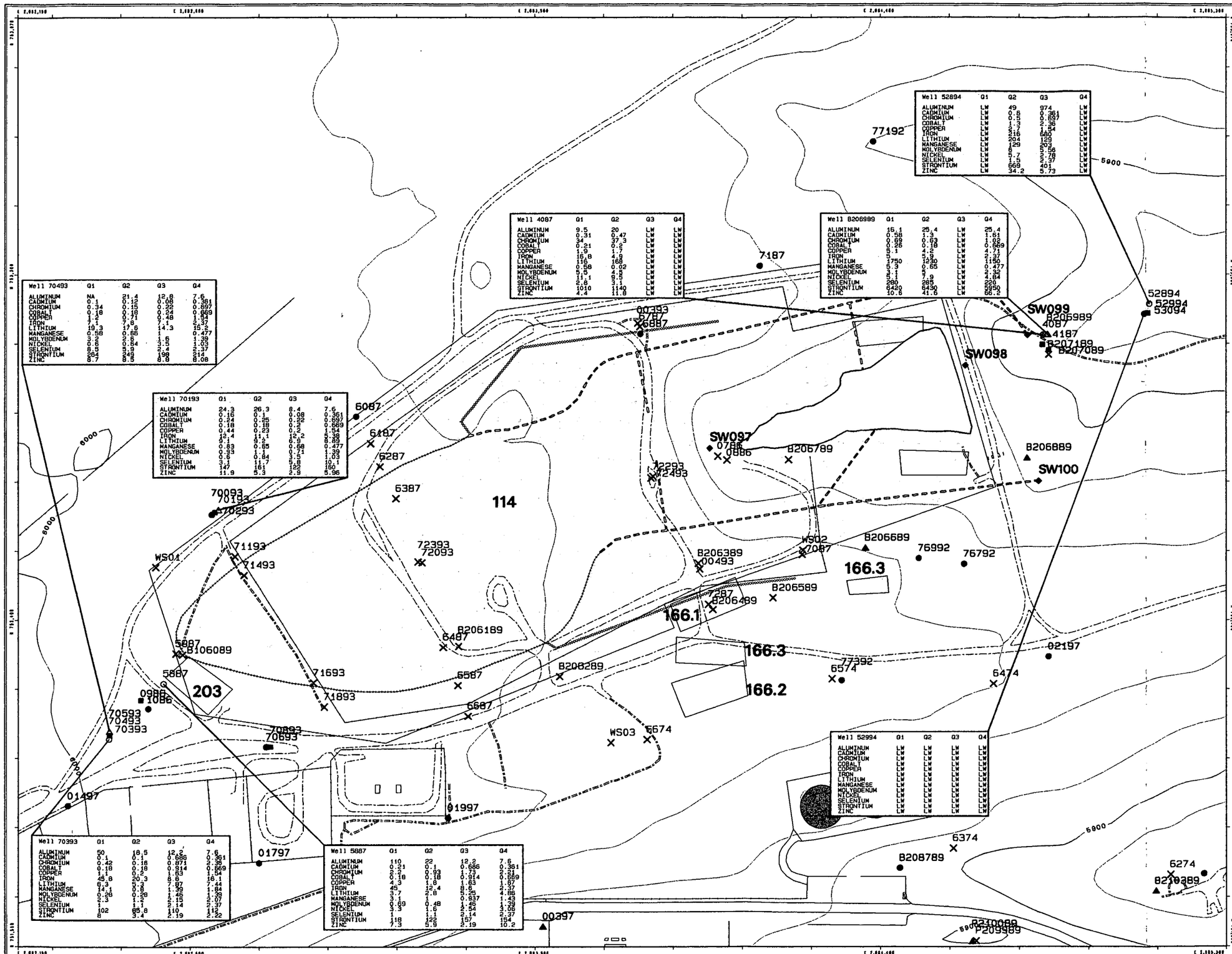
Prepared for: KAISER•HILL COMPANY

MAP ID: 01-0641/box_landfill

November 02, 2001

NT_Svr w:/projects/fy2001/01-0641/box_landfill/uhsuwqp00.aml

212



Well 52894	Q1	Q2	Q3	Q4
ALUMINUM	LW	49	974	LW
CADMIUM	LW	0.6	0.361	LW
CHROMIUM	LW	0.5	0.697	LW
COBALT	LW	1.3	2.36	LW
COPPER	LW	2.7	1.54	LW
IRON	LW	216	680	LW
LITHIUM	LW	204	123	LW
MANGANESE	LW	129	203	LW
MOLYBDENUM	LW	6	5.58	LW
NICKEL	LW	5.7	2.79	LW
SELENIUM	LW	7.5	2.37	LW
STRONTIUM	LW	669	401	LW
ZINC	LW	34.2	5.73	LW

Well 4087	Q1	Q2	Q3	Q4
ALUMINUM	9.5	20	LW	LW
CADMIUM	0.31	0.47	LW	LW
CHROMIUM	34	37.3	LW	LW
COBALT	0.21	0.2	LW	LW
COPPER	1.9	1.7	LW	LW
IRON	16.8	4.9	LW	LW
LITHIUM	116	168	LW	LW
MANGANESE	0.58	0.02	LW	LW
MOLYBDENUM	5.5	4.5	LW	LW
NICKEL	11.1	9.5	LW	LW
SELENIUM	2.8	3.1	LW	LW
STRONTIUM	1010	1140	LW	LW
ZINC	4.4	11.8	LW	LW

Well 8206989	Q1	Q2	Q3	Q4
ALUMINUM	16.1	25.4	LW	25.4
CADMIUM	0.58	1.3	LW	1.61
CHROMIUM	0.99	0.63	LW	1.02
COBALT	0.26	0.18	LW	0.669
COPPER	5.1	4.2	LW	4.71
IRON	5	5.9	LW	2.37
LITHIUM	1750	1230	LW	1150
MANGANESE	5.3	0.65	LW	0.477
MOLYBDENUM	3.1	5	LW	2.32
NICKEL	9.1	7.9	LW	4.84
SELENIUM	280	285	LW	220
STRONTIUM	6420	6430	LW	5950
ZINC	10.6	41.6	LW	68.2

Well 70493	Q1	Q2	Q3	Q4
ALUMINUM	NA	21.4	12.8	7.6
CADMIUM	0.1	0.12	0.08	0.361
CHROMIUM	0.34	0.15	0.22	0.697
COBALT	0.18	0.18	0.24	0.669
COPPER	1.2	0.71	0.48	1.54
IRON	7.1	7.8	7.1	2.37
LITHIUM	19.3	17.6	14.3	16.2
MANGANESE	0.58	0.66	1	0.477
MOLYBDENUM	3.2	2.8	1.6	1.39
NICKEL	0.6	0.64	3.5	1.03
SELENIUM	8.5	5.9	2.4	2.37
STRONTIUM	264	249	198	214
ZINC	8.7	8.5	8.8	8.08

Well 70193	Q1	Q2	Q3	Q4
ALUMINUM	24.3	26.3	8.4	7.6
CADMIUM	0.16	0.1	0.08	0.361
CHROMIUM	0.24	0.25	0.22	0.697
COBALT	0.18	0.18	0.2	0.669
COPPER	0.44	0.23	0.2	1.54
IRON	12.4	11.1	12.2	5.38
LITHIUM	9.1	9.2	6.9	8.89
MANGANESE	0.83	0.65	0.68	0.477
MOLYBDENUM	0.93	1.1	0.71	1.39
NICKEL	0.6	0.84	3.5	1.03
SELENIUM	3.1	11.7	5.6	10.1
STRONTIUM	147	161	122	160
ZINC	11.9	5.3	2.9	5.96

Well 52994	Q1	Q2	Q3	Q4
ALUMINUM	LW	LW	LW	LW
CADMIUM	LW	LW	LW	LW
CHROMIUM	LW	LW	LW	LW
COBALT	LW	LW	LW	LW
COPPER	LW	LW	LW	LW
IRON	LW	LW	LW	LW
LITHIUM	LW	LW	LW	LW
MANGANESE	LW	LW	LW	LW
MOLYBDENUM	LW	LW	LW	LW
NICKEL	LW	LW	LW	LW
SELENIUM	LW	LW	LW	LW
STRONTIUM	LW	LW	LW	LW
ZINC	LW	LW	LW	LW

Well 70393	Q1	Q2	Q3	Q4
ALUMINUM	50	18.5	12.2	7.6
CADMIUM	0.1	0.1	0.686	0.361
CHROMIUM	0.42	0.18	0.871	2.36
COBALT	0.18	0.18	0.914	0.669
COPPER	1.1	0.2	1.63	1.54
IRON	45.8	20.3	8.6	16.1
LITHIUM	6.3	8.3	7.87	7.44
MANGANESE	14.1	0.8	1.29	1.84
MOLYBDENUM	0.28	0.28	1.45	1.39
NICKEL	2.3	1.2	2.15	2.07
SELENIUM	1	1.1	2.14	2.37
STRONTIUM	102	95.8	110	113
ZINC	8	3.4	2.19	2.22

Well 5887	Q1	Q2	Q3	Q4
ALUMINUM	110	22	12.2	7.6
CADMIUM	0.21	0.1	0.686	0.361
CHROMIUM	2.2	0.93	1.73	2.21
COBALT	0.18	0.18	0.914	0.669
COPPER	4.3	1.6	1.63	1.87
IRON	45	12.4	8.6	2.37
LITHIUM	3.7	2.8	3.25	4.88
MANGANESE	3.1	1	0.937	1.43
MOLYBDENUM	0.69	0.48	1.46	1.39
NICKEL	3.3	1.6	2.54	3.06
SELENIUM	1	1.1	2.14	2.37
STRONTIUM	118	122	157	154
ZINC	7.3	5.9	2.19	10.2

Figure 6-3

Selected Metals (ug/L) at the Present Sanitary Landfill

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Groundwater Monitor Well UHSU Surficial Material
- Groundwater Monitor Well UHSU Bedrock
- Groundwater Monitor Well LHSU Bedrock
- Surface Water Monitoring Locations
- Landfill Groundwater Monitoring Wells
- All Other Existing Wells
- Abandoned Wells
- 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 - Locked 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

MAP ID: 01-0641/box_landfill

November 02, 2001

NT_Svr w:/projects/y2001/01-0641/box_landfill/uheum1100.aml

2/3

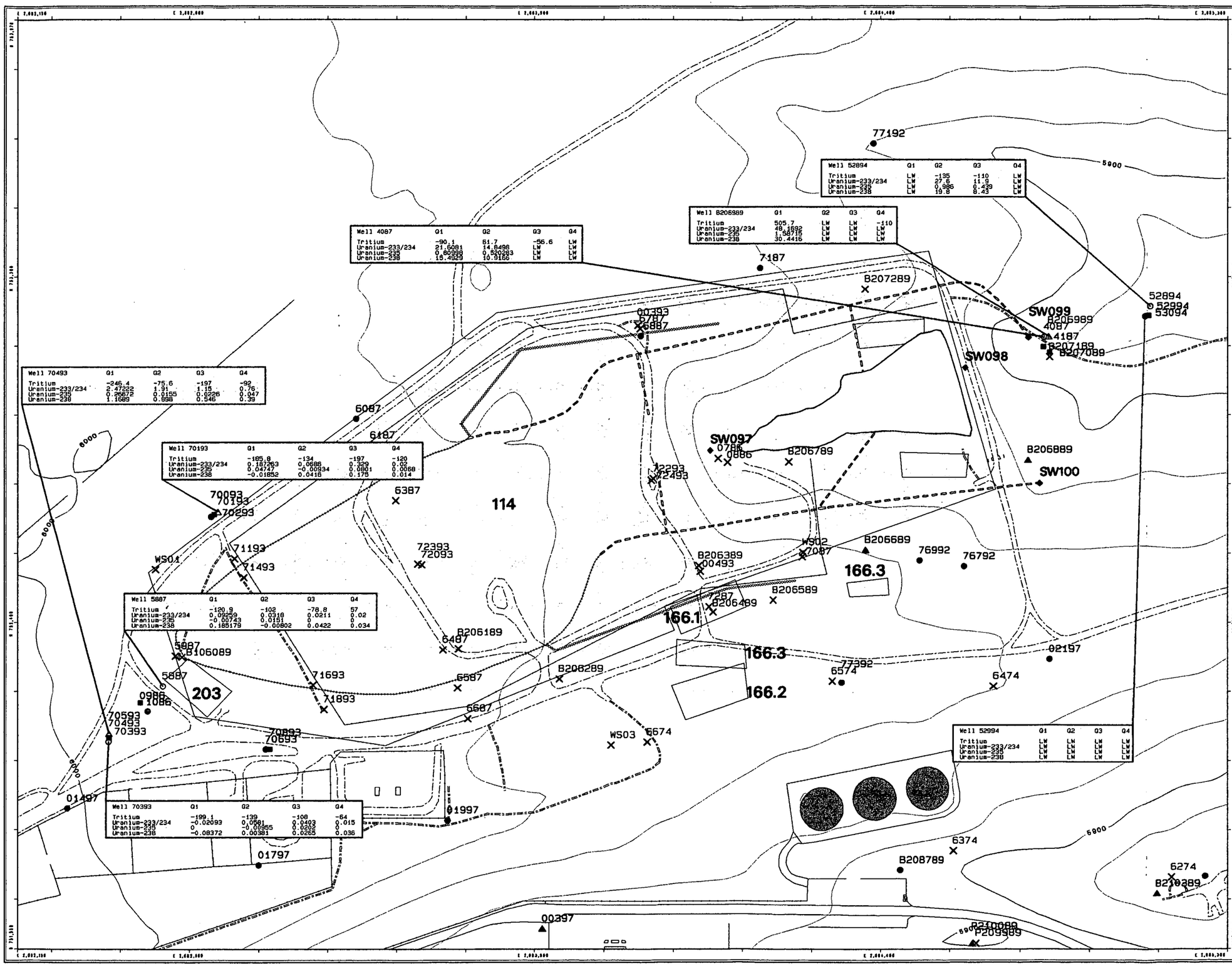


Figure 6-4

Tritium & Dissolved Uranium (pCi/L) at the Present Sanitary Landfill

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Groundwater Monitor Well UHSU Surficial Material
- Groundwater Monitor Well UHSU Bedrock
- Groundwater Monitor Well LHSU Bedrock
- Surface Water Monitoring Locations
- Landfill Groundwater Monitoring Wells
- All Other Existing Wells
- Abandoned Wells
- 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:
LW - Locked Water
NS - Not Sampled/Dry Conditions

Source of GIS data available upon request.

N

Scale = 1 : 2970
1 inch represents approximately 248 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

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KAISER-HILL COMPANY

MAP ID: 01-0641/box_landfill

November 02, 2001

NT_8vr w:/projects/fy2001/01-0641/box_landfill/uhsurad00.aml

214

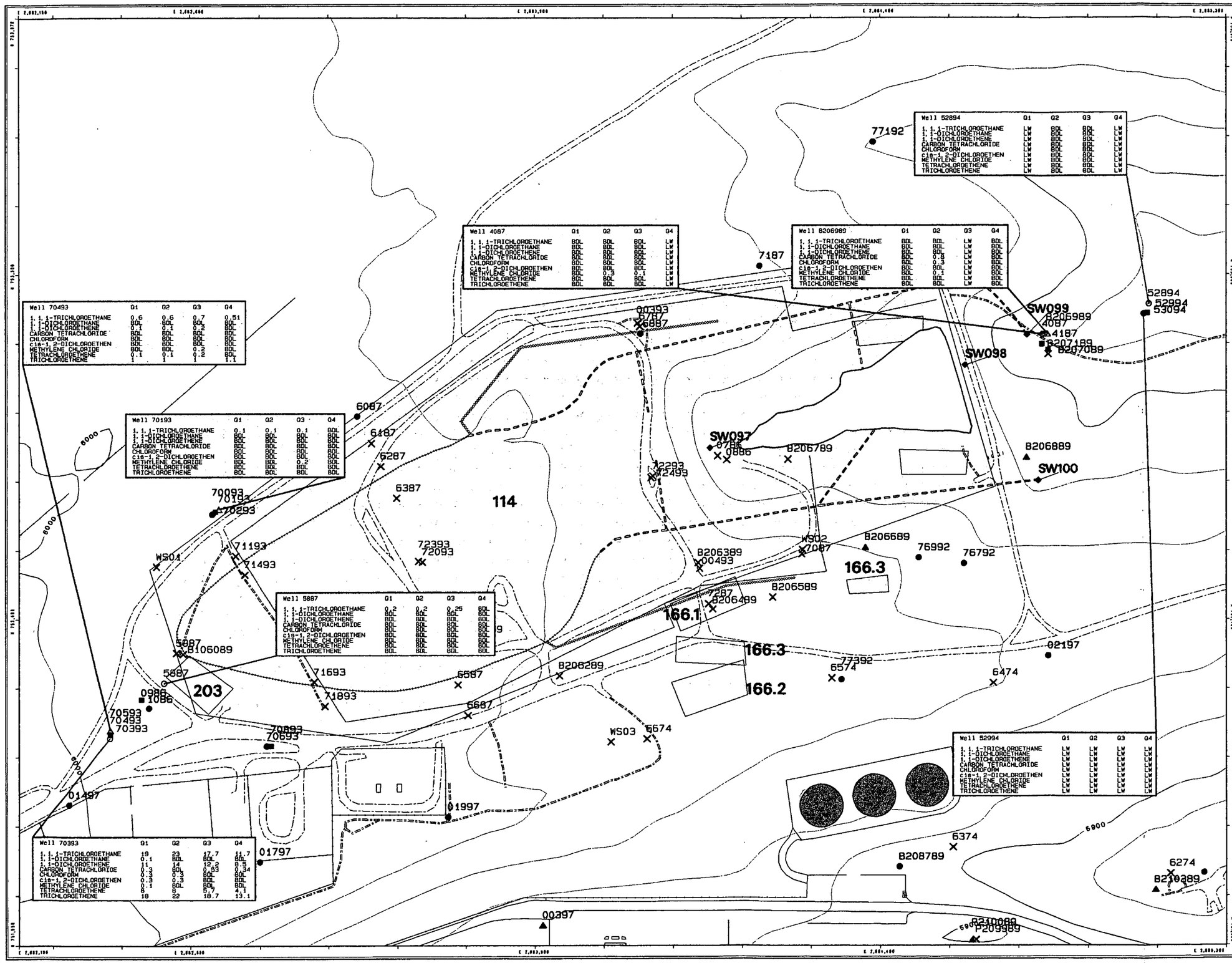


Figure 6-5

Detected Volatile Organic Compounds (ug/L) at the Present Sanitary Landfill

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Groundwater Monitor Well UHSU Surficial Material
- Groundwater Monitor Well UHSU Bedrock
- Groundwater Monitor Well LHSU Bedrock
- Surface Water Monitoring Locations
- Landfill Groundwater Monitoring Wells
- All Other Existing Wells
- Abandoned Wells
- 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 - Locked Water
NS - Not Sampled/Dry Conditions

Source of GIS data available upon request.

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
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KAISER•HILL COMPANY

MAP ID: 01-0841/box_landfill

November 02, 2001

NT_Svr w:/projects/fy2001/01-0841/box_landfill/uhsuvoc00.aml

215

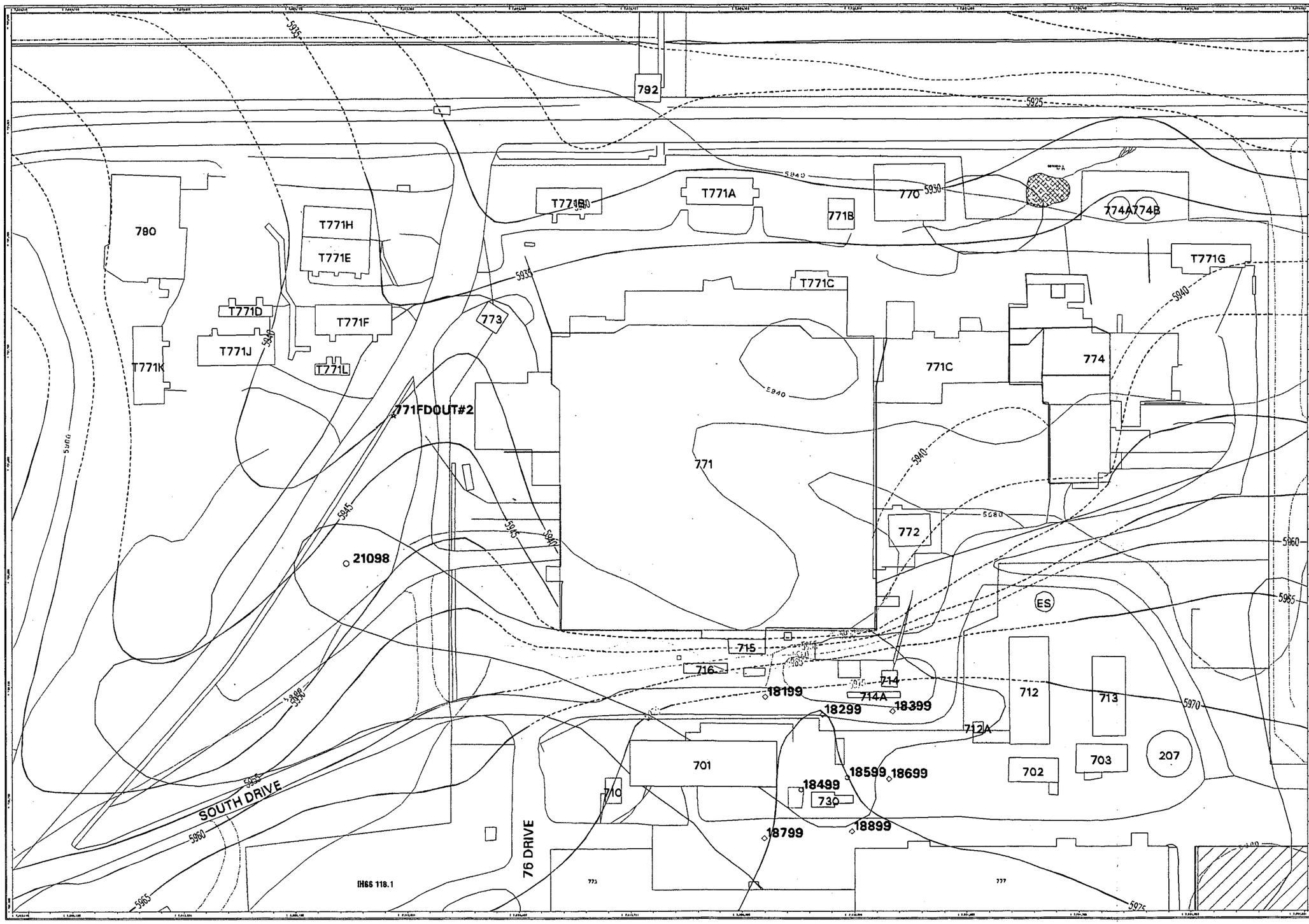


Figure 7-1

Location Map

IHSS 118.1 Wells

2000 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, areas, hydrography, roads and other structures from 1994 aerial photography, data exclusively owned by Rocky Mountain Digital Services from the Denver Regional, 1993 topographic coverage, and other miscellaneous data. Topographic contours are derived from digital elevation model (DEM) data and are based on Kaiser-Hill Superimposed the DEM data to create 5-foot contours. The DEM data was created by Pamela Smith of Lockheed Martin Utility Services from aerial photography MAY, 1994.

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Prepared for: KAISER-HILL COMPANY

NT_Svr w:/projects/fy2001/01-0938/ihss-118.aml

238

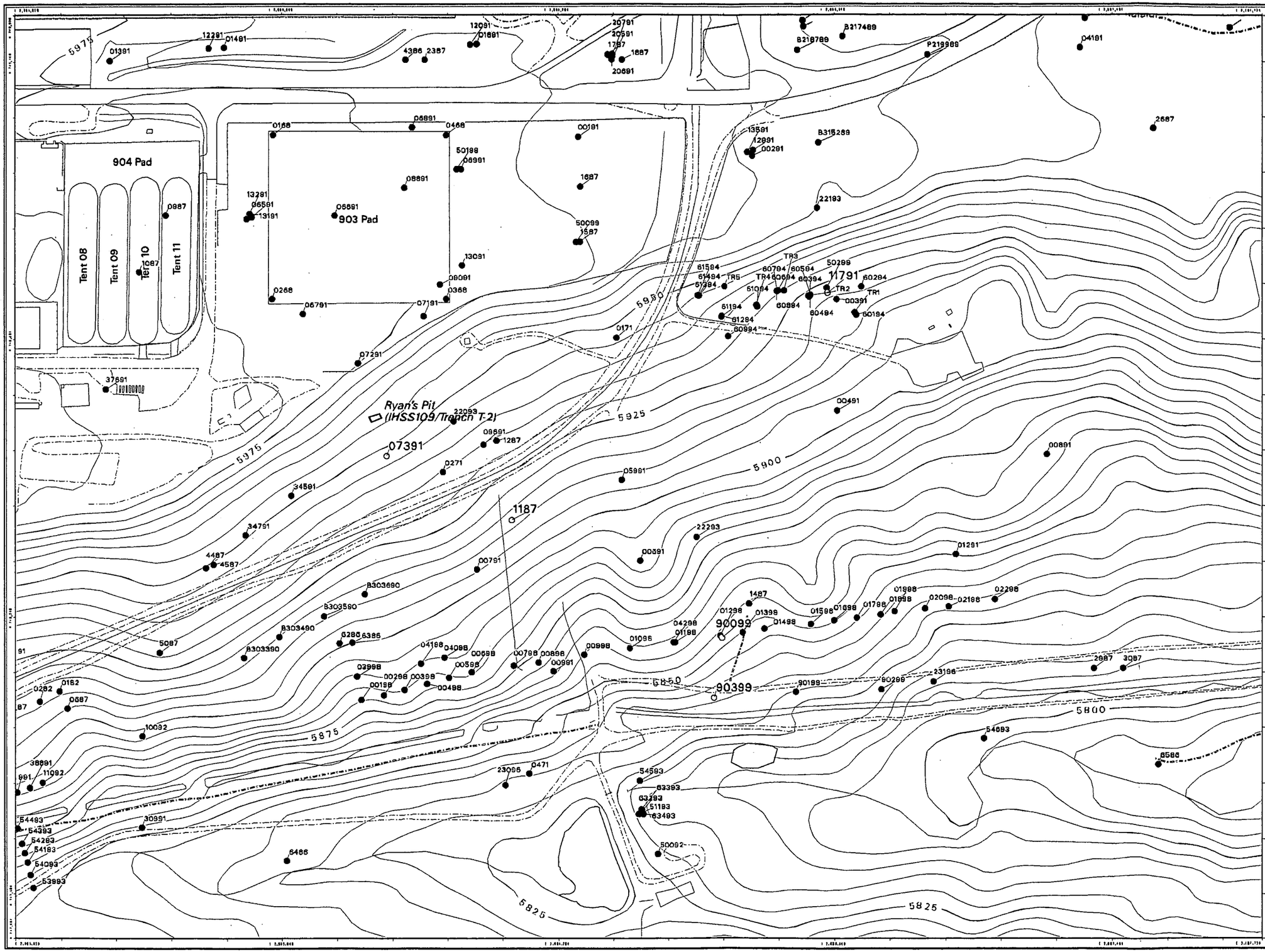

Figure 7-7

903 Pad/Ryan's Pit Area Location Map

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Groundwater Wells
- Project Wells
- Seeps

Standard Map Features

- Buildings and other structures
- 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 1995.

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Scale = 1 : 2470
1 inch represents approximately 206 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

MAP ID: 01-0853

October 18, 2001

Original map contents are preserved. Logo and date have changed.

NT_Svr w:/projects/fy2001/01-0952/fig7-7.aml

244

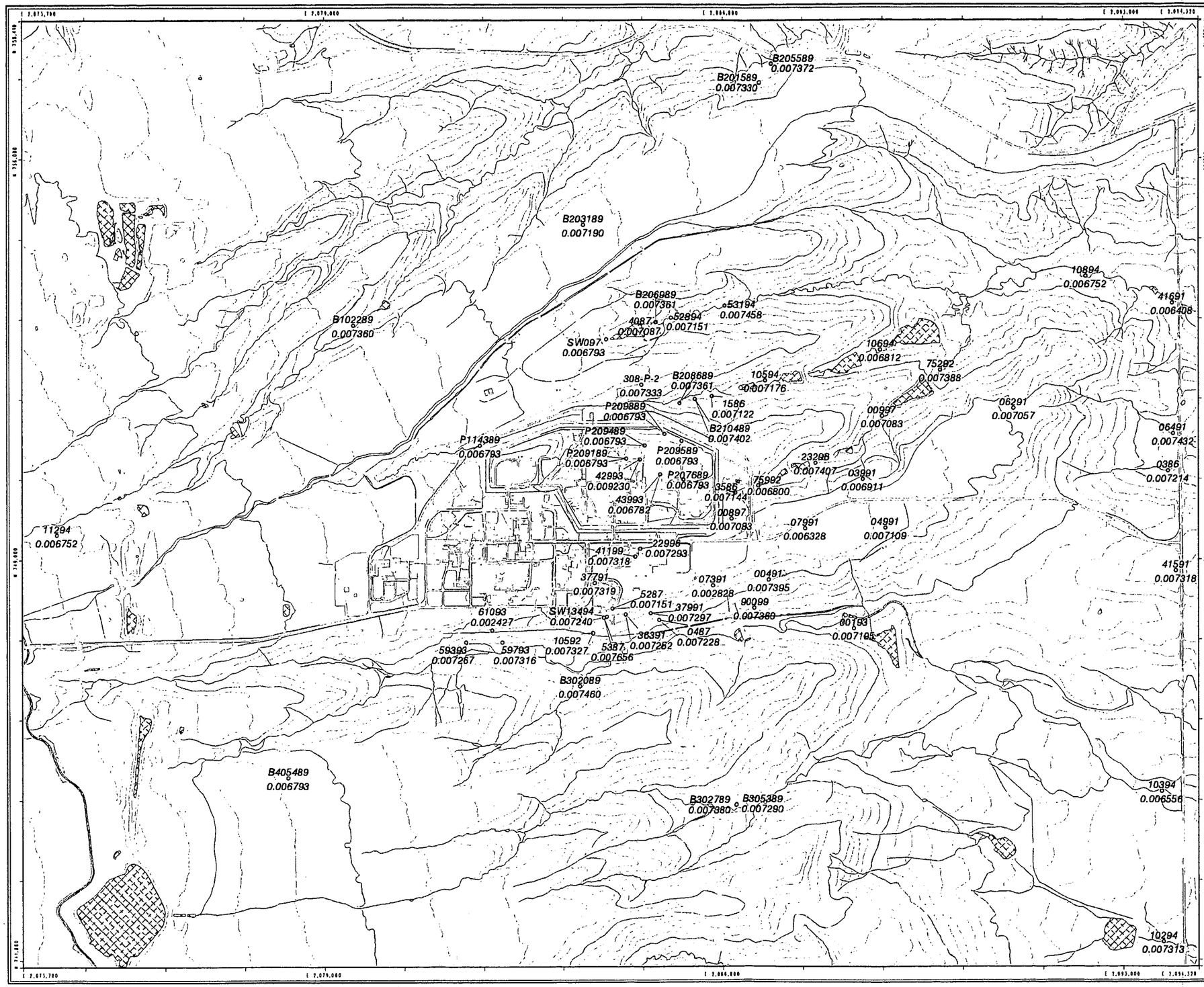

Figure 8-8

Selected Groundwater Wells and U235/U238 ICP/MS Ratios

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

○ Location in Blue
Value in Green

Standard Map Features

- Buildings and other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Topographic Contour (20-Foot)
- Paved 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 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

MAP ID: 01-0959

November 02, 2001

NT_Svr w:/projects/fy2001/01-0959/fig8-8.aml

289

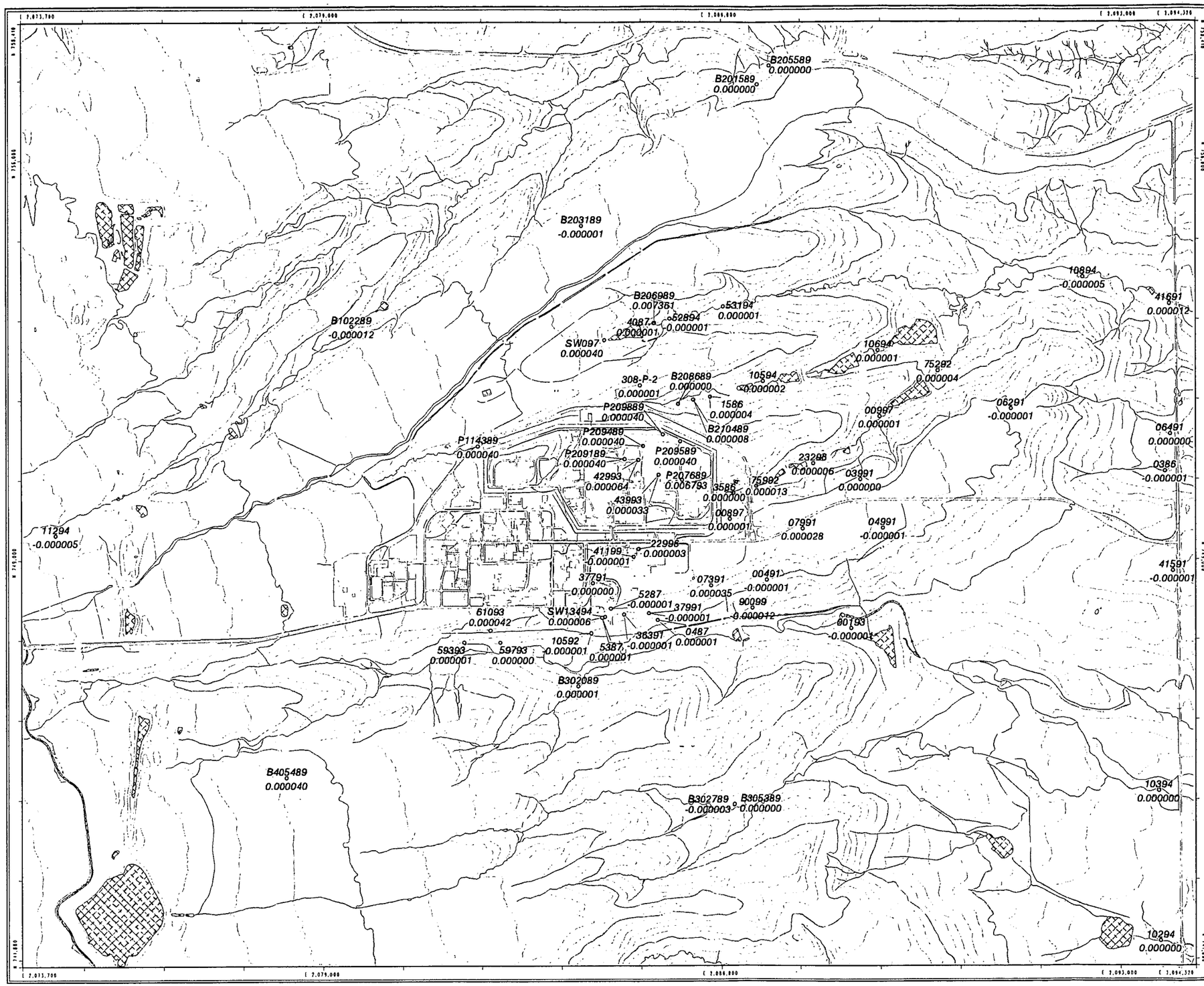

Figure 8-9

Selected Groundwater Wells and U236/U238 ICP/MS Ratios

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

○ Location in Blue
Value in Green

Standard Map Features

- Buildings and other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Topographic Contour (20-Foot)
- Paved 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 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

MAP ID: 01-0959

November 02, 2001

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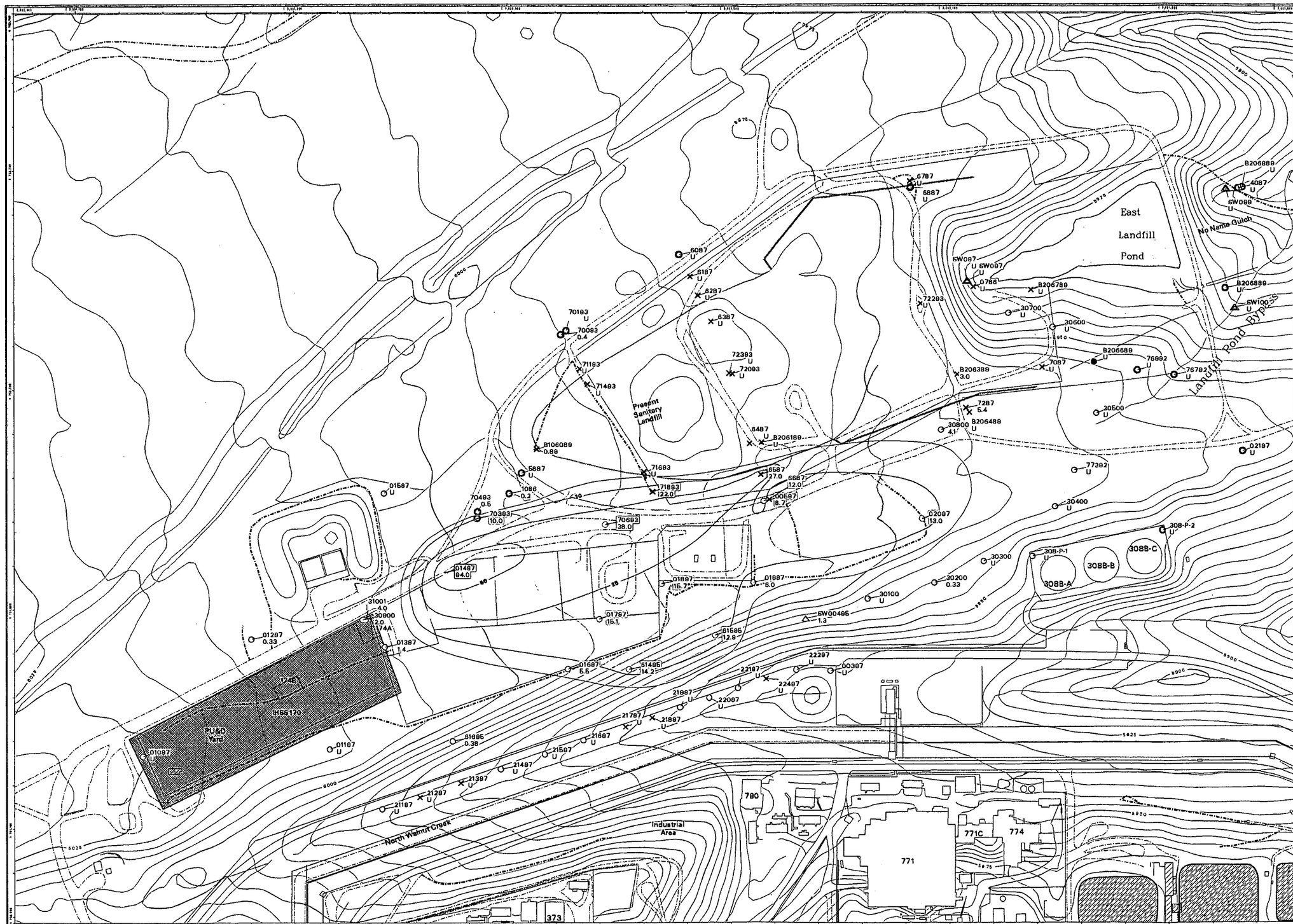

Figure 8-10

PU&D Yard Groundwater 1,1,1-Trichloroethane Concentrations (ug/L)

Tier II = 200 ug/L

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- △ Post-97 PU&D Yard Investigation Surface Water Sampling Location
- ● PU&D Yard Investigation Groundwater Well (Black: Pre-97 data; Red: Post-97 data)
- ○ Non-PU&D Yard Investigation Groundwater Well (Black: Pre-97 data; Red: Post-97 data)
- ▲ Non-PU&D Yard Investigation Surface Water Sampling Location (Black: Pre-97 data; Red: Post-97 data)
- × Abandoned, Non-PU&D Yard Investigation Well (Black: Pre-1997 data; Red: Post-1997 data)
- × Abandoned/Destroyed PU&D Yard Investigation Well
- Groundwater Intercept System
- Landfill Slurry wall
- PU&D Yard IHSS

1,1,1-Trichloroethane Concentrations

- 5 ug/L
- 10 ug/L
- 25 ug/L
- 50 ug/L

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Landfill Pond
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

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Scale = 1 : 3600
1 inch represents approximately 300 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

MAP ID: 01-0893 November 05, 2001

NT_Svr w:/projects/fy2001/01-0893/pud-yard-111-tce.aml

391

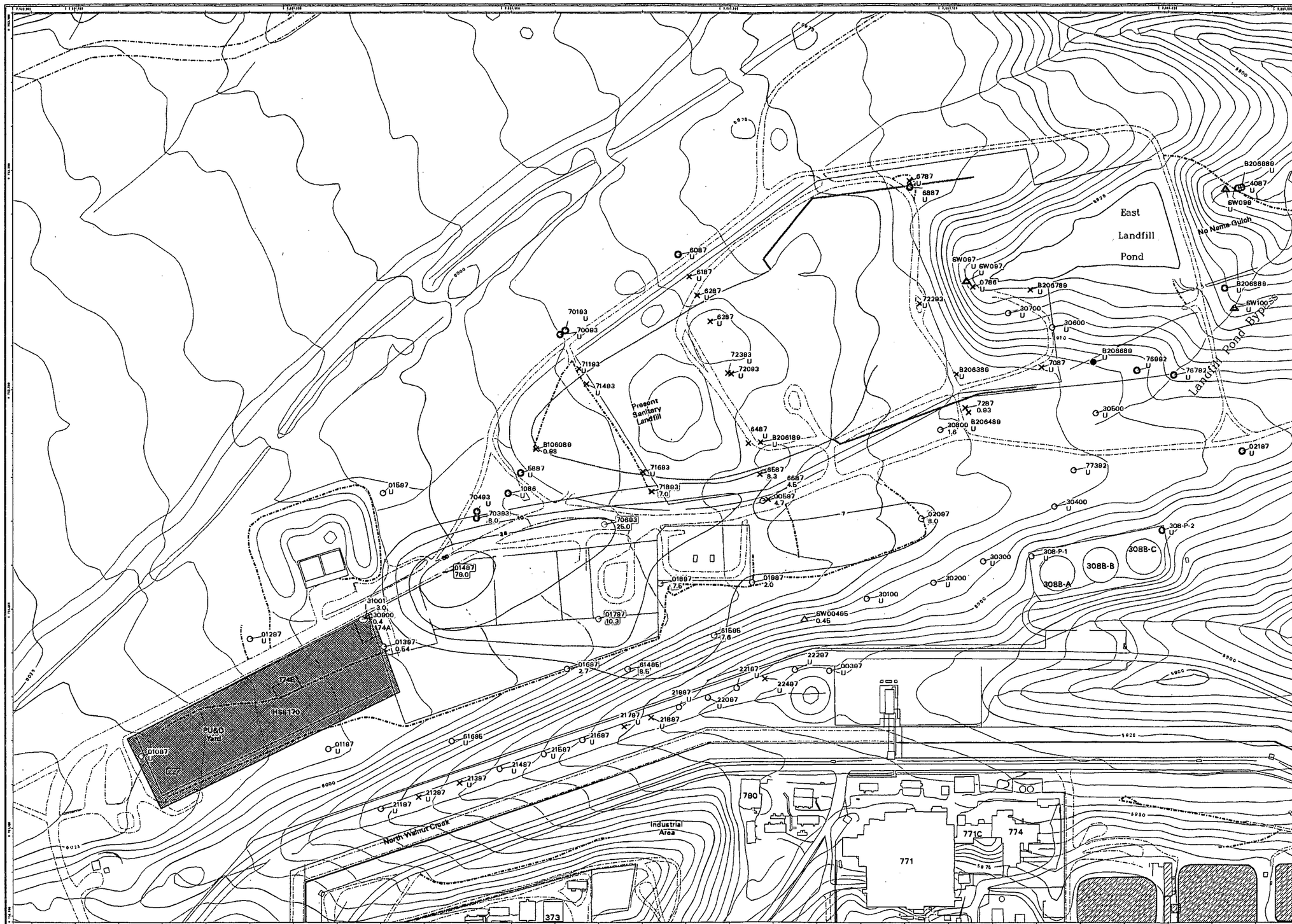

Figure 8-11

PU&D Yard Groundwater 1,1-Dichloroethene Concentrations (ug/L)

Tier II = 7 ug/L

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- △ Post-97 PU&D Yard Investigation Surface Water Sampling Location
- ● PU&D Yard Investigation Groundwater Well (Black: Pre-97 data; Red: Post-97 data)
- ○ Non-PU&D Yard Investigation Groundwater Well (Black: Pre-97 data; Red: Post-97 data)
- △ Non-PU&D Yard Investigation Surface Water Sampling Location (Black: Pre-97 data; Red: Post-97 data)
- × Abandoned, Non-PU&D Yard Investigation Well (Black: Pre-1997 data; Red: Post-1997 data)
- × Abandoned/Destroyed PU&D Yard Investigation Well
- Groundwater Intercept System
- Landfill Slurry wall
- PU&D Yard IHSS

1,1-Dichloroethene Concentrations

- 7 ug/L (Tier II)
- 10 ug/L
- 25 ug/L
- 50 ug/L

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Landfill Pond
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

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Scale = 1 : 3580
1 inch represents approximately 300 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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GIS Dept. 303-966-7707

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KAISER-HILL COMPANY

MAP ID: 01-0883

November 05, 2001

NT_Svr w:/projects/fy2001/01-0883/pud-yard-11-doe.aml

292

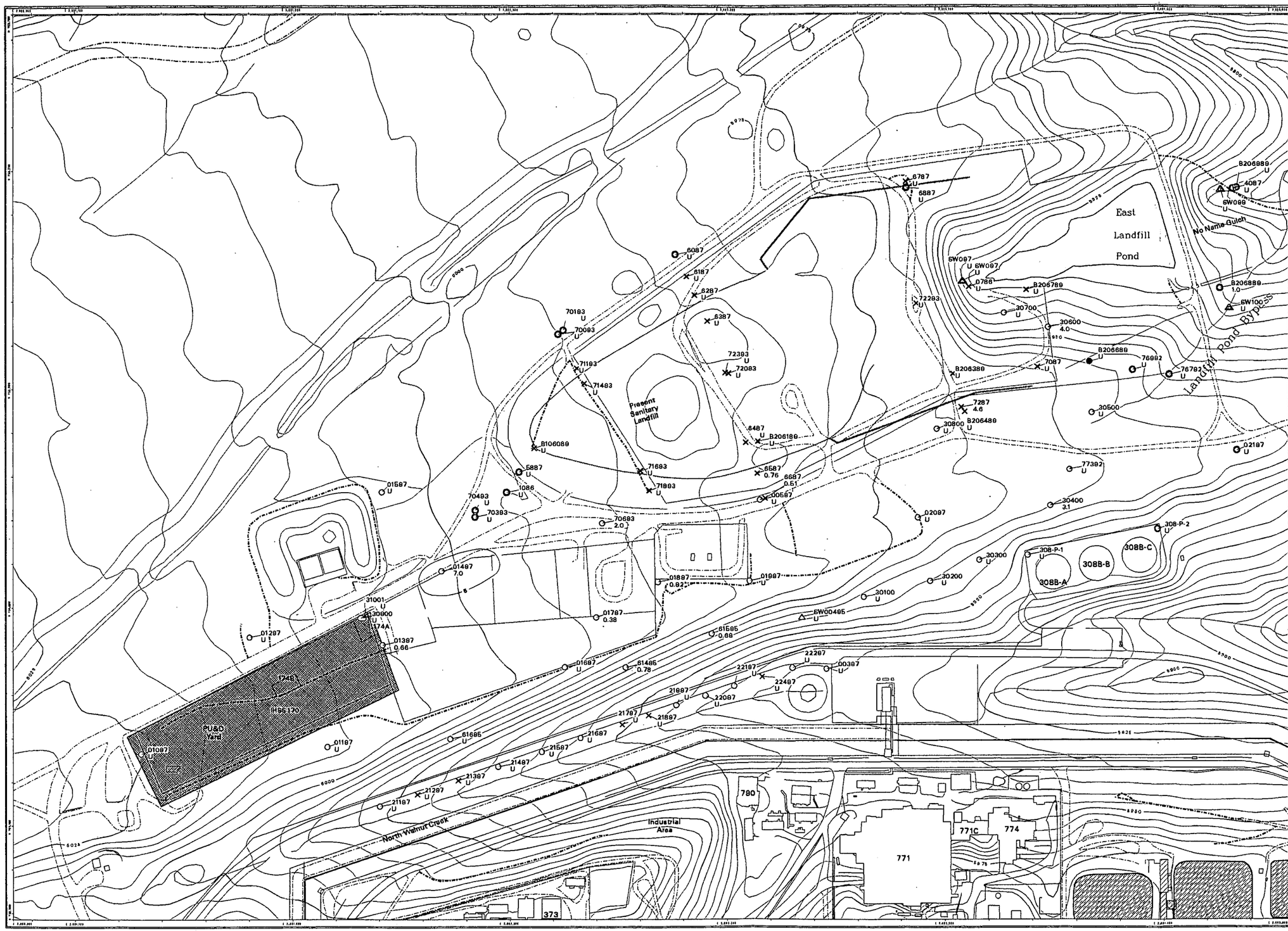

Figure 8-12

PU&D Yard Groundwater Carbon Tetrachloride Concentrations (ug/L)

Tier II = 5 ug/L

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- △ Post-97 PU&D Yard Investigation Surface Water Sampling Location
- ● PU&D Yard Investigation Groundwater Well (Black: Pre-97 data; Red: Post-97 data)
- ○ Non-PU&D Yard Investigation Groundwater Well (Black: Pre-97 data; Red: Post-97 data)
- △ Non-PU&D Yard Investigation Surface Water Sampling Location (Black: Pre-97 data; Red: Post-97 data)
- × Abandoned, Non-PU&D Yard Investigation Well (Black: Pre-1997 data; Red: Post-1997 data)
- × Abandoned/Destroyed PU&D Yard Investigation Well
- Groundwater Intercept System
- Landfill Slurry wall
- PU&D Yard IHSS

Carbon Tetrachloride Concentrations

- 5 ug/L (Tier II)

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Landfill Pond
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

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Scale = 1 : 3580
1 inch represents approximately 308 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
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GIS Dept. 303-966-7707

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KAISER-HILL COMPANY

MAP ID: 01-0893

November 05, 2001

NT_Svr w:/projects/fy2001/01-0893/pud-yard-ct.aml

293

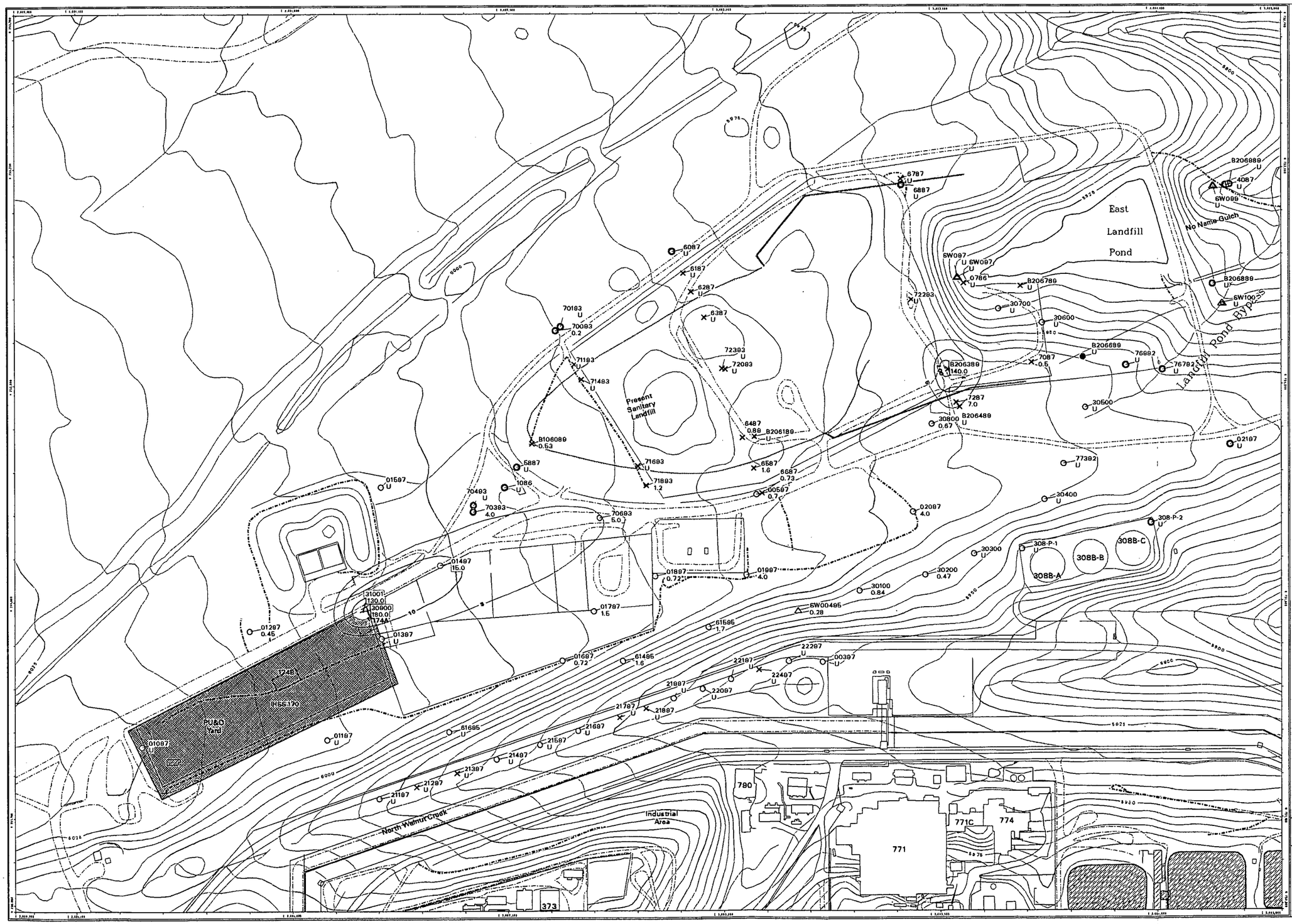

Figure 8-13

PU&D Yard Groundwater Tetrachloroethene Concentrations (ug/L)

Tier II = 5 ug/L

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- △ Post-97 PU&D Yard Investigation Surface Water Sampling Location
- ● PU&D Yard Investigation Groundwater Well (Black: Pre-97 data; Red: Post-97 data)
- ○ Non-PU&D Yard Investigation Groundwater Well (Black: Pre-97 data; Red: Post-97 data)
- △ Non-PU&D Yard Investigation Surface Water Sampling Location (Black: Pre-97 data; Red: Post-97 data)
- × Abandoned, Non-PU&D Yard Investigation Well (Black: Pre-1997 data; Red: Post-1997 data)
- × Abandoned/Destroyed PU&D Yard Investigation Well
- Groundwater Intercept System
- Landfill Slurry wall
- PU&D Yard IHSS

Tetrachloroethene Concentrations

- 5 ug/L (Tier II)
- 10 ug/L
- 100 ug/L

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Landfill Pond
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

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Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KAISER-HILL COMPANY

MAP ID: 01-0893

November 05, 2001

NT_Svr w:/projects/fy2001/01-0893/pud-yard-pce.aml

294

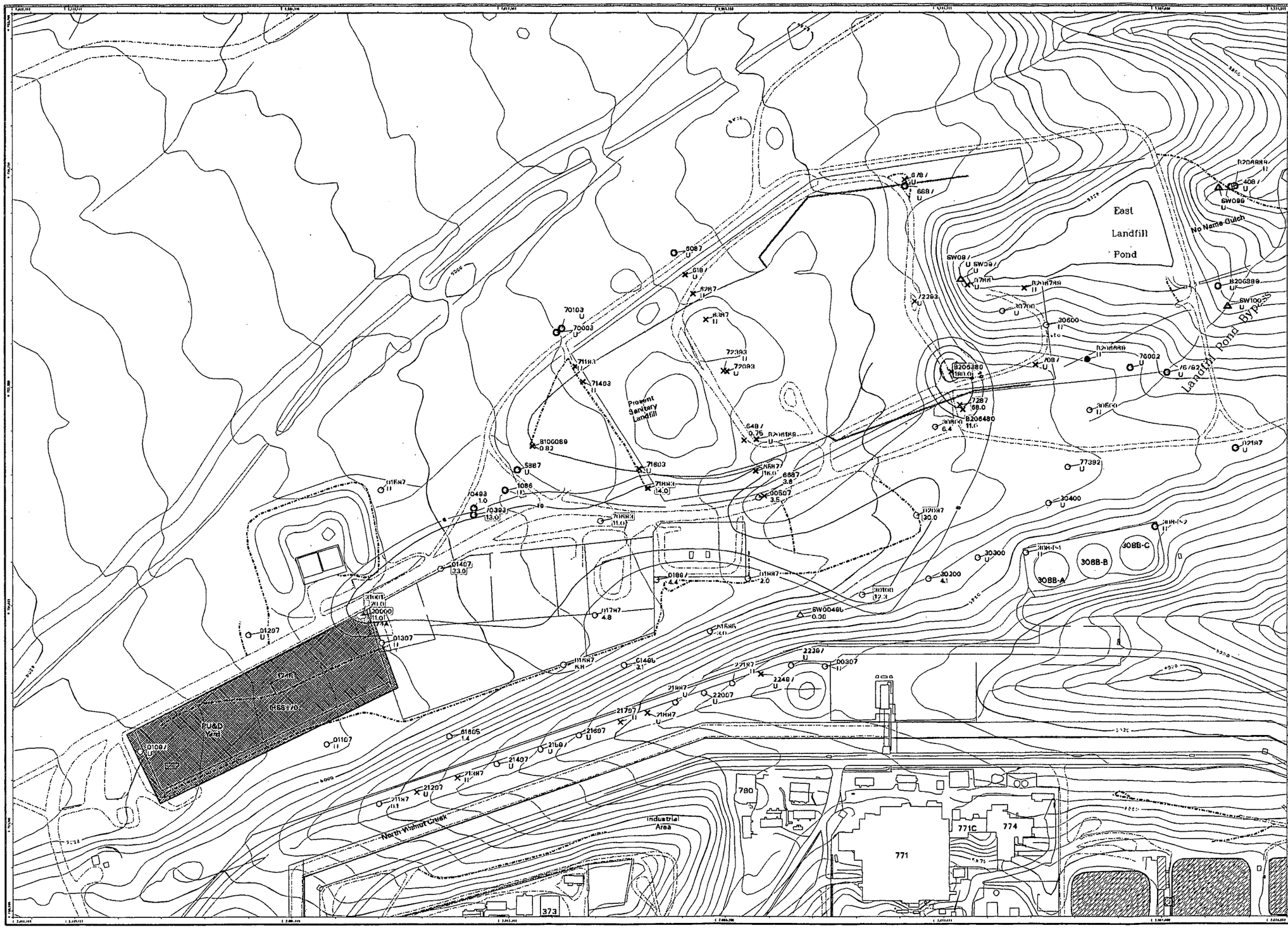

Figure 8-14

PU&D Yard Groundwater Trichloroethene Concentrations (ug/L)

Tier II = 5 ug/L

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- △ Post-97 PU&D Yard Investigation Surface Water Sampling Location
- ● PU&D Yard Investigation Groundwater Well (Black: Pre-97 data; Red: Post-97 data)
- ○ Non-PU&D Yard Investigation Groundwater Well (Black: Pre-97 data; Red: Post-97 data)
- △ Non-PU&D Yard Investigation Surface Water Sampling Location (Black: Pre-97 data; Red: Post-97 data)
- × Abandoned, Non-PU&D Yard Investigation Well (Black: Pre-1997 data; Red: Post-1997 data)
- × Abandoned/Destroyed PU&D Yard Investigation Well
- Groundwater Intercept System
- Landfill Slurry wall
- PU&D Yard IHSS

Trichloroethene Concentrations

- 5 ug/L (Tier II)
- 10 ug/L
- 50 ug/L
- 100 ug/L

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Landfill Pond
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

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Scale 1 : 3000
1 inch is based on a sheet width of 30 feet

State Plane Coordinate System
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

MAP ID: 31408 — November, 2001

NT Svr w:/projects/fy2001/01-0893/pud-yard-tce.aml

295

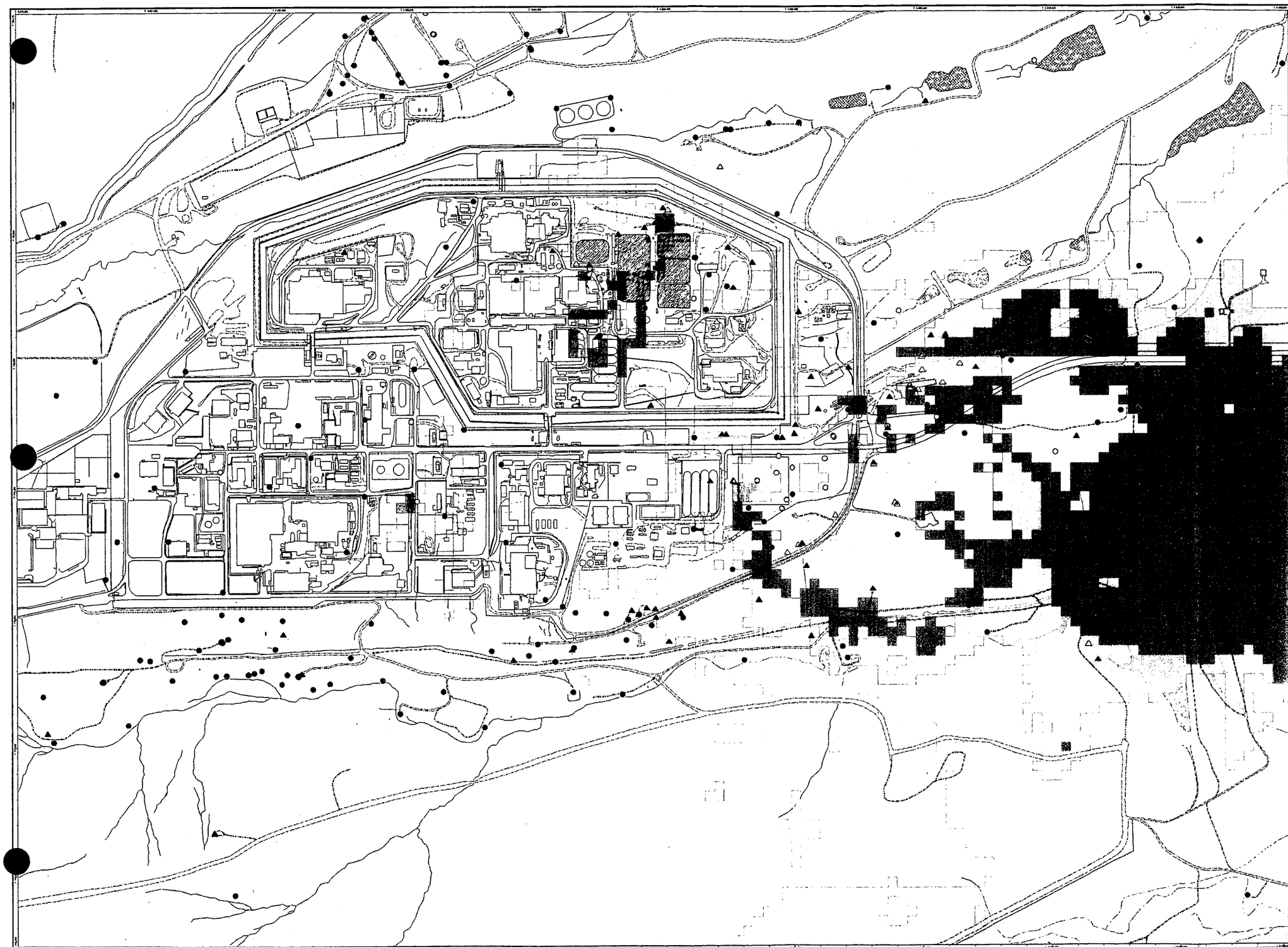

Figure 9-1

Unfiltered Plutonium 239/240 in UHSU Groundwater Superimposed on Surface Soil Plutonium 239/240 Concentrations 1991-1995

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

Plutonium 239/240 Activity in Groundwater Wells (Units = pCi/L)

Alluvial Wells		Bedrock Wells
●	0.0 to 0.05	▲
○	0.05 to 0.15	△
○	0.15 to 0.5	△
○	0.5 to 1.0	△
○	> 1.0	△

Plutonium 239/240 Activity in Surface Soils (Units = pCi/g) *

- □ < = 0.1
- □ > 0.1 and < = 1.0
- □ > 1.0 and < = 5.0
- □ > 5.0 and < = 10.0
- ▨ > 10.0 and < = 25.0
- □ > 25.0 and < = 100.0
- □ > 100.0 and < = 252.0
- □ > 252.0 and < = 1429.0
- □ > 1429.0 and < = 10000.0
- □ > 10000.0

Standard Map Features

- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Rocky Flats boundary
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
**Surface Soil Plutonium Data Kriged for Kaiser Hill, Report on Soil Erosion and Surface Water Sediment Transport, 2000 Controlled Document # OU-RF-01823.*

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Scale 1 : 8800
1 inch represents approximately 742 feet
100 0 200 400ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: DynCorp

Prepared for: KH Kaiser-Hill

NT_Svr w:/projects/fy2001/01-0925/fig9-1.aml

314

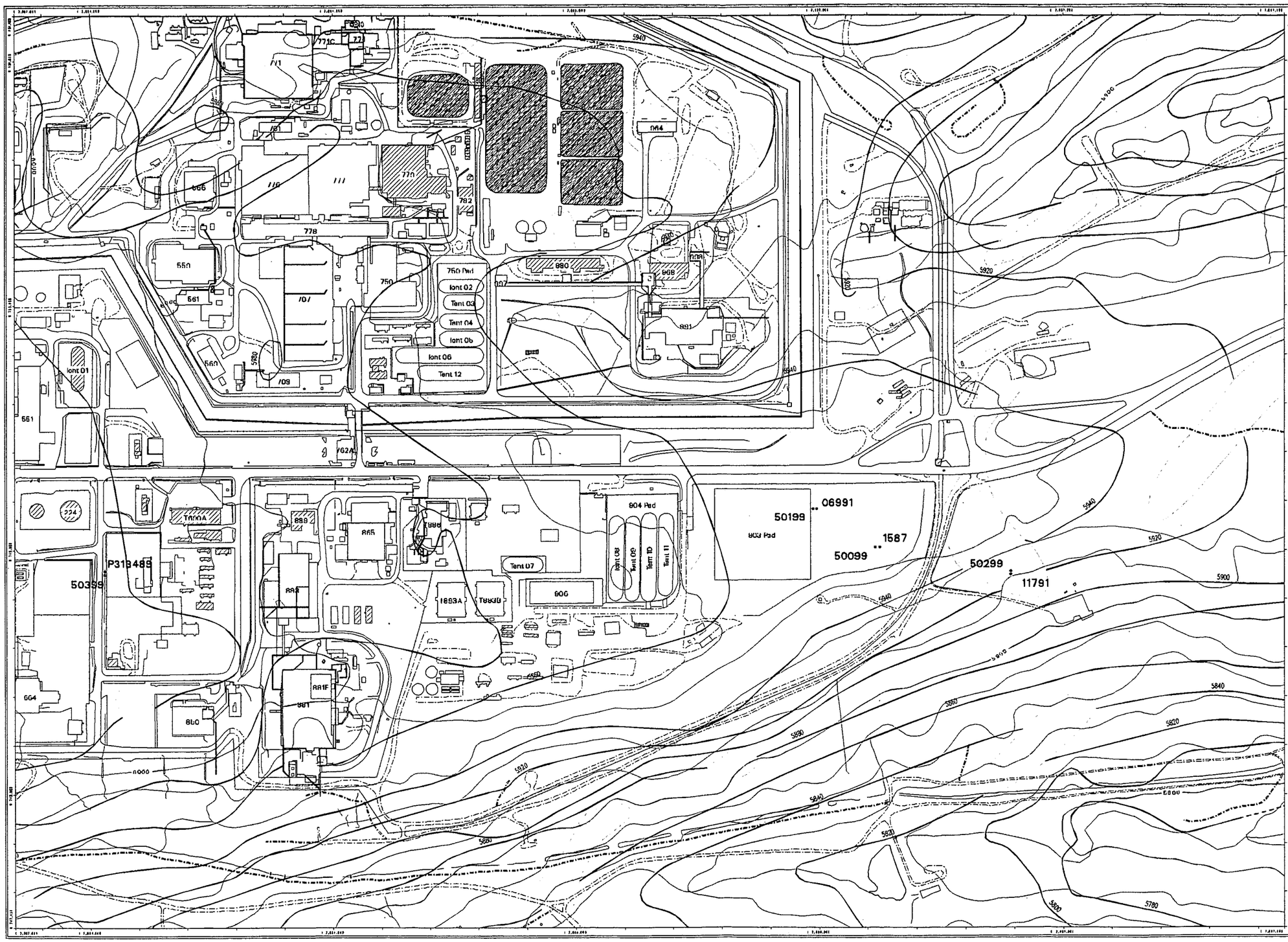

Figure 9-2

Monitoring Well Locations
Actinide Drilling Artifact Contamination Project

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- Actinide Monitoring Well Location
- Existing Groundwater Monitoring Well
- Water Level Contour 2nd Qtr. 2000
- Dashed where inferred
- Foundation Drain
- Approximate extent of Alluvial Unsaturated Area

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

NOTES:
Potentiometric Surface Contours Represent April 2000 Data

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Scale = 1:4820
1 inch represents approximately 402 feet

100 0 200 400

State Plane Coordinate System
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

MAP ID: 01-0830

November 05, 2001

NT_Svr w:/projects/fy2001/01-0830/pot99-ii-spring.aml

315

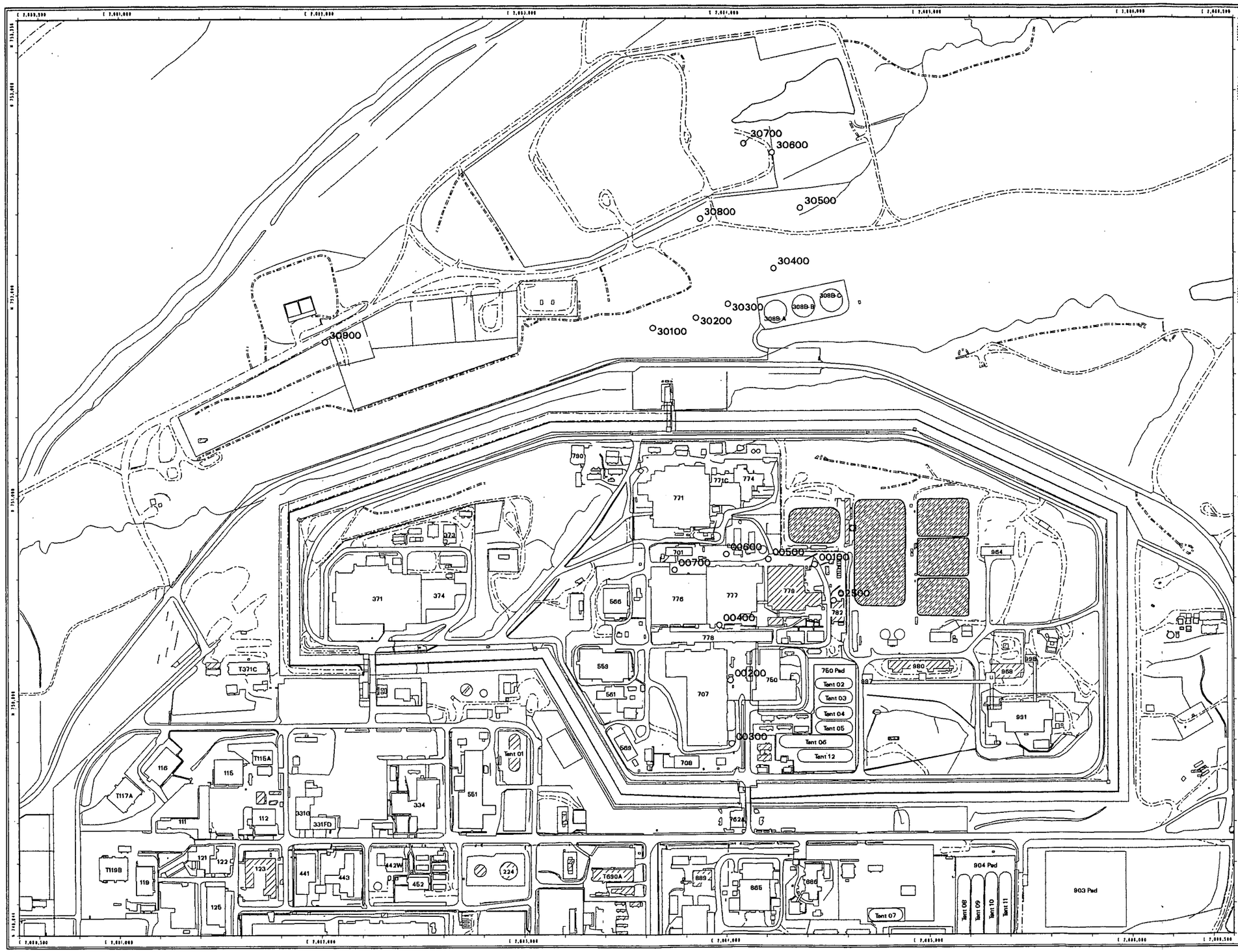

Figure 10-1

CY2000 Well Abandonments and Installations

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EXPLANATION

- ○ 2000 Groundwater Monitoring Well Completions

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 : 5820
1 inch represents 485 feet

100 0 200 400ft

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

MAP ID: rfca-rpt

October 31, 2001

NT_Svr w:/projects/fy2001/01-0683/gw_aban-inst.aml

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