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RESIDUAL RISK EVALUATION - RELEASE BLOCK H

MOUND PLANT
MIAMISBURG, OHIO

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FINAL

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EXECUTIVE SUMMARY

The Mound Plant has been used as a research, development and production facility in support of the Department of Energy's (DOE) weapons and energy programs since 1948. Past operations created approximately 400 areas at the Mound where potential releases of hazardous substances may have occurred. These areas where releases may have occurred are undergoing investigation and, as deemed necessary, restoration. With the concurrence of the United States Environmental Protection Agency and the Ohio Environmental Protection Agency, the DOE will release the restored Mound property for economic development and commercial enterprises.

To streamline the transfer process, the Mound property has been divided into 19 "release blocks", which are contiguous tracts of property designated for release. Before transfer of each release block can be completed, an evaluation will be completed of any human health risks that are associated with residual levels of contamination remaining in the release block either after removal actions (clean-ups) have occurred or have been deemed unnecessary. A Residual Risk Evaluation (RRE) will be prepared for each release block at the Mound to evaluate these residual risks. The RRE methodology is not intended to assess risks associated with residual contamination in buildings. For the release blocks that contain buildings, a separate analysis of the health hazards associated with residual contamination will be performed by the Mound D&D program, as approved by USEPA and OEPA. This report is the RRE for Release Block H , and it addresses residual contaminants in soil and groundwater.

The residual contaminants in Release Block H were evaluated by assuming that two categories of people would come into contact with the contaminants: construction workers, who may be directly exposed to soil and groundwater (used for showering and drinking) for up to five years, and site employees, such as office workers who may have minimal exposure to soil and groundwater, but may be exposed for up to 25 years. Additionally, the construction worker and site employee scenarios include both a scenario for current groundwater contaminant concentrations, and a scenario for future groundwater contaminant concentrations. The current contaminant concentrations were estimated for groundwater by assuming that the groundwater currently being pumped from Mound production wells represents today's groundwater exposures. In the future, additional site-related contamination may enter the groundwater and potentially cause different exposures than today's.

The risks associated with the naturally occurring, "background" concentrations of contaminants were calculated separately from the risks associated directly with Mound activities that constitute the "incremental" risks above background. The soil and groundwater risks were added together, and the background and incremental risks were added together to produce total risks. These total risks were divided into risks associated with non-carcinogenic contaminants, termed the Overall Hazard Index, and the risks associated with carcinogenic contaminants (including radionuclides), termed Overall Risk. The Overall Hazard Indices are divided into separate indices based on the potential organ systems that are affected. Separate indices are presented for those chemicals that pose noncarcinogenic systemic effects to the hepatic system (liver), the excretory system (kidney and related organs), and other effects (e.g. skin disorders). Summary tables of the final risks obtained during this RRE are provided below.

An Overall Hazard Index of 1.0 indicates that for exposures at or below the given concentration of contaminants, no effects on humans are expected. Risks from carcinogens are expressed in scientific notation. For example, 1.0E-4 equals one cancer in 10,000 people and 1.0E-6 equals one cancer in 1,000,000 people.

The construction worker and site employee tables show that for Overall Hazard Indices, the incremental values equal the total values due to the absence of background contamination for these compounds. This demonstrates that for noncarcinogens, the majority of the risk is incremental, and therefore possibly caused by former Mound activities. For carcinogens, the Overall Risks, however, show that

Construction Worker

	Current Scenario		Future Scenario		
	Overall Hazard Index	Overall Risk	Overall Hazard Index	Overall Risk	Comments
Incremental	3.2E-3 (1) 3.7E-2 (2) 3.7E-2 (3)	2.2E-5	3.9E-3 (1) 1.0 (2) 3.7E-2 (3)	2.3E-5	Table V.7
Background	9.3E-5 (1) 0.0 (2) 1.3E-1 (3)	4.6E-5	9.3E-5 (1) 0.0 (2) 1.3E-1 (3)	4.6E-5	Table V.8
Total	3.3E-3 (1) 3.7E-2 (2) 1.7E-1 (3)	6.8E-5	4.0E-3 (1) 1.0 (2) 1.7E-1 (3)	6.9E-5	Table V.9

Site Employee

	Current Scenario		Future Scenario		
	Overall Hazard Index	Overall Risk	Overall Hazard Index	Overall Risk	Comments
Incremental	2.8E-4 (1) 3.7E-2 (2) 3.8E-3 (3)	2.3E-5	7.9E-4 (1) 1.0 (2) 4.0E-3 (3)	2.6E-5	Table V.7
Background	7.3E-5 (1) 0.0 (2) 1.4E-2 (3)	2.5E-5	7.3E-5 (1) 2.3E-2 (2) 1.4E-2 (3)	2.5E-5	Table V.8
Total	3.6E-4 (1) 3.7E-2 (2) 1.8E-2 (3)	4.9E-5	8.7E-4 (1) 1.0 (2) 1.8E-2 (3)	5.2E-5	Table V.9

Note: (1) includes potential hazards due to effects on the liver
(2) includes potential hazards due to effects on the kidney
(3) includes potential hazards due to other effects such as to skin.

the background contributes as much or more risk than the incremental, suggesting that these risks are not attributed solely to the Mound. A comparison of the construction worker and the site employee Hazard Indices show that they are currently both well below 1.0. In the future, potential Hazard Indices up to, but not exceeding 1.0, may be calculated, primarily due to chromium in future groundwater. A comparison of the construction worker and the site worker Overall Risks shows that they are similar. For example, for the current scenario, risks are calculated to be 6.8E-5 and 4.9E-5 for the construction worker and site employee, respectively, and for the future scenario, risks are calculated to be 6.9E-5 and 5.2E-5 for construction workers and site employees, respectfully.

Site employees and construction workers at Release Block H are assumed to be directly exposed to Release Block H soil. The groundwater that may be supplied to workers at Release Block H businesses comes from elsewhere on the Mound site. Therefore, a comparison of the soil hazards and risks associated with soil and groundwater is useful to better illustrate residual risks directly attributable to Release Block H. Approximately 52% of the Incremental Overall Hazard Index for construction workers currently, but only 4% of the hazard in the future, is attributable to Release Block soils. About 10% of the Incremental Overall Hazard Index for site employees currently, but only 0.4% of the hazard in the future, is attributable to Release Block H soils. The rest of the overall calculated hazards to construction workers and site employees would result from use of the BVA groundwater.

Similar results are seen with Incremental Overall Risks. Approximately 90% of the Overall Risks to construction workers currently, and 86% in the future, are attributable to Release Block H soils. For site employees, 49 to 56% of the Overall Risks, both currently and in the future, are attributable to Release Block H soils. The remainder of the calculated risks to construction workers and site employees would result from use of the BVA groundwater.

1.0 INTRODUCTION

1.1 OVERVIEW

The Department of Energy's Mound Plant is located on a 306-acre parcel of land within the city of Miamisburg, Ohio, about 10 miles southwest of Dayton, Ohio. The plant is located approximately 2000 feet east of the Great Miami River. Portions of the site overlie the Great Miami Buried Valley Aquifer, which has sole source designation. The Mound Plant has been used as a research, development and production facility in support of DOE's weapons and energy programs since 1948. Past operations created over 400 areas at the Mound where potential releases of hazardous substances may have occurred. These areas where releases may have occurred are undergoing investigation and, as deemed necessary, restoration. The restored Mound property will be released for economic development.

To streamline the transfer process, the Mound property has been divided into 19 "release blocks", which are contiguous tracts of property designated for release at a specific time. Before transfer of each release block can be completed, any residual risks in each of the areas where releases may have occurred (called potential release sites or PRSs) in that release block must be evaluated. The locations and designations of the release blocks are shown in Figure 1.1. All preparations for the transfer of the first Release Block (Block A) were completed in 1995, and are underway to make Release Block H available for transfer in 1997 (the subject of this report). The RREM is not intended to assess risks associated with residual contamination in buildings. For the release blocks that contain buildings, a separate analysis of the health hazards associated with residual contamination will be performed by the Mound D&D program, as approved by USEPA and OEPA. All of the release blocks are scheduled to be cleaned up and available for transfer by 2005.

A Residual Risk Evaluation (RRE) needs to be prepared for each release block to evaluate human health risks associated with residual levels of contamination that remain after removal actions have been completed or judged unnecessary. This information is necessary to show that the release block is acceptable for redevelopment. This report is the RRE completed for Release Block H, which addresses residual contaminants in soil, surface water and groundwater. The RRE also addresses potential cumulative risks from exposure to non-release block-specific contaminants in groundwater and air, in addition to release block-specific contaminants.

The data used to evaluate the human health risks associated with residual contaminants has been derived from many sources over a number of years. These data include, but are not limited to, background study results, soil screening samples, groundwater assessments, soil gas sampling, soil gas confirmation sampling, groundwater data from Mound production wells and Mound bedrock aquifer monitoring wells, and air sampling data.

1.2 SCOPE OF THE RRE PERFORMED FOR A SPECIFIC RELEASE BLOCK

This report was developed using the Mound 2000 Residual Risk Evaluation Methodology or RREM (DOE, 1996). The RREM was developed through the collaborative efforts of Mound personnel, DOE, U.S. Environmental Protection Agency (U.S. EPA), and the Ohio Environmental Protection Agency (OEPA). A core team of personnel from each party participated in the development of the methodology and were supported by risk assessment experts.

Each release block RRE consists of five elements. These elements are:

1. Identification of contaminants to be evaluated,
2. Exposure assessment,
3. Toxicity assessment,
4. Risk characterization, and
5. Characterization of cumulative risks.

Figure 1.1. Mound facility location map with release blocks identified.

Identification of contaminants to be evaluated

For Release Block H, identification of contaminants to be carried through the RRE calculations was based on several sources of data. In general, all information that qualitatively and quantitatively describes the residual contamination within the release block was collected. Historical information describing the past usage of land and buildings within Release Block H was also required.

As described in the RREM, the process of identifying contaminants to be evaluated consists of several steps. All contaminants that were detected one or more times were listed in a contaminant summary table by media where they were detected. Such information as the maximum concentration detected was noted. These data were compared to background concentrations of the contaminants for organics, inorganics, and radionuclides. Background concentrations (95th% Upper Tolerance Limit of the background level) were developed and are presented in the RREM. Contaminants with the maximum concentration detected exceeding their background were carried to the next step of the RRE. Contaminants with the maximum concentration less than their background concentration were not quantitatively addressed further in the RRE. This approach focuses RRE evaluations to address contamination caused by Release Block H and Mound plant activities.

Soil and groundwater contaminants that exceeded the background concentration were compared to risk-based Guideline Values. Guideline Values are media-specific concentrations of contaminants that correspond to certain human health risk levels for specified exposure scenarios. As described in the RREM, Guideline Values were developed for construction worker and site employee scenarios (see HAZWRAP, 1995 for the detailed derivation of Guideline Values). The Guideline Values used in the RRE for Release Block H were developed specifically for the Mound, and were approved by the DOE, the U.S. EPA, and OEPA. Based on these exposure scenarios, the Guideline Values correspond to the 1.0E-6 risk level for carcinogens and radionuclides, and the concentration corresponding to a Hazard Quotient of one for each noncarcinogen. A 1.0E-6 risk level represents one chance in one million of contracting cancer as a result of exposure to the Guideline Value concentration. A Hazard Quotient of one indicates that from an exposure at or below the given concentration, no effects to humans are expected. Carcinogenic or radionuclide contaminants that exceeded their Guideline Values and noncarcinogenic contaminants that exceeded one-tenth of their Guideline Value were carried to the next step of the RRE. Comparison to Guideline Values ensures that Release Block H related contaminants occurring at concentrations potentially detrimental to human health were included in the RRE.

Additional screening procedures were also used to evaluate release block contaminants. Contaminants with a frequency of detection less than or equal to 5% (1 detect per 20 analyses) may not indicate contamination that is site related. If a contaminant was infrequently detected in all media, was not detected at high concentrations in any media, and there was no reason to believe it was used on site, the contaminant was eliminated from further consideration. Additionally, a contaminant detected in samples and blanks but is known to be a common laboratory contaminant, and was unlikely to have been used on site, may be eliminated from further consideration if concentrations are within a factor of 10 of the detection limit (RAGS, 1989). Such laboratory contaminants may include methylene chloride, 2-butanone, and phthalate esters.

A final list was then prepared of all contaminants detected in one or more samples and in one or more media that were screened by comparison of the maximum detected value with background and Guideline Values, and considering frequency of detection and whether or not it was a laboratory contaminant. Appropriate screening values for each constituent are listed in the tables presented in Section 2, and the decision and rationale to include or exclude a contaminant from further consideration is indicated. Additionally, general water quality indicator parameters were noted as such and were not carried through the risk evaluation. Nitrogen, as an example, has been measured as nitrates, nitrites, or together as nitrates-nitrites. All are considered indicators of water quality.

Exposure Assessment

The goal of exposure assessment is to estimate the type and magnitude of contaminant exposures that may be incurred by an individual working within the release block under consideration. First, exposure scenarios were identified. DOE, U.S. EPA and OEPA core team members and the stakeholders have agreed that the site use will be commercial/industrial. Therefore, the two exposure scenarios developed for use in the RRE are the construction worker and site employee scenarios. These scenarios represent exposures that are reasonably expected to occur at the Mound property. The intake variables with which potential exposures were quantified for these two types of personnel were conservatively selected such that the exposures represent a reasonable maximum exposure.

Potential exposure pathways through which the construction worker or the site employee may be exposed were determined based on the RREM and knowledge of Release Block H. These potential exposure pathways include direct soil exposure pathways (inadvertent ingestion of soil, external radiation exposure, and dermal contact with soil), air exposure pathways (inhalation of airborne particulates and vapors), and groundwater pathways (ingestion of groundwater as drinking water, inhalation of volatiles during showering, and dermal contact with groundwater during showering). Some differences in pathways for the site employee and construction worker are noted. Construction workers are assumed to be on site for a shorter period of time and consume more soil via incidental ingestion than site employees. Site employees do not shower with groundwater at the site.

The quantification of intakes for each contaminant and each pathway for each exposure scenario were also conducted during exposure assessment. First, constituent concentrations were determined for each media. Then, separate concentrations for each contaminant were calculated for the background (if available) for the incremental portion of the contamination attributable to the Mound facility, and for the total concentration. The total concentration, which is based on the measured concentration, is comprised of both background and the increment above background. These concentrations were then used with the appropriate equations for contaminant intake for each pathway and each receptor (construction worker or site employee) as specified in the RREM. In addition, Secondary Drinking Water Standards were used to assess general quality of the potable water supply.

Toxicity Assessment

The toxicity assessment identifies potential adverse effects associated with exposure to release block-related substances. Toxicity values were taken from the U.S. EPA's Integrated Risk Information System (IRIS) and the Health Effects Assessment Summary Tables (HEAST). For contaminants without toxicity values in IRIS or HEAST, the most recent data available may be used. If no toxicity values exist for a particular contaminant, the contaminant was not quantitatively evaluated in the RRE.

Risk Characterization

Risk characterization combines information from both the exposure assessment and the toxicity assessment to characterize human health risks. This process characterizes carcinogenic and radionuclide risk separately, using standard equations as specified in the RREM. Hazard Quotients are calculated for each noncarcinogen contaminant. Potential risks were calculated for each pathway and each receptor based on the total concentration of a contaminant, its background concentration and the increment above background attributable to Mound activities. Chemical-specific risks and Hazard Quotients were then summed across pathways and across contaminants.

Evaluation of Potential Cumulative Health Effects

The exposures to contaminants located within a release block are called release block exposures. However, contaminants from outside the release block under investigation may migrate to the release

block via air pathways, surface water pathways and groundwater pathways. The potential for exposure to these migrating contaminants are called cumulative exposures, and they were evaluated to complete the RRE for Release Block H.

1.3 ORGANIZATION OF THIS RRE REPORT

This RRE report is for Release Block H. Section 2.0 identifies the Release Block H contaminants by describing the available data and performing the screening with background and Guideline Values. Section 3.0 identifies exposure scenarios and exposure pathways to complete the exposure assessment. Section 4.0 is the toxicity assessment. Section 5.0 contains the residual risk evaluation for both construction workers and site employees, and considers both current exposures and potential future exposures. This section also evaluates the cumulative health effects of residual risk from multiple pathways, and discusses uncertainties.

2.0 IDENTIFICATION OF RELEASE BLOCK H POTENTIAL CONTAMINANTS

2.1 RELEASE BLOCK H SITE HISTORY

Release Block H constitutes the northeastern most portion of Operable Unit 2 (OU-2). Although OU-2 was primarily designated for investigation of the Main Hill area, Release Block H is generally not located on the Main Hill. The Block consists primarily of a large asphalt-paved parking lot located off of and downgradient of the Main Hill, the main plant entrance and exit gates, and associated roadways.

In addition to the paved parking lot, Release Block H also includes a small Guard House, Building GP-4, which is located on the Main Hill. Release Block H is bound to the north by off-site residences, to the west by the main Hill, to the south by an asphalt lined pond and Buildings 29 and 61, and to the east by the Mound property line and main entrance gate.

In the early 1980's a Site Survey Project was initiated to estimate the quantities and types of radionuclides, the volume and locations of contaminated soil, and the potential remediation costs. The report, published in 1988, lists 109 contaminated areas on the Mound facility property, called Areas of Concern (AOC). Forty-one of these AOC are located within OU-2, but only one is located within Release Block H. This AOC is a seep of groundwater that originates within the Main Hill and is identified as Potential Release Site (PRS) 93.

2.2 AVAILABLE DATA FOR RELEASE BLOCK H

2.2.1 Soil Contaminant Data

Soil contaminant data for Release Block H were obtained from a number of sources. These include:

- Other Soils Characterization Report, Volume I - Text. Final, Revision 0. May 1, 1995.
- OU-5 Operational Area Phase I Investigation Non-AOC Field Reports, Volume I - Text. Final, Revision 0. June 1, 1995.
- OU-9 Regional Soils Investigation Report, Revision 2. August 1, 1995.
- OU-3 Miscellaneous Sites Limited Field Investigation Report, Volumes 1, 2 and 3. Final, Revision 0. July 1, 1993.
- OU-9 Site Scoping Report, Volume 3 - Radiological Site Survey. Final. June 1, 1993.
- Soil Gas Confirmation Sampling. Revision 0. April 1, 1996.

The soil data can be divided into three types: data obtained through analytical laboratory analysis, data obtained through "screening" techniques conducted in a laboratory and data obtained through screening techniques conducted in the field. The analytical laboratory data is obtained by using strict methods and following exacting quality control procedures. This data is of the highest quality, and is quantitative. The laboratory screening data is considered to be of a lower quality because sample preparation does not occur, and the measuring instruments are less precise than when analytical techniques are used. The field screening techniques are the least accurate, due to instrument limitations, field calibrations and the effect of ambient conditions. Field screening data was not used for any calculations in this RRE. Laboratory screening data was the subject of an OEPA audit, and the

data was deemed useable for risk evaluation purposes. The analytical laboratory data was also used for calculations in this RRE.

The Release Block H distribution of quantitative analytical data is shown in Figure 2.1. The Release Block H distribution of relatively qualitative screening data is shown in Appendix A, Diagrams A and C.

2.2.2 Groundwater Contaminant Data

Groundwater data consists of water analyses of the Mound production wells and analyses of groundwater from monitoring wells screened in the bedrock aquifer on the Mound property. This data has been compiled in the Mound MEIMS database.

Groundwater from the Great Miami Buried Valley Aquifer (BVA) Mound Plant Production Wells is a potable water supply capable of serving uses associated with Release Block H. Current BVA groundwater contamination is defined by current concentration levels in Production Wells 0076 and 0271 (Appendix B). There have been 57 organic, inorganic and radionuclide contaminants detected in these wells.

Future groundwater contamination is assumed to be appropriately represented by combining current BVA contamination with additional contamination currently in the nearby bedrock aquifer. Bedrock aquifer groundwater from across the entire Mound Plant is assumed to eventually mix with BVA water, and thereby contribute bedrock aquifer contaminant mass to the BVA. A detailed analysis of this approach is presented in Appendix C. There have been 74 organic, inorganic and radionuclide contaminants detected in bedrock aquifer wells.

2.2.3 Background Data

For an analyte to be carried through the risk evaluation, the analyte must exceed both background concentrations and Guideline Value concentrations (0.1 times the Guideline Value for non-carcinogens and the 10^{-6} Guideline Value for carcinogens) for the soil or groundwater media in which it was detected. Background concentrations measure the amount of a chemical that is naturally occurring (like metals) or anthropogenic chemicals originating from sources other than the Mound plant. Background concentrations in soil were determined during an investigation conducted in September 1994 titled "Operable Unit 9 Background Soils Investigation Soil Chemistry Report".

Background concentrations in groundwater were developed from two sources of data. For the Buried Valley Aquifer, background values were reported in the April 1995 "OU9 Hydrologic Investigation: Groundwater Sweeps Report". Background for bedrock groundwater was reported in the April 1995 "OU5 New Property Remedial Investigation Report". Guideline Values were developed by the DOE and are listed in a document titled "Risk-Based Guideline Values, Mound Plant, Miamisburg, OH" December 1995. For analytes in soil or groundwater with no Guideline Values, analytes that exceeded background were carried through the RRE. Detected analytes with neither background nor Guideline Values were carried through to the next step of the RRE. The following section examines the available soil and groundwater data for Release Block H.

2.2.4 PRS Data

There is one Potential Release Site (PRS) located within Release Block H. It is the site of Seep 603 and has been identified as PRS 93. This former seep is located on the eastern slope of the Main Hill, between the Guard House and the paved parking lot (Figure 2.1). About 200 ft east of Release Block H is PRS 241, which is located within and will be addressed in the RRE for Release Block N.

Sampling of the seep was initiated in 1986 when tritium contamination was discovered in seeps located on the western side of the Main Hill, below the SW Building. The initial sampling detected

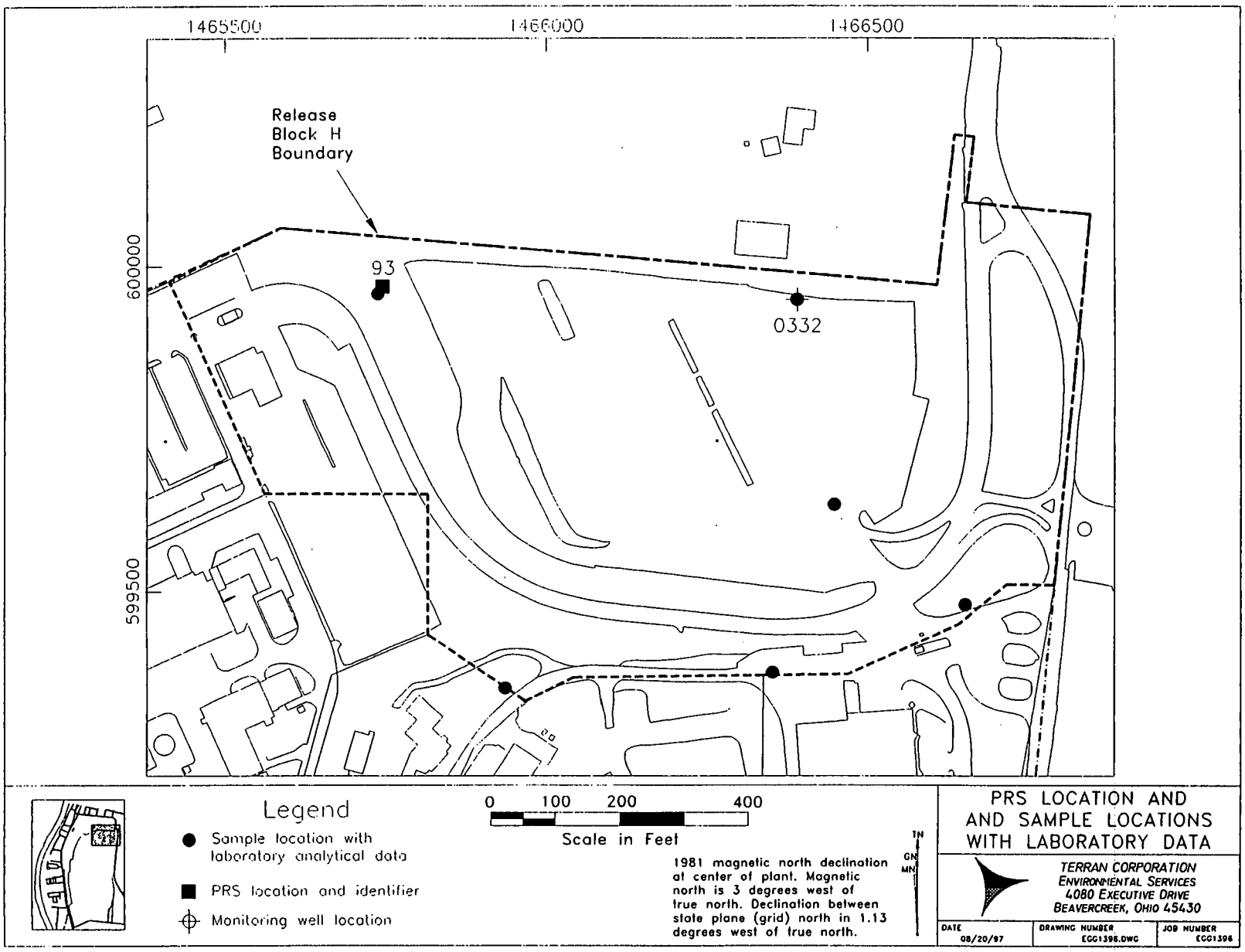

Figure 2.1. Release Block H map showing the locations of samples for which there is quantitative laboratory analytical data.

tritium at low concentrations (1-4 nCi/L). Data from 1991 and 1994 suggest an increase in tritium concentrations (up to 109 nCi/L), but is probably a function of the intermittent and possibly diminishing water flow from this seep. Soil was sampled at this location as part of the OU-9 Regional Soils Investigation (1995). All contaminants that were analyzed had results that were in the range of background concentrations.

2.2.5 Radiological Analytical Data

Radiological data provided by the Mound was compiled by Terran Corporation into four maps (Appendix A). One set of two maps shows analytical laboratory data: one for thorium-232 and one for plutonium-238 concentrations. The other set of two maps shows Mound Soil Screening Laboratory data for thorium-232 and plutonium-238. The analytical laboratory and screening laboratory data were separated because of their differing detection limits.

The screening laboratory map for thorium-232 shows that of 548 samples within Release Block H, three (or 0.5%) were 2 pCi/g (the detection limit) or above. The highest thorium-232 concentration from these three samples was 4.47 pCi/g. The analytical laboratory map shows that in ten samples, no thorium-232 values are above a positively measured value of 1.16 pCi/g.

The map showing analytical laboratory data for plutonium-238 shows that of 98 samples, none exceeded 3.54 pCi/g. Maps of soil screening facility data for plutonium-238 within Release Block H show a number of samples (8% of 460 samples) that were at or above the 25 pCi/g detection limit. The highest screening sample concentration measured within Release Block H was 56 pCi/g.

2.3 SUMMARY OF DETECTED CONTAMINANTS IN RELEASE BLOCK H

Based on the available data, the complete list of all contaminants detected at least once within Release Block H appears in Tables II.1, II.2 and II.3 for soil, current groundwater and future groundwater, respectively. These tables present the maximum concentration of each contaminant, and also present appropriate background concentrations, Guideline Values and additional screening criteria for comparative purposes. The comparison of contaminant concentrations to background concentrations, Guideline Values and other screening criteria serves to reduce the number of contaminants to be carried through the RRE process. Only contaminants exceeding both background and a base level of potential health concerns and meeting certain frequency of detection criteria are carried through the RRE process. The screening process is documented on these tables by listing the reason contaminants are chosen to be carried through the RRE. As described in table footnotes, any contaminants compared to a Hazard Quotient Guideline Value were screened based on a value that is one-tenth the Hazard Quotient, as directed in the Mound 2000 Residual Risk Evaluation Methodology (RREM).

2.4 SOIL CONTAMINANT SCREENING

The complete list of all contaminants in soil contained 36 organic, 32 inorganic and 14 radionuclide compounds. Because the organic contaminants found here are generally not naturally occurring substances, background concentrations are not available for organic compounds. The organic compounds were screened against Guideline Values, and against a frequency of detection screening factor (contaminants must have been detected at least once for every 20 samples to be carried forward in the RRE). The inorganic compounds were screened against background concentrations, Guideline Values, frequency of detection criteria and whether they are common constituents of most soils, such as sodium and potassium. The radiological contaminants were screened against background and Guideline Values.

This screening reduced the number of organic contaminants from 36 to 18, the inorganic contaminants from 32 to 5, and the radiological contaminants from 14 to 5. The contaminants which will be carried through the RRE process for the soil media are summarized in Table II.4.

2.5 LEACHING OF SOIL CONTAMINATION TO GROUNDWATER

The potential for contaminants in the soil to be dissolved and transported into the groundwater by infiltrating rainfall was modeled as part of the PRS evaluation process. The model is a conservative soil to groundwater partitioning model that assumes a continuous source extending from the surface to the water table. Dispersion effects are not modeled. This model was adapted from the USEPA Soil Screening Level (SSL) guidance document (USEPA, 1996). A full presentation of the model is available in the public reading room in the "Potential Release Site Packages--Reading and Understanding, Volume II" report.

This Soil Screening Level model produces soil concentrations that correspond to the Mound Plant Construction Worker Industrial Use 10^{-6} risk level in groundwater. Soil concentrations that are below this calculated acceptable soil concentration are not a concern and do not have to be remediated or addressed in this document. Soil concentrations that are above this calculated acceptable soil concentration may pose a concern if there are multiple chemicals that leach to groundwater. These cases are examined on a PRS by PRS basis by the core team to determine whether remediation might be required.

Because all PRSs within Release Block H have been examined by the core team and No Further Action (NFA) recommended, all issues relating to potential soil leaching from soils have been resolved. As a result, the detailed modeling of soil leaching to groundwater did not need to be performed in this document.

2.6 CURRENT SCENARIO GROUNDWATER SCREENING

The complete list of current groundwater contaminants contains 16 organic compounds, 28 inorganic constituents, and 12 radiological contaminants. These contaminants were screened against background, Guideline Values, and on the basis of whether they are common water quality parameters, such as alkalinity or dissolved solids.

The screening reduced the number of organic contaminants from 16 to 3, the number of inorganic contaminants from 28 to 3, and the number of radiological contaminants from 12 to 6. The contaminants which will be carried through the RRE process for the current groundwater scenario are summarized in Table II.5.

2.7 FUTURE GROUNDWATER SCREENING

Future groundwater contaminants are defined as those currently in the Mound production wells (the Current Groundwater list), combined with contaminants measured in Mound site bedrock monitoring wells. This assumes that all contaminants in the bedrock aquifer that exceed background, will migrate to the production wells within the Buried Valley Aquifer (the BVA) in the future. To create this combined list of contaminants, the bedrock contaminants were screened against bedrock background concentrations. The complete list of bedrock contaminants, the applicable background concentrations, and the screening documentation are presented in Table II.6. The screening process reduced the number of bedrock contaminants from 74 to 39. This list was combined with the current groundwater list which yielded Table II.3. This complete list of future groundwater contaminants contains 22 organic compounds, 21 inorganic contaminants, and 16 radiological contaminants. These contaminants were screened with respect to BVA background concentrations, Guideline Values, and common water quality parameters.

The screening reduced the number of future organic contaminants from 22 to 3 the inorganic contaminants from 21 to 8, and the radiological contaminants from 16 to 6. The contaminants that will be carried through the RRE process for the future groundwater scenario are summarized in Table II.7.

Some of the radionuclide constituents detected in groundwater are not expected to be found in groundwater due to their insolubility. However, it is true that essentially insoluble compounds and elements (including radionuclides) that are found in groundwater are generally bound up in particulate or colloidal components within the groundwater. Filtered sample results were not used in this analysis. All groundwater concentrations available represent both dissolved and particulate-bound contaminant.

Table II.1. Summary Table of All Soil Contaminants Detected

Parameter / Constituent	Maximum Concentration Any Depth	Maximum Concentration Shallow (<2')	Soil Background Value	G.V. for Construction Worker	G.V. for Site Employee	Detects / Analyses	Carry Through RRE?	Reason
ORGANICS (mg/kg)								
Acenaphthene	0.18	0.18				3 / 10	Yes	F.O.D.[7] = 30%
Acenaphthylene	0.7	0.7				1 / 10	Yes	F.O.D.[7] = 10%
Acetone	0.0355	0.0355		21000 [2]	200000 [2]	2 / 10	No	Conc. < G.V.
Aldrin	0.0031	0.0031				2 / 11	Yes	F.O.D.[7] = 18%
Anthracene	1.25	1.25		64000 [2]	610000 [2]	2 / 10	No	Conc. < G.V.
Aroclor-1254	0.0037	0.0037	58	4.30 [2]	41 [2]	1 / 11	No	Conc. < G.V. & Bkgd.
Benzene	0.0015	0.0015		32.0 [3]	8.9 [3]	1 / 10	No	Conc. < G.V.
Benzo(a)anthracene	1.4	1.4		4.10 [4]	7.8 [4]	5 / 10	No	Conc. < G.V.
Benzo(a)pyrene	1.115	1.115		0.41 [4]	0.78 [4]	5 / 10	Yes	Conc. > G.V.
Benzo(b)fluoranthene	0.9125	0.9125		4.10 [4]	7.8 [4]	5 / 10	No	Conc. < G.V.
Benzo(g,h,i)perylene	1.0625	1.0625				4 / 10	Yes	F.O.D.[7] = 40%
Benzo(k)fluoranthene	0.915	0.915		41.0 [4]	78.0 [4]	3 / 10	No	Conc. < G.V.
Benzoic Acid	0.072	0.072		850000 [2]	8200000 [2]	1 / 9	No	Conc. < G.V.
delta-BHC	0.00025	0.00025				1 / 11	Yes	F.O.D.[7] = 9%
2-Butanone	0.0115	0.0115		9300 [1]	9300 [1]	1 / 10	No	Conc. < G.V.
Carbazole	0.5875	0.5875				1 / 6	Yes	F.O.D.[7] = 17%
alpha Chlordane	0.01	0.01				4 / 7	Yes	F.O.D.[7] = 57%
gamma Chlordane	0.0074	0.0074				4 / 7	Yes	F.O.D.[7] = 57%
4-Chloro-3-methylphenol	0.047	0.047				1 / 10	Yes	F.O.D.[7] = 10%
Chrysene	1.4	1.4		410 [4]	780 [4]	5 / 10	No	Conc. < G.V.
Dibenzo(a,h)anthracene	0.78	0.78		0.41 [4]	0.78 [4]	2 / 10	Yes	Conc. > G.V.
Dibenzofuran	1.035	1.035				1 / 10	Yes	F.O.D.[7] = 10%
Dieldrin	0.145	0.145		0.185 [3]	0.36 [3]	3 / 11	No	Conc. < G.V.
bis(2-Ethylhexyl)phthalate	3.4	0.13		215 [4]	410 [4]	5 / 10	No	Conc. < G.V.
Fluoranthene	2.325	2.325		8500 [2]	82000 [2]	7 / 10	No	Conc. < G.V.
Fluorene	1.45	1.45				1 / 10	Yes	F.O.D.[7] = 10%
Heptachlor Epoxide	0.0022	0.0022				2 / 11	Yes	F.O.D.[7] = 18%
Indeno(1,2,3-cd)pyrene	0.99	0.99		4.10 [4]	7.8 [4]	5 / 10	No	Conc. < G.V.
Methylene Chloride (Dichloromethane)	0.0065	0.0065		1000 [1]	1000 [1]	4 / 10	No	Conc. < G.V.
2-Methylnaphthalene	0.92	0.92				1 / 10	Yes	F.O.D.[7] = 10%
Naphthalene	2.625	2.625				1 / 10	Yes	F.O.D.[7] = 10%
Phenanthrene	3.75	3.75				5 / 10	Yes	F.O.D.[7] = 50%
Pyrene	1.975	1.975		6400 [2]	61000 [2]	6 / 10	No	Conc. < G.V.
Toluene	0.002	0.002		250 [1]	250 [1]	1 / 10	No	Conc. < G.V.

Table II.1. Summary Table of All Soil Contaminants Detected (cont.)

Parameter / Constituent	Maximum Concentration Any Depth	Maximum Concentration Shallow (<2')	Soil Background Value	G.V. for Construction Worker	G.V. for Site Employee	Detects / Analyses	Carry Through RRE?	Reason
1,1,2-Trichloro-1,2,2-trifluoroethane	0.002	0.002				1 / 5	Yes	F.O.D.[7] = 20%
Xylenes, total	0.00175	0.00175		430000 [2]	4100000 [2]	1 / 10	No	Conc. < G.V.
INORGANICS (mg/kg)								
Aluminum	15900	13500	19000			11 / 11	No	Conc. < Bkgd.
Antimony	0.235	0.235		85 [2]	820 [2]	1 / 8	No	Conc. < G.V.
Arsenic (total)	10.9	10.9	8.6	64 [2]	610 [2]	11 / 11	Yes	Conc. > Bkgd. & G.V.
Barium (total)	249	249	180	15000 [1]	140000 [1]	11 / 11	No	Conc. < G.V. > Bkgd.
Beryllium	0.89	0.89	1.3	0.7 [3]	1.3 [3]	11 / 11	No	Conc. < Bkgd. > G.V.
Bismuth	58.6	58.6				4 / 7	Yes	F.O.D.[7] = 57%
Cadmium (total)	0.255	0.255	2.1	210 [2]	2000 [2]	1 / 11	No	Conc. < Bkgd. & G.V.
Calcium (total)	152000	152000	310000			11 / 11	No	Conc. < Bkgd.
Chloride	1300	1300	107			6 / 6	No	Common soil constituent
Chromium (total)	19.8	19.8	20	1100 [2]	10000 [2]	11 / 11	No	Conc. < Bkgd. & G.V.
Cobalt (total)	12.3	12.3	19			11 / 11	No	Conc. < Bkgd.
Copper (total)	26.4	22.1	26			11 / 11	Yes	Conc. > Bkgd.
Cyanide	1.7	1.7		4300 [2]	41000 [2]	2 / 11	No	Conc. < G.V.
Fluoride	7.8	7.8	6.7			6 / 6	No	Common soil constituent
Iron (total)	34700	34700	35000			11 / 11	No	Conc. < Bkgd.
Lead (total)	163	163	48			11 / 11	Yes	Conc. > Bkgd.
Lithium	40.2	19	26			2 / 2	Yes	Conc. > Bkgd.
Magnesium (total)	54100	39900	40000			11 / 11	No	Common soil constituent
Manganese (total)	1200	1200	1400	27000 [1]	150000 [1]	11 / 11	No	Conc. < Bkgd. & G.V.
Mercury (total)	0.04	0.04		64 [1]	610 [1]	3 / 11	No	Conc. < G.V.
Molybdenum	7.7	0.935	27			2 / 2	No	Conc. < Bkgd.
Nickel (total)	28.5	23.4	32	4300 [2]	41000 [2]	11 / 11	No	Conc. < Bkgd. & G.V.
Nitrate	1.32	---				1 / 1	No	Common soil constituent
Nitrate/Nitrite	9	9	26			6 / 6	No	Conc. < Bkgd.
Organic Carbon	216670	216670				4 / 4	No	Common soil constituent
Percent Solids (%)	88.8	88.8				1 / 1	No	Common soil constituent
Potassium (total)	3750	1680	1900			11 / 11	No	Common soil constituent
Silver (total)	8.9	0.56	1.7	1100 [2]	10000 [2]	4 / 11	No	Conc. < G.V. > Bkgd.
Sodium (total)	2670	2670	240			11 / 11	No	Common soil constituent
Sulfate	322	322	150			5 / 6	No	Common soil constituent
Vanadium	30.8	27.9	25	1500 [2]	14000 [2]	11 / 11	No	Conc. < G.V. > Bkgd.
Zinc (total)	311	311	140	64000 [2]	610000 [2]	11 / 11	No	Conc. < G.V. > Bkgd.

Table II.1. Summary Table of All Soil Contaminants Detected (cont.)

Parameter / Constituent	Maximum Concentration Any Depth	Maximum Concentration Shallow (<2')	Soil Background Value	G.V. for Construction Worker	G.V. for Site Employee	Detects / Analyses	Carry Through RRE?	Reason
RADIONUCLIDES (pCi/g)								
Cesium-137	1.9	1.9	0.42	0.46 [5]	0.42 [5]	6 / 9	Yes	Conc. > Bkgd. & G.V.
Plutonium-238	56	56	0.13	5.50 [5]	11 [5]	548 / 557	Yes	Conc. > Bkgd. & G.V.
Plutonium-239/240	0.0328	0.0328	0.18	5.50 [5]	10 [5]	3 / 7	No	Conc. < Bkgd. & G.V.
Plutonium-242	0.0143	0.0143				2 / 5	Yes	F.O.D.[7] = 40%
Potassium-40	45.4	21	37			7 / 7	Yes	Conc. > Bkgd.
Radium-226	3.15	3.15	2	0.14 [5]	0.13 [5]	7 / 9	No	Th-232 decay products
Strontium-90	0.845	0.384	0.72	3.0 [5]	57 [5]	2 / 6	No	Conc. < G.V. > Bkgd.
Thorium-228	1.17	0.847	1.5	0.85 [5]	0.83 [5]	6 / 6	No	Conc. > G.V. < Bkgd.
Thorium-230	1.6	1.6	1.9	44.0 [5]	81 [5]	6 / 6	No	Conc. < Bkgd. & G.V.
Thorium-232	4.47	2.3	1.4	0.85 [5,6]	0.83 [5,6]	470 / 556	Yes	Conc. > Bkgd. & G.V.
Tritium	0.3	---	1.6	23500 [5]	45000 [5]	1 / 3	No	Conc. < Bkgd. & G.V.
Uranium-234	1.02	0.851	1.1	37.5 [5]	70 [5]	5 / 6	No	Conc. < Bkgd. & G.V.
Uranium-235	0.0659	0.0659	0.11	3.35 [5]	3.1 [5]	3 / 6	No	Conc. < Bkgd. & G.V.
Uranium-238	0.962	0.962	1.2	11.0 [5]	13.0 [5]	5 / 6	No	Conc. < Bkgd. & G.V.

Note: Contaminants with no background or Guideline Value available were left blank.

--- - No shallow data available.

[1] - Hazard Quotient for both Ingestion and Inhalation. (decision made on 0.1 x G.V.)

[2] - Hazard Quotient for Ingestion only. (decision made on 0.1 x G.V.)

[3] - Total Risk (10^-6) for both Ingestion and Inhalation.

[4] - Total Risk (10^-6) for Ingestion only.

[5] - Total Risk (10^-6) for Ingestion, Inhalation and External.

[6] - Guideline Values from Thorium-228+D.

[7] - F.O.D. = Frequency of detection. Contaminants with a F.O.D. greater than 5% were carried through the RRE.

Table II.2. Summary Table of All Current Groundwater Contaminants Detected in BVA Production Wells

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
ORGANICS (mg/L)						
Acetone	0.012		10[1]	10[2]	No	Conc. < G.V.
Bromodichloromethane	0.0037		0.0045[3]	0.0046[4]	No	Conc. < G.V.
2-Butanone	0.041		53[1]	61[2]	No	Conc. < G.V.
Chloroform	0.0022	0.0005	0.024[3]	0.047[4]	No	Conc. < G.V. > Bkgd.
1,1-Dichloroethane	0.0035		9.5[1]	10[2]	No	Conc. < G.V.
1,1-Dichloroethene	0.0017				Yes	No screening values
1,2-Dichloroethene	0.0047		2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-cis-Dichloroethene	0.0021	0.0010	2.0[2]	2.0[2]	No	Conc. < G.V. > Bkgd.
1,2-trans-Dichloroethene	0.003		2.0[2]	2.0[2]	No	Conc. < G.V.
Dichloromethane - Methylene Chloride	0.0098		0.038[3]	0.038[4]	No	Conc. < G.V.
Isophorone	0.010		0.3[3]	0.3[4]	No	Conc. < G.V.
Tetrachloroethene	0.002		0.46[1]	1.0[2]	No	Conc. < G.V.
1,1,1-Trichloroethane	0.0018	0.0007			Yes	Conc. > Bkgd.
Trichloroethene	0.0046		0.024[3]	0.026[4]	No	Conc. < G.V.
Trichlorofluoromethane	0.0025		26[1]	31[2]	No	Conc. < G.V.
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087				Yes	No screening values
INORGANICS (mg/L)						
Alkalinity	335				No	Water quality parameter
Aluminum	0.0737	0.0375			No	Water quality parameter
Ammonia	0.58	0.162			No	Water quality parameter
Barium	0.0884	0.3102	7.1[1]	7.2[2]	No	Conc. < G.V. & Bkgd.
Cadmium	0.0077		0.051[1]	0.051[2]	Yes	Conc. > G.V.

Table II.2. Summary Table of All Current Groundwater Contaminants Detected in BVA Production Wells (cont.)

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
Calcium	126	111			No	Water quality parameter
Chloride	133	106			No	Water quality parameter
Chromium	0.0249	0.0061	0.51[1]	0.51[2]	No	Conc. < G.V. > Bkgd.
Copper	0.593	0.0012			Yes	Conc. > Bkgd.
Dissolved Solids	719	603			No	Water quality parameter
Fluoride	0.18	0.419			No	Water quality parameter
Iron	0.780	4.065			No	Conc. < Bkgd.
Lead (soluble)	0.040	0.0101			Yes	Conc. > Bkgd.
Magnesium	39.6	40.43			No	Conc. < Bkgd.
Manganese	0.0248	0.2296	0.51[1]	0.51[2]	No	Conc. < G.V. & Bkgd.
Nitrate/Nitrite	4.9	5.349			No	Conc. < Bkgd.
Nitrate	2.55				No	Water quality parameter
Nitrite	0.066				No	Water quality parameter
Nitrogen	0.62	0.324			No	Water quality parameter
Organic Carbon	1.1	1.987			No	Conc. < Bkgd.
Phosphate	0.22	0.231			No	Conc. < Bkgd.
Potassium	3.8	4.461			No	Conc. < Bkgd.
Silver	0.0242		0.51[1]	0.51[2]	No	Conc. < G.V.
Sodium	82.4	62.43			No	Water quality parameter
Sulfate	83.0	142.7			No	Conc. < Bkgd.
Suspended Solids	8.0	26.44			No	Conc. < Bkgd.
Vanadium	0.0244	0.0171	0.71[1]	0.72[2]	No	Conc. < G.V. > Bkgd.
Zinc	0.0577	0.1196	31[1]	31[2]	No	Conc. < G.V. & Bkgd.

Table II.2. Summary Table of All Current Groundwater Contaminants Detected in BVA Production Wells (cont.)

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
RADIONUCLIDES (pCi/L)						
Actinium-227	0.335		0.26[4]	0.26[4]	Yes	Conc. > G.V.
Bismuth-210	0.39				Yes	No screening values
Plutonium-239/240	2.0	0.125	0.51[4]	0.51[4]	Yes	Conc. > G.V. & Bkgd.
Radium-226	0.4	0.996	0.54[4]	0.54[4]	No	Conc. < G.V. & Bkgd.
Strontium-85	25				No	1 detect, short ½ life
Strontium-90	0.3	0.975	2.9[4]	2.9[4]	No	Conc. < G.V. & Bkgd.
Thorium-228	2.17	0.779	0.69[4]	0.69[4]	No	Th-232 decay product
Thorium-230	1.99	0.289	4.3[4]	4.3[4]	No	Conc. < G.V. > Bkgd.
Thorium-232	0.1		0.69[4,5]	0.69[4,5]	No	Conc. < G.V.
Tritium	7200	1485	2200[4]	2200[4]	Yes	Conc. > G.V. & Bkgd.
Uranium-234	8.14	0.792	3.6[4]	3.6[4]	Yes	Conc. > G.V. & Bkgd.
Uranium-238	8.25	0.688	2.6[4]	2.6[4]	Yes	Conc. > G.V. & Bkgd.

[1] - Hazard Index for Ingestion + Dermal + Inhalation. (decision made on 0.1 x G.V.)
[2] - Hazard Index for Ingestion only. (decision made on 0.1 x G.V.)
[3] - Total Risk 10^{-6} for Ingestion + Dermal + Inhalation.
[4] - Total Risk 10^{-6} for Ingestion only.
[5] - Guideline values from Thorium-228+D.

Table II.3. Summary Table of All Future Groundwater Contaminants Assumed to be in Production Wells with Input from the Bedrock Aquifer

Groundwater contaminants above detection limit	Estimated maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
ORGANICS (mg/L)						
Acetone	0.0129		10[1]	10[2]	No	Conc < G.V.
Benzene	0.0001		0.0087[3]	0.0099[4]	No	Conc < G.V.
Benzoic Acid	0.071		400[1]	410[2]	No	Conc < G.V.
Bromodichloromethane	0.0037		0.0045[3]	0.0046[4]	No	Conc < G.V.
2-Butanone	0.0543		53[1]	61[2]	No	Conc < G.V.
Carbon Tetrachloride	1.3E-5		0.002[3]	0.0022[4]	No	Conc < G.V.
Chloroform	0.0022	0.0005	0.024[3]	0.047[4]	No	Conc < G.V. > Bkgd.
1,1-Dichloroethane	0.0035		9.5[1]	10[2]	No	Conc < G.V.
1,1-Dichloroethene	0.0017				Yes	No screening values
1,2-Dichloroethene	0.0050		2.0[2]	2.0[2]	No	Conc < G.V.
1,2-cis-Dichloroethene	0.0023	0.0010	2.0[2]	2.0[2]	No	Conc < G.V. > Bkgd.
1,2-trans-Dichloroethene	0.0032		2.0[2]	2.0[2]	No	Conc < G.V.
Bis (2-ethylhexyl)phthalate	0.0153	0.0084	0.019[3]	0.02[3]	No	Conc < G.V.
Isophorone	0.0100		0.3[3]	0.3[4]	No	Conc < G.V.
4-Methylphenol	0.0004		0.48[1]	0.51[2]	No	Conc < G.V.
Tetrachloroethene	0.0021		0.46[1]	1.0[2]	No	Conc < G.V.
Trichloroethene	0.0050		0.024[3]	0.026[4]	No	Conc < G.V.
1,1,1-Trichloroethane	0.0065	0.0007			Yes	Conc. > Bkgd.
Trichlorofluoromethane	0.0025		26[1]	31[2]	No	Conc < G.V.
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087				Yes	No screening values
Toluene	0.0002		16[1]	20[2]	No	Conc < G.V.
Total Xylenes	4.3E-5		200[2]	200[2]	No	Conc < G.V.
INORGANICS (mg/L)						
Antimony	0.0008	0.0006	0.041[1]	0.041[2]	No	Conc < G.V. > Bkgd.
Barium	0.0884	0.3102	7.1[1]	7.2[2]	No	Conc < G.V. & Bkgd.
Beryllium	0.0001		0.000066[3]	0.000067[4]	Yes	Conc > G.V.
Bismuth	0.0016				Yes	No screening values

Table II.3. Summary Table of All Future Groundwater Contaminants Assumed to be in Production Wells with Input from the Bedrock Aquifer (cont.)

Groundwater contaminants above detection limit	Estimated maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
Cadmium	0.0077		0.051[1]	0.051[2]	Yes	Conc > G.V.
Chromium	0.4961	0.0061	0.51[2]	0.51[2]	Yes	Conc > G.V. > Bkgd.
Cobalt	0.0039				Yes	No screening values
Copper	0.5964	0.0012			Yes	Conc > Bkgd.
Cyanide	0.0001		2.0[1]	2.0[2]	No	Conc < G.V.
Iron	0.78	4.065			No	Conc < Bkgd.
Lead	0.04	0.0101			Yes	Conc > Bkgd.
Lithium	0.0036	0.0557			No	Conc < Bkgd.
Magnesium	43.974	40.428			No	Water quality parameter
Manganese	0.0248	0.2296	0.51[1]	0.51[2]	No	Conc < G.V. & Bkgd.
Molybdenum	0.0096	0.0056			Yes	Conc > Bkgd.
Nickel	0.1003	0.0350	2.0[1]	2.0[2]	No	Conc < G.V. > Bkgd.
Phosphate	0.3664	0.231			No	Water quality parameter
Potassium	6.0034	4.461			No	Water quality parameter
Silver	0.0242		0.51[1]	0.51[2]	No	Conc < G.V.
Vanadium	0.028	0.0171	0.71[1]	0.72[2]	No	Conc < G.V. > Bkgd.
Zinc	0.0577	0.1196	31[1]	31[2]	No	Conc < G.V. & Bkgd.
RADIONUCLIDES (pCi/L)						
Actinium-227	0.355		0.26[4]	0.26[4]	Yes	Conc. > G.V.
Bismuth-210	0.39				Yes	No screening values
Plutonium-238	0.0034	0.087	0.54[4]	0.54[4]	No	Conc < G.V. & Bkgd.
Plutonium-239/240	2.0199	0.125	0.51[4]	0.51[4]	Yes	Conc > G.V. & Bkgd.
Radium-226	0.6402	0.996	0.54[4]	0.54[4]	No	Conc < Bkgd. > G.V.
Strontium-85	25				No	1 detect, short ½ life
Strontium-90	0.3121	0.975	2.9[4]	2.9[4]	No	Conc < G.V. & Bkgd.
Thorium-228	2.17	0.779	0.69[4]	0.69[4]	No	Th-232 decay product
Thorium-230	2.0645	0.289	4.3[4]	4.3[4]	No	Conc < G.V. > Bkgd.
Thorium-232	0.1422		0.69[4,5]	0.69[4,5]	No	Conc < G.V.

Table II.3. Summary Table of All Future Groundwater Contaminants Assumed to be in Production Wells with Input from the Bedrock Aquifer (cont.)

Groundwater contaminants above detection limit	Estimated maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
Tritium	10427	1485	2200[4]	2200[4]	Yes	Conc > G.V. & Bkgd.
Uranium-233	0.0002		3.6[4]	3.6[4]	No	Conc < G.V.
Uranium-234	8.14	0.792	3.6[4]	3.6[4]	Yes	Conc > G.V. & Bkgd.
Uranium-235	0.0036	0.045	3.4[4]	3.4[4]	No	Conc < G.V. & Bkgd.
Uranium-235/236	0.0003		3.4[4]	3.4[4]	No	Conc < G.V.
Uranium-238	8.25	0.688	2.6[4]	2.6[4]	Yes	Conc > G.V. & Bkgd.

[1] - Hazard Index for Ingestion + Dermal + Inhalation. (decision made on 0.1 x G.V.)
[2] - Hazard Index for Ingestion only. (decision made on 0.1 x G.V.)
[3] - Total Risk 10^{-6} for Ingestion + Dermal + Inhalation.
[4] - Total Risk 10^{-6} for Ingestion only.
[5] - Guideline values from Thorium-228 + D.

Table II.4. Soil Contaminants Carried Through RRE

Parameter / Constituent	Maximum Concentration Any Depth	Maximum Concentration Shallow (<2')	Screening Concentration (either bkgd or G.V.)	Reason for carrying through RRE
ORGANICS (mg/kg)				
Acenaphthene	0.18	0.18		F.O.D. [6] = 30%
Acenaphthylene	0.7	0.7		F.O.D. [6] = 10%
Aldrin	0.0031	0.0031		F.O.D. [6] = 18%
Benzo(a)pyrene	1.115	1.115	0.41 [1]	Conc. > G.V.
Benzo(g,h,i)perylene	1.0625	1.0625		F.O.D. [6] = 40%
delta-BHC	0.00025	0.00025		F.O.D. [6] = 9%
Carbazole	0.5875	0.5875		F.O.D. [6] = 17%
alpha Chlordane	0.01	0.01		F.O.D. [6] = 57%
gamma Chlordane	0.0074	0.0074		F.O.D. [6] = 57%
4-Chloro-3-methylphenol	0.047	0.047		F.O.D. [6] = 10%
Dibenzo(a,h)anthracene	0.78	0.78	0.41 [1]	Conc. > G.V.
Dibenzofuran	1.035	1.035		F.O.D. [6] = 10%
Fluorene	1.45	1.45		F.O.D. [6] = 10%
Heptachlor Epoxide	0.0022	0.0022		F.O.D. [6] = 18%
2-Methylnaphthalene	0.92	0.92		F.O.D. [6] = 10%
Naphthalene	2.625	2.625		F.O.D. [6] = 10%
Phenanthrene	3.75	3.75		F.O.D. [6] = 50%
1,1,2-Trichloro-1,2,2-trifluoroethane	0.002	0.002		F.O.D. [6] = 20%
INORGANICS (mg/kg)				
Arsenic (total)	10.9	10.9	64 [5]	Conc. > Bkgd. & G.V.
Bismuth	58.6	58.6		F.O.D. [6] = 57%
Copper (total)	26.4	22.1	26 [4]	Conc. > Bkgd.
Lead (total)	163	163	48 [4]	Conc. > Bkgd.
Lithium	40.2	19	26 [4]	Conc. > Bkgd.
RADIONUCLIDES (pCi/g)				
Cesium-137	1.9	1.9	0.42 [2]	Conc. > Bkgd. & G.V.
Plutonium-238	56	56	5.50 [2]	Conc. > Bkgd. & G.V.
Plutonium-242	0.0143	0.0143		F.O.D. [6] = 40%
Potassium-40	45.4	21	37 [4]	Conc. > Bkgd.
Thorium-232	4.47	2.3	0.83 [2,3]	Conc. > Bkgd. & G.V.

[1] - Total Risk 10^{-6} for Ingestion only.
[2] - Total Risk 10^{-6} for Ingestion, Inhalation and External.
[3] - Guideline Values from Thorium-228+D.
[4] - Background value.
[5] - Hazard Quotient for Ingestion only. (decision made on 0.1 x G.V.)
[6] - F.O.D. = Frequency of detection. Contaminants with a F.O.D. greater than 5% were carried through the RRE.

Table II.5. Current Groundwater Contaminants Carried Through RRE

Groundwater Constituents	Maximum concentration	Screening Concentration (either background or G.V.)	Reason for carrying through RRE
ORGANICS (mg/L)			
1,1-Dichloroethene	0.0017	---	No Bkgd. or G.V. available
1,1,1-Trichloroethane	0.0018	0.0007[3]	Conc. > Bkgd.; no G.V. available
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087	---	No Bkgd. or G.V. available
INORGANICS (mg/L)			
Cadmium	0.0077	0.051[1]	Conc. >G.V., no Bkgd. available
Copper	0.593	0.0012[3]	Conc. > Bkgd.; no G.V. available
Lead	0.040	0.0101[3]	Conc. > Bkgd.; no G.V. available
RADIONUCLIDES (pCi/L)			
Actinium-227	0.335	0.26[2]	Conc. > G.V.; no Bkgd. available
Bismuth-210	0.39	---	No Bkgd. or G.V. available
Plutonium-239/240	2.0	0.125[3]	Conc. > Bkgd. & G.V.
Tritium	7200	1485[2]	Conc. > Bkgd. & G.V.
Uranium-234	8.14	0.792[3]	Conc. > Bkgd. & G.V.
Uranium-238	8.25	0.688[3]	Conc. > Bkgd. & G.V.

[1] - Hazard Index for Ingestion + Dermal + Inhalation. (decision made on 0.1 x G.V.)
[2] - Total Risk 10^{-6} for Ingestion only.
[3] - Background value.

Table II.6. Summary Table of All Bedrock Aquifer Contaminants

Bedrock Groundwater Compounds Above Detection	Maximum Concentration	Bedrock Background Concentration	Contribute to Future Groundwater Concentration?	Reason
ORGANICS (mg/L)				
Acetone	0.028	NA	Yes	
Alpha Chlordane	0.000069	0.00045	No	Conc. < background
Benzene	0.005	NA	Yes	
Benzoic Acid	0.99	NA	Yes	
Bis(2-ethylhexyl)phthalate	0.950	NA	Yes	
2-Butanone	0.095	NA	Yes	
Carbon Disulfide	0.005	NA	No	Common lab contaminant
Carbon Tetrachloride	0.002	NA	Yes	
Chloroform	0.0024	NA	Yes	
1,2-Dichloroethene	0.035	NA	Yes	
1,2-cis-Dichloroethene	0.017	NA	Yes	
1,2-trans-Dichloroethene	0.01	NA	Yes	
Methylene Chloride	0.0089	NA	No	Common lab contaminant
4-Methylphenol	0.061	NA	Yes	
Organic Carbon	47.9	NA	No	Indicator parameter
Tetrachloroethene	0.002	NA	Yes	
1,1,1-Trichloroethane	0.001	NA	Yes	
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0022	NA	Yes	
Toluene	0.005	NA	Yes	
Trichloroethene	0.03	NA	Yes	
Trichlorofluoromethane	0.002	NA	Yes	
Xylenes, Total	0.006	NA	Yes	
INORGANICS (mg/L)				
Alkalinity	447	NA	No	Indicator parameter
Aluminum	28.5	7.82	No	
Ammonia	21.7	NA	No	Indicator parameter
Antimony	0.0128	0.0012	Yes	
Arsenic	0.0187	0.084	No	Conc. < background
Barium	0.284	0.53712	No	Conc. < background
Beryllium	0.0023	0.00065	Yes	
Bismuth	0.051	0.0296	Yes	
Cadmium	0.0131	0.0138	No	Conc. < background
Calcium	935	111	No	Indicator parameter
Chloride	4770	NA	No	Indicator parameter
Chromium	15.1	0.104	Yes	
Cobalt	0.283	0.0179	Yes	
Copper	0.277	0.19462	Yes	
Cyanide	0.0142	0.01	Yes	
Dissolved Solids	4800	NA	No	Indicator parameter

Table II.6. Summary Table of All Bedrock Aquifer Contaminants (cont.)

Bedrock Groundwater Compounds Above Detection	Maximum Concentration	Bedrock Background Concentration	Contribute to Future Groundwater Concentration?	Reason
Fluoride	2.4	1.3	No	Water quality parameter
Iron	181	526.097	No	Conc. < background
Lead	0.0404	0.230	No	Conc. < background
Lithium	0.331	0.208	Yes	
Magnesium	279	65.1	No	Water quality parameter
Manganese	3.03	4.78754	No	Conc. < background
Molybdenum	0.32	0.0743	Yes	
Nickel	7.22	0.0249	Yes	
Nitrate	2.1	NA	No	Water quality parameter
Nitrate/Nitrite	21.1	9.55	No	Water quality parameter
Nitrite	0.314	NA	No	Water quality parameter
Nitrogen	4.6	NA	No	Water quality parameter
Phosphate	10.1	NA	No	Water quality parameter
Potassium	314	7.3	No	Water quality parameter
Sodium	3790	351.63	No	Water quality parameter
Sulfate	399	NA	No	Water quality parameter
Suspended Solids	2880	NA	No	
Tin	0.0659	0.118	No	Conc. < background
Vanadium	0.0703	0.0132	Yes	
Zinc	0.399	92.83128	No	Conc. < background
RADIONUCLIDES (pCi/L)				
Americium-241	0.217	3.95	No	Conc. < background
Bismuth-210	0.26	24.94	No	Conc. < background
Plutonium-238	0.236	0.08	Yes	
Plutonium-239/240	0.378	0.18	Yes	
Potassium-40	129	455.56	No	Conc. < background
Radium-226	9.47	0.95	Yes	
Strontium-90	1.77	2.22	No	Conc. < background
Thorium-228	4.86	1.45	No	Th-232 decay product
Thorium-230	4.07	4.86	No	Conc. < background
Thorium-232	2.11	0.92	Yes	
Tritium	61020	4658	Yes	
Uranium-233	0.0272	NA	Yes	
Uranium-234	3.23	6.23	No	Conc. < background
Uranium-235	0.3	0.27	Yes	
Uranium-235/236	0.0471	NA	Yes	
Uranium-238	1.34	9.28	No	Conc. < background

Table II.7. Future Groundwater Contaminants Carried Through RRE

Groundwater Constituents	Estimated Maximum Concentration	Screening Concentration (either background or G.V.)	Reason for carrying through RRE
ORGANICS (mg/L)			
1,1-Dichloroethene	0.0017	---	No Bkgd. or G.V. available
1,1,1-Trichloroethane	0.0065	0.0007[4]	Conc > Bkgd.; no G.V. available
1,1,2,-Trichloro-1,2,2-trifluoroethane	0.0087	---	No Bkgd. or G.V. available
INORGANICS (mg/L)			
Beryllium	0.0001	6.6E-05[3]	Conc. > G.V.
Bismuth	0.0016	---	No Bkgd. or G.V. available
Cadmium	0.0077	0.051[4]	Conc > G.V.; no Bkgd. available
Chromium	0.4961	0.0061[4]	Conc > Bkgd. and G.V.
Cobalt	0.0039	0[4]	Conc > Bkgd.; no G.V. available
Copper	0.5964	0.0012[4]	Conc > Bkgd.; no G.V. available
Lead	0.04	0.010[4]	Conc > Bkgd.; no G.V. available
Molybdenum	0.0096	0.0056[4]	Conc > Bkgd.; no G.V. available
RADIONUCLIDES (pCi/L)			
Actinium-227	0.355	0.26[2]	Conc > G.V.; no Bkgd. available
Bismuth-210	0.39	---	No Bkgd. or G.V. available
Plutonium-239/240	2.020	0.125[4]	Conc > Bkgd. and G.V.
Tritium	10427	1485[4]	Conc > Bkgd. and G.V.
Uranium-234	8.14	0.792[4]	Conc > Bkgd. and G.V.
Uranium-238	8.25	0.688[4]	Conc > Bkgd. and G.V.

[1] - Hazard Index for Ingestion + Dermal + Inhalation. (decision made on 0.1 x G.V.)
[2] - Total Risk 10^{-6} for Ingestion only.
[3] - Total Risk 10^{-6} for Ingestion + Dermal + Inhalation
[4] - Background value.

3.0 EXPOSURE ASSESSMENT

The Department of Energy, Ohio EPA, the U.S. EPA and the Mound Facility stakeholders have agreed that the future use of the Mound Plant property will be commercial/industrial use. Based on the RREM guidance for the Mound facility, two receptor scenarios have been developed and will be carried through this evaluation, 1) an onsite construction worker, and 2) a site employee engaged in non-construction work activities. Several potential exposure pathways exist for each scenario. The pathway analysis will be based on either known current exposures or assumed future exposures.

3.1 IDENTIFICATION OF EXPOSURE SCENARIOS

The two exposure scenarios that were examined are the onsite construction worker and the site employee engaged in non-construction activities. The construction worker and site employee are assumed to be exposed to soil contaminated at the level described by currently available data. The workers are assumed to be exposed to the existing soil contamination both now and into the future. For the groundwater pathways, both current and future exposures are assumed. Current groundwater exposures will be estimated based on the current production well (Buried Valley Aquifer) conditions. Future BVA groundwater contamination is assumed to be made up of a mix of known bedrock aquifer contamination that will enter the BVA groundwater and become the future BVA contamination to which construction workers and site employees would be exposed.

3.1.1 Construction Worker Scenario

It is assumed that activities requiring earth-moving, such as construction of new buildings, will occur in Release Block H. These construction activities could result in worker exposure to contaminants in soil, on dust particles, in air, and in groundwater. This scenario characterizes the potential exposure of a construction worker assumed to work on the property 8 hours per day for 250 days per year over a 5 year period. The construction worker is assumed to be an adult weighing 70 kg. The amount of soil ingested is 480 mg/day and is reflective of "heavy" construction-type work. All parameters needed to calculate intakes are specified in the RREM.

3.1.2 Site Employee Scenario

It is assumed that normal work-site activities associated with light industry, small business, and general office work will occur in the Release Block H Mound property. These activities could result in worker exposures to contaminants in soil, on dust particles, in air, and in groundwater. This scenario characterizes the potential exposure of a site employee assumed to work on the property 8 hours per day for 250 days per year over a 25 year period. No exposure to potential interior building contamination is assumed or addressed here. The site employee is assumed to be an adult weighing 70 kg. The site employee is assumed to ingest 50 mg/day of contaminated soil, the amount incidentally ingested while working at the site. All parameters needed to calculate intakes are specified in the RREM.

3.2 IDENTIFICATION OF EXPOSURE PATHWAYS

An exposure pathway describes the course a chemical or radionuclide takes from a source to an exposed individual. An exposure pathway generally consists of a source and mechanism of chemical or radionuclide release, an environmental compartment in which the contaminant is retained or transported, a human or environmental receptor, and an exposure route. As an example, a source of contamination may be shallow soil that received a spill, the environmental compartment may be contaminated soil that becomes windborne, and a construction worker may be the receptor who is exposed by inhaling contaminated airborne particulates. A source may also be an exposure point, such as contaminated groundwater or soil that is directly ingested.

3.2.1 Construction Worker Exposure Pathways

Several potential exposure pathways have been identified and will be addressed for the onsite construction worker (Figure 3.1). Two airborne exposure pathways will be addressed. The first potential air exposure pathway assumes inhalation of airborne contaminated soil particulates. The second potential air pathway assumes inhalation of volatile emissions from soil. The airborne exposures are assumed to be continuous when the construction worker is onsite.

Three groundwater exposure pathways will be addressed. All groundwater is assumed to be withdrawn from the Buried Valley Aquifer (BVA). The first potential groundwater exposure pathway assumes ingestion of BVA groundwater as drinking water. The second groundwater pathway assumes inhalation of volatile contaminants from a daily shower at the site. The third groundwater pathway assumes dermal contact with BVA groundwater during showering. Calculations will be made based on both currently known and future estimated groundwater concentrations

Three soil exposure pathways will be addressed. The first potential soil exposure pathway assumes inadvertent ingestion of small amounts of contaminated soil. The second soil pathway assumes dermal contact with soil during construction activities. The third soil pathway assumes external exposure to ionizing radiation from radionuclides in soil. Incidental ingestion, dermal contact, and external exposure are assumed to occur daily.

3.2.2 Site Employee Exposure Pathways

Several potential exposure pathways have been identified and will be addressed for the site employee (Figure 3.1). Two airborne exposure pathways will be addressed. The first potential air exposure pathway assumes inhalation of airborne contaminated soil particulates. The second potential air pathway assumes inhalation of volatile emissions from soil.

A single groundwater exposure pathway will be addressed. All groundwater is assumed to be withdrawn from the Buried Valley Aquifer (BVA). The potential groundwater exposure pathway assumes ingestion of BVA groundwater as drinking water. The site employee is not assumed to shower at the site. Calculations will be made based on both currently known and future estimated groundwater concentrations.

Two soil exposure pathways will be addressed. The first potential soil exposure pathway assumes inadvertent ingestion of small amounts of contaminated shallow (<2 ft) soil on a daily basis. The soil pathway that assumes dermal contact with soil during daily activities is not addressed for site employees as daily soil contact is assumed to be negligible. The second soil pathway that is addressed assumes external exposure to ionizing radiation from radionuclides in soil. Incidental ingestion and external exposure are assumed to occur daily.

3.3 EXPOSURE CALCULATIONS

The calculated contaminant exposures to the construction workers and site employees were made for each of the appropriate pathways. The construction worker and site employee exposure pathways were described above and are shown in Figure 3.1. Each pathway described below is numbered one through eight as shown in the figure.

3.3.1 Exposure Pathways Intake Calculations

There are eight construction worker pathways and five site employee pathways described above. Equations describing the intake of Release Block H constituents were taken from the RREM (Appendix D). Equations were adapted from U.S. EPA Risk Assessment Guidance for Superfund (RAGS) Parts A and B (1989, 1991) and the Dermal Exposure Assessment: Principles and Applications - Interim Guidance (1992).

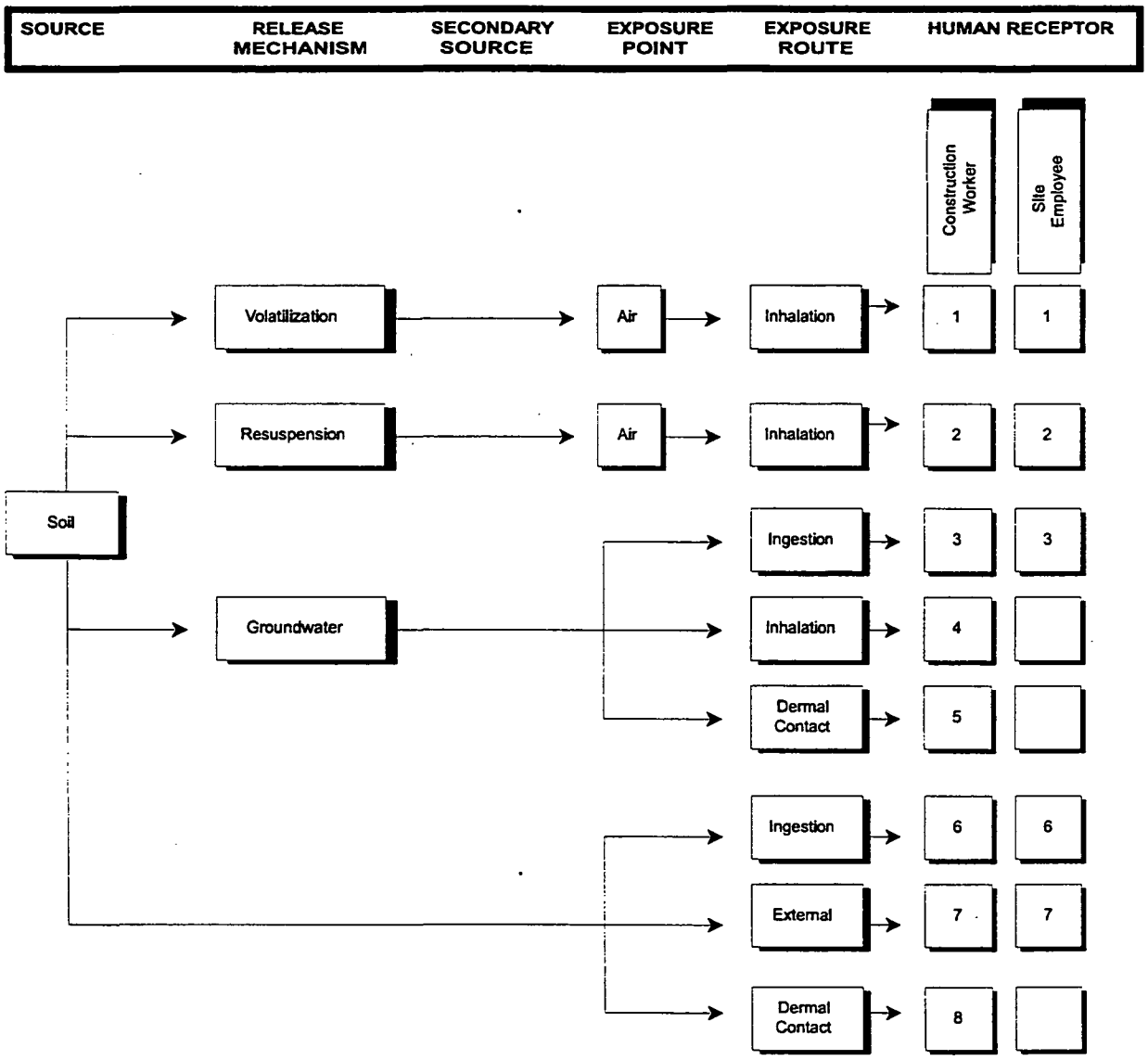

Figure 3.1. Residual Risk Evaluation Exposure Scenarios.

3.3.1.1 Inhalation of Volatile Air Contaminants From Soil

Exposures of noncarcinogens and carcinogens via inhalation of volatile air contaminants were not calculated for Release Block H as no volatile compounds were detected in Release Block H soil. If volatile contaminants were present in the Release Block H soil, exposures would be calculated using the equations presented in Appendix D.

3.3.1.2 Inhalation of Dust-bound Contaminants

Exposures of noncarcinogens, carcinogens and radionuclides may occur via inhalation of soil-bound contaminants resuspended into the atmosphere attached to dust. The exposures of dust-bound contaminants inhaled by the onsite construction worker and the site employee were calculated using the intake equations shown in Appendix D.

3.3.1.3 Ingestion of Drinking Water

Exposures of noncarcinogens, carcinogens and radionuclides via ingestion of one liter of drinking water each day were calculated using the intake equations shown in Appendix D. This pathway applies to both construction workers and site employees.

3.3.1.4 Inhalation of Volatile Air Contaminants During Showering

Exposures of noncarcinogens, carcinogens and radionuclides via inhalation of volatile air contaminants derived from a 10 minute shower once daily were calculated using the intake equations shown in Appendix D. Tritium (H-3) is the only radionuclide to which this pathway applies. This pathway applies only to the construction worker.

3.3.1.5 Dermal Contact With Groundwater-derived Shower Water

Exposures of noncarcinogens, carcinogens and radionuclides via dermal contact of groundwater contaminants derived from a 10 minute shower once daily were calculated using the intake equations shown in Appendix D. Tritium (H-3) is the only radionuclide to which this pathway applies. This pathway applies only to the construction worker.

3.3.1.6 Ingestion of Soil-bound Contaminants

Exposures of noncarcinogens, carcinogens and radionuclides via ingestion of soil-bound contaminants were calculated using the intake equations shown in Appendix D. This pathway applies to both construction workers and site employees, although the amount of soil ingested through incidental contact with soil is 480 mg/day for the construction worker and only 50 mg/day for the site employee.

3.3.1.7 External Exposure to Radiation

Exposures of radionuclides during daily presence at the site were calculated using the exposure equation shown in Appendix D. This pathway applies to both construction workers and site employees.

3.3.1.8 Dermal Contact With Soil

Exposures of noncarcinogens and carcinogens via dermal contact with soil during daily activities were calculated using the intake equations shown in Appendix D. This pathway applies only to construction workers as site employees are not assumed to be engaged in work activities providing direct contact with contaminated soil.

3.3.2 Contaminant Exposures

Table III.1 lists the soil contaminants carried through the RRE process at Release Block H for all onsite construction workers and site employees. Table III.2 lists the current groundwater contaminants carried through the RRE process for Release Block H. Table III.3 lists the future groundwater contaminants carried through the Release Block H RRE. The soil and groundwater exposure concentrations (C_{soil} and C_{gw}) are listed. The total concentration was based either on the measured maximum concentration for Release Block H or the 95th% UCL of the arithmetic mean or geometric mean, as appropriate. The total concentration is comprised of possible background concentrations plus any incremental additional contamination above background. The background concentration, if available, and the incremental concentration above background that is attributed to Release Block H (for soil) or Mound Facility (for groundwater) activities are also listed. Also shown are the chemical-specific parameters needed to calculate dermal exposures from soil or water (ABS, Kp, and T). The number of detected values and analyses for current groundwater contaminants are listed (Table III.2).

Several contaminants had sufficient concentration data to calculate credible 95th% UCL of the mean (either geometric or arithmetic). To calculate the 95th% UCL, the range of concentrations from a contaminant with 20 or more samples was divided into 5% increments. The number of samples which fell into each increment was counted and divided into the total number of samples of that contaminant to provide a probability distribution. The probability distributions were then added cumulatively, and the concentrations at the 95% cumulative probability distribution were used in the calculations. The plotted distributions of contaminants with less than about 20 values often did not appear to be either log normal or normal distributions. Therefore, a decision was made to calculate 95th% UCL values for contaminants with a sample size of 20 or more.

In soil, plutonium-238 and thorium-232 had sufficient concentration data (n>20 or more) to allow a calculation of the 95th% UCL of the mean. An examination of the frequency distributions for plutonium-238 show them to be log normally distributed, so the 95th% UCL is based on log-transformed data. The 95th% UCL is considered the total concentration. Background concentrations for all contaminants were subtracted from the total to obtain the incremental concentrations attributed to the site (Table III.1). In the case of thorium-232, copper, lithium and potassium-40 for site employee and thorium-232 for construction worker this resulted in incremental concentrations of effectively zero.

Similarly in groundwater (currently in the BVA), contaminants for which 95th% UCL values were calculated are indicated in Table III.2. These values were considered the total concentrations, as were the maximum BVA groundwater concentrations for all contaminants with fewer than 20 data points. Background concentrations were subtracted from the total concentrations to obtain the incremental concentration attributed to the site (Table III.2). In the case of lead, this resulted in an incremental concentration of effectively zero.

Future potential groundwater concentrations were estimated by combining known bedrock aquifer contamination with known BVA contamination. The procedures for calculation of bedrock aquifer contamination and resulting BVA contamination projected for the future, are detailed in Appendix C. The resulting contaminant concentrations are considered the estimated total concentrations. Background concentrations were subtracted from the total concentrations to obtain the incremental concentration attributed to the site (Table III.3). In the case of lead, this resulted in an incremental concentration of effectively zero.

Based on the nature of the exposure pathways and characteristics of the Release Block H contaminants, some pathways need not be evaluated. In soil, all but one of the contaminants carried through the RRE have a low degree of volatility and hence, are not considered here as vapor-phase contaminants. Therefore, the inhalation Pathway 1 (inhalation of volatile air contaminants from soil) was not addressed at Release Block H. The exception is 1,1,2-trichloro-1,2,2-trifluoroethane. Although this organic compound is very volatile, there are no health-based inhalation criteria available for it. Therefore, a Pathway 1 calculation could not be completed. The soil dermal exposure pathway,

which assumes direct contact with soil, is addressed only with the construction worker as the site employee is assumed to come into negligible contact with Release Block H soil. All other soil pathways will be addressed for the soil contaminants. Intakes of Release Block H soil contaminants based on the incremental concentrations attributable to the site, are shown in Table III.4 for the construction worker and in Table III.7 for the site employee. Intakes of Release Block H soil contaminants based on the total and background concentrations at the site, are shown in Appendix F for both the construction worker and site employee.

In groundwater, contaminant exposures were calculated for all organic, inorganic, and radionuclide contaminants for the groundwater ingestion pathway with both construction workers and site employees.

For construction workers only, dermal exposures during showering were calculated for all organic and inorganic contaminants, as well as tritium. Also for construction workers only, inhalation exposures were calculated for volatile organic contaminants and tritium. Site employees are not assumed to shower at the site.

Currently, BVA groundwater, the source of potable water available for use at Release Block H, has three volatile organic, three inorganic, and six radionuclide contaminants that were carried through the RRE (Table III.2). Intakes of Release Block H current groundwater contaminants based on the incremental concentrations attributable to the site, are shown in Table III.5 for the construction worker and in Table III.8 for the site employee. Intakes of Release Block H current groundwater contaminants based on the total and background concentrations at the site, are shown in Appendix F for both the construction worker and site employee.

Future BVA groundwater has three volatile organic, eight inorganic, and six radionuclide contaminants that were carried through the RRE (Table III.3). Intakes of Release Block H future groundwater contaminants based on the incremental concentrations attributable to the site, are shown in Table III.6 for the construction worker and in Table III.9 for the site employee. Intakes of Release Block H future groundwater contaminants based on the total and background concentrations at the site, are shown in Appendix F for both the construction worker and site employee.

Table III.1. Soil Constituents Carried through Release Block H RRE

Parameter / Constituent	C_{soil}					ABS
	Total Construction Worker	Total Site Employee	Background[1]	Incremental Construction Worker	Incremental Site Employee	
ORGANICS (mg/kg)						
Acenaphthene	0.18	0.18	NAv	0.18	0.18	0.1
Acenaphthylene	0.7	0.7	NAv	0.7	0.7	0.1
Aldrin	0.0031	0.0031	NAv	0.0031	0.0031	0.1
Benzo(a)pyrene	1.115	1.115	NAv	1.115	1.115	0.1
Benzo(g,h,i)perylene	1.0625	1.0625	NAv	1.0625	1.0625	0.1
delta-BHC	0.00025	0.00025	NAv	0.00025	0.00025	0.1
Carbazole	0.5875	0.5875	NAv	0.5875	0.5875	0.1
alpha Chlordane	0.01	0.01	NAv	0.01	0.01	0.1
gamma Chlordane	0.0074	0.0074	NAv	0.0074	0.0074	0.1
4-Chloro-3-methylphenol	0.047	0.047	NAv	0.047	0.047	0.1
Dibenzo(a,h)anthracene	0.78	0.78	NAv	0.78	0.78	0.1
Dibenzofuran	1.035	1.035	NAv	1.035	1.035	0.1
Fluorene	1.45	1.45	NAv	1.45	1.45	0.1
Heptachlor Epoxide	0.0022	0.0022	NAv	0.0022	0.0022	0.1
2-Methylnaphthalene	0.92	0.92	NAv	0.92	0.92	0.1
Naphthalene	2.625	2.625	NAv	2.625	2.625	0.1
Phenanthrene	3.75	3.75	NAv	3.75	3.75	0.1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.002	0.002	NAv	0.002	0.002	0.1
INORGANICS (mg/kg)						
Arsenic (total)	10.9	10.9	8.6	2.3	2.3	0.01
Bismuth	58.6	58.6	NAv	58.6	58.6	0.01
Copper (total) [4]	26.4	22.1	26	0.4	0	0.01
Lead (total)	163	163	48	115	115	0.01
Lithium [4]	40.2	19	26	14.2	0	0.01
RADIONUCLIDES (pCi/g)						
Cesium-137	1.9	1.9	0.42	1.48	1.48	NAp
Plutonium-238 [2]	1.26	1.35	0.13	1.13	1.22	NAp
Plutonium-242	0.0143	0.0143	NAv	0.0143	0.0143	NAp
Potassium-40 [4]	45.4	21	37	8.4	0	NAp
Thorium-232 [3]	0.8	0.79	1.4	0	0	NAp

ABS - Absorption factor (unitless)
NAv - Not Available
NAp - Not Applicable
[1] - Soil background concentration for Mound facility (see RREM, DOE, 1996).
[2] - Pu-238 values were log-normally distributed and hence, concentrations (95th% UCL) shown were based on the log-transformed data.
[3] - Th-232 total value (95th % UCL) was l ess than background value, therefore not carried through RRE.
[4] - Copper, Lithium and Potassium-40 site employee values were less than background values, therefore not carried through RRE.

Table III.2. Current Groundwater Constituents Carried through Release Block H RRE

Groundwater Constituent	C_{gw}			Kp (cm/hr)	T (hr)	Detects / Analyses
	Total[1]	BG[2]	Incremental[3]			
ORGANICS (mg/L)						
1,1-Dichloroethene	0.0017	NAv	0.0017	0.016	0.34	8/11
1,1,1-Trichloroethane[4]	0.0007	0.0007	0.000001	0.017	0.57	21/41
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087	NAv	0.0087	NAv	NAv	3/3
INORGANICS (mg/L)						
Cadmium[4]	0.0019	NAv	0.0019	0.001	NAp	7/28
Copper	0.593	0.0012	0.5918	0.001	NAp	6/12
Lead[4]	0.0025	0.0101	0	0	NAp	17/28
RADIONUCLIDES (pCi/L)						
Actinium-227	0.335	NAv	0.335	NAp	NAp	1/1
Bismuth-210	0.39	NAv	0.39	NAp	NAp	2/2
Plutonium-239/240	2	0.125	1.875	NAp	NAp	3/3
Tritium[4]	2709	1485	1224	1.5E-5 m/hr	NAp	23/23
Uranium-234	8.14	0.792	7.348	NAp	NAp	11/11
Uranium-238	8.25	0.688	7.562	NAp	NAp	9/9

Kp - Permeability constant for dermal exposures.
T - Tau, a chemical specific timing constant for dermal exposures.
NAv - Not Available
NAp - Not Applicable

1 - Groundwater exposure concentrations for Release Block H, based on measured data from Production Wells 0076 and 0271. All total values were C_{max} from Table II.1. except 1,1,1-Trichloroethane, Cadmium, Lead and Tritium.

2 - Groundwater background concentrations for the BVA (see RREM).

3 - Increment above background for Release Block H groundwater contaminant concentrations.

4 - Total concentration was based on 95th UCL of mean (by log transformed values except Lead). These contaminants were carried through the RRE because C_{max} > BG and/or GV.

Table III.3. Future Groundwater Constituents Carried through Release Block H RRE

Groundwater Constituent	C_{gw}			Kp (cm/hr)	T (hr)
	Estimated Total[1]	BG[2]	Incremental[3]		
ORGANICS (mg/L)					
1,1-Dichloroethene	0.0017	NAv	0.0017	0.016	0.34
1,1,1-Trichloroethane[4]	0.0054	0.0007	0.0047	0.017	0.57
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087	NAv	0.0087	NAv	NAv
INORGANICS (mg/L)					
Beryllium	0.0001	NAv	0.0001	0.001	NAp
Bismuth	0.0016	NAv	0.0016	0.001	NAp
Cadmium[4]	0.0019	NAv	0.0019	0.001	NAp
Chromium	0.4961	0.0061	0.49	0.002	NAp
Cobalt	0.0039	NAv	0.0039	0.0004	NAp
Copper	0.5964	0.0012	0.5952	0.001	NAp
Lead[4]	0.002509	0.01005	0	0	NAp
Molybdenum	0.0096	0.0056	0.004	0.001	NAp
RADIONUCLIDES (pCi/L)					
Actinium-227	0.355	NAv	0.355	NAp	NAp
Bismuth-210	0.39	NAv	0.39	NAp	NAp
Plutonium-239/240	2.02	0.125	1.895	NAp	NAp
Tritium[4]	5936	1485	4451	1.5E-5 m/hr	NAp
Uranium-234	8.14	0.792	7.348	NAp	NAp
Uranium-238	8.25	0.688	7.562	NAp	NAp

Kp - Permeability constant for dermal exposures.
T - Tau, a chemical specific timing constant for dermal exposures.
NAv - Not Available
NAp - Not Applicable

[1] - Estimated future groundwater exposure concentrations for Release Block H, based on measured data from Production Wells 0076 and 0271 and bedrock wells. All total values were C_{max} from Table II.2.
except 1,1,1-Trichloroethane, Cadmium, Lead and Tritium.

[2] - Groundwater background concentrations for the BVA (see RREM).

[3] - Increment above background for estimated future Release Block H groundwater contaminant concentrations.

[4] - Total concentration was based on 95th UCL of mean (by log transformed values except Lead). These contaminants were carried through the RRE because C_{max} > BG and/or GV.

Table III.4. Construction Worker Calculated Constituent Intakes for Soil (Incremental*) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwater Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwater Dermal	Pathway 6 Soil Ingestion	Pathway 7 External** Radiation	Pathway 8 Soil Dermal
ORGANICS								
Acenaphthene	NA	8.230E-12	NA	NA	NA	8.454E-07	NA	1.761E-07
Acenaphthylene	NA	3.201E-11	NA	NA	NA	3.288E-06	NA	6.849E-07
Aldrin (carcinogen)	NA	1.012E-14	NA	NA	NA	1.040E-09	NA	2.167E-10
Aldrin (non-carcinogen)	NA	1.417E-13	NA	NA	NA	1.456E-08	NA	3.033E-09
Benzo(a)pyrene	NA	3.642E-12	NA	NA	NA	3.741E-07	NA	7.793E-08
Benzo(g,h,i)perylene	NA	3.470E-12	NA	NA	NA	3.564E-07	NA	7.426E-08
delta-BHC	NA	1.143E-14	NA	NA	NA	1.174E-09	NA	2.446E-10
Carbazole	NA	1.919E-12	NA	NA	NA	1.971E-07	NA	4.106E-08
alpha-Chlordane (carcinogen)	NA	3.266E-14	NA	NA	NA	3.355E-09	NA	6.989E-10
alpha-Chlordane (non-carcinogen)	NA	4.572E-13	NA	NA	NA	4.697E-08	NA	9.785e-09
gamma-Chlordane (carcinogen)	NA	2.417E-14	NA	NA	NA	2.483E-09	NA	5.172E-10
gamma-Chlordane (non-carcinogen)	NA	3.384E-13	NA	NA	NA	3.476E-08	NA	7.241E-09
4-Chloro-3-methylphenol	NA	2.149E-12	NA	NA	NA	2.207E-07	NA	4.599E-08
Dibenzo(a,h)anthracene	NA	2.547E-12	NA	NA	NA	2.617E-07	NA	5.451E-08
Dibenzofuran	NA	4.732E-11	NA	NA	NA	4.861E-06	NA	1.013E-06
Fluorene	NA	6.630E-11	NA	NA	NA	6.810E-06	NA	1.419E-06
Heptachlor Epoxide (carcinogen)	NA	7.185E-15	NA	NA	NA	7.380E-10	NA	1.538E-10
Heptachlor Epoxide (non-carcinogen)	NA	1.006E-13	NA	NA	NA	1.033E-08	NA	2.153E-09
2-Methylnaphthalene	NA	4.207E-11	NA	NA	NA	4.321E-06	NA	9.002E-07
Naphthalene	NA	1.200E-10	NA	NA	NA	1.233E-05	NA	2.568E-06
Phenanthrene	NA	1.715E-10	NA	NA	NA	1.761E-05	NA	3.669E-06
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	9.145E-14	NA	NA	NA	9.393E-09	NA	1.957E-09
INORGANICS								
Arsenic (carcinogen)	NA	7.512E-12	NA	NA	NA	7.716E-07	NA	1.607E-08
Arsenic (non-carcinogen)	NA	1.052E-10	NA	NA	NA	1.080E-05	NA	2.250E-07
Bismuth	NA	2.679E-09	NA	NA	NA	2.752E-04	NA	5.734E-06
Copper	NA	1.829E-11	NA	NA	NA	1.879E-06	NA	3.914E-08
Lead	NA	3.756E-10	NA	NA	NA	3.858E-05	NA	8.037E-07
Lithium	NA	6.493E-10	NA	NA	NA	6.669E-05	NA	1.389E-06
RADIONUCLIDES								
Cesium-137 (pCi)	NA	8.645E-03	NA	NA	NA	8.880E+02	2.218E+00	NA
Plutonium-238 (pCi)	NA	6.600E-03	NA	NA	NA	6.780E+02	1.693E+00	NA
Plutonium-242 (pCi)	NA	8.353E-05	NA	NA	NA	8.580E+00	2.143E-02	NA
Potassium-40 (pCi)	NA	4.907E-02	NA	NA	NA	5.040E+03	1.259E+01	NA

* - Incremental soil concentrations and resulting intakes obtained by subtracting background from total concentrations.

** - External Radiation Exposure has units of pCi-yr/gm (Pathway 7).

Intakes due to exposure to total and background concentrations presented in Appendix F.

Note: Intakes for carcinogens are calculated as average daily dose-lifetime, Intakes for non-carcinogens are calculated as average daily doses. Carcinogen status presented in Section 4 of this report.

NA - Not applicable.

Table III.5. Construction Worker Calculated Constituent Intakes from Groundwater (Current -Incremental*) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwater Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwater Dermal	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal
ORGANICS								
1,1-Dichloroethene	NA	NA	1.663E-05	8.268E-08	3.401E-06	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	1.174E-08	8.170E-10	3.302E-09	NA	NA	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	8.513E-05	5.923E-06	NAv	NA	NA	NA
INORGANICS								
Cadmium	NA	NA	1.859E-05	NA	6.023E-08	NA	NA	NA
Copper	NA	NA	5.791E-03	NA	1.876E-05	NA	NA	NA
Lead	NA	NA	0.000E+00	NA	0.000E+00	NA	NA	NA
RADIONUCLIDES								
Actinium-227 (pCi)	NA	NA	4.188E+02	NA	NA	NA	NA	NA
Bismuth-210 (pCi)	NA	NA	4.875E+02	NA	NA	NA	NA	NA
Plutonium-239/240 (pCi)	NA	NA	2.344E+03	NA	NA	NA	NA	NA
Tritium (pCi)	NA	NA	1.530E+06	1.426E+04	7.282E+03	NA	NA	NA
Uranium-234 (pCi)	NA	NA	9.185E+03	NA	NA	NA	NA	NA
Uranium-238 (pCi)	NA	NA	9.453E+03	NA	NA	NA	NA	NA

NAv - Data not available to perform this calculation.
* - Incremental groundwater concentrations and resulting intakes obtained by subtracting background from total concentrations.
Intakes due to exposure to total and background concentrations presented in Appendix F.
NA - Not applicable.

Table III.6. Construction Worker Calculated Constituent Intakes from Groundwater (Future - Incremental*) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal
ORGANICS			
1,1-Dichloroethene	1.663E-05	8.268E-08	3.401E-06
1,1,1-Trichloroethane	4.630E-05	3.222E-06	1.302E-05
1,1,2-Trichloro-1,2,2-trifluoroethane	8.513E-05	5.923E-06	NAv
INORGANICS			
Beryllium (carcinogen)	6.989E-08	NA	2.264E-10
Beryllium (non-carcinogen)	9.785E-07	NA	3.170E-09
Bismuth	1.566E-05	NA	5.072E-08
Cadmium	1.859E-05	NA	6.023E-08
Chromium	4.795E-03	NA	3.107E-05
Cobalt	3.816E-05	NA	4.945E-08
Copper	5.824E-03	NA	1.887E-05
Lead	0.000E+00	NA	0.000E+00
Molybdenum	3.917E-05	NA	1.269E-07
RADIONUCLIDES			
Actinium-227 (pCi)	4.188E+02	NA	NA
Bismuth-210 (pCi)	4.875E+02	NA	NA
Plutonium-239/240 (pCi)	2.369E+03	NA	NA
Tritium (pCi)	5.563E+06	5.184E+04	2.648E+04
Uranium-234 (pCi)	9.185E+03	NA	NA
Uranium-238 (pCi)	9.453E+03	NA	NA

NAv - Data not available to perform this calculation.
* - Incremental groundwater concentrations and resulting intakes obtained by subtracting background from total concentrations.
Intakes due to exposure to total and background concentrations presented in Appendix F.
NA - Not applicable.

Table III.7. Site Employee Calculated Constituent Intakes from Soil (Incremental*) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwater Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External** Radiation
ORGANICS					
Acenaphthene	NA	8.230E-12	NA	8.806E-08	NA
Acenaphthylene	NA	3.201E-11	NA	3.425E-07	NA
Aldrin (carcinogen)	NA	5.062E-14	NA	5.417E-10	NA
Aldrin (non-carcinogen)	NA	1.417E-13	NA	1.517E-09	NA
Benzo(a)pyrene	NA	1.821E-11	NA	1.948E-07	NA
Benzo(g,h,i)perylene	NA	1.735E-11	NA	1.856E-07	NA
delta-BHC	NA	1.143E-14	NA	1.223E-10	NA
Carbazole	NA	9.594E-12	NA	1.027E-07	NA
alpha-Chlordane (carcinogen)	NA	1.633E-13	NA	1.747E-09	NA
alpha-Chlordane (non-carcinogen)	NA	4.572E-13	NA	4.892E-09	NA
gamma-Chlordane (carcinogen)	NA	1.208E-13	NA	1.293E-09	NA
gamma-Chlordane (non-carcinogen)	NA	3.384E-13	NA	3.620E-09	NA
4-Chloro-3-methylphenol	NA	2.149E-12	NA	2.299E-08	NA
Dibenzo(a,h)anthracene	NA	1.274E-11	NA	1.363E-07	NA
Dibenzofuran	NA	4.732E-11	NA	5.064E-07	NA
Fluorene	NA	6.630E-11	NA	7.094E-07	NA
Heptachlor Epoxide (carcinogen)	NA	3.593E-14	NA	3.844E-10	NA
Heptachlor Epoxide (non-carcinogen)	NA	1.006E-13	NA	1.076E-09	NA
2-Methylnaphthalene	NA	4.207E-11	NA	4.501E-07	NA
Naphthalene	NA	1.200E-10	NA	1.284E-06	NA
Phenanthrene	NA	1.715E-10	NA	1.835E-06	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	9.145E-14	NA	9.785E-10	NA
INORGANICS					
Arsenic (carcinogen)	NA	3.756E-11	NA	4.019E-07	NA
Arsenic (non-carcinogen)	NA	1.052E-10	NA	1.125E-06	NA
Bismuth	NA	2.679E-09	NA	2.867E-05	NA
Lead	NA	1.878E-09	NA	2.009E-05	NA
RADIONUCLIDES					
Cesium-137 (pCi)	NA	4.322E-02	NA	4.625E+02	2.466E+00
Plutonium-238 (pCi)	NA	3.563E-02	NA	3.813E+02	2.033E+00
Plutonium-242 (pCi)	NA	4.176E-04	NA	4.469E+00	2.382E-02

* - Incremental soil concentrations and resulting intakes obtained by subtracting background from total concentrations.

** - External Radiation Exposure has units of pCi-yr/gm (Pathway 7).

Intakes due to exposure to total and background concentrations presented in Appendix F.

NA - Not applicable.

Table III.8. Site Employee Calculated Constituent Intakes from Groundwater (Current - Incremental*) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwater Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External Radiation
ORGANICS					
1,1-Dichloroethene	NA	NA	1.663E-05	NA	NA
1,1,1-Trichloroethane	NA	NA	1.174E-08	NA	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	8.513E-05	NA	NA
INORGANICS					
Cadmium	NA	NA	1.859E-05	NA	NA
Copper	NA	NA	5.791E-03	NA	NA
Lead	NA	NA	0.000E+00	NA	NA
RADIONUCLIDES					
Actinium-227 (pCi)	NA	NA	2.094E+03	NA	NA
Bismuth-210 (pCi)	NA	NA	2.438E+03	NA	NA
Plutonium-239/240 (pCi)	NA	NA	1.172E+04	NA	NA
Tritium (pCi)	NA	NA	7.650E+06	NA	NA
Uranium-234 (pCi)	NA	NA	4.593E+04	NA	NA
Uranium-238 (pCi)	NA	NA	4.726E+04	NA	NA

* - Incremental groundwater concentrations and resulting intakes obtained by subtracting background from total concentrations.

Intakes due to exposure to total and background concentrations presented in Appendix F.

NA - Not applicable.

Table III.9. Site Employee Calculated Constituent Intakes from Groundwater (Future - Incremental*) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 3 Groundwater Ingestion
ORGANICS	
1,1-Dichloroethene	1.663E-05
1,1,1-Trichloroethane	4.630E-05
1,1,2-Trichloro-1,2,2-trifluoroethane	8.513E-05
INORGANICS	
Beryllium (carcinogen)	3.495E-07
Beryllium (non-carcinogen)	9.785E-07
Bismuth	1.566E-05
Cadmium	1.859E-05
Chromium	4.795E-03
Cobalt	3.816E-05
Copper	5.824E-03
Lead	0.000E+00
Molybdenum	3.917E-05
RADIONUCLIDES	
Actinium-227 (pCi)	2.094E+03
Bismuth-210 (pCi)	2.438E+03
Thorium-228 (pCi)	9.513E+03
Tritium (pCi)	2.782E+07
Uranium-234 (pCi)	4.593E+04
Uranium-238 (pCi)	4.726E+04

* - Incremental groundwater concentrations and resulting intakes obtained by subtracting background from total concentrations.
Intakes due to exposure to total and background concentrations presented in Appendix F.
NA - Not applicable.

4.0 TOXICITY ASSESSMENT

Toxicological values appropriate to use in the Release Block H RRE were assembled from various sources. The U.S. EPA's Integrated Risk Information System (IRIS) and the Health Assessment Summary Tables (HEAST) were the data sources for organics and inorganics. Radionuclide data was obtained from the DOE (HAZWRAP, 1995). Toxicity values included noncarcinogenic oral and inhalation reference doses (oral RfD or inhalation RfD). Inhalation RfDs were calculated from the inhalation RfC by assuming a $20m^3$/day inhalation volume and 70 kg body weight. A reference dose is an estimate of a route-specific exposure level that would not be expected to cause adverse effects when exposure occurs for a significant portion of a lifespan. Additional data were cancer slope factors for ingested or inhaled carcinogenic contaminants (referred to as oral and inhalation slope factors). These slope factors correlate intake of a carcinogen with an increased risk of cancer. Radionuclides are classified as known carcinogens but are discussed separately from organic and inorganic carcinogens, and have oral, inhalation, and external radiation slope factors. Toxicity data were not available for several organic and inorganic constituents. Some chemicals have no conclusive data; others are undergoing review by the U.S. EPA. Secondary drinking water standards were also obtained for those contaminants which can affect general water quality. Consistent with the approach used to develop Guideline Values, oral slope factors and oral references doses were used, unmodified by gastrointestinal absorption efficiency, for evaluation of dermal pathways. Toxicity profiles for each contaminant are presented in Appendix E.

4.1 NONCARCINOGENS

There were eight organic and one inorganic soil contaminants causing potential noncarcinogenic effects addressed with the Release Block H RRE. Toxicity values for these soil noncarcinogens are shown in Table IV.1. There were two organic and four inorganic contaminants in groundwater (either current or future) causing potential noncarcinogenic effects addressed with the Release Block H RRE. Toxicity values for these groundwater noncarcinogens are shown in Table IV.2.

4.2 CARCINOGENS

There were five organic and one inorganic carcinogenic constituent in soil addressed in Release Block H RRE for which toxicity data were available. Toxicity values for these soil carcinogens are shown in Table IV.1. There were three inorganic and one organic carcinogenic constituents in current and future groundwater that were addressed in Release Block H RRE for which toxicity data were available. Toxicity values for these groundwater carcinogens are shown in Table IV.2.

4.3 RADIONUCLIDES

There were two radionuclides in soil that were addressed in the Release Block H RRE for which toxicity values (including oral, inhalation and external slope factors) are shown in Table IV.1. There were five radionuclides in current and future groundwater that were addressed in the Release Block H RRE. Toxicity values (including oral, inhalation and external slope factors) for these radionuclides are shown in Table IV.2.

4.4 OTHER CHEMICALS

Several additional constituents have been identified at the site that are water quality indicators or secondary water quality parameters. These constituents give a general indication of water quality and are naturally found in most, if not all waters. These were taken from the data introduced in Section 2. These parameters are shown in Table IV.3.

Table IV.1. Toxicity Values* for Soil Constituents included in the Release Block H RRE

Soil Constituent	Oral RfD (mg/kg/da)	Inhalation RfD (mg/kg/da)	Oral Slope Factor $(mg/kg/da)^{-1}$	Inhalation Slope Factor $(mg/kg/da)^{-1}$	Carcinogenic Weight of Evidence**
ORGANICS (mg/kg)					
Acenaphthene	0.06				D
Acenaphthylene					D
Aldrin	3.00E-05		17		B2
Benzo(a)pyrene			7.3		B2
Benzo(g,h,i)perylene					B2
delta-BHC					D
Carbazole					
alpha Chlordane	6.00E-05		1.3		B2
gamma Chlordane	6.00E-05		1.3		B2
4-Chloro-2-methylphenol					D
Dibenzo(a,h)anthracene					B2
Dibenzofuran					D
Fluorene	0.04				D
Heptachlor Epoxide	1.30E-05		9.1		B2
2-Methylnaphthalene					D
Naphthalene	50				D
Phenanthrene					
1,1,2-Trichloro-1,2,2-trifluoroethane	30				D
INORGANICS (mg/kg)					
Arsenic (total)	3.00E-04		15		A
Bismuth					
Copper (total)					D
Lead (total)					B2
Lithium					D
RADIONUCLIDES (pCi/g)			**Oral Slope Factor (risk/pCi)**	**Inhalation Slope Factor (risk/pCi)**	**External Slope Factor (risk/yr per**
Cesium-137			3.25E-11	1.90E-11	2.10E-06
Plutonium-238			3.00E-10	2.70E-08	1.90E-11
Plutonium-242					
Potassium-40					

* - Values from IRIS, HEAST and HAZWRAP (1995). No data available if left blank.

** - A - Human carcinogen.
B1- Probable human carcinogen, limited human data available.
B2- Probable human carcinogen, sufficient evidence in animals, insufficient or no human data available.
C - Possible human carcinogen.
D - Not classified.

Table IV.2. Toxicity Values[1] for All Groundwater Constituents Included in the Release Block H RRE

Groundwater Constituent	Oral RfD (mg/kg/da)	Inhalation RfD (mg/kg/da)	Oral Slope Factor $(mg/kg/da)^{-1}$	Inhalation Slope Factor $(mg/kg/da)^{-1}$	Carcinogenic Weight of Evidence[3]
ORGANICS					
1,1-Dichloroethene	9.0			1.2	C
1,1,1-Trichloroethane	0.09				D
1,1,2-Trichloro-1,2,2-trifluoroethane	30				
INORGANICS					
Beryllium	0.005		4.3	8.4	
Bismuth					
Cadmium	0.0005			6.1	B1
Chromium[2]	0.005			41	A
Cobalt					
Copper					D
Lead					B2
Molybdenum	0.005				
RADIONUCLIDES			**Oral Slope Factor (risk/pCi)**	**Inhalation Slope Factor (risk/pCi)**	**Carcinogenic Weight of Evidence[3]**
Actinium-227			6.3E-10	7.9E-8	A
Bismuth-210					A
Plutonium-239/240			3.2E-10	2.8E-8	A
Tritium			7.2E-14	9.6E-14	A
Uranium-234			4.4E-11	1.4E-8	A
Uranium-238			6.2E-11	1.2E-8	A

[1] - Values from IRIS, HEAST and HAZWRAP (1995). No data available if left blank.
[2] - Chromium assumed to be Cr-VI.
[3] A - Human Carcinogen.
B1 - Probable human carcinogen; limited human data available.
B2 - Probable human carcinogen; sufficient evidence in animals, insufficient or no human data available.
C - Possible human carcinogen.
D - Not classified

Table IV.3. Current and Future Water Quality Data for BVA

Groundwater Constituent	Current Maximum Concentration (mg/L)	Future Maximum Concentration (mg/L)	Secondary Drinking Water Standard (mg/L)
Alkalinity	335	373.4	---
Aluminum	0.0737	0.3495	0.05 to 0.20
Ammonia	0.58	0.8652	---
Calcium	126	156	---
Chloride	133	232.7	250
Copper	0.593	0.596	1
Dissolved Solids	719	882.9	500
Fluoride	0.18	0.1961	2
Iron	0.78	0.78	0.3
Magnesium	39.6	44	---
Manganese	0.0248	0.0248	0.05
Nitrate	2.55	2.57	10
Nitrate/Nitrite	4.9	5.05	10
Nitrite	0.066	0.0669	---
Nitrogen	0.62	0.77	---
Organic Carbon	1.1	1.82	---
Phosphate	0.22	0.37	---
Potassium	3.8	6	---
Sodium	82.4	143.2	---
Sulfate	83	111	250
Suspended Solids	8	81.1	---

--- - No Secondary Drinking Water Standard available.

5.0 RESIDUAL RISK EVALUATION FOR RELEASE BLOCK H

The residual risks associated with use of Release Block H are characterized in this section. To accomplish this, toxicity and exposure assessment are summarized and integrated into quantitative expressions of risk. Two types of risk characterization are performed. The first is the calculation of hazard quotients (HQ) for noncarcinogens. The second is the calculation of carcinogenic risk associated with carcinogens and radionuclides. Following the calculation of hazard quotients or risks for individual chemicals and all exposure pathways, the hazards or risks can be summed across constituents and across media.

5.1 CALCULATION OF NONCARCINOGENIC HAZARD QUOTIENTS

Potential human health hazards from exposure to noncarcinogens are calculated by combining an oral Reference Dose (oral RfD) or an inhalation Reference Dose, (inhalation RfD) as presented in Section 4, with calculated intakes as presented in Section 3 to generate a ratio called a Hazard Quotient. The specific relationship between toxicity and exposure of noncarcinogens is represented as Equation 1. Chemical-specific hazard quotients may be summed to yield the hazard index (HI). As an example, a hazard quotient of one or less implies that no toxicity will occur at the specified contaminant exposure.

$$HQ = \text{intake} / \text{oral RfD or inhalation RfD} \quad (1)$$

where, intake is the pathway and chemical-specific intake (mg/kg/da)
and, oral RfD and inhalation RfD have units of (mg/kg-da).

5.2 CALCULATION OF CARCINOGENIC RISKS

Carcinogenic risks are calculated for both carcinogenic chemicals and radionuclides. A carcinogenic risk is calculated by converting calculated intakes to incremental risks by using Equation 2 or 3 and the oral slope factor (oral SF), an inhalation slope factor (inhalation SF), or external radiation slope factor. As an example, a risk of 1.0E-6, or one in a million, indicates that the exposed individual has one chance in a million of cancer occurring at the specified contaminant exposure.

$$\text{Risk} = \text{intake} \times \text{slope factor (oral or inhalation)} \quad (2)$$
$$\text{Risk} = \text{external exposure} \times \text{slope factor (external)} \quad (3)$$

where, oral and inhalation slope factors have units of $(\text{mg/kg-da})^{-1}$ and,
external slope factors have units of $(\text{pCi-yr/g})^{-1}$.

5.3 CONSTRUCTION WORKER RESIDUAL RISK EVALUATION

5.3.1 Soil Residual Risk Evaluation - Construction Worker

5.3.1.1 Soil Noncarcinogenic Hazards - Construction Worker

For soil, noncarcinogenic hazards were calculated for all relevant construction worker pathways, in this case, Pathway 6 (incidental ingestion of soil) and Pathway 8 (dermal contact with soil). Noncarcinogenic hazards for Pathway 2 (inhalation of soil/dust) were not calculable as no inhalation toxicity values were available. Hazards were calculated for the incremental concentration above background (Table V.1) and for background and total concentrations (Appendix F).

For Pathway 6 (incidental ingestion of soil), the overall pathway hazard was 3.9E-2 and for Pathway 8 (dermal contact with soil), the overall pathway hazard was 1.3E-3. When combined, the overall construction worker incremental hazard (above background) from soil noncarcinogenic contaminants was 4.0E-2, which is lower than the upper limit of 1.0. Hazards were calculated similarly for the same

pathways using intakes based on background and total concentrations (Appendix F). The overall construction worker hazard from soil noncarcinogenic contaminants was 1.4E-1 based solely on background. The overall construction worker hazard from soil noncarcinogenic contaminants was 1.8E-1, as calculated from intakes based on total concentrations. The primary contaminant contributing to the calculated hazard, primarily due to background levels, was arsenic.

5.3.1.2 Soil Carcinogenic Risks - Construction Worker

Carcinogenic risks were calculated for all relevant construction worker pathways. Pathway 6 (incidental ingestion of soil) and Pathway 8 (dermal contact with soil) applied to non-radionuclide carcinogens. Carcinogenic risks for Pathway 2 (inhalation of soil/dust) were not calculable as no inhalation toxicity values were available. Risks were calculated for the incremental concentration above background (Table V.1) and for background and total concentrations (Appendix F).

For the carcinogenic soil contaminants, the potential risk due to exposure of non-radionuclide carcinogens to a construction worker for Pathway 6 (incidental ingestion of soil) overall was 1.4E-5, and for Pathway 8 (dermal contact with soil) overall was 8.2E-7. The combined incremental risks (above background) across all pathways and all chemicals was 1.5E-5. Risks were calculated similarly for the same pathways using intakes based on background and total concentrations (Appendix F). The overall construction worker risk from soil carcinogenic soil contaminants was 4.4E-5 based solely on background. The overall construction worker risk from carcinogenic soil contaminants was 5.9E-5 as calculated from intakes based on total concentrations. The overall incremental risk was approximately evenly divided between two contaminants, including arsenic (with contributions from both background and incremental concentrations), and benzo(a)pyrene.

5.3.1.3 Soil Radionuclide Risks - Construction Worker

For radionuclides, the potential risk to the construction worker for Pathway 2 (inhalation of dust) was 1.8E-10, for Pathway 6 (incidental ingestion of soil) was 2.3E-7 and for Pathway 7 (external radiation) was 4.7E-6, while the combined incremental risks (above background) across all pathways were 4.9E-6. Risks were calculated similarly for the same pathways using intakes based on background and total radionuclide concentrations (Appendix F). The overall construction worker risk from soil radionuclides was 1.4E-6 based solely on background. The overall construction worker risk from soil radionuclides was 6.2E-6 as calculated from intakes based on total concentrations. Note that the total, background and incremental risks presented here may not add up exactly due to rounding of the numbers.

5.3.2 Current Groundwater Residual Risk Evaluation - Construction Worker

5.3.2.1 Current Groundwater Noncarcinogenic Hazards - Construction Worker

For groundwater (current), noncarcinogenic hazards were calculated for all relevant pathways, in this case, Pathway 3 (groundwater ingestion), Pathway 4 (shower inhalation), and Pathway 5 (dermal contact with shower water). Hazards were calculated for the incremental concentration above background (Table V.2) and for background and total concentrations (Appendix F).

For Pathway 3 (groundwater ingestion), the overall pathway hazard was 3.7E-2, not applicable for Pathway 4, and for Pathway 5 (dermal contact with shower water), the overall pathway hazard was 1.2E-4. When combined, the overall construction worker incremental hazard (above background) from current groundwater noncarcinogenic contaminants was 3.7E-2. The primary contaminant contributing to the overall incremental hazard was cadmium. Hazards were calculated similarly for the same pathways using intakes based on background and total concentrations (Appendix F). The overall construction worker hazard from current groundwater noncarcinogenic contaminants was 9.3E-5 based solely on background. The overall construction worker hazard from current groundwater noncarcinogenic contaminants was 3.7E-2 as calculated from intakes based on total concentrations.

5.3.2.2 Current Groundwater Carcinogenic Risks - Construction Worker

Carcinogenic risks were calculated for all relevant current groundwater pathways. Pathway 4 (inhalation of volatiles from shower water) was the only applicable pathway for the one carcinogenic organic chemical in current groundwater. Risks were calculated for the incremental concentration above background (Table V.2) and for background and total concentrations (Appendix F).

For the single carcinogenic current groundwater contaminant (1,1-dichloroethene), the potential risk due to exposure to a construction worker for Pathway 4 (inhalation of shower volatile contaminants) overall was 9.9E-8 and represents the overall incremental risks (above background) for current groundwater carcinogens. Risks were calculated similarly for the same pathways using intakes based on background and total concentrations (Appendix F). The overall construction worker risk from current groundwater carcinogenic contaminants was zero based solely on background. The overall construction worker risk from carcinogenic current groundwater contaminants was 9.9E-8 as calculated from intakes based on total concentrations.

5.3.2.3 Current Groundwater Radionuclide Risks - Construction Worker

For radionuclides, the potential risk to the construction worker for Pathway 3 (groundwater ingestion) was 2.1E-6, for Pathway 4 (shower inhalation) was 1.4E-9 (based solely on tritium), and for Pathway 5 (dermal contact with shower water), was 5.2E-10 (based solely on tritium). When combined, the overall construction worker incremental risk (above background) from current groundwater radionuclides was 2.1E-6. Risks were calculated similarly for the same pathways using intakes based on current groundwater background and total radionuclide concentrations (Appendix F). The overall construction worker risk from current groundwater radionuclides was 2.9E-7 based solely on background. The overall construction worker risk from current groundwater radionuclides was 2.4E-6 as calculated from intakes based on total concentrations. Note that the total, background, and incremental risks presented here may not add up exactly due to rounding of the numbers.

5.3.3 Future Groundwater Residual Risk Evaluation - Construction Worker

5.3.3.1 Future Groundwater Noncarcinogenic Hazards - Construction Worker

For groundwater (future), noncarcinogenic hazards were calculated for all relevant pathways, in this case, Pathway 3 (groundwater ingestion), Pathway 4 (shower inhalation), and Pathway 5 (dermal contact with shower water). Hazards were calculated for the incremental concentration above background (Table V.3) and for background and total concentrations (Appendix F).

For Pathway 3 (groundwater ingestion), the overall pathway hazard was 1.0 (due primarily to chromium) not applicable for Pathway 4, and for Pathway 5 (dermal contact with shower water), the overall pathway hazard was 6.5E-3. When combined, the overall construction worker incremental hazard (above background) from future groundwater noncarcinogenic contaminants was 1.0. Hazards were calculated similarly for the same pathways using intakes based on background and total concentrations (Appendix F). The overall construction worker hazard from future groundwater noncarcinogenic contaminants was 2.3E-2 based solely on background. The overall construction worker hazard from future groundwater noncarcinogenic contaminants was 1.0 as calculated from intakes based on total concentrations.

5.3.3.2 Future Groundwater Carcinogenic Risks - Construction Worker

Carcinogenic risks were calculated for all relevant future groundwater pathways. Pathway 3 (groundwater ingestion), Pathway 4 (inhalation of volatiles from shower water), and Pathway 5 (dermal contact with shower water) were the applicable pathways. Risks were calculated for the incremental concentration above background (Table V.3) and for background and total concentrations (Appendix F).

For future groundwater contaminants, the potential risk to a construction worker for Pathway 3 (ingestion of groundwater) was 3.0E-7 (due to beryllium), for Pathway 4 (inhalation of shower volatiles) was 9.9E-8 (due to 1,1-dichloroethene), and for Pathway 5 (dermal exposure to shower water) was 9.7E-10 (due to beryllium). The overall incremental risk (above background) for future groundwater carcinogens was 4.0E-7. Risks were calculated similarly for the same pathways using intakes based on background and total concentrations (Appendix F). The overall construction worker risk from future groundwater carcinogenic contaminants was zero based solely on background. The overall construction worker risk from carcinogenic future groundwater contaminants was 4.0E-7 as calculated from intakes based on total concentrations.

5.3.3.3 Future Groundwater Radionuclide Risks - Construction Worker

For radionuclides, the potential risk to the construction worker exposed to future groundwater from Pathway 3 (groundwater ingestion) was 2.4E-6, from Pathway 4 (shower inhalation) was 5.0E-9 (based solely on tritium), and from Pathway 5 (dermal contact with shower water), was 1.9E-9 (based solely on tritium). Combined together, the overall construction worker incremental risk (above background) from future groundwater radionuclides was 2.4E-6. Risks were calculated similarly for the same pathways using intakes based on future groundwater background and total radionuclide concentrations (Appendix F). The overall construction worker risk from future groundwater radionuclides was 2.8E-7 based solely on background. The overall construction worker risk from future groundwater radionuclides was 2.7E-6 as calculated from intakes based on total concentrations. Note that the total, background, and incremental risks presented here may not add up exactly due to rounding of the numbers.

5.3.4 Summary of Hazards and Risks for the Construction Worker

Overall hazards across all pathways for soil + current groundwater, and for soil + future groundwater, were summed to provide comprehensive Hazard Indices based on the incremental exposures above background to construction workers potentially working at Release Block H (Table V.7). Separate indices were calculated for noncarcinogenic systemic effects to the hepatic system, the kidney and related systems, and other effects, for example skin problems. Similar comprehensive Hazard Indices were also developed based on background and total exposures (Tables V.8 and V.9).

The Hazard Indices for construction workers based on incremental exposures and effects to the liver, the kidney, and to other systems for soil + current groundwater were, 3.2E-3, 3.7E-2, and 3.7E-2, respectively, and for soil + future groundwater were 3.9E-3, 1.0, and 3.7E-2, respectively. The Hazard Indices based on background exposures and effects to the liver, the kidney, and to other systems for soil + current groundwater were, 9.3E-5, 0.0, and 1.3E-1, respectively, and for soil + future groundwater were 9.3E-5, 2.3E-1, and 1.3E-1, respectively. The Hazard Indices based on total exposures and effects to the liver, the kidney, and to other systems for soil + current groundwater were, 3.3E-3, 3.7E-2, and 1.7E-1, respectively, and for soil + future groundwater were 4.0E-3, 1.0, and 1.7E-1, respectively. The primary difference between current and future groundwater hazards was due to the potential presence of chromium in the future groundwater. The background hazards calculated for the current and future scenarios are slightly different since additional compounds are present in groundwater in the future. If positive background concentrations have been measured for those additional compounds, they would be added to the current background concentrations. Hence, differences in the hazards between the current and future scenarios would result.

Overall risks from carcinogenic and radionuclide contaminants across all pathways for soil + current groundwater, and for soil + future groundwater, were summed to provide an overall risk based on the incremental exposures above background to construction workers potentially working at Release Block H (Table V.7). Overall risks were also developed based on background and total exposures (Tables V.8 and V.9). The risks based on incremental exposures were 2.2E-5 for soil + current groundwater and the 2.3E-5 for soil + future groundwater. The risks based on background exposures were 4.6E-5 for soil + current groundwater and the same for soil + future groundwater. The risks based on total exposures were 6.8E-5 for soil + current groundwater and 6.9E-5 for soil + future groundwater.

The hazards to which a construction worker may be exposed arise primarily (67%) from background contributions. The non-radionuclide risk derives primarily (75%) from background contributions, and the radiological risk derives primarily (81%) from incremental contributions.

The hypothetical construction worker would potentially be exposed to several soil and BVA groundwater contaminants that collectively may pose a current incremental hazard above background of 0.077, which is less than the maximum desired Hazard Index of 1.0. Much of the potential hazard would be caused by daily ingestion of groundwater containing cadmium and soil containing arsenic. In the future, the construction worker would be exposed to an incremental hazard above background, from soil and BVA groundwater, of 1.1. Most of the hazard is due to chromium that was inadvertently released by the Mound facility and entered the bedrock aquifer, which then entered the BVA groundwater that is supplied to Release Block H. Long term exposure to this groundwater is likely to be less than assumed here as the hazards were calculated using only the highest concentrations of chromium detected in groundwater. The chromium is believed to have resulted from its use at the site for corrosion control in water systems.

The construction worker would also potentially be exposed to several soil and BVA groundwater organic, inorganic, and radionuclide carcinogenic contaminants both now and in the future. For current or future conditions, the overall incremental risks above background would be about 2.25E-5 or approximately two chances in 100,000 of cancer occurring in an exposed worker. Much of the risk from soil to the construction worker is due to ingesting soil containing arsenic.

The main contributors of risk from groundwater were several radionuclides in BVA groundwater. Virtually all contaminants contributing the most to risks and hazards were based on maximum concentrations, rather than an average, due to the limited available data. Based on the RREM, this conservative assumption of maximum concentrations applies to daily exposures occurring over 5 years. This would tend to overestimate hazards and risks.

Several soil contaminants detected in Release Block H are polynuclear aromatic hydrocarbons (PAHs) that are associated with parking lot runoff. These compounds would not be associated with Mound mission activities. A more detailed examination of parking lot runoff contamination is presented in Appendix I.

5.4 SITE EMPLOYEE RESIDUAL RISK EVALUATION

5.4.1 Soil Residual Risk Evaluation - Site Employee

5.4.1.1 Noncarcinogenic Hazards - Site Employee

For soil, noncarcinogenic hazards were calculated for the only (for site employees) pathway with adequate toxicity values, Pathway 6 (incidental ingestion of soil). Pathway 2 (inhalation of soil/dust) could not be evaluated due to an absence of toxicity values. Hazards were calculated for the incremental concentration above background (Table V.4) and for background and total concentrations (Appendix F).

For Pathway 6 (incidental ingestion of soil), the overall pathway hazard was 4.0E-3 (primarily due to arsenic). Since only one pathway was considered, site employee incremental hazard (above background) from soil noncarcinogenic contaminants was the same value, 4.0E-3. Hazards were calculated similarly for the same pathway using intakes based on background and total concentrations (Appendix F). The site employee hazard from soil noncarcinogenic contaminants was 1.4E-2 based solely on background. The site employee hazard from soil noncarcinogenic contaminants was 1.8E-2 as calculated from intakes based on total concentrations.

5.4.1.2 Soil Carcinogenic Risks Site Employee

Carcinogenic risk was calculated for the only relevant pathway for site employees with adequate toxicity values, Pathway 6 (incidental ingestion of soil). Pathway 2 (inhalation of soil/dust) carcinogenic risks could not be evaluated due to an absence of appropriate toxicity values. The risk from Pathway 6 (incidental ingestion of soil) was calculated for the incremental concentration above background (Table V.4) and for background and total concentrations (Appendix F).

For the carcinogenic soil contaminants, the potential risk due to exposure of carcinogens to a site employee for Pathway 6 (incidental ingestion of soil) overall was 7.5E-06 (attributed to arsenic and benzo(a)pyrene). As there was only one relevant pathway, this represents the overall incremental risk above background. Risks were calculated similarly for the same pathway using intakes based on background and total concentrations (Appendix F). The overall site employee risk from soil carcinogenic contaminants was 2.3E-05 based solely on background. The overall site employee risk from carcinogenic soil contaminants was 3.0E-05 as calculated from intakes based on total concentrations.

5.4.1.3 Soil Radionuclide Risks - Site Employee

For radionuclides, the potential risk to the site employee for Pathway 2 (inhalation of dust) was 9.6E-10, for Pathway 6 (incidental ingestion of soil) was 1.3E-07, and for Pathway 7 (external radiation) was 5.2E-06. The combined incremental risks (above background) across all pathways and all radionuclides was 5.3E-06 based on cesium-137 and plutonium-238 (Table V.4). Risks were calculated similarly for the same pathways using intakes based on background and total radionuclide concentrations (Appendix F). The overall site employee risk from soil radionuclides was 1.5E-06 based solely on background. The overall site employee risk from soil radionuclides was 6.8E-06 as calculated from intakes based on total concentrations.

5.4.2 Current Groundwater Residual Risk Evaluation - Site Employee

5.4.2.1 Current Groundwater Noncarcinogenic Hazards - Site Employee

For groundwater (current), noncarcinogenic hazards were calculated for the only relevant pathway to which the site employee would be exposed, Pathway 3 (groundwater ingestion). Hazards were calculated for the incremental concentration above background (Table V.5) and for background and total concentrations (Appendix F) for this pathway.

For Pathway 3 (groundwater ingestion), the overall pathway hazard was 3.7E-2 (primarily due to cadmium). This also represents the overall hazard from noncarcinogens to a site employee based on current groundwater exposures. Hazards were calculated similarly for the same pathway using intakes based on background and total concentrations (Appendix F). The overall site employee hazard from current groundwater noncarcinogenic contaminants was 7.3E-5 based solely on background. The overall site employee hazard from current groundwater noncarcinogenic contaminants was 3.7E-2 as calculated from intakes based on total concentrations.

5.4.2.2 Current Groundwater Carcinogenic Risks - Site Employee

No current groundwater non-radionuclide carcinogenic contaminants have toxicity data available. Therefore, no risks were calculated for the incremental concentration above background (Table V.5), nor for background or total concentrations (Appendix F).

5.4.2.3 Current Groundwater Radionuclide Risks - Site Employee

For radionuclides, the potential risk to the site employee for Pathway 3 (groundwater ingestion) was 1.1E-5. As this is the only relevant pathway for current groundwater radionuclides and the site

employee, the site employee incremental risk (above background) from current groundwater radionuclides was also 1.1E-5. Risks were calculated similarly for the same pathways using intakes based on current groundwater background and total radionuclide concentrations (Appendix F). The overall site employee risk from current groundwater radionuclides was 1.4E-6 based solely on background. The overall site employee risk from current groundwater radionuclides was 1.2E-5 as calculated from intakes based on total concentrations. Note that the total, background, and incremental risks presented here may not add up exactly due to rounding of the numbers.

5.4.3 Future Groundwater Residual Risk Evaluation - Site Employee

5.4.3.1 Future Groundwater Noncarcinogenic Hazards - Site Employee

For groundwater (future), noncarcinogenic hazards were calculated for the only relevant pathway, Pathway 3 (groundwater ingestion). Hazards were calculated for the incremental concentration above background (Table V.6) and for background and total concentrations (Appendix F).

For Pathway 3 (groundwater ingestion), the overall pathway hazard was 1.0 (primarily due to chromium) and represents the overall site employee incremental hazard (above background) from future groundwater noncarcinogenic contaminants. Hazards were calculated similarly for the same pathway using intakes based on background and total concentrations (Appendix F). The overall site employee hazard from future groundwater noncarcinogenic contaminants was 2.3E-2 based solely on background.

5.4.3.2 Future Groundwater Carcinogenic Risks - Site Employee

For groundwater (future), carcinogenic risks were calculated for the only relevant pathway, Pathway 3 (groundwater ingestion). Risks were calculated for the incremental concentration above background (Table V.6) and for background and total concentrations (Appendix F).

For future groundwater contaminants, the potential risk to a site employee for Pathway 3 (ingestion of groundwater) was 1.5E-6 (due to beryllium), which also represents the overall incremental risk (above background) to a site employee from future groundwater carcinogens. Risks were calculated similarly for the same pathways using intakes based on background and total concentrations (Appendix F). The overall site employee risk from future groundwater carcinogenic contaminants was zero based solely on background. The overall construction worker risk from carcinogenic future groundwater contaminants was 1.5E-6 as calculated from intakes based on total concentrations.

5.4.3.3 Future Groundwater Radionuclide Risks - Site Employee

For radionuclides, the potential risk to the site employee exposed to future groundwater from Pathway 3 (groundwater ingestion) was 1.2E-5, which also represents the overall incremental risk (above background) from future groundwater radionuclides. Risks were calculated similarly for the same pathway using intakes based on future groundwater background and total radionuclide concentrations (Appendix F). The overall site employee risk from future groundwater radionuclides was 1.4E-6 based solely on background. The overall construction worker risk from future groundwater radionuclides was 1.3E-5 as calculated from intakes based on total concentrations. Note that the total, background, and incremental risks presented here may not add up exactly due to rounding of the numbers.

5.4.4 Summary of Hazards and Risks for the Site Employee

Overall hazards across all pathways for soil + current groundwater, and for soil + future groundwater, were summed to provide comprehensive Hazard Indices based on the incremental exposures above background to site employees potentially working at Release Block H (Table V.7). Separate indices were calculated for noncarcinogenic systemic effects to the hepatic system, the kidney and related

systems, and other effects, for example skin problems. Similar comprehensive Hazard Indices were also developed based on background and total exposures (Tables V.8 and V.9).

The Hazard Indices for site employees based on incremental exposures and effects to the liver, the kidney, and to other systems for soil + current groundwater were, 2.8E-4, 3.7E-2, and 3.8E-3, respectively, and for soil + future groundwater were 7.9E-4, 1.0, and 4.0E-3, respectively. The Hazard Indices based on background exposures and effects to the liver, the kidney, and to other systems for soil + current groundwater were 7.3E-5, 0.0, and 1.4E-2, respectively, and for soil + future groundwater were 7.3E-5, 2.3E-2, and 1.4E-2, respectively. The Hazard Indices based on total exposures and effects to the liver, the kidney, and to other systems for soil + current groundwater were 3.6E-4, 3.7E-2, and 1.8E-2, respectively, and for soil + future groundwater were 8.7E-4, 1.0, and 1.8E-2, respectively. The primary difference between current and future groundwater hazards was due to the potential presence of chromium in the future groundwater. The background hazards calculated for the current and future scenarios are slightly different since additional compounds are present in groundwater in the future. If positive background concentrations have been measured for those additional compounds, they would be added to the current background concentrations. Hence, differences in the hazards between the current and future scenarios would result.

Overall risks from carcinogenic and radionuclide contaminants across all pathways for soil + current groundwater, and for soil + future groundwater, were summed to provide an overall risk based on the incremental exposures above background to site employees potentially working at Release Block H (Table V.7). Overall risks were also developed based on background and total exposures (Tables V.8 and V.9). The risks based on incremental exposures were 2.3E-05 for soil + current groundwater and 2.6E-05 for soil + future groundwater. The risks based on background exposures were 2.5E-05 for soil + current groundwater and the same for soil + future groundwater. The risks based on total exposures were 4.9E-05 for soil + current groundwater and 5.2E-05 for soil + future groundwater.

The total hazards to which a site employee may be exposed arise primarily (75% to essentially 100%) from the incremental contribution of Release Block H. The nonradionuclide carcinogenic risks arise primarily (72-77%) from background contributions, and the radionuclide risks arise primarily (84-85%) from incremental contributions.

The hypothetical site employee would currently be potentially exposed to several soil and BVA groundwater contaminants that collectively may pose a very small incremental hazard above background of 0.041, which is much less than the maximum desired Hazard Index of 1.0. Most of the potential hazard would be caused by daily consumption of BVA groundwater containing cadmium with the remaining attributed to arsenic in the soil. In the future, the site employee would be exposed to an incremental hazard above background, from soil and BVA groundwater, of 1.0. Most of the hazard is due to chromium that was inadvertently released by the Mound facility and entered the bedrock aquifer, which then entered the BVA groundwater that is supplied to Release Block H. Long term exposure to this groundwater is likely to be less than assumed here as the hazards were calculated using only the highest concentrations of chromium detected in groundwater. The chromium is believed to have been used at the site for corrosion control in water systems.

The site employee would also potentially be exposed to several soil and BVA groundwater organic, inorganic, and radionuclide carcinogenic contaminants both now and in the future. For current or future conditions, the overall incremental risks above background would be 2.3 to 2.6E-5 or about two chances in 100,000 of cancer occurring in an exposed site employee. The risks based on soil exposures to the site employee are lower than for the construction worker because the construction worker is assumed to ingest nearly 10 times the soil each day than a site employee, although the site employee remains working at the site for 25 years, as opposed to 5 years for the construction worker.

The main contributors of risk from groundwater were several radionuclides in BVA groundwater. Virtually all contaminants contributing the most to risks and hazards were based on maximum concentrations, rather than an average, due to the limited available data. Based on the RREM, this

conservative assumption of maximum concentrations applies to daily exposures occurring over 25 years. This would tend to overestimate hazards and risks.

Several soil contaminants detected in Release Block H are polynuclear aromatic hydrocarbons (PAHs) that are associated with parking lot runoff. These compounds would not be associated with Mound mission activities. A more detailed examination of parking lot runoff contamination is presented in Appendix I.

5.5 EVALUATION OF POTENTIAL CUMULATIVE EXPOSURE - AIR

Potential exposure to contaminants originating from outside Release Block H that may reach a receptor at the release block are termed potential cumulative exposures. Potential cumulative exposures may come from groundwater (dealt with previously), air, or surface water. No surface water is present at or near Release Block H so only airborne emissions pose an additional potential exposure to exposures quantified already.

Airborne contaminant concentrations were measured at the Mound Facility in 1994 during various site restoration activities (DOE, 1994). Both radiological and nonradiological data were collected. It is assumed that the measured concentrations would represent an upper-bound air concentration. These data are shown in Table V.10. Risks due to inhalation of the radionuclides by construction workers and site employees were calculated (Table V.10).

The calculated risks attributable to the potential upper-bound exposure of airborne contaminants would total 2E-7 (or 2 chances in 10,000,000 of contracting cancer) for the construction worker and 9.8E-7 (or about one chance in a million of contracting cancer) for the site employee. Note that the potential exposures are based on the assumption of long-term consumption of this upper-bound concentration that was measured during site restoration activities.

5.6 UNCERTAINTIES ASSOCIATED WITH THE RELEASE BLOCK H RRE

Uncertainties are inherent in the risk assessment process. In addition to the use of many conservative assumptions and approximations, the identification and analysis of environmental conditions is difficult and inexact. A number of assumptions and interpretations were made during the preparation of this RRE which lead to some degree of uncertainty in the results. By understanding the inherent uncertainties in the assumptions and interpretations, the potential for overestimation or underestimation of potential Release Block H risks can be ascertained.

5.6.1 Uncertainties Associated with Release Block H Analytical Data

Many of the Release block H samples represent sporadic coverage of the site or focused on an isolated location. In this RRE, the long-term exposure concentrations were assumed to be equivalent to the maximum concentration detected for most constituents. As a result, it is likely that a bias to overestimate potential exposure has occurred. It is also possible that contaminated areas of Release Block H were not sampled, but this is considered unlikely given the well-known past uses of this portion of the Mound Facility.

5.6.2 Uncertainties Associated with Toxicological Data

Toxicity data were obtained from U.S. EPA sources. Carcinogens were assumed to be human carcinogens regardless of EPA's weight-of-evidence classification (i.e., risk associated with EPA Group C carcinogens [insufficient human evidence of carcinogenicity] were weighted equally with Group A carcinogens [sufficient human evidence of carcinogenicity]). EPA develops slope factors (SFs) as the upper 95% confidence limit SFs of the range of possible SFs and are based on the linearized multistage

(LMS) dose-response model, which is used to define the expected potency of a carcinogen. Animal data selected for use in this model are often obtained from the most sensitive species tested, and uses the study that gave the most severe results (if more than one study were available). These data are then scaled to potential human doses assuming that humans are even more sensitive than the most sensitive animal species. The estimate of potency incorporates conservative assumptions designed not to underestimate risks. Therefore, use of the EPA slope factors likely overestimates the risks associated with exposure to a particular chemical.

Dermal reference doses and slope factors are not available. The oral reference dose or slope factors were used for dermal pathway analysis. This likely overestimates risk but is consistent with recent DOE procedures and decisions (HAZWRAP, DOE, 1995). Currently no pertinent regional or Ohio EPA guidance exists on the subject of dermal reference doses. Since very few of the required data are available to accomplish the revision of oral toxicity factors for use with dermal equations, the dermal risks may be underestimated or overestimated for some compounds.

To calculate potential noncarcinogenic health effects, this RRE used EPA-established route-specific RfDs. RfDs are generally derived by EPA using a No Observed Effect Level (NOEL) or a No Observed Adverse Effect Level (NOAEL), often obtained from animal studies. The extrapolation from animals to humans, and the use of specific uncertainty factors and modifying factors, produces an RfD that is conservative.

Overall, the uncertainty associated with the toxicological data leads to a conservative bias. Several contaminants have demonstrated toxicity to laboratory animals, but no toxicity values have been developed for use here. Similarly, other contaminants have had their toxicity values withdrawn by EPA for further review. For these contaminants, the previous data were used, which may be either over conservative or under conservative, pending the EPA review.

5.6.3 Uncertainties Associated with Infrequently Detected Compounds

Numerous groundwater constituents were included in the RRE that had only one detection and usually one or more non-detected value. The actual presence of these constituents is uncertain. The risks and HQs calculated for these constituents are based on the assumption that construction workers and site employees would be exposed to the detected concentration of each chemical for 5 to 25 years. This likely overestimates the groundwater risks to the construction worker and site employee both currently and in the future. Conversely, elimination of compounds with a frequency of detection less than 5% may tend to underestimate potential risks. Due to the possible biased sampling that may have occurred, contaminants may be removed from further consideration despite the potential presence of localized contamination.

5.6.4 Uncertainties Associated with Future Groundwater Concentrations

Bedrock aquifer groundwater contamination was assumed to enter the BVA and move without mixing, through the BVA to active production wells. This likely overestimates the future groundwater contamination to which the construction worker and site employee will be exposed for 5 to 25 years. Additionally, the maximum concentrations detected in the various portions of the bedrock aquifer were assumed to be representative of long-term contamination entering the BVA groundwater. This assumption would tend to over conservatively estimate the calculated hazards and risks associated with future groundwater concentrations

5.6.5 Uncertainties Associated with Soil Contamination

The use of Guideline Values determines which soil contaminants are considered to be Mound related. This may underestimate overall risks due to the fact that several chemicals may cause exposure above background but below the Guideline Values and collectively these compounds may pose an additional uncounted risk.

Most contaminants were examined by using maximum soil concentrations. This may tend to overestimate risks as maximum values are poor estimates of overall site contamination.

Many soil sampling events collected samples in a biased manner with the deliberate intent of identifying areas of contamination. These biased samples do not represent actual contaminant distributions in areas outside of the sampled area. To do so may result in overestimation of risks as uncontaminated areas would then be assumed to be contaminated to the same degree as known areas of contamination. Additionally, relatively few samples were available for Release Block H since most of Release Block H is an asphalt covered parking lot and therefore systematic sampling has not been performed. This may result in an under-estimation or over-estimation of risks to Release Block H.

5.6.6 Uncertainties Associated with Exposure Estimates

The RREM presents exposure and intake calculations based on EPA procedures that were used in this Release Block H RRE. Parameter values for calculating exposure were developed by EPA with a conservative bias. For example, it is assumed that a worker at the site is exposed to upper-bound contaminant concentrations during every work day for 5 to 25 years, for the construction worker or site employee, respectively. An additional example of potential uncertainty is the assumption that all individuals within a particular receptor group will receive the same dose. Biological variability in absorption, ingestion rates, breathing rates, and exposure frequency and duration will exist, even in narrowly defined age group or sensitive population group. On the basis of this information, uncertainties for the intakes used in this RRE likely have a bias toward over conservatism. Conversely, consideration of only construction workers and site employees may underestimate or overestimate risks if future land use does not conform to these scenarios.

Some minor pathways may be excluded in this analysis. For instance, trespassing is not assumed to occur in Release Block H. This may lead to some underestimation of potential incremental risks attributable to the Mound facility. Additionally, any potential offsite pathways are not addressed, based on the RREM. This may underestimate potential risks should any offsite migration be occurring.

5.6.7 Uncertainties Associated with Risk Characterization

To estimate hypothetical future noncarcinogenic health effects, the EPA-established RfDs were compared with the calculated exposure or intake for each contaminant for each pathway. Because conservative assumptions were used by EPA in developing RfDs, it is not expected that noncarcinogenic effects will be underestimated in this RRE, and in fact, are likely overestimated.

The extent of chemical and biological interaction of chemicals is another site-specific factor that may introduce uncertainty. The Hazard Index approach used in this RRE to evaluate the potential for adverse noncarcinogenic effects posed by exposure to multiple chemicals adds individual hazard quotients for each chemical together. When the HI exceeds 1.0, there may be concern that adverse health effects could occur from the predicted exposures. It is possible that the HI can exceed 1.0 even if no single chemical exceeds its acceptable level. Therefore, the HI approach assumes that an adverse effect could occur as a result of multiple exposures below threshold levels. In this RRE, the HIs were summed without consideration of specific toxic effects, target organs, and mechanisms of action. Thus, the potential for adverse noncarcinogenic effects is likely overestimated.

Hypothetical cancer risks were calculated by multiplying the chemical-specific route-specific SF by the calculated dose for each exposure pathway. Similar to the HI calculations conducted for noncarcinogens, the predicted health risks were summed across chemicals and pathways, without regard to specific toxic effects, target organs, and mechanisms of action. Thus, the potential for adverse carcinogenic effects is likely overestimated. Overall, there is significant potential for overestimation of potential health risks at Release Block H and a low potential for underestimation of potential health risks.

5.6.8 Uncertainties Associated with Chromium in Groundwater

To calculate potential risks due to exposure to chromium (based on Hazard Indices), an assumption was made that 100% of the chromium was the more toxic Cr+6, rather than the less toxic Cr+3. As shown in Appendix H, this may overestimate the potential Hazard Indices by about a factor of six-fold, depending on the exact ratio of Cr+3 and Cr+6 assumed to make up the total chromium detected at the Mound site.

5.6.9 Uncertainties Associated with Non-Mound Related or Mis-identified Contaminants Detected in Soil

Several polynuclear aromatic hydrocarbons (PAHs) were detected in the Release Block H soil that are commonly associated with parking lot runoff and residue from asphalt. These compounds would not have been associated with Mound mission activities. A summary of available literature is presented in Appendix I. Several pesticides or their degradation by-products were also detected in soil that would not have been associated with Mound mission activities. It is unlikely that either the PAHs or the pesticides would be widely spread across Release Block H. However, it was assumed that they were, which may tend to over estimate risks associated with Release Block H.

Potassium-40 (K-40) and plutonium-242 (Pu-242) were identified in soils. However, the K-40 is naturally occurring and unrelated to any Mound activities. The Pu-238 that was used at Mound contains 0.1% by weight Pu-242. This 0.1% weight ratio of Pu-242 to Pu-238 corresponds to an activity difference of 0.28×10^{-6} pCi/g of Pu-242 for every 1 pCi/g of Pu-238. Thus, the measured activity of Pu-242 should be approximately 1 million times less than the activities of Pu-238 identified in Release Block H. These values of Pu-242 are less than the detection limits of the laboratory equipment, therefore it is unlikely to have been correctly identified.

5.6.10 Uncertainties Associated with the Use of Unfiltered Samples

Some of the radionuclide and metallic contaminants detected in groundwater are not expected to be found in groundwater due to their insolubility. Compounds that are essentially insoluble and are present in groundwater are generally bound-up in particulate or colloidal components within the groundwater. The conservative approach used here did not use filtered samples, but rather total (dissolved plus particulate-bound) sample results, although both dissolved and particulate-bound results were available. The conservative nature of the use of total sample results is compounded by the fact that groundwater actually used for consumption passes through some treatment that effectively removes solids from the water. The assumption that total radionuclide and metal concentrations represent the groundwater actually consumed, likely overestimates potential health risks.

Table V.1. Characterization of Residual Risks at Release Block H - Construction Worker (Soil Pathways - Incremental)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker		
Non-carcinogens (HQ)											
Aldrin (1)	NA	***	NA	NA	NA	4.9E-04	NA	1.0E-04			
alpha-Chlordane (1)	NA	***	NA	NA	NA	7.8E-04	NA	1.6E-04			
gamma-Chlordane (1)	NA	***	NA	NA	NA	5.8E-04	NA	1.2E-04			
Heptachlor Epoxide (1)	NA	***	NA	NA	NA	7.9E-04	NA	1.7E-04			
Acenaphthene (3)	NA	***	NA	NA	NA	1.4E-05	NA	2.9E-06			
Arsenic (3)	NA	***	NA	NA	NA	3.6E-02	NA	7.5E-04			
Fluorene (3)	NA	***	NA	NA	NA	1.7E-04	NA	3.5E-05			
Naphthalene (3)	NA	***	NA	NA	NA	2.5E-07	NA	5.1E-08			
1,1,2-Trichloro-1,2,2-trifluoroethane (3)	NA	***	NA	NA	NA	3.1E-10	NA	6.5E-11			
Acenaphthylene	NA	***	NA	NA	NA	***	NA	***			
delta-BHC	NA	***	NA	NA	NA	***	NA	***			
Bismuth	NA	***	NA	NA	NA	***	NA	***			
4-Chloro-3-methylphenol	NA	***	NA	NA	NA	***	NA	***			
Copper	NA	***	NA	NA	NA	***	NA	***			
Dibenzofuran	NA	***	NA	NA	NA	***	NA	***			
Lithium	NA	***	NA	NA	NA	***	NA	***			
2-Methylnaphthalene	NA	***	NA	NA	NA	***	NA	***			
Phenanthrene	NA	***	NA	NA	NA	***	NA	***	Total HI (1) 3.2E-03	Total HI (2) 0	Total HI (3) 3.7E-02
Carcinogens (Risk)											
Aldrin	NA	***	NA	NA	NA	1.8E-08	NA	3.7E-09			
Arsenic	NA	***	NA	NA	NA	1.2E-05	NA	2.4E-07			
Benzo(a)pyrene	NA	***	NA	NA	NA	2.7E-06	NA	5.7E-07			
Benzo(g,h,i)perylene	NA	***	NA	NA	NA	***	NA	***			
Carbazole	NA	***	NA	NA	NA	***	NA	***			
alpha-Chlordane	NA	***	NA	NA	NA	4.4E-09	NA	9.1E-10			
gamma-Chlordane	NA	***	NA	NA	NA	3.2E-09	NA	6.7E-10			
Dibenzo(a,h)anthracene	NA	***	NA	NA	NA	***	NA	***			
Heptachlor Epoxide	NA	***	NA	NA	NA	6.7E-09	NA	1.4E-09	Total Carcinogenic Risks = 1.5E-05		
Lead	NA	***	NA	NA	NA	***	NA	***			
Total:						1.4E-05		8.2E-07			
Radionuclides (Risk)											
Cesium-137 (pCi)	NA	1.6E-13	NA	NA	NA	2.8E-08	4.7E-06	NA			
Plutonium-238 (pCi)	NA	1.8E-10	NA	NA	NA	2.0E-07	3.2E-11	NA			
Plutonium-242 (pCi)	NA	***	NA	NA	NA	***	***	NA	Total Radionuclide Risks = 4.9E-06		
Potassium-40 (pCi)	NA	***	NA	NA	NA	***	***	NA			
Total:		1.8E-10				2.3E-07	4.7E-06				

*** - Toxicity values not available.
NA - Not applicable.

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table V.2. Characterization of Residual Risks at Release Block H - Construction Worker (Groundwater - Current - Incremental)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker		
Non-carcinogens (HQ)											
1,1-Dichloroethene (1)	NA	NA	1.8E-06	NA	3.6E-07	NA	NA	NA			
1,1,1-Trichloroethane (1)	NA	NA	1.3E-07	***	3.7E-08	NA	NA	NA			
Cadmium (2)	NA	NA	3.7E-02	NA	1.2E-04	NA	NA	NA			
1,1,2-Trichloro-1,2,2-trifluoroethane (3)	NA	NA	2.8E-06	***	NAv	NA	NA	NA			
Copper	NA	NA	***	NA	***	NA	NA	NA			
Lead	NA	NA	***	NA	***	NA	NA	NA	Total HI (1) 2.4E-06	Total HI (2) 3.7E-02	Total HI (3) 2.8E-06
Carcinogens (Risk)											
1,1-Dichloroethene	NA	NA	NA	9.9E-08	NA	NA	NA	NA	Total Carcinogenic Risks = 9.9E-08		
Total:				9.9E-08							
Radionuclides (Risk)											
Actinium-227 (pCi)	NA	NA	2.6E-07	NA	NA	NA	NA	NA			
Bismuth-210 (pCi)	NA	NA	***	NA	NA	NA	NA	NA			
Plutonium-239/240 (pCi)	NA	NA	7.5E-07	NA	NA	NA	NA	NA			
Strontium-85 (pCi)	NA	NA	***	NA	NA	NA	NA	NA	Total Radionuclide Risks = 2.1E-06		
Uranium-234 (pCi)	NA	NA	4.0E-07	NA	NA	NA	NA	NA			
Uranium-238 (pCi)	NA	NA	5.9E-07	NA	NA	NA	NA	NA			
Total:			2.1E-06	1.4E-09	5.2E-10						

*** - Toxicity values not available.
NA - Not applicable.
NAv - dermal parameters not available

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table V.3. Characterization of Residual Risks at Release Block H
Construction Worker (Groundwater - Future - Incremental)

Constituent	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Construction Worker	
Non-carcinogens (HQ)					
1,1-Dichloroethene (1)	1.8E-06	NA	3.8E-07		
1,1,1-Trichloroethane (1)	5.1E-04	***	1.4E-04		
Cadmium (2)	3.7E-02	NA	1.2E-04		
Chromium (2)	9.6E-01	NA	6.2E-03		
Molybdenum (2)	7.8E-03	NA	2.5E-05		
Beryllium (3)	2.0E-04.	NA	6.3E-07		
1,1,2-Trichloro-1,2,2-trifluoroethane (3)	2.8E-06	NAv	NAv		
Bismuth	***	NA	***		
Cobalt	***	NA	***		
Copper	***	NA	***		
Lead	***	NA	***	Total HI (1) 6.6E-04	Total HI (2) 1.0E+00
Carcinogens (Risk)					
Beryllium	3.0E-07	NA	9.7E-10	Total Carcinogenic Risks = 4.0E-07	
1,1-Dichloroethene	NA	9.9E-08	NA		
Total:	3.0E-07	9.9E-08	9.7E-10		
Radionuclides (Risk)					
Actinium-227 (pCi)	2.6E-07	NA	NA		
Bismuth-210 (pCi)	***	NA	NA		
Plutonium-239/240 (pCi)	7.6E-07	NA	NA		
Strontium-85 (pCi)	***	NA	NA		
Thorium-228 (pCi)	4.4E-07	NA	NA		
Tritium (pCi)	4.0E-07	5.0E-09	1.9E-09	Total Radionuclide Risks = 2.4E-06	
Uranium-234 (pCi)	4.0E-07	NA	NA		
Uranium-238 (pCi)	5.9E-07	NA	NA		
Total:	2.4E-06	5.0E-09	1.9E-09		

*** - Toxicity values not available.
NA - Not applicable.
NAv - Dermal parameters not available

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table V.4. Characterization of Residual Risks at Release Block H - Site Employee (Soil Pathways - Incremental)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee		
Non-carcinogens (HQ)								
Aldrin (1)	NA	***	NA	5.1E-05	NA			
alpha-Chlordane (1)	NA	***	NA	8.2E-05	NA			
gamma-Chlordane (1)	NA	***	NA	6.0E-05	NA			
Heptachlor Epoxide (1)	NA	***	NA	8.3E-05	NA			
Acenaphthene (3)	NA	***	NA	1.5E-06	NA			
Arsenic (3)	NA	***	NA	3.8E-03	NA			
Fluorene (3)	NA	***	NA	1.8E-05	NA			
Naphthalene (3)	NA	***	NA	2.6E-08	NA			
1,1,2-Trichloro-1,2,2-trifluoroethane (3)	NA	***	NA	3.3E-11	NA			
Acenaphthylene	NA	***	NA	***	NA			
delta-BHC	NA	***	NA	***	NA			
Bismuth	NA	***	NA	***	NA			
4-Chloro-3-methylphenol	NA	***	NA	***	NA			
Dibenzofuran	NA	***	NA	***	NA			
2-Methylnaphthalene	NA	***	NA	***	NA			
Phenanthrene	NA	***	NA	***	NA	Total HI (1) 2.8E-04	Total HI (2) 0	Total HI (3) 3.8E-03
Carcinogens (Risk)								
Aldrin	NA	***	NA	9.2E-09	NA			
Arsenic	NA	***	NA	6.0E-06	NA			
Benzo(a)pyrene	NA	***	NA	1.4E-06	NA			
Benzo(g,h,i)perylene	NA	***	NA	***	NA			
Carbazole	NA	***	NA	***	NA			
alpha-Chlordane	NA	***	NA	2.3E-09	NA			
gamma-Chlordane	NA	***	NA	1.7E-09	NA			
Dibenzo(a,h)anthracene	NA	***	NA	***	NA			
Heptachlor Epoxide	NA	***	NA	3.5E-09	NA	Total Carcinogenic Risks = 7.5E-06		
Lead	NA	***	NA	***	NA			
Total:		—		7.5E-06				
Radionuclides (Risk)								
Cesium-137 (pCi)	NA	8.2E-13	NA	1.5E-08	5.2E-06			
Plutonium-238 (pCi)	NA	9.6E-10	NA	1.1E-07	3.9E-11			
Plutonium-242 (pCi)	NA	***	NA	***	***			
Potassium-40 (pCi)	NA	***	NA	***	***	Total Radionuclide Risks = 5.3E-06		
Thorium-232 (pCi)	NA	***	NA	***	***			
Total:		9.6E-10		1.3E-07	5.2E-06			

*** - Toxicity values not available.
NA - Not applicable.

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table V.5. Characterization of Residual Risks at Release Block H - Site Employee (Groundwater - Current - Incremental)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee		
Non-carcinogens (HQ)								
1,1-Dichloroethene (1)	NA	NA	1.8E-06	NA	NA			
1,1,1-Trichloroethane (1)	NA	NA	1.3E-07	NA	NA			
Cadmium (2)	NA	NA	3.7E-02	NA	NA			
1,1,2-Trichloro-1,2,2-trifluoroethane (3)	NA	NA	2.8E-06	NA	NA			
Copper	NA	NA	***	NA	NA			
Lead	NA	NA	***	NA	NA	Total HI (1) 2.0E-06	Total HI (2) 3.7E-02	Total HI (3) 2.8E-06
Carcinogens (Risk)								
1,1-Dichloroethene	NA	NA	NA	NA	NA	Total Carcinogenic Risk = NA		
Radionuclides (Risk)								
Actinium-227 (pCi)	NA	NA	1.3E-06	NA	NA			
Bismuth-210 (pCi)	NA	NA	***	NA	NA			
Plutonium-239/240 (pCi)	NA	NA	3.8E-06	NA	NA			
Strontium-85 (pCi)	NA	NA	***	NA	NA	Total		
Thorium-228 (pCi)	NA	NA	2.0E-06	NA	NA	Radionuclide		
Tritium (pCi)	NA	NA	5.5E-07	NA	NA	Risk		
Total:			1.1E-05			1.1E-05		

*** - Toxicity values not available.
NA - Not applicable.

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table V.6. Characterization of Residual Risks at Release Block H
Site Employee (Groundwater - Future - Incremental)

Constituent	Pathway 3 Groundwtr. Ingestion	Site Employee		
Non-carcinogens (HQ)				
1,1-Dichloroethene (1)	1.8E-06			
1,1,1-Trichloroethane (1)	5.1E-04			
Cadmium (2)	3.7E-02			
Chromium (2)	9.6E-01			
Molybdenum (2)	7.8E-03			
Beryllium (3)	2.0E-04			
1,1,2-Trichloro-1,2,2-trifluoroethane (3)	2.8E-06			
Bismuth	---			
Cobalt	---			
Copper	---			
Lead	---	Total HI (1)	Total HI (2)	Total HI (3)
		5.2E-04	1.0E+00	2.0E-04
Carcinogens (Risk)		Total Carcinogenic		
Beryllium	1.5E-06	Risks =		
Total:	1.5E-06	1.5E-06		
Radionuclides (Risk)				
Actinium-227 (pCi)	1.3E-06			
Bismuth-210 (pCi)	---			
Plutonium-239/240 (pCi)	3.8E-06			
Strontium-85 (pCi)	---	Total		
Uranium-234 (pCi)	2.0E-06	Radionuclide		
Uranium-238 (pCi)	2.9E-06	Risks =		
Total:	1.2E-05	1.2E-05		

--- - Toxicity values not available.

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

TABLE V.7. Summary of Current and Future Incremental Risks at Release Block H - Mound Facility

		Construction Worker				
		Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future
Non-carcinogenic Hazard Index for Organics & Inorganics	(1)	3.2E-03	2.3E-06	6.5E-04	3.2E-03	3.9E-03
	(2)	0.0E+00	3.7E-02	1.0E+00	3.7E-02	1.0E+00
	(3)	3.7E-02	2.8E-06	2.0E-04	3.7E-02	3.7E-02
Carcinogenic Risks for Organics & Inorganics		1.5E-05	9.9E-08	4.0E-07	Risk = 1.5E-05	Risk = 1.6E-05
Carcinogenic Risks for Radionuclides		4.9E-06	2.1E-06	2.4E-06	Risk = 7.0E-06	Risk = 7.3E-06
			Construction Worker	(1)	3.2E-03	3.9E-03
				(2)	3.7E-02	1.0E+00
			Overall HI =	(3)	3.7E-02	3.7E-02
			Overall Risk =		2.2E-05	2.3E-05

		Site Employee				
		Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future
Non-carcinogenic Hazard Index for Organics & Inorganics	(1)	2.8E-04	1.9E-06	5.1E-04	2.8E-04	7.9E-04
	(2)	0.0E+00	3.7E-02	1.0E+00	3.7E-02	1.0E+00
	(3)	3.8E-03	2.8E-06	2.0E-04	3.8E-03	4.0E-03
Carcinogenic Risks for Organics & Inorganics		7.5E-06	NA	1.5E-06	Risk = 7.5E-06	Risk = 9.0E-06
Carcinogenic Risks for Radionuclides		5.3E-06	1.1E-05	1.2E-05	Risk = 1.6E-05	Risk = 1.7E-05
			Site Employee	(1)	2.8E-04	7.9E-04
			Overall HI =	(2)	3.7E-02	1.0E+00
				(3)	3.8E-03	4.0E-03
			Overall Risk =		2.3E-05	2.6E-05

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to Kidney
(3) Other Noncarcinogenic effects

TABLE V.8. Summary of Current and Future Background Risks at Release Block H - Mound Facility

		Construction Worker				
		Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future
Non-carcinogenic Hazard Index for for Organics & Inorganics	(1)	0.0E+00	9.3E-05	9.3E-05	9.3E-05	9.3E-05
	(2)	0.0E+00	0.0E+00	2.3E-01	0.0E+00	2.3E-01
	(3)	1.3E-01	0.0E+00	0.0E+00	1.3E-01	1.3E-01
Carcinogenic Risks for Organics & Inorganics		4.4E-05	0.0E+00	0.0E+00	Risk = 4.4E-05	Risk = 4.4E-05
Carcinogenic Risks for Radionuclides		1.4E-06	2.9E-07	2.8E-07	Risk = 1.6E-06	Risk = 1.6E-06
			Construction Worker			
			Overall HI =	(1)	9.3E-05	9.3E-05
				(2)	0.0E+00	2.3E-01
				(3)	1.3E-01	1.3E-01
			Overall Risk =		4.6E-05	4.6E-05

		Site Employee				
		Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future
Non-carcinogenic Hazard Index for Organics & Inorganics	(1)	0.0E+00	7.3E-05	7.3E-05	7.3E-05	7.3E-05
	(2)	0.0E+00	0.0E+00	2.3E-02	0.0E+00	2.3E-02
	(3)	1.4E-02	0.0E+00	0.0E+00	1.4E-02	1.4E-02
Carcinogenic Risks for Organics & Inorganics		2.3E-05	NA	0.0E+00	Risk = 2.3E-05	Risk = 2.3E-05
Carcinogenic Risks for Radionuclides		1.5E-06	1.4E-06	1.4E-06	Risk = 2.9E-06	Risk = 2.9E-06
			Site Employee			
			Overall HI	(1)	7.3E-05	7.3E-05
				(2)	0.0E+00	2.3E-02
				(3)	1.4E-02	1.4E-02
			Overall Risk		2.5E-05	2.5E-05

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

TABLE V.9. Summary of Current and Future Total Risks at Release Block H - Mound Facility

		Construction Worker				
		Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future
Non-carcinogenic Hazard Index for Organics & Inorganics	(1)	3.2E-03	9.5E-05	7.6E-04	3.3E-03	4.0E-03
	(2)	0.0E+00	3.7E-02	1.0E+00	3.7E-02	1.0E+00
	(3)	1.7E-01	2.8E-06	2.0E-04	1.7E-01	1.7E-01
Carcinogenic Risks for Organics & Inorganics		5.9E-05	9.9E-08	4.0E-07	Risk = 5.9E-05	Risk = 6.0E-05
Carcinogenic Risks for Radionuclides		6.2E-06	2.4E-06	2.7E-06	Risk = 8.6E-06	Risk = 8.9E-06

	Construction Worker		
Overall HI	(1)	3.3E-03	4.0E-03
	(2)	3.7E-02	1.0E+00
	(3)	1.7E-01	1.7E-01
Overall Risk		6.8E-05	6.9E-05

		Site Employee				
		Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future
Non-carcinogenic Hazard Index for Organics & Inorganics	(1)	2.8E-04	7.5E-05	5.9E-04	3.6E-04	8.7E-04
	(2)	0.0E+00	3.7E-02	1.0E+00	3.7E-02	1.0E+00
	(3)	1.8E-02	2.8E-06	2.0E-04	1.8E-02	1.8E-02
Carcinogenic Risks for Organics & Inorganics		3.0E-05	NA	1.5E-06	Risk = 3.0E-05	Risk = 3.2E-05
Carcinogenic Risks for Radionuclides		6.8E-06	1.2E-05	1.3E-05	Risk = 1.9E-05	Risk = 2.0E-05

	Site Employee		
Overall HI	(1)	3.6E-04	8.7E-04
	(2)	3.7E-02	1.0E+00
	(3)	1.8E-02	1.8E-02
Overall Risk		4.9E-05	5.2E-05

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table V.10. Concentration of Radionuclides in Air in 1994 (EG&G Mound Applied Technologies - Mound Site Environmental Report for Calendar Year 1994, pg. 4-15 to 4-17) MLM-3814

Radionuclide	Maximum Concentration* (μCi/mL)	Risks to** Construction Worker	Risks to** Site Employees
Tritium oxide (H-3)	7.54 ± 4.61E-12	1.8E-8	9.0E-8
Plutonium-238	259.65 ± 289.58E-18	1.75E-7	8.8E-7
Plutonium-239,240	3.50 ± 2.75E-18	2.5E-9	1.2E-8
SUM		2.0E-7	9.8E-7

* - Error limits are estimates of the standard error of the estimated means at the 95% confidence level. Values given are from the location on the site with the highest concentration (based on the average of two or more samples).

** - Calculated risks assumed that the maximum concentration shown here was the C_{air} value needed for Pathway 1 for inhalation of volatiles for construction workers and site employees. Intake equations shown in Appendix D (with appropriate units conversions).

6.0 REFERENCES

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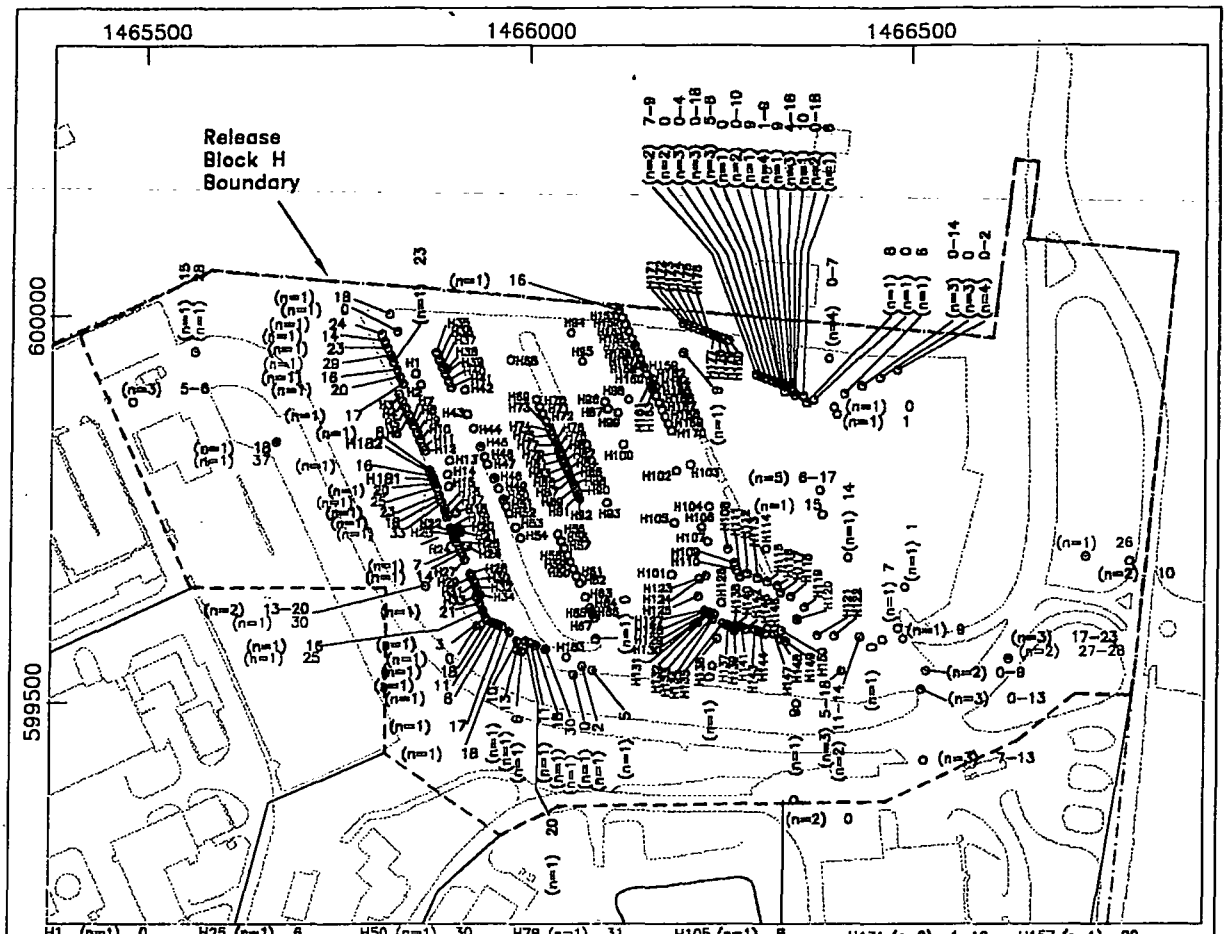
APPENDIX A

MONITORING DATA PLOTS FOR PLUTONIUM-238 AND THORIUM-232



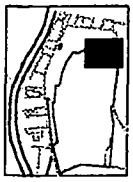
H1	(n=1)	0	H25	(n=1)	6	H50	(n=1)	30	H78	(n=1)	31	H105	(n=1)	8	H131	(n=2)	1–10	H157	(n=1)	22
H2	(n=2)	0–14	H26	(n=2)	0	H51	(n=1)	3	H79	(n=1)	6	H106	(n=11)	0–9	H132	(n=1)	0	H158	(n=1)	2
H3	(n=1)	19	H27	(n=1)	17	H52	(n=1)	11	H80	(n=1)	2	H107	(n=1)	0	H133	(n=3)	9–17	H159	(n=1)	32
H4	(n=1)	12	H28	(n=2)	4–6	H53	(n=1)	18	H81	(n=1)	12	H108	(n=3)	0–2	H134	(n=3)	0–20	H160	(n=1)	17
H5	(n=1)	21	H29	(n=1)	16	H54	(n=1)	14	H82	(n=2)	8–13	H109	(n=7)	0–8	H135	(n=1)	19	H161	(n=1)	23
H6	(n=1)	12	H30	(n=1)	16	H55	(n=1)	14	H83	(n=1)	8	H110	(n=1)	1	H136	(n=1)	10	H162	(n=4)	1–7
H7	(n=1)	16	H31	(n=1)	13	H56	(n=1)	5	H84	(n=2)	4–13	H111	(n=1)	4	H137	(n=1)	35	H163	(n=1)	28
H8	(n=1)	18	H32	(n=1)	22	H57	(n=1)	1	H85	(n=1)	24	H112	(n=1)	7	H138	(n=1)	8	H164	(n=1)	5
H9	(n=1)	27		(n=1)	44	H58	(n=1)	9	H86	(n=1)	7	H113	(n=1)	14	H139	(n=7)	0–12	H165	(n=1)	5
H10	(n=1)	12	H33	(n=1)	12	H59	(n=1)	6	H87	(n=1)	21	H114	(n=1)	10	H140	(n=1)	6	H166	(n=1)	18
H11	(n=1)	10	H34	(n=1)	13	H60	(n=1)	14	H88	(n=1)	31	H115	(n=1)	2	H141	(n=1)	39	H167	(n=1)	14
H12	(n=1)	20		(n=1)	37	H61	(n=1)	16	H89	(n=1)	0	H116	(n=1)	9	H142	(n=1)	9	H168	(n=1)	5
H13	(n=1)	18	H35	(n=1)	16	H62	(n=1)	12	H90	(n=2)	0	H117	(n=1)	4		(n=2)	4–11	H169	(n=1)	6
H14	(n=1)	0	H36	(n=1)	10	H63	(n=1)	13		(n=1)	28	H118	(n=1)	4	H143	(n=1)	12	H170	(n=1)	8
H15	(n=1)	0	H37	(n=1)	22	H64	(n=1)	12	H91	(n=1)	0	H119	(n=1)	16	H144	(n=1)	9	H171	(n=8)	0–9
H16	(n=1)	18		(n=1)	31	H65	(n=1)	0	H92	(n=1)	15	H120	(n=2)	7–10	H145	(n=1)	20	H172	(n=8)	1–8
	(n=1)	27	H38	(n=2)	0–17	H66	(n=1)	10	H93	(n=2)	4–5		(n=1)	29	H146	(n=3)	0–10	H173	(n=5)	0–14
H17	(n=1)	33	H39	(n=1)	15	H67	(n=1)	16	H94	(n=3)	3–12	H121	(n=1)	12	H147	(n=1)	4	H174	(n=4)	0–5
H18	(n=1)	16	H40	(n=2)	27–33	H68	(n=1)	14	H95	(n=3)	0–3	H122	(n=3)	0–4	H148	(n=1)	8	H175	(n=6)	0–8
H19	(n=2)	25–56	H41	(n=1)	18	H69	(n=1)	15	H96	(n=5)	0–2	H123	(n=3)	3–10	H149	(n=1)	18	H176	(n=2)	1–13
H20	(n=2)	11–19	H42	(n=1)	6	H70	(n=2)	6	H97	(n=5)	0–4	H124	(n=2)	0–1	H150	(n=3)	0–16	H177	(n=3)	5–15
H21	(n=1)	15	H43	(n=1)	0	H71	(n=1)	23	H98	(n=1)	11	H125	(n=2)	0–8	H151	(n=1)	9	H178	(n=2)	2–8
	(n=1)	32	H44	(n=3)	0–22	H72	(n=1)	20	H99	(n=6)	2–9	H126	(n=1)	3	H152	(n=1)	23	H179	(n=3)	0–8
H22	(n=1)	19	H45	(n=1)	35	H73	(n=1)	8	H100	(n=6)	0–5	H127	(n=2)	0–1	H153	(n=1)	11	H180	(n=3)	0–5
H23	(n=1)	5	H46	(n=1)	12	H74	(n=1)	5	H101	(n=2)	12–23	H128	(n=1)	9	H154	(n=1)	8	H181	(n=2)	21–22
	(n=1)	32	H47	(n=1)	23	H75	(n=1)	9	H102	(n=2)	1–11	H129	(n=1)	10	H155	(n=1)	25	H182	(n=1)	23
H24	(n=1)	16	H48	(n=1)	43	H76	(n=1)	30	H103	(n=3)	0–3	H130	(n=5)	1–20	H156	(n=1)	6	H183	(n=1)	24
	(n=1)	39	H49	(n=1)	12	H77	(n=1)	9	H104	(n=10)	0–14									

Legend

- ○ Soil screening location
  (n=10) n = Number of samples at location
  1–22 Concentration value below 25 pCi/g
- ● Soil screening location
  (n=2) n = Number of samples at location
  26–35 Concentration value above 25 pCi/g

0 100 200 400

Scale In Feet



TN
GN
MN

1981 magnetic north declination at center of plant. Magnetic north is 3 degrees west of true north. Declination between state plane (grid) north in 1.13 degrees west of true north.

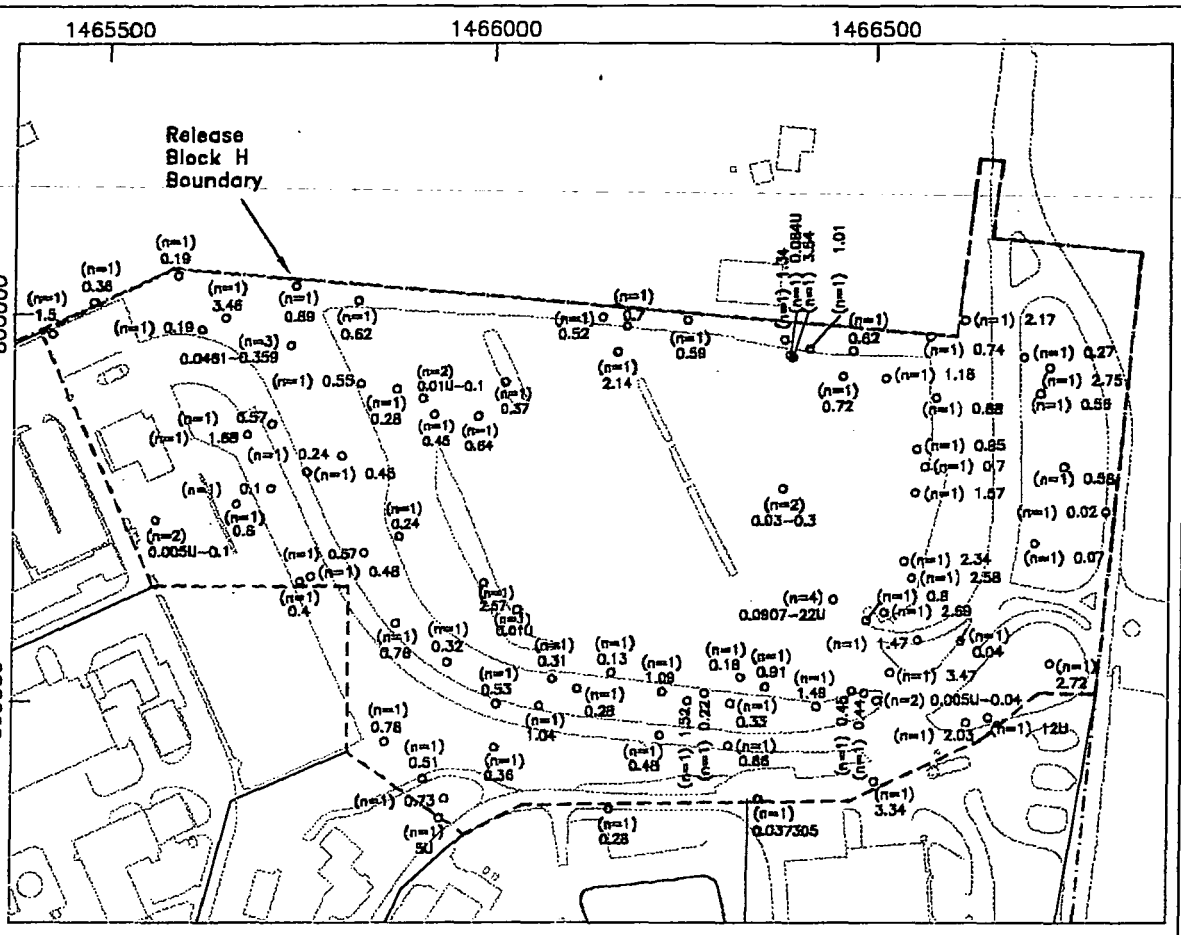
SOIL SCREENING DATA FOR RELEASE BLOCK H PLUTONIUM–238

TERRAN CORPORATION
ENVIRONMENTAL CONSULTANTS
4080 EXECUTIVE DRIVE
BEAVERCREEK, OHIO 45430

DRAWING CLASSIFICATION	DRAWING NUMBER	JOB NUMBER
UNCLASSIFIED	RELEASEH.DWG	EGG1398

DWG TYPE	SCALE	DATE	SHEET 1 OF 1
Site	Graphical	01/07/97	

DIAGRAM A

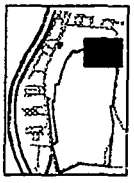


Legend

- ○ Soil screening location
- (n=1) n = Number of samples at location
- 2.5 Concentration value below 5.5 pCi/g
- ● Soil screening location
- (n=1) n = Number of samples at location
- 6.4 Detected concentration above 5.5 pCi/g

0 100 200 400

Scale In Feet



TN
GN
MN

1981 magnetic north declination at center of plant. Magnetic north is 3 degrees west of true north. Declination between state plane (grid) north in 1.13 degrees west of true north.

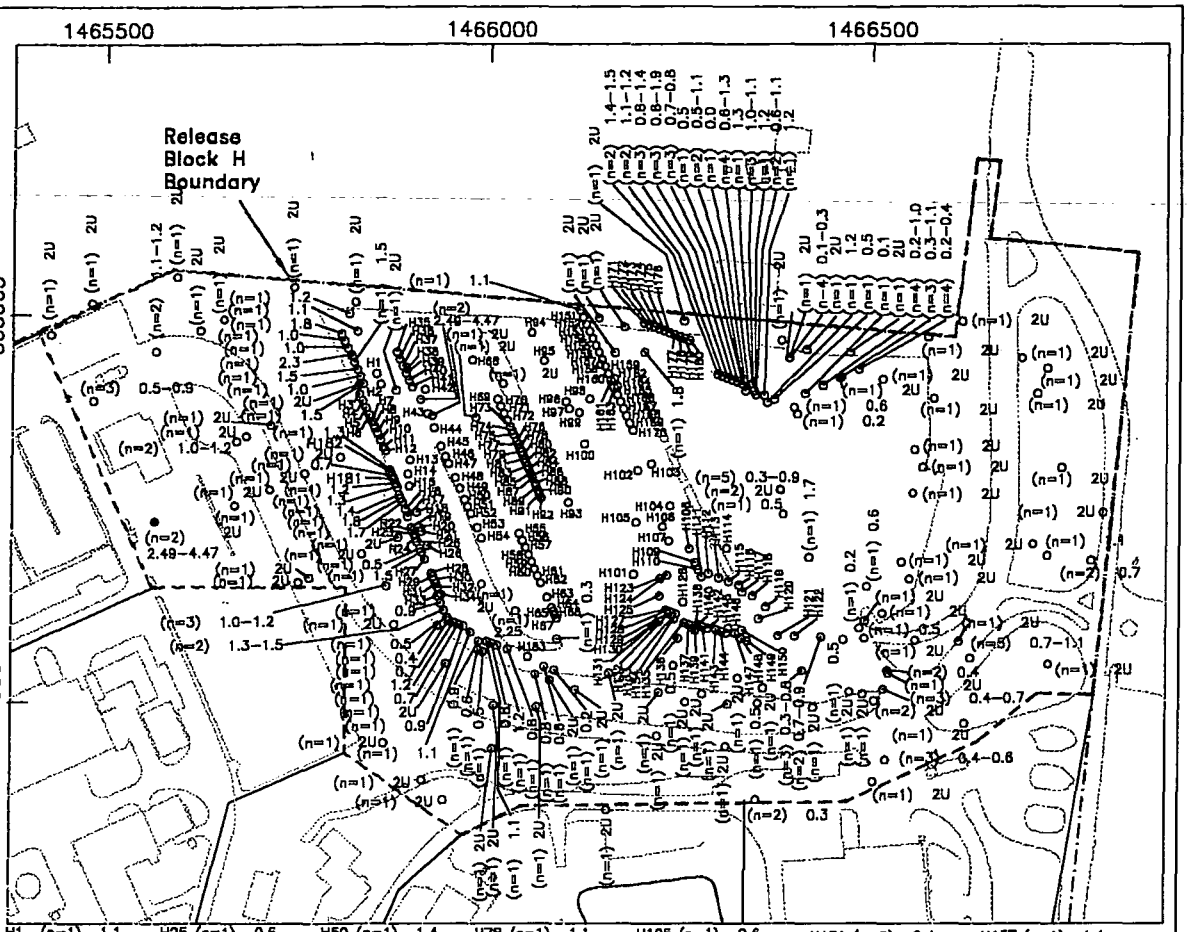
LABORATORY RESULTS FOR RELEASE BLOCK H PLUTONIUM-238

TERRAN CORPORATION
ENVIRONMENTAL CONSULTANTS
4080 EXECUTIVE DRIVE
BEAVERCREEK, OHIO 45430

DRAWING CLASSIFICATION	DRAWING NUMBER	JOB NUMBER
UNCLASSIFIED	RELEASEH.DWG	EG01396

DWG TYPE	SCALE	DATE	SHEET 1 OF 1
Site	Graphical	01/04/97	

DIAGRAM B



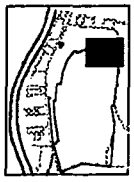
H1	(n=1)	1.1	H25	(n=1)	0.6	H50	(n=1)	1.4	H78	(n=1)	1.1	H105	(n=1)	0.6	H131	(n=2)	0.4	H157	(n=1)	1.4
H2	(n=2)	0.3–0.8	H26	(n=2)	0.1–0.8	H51	(n=1)	0.7	H79	(n=1)	1.5	H106	(n=11)	0.4–0.6	H132	(n=1)	0.5	H158	(n=1)	0.6
H3	(n=1)	1.1	H27	(n=1)	0.3	H52	(n=1)	1.1	H80	(n=1)	1.5	H107	(n=1)	0.5	H133	(n=3)	0.9–1.2	H159	(n=1)	1.3
H4	(n=1)	1.3	H28	(n=2)	0.5	H53	(n=1)	0.9	H81	(n=1)	0.8	H108	(n=3)	0.7–0.8	H134	(n=3)	0.2–0.5	H160	(n=1)	1.4
H5	(n=1)	1.6	H29	(n=1)	1.0	H54	(n=1)	0.8	H82	(n=2)	0.7–0.9	H109	(n=7)	0.4–0.7	H135	(n=1)	1.1	H161	(n=1)	1.2
H6	(n=1)	0.4	H30	(n=1)	1.0	H55	(n=1)	0.9	H83	(n=1)	1.0	H110	(n=1)	0.6	H136	(n=1)	0.5	H162	(n=4)	0.5–0.8
H7	(n=1)	1.5	H31	(n=1)	0.8	H56	(n=1)	0.8	H84	(n=2)	0.5–1.1	H111	(n=1)	0.4	H137	(n=1)	1.5	H163	(n=1)	1.2
H8	(n=1)	1.7	H32	(n=2)	1.3–1.4	H57	(n=1)	0.3	H85	(n=1)	1.1	H112	(n=1)	1.0	H138	(n=1)	0.7	H164	(n=1)	0.4
H9	(n=1)	1.2				H58	(n=1)	1.4	H86	(n=1)	1.2	H113	(n=1)	0.5	H139	(n=7)	0.1–0.8	H165	(n=1)	1.1
H10	(n=1)	1.4	H33	(n=1)	1.3	H59	(n=1)	1.2	H87	(n=1)	1.5	H114	(n=1)	0.2	H140	(n=1)	0.9	H166	(n=1)	1.1
H11	(n=1)	0.4	H34	(n=2)	1.0–1.2	H60	(n=1)	1.0	H88	(n=1)	1.4	H115	(n=1)	0.5	H141	(n=1)	1.5	H167	(n=1)	0.4
H12	(n=1)	1.3				H61	(n=1)	1.0	H89	(n=1)	0.6	H116	(n=1)	0.7	H142	(n=1)	1.1	H168	(n=1)	0.4
H13	(n=1)	1.0	H35	(n=1)	1.5	H62	(n=1)	1.1	H90	(n=3)	0.3–1.1	H117	(n=1)	0.9		(n=2)	0.5–0.6	H169	(n=1)	0.5
H14	(n=1)	1.3	H36	(n=1)	0.9	H63	(n=1)	1.4				H118	(n=1)	0.7	H143	(n=1)	1.4	H170	(n=1)	1.1
H15	(n=1)	0.7	H37	(n=2)	1.3–1.4	H64	(n=1)	0.8	H91	(n=1)	0.5	H119	(n=1)	0.8	H144	(n=1)	1.1	H171	(n=8)	0.9–1.1
H16	(n=2)	1.4–1.8				H65	(n=1)	0.4	H92	(n=1)	1.0	H120	(n=3)	0.3–0.6	H145	(n=1)	1.4	H172	(n=8)	0.7–1.1
			H38	(n=2)	0.8–0.9	H66	(n=1)	1.1	H93	(n=2)	0.5				H146	(n=3)	0.3–0.5	H173	(n=5)	0.6–1.0
H17	(n=1)	1.0	H39	(n=1)	1.1	H67	(n=1)	1.1	H94	(n=3)	0.3–0.4	H121	(n=1)	0.4	H147	(n=1)	1.0	H174	(n=4)	0.7–0.9
H18	(n=1)	0.8	H40	(n=2)	1.6–1.7	H68	(n=1)	1.1	H95	(n=3)	0.1–0.7	H122	(n=3)	0.5–0.6	H148	(n=1)	0.9	H175	(n=6)	0.6–1.2
H19	(n=2)	1.6–1.7	H41	(n=1)	1.2	H69	(n=1)	1.2	H96	(n=5)	0.3–0.5	H123	(n=3)	0.5–0.6	H149	(n=1)	1.0	H176	(n=2)	1.0–1.2
H20	(n=2)	1.2–1.9	H42	(n=1)	1.0	H70	(n=2)	1.1–1.3	H97	(n=5)	0.4–0.7	H124	(n=2)	0.4–0.7	H150	(n=3)	0.4–0.6	H177	(n=3)	1.3–1.8
H21	(n=2)	1.3–1.4	H43	(n=1)	1.4	H71	(n=1)	1.4	H98	(n=1)	0.3	H125	(n=2)	0.3	H151	(n=1)	1.6	H178	(n=2)	1.2
			H44	(n=3)	1.2–1.5	H72	(n=1)	1.8	H99	(n=6)	0.4–0.5	H126	(n=1)	0.5	H152	(n=1)	0.9	H179	(n=3)	0.9–1.3
H22	(n=1)	1.0	H45	(n=1)	1.4	H73	(n=1)	1.3	H100	(n=6)	0.3–0.6	H127	(n=2)	0.5–1.0	H153	(n=1)	1.1	H180	(n=3)	0.8–1.4
H23	(n=2)	0.5–1.1	H46	(n=1)	1.3	H74	(n=1)	1.3	H101	(n=2)	0.9–1.2	H128	(n=1)	0.6	H154	(n=1)	0.9	H181	(n=2)	1.1–1.3
			H47	(n=1)	0.9	H75	(n=1)	1.3	H102	(n=2)	0.4	H129	(n=1)	1.2	H155	(n=1)	0.7	H182	(n=1)	1.4
H24	(n=2)	1.3–1.5	H48	(n=1)	1.6	H76	(n=1)	1.6	H103	(n=3)	0.6–0.7	H130	(n=5)	0.1–0.5	H156	(n=1)	0.8	H183	(n=1)	0.9
			H49	(n=1)	0.8	H77	(n=1)	0.8	H104	(n=10)	0.4–0.9									

Legend

o Soil screening location
(n=10) n = Number of samples at location
0.1–1.5 Concentration value below 2.0 pCi/g

• Soil screening location
(n=2) n = Number of samples at location
2.0–3.5 Concentration value above 2.0 pCi/g

0 100 200 400
Scale In Feet



TN
GN
MN

1981 magnetic north declination at center of plant. Magnetic north is 3 degrees west of true north. Declination between state plane (grid) north in 1.13 degrees west of true north.

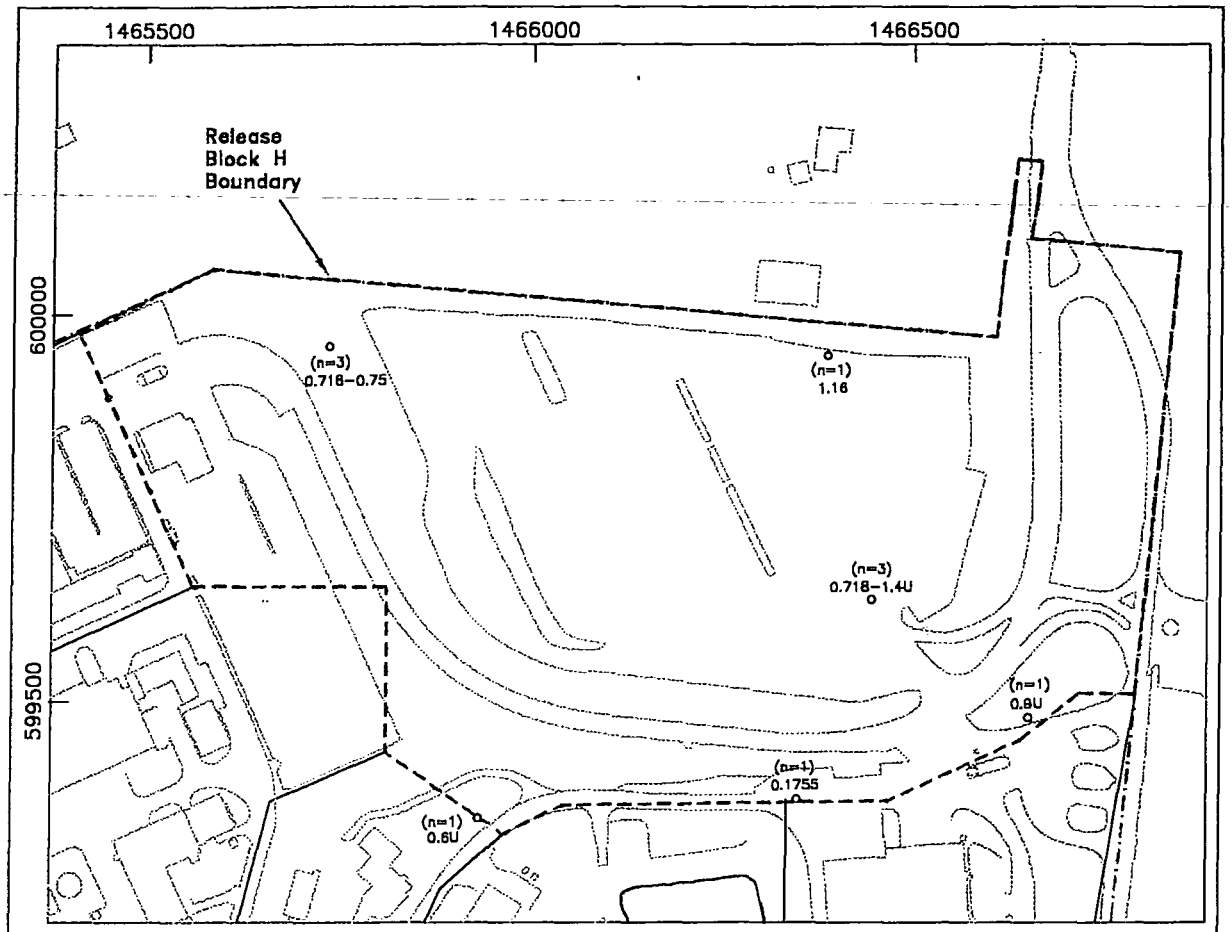
SOIL SCREENING DATA FOR RELEASE BLOCK H THORIUM–232

TERRAN CORPORATION
ENVIRONMENTAL CONSULTANTS
4080 EXECUTIVE DRIVE
BEAVERCREEK, OHIO 45430

DRAWING CLASSIFICATION	DRAWING NUMBER	JOB NUMBER
UNCLASSIFIED	RELEASEH.DWG	EG01386

DWG TYPE	SCALE	DATE	SHEET 1 OF 1
Site	Graphical	01/07/97	

DIAGRAM C

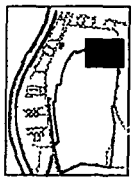


Legend

o Soil screening location
(n=1) n = Number of samples at location
0 Concentration value below 1.5 pCi/g

● Soil screening location
(n=1) n = Number of samples at location
3.0 Detected concentration above 1.5 pCi/g

0 100 200 400
Scale in Feet



TN
GN
MN

1981 magnetic north declination at center of plant. Magnetic north is 3 degrees west of true north. Declination between state plane (grid) north in 1.13 degrees west of true north.

LABORATORY RESULTS FOR RELEASE BLOCK H THORIUM–232

TERRAN CORPORATION
ENVIRONMENTAL CONSULTANTS
4080 EXECUTIVE DRIVE
BEAVERCREEK, OHIO 45430

DRAWING CLASSIFICATION	DRAWING NUMBER	JOB NUMBER
UNCLASSIFIED	RELEASEH.DWG	EGG1386

DWG TYPE	SCALE	DATE	SHEET 1 OF 1
Site	Graphical	01/04/97	

DIAGRAM D

APPENDIX B

ANALYTICAL DATA FOR MOUND PRODUCTION WELLS 0271 AND 0076

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	06-May-91	1,1,1,2-Tetrachloroethane	0.3	0.3	UG/L	U	UJ
0271	05-Aug-91	1,1,1,2-Tetrachloroethane	0.3	0.3	UG/L	U	UJ
0271	06-May-91	1,1,1,2-Tetrachloroethane	0.3	0.3	UG/L	U	UJ
0076	31-Jul-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0271	27-Feb-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0271	24-Jan-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0271	31-Jul-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0271	27-Feb-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0076	22-Jun-92	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	R
0271	11-Oct-93	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	UJ
0076	16-Dec-91	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	UJ
0271	23-Mar-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0271	27-Feb-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0076	23-Mar-92	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0271	15-Jun-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0076	16-Sep-92	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0076	11-Oct-93	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	UJ
0076	27-Feb-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0271	16-Dec-91	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	UJ
0076	07-Apr-94	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0271	01-Feb-91	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0076	15-Jun-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0076	24-Jan-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0271	06-Nov-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	UJ
0271	16-Sep-92	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0076	06-Nov-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	UJ
0076	23-Mar-90	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0271	22-Jun-92	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	R
0076	16-Jun-93	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0076	01-Feb-91	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0271	07-Apr-94	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0271	07-Apr-94	1,1,1,2-Tetrachloroethane	1	1	UG/L	U	U
0076	16-Jun-93	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	U
0076	06-Nov-90	1,1,1-Trichloroethane	0.3	0.3	UG/L		UJ
0271	23-Mar-90	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	U
0271	27-Feb-90	1,1,1-Trichloroethane	0.3	0.3	UG/L		
0076	23-Mar-92	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	U
0271	05-Aug-91	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	UJ
0271	15-Jun-90	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	U
0271	24-Jan-90	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	U
0271	16-Sep-92	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	U
0076	22-Jun-92	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	U
0076	06-May-91	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	UJ
0271	01-Feb-91	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	UJ
0076	16-Sep-92	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	U
0271	06-Nov-90	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	U
0076	01-Feb-91	1,1,1-Trichloroethane	0.3	0.3	UG/L	U	U
0271	27-Feb-90	1,1,1-Trichloroethane	0.3	0.3	UG/L		
0076	11-Oct-93	1,1,1-Trichloroethane	0.36	0.3	UG/L		J
0076	27-Feb-90	1,1,1-Trichloroethane	0.4	0.3	UG/L		
0271	27-Feb-90	1,1,1-Trichloroethane	0.4	0.3	UG/L		
0076	24-Jan-90	1,1,1-Trichloroethane	0.4	0.3	UG/L		
0076	15-Jun-90	1,1,1-Trichloroethane	0.4	0.3	UG/L		
0076	23-Mar-90	1,1,1-Trichloroethane	0.6	0.3	UG/L		
0271	31-Jul-90	1,1,1-Trichloroethane	0.7	0.3	UG/L		
0076	07-Apr-94	1,1,1-Trichloroethane	0.71	0.3	UG/L		
0271	06-May-91	1,1,1-Trichloroethane	0.9	0.3	UG/L		J
0076	16-Dec-91	1,1,1-Trichloroethane	1	1	UG/L	U	UJ
0271	16-Dec-91	1,1,1-Trichloroethane	1	1	UG/L	U	U
0076	13-Sep-88	1,1,1-Trichloroethane	1	1	UG/L	U	U
0271	13-Sep-88	1,1,1-Trichloroethane	1	1	UG/L	U	U
0271	07-Apr-94	1,1,1-Trichloroethane	1.4	0.3	UG/L		
0076	31-Jul-90	1,1,1-Trichloroethane	1.4	0.3	UG/L		
0271	07-Apr-94	1,1,1-Trichloroethane	1.7	0.3	UG/L		
0271	22-Jun-92	1,1,1-Trichloroethane	1.8	0.3	UG/L		
0271	11-Oct-93	1,1,1-Trichloroethane	1.8	0.3	UG/L		J
0271	08-Mar-88	1,1,1-Trichloroethane	5	5	UG/L	U	U
0076	13-Sep-88	1,1,1-Trichloroethane	5	5	UG/L	U	U
0271	13-Sep-88	1,1,1-Trichloroethane	5	5	UG/L	U	U

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	25-Apr-90	1,1,1-Trichloroethane	5	5	UG/L	U	U
0271	24-Jun-88	1,1,1-Trichloroethane	5	5	UG/L	U	U
0076	25-Apr-90	1,1,1-Trichloroethane	5	5	UG/L	U	U
0076	24-Jun-88	1,1,1-Trichloroethane	5	5	UG/L	U	U
0076	22-Jun-92	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	R
0076	16-Sep-92	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	24-Jan-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0076	16-Jun-93	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	UJ
0076	01-Feb-91	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	UJ
0271	16-Sep-92	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	07-Apr-94	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	UJ
0076	06-Nov-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	22-Jun-92	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	R
0271	31-Jul-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	06-May-91	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	07-Apr-94	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0076	27-Feb-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	27-Feb-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0076	07-Apr-94	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	23-Mar-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0076	06-May-91	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	01-Feb-91	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	UJ
0076	11-Oct-93	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	11-Oct-93	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	UJ
0076	31-Jul-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	27-Feb-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0076	23-Mar-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	15-Jun-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0076	15-Jun-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	27-Feb-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0076	23-Mar-92	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0076	24-Jan-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	05-Aug-91	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	06-Nov-90	1,1,2,2-Tetrachloroethane	0.3	0.3	UG/L	U	U
0271	16-Dec-91	1,1,2,2-Tetrachloroethane	1	1	UG/L	U	UJ
0076	13-Sep-88	1,1,2,2-Tetrachloroethane	1	1	UG/L	U	U
0271	13-Sep-88	1,1,2,2-Tetrachloroethane	1	1	UG/L	U	U
0076	16-Dec-91	1,1,2,2-Tetrachloroethane	1	1	UG/L	U	UJ
0076	13-Sep-88	1,1,2,2-Tetrachloroethane	5	5	UG/L	U	U
0271	08-Mar-88	1,1,2,2-Tetrachloroethane	5	5	UG/L	U	U
0076	25-Apr-90	1,1,2,2-Tetrachloroethane	5	5	UG/L	U	U
0271	13-Sep-88	1,1,2,2-Tetrachloroethane	5	5	UG/L	U	U
0271	25-Apr-90	1,1,2,2-Tetrachloroethane	5	5	UG/L	U	U
0271	24-Jun-88	1,1,2,2-Tetrachloroethane	5	5	UG/L	U	U
0076	24-Jun-88	1,1,2,2-Tetrachloroethane	5	5	UG/L	U	U
0271	11-Oct-93	1,1,2-Trichloro-1,2,2-trifluoroethane	2	2	UG/L	U	UJ
0076	11-Oct-93	1,1,2-Trichloro-1,2,2-trifluoroethane	2	2	UG/L	U	UJ
0076	07-Apr-94	1,1,2-Trichloro-1,2,2-trifluoroethane	2	2	UG/L	U	U
0271	07-Apr-94	1,1,2-Trichloro-1,2,2-trifluoroethane	2.3	2	UG/L		J
0271	07-Apr-94	1,1,2-Trichloro-1,2,2-trifluoroethane	2.6	2	UG/L		J
0076	16-Jun-93	1,1,2-Trichloro-1,2,2-trifluoroethane	8.7	1	UG/L		J
0076	23-Mar-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	27-Feb-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	15-Jun-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	06-Nov-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0076	15-Jun-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	01-Feb-91	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	27-Feb-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0076	06-May-91	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	07-Apr-94	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	UJ
0076	22-Jun-92	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	R
0271	23-Mar-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0076	07-Apr-94	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0076	27-Feb-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	06-May-91	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	07-Apr-94	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0076	31-Jul-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	11-Oct-93	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0076	23-Mar-92	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	UJ

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	24-Jan-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	05-Aug-91	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0076	11-Oct-93	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	UJ
0271	27-Feb-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0076	06-Nov-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0076	16-Jun-93	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	16-Sep-92	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	22-Jun-92	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	R
0271	24-Jan-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0076	01-Feb-91	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	31-Jul-90	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0076	16-Sep-92	1,1,2-Trichloroethane	0.2	0.2	UG/L	U	U
0271	13-Sep-88	1,1,2-Trichloroethane	1	1	UG/L	U	U
0076	13-Sep-88	1,1,2-Trichloroethane	1	1	UG/L	U	U
0076	16-Dec-91	1,1,2-Trichloroethane	1	1	UG/L	U	U
0271	16-Dec-91	1,1,2-Trichloroethane	1	1	UG/L	U	U
0076	25-Apr-90	1,1,2-Trichloroethane	5	5	UG/L	U	U
0271	24-Jun-88	1,1,2-Trichloroethane	5	5	UG/L	U	U
0076	13-Sep-88	1,1,2-Trichloroethane	5	5	UG/L	U	U
0271	13-Dec-85	1,1,2-Trichloroethane	5	5	UG/L	U	U
0271	08-Mar-88	1,1,2-Trichloroethane	5	5	UG/L	U	U
0076	12-Dec-85	1,1,2-Trichloroethane	5	5	UG/L	U	U
0271	13-Sep-88	1,1,2-Trichloroethane	5	5	UG/L	U	U
0271	13-Mar-86	1,1,2-Trichloroethane	5	5	UG/L	U	U
0271	25-Apr-90	1,1,2-Trichloroethane	5	5	UG/L	U	U
0076	24-Jun-88	1,1,2-Trichloroethane	5	5	UG/L	U	U
0076	01-Feb-84	1,1,2-Trichloroethane	10	10	UG/L	U	U
0271	07-Apr-94	1,1-Dichloroethane	0.7	0.7	UG/L	U	UJ
0076	06-May-91	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0271	24-Jan-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0076	31-Jul-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0076	16-Sep-92	1,1-Dichloroethane	0.7	0.7	UG/L	U	UJ
0076	07-Apr-94	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0271	06-May-91	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0271	01-Feb-91	1,1-Dichloroethane	0.7	0.7	UG/L	U	UJ
0271	11-Oct-93	1,1-Dichloroethane	0.7	0.7	UG/L	U	UJ
0076	06-Nov-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0076	11-Oct-93	1,1-Dichloroethane	0.7	0.7	UG/L	U	UJ
0271	16-Sep-92	1,1-Dichloroethane	0.7	0.7	UG/L	U	UJ
0076	24-Jan-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0271	07-Apr-94	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0076	16-Jun-93	1,1-Dichloroethane	0.7	0.7	UG/L	U	UJ
0076	15-Jun-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0271	27-Feb-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0271	27-Feb-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0076	22-Jun-92	1,1-Dichloroethane	0.7	0.7	UG/L	U	R
0271	06-Nov-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0076	23-Mar-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0271	15-Jun-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0271	31-Jul-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0271	05-Aug-91	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0076	27-Feb-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0076	01-Feb-91	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0271	27-Feb-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0076	23-Mar-92	1,1-Dichloroethane	0.7	0.7	UG/L	U	UJ
0271	22-Jun-92	1,1-Dichloroethane	0.7	0.7	UG/L	U	R
0271	23-Mar-90	1,1-Dichloroethane	0.7	0.7	UG/L	U	U
0271	16-Dec-91	1,1-Dichloroethane	1	1	UG/L	U	U
0076	16-Dec-91	1,1-Dichloroethane	1	1	UG/L	U	U
0076	13-Sep-88	1,1-Dichloroethane	2.5	1	UG/L		
0271	13-Sep-88	1,1-Dichloroethane	3.5	1	UG/L		
0271	24-Jun-88	1,1-Dichloroethane	5	5	UG/L	U	U
0076	24-Jun-88	1,1-Dichloroethane	5	5	UG/L	U	U
0076	25-Apr-90	1,1-Dichloroethane	5	5	UG/L	U	U
0271	13-Sep-88	1,1-Dichloroethane	5	5	UG/L	U	U
0271	08-Mar-88	1,1-Dichloroethane	5	5	UG/L	U	U
0271	25-Apr-90	1,1-Dichloroethane	5	5	UG/L	U	U
0076	13-Sep-88	1,1-Dichloroethane	5	5	UG/L	U	U
0271	16-Sep-92	1,1-Dichloroethene	1	1	UG/L	U	UJ

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	22-Jun-92	1,1-Dichloroethene	1	1	UG/L	U	UJ
0076	16-Dec-91	1,1-Dichloroethene	1	1	UG/L	U	UJ
0271	22-Jun-92	1,1-Dichloroethene	1	1	UG/L	U	UJ
0076	16-Jun-93	1,1-Dichloroethene	1	1	UG/L	U	UJ
0076	16-Sep-92	1,1-Dichloroethene	1	1	UG/L	U	UJ
0076	13-Sep-88	1,1-Dichloroethene	1	1	UG/L	U	U
0271	16-Dec-91	1,1-Dichloroethene	1	1	UG/L	U	UJ
0271	13-Sep-88	1,1-Dichloroethene	1	1	UG/L	U	U
0076	23-Mar-92	1,1-Dichloroethene	1	1	UG/L	U	UJ
0076	31-Jul-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	06-Nov-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	UJ
0076	06-Nov-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	31-Jul-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	24-Jan-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	27-Feb-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	15-Jun-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	27-Feb-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	27-Feb-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	06-May-91	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0076	11-Oct-93	1,1-Dichloroethene	1.3	1.3	UG/L	U	UJ
0271	07-Apr-94	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	07-Apr-94	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	23-Mar-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0076	07-Apr-94	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	01-Feb-91	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0076	06-May-91	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	05-Aug-91	1,1-Dichloroethene	1.3	1.3	UG/L	U	UJ
0076	15-Jun-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0076	24-Jan-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0076	27-Feb-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0076	23-Mar-90	1,1-Dichloroethene	1.3	1.3	UG/L	U	U
0271	11-Oct-93	1,1-Dichloroethene	1.3	1.3	UG/L	U	UJ
0076	01-Feb-91	1,1-Dichloroethene	1.7	1.3	UG/L		J
0271	25-Apr-90	1,1-Dichloroethene	5	5	UG/L	U	U
0076	24-Jun-88	1,1-Dichloroethene	5	5	UG/L	U	U
0271	13-Sep-88	1,1-Dichloroethene	5	5	UG/L	U	U
0076	13-Sep-88	1,1-Dichloroethene	5	5	UG/L	U	U
0271	08-Mar-88	1,1-Dichloroethene	5	5	UG/L	U	U
0076	25-Apr-90	1,1-Dichloroethene	5	5	UG/L	U	U
0271	24-Jun-88	1,1-Dichloroethene	5	5	UG/L	U	U
0271	11-Oct-93	1,2,3-Trichloropropane	1	1	UG/L	U	U
0076	06-May-91	1,2,3-Trichloropropane	1	1	UG/L	U	UJ
0271	05-Aug-91	1,2,3-Trichloropropane	1	1	UG/L	U	UJ
0271	06-Nov-90	1,2,3-Trichloropropane	1	1	UG/L	U	UJ
0076	07-Apr-94	1,2,3-Trichloropropane	1	1	UG/L	U	U
0271	06-May-91	1,2,3-Trichloropropane	1	1	UG/L	U	UJ
0076	01-Feb-91	1,2,3-Trichloropropane	1	1	UG/L		UJ
0076	11-Oct-93	1,2,3-Trichloropropane	1	1	UG/L	U	U
0271	01-Feb-91	1,2,3-Trichloropropane	1	1	UG/L	U	UJ
0271	07-Apr-94	1,2,3-Trichloropropane	1	1	UG/L	U	U
0271	07-Apr-94	1,2,3-Trichloropropane	1	1	UG/L	U	U
0076	23-Mar-92	1,2,3-Trichloropropane	1	1	UG/L	U	UJ
0076	16-Sep-92	1,2,3-Trichloropropane	1	1	UG/L	U	UJ
0271	16-Sep-92	1,2,3-Trichloropropane	1	1	UG/L	U	UJ
0076	22-Jun-92	1,2,3-Trichloropropane	1	1	UG/L	U	U
0076	06-Nov-90	1,2,3-Trichloropropane	1	1	UG/L	U	UJ
0271	22-Jun-92	1,2,3-Trichloropropane	1	1	UG/L	U	U
0076	16-Jun-93	1,2,3-Trichloropropane	1	1	UG/L	U	U
0076	16-Dec-91	1,2,3-Trichloropropane	1	1	UG/L	U	UJ
0271	16-Dec-91	1,2,3-Trichloropropane	1	1	UG/L	U	UJ
0076	06-Nov-90	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0076	01-Feb-91	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0076	16-Sep-92	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0076	16-Dec-91	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0076	11-Oct-93	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0076	06-May-91	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0076	23-Mar-92	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0076	22-Jun-92	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0271	06-May-91	1,2,4-Trichlorobenzene	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	05-Aug-91	1,2,4-Trichlorobenzene	10	10	UG/L	U	UJ
0271	06-Nov-90	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0271	01-Feb-91	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0271	16-Sep-92	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0271	11-Oct-93	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0271	16-Dec-91	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0271	22-Jun-92	1,2,4-Trichlorobenzene	10	10	UG/L	U	U
0271	07-Apr-94	1,2,4-Trichlorobenzene	11	11	UG/L	U	U
0271	07-Apr-94	1,2,4-Trichlorobenzene	11	11	UG/L	U	U
0076	07-Apr-94	1,2,4-Trichlorobenzene	11	11	UG/L	U	U
0076	13-Sep-88	1,2-Dichlorobenzene	1	1	UG/L	U	U
0076	16-Dec-91	1,2-Dichlorobenzene	1	1	UG/L	U	U
0271	13-Sep-88	1,2-Dichlorobenzene	1	1	UG/L	U	U
0271	16-Dec-91	1,2-Dichlorobenzene	1	1	UG/L	U	U
0271	01-Feb-91	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0076	07-Apr-94	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	24-Jan-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	27-Feb-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	27-Feb-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0076	27-Feb-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0076	16-Sep-92	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0076	06-Nov-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	06-May-91	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0076	24-Jan-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	22-Jun-92	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	UJ
0076	23-Mar-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0076	16-Jun-93	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	16-Sep-92	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0076	11-Oct-93	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	UJ
0271	05-Aug-91	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	07-Apr-94	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	UJ
0271	23-Mar-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	11-Oct-93	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	31-Jul-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0076	01-Feb-91	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	07-Apr-94	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	15-Jun-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0076	06-May-91	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0076	22-Jun-92	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	UJ
0076	31-Jul-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	27-Feb-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0076	15-Jun-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0271	06-Nov-90	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	U
0076	23-Mar-92	1,2-Dichlorobenzene	1.5	1.5	UG/L	U	UJ
0076	06-Nov-90	1,2-Dichlorobenzene	10	10	UG/L	U	U
0076	11-Oct-93	1,2-Dichlorobenzene	10	10	UG/L	U	U
0271	05-Aug-91	1,2-Dichlorobenzene	10	10	UG/L	U	UJ
0076	01-Feb-91	1,2-Dichlorobenzene	10	10	UG/L	U	U
0076	23-Mar-92	1,2-Dichlorobenzene	10	10	UG/L	U	U
0271	01-Feb-91	1,2-Dichlorobenzene	10	10	UG/L	U	U
0271	11-Oct-93	1,2-Dichlorobenzene	10	10	UG/L	U	U
0076	06-May-91	1,2-Dichlorobenzene	10	10	UG/L	U	U
0076	16-Dec-91	1,2-Dichlorobenzene	10	10	UG/L	U	U
0271	06-Nov-90	1,2-Dichlorobenzene	10	10	UG/L	U	U
0271	22-Jun-92	1,2-Dichlorobenzene	10	10	UG/L	U	U
0271	16-Dec-91	1,2-Dichlorobenzene	10	10	UG/L	U	U
0271	16-Sep-92	1,2-Dichlorobenzene	10	10	UG/L	U	U
0076	22-Jun-92	1,2-Dichlorobenzene	10	10	UG/L	U	U
0076	16-Sep-92	1,2-Dichlorobenzene	10	10	UG/L	U	U
0271	06-May-91	1,2-Dichlorobenzene	10	10	UG/L	U	U
0271	07-Apr-94	1,2-Dichlorobenzene	11	11	UG/L	U	U
0076	07-Apr-94	1,2-Dichlorobenzene	11	11	UG/L	U	U
0271	07-Apr-94	1,2-Dichlorobenzene	11	11	UG/L	U	U
0076	22-Jun-92	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0076	23-Mar-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0076	07-Apr-94	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0076	24-Jan-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	06-Nov-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0076	01-Feb-91	1,2-Dichloroethane	0.3	0.3	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	27-Feb-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0076	16-Jun-93	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0076	16-Sep-92	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	23-Mar-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	01-Feb-91	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	15-Jun-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	27-Feb-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	27-Feb-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	24-Jan-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	22-Jun-92	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	16-Sep-92	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	05-Aug-91	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	31-Jul-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	07-Apr-94	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0076	11-Oct-93	1,2-Dichloroethane	0.3	0.3	UG/L	U	UJ
0076	06-May-91	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	07-Apr-94	1,2-Dichloroethane	0.3	0.3	UG/L	U	UJ
0271	11-Oct-93	1,2-Dichloroethane	0.3	0.3	UG/L	U	UJ
0076	23-Mar-92	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0076	31-Jul-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0076	27-Feb-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0076	15-Jun-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	06-May-91	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0076	06-Nov-90	1,2-Dichloroethane	0.3	0.3	UG/L	U	U
0271	16-Dec-91	1,2-Dichloroethane	1	1	UG/L	U	UJ
0076	16-Dec-91	1,2-Dichloroethane	1	1	UG/L	U	UJ
0271	13-Sep-88	1,2-Dichloroethane	1	1	UG/L	U	U
0076	13-Sep-88	1,2-Dichloroethane	1	1	UG/L	U	U
0076	12-Dec-85	1,2-Dichloroethane	2.8	2.8	UG/L	U	U
0271	13-Dec-85	1,2-Dichloroethane	2.8	2.8	UG/L	U	U
0271	13-Mar-86	1,2-Dichloroethane	2.8	2.8	UG/L	U	U
0271	24-Jun-88	1,2-Dichloroethane	5	5	UG/L	U	U
0271	13-Sep-88	1,2-Dichloroethane	5	5	UG/L	U	U
0076	24-Jun-88	1,2-Dichloroethane	5	5	UG/L	U	U
0076	13-Sep-88	1,2-Dichloroethane	5	5	UG/L	U	U
0271	08-Mar-88	1,2-Dichloroethane	5	5	UG/L	U	U
0271	25-Apr-90	1,2-Dichloroethane	5	5	UG/L	U	U
0076	25-Apr-90	1,2-Dichloroethane	5	5	UG/L	U	U
0076	01-Feb-84	1,2-Dichloroethane	10	10	UG/L	U	U
0076	06-May-91	1,2-Dichloroethene	1.3	1	UG/L		
0076	13-Sep-88	1,2-Dichloroethene	1.5	5	UG/L	J	J
0076	01-Feb-91	1,2-Dichloroethene	1.6	1	UG/L		
0076	25-Apr-90	1,2-Dichloroethene	2	5	UG/L	J	J
0271	25-Apr-90	1,2-Dichloroethene	3	5	UG/L	J	J
0271	05-Aug-91	1,2-Dichloroethene	3.2	1	UG/L		J
0271	01-Feb-91	1,2-Dichloroethene	3.7	1	UG/L		
0271	06-May-91	1,2-Dichloroethene	4.7	1	UG/L		J
0271	13-Sep-88	1,2-Dichloroethene	5	5	UG/L	U	U
0076	24-Jan-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	23-Mar-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	05-Aug-91	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	06-Nov-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	27-Feb-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0076	15-Jun-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0076	23-Mar-92	1,2-Dichloropropane	0.4	0.4	UG/L	U	UJ
0271	27-Feb-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0076	23-Mar-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	06-May-91	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	07-Apr-94	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	15-Jun-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0076	01-Feb-91	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0076	31-Jul-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	07-Apr-94	1,2-Dichloropropane	0.4	0.4	UG/L	U	UJ
0271	11-Oct-93	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	31-Jul-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0076	27-Feb-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0076	06-May-91	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0076	11-Oct-93	1,2-Dichloropropane	0.4	0.4	UG/L	U	UJ
0271	01-Feb-91	1,2-Dichloropropane	0.4	0.4	UG/L	U	U

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	16-Jun-93	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	16-Sep-92	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	24-Jan-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	22-Jun-92	1,2-Dichloropropane	0.4	0.4	UG/L	U	R
0076	06-Nov-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0076	16-Sep-92	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0076	07-Apr-94	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0271	27-Feb-90	1,2-Dichloropropane	0.4	0.4	UG/L	U	U
0076	22-Jun-92	1,2-Dichloropropane	0.4	0.4	UG/L	U	R
0076	16-Dec-91	1,2-Dichloropropane	1	1	UG/L	U	U
0076	13-Sep-88	1,2-Dichloropropane	1	1	UG/L	U	U
0271	16-Dec-91	1,2-Dichloropropane	1	1	UG/L	U	UJ
0271	13-Sep-88	1,2-Dichloropropane	1	1	UG/L	U	U
0076	13-Sep-88	1,2-Dichloropropane	5	5	UG/L	U	U
0271	25-Apr-90	1,2-Dichloropropane	5	5	UG/L	U	U
0271	13-Sep-88	1,2-Dichloropropane	5	5	UG/L	U	U
0271	24-Jun-88	1,2-Dichloropropane	5	5	UG/L	U	U
0076	25-Apr-90	1,2-Dichloropropane	5	5	UG/L	U	U
0271	08-Mar-88	1,2-Dichloropropane	5	5	UG/L	U	U
0076	24-Jun-88	1,2-Dichloropropane	5	5	UG/L	U	U
0271	11-Oct-93	1,2-Diethylbenzene	1	1	UG/L	U	UJ
0271	07-Apr-94	1,2-Diethylbenzene	1	1	UG/L	U	U
0076	07-Apr-94	1,2-Diethylbenzene	1	1	UG/L	U	U
0076	11-Oct-93	1,2-Diethylbenzene	1	1	UG/L	U	U
0271	07-Apr-94	1,2-Diethylbenzene	1	1	UG/L	U	U
0076	23-Mar-92	1,2-cis-Dichloroethene	0.93	1	UG/L	J	J
0076	07-Apr-94	1,2-cis-Dichloroethene	1	1	UG/L	U	U
0076	16-Sep-92	1,2-cis-Dichloroethene	1	1	UG/L	U	U
0076	22-Jun-92	1,2-cis-Dichloroethene	1	1	UG/L	U	UJ
0076	11-Oct-93	1,2-cis-Dichloroethene	1.1	1	UG/L		J
0271	07-Apr-94	1,2-cis-Dichloroethene	1.2	1	UG/L		
0271	07-Apr-94	1,2-cis-Dichloroethene	1.3	1	UG/L		J
0076	16-Jun-93	1,2-cis-Dichloroethene	1.4	1	UG/L		J
0271	11-Oct-93	1,2-cis-Dichloroethene	1.5	1	UG/L		J
0271	16-Sep-92	1,2-cis-Dichloroethene	1.8	1	UG/L		UJ
0271	22-Jun-92	1,2-cis-Dichloroethene	2.1	1	UG/L		J
0076	07-Apr-94	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0271	23-Mar-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	22-Jun-92	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0271	22-Jun-92	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0271	27-Feb-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	11-Oct-93	1,2-trans-Dichloroethene	1	1	UG/L	U	UJ
0271	15-Jun-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	27-Feb-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	01-Feb-91	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	23-Mar-92	1,2-trans-Dichloroethene	1	1	UG/L	U	UJ
0271	07-Apr-94	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	16-Jun-93	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	16-Sep-92	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0271	11-Oct-93	1,2-trans-Dichloroethene	1	1	UG/L	U	UJ
0271	06-Nov-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0271	27-Feb-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0271	31-Jul-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0271	05-Aug-91	1,2-trans-Dichloroethene	1	1	UG/L	U	UJ
0271	06-May-91	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	24-Jan-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	08-May-91	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0271	16-Sep-92	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0271	27-Feb-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0271	24-Jan-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0271	07-Apr-94	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0271	01-Feb-91	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	23-Mar-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	15-Jun-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	06-Nov-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	13-Sep-88	1,2-trans-Dichloroethene	1	5	UG/L	J	J
0076	31-Jul-90	1,2-trans-Dichloroethene	1	1	UG/L	U	U
0076	12-Dec-85	1,2-trans-Dichloroethene	1.6	1.6	UG/L	U	U
0271	13-Dec-85	1,2-trans-Dichloroethene	1.6	1.6	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	16-Dec-91	1,2-trans-Dichloroethene	1.8	1	UG/L		
0271	13-Sep-88	1,2-trans-Dichloroethene	1.9	1	UG/L		
0076	24-Jun-88	1,2-trans-Dichloroethene	2	5	UG/L	J	J
0271	16-Dec-91	1,2-trans-Dichloroethene	2.1	1	UG/L		
0076	13-Sep-88	1,2-trans-Dichloroethene	2.8	1	UG/L		
0271	24-Jun-88	1,2-trans-Dichloroethene	3	5	UG/L	J	J
0271	13-Mar-86	1,2-trans-Dichloroethene	3	1.6	UG/L		
0271	13-Sep-88	1,2-trans-Dichloroethene	5	5	UG/L	U	U
0271	08-Mar-88	1,2-trans-Dichloroethene	5	5	UG/L	U	U
0076	01-Feb-84	1,2-trans-Dichloroethene	10	10	UG/L	U	U
0271	07-Apr-94	1,3,5-Trinitrobenzene	1.3	1.3	UG/L	U	U
0076	07-Apr-94	1,3,5-Trinitrobenzene	1.3	1.3	UG/L	U	U
0271	11-Oct-93	1,3,5-Trinitrobenzene	1.3	1.3	UG/L	U	R
0076	11-Oct-93	1,3,5-Trinitrobenzene	1.3	1.3	UG/L	U	R
0076	16-Dec-91	1,3-Dichlorobenzene	1	1	UG/L	U	U
0076	13-Sep-88	1,3-Dichlorobenzene	1	1	UG/L	U	U
0271	13-Sep-88	1,3-Dichlorobenzene	1	1	UG/L	U	U
0271	16-Dec-91	1,3-Dichlorobenzene	1	1	UG/L	U	U
0271	07-Apr-94	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0076	06-Nov-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0076	15-Jun-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0076	24-Jan-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	05-Aug-91	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	24-Jan-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0076	27-Feb-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	06-May-91	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	31-Jul-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	06-Nov-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	15-Jun-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	23-Mar-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	11-Oct-93	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	UJ
0076	11-Oct-93	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	UJ
0076	06-May-91	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	01-Feb-91	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0076	07-Apr-94	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0076	31-Jul-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0076	22-Jun-92	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	R
0271	07-Apr-94	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	UJ
0076	16-Jun-93	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	UJ
0271	27-Feb-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	22-Jun-92	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	R
0076	16-Sep-92	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0076	01-Feb-91	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	27-Feb-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	16-Sep-92	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0076	23-Mar-92	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	UJ
0271	27-Feb-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0076	23-Mar-90	1,3-Dichlorobenzene	3.2	3.2	UG/L	U	U
0271	11-Oct-93	1,3-Dichlorobenzene	10	10	UG/L	U	U
0076	01-Feb-91	1,3-Dichlorobenzene	10	10	UG/L	U	U
0076	23-Mar-92	1,3-Dichlorobenzene	10	10	UG/L	U	U
0076	16-Dec-91	1,3-Dichlorobenzene	10	10	UG/L	U	U
0076	16-Sep-92	1,3-Dichlorobenzene	10	10	UG/L	U	U
0271	22-Jun-92	1,3-Dichlorobenzene	10	10	UG/L	U	U
0271	06-May-91	1,3-Dichlorobenzene	10	10	UG/L	U	U
0076	11-Oct-93	1,3-Dichlorobenzene	10	10	UG/L	U	U
0076	22-Jun-92	1,3-Dichlorobenzene	10	10	UG/L	U	U
0271	06-Nov-90	1,3-Dichlorobenzene	10	10	UG/L	U	U
0271	05-Aug-91	1,3-Dichlorobenzene	10	10	UG/L	U	UJ
0271	16-Sep-92	1,3-Dichlorobenzene	10	10	UG/L	U	U
0076	06-May-91	1,3-Dichlorobenzene	10	10	UG/L	U	U
0271	16-Dec-91	1,3-Dichlorobenzene	10	10	UG/L	U	U
0076	06-Nov-90	1,3-Dichlorobenzene	10	10	UG/L	U	U
0271	01-Feb-91	1,3-Dichlorobenzene	10	10	UG/L	U	U
0271	07-Apr-94	1,3-Dichlorobenzene	11	11	UG/L	U	U
0076	07-Apr-94	1,3-Dichlorobenzene	11	11	UG/L	U	U
0271	07-Apr-94	1,3-Dichlorobenzene	11	11	UG/L	U	U
0076	07-Apr-94	1,3-Diethylbenzene	1	1	UG/L	U	U
0271	11-Oct-93	1,3-Diethylbenzene	1	1	UG/L	U	UJ

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	07-Apr-94	1,3-Diethylbenzene	1	1	UG/L	U	U
0076	11-Oct-93	1,3-Diethylbenzene	1	1	UG/L	U	U
0271	07-Apr-94	1,3-Diethylbenzene	1	1	UG/L	U	UJ
0076	07-Apr-94	1,3-Dinitrobenzene	0.31	0.31	UG/L	U	U
0271	11-Oct-93	1,3-Dinitrobenzene	0.31	0.31	UG/L	U	UJ
0271	07-Apr-94	1,3-Dinitrobenzene	0.31	0.31	UG/L	U	U
0076	11-Oct-93	1,3-Dinitrobenzene	0.31	0.31	UG/L	U	UJ
0271	13-Sep-88	1,3-cis-Dichloropropene	1	1	UG/L	U	U
0076	13-Sep-88	1,3-cis-Dichloropropene	1	1	UG/L	U	U
0271	16-Dec-91	1,3-cis-Dichloropropene	1	1	UG/L	U	UJ
0076	16-Dec-91	1,3-cis-Dichloropropene	1	1	UG/L	U	UJ
0076	06-May-91	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0076	16-Jun-93	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	23-Mar-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0076	06-Nov-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	07-Apr-94	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	07-Apr-94	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0076	11-Oct-93	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	UJ
0076	22-Jun-92	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0076	16-Sep-92	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0076	23-Mar-92	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0076	24-Jan-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0076	07-Apr-94	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0076	27-Feb-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0076	31-Jul-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	27-Feb-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	11-Oct-93	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0076	23-Mar-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	15-Jun-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	06-Nov-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	31-Jul-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	22-Jun-92	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	27-Feb-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	27-Feb-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	06-May-91	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	24-Jan-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	05-Aug-91	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0076	15-Jun-90	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	16-Sep-92	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	U
0271	01-Feb-91	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	UJ
0076	01-Feb-91	1,3-cis-Dichloropropene	3.4	3.4	UG/L	U	UJ
0076	24-Jun-88	1,3-cis-Dichloropropene	5	5	UG/L	U	U
0076	13-Sep-88	1,3-cis-Dichloropropene	5	5	UG/L	U	U
0076	25-Apr-90	1,3-cis-Dichloropropene	5	5	UG/L	U	U
0076	13-Sep-88	1,3-cis-Dichloropropene	5	5	UG/L	U	U
0271	25-Apr-90	1,3-cis-Dichloropropene	5	5	UG/L	U	U
0271	24-Jun-88	1,3-cis-Dichloropropene	5	5	UG/L	U	U
0271	08-Mar-88	1,3-cis-Dichloropropene	5	5	UG/L	U	U
0271	13-Sep-88	1,3-cis-Dichloropropene	5	5	UG/L	U	U
0271	13-Sep-88	1,3-cis-Dichloropropene	5	5	UG/L	U	U
0076	16-Dec-91	1,3-trans-Dichloropropene	1	1	UG/L	U	UJ
0271	13-Sep-88	1,3-trans-Dichloropropene	1	1	UG/L	U	U
0076	13-Sep-88	1,3-trans-Dichloropropene	1	1	UG/L	U	U
0271	16-Dec-91	1,3-trans-Dichloropropene	1	1	UG/L	U	UJ
0271	27-Feb-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0076	06-May-91	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	24-Jan-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	22-Jun-92	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	27-Feb-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0076	24-Jan-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0076	22-Jun-92	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	05-Aug-91	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	16-Sep-92	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0076	23-Mar-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0076	16-Sep-92	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	07-Apr-94	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	27-Feb-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	07-Apr-94	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0076	23-Mar-92	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	16-Jun-93	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0076	06-Nov-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0076	01-Feb-91	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	UJ
0076	31-Jul-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	06-May-91	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	06-Nov-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	01-Feb-91	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	UJ
0271	11-Oct-93	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	UJ
0076	11-Oct-93	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	UJ
0076	07-Apr-94	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	31-Jul-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	15-Jun-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0271	23-Mar-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0076	15-Jun-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0076	27-Feb-90	1,3-trans-Dichloropropene	3.4	3.4	UG/L	U	U
0076	13-Sep-88	1,3-trans-Dichloropropene	5	5	UG/L	U	U
0271	13-Sep-88	1,3-trans-Dichloropropene	5	5	UG/L	U	U
0076	13-Sep-88	1,3-trans-Dichloropropene	5	5	UG/L	U	U
0271	24-Jun-88	1,3-trans-Dichloropropene	5	5	UG/L	U	U
0271	13-Sep-88	1,3-trans-Dichloropropene	5	5	UG/L	U	U
0271	08-Mar-88	1,3-trans-Dichloropropene	5	5	UG/L	U	U
0076	24-Jun-88	1,3-trans-Dichloropropene	5	5	UG/L	U	U
0076	25-Apr-90	1,3-trans-Dichloropropene	5	5	UG/L	U	U
0271	25-Apr-90	1,3-trans-Dichloropropene	5	5	UG/L	U	U
0271	13-Sep-88	1,4-Dichlorobenzene	1	1	UG/L	U	U
0076	13-Sep-88	1,4-Dichlorobenzene	1	1	UG/L	U	U
0076	16-Dec-91	1,4-Dichlorobenzene	1	1	UG/L	U	U
0271	16-Dec-91	1,4-Dichlorobenzene	1	1	UG/L	U	U
0271	24-Jan-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	06-May-91	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	22-Jun-92	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	UJ
0076	23-Mar-92	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	UJ
0271	23-Mar-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	23-Mar-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0271	16-Sep-92	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0271	11-Oct-93	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0271	15-Jun-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0271	27-Feb-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	11-Oct-93	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	UJ
0271	07-Apr-94	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	UJ
0076	16-Jun-93	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	UJ
0271	27-Feb-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0271	06-May-91	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0271	05-Aug-91	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	27-Feb-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	24-Jan-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	15-Jun-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	16-Sep-92	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	06-Nov-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0271	31-Jul-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0271	06-Nov-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0271	27-Feb-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	31-Jul-90	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0271	01-Feb-91	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	07-Apr-94	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0271	22-Jun-92	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	UJ
0271	07-Apr-94	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	01-Feb-91	1,4-Dichlorobenzene	2.4	2.4	UG/L	U	U
0076	16-Sep-92	1,4-Dichlorobenzene	10	10	UG/L	U	U
0076	22-Jun-92	1,4-Dichlorobenzene	10	10	UG/L	U	U
0271	01-Feb-91	1,4-Dichlorobenzene	10	10	UG/L	U	U
0076	11-Oct-93	1,4-Dichlorobenzene	10	10	UG/L	U	U
0076	06-Nov-90	1,4-Dichlorobenzene	10	10	UG/L	U	U
0076	01-Feb-91	1,4-Dichlorobenzene	10	10	UG/L	U	U
0076	06-May-91	1,4-Dichlorobenzene	10	10	UG/L	U	U
0076	16-Dec-91	1,4-Dichlorobenzene	10	10	UG/L	U	U
0271	16-Dec-91	1,4-Dichlorobenzene	10	10	UG/L	U	U
0271	11-Oct-93	1,4-Dichlorobenzene	10	10	UG/L	U	U
0271	16-Sep-92	1,4-Dichlorobenzene	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	05-Aug-91	1,4-Dichlorobenzene	10	10	UG/L	U	UJ
0271	06-Nov-90	1,4-Dichlorobenzene	10	10	UG/L	U	U
0076	23-Mar-92	1,4-Dichlorobenzene	10	10	UG/L	U	U
0271	06-May-91	1,4-Dichlorobenzene	10	10	UG/L	U	U
0271	22-Jun-92	1,4-Dichlorobenzene	10	10	UG/L	U	U
0076	07-Apr-94	1,4-Dichlorobenzene	11	11	UG/L	U	U
0271	07-Apr-94	1,4-Dichlorobenzene	11	11	UG/L	U	U
0271	07-Apr-94	1,4-Dichlorobenzene	11	11	UG/L	U	U
0271	07-Apr-94	1,4-Diethylbenzene	1	1	UG/L	U	UJ
0076	11-Oct-93	1,4-Diethylbenzene	1	1	UG/L	U	UJ
0271	07-Apr-94	1,4-Diethylbenzene	1	1	UG/L	U	U
0271	11-Oct-93	1,4-Diethylbenzene	1	1	UG/L	U	UJ
0076	07-Apr-94	1,4-Diethylbenzene	1	1	UG/L	U	U
0076	01-Feb-91	1-Chlorohexane	1	1	UG/L	U	UJ
0076	06-May-91	1-Chlorohexane	1	1	UG/L	U	UJ
0076	22-Jun-92	1-Chlorohexane	1	1	UG/L	U	R
0076	16-Sep-92	1-Chlorohexane	1	1	UG/L	U	UJ
0271	01-Feb-91	1-Chlorohexane	1	1	UG/L	U	UJ
0076	11-Oct-93	1-Chlorohexane	1	1	UG/L	U	UJ
0271	07-Apr-94	1-Chlorohexane	1	1	UG/L	U	UJ
0076	15-Jun-90	1-Chlorohexane	1	1	UG/L	U	U
0271	06-Nov-90	1-Chlorohexane	1	1	UG/L	U	UJ
0271	27-Feb-90	1-Chlorohexane	1	1	UG/L	U	U
0076	06-Nov-90	1-Chlorohexane	1	1	UG/L	U	UJ
0076	23-Mar-90	1-Chlorohexane	1	1	UG/L	U	U
0076	23-Mar-92	1-Chlorohexane	1	1	UG/L	U	U
0271	15-Jun-90	1-Chlorohexane	1	1	UG/L	U	U
0271	07-Apr-94	1-Chlorohexane	1	1	UG/L	U	U
0271	06-May-91	1-Chlorohexane	1	1	UG/L	U	UJ
0271	05-Aug-91	1-Chlorohexane	1	1	UG/L	U	UJ
0076	07-Apr-94	1-Chlorohexane	1	1	UG/L	U	U
0271	16-Sep-92	1-Chlorohexane	1	1	UG/L	U	UJ
0076	27-Feb-90	1-Chlorohexane	1	1	UG/L	U	U
0271	24-Jan-90	1-Chlorohexane	1	1	UG/L	U	U
0076	24-Jan-90	1-Chlorohexane	1	1	UG/L	U	U
0271	11-Oct-93	1-Chlorohexane	1	1	UG/L	U	UJ
0271	27-Feb-90	1-Chlorohexane	1	1	UG/L	U	U
0076	16-Jun-93	1-Chlorohexane	1	1	UG/L	U	U
0271	22-Jun-92	1-Chlorohexane	1	1	UG/L	U	R
0271	23-Mar-90	1-Chlorohexane	1	1	UG/L	U	U
0076	31-Jul-90	1-Chlorohexane	1	1	UG/L	U	U
0271	27-Feb-90	1-Chlorohexane	1	1	UG/L	U	U
0271	31-Jul-90	1-Chlorohexane	1	1	UG/L	U	U
0076	23-Mar-92	2,2'-oxybis(1-chloropropane)	2	2	UG/L	U	UJ
0271	16-Sep-92	2,2'-oxybis(1-chloropropane)	2	2	UG/L	U	UJ
0076	16-Jun-93	2,2'-oxybis(1-chloropropane)	2	2	UG/L	U	U
0076	22-Jun-92	2,2'-oxybis(1-chloropropane)	2	2	UG/L	U	R
0271	22-Jun-92	2,2'-oxybis(1-chloropropane)	2	2	UG/L	U	R
0076	16-Sep-92	2,2'-oxybis(1-chloropropane)	2	2	UG/L	U	UJ
0271	16-Dec-91	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	U
0076	11-Oct-93	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	U
0271	05-Aug-91	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	UJ
0271	06-Nov-90	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	UJ
0076	22-Jun-92	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	U
0076	06-May-91	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	U
0076	16-Dec-91	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	U
0076	23-Mar-92	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	U
0076	01-Feb-91	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	U
0271	16-Sep-92	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	U
0076	06-Nov-90	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	UJ
0271	11-Oct-93	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	U
0271	06-May-91	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	U
0271	22-Jun-92	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	UJ
0076	16-Sep-92	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	U
0271	01-Feb-91	2,2'-oxybis(1-chloropropane)	10	10	UG/L	U	U
0271	07-Apr-94	2,2'-oxybis(1-chloropropane)	11	11	UG/L	U	U
0271	07-Apr-94	2,2'-oxybis(1-chloropropane)	11	11	UG/L	U	U
0076	07-Apr-94	2,2'-oxybis(1-chloropropane)	11	11	UG/L	U	U
0271	23-Mar-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	15-Jun-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0271	06-May-91	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	UJ
0271	05-Aug-91	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	UJ
0271	11-Oct-93	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0076	27-Feb-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0271	01-Feb-91	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	UJ
0076	11-Oct-93	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0076	31-Jul-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0271	06-Nov-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	UJ
0076	06-Nov-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	UJ
0076	07-Apr-94	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0271	31-Jul-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0076	15-Jun-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0076	06-May-91	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	UJ
0271	27-Feb-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0076	24-Jan-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0271	07-Apr-94	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	UJ
0271	27-Feb-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0076	01-Feb-91	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	UJ
0271	27-Feb-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0271	24-Jan-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0271	07-Apr-94	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0076	23-Mar-90	2,2'-oxybis(1-chloropropane)	20	20	UG/L	U	U
0271	11-Oct-93	2,4,5-Trichlorophenol	26	26	UG/L	U	U
0076	07-Apr-94	2,4,5-Trichlorophenol	26	26	UG/L	U	U
0076	16-Sep-92	2,4,5-Trichlorophenol	26	26	UG/L	U	U
0271	07-Apr-94	2,4,5-Trichlorophenol	26	26	UG/L	U	U
0076	22-Jun-92	2,4,5-Trichlorophenol	26	26	UG/L	U	U
0076	11-Oct-93	2,4,5-Trichlorophenol	26	26	UG/L	U	U
0271	22-Jun-92	2,4,5-Trichlorophenol	26	26	UG/L	U	U
0076	23-Mar-92	2,4,5-Trichlorophenol	26	26	UG/L	U	U
0271	07-Apr-94	2,4,5-Trichlorophenol	26	26	UG/L	U	U
0271	16-Sep-92	2,4,5-Trichlorophenol	26	26	UG/L	U	U
0076	01-Feb-91	2,4,5-Trichlorophenol	50	50	UG/L	U	U
0076	06-Nov-90	2,4,5-Trichlorophenol	50	50	UG/L	U	U
0271	16-Dec-91	2,4,5-Trichlorophenol	50	50	UG/L	U	U
0271	06-Nov-90	2,4,5-Trichlorophenol	50	50	UG/L	U	U
0271	05-Aug-91	2,4,5-Trichlorophenol	50	50	UG/L	U	U
0076	16-Dec-91	2,4,5-Trichlorophenol	50	50	UG/L	U	U
0271	01-Feb-91	2,4,5-Trichlorophenol	50	50	UG/L	U	U
0076	06-May-91	2,4,5-Trichlorophenol	50	50	UG/L	U	U
0271	06-May-91	2,4,5-Trichlorophenol	50	50	UG/L	U	U
0076	11-Oct-93	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0271	11-Oct-93	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0076	06-Nov-90	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0271	01-Feb-91	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0271	06-Nov-90	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0076	16-Dec-91	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0271	16-Sep-92	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0271	05-Aug-91	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0076	23-Mar-92	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0076	16-Sep-92	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0271	16-Dec-91	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0076	01-Feb-91	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0271	22-Jun-92	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0076	22-Jun-92	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0271	06-May-91	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0076	06-May-91	2,4,6-Trichlorophenol	10	10	UG/L	U	U
0076	07-Apr-94	2,4,6-Trichlorophenol	11	11	UG/L	U	U
0271	07-Apr-94	2,4,6-Trichlorophenol	11	11	UG/L	U	U
0271	07-Apr-94	2,4,6-Trichlorophenol	11	11	UG/L	U	U
0271	11-Oct-93	2,4,6-Trinitrotoluene	1.3	1.3	UG/L	U	R
0076	11-Oct-93	2,4,6-Trinitrotoluene	1.3	1.3	UG/L	U	R
0076	07-Apr-94	2,4,6-Trinitrotoluene	1.3	1.3	UG/L	U	U
0271	07-Apr-94	2,4,6-Trinitrotoluene	1.3	1.3	UG/L	U	U
0076	01-Feb-91	2,4-Dichlorophenol	10	10	UG/L	U	U
0271	16-Sep-92	2,4-Dichlorophenol	10	10	UG/L	U	U
0076	22-Jun-92	2,4-Dichlorophenol	10	10	UG/L	U	U
0076	23-Mar-92	2,4-Dichlorophenol	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	06-Nov-90	2,4-Dichlorophenol	10	10	UG/L	U	U
0076	06-May-91	2,4-Dichlorophenol	10	10	UG/L	U	U
0271	01-Feb-91	2,4-Dichlorophenol	10	10	UG/L	U	U
0271	22-Jun-92	2,4-Dichlorophenol	10	10	UG/L	U	U
0271	16-Dec-91	2,4-Dichlorophenol	10	10	UG/L	U	U
0076	11-Oct-93	2,4-Dichlorophenol	10	10	UG/L	U	U
0076	16-Sep-92	2,4-Dichlorophenol	10	10	UG/L	U	U
0271	11-Oct-93	2,4-Dichlorophenol	10	10	UG/L	U	U
0271	05-Aug-91	2,4-Dichlorophenol	10	10	UG/L	U	U
0076	16-Dec-91	2,4-Dichlorophenol	10	10	UG/L	U	U
0076	06-Nov-90	2,4-Dichlorophenol	10	10	UG/L	U	U
0271	06-May-91	2,4-Dichlorophenol	10	10	UG/L	U	U
0271	07-Apr-94	2,4-Dichlorophenol	11	11	UG/L	U	U
0271	07-Apr-94	2,4-Dichlorophenol	11	11	UG/L	U	U
0076	07-Apr-94	2,4-Dichlorophenol	11	11	UG/L	U	U
0076	11-Oct-93	2,4-Dimethylphenol	10	10	UG/L	U	U
0076	22-Jun-92	2,4-Dimethylphenol	10	10	UG/L	U	U
0271	05-Aug-91	2,4-Dimethylphenol	10	10	UG/L	U	U
0076	06-Nov-90	2,4-Dimethylphenol	10	10	UG/L	U	U
0271	16-Dec-91	2,4-Dimethylphenol	10	10	UG/L	U	U
0076	23-Mar-92	2,4-Dimethylphenol	10	10	UG/L	U	UJ
0271	01-Feb-91	2,4-Dimethylphenol	10	10	UG/L	U	U
0076	16-Dec-91	2,4-Dimethylphenol	10	10	UG/L	U	U
0271	11-Oct-93	2,4-Dimethylphenol	10	10	UG/L	U	U
0076	06-May-91	2,4-Dimethylphenol	10	10	UG/L	U	U
0076	16-Sep-92	2,4-Dimethylphenol	10	10	UG/L	U	U
0271	06-May-91	2,4-Dimethylphenol	10	10	UG/L	U	U
0271	16-Sep-92	2,4-Dimethylphenol	10	10	UG/L	U	U
0076	01-Feb-91	2,4-Dimethylphenol	10	10	UG/L	U	U
0271	22-Jun-92	2,4-Dimethylphenol	10	10	UG/L	U	U
0271	06-Nov-90	2,4-Dimethylphenol	10	10	UG/L	U	U
0076	07-Apr-94	2,4-Dimethylphenol	11	11	UG/L	U	U
0271	07-Apr-94	2,4-Dimethylphenol	11	11	UG/L	U	U
0271	07-Apr-94	2,4-Dimethylphenol	11	11	UG/L	U	U
0076	16-Sep-92	2,4-Dinitrophenol	26	26	UG/L	U	UJ
0076	23-Mar-92	2,4-Dinitrophenol	26	26	UG/L	U	U
0271	07-Apr-94	2,4-Dinitrophenol	26	26	UG/L	U	U
0076	22-Jun-92	2,4-Dinitrophenol	26	26	UG/L	U	U
0076	07-Apr-94	2,4-Dinitrophenol	26	26	UG/L	U	U
0076	11-Oct-93	2,4-Dinitrophenol	26	26	UG/L	U	UJ
0271	07-Apr-94	2,4-Dinitrophenol	26	26	UG/L	U	U
0271	11-Oct-93	2,4-Dinitrophenol	26	26	UG/L	U	UJ
0271	16-Sep-92	2,4-Dinitrophenol	26	26	UG/L	U	UJ
0271	22-Jun-92	2,4-Dinitrophenol	26	26	UG/L	U	U
0076	06-Nov-90	2,4-Dinitrophenol	50	50	UG/L	U	U
0271	05-Aug-91	2,4-Dinitrophenol	50	50	UG/L	U	UJ
0271	06-May-91	2,4-Dinitrophenol	50	50	UG/L	U	UJ
0076	16-Dec-91	2,4-Dinitrophenol	50	50	UG/L	U	U
0271	01-Feb-91	2,4-Dinitrophenol	50	50	UG/L	U	UJ
0271	06-Nov-90	2,4-Dinitrophenol	50	50	UG/L	U	U
0271	16-Dec-91	2,4-Dinitrophenol	50	50	UG/L	U	U
0076	06-May-91	2,4-Dinitrophenol	50	50	UG/L	U	UJ
0076	01-Feb-91	2,4-Dinitrophenol	50	50	UG/L	U	UJ
0271	07-Apr-94	2,4-Dinitrotoluene	0.31	0.31	UG/L	U	U
0076	11-Oct-93	2,4-Dinitrotoluene	0.31	0.31	UG/L	U	R
0076	07-Apr-94	2,4-Dinitrotoluene	0.31	0.31	UG/L	U	U
0271	11-Oct-93	2,4-Dinitrotoluene	0.31	0.31	UG/L	U	R
0271	06-Nov-90	2,4-Dinitrotoluene	10	10	UG/L	U	U
0076	06-Nov-90	2,4-Dinitrotoluene	10	10	UG/L	U	U
0271	11-Oct-93	2,4-Dinitrotoluene	10	10	UG/L	U	U
0271	01-Feb-91	2,4-Dinitrotoluene	10	10	UG/L	U	U
0076	16-Dec-91	2,4-Dinitrotoluene	10	10	UG/L	U	U
0271	16-Dec-91	2,4-Dinitrotoluene	10	10	UG/L	U	U
0076	22-Jun-92	2,4-Dinitrotoluene	10	10	UG/L	U	U
0076	16-Sep-92	2,4-Dinitrotoluene	10	10	UG/L	U	U
0271	22-Jun-92	2,4-Dinitrotoluene	10	10	UG/L	U	U
0076	06-May-91	2,4-Dinitrotoluene	10	10	UG/L	U	U
0271	06-May-91	2,4-Dinitrotoluene	10	10	UG/L	U	U
0076	11-Oct-93	2,4-Dinitrotoluene	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	18-Sep-92	2,4-Dinitrotoluene	10	10	UG/L	U	U
0271	05-Aug-91	2,4-Dinitrotoluene	10	10	UG/L	U	UJ
0076	01-Feb-91	2,4-Dinitrotoluene	10	10	UG/L	U	U
0076	23-Mar-92	2,4-Dinitrotoluene	10	10	UG/L	U	U
0076	07-Apr-94	2,4-Dinitrotoluene	11	11	UG/L	U	U
0271	07-Apr-94	2,4-Dinitrotoluene	11	11	UG/L	U	U
0271	07-Apr-94	2,4-Dinitrotoluene	11	11	UG/L	U	U
0076	07-Apr-94	2,6-Dinitrotoluene	0.31	0.31	UG/L	U	U
0271	11-Oct-93	2,6-Dinitrotoluene	0.31	0.31	UG/L	U	R
0271	07-Apr-94	2,6-Dinitrotoluene	0.31	0.31	UG/L	U	U
0076	11-Oct-93	2,6-Dinitrotoluene	0.31	0.31	UG/L	U	R
0076	06-Nov-90	2,6-Dinitrotoluene	10	10	UG/L	U	U
0076	23-Mar-92	2,6-Dinitrotoluene	10	10	UG/L	U	U
0076	16-Dec-91	2,6-Dinitrotoluene	10	10	UG/L	U	U
0271	06-May-91	2,6-Dinitrotoluene	10	10	UG/L	U	U
0076	11-Oct-93	2,6-Dinitrotoluene	10	10	UG/L	U	U
0076	01-Feb-91	2,6-Dinitrotoluene	10	10	UG/L	U	U
0271	01-Feb-91	2,6-Dinitrotoluene	10	10	UG/L	U	U
0271	16-Sep-92	2,6-Dinitrotoluene	10	10	UG/L	U	U
0271	06-Nov-90	2,6-Dinitrotoluene	10	10	UG/L	U	U
0076	22-Jun-92	2,6-Dinitrotoluene	10	10	UG/L	U	U
0271	22-Jun-92	2,6-Dinitrotoluene	10	10	UG/L	U	U
0271	16-Dec-91	2,6-Dinitrotoluene	10	10	UG/L	U	U
0271	11-Oct-93	2,6-Dinitrotoluene	10	10	UG/L	U	U
0076	06-May-91	2,6-Dinitrotoluene	10	10	UG/L	U	U
0271	05-Aug-91	2,6-Dinitrotoluene	10	10	UG/L	U	UJ
0076	16-Sep-92	2,6-Dinitrotoluene	10	10	UG/L	U	U
0271	07-Apr-94	2,6-Dinitrotoluene	11	11	UG/L	U	U
0076	07-Apr-94	2,6-Dinitrotoluene	11	11	UG/L	U	U
0271	07-Apr-94	2,6-Dinitrotoluene	11	11	UG/L	U	U
0076	07-Apr-94	2-Amino-4,6-dinitrotoluene	0.62	0.62	UG/L	U	U
0076	11-Oct-93	2-Amino-4,6-dinitrotoluene	0.62	0.62	UG/L	U	UJ
0271	07-Apr-94	2-Amino-4,6-dinitrotoluene	0.62	0.62	UG/L	U	U
0271	11-Oct-93	2-Amino-4,6-dinitrotoluene	0.62	0.62	UG/L	U	UJ
0076	11-Oct-93	2-Benzyl-4-Chlorophenol	10	10	UG/L	U	U
0271	11-Oct-93	2-Benzyl-4-Chlorophenol	10	10	UG/L	U	U
0271	07-Apr-94	2-Benzyl-4-Chlorophenol	11	11	UG/L	U	U
0271	07-Apr-94	2-Benzyl-4-Chlorophenol	11	11	UG/L	U	U
0076	07-Apr-94	2-Benzyl-4-Chlorophenol	11	11	UG/L	U	U
0271	25-Apr-90	2-Butanone	7	10	UG/L	JB	
0271	11-Oct-93	2-Butanone	10	10	UG/L	U	UJ
0076	24-Jun-88	2-Butanone	10	10	UG/L	U	U
0076	13-Sep-88	2-Butanone	10	10	UG/L	U	U
0076	11-Oct-93	2-Butanone	10	10	UG/L	U	UJ
0271	13-Sep-88	2-Butanone	10	10	UG/L	U	U
0271	07-Apr-94	2-Butanone	10	10	UG/L	U	UJ
0076	07-Apr-94	2-Butanone	10	10	UG/L	U	UJ
0271	24-Jun-88	2-Butanone	10	10	UG/L	U	U
0271	07-Apr-94	2-Butanone	10	10	UG/L	U	U
0076	25-Apr-90	2-Butanone	11	10	UG/L	B	
0271	08-Mar-88	2-Butanone	41	10	UG/L		
0076	13-Sep-88	2-Chloroethylvinylether	1	1	UG/L	U	U
0271	13-Sep-88	2-Chloroethylvinylether	1	1	UG/L	U	U
0271	23-Mar-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0076	31-Jul-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0271	05-Aug-91	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0271	31-Jul-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0271	27-Feb-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0271	07-Apr-94	2-Chloroethylvinylether	1.3	1.3	UG/L	U	R
0076	06-Nov-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	UJ
0076	22-Jun-92	2-Chloroethylvinylether	1.3	1.3	UG/L	U	R
0271	22-Jun-92	2-Chloroethylvinylether	1.3	1.3	UG/L	U	R
0076	16-Jun-93	2-Chloroethylvinylether	1.3	1.3	UG/L	U	UJ
0076	23-Mar-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0076	16-Sep-92	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0271	24-Jan-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0271	27-Feb-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0076	07-Apr-94	2-Chloroethylvinylether	1.3	1.3	UG/L	U	R
0271	06-May-91	2-Chloroethylvinylether	1.3	1.3	UG/L	U	UJ

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	15-Jun-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0076	06-May-91	2-Chloroethylvinylether	1.3	1.3	UG/L	U	UJ
0076	11-Oct-93	2-Chloroethylvinylether	1.3	1.3	UG/L	U	R
0271	16-Sep-92	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0271	01-Feb-91	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0076	01-Feb-91	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0076	15-Jun-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0076	23-Mar-92	2-Chloroethylvinylether	1.3	1.3	UG/L	U	UJ
0271	06-Nov-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0271	11-Oct-93	2-Chloroethylvinylether	1.3	1.3	UG/L	U	R
0076	27-Feb-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0076	24-Jan-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0271	27-Feb-90	2-Chloroethylvinylether	1.3	1.3	UG/L	U	U
0271	07-Apr-94	2-Chloroethylvinylether	1.3	1.3	UG/L	U	R
0271	16-Dec-91	2-Chloroethylvinylether	5	5	UG/L	U	U
0076	16-Dec-91	2-Chloroethylvinylether	5	5	UG/L	U	U
0271	08-Mar-88	2-Chloroethylvinylether	10	10	UG/L	U	U
0271	24-Jun-88	2-Chloroethylvinylether	10	10	UG/L	U	U
0076	24-Jun-88	2-Chloroethylvinylether	10	10	UG/L	U	U
0076	13-Sep-88	2-Chloroethylvinylether	10	10	UG/L	U	U
0271	13-Sep-88	2-Chloroethylvinylether	10	10	UG/L	U	U
0076	16-Sep-92	2-Chloronaphthalene	10	10	UG/L	U	U
0271	22-Jun-92	2-Chloronaphthalene	10	10	UG/L	U	U
0271	01-Feb-91	2-Chloronaphthalene	10	10	UG/L	U	U
0076	11-Oct-93	2-Chloronaphthalene	10	10	UG/L	U	U
0076	01-Feb-91	2-Chloronaphthalene	10	10	UG/L	U	U
0271	06-May-91	2-Chloronaphthalene	10	10	UG/L	U	U
0271	06-Nov-90	2-Chloronaphthalene	10	10	UG/L	U	U
0076	23-Mar-92	2-Chloronaphthalene	10	10	UG/L	U	U
0271	16-Sep-92	2-Chloronaphthalene	10	10	UG/L	U	U
0271	11-Oct-93	2-Chloronaphthalene	10	10	UG/L	U	U
0076	06-May-91	2-Chloronaphthalene	10	10	UG/L	U	U
0076	22-Jun-92	2-Chloronaphthalene	10	10	UG/L	U	U
0271	16-Dec-91	2-Chloronaphthalene	10	10	UG/L	U	U
0076	06-Nov-90	2-Chloronaphthalene	10	10	UG/L	U	U
0076	16-Dec-91	2-Chloronaphthalene	10	10	UG/L	U	U
0271	05-Aug-91	2-Chloronaphthalene	10	10	UG/L	U	UJ
0076	07-Apr-94	2-Chloronaphthalene	11	11	UG/L	U	U
0271	07-Apr-94	2-Chloronaphthalene	11	11	UG/L	U	U
0271	07-Apr-94	2-Chloronaphthalene	11	11	UG/L	U	U
0271	16-Sep-92	2-Chlorophenol	10	10	UG/L	U	U
0076	22-Jun-92	2-Chlorophenol	10	10	UG/L	U	U
0271	22-Jun-92	2-Chlorophenol	10	10	UG/L	U	U
0076	23-Mar-92	2-Chlorophenol	10	10	UG/L	U	U
0076	06-May-91	2-Chlorophenol	10	10	UG/L	U	U
0076	01-Feb-91	2-Chlorophenol	10	10	UG/L	U	U
0076	16-Dec-91	2-Chlorophenol	10	10	UG/L	U	U
0271	05-Aug-91	2-Chlorophenol	10	10	UG/L	U	U
0271	06-May-91	2-Chlorophenol	10	10	UG/L	U	U
0271	06-Nov-90	2-Chlorophenol	10	10	UG/L	U	U
0271	11-Oct-93	2-Chlorophenol	10	10	UG/L	U	U
0271	01-Feb-91	2-Chlorophenol	10	10	UG/L	U	U
0076	11-Oct-93	2-Chlorophenol	10	10	UG/L	U	U
0076	06-Nov-90	2-Chlorophenol	10	10	UG/L	U	U
0271	16-Dec-91	2-Chlorophenol	10	10	UG/L	U	U
0076	16-Sep-92	2-Chlorophenol	10	10	UG/L	U	U
0271	07-Apr-94	2-Chlorophenol	11	11	UG/L	U	U
0271	07-Apr-94	2-Chlorophenol	11	11	UG/L	U	U
0076	07-Apr-94	2-Chlorophenol	11	11	UG/L	U	U
0271	16-Sep-92	2-Chlorotoluene	1	1	UG/L	U	U
0076	11-Oct-93	2-Chlorotoluene	1	1	UG/L	U	UJ
0271	07-Apr-94	2-Chlorotoluene	1	1	UG/L	U	U
0076	16-Dec-91	2-Chlorotoluene	1	1	UG/L	U	UJ
0076	07-Apr-94	2-Chlorotoluene	1	1	UG/L	U	U
0271	11-Oct-93	2-Chlorotoluene	1	1	UG/L	U	UJ
0271	07-Apr-94	2-Chlorotoluene	1	1	UG/L	U	U
0076	16-Sep-92	2-Chlorotoluene	1	1	UG/L	U	U
0076	16-Jun-93	2-Chlorotoluene	1	1	UG/L	U	U
0271	22-Jun-92	2-Chlorotoluene	1	1	UG/L	U	R

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	22-Jun-92	2-Chlorotoluene	1	1	UG/L	U	R
0076	23-Mar-92	2-Chlorotoluene	1	1	UG/L	U	U
0271	16-Dec-91	2-Chlorotoluene	1	1	UG/L	U	UJ
0271	13-Sep-88	2-Hexanone	10	10	UG/L	U	U
0271	24-Jun-88	2-Hexanone	10	10	UG/L	U	U
0076	13-Sep-88	2-Hexanone	10	10	UG/L	U	U
0271	25-Apr-90	2-Hexanone	10	10	UG/L	U	U
0076	24-Jun-88	2-Hexanone	10	10	UG/L	U	U
0271	08-Mar-88	2-Hexanone	10	10	UG/L	U	U
0076	25-Apr-90	2-Hexanone	10	10	UG/L	U	U
0271	06-May-91	2-Methylnaphthalene	10	10	UG/L	U	U
0271	01-Feb-91	2-Methylnaphthalene	10	10	UG/L	U	U
0076	16-Dec-91	2-Methylnaphthalene	10	10	UG/L	U	U
0076	06-May-91	2-Methylnaphthalene	10	10	UG/L	U	U
0271	22-Jun-92	2-Methylnaphthalene	10	10	UG/L	U	U
0271	05-Aug-91	2-Methylnaphthalene	10	10	UG/L	U	UJ
0076	11-Oct-93	2-Methylnaphthalene	10	10	UG/L	U	U
0076	06-Nov-90	2-Methylnaphthalene	10	10	UG/L	U	U
0271	11-Oct-93	2-Methylnaphthalene	10	10	UG/L	U	U
0076	01-Feb-91	2-Methylnaphthalene	10	10	UG/L	U	U
0076	22-Jun-92	2-Methylnaphthalene	10	10	UG/L	U	U
0271	16-Sep-92	2-Methylnaphthalene	10	10	UG/L	U	U
0271	16-Dec-91	2-Methylnaphthalene	10	10	UG/L	U	U
0076	16-Sep-92	2-Methylnaphthalene	10	10	UG/L	U	U
0271	06-Nov-90	2-Methylnaphthalene	10	10	UG/L	U	U
0076	23-Mar-92	2-Methylnaphthalene	10	10	UG/L	U	U
0271	07-Apr-94	2-Methylnaphthalene	11	11	UG/L	U	U
0076	07-Apr-94	2-Methylnaphthalene	11	11	UG/L	U	U
0271	07-Apr-94	2-Methylnaphthalene	11	11	UG/L	U	U
0076	06-May-91	2-Methylphenol	10	10	UG/L	U	U
0271	01-Feb-91	2-Methylphenol	10	10	UG/L	U	U
0076	16-Dec-91	2-Methylphenol	10	10	UG/L	U	U
0271	11-Oct-93	2-Methylphenol	10	10	UG/L	U	U
0271	05-Aug-91	2-Methylphenol	10	10	UG/L	U	U
0076	06-Nov-90	2-Methylphenol	10	10	UG/L	U	U
0076	22-Jun-92	2-Methylphenol	10	10	UG/L	U	U
0076	23-Mar-92	2-Methylphenol	10	10	UG/L	U	U
0271	16-Dec-91	2-Methylphenol	10	10	UG/L	U	U
0271	06-May-91	2-Methylphenol	10	10	UG/L	U	U
0271	06-Nov-90	2-Methylphenol	10	10	UG/L	U	U
0076	16-Sep-92	2-Methylphenol	10	10	UG/L	U	U
0076	01-Feb-91	2-Methylphenol	10	10	UG/L	U	U
0076	11-Oct-93	2-Methylphenol	10	10	UG/L	U	U
0271	22-Jun-92	2-Methylphenol	10	10	UG/L	U	U
0271	16-Sep-92	2-Methylphenol	10	10	UG/L	U	U
0076	07-Apr-94	2-Methylphenol	11	11	UG/L	U	U
0271	07-Apr-94	2-Methylphenol	11	11	UG/L	U	U
0271	07-Apr-94	2-Methylphenol	11	11	UG/L	U	U
0076	07-Apr-94	2-Nitroaniline	26	26	UG/L	U	U
0271	07-Apr-94	2-Nitroaniline	26	26	UG/L	U	U
0076	11-Oct-93	2-Nitroaniline	26	26	UG/L	U	UJ
0271	07-Apr-94	2-Nitroaniline	26	26	UG/L	U	U
0076	23-Mar-92	2-Nitroaniline	26	26	UG/L	U	U
0076	16-Sep-92	2-Nitroaniline	26	26	UG/L	U	U
0076	22-Jun-92	2-Nitroaniline	26	26	UG/L	U	U
0271	11-Oct-93	2-Nitroaniline	26	26	UG/L	U	UJ
0271	22-Jun-92	2-Nitroaniline	26	26	UG/L	U	UJ
0271	16-Sep-92	2-Nitroaniline	26	26	UG/L	U	U
0076	01-Feb-91	2-Nitroaniline	50	50	UG/L	U	U
0076	06-May-91	2-Nitroaniline	50	50	UG/L	U	U
0271	16-Dec-91	2-Nitroaniline	50	50	UG/L	U	U
0271	05-Aug-91	2-Nitroaniline	50	50	UG/L	U	UJ
0271	01-Feb-91	2-Nitroaniline	50	50	UG/L	U	U
0271	06-May-91	2-Nitroaniline	50	50	UG/L	U	U
0271	06-Nov-90	2-Nitroaniline	50	50	UG/L	U	U
0076	06-Nov-90	2-Nitroaniline	50	50	UG/L	U	U
0076	16-Dec-91	2-Nitroaniline	50	50	UG/L	U	U
0076	11-Oct-93	2-Nitrophenol	10	10	UG/L	U	U
0076	01-Feb-91	2-Nitrophenol	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	22-Jun-92	2-Nitrophenol	10	10	UG/L	U	U
0271	06-Nov-90	2-Nitrophenol	10	10	UG/L	U	U
0076	23-Mar-92	2-Nitrophenol	10	10	UG/L	U	U
0271	06-May-91	2-Nitrophenol	10	10	UG/L	U	U
0271	22-Jun-92	2-Nitrophenol	10	10	UG/L	U	U
0271	16-Sep-92	2-Nitrophenol	10	10	UG/L	U	U
0076	16-Sep-92	2-Nitrophenol	10	10	UG/L	U	U
0271	16-Dec-91	2-Nitrophenol	10	10	UG/L	U	U
0271	05-Aug-91	2-Nitrophenol	10	10	UG/L	U	U
0271	11-Oct-93	2-Nitrophenol	10	10	UG/L	U	U
0271	01-Feb-91	2-Nitrophenol	10	10	UG/L	U	U
0076	06-May-91	2-Nitrophenol	10	10	UG/L	U	U
0076	06-Nov-90	2-Nitrophenol	10	10	UG/L	U	U
0076	16-Dec-91	2-Nitrophenol	10	10	UG/L	U	U
0271	07-Apr-94	2-Nitrophenol	11	11	UG/L	U	U
0076	07-Apr-94	2-Nitrophenol	11	11	UG/L	U	U
0271	07-Apr-94	2-Nitrophenol	11	11	UG/L	U	U
0076	16-Sep-92	3,3'-Dichlorobenzidine	10	10	UG/L	U	UJ
0076	23-Mar-92	3,3'-Dichlorobenzidine	10	10	UG/L	U	U
0076	11-Oct-93	3,3'-Dichlorobenzidine	10	10	UG/L	U	U
0076	22-Jun-92	3,3'-Dichlorobenzidine	10	10	UG/L	U	UJ
0271	11-Oct-93	3,3'-Dichlorobenzidine	10	10	UG/L	U	U
0271	16-Sep-92	3,3'-Dichlorobenzidine	10	10	UG/L	U	UJ
0271	22-Jun-92	3,3'-Dichlorobenzidine	10	10	UG/L	U	U
0271	07-Apr-94	3,3'-Dichlorobenzidine	11	11	UG/L	U	U
0076	07-Apr-94	3,3'-Dichlorobenzidine	11	11	UG/L	U	U
0271	07-Apr-94	3,3'-Dichlorobenzidine	11	11	UG/L	U	U
0076	16-Dec-91	3,3'-Dichlorobenzidine	20	20	UG/L	U	U
0076	01-Feb-91	3,3'-Dichlorobenzidine	20	20	UG/L	U	U
0271	16-Dec-91	3,3'-Dichlorobenzidine	20	20	UG/L	U	U
0076	06-May-91	3,3'-Dichlorobenzidine	20	20	UG/L	U	U
0271	05-Aug-91	3,3'-Dichlorobenzidine	20	20	UG/L	U	UJ
0076	06-Nov-90	3,3'-Dichlorobenzidine	20	20	UG/L	U	U
0271	06-May-91	3,3'-Dichlorobenzidine	20	20	UG/L	U	U
0271	01-Feb-91	3,3'-Dichlorobenzidine	20	20	UG/L	U	U
0271	06-Nov-90	3,3'-Dichlorobenzidine	20	20	UG/L	U	U
0076	11-Oct-93	3-Nitroaniline	26	26	UG/L	U	U
0271	16-Sep-92	3-Nitroaniline	26	26	UG/L	U	U
0271	11-Oct-93	3-Nitroaniline	26	26	UG/L	U	U
0271	07-Apr-94	3-Nitroaniline	26	26	UG/L	U	U
0271	22-Jun-92	3-Nitroaniline	26	26	UG/L	U	UJ
0076	16-Sep-92	3-Nitroaniline	26	26	UG/L	U	U
0271	07-Apr-94	3-Nitroaniline	26	26	UG/L	U	U
0076	23-Mar-92	3-Nitroaniline	26	26	UG/L	U	U
0076	07-Apr-94	3-Nitroaniline	26	26	UG/L	U	U
0076	22-Jun-92	3-Nitroaniline	26	26	UG/L	U	U
0271	06-Nov-90	3-Nitroaniline	50	50	UG/L	U	U
0076	01-Feb-91	3-Nitroaniline	50	50	UG/L	U	U
0271	06-May-91	3-Nitroaniline	50	50	UG/L	U	U
0076	06-Nov-90	3-Nitroaniline	50	50	UG/L	U	U
0076	16-Dec-91	3-Nitroaniline	50	50	UG/L	U	U
0271	01-Feb-91	3-Nitroaniline	50	50	UG/L	U	U
0271	16-Dec-91	3-Nitroaniline	50	50	UG/L	U	U
0271	05-Aug-91	3-Nitroaniline	50	50	UG/L	U	UJ
0076	06-May-91	3-Nitroaniline	50	50	UG/L	U	U
0076	22-Jun-92	4,4'-DDD	0.1	0.1	UG/L	U	U
0076	16-Sep-92	4,4'-DDD	0.1	0.1	UG/L	U	U
0076	11-Oct-93	4,4'-DDD	0.1	0.1	UG/L	U	UJ
0271	07-Apr-94	4,4'-DDD	0.1	0.1	UG/L	U	U
0076	01-Feb-91	4,4'-DDD	0.1	0.1	UG/L	U	U
0076	06-May-91	4,4'-DDD	0.1	0.1	UG/L	U	U
0076	06-Nov-90	4,4'-DDD	0.1	0.1	UG/L	U	U
0271	05-Aug-91	4,4'-DDD	0.1	0.1	UG/L	U	U
0271	07-Apr-94	4,4'-DDD	0.1	0.1	UG/L	U	U
0271	01-Feb-91	4,4'-DDD	0.1	0.1	UG/L	U	U
0271	22-Jun-92	4,4'-DDD	0.1	0.1	UG/L	U	U
0271	16-Dec-91	4,4'-DDD	0.1	0.1	UG/L	U	U
0271	11-Oct-93	4,4'-DDD	0.1	0.1	UG/L	U	U
0271	06-Nov-90	4,4'-DDD	0.1	0.1	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	06-May-91	4,4'-DDD	0.1	0.1	UG/L	U	U
0271	16-Sep-92	4,4'-DDD	0.1	0.1	UG/L	U	U
0076	16-Dec-91	4,4'-DDD	0.1	0.1	UG/L	U	U
0076	07-Apr-94	4,4'-DDD	0.11	0.11	UG/L	U	U
0076	23-Mar-92	4,4'-DDD	0.11	0.11	UG/L	U	U
0076	06-May-91	4,4'-DDD	0.5	0.5	UG/L	U	U
0271	06-May-91	4,4'-DDD	1.5	1.5	UG/L	U	U
0271	05-Aug-91	4,4'-DDE	0.04	0.04	UG/L	U	U
0076	01-Feb-91	4,4'-DDE	0.1	0.1	UG/L	U	U
0076	06-May-91	4,4'-DDE	0.1	0.1	UG/L	U	U
0271	07-Apr-94	4,4'-DDE	0.1	0.1	UG/L	U	U
0076	11-Oct-93	4,4'-DDE	0.1	0.1	UG/L	U	UJ
0076	16-Sep-92	4,4'-DDE	0.1	0.1	UG/L	U	U
0271	01-Feb-91	4,4'-DDE	0.1	0.1	UG/L	U	U
0076	22-Jun-92	4,4'-DDE	0.1	0.1	UG/L	U	U
0271	06-May-91	4,4'-DDE	0.1	0.1	UG/L	U	U
0271	16-Dec-91	4,4'-DDE	0.1	0.1	UG/L	U	U
0271	07-Apr-94	4,4'-DDE	0.1	0.1	UG/L	U	U
0076	16-Dec-91	4,4'-DDE	0.1	0.1	UG/L	U	U
0076	06-Nov-90	4,4'-DDE	0.1	0.1	UG/L	U	U
0271	22-Jun-92	4,4'-DDE	0.1	0.1	UG/L	U	U
0271	16-Sep-92	4,4'-DDE	0.1	0.1	UG/L	U	U
0271	11-Oct-93	4,4'-DDE	0.1	0.1	UG/L	U	U
0271	06-Nov-90	4,4'-DDE	0.1	0.1	UG/L	U	U
0076	07-Apr-94	4,4'-DDE	0.11	0.11	UG/L	U	U
0076	23-Mar-92	4,4'-DDE	0.11	0.11	UG/L	U	U
0076	06-May-91	4,4'-DDE	0.5	0.5	UG/L	U	U
0271	06-May-91	4,4'-DDE	1.5	1.5	UG/L	U	U
0271	22-Jun-92	4,4'-DDT	0.1	0.1	UG/L	U	U
0271	06-May-91	4,4'-DDT	0.1	0.1	UG/L	U	U
0271	16-Dec-91	4,4'-DDT	0.1	0.1	UG/L	U	U
0076	06-Nov-90	4,4'-DDT	0.1	0.1	UG/L	U	U
0076	06-May-91	4,4'-DDT	0.1	0.1	UG/L	U	U
0076	16-Sep-92	4,4'-DDT	0.1	0.1	UG/L	U	UJ
0271	06-Nov-90	4,4'-DDT	0.1	0.1	UG/L	U	U
0271	05-Aug-91	4,4'-DDT	0.1	0.1	UG/L	U	U
0271	07-Apr-94	4,4'-DDT	0.1	0.1	UG/L	U	U
0271	07-Apr-94	4,4'-DDT	0.1	0.1	UG/L	U	U
0076	01-Feb-91	4,4'-DDT	0.1	0.1	UG/L	U	U
0076	11-Oct-93	4,4'-DDT	0.1	0.1	UG/L	U	UJ
0271	11-Oct-93	4,4'-DDT	0.1	0.1	UG/L	U	U
0271	01-Feb-91	4,4'-DDT	0.1	0.1	UG/L	U	U
0271	16-Sep-92	4,4'-DDT	0.1	0.1	UG/L	U	UJ
0076	22-Jun-92	4,4'-DDT	0.1	0.1	UG/L		U
0076	16-Dec-91	4,4'-DDT	0.1	0.1	UG/L	U	U
0076	07-Apr-94	4,4'-DDT	0.11	0.11	UG/L	U	U
0076	23-Mar-92	4,4'-DDT	0.11	0.11	UG/L	U	U
0076	06-May-91	4,4'-DDT	0.5	0.5	UG/L	U	U
0271	06-May-91	4,4'-DDT	1.5	1.5	UG/L	U	U
0271	07-Apr-94	4,6-Dinitro-o-Cresol	26	26	UG/L	U	U
0076	22-Jun-92	4,6-Dinitro-o-Cresol	26	26	UG/L	U	U
0271	07-Apr-94	4,6-Dinitro-o-Cresol	26	26	UG/L	U	U
0271	11-Oct-93	4,6-Dinitro-o-Cresol	26	26	UG/L	U	U
0076	16-Sep-92	4,6-Dinitro-o-Cresol	26	26	UG/L	U	UJ
0271	16-Sep-92	4,6-Dinitro-o-Cresol	26	26	UG/L	U	UJ
0271	22-Jun-92	4,6-Dinitro-o-Cresol	26	26	UG/L	U	U
0076	23-Mar-92	4,6-Dinitro-o-Cresol	26	26	UG/L	U	U
0076	07-Apr-94	4,6-Dinitro-o-Cresol	26	26	UG/L	U	U
0076	11-Oct-93	4,6-Dinitro-o-Cresol	26	26	UG/L	U	U
0076	01-Feb-91	4,6-Dinitro-o-Cresol	50	50	UG/L	U	U
0271	01-Feb-91	4,6-Dinitro-o-Cresol	50	50	UG/L	U	U
0076	06-May-91	4,6-Dinitro-o-Cresol	50	50	UG/L	U	U
0076	16-Dec-91	4,6-Dinitro-o-Cresol	50	50	UG/L	U	U
0271	16-Dec-91	4,6-Dinitro-o-Cresol	50	50	UG/L	U	U
0271	06-Nov-90	4,6-Dinitro-o-Cresol	50	50	UG/L	U	U
0271	06-May-91	4,6-Dinitro-o-Cresol	50	50	UG/L	U	U
0271	05-Aug-91	4,6-Dinitro-o-Cresol	50	50	UG/L	U	UJ
0076	06-Nov-90	4,6-Dinitro-o-Cresol	50	50	UG/L	U	U
0271	01-Feb-91	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	06-Nov-90	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0271	05-Aug-91	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	UJ
0271	06-May-91	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0271	11-Oct-93	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0076	23-Mar-92	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0076	06-Nov-90	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0076	06-May-91	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0271	16-Sep-92	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0076	16-Dec-91	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0076	22-Jun-92	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0271	16-Dec-91	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0076	16-Sep-92	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0271	22-Jun-92	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0076	01-Feb-91	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0076	11-Oct-93	4-Bromophenyl-phenyl Ether	10	10	UG/L	U	U
0271	07-Apr-94	4-Bromophenyl-phenyl Ether	11	11	UG/L	U	U
0271	07-Apr-94	4-Bromophenyl-phenyl Ether	11	11	UG/L	U	U
0076	07-Apr-94	4-Bromophenyl-phenyl Ether	11	11	UG/L	U	U
0076	06-Nov-90	4-Chloroaniline	10	10	UG/L	U	U
0271	06-May-91	4-Chloroaniline	10	10	UG/L	U	U
0271	11-Oct-93	4-Chloroaniline	10	10	UG/L	U	U
0076	16-Dec-91	4-Chloroaniline	10	10	UG/L	U	U
0076	06-May-91	4-Chloroaniline	10	10	UG/L	U	U
0076	22-Jun-92	4-Chloroaniline	10	10	UG/L	U	U
0271	05-Aug-91	4-Chloroaniline	10	10	UG/L	U	UJ
0271	16-Dec-91	4-Chloroaniline	10	10	UG/L	U	U
0076	01-Feb-91	4-Chloroaniline	10	10	UG/L	U	U
0076	11-Oct-93	4-Chloroaniline	10	10	UG/L	U	U
0271	01-Feb-91	4-Chloroaniline	10	10	UG/L	U	U
0076	16-Sep-92	4-Chloroaniline	10	10	UG/L	U	U
0271	06-Nov-90	4-Chloroaniline	10	10	UG/L	U	U
0076	23-Mar-92	4-Chloroaniline	10	10	UG/L	U	U
0271	22-Jun-92	4-Chloroaniline	10	10	UG/L	U	U
0271	16-Sep-92	4-Chloroaniline	10	10	UG/L	U	U
0271	07-Apr-94	4-Chloroaniline	11	11	UG/L	U	U
0076	07-Apr-94	4-Chloroaniline	11	11	UG/L	U	U
0271	07-Apr-94	4-Chloroaniline	11	11	UG/L	U	U
0076	01-Feb-91	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0271	06-Nov-90	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0076	22-Jun-92	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0271	05-Aug-91	4-Chlorophenyl-phenylether	10	10	UG/L	U	UJ
0271	01-Feb-91	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0271	06-May-91	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0076	16-Dec-91	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0271	22-Jun-92	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0076	23-Mar-92	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0076	11-Oct-93	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0271	16-Dec-91	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0076	16-Sep-92	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0271	11-Oct-93	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0076	06-Nov-90	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0076	06-May-91	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0271	16-Sep-92	4-Chlorophenyl-phenylether	10	10	UG/L	U	U
0076	07-Apr-94	4-Chlorophenyl-phenylether	11	11	UG/L	U	U
0271	07-Apr-94	4-Chlorophenyl-phenylether	11	11	UG/L	U	U
0271	07-Apr-94	4-Chlorophenyl-phenylether	11	11	UG/L	U	U
0076	07-Apr-94	4-Chlorotoluene	1	1	UG/L	U	U
0271	11-Oct-93	4-Chlorotoluene	1	1	UG/L	U	UJ
0076	11-Oct-93	4-Chlorotoluene	1	1	UG/L	U	UJ
0271	07-Apr-94	4-Chlorotoluene	1	1	UG/L	U	U
0271	07-Apr-94	4-Chlorotoluene	1	1	UG/L	U	U
0271	11-Oct-93	4-Methyl-2-pentanone	5	5	UG/L	U	UJ
0076	11-Oct-93	4-Methyl-2-pentanone	5	5	UG/L	U	UJ
0076	07-Apr-94	4-Methyl-2-pentanone	5	5	UG/L	U	UJ
0271	07-Apr-94	4-Methyl-2-pentanone	5	5	UG/L	U	UJ
0271	07-Apr-94	4-Methyl-2-pentanone	5	5	UG/L	U	U
0271	13-Sep-88	4-Methyl-2-pentanone	10	10	UG/L	U	U
0076	25-Apr-90	4-Methyl-2-pentanone	10	10	UG/L	U	U
0271	25-Apr-90	4-Methyl-2-pentanone	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	08-Mar-88	4-Methyl-2-pentanone	10	10	UG/L	U	U
0271	24-Jun-88	4-Methyl-2-pentanone	10	10	UG/L	U	U
0076	13-Sep-88	4-Methyl-2-pentanone	10	10	UG/L	U	U
0076	24-Jun-88	4-Methyl-2-pentanone	10	10	UG/L	U	U
0271	11-Oct-93	4-Methylphenol	10	10	UG/L	U	U
0271	01-Feb-91	4-Methylphenol	10	10	UG/L	U	U
0271	06-Nov-90	4-Methylphenol	10	10	UG/L	U	U
0271	22-Jun-92	4-Methylphenol	10	10	UG/L	U	U
0271	05-Aug-91	4-Methylphenol	10	10	UG/L	U	U
0076	16-Dec-91	4-Methylphenol	10	10	UG/L	U	U
0271	16-Dec-91	4-Methylphenol	10	10	UG/L	U	U
0076	11-Oct-93	4-Methylphenol	10	10	UG/L	U	U
0076	06-Nov-90	4-Methylphenol	10	10	UG/L	U	U
0076	01-Feb-91	4-Methylphenol	10	10	UG/L	U	U
0076	16-Sep-92	4-Methylphenol	10	10	UG/L	U	U
0271	06-May-91	4-Methylphenol	10	10	UG/L	U	U
0076	22-Jun-92	4-Methylphenol	10	10	UG/L	U	U
0271	16-Sep-92	4-Methylphenol	10	10	UG/L	U	U
0076	06-May-91	4-Methylphenol	10	10	UG/L	U	U
0076	23-Mar-92	4-Methylphenol	10	10	UG/L	U	U
0076	07-Apr-94	4-Methylphenol	11	11	UG/L	U	U
0271	07-Apr-94	4-Methylphenol	11	11	UG/L	U	U
0271	07-Apr-94	4-Methylphenol	11	11	UG/L	U	U
0076	11-Oct-93	4-Nitroaniline	26	26	UG/L	U	U
0076	16-Sep-92	4-Nitroaniline	26	26	UG/L	U	UJ
0076	07-Apr-94	4-Nitroaniline	26	26	UG/L	U	UJ
0271	07-Apr-94	4-Nitroaniline	26	26	UG/L	U	UJ
0271	22-Jun-92	4-Nitroaniline	26	26	UG/L	U	U
0076	22-Jun-92	4-Nitroaniline	26	26	UG/L	U	U
0271	07-Apr-94	4-Nitroaniline	26	26	UG/L	U	UJ
0076	23-Mar-92	4-Nitroaniline	26	26	UG/L	U	U
0271	16-Sep-92	4-Nitroaniline	26	26	UG/L	U	UJ
0271	11-Oct-93	4-Nitroaniline	26	26	UG/L	U	U
0076	06-May-91	4-Nitroaniline	50	50	UG/L	U	U
0076	06-Nov-90	4-Nitroaniline	50	50	UG/L	U	U
0271	06-May-91	4-Nitroaniline	50	50	UG/L	U	U
0271	06-Nov-90	4-Nitroaniline	50	50	UG/L	U	U
0076	16-Dec-91	4-Nitroaniline	50	50	UG/L	U	U
0271	01-Feb-91	4-Nitroaniline	50	50	UG/L	U	U
0271	05-Aug-91	4-Nitroaniline	50	50	UG/L	U	UJ
0076	01-Feb-91	4-Nitroaniline	50	50	UG/L	U	U
0271	16-Dec-91	4-Nitroaniline	50	50	UG/L	U	U
0271	22-Jun-92	4-Nitrophenol	26	26	UG/L	U	U
0076	23-Mar-92	4-Nitrophenol	26	26	UG/L	U	UJ
0076	16-Sep-92	4-Nitrophenol	26	26	UG/L	U	UJ
0076	22-Jun-92	4-Nitrophenol	26	26	UG/L	U	U
0076	07-Apr-94	4-Nitrophenol	26	26	UG/L	U	U
0271	11-Oct-93	4-Nitrophenol	26	26	UG/L	U	UJ
0076	11-Oct-93	4-Nitrophenol	26	26	UG/L	U	UJ
0271	07-Apr-94	4-Nitrophenol	26	26	UG/L	U	U
0271	16-Sep-92	4-Nitrophenol	26	26	UG/L	U	UJ
0271	07-Apr-94	4-Nitrophenol	26	26	UG/L	U	U
0271	05-Aug-91	4-Nitrophenol	50	50	UG/L	U	UJ
0271	01-Feb-91	4-Nitrophenol	50	50	UG/L	U	U
0271	16-Dec-91	4-Nitrophenol	50	50	UG/L	U	U
0076	16-Dec-91	4-Nitrophenol	50	50	UG/L	U	U
0271	06-Nov-90	4-Nitrophenol	50	50	UG/L	U	U
0076	06-Nov-90	4-Nitrophenol	50	50	UG/L	U	U
0076	06-May-91	4-Nitrophenol	50	50	UG/L	U	U
0271	06-May-91	4-Nitrophenol	50	50	UG/L	U	U
0076	01-Feb-91	4-Nitrophenol	50	50	UG/L	U	U
0271	06-May-91	4-chloro-3-methylphenol	10	10	UG/L	U	U
0076	11-Oct-93	4-chloro-3-methylphenol	10	10	UG/L	U	U
0076	16-Sep-92	4-chloro-3-methylphenol	10	10	UG/L	U	U
0271	16-Sep-92	4-chloro-3-methylphenol	10	10	UG/L	U	U
0271	01-Feb-91	4-chloro-3-methylphenol	10	10	UG/L	U	U
0076	01-Feb-91	4-chloro-3-methylphenol	10	10	UG/L	U	U
0076	06-May-91	4-chloro-3-methylphenol	10	10	UG/L	U	U
0271	16-Dec-91	4-chloro-3-methylphenol	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	23-Mar-92	4-chloro-3-methylphenol	10	10	UG/L	U	U
0076	22-Jun-92	4-chloro-3-methylphenol	10	10	UG/L	U	U
0271	22-Jun-92	4-chloro-3-methylphenol	10	10	UG/L	U	U
0271	05-Aug-91	4-chloro-3-methylphenol	10	10	UG/L	U	U
0076	06-Nov-90	4-chloro-3-methylphenol	10	10	UG/L	U	U
0271	06-Nov-90	4-chloro-3-methylphenol	10	10	UG/L	U	U
0076	16-Dec-91	4-chloro-3-methylphenol	10	10	UG/L	U	U
0271	11-Oct-93	4-chloro-3-methylphenol	10	10	UG/L	U	U
0271	07-Apr-94	4-chloro-3-methylphenol	11	11	UG/L	U	U
0076	07-Apr-94	4-chloro-3-methylphenol	11	11	UG/L	U	U
0271	07-Apr-94	4-chloro-3-methylphenol	11	11	UG/L	U	U
0076	22-Jun-92	Acenaphthene	10	10	UG/L	U	U
0271	05-Aug-91	Acenaphthene	10	10	UG/L	U	UJ
0076	16-Dec-91	Acenaphthene	10	10	UG/L	U	U
0076	06-Nov-90	Acenaphthene	10	10	UG/L	U	U
0271	06-Nov-90	Acenaphthene	10	10	UG/L	U	U
0271	16-Dec-91	Acenaphthene	10	10	UG/L	U	U
0271	01-Feb-91	Acenaphthene	10	10	UG/L	U	U
0271	11-Oct-93	Acenaphthene	10	10	UG/L	U	U
0076	11-Oct-93	Acenaphthene	10	10	UG/L	U	U
0076	16-Sep-92	Acenaphthene	10	10	UG/L	U	U
0076	06-May-91	Acenaphthene	10	10	UG/L	U	U
0271	16-Sep-92	Acenaphthene	10	10	UG/L	U	U
0271	22-Jun-92	Acenaphthene	10	10	UG/L	U	U
0076	23-Mar-92	Acenaphthene	10	10	UG/L	U	U
0271	06-May-91	Acenaphthene	10	10	UG/L	U	U
0076	01-Feb-91	Acenaphthene	10	10	UG/L	U	U
0271	07-Apr-94	Acenaphthene	11	11	UG/L	U	U
0076	07-Apr-94	Acenaphthene	11	11	UG/L	U	U
0271	07-Apr-94	Acenaphthene	11	11	UG/L	U	U
0076	16-Sep-92	Acenaphthylene	10	10	UG/L	U	U
0076	06-May-91	Acenaphthylene	10	10	UG/L	U	U
0271	11-Oct-93	Acenaphthylene	10	10	UG/L	U	U
0271	16-Sep-92	Acenaphthylene	10	10	UG/L	U	U
0271	06-May-91	Acenaphthylene	10	10	UG/L	U	U
0271	05-Aug-91	Acenaphthylene	10	10	UG/L	U	UJ
0076	23-Mar-92	Acenaphthylene	10	10	UG/L	U	U
0271	01-Feb-91	Acenaphthylene	10	10	UG/L	U	U
0076	16-Dec-91	Acenaphthylene	10	10	UG/L	U	U
0076	11-Oct-93	Acenaphthylene	10	10	UG/L	U	U
0271	16-Dec-91	Acenaphthylene	10	10	UG/L	U	U
0271	22-Jun-92	Acenaphthylene	10	10	UG/L	U	U
0076	06-Nov-90	Acenaphthylene	10	10	UG/L	U	U
0076	22-Jun-92	Acenaphthylene	10	10	UG/L	U	U
0271	06-Nov-90	Acenaphthylene	10	10	UG/L	U	U
0076	01-Feb-91	Acenaphthylene	10	10	UG/L	U	U
0076	07-Apr-94	Acenaphthylene	11	11	UG/L	U	U
0271	07-Apr-94	Acenaphthylene	11	11	UG/L	U	U
0271	07-Apr-94	Acenaphthylene	11	11	UG/L	U	U
0076	13-Sep-88	Acetone	2	10	UG/L	J	J
0271	24-Jun-88	Acetone	3	10	UG/L	JB	
0271	25-Apr-90	Acetone	5	10	UG/L	JB	
0076	24-Jun-88	Acetone	5	10	UG/L	JB	
0076	25-Apr-90	Acetone	9	10	UG/L	JB	
0271	08-Mar-88	Acetone	10	10	UG/L	U	U
0271	13-Sep-88	Acetone	12	10	UG/L		
0271	07-Apr-94	Acetone	20	20	UG/L	U	U
0076	07-Apr-94	Acetone	20	20	UG/L	U	U
0271	11-Oct-93	Acetone	20	20	UG/L	U	UJ
0076	11-Oct-93	Acetone	20	20	UG/L	U	UJ
0271	07-Apr-94	Acetone	20	20	UG/L	U	U
0271	11-Oct-93	Acetonitrile	10	10	UG/L	U	U
0076	11-Oct-93	Acetonitrile	10	10	UG/L	U	U
0271	07-Apr-94	Acetonitrile	10	10	UG/L	U	UJ
0076	07-Apr-94	Acetonitrile	10	10	UG/L	U	UJ
0271	07-Apr-94	Acetonitrile	10	10	UG/L	U	U
0076	07-Apr-94	Acrylonitrile	10	10	UG/L	U	UJ
0271	07-Apr-94	Acrylonitrile	10	10	UG/L	U	U
0271	07-Apr-94	Acrylonitrile	10	10	UG/L	U	UJ

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	11-Oct-93	Acrylonitrile	10	10	UG/L	U	U
0271	11-Oct-93	Acrylonitrile	10	10	UG/L	U	U
0271	16-Sep-92	Actinium-227	0.355	1	PCI/L		
0076	16-Sep-92	Actinium-227	0.84	0.84	PCI/L	U	U
0076	16-Dec-91	Actinium-227	1	1	PCI/L	U	U
0271	05-Aug-91	Actinium-227	1	0	PCI/L	U	U
0076	01-Feb-91	Actinium-227	1	0	PCI/L	U	U
0271	16-Dec-91	Actinium-227	1	1	PCI/L	U	U
0271	01-Feb-91	Actinium-227	1	0	PCI/L	U	U
0076	23-Mar-92	Actinium-227	14	14	PCI/L	U	U
0271	22-Jun-92	Actinium-227	18	18	PCI/L	U	U
0076	22-Jun-92	Actinium-227	22	22	PCI/L	U	U
0271	05-Aug-91	Aldrin	0.04	0.04	UG/L	U	U
0076	11-Oct-93	Aldrin	0.05	0.05	UG/L	U	UJ
0271	16-Sep-92	Aldrin	0.05	0.05	UG/L	B	U
0271	06-May-91	Aldrin	0.05	0.05	UG/L	U	U
0076	01-Feb-91	Aldrin	0.05	0.05	UG/L	U	U
0271	07-Apr-94	Aldrin	0.05	0.05	UG/L	U	U
0271	11-Oct-93	Aldrin	0.05	0.05	UG/L	U	U
0271	01-Feb-91	Aldrin	0.05	0.05	UG/L	U	U
0076	06-Nov-90	Aldrin	0.05	0.05	UG/L	U	U
0076	06-May-91	Aldrin	0.05	0.05	UG/L	U	U
0271	06-Nov-90	Aldrin	0.05	0.05	UG/L	U	U
0076	16-Sep-92	Aldrin	0.05	0.05	UG/L	B	U
0271	22-Jun-92	Aldrin	0.051	0.051	UG/L	U	U
0076	16-Dec-91	Aldrin	0.052	0.052	UG/L	U	U
0271	07-Apr-94	Aldrin	0.052	0.052	UG/L	U	U
0076	22-Jun-92	Aldrin	0.052	0.052	UG/L	U	U
0271	16-Dec-91	Aldrin	0.052	0.052	UG/L	U	U
0076	23-Mar-92	Aldrin	0.053	0.053	UG/L	U	U
0076	07-Apr-94	Aldrin	0.055	0.055	UG/L	U	U
0076	06-May-91	Aldrin	0.25	0.25	UG/L	U	U
0271	06-May-91	Aldrin	0.75	0.75	UG/L	U	U
0076	13-Sep-88	Alkalinity	272	1	MG/L		
0076	24-Jun-88	Alkalinity	308	1	MG/L		
0271	24-Jun-88	Alkalinity	334	1	MG/L		
0271	13-Sep-88	Alkalinity	335	1	MG/L		
0271	13-Sep-88	Alkalinity	335	1	MG/L		
0271	13-Sep-88	Alkalinity	335	1	MG/L		
0271	08-Mar-88	Alkalinity	335	1	MG/L		
0271	11-Oct-93	Alpha Chlordane	0.05	0.05	UG/L	U	U
0271	07-Apr-94	Alpha Chlordane	0.05	0.05	UG/L	U	U
0271	16-Sep-92	Alpha Chlordane	0.05	0.05	UG/L	U	U
0271	05-Aug-91	Alpha Chlordane	0.05	0.05	UG/L	U	U
0076	16-Sep-92	Alpha Chlordane	0.05	0.05	UG/L	U	U
0076	11-Oct-93	Alpha Chlordane	0.05	0.05	UG/L	U	UJ
0271	22-Jun-92	Alpha Chlordane	0.051	0.051	UG/L	U	U
0076	22-Jun-92	Alpha Chlordane	0.052	0.052	UG/L	U	U
0271	07-Apr-94	Alpha Chlordane	0.052	0.052	UG/L	U	U
0076	23-Mar-92	Alpha Chlordane	0.053	0.053	UG/L	U	U
0076	07-Apr-94	Alpha Chlordane	0.055	0.055	UG/L	U	U
0076	06-Nov-90	Alpha Chlordane	0.5	0.5	UG/L	U	U
0076	06-May-91	Alpha Chlordane	0.5	0.5	UG/L	U	U
0271	01-Feb-91	Alpha Chlordane	0.5	0.5	UG/L	U	U
0271	06-Nov-90	Alpha Chlordane	0.5	0.5	UG/L	U	U
0076	01-Feb-91	Alpha Chlordane	0.5	0.5	UG/L	U	U
0271	06-May-91	Alpha Chlordane	0.5	0.5	UG/L	U	U
0076	16-Dec-91	Alpha Chlordane	0.52	0.52	UG/L	U	U
0271	16-Dec-91	Alpha Chlordane	0.52	0.52	UG/L	U	U
0076	06-May-91	Alpha Chlordane	2.5	2.5	UG/L	U	U
0271	06-May-91	Alpha Chlordane	7.5	7.5	UG/L	U	U
0271	05-Aug-91	Alpha-BHC	0.03	0.03	UG/L	U	U
0271	06-Nov-90	Alpha-BHC	0.05	0.05	UG/L	U	U
0271	16-Sep-92	Alpha-BHC	0.05	0.05	UG/L	U	U
0076	06-May-91	Alpha-BHC	0.05	0.05	UG/L	U	U
0271	11-Oct-93	Alpha-BHC	0.05	0.05	UG/L	U	U
0271	01-Feb-91	Alpha-BHC	0.05	0.05	UG/L	U	U
0076	16-Sep-92	Alpha-BHC	0.05	0.05	UG/L	U	U
0076	11-Oct-93	Alpha-BHC	0.05	0.05	UG/L	U	UJ

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	07-Apr-94	Alpha-BHC	0.05	0.05	UG/L	U	U
0076	06-Nov-90	Alpha-BHC	0.05	0.05	UG/L	U	U
0271	06-May-91	Alpha-BHC	0.05	0.05	UG/L	U	U
0076	01-Feb-91	Alpha-BHC	0.05	0.05	UG/L	U	U
0271	22-Jun-92	Alpha-BHC	0.051	0.051	UG/L	U	U
0271	16-Dec-91	Alpha-BHC	0.052	0.052	UG/L	U	U
0076	22-Jun-92	Alpha-BHC	0.052	0.052	UG/L	U	U
0271	07-Apr-94	Alpha-BHC	0.052	0.052	UG/L	U	U
0076	16-Dec-91	Alpha-BHC	0.052	0.052	UG/L	U	U
0076	23-Mar-92	Alpha-BHC	0.053	0.053	UG/L	U	U
0076	07-Apr-94	Alpha-BHC	0.055	0.055	UG/L	U	U
0076	06-May-91	Alpha-BHC	0.25	0.25	UG/L	U	U
0271	06-May-91	Alpha-BHC	0.75	0.75	UG/L	U	U
0076	11-Oct-93	Aluminum	7.1	9.3	UG/L	B	U
0076	11-Oct-93	Aluminum	9.1	9.3	UG/L	B	U
0271	11-Oct-93	Aluminum	11.8	9.3	UG/L	B	U
0271	07-Apr-94	Aluminum	13.1	4.1	UG/L	B	U
0271	07-Apr-94	Aluminum	13.2	4.1	UG/L	B	U
0271	07-Apr-94	Aluminum	13.7	4.1	UG/L	B	U
0076	07-Apr-94	Aluminum	15.3	4.1	UG/L	B	U
0076	07-Apr-94	Aluminum	15.3	4.1	UG/L	B	U
0271	11-Oct-93	Aluminum	15.8	9.3	UG/L	B	U
0271	22-Jun-92	Aluminum	17	17	UG/L	U	UJ
0076	22-Jun-92	Aluminum	17	17	UG/L	U	UJ
0271	07-Apr-94	Aluminum	17.8	4.1	UG/L	B	U
0271	16-Sep-92	Aluminum	37	37	UG/L	U	U
0076	16-Sep-92	Aluminum	37	37	UG/L	U	U
0076	23-Mar-92	Aluminum	46	200	UG/L	U	U
0271	06-Nov-90	Aluminum	60	60	UG/L	U	U
0271	05-Aug-91	Aluminum	67.911	60	UG/L		
0076	06-Nov-90	Aluminum	68.8	60	UG/L	B	
0271	05-Aug-91	Aluminum	73.7	60	UG/L		
0076	06-May-91	Aluminum	92.2	60	UG/L	B	
0271	06-May-91	Aluminum	93.5	60	UG/L	B	
0076	01-Feb-91	Aluminum	106	40	UG/L	B	
0271	01-Feb-91	Aluminum	148	40	UG/L	B	
0076	16-Dec-91	Aluminum	200	200	UG/L	U	U
0271	16-Dec-91	Aluminum	200	200	UG/L	U	U
0271	07-Apr-94	Americium-241	0.025	0.019	PCI/L		J
0271	07-Apr-94	Americium-241	0.03	0.03	PCI/L	U	UJ
0076	07-Apr-94	Americium-241	0.046	0.046	PCI/L	U	U
0076	11-Oct-93	Americium-241	0.049	0.049	PCI/L	U	U
0271	11-Oct-93	Americium-241	0.1	0.1	PCI/L	U	U
0076	06-May-91	Americium-241	24.4	1	PCI/L	U	U
0271	01-Feb-91	Americium-241	29	0	PCI/L	U	U
0271	06-May-91	Americium-241	30.5	1	PCI/L	U	U
0076	01-Feb-91	Americium-241	42	0	PCI/L	U	U
0271	07-Apr-94	Ammonia	0.1	0.1	MG/L	U	U
0271	07-Apr-94	Ammonia	0.1	0.1	MG/L	U	U
0271	11-Oct-93	Ammonia	0.1	0.1	MG/L	U	U
0076	11-Oct-93	Ammonia	0.39	0.1	MG/L		
0076	07-Apr-94	Ammonia	0.58	0.1	MG/L		
0076	22-Jun-92	Anthracene	10	10	UG/L	U	U
0271	11-Oct-93	Anthracene	10	10	UG/L	U	U
0271	16-Dec-91	Anthracene	10	10	UG/L	U	U
0271	22-Jun-92	Anthracene	10	10	UG/L	U	U
0076	06-May-91	Anthracene	10	10	UG/L	U	U
0271	01-Feb-91	Anthracene	10	10	UG/L	U	U
0076	16-Dec-91	Anthracene	10	10	UG/L	U	U
0271	16-Sep-92	Anthracene	10	10	UG/L	U	U
0076	06-Nov-90	Anthracene	10	10	UG/L	U	U
0271	06-Nov-90	Anthracene	10	10	UG/L	U	U
0271	06-May-91	Anthracene	10	10	UG/L	U	U
0076	11-Oct-93	Anthracene	10	10	UG/L	U	U
0271	05-Aug-91	Anthracene	10	10	UG/L	U	UJ
0076	16-Sep-92	Anthracene	10	10	UG/L	U	U
0076	01-Feb-91	Anthracene	10	10	UG/L	U	U
0076	23-Mar-92	Anthracene	10	10	UG/L	U	U
0076	07-Apr-94	Anthracene	11	11	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	07-Apr-94	Anthracene	11	11	UG/L	U	U
0271	07-Apr-94	Anthracene	11	11	UG/L	U	U
0076	11-Oct-93	Antimony	0.5	0.5	UG/L	U	U
0271	11-Oct-93	Antimony	0.5	0.5	UG/L	U	U
0271	07-Apr-94	Antimony	0.58	0.58	UG/L	U	U
0271	07-Apr-94	Antimony	0.58	0.58	UG/L	U	U
0271	07-Apr-94	Antimony	0.58	0.58	UG/L	U	UJ
0271	07-Apr-94	Antimony	0.58	0.58	UG/L	U	U
0076	07-Apr-94	Antimony	0.58	0.58	UG/L	U	U
0271	22-Jun-92	Antimony	2	2	UG/L	U	U
0076	22-Jun-92	Antimony	2	2	UG/L	U	U
0076	11-Oct-93	Antimony	2.8	0.5	UG/L		
0271	16-Sep-92	Antimony	5	5	UG/L	U	UJ
0076	16-Sep-92	Antimony	5	5	UG/L	U	UJ
0271	11-Oct-93	Antimony	7	0.5	UG/L		
0076	07-Apr-94	Antimony	14.4	0.58	UG/L		
0076	01-Feb-91	Antimony	30	30	UG/L	U	U
0271	05-Aug-91	Antimony	30	30	UG/L	U	U
0076	06-Nov-90	Antimony	30	30	UG/L	U	U
0271	01-Feb-91	Antimony	30	30	UG/L	U	U
0271	06-Nov-90	Antimony	30	30	UG/L	U	U
0271	05-Aug-91	Antimony	30	30	UG/L	U	U
0076	23-Mar-92	Antimony	36	60	UG/L	U	U
0271	06-May-91	Antimony	38.3	30	UG/L	B	
0076	06-May-91	Antimony	40.2	30	UG/L	B	
0271	16-Dec-91	Antimony	60	60	UG/L	U	U
0076	16-Dec-91	Antimony	60	60	UG/L	U	U
0271	01-Feb-91	Antimony-124	59	0	PCI/L	U	U
0076	01-Feb-91	Antimony-124	70	0	PCI/L	U	U
0076	01-Feb-91	Antimony-125	83	0	PCI/L	U	U
0271	01-Feb-91	Antimony-125	84	0	PCI/L	U	U
0271	06-May-91	Aroclor-1016	0.5	0.5	UG/L	U	U
0271	06-Nov-90	Aroclor-1016	0.5	0.5	UG/L	U	U
0076	01-Feb-91	Aroclor-1016	0.5	0.5	UG/L	U	U
0271	01-Feb-91	Aroclor-1016	0.5	0.5	UG/L	U	U
0271	16-Sep-92	Aroclor-1016	0.5	0.5	UG/L	U	U
0271	07-Apr-94	Aroclor-1016	0.5	0.5	UG/L	U	U
0076	11-Oct-93	Aroclor-1016	0.5	0.5	UG/L	U	UJ
0076	06-Nov-90	Aroclor-1016	0.5	0.5	UG/L	U	U
0271	11-Oct-93	Aroclor-1016	0.5	0.5	UG/L	U	U
0076	06-May-91	Aroclor-1016	0.5	0.5	UG/L	U	U
0076	16-Sep-92	Aroclor-1016	0.5	0.5	UG/L	U	U
0271	22-Jun-92	Aroclor-1016	0.51	0.51	UG/L	U	U
0076	16-Dec-91	Aroclor-1016	0.52	0.52	UG/L	U	U
0076	22-Jun-92	Aroclor-1016	0.52	0.52	UG/L	U	U
0271	07-Apr-94	Aroclor-1016	0.52	0.52	UG/L	U	U
0271	16-Dec-91	Aroclor-1016	0.52	0.52	UG/L	U	U
0076	07-Apr-94	Aroclor-1016	0.55	0.55	UG/L	U	U
0271	05-Aug-91	Aroclor-1016	1	1	UG/L	U	U
0076	23-Mar-92	Aroclor-1016	1.1	1.1	UG/L	U	U
0076	06-May-91	Aroclor-1016	2.5	2.5	UG/L	U	U
0271	06-May-91	Aroclor-1016	7.5	7.5	UG/L	U	U
0271	06-May-91	Aroclor-1221	0.5	0.5	UG/L	U	U
0271	07-Apr-94	Aroclor-1221	0.5	0.5	UG/L	U	U
0271	11-Oct-93	Aroclor-1221	0.5	0.5	UG/L	U	U
0076	16-Sep-92	Aroclor-1221	0.5	0.5	UG/L	U	U
0076	01-Feb-91	Aroclor-1221	0.5	0.5	UG/L	U	U
0271	01-Feb-91	Aroclor-1221	0.5	0.5	UG/L	U	U
0271	06-Nov-90	Aroclor-1221	0.5	0.5	UG/L	U	U
0076	06-Nov-90	Aroclor-1221	0.5	0.5	UG/L	U	U
0076	11-Oct-93	Aroclor-1221	0.5	0.5	UG/L	U	UJ
0076	06-May-91	Aroclor-1221	0.5	0.5	UG/L	U	U
0271	16-Sep-92	Aroclor-1221	0.5	0.5	UG/L	U	U
0271	22-Jun-92	Aroclor-1221	0.51	0.51	UG/L	U	U
0076	22-Jun-92	Aroclor-1221	0.52	0.52	UG/L	U	U
0076	16-Dec-91	Aroclor-1221	0.52	0.52	UG/L	U	U
0271	07-Apr-94	Aroclor-1221	0.52	0.52	UG/L	U	U
0271	16-Dec-91	Aroclor-1221	0.52	0.52	UG/L	U	U
0076	07-Apr-94	Aroclor-1221	0.55	0.55	UG/L	U	U

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	05-Aug-91	Aroclor-1221	1	1	UG/L	U	U
0076	23-Mar-92	Aroclor-1221	2.1	2.1	UG/L	U	U
0076	06-May-91	Aroclor-1221	2.5	2.5	UG/L	U	U
0271	06-May-91	Aroclor-1221	7.5	7.5	UG/L	U	U
0271	01-Feb-91	Aroclor-1232	0.5	0.5	UG/L	U	U
0076	11-Oct-93	Aroclor-1232	0.5	0.5	UG/L	U	UJ
0271	11-Oct-93	Aroclor-1232	0.5	0.5	UG/L	U	U
0271	16-Sep-92	Aroclor-1232	0.5	0.5	UG/L	U	U
0076	01-Feb-91	Aroclor-1232	0.5	0.5	UG/L	U	U
0271	07-Apr-94	Aroclor-1232	0.5	0.5	UG/L	U	U
0076	16-Sep-92	Aroclor-1232	0.5	0.5	UG/L	U	U
0271	06-Nov-90	Aroclor-1232	0.5	0.5	UG/L	U	U
0076	06-May-91	Aroclor-1232	0.5	0.5	UG/L	U	U
0271	06-May-91	Aroclor-1232	0.5	0.5	UG/L	U	U
0076	06-Nov-90	Aroclor-1232	0.5	0.5	UG/L	U	U
0271	22-Jun-92	Aroclor-1232	0.51	0.51	UG/L	U	U
0271	07-Apr-94	Aroclor-1232	0.52	0.52	UG/L	U	U
0076	16-Dec-91	Aroclor-1232	0.52	0.52	UG/L	U	U
0076	22-Jun-92	Aroclor-1232	0.52	0.52	UG/L	U	U
0271	16-Dec-91	Aroclor-1232	0.52	0.52	UG/L	U	U
0076	07-Apr-94	Aroclor-1232	0.55	0.55	UG/L	U	U
0271	05-Aug-91	Aroclor-1232	1	1	UG/L	U	U
0076	23-Mar-92	Aroclor-1232	1.1	1.1	UG/L	U	U
0076	06-May-91	Aroclor-1232	2.5	2.5	UG/L	U	U
0271	06-May-91	Aroclor-1232	7.5	7.5	UG/L	U	U
0076	16-Sep-92	Aroclor-1242	0.5	0.5	UG/L	U	U
0076	11-Oct-93	Aroclor-1242	0.5	0.5	UG/L	U	UJ
0271	07-Apr-94	Aroclor-1242	0.5	0.5	UG/L	U	U
0271	01-Feb-91	Aroclor-1242	0.5	0.5	UG/L	U	U
0076	06-May-91	Aroclor-1242	0.5	0.5	UG/L	U	U
0271	16-Sep-92	Aroclor-1242	0.5	0.5	UG/L	U	U
0076	06-Nov-90	Aroclor-1242	0.5	0.5	UG/L	U	U
0271	06-Nov-90	Aroclor-1242	0.5	0.5	UG/L	U	U
0076	01-Feb-91	Aroclor-1242	0.5	0.5	UG/L	U	U
0271	06-May-91	Aroclor-1242	0.5	0.5	UG/L	U	U
0271	11-Oct-93	Aroclor-1242	0.5	0.5	UG/L	U	U
0271	22-Jun-92	Aroclor-1242	0.51	0.51	UG/L	U	U
0076	22-Jun-92	Aroclor-1242	0.52	0.52	UG/L	U	U
0271	16-Dec-91	Aroclor-1242	0.52	0.52	UG/L	U	U
0076	16-Dec-91	Aroclor-1242	0.52	0.52	UG/L	U	U
0271	07-Apr-94	Aroclor-1242	0.52	0.52	UG/L	U	U
0076	07-Apr-94	Aroclor-1242	0.55	0.55	UG/L	U	U
0271	05-Aug-91	Aroclor-1242	1	1	UG/L	U	U
0076	23-Mar-92	Aroclor-1242	1.1	1.1	UG/L	U	U
0076	06-May-91	Aroclor-1242	2.5	2.5	UG/L	U	U
0271	06-May-91	Aroclor-1242	7.5	7.5	UG/L	U	U
0271	01-Feb-91	Aroclor-1248	0.5	0.5	UG/L	U	U
0076	06-May-91	Aroclor-1248	0.5	0.5	UG/L	U	U
0076	01-Feb-91	Aroclor-1248	0.5	0.5	UG/L	U	U
0271	16-Sep-92	Aroclor-1248	0.5	0.5	UG/L	U	U
0076	16-Sep-92	Aroclor-1248	0.5	0.5	UG/L	U	U
0271	11-Oct-93	Aroclor-1248	0.5	0.5	UG/L	U	U
0271	06-Nov-90	Aroclor-1248	0.5	0.5	UG/L	U	U
0271	07-Apr-94	Aroclor-1248	0.5	0.5	UG/L	U	U
0076	11-Oct-93	Aroclor-1248	0.5	0.5	UG/L	U	UJ
0076	06-Nov-90	Aroclor-1248	0.5	0.5	UG/L	U	U
0271	06-May-91	Aroclor-1248	0.5	0.5	UG/L	U	U
0271	22-Jun-92	Aroclor-1248	0.51	0.51	UG/L	U	U
0076	22-Jun-92	Aroclor-1248	0.52	0.52	UG/L	U	U
0271	07-Apr-94	Aroclor-1248	0.52	0.52	UG/L	U	U
0271	16-Dec-91	Aroclor-1248	0.52	0.52	UG/L	U	U
0076	16-Dec-91	Aroclor-1248	0.52	0.52	UG/L	U	U
0076	07-Apr-94	Aroclor-1248	0.55	0.55	UG/L	U	U
0271	05-Aug-91	Aroclor-1248	1	1	UG/L	U	U
0076	23-Mar-92	Aroclor-1248	1.1	1.1	UG/L	U	U
0076	06-May-91	Aroclor-1248	2.5	2.5	UG/L	U	U
0271	06-May-91	Aroclor-1248	7.5	7.5	UG/L	U	U
0076	11-Oct-93	Aroclor-1254	0.5	0.5	UG/L	U	UJ
0271	11-Oct-93	Aroclor-1254	0.5	0.5	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	16-Sep-92	Aroclor-1254	0.5	0.5	UG/L	U	U
0271	07-Apr-94	Aroclor-1254	0.5	0.5	UG/L	U	U
0271	16-Sep-92	Aroclor-1254	0.5	0.5	UG/L	U	U
0271	22-Jun-92	Aroclor-1254	0.51	0.51	UG/L	U	U
0271	07-Apr-94	Aroclor-1254	0.52	0.52	UG/L	U	U
0076	22-Jun-92	Aroclor-1254	0.52	0.52	UG/L	U	U
0076	07-Apr-94	Aroclor-1254	0.55	0.55	UG/L	U	U
0076	16-Dec-91	Aroclor-1254	1	1	UG/L	U	U
0076	06-Nov-90	Aroclor-1254	1	1	UG/L	U	U
0271	06-May-91	Aroclor-1254	1	1	UG/L	U	U
0271	01-Feb-91	Aroclor-1254	1	1	UG/L	U	U
0271	06-Nov-90	Aroclor-1254	1	1	UG/L	U	U
0271	05-Aug-91	Aroclor-1254	1	1	UG/L	U	U
0271	16-Dec-91	Aroclor-1254	1	1	UG/L	U	U
0076	01-Feb-91	Aroclor-1254	1	1	UG/L	U	U
0076	06-May-91	Aroclor-1254	1	1	UG/L	U	U
0076	23-Mar-92	Aroclor-1254	1.1	1.1	UG/L	U	U
0076	06-May-91	Aroclor-1254	5	5	UG/L	U	U
0271	06-May-91	Aroclor-1254	15	15	UG/L	U	U
0076	16-Sep-92	Aroclor-1260	0.5	0.5	UG/L	U	U
0076	11-Oct-93	Aroclor-1260	0.5	0.5	UG/L	U	UJ
0271	07-Apr-94	Aroclor-1260	0.5	0.5	UG/L	U	U
0271	11-Oct-93	Aroclor-1260	0.5	0.5	UG/L	U	U
0271	16-Sep-92	Aroclor-1260	0.5	0.5	UG/L	U	U
0271	22-Jun-92	Aroclor-1260	0.51	0.51	UG/L	U	U
0271	07-Apr-94	Aroclor-1260	0.52	0.52	UG/L	U	U
0076	22-Jun-92	Aroclor-1260	0.52	0.52	UG/L	U	U
0076	07-Apr-94	Aroclor-1260	0.55	0.55	UG/L	U	U
0076	06-Nov-90	Aroclor-1260	1	1	UG/L	U	U
0271	16-Dec-91	Aroclor-1260	1	1	UG/L	U	U
0076	06-May-91	Aroclor-1260	1	1	UG/L	U	U
0271	01-Feb-91	Aroclor-1260	1	1	UG/L	U	U
0271	05-Aug-91	Aroclor-1260	1	1	UG/L	U	U
0076	16-Dec-91	Aroclor-1260	1	1	UG/L	U	U
0076	01-Feb-91	Aroclor-1260	1	1	UG/L	U	U
0271	06-May-91	Aroclor-1260	1	1	UG/L	U	U
0271	06-Nov-90	Aroclor-1260	1	1	UG/L	U	U
0076	23-Mar-92	Aroclor-1260	1.1	1.1	UG/L	U	U
0076	06-May-91	Aroclor-1260	5	5	UG/L	U	U
0271	06-May-91	Aroclor-1260	15	15	UG/L	U	U
0076	22-Jun-92	Arsenic	2	2	UG/L	U	U
0271	07-Apr-94	Arsenic	2	2	UG/L	U	UJ
0271	07-Apr-94	Arsenic	2	2	UG/L	U	UJ
0271	22-Jun-92	Arsenic	2	2	UG/L	U	U
0271	06-Nov-90	Arsenic	2	2	UG/L	U	U
0271	07-Apr-94	Arsenic	2	2	UG/L	U	UJ
0076	23-Mar-92	Arsenic	2	10	UG/L	U	U
0076	01-Feb-91	Arsenic	2	2	UG/L	U	U
0076	07-Apr-94	Arsenic	2	2	UG/L	U	U
0271	07-Apr-94	Arsenic	2	2	UG/L	U	UJ
0076	07-Apr-94	Arsenic	2	2	UG/L	U	UJ
0076	11-Oct-93	Arsenic	2	2	UG/L	U	UJ
0076	11-Oct-93	Arsenic	2	2	UG/L	U	UJ
0271	11-Oct-93	Arsenic	2	2	UG/L	U	U
0271	11-Oct-93	Arsenic	2	2	UG/L	U	UJ
0076	16-Sep-92	Arsenic	2	2	UG/L	U	UJ
0271	05-Aug-91	Arsenic	2	2	UG/L	U	U
0076	06-Nov-90	Arsenic	2	2	UG/L	U	U
0271	01-Feb-91	Arsenic	2	2	UG/L	U	U
0271	06-May-91	Arsenic	2	2	UG/L	U	U
0271	16-Sep-92	Arsenic	2	2	UG/L	U	UJ
0271	05-Aug-91	Arsenic	2	2	UG/L	U	U
0076	06-May-91	Arsenic	2	2	UG/L	U	UJ
0076	01-Feb-84	Arsenic	5	5	UG/L	U	U
0076	16-Dec-91	Arsenic	10	10	UG/L	U	U
0271	16-Dec-91	Arsenic	10	10	UG/L	U	U
0271	13-Dec-85	Arsenic	10	10	UG/L	U	U
0076	12-Dec-85	Arsenic	10	10	UG/L	U	U
0076	16-Sep-92	Barium	75	2	UG/L		

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	16-Sep-92	Barium	78.6	2	UG/L		
0076	22-Jun-92	Barium	79.7	3	UG/L	B	
0076	07-Apr-94	Barium	81.6	1.1	UG/L	B	J
0076	07-Apr-94	Barium	81.7	1.1	UG/L	B	J
0076	11-Oct-93	Barium	82.1	0.5	UG/L	B	J
0271	22-Jun-92	Barium	82.4	3	UG/L	B	
0271	11-Oct-93	Barium	83.4	0.5	UG/L	B	J
0076	23-Mar-92	Barium	83.6	200	UG/L	B	
0271	11-Oct-93	Barium	84.3	0.5	UG/L	B	J
0076	06-May-91	Barium	84.5	2	UG/L	B	
0076	11-Oct-93	Barium	84.9	0.5	UG/L	B	J
0271	05-Aug-91	Barium	85	2	UG/L		
0076	01-Feb-91	Barium	85	2	UG/L	B	
0271	07-Apr-94	Barium	85.8	1.1	UG/L	B	J
0271	07-Apr-94	Barium	85.8	1.1	UG/L	B	J
0271	07-Apr-94	Barium	86.9	1.1	UG/L	B	J
0271	05-Aug-91	Barium	88.424	2	UG/L		
0271	06-Nov-90	Barium	95	2	UG/L	B	
0271	01-Feb-91	Barium	98.2	2	UG/L	B	
0271	07-Apr-94	Barium	98.7	1.1	UG/L	B	J
0271	06-May-91	Barium	99.7	2	UG/L	B	
0076	06-Nov-90	Barium	115	2	UG/L	B	
0271	16-Dec-91	Barium	200	200	UG/L	U	U
0076	16-Dec-91	Barium	200	200	UG/L	U	U
0271	01-Feb-91	Barium-133	19	0	PCI/L	U	U
0076	01-Feb-91	Barium-133	26	0	PCI/L	U	U
0271	01-Feb-91	Barium-140	44	0	PCI/L	U	U
0076	01-Feb-91	Barium-140	68	0	PCI/L	U	U
0271	16-Dec-91	Benzene	1	1	UG/L	U	U
0076	16-Dec-91	Benzene	1	1	UG/L	U	U
0271	16-Sep-92	Benzene	1	1	UG/L	U	UJ
0076	23-Mar-92	Benzene	1	1	UG/L	U	U
0076	16-Jun-93	Benzene	1	1	UG/L	U	U
0271	13-Sep-88	Benzene	1	1	UG/L	U	U
0076	13-Sep-88	Benzene	1	1	UG/L	U	U
0076	22-Jun-92	Benzene	1	1	UG/L	U	UJ
0076	16-Sep-92	Benzene	1	1	UG/L	U	UJ
0271	22-Jun-92	Benzene	1	1	UG/L	U	UJ
0271	15-Jun-90	Benzene	2	2	UG/L	U	U
0271	24-Jan-90	Benzene	2	2	UG/L	U	U
0271	07-Apr-94	Benzene	2	2	UG/L	U	U
0076	23-Mar-90	Benzene	2	2	UG/L	U	U
0076	06-May-91	Benzene	2	2	UG/L	U	UJ
0076	06-Nov-90	Benzene	2	2	UG/L	U	U
0271	05-Aug-91	Benzene	2	2	UG/L	U	U
0271	27-Feb-90	Benzene	2	2	UG/L	U	U
0271	31-Jul-90	Benzene	2	2	UG/L	U	U
0076	11-Oct-93	Benzene	2	2	UG/L	U	UJ
0271	01-Feb-91	Benzene	2	2	UG/L	U	U
0076	27-Feb-90	Benzene	2	2	UG/L	U	U
0076	07-Apr-94	Benzene	2	2	UG/L	U	U
0271	27-Feb-90	Benzene	2	2	UG/L	U	U
0271	11-Oct-93	Benzene	2	2	UG/L	U	UJ
0076	01-Feb-91	Benzene	2	2	UG/L	U	U
0076	15-Jun-90	Benzene	2	2	UG/L	U	U
0076	31-Jul-90	Benzene	2	2	UG/L	U	U
0271	07-Apr-94	Benzene	2	2	UG/L	U	U
0271	23-Mar-90	Benzene	2	2	UG/L	U	U
0271	06-May-91	Benzene	2	2	UG/L	U	UJ
0271	06-Nov-90	Benzene	2	2	UG/L	U	U
0271	27-Feb-90	Benzene	2	2	UG/L	U	U
0076	24-Jan-90	Benzene	2	2	UG/L	U	U
0076	13-Sep-88	Benzene	5	5	UG/L	U	U
0271	25-Apr-90	Benzene	5	5	UG/L	U	U
0271	08-Mar-88	Benzene	5	5	UG/L	U	U
0271	13-Sep-88	Benzene	5	5	UG/L	U	U
0271	24-Jun-88	Benzene	5	5	UG/L	U	U
0076	25-Apr-90	Benzene	5	5	UG/L	U	U
0076	24-Jun-88	Benzene	5	5	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	16-Dec-91	Benzo(a)anthracene	10	10	UG/L	U	U
0271	06-Nov-90	Benzo(a)anthracene	10	10	UG/L	U	U
0076	06-May-91	Benzo(a)anthracene	10	10	UG/L	U	U
0076	06-Nov-90	Benzo(a)anthracene	10	10	UG/L	U	U
0271	22-Jun-92	Benzo(a)anthracene	10	10	UG/L	U	U
0076	16-Sep-92	Benzo(a)anthracene	10	10	UG/L	U	U
0271	05-Aug-91	Benzo(a)anthracene	10	10	UG/L	U	UJ
0076	11-Oct-93	Benzo(a)anthracene	10	10	UG/L	U	U
0271	06-May-91	Benzo(a)anthracene	10	10	UG/L	U	U
0271	11-Oct-93	Benzo(a)anthracene	10	10	UG/L	U	U
0076	23-Mar-92	Benzo(a)anthracene	10	10	UG/L	U	U
0271	01-Feb-91	Benzo(a)anthracene	10	10	UG/L	U	U
0076	22-Jun-92	Benzo(a)anthracene	10	10	UG/L	U	U
0271	16-Sep-92	Benzo(a)anthracene	10	10	UG/L	U	U
0076	01-Feb-91	Benzo(a)anthracene	10	10	UG/L	U	U
0271	16-Dec-91	Benzo(a)anthracene	10	10	UG/L	U	U
0271	07-Apr-94	Benzo(a)anthracene	11	11	UG/L	U	U
0271	07-Apr-94	Benzo(a)anthracene	11	11	UG/L	U	U
0076	07-Apr-94	Benzo(a)anthracene	11	11	UG/L	U	U
0076	06-Nov-90	Benzo(a)pyrene	10	10	UG/L	U	U
0271	11-Oct-93	Benzo(a)pyrene	10	10	UG/L	U	U
0076	23-Mar-92	Benzo(a)pyrene	10	10	UG/L	U	U
0076	06-May-91	Benzo(a)pyrene	10	10	UG/L	U	U
0271	01-Feb-91	Benzo(a)pyrene	10	10	UG/L	U	U
0271	06-May-91	Benzo(a)pyrene	10	10	UG/L	U	U
0076	22-Jun-92	Benzo(a)pyrene	10	10	UG/L	U	U
0271	06-Nov-90	Benzo(a)pyrene	10	10	UG/L	U	U
0271	05-Aug-91	Benzo(a)pyrene	10	10	UG/L	U	UJ
0271	16-Sep-92	Benzo(a)pyrene	10	10	UG/L	U	U
0076	01-Feb-91	Benzo(a)pyrene	10	10	UG/L	U	U
0271	22-Jun-92	Benzo(a)pyrene	10	10	UG/L	U	U
0271	16-Dec-91	Benzo(a)pyrene	10	10	UG/L	U	U
0076	11-Oct-93	Benzo(a)pyrene	10	10	UG/L	U	U
0076	16-Dec-91	Benzo(a)pyrene	10	10	UG/L	U	U
0076	16-Sep-92	Benzo(a)pyrene	10	10	UG/L	U	U
0271	07-Apr-94	Benzo(a)pyrene	11	11	UG/L	U	U
0271	07-Apr-94	Benzo(a)pyrene	11	11	UG/L	U	U
0076	07-Apr-94	Benzo(a)pyrene	11	11	UG/L	U	U
0271	16-Sep-92	Benzo(b)fluoranthene	10	10	UG/L	U	U
0271	16-Dec-91	Benzo(b)fluoranthene	10	10	UG/L	U	U
0076	23-Mar-92	Benzo(b)fluoranthene	10	10	UG/L	U	U
0271	06-Nov-90	Benzo(b)fluoranthene	10	10	UG/L	U	U
0076	22-Jun-92	Benzo(b)fluoranthene	10	10	UG/L	U	U
0271	11-Oct-93	Benzo(b)fluoranthene	10	10	UG/L	U	U
0076	11-Oct-93	Benzo(b)fluoranthene	10	10	UG/L	U	U
0076	06-Nov-90	Benzo(b)fluoranthene	10	10	UG/L	U	U
0271	22-Jun-92	Benzo(b)fluoranthene	10	10	UG/L	U	U
0076	01-Feb-91	Benzo(b)fluoranthene	10	10	UG/L	U	U
0271	01-Feb-91	Benzo(b)fluoranthene	10	10	UG/L	U	U
0271	06-May-91	Benzo(b)fluoranthene	10	10	UG/L	U	U
0076	06-May-91	Benzo(b)fluoranthene	10	10	UG/L	U	U
0271	05-Aug-91	Benzo(b)fluoranthene	10	10	UG/L	U	UJ
0076	16-Dec-91	Benzo(b)fluoranthene	10	10	UG/L	U	U
0076	16-Sep-92	Benzo(b)fluoranthene	10	10	UG/L	U	U
0076	07-Apr-94	Benzo(b)fluoranthene	11	11	UG/L	U	U
0271	07-Apr-94	Benzo(b)fluoranthene	11	11	UG/L	U	U
0271	07-Apr-94	Benzo(b)fluoranthene	11	11	UG/L	U	U
0271	16-Sep-92	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0076	16-Sep-92	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0271	22-Jun-92	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0271	06-May-91	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0271	05-Aug-91	Benzo(g,h,i)perylene	10	10	UG/L	U	UJ
0076	06-May-91	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0076	01-Feb-91	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0076	11-Oct-93	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0076	22-Jun-92	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0271	16-Dec-91	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0271	11-Oct-93	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0271	06-Nov-90	Benzo(g,h,i)perylene	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	01-Feb-91	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0076	23-Mar-92	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0076	06-Nov-90	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0076	16-Dec-91	Benzo(g,h,i)perylene	10	10	UG/L	U	U
0076	07-Apr-94	Benzo(g,h,i)perylene	11	11	UG/L	U	U
0271	07-Apr-94	Benzo(g,h,i)perylene	11	11	UG/L	U	U
0271	07-Apr-94	Benzo(g,h,i)perylene	11	11	UG/L	U	U
0271	11-Oct-93	Benzo(k)fluoranthene	10	10	UG/L	U	U
0271	16-Dec-91	Benzo(k)fluoranthene	10	10	UG/L	U	U
0271	06-May-91	Benzo(k)fluoranthene	10	10	UG/L	U	U
0271	22-Jun-92	Benzo(k)fluoranthene	10	10	UG/L	U	U
0076	16-Sep-92	Benzo(k)fluoranthene	10	10	UG/L	U	U
0076	01-Feb-91	Benzo(k)fluoranthene	10	10	UG/L	U	U
0076	11-Oct-93	Benzo(k)fluoranthene	10	10	UG/L	U	U
0076	06-Nov-90	Benzo(k)fluoranthene	10	10	UG/L	U	U
0271	16-Sep-92	Benzo(k)fluoranthene	10	10	UG/L	U	U
0271	01-Feb-91	Benzo(k)fluoranthene	10	10	UG/L	U	U
0076	16-Dec-91	Benzo(k)fluoranthene	10	10	UG/L	U	U
0271	06-Nov-90	Benzo(k)fluoranthene	10	10	UG/L	U	U
0076	22-Jun-92	Benzo(k)fluoranthene	10	10	UG/L	U	U
0271	05-Aug-91	Benzo(k)fluoranthene	10	10	UG/L	U	UJ
0076	23-Mar-92	Benzo(k)fluoranthene	10	10	UG/L	U	U
0076	06-May-91	Benzo(k)fluoranthene	10	10	UG/L	U	U
0271	07-Apr-94	Benzo(k)fluoranthene	11	11	UG/L	U	U
0076	07-Apr-94	Benzo(k)fluoranthene	11	11	UG/L	U	U
0271	07-Apr-94	Benzo(k)fluoranthene	11	11	UG/L	U	U
0271	06-May-91	Benzoic Acid	50	50	UG/L	U	UJ
0076	16-Dec-91	Benzoic Acid	50	50	UG/L	U	UJ
0271	06-Nov-90	Benzoic Acid	50	50	UG/L	U	U
0271	16-Dec-91	Benzoic Acid	50	50	UG/L	U	UJ
0271	05-Aug-91	Benzoic Acid	50	50	UG/L	U	UJ
0076	06-Nov-90	Benzoic Acid	50	50	UG/L	U	U
0076	06-May-91	Benzoic Acid	50	50	UG/L	U	UJ
0076	01-Feb-91	Benzoic Acid	50	50	UG/L	U	UJ
0271	01-Feb-91	Benzoic Acid	50	50	UG/L	U	UJ
0271	11-Oct-93	Benzoic Acid	51	51	UG/L	U	U
0076	11-Oct-93	Benzoic Acid	51	51	UG/L	U	U
0271	07-Apr-94	Benzoic Acid	53	53	UG/L	U	U
0271	07-Apr-94	Benzoic Acid	53	53	UG/L	U	U
0076	07-Apr-94	Benzoic Acid	53	53	UG/L	U	U
0271	06-May-91	Benzyl Alcohol	10	10	UG/L	U	U
0271	06-Nov-90	Benzyl Alcohol	10	10	UG/L	U	U
0271	11-Oct-93	Benzyl Alcohol	10	10	UG/L	U	U
0076	06-Nov-90	Benzyl Alcohol	10	10	UG/L	U	U
0076	01-Feb-91	Benzyl Alcohol	10	10	UG/L	U	U
0076	16-Dec-91	Benzyl Alcohol	10	10	UG/L	U	U
0271	05-Aug-91	Benzyl Alcohol	10	10	UG/L	U	UJ
0271	01-Feb-91	Benzyl Alcohol	10	10	UG/L	U	U
0076	06-May-91	Benzyl Alcohol	10	10	UG/L	U	U
0271	16-Dec-91	Benzyl Alcohol	10	10	UG/L	U	U
0076	11-Oct-93	Benzyl Alcohol	10	10	UG/L	U	U
0271	07-Apr-94	Benzyl Alcohol	11	11	UG/L	U	U
0271	07-Apr-94	Benzyl Alcohol	11	11	UG/L	U	U
0076	07-Apr-94	Benzyl Alcohol	11	11	UG/L	U	U
0271	07-Apr-94	Beryllium	0.08	0.08	UG/L	U	U
0271	07-Apr-94	Beryllium	0.08	0.08	UG/L	U	U
0271	07-Apr-94	Beryllium	0.08	0.08	UG/L	U	U
0076	07-Apr-94	Beryllium	0.08	0.08	UG/L	U	U
0076	07-Apr-94	Beryllium	0.08	0.08	UG/L	U	U
0271	07-Apr-94	Beryllium	0.08	0.08	UG/L	U	U
0271	11-Oct-93	Beryllium	0.25	0.25	UG/L	U	U
0271	11-Oct-93	Beryllium	0.25	0.25	UG/L	U	U
0076	11-Oct-93	Beryllium	0.25	0.25	UG/L	U	U
0076	11-Oct-93	Beryllium	0.25	0.25	UG/L	U	U
0076	16-Sep-92	Beryllium	1	1	UG/L	U	U
0271	01-Feb-91	Beryllium	1	1	UG/L	U	U
0271	16-Sep-92	Beryllium	1	1	UG/L	U	U
0076	23-Mar-92	Beryllium	1	5	UG/L	U	U
0271	22-Jun-92	Beryllium	1	1	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	01-Feb-91	Beryllium	1	1	UG/L	U	U
0076	22-Jun-92	Beryllium	1	1	UG/L	U	U
0271	05-Aug-91	Beryllium	2	2	UG/L	U	U
0271	06-Nov-90	Beryllium	2	2	UG/L	U	U
0271	13-Dec-85	Beryllium	2	2	UG/L	U	U
0271	06-May-91	Beryllium	2	2	UG/L	U	U
0271	05-Aug-91	Beryllium	2	2	UG/L	U	U
0076	06-Nov-90	Beryllium	2	2	UG/L	U	U
0076	06-May-91	Beryllium	2	2	UG/L	U	U
0076	12-Dec-85	Beryllium	2	2	UG/L	U	U
0076	01-Feb-84	Beryllium	5	5	UG/L	U	U
0271	16-Dec-91	Beryllium	5	5	UG/L	U	U
0076	16-Dec-91	Beryllium	5	5	UG/L	U	U
0271	01-Feb-91	Beryllium-7	96	0	PCI/L	U	U
0076	01-Feb-91	Beryllium-7	110	0	PCI/L	U	U
0076	06-Nov-90	Beta-BHC	0.05	0.05	UG/L	U	U
0271	06-Nov-90	Beta-BHC	0.05	0.05	UG/L	U	U
0271	05-Aug-91	Beta-BHC	0.05	0.05	UG/L	U	U
0076	16-Sep-92	Beta-BHC	0.05	0.05	UG/L	U	U
0271	01-Feb-91	Beta-BHC	0.05	0.05	UG/L	U	U
0271	11-Oct-93	Beta-BHC	0.05	0.05	UG/L	U	U
0271	07-Apr-94	Beta-BHC	0.05	0.05	UG/L	U	U
0271	06-May-91	Beta-BHC	0.05	0.05	UG/L	U	U
0076	11-Oct-93	Beta-BHC	0.05	0.05	UG/L	U	UJ
0076	01-Feb-91	Beta-BHC	0.05	0.05	UG/L	U	U
0076	06-May-91	Beta-BHC	0.05	0.05	UG/L	U	U
0271	16-Sep-92	Beta-BHC	0.05	0.05	UG/L	U	U
0271	22-Jun-92	Beta-BHC	0.051	0.051	UG/L		U
0076	16-Dec-91	Beta-BHC	0.052	0.052	UG/L	U	U
0271	07-Apr-94	Beta-BHC	0.052	0.052	UG/L	U	U
0271	16-Dec-91	Beta-BHC	0.052	0.052	UG/L	U	U
0076	22-Jun-92	Beta-BHC	0.052	0.052	UG/L	U	U
0076	23-Mar-92	Beta-BHC	0.053	0.053	UG/L	JB	U
0076	07-Apr-94	Beta-BHC	0.055	0.055	UG/L	U	U
0076	06-May-91	Beta-BHC	0.25	0.25	UG/L	U	U
0271	06-May-91	Beta-BHC	0.75	0.75	UG/L	U	U
0271	06-May-91	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0271	06-Nov-90	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0076	06-Nov-90	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0271	16-Sep-92	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0076	22-Jun-92	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0076	23-Mar-92	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0271	01-Feb-91	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0076	01-Feb-91	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0271	05-Aug-91	Bis(2-chloroethoxy)methane	10	10	UG/L	U	UJ
0271	11-Oct-93	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0076	06-May-91	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0076	16-Dec-91	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0271	22-Jun-92	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0076	11-Oct-93	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0271	16-Dec-91	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0076	16-Sep-92	Bis(2-chloroethoxy)methane	10	10	UG/L	U	U
0271	07-Apr-94	Bis(2-chloroethoxy)methane	11	11	UG/L	U	U
0271	07-Apr-94	Bis(2-chloroethoxy)methane	11	11	UG/L	U	U
0076	07-Apr-94	Bis(2-chloroethoxy)methane	11	11	UG/L	U	U
0076	23-Mar-92	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0076	11-Oct-93	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0271	01-Feb-91	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0271	11-Oct-93	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0271	06-May-91	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0271	06-Nov-90	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0271	16-Sep-92	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0076	01-Feb-91	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0076	16-Sep-92	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0271	05-Aug-91	Bis(2-chloroethyl)ether	10	10	UG/L	U	UJ
0271	16-Dec-91	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0076	06-May-91	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0076	06-Nov-90	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0076	16-Dec-91	Bis(2-chloroethyl)ether	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	22-Jun-92	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0271	22-Jun-92	Bis(2-chloroethyl)ether	10	10	UG/L	U	U
0076	07-Apr-94	Bis(2-chloroethyl)ether	11	11	UG/L	U	U
0271	07-Apr-94	Bis(2-chloroethyl)ether	11	11	UG/L	U	U
0271	07-Apr-94	Bis(2-chloroethyl)ether	11	11	UG/L	U	U
0271	16-Sep-92	Bis(2-ethylhexyl)phthalate	10	10	UG/L	JB	UJ
0076	12-Dec-85	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0271	13-Dec-85	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0271	05-Aug-91	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	UJ
0076	16-Dec-91	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0271	16-Dec-91	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0076	22-Jun-92	Bis(2-ethylhexyl)phthalate	10	10	UG/L	JB	UJ
0271	11-Oct-93	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0076	23-Mar-92	Bis(2-ethylhexyl)phthalate	10	10	UG/L	JB	UJ
0271	01-Feb-91	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0076	01-Feb-91	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0076	06-Nov-90	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0076	11-Oct-93	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0076	16-Sep-92	Bis(2-ethylhexyl)phthalate	10	10	UG/L	JB	UJ
0271	06-Nov-90	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0271	22-Jun-92	Bis(2-ethylhexyl)phthalate	10	10	UG/L	JB	UJ
0076	01-Feb-84	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0271	06-May-91	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0076	06-May-91	Bis(2-ethylhexyl)phthalate	10	10	UG/L	U	U
0076	07-Apr-94	Bis(2-ethylhexyl)phthalate	11	11	UG/L	JB	UJ
0271	07-Apr-94	Bis(2-ethylhexyl)phthalate	11	11	UG/L	JB	UJ
0271	07-Apr-94	Bis(2-ethylhexyl)phthalate	11	11	UG/L	JB	UJ
0076	11-Oct-93	Bismuth	32.2	32.2	UG/L	U	U
0076	11-Oct-93	Bismuth	32.2	32.2	UG/L	U	U
0271	11-Oct-93	Bismuth	32.2	32.2	UG/L	U	U
0271	11-Oct-93	Bismuth	32.2	32.2	UG/L	U	U
0271	07-Apr-94	Bismuth	32.5	32.5	UG/L	U	U
0076	07-Apr-94	Bismuth	32.5	32.5	UG/L	U	U
0271	07-Apr-94	Bismuth	32.5	32.5	UG/L	U	U
0271	07-Apr-94	Bismuth	32.5	32.5	UG/L	U	U
0271	07-Apr-94	Bismuth	32.5	32.5	UG/L	U	U
0076	07-Apr-94	Bismuth	32.5	32.5	UG/L	U	U
0271	07-Apr-94	Bismuth-207	1.97	1.97	PCI/L	U	U
0076	07-Apr-94	Bismuth-207	2.5	2.5	PCI/L	U	U
0271	07-Apr-94	Bismuth-207	3.86	3.86	PCI/L	U	U
0076	11-Oct-93	Bismuth-207	8.1	8.1	PCI/L	U	U
0271	11-Oct-93	Bismuth-207	9.9	9.9	PCI/L	U	U
0076	16-Sep-92	Bismuth-207	10.2	10.2	PCI/L	U	U
0271	16-Sep-92	Bismuth-207	12.1	12.1	PCI/L	U	U
0271	06-May-91	Bismuth-210	0.11	1	PCI/L		
0076	06-May-91	Bismuth-210	0.39	1	PCI/L		
0076	01-Feb-91	Bismuth-210	1	1	PCI/L	U	U
0271	01-Feb-91	Bismuth-210	1	1	PCI/L	U	U
0076	23-Mar-92	Bismuth-210	6	6	PCI/L	U	U
0271	07-Apr-94	Bismuth-210	6.67	6.67	PCI/L	U	U
0271	22-Jun-92	Bismuth-210	7	7	PCI/L	U	U
0271	07-Apr-94	Bismuth-210	7.1	7.1	PCI/L	U	U
0076	16-Dec-91	Bismuth-210	9.1	9.1	PCI/L	U	U
0076	07-Apr-94	Bismuth-210	9.82	9.82	PCI/L	U	U
0076	22-Jun-92	Bismuth-210	10	10	PCI/L	U	U
0271	05-Aug-91	Bismuth-210	10	0	PCI/L	U	U
0076	11-Oct-93	Bismuth-210	12	12	PCI/L	U	U
0271	11-Oct-93	Bismuth-210	13	13	PCI/L	U	U
0076	16-Sep-92	Bismuth-210	13.8	13.8	PCI/L	U	U
0271	16-Sep-92	Bismuth-210	14.4	14.4	PCI/L	U	U
0271	16-Dec-91	Bismuth-210	15	15	PCI/L	U	U
0076	06-Nov-90	Bismuth-210	20	0	PCI/L	U	U
0271	06-Nov-90	Bismuth-210	20	0	PCI/L	U	U
0076	06-May-91	Bismuth-211	219	1	PCI/L	U	U
0271	06-May-91	Bismuth-211	274	1	PCI/L	U	U
0076	06-May-91	Bismuth-212	187	1	PCI/L	U	U
0271	06-May-91	Bismuth-212	282	1	PCI/L	U	U
0271	06-May-91	Bismuth-214	82.5	1	PCI/L	U	U
0076	06-May-91	Bismuth-214	91.7	1	PCI/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	16-Dec-91	Bromobenzene	1	1	UG/L	U	UJ
0076	16-Dec-91	Bromobenzene	1	1	UG/L	U	UJ
0271	15-Jun-90	Bromobenzene	2	2	UG/L	U	U
0076	31-Jul-90	Bromobenzene	2	2	UG/L	U	U
0271	24-Jan-90	Bromobenzene	2	2	UG/L	U	U
0271	06-Nov-90	Bromobenzene	2	2	UG/L	U	UJ
0076	01-Feb-91	Bromobenzene	2	2	UG/L	U	UJ
0271	23-Mar-90	Bromobenzene	2	2	UG/L	U	U
0271	11-Oct-93	Bromobenzene	2	2	UG/L	U	U
0271	31-Jul-90	Bromobenzene	2	2	UG/L	U	U
0076	23-Mar-90	Bromobenzene	2	2	UG/L	U	U
0271	27-Feb-90	Bromobenzene	2	2	UG/L	U	U
0271	01-Feb-91	Bromobenzene	2	2	UG/L	U	UJ
0076	22-Jun-92	Bromobenzene	2	2	UG/L	U	R
0076	06-Nov-90	Bromobenzene	2	2	UG/L	U	UJ
0076	11-Oct-93	Bromobenzene	2	2	UG/L	U	UJ
0271	07-Apr-94	Bromobenzene	2	2	UG/L	U	U
0271	16-Sep-92	Bromobenzene	2	2	UG/L	U	U
0076	15-Jun-90	Bromobenzene	2	2	UG/L	U	U
0271	22-Jun-92	Bromobenzene	2	2	UG/L	U	R
0271	27-Feb-90	Bromobenzene	2	2	UG/L	U	U
0271	07-Apr-94	Bromobenzene	2	2	UG/L	U	U
0271	05-Aug-91	Bromobenzene	2	2	UG/L	U	UJ
0271	27-Feb-90	Bromobenzene	2	2	UG/L	U	U
0076	24-Jan-90	Bromobenzene	2	2	UG/L	U	U
0076	27-Feb-90	Bromobenzene	2	2	UG/L	U	U
0076	16-Jun-93	Bromobenzene	2	2	UG/L	U	U
0076	16-Sep-92	Bromobenzene	2	2	UG/L	U	U
0271	06-May-91	Bromobenzene	2	2	UG/L	U	UJ
0076	23-Mar-92	Bromobenzene	2	2	UG/L	U	U
0076	06-May-91	Bromobenzene	2	2	UG/L	U	UJ
0076	07-Apr-94	Bromobenzene	2	2	UG/L	U	U
0076	07-Apr-94	Bromodichloromethane	1	1	UG/L	U	U
0271	07-Apr-94	Bromodichloromethane	1	1	UG/L	U	UJ
0076	16-Jun-93	Bromodichloromethane	1	1	UG/L	U	U
0271	15-Jun-90	Bromodichloromethane	1	1	UG/L	U	U
0271	24-Jan-90	Bromodichloromethane	1	1	UG/L	U	U
0076	06-Nov-90	Bromodichloromethane	1	1	UG/L	U	U
0076	22-Jun-92	Bromodichloromethane	1	1	UG/L	U	U
0076	31-Jul-90	Bromodichloromethane	1	1	UG/L	U	U
0076	27-Feb-90	Bromodichloromethane	1	1	UG/L	U	U
0271	31-Jul-90	Bromodichloromethane	1	1	UG/L	U	U
0271	27-Feb-90	Bromodichloromethane	1	1	UG/L	U	U
0271	27-Feb-90	Bromodichloromethane	1	1	UG/L	U	U
0271	16-Sep-92	Bromodichloromethane	1	1	UG/L	U	U
0271	23-Mar-90	Bromodichloromethane	1	1	UG/L	U	U
0076	24-Jan-90	Bromodichloromethane	1	1	UG/L	U	U
0271	05-Aug-91	Bromodichloromethane	1	1	UG/L	U	U
0271	27-Feb-90	Bromodichloromethane	1	1	UG/L	U	U
0271	16-Dec-91	Bromodichloromethane	1	1	UG/L	U	UJ
0271	06-May-91	Bromodichloromethane	1	1	UG/L	U	U
0076	15-Jun-90	Bromodichloromethane	1	1	UG/L	U	U
0076	23-Mar-90	Bromodichloromethane	1	1	UG/L	U	U
0271	06-Nov-90	Bromodichloromethane	1	1	UG/L	U	U
0271	07-Apr-94	Bromodichloromethane	1	1	UG/L	U	U
0076	06-May-91	Bromodichloromethane	1	1	UG/L	U	U
0271	22-Jun-92	Bromodichloromethane	1	1	UG/L	U	U
0076	16-Dec-91	Bromodichloromethane	1	1	UG/L	U	UJ
0271	01-Feb-91	Bromodichloromethane	1	1	UG/L	U	U
0271	11-Oct-93	Bromodichloromethane	1	1	UG/L	U	UJ
0076	11-Oct-93	Bromodichloromethane	1	1	UG/L	U	UJ
0076	16-Sep-92	Bromodichloromethane	1	1	UG/L	U	U
0076	01-Feb-91	Bromodichloromethane	1	1	UG/L	U	U
0076	23-Mar-92	Bromodichloromethane	1	1	UG/L	U	U
0076	13-Sep-88	Bromodichloromethane	2.2	1	UG/L		
0271	13-Sep-88	Bromodichloromethane	3.7	1	UG/L		
0076	13-Sep-88	Bromodichloromethane	5	5	UG/L	U	U
0271	25-Apr-90	Bromodichloromethane	5	5	UG/L	U	U
0271	08-Mar-88	Bromodichloromethane	5	5	UG/L	U	U

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	13-Sep-88	Bromodichloromethane	5	5	UG/L	U	U
0271	24-Jun-88	Bromodichloromethane	5	5	UG/L	U	U
0076	25-Apr-90	Bromodichloromethane	5	5	UG/L	U	U
0076	24-Jun-88	Bromodichloromethane	5	5	UG/L	U	U
0271	16-Dec-91	Bromoform	1	1	UG/L	U	UJ
0271	13-Sep-88	Bromoform	1	1	UG/L	U	U
0076	16-Dec-91	Bromoform	1	1	UG/L	U	UJ
0076	13-Sep-88	Bromoform	1	1	UG/L	U	U
0076	11-Oct-93	Bromoform	2	2	UG/L	U	UJ
0271	31-Jul-90	Bromoform	2	2	UG/L	U	U
0076	15-Jun-90	Bromoform	2	2	UG/L	U	U
0271	06-May-91	Bromoform	2	2	UG/L	U	U
0076	16-Sep-92	Bromoform	2	2	UG/L	U	U
0271	05-Aug-91	Bromoform	2	2	UG/L	U	UJ
0271	27-Feb-90	Bromoform	2	2	UG/L	U	U
0076	07-Apr-94	Bromoform	2	2	UG/L	U	UJ
0271	16-Sep-92	Bromoform	2	2	UG/L	U	U
0076	24-Jan-90	Bromoform	2	2	UG/L	U	U
0271	01-Feb-91	Bromoform	2	2	UG/L	U	U
0271	22-Jun-92	Bromoform	2	2	UG/L	U	UJ
0076	23-Mar-92	Bromoform	2	2	UG/L	U	U
0076	06-May-91	Bromoform	2	2	UG/L	U	U
0076	22-Jun-92	Bromoform	2	2	UG/L	U	U
0271	23-Mar-90	Bromoform	2	2	UG/L	U	U
0271	27-Feb-90	Bromoform	2	2	UG/L	U	U
0271	07-Apr-94	Bromoform	2	2	UG/L	U	UJ
0271	07-Apr-94	Bromoform	2	2	UG/L	U	UJ
0076	16-Jun-93	Bromoform	2	2	UG/L	U	U
0076	06-Nov-90	Bromoform	2	2	UG/L	U	UJ
0271	24-Jan-90	Bromoform	2	2	UG/L	U	U
0076	01-Feb-91	Bromoform	2	2	UG/L	U	U
0076	27-Feb-90	Bromoform	2	2	UG/L	U	U
0271	15-Jun-90	Bromoform	2	2	UG/L	U	U
0076	23-Mar-90	Bromoform	2	2	UG/L	U	U
0076	31-Jul-90	Bromoform	2	2	UG/L	U	U
0271	06-Nov-90	Bromoform	2	2	UG/L	U	U
0271	27-Feb-90	Bromoform	2	2	UG/L	U	U
0076	13-Sep-88	Bromoform	5	5	UG/L	U	U
0271	24-Jun-88	Bromoform	5	5	UG/L	U	U
0076	25-Apr-90	Bromoform	5	5	UG/L	U	U
0076	24-Jun-88	Bromoform	5	5	UG/L	U	U
0271	25-Apr-90	Bromoform	5	5	UG/L	U	U
0271	13-Sep-88	Bromoform	5	5	UG/L	U	U
0271	08-Mar-88	Bromoform	5	5	UG/L	U	U
0076	06-May-91	Bromomethane	1.2	1.2	UG/L	U	U
0271	05-Aug-91	Bromomethane	1.2	1.2	UG/L	U	U
0271	06-May-91	Bromomethane	1.2	1.2	UG/L	U	U
0271	16-Dec-91	Bromomethane	2	2	UG/L	U	R
0076	16-Dec-91	Bromomethane	2	2	UG/L	U	R
0271	13-Sep-88	Bromomethane	2	2	UG/L	U	U
0076	13-Sep-88	Bromomethane	2	2	UG/L	U	U
0076	24-Jun-88	Bromomethane	10	10	UG/L	U	U
0076	13-Sep-88	Bromomethane	10	10	UG/L	U	U
0271	25-Apr-90	Bromomethane	10	10	UG/L	U	U
0271	13-Sep-88	Bromomethane	10	10	UG/L	U	U
0271	24-Jun-88	Bromomethane	10	10	UG/L	U	U
0076	25-Apr-90	Bromomethane	10	10	UG/L	U	U
0271	08-Mar-88	Bromomethane	10	10	UG/L	U	U
0271	06-May-91	Butyl Benzyl Phthalate	10	10	UG/L	U	U
0076	16-Dec-91	Butyl Benzyl Phthalate	10	10	UG/L	U	U
0076	01-Feb-91	Butyl Benzyl Phthalate	10	10	UG/L	U	U
0271	06-Nov-90	Butyl Benzyl Phthalate	10	10	UG/L	U	U
0271	16-Dec-91	Butyl Benzyl Phthalate	10	10	UG/L	U	U
0271	05-Aug-91	Butyl Benzyl Phthalate	10	10	UG/L	U	UJ
0076	06-Nov-90	Butyl Benzyl Phthalate	10	10	UG/L	U	U
0076	16-Sep-92	Butyl Benzyl Phthalate	10	10	UG/L	U	UJ
0076	22-Jun-92	Butyl Benzyl Phthalate	10	10	UG/L	U	U
0271	22-Jun-92	Butyl Benzyl Phthalate	10	10	UG/L	U	UJ
0076	06-May-91	Butyl Benzyl Phthalate	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	16-Sep-92	Butyl Benzyl Phthalate	10	10	UG/L	U	UJ
0271	11-Oct-93	Butyl Benzyl Phthalate	10	10	UG/L	U	U
0076	11-Oct-93	Butyl Benzyl Phthalate	10	10	UG/L	U	U
0271	01-Feb-91	Butyl Benzyl Phthalate	10	10	UG/L	U	U
0076	23-Mar-92	Butyl Benzyl Phthalate	10	10	UG/L	U	U
0076	07-Apr-94	Butyl Benzyl Phthalate	11	11	UG/L	U	U
0271	07-Apr-94	Butyl Benzyl Phthalate	11	11	UG/L	U	U
0271	07-Apr-94	Butyl Benzyl Phthalate	11	11	UG/L	U	U
0271	11-Oct-93	Cadmium	0.5	0.5	UG/L	U	U
0271	11-Oct-93	Cadmium	0.5	0.5	UG/L	U	UJ
0076	11-Oct-93	Cadmium	0.5	0.5	UG/L	U	U
0076	11-Oct-93	Cadmium	0.5	0.5	UG/L	U	U
0076	07-Apr-94	Cadmium	0.65	0.65	UG/L	U	U
0271	07-Apr-94	Cadmium	0.65	0.65	UG/L	U	U
0271	07-Apr-94	Cadmium	0.65	0.65	UG/L	U	U
0076	07-Apr-94	Cadmium	0.65	0.65	UG/L	U	U
0271	07-Apr-94	Cadmium	0.65	0.65	UG/L	U	U
0271	07-Apr-94	Cadmium	0.65	0.65	UG/L	U	U
0076	12-Dec-85	Cadmium	1	1	UG/L	U	U
0271	13-Dec-85	Cadmium	1	1	UG/L	U	U
0271	16-Sep-92	Cadmium	3	3	UG/L	U	U
0076	16-Sep-92	Cadmium	3	3	UG/L	U	U
0271	22-Jun-92	Cadmium	4	4	UG/L	U	U
0076	23-Mar-92	Cadmium	4	5	UG/L	U	U
0076	22-Jun-92	Cadmium	4	4	UG/L	U	U
0271	05-Aug-91	Cadmium	4.6	2	UG/L		
0271	01-Feb-91	Cadmium	5	5	UG/L	U	U
0271	16-Dec-91	Cadmium	5	5	UG/L	U	U
0076	01-Feb-91	Cadmium	5	5	UG/L	U	U
0076	16-Dec-91	Cadmium	5	5	UG/L	U	U
0271	05-Aug-91	Cadmium	5.131	2	UG/L		
0271	06-Nov-90	Cadmium	5.3	2	UG/L		
0076	06-Nov-90	Cadmium	5.4	2	UG/L		
0076	06-May-91	Cadmium	6.9	2	UG/L		
0271	06-May-91	Cadmium	7.7	2	UG/L		
0076	01-Feb-84	Cadmium	30	30	UG/L	U	U
0271	05-Aug-91	Calcium	107	0.02	UG/L		
0271	05-Aug-91	Calcium	108	0.02	UG/L		
0271	05-Aug-91	Calcium	108	0.02	UG/L		
0076	23-Mar-92	Calcium	94300	5000	UG/L		J
0076	22-Jun-92	Calcium	94500	14	UG/L		
0076	16-Sep-92	Calcium	94600	30	UG/L		
0076	07-Apr-94	Calcium	95400	14	UG/L		
0076	07-Apr-94	Calcium	96100	14	UG/L		
0076	11-Oct-93	Calcium	96600	7.5	UG/L		J
0076	16-Dec-91	Calcium	98100	5000	UG/L		J
0076	06-May-91	Calcium	99300	0.05	UG/L		
0076	11-Oct-93	Calcium	99600	7.5	UG/L		J
0271	07-Apr-94	Calcium	100000	14	UG/L		
0271	05-Aug-91	Calcium	101000	20	UG/L		
0271	11-Oct-93	Calcium	102000	7.5	UG/L		J
0271	11-Oct-93	Calcium	102000	7.5	UG/L		J
0076	06-May-91	Calcium	102000	20	UG/L		
0271	22-Jun-92	Calcium	103000	14	UG/L		
0271	07-Apr-94	Calcium	103000	14	UG/L		
0271	16-Sep-92	Calcium	105000	30	UG/L		
0271	07-Apr-94	Calcium	105000	14	UG/L		
0271	06-Nov-90	Calcium	106000	20	UG/L		
0271	05-Aug-91	Calcium	106719.414	20	UG/L		
0076	06-Nov-90	Calcium	107000	20	UG/L		
0271	16-Dec-91	Calcium	108000	5000	UG/L		J
0076	01-Feb-91	Calcium	112000	30	UG/L		
0076	01-Feb-91	Calcium	113000	0	UG/L		
0271	06-May-91	Calcium	116000	0.05	UG/L		
0271	07-Apr-94	Calcium	117000	14	UG/L		
0271	06-May-91	Calcium	119000	20	UG/L		
0271	01-Feb-91	Calcium	125000	0	UG/L		
0271	01-Feb-91	Calcium	126000	30	UG/L		
0076	22-Jun-92	Carbazole	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	16-Sep-92	Carbazole	10	10	UG/L	U	UJ
0271	22-Jun-92	Carbazole	10	10	UG/L	U	U
0076	11-Oct-93	Carbazole	10	10	UG/L	U	U
0076	23-Mar-92	Carbazole	10	10	UG/L	U	U
0271	11-Oct-93	Carbazole	10	10	UG/L	U	U
0076	16-Sep-92	Carbazole	10	10	UG/L	U	UJ
0271	07-Apr-94	Carbazole	11	11	UG/L	U	U
0271	07-Apr-94	Carbazole	11	11	UG/L	U	U
0076	07-Apr-94	Carbazole	11	11	UG/L	U	U
0271	24-Jun-88	Carbon Disulfide	5	5	UG/L	U	U
0271	25-Apr-90	Carbon Disulfide	5	5	UG/L	U	U
0271	07-Apr-94	Carbon Disulfide	5	5	UG/L	U	UJ
0271	11-Oct-93	Carbon Disulfide	5	5	UG/L	U	UJ
0076	11-Oct-93	Carbon Disulfide	5	5	UG/L	U	UJ
0271	08-Mar-88	Carbon Disulfide	5	5	UG/L	U	U
0271	13-Sep-88	Carbon Disulfide	5	5	UG/L	U	U
0076	07-Apr-94	Carbon Disulfide	5	5	UG/L	U	UJ
0076	13-Sep-88	Carbon Disulfide	5	5	UG/L	U	U
0076	25-Apr-90	Carbon Disulfide	5	5	UG/L	U	U
0271	07-Apr-94	Carbon Disulfide	5	5	UG/L	U	UJ
0076	24-Jun-88	Carbon Disulfide	5	5	UG/L	U	U
0076	16-Sep-92	Carbon Tetrachloride	1	1	UG/L	U	U
0271	13-Sep-88	Carbon Tetrachloride	1	1	UG/L	U	U
0271	16-Sep-92	Carbon Tetrachloride	1	1	UG/L	U	U
0271	16-Dec-91	Carbon Tetrachloride	1	1	UG/L	U	U
0076	23-Mar-92	Carbon Tetrachloride	1	1	UG/L	U	U
0076	16-Jun-93	Carbon Tetrachloride	1	1	UG/L	U	UJ
0076	13-Sep-88	Carbon Tetrachloride	1	1	UG/L	U	U
0076	16-Dec-91	Carbon Tetrachloride	1	1	UG/L	U	U
0076	22-Jun-92	Carbon Tetrachloride	1	1	UG/L	U	UJ
0271	22-Jun-92	Carbon Tetrachloride	1	1	UG/L	U	UJ
0076	24-Jan-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0076	27-Feb-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0076	01-Feb-91	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	27-Feb-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	15-Jun-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	24-Jan-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	11-Oct-93	Carbon Tetrachloride	1.2	1.2	UG/L	U	UJ
0076	07-Apr-94	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	05-Aug-91	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	07-Apr-94	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	31-Jul-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	23-Mar-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	27-Feb-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	06-May-91	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	07-Apr-94	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0076	31-Jul-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0076	06-Nov-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	01-Feb-91	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0076	11-Oct-93	Carbon Tetrachloride	1.2	1.2	UG/L	U	UJ
0076	15-Jun-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0076	23-Mar-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	06-Nov-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0076	06-May-91	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	27-Feb-90	Carbon Tetrachloride	1.2	1.2	UG/L	U	U
0271	08-Mar-88	Carbon Tetrachloride	5	5	UG/L	U	U
0076	25-Apr-90	Carbon Tetrachloride	5	5	UG/L	U	U
0271	25-Apr-90	Carbon Tetrachloride	5	5	UG/L	U	U
0076	24-Jun-88	Carbon Tetrachloride	5	5	UG/L	U	U
0076	13-Sep-88	Carbon Tetrachloride	5	5	UG/L	U	U
0271	24-Jun-88	Carbon Tetrachloride	5	5	UG/L	U	U
0271	13-Sep-88	Carbon Tetrachloride	5	5	UG/L	U	U
0271	01-Feb-91	Cerium-139	11	0	PCI/L	U	U
0076	01-Feb-91	Cerium-139	16	0	PCI/L	U	U
0271	01-Feb-91	Cerium-141	18	0	PCI/L	U	U
0076	01-Feb-91	Cerium-141	25	0	PCI/L	U	U
0271	01-Feb-91	Cerium-144	88	0	PCI/L	U	U
0076	01-Feb-91	Cerium-144	100	0	PCI/L	U	U
0271	01-Feb-91	Cesium-134	12	0	PCI/L	U	U

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	01-Feb-91	Cesium-134	16	0	PCI/L	U	U
0076	06-May-91	Cesium-134	25	1	PCI/L	U	U
0271	06-May-91	Cesium-134	34.5	1	PCI/L	U	U
0271	07-Apr-94	Cesium-137	1.83	1.83	PCI/L	U	U
0271	07-Apr-94	Cesium-137	2.52	2.52	PCI/L	U	U
0076	23-Mar-92	Cesium-137	3	3	PCI/L	U	U
0076	22-Jun-92	Cesium-137	3	3	PCI/L	U	U
0271	22-Jun-92	Cesium-137	4	4	PCI/L	U	U
0076	07-Apr-94	Cesium-137	4.37	4.37	PCI/L	U	U
0271	11-Oct-93	Cesium-137	11	11	PCI/L	U	U
0271	01-Feb-91	Cesium-137	12	0	PCI/L	U	U
0076	16-Sep-92	Cesium-137	13	13	PCI/L	U	U
0076	01-Feb-91	Cesium-137	15	0	PCI/L	U	U
0076	11-Oct-93	Cesium-137	15	15	PCI/L	U	U
0271	16-Sep-92	Cesium-137	16.5	16.5	PCI/L	U	U
0076	06-May-91	Cesium-137	37.3	20	PCI/L	U	U
0271	06-May-91	Cesium-137	42	20	PCI/L	U	U
0076	22-Jun-92	Chloride	75.5	5	MG/L		
0076	16-Dec-91	Chloride	80.72	0.5	MG/L		
0076	16-Sep-92	Chloride	80.9	5	MG/L		
0076	11-Oct-93	Chloride	88.6	6.2	MG/L		
0076	06-May-91	Chloride	89.1	0.05	MG/L		
0076	23-Mar-92	Chloride	91.2	5	MG/L		
0076	01-Feb-91	Chloride	96.1	0	MG/L		
0076	07-Apr-94	Chloride	98.1	25	MG/L		
0271	22-Jun-92	Chloride	98.2	25	MG/L		
0271	05-Aug-91	Chloride	103	0.5	MG/L		
0271	16-Sep-92	Chloride	111	10	MG/L		
0271	16-Dec-91	Chloride	113.72	0.5	MG/L		
0271	11-Oct-93	Chloride	119	6.2	MG/L		
0271	07-Apr-94	Chloride	128	50	MG/L		
0271	01-Feb-91	Chloride	130	0	MG/L		
0271	07-Apr-94	Chloride	132	50	MG/L		
0271	06-May-91	Chloride	133	0.05	MG/L		
0076	16-Jun-93	Chlorobenzene	1	1	UG/L	U	UJ
0271	13-Sep-88	Chlorobenzene	1	1	UG/L	U	U
0076	16-Dec-91	Chlorobenzene	1	1	UG/L	U	U
0076	22-Jun-92	Chlorobenzene	1	1	UG/L	U	R
0076	13-Sep-88	Chlorobenzene	1	1	UG/L	U	U
0271	22-Jun-92	Chlorobenzene	1	1	UG/L	U	R
0076	16-Sep-92	Chlorobenzene	1	1	UG/L	U	U
0076	23-Mar-92	Chlorobenzene	1	1	UG/L	U	UJ
0271	16-Dec-91	Chlorobenzene	1	1	UG/L	U	U
0271	16-Sep-92	Chlorobenzene	1	1	UG/L	U	U
0271	23-Mar-90	Chlorobenzene	2	2	UG/L	U	U
0271	11-Oct-93	Chlorobenzene	2	2	UG/L	U	U
0076	23-Mar-90	Chlorobenzene	2	2	UG/L	U	U
0076	06-May-91	Chlorobenzene	2	2	UG/L	U	U
0271	06-May-91	Chlorobenzene	2	2	UG/L	U	U
0076	15-Jun-90	Chlorobenzene	2	2	UG/L	U	U
0076	07-Apr-94	Chlorobenzene	2	2	UG/L	U	U
0076	24-Jan-90	Chlorobenzene	2	2	UG/L	U	U
0271	06-Nov-90	Chlorobenzene	2	2	UG/L	U	U
0076	01-Feb-91	Chlorobenzene	2	2	UG/L	U	U
0271	27-Feb-90	Chlorobenzene	2	2	UG/L	U	U
0271	01-Feb-91	Chlorobenzene	2	2	UG/L	U	U
0271	05-Aug-91	Chlorobenzene	2	2	UG/L	U	U
0076	11-Oct-93	Chlorobenzene	2	2	UG/L	U	UJ
0076	31-Jul-90	Chlorobenzene	2	2	UG/L	U	U
0271	07-Apr-94	Chlorobenzene	2	2	UG/L	U	U
0076	27-Feb-90	Chlorobenzene	2	2	UG/L	U	U
0271	15-Jun-90	Chlorobenzene	2	2	UG/L	U	U
0271	24-Jan-90	Chlorobenzene	2	2	UG/L	U	U
0076	06-Nov-90	Chlorobenzene	2	2	UG/L	U	U
0271	27-Feb-90	Chlorobenzene	2	2	UG/L	U	U
0271	27-Feb-90	Chlorobenzene	2	2	UG/L	U	U
0271	07-Apr-94	Chlorobenzene	2	2	UG/L	U	U
0271	31-Jul-90	Chlorobenzene	2	2	UG/L	U	U
0271	08-Mar-88	Chlorobenzene	5	5	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	25-Apr-90	Chlorobenzene	5	5	UG/L	U	U
0271	13-Sep-88	Chlorobenzene	5	5	UG/L	U	U
0076	13-Sep-88	Chlorobenzene	5	5	UG/L	U	U
0271	25-Apr-90	Chlorobenzene	5	5	UG/L	U	U
0076	24-Jun-88	Chlorobenzene	5	5	UG/L	U	U
0271	24-Jun-88	Chlorobenzene	5	5	UG/L	U	U
0076	16-Dec-91	Chloroethane	2	2	UG/L	U	R
0076	13-Sep-88	Chloroethane	2	2	UG/L	U	U
0271	13-Sep-88	Chloroethane	2	2	UG/L	U	U
0271	16-Dec-91	Chloroethane	2	2	UG/L	U	R
0076	06-May-91	Chloroethane	5.2	5.2	UG/L	U	U
0271	05-Aug-91	Chloroethane	5.2	5.2	UG/L	U	U
0271	06-May-91	Chloroethane	5.2	5.2	UG/L	U	U
0076	24-Jun-88	Chloroethane	10	10	UG/L	U	U
0271	08-Mar-88	Chloroethane	10	10	UG/L	U	U
0076	25-Apr-90	Chloroethane	10	10	UG/L	U	U
0271	13-Sep-88	Chloroethane	10	10	UG/L	U	U
0271	24-Jun-88	Chloroethane	10	10	UG/L	U	U
0271	25-Apr-90	Chloroethane	10	10	UG/L	U	U
0076	13-Sep-88	Chloroethane	10	10	UG/L	U	U
0271	27-Feb-90	Chloroform	0.5	0.5	UG/L	U	U
0271	24-Jan-90	Chloroform	0.5	0.5	UG/L	U	U
0076	07-Apr-94	Chloroform	0.5	0.5	UG/L	U	U
0271	27-Feb-90	Chloroform	0.5	0.5	UG/L	U	U
0076	24-Jan-90	Chloroform	0.5	0.5	UG/L	U	U
0076	27-Feb-90	Chloroform	0.5	0.5	UG/L	U	U
0271	27-Feb-90	Chloroform	0.5	0.5	UG/L	U	U
0076	22-Jun-92	Chloroform	0.5	0.5	UG/L	U	UJ
0076	11-Oct-93	Chloroform	0.5	0.5	UG/L	U	UJ
0271	11-Oct-93	Chloroform	0.5	0.5	UG/L	U	UJ
0076	16-Sep-92	Chloroform	0.5	0.5	UG/L	U	U
0076	06-May-91	Chloroform	0.5	0.5	UG/L	U	U
0271	16-Sep-92	Chloroform	0.5	0.5	UG/L	U	U
0271	23-Mar-90	Chloroform	0.5	0.5	UG/L	U	U
0076	15-Jun-90	Chloroform	0.5	0.5	UG/L	U	U
0271	07-Apr-94	Chloroform	0.5	0.5	UG/L	U	UJ
0271	22-Jun-92	Chloroform	0.5	0.5	UG/L	U	UJ
0076	31-Jul-90	Chloroform	0.5	0.5	UG/L	U	U
0271	07-Apr-94	Chloroform	0.5	0.5	UG/L	U	U
0076	16-Jun-93	Chloroform	0.5	0.5	UG/L	U	U
0076	23-Mar-92	Chloroform	0.5	0.5	UG/L	U	U
0271	15-Jun-90	Chloroform	0.5	0.5	UG/L	U	U
0271	01-Feb-91	Chloroform	0.6	0.5	UG/L		UJ
0271	06-May-91	Chloroform	0.6	0.5	UG/L		J
0076	23-Mar-90	Chloroform	0.7	0.5	UG/L		
0076	01-Feb-91	Chloroform	0.8	0.5	UG/L		UJ
0271	05-Aug-91	Chloroform	0.9	0.5	UG/L		J
0076	06-Nov-90	Chloroform	0.9	0.5	UG/L		UJ
0271	13-Sep-88	Chloroform	1	1	UG/L	U	U
0076	13-Sep-88	Chloroform	1	1	UG/L	U	U
0076	16-Dec-91	Chloroform	1	1	UG/L	U	U
0271	16-Dec-91	Chloroform	1	1	UG/L	U	UJ
0271	06-Nov-90	Chloroform	1.2	0.5	UG/L		UJ
0076	12-Dec-85	Chloroform	1.6	1.6	UG/L	U	U
0271	13-Mar-86	Chloroform	1.6	1.6	UG/L	U	U
0271	13-Dec-85	Chloroform	1.6	1.6	UG/L	U	U
0271	31-Jul-90	Chloroform	2.2	0.5	UG/L		
0076	24-Jun-88	Chloroform	5	5	UG/L	U	U
0076	25-Apr-90	Chloroform	5	5	UG/L	U	U
0271	25-Apr-90	Chloroform	5	5	UG/L	U	U
0076	13-Sep-88	Chloroform	5	5	UG/L	U	U
0271	13-Sep-88	Chloroform	5	5	UG/L	U	U
0271	08-Mar-88	Chloroform	5	5	UG/L	U	U
0271	24-Jun-88	Chloroform	5	5	UG/L	U	U
0076	01-Feb-84	Chloroform	10	10	UG/L	U	U
0271	05-Aug-91	Chloromethane	0.8	0.8	UG/L	U	UJ
0271	06-May-91	Chloromethane	0.8	0.8	UG/L	U	U
0076	06-May-91	Chloromethane	0.8	0.8	UG/L	U	U
0271	13-Sep-88	Chloromethane	2	2	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	16-Dec-91	Chloromethane	2	2	UG/L	U	UJ
0076	13-Sep-88	Chloromethane	2	2	UG/L	U	U
0076	16-Dec-91	Chloromethane	2	2	UG/L	U	UJ
0076	25-Apr-90	Chloromethane	10	10	UG/L	U	U
0271	08-Mar-88	Chloromethane	10	10	UG/L	U	U
0076	24-Jun-88	Chloromethane	10	10	UG/L	U	U
0271	25-Apr-90	Chloromethane	10	10	UG/L	U	U
0076	13-Sep-88	Chloromethane	10	10	UG/L	U	U
0271	13-Sep-88	Chloromethane	10	10	UG/L	U	U
0271	24-Jun-88	Chloromethane	10	10	UG/L	U	U
0076	23-Mar-90	Chlorotoluene	1	1	UG/L	U	U
0076	31-Jul-90	Chlorotoluene	1	1	UG/L	U	U
0271	27-Feb-90	Chlorotoluene	1	1	UG/L	U	U
0271	27-Feb-90	Chlorotoluene	1	1	UG/L	U	U
0076	06-Nov-90	Chlorotoluene	1	1	UG/L	U	U
0271	31-Jul-90	Chlorotoluene	1	1	UG/L	U	U
0271	23-Mar-90	Chlorotoluene	1	1	UG/L	U	U
0271	06-May-91	Chlorotoluene	1	1	UG/L	U	U
0076	06-May-91	Chlorotoluene	1	1	UG/L	U	U
0076	15-Jun-90	Chlorotoluene	1	1	UG/L	U	U
0271	01-Feb-91	Chlorotoluene	1	1	UG/L	U	U
0271	24-Jan-90	Chlorotoluene	1	1	UG/L	U	U
0271	27-Feb-90	Chlorotoluene	1	1	UG/L	U	U
0076	24-Jan-90	Chlorotoluene	1	1	UG/L	U	U
0076	27-Feb-90	Chlorotoluene	1	1	UG/L	U	U
0271	05-Aug-91	Chlorotoluene	1	1	UG/L	U	U
0271	15-Jun-90	Chlorotoluene	1	1	UG/L	U	U
0076	01-Feb-91	Chlorotoluene	1	1	UG/L	U	U
0271	06-Nov-90	Chlorotoluene	1	1	UG/L	U	U
0076	11-Oct-93	Chromium	0.75	0.75	UG/L	U	U
0076	07-Apr-94	Chromium	0.82	0.82	UG/L	U	U
0271	07-Apr-94	Chromium	0.82	0.82	UG/L	U	U
0076	07-Apr-94	Chromium	0.82	0.82	UG/L	U	U
0271	07-Apr-94	Chromium	0.82	0.82	UG/L	U	U
0271	07-Apr-94	Chromium	0.82	0.82	UG/L	U	U
0271	07-Apr-94	Chromium	0.82	0.82	UG/L	U	U
0076	11-Oct-93	Chromium	1.4	0.75	UG/L	B	U
0271	11-Oct-93	Chromium	2	0.75	UG/L	B	U
0271	16-Sep-92	Chromium	3	3	UG/L	U	UJ
0076	16-Sep-92	Chromium	3	3	UG/L	U	UJ
0271	11-Oct-93	Chromium	3.1	0.75	UG/L	B	U
0076	23-Mar-92	Chromium	7	10	UG/L	U	U
0076	22-Jun-92	Chromium	8	8	UG/L	U	U
0271	22-Jun-92	Chromium	8	8	UG/L	U	U
0076	01-Feb-84	Chromium	9	9	UG/L	U	U
0271	01-Feb-91	Chromium	10	10	UG/L	U	U
0076	12-Dec-85	Chromium	10	10	UG/L	U	U
0271	13-Dec-85	Chromium	10	10	UG/L	U	U
0076	16-Dec-91	Chromium	10	10	UG/L	U	U
0076	01-Feb-91	Chromium	10	10	UG/L	U	U
0271	16-Dec-91	Chromium	10	10	UG/L	U	U
0271	06-Nov-90	Chromium	18.3	10	UG/L		
0076	06-Nov-90	Chromium	20.5	10	UG/L		
0271	05-Aug-91	Chromium	22	10	UG/L		
0076	06-May-91	Chromium	23.3	10	UG/L		
0271	06-May-91	Chromium	23.8	10	UG/L		
0271	05-Aug-91	Chromium	24.911	10	UG/L		
0271	01-Feb-91	Chromium-51	96	0	PCI/L	U	U
0076	01-Feb-91	Chromium-51	110	0	PCI/L	U	U
0076	06-May-91	Chrysene	10	10	UG/L	U	U
0271	16-Dec-91	Chrysene	10	10	UG/L	U	U
0271	06-May-91	Chrysene	10	10	UG/L	U	U
0076	06-Nov-90	Chrysene	10	10	UG/L	U	U
0271	05-Aug-91	Chrysene	10	10	UG/L	U	UJ
0076	22-Jun-92	Chrysene	10	10	UG/L	U	U
0076	01-Feb-91	Chrysene	10	10	UG/L	U	U
0271	06-Nov-90	Chrysene	10	10	UG/L	U	U
0271	11-Oct-93	Chrysene	10	10	UG/L	U	U
0076	23-Mar-92	Chrysene	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	22-Jun-92	Chrysene	10	10	UG/L	U	U
0271	01-Feb-91	Chrysene	10	10	UG/L	U	U
0271	16-Sep-92	Chrysene	10	10	UG/L	U	U
0076	16-Dec-91	Chrysene	10	10	UG/L	U	U
0076	11-Oct-93	Chrysene	10	10	UG/L	U	U
0076	16-Sep-92	Chrysene	10	10	UG/L	U	U
0271	07-Apr-94	Chrysene	11	11	UG/L	U	U
0271	07-Apr-94	Chrysene	11	11	UG/L	U	U
0076	07-Apr-94	Chrysene	11	11	UG/L	U	U
0076	07-Apr-94	Cobalt	0.98	0.98	UG/L	U	U
0271	07-Apr-94	Cobalt	0.98	0.98	UG/L	U	U
0076	07-Apr-94	Cobalt	0.98	0.98	UG/L	U	U
0271	07-Apr-94	Cobalt	0.98	0.98	UG/L	U	U
0271	07-Apr-94	Cobalt	0.98	0.98	UG/L	U	U
0271	07-Apr-94	Cobalt	0.98	0.98	UG/L	U	U
0076	11-Oct-93	Cobalt	1.2	1.2	UG/L	U	U
0271	11-Oct-93	Cobalt	1.2	1.2	UG/L	U	U
0271	11-Oct-93	Cobalt	1.2	1.2	UG/L	U	U
0076	11-Oct-93	Cobalt	1.2	1.2	UG/L	U	U
0076	16-Sep-92	Cobalt	4	4	UG/L	U	U
0271	16-Sep-92	Cobalt	4	4	UG/L	U	U
0271	22-Jun-92	Cobalt	6	6	UG/L	U	U
0076	22-Jun-92	Cobalt	6	6	UG/L	U	U
0076	23-Mar-92	Cobalt	7	50	UG/L	U	U
0076	06-Nov-90	Cobalt	10	10	UG/L	U	U
0271	05-Aug-91	Cobalt	10	10	UG/L	U	U
0271	06-May-91	Cobalt	10	10	UG/L	U	U
0271	06-Nov-90	Cobalt	10	10	UG/L	U	U
0076	06-May-91	Cobalt	10	10	UG/L	U	U
0271	05-Aug-91	Cobalt	10	10	UG/L	U	U
0271	01-Feb-91	Cobalt	20	20	UG/L	U	U
0076	01-Feb-91	Cobalt	20	20	UG/L	U	U
0076	16-Dec-91	Cobalt	50	50	UG/L	U	U
0271	16-Dec-91	Cobalt	50	50	UG/L	U	U
0271	01-Feb-91	Cobalt-57	11	0	PCI/L	U	U
0076	01-Feb-91	Cobalt-57	110	0	PCI/L	U	U
0076	01-Feb-91	Cobalt-58	8.2	0	PCI/L	U	U
0271	01-Feb-91	Cobalt-58	14	0	PCI/L	U	U
0076	07-Apr-94	Cobalt-60	1.74	1.74	PCI/L	U	U
0271	07-Apr-94	Cobalt-60	3.35	3.35	PCI/L	U	U
0271	07-Apr-94	Cobalt-60	4.46	4.46	PCI/L	U	U
0271	11-Oct-93	Cobalt-60	10	10	PCI/L	U	U
0076	11-Oct-93	Cobalt-60	14	14	PCI/L	U	U
0076	16-Sep-92	Cobalt-60	14.9	14.9	PCI/L	U	U
0271	01-Feb-91	Cobalt-60	17	0	PCI/L	U	U
0271	16-Sep-92	Cobalt-60	18.3	18.3	PCI/L	U	U
0271	06-May-91	Cobalt-60	22.7	20	PCI/L	U	U
0076	06-May-91	Cobalt-60	22.7	20	PCI/L	U	U
0076	01-Feb-91	Cobalt-60	32	0	PCI/L	U	U
0076	11-Oct-93	Copper	1.6	0.5	UG/L	B	
0076	11-Oct-93	Copper	1.6	0.5	UG/L	B	
0076	07-Apr-94	Copper	2.5	0.83	UG/L	B	
0271	11-Oct-93	Copper	3.9	0.5	UG/L	B	
0076	16-Sep-92	Copper	4	2	UG/L		J
0271	16-Sep-92	Copper	4	2	UG/L		J
0271	11-Oct-93	Copper	4.4	0.5	UG/L	B	
0076	22-Jun-92	Copper	5	5	UG/L	U	U
0076	23-Mar-92	Copper	7	25	UG/L	U	U
0271	13-Dec-85	Copper	7	7	UG/L	U	U
0076	12-Dec-85	Copper	7	7	UG/L	U	U
0076	07-Apr-94	Copper	7.4	0.83	UG/L	B	
0271	07-Apr-94	Copper	7.5	0.83	UG/L	B	
0271	07-Apr-94	Copper	8.7	0.83	UG/L	B	
0271	07-Apr-94	Copper	8.9	0.83	UG/L	B	
0271	07-Apr-94	Copper	9.2	0.83	UG/L	B	
0271	22-Jun-92	Copper	9.9	5	UG/L	B	
0076	01-Feb-91	Copper	10	10	UG/L	U	U
0076	01-Feb-84	Copper	10	10	UG/L	U	U
0271	16-Dec-91	Copper	11.4	25	UG/L	U	UJ

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	05-Aug-91	Copper	11.8	10	UG/L		
0271	05-Aug-91	Copper	13.458	10	UG/L		
0076	16-Dec-91	Copper	14.2	25	UG/L	U	UJ
0271	06-Nov-90	Copper	17	10	UG/L	B	
0271	06-May-91	Copper	17.6	10	UG/L	B	
0076	06-May-91	Copper	18.2	10	UG/L	B	
0271	01-Feb-91	Copper	40.4	10	UG/L		
0076	06-Nov-90	Copper	593	10	UG/L		
0076	23-Mar-92	Currently Unknown Radioisotope	0	0.4	PCI/L		
0076	22-Jun-92	Currently Unknown Radioisotope	0	0.4	PCI/L		
0271	22-Jun-92	Currently Unknown Radioisotope	0	0.4	PCI/L		
0076	06-May-91	Currently Unknown Radioisotope	1	1	PCI/L	U	U
0271	06-May-91	Currently Unknown Radioisotope	1	1	PCI/L	U	U
0271	06-Nov-90	Currently Unknown Radioisotope	1	0	PCI/L	U	U
0076	06-Nov-90	Currently Unknown Radioisotope	1	0	PCI/L	U	U
0271	01-Feb-91	Currently Unknown Radioisotope	1.4	0	PCI/L		
0076	01-Feb-91	Currently Unknown Radioisotope	2.3	0	PCI/L		
0076	06-May-91	Currently Unknown Radioisotope	46.1	1	PCI/L	U	U
0271	06-May-91	Currently Unknown Radioisotope	47	1	PCI/L	U	U
0271	07-Apr-94	Cyanide	5	5	UG/L	U	U
0271	07-Apr-94	Cyanide	5	5	UG/L	U	U
0271	07-Apr-94	Cyanide	5	5	UG/L	U	U
0271	07-Apr-94	Cyanide	5	5	UG/L	U	U
0076	07-Apr-94	Cyanide	5	5	UG/L	U	U
0076	07-Apr-94	Cyanide	5	5	UG/L	U	U
0271	11-Oct-93	Cyanide	10	10	UG/L	U	U
0271	11-Oct-93	Cyanide	10	10	UG/L	U	U
0076	11-Oct-93	Cyanide	10	10	UG/L	U	U
0076	11-Oct-93	Cyanide	10	10	UG/L	U	U
0076	06-Nov-90	Delta-BHC	0.05	0.05	UG/L	U	U
0271	07-Apr-94	Delta-BHC	0.05	0.05	UG/L	U	U
0076	01-Feb-91	Delta-BHC	0.05	0.05	UG/L	U	U
0271	06-Nov-90	Delta-BHC	0.05	0.05	UG/L	U	U
0076	11-Oct-93	Delta-BHC	0.05	0.05	UG/L	U	UJ
0076	06-May-91	Delta-BHC	0.05	0.05	UG/L	U	U
0271	11-Oct-93	Delta-BHC	0.05	0.05	UG/L	U	U
0271	06-May-91	Delta-BHC	0.05	0.05	UG/L	U	U
0271	05-Aug-91	Delta-BHC	0.05	0.05	UG/L	U	U
0271	16-Sep-92	Delta-BHC	0.05	0.05	UG/L	U	U
0076	16-Sep-92	Delta-BHC	0.05	0.05	UG/L		U
0271	01-Feb-91	Delta-BHC	0.05	0.05	UG/L	U	U
0271	22-Jun-92	Delta-BHC	0.051	0.051	UG/L	J	U
0271	07-Apr-94	Delta-BHC	0.052	0.052	UG/L	U	U
0076	16-Dec-91	Delta-BHC	0.052	0.052	UG/L	U	UJ
0076	22-Jun-92	Delta-BHC	0.052	0.052	UG/L	U	U
0271	16-Dec-91	Delta-BHC	0.052	0.052	UG/L	U	UJ
0076	23-Mar-92	Delta-BHC	0.053	0.053	UG/L	U	U
0076	07-Apr-94	Delta-BHC	0.055	0.055	UG/L	U	U
0076	06-May-91	Delta-BHC	0.25	0.25	UG/L	U	U
0271	06-May-91	Delta-BHC	0.75	0.75	UG/L	U	U
0271	16-Sep-92	Di-n-butyl Phthalate	10	10	UG/L	JB	UJ
0271	06-Nov-90	Di-n-butyl Phthalate	10	10	UG/L	U	U
0076	16-Dec-91	Di-n-butyl Phthalate	10	10	UG/L	U	U
0076	01-Feb-84	Di-n-butyl Phthalate	10	10	UG/L	U	U
0076	06-Nov-90	Di-n-butyl Phthalate	10	10	UG/L	U	U
0076	12-Dec-85	Di-n-butyl Phthalate	10	10	UG/L	U	U
0076	06-May-91	Di-n-butyl Phthalate	10	10	UG/L	U	U
0271	06-May-91	Di-n-butyl Phthalate	10	10	UG/L	U	U
0271	11-Oct-93	Di-n-butyl Phthalate	10	10	UG/L	U	UJ
0271	05-Aug-91	Di-n-butyl Phthalate	10	10	UG/L	U	UJ
0076	23-Mar-92	Di-n-butyl Phthalate	10	10	UG/L	JB	UJ
0076	11-Oct-93	Di-n-butyl Phthalate	10	10	UG/L	U	UJ
0076	16-Sep-92	Di-n-butyl Phthalate	10	10	UG/L	JB	UJ
0271	22-Jun-92	Di-n-butyl Phthalate	10	10	UG/L	JB	UJ
0271	13-Dec-85	Di-n-butyl Phthalate	10	10	UG/L	U	U
0076	01-Feb-91	Di-n-butyl Phthalate	10	10	UG/L	U	U
0076	22-Jun-92	Di-n-butyl Phthalate	10	10	UG/L	JB	UJ
0271	01-Feb-91	Di-n-butyl Phthalate	10	10	UG/L	U	U
0271	16-Dec-91	Di-n-butyl Phthalate	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	07-Apr-94	Di-n-butyl Phthalate	11	11	UG/L	JB	U
0271	07-Apr-94	Di-n-butyl Phthalate	11	11	UG/L	JB	U
0271	07-Apr-94	Di-n-butyl Phthalate	11	11	UG/L	JB	U
0076	01-Feb-91	Di-n-octyl Phthalate	10	10	UG/L	U	U
0076	16-Sep-92	Di-n-octyl Phthalate	10	10	UG/L	U	U
0271	16-Dec-91	Di-n-octyl Phthalate	10	10	UG/L	U	U
0271	05-Aug-91	Di-n-octyl Phthalate	10	10	UG/L	U	UJ
0076	22-Jun-92	Di-n-octyl Phthalate	10	10	UG/L	U	U
0076	06-May-91	Di-n-octyl Phthalate	10	10	UG/L	U	U
0271	22-Jun-92	Di-n-octyl Phthalate	10	10	UG/L	U	U
0271	16-Sep-92	Di-n-octyl Phthalate	10	10	UG/L	U	U
0271	06-May-91	Di-n-octyl Phthalate	10	10	UG/L	U	U
0076	23-Mar-92	Di-n-octyl Phthalate	10	10	UG/L	U	U
0076	11-Oct-93	Di-n-octyl Phthalate	10	10	UG/L	U	U
0076	06-Nov-90	Di-n-octyl Phthalate	10	10	UG/L	U	U
0076	16-Dec-91	Di-n-octyl Phthalate	10	10	UG/L	U	U
0271	06-Nov-90	Di-n-octyl Phthalate	10	10	UG/L	U	U
0271	11-Oct-93	Di-n-octyl Phthalate	10	10	UG/L	U	U
0271	01-Feb-91	Di-n-octyl Phthalate	10	10	UG/L	U	U
0271	07-Apr-94	Di-n-octyl Phthalate	11	11	UG/L	U	UJ
0271	07-Apr-94	Di-n-octyl Phthalate	11	11	UG/L	U	UJ
0076	07-Apr-94	Di-n-octyl Phthalate	11	11	UG/L	U	UJ
0076	01-Feb-91	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0076	16-Sep-92	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0271	11-Oct-93	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0271	05-Aug-91	Dibenzo(a,h)anthracene	10	10	UG/L	U	UJ
0271	22-Jun-92	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0271	01-Feb-91	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0271	16-Dec-91	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0076	23-Mar-92	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0076	16-Dec-91	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0271	06-May-91	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0076	06-Nov-90	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0076	06-May-91	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0076	11-Oct-93	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0271	06-Nov-90	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0271	16-Sep-92	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0076	22-Jun-92	Dibenzo(a,h)anthracene	10	10	UG/L	U	U
0271	07-Apr-94	Dibenzo(a,h)anthracene	11	11	UG/L	U	U
0271	07-Apr-94	Dibenzo(a,h)anthracene	11	11	UG/L	U	U
0076	07-Apr-94	Dibenzo(a,h)anthracene	11	11	UG/L	U	U
0271	01-Feb-91	Dibenzofuran	10	10	UG/L	U	U
0076	06-Nov-90	Dibenzofuran	10	10	UG/L	U	U
0271	16-Dec-91	Dibenzofuran	10	10	UG/L	U	U
0076	23-Mar-92	Dibenzofuran	10	10	UG/L	U	U
0076	16-Dec-91	Dibenzofuran	10	10	UG/L	U	U
0271	06-May-91	Dibenzofuran	10	10	UG/L	U	U
0271	05-Aug-91	Dibenzofuran	10	10	UG/L	U	UJ
0271	06-Nov-90	Dibenzofuran	10	10	UG/L	U	U
0076	06-May-91	Dibenzofuran	10	10	UG/L	U	U
0271	16-Sep-92	Dibenzofuran	10	10	UG/L	U	U
0076	11-Oct-93	Dibenzofuran	10	10	UG/L	U	U
0076	22-Jun-92	Dibenzofuran	10	10	UG/L	U	U
0076	01-Feb-91	Dibenzofuran	10	10	UG/L	U	U
0076	16-Sep-92	Dibenzofuran	10	10	UG/L	U	U
0271	22-Jun-92	Dibenzofuran	10	10	UG/L	U	U
0271	11-Oct-93	Dibenzofuran	10	10	UG/L	U	U
0271	07-Apr-94	Dibenzofuran	11	11	UG/L	U	U
0271	07-Apr-94	Dibenzofuran	11	11	UG/L	U	U
0076	07-Apr-94	Dibenzofuran	11	11	UG/L	U	U
0271	11-Oct-93	Dibromochloromethane	0.9	0.9	UG/L	U	U
0271	22-Jun-92	Dibromochloromethane	0.9	0.9	UG/L	U	UJ
0271	27-Feb-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0271	23-Mar-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0271	06-May-91	Dibromochloromethane	0.9	0.9	UG/L	U	U
0076	06-Nov-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0271	01-Feb-91	Dibromochloromethane	0.9	0.9	UG/L	U	U
0076	06-May-91	Dibromochloromethane	0.9	0.9	UG/L	U	U
0076	15-Jun-90	Dibromochloromethane	0.9	0.9	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	31-Jul-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0076	31-Jul-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0076	11-Oct-93	Dibromochloromethane	0.9	0.9	UG/L	U	U
0076	16-Sep-92	Dibromochloromethane	0.9	0.9	UG/L	U	U
0076	07-Apr-94	Dibromochloromethane	0.9	0.9	UG/L	U	UJ
0271	07-Apr-94	Dibromochloromethane	0.9	0.9	UG/L	U	UJ
0076	22-Jun-92	Dibromochloromethane	0.9	0.9	UG/L	U	UJ
0076	23-Mar-92	Dibromochloromethane	0.9	0.9	UG/L	U	U
0076	16-Jun-93	Dibromochloromethane	0.9	0.9	UG/L	U	U
0271	06-Nov-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0271	05-Aug-91	Dibromochloromethane	0.9	0.9	UG/L	U	U
0271	16-Sep-92	Dibromochloromethane	0.9	0.9	UG/L	U	U
0076	23-Mar-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0271	27-Feb-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0271	24-Jan-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0271	27-Feb-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0076	27-Feb-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0271	07-Apr-94	Dibromochloromethane	0.9	0.9	UG/L	U	UJ
0076	24-Jan-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0076	01-Feb-91	Dibromochloromethane	0.9	0.9	UG/L	U	U
0271	15-Jun-90	Dibromochloromethane	0.9	0.9	UG/L	U	U
0076	16-Dec-91	Dibromochloromethane	1	1	UG/L	U	U
0271	16-Dec-91	Dibromochloromethane	1	1	UG/L	U	U
0076	13-Sep-88	Dibromochloromethane	1	1	UG/L	U	U
0271	13-Sep-88	Dibromochloromethane	1	1	UG/L	U	U
0076	25-Apr-90	Dibromochloromethane	5	5	UG/L	U	U
0271	08-Mar-88	Dibromochloromethane	5	5	UG/L	U	U
0076	13-Sep-88	Dibromochloromethane	5	5	UG/L	U	U
0271	25-Apr-90	Dibromochloromethane	5	5	UG/L	U	U
0076	24-Jun-88	Dibromochloromethane	5	5	UG/L	U	U
0271	24-Jun-88	Dibromochloromethane	5	5	UG/L	U	U
0271	13-Sep-88	Dibromochloromethane	5	5	UG/L	U	U
0271	16-Dec-91	Dibromomethane	1	1	UG/L	U	UJ
0076	16-Dec-91	Dibromomethane	1	1	UG/L	U	UJ
0076	11-Oct-93	Dibromomethane	2	2	UG/L	U	UJ
0076	01-Feb-91	Dibromomethane	2	2	UG/L	U	UJ
0271	27-Feb-90	Dibromomethane	2	2	UG/L	U	U
0271	15-Jun-90	Dibromomethane	2	2	UG/L	U	U
0271	11-Oct-93	Dibromomethane	2	2	UG/L	U	U
0076	24-Jan-90	Dibromomethane	2	2	UG/L	U	U
0271	07-Apr-94	Dibromomethane	2	2	UG/L	U	U
0076	16-Jun-93	Dibromomethane	2	2	UG/L	U	U
0076	06-May-91	Dibromomethane	2	2	UG/L	U	UJ
0271	27-Feb-90	Dibromomethane	2	2	UG/L	U	U
0271	06-May-91	Dibromomethane	2	2	UG/L	U	UJ
0271	23-Mar-90	Dibromomethane	2	2	UG/L	U	U
0271	01-Feb-91	Dibromomethane	2	2	UG/L	U	UJ
0076	23-Mar-92	Dibromomethane	2	2	UG/L	U	U
0076	15-Jun-90	Dibromomethane	2	2	UG/L	U	U
0271	16-Sep-92	Dibromomethane	2	2	UG/L	U	U
0076	23-Mar-90	Dibromomethane	2	2	UG/L	U	U
0271	06-Nov-90	Dibromomethane	2	2	UG/L	U	UJ
0271	24-Jan-90	Dibromomethane	2	2	UG/L	U	U
0271	31-Jul-90	Dibromomethane	2	2	UG/L	U	U
0271	27-Feb-90	Dibromomethane	2	2	UG/L	U	U
0076	31-Jul-90	Dibromomethane	2	2	UG/L	U	U
0076	06-Nov-90	Dibromomethane	2	2	UG/L	U	UJ
0271	07-Apr-94	Dibromomethane	2	2	UG/L	U	U
0271	05-Aug-91	Dibromomethane	2	2	UG/L	U	UJ
0076	07-Apr-94	Dibromomethane	2	2	UG/L	U	U
0076	16-Sep-92	Dibromomethane	2	2	UG/L	U	U
0076	27-Feb-90	Dibromomethane	2	2	UG/L	U	U
0271	22-Jun-92	Dibromomethane	2.5	2	UG/L	B	UJ
0076	22-Jun-92	Dibromomethane	2.7	2	UG/L	B	UJ
0076	06-May-91	Dichlorodifluoromethane	1.8	1.8	UG/L	U	U
0271	06-May-91	Dichlorodifluoromethane	1.8	1.8	UG/L	U	U
0271	05-Aug-91	Dichlorodifluoromethane	1.8	1.8	UG/L	U	UJ
0271	13-Sep-88	Dichlorodifluoromethane	2	2	UG/L	U	U
0076	13-Sep-88	Dichlorodifluoromethane	2	2	UG/L	U	U

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	16-Dec-91	Dichlorodifluoromethane	2	2	UG/L	U	R
0076	16-Dec-91	Dichlorodifluoromethane	2	2	UG/L	U	R
0271	05-Aug-91	Dieldrin	0.02	0.02	UG/L	U	U
0271	01-Feb-91	Dieldrin	0.1	0.1	UG/L	U	U
0076	22-Jun-92	Dieldrin	0.1	0.1	UG/L	U	U
0271	16-Dec-91	Dieldrin	0.1	0.1	UG/L	U	U
0271	07-Apr-94	Dieldrin	0.1	0.1	UG/L	U	U
0271	11-Oct-93	Dieldrin	0.1	0.1	UG/L	U	U
0076	06-May-91	Dieldrin	0.1	0.1	UG/L	U	U
0271	06-Nov-90	Dieldrin	0.1	0.1	UG/L	U	U
0271	22-Jun-92	Dieldrin	0.1	0.1	UG/L	U	U
0076	01-Feb-91	Dieldrin	0.1	0.1	UG/L	U	U
0076	06-Nov-90	Dieldrin	0.1	0.1	UG/L	U	U
0076	16-Dec-91	Dieldrin	0.1	0.1	UG/L	U	U
0271	16-Sep-92	Dieldrin	0.1	0.1	UG/L	U	U
0076	16-Sep-92	Dieldrin	0.1	0.1	UG/L	U	U
0271	06-May-91	Dieldrin	0.1	0.1	UG/L	U	U
0271	07-Apr-94	Dieldrin	0.1	0.1	UG/L	U	U
0076	11-Oct-93	Dieldrin	0.1	0.1	UG/L	U	UJ
0076	23-Mar-92	Dieldrin	0.11	0.11	UG/L	U	U
0076	07-Apr-94	Dieldrin	0.11	0.11	UG/L	U	U
0076	06-May-91	Dieldrin	0.5	0.5	UG/L	U	U
0271	06-May-91	Dieldrin	1.5	1.5	UG/L	U	U
0271	16-Dec-91	Diethyl Phthalate	10	10	UG/L	U	U
0271	01-Feb-91	Diethyl Phthalate	10	10	UG/L	U	U
0076	16-Dec-91	Diethyl Phthalate	10	10	UG/L	U	U
0271	06-Nov-90	Diethyl Phthalate	10	10	UG/L	U	U
0271	06-May-91	Diethyl Phthalate	10	10	UG/L	U	U
0076	01-Feb-91	Diethyl Phthalate	10	10	UG/L	U	U
0076	11-Oct-93	Diethyl Phthalate	10	10	UG/L	U	U
0076	06-Nov-90	Diethyl Phthalate	10	10	UG/L	U	U
0271	11-Oct-93	Diethyl Phthalate	10	10	UG/L	U	U
0271	16-Sep-92	Diethyl Phthalate	10	10	UG/L	U	U
0076	16-Sep-92	Diethyl Phthalate	10	10	UG/L	U	U
0076	23-Mar-92	Diethyl Phthalate	10	10	UG/L	U	U
0076	06-May-91	Diethyl Phthalate	10	10	UG/L	U	U
0271	05-Aug-91	Diethyl Phthalate	10	10	UG/L	U	UJ
0271	22-Jun-92	Diethyl Phthalate	10	10	UG/L	U	U
0076	22-Jun-92	Diethyl Phthalate	10	10	UG/L	U	U
0271	07-Apr-94	Diethyl Phthalate	11	11	UG/L	U	U
0076	07-Apr-94	Diethyl Phthalate	11	11	UG/L	U	U
0271	07-Apr-94	Diethyl Phthalate	11	11	UG/L	U	U
0271	22-Jun-92	Dimethyl Phthalate	10	10	UG/L	U	U
0271	16-Sep-92	Dimethyl Phthalate	10	10	UG/L	U	U
0271	06-Nov-90	Dimethyl Phthalate	10	10	UG/L	U	U
0076	06-May-91	Dimethyl Phthalate	10	10	UG/L	U	U
0271	06-May-91	Dimethyl Phthalate	10	10	UG/L	U	U
0271	05-Aug-91	Dimethyl Phthalate	10	10	UG/L	U	UJ
0076	11-Oct-93	Dimethyl Phthalate	10	10	UG/L	U	U
0076	01-Feb-91	Dimethyl Phthalate	10	10	UG/L	U	U
0076	06-Nov-90	Dimethyl Phthalate	10	10	UG/L	U	U
0076	16-Dec-91	Dimethyl Phthalate	10	10	UG/L	U	U
0076	16-Sep-92	Dimethyl Phthalate	10	10	UG/L	U	U
0076	22-Jun-92	Dimethyl Phthalate	10	10	UG/L	U	U
0271	01-Feb-91	Dimethyl Phthalate	10	10	UG/L	U	U
0271	11-Oct-93	Dimethyl Phthalate	10	10	UG/L	U	U
0076	23-Mar-92	Dimethyl Phthalate	10	10	UG/L	U	U
0271	16-Dec-91	Dimethyl Phthalate	10	10	UG/L	U	U
0271	07-Apr-94	Dimethyl Phthalate	11	11	UG/L	U	U
0076	07-Apr-94	Dimethyl Phthalate	11	11	UG/L	U	U
0271	07-Apr-94	Dimethyl Phthalate	11	11	UG/L	U	U
0076	11-Oct-93	Dissolved Solids	518	4	MG/L		
0076	07-Apr-94	Dissolved Solids	562	4	MG/L		
0271	11-Oct-93	Dissolved Solids	589	4	MG/L		
0271	07-Apr-94	Dissolved Solids	685	4	MG/L		
0271	07-Apr-94	Dissolved Solids	719	4	MG/L		
0076	01-Feb-91	Endosulfan I	0.05	0.05	UG/L	U	U
0076	16-Sep-92	Endosulfan I	0.05	0.05	UG/L	U	U
0271	05-Aug-91	Endosulfan I	0.05	0.05	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	06-May-91	Endosulfan I	0.05	0.05	UG/L	U	U
0271	16-Sep-92	Endosulfan I	0.05	0.05	UG/L	U	U
0076	11-Oct-93	Endosulfan I	0.05	0.05	UG/L	U	UJ
0076	06-Nov-90	Endosulfan I	0.05	0.05	UG/L	U	U
0271	01-Feb-91	Endosulfan I	0.05	0.05	UG/L	U	U
0271	06-Nov-90	Endosulfan I	0.05	0.05	UG/L	U	U
0271	07-Apr-94	Endosulfan I	0.05	0.05	UG/L	U	U
0271	06-May-91	Endosulfan I	0.05	0.05	UG/L	U	U
0271	11-Oct-93	Endosulfan I	0.05	0.05	UG/L	U	U
0271	22-Jun-92	Endosulfan I	0.051	0.051	UG/L	U	U
0271	16-Dec-91	Endosulfan I	0.052	0.052	UG/L	U	U
0076	22-Jun-92	Endosulfan I	0.052	0.052	UG/L	U	U
0076	16-Dec-91	Endosulfan I	0.052	0.052	UG/L	U	U
0271	07-Apr-94	Endosulfan I	0.052	0.052	UG/L	U	U
0076	23-Mar-92	Endosulfan I	0.053	0.053	UG/L	J	U
0076	07-Apr-94	Endosulfan I	0.055	0.055	UG/L	U	U
0076	06-May-91	Endosulfan I	0.25	0.25	UG/L	U	U
0271	06-May-91	Endosulfan I	0.75	0.75	UG/L	U	U
0271	05-Aug-91	Endosulfan II	0.04	0.04	UG/L	U	U
0076	06-May-91	Endosulfan II	0.1	0.1	UG/L	U	U
0076	22-Jun-92	Endosulfan II	0.1	0.1	UG/L	U	U
0271	01-Feb-91	Endosulfan II	0.1	0.1	UG/L	U	U
0271	16-Dec-91	Endosulfan II	0.1	0.1	UG/L	U	U
0076	16-Dec-91	Endosulfan II	0.1	0.1	UG/L	U	U
0076	01-Feb-91	Endosulfan II	0.1	0.1	UG/L	U	U
0271	16-Sep-92	Endosulfan II	0.1	0.1	UG/L	U	U
0271	22-Jun-92	Endosulfan II	0.1	0.1	UG/L	U	U
0271	07-Apr-94	Endosulfan II	0.1	0.1	UG/L	U	U
0076	06-Nov-90	Endosulfan II	0.1	0.1	UG/L	U	U
0271	07-Apr-94	Endosulfan II	0.1	0.1	UG/L	U	U
0076	11-Oct-93	Endosulfan II	0.1	0.1	UG/L	U	UJ
0076	16-Sep-92	Endosulfan II	0.1	0.1	UG/L	U	U
0271	11-Oct-93	Endosulfan II	0.1	0.1	UG/L	U	U
0271	06-May-91	Endosulfan II	0.1	0.1	UG/L	U	U
0271	06-Nov-90	Endosulfan II	0.1	0.1	UG/L	U	U
0076	23-Mar-92	Endosulfan II	0.11	0.11	UG/L	U	U
0076	07-Apr-94	Endosulfan II	0.11	0.11	UG/L	U	U
0076	06-May-91	Endosulfan II	0.5	0.5	UG/L	U	U
0271	06-May-91	Endosulfan II	1.5	1.5	UG/L	U	U
0271	11-Oct-93	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0271	06-May-91	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0271	16-Dec-91	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0076	01-Feb-91	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0271	01-Feb-91	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0076	22-Jun-92	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0271	05-Aug-91	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0271	16-Sep-92	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0076	06-May-91	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0076	11-Oct-93	Endosulfan Sulfate	0.1	0.1	UG/L	U	UJ
0271	06-Nov-90	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0076	16-Dec-91	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0271	22-Jun-92	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0076	16-Sep-92	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0271	07-Apr-94	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0271	07-Apr-94	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0076	06-Nov-90	Endosulfan Sulfate	0.1	0.1	UG/L	U	U
0076	07-Apr-94	Endosulfan Sulfate	0.11	0.11	UG/L	U	U
0076	23-Mar-92	Endosulfan Sulfate	0.11	0.11	UG/L	U	U
0076	06-May-91	Endosulfan Sulfate	0.5	0.5	UG/L	U	U
0271	06-May-91	Endosulfan Sulfate	1.5	1.5	UG/L	U	U
0271	05-Aug-91	Endrin	0.06	0.06	UG/L	U	U
0076	06-Nov-90	Endrin	0.1	0.1	UG/L	U	U
0271	06-Nov-90	Endrin	0.1	0.1	UG/L	U	U
0076	11-Oct-93	Endrin	0.1	0.1	UG/L	U	UJ
0271	16-Dec-91	Endrin	0.1	0.1	UG/L	U	U
0076	16-Dec-91	Endrin	0.1	0.1	UG/L	U	U
0076	16-Sep-92	Endrin	0.1	0.1	UG/L	U	U
0271	16-Sep-92	Endrin	0.1	0.1	UG/L	U	U
0271	06-May-91	Endrin	0.1	0.1	UG/L	U	U

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	06-May-91	Endrin	0.1	0.1	UG/L	U	U
0076	22-Jun-92	Endrin	0.1	0.1	UG/L	U	U
0271	11-Oct-93	Endrin	0.1	0.1	UG/L	U	U
0076	01-Feb-91	Endrin	0.1	0.1	UG/L	U	U
0271	01-Feb-91	Endrin	0.1	0.1	UG/L	U	U
0271	07-Apr-94	Endrin	0.1	0.1	UG/L	U	U
0271	22-Jun-92	Endrin	0.1	0.1	UG/L	U	U
0271	07-Apr-94	Endrin	0.1	0.1	UG/L	U	U
0076	23-Mar-92	Endrin	0.11	0.11	UG/L	U	U
0076	07-Apr-94	Endrin	0.11	0.11	UG/L	U	U
0076	06-May-91	Endrin	0.5	0.5	UG/L	U	U
0271	06-May-91	Endrin	1.5	1.5	UG/L	U	U
0271	07-Apr-94	Endrin Aldehyde	0.1	0.1	UG/L	U	U
0271	05-Aug-91	Endrin Aldehyde	0.1	0.1	UG/L	U	U
0271	11-Oct-93	Endrin Aldehyde	0.1	0.1	UG/L	U	U
0076	22-Jun-92	Endrin Aldehyde	0.1	0.1	UG/L	U	U
0076	11-Oct-93	Endrin Aldehyde	0.1	0.1	UG/L	U	UJ
0271	07-Apr-94	Endrin Aldehyde	0.1	0.1	UG/L	U	U
0271	16-Sep-92	Endrin Aldehyde	0.1	0.1	UG/L	U	U
0271	22-Jun-92	Endrin Aldehyde	0.1	0.1	UG/L	U	U
0076	16-Sep-92	Endrin Aldehyde	0.1	0.1	UG/L	U	U
0076	23-Mar-92	Endrin Aldehyde	0.11	0.11	UG/L	U	U
0076	07-Apr-94	Endrin Aldehyde	0.11	0.11	UG/L	U	U
0271	16-Sep-92	Endrin Ketone	0.1	0.1	UG/L	U	U
0271	01-Feb-91	Endrin Ketone	0.1	0.1	UG/L	U	U
0076	01-Feb-91	Endrin Ketone	0.1	0.1	UG/L	U	U
0076	11-Oct-93	Endrin Ketone	0.1	0.1	UG/L	U	UJ
0271	05-Aug-91	Endrin Ketone	0.1	0.1	UG/L	U	U
0271	07-Apr-94	Endrin Ketone	0.1	0.1	UG/L	U	U
0271	22-Jun-92	Endrin Ketone	0.1	0.1	UG/L	U	U
0076	22-Jun-92	Endrin Ketone	0.1	0.1	UG/L	U	U
0076	06-May-91	Endrin Ketone	0.1	0.1	UG/L	U	U
0076	06-Nov-90	Endrin Ketone	0.1	0.1	UG/L	U	U
0271	16-Dec-91	Endrin Ketone	0.1	0.1	UG/L	U	U
0076	16-Sep-92	Endrin Ketone	0.1	0.1	UG/L	U	U
0271	11-Oct-93	Endrin Ketone	0.1	0.1	UG/L	U	U
0271	07-Apr-94	Endrin Ketone	0.1	0.1	UG/L	U	U
0076	16-Dec-91	Endrin Ketone	0.1	0.1	UG/L	U	U
0271	06-Nov-90	Endrin Ketone	0.1	0.1	UG/L	U	U
0271	06-May-91	Endrin Ketone	0.1	0.1	UG/L	U	U
0076	07-Apr-94	Endrin Ketone	0.11	0.11	UG/L	U	U
0076	23-Mar-92	Endrin Ketone	0.11	0.11	UG/L	U	U
0076	06-May-91	Endrin Ketone	0.5	0.5	UG/L	U	U
0271	06-May-91	Endrin Ketone	1.5	1.5	UG/L	U	U
0271	13-Sep-88	Ethylbenzene	1	1	UG/L	U	U
0076	16-Jun-93	Ethylbenzene	1	1	UG/L	U	U
0271	16-Dec-91	Ethylbenzene	1	1	UG/L	U	U
0076	23-Mar-92	Ethylbenzene	1	1	UG/L	U	UJ
0271	22-Jun-92	Ethylbenzene	1	1	UG/L	U	UJ
0076	16-Sep-92	Ethylbenzene	1	1	UG/L	U	UJ
0076	13-Sep-88	Ethylbenzene	1	1	UG/L	U	U
0076	22-Jun-92	Ethylbenzene	1	1	UG/L	U	UJ
0076	16-Dec-91	Ethylbenzene	1	1	UG/L	U	U
0271	16-Sep-92	Ethylbenzene	1	1	UG/L	U	UJ
0076	24-Jan-90	Ethylbenzene	2	2	UG/L	U	U
0271	06-May-91	Ethylbenzene	2	2	UG/L	U	UJ
0076	15-Jun-90	Ethylbenzene	2	2	UG/L	U	U
0271	24-Jan-90	Ethylbenzene	2	2	UG/L	U	U
0271	01-Feb-91	Ethylbenzene	2	2	UG/L	U	U
0271	23-Mar-90	Ethylbenzene	2	2	UG/L	U	U
0076	06-Nov-90	Ethylbenzene	2	2	UG/L	U	U
0271	31-Jul-90	Ethylbenzene	2	2	UG/L	U	U
0271	07-Apr-94	Ethylbenzene	2	2	UG/L	U	U
0076	23-Mar-90	Ethylbenzene	2	2	UG/L	U	U
0076	31-Jul-90	Ethylbenzene	2	2	UG/L	U	U
0271	27-Feb-90	Ethylbenzene	2	2	UG/L	U	U
0271	07-Apr-94	Ethylbenzene	2	2	UG/L	U	U
0076	01-Feb-91	Ethylbenzene	2	2	UG/L	U	U
0271	06-Nov-90	Ethylbenzene	2	2	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	15-Jun-90	Ethylbenzene	2	2	UG/L	U	U
0076	07-Apr-94	Ethylbenzene	2	2	UG/L	U	U
0076	06-May-91	Ethylbenzene	2	2	UG/L	U	UJ
0271	27-Feb-90	Ethylbenzene	2	2	UG/L	U	U
0271	11-Oct-93	Ethylbenzene	2	2	UG/L	U	U
0271	05-Aug-91	Ethylbenzene	2	2	UG/L	U	U
0076	11-Oct-93	Ethylbenzene	2	2	UG/L	U	UJ
0076	27-Feb-90	Ethylbenzene	2	2	UG/L	U	U
0271	27-Feb-90	Ethylbenzene	2	2	UG/L	U	U
0271	08-Mar-88	Ethylbenzene	5	5	UG/L	U	U
0076	25-Apr-90	Ethylbenzene	5	5	UG/L	U	U
0076	24-Jun-88	Ethylbenzene	5	5	UG/L	U	U
0271	25-Apr-90	Ethylbenzene	5	5	UG/L	U	U
0271	13-Sep-88	Ethylbenzene	5	5	UG/L	U	U
0271	24-Jun-88	Ethylbenzene	5	5	UG/L	U	U
0076	13-Sep-88	Ethylbenzene	5	5	UG/L	U	U
0271	13-Dec-85	Ethylbenzene	7.2	7.2	UG/L	U	U
0076	12-Dec-85	Ethylbenzene	7.2	7.2	UG/L	U	U
0271	13-Mar-86	Ethylbenzene	7.2	7.2	UG/L	U	U
0076	01-Feb-84	Ethylbenzene	10	10	UG/L	U	U
0076	06-May-91	Europium-152	10.8	1	PCI/L	U	U
0271	06-May-91	Europium-152	13.8	1	PCI/L	U	U
0076	01-Feb-91	Europium-152	100	0	PCI/L	U	U
0271	01-Feb-91	Europium-152	120	0	PCI/L	U	U
0271	01-Feb-91	Europium-154	26	0	PCI/L	U	U
0076	06-May-91	Europium-154	29.3	1	PCI/L	U	U
0271	06-May-91	Europium-154	35.9	1	PCI/L	U	U
0076	01-Feb-91	Europium-154	56	0	PCI/L	U	U
0271	01-Feb-91	Europium-155	33	0	PCI/L	U	U
0076	01-Feb-91	Europium-155	39	0	PCI/L	U	U
0076	06-May-91	Europium-155	71.5	1	PCI/L	U	U
0271	06-May-91	Europium-155	78.3	1	PCI/L	U	U
0271	16-Sep-92	Fluoranthene	10	10	UG/L	U	U
0271	06-Nov-90	Fluoranthene	10	10	UG/L	U	U
0076	23-Mar-92	Fluoranthene	10	10	UG/L	U	U
0271	11-Oct-93	Fluoranthene	10	10	UG/L	U	U
0271	05-Aug-91	Fluoranthene	10	10	UG/L	U	UJ
0076	22-Jun-92	Fluoranthene	10	10	UG/L	U	U
0076	16-Sep-92	Fluoranthene	10	10	UG/L	U	U
0271	22-Jun-92	Fluoranthene	10	10	UG/L	U	U
0076	06-May-91	Fluoranthene	10	10	UG/L	U	U
0076	11-Oct-93	Fluoranthene	10	10	UG/L	U	U
0076	16-Dec-91	Fluoranthene	10	10	UG/L	U	U
0076	01-Feb-91	Fluoranthene	10	10	UG/L	U	U
0076	06-Nov-90	Fluoranthene	10	10	UG/L	U	U
0271	06-May-91	Fluoranthene	10	10	UG/L	U	U
0271	01-Feb-91	Fluoranthene	10	10	UG/L	U	U
0271	16-Dec-91	Fluoranthene	10	10	UG/L	U	U
0271	07-Apr-94	Fluoranthene	11	11	UG/L	U	U
0076	07-Apr-94	Fluoranthene	11	11	UG/L	U	U
0271	07-Apr-94	Fluoranthene	11	11	UG/L	U	U
0271	16-Sep-92	Fluorene	10	10	UG/L	U	U
0076	22-Jun-92	Fluorene	10	10	UG/L	U	U
0076	06-May-91	Fluorene	10	10	UG/L	U	U
0271	06-May-91	Fluorene	10	10	UG/L	U	U
0271	01-Feb-91	Fluorene	10	10	UG/L	U	U
0076	16-Sep-92	Fluorene	10	10	UG/L	U	U
0271	06-Nov-90	Fluorene	10	10	UG/L	U	U
0271	22-Jun-92	Fluorene	10	10	UG/L	U	U
0076	01-Feb-91	Fluorene	10	10	UG/L	U	U
0076	16-Dec-91	Fluorene	10	10	UG/L	U	U
0271	11-Oct-93	Fluorene	10	10	UG/L	U	U
0076	11-Oct-93	Fluorene	10	10	UG/L	U	U
0271	16-Dec-91	Fluorene	10	10	UG/L	U	U
0076	06-Nov-90	Fluorene	10	10	UG/L	U	U
0271	05-Aug-91	Fluorene	10	10	UG/L	U	UJ
0076	23-Mar-92	Fluorene	10	10	UG/L	U	U
0271	07-Apr-94	Fluorene	11	11	UG/L	U	U
0076	07-Apr-94	Fluorene	11	11	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	07-Apr-94	Fluorene	11	11	UG/L	U	U
0271	07-Apr-94	Fluoride	0.14	0.1	MG/L		
0271	07-Apr-94	Fluoride	0.15	0.1	MG/L		
0271	11-Oct-93	Fluoride	0.15	0.1	MG/L		
0076	11-Oct-93	Fluoride	0.18	0.1	MG/L		
0076	07-Apr-94	Fluoride	0.18	0.1	MG/L		
0271	01-Feb-91	Gadolinium-153	31	0	PCI/L	U	U
0076	01-Feb-91	Gadolinium-153	38	0	PCI/L	U	U
0076	16-Sep-92	Gamma Chlordane	0.05	0.05	UG/L	U	U
0271	05-Aug-91	Gamma Chlordane	0.05	0.05	UG/L	U	U
0271	11-Oct-93	Gamma Chlordane	0.05	0.05	UG/L	U	U
0076	11-Oct-93	Gamma Chlordane	0.05	0.05	UG/L	U	UJ
0271	16-Sep-92	Gamma Chlordane	0.05	0.05	UG/L	U	U
0271	07-Apr-94	Gamma Chlordane	0.05	0.05	UG/L	U	U
0271	22-Jun-92	Gamma Chlordane	0.051	0.051	UG/L	U	U
0076	22-Jun-92	Gamma Chlordane	0.052	0.052	UG/L	U	U
0271	07-Apr-94	Gamma Chlordane	0.052	0.052	UG/L	U	U
0076	23-Mar-92	Gamma Chlordane	0.053	0.053	UG/L	U	U
0076	07-Apr-94	Gamma Chlordane	0.055	0.055	UG/L	U	U
0076	01-Feb-91	Gamma Chlordane	0.5	0.5	UG/L	U	U
0271	06-Nov-90	Gamma Chlordane	0.5	0.5	UG/L	U	U
0076	06-Nov-90	Gamma Chlordane	0.5	0.5	UG/L	U	U
0271	06-May-91	Gamma Chlordane	0.5	0.5	UG/L	U	U
0271	01-Feb-91	Gamma Chlordane	0.5	0.5	UG/L	U	U
0076	06-May-91	Gamma Chlordane	0.5	0.5	UG/L	U	U
0271	16-Dec-91	Gamma Chlordane	0.52	0.52	UG/L	U	U
0076	16-Dec-91	Gamma Chlordane	0.52	0.52	UG/L	U	U
0076	06-May-91	Gamma Chlordane	2.5	2.5	UG/L	U	U
0271	06-May-91	Gamma Chlordane	7.5	7.5	UG/L	U	U
0271	05-Aug-91	Gamma-BHC (Lindane)	0.04	0.04	UG/L	U	U
0271	01-Feb-91	Gamma-BHC (Lindane)	0.05	0.05	UG/L	U	U
0271	06-Nov-90	Gamma-BHC (Lindane)	0.05	0.05	UG/L	U	U
0076	16-Sep-92	Gamma-BHC (Lindane)	0.05	0.05	UG/L	U	U
0271	16-Sep-92	Gamma-BHC (Lindane)	0.05	0.05	UG/L	U	U
0076	06-May-91	Gamma-BHC (Lindane)	0.05	0.05	UG/L	U	U
0076	01-Feb-91	Gamma-BHC (Lindane)	0.05	0.05	UG/L	U	U
0076	11-Oct-93	Gamma-BHC (Lindane)	0.05	0.05	UG/L	U	UJ
0271	11-Oct-93	Gamma-BHC (Lindane)	0.05	0.05	UG/L	U	U
0271	07-Apr-94	Gamma-BHC (Lindane)	0.05	0.05	UG/L	U	U
0271	06-May-91	Gamma-BHC (Lindane)	0.05	0.05	UG/L	U	U
0076	06-Nov-90	Gamma-BHC (Lindane)	0.05	0.05	UG/L	U	U
0271	22-Jun-92	Gamma-BHC (Lindane)	0.051	0.051	UG/L	U	U
0076	22-Jun-92	Gamma-BHC (Lindane)	0.052	0.052	UG/L	U	U
0271	16-Dec-91	Gamma-BHC (Lindane)	0.052	0.052	UG/L	U	U
0271	07-Apr-94	Gamma-BHC (Lindane)	0.052	0.052	UG/L	U	U
0076	16-Dec-91	Gamma-BHC (Lindane)	0.052	0.052	UG/L	U	U
0076	23-Mar-92	Gamma-BHC (Lindane)	0.053	0.053	UG/L	U	U
0076	07-Apr-94	Gamma-BHC (Lindane)	0.055	0.055	UG/L	U	U
0076	06-May-91	Gamma-BHC (Lindane)	0.25	0.25	UG/L	U	U
0271	06-May-91	Gamma-BHC (Lindane)	0.75	0.75	UG/L	U	U
0076	07-Apr-94	HMX	0.63	0.63	UG/L	U	U
0271	07-Apr-94	HMX	0.63	0.63	UG/L	U	U
0076	11-Oct-93	HMX	0.63	0.63	UG/L	U	UJ
0271	11-Oct-93	HMX	0.63	0.63	UG/L	U	UJ
0271	05-Aug-91	Heptachlor	0.03	0.03	UG/L	U	U
0076	11-Oct-93	Heptachlor	0.05	0.05	UG/L	U	UJ
0076	01-Feb-91	Heptachlor	0.05	0.05	UG/L	U	U
0271	11-Oct-93	Heptachlor	0.05	0.05	UG/L	U	U
0076	06-Nov-90	Heptachlor	0.05	0.05	UG/L	U	U
0076	16-Sep-92	Heptachlor	0.05	0.05	UG/L	U	U
0271	06-May-91	Heptachlor	0.05	0.05	UG/L	U	U
0271	16-Sep-92	Heptachlor	0.05	0.05	UG/L	U	U
0271	07-Apr-94	Heptachlor	0.05	0.05	UG/L	U	U
0271	06-Nov-90	Heptachlor	0.05	0.05	UG/L	U	U
0076	06-May-91	Heptachlor	0.05	0.05	UG/L	U	U
0271	01-Feb-91	Heptachlor	0.05	0.05	UG/L	U	U
0271	22-Jun-92	Heptachlor	0.051	0.051	UG/L	U	U
0076	22-Jun-92	Heptachlor	0.052	0.052	UG/L	U	U
0271	07-Apr-94	Heptachlor	0.052	0.052	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	16-Dec-91	Heptachlor	0.052	0.052	UG/L	U	U
0271	16-Dec-91	Heptachlor	0.052	0.052	UG/L	U	U
0076	23-Mar-92	Heptachlor	0.053	0.053	UG/L	U	U
0076	07-Apr-94	Heptachlor	0.055	0.055	UG/L	U	U
0076	06-May-91	Heptachlor	0.25	0.25	UG/L	U	U
0271	06-May-91	Heptachlor	0.75	0.75	UG/L	U	U
0076	01-Feb-91	Heptachlor Epoxide	0.05	0.05	UG/L	U	U
0271	06-May-91	Heptachlor Epoxide	0.05	0.05	UG/L	U	U
0076	11-Oct-93	Heptachlor Epoxide	0.05	0.05	UG/L	U	UJ
0271	01-Feb-91	Heptachlor Epoxide	0.05	0.05	UG/L	U	U
0076	16-Sep-92	Heptachlor Epoxide	0.05	0.05	UG/L	U	U
0076	06-Nov-90	Heptachlor Epoxide	0.05	0.05	UG/L	U	U
0271	16-Sep-92	Heptachlor Epoxide	0.05	0.05	UG/L	U	U
0271	07-Apr-94	Heptachlor Epoxide	0.05	0.05	UG/L	U	U
0271	05-Aug-91	Heptachlor Epoxide	0.05	0.05	UG/L	U	U
0271	06-Nov-90	Heptachlor Epoxide	0.05	0.05	UG/L	U	U
0271	11-Oct-93	Heptachlor Epoxide	0.05	0.05	UG/L	U	U
0076	06-May-91	Heptachlor Epoxide	0.05	0.05	UG/L	U	U
0271	22-Jun-92	Heptachlor Epoxide	0.051	0.051	UG/L	U	U
0271	16-Dec-91	Heptachlor Epoxide	0.052	0.052	UG/L	U	U
0076	16-Dec-91	Heptachlor Epoxide	0.052	0.052	UG/L	U	U
0271	07-Apr-94	Heptachlor Epoxide	0.052	0.052	UG/L	U	U
0076	22-Jun-92	Heptachlor Epoxide	0.052	0.052	UG/L	U	U
0076	23-Mar-92	Heptachlor Epoxide	0.053	0.053	UG/L	U	U
0076	07-Apr-94	Heptachlor Epoxide	0.055	0.055	UG/L	U	U
0076	06-May-91	Heptachlor Epoxide	0.25	0.25	UG/L	U	U
0271	06-May-91	Heptachlor Epoxide	0.75	0.75	UG/L	U	U
0076	23-Mar-92	Hexachlorobenzene	10	10	UG/L	U	U
0076	22-Jun-92	Hexachlorobenzene	10	10	UG/L	U	U
0271	11-Oct-93	Hexachlorobenzene	10	10	UG/L	U	U
0271	01-Feb-91	Hexachlorobenzene	10	10	UG/L	U	U
0076	06-May-91	Hexachlorobenzene	10	10	UG/L	U	U
0271	05-Aug-91	Hexachlorobenzene	10	10	UG/L	U	UJ
0076	11-Oct-93	Hexachlorobenzene	10	10	UG/L	U	U
0271	16-Sep-92	Hexachlorobenzene	10	10	UG/L	U	U
0271	06-May-91	Hexachlorobenzene	10	10	UG/L	U	U
0271	16-Dec-91	Hexachlorobenzene	10	10	UG/L	U	U
0076	16-Sep-92	Hexachlorobenzene	10	10	UG/L	U	U
0076	06-Nov-90	Hexachlorobenzene	10	10	UG/L	U	U
0076	16-Dec-91	Hexachlorobenzene	10	10	UG/L	U	U
0271	22-Jun-92	Hexachlorobenzene	10	10	UG/L	U	U
0076	01-Feb-91	Hexachlorobenzene	10	10	UG/L	U	U
0271	06-Nov-90	Hexachlorobenzene	10	10	UG/L	U	U
0271	07-Apr-94	Hexachlorobenzene	11	11	UG/L	U	U
0271	07-Apr-94	Hexachlorobenzene	11	11	UG/L	U	U
0076	07-Apr-94	Hexachlorobenzene	11	11	UG/L	U	U
0271	01-Feb-91	Hexachlorobutadiene	10	10	UG/L	U	U
0271	06-May-91	Hexachlorobutadiene	10	10	UG/L	U	U
0076	06-May-91	Hexachlorobutadiene	10	10	UG/L	U	U
0076	16-Sep-92	Hexachlorobutadiene	10	10	UG/L	U	U
0076	01-Feb-91	Hexachlorobutadiene	10	10	UG/L	U	U
0076	23-Mar-92	Hexachlorobutadiene	10	10	UG/L	U	U
0271	22-Jun-92	Hexachlorobutadiene	10	10	UG/L	U	UJ
0271	16-Dec-91	Hexachlorobutadiene	10	10	UG/L	U	U
0076	11-Oct-93	Hexachlorobutadiene	10	10	UG/L	U	U
0076	16-Dec-91	Hexachlorobutadiene	10	10	UG/L	U	U
0076	06-Nov-90	Hexachlorobutadiene	10	10	UG/L	U	U
0271	06-Nov-90	Hexachlorobutadiene	10	10	UG/L	U	U
0271	16-Sep-92	Hexachlorobutadiene	10	10	UG/L	U	U
0271	11-Oct-93	Hexachlorobutadiene	10	10	UG/L	U	U
0271	05-Aug-91	Hexachlorobutadiene	10	10	UG/L	U	UJ
0076	22-Jun-92	Hexachlorobutadiene	10	10	UG/L	U	U
0076	07-Apr-94	Hexachlorobutadiene	11	11	UG/L	U	U
0271	07-Apr-94	Hexachlorobutadiene	11	11	UG/L	U	U
0271	07-Apr-94	Hexachlorobutadiene	11	11	UG/L	U	U
0076	06-Nov-90	Hexachlorocyclopentadiene	10	10	UG/L	U	U
0271	01-Feb-91	Hexachlorocyclopentadiene	10	10	UG/L	U	UJ
0271	22-Jun-92	Hexachlorocyclopentadiene	10	10	UG/L	U	UJ
0076	11-Oct-93	Hexachlorocyclopentadiene	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	23-Mar-92	Hexachlorocyclopentadiene	10	10	UG/L	U	U
0076	01-Feb-91	Hexachlorocyclopentadiene	10	10	UG/L	U	UJ
0076	16-Sep-92	Hexachlorocyclopentadiene	10	10	UG/L	U	U
0271	05-Aug-91	Hexachlorocyclopentadiene	10	10	UG/L	U	UJ
0271	06-May-91	Hexachlorocyclopentadiene	10	10	UG/L	U	U
0076	06-May-91	Hexachlorocyclopentadiene	10	10	UG/L	U	U
0076	16-Dec-91	Hexachlorocyclopentadiene	10	10	UG/L	U	U
0271	16-Sep-92	Hexachlorocyclopentadiene	10	10	UG/L	U	U
0271	16-Dec-91	Hexachlorocyclopentadiene	10	10	UG/L	U	U
0271	11-Oct-93	Hexachlorocyclopentadiene	10	10	UG/L	U	U
0271	06-Nov-90	Hexachlorocyclopentadiene	10	10	UG/L	U	U
0076	22-Jun-92	Hexachlorocyclopentadiene	10	10	UG/L	U	U
0271	07-Apr-94	Hexachlorocyclopentadiene	11	11	UG/L	U	U
0076	07-Apr-94	Hexachlorocyclopentadiene	11	11	UG/L	U	U
0271	07-Apr-94	Hexachlorocyclopentadiene	11	11	UG/L	U	U
0076	22-Jun-92	Hexachloroethane	10	10	UG/L	U	U
0271	22-Jun-92	Hexachloroethane	10	10	UG/L	U	U
0076	16-Sep-92	Hexachloroethane	10	10	UG/L	U	U
0076	23-Mar-92	Hexachloroethane	10	10	UG/L	U	U
0076	01-Feb-91	Hexachloroethane	10	10	UG/L	U	U
0076	06-Nov-90	Hexachloroethane	10	10	UG/L	U	U
0271	01-Feb-91	Hexachloroethane	10	10	UG/L	U	U
0271	06-Nov-90	Hexachloroethane	10	10	UG/L	U	U
0271	11-Oct-93	Hexachloroethane	10	10	UG/L	U	U
0271	05-Aug-91	Hexachloroethane	10	10	UG/L	U	UJ
0076	06-May-91	Hexachloroethane	10	10	UG/L	U	U
0271	16-Sep-92	Hexachloroethane	10	10	UG/L	U	U
0076	11-Oct-93	Hexachloroethane	10	10	UG/L	U	U
0271	16-Dec-91	Hexachloroethane	10	10	UG/L	U	U
0076	16-Dec-91	Hexachloroethane	10	10	UG/L	U	U
0271	06-May-91	Hexachloroethane	10	10	UG/L	U	U
0271	07-Apr-94	Hexachloroethane	11	11	UG/L	U	U
0076	07-Apr-94	Hexachloroethane	11	11	UG/L	U	U
0271	07-Apr-94	Hexachloroethane	11	11	UG/L	U	U
0271	16-Sep-92	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0076	06-May-91	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0271	16-Dec-91	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0076	23-Mar-92	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0076	22-Jun-92	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0271	11-Oct-93	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0271	05-Aug-91	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	UJ
0271	06-May-91	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0076	11-Oct-93	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0076	06-Nov-90	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0076	01-Feb-91	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0271	01-Feb-91	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0076	16-Dec-91	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0076	16-Sep-92	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0271	06-Nov-90	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0271	22-Jun-92	Indeno(1,2,3-cd)pyrene	10	10	UG/L	U	U
0271	07-Apr-94	Indeno(1,2,3-cd)pyrene	11	11	UG/L	U	U
0076	07-Apr-94	Indeno(1,2,3-cd)pyrene	11	11	UG/L	U	U
0271	07-Apr-94	Indeno(1,2,3-cd)pyrene	11	11	UG/L	U	U
0271	01-Feb-91	Iodine-131	11	0	PCI/L	U	U
0076	01-Feb-91	Iodine-131	19	0	PCI/L	U	U
0271	01-Feb-91	Iridium-192	12	0	PCI/L	U	U
0076	01-Feb-91	Iridium-192	15	0	PCI/L	U	U
0271	05-Aug-91	Iron	0.0301	0.01	UG/L		
0271	05-Aug-91	Iron	0.0336	0.01	UG/L		
0271	07-Apr-94	Iron	7.6	4.5	UG/L	B	U
0271	05-Aug-91	Iron	10	10	UG/L	U	U
0076	07-Apr-94	Iron	10	4.5	UG/L	B	U
0271	07-Apr-94	Iron	10.5	4.5	UG/L	B	U
0076	07-Apr-94	Iron	11.6	4.5	UG/L	B	U
0076	11-Oct-93	Iron	13.2	13.2	UG/L	U	U
0271	06-May-91	Iron	17.5	0.1	UG/L		
0076	06-May-91	Iron	17.7	0.1	UG/L		
0271	11-Oct-93	Iron	18.8	2.5	UG/L	B	
0271	06-May-91	Iron	19	10	UG/L	B	

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	22-Jun-92	Iron	19.8	19	UG/L	B	
0076	06-May-91	Iron	19.9	10	UG/L	B	UJ
0076	01-Feb-91	Iron	22.9	0	UG/L		
0076	16-Sep-92	Iron	28.3	10	UG/L		UJ
0076	11-Oct-93	Iron	28.8	2.5	UG/L	B	
0271	16-Sep-92	Iron	29.1	10	UG/L		UJ
0076	23-Mar-92	Iron	30	100	UG/L	U	U
0271	11-Oct-93	Iron	31.2	2.5	UG/L	B	
0271	06-Nov-90	Iron	32.6	10	UG/L	B	
0271	07-Apr-94	Iron	40.2	4.5	UG/L	B	U
0271	07-Apr-94	Iron	47	4.5	UG/L	B	U
0271	05-Aug-91	Iron	48.2	10	UG/L		J
0271	01-Feb-91	Iron	65.4	0	UG/L		
0076	22-Jun-92	Iron	69.6	19	UG/L	B	
0076	01-Feb-91	Iron	69.7	10	UG/L	B	
0271	16-Dec-91	Iron	100	100	UG/L	U	U
0076	16-Dec-91	Iron	100	100	UG/L	U	U
0271	01-Feb-91	Iron	153	10	UG/L		
0076	06-Nov-90	Iron	780	10	UG/L		
0076	01-Feb-91	Iron-59	34	0	PCI/L	U	U
0271	01-Feb-91	Iron-59	35	0	PCI/L	U	U
0271	16-Dec-91	Isophorone	10	10	UG/L	U	U
0271	22-Jun-92	Isophorone	10	10	UG/L	U	U
0076	23-Mar-92	Isophorone	10	10	UG/L	U	U
0076	06-May-91	Isophorone	10	10	UG/L	U	U
0271	05-Aug-91	Isophorone	10	10	UG/L	U	UJ
0076	16-Sep-92	Isophorone	10	10	UG/L	U	U
0271	06-May-91	Isophorone	10	10	UG/L	U	U
0271	11-Oct-93	Isophorone	10	10	UG/L	U	U
0076	16-Dec-91	Isophorone	10	10	UG/L	U	U
0076	22-Jun-92	Isophorone	10	10	UG/L	U	U
0271	01-Feb-91	Isophorone	10	10	UG/L	U	U
0076	01-Feb-91	Isophorone	10	10	UG/L	U	U
0076	06-Nov-90	Isophorone	10	10	UG/L	U	U
0271	06-Nov-90	Isophorone	10	10	UG/L	U	U
0271	16-Sep-92	Isophorone	10	10	UG/L	U	U
0076	11-Oct-93	Isophorone	10	10	UG/L	U	U
0271	07-Apr-94	Isophorone	11	11	UG/L	U	U
0076	07-Apr-94	Isophorone	11	11	UG/L	U	U
0271	07-Apr-94	Isophorone	11	11	UG/L	U	U
0271	01-Feb-91	Lanthanum-140	20	0	PCI/L	U	U
0076	01-Feb-91	Lanthanum-140	27	0	PCI/L	U	U
0076	07-Apr-94	Lead	0.8	0.8	UG/L	U	UJ
0271	07-Apr-94	Lead	0.8	0.8	UG/L	U	UJ
0271	07-Apr-94	Lead	0.8	0.8	UG/L	U	UJ
0271	07-Apr-94	Lead	0.8	0.8	UG/L	U	UJ
0271	07-Apr-94	Lead	0.8	0.8	UG/L	U	UJ
0076	16-Sep-92	Lead	2	2	UG/L	U	UJ
0271	11-Oct-93	Lead	2	2	UG/L	U	U
0271	11-Oct-93	Lead	2	2	UG/L	U	U
0271	06-May-91	Lead	2	2	UG/L	U	UJ
0271	05-Aug-91	Lead	2	2	UG/L	U	U
0076	23-Mar-92	Lead	2	3	UG/L	U	U
0076	11-Oct-93	Lead	2	2	UG/L	U	U
0076	11-Oct-93	Lead	2	2	UG/L	U	U
0076	22-Jun-92	Lead	2	2	UG/L	U	UJ
0076	06-May-91	Lead	2	2	UG/L	U	UJ
0271	16-Sep-92	Lead	2	2	UG/L	U	UJ
0271	06-Nov-90	Lead	2	2	UG/L	U	U
0271	05-Aug-91	Lead	2	2	UG/L	U	U
0271	22-Jun-92	Lead	2	2	UG/L	U	UJ
0076	01-Feb-91	Lead	2	2	UG/L	U	U
0271	01-Feb-91	Lead	2	2	UG/L	U	U
0076	16-Dec-91	Lead	2.7	3	UG/L	U	J
0271	16-Dec-91	Lead	3.4	3	UG/L		
0076	07-Apr-94	Lead	10.5	1	UG/L		
0076	01-Feb-84	Lead	30	30	UG/L		
0076	06-Nov-90	Lead	37.9	2	UG/L		
0271	13-Dec-85	Lead	40	40	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	12-Dec-85	Lead	40	40	UG/L		
0271	06-May-91	Lead-212	70	1	PCI/L	U	U
0076	06-May-91	Lead-212	70	1	PCI/L	U	U
0076	06-May-91	Lead-214	67.7	1	PCI/L	U	U
0271	06-May-91	Lead-214	85.1	1	PCI/L	U	U
0076	11-Oct-93	Lithium	2.9	4.8	UG/L	B	
0076	11-Oct-93	Lithium	2.9	4.8	UG/L	B	
0271	11-Oct-93	Lithium	2.9	4.8	UG/L	B	
0271	11-Oct-93	Lithium	2.9	4.8	UG/L	B	
0271	07-Apr-94	Lithium	13	13	UG/L	U	UJ
0076	07-Apr-94	Lithium	13	13	UG/L	U	U
0271	07-Apr-94	Lithium	13	13	UG/L	U	UJ
0271	07-Apr-94	Lithium	13	13	UG/L	U	UJ
0271	07-Apr-94	Lithium	13	13	UG/L	U	UJ
0076	07-Apr-94	Lithium	39.8	27.2	UG/L	B	U
0271	05-Aug-91	Magnesium	34	0.05	UG/L		
0271	05-Aug-91	Magnesium	34.4	0.05	UG/L		
0271	05-Aug-91	Magnesium	34.4	0.05	UG/L		
0076	16-Sep-92	Magnesium	29100	24	UG/L		
0076	22-Jun-92	Magnesium	29200	36	UG/L		
0076	07-Apr-94	Magnesium	30300	17.9	UG/L		
0076	16-Dec-91	Magnesium	30300	5000	UG/L		
0076	23-Mar-92	Magnesium	30400	5000	UG/L		J
0076	07-Apr-94	Magnesium	30500	17.9	UG/L		J
0076	11-Oct-93	Magnesium	30900	6	UG/L		J
0076	06-May-91	Magnesium	31000	50	UG/L		
0076	06-May-91	Magnesium	31600	0.1	UG/L		
0271	22-Jun-92	Magnesium	31600	36	UG/L		
0076	11-Oct-93	Magnesium	31900	6	UG/L		J
0076	01-Feb-91	Magnesium	32300	30	UG/L		
0271	16-Sep-92	Magnesium	32500	24	UG/L		
0271	07-Apr-94	Magnesium	32900	17.9	UG/L		
0271	11-Oct-93	Magnesium	33000	6	UG/L		J
0271	11-Oct-93	Magnesium	33100	6	UG/L		J
0271	07-Apr-94	Magnesium	33200	17.9	UG/L		
0271	05-Aug-91	Magnesium	33400	50	UG/L		
0271	07-Apr-94	Magnesium	33400	17.9	UG/L		J
0076	01-Feb-91	Magnesium	34500	0	UG/L		
0271	05-Aug-91	Magnesium	34757.094	50	UG/L		
0076	06-Nov-90	Magnesium	35100	50	UG/L		
0271	16-Dec-91	Magnesium	35200	5000	UG/L		
0271	06-Nov-90	Magnesium	35200	50	UG/L		
0271	06-May-91	Magnesium	37100	50	UG/L		
0271	01-Feb-91	Magnesium	37400	30	UG/L		
0271	06-May-91	Magnesium	37500	0.1	UG/L		
0271	07-Apr-94	Magnesium	37600	17.9	UG/L		J
0271	01-Feb-91	Magnesium	39600	0	UG/L		
0271	05-Aug-91	Manganese	0.0154	0.002	UG/L		
0271	05-Aug-91	Manganese	0.0156	0.002	UG/L		
0076	23-Mar-92	Manganese	2.8	15	UG/L	B	
0076	06-May-91	Manganese	3.4	0.1	UG/L		
0076	06-May-91	Manganese	4.7	2	UG/L	B	
0076	01-Feb-91	Manganese	5.1	2	UG/L	B	
0076	22-Jun-92	Manganese	6.8	2	UG/L	B	
0076	16-Sep-92	Manganese	9.2	2	UG/L		
0076	01-Feb-91	Manganese	9.51	0	UG/L		
0076	11-Oct-93	Manganese	11.3	0.5	UG/L	B	
0271	07-Apr-94	Manganese	11.4	0.33	UG/L	B	
0271	07-Apr-94	Manganese	11.6	0.33	UG/L	B	
0271	07-Apr-94	Manganese	11.8	0.33	UG/L	B	
0271	06-May-91	Manganese	12.1	0.1	UG/L		
0076	11-Oct-93	Manganese	12.2	0.5	UG/L	B	
0076	07-Apr-94	Manganese	12.3	0.33	UG/L	B	
0271	11-Oct-93	Manganese	13	0.5	UG/L	B	
0271	22-Jun-92	Manganese	13	2	UG/L	B	
0271	06-May-91	Manganese	13.4	2	UG/L	B	
0271	07-Apr-94	Manganese	13.7	0.33	UG/L	B	
0076	07-Apr-94	Manganese	13.8	0.33	UG/L	B	
0271	05-Aug-91	Manganese	14.4	2	UG/L		

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	16-Dec-91	Manganese	15	15	UG/L	U	U
0271	16-Dec-91	Manganese	15	15	UG/L	U	U
0271	11-Oct-93	Manganese	15.2	0.5	UG/L		
0271	05-Aug-91	Manganese	15.33	2	UG/L		
0271	06-Nov-90	Manganese	17	2	UG/L		
0271	16-Sep-92	Manganese	17.1	2	UG/L		
0076	06-Nov-90	Manganese	19.1	2	UG/L		
0271	01-Feb-91	Manganese	20.2	2	UG/L		
0271	01-Feb-91	Manganese	24.8	0	UG/L		
0271	01-Feb-91	Manganese-54	14	0	PCI/L	U	U
0076	01-Feb-91	Manganese-54	15	0	PCI/L	U	U
0271	07-Apr-94	Mercury	0.1	0.1	UG/L	U	U
0271	07-Apr-94	Mercury	0.1	0.1	UG/L	U	U
0076	11-Oct-93	Mercury	0.1	0.1	UG/L	U	U
0271	11-Oct-93	Mercury	0.1	0.1	UG/L	U	U
0076	11-Oct-93	Mercury	0.1	0.1	UG/L	U	U
0271	07-Apr-94	Mercury	0.1	0.1	UG/L	U	U
0271	22-Jun-92	Mercury	0.1	0.1	UG/L	U	UJ
0271	07-Apr-94	Mercury	0.1	0.1	UG/L	U	U
0076	07-Apr-94	Mercury	0.1	0.1	UG/L	U	U
0076	23-Mar-92	Mercury	0.1	0.2	UG/L	U	U
0076	07-Apr-94	Mercury	0.1	0.1	UG/L	U	U
0271	16-Sep-92	Mercury	0.1	0.1	UG/L	U	U
0271	11-Oct-93	Mercury	0.1	0.1	UG/L	U	U
0076	22-Jun-92	Mercury	0.1	0.1	UG/L	U	UJ
0076	16-Sep-92	Mercury	0.1	0.1	UG/L	U	U
0271	16-Dec-91	Mercury	0.2	0.2	UG/L	U	U
0271	05-Aug-91	Mercury	0.2	0.2	UG/L	U	U
0076	06-Nov-90	Mercury	0.2	0.2	UG/L	U	U
0271	05-Aug-91	Mercury	0.2	0.2	UG/L	U	U
0271	06-Nov-90	Mercury	0.2	0.2	UG/L	U	U
0271	06-May-91	Mercury	0.2	0.2	UG/L	U	U
0076	01-Feb-91	Mercury	0.2	0.2	UG/L	U	U
0271	01-Feb-91	Mercury	0.2	0.2	UG/L	U	U
0076	16-Dec-91	Mercury	0.2	0.2	UG/L	U	U
0076	06-May-91	Mercury	0.2	0.2	UG/L	U	U
0271	01-Feb-91	Mercury-203	10	0	PCI/L	U	U
0076	01-Feb-91	Mercury-203	15	0	PCI/L	U	U
0271	01-Feb-91	Methoxychlor	0.5	0.5	UG/L	U	U
0271	11-Oct-93	Methoxychlor	0.5	0.5	UG/L	U	U
0076	06-May-91	Methoxychlor	0.5	0.5	UG/L	U	U
0076	11-Oct-93	Methoxychlor	0.5	0.5	UG/L	U	UJ
0076	16-Sep-92	Methoxychlor	0.5	0.5	UG/L	U	U
0076	06-Nov-90	Methoxychlor	0.5	0.5	UG/L	U	U
0076	01-Feb-91	Methoxychlor	0.5	0.5	UG/L	U	U
0271	05-Aug-91	Methoxychlor	0.5	0.5	UG/L	U	U
0271	06-May-91	Methoxychlor	0.5	0.5	UG/L	U	U
0271	16-Sep-92	Methoxychlor	0.5	0.5	UG/L	U	U
0271	06-Nov-90	Methoxychlor	0.5	0.5	UG/L	U	U
0271	07-Apr-94	Methoxychlor	0.5	0.5	UG/L	U	U
0271	22-Jun-92	Methoxychlor	0.51	0.51	UG/L	U	U
0076	16-Dec-91	Methoxychlor	0.52	0.52	UG/L	U	U
0271	07-Apr-94	Methoxychlor	0.52	0.52	UG/L	U	U
0271	16-Dec-91	Methoxychlor	0.52	0.52	UG/L	U	U
0076	22-Jun-92	Methoxychlor	0.52	0.52	UG/L	U	U
0076	23-Mar-92	Methoxychlor	0.53	0.53	UG/L	U	U
0076	07-Apr-94	Methoxychlor	0.55	0.55	UG/L	U	U
0076	06-May-91	Methoxychlor	2.5	2.5	UG/L	U	U
0271	06-May-91	Methoxychlor	7.5	7.5	UG/L	U	U
0271	24-Jan-90	Methylene Chloride	2	2	UG/L	U	U
0271	31-Jul-90	Methylene Chloride	2	2	UG/L	U	U
0076	24-Jan-90	Methylene Chloride	2	2	UG/L	U	U
0076	06-Nov-90	Methylene Chloride	2	2	UG/L	U	UJ
0271	27-Feb-90	Methylene Chloride	2	2	UG/L	U	U
0076	23-Mar-90	Methylene Chloride	2	2	UG/L	U	U
0076	31-Jul-90	Methylene Chloride	2	2	UG/L	U	U
0076	15-Jun-90	Methylene Chloride	2	2	UG/L	U	U
0271	23-Mar-90	Methylene Chloride	2	2	UG/L	U	U
0271	27-Feb-90	Methylene Chloride	2	2	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	15-Jun-90	Methylene Chloride	2	2	UG/L	U	U
0076	27-Feb-90	Methylene Chloride	2	2	UG/L	U	U
0271	06-Nov-90	Methylene Chloride	2	2	UG/L	U	UJ
0271	27-Feb-90	Methylene Chloride	2	2	UG/L	U	U
0271	13-Dec-85	Methylene Chloride	2.8	2.8	UG/L	U	U
0271	13-Mar-86	Methylene Chloride	2.8	2.8	UG/L	U	U
0271	25-Apr-90	Methylene Chloride	3	5	UG/L	JB	
0271	13-Sep-88	Methylene Chloride	3	5	UG/L	JB	
0076	16-Jun-93	Methylene Chloride	4	4	UG/L	U	U
0076	16-Sep-92	Methylene Chloride	4	4	UG/L	U	UJ
0271	24-Jun-88	Methylene Chloride	4	5	UG/L	JB	
0076	23-Mar-92	Methylene Chloride	4	4	UG/L	U	UJ
0271	22-Jun-92	Methylene Chloride	4	4	UG/L	U	R
0076	13-Sep-88	Methylene Chloride	4	4	UG/L	U	U
0271	16-Dec-91	Methylene Chloride	4	4	UG/L	U	UJ
0271	16-Sep-92	Methylene Chloride	4	4	UG/L	U	UJ
0076	16-Dec-91	Methylene Chloride	4	4	UG/L	U	UJ
0076	22-Jun-92	Methylene Chloride	4	4	UG/L	U	R
0271	13-Sep-88	Methylene Chloride	4	4	UG/L	U	U
0076	24-Jun-88	Methylene Chloride	4	5	UG/L	JB	
0271	11-Oct-93	Methylene Chloride	5	5	UG/L	U	U
0271	07-Apr-94	Methylene Chloride	5	5	UG/L	U	U
0271	05-Aug-91	Methylene Chloride	5	5	UG/L	U	UJ
0076	11-Oct-93	Methylene Chloride	5	5	UG/L	U	UJ
0271	06-May-91	Methylene Chloride	5	5	UG/L	U	U
0271	07-Apr-94	Methylene Chloride	5	5	UG/L	U	UJ
0076	07-Apr-94	Methylene Chloride	5	5	UG/L	U	U
0076	06-May-91	Methylene Chloride	5	5	UG/L	U	U
0076	25-Apr-90	Methylene Chloride	6	5	UG/L	B	
0076	12-Dec-85	Methylene Chloride	7	2.8	UG/L		
0076	13-Sep-88	Methylene Chloride	9	5	UG/L	B	
0271	01-Feb-91	Methylene Chloride	9.8	2	UG/L		UJ
0076	01-Feb-84	Methylene Chloride	10	10	UG/L	U	U
0076	01-Feb-91	Methylene Chloride	10	2	UG/L		UJ
0271	08-Mar-88	Methylene Chloride	13	5	UG/L	B	
0271	07-Apr-94	Molybdenum	1.4	1.4	UG/L	U	UJ
0271	07-Apr-94	Molybdenum	1.6	1.4	UG/L	B	J
0271	11-Oct-93	Molybdenum	1.7	0.5	UG/L	B	U
0271	07-Apr-94	Molybdenum	1.7	1.4	UG/L	B	
0271	11-Oct-93	Molybdenum	1.8	0.5	UG/L	B	U
0076	07-Apr-94	Molybdenum	2	1.4	UG/L	B	
0271	07-Apr-94	Molybdenum	2	1.4	UG/L	B	
0076	11-Oct-93	Molybdenum	2	0.5	UG/L	B	U
0076	11-Oct-93	Molybdenum	2.1	0.5	UG/L	B	U
0076	07-Apr-94	Molybdenum	2.7	1.4	UG/L	B	
0076	22-Jun-92	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0076	06-May-91	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0271	16-Sep-92	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0076	06-Nov-90	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0271	06-May-91	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0076	23-Mar-92	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0271	06-Nov-90	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0076	01-Feb-91	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0271	01-Feb-91	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0271	05-Aug-91	N-Nitroso-di-n-propylamine	10	10	UG/L	U	UJ
0076	16-Sep-92	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0076	16-Dec-91	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0271	11-Oct-93	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0271	22-Jun-92	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0271	16-Dec-91	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0076	11-Oct-93	N-Nitroso-di-n-propylamine	10	10	UG/L	U	U
0076	07-Apr-94	N-Nitroso-di-n-propylamine	11	11	UG/L	U	U
0271	07-Apr-94	N-Nitroso-di-n-propylamine	11	11	UG/L	U	U
0271	07-Apr-94	N-Nitroso-di-n-propylamine	11	11	UG/L	U	U
0271	16-Dec-91	N-Nitrosodiphenylamine	10	10	UG/L	U	U
0271	11-Oct-93	N-Nitrosodiphenylamine	10	10	UG/L	U	U
0076	16-Sep-92	N-Nitrosodiphenylamine	10	10	UG/L	U	UJ
0271	06-Nov-90	N-Nitrosodiphenylamine	10	10	UG/L	U	U
0271	22-Jun-92	N-Nitrosodiphenylamine	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	23-Mar-92	N-Nitrosodiphenylamine	10	10	UG/L	U	U
0076	22-Jun-92	N-Nitrosodiphenylamine	10	10	UG/L	U	U
0076	16-Dec-91	N-Nitrosodiphenylamine	10	10	UG/L	U	U
0271	01-Feb-91	N-Nitrosodiphenylamine	10	10	UG/L	U	U
0076	11-Oct-93	N-Nitrosodiphenylamine	10	10	UG/L	U	U
0271	05-Aug-91	N-Nitrosodiphenylamine	10	10	UG/L	U	UJ
0076	06-May-91	N-Nitrosodiphenylamine	10	10	UG/L	U	U
0271	16-Sep-92	N-Nitrosodiphenylamine	10	10	UG/L	U	UJ
0076	01-Feb-91	N-Nitrosodiphenylamine	10	10	UG/L	U	U
0271	06-May-91	N-Nitrosodiphenylamine	10	10	UG/L	U	U
0076	06-Nov-90	N-Nitrosodiphenylamine	10	10	UG/L	U	U
0076	07-Apr-94	N-Nitrosodiphenylamine	11	11	UG/L	U	U
0271	07-Apr-94	N-Nitrosodiphenylamine	11	11	UG/L	U	U
0271	07-Apr-94	N-Nitrosodiphenylamine	11	11	UG/L	U	U
0271	01-Feb-91	Naphthalene	10	10	UG/L	U	U
0271	06-Nov-90	Naphthalene	10	10	UG/L	U	U
0271	11-Oct-93	Naphthalene	10	10	UG/L	U	U
0076	06-May-91	Naphthalene	10	10	UG/L	U	U
0076	01-Feb-91	Naphthalene	10	10	UG/L	U	U
0271	06-May-91	Naphthalene	10	10	UG/L	U	U
0076	06-Nov-90	Naphthalene	10	10	UG/L	U	U
0076	16-Sep-92	Naphthalene	10	10	UG/L	U	U
0076	22-Jun-92	Naphthalene	10	10	UG/L	U	U
0076	23-Mar-92	Naphthalene	10	10	UG/L	U	U
0076	11-Oct-93	Naphthalene	10	10	UG/L	U	U
0076	16-Dec-91	Naphthalene	10	10	UG/L	U	U
0271	05-Aug-91	Naphthalene	10	10	UG/L	U	UJ
0271	16-Sep-92	Naphthalene	10	10	UG/L	U	U
0271	16-Dec-91	Naphthalene	10	10	UG/L	U	U
0271	22-Jun-92	Naphthalene	10	10	UG/L	U	U
0271	07-Apr-94	Naphthalene	11	11	UG/L	U	U
0076	07-Apr-94	Naphthalene	11	11	UG/L	U	U
0271	07-Apr-94	Naphthalene	11	11	UG/L	U	U
0076	06-May-91	Neptunium-237	145	1	PCI/L	U	U
0271	06-May-91	Neptunium-237	163	1	PCI/L	U	U
0271	11-Oct-93	Nickel	2	2	UG/L	U	U
0076	11-Oct-93	Nickel	2	2	UG/L	U	U
0076	11-Oct-93	Nickel	2.1	2.3	UG/L	B	
0271	11-Oct-93	Nickel	2.2	2.3	UG/L	B	
0076	07-Apr-94	Nickel	2.3	2.3	UG/L	U	U
0271	07-Apr-94	Nickel	2.3	2.3	UG/L	U	U
0271	07-Apr-94	Nickel	2.3	2.3	UG/L	U	U
0271	07-Apr-94	Nickel	2.3	2.3	UG/L	U	U
0271	07-Apr-94	Nickel	2.3	2.3	UG/L	U	UJ
0076	07-Apr-94	Nickel	2.3	2.3	UG/L	U	U
0076	01-Feb-84	Nickel	6	6	UG/L	U	U
0271	16-Sep-92	Nickel	9	9	UG/L	U	U
0076	16-Sep-92	Nickel	9	9	UG/L	U	U
0271	13-Dec-85	Nickel	10	10	UG/L	U	U
0076	12-Dec-85	Nickel	10	10	UG/L	U	U
0076	22-Jun-92	Nickel	18	18	UG/L	U	U
0076	23-Mar-92	Nickel	18	40	UG/L	U	U
0271	22-Jun-92	Nickel	18	18	UG/L	U	U
0271	05-Aug-91	Nickel	20	20	UG/L	U	U
0271	01-Feb-91	Nickel	20	20	UG/L	U	U
0271	06-Nov-90	Nickel	20	20	UG/L	U	U
0076	01-Feb-91	Nickel	20	20	UG/L	U	U
0271	05-Aug-91	Nickel	20	20	UG/L	U	U
0076	06-Nov-90	Nickel	21.8	20	UG/L	B	
0076	06-May-91	Nickel	24.9	20	UG/L	B	
0271	06-May-91	Nickel	27.1	20	UG/L	B	
0271	16-Dec-91	Nickel	40	40	UG/L	U	U
0076	16-Dec-91	Nickel	40	40	UG/L	U	U
0271	01-Feb-91	Niobium-95	14	0	PCI/L	U	U
0076	01-Feb-91	Niobium-95	15	0	PCI/L	U	U
0076	16-Dec-91	Nitrate	0.738	0.1	MG/L		
0271	16-Dec-91	Nitrate	2.55	0.1	MG/L		
0076	22-Jun-92	Nitrate/Nitrite	0.68	0.1	MG/L		
0076	16-Sep-92	Nitrate/Nitrite	0.84	0.1	MG/L		

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	06-May-91	Nitrate/Nitrite	1.1	0.1	MG/L		
0076	07-Apr-94	Nitrate/Nitrite	1.1	0.04	MG/L		
0271	05-Aug-91	Nitrate/Nitrite	1.18	0.1	MG/L		
0076	01-Feb-91	Nitrate/Nitrite	1.79	0	MG/L		
0076	11-Oct-93	Nitrate/Nitrite	1.9	0.04	MG/L		
0271	16-Sep-92	Nitrate/Nitrite	2	1	MG/L		
0271	22-Jun-92	Nitrate/Nitrite	2.4	0.5	MG/L		
0271	07-Apr-94	Nitrate/Nitrite	2.5	0.1	MG/L		
0271	07-Apr-94	Nitrate/Nitrite	2.5	0.1	MG/L		
0271	06-May-91	Nitrate/Nitrite	2.7	0.1	MG/L		
0271	01-Feb-91	Nitrate/Nitrite	4.03	0	MG/L		
0271	11-Oct-93	Nitrate/Nitrite	4.9	0.1	MG/L		
0076	16-Dec-91	Nitrite	0.1	0.1	MG/L	U	U
0271	16-Dec-91	Nitrite	0.1	0.1	MG/L	U	U
0076	07-Apr-94	Nitrobenzene	0.31	0.31	UG/L	U	UJ
0271	11-Oct-93	Nitrobenzene	0.31	0.31	UG/L	U	UJ
0271	07-Apr-94	Nitrobenzene	0.31	0.31	UG/L	U	UJ
0076	11-Oct-93	Nitrobenzene	0.31	0.31	UG/L	U	UJ
0271	11-Oct-93	Nitrobenzene	10	10	UG/L	U	U
0076	22-Jun-92	Nitrobenzene	10	10	UG/L	U	U
0271	05-Aug-91	Nitrobenzene	10	10	UG/L	U	UJ
0076	23-Mar-92	Nitrobenzene	10	10	UG/L	U	U
0271	16-Dec-91	Nitrobenzene	10	10	UG/L	U	U
0076	16-Dec-91	Nitrobenzene	10	10	UG/L	U	U
0271	06-May-91	Nitrobenzene	10	10	UG/L	U	U
0076	11-Oct-93	Nitrobenzene	10	10	UG/L	U	U
0271	16-Sep-92	Nitrobenzene	10	10	UG/L	U	U
0076	16-Sep-92	Nitrobenzene	10	10	UG/L	U	U
0076	06-Nov-90	Nitrobenzene	10	10	UG/L	U	U
0271	01-Feb-91	Nitrobenzene	10	10	UG/L	U	U
0076	06-May-91	Nitrobenzene	10	10	UG/L	U	U
0076	01-Feb-91	Nitrobenzene	10	10	UG/L	U	U
0271	22-Jun-92	Nitrobenzene	10	10	UG/L	U	U
0271	06-Nov-90	Nitrobenzene	10	10	UG/L	U	U
0076	07-Apr-94	Nitrobenzene	11	11	UG/L	U	U
0271	07-Apr-94	Nitrobenzene	11	11	UG/L	U	U
0271	07-Apr-94	Nitrobenzene	11	11	UG/L	U	U
0271	07-Apr-94	Nitrogen	0.1	0.1	MG/L	U	U
0271	07-Apr-94	Nitrogen	0.1	0.1	MG/L	U	U
0271	11-Oct-93	Nitrogen	0.18	0.1	MG/L		
0076	07-Apr-94	Nitrogen	0.52	0.1	MG/L		
0076	11-Oct-93	Nitrogen	0.62	0.1	MG/L		
0271	07-Apr-94	Organic Carbon	0.79	0.5	MG/L		
0271	07-Apr-94	Organic Carbon	0.85	0.5	MG/L		
0076	07-Apr-94	Organic Carbon	0.94	0.5	MG/L		
0271	11-Oct-93	Organic Carbon	1.1	0.5	MG/L		
0076	11-Oct-93	Organic Carbon	1.1	0.5	MG/L		
0076	07-Apr-94	PETN	1	1	UG/L	U	U
0271	07-Apr-94	PETN	1	1	UG/L	U	U
0076	11-Oct-93	PETN	1	1	UG/L	U	R
0271	11-Oct-93	PETN	1	1	UG/L	U	UJ
0271	13-Dec-85	Pentachlorophenol	3.6	3.6	UG/L	U	U
0076	12-Dec-85	Pentachlorophenol	3.7	3.7	UG/L	U	U
0076	01-Feb-84	Pentachlorophenol	25	25	UG/L	U	U
0076	11-Oct-93	Pentachlorophenol	26	26	UG/L	U	U
0271	11-Oct-93	Pentachlorophenol	26	26	UG/L	U	U
0076	07-Apr-94	Pentachlorophenol	26	26	UG/L	U	U
0076	22-Jun-92	Pentachlorophenol	26	26	UG/L	U	U
0076	16-Sep-92	Pentachlorophenol	26	26	UG/L	U	U
0076	23-Mar-92	Pentachlorophenol	26	26	UG/L	U	U
0271	07-Apr-94	Pentachlorophenol	26	26	UG/L	U	U
0271	22-Jun-92	Pentachlorophenol	26	26	UG/L	U	U
0271	07-Apr-94	Pentachlorophenol	26	26	UG/L	U	U
0271	16-Sep-92	Pentachlorophenol	26	26	UG/L	U	U
0271	06-May-91	Pentachlorophenol	50	50	UG/L	U	U
0076	16-Dec-91	Pentachlorophenol	50	50	UG/L	U	U
0076	06-May-91	Pentachlorophenol	50	50	UG/L	U	U
0076	01-Feb-91	Pentachlorophenol	50	50	UG/L	U	U
0271	16-Dec-91	Pentachlorophenol	50	50	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	06-Nov-90	Pentachlorophenol	50	50	UG/L	U	U
0271	05-Aug-91	Pentachlorophenol	50	50	UG/L	U	U
0076	06-Nov-90	Pentachlorophenol	50	50	UG/L	U	U
0271	01-Feb-91	Pentachlorophenol	50	50	UG/L	U	U
0271	05-Aug-91	Phenanthrene	10	10	UG/L	U	UJ
0271	06-May-91	Phenanthrene	10	10	UG/L	U	U
0271	22-Jun-92	Phenanthrene	10	10	UG/L	U	U
0271	16-Dec-91	Phenanthrene	10	10	UG/L	U	U
0271	01-Feb-91	Phenanthrene	10	10	UG/L	U	U
0076	16-Dec-91	Phenanthrene	10	10	UG/L	U	U
0271	16-Sep-92	Phenanthrene	10	10	UG/L	U	U
0076	06-Nov-90	Phenanthrene	10	10	UG/L	U	U
0076	22-Jun-92	Phenanthrene	10	10	UG/L	U	U
0076	16-Sep-92	Phenanthrene	10	10	UG/L	U	U
0076	23-Mar-92	Phenanthrene	10	10	UG/L	U	U
0271	11-Oct-93	Phenanthrene	10	10	UG/L	U	UJ
0271	06-Nov-90	Phenanthrene	10	10	UG/L	U	U
0076	01-Feb-91	Phenanthrene	10	10	UG/L	U	U
0076	11-Oct-93	Phenanthrene	10	10	UG/L	U	UJ
0076	06-May-91	Phenanthrene	10	10	UG/L	U	U
0271	07-Apr-94	Phenanthrene	11	11	UG/L	U	U
0076	07-Apr-94	Phenanthrene	11	11	UG/L	U	U
0271	07-Apr-94	Phenanthrene	11	11	UG/L	U	U
0271	13-Dec-85	Phenol	1.5	1.5	UG/L	U	U
0076	12-Dec-85	Phenol	1.5	1.5	UG/L	U	U
0271	11-Oct-93	Phenol	10	10	UG/L	U	U
0076	23-Mar-92	Phenol	10	10	UG/L	U	U
0271	05-Aug-91	Phenol	10	10	UG/L	U	U
0076	06-May-91	Phenol	10	10	UG/L	U	U
0076	06-Nov-90	Phenol	10	10	UG/L	U	U
0076	16-Dec-91	Phenol	10	10	UG/L	U	U
0076	22-Jun-92	Phenol	10	10	UG/L	U	U
0271	06-Nov-90	Phenol	10	10	UG/L	U	U
0076	16-Sep-92	Phenol	10	10	UG/L	U	U
0271	01-Feb-91	Phenol	10	10	UG/L	U	U
0271	16-Dec-91	Phenol	10	10	UG/L	U	U
0271	16-Sep-92	Phenol	10	10	UG/L	U	U
0076	11-Oct-93	Phenol	10	10	UG/L	U	U
0271	06-May-91	Phenol	10	10	UG/L	U	U
0271	22-Jun-92	Phenol	10	10	UG/L	U	U
0076	01-Feb-91	Phenol	10	10	UG/L	U	U
0271	07-Apr-94	Phenol	11	11	UG/L	U	U
0271	07-Apr-94	Phenol	11	11	UG/L	U	U
0076	07-Apr-94	Phenol	11	11	UG/L	U	U
0076	01-Feb-84	Phenol	25	25	UG/L	U	U
0076	07-Apr-94	Phosphate	0.05	0.05	MG/L	U	U
0271	07-Apr-94	Phosphate	0.05	0.05	MG/L	U	UJ
0076	11-Oct-93	Phosphate	0.1	0.05	MG/L		
0271	11-Oct-93	Phosphate	0.11	0.05	MG/L		
0271	07-Apr-94	Phosphate	0.22	0.05	MG/L		J
0076	22-Jun-92	Plutonium-238	0	0.5	PCI/L		
0076	23-Mar-92	Plutonium-238	0	0.5	PCI/L		
0271	22-Jun-92	Plutonium-238	0	0.5	PCI/L		
0076	07-Apr-94	Plutonium-238	0.0013	0.0013	PCI/L	U	U
0271	07-Apr-94	Plutonium-238	0.0082	0.0082	PCI/L	U	U
0271	07-Apr-94	Plutonium-238	0.0084	0.0084	PCI/L	U	U
0271	11-Oct-93	Plutonium-238	0.049	0.049	PCI/L	U	U
0076	16-Sep-92	Plutonium-238	0.0992	0.0992	PCI/L	U	U
0271	16-Sep-92	Plutonium-238	0.1	0.1	PCI/L	U	U
0076	11-Oct-93	Plutonium-238	0.12	0.12	PCI/L	U	U
0271	05-Aug-91	Plutonium-238	1	0	PCI/L	U	U
0271	01-Feb-91	Plutonium-238	1	0	PCI/L	U	U
0271	16-Dec-91	Plutonium-238	1	1	PCI/L	U	U
0271	06-Nov-90	Plutonium-238	1	0	PCI/L	U	U
0076	16-Dec-91	Plutonium-238	1	1	PCI/L	U	U
0076	01-Feb-91	Plutonium-238	1	0	PCI/L	U	U
0076	06-Nov-90	Plutonium-238	1	0	PCI/L	U	U
0076	22-Jun-92	Plutonium-239/240	0	0.5	PCI/L		
0076	07-Apr-94	Plutonium-239/240	0.0018	0.0013	PCI/L		

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	07-Apr-94	Plutonium-239/240	0.0065	0.0024	PCI/L		J
0271	07-Apr-94	Plutonium-239/240	0.0104	0.0059	PCI/L		J
0076	16-Sep-92	Plutonium-239/240	0.0389	0.0389	PCI/L	U	U
0076	11-Oct-93	Plutonium-239/240	0.047	0.047	PCI/L	U	U
0271	11-Oct-93	Plutonium-239/240	0.049	0.049	PCI/L	U	U
0271	16-Sep-92	Plutonium-239/240	0.1	0.1	PCI/L	U	U
0076	16-Dec-91	Plutonium-239/240	1	1	PCI/L	U	U
0076	06-May-91	Plutonium-239/240	1	1	PCI/L	U	U
0076	01-Feb-91	Plutonium-239/240	1	0	PCI/L	U	U
0271	16-Dec-91	Plutonium-239/240	1	1	PCI/L	U	U
0271	06-Nov-90	Plutonium-239/240	1	0	PCI/L	U	U
0076	06-Nov-90	Plutonium-239/240	1	0	PCI/L	U	U
0271	05-Aug-91	Plutonium-239/240	1	0	PCI/L	U	U
0271	06-May-91	Plutonium-239/240	1	1	PCI/L	U	U
0271	01-Feb-91	Plutonium-239/240	1	0	PCI/L	U	U
0076	23-Mar-92	Plutonium-239/240	1.7	0.5	PCI/L		
0271	22-Jun-92	Plutonium-239/240	2	0.5	PCI/L		
0271	05-Aug-91	Potassium	3.71	0.1	UG/L		
0271	05-Aug-91	Potassium	3.8	0.1	UG/L		
0271	11-Oct-93	Potassium	2390	693	UG/L	B	
0271	11-Oct-93	Potassium	2390	693	UG/L	B	
0271	01-Feb-91	Potassium	2470	1000	UG/L	B	UJ
0076	11-Oct-93	Potassium	2530	693	UG/L	B	
0076	11-Oct-93	Potassium	2530	693	UG/L	B	
0076	23-Mar-92	Potassium	2570	5000	UG/L	B	
0271	16-Sep-92	Potassium	2780	419	UG/L		UJ
0076	06-May-91	Potassium	2800	100	UG/L	B	
0076	06-May-91	Potassium	2870	0.05	UG/L		
0271	07-Apr-94	Potassium	2930	887	UG/L	B	
0271	07-Apr-94	Potassium	2990	887	UG/L	B	
0271	07-Apr-94	Potassium	2990	887	UG/L	B	
0076	22-Jun-92	Potassium	2990	970	UG/L	B	
0076	07-Apr-94	Potassium	3000	887	UG/L	B	
0076	07-Apr-94	Potassium	3050	887	UG/L	B	
0271	07-Apr-94	Potassium	3050	887	UG/L	B	
0271	06-May-91	Potassium	3100	0.05	UG/L		
0271	22-Jun-92	Potassium	3160	970	UG/L	B	
0271	06-May-91	Potassium	3190	100	UG/L	B	
0271	06-Nov-90	Potassium	3230	100	UG/L	B	
0076	16-Sep-92	Potassium	3280	419	UG/L		UJ
0076	06-Nov-90	Potassium	3320	100	UG/L	B	
0076	01-Feb-91	Potassium	3320	0	UG/L		
0076	01-Feb-91	Potassium	3400	1000	UG/L	B	UJ
0271	01-Feb-91	Potassium	3560	0	UG/L		
0271	05-Aug-91	Potassium	3650	100	UG/L		
0271	05-Aug-91	Potassium	3761	100	UG/L		
0271	16-Dec-91	Potassium	5000	5000	UG/L	U	U
0076	16-Dec-91	Potassium	5000	5000	UG/L	U	U
0271	07-Apr-94	Potassium-40	96.1	96.1	PCI/L	U	U
0271	07-Apr-94	Potassium-40	103	103	PCI/L	U	U
0076	07-Apr-94	Potassium-40	104	104	PCI/L	U	U
0076	11-Oct-93	Potassium-40	130	130	PCI/L	U	U
0271	01-Feb-91	Potassium-40	140	0	PCI/L	U	U
0076	01-Feb-91	Potassium-40	170	0	PCI/L	U	U
0271	11-Oct-93	Potassium-40	200	200	PCI/L	U	U
0076	16-Sep-92	Potassium-40	223	223	PCI/L	U	U
0271	16-Sep-92	Potassium-40	351	351	PCI/L	U	U
0271	06-May-91	Potassium-40	800	1	PCI/L	U	U
0076	06-May-91	Potassium-40	800	1	PCI/L	U	U
0271	06-May-91	Protactinium-233	50	1	PCI/L	U	U
0076	06-May-91	Protactinium-233	51.1	1	PCI/L	U	U
0076	06-May-91	Protactinium-234 metastable	3810	1	PCI/L	U	U
0271	06-May-91	Protactinium-234 metastable	6590	1	PCI/L	U	U
0271	22-Jun-92	Pyrene	10	10	UG/L	U	U
0076	01-Feb-91	Pyrene	10	10	UG/L	U	U
0076	06-May-91	Pyrene	10	10	UG/L	U	U
0271	06-May-91	Pyrene	10	10	UG/L	U	U
0076	22-Jun-92	Pyrene	10	10	UG/L	U	U
0271	16-Dec-91	Pyrene	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	16-Sep-92	Pyrene	10	10	UG/L	U	U
0076	06-Nov-90	Pyrene	10	10	UG/L	U	U
0271	01-Feb-91	Pyrene	10	10	UG/L	U	U
0076	11-Oct-93	Pyrene	10	10	UG/L	U	U
0271	16-Sep-92	Pyrene	10	10	UG/L	U	U
0076	16-Dec-91	Pyrene	10	10	UG/L	U	U
0271	11-Oct-93	Pyrene	10	10	UG/L	U	U
0076	23-Mar-92	Pyrene	10	10	UG/L	U	U
0271	05-Aug-91	Pyrene	10	10	UG/L	U	UJ
0271	06-Nov-90	Pyrene	10	10	UG/L	U	U
0271	07-Apr-94	Pyrene	11	11	UG/L	U	U
0271	07-Apr-94	Pyrene	11	11	UG/L	U	U
0076	07-Apr-94	Pyrene	11	11	UG/L	U	U
0271	11-Oct-93	RDX	0.63	0.63	UG/L	U	UJ
0076	07-Apr-94	RDX	0.63	0.63	UG/L	U	U
0076	11-Oct-93	RDX	0.63	0.63	UG/L	U	UJ
0271	07-Apr-94	RDX	0.63	0.63	UG/L	U	U
0076	06-May-91	Radium-223	92.9	1	PCI/L	U	U
0271	06-May-91	Radium-223	102	1	PCI/L	U	U
0076	06-May-91	Radium-225	13.3	1	PCI/L	U	U
0271	06-May-91	Radium-225	14.9	1	PCI/L	U	U
0076	23-Mar-92	Radium-226	0	0.2	PCI/L		
0271	07-Apr-94	Radium-226	0.22	0.22	PCI/L	U	U
0271	22-Jun-92	Radium-226	0.3	0.2	PCI/L		
0271	16-Sep-92	Radium-226	0.303	1	PCI/L		
0271	07-Apr-94	Radium-226	0.4	0.2	PCI/L		
0076	22-Jun-92	Radium-226	0.4	0.2	PCI/L		
0076	16-Sep-92	Radium-226	0.45	0.45	PCI/L	U	U
0076	07-Apr-94	Radium-226	0.52	0.23	PCI/L		
0076	11-Oct-93	Radium-226	0.69	0.69	PCI/L	U	U
0271	11-Oct-93	Radium-226	0.84	0.84	PCI/L	U	U
0076	16-Dec-91	Radium-226	1	1	PCI/L	U	U
0076	06-Nov-90	Radium-226	1	0	PCI/L	U	U
0076	06-May-91	Radium-226	1	1	PCI/L	U	U
0271	01-Feb-91	Radium-226	1	0	PCI/L	U	U
0271	16-Dec-91	Radium-226	1	1	PCI/L	U	U
0271	05-Aug-91	Radium-226	1	0	PCI/L	U	U
0076	01-Feb-91	Radium-226	1	0	PCI/L	U	U
0271	06-May-91	Radium-226	1	1	PCI/L	U	U
0271	06-Nov-90	Radium-226	1	0	PCI/L	U	U
0271	01-Feb-91	Ruthenium-103	11	0	PCI/L	U	U
0076	01-Feb-91	Ruthenium-103	17	0	PCI/L	U	U
0271	01-Feb-91	Ruthenium-106	140	0	PCI/L	U	U
0076	01-Feb-91	Ruthenium-106	170	0	PCI/L	U	U
0076	01-Feb-91	Scandium-46	1.3	0	PCI/L	U	U
0271	01-Feb-91	Scandium-46	17	0	PCI/L	U	U
0076	07-Apr-94	Selenium	0.9	0.9	UG/L	U	UJ
0076	07-Apr-94	Selenium	0.9	0.9	UG/L	U	UJ
0271	07-Apr-94	Selenium	0.9	0.9	UG/L	U	U
0271	07-Apr-94	Selenium	0.9	0.9	UG/L	U	UJ
0271	07-Apr-94	Selenium	0.9	0.9	UG/L	U	UJ
0076	11-Oct-93	Selenium	1	1	UG/L	U	UJ
0271	11-Oct-93	Selenium	1	1	UG/L	U	UJ
0271	11-Oct-93	Selenium	1	1	UG/L	U	UJ
0076	11-Oct-93	Selenium	1	1	UG/L	U	UJ
0271	22-Jun-92	Selenium	2	2	UG/L	U	U
0271	01-Feb-91	Selenium	2	2	UG/L	U	UJ
0076	23-Mar-92	Selenium	2	5	UG/L	U	UJ
0076	16-Dec-91	Selenium	2	5	UG/L	U	UJ
0076	01-Feb-91	Selenium	2	2	UG/L	U	UJ
0076	06-May-91	Selenium	2	2	UG/L	U	UJ
0271	16-Sep-92	Selenium	2	2	UG/L	U	UJ
0076	06-Nov-90	Selenium	2	2	UG/L	U	U
0271	05-Aug-91	Selenium	2	2	UG/L		UJ
0271	05-Aug-91	Selenium	2	2	UG/L	U	U
0076	22-Jun-92	Selenium	2	2	UG/L	U	U
0271	06-Nov-90	Selenium	2	2	UG/L	U	U
0076	16-Sep-92	Selenium	2	2	UG/L	U	UJ
0271	16-Dec-91	Selenium	2	5	UG/L	U	UJ

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	06-May-91	Selenium	2	2	UG/L	U	U
0076	01-Feb-84	Selenium	5	5	UG/L	U	U
0076	12-Dec-85	Selenium	5	5	UG/L	U	U
0271	13-Dec-85	Selenium	5	5	UG/L	U	U
0271	07-Apr-94	Selenium	9	9	UG/L	U	UJ
0271	11-Oct-93	Silver	0.75	0.75	UG/L	U	U
0271	11-Oct-93	Silver	0.75	0.75	UG/L	U	UJ
0076	11-Oct-93	Silver	0.75	0.75	UG/L	U	UJ
0076	11-Oct-93	Silver	0.75	0.75	UG/L	U	UJ
0271	07-Apr-94	Silver	1	1	UG/L	U	U
0076	07-Apr-94	Silver	1	1	UG/L	U	U
0076	07-Apr-94	Silver	1	1	UG/L	U	U
0271	07-Apr-94	Silver	1	1	UG/L	U	U
0271	07-Apr-94	Silver	1	1	UG/L	U	U
0271	07-Apr-94	Silver	1	1	UG/L	U	U
0076	16-Sep-92	Silver	3	3	UG/L	U	UJ
0271	16-Sep-92	Silver	3	3	UG/L	U	UJ
0271	01-Feb-91	Silver	5	5	UG/L	U	U
0271	22-Jun-92	Silver	6	6	UG/L	U	U
0076	22-Jun-92	Silver	6	6	UG/L	U	U
0076	01-Feb-91	Silver	7.4	5	UG/L	B	UJ
0076	23-Mar-92	Silver	8	10	UG/L	U	U
0271	16-Dec-91	Silver	10	10	UG/L	U	U
0076	16-Dec-91	Silver	10	10	UG/L	U	U
0271	06-Nov-90	Silver	16.9	10	UG/L		
0076	06-Nov-90	Silver	17.4	10	UG/L		
0271	05-Aug-91	Silver	20.9	10	UG/L		
0076	06-May-91	Silver	23.1	10	UG/L		
0271	05-Aug-91	Silver	23.198	10	UG/L		
0271	06-May-91	Silver	24.2	10	UG/L		
0271	01-Feb-91	Silver-110	49	0	PCI/L	U	U
0076	01-Feb-91	Silver-110	57	0	PCI/L	U	U
0271	05-Aug-91	Sodium	64	0.1	UG/L		
0271	05-Aug-91	Sodium	64.8	0.1	UG/L		
0271	05-Aug-91	Sodium	64.8	0.1	UG/L		
0076	16-Dec-91	Sodium	46600	5000	UG/L		
0076	22-Jun-92	Sodium	46800	51	UG/L		
0076	06-May-91	Sodium	46900	100	UG/L		
0076	16-Sep-92	Sodium	47700	18	UG/L		
0076	06-May-91	Sodium	49200	0.1	UG/L		
0076	11-Oct-93	Sodium	49300	4.5	UG/L		J
0076	11-Oct-93	Sodium	50400	4.5	UG/L		J
0076	01-Feb-91	Sodium	52000	0	UG/L		
0076	07-Apr-94	Sodium	53000	39.3	UG/L		
0076	23-Mar-92	Sodium	53100	5000	UG/L		J
0076	01-Feb-91	Sodium	53800	200	UG/L		
0076	07-Apr-94	Sodium	54900	39.3	UG/L		
0271	16-Sep-92	Sodium	61800	18	UG/L		
0271	05-Aug-91	Sodium	64400	100	UG/L		
0271	22-Jun-92	Sodium	64800	51	UG/L		
0271	06-Nov-90	Sodium	66500	100	UG/L		
0271	05-Aug-91	Sodium	66658.336	100	UG/L		
0076	06-Nov-90	Sodium	67000	100	UG/L		
0271	11-Oct-93	Sodium	68500	4.5	UG/L		J
0271	11-Oct-93	Sodium	69700	4.5	UG/L		J
0271	06-May-91	Sodium	71400	100	UG/L		
0271	16-Dec-91	Sodium	72800	5000	UG/L		
0271	06-May-91	Sodium	73200	0.1	UG/L		
0271	01-Feb-91	Sodium	78000	0	UG/L		
0271	07-Apr-94	Sodium	78600	39.3	UG/L		
0271	07-Apr-94	Sodium	81200	39.3	UG/L		
0271	01-Feb-91	Sodium	82400	200	UG/L		
0271	07-Apr-94	Sodium	84200	39.3	UG/L		
0271	07-Apr-94	Sodium	84200	39.3	UG/L		
0271	01-Feb-91	Sodium-22	9.1	0	PCI/L	U	U
0076	01-Feb-91	Sodium-22	20	0	PCI/L	U	U
0076	01-Feb-91	Strontium-85	22	0	PCI/L	U	U
0271	01-Feb-91	Strontium-85	25	0	PCI/L		
0076	06-May-91	Strontium-89	5	1	PCI/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	06-May-91	Strontium-89	5	1	PCI/L	U	U
0271	22-Jun-92	Strontium-90	0	1	PCI/L		
0076	23-Mar-92	Strontium-90	0.3	1	PCI/L		
0076	22-Jun-92	Strontium-90	0.3	1	PCI/L		
0271	16-Sep-92	Strontium-90	0.56	0.56	PCI/L	U	U
0271	11-Oct-93	Strontium-90	0.59	0.59	PCI/L	U	U
0076	16-Sep-92	Strontium-90	0.59	0.59	PCI/L	U	U
0076	11-Oct-93	Strontium-90	0.59	0.59	PCI/L	U	U
0271	05-Aug-91	Strontium-90	1	0	PCI/L	U	U
0076	07-Apr-94	Strontium-90	1.16	1.16	PCI/L	U	U
0271	07-Apr-94	Strontium-90	1.456	1.456	PCI/L	U	U
0271	07-Apr-94	Strontium-90	1.463	1.463	PCI/L	U	U
0271	01-Feb-91	Strontium-90	2	0	PCI/L	U	U
0076	01-Feb-91	Strontium-90	2	0	PCI/L	U	U
0271	06-Nov-90	Strontium-90	5	0	PCI/L	U	U
0076	16-Dec-91	Strontium-90	5	5	PCI/L	U	U
0271	06-May-91	Strontium-90	5	5	PCI/L	U	U
0076	06-May-91	Strontium-90	5	5	PCI/L	U	U
0271	16-Dec-91	Strontium-90	5	5	PCI/L	U	U
0076	06-Nov-90	Strontium-90	5	0	PCI/L	U	U
0271	08-Mar-88	Styrene	5	5	UG/L	U	U
0271	24-Jun-88	Styrene	5	5	UG/L	U	U
0076	13-Sep-88	Styrene	5	5	UG/L	U	U
0076	24-Jun-88	Styrene	5	5	UG/L	U	U
0076	25-Apr-90	Styrene	5	5	UG/L	U	U
0271	13-Sep-88	Styrene	5	5	UG/L	U	U
0271	25-Apr-90	Styrene	5	5	UG/L	U	U
0076	16-Dec-91	Sulfate	2	2	MG/L	U	U
0076	07-Apr-94	Sulfate	25	25	MG/L	U	U
0076	06-May-91	Sulfate	41.3	0.05	MG/L		
0076	22-Jun-92	Sulfate	44.2	10	MG/L		
0271	07-Apr-94	Sulfate	44.9	25	MG/L		
0271	07-Apr-94	Sulfate	54	25	MG/L		
0076	16-Sep-92	Sulfate	55.4	50	MG/L		
0076	23-Mar-92	Sulfate	56.5	25	MG/L		
0271	22-Jun-92	Sulfate	59	25	MG/L		
0271	05-Aug-91	Sulfate	62.2	2	MG/L		
0076	01-Feb-91	Sulfate	62.3	0	MG/L		
0271	16-Dec-91	Sulfate	70.1	2	MG/L		
0271	16-Sep-92	Sulfate	72.1	50	MG/L		
0271	06-May-91	Sulfate	74.5	0.05	MG/L		
0271	01-Feb-91	Sulfate	80	0	MG/L		
0076	11-Oct-93	Sulfate	81	25	MG/L		
0271	11-Oct-93	Sulfate	83	25	MG/L		
0076	11-Oct-93	Suspended Solids	4	4	MG/L	U	U
0076	07-Apr-94	Suspended Solids	5	5	MG/L	U	U
0271	07-Apr-94	Suspended Solids	5	5	MG/L	U	U
0271	07-Apr-94	Suspended Solids	5	5	MG/L	U	U
0271	11-Oct-93	Suspended Solids	8	4	MG/L		
0076	23-Mar-92	Tetrachloroethene	0.29	0.3	UG/L	J	J
0076	15-Jun-90	Tetrachloroethene	0.3	0.3	UG/L	U	U
0076	24-Jan-90	Tetrachloroethene	0.3	0.3	UG/L		
0076	22-Jun-92	Tetrachloroethene	0.3	0.3	UG/L	U	R
0076	01-Feb-91	Tetrachloroethene	0.3	0.3	UG/L		
0076	11-Oct-93	Tetrachloroethene	0.38	0.3	UG/L		J
0271	15-Jun-90	Tetrachloroethene	0.4	0.3	UG/L		
0076	16-Sep-92	Tetrachloroethene	0.4	0.3	UG/L		UJ
0076	31-Jul-90	Tetrachloroethene	0.4	0.3	UG/L		
0076	06-May-91	Tetrachloroethene	0.4	0.3	UG/L		J
0271	16-Sep-92	Tetrachloroethene	0.44	0.3	UG/L		UJ
0271	31-Jul-90	Tetrachloroethene	0.5	0.3	UG/L		
0076	07-Apr-94	Tetrachloroethene	0.51	0.3	UG/L		
0271	07-Apr-94	Tetrachloroethene	0.53	0.3	UG/L		
0271	07-Apr-94	Tetrachloroethene	0.6	0.3	UG/L		
0076	27-Feb-90	Tetrachloroethene	0.6	0.3	UG/L		
0271	22-Jun-92	Tetrachloroethene	0.6	0.3	UG/L		J
0271	27-Feb-90	Tetrachloroethene	0.7	0.3	UG/L		
0271	01-Feb-91	Tetrachloroethene	0.7	0.3	UG/L		
0271	11-Oct-93	Tetrachloroethene	0.75	0.3	UG/L		J

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	06-May-91	Tetrachloroethene	0.8	0.3	UG/L		J
0076	16-Jun-93	Tetrachloroethene	0.85	0.3	UG/L		J
0271	27-Feb-90	Tetrachloroethene	0.9	0.3	UG/L		
0076	16-Dec-91	Tetrachloroethene	1	1	UG/L	U	U
0271	16-Dec-91	Tetrachloroethene	1	1	UG/L	U	U
0271	27-Feb-90	Tetrachloroethene	1	0.3	UG/L		
0271	13-Sep-88	Tetrachloroethene	1	1	UG/L	U	U
0076	13-Sep-88	Tetrachloroethene	1	1	UG/L	U	U
0076	23-Mar-90	Tetrachloroethene	1.1	0.3	UG/L		
0271	24-Jan-90	Tetrachloroethene	1.1	0.3	UG/L		
0076	06-Nov-90	Tetrachloroethene	1.2	0.3	UG/L		J
0271	05-Aug-91	Tetrachloroethene	1.2	0.3	UG/L		J
0271	06-Nov-90	Tetrachloroethene	1.2	0.3	UG/L		J
0271	23-Mar-90	Tetrachloroethene	1.8	0.3	UG/L		
0271	24-Jun-88	Tetrachloroethene	2	5	UG/L	J	J
0271	13-Dec-85	Tetrachloroethene	4.1	4.1	UG/L	U	U
0271	13-Mar-86	Tetrachloroethene	4.1	4.1	UG/L	U	U
0076	12-Dec-85	Tetrachloroethene	4.1	4.1	UG/L	U	U
0076	13-Sep-88	Tetrachloroethene	5	5	UG/L	U	U
0271	08-Mar-88	Tetrachloroethene	5	5	UG/L	U	U
0076	24-Jun-88	Tetrachloroethene	5	5	UG/L	U	U
0271	13-Sep-88	Tetrachloroethene	5	5	UG/L	U	U
0076	25-Apr-90	Tetrachloroethene	5	5	UG/L	U	U
0271	25-Apr-90	Tetrachloroethene	5	5	UG/L	U	U
0076	01-Feb-84	Tetrachloroethene	10	10	UG/L	U	U
0271	11-Oct-93	Tetryl	3	3	UG/L	U	UJ
0076	07-Apr-94	Tetryl	3	3	UG/L	U	U
0076	11-Oct-93	Tetryl	3	3	UG/L	U	UJ
0271	07-Apr-94	Tetryl	3	3	UG/L	U	U
0271	07-Apr-94	Thallium	1.6	1.6	UG/L	U	U
0076	07-Apr-94	Thallium	1.6	1.6	UG/L	U	U
0271	07-Apr-94	Thallium	1.6	1.6	UG/L	U	U
0271	07-Apr-94	Thallium	1.6	1.6	UG/L	U	U
0271	07-Apr-94	Thallium	1.6	1.6	UG/L	U	U
0076	07-Apr-94	Thallium	1.6	1.6	UG/L	U	U
0076	22-Jun-92	Thallium	2	2	UG/L	U	U
0271	01-Feb-91	Thallium	2	2	UG/L	U	UJ
0271	16-Sep-92	Thallium	2	2	UG/L	U	UJ
0271	06-Nov-90	Thallium	2	2	UG/L	U	U
0271	16-Dec-91	Thallium	2	10	UG/L	U	UJ
0076	23-Mar-92	Thallium	2	10	UG/L	U	U
0076	01-Feb-91	Thallium	2	2	UG/L	U	UJ
0076	11-Oct-93	Thallium	2	2	UG/L	U	UJ
0076	16-Sep-92	Thallium	2	2	UG/L	U	UJ
0271	22-Jun-92	Thallium	2	2	UG/L	U	U
0271	05-Aug-91	Thallium	2	2	UG/L	U	U
0271	11-Oct-93	Thallium	2	2	UG/L	U	UJ
0076	11-Oct-93	Thallium	2	2	UG/L	U	UJ
0271	11-Oct-93	Thallium	2	2	UG/L	U	UJ
0271	05-Aug-91	Thallium	2	2	UG/L	U	U
0076	16-Dec-91	Thallium	2	10	UG/L	U	UJ
0076	06-Nov-90	Thallium	2.4	2	UG/L	B	
0076	06-May-91	Thallium	10	2	UG/L	U	U
0271	06-May-91	Thallium	10	2	UG/L	U	U
0076	06-May-91	Thallium-208	54.8	1	PCI/L	U	U
0271	06-May-91	Thallium-208	100	1	PCI/L	U	U
0271	06-May-91	Thorium-227	278	1	PCI/L	U	U
0076	06-May-91	Thorium-227	282	1	PCI/L	U	U
0271	22-Jun-92	Thorium-228	0	0.2	PCI/L		
0076	22-Jun-92	Thorium-228	0	0.2	PCI/L		
0076	23-Mar-92	Thorium-228	0	0.2	PCI/L		
0076	07-Apr-94	Thorium-228	0.05	0.05	PCI/L	U	U
0271	07-Apr-94	Thorium-228	0.061	0.061	PCI/L	U	U
0271	07-Apr-94	Thorium-228	0.072	0.072	PCI/L	U	U
0076	16-Sep-92	Thorium-228	0.15	0.15	PCI/L	U	U
0271	16-Sep-92	Thorium-228	0.2	0.2	PCI/L	U	U
0271	11-Oct-93	Thorium-228	0.635	0.29	PCI/L		
0076	11-Oct-93	Thorium-228	0.73	0.73	PCI/L	U	U
0271	01-Feb-91	Thorium-228	1	0	PCI/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	16-Dec-91	Thorium-228	1	1	PCI/L	U	U
0076	06-Nov-90	Thorium-228	1	0	PCI/L	U	U
0271	06-Nov-90	Thorium-228	1	0	PCI/L	U	U
0076	16-Dec-91	Thorium-228	1.3	1	PCI/L		
0076	01-Feb-91	Thorium-228	1.5	0	PCI/L		
0271	05-Aug-91	Thorium-228	2.17	0	PCI/L		
0076	06-May-91	Thorium-228	1940	1	PCI/L	U	U
0271	06-May-91	Thorium-228	2100	1	PCI/L	U	U
0271	22-Jun-92	Thorium-230	0	0.2	PCI/L		
0076	23-Mar-92	Thorium-230	0	0.2	PCI/L		
0076	22-Jun-92	Thorium-230	0	0.2	PCI/L		
0076	07-Apr-94	Thorium-230	0.033	0.033	PCI/L	U	U
0271	07-Apr-94	Thorium-230	0.033	0.033	PCI/L	U	U
0271	07-Apr-94	Thorium-230	0.051	0.051	PCI/L	U	U
0076	11-Oct-93	Thorium-230	0.14	0.14	PCI/L	U	UJ
0271	16-Sep-92	Thorium-230	0.142	1	PCI/L		
0271	11-Oct-93	Thorium-230	0.221	0.054	PCI/L		R
0076	16-Sep-92	Thorium-230	0.57	1	PCI/L		
0271	05-Aug-91	Thorium-230	1	0	PCI/L	U	U
0076	16-Dec-91	Thorium-230	1	1	PCI/L	U	U
0271	06-Nov-90	Thorium-230	1	0	PCI/L	U	U
0076	01-Feb-91	Thorium-230	1	0	PCI/L	U	U
0076	06-Nov-90	Thorium-230	1	0	PCI/L	U	U
0271	01-Feb-91	Thorium-230	1.5	0	PCI/L		
0271	16-Dec-91	Thorium-230	1.99	1	PCI/L		
0076	22-Jun-92	Thorium-232	0	0.2	PCI/L		
0076	23-Mar-92	Thorium-232	0	0.2	PCI/L		
0271	22-Jun-92	Thorium-232	0	0.2	PCI/L		
0076	07-Apr-94	Thorium-232	0.033	0.033	PCI/L	U	U
0271	07-Apr-94	Thorium-232	0.033	0.033	PCI/L	U	U
0271	07-Apr-94	Thorium-232	0.061	0.061	PCI/L	U	U
0076	16-Sep-92	Thorium-232	0.093	0.093	PCI/L	U	U
0271	11-Oct-93	Thorium-232	0.1	0.054	PCI/L		
0271	16-Sep-92	Thorium-232	0.14	0.14	PCI/L	U	U
0076	11-Oct-93	Thorium-232	0.28	0.28	PCI/L	U	U
0271	01-Feb-91	Thorium-232	1	0	PCI/L	U	U
0271	16-Dec-91	Thorium-232	1	1	PCI/L	U	U
0271	06-Nov-90	Thorium-232	1	0	PCI/L	U	U
0076	06-Nov-90	Thorium-232	1	0	PCI/L	U	U
0271	05-Aug-91	Thorium-232	1	0	PCI/L	U	U
0076	16-Dec-91	Thorium-232	1	1	PCI/L	U	U
0076	01-Feb-91	Thorium-232	1	0	PCI/L	U	U
0076	06-May-91	Thorium-234	341	1	PCI/L	U	U
0271	06-May-91	Thorium-234	341	1	PCI/L	U	U
0076	11-Oct-93	Tin	4.5	4.5	UG/L	U	U
0271	11-Oct-93	Tin	4.5	4.5	UG/L	U	U
0076	11-Oct-93	Tin	4.5	4.5	UG/L	U	U
0271	11-Oct-93	Tin	4.5	4.5	UG/L	U	U
0076	07-Apr-94	Tin	4.8	4.8	UG/L	U	U
0271	07-Apr-94	Tin	4.8	4.8	UG/L	U	UJ
0271	07-Apr-94	Tin	4.8	4.8	UG/L	U	U
0076	07-Apr-94	Tin	4.8	4.8	UG/L	U	U
0271	07-Apr-94	Tin	4.8	4.8	UG/L	U	U
0271	07-Apr-94	Tin	8.7	4.8	UG/L	B	J
0271	01-Feb-91	Tin-113	15	0	PCI/L	U	U
0076	01-Feb-91	Tin-113	23	0	PCI/L	U	U
0271	01-Feb-91	Tin-126	12	0	PCI/L	U	U
0076	01-Feb-91	Tin-126	46	0	PCI/L	U	U
0076	13-Sep-88	Toluene	1	1	UG/L	U	U
0271	13-Sep-88	Toluene	1	1	UG/L	U	U
0271	16-Dec-91	Toluene	1	1	UG/L	U	U
0076	16-Dec-91	Toluene	1	1	UG/L	U	U
0076	27-Feb-90	Toluene	2	2	UG/L	U	U
0271	06-Nov-90	Toluene	2	2	UG/L	U	U
0076	23-Mar-92	Toluene	2	2	UG/L	U	UJ
0271	24-Jan-90	Toluene	2	2	UG/L	U	U
0076	01-Feb-91	Toluene	2	2	UG/L	U	U
0076	24-Jan-90	Toluene	2	2	UG/L	U	U
0076	07-Apr-94	Toluene	2	2	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	31-Jul-90	Toluene	2	2	UG/L	U	U
0271	15-Jun-90	Toluene	2	2	UG/L	U	U
0076	16-Sep-92	Toluene	2	2	UG/L	U	UJ
0076	06-Nov-90	Toluene	2	2	UG/L	U	U
0271	27-Feb-90	Toluene	2	2	UG/L	U	U
0271	16-Sep-92	Toluene	2	2	UG/L	U	UJ
0271	27-Feb-90	Toluene	2	2	UG/L	U	U
0271	05-Aug-91	Toluene	2	2	UG/L	U	UJ
0271	27-Feb-90	Toluene	2	2	UG/L	U	U
0271	06-May-91	Toluene	2	2	UG/L	U	UJ
0271	23-Mar-90	Toluene	2	2	UG/L	U	U
0076	06-May-91	Toluene	2	2	UG/L	U	UJ
0271	31-Jul-90	Toluene	2	2	UG/L	U	U
0076	22-Jun-92	Toluene	2	2	UG/L	U	UJ
0271	07-Apr-94	Toluene	2	2	UG/L	U	U
0271	22-Jun-92	Toluene	2	2	UG/L	U	UJ
0271	07-Apr-94	Toluene	2	2	UG/L	U	U
0076	23-Mar-90	Toluene	2	2	UG/L	U	U
0076	15-Jun-90	Toluene	2	2	UG/L	U	U
0271	01-Feb-91	Toluene	2	2	UG/L	U	U
0076	11-Oct-93	Toluene	2	2	UG/L	U	UJ
0271	11-Oct-93	Toluene	2	2	UG/L	U	U
0076	16-Jun-93	Toluene	2	2	UG/L	U	U
0271	08-Mar-88	Toluene	3	5	UG/L	J	J
0076	13-Sep-88	Toluene	5	5	UG/L	U	U
0076	25-Apr-90	Toluene	5	5	UG/L	U	U
0271	25-Apr-90	Toluene	5	5	UG/L	U	U
0271	13-Sep-88	Toluene	5	5	UG/L	U	U
0076	24-Jun-88	Toluene	5	5	UG/L	U	U
0271	24-Jun-88	Toluene	5	5	UG/L	U	U
0076	12-Dec-85	Toluene	6	6	UG/L	U	U
0271	13-Dec-85	Toluene	6	6	UG/L	U	U
0271	13-Mar-86	Toluene	6	6	UG/L	U	U
0076	01-Feb-84	Toluene	10	10	UG/L	U	U
0271	06-May-91	Toxaphene	1	1	UG/L	U	U
0271	16-Dec-91	Toxaphene	1	1	UG/L	U	U
0271	01-Feb-91	Toxaphene	1	1	UG/L	U	U
0076	01-Feb-91	Toxaphene	1	1	UG/L	U	U
0076	06-Nov-90	Toxaphene	1	1	UG/L	U	U
0076	06-May-91	Toxaphene	1	1	UG/L	U	U
0271	06-Nov-90	Toxaphene	1	1	UG/L	U	U
0076	16-Dec-91	Toxaphene	1	1	UG/L	U	U
0271	05-Aug-91	Toxaphene	2.4	2.4	UG/L	U	U
0271	16-Sep-92	Toxaphene	5	5	UG/L	U	U
0076	16-Sep-92	Toxaphene	5	5	UG/L	U	U
0076	11-Oct-93	Toxaphene	5	5	UG/L	U	UJ
0076	06-May-91	Toxaphene	5	5	UG/L	U	U
0271	11-Oct-93	Toxaphene	5	5	UG/L	U	U
0271	07-Apr-94	Toxaphene	5	5	UG/L	U	U
0271	22-Jun-92	Toxaphene	5.1	5.1	UG/L	U	U
0076	22-Jun-92	Toxaphene	5.2	5.2	UG/L	U	U
0271	07-Apr-94	Toxaphene	5.2	5.2	UG/L	U	U
0076	23-Mar-92	Toxaphene	5.3	5.3	UG/L	U	U
0076	07-Apr-94	Toxaphene	5.5	5.5	UG/L	U	U
0271	06-May-91	Toxaphene	15	15	UG/L	U	U
0076	13-Sep-88	Trichloroethene	0.93	1	UG/L	J	J
0076	16-Dec-91	Trichloroethene	1	1	UG/L	U	U
0271	13-Sep-88	Trichloroethene	1	1	UG/L	U	U
0076	25-Apr-90	Trichloroethene	1	5	UG/L	J	J
0076	31-Jul-90	Trichloroethene	1.2	1.2	UG/L	U	U
0271	07-Apr-94	Trichloroethene	1.2	1.2	UG/L		J
0076	15-Jun-90	Trichloroethene	1.2	1.2	UG/L	U	U
0076	24-Jan-90	Trichloroethene	1.2	1.2	UG/L	U	U
0076	01-Feb-91	Trichloroethene	1.2	1.2	UG/L		
0271	07-Apr-94	Trichloroethene	1.3	1.2	UG/L		J
0076	23-Mar-92	Trichloroethene	1.4	1.2	UG/L		J
0271	31-Jul-90	Trichloroethene	1.4	1.2	UG/L		
0271	15-Jun-90	Trichloroethene	1.5	1.2	UG/L		
0076	22-Jun-92	Trichloroethene	1.6	1.2	UG/L		J

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	07-Apr-94	Trichloroethene	1.6	1.2	UG/L		J
0076	06-May-91	Trichloroethene	1.7	1.2	UG/L		J
0076	16-Sep-92	Trichloroethene	1.7	1.2	UG/L		UJ
0271	16-Sep-92	Trichloroethene	1.7	1.2	UG/L		UJ
0076	11-Oct-93	Trichloroethene	1.7	1.2	UG/L		J
0271	22-Jun-92	Trichloroethene	1.8	1.2	UG/L		J
0271	13-Mar-86	Trichloroethene	1.9	1.9	UG/L	U	U
0076	12-Dec-85	Trichloroethene	1.9	1.9	UG/L	U	U
0271	13-Dec-85	Trichloroethene	1.9	1.9	UG/L	U	U
0271	25-Apr-90	Trichloroethene	2	5	UG/L	J	J
0076	27-Feb-90	Trichloroethene	2	1.2	UG/L		
0076	24-Jun-88	Trichloroethene	2	5	UG/L	J	J
0076	13-Sep-88	Trichloroethene	2	5	UG/L	J	J
0271	01-Feb-91	Trichloroethene	2.1	1.2	UG/L		
0271	11-Oct-93	Trichloroethene	2.2	1.2	UG/L		J
0271	16-Dec-91	Trichloroethene	2.4	1	UG/L		
0271	27-Feb-90	Trichloroethene	2.5	1.2	UG/L		
0076	16-Jun-93	Trichloroethene	2.6	1.2	UG/L		J
0271	24-Jun-88	Trichloroethene	3	5	UG/L	J	J
0271	27-Feb-90	Trichloroethene	3	1.2	UG/L		
0271	27-Feb-90	Trichloroethene	3.1	1.2	UG/L		
0076	23-Mar-90	Trichloroethene	3.1	1.2	UG/L		
0271	24-Jan-90	Trichloroethene	3.5	1.2	UG/L		
0076	06-Nov-90	Trichloroethene	3.8	1.2	UG/L		J
0271	06-May-91	Trichloroethene	3.8	1.2	UG/L		J
0271	06-Nov-90	Trichloroethene	3.9	1.2	UG/L		J
0271	23-Mar-90	Trichloroethene	4	1.2	UG/L		
0271	05-Aug-91	Trichloroethene	4.6	1.2	UG/L		J
0271	08-Mar-88	Trichloroethene	5	5	UG/L	U	U
0271	13-Sep-88	Trichloroethene	5	5	UG/L	U	U
0076	01-Feb-84	Trichloroethene	10	10	UG/L	U	U
0076	23-Mar-90	Trichlorofluoromethane	2	2	UG/L	U	U
0271	27-Feb-90	Trichlorofluoromethane	2	2	UG/L	U	U
0271	06-May-91	Trichlorofluoromethane	2	2	UG/L	U	U
0271	01-Feb-91	Trichlorofluoromethane	2	2	UG/L	U	U
0076	06-May-91	Trichlorofluoromethane	2	2	UG/L	U	U
0271	23-Mar-90	Trichlorofluoromethane	2	2	UG/L	U	U
0076	16-Dec-91	Trichlorofluoromethane	2	2	UG/L	U	U
0076	22-Jun-92	Trichlorofluoromethane	2	2	UG/L	U	R
0271	07-Apr-94	Trichlorofluoromethane	2	2	UG/L	U	UJ
0076	15-Jun-90	Trichlorofluoromethane	2	2	UG/L	U	U
0271	06-Nov-90	Trichlorofluoromethane	2	2	UG/L	U	U
0076	23-Mar-92	Trichlorofluoromethane	2	2	UG/L	U	UJ
0271	27-Feb-90	Trichlorofluoromethane	2	2	UG/L	U	U
0076	06-Nov-90	Trichlorofluoromethane	2	2	UG/L	U	U
0271	15-Jun-90	Trichlorofluoromethane	2	2	UG/L	U	U
0271	16-Dec-91	Trichlorofluoromethane	2	2	UG/L	U	U
0271	31-Jul-90	Trichlorofluoromethane	2	2	UG/L	U	U
0076	01-Feb-91	Trichlorofluoromethane	2	2	UG/L	U	U
0076	31-Jul-90	Trichlorofluoromethane	2	2	UG/L	U	U
0271	16-Sep-92	Trichlorofluoromethane	2	2	UG/L	U	U
0076	11-Oct-93	Trichlorofluoromethane	2	2	UG/L	U	UJ
0271	07-Apr-94	Trichlorofluoromethane	2	2	UG/L	U	UJ
0271	22-Jun-92	Trichlorofluoromethane	2	2	UG/L	U	R
0271	27-Feb-90	Trichlorofluoromethane	2	2	UG/L	U	U
0076	16-Sep-92	Trichlorofluoromethane	2	2	UG/L	U	U
0271	11-Oct-93	Trichlorofluoromethane	2	2	UG/L	U	UJ
0076	24-Jan-90	Trichlorofluoromethane	2	2	UG/L	U	U
0076	16-Jun-93	Trichlorofluoromethane	2	2	UG/L	U	UJ
0271	05-Aug-91	Trichlorofluoromethane	2	2	UG/L	U	U
0076	27-Feb-90	Trichlorofluoromethane	2	2	UG/L	U	U
0076	07-Apr-94	Trichlorofluoromethane	2	2	UG/L	U	UJ
0271	24-Jan-90	Trichlorofluoromethane	2	2	UG/L	U	U
0271	13-Sep-88	Trichlorofluoromethane	2.2	1	UG/L		
0076	13-Sep-88	Trichlorofluoromethane	2.5	1	UG/L		
0076	12-Dec-85	Trichlorofluoromethane	5	5	UG/L	U	U
0271	13-Dec-85	Trichlorofluoromethane	5	5	UG/L	U	U
0271	13-Mar-86	Trichlorofluoromethane	5	5	UG/L	U	U
0076	01-Feb-84	Trichlorofluoromethane	10	10	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	01-Feb-91	Tritium	1.7	0	PCI/ML		
0076	13-Sep-88	Tritium	1.76	500	NCI/L		
0076	13-Sep-88	Tritium	1.78	500	NCI/L		
0271	13-Sep-88	Tritium	3.34	500	NCI/L		
0271	13-Sep-88	Tritium	3.35	500	NCI/L		
0271	01-Feb-91	Tritium	7.2	0	PCI/ML		
0076	16-Dec-91	Tritium	527	5	PCI/L		
0076	11-Oct-93	Tritium	649	270	PCI/L		
0076	22-Jun-92	Tritium	1100	460	PCI/L		
0076	06-May-91	Tritium	1184	500	PCI/L		
0076	23-Mar-92	Tritium	1200	460	PCI/L		
0076	07-Apr-94	Tritium	1350	473	PCI/L		
0076	16-Sep-92	Tritium	1420	500	PCI/L		
0271	11-Oct-93	Tritium	1490	270	PCI/L		
0271	22-Jun-92	Tritium	1800	460	PCI/L		
0271	16-Sep-92	Tritium	1970	500	PCI/L		
0271	07-Apr-94	Tritium	2070	481	PCI/L		
0271	07-Apr-94	Tritium	2170	471	PCI/L		
0271	05-Aug-91	Tritium	2340	0	PCI/L		
0271	16-Dec-91	Tritium	2530	5	PCI/L		
0076	06-Nov-90	Tritium	2970	0	PCI/L		
0271	06-Nov-90	Tritium	3110	0	PCI/L		
0271	06-May-91	Tritium	3772	500	PCI/L		
0076	07-Apr-94	Uranium-234	0.2	0.086	PCI/L		
0271	07-Apr-94	Uranium-234	0.25	0.036	PCI/L		
0271	07-Apr-94	Uranium-234	0.26	0.077	PCI/L		
0271	11-Oct-93	Uranium-234	0.279	0.095	PCI/L		
0271	16-Sep-92	Uranium-234	0.33	0.33	PCI/L	U	U
0076	16-Sep-92	Uranium-234	0.394	1	PCI/L		
0076	11-Oct-93	Uranium-234	0.463	0.14	PCI/L		
0076	23-Mar-92	Uranium-234	0.5	0.4	PCI/L		
0271	22-Jun-92	Uranium-234	0.5	0.4	PCI/L		
0076	22-Jun-92	Uranium-234	0.7	0.4	PCI/L		
0271	06-Nov-90	Uranium-234	1	0	PCI/L	U	U
0076	06-Nov-90	Uranium-234	1	0	PCI/L	U	U
0271	06-May-91	Uranium-234	1	1	PCI/L	U	U
0076	06-May-91	Uranium-234	1	1	PCI/L	U	U
0271	05-Aug-91	Uranium-234	1.38	0	PCI/L		
0076	16-Dec-91	Uranium-234	1.4	1	PCI/L		
0271	01-Feb-91	Uranium-234	4.8	0	PCI/L		
0076	01-Feb-91	Uranium-234	7.7	0	PCI/L		
0271	16-Dec-91	Uranium-234	8.14	1	PCI/L		
0271	07-Apr-94	Uranium-235	0.036	0.036	PCI/L	U	U
0271	07-Apr-94	Uranium-235	0.077	0.077	PCI/L	U	U
0076	07-Apr-94	Uranium-235	0.086	0.086	PCI/L	U	U
0271	11-Oct-93	Uranium-235/236	0.096	0.096	PCI/L	U	U
0076	11-Oct-93	Uranium-235/236	0.14	0.14	PCI/L	U	U
0271	16-Sep-92	Uranium-235/236	0.19	0.19	PCI/L	U	U
0076	16-Sep-92	Uranium-235/236	0.22	0.22	PCI/L	U	U
0271	16-Dec-91	Uranium-235/236	1	1	PCI/L	U	U
0076	16-Dec-91	Uranium-235/236	1	1	PCI/L	U	U
0271	05-Aug-91	Uranium-235/236	1	0	PCI/L	U	U
0271	07-Apr-94	Uranium-238	0.131	0.036	PCI/L		
0271	07-Apr-94	Uranium-238	0.15	0.077	PCI/L		
0076	11-Oct-93	Uranium-238	0.152	0.11	PCI/L		
0076	07-Apr-94	Uranium-238	0.2	0.086	PCI/L		
0271	22-Jun-92	Uranium-238	0.2	0.4	PCI/L		
0076	16-Sep-92	Uranium-238	0.22	0.22	PCI/L	U	U
0271	11-Oct-93	Uranium-238	0.233	0.11	PCI/L		
0076	23-Mar-92	Uranium-238	0.3	0.4	PCI/L		
0271	16-Sep-92	Uranium-238	0.348	1	PCI/L		
0076	22-Jun-92	Uranium-238	0.8	0.4	PCI/L		
0271	06-May-91	Uranium-238	1	1	PCI/L	U	U
0076	16-Dec-91	Uranium-238	1	1	PCI/L	U	U
0076	06-Nov-90	Uranium-238	1	0	PCI/L	U	U
0271	05-Aug-91	Uranium-238	1	0	PCI/L	U	U
0076	06-May-91	Uranium-238	1	1	PCI/L	U	U
0271	06-Nov-90	Uranium-238	1	0	PCI/L	U	U
0076	01-Feb-91	Uranium-238	1.6	0	PCI/L		

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	01-Feb-91	Uranium-238	2	0	PCI/L		
0271	16-Dec-91	Uranium-238	8.25	1	PCI/L		
0076	11-Oct-93	Vanadium	0.75	0.75	UG/L	U	UJ
0271	11-Oct-93	Vanadium	0.75	0.75	UG/L	U	UJ
0271	11-Oct-93	Vanadium	0.75	0.75	UG/L	U	U
0076	11-Oct-93	Vanadium	0.75	0.75	UG/L	U	UJ
0076	23-Mar-92	Vanadium	7.8	50	UG/L	B	J
0271	01-Feb-91	Vanadium	10	10	UG/L	U	U
0271	06-Nov-90	Vanadium	10	10	UG/L	U	U
0076	01-Feb-91	Vanadium	10	10	UG/L	U	U
0076	06-Nov-90	Vanadium	10.2	10	UG/L	B	
0271	16-Sep-92	Vanadium	10.3	2	UG/L		UJ
0271	07-Apr-94	Vanadium	10.6	0.9	UG/L		
0076	07-Apr-94	Vanadium	10.8	0.9	UG/L		
0271	07-Apr-94	Vanadium	10.9	0.9	UG/L		
0271	07-Apr-94	Vanadium	10.9	0.9	UG/L		
0076	16-Sep-92	Vanadium	11	2	UG/L		UJ
0076	07-Apr-94	Vanadium	11.2	0.9	UG/L		
0271	07-Apr-94	Vanadium	11.2	0.9	UG/L		
0271	05-Aug-91	Vanadium	11.7	10	UG/L		
0271	05-Aug-91	Vanadium	13.214	10	UG/L		
0076	06-May-91	Vanadium	14.2	10	UG/L	B	
0271	06-May-91	Vanadium	14.6	10	UG/L	B	
0076	22-Jun-92	Vanadium	21.7	6	UG/L		UJ
0271	22-Jun-92	Vanadium	24.4	2	UG/L		UJ
0076	16-Dec-91	Vanadium	32	50	UG/L	U	UJ
0271	16-Dec-91	Vanadium	33.8	50	UG/L	U	UJ
0271	11-Oct-93	Vinyl Acetate	3	3	UG/L	U	U
0271	07-Apr-94	Vinyl Acetate	3	3	UG/L	U	UJ
0076	07-Apr-94	Vinyl Acetate	3	3	UG/L	U	UJ
0076	11-Oct-93	Vinyl Acetate	3	3	UG/L	U	UJ
0271	07-Apr-94	Vinyl Acetate	3	3	UG/L	U	UJ
0271	24-Jun-88	Vinyl Acetate	10	10	UG/L	U	U
0076	13-Sep-88	Vinyl Acetate	10	10	UG/L	U	U
0271	13-Sep-88	Vinyl Acetate	10	10	UG/L	U	U
0271	08-Mar-88	Vinyl Acetate	10	10	UG/L	U	U
0076	24-Jun-88	Vinyl Acetate	10	10	UG/L	U	U
0271	25-Apr-90	Vinyl Acetate	10	10	UG/L	U	U
0076	25-Apr-90	Vinyl Acetate	10	10	UG/L	U	U
0076	13-Sep-88	Vinyl Chloride	0.2	0.2	UG/L	U	U
0271	13-Sep-88	Vinyl Chloride	0.2	0.2	UG/L	U	U
0271	11-Oct-93	Vinyl Chloride	1	1	UG/L	U	UJ
0076	07-Apr-94	Vinyl Chloride	1	1	UG/L	U	UJ
0076	11-Oct-93	Vinyl Chloride	1	1	UG/L	U	UJ
0271	07-Apr-94	Vinyl Chloride	1	1	UG/L	U	UJ
0271	07-Apr-94	Vinyl Chloride	1	1	UG/L	U	U
0076	16-Jun-93	Vinyl Chloride	1.8	1.8	UG/L	U	U
0076	01-Feb-91	Vinyl Chloride	1.8	1.8	UG/L	U	UJ
0076	24-Jan-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0271	15-Jun-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0271	06-May-91	Vinyl Chloride	1.8	1.8	UG/L	U	U
0076	06-May-91	Vinyl Chloride	1.8	1.8	UG/L	U	U
0271	01-Feb-91	Vinyl Chloride	1.8	1.8	UG/L	U	UJ
0076	16-Sep-92	Vinyl Chloride	1.8	1.8	UG/L	U	UJ
0076	23-Mar-92	Vinyl Chloride	1.8	1.8	UG/L	U	UJ
0271	23-Mar-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0076	27-Feb-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0076	15-Jun-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0271	27-Feb-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0271	05-Aug-91	Vinyl Chloride	1.8	1.8	UG/L	U	U
0271	24-Jan-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0271	27-Feb-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0076	22-Jun-92	Vinyl Chloride	1.8	1.8	UG/L	U	UJ
0271	06-Nov-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0076	06-Nov-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0271	16-Sep-92	Vinyl Chloride	1.8	1.8	UG/L	U	UJ
0271	31-Jul-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0271	27-Feb-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0076	23-Mar-90	Vinyl Chloride	1.8	1.8	UG/L	U	U

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0076	31-Jul-90	Vinyl Chloride	1.8	1.8	UG/L	U	U
0271	22-Jun-92	Vinyl Chloride	1.8	1.8	UG/L	U	UJ
0271	16-Dec-91	Vinyl Chloride	2	2	UG/L	U	U
0076	16-Dec-91	Vinyl Chloride	2	2	UG/L	U	U
0271	25-Apr-90	Vinyl Chloride	10	10	UG/L	U	U
0076	25-Apr-90	Vinyl Chloride	10	10	UG/L	U	U
0271	13-Dec-85	Vinyl Chloride	10	10	UG/L	U	U
0076	13-Sep-88	Vinyl Chloride	10	10	UG/L	U	U
0271	13-Mar-86	Vinyl Chloride	10	10	UG/L	U	U
0271	08-Mar-88	Vinyl Chloride	10	10	UG/L	U	U
0271	13-Sep-88	Vinyl Chloride	10	10	UG/L	U	U
0076	24-Jun-88	Vinyl Chloride	10	10	UG/L	U	U
0076	01-Feb-84	Vinyl Chloride	10	10	UG/L	U	U
0076	12-Dec-85	Vinyl Chloride	10	10	UG/L	U	U
0271	24-Jun-88	Vinyl Chloride	10	10	UG/L	U	U
0271	15-Jun-90	Xylenes, Total	1	1	UG/L	U	U
0076	13-Sep-88	Xylenes, Total	1	1	UG/L	U	U
0076	23-Mar-90	Xylenes, Total	1	1	UG/L	U	U
0271	27-Feb-90	Xylenes, Total	1	1	UG/L	U	U
0271	23-Mar-90	Xylenes, Total	1	1	UG/L	U	U
0076	01-Feb-91	Xylenes, Total	1	1	UG/L	U	U
0271	06-Nov-90	Xylenes, Total	1	1	UG/L	U	U
0076	24-Jan-90	Xylenes, Total	1	1	UG/L	U	U
0271	05-Aug-91	Xylenes, Total	1	1	UG/L	U	U
0076	06-Nov-90	Xylenes, Total	1	1	UG/L	U	U
0271	27-Feb-90	Xylenes, Total	1	1	UG/L	U	U
0271	01-Feb-91	Xylenes, Total	1	1	UG/L	U	U
0076	31-Jul-90	Xylenes, Total	1	1	UG/L	U	U
0271	13-Sep-88	Xylenes, Total	1	1	UG/L	U	U
0271	27-Feb-90	Xylenes, Total	1	1	UG/L	U	U
0076	27-Feb-90	Xylenes, Total	1	1	UG/L	U	U
0271	06-May-91	Xylenes, Total	1	1	UG/L	U	UJ
0076	06-May-91	Xylenes, Total	1	1	UG/L	U	UJ
0271	31-Jul-90	Xylenes, Total	1	1	UG/L	U	U
0076	15-Jun-90	Xylenes, Total	1	1	UG/L	U	U
0271	24-Jan-90	Xylenes, Total	1	1	UG/L	U	U
0076	16-Jun-93	Xylenes, Total	2	2	UG/L	U	U
0271	07-Apr-94	Xylenes, Total	2	2	UG/L	U	U
0076	16-Dec-91	Xylenes, Total	2	2	UG/L	U	U
0076	22-Jun-92	Xylenes, Total	2	2	UG/L	U	UJ
0271	11-Oct-93	Xylenes, Total	2	2	UG/L	U	U
0076	07-Apr-94	Xylenes, Total	2	2	UG/L	U	U
0271	07-Apr-94	Xylenes, Total	2	2	UG/L	U	U
0271	16-Sep-92	Xylenes, Total	2	2	UG/L	U	UJ
0271	16-Dec-91	Xylenes, Total	2	2	UG/L	U	U
0076	23-Mar-92	Xylenes, Total	2	2	UG/L	U	UJ
0076	16-Sep-92	Xylenes, Total	2	2	UG/L	U	UJ
0271	22-Jun-92	Xylenes, Total	2	2	UG/L	U	U
0076	11-Oct-93	Xylenes, Total	2	2	UG/L	U	U
0076	25-Apr-90	Xylenes, Total	5	5	UG/L	U	U
0076	24-Jun-88	Xylenes, Total	5	5	UG/L	U	U
0271	08-Mar-88	Xylenes, Total	5	5	UG/L	U	U
0271	13-Sep-88	Xylenes, Total	5	5	UG/L	U	U
0271	25-Apr-90	Xylenes, Total	5	5	UG/L	U	U
0271	24-Jun-88	Xylenes, Total	5	5	UG/L	U	U
0076	13-Sep-88	Xylenes, Total	5	5	UG/L	U	U
0271	01-Feb-91	Yttrium-88	16	0	PCI/L	U	U
0076	01-Feb-91	Yttrium-88	23	0	PCI/L	U	U
0076	07-Apr-94	Zinc	4.5	0.55	UG/L	B	U
0076	23-Mar-92	Zinc	6	20	UG/L	U	UJ
0076	22-Jun-92	Zinc	6	6	UG/L	U	U
0076	11-Oct-93	Zinc	6.1	1.8	UG/L	B	U
0271	11-Oct-93	Zinc	6.2	1.8	UG/L	B	U
0271	11-Oct-93	Zinc	6.4	1.8	UG/L	B	U
0271	05-Aug-91	Zinc	6.667	5	UG/L		
0076	16-Dec-91	Zinc	8.3	20	UG/L	U	UJ
0076	07-Apr-94	Zinc	8.9	0.55	UG/L	B	U
0076	06-May-91	Zinc	9.2	5	UG/L	B	UJ
0271	05-Aug-91	Zinc	9.7	5	UG/L		

Mound Production Well Data

Production Well	Date Collect	Parameter	Results	Detect. Limit	Units	Lab Qual.	Data Qual.
0271	07-Apr-94	Zinc	11.4	0.55	UG/L	B	U
0271	06-May-91	Zinc	11.9	5	UG/L	B	UJ
0271	07-Apr-94	Zinc	12	0.55	UG/L	B	U
0076	11-Oct-93	Zinc	13.2	1.8	UG/L	B	U
0271	07-Apr-94	Zinc	13.3	0.55	UG/L	B	U
0271	07-Apr-94	Zinc	14.8	0.55	UG/L	B	U
0271	16-Dec-91	Zinc	20	20	UG/L	U	U
0271	06-Nov-90	Zinc	20.3	5	UG/L		
0271	22-Jun-92	Zinc	28.9	2	UG/L		
0271	16-Sep-92	Zinc	31.1	7	UG/L		UJ
0076	16-Sep-92	Zinc	33	7	UG/L		UJ
0076	12-Dec-85	Zinc	40	40	UG/L	U	U
0271	13-Dec-85	Zinc	40	40	UG/L	U	U
0076	01-Feb-84	Zinc	47	7	UG/L		
0076	06-Nov-90	Zinc	52.2	5	UG/L		
0076	01-Feb-91	Zinc	55.5	5	UG/L		J
0271	01-Feb-91	Zinc	57.7	5	UG/L		J
0271	01-Feb-91	Zinc-65	15	0	PCI/L	U	U
0076	01-Feb-91	Zinc-65	53	0	PCI/L	U	U
0271	01-Feb-91	Zirconium-95	28	0	PCI/L	U	U
0076	01-Feb-91	Zirconium-95	55	0	PCI/L	U	U

APPENDIX C

RELEASE BLOCK H CURRENT AND FUTURE GROUNDWATER SCENARIOS

This Appendix describes the steps completed to estimate the potential future concentration of contaminants in the Mound Plant Production Wells. In summary, this was completed by assuming that all contaminants currently in the Bedrock Aquifer of the Mound property would migrate to the Buried Valley Aquifer (BVA), from which the Mound Plant Production Wells withdraw potable water for Mound facility use. The current bedrock contaminant concentrations were then added to the current contaminant concentrations in the Mound Plant Production Wells to obtain the estimated future contaminant concentrations.

The technique described here was designed to represent the most conservative (worst-case) future scenario possible. The steps completed to "model" the future contaminant concentrations in the Mound Plant Production Wells include:

1. A topographic map of the bedrock surface underlying the Mound facility was used to divide the bedrock surface into 20 areas termed "flow tubes." Ground water flow within the Bedrock Aquifer was assumed to generally follow the topography of the bedrock surface. The flow tubes were delineated based on drainage patterns suggested by the bedrock topographic map. Within each flow tube, therefore, ground water flows in the same general direction, on a slope of the same general gradient. Based on topography and gradient, ground water from the majority of these flow tubes will eventually flow into the BVA. Although several of the flow tubes do not appear to contribute to the BVA directly, they were considered to contribute to the BVA to make the future scenario as conservative as possible.

2. The contaminant concentration data from bedrock wells within a flow tube was examined. The maximum concentration of each analyte for any of the wells within a flow tube was assumed to be representative of the contamination within the flow tube. This maximum concentration was multiplied by the volume of water per unit time that flows within each flow tube in order to determine the mass of each contaminant that is contributed to the BVA production wells.

3. The total flow of each flow tube was determined by measuring the width and the gradient of the flow tube from the bedrock topographic map. These were multiplied by the assumed thickness of the bedrock aquifer (40 feet), and by the assumed hydraulic conductivity (0.1 feet/day). The product of these values is the volume of ground water flow per flow tube per unit time.

4. The maximum concentration of each analyte from each flow tube was applied to the total flow of each flow tube to determine a mass of contaminant entering the BVA per year per flow tube.

5. The contaminant mass from each flow tube was summed to provide the total mass of each contaminant contributed by the bedrock aquifer to the BVA per year.

6. The total mass of each contaminant was divided by an assumed Mound Plant water use of 500,000 gallons per day (182,000,000 gallons per year) to obtain the theoretical concentration of the bedrock contribution for all bedrock contaminants. Therefore, the conservative

assumption is made that the mass of contaminants that enter the BVA contribute to the production wells without any dilution from the BVA or any degradation.

7. This theoretical concentration was added to the current concentration of contaminants observed in the Mound Plant Production wells to obtain the theoretical worst case future ground water concentration.

This technique represents the most conservative scenario possible using currently available ground water data because dilution and degradation of contaminants within the bedrock and the BVA are not calculated, all the bedrock ground water is assumed to reach the BVA, and the maximum contaminant concentration are assumed to be representative.

The following table lists all analytes detected in either a bedrock well or a Mound Plant Production well, their respective concentrations, the combined estimated future maximum concentration, and the BVA background concentrations, for reference.

Estimated Future Maximum Concentrations in the BVA

Compounds in Production and Bedrock Wells	Bedrock Contrib to BVA (mg/L or pCi/L)	Prod Well Conc (mg/L or pCi/L)	Estimated Future Max. (mg/L or pCi/L)	BVA Background (mg/L or pCi/L)
1,1,1-Trichloroethane	0.004736	0.0018	0.0065	0.0007
1,1,2-trichloro-1,2,2-trifluoroethene	1.58E-05	0.0087	0.0087	NA
1,1-Dichloroethane	0	0.0035	0.0035	NA
1,1-Dichloroethene	0	0.0017	0.0017	NA
1,2-Dichloroethene	0.000314	0.0047	0.0050	NA
1,2-cis-Dichloroethene	0.000225	0.0021	0.0023	0.0010
1,2-trans-dichloroethene	0.000169	0.003	0.0032	NA
2-Butanone	0.013317	0.041	0.0543	NA
4-Methylphenol	0.000439	0	0.0004	NA
Acetone	0.000914	0.012	0.0129	NA
Actinium-227	0	0.355	0.3550	NA
Alkalinity	38.41599	335	373.4160	NA
Aluminum	0.275848	0.0737	0.3495	37.5230
Ammonia	0.285285	0.58	0.8653	0.1620
Antimony	0.000775	0	0.0008	0.0006
Barium	0	0.088424	0.0884	0.3102
Benzene	5.37E-05	0	0.0001	NA
Benzoic Acid	0.007126	0	0.0071	NA
Beryllium	8.06E-05	0	0.0001	NA
Bis(2-ethylhexyl)phthalate	0.0153	0	0.0153	0.0084
Bismuth	0.001616	0	0.0016	NA
Bismuth-210	0	0.39	0.3900	NA
Bromodichloromethane	0	0.0037	0.0037	NA
Cadmium	0	0.0077	0.0077	NA
Calcium	30.10967	126	156.1097	NA
Carbon Tetrachloride	1.29E-05	0	0.0000	NA
Chloride	99.66917	133	232.6692	105.8210
Chloroform	1.99E-05	0.0022	0.0022	0.0005
Chromium	0.496041	2.49E-05	0.4961	0.0061
Cobalt	0.003931	0	0.0039	0.0000
Copper	0.003361	0.593	0.5964	0.0012
Cyanide	0.000102	0	0.0001	NA
Dissolved Solids	163.8855	719	882.8855	603.2070
Fluoride	0.016088	0.18	0.1961	0.4190
Iron	0	0.78	0.7800	4.0649
Isophorone	0	0.01	0.0100	NA
Lead	0	0.04	0.0400	0.0101
Lithium	0.003604	0	0.0036	0.0557
Magnesium	4.374434	39.6	43.9744	40.4281
Manganese	0	0.0248	0.0248	0.2296

Estimated Future Maximum Concentrations in the BVA

Compounds in Production and Bedrock Wells	Bedrock Contrib to BVA (mg/L or pCi/L)	Prod Well Conc (mg/L or pCi/L)	Estimated Future Max. (mg/L or pCi/L)	BVA Background (mg/L or pCi/L)
Molybdenum	0.009611	0	0.0096	0.0056
Nickel	0.100253	0	0.1003	0.0350
Nitrate	0.018101	2.55	2.5681	NA
Nitrate/Nitrite	0.151874	4.9	5.0519	5.3490
Nitrite	0.000944	0.066	0.0669	NA
Nitrogen	0.153262	0.62	0.1533	0.3240
Organic Carbon	0.720726	1.1	1.8207	1.9870
Phosphate	0.146365	0.22	0.3664	0.2310
Plutonium-238	0.003373	0	0.0034	0.0870
Plutonium-239/240	0.019913	2	2.0199	0.1250
Potassium	2.203355	3.8	6.0034	4.4611
Radium-226	0.240223	0.4	0.6402	0.9960
Silver	0	0.0242	0.0242	NA
Sodium	60.83225	82.4	143.2323	61.6459
Stronium-90	0.012059	0.3	0.3121	0.9750
Strontium-85	0	25	25.0000	NA
Sulfate	28.04066	83	111.0407	142.6550
Suspended Solids	73064.18	8	73072.1758	26.4400
Tetrachloroethene	9.66E-05	0.002	0.0021	0.0000
Thorium-228	0.130991	2.17	2.3010	0.7790
Thorium-230	0.074547	1.99	2.0645	0.2890
Thorium-232	0.042228	0.1	0.1422	0.0000
Toluene	0.000235	0	0.0002	NA
Trichloroethene	0.000424	0.0046	0.0050	NA
Trichlorofluoromethane	4.41E-05	0.0025	0.0025	NA
Tritium	3226.755	7200	10426.7551	1485.4730
Uranium-233	0.000185	0	0.0002	NA
Uranium-234	0	8.14	8.1400	0.7920
Uranium-235	0.003634	0	0.0036	0.0450
Uranium-235/236	0.000321	0	0.0003	NA
Uranium-238	0	8.25	8.2500	0.6880
Vanadium	0.003638	0.0244	0.0280	0.0171
Xylenes, Total	4.34E-05	0	0.0000	NA
Zinc	0	0.0577	0.0577	0.1196

APPENDIX D

EXPOSURE PATHWAY INTAKE EQUATIONS

CONSTRUCTION WORKER - PATHWAY 2: INHALATION OF DUST

Noncarcinogens

Intake = (mg/kg/da)

$$\frac{(C_{air} \; x \; IR_{air} \; x \; EF)}{(BW \; x \; 365 \; \frac{da}{yr})}$$

where,

$$C_{air} = C_{soil} \; x \; \frac{1}{PEF}$$

C_{air} = airborne constituent concentration (mg/m^3)
C_{soil} = soil constituent concentration (mg/kg)
IR_{air} = inhalation rate (20 m^3/da)
EF = exposure frequency (250 da/yr)
BW = body weight (70 kg)
PEF = particulate emission factor (4.28E+9 m^3/kg)

Carcinogens

Intake = (mg/kg/da)

$$\frac{(C_{air} \; x \; EF \; x \; ED \; x \; IR_{air})}{(BW \; x \; AT \; x \; 365 \; \frac{da}{yr})}$$

where,

$$C_{air} = C_{soil} \; x \; \frac{1}{PEF}$$

C_{air} = airborne constituent concentration (mg/m^3)
C_{soil} = soil constituent concentration (mg/kg)
EF = exposure frequency (250 da/yr)
ED = exposure duration (5 yr)
IR_{air} = inhalation rate (20 m^3/da)
BW = body weight (70 kg)
AT = averaging time (70 yr)
PEF = particulate emission factor (4.28E+9 m^3/kg)

Radionuclides

Intake = (pCi)

$$C_{air} \; x \; ED \; x \; EF \; x \; IR_{air}$$

where,

$$C_{air} = C_{soil} \; x \; 1000 \; (\frac{g}{kg}) \; x \; \frac{1}{PEF}$$

C_{air} = airborne constituent concentration (pCi/m^3)
C_{soil} = soil constituent concentration (pCi/g)
ED = exposure duration (5 yr)
EF = exposure frequency (250 da/yr)
IR_{air} = inhalation rate (20 m^3/da)
PEF = particulate emission factor (4.28E+9 m^3/kg)

CONSTRUCTION WORKER - PATHWAY 3: INGESTION OF DRINKING WATER

Noncarcinogens

Intake = (mg/kg/da)

$$\frac{(C_{water} \times IR_{gw} \times EF)}{(BW \times 365 \frac{da}{yr})}$$

where,

C_{water} =	groundwater chemical concentration (mg/L)
IR_{gw} =	ingestion rate of groundwater (1.0 L/da)
EF =	exposure frequency (250 da/yr)
BW =	body weight (70 kg)

Carcinogens

Intake = (mg/kg/da)

$$\frac{(C_{water} \times IR_{gw} \times EF \times ED)}{(BW \times AT \times 365 \frac{da}{yr})}$$

where,

C_{water} =	groundwater chemical concentration (mg/L)
IR_{gw} =	ingestion rate of groundwater (1.0 L/da)
EF =	exposure frequency (250 da/yr)
ED =	exposure duration (5 yr)
BW =	body weight (70 kg)
AT =	averaging time (70 yr)

Radionuclides

Intake = (pCi)

$$C_{water} \times IR_{gw} \times EF \times ED$$

where,

C_{water} =	groundwater radionuclide level (pCi/L)
IR_{gw} =	ingestion rate of groundwater (1.0 L/da)
EF =	exposure frequency (250 da/yr)
ED =	exposure duration (5 yr)

CONSTRUCTION WORKER - PATHWAY 4: INHALATION DURING SHOWERING

Noncarcinogens

Intake = (mg/kg/da)

$$\frac{(C_{water} \times K \times IR_{air} \times EF \times ET \times \frac{1\ da}{24\ hr})}{(BW \times 365\ \frac{da}{yr})}$$

where,

C_{water} =	groundwater chemical concentration (mg/L)
K =	volatilization factor (0.0005 x 1000 L/m^3)
IR_{air} =	inhalation rate (20 m^3/da)
EF =	exposure frequency (250 da/yr)
ET =	exposure time (0.167 hr/da)
BW =	body weight (70 kg)

Carcinogens

Intake = (mg/kg/da)

$$\frac{(C_{water} \times K \times IR_{air} \times EF \times ED \times ET \times \frac{1\ da}{24\ hr})}{(BW \times AT \times 365\ \frac{da}{yr})}$$

where,

C_{water} =	groundwater chemical concentration (mg/L)
K =	volatilization factor (0.0005 x 1000 L/m^3)
IR_{air} =	inhalation rate (20 m^3/da)
EF =	exposure frequency (250 da/yr)
ED =	exposure duration (5 yr)
ET =	exposure time (0.167 hr/da)
BW =	body weight (70 kg)
AT =	averaging time (70 yr)

Radionuclides

Intake = (pCi, H^3 - only)

$$C_w \times IR_{air} \times EF \times ED \times M_{total} \times \frac{1\ L}{1000g} \times ET \times \frac{1\ da}{24\ hr}$$

where,

C_w =	tritium concentration in water (pCi/L)
IR_{air} =	inhalation rate (20 m^3/da)
EF =	exposure frequency (250 da/yr)
ED =	exposure duration (5 yr)
M_{total} =	airborne mass concentration of water in shower (66.96 g/m^3)
ET =	shower duration (0.167 hr/da)

CONSTRUCTION WORKER -
PATHWAY 5: DERMAL CONTACT WITH GROUNDWATER

Noncarcinogens

Intake (Dermally Absorbed Dose) = (mg/kg/da)

$$\frac{DA_{event} \; x \; EV \; x \; EF \; x \; A}{BW \; x \; 365 \; \frac{da}{yr}}$$

where,

(for organics)

$$DA_{event} = 2 \; x \; K_p \; x \; C_w \; x \; 10^{-3} \; \frac{L}{cm^3} \; x \; \sqrt{\frac{6 \; x \; T \; x \; t_{event}}{\pi}}$$

(for inorganics)

$$DA_{event} = K_p \; x \; C_w \; x \; t_{event} \; x \; 10^{-3} \; \frac{L}{cm^3}$$

K_p =	chemical-specific permeability coefficient (cm/hr)
C_w =	groundwater concentration (mg/L)
T =	chemical-specific lag time (hr)
t_{event} =	shower duration (0.167 hr)
π =	pi (3.14159)
EV =	events/da (1 event/da)
EF =	exposure frequency (250 da/yr)
A =	body surface area (19,400 cm^2)
BW =	body weight (70 kg)

Carcinogens

Intake (Dermally Absorbed Dose) = (mg/kg/da)

$$\frac{DA_{event} \; x \; EV \; x \; EF \; x \; A \; x \; ED}{BW \; x \; AT \; x \; 365 \; \frac{da}{yr}}$$

where,

(for organics)

$$DA_{event} = 2 \; x \; K_p \; x \; C_w \; x \; 10^{-3} \; \frac{L}{cm^3} \; x \; \sqrt{\frac{6 \; x \; T \; x \; t_{event}}{\pi}}$$

(for inorganics)

$$DA_{event} = K_p \; x \; C_w \; x \; t_{event} \; x \; 10^{-3} \; \frac{L}{cm^3}$$

K_p =	chemical-specific permeability coefficient (cm/hr)
C_w =	groundwater concentration (mg/L)
T =	chemical-specific lag time (hr)
t_{event} =	shower duration (0.167 hr)
EV =	events/da (1 event/da)
EF =	exposure frequency (250 da/yr)
A =	body surface area (19,400 cm^2)
ED =	exposure duration (5 yr)
BW =	body weight (70 kg)
AT =	averaging time (70 yr)

CONSTRUCTION WORKER -
PATHWAY 5: DERMAL CONTACT WITH GROUNDWATER (cont.)

Radionuclides

Intake (pCi) = $C_w \times A \times Kp_{trit} \times EF \times 1000 \frac{L}{m^3} \times ED \times ET$

where,	C_w =	groundwater concentration (pCi/L)
	A =	body surface area (1.9 m^2)
	Kp_{trit} =	chemical-specific permeability coefficient (1.5E-5m/hr)
	EF =	exposure frequency (250 da/yr)
	ED =	exposure duration (5 yr)
	ET =	shower duration (0.167 hr/da)

CONSTRUCTION WORKER -
PATHWAY 6: INGESTION OF SOIL BOUND CHEMICAL

Noncarcinogens

Intake = (mg/kg/da)

$$\frac{(C_{soil} \; x \; EF \; x \; 10^{-6} \; \frac{kg}{mg} \; x \; IR_{soil})}{(BW \; x \; 365 \; \frac{da}{yr})}$$

where,
C_{soil} = soil chemical concentration (mg/kg)
EF = exposure frequency (250 da/yr)
IR_{soil} = ingestion rate (480 mg/da)
BW = body weight (70 kg)

Carcinogens

Intake = (mg/kg/da)

$$\frac{(C_{soil} \; x \; EF \; x \; ED \; x \; 10^{-6} \; \frac{kg}{mg} \; x \; IR_{soil})}{(AT \; x \; BW \; x \; 365 \; \frac{da}{yr})}$$

where,
C_{soil} = soil chemical concentration (mg/kg)
EF = exposure frequency (250 da/yr)
ED = exposure duration (5 yr)
IR_{soil} = ingestion rate (480 mg/da)
AT = averaging time (70 yr)
BW = body weight (70 kg)

Radionuclides

Intake = (pCi)

$$C_{soil} \; x \; ED \; x \; EF \; x \; 10^{-3} \; \frac{g}{mg} \; x \; IR_{soil}$$

where,
C_{soil} = soil chemical concentration (pCi/g)
ED = exposure duration (5 yr)
EF = exposure frequency (250 da/yr)
IR_{soil} = ingestion rate (480 mg/da)

CONSTRUCTION WORKER -
PATHWAY 7: EXTERNAL EXPOSURE TO RADIATION

Radionuclides

$$\text{External Exposure} = C_{soil} \times T_e \times (1 - S_e) \times ED$$

where,	External Exposure =	external exposure contact rate (pCi yr/g)
	C_{soil} =	radionuclide concentration in soil (pCi/g)
	T_e =	gamma shielding factor (0.333 dim.)
	S_e =	gamma exposure time factor (0.10 dim.)
	ED =	exposure duration (5 yr)

CONSTRUCTION WORKER -
PATHWAY 8: DERMAL CONTACT WITH SOIL

Noncarcinogens

Intake (Dermally Absorbed Dose) = (mg/kg/da)

$$\frac{DA_{event} \; x \; EF \; x \; A}{BW \; x \; 365 \; \frac{da}{yr}}$$

where,

$$DA_{event} = C_{soil} \; x \; AF \; x \; ABS \; x \; 10^{-6} \; \frac{kg}{mg}$$

C_{soil} = soil concentration (mg/kg)
AF = adherence factor (0.2 mg/cm^2 - event)
ABS = chemical-specific absorption fraction (dim.)
EF = exposure frequency (250 events/yr)
A = skin surface area in contact with soil (5000 cm^2)
BW = body weight (70 kg)

Carcinogens

Intake (Dermally Absorbed Dose) = (mg/kg/da)

$$\frac{DA_{event} \; x \; EF \; x \; ED \; x \; A}{BW \; x \; AT \; x \; 365 \; \frac{da}{yr}}$$

where,

$$DA_{event} = C_{soil} \; x \; AF \; x \; ABS \; x \; 10^{-6} \; \frac{kg}{mg}$$

C_{soil} = soil concentration (mg/kg)
AF = adherence factor (0.2 mg/cm^2 - event)
ABS = chemical-specific absorption fraction (dim.)
EF = exposure frequency (250 events/yr)
ED = exposure duration (5 yr)
A = skin surface area in contact with soil (5000 cm^2)
BW = body weight (70 kg)
AT = averaging time (70 yr)

Radionuclides

Not used here

SITE EMPLOYEE -
PATHWAY 1: INHALATION OF VOLATILES FROM SOIL

Noncarcinogens

Intake = (mg/kg/da)

$$\frac{(C_{air} \; x \; IR_{air} \; x \; EF)}{(BW \; x \; 365 \; \frac{da}{yr})}$$

where,

$$C_{air} = C_{soil} \; x \; \frac{1}{VF}$$

C_{air} = airborne constituent concentration (mg/m^3)
C_{soil} = soil constituent concentration (mg/kg)
IR_{air} = inhalation rate (20 m^3/da)
EF = exposure frequency (250 da/yr)
BW = body weight (70 kg)
VF = chemical specific volatilization factor (m^3/kg)

Carcinogens

Intake = (mg/kg/da)

$$\frac{(C_{air} \; x \; EF \; x \; ED \; x \; IR_{air})}{(BW \; x \; AT \; x \; 365 \; \frac{da}{yr})}$$

where,

$$C_{air} = C_{soil} \; x \; \frac{1}{VF}$$

C_{air} = airborne constituent concentration (mg/m^3)
C_{soil} = soil constituent concentration (mg/kg)
EF = exposure frequency (250 da/yr)
ED = exposure duration (25 yr)
IR_{air} = inhalation rate (20 m^3/da)
BW = body weight (70 kg)
AT = averaging time (70 yr)
VF = chemical specific volatilization factor (m^3/kg)

Radionuclides

Intake = (pCi)

$$C_{air} \; x \; ED \; x \; EF \; x \; IR_{air}$$

where,

$$C_{air} = C_{soil} \; x \; 1000 \; (\frac{g}{kg}) \; x \; \frac{1}{VF}$$

C_{air} = airborne constituent concentration (pCi/m^3)
C_{soil} = soil constituent concentration (pCi/g)
ED = exposure duration (25 yr)
EF = exposure frequency (250 da/yr)
IR_{air} = inhalation rate (20 m^3/da)
VF = chemical specific volatilization factor (m^3/kg)

SITE EMPLOYEE -
PATHWAY 2: INHALATION OF DUST

Noncarcinogens

Intake = (mg/kg/da)

$$\frac{(C_{air} \; x \; IR_{air} \; x \; EF)}{(BW \; x \; 365 \; \frac{da}{yr})}$$

where,

$$C_{air} = C_{soil} \; x \; \frac{1}{PEF}$$

C_{air} = airborne constituent concentration (mg/m^3)
C_{soil} = soil constituent concentration (mg/kg)
IR_{air} = inhalation rate (20 m^3/da)
EF = exposure frequency (250 da/yr)
BW = body weight (70 kg)
PEF = particulate emission factor (4.28E+9 m^3/kg)

Carcinogens

Intake = (mg/kg/da)

$$\frac{(C_{air} \; x \; EF \; x \; ED \; x \; IR_{air})}{(BW \; x \; AT \; x \; 365 \; \frac{da}{yr})}$$

where,

$$C_{air} = C_{soil} \; x \; \frac{1}{PEF}$$

C_{air} = airborne constituent concentration (mg/m^3)
C_{soil} = soil constituent concentration (mg/kg)
EF = exposure frequency (250 da/yr)
ED = exposure duration (25 yr)
IR_{air} = inhalation rate (20 m^3/da)
BW = body weight (70 kg)
AT = averaging time (70 yr)
PEF = particulate emission factor (4.28E+9 m^3/kg)

Radionuclides

Intake = (pCi)

$$C_{air} \; x \; ED \; x \; EF \; x \; IR_{air}$$

where,

$$C_{air} = C_{soil} \; x \; 1000 \; (\frac{g}{kg}) \; x \; \frac{1}{PEF}$$

C_{air} = airborne constituent concentration (pCi/m^3)
C_{soil} = soil constituent concentration (pCi/g)
ED = exposure duration (25 yr)
EF = exposure frequency (250 da/yr)
IR_{air} = inhalation rate (20 m^3/da)
PEF = particulate emission factor (4.28E+9 m^3/kg)

SITE EMPLOYEE -
PATHWAY 3: INGESTION OF DRINKING WATER

Noncarcinogens

Intake = (mg/kg/da)

$$\frac{(C_{water} \; x \; IR_{gw} \; x \; EF)}{(BW \; x \; 365 \; \frac{da}{yr})}$$

where,

C_{water} =	groundwater chemical concentration (mg/L)
IR_{gw} =	ingestion rate of groundwater (1.0 L/da)
EF =	exposure frequency (250 da/yr)
BW =	body weight (70 kg)

Carcinogens

Intake = (mg/kg/da)

$$\frac{(C_{water} \; x \; IR_{gw} \; x \; EF \; x \; ED)}{(BW \; x \; AT \; x \; 365 \; \frac{da}{yr})}$$

where,

C_{water} =	groundwater chemical concentration (mg/L)
IR_{gw} =	ingestion rate of groundwater (1.0 L/da)
EF =	exposure frequency (250 da/yr)
ED =	exposure duration (25 yr)
BW =	body weight (70 kg)
AT =	averaging time (70 yr)

Radionuclides

Intake = (pCi)

$$C_{water} \; x \; IR_{gw} \; x \; EF \; x \; ED$$

where,

C_{water} =	groundwater radionuclide level (pCi/L)
IR_{gw} =	ingestion rate of groundwater (1.0 L/da)
EF =	exposure frequency (250 da/yr)
ED =	exposure duration (25 yr)

SITE EMPLOYEE -
PATHWAY 6: INGESTION OF SOIL BOUND CHEMICAL

Noncarcinogens

Intake = (mg/kg/da)

$$\frac{(C_{soil} \; x \; EF \; x \; 10^{-6} \; \frac{kg}{mg} \; x \; IR_{soil})}{(BW \; x \; 365 \; \frac{da}{yr})}$$

where,
C_{soil} = soil chemical concentration (mg/kg)
EF = exposure frequency (250 da/yr)
IR_{soil} = ingestion rate (50 mg/da)
BW = body weight (70 kg)

Carcinogens

Intake = (mg/kg/da)

$$\frac{(C_{soil} \; x \; EF \; x \; ED \; x \; 10^{-6} \; \frac{kg}{mg} \; x \; IR_{soil})}{(AT \; x \; BW \; x \; 365 \; \frac{da}{yr})}$$

where,
C_{soil} = soil chemical concentration (mg/kg)
EF = exposure frequency (250 da/yr)
ED = exposure duration (25 yr)
IR_{soil} = ingestion rate (50 mg/da)
AT = averaging time (70 yr)
BW = body weight (70 kg)

Radionuclides

Intake = (pCi)

$$C_{soil} \; x \; ED \; x \; EF \; x \; 10^{-3} \; \frac{g}{mg} \; x \; IR_{soil}$$

where,
C_{soil} = soil chemical concentration (pCi/g)
ED = exposure duration (25 yr)
EF = exposure frequency (250 da/yr)
IR_{soil} = ingestion rate (50 mg/da)

SITE EMPLOYEE -
PATHWAY 7: EXTERNAL EXPOSURE TO RADIATION

Radionuclides

$$\text{External Exposure} = C_{soil} \times T_e \times (1 - S_e) \times ED$$

where,	External Exposure =	external exposure contact rate (pCi yr/g)
	C_{soil} =	radionuclide concentration in soil (pCi/g)
	T_e =	gamma shielding factor (0.083 dim.)
	S_e =	gamma exposure time factor (0.2 dim.)
	ED =	exposure duration (25 yr)

SITE EMPLOYEE -
PATHWAY 8: DERMAL CONTACT WITH SOIL

Noncarcinogens

Intake (Dermally Absorbed Dose) = (mg/kg/da)

$$\frac{DA_{event} \times EF \times A}{BW \times 365 \frac{da}{yr}}$$

where,

$$DA_{event} = C_{soil} \times AF \times ABS \times 10^{-6} \frac{kg}{mg}$$

C_{soil} = soil concentration (mg/kg)
AF = adherence factor (0.2 mg/cm^2 - event)
ABS = chemical-specific absorption fraction (dim.)
EF = exposure frequency (250 events/yr)
A = skin surface area in contact with soil (5000 cm^2)
BW = body weight (70 kg)

Carcinogens

Intake (Dermally Absorbed Dose) = (mg/kg/da)

$$\frac{DA_{event} \times EF \times ED \times A}{BW \times AT \times 365 \frac{da}{yr}}$$

where,

$$DA_{event} = C_{soil} \times AF \times ABS \times 10^{-6} \frac{kg}{mg}$$

C_{soil} = soil concentration (mg/kg)
AF = adherence factor (0.2 mg/cm^2 - event)
ABS = chemical-specific absorption fraction (dim.)
EF = exposure frequency (250 events/yr)
ED = exposure duration (25 yr)
A = skin surface area in contact with soil (5000 cm^2)
BW = body weight (70 kg)
AT = averaging time (70 yr)

Radionuclides

Not used here

CONSTRUCTION WORKER -
PATHWAY 1: INHALATION OF VOLATILES FROM SOIL

Noncarcinogens

Intake = (mg/kg/da)

$$\frac{(C_{air} \; x \; IR_{air} \; x \; EF)}{(BW \; x \; 365 \; \frac{da}{yr})}$$

where,

$$C_{air} = C_{soil} \; x \; \frac{1}{VF}$$

C_{air} = airborne constituent concentration (mg/m^3)
C_{soil} = soil constituent concentration (mg/kg)
IR_{air} = inhalation rate (20 m^3/da)
EF = exposure frequency (250 da/yr)
BW = body weight (70 kg)
VF = chemical specific volatilization factor (m^3/kg)

Carcinogens

Intake = (mg/kg/da)

$$\frac{(C_{air} \; x \; EF \; x \; ED \; x \; IR_{air})}{(BW \; x \; AT \; x \; 365 \; \frac{da}{yr})}$$

where,

$$C_{air} = C_{soil} \; x \; \frac{1}{VF}$$

C_{air} = airborne constituent concentration (mg/m^3)
C_{soil} = soil constituent concentration (mg/kg)
EF = exposure frequency (250 da/yr)
ED = exposure duration (5 yr)
IR_{air} = inhalation rate (20 m^3/da)
BW = body weight (70 kg)
AT = averaging time (70 yr)
VF = chemical specific volatilization factor (m^3/kg)

Radionuclides

Intake = (pCi)

$$C_{air} \; x \; ED \; x \; EF \; x \; IR_{air}$$

where,

$$C_{air} = C_{soil} \; x \; 1000 \; (\frac{g}{kg}) \; x \; \frac{1}{VF}$$

C_{air} = airborne constituent concentration (pCi/m^3)
C_{soil} = soil constituent concentration (pCi/g)
ED = exposure duration (5 yr)
EF = exposure frequency (250 da/yr)
IR_{air} = inhalation rate (20 m^3/da)
VF = chemical specific volatilization factor (m^3/kg)

APPENDIX E

TOXICITY PROFILES

Table Appendix E.1. Toxicity Profiles for Release Block H Constituents*

Chemical	Acute Toxicity Summary	Chronic Toxicity Summary	Cancer Potential	Other
Acenaphthene				
Acenaphthylene			Classified as D, not classifiable as to human carcinogenicity.	
Aldrin		Liver lesions characteristic of chlorinated insecticide poisoning were observed at doses of 0.5 ppm and greater given to rats. Increase in liver/body weight ratio noted at all doses. Similar effects seen in several other rat and dog studies.	Classified as a B2, probable human carcinogen. Orally administered aldrin produced significant increases in tumor responses in three mouse strains, including both sexes. Tumor induction has been observed for structurally related chemicals, including dieldrin, a metabolite.	Aldrin causes chromosomal aberrations in mouse, rat, and human cells, and unscheduled DNA synthesis in rats and humans.
Arsenic		Chronic human exposure has resulted in hyperpigmentation, keratosis, and possible vascular complications.	Classified as an A carcinogen; human carcinogen. An increased lung cancer mortality observed in multiple human populations exposed primarily through inhalation. Increased mortality from liver, kidney, lung, and bladder cancers. A increased incidence of skin cancer was observed in populations consuming drinking water high in inorganic arsenic.	
Benzo(a) pyrene	No information is available on short-term dermal or inhalation effects with benzo(a)pyrene (BaP)		Classified as a B2, probable human carcinogen. Evidence exists that benzo(a)pyrene is carcinogenic to laboratory animals through dermal and ingestion exposure routes. The animal data consists of dietary, gavage, inhalation, intertrachial instillation, dermal and subcutaneous studies in numerous strains of at least four species of rodents and several primates. Repeated BaP administration has been associated with increased incidences of total tumors and of tumors at the site of exposure. Distant site tumors have also been observed after BaP administration by various routes. Studies have produced tumors in the esophagus, larynx, forestomach, respiratory tract, upper and lower digestive tracts.	BaP has been shown to cause genotoxic effects in a broad range of prokaryotic and mammalian cell assay systems. In prokaryotes, BaP tested positive in DNA damage assays and in both forward and reverse mutation assays. Using mammalian cells, BaP tested positive in DNA damage assays, forward mutation assays, chromosomal effects and cell transformation assays.

Table Appendix E.1. Toxicity Profiles for Release Block H Constituents* (cont.)

Chemical	Acute Toxicity Summary	Chronic Toxicity Summary	Cancer Potential	Other
Benzo(ghi) perylene	No information is available on short-term dermal or inhalation effects with benzo(ghi)perylene		Not classifiable as to human carcinogenicity (D). Lung implants in female rats produced no apparent increase in tumors. Dermal applications of benzo(ghi)perylene produced no tumors and a papilloma was observed in the high-dose group. Skin painting and subcutaneous injections produced no skin or subcutaneous tumors.	Benzo(ghi)perylene produced positive results in tests for reverse mutation in three strains of Salmonella and forward mutation in one strain. Chinese hamster ovary cells also yielded positive results.
Beryllium	No information is available on short-term effects with beryllium.	Lifetime exposures to beryllium caused no effects on the heart, liver, kidney, or spleen, nor were effects observed on the lifespan or blood. Reported to produce embryolethality and terata in chick embryos.	Classified as a B2, probable human carcinogen. Beryllium has been shown to induce lung cancer via inhalation in rats and monkeys and to induce osteosarcomas in rabbits via intravenous or intramedullary injection.	Beryllium salts have been shown to be nonmutagenic in bacterial and yeast gene mutation assays. Chinese hamster ovary assays were positive.. Chromosomal aberrations observed in other cell culture assays.
delta-BHC			Classified as D, not classified for carcinogenicity.	
Bismuth				
Cadmium		Substantial data exist on the chronic toxicity of Cd to animals and humans. The most sensitive endpoint appears to be exposure of the human renal cortex to sufficient Cd to cause significant proteinurea.	Classified as a B1, probable human carcinogen. Evidence of carcinogenicity based on consistent results from epidemiology studies. Inhalation of cadmium leading to lung cancer is the primary cause. Mammary tumors and other tumors noted as well.	Results of mutagenicity tests in bacteria and yeasts have been inconclusive.
Carbazole	Carbazole is moderately toxic to rats after acute exposure.	No information was located regarding the toxicity of carbazole after chronic exposure of humans or other animals.	There is limited evidence of the carcinogenicity of carbazole in animals. Classified as a Group B2 carcinogen. Neoplastic lesions were observed in the liver (neoplastic nodules, hepatocellular carcinomas), and forestomach (papillomas, squamous cell carcinomas) of mice fed carbazole. No information was located regarding the carcinogenicity of carbazole in humans.	Carbazole was not mutagenic in *Salmonella typhimurium* assays. No information was located regarding the developmental or reproductive toxicity of carbazole in humans or other animals.

Table Appendix E.1. *Toxicity Profiles* for Release Block H Constituents* (cont.)

Chemical	Acute Toxicity Summary	Chronic Toxicity Summary	Cancer Potential	Other
alpha-Chlordane		A 30-month study found regional liver hypertrophy in female rats. Male rats in the same study exhibited no increase in liver tumors at the highest dose. A 24-month mouse study found hepatocellular swelling and necrosis in males, hepatocyte swelling in males and increased liver weights in both sexes.	Classified as a B2, probable human carcinogen. Sufficient evidence in studies in which benign and malignant liver tumors were induced in four strains of mice of both sexes and in rats. This compound is structurally similar to other liver carcinogens.	Gene mutation assays indicate that chlordane is not mutagenic in bacteria. Positive results have been reported in Chinese hamster lung cells an mouse lymphoma cells, and in plant assays. It did not induce DNA repair in several cell lines and is genotoxic to others.
gamma-Chlordane		A 30-month study found regional liver hypertrophy in female rats. Male rats in the same study exhibited no increase in liver tumors at the highest dose. A 24-month mouse study found hepatocellular swelling and necrosis in males, hepatocyte swelling in males and increased liver weights in both sexes.	Classified as a B2, probable human carcinogen. Sufficient evidence in studies in which benign and malignant liver tumors were induced in four strains of mice of both sexes and in rats. This compound is structurally similar to other liver carcinogens.	Gene mutation assays indicate that chlordane is not mutagenic in bacteria. Positive results have been reported in Chinese hamster lung cells an mouse lymphoma cells, and in plant assays. It did not induce DNA repair in several cell lines and is genotoxic to others.
4-Chloro-2-methylphenol				
Chromium	Major acute effect from oral exposure is renal tubular necrosis. Inhalation of chromate salts results in irritation and inflammation of nasal mucosa, ulceration, and perforation of nasal septum.	Chronic exposure to hexavalent chromium has resulted in kidney damage in animals and humans. Inhalation exposures to chromates in industrial settings have resulted in nasal membrane inflammation, chronic rhinitis, laryngitis, and pharyngitis. Exposures to skin can result in allergic skin reactions in sensitive individuals. Overall, hexavalent forms are more toxic than trivalent forms.	Classified as an A, human carcinogen. Excess lung cancer has been associated with chromate-producing industry workers. Chromatic salts are carcinogenic in rats exposed by inhalation.	Essential element. Toxicity is related to valence state.

Table Appendix E.1. Toxicity Profiles for Release Block H Constituents* (cont.)

Chemical	Acute Toxicity Summary	Chronic Toxicity Summary	Cancer Potential	Other
Cobalt	High doses can produce decreased appetite, weight loss, and debilitation. Death can occur in animals injected intravenously with cobalt salts.	Oral exposures of humans and animals can result in polycythemia (abnormal increase in red blood cells). Vomiting, diarrhea, and flushing have been reported in humans, changes in blood pressure and tinnitus (ear ringing), and deafness in animals after I.V. injection. Severe cardiac effects including effects on contractility, conductivity, and perhaps structural changes in the heart, and congestive heart failure offered among people drinking beer containing cobalt as a foam stabilizer at levels of approximately 1.5 mg/L, apparently because of synergistic effects of alcohol and cobalt. Among some children treated with cobalt therapeutically for anemia, toxicity included goiter, decreased thyroid function, increased cardiac and respiration rate, and skin and blood pressure changes. Cobalt may pose a health hazard to humans at levels above 1 mg/kg, especially people with ailments. Workers exposed occupationally may exhibit respiratory effects from irritation. Cobalt salts may produce allergic contact dermatitis. Cobalt inhibits enzyme reactions catalyzed by cytochrome P450 and may affect metabolism of other chemicals.	Classified as a B2, probable human carcinogen. Sarcomas at injection site have been observed in animals administered cobalt powder or salts subcutaneously or intramuscularly.	Essential nutrient as part of vitamin B12 in humans; found in diet; in livestock cobalt deficiencies cause anemia, weight loss, slow growth.
Copper	Used for control of algae and other organisms. A high single dose of copper produced GI irritation in humans. No data available for mammals or other humans.		Classified as D, not classified for carcinogenicity. Several long-term assays have shown no tumors in several strains of mice and rats.	High concentrations of copper compounds have been reported to induce mitosis in rat ascites cells and recessive lethals in Drosophila.

Table Appendix E.1. Toxicity Profiles for Release Block H Constituents* (cont.)

Chemical	Acute Toxicity Summary	Chronic Toxicity Summary	Cancer Potential	Other
Dibenzo-a,h-anthracene			Classified as B2; probable human carcinogen. This compound produced carcinomas in mice following oral or dermal exposure and injection site tumors ion several species following subcutaneous or intramuscular administration.	This compound has induced DNA damage and gene mutations in bacteria as well as gene mutations and transformation in several types of cell cultures.
Dibenzofuran			Classified as D; not classifiable as to human carcinogenicity	
1,1-Dichloroethene	Liver appears to be principal target. Biochemical changes and necrosis in liver in fasted rats have been reported to develop rapidly after inhalation. Liver damage in fasted rats can occur after one oral dose. At high concentrations, inhalation of 1,1-dichloroethene can cause central nervous system depression (CNS) in humans & unconsciousness.	Kidney injury can occur at relatively low doses. Reports of health effects on workers exposed to 1,1-dichloroethene include liver function abnormalities, headaches, vision problems, weakness, fatigue, and neurological sensory disturbances.	Classified as a C, possible human carcinogen. One group of investigators reported an increasing incidence of kidney tumors in mice exposed by inhalation and possibly mammary tumors in rats. Tumor initiator activity in mouse skin following several treatments with phorbol as promoter has been described.	Structure similar to vinyl chloride, a known human carcinogen; mutagenic in bacterial tests; may be fetotoxic in laboratory animals.
Fluorene	No information is available on short-term dermal or inhalation effects with benzo(ghi)perylene	Parameters used to assess subchronic toxicity in mice included food intake, body weight, clinical observations, and histopathological observations. Decreases in red blood cell count, packed cell volume, and hemoglobin, as well as increased serum bilirubin levels observed in most doses. Higher doses produced liver, kidney, and spleen weight increases as well. Skin painting of rats showed no positive results.	Not classifiable as to human carcinogenicity (D)	Fluorene produced no positive results in reverse mutation assays in five Salmonella strains or in on forward mutation assay.

Table Appendix E.1. Toxicity Profiles for Release Block H Constituents* (cont.)

Chemical	Acute Toxicity Summary	Chronic Toxicity Summary	Cancer Potential	Other
Heptachlor epoxide		In a 60-week dog feeding study, increased liver-to-body weight ratios were noted in both sexes. In multi-year studies with dogs and rats, mortality noted at various doses.	Classified as B2; probable human carcinogen. Sufficient evidence exists from rodent studies in which liver carcinomas were induced in two strains of mice of both sexes and in CFN female rats. Several structurally related compounds are liver carcinogens.	Gene mutation assays indicate that heptachlor epoxide is not mutagenic in bacteria. In two mouse dominant lethal assays, this compound did not induce major chromosomal aberrations in male germ cells.
Lead	Acute inorganic lead intoxication in humans is characterized by encephalopathy, abdominal pain, hemolysis, liver damage, renal tubular necrosis, seizures, coma, and respiratory arrest.	Chronic low level exposure to lead can affect the hematopoietic system, the nervous system, and the cardiovascular system, the nervous system, and the cardiovascular system. Lead inhibits several key enzymes involved in heme-biosynthesis. One characteristic effect of chronic lead intoxication is anemia, by reduced hemoglobin production and shortened erythrocyte survival. In humans, lead exposure has resulted in nervous system injury including reduced hand-eye coordination, reaction time, visual motor performance, and nerve conduction velocity. The developing child appears especially sensitive to lead-induced nervous system injury. Lead can also affect the immune system and produce gingival lead lines. Epidemiological studies have indicated that chronic lead exposure may be associated with increased blood pressure in humans. Exposure to lead is associated with sterility, abortion, neonatal mortality, and morbidity. Organolead compounds are neurotoxic.	Classified as a B2, probable human carcinogen. Lead salts have some evidence of carcinogenicity in animals. Renal tumors found with dietary and subcutaneous exposures to various lead salts.	Children are especially sensitive to low level exposures.
Lithium				
2-Methyl naphthalene				

Table Appendix E.1. Toxicity Profiles for Release Block H Constituents* (cont.)

Chemical	Acute Toxicity Summary	Chronic Toxicity Summary	Cancer Potential	Other
Molybdenum	No information is available on short-term dermal or inhalation effects with molybdenum.	Dietary intake correlated with increased serum uric acid levels, several biochemical endpoints and a gout-like illness affecting a Russian village. Gout-like symptoms included pain, swelling, inflammation, and deformities of the joints. Illnesses of the GI tract, liver and kidneys were reported. Long-term consumption of molybdenum in drinking water produced some mineral imbalances and increased copper excretion and resulting copper deficiencies.		Molybdenum is an essential dietary nutrient which is a constituent of several mammalian enzymes.
Naphthalene	Inhalation of vapor may cause eye irritation, headache, and confusion. Ingestion may cause abdominal pain, nausea, and vomiting. Skin or eye contact may lead to systemic effects, and nemoletic effects such as anemia and decreased hemoglobin. In animal studies, bronchial necrosis was observed in rats.	Occurrence of cataracts upon naphthalene vapor and dust exposure has been observed in humans. Subchronic animal studies have shown that oral doses produced cataracts and degeneration of the retina. Dermatitis has been reported with repeated skin exposure. Two studies have reported hemolytic anemia in infants born to women exposed during pregnancy.	Not classifiable as to human carcinogenicity (D). Studies have not shown that naphthalene is carcinogenic. Naphthalene is commonly found in coal tar and epidemiological studies have shown coal tar to be carcinogenic. The role of naphthalene alone could not be determined.	Acute exposures to large doses may cause hemolytic effects (destruction of red blood cells). This effect is most pronounced in individuals with a heredity deficiency of glucose-6-phosphate dehydrogenase.
Phenanthrene	An irritant through inhalation and ingestion exposure. May also be dermally absorbed.	May be an allergin.	Not classifiable as to human carcinogenicity (D). Inadequate data for the evaluation in experimental animals.	Can cause photosensitization of the skin.
111-Trichloroethane	No information is available on short-term dermal or inhalation effects with 111-trichloroethane.	Oral exposure of 1,1,1-trichloroethane for six months produced hepatotoxicity in guinea pigs.	Not classifiable as to human carcinogenicity (D). Technical grade 111-trichloroethane is weakly mutagenic but is known to have 1,4-dioxane, a known human carcinogen, as a contaminant.	Mutagenicity testing of 1,1,1-trichloroethane has produced positive results in one Salmonella strain and negative effects in other assays.

Table Appendix E.1. Toxicity Profiles for Release Block H Constituents* (cont.)

Chemical	Acute Toxicity Summary	Chronic Toxicity Summary	Cancer Potential	Other
112-Trichloro-122-trifluorethane	Exposure for 2.75 hours to 112-trichloro-122-trifluoro ethane produced slight psychomotor performance impairment at 19,161 mg/m3.	Inhalation studies with dogs, rabbits, and rats exposed to very high concentrations all reported negative results. No adverse effects were reported with long-term occupational exposures.	This substance has not been evaluated by the U.S. EPA for carcinogenic potential	

* - Note that all radionuclides are classified as A carcinogens (human carcinogens).

APPENDIX F

CALCULATED INTAKES AND RESIDUAL RISK TABLES

Table Appendix F.1. Construction Worker Calculated Constituent Intakes from Soil (Background) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External** Radiation	Pathway 8 Soil Dermal
Organics								
Acenaphthene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Acenaphthylene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Aldrin (carcinogen)	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Aldrin (non-carcinogen)	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Benzo(a)pyrene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Benzo(g,h,i)perylene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
delta-BHC	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Carbazole	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
alpha-Chlordane (carcinogen)	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
alpha-Chlordane (non-carcinogen)	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
gamma-Chlordane (carcinogen)	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
gamma-Chlordane (non-carcinogen)	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
4-Chloro-3-methylphenol	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Dibenzo(a,h)anthracene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Dibenzofuran	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Fluorene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Heptachlor Epoxide (carcinogen)	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Heptachlor Epoxide (non-carcinogen)	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
2-Methylnaphthalene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Naphthalene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Phenanthrene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Inorganics								
Arsenic (carcinogen)	NA	2.809E-11	NA	NA	NA	2.885E-06	NA	6.011E-08
Arsenic (non-carcinogen)	NA	3.932E-10	NA	NA	NA	4.039E-05	NA	8.415E-07
Bismuth	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Copper	NA	1.189E-09	NA	NA	NA	1.221E-04	NA	2.544E-06
Lead	NA	1.568E-10	NA	NA	NA	1.610E-05	NA	3.355E-07
Lithium	NA	1.189E-09	NA	NA	NA	1.221E-04	NA	2.544E-06
Radionuclides								
Cesium-137 (pCi)	NA	2.453E-03	NA	NA	NA	2.520E+02	6.294E-01	NA
Plutonium-238 (pCi)	NA	7.593E-04	NA	NA	NA	7.800E+01	1.948E-01	NA
Plutonium-242 (pCi)	NA	0.000E+00	NA	NA	NA	0.000E+00	0.000E+00	NA
Potassium-40 (pCi)	NA	2.161E-01	NA	NA	NA	2.220E+04	5.544E+01	NA

NA - Not applicable.

** - External Radiation Exposure has units of pCi-yr/gm (Pathway 7).

Note: Intakes for carcinogens are calculated as average daily dose-lifetime,
Intakes for non-carcinogens are calculated as average daily doses.
Carcinogen status presented in Section 4 of this report.

Table Appendix F.2. Construction Worker Calculated Constituent Intakes from Groundwater (Current - Background) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal
Organics								
1,1-Dichloroethene	NA	NA	0.000E+00	0.000E+00	0.000E+00	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	6.536E-06	4.548E-07	1.838E-06	NA	NA	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.000E+00	0.000E+00	NAv	NA	NA	NA
Inorganics								
Cadmium	NA	NA	0.000E+00	NA	0.000E+00	NA	NA	NA
Copper	NA	NA	1.142E-05	NA	3.699E-08	NA	NA	NA
Lead	NA	NA	9.834E-05	NA	1.274E-09	NA	NA	NA
Radionuclides								
Actinium-227 (pCi)	NA	NA	0.000E+00	NA	NA	NA	NA	NA
Bismuth-210 (pCi)	NA	NA	0.000E+00	NA	NA	NA	NA	NA
Plutonium-239/240 (pCi)	NA	NA	1.563E+02	NA	NA	NA	NA	NA
Tritium (pCi)	NA	NA	1.857E+06	1.730E+04	8.838E+03	NA	NA	NA
Uranium-234 (pCi)	NA	NA	9.900E+02	NA	NA	NA	NA	NA
Uranium-238 (pCi)	NA	NA	8.600E+02	NA	NA	NA	NA	NA

NAv - Data not available to perform this calculation.

NA - Not applicable.

Table Appendix F.3. Construction Worker Calculated Constituent Intakes from Groundwater (Future - Background) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal
Organics			
1,1-Dichloroethene	0.000E+00	0.000E+00	0.000E+00
1,1,1-Trichloroethane	6.536E-06	4.548E-07	1.838E-06
1,1,2-Trichloro-1,2,2-trifluoroethane	0.000E+00	0.000E+00	NAv
Inorganics			
Beryllium (carcinogen)	0.000E+00	NA	0.000E+00
Beryllium (non-carcinogen)	0.000E+00	NA	0.000E+00
Bismuth	0.000E+00	NA	0.000E+00
Cadmium	0.000E+00	NA	0.000E+00
Chromium	5.945E-05	NA	3.852E-07
Cobalt	0.000E+00	NA	0.000E+00
Copper	1.142E-05	NA	3.699E-08
Lead	9.834E-05	NA	1.274E-09
Molybdenum	5.477E-05	NA	1.774E-07
Radionuclides			
Actinium-227 (pCi)	0.000E+00	NA	NA
Bismuth-210 (pCi)	0.000E+00	NA	NA
Plutonium-239/240 (pCi)	1.563E+02	NA	NA
Tritium (pCi)	1.857E+06	1.730E+04	8.838E+03
Uranium-234 (pCi)	9.900E+02	NA	NA
Uranium-238 (pCi)	8.600E+02	NA	NA

NAv - Data not available to perform this calculation.

NA - Not applicable.

Table Appendix F.4. Site Employee Calculated Constituent Intakes from Soil (Background) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External** Radiation
Organics					
Acenaphthene	NA	0.000E+00	NA	0.000E+00	NA
Acenaphthylene	NA	0.000E+00	NA	0.000E+00	NA
Aldrin (carcinogen)	NA	0.000E+00	NA	0.000E+00	NA
Aldrin (non-carcinogen)	NA	0.000E+00	NA	0.000E+00	NA
Benzo(a)pyrene	NA	0.000E+00	NA	0.000E+00	NA
Benzo(g,h,i)perylene	NA	0.000E+00	NA	0.000E+00	NA
delta-BHC	NA	0.000E+00	NA	0.000E+00	NA
Carbazole	NA	0.000E+00	NA	0.000E+00	NA
alpha-Chlordane (carcinogen)	NA	0.000E+00	NA	0.000E+00	NA
alpha-Chlordane (non-carcinogen)	NA	0.000E+00	NA	0.000E+00	NA
gamma-Chlordane (carcinogen)	NA	0.000E+00	NA	0.000E+00	NA
gamma-Chlordane (non-carcinogen)	NA	0.000E+00	NA	0.000E+00	NA
4-Chloro-3-methylphenol	NA	0.000E+00	NA	0.000E+00	NA
Dibenzo(a,h)anthracene	NA	0.000E+00	NA	0.000E+00	NA
Dibenzofuran	NA	0.000E+00	NA	0.000E+00	NA
Fluorene	NA	0.000E+00	NA	0.000E+00	NA
Heptachlor Epoxide (carcinogen)	NA	0.000E+00	NA	0.000E+00	NA
Heptachlor Epoxide (non-carcinogen)	NA	0.000E+00	NA	0.000E+00	NA
2-Methylnaphthalene	NA	0.000E+00	NA	0.000E+00	NA
Naphthalene	NA	0.000E+00	NA	0.000E+00	NA
Phenanthrene	NA	0.000E+00	NA	0.000E+00	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	0.000E+00	NA	0.000E+00	NA
Inorganics					
Arsenic (carcinogen)	NA	1.404E-10	NA	1.503E-06	NA
Arsenic (non-carcinogen)	NA	3.932E-10	NA	4.207E-06	NA
Bismuth	NA	0.000E+00	NA	0.000E+00	NA
Copper	NA	1.189E-09	NA	1.272E-05	NA
Lead	NA	7.838E-10	NA	8.387E-06	NA
Lithium	NA	1.189E-09	NA	1.272E-05	NA
Radionuclides					
Cesium-137 (pCi)	NA	1.227E-02	NA	1.313E+02	6.997E-01
Plutonium-238 (pCi)	NA	3.797E-03	NA	4.063E+01	2.166E-01
Plutonium-242 (pCi)	NA	0.000E+00	NA	0.000E+00	0.000E+00
Potassium-40 (pCi)	NA	1.081E+00	NA	1.156E+04	6.164E+01

NA - Not applicable.

** - External Radiation Exposure has units of pCi-yr/gm (Pathway 7).

Table Appendix F.5. Site Employee Calculated Constituent Intakes from Groundwater (Current - Background) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External Radiation
Organics					
1,1-Dichloroethene	NA	NA	0.000E+00	NA	NA
1,1,1-Trichloroethane	NA	NA	6.536E-06	NA	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.000E+00	NA	NA
Inorganics					
Cadmium	NA	NA	0.000E+00	NA	NA
Copper	NA	NA	1.142E-05	NA	NA
Lead	NA	NA	9.834E-05	NA	NA
Radionuclides					
Actinium-227 (pCi)	NA	NA	0.000E+00	NA	NA
Bismuth-210 (pCi)	NA	NA	0.000E+00	NA	NA
Plutonium-239/240 (pCi)	NA	NA	7.813E+02	NA	NA
Tritium (pCi)	NA	NA	9.284E+06	NA	NA
Uranium-234 (pCi)	NA	NA	4.950E+03	NA	NA
Uranium-238 (pCi)	NA	NA	4.300E+03	NA	NA

NA - Not applicable.

Table Appendix F.6. Site Employee Calculated Constituent Intakes from Groundwater (Future - Background) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 3 Groundwtr. Ingestion
Organics	
1,1-Dichloroethene	0.000E+00
1,1,1-Trichloroethane	6.536E-06
1,1,2-Trichloro-1,2,2-trifluoroethane	0.000E+00
Inorganics	
Beryllium (carcinogen)	0.000E+00
Beryllium (non-carcinogen)	0.000E+00
Bismuth	0.000E+00
Cadmium	0.000E+00
Chromium	5.945E-05
Cobalt	5.945E-05
Copper	1.142E-05
Lead	9.834E-05
Molybdenum	5.477E-05
Radionuclides	
Actinium-227 (pCi)	0.000E+00
Bismuth-210 (pCi)	0.000E+00
Plutonium-239/240 (pCi)	7.813E+02
Tritium (pCi)	9.284E+06
Uranium-234 (pCi)	4.950E+03
Uranium-238 (pCi)	4.300E+03

Table Appendix F.7. Characterization of Residual Risks at Release Block H - Construction Worker (Soil Pathways - Background)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker		
Non-carcinogens (HQ)											
Arsenic (3)	NA	***	NA	NA	NA	1.3E-01	NA	2.8E-03			
Acenaphthene	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00			
Acenaphthylene	NA	***	NA	NA	NA	***	NA	***			
Aldrin	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00			
delta-BHC	NA	***	NA	NA	NA	***	NA	***			
Bismuth	NA	***	NA	NA	NA	***	NA	***			
alpha-Chlordane	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00			
gamma-Chlordane	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00			
4-Chloro-3-methylphenol	NA	***	NA	NA	NA	***	NA	***			
Copper	NA	***	NA	NA	NA	***	NA	***			
Dibenzofuran	NA	***	NA	NA	NA	***	NA	***			
Fluorene	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00			
Heptachlor Epoxide	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00			
Lithium	NA	***	NA	NA	NA	***	NA	***			
2-Methylnaphthalene	NA	***	NA	NA	NA	***	NA	***			
Naphthalene	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00			
Phenanthrene	NA	***	NA	NA	NA	***	NA	***			
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	Total HI (1) 0.0E+00	Total HI (2) 0.0E+00	Total HI (3) 1.4E-01
Carcinogens (Risk)											
Aldrin	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00			
Arsenic	NA	***	NA	NA	NA	4.3E-05	NA	9.0E-07			
Benzo(a)pyrene	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00			
Benzo(g,h,i)perylene	NA	***	NA	NA	NA	***	NA	***			
Carbazole	NA	***	NA	NA	NA	***	NA	***			
alpha-Chlordane	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00			
gamma-Chlordane	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00			
Dibenzo(a,h)anthracene	NA	***	NA	NA	NA	***	NA	***			
Heptachlor Epoxide	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	Total Carcinogenic Risks = 4.4E-05		
Lead	NA	***	NA	NA	NA	***	NA	***			
Total:						4.3E-05		9.0E-07			
Radionuclides (Risk)											
Cesium-137 (pCi)	NA	4.7E-14	NA	NA	NA	8.1E-09	1.3E-06	NA			
Plutonium-238 (pCi)	NA	2.1E-11	NA	NA	NA	2.3E-08	3.7E-12	NA			
Plutonium-242 (pCi)	NA	***	NA	NA	NA	***	***	NA	Total Radionuclide Risks = 1.4E-06		
Potassium-40 (pCi)	NA	***	NA	NA	NA	***	***	NA			
Total:		2.1E-11				3.1E-08	1.3E-06				

*** - Toxicity values not available.
NA - Not applicable.

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table Appendix F.8. Characterization of Residual Risks at Release Block H - Construction Worker (Groundwater - Current - Background)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker		
Non-carcinogens (HQ)											
1,1,1-Trichloroethane (1)	NA	NA	7.3E-05	***	2.0E-05	NA	NA	NA			
Cadmium	NA	NA	0.0E+00	NA	0.0E+00	NA	NA	NA			
Copper	NA	NA	***	NA	***	NA	NA	NA			
1,1-Dichloroethene	NA	NA	0.0E+00	NA	0.0E+00	NA	NA	NA			
Lead	NA	NA	***	NA	***	NA	NA	NA			
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.0E+00	***	NAv	NA	NA	NA	Total HI (1) 9.3E-05	Total HI (2 0.E+00	Total HI (3) 0.E+00
Carcinogens (Risk)									Total Carcinogenic Risks = 0.0E+00		
1,1-Dichloroethene	NA	NA	NA	0.0E+00	NA	NA	NA	NA			
Total:				0.0E+00							
Radionuclides (Risk)											
Actinium-227 (pCi)	NA	NA	0.0E+00	NA	NA	NA	NA	NA			
Bismuth-210 (pCi)	NA	NA	***	NA	NA	NA	NA	NA			
Plutonium-239/240 (pCi)	NA	NA	5.0E-08	NA	NA	NA	NA	NA			
Tritium (pCi)	NA	NA	1.3E-07	1.7E-09	6.4E-10	NA	NA	NA	Total Radionuclide Risks = 2.9E-07		
Uranium-234 (pCi)	NA	NA	4.4E-08	NA	NA	NA	NA	NA			
Uranium-238 (pCi)	NA	NA	6.1E-08	NA	NA	NA	NA	NA			
Total:			2.9E-07	1.7E-09	6.4E-10						

*** - Toxicity values not available.
NA - Not applicable.
NAv - dermal parameters not available

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table Appendix F.9. Characterization of Residual Risks at Release Block H
Construction Worker (Groundwater - Future - Background)

Constituent	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Construction Worker		
Non-carcinogens (HQ)						
1,1,1-Trichloroethane (1)	7.3E-05	***	2.0E-05			
Chromium (2)	1.2E-02	NA	7.7E-05			
Molybdenum (2)	1.1E-02	NA	3.5E-05			
Beryllium	0.0E+00	NA	0.0E+00			
Bismuth	***	NA	***			
Cadmium	0.0E+00	NA	0.0E+00			
Cobalt	***	NA	***			
Copper	***	NA	***			
1,1-Dichloroethene	0.0E+00	NA	0.0E+00			
Lead	***	NA	***			
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0E+00	***	NAv	Total HI (1) 9.3E-05	Total HI (2) 2.3E-02	Total HI (3) 0.0E+00
Carcinogens (Risk)						
Beryllium	0.0E+00	NA	0.0E+00	Total Carcin. Risks = 0.0E+00		
1,1-Dichloroethene	NA	0.0E+00	NA			
Total:	0.0E+00	0.0E+00	0.0E+00			
Radionuclides (Risk)						
Actinium-227 (pCi)	0.0E+00	NA	NA			
Bismuth-210 (pCi)	***	NA	NA			
Plutonium-239/240 (pCi)	5.0E-08	NA	NA			
Tritium (pCi)	1.3E-07	1.7E-09	6.4E-10	Total Radionuclide Risks = 2.8E-07		
Uranium-234 (pCi)	4.4E-08	NA	NA			
Uranium-238 (pCi)	5.3E-08	NA	NA			
Total:	2.8E-07	1.7E-09	6.4E-10			

*** - Toxicity values not available.
NA - Not applicable.
NAv - Dermal parameters not available

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table Appendix F.10. Characterization of Residual Risks at Release Block H - Site Employee (Soil Pathways - Background)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee		
Non-carcinogens (HQ)								
Arsenic (3)	NA	***	NA	1.4E-02	NA			
Acenaphthene	NA	***	NA	0.0E+00	NA			
Acenaphthylene	NA	***	NA	***	NA			
Aldrin	NA	***	NA	0.0E+00	NA			
delta-BHC	NA	***	NA	***	NA			
Bismuth	NA	***	NA	***	NA			
alpha-Chlordane	NA	***	NA	0.0E+00	NA			
gamma-Chlordane	NA	***	NA	0.0E+00	NA			
4-Chloro-3-methylphenol	NA	***	NA	***	NA			
Copper	NA	***	NA	***	NA			
Dibenzofuran	NA	***	NA	***	NA			
Fluorene	NA	***	NA	0.0E+00	NA			
Heptachlor Epoxide	NA	***	NA	0.0E+00	NA			
Lithium	NA	***	NA	***	NA			
2-Methylnaphthalene	NA	***	NA	***	NA			
Naphthalene	NA	***	NA	0.0E+00	NA			
Phenanthrene	NA	***	NA	***	NA			
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	NA	0.0E+00	NA	Total HI (1) 0.0E+00	Total HI (2) 0.0E+00	Total HI (3) 1.4E-02
Carcinogens (Risk)								
Aldrin	NA	***	NA	0.0E+00	NA			
Arsenic	NA	***	NA	2.3E-05	NA			
Benzo(a)pyrene	NA	***	NA	0.0E+00	NA			
Benzo(g,h,i)perylene	NA	***	NA	***	NA			
Carbazole	NA	***	NA	***	NA			
alpha-Chlordane	NA	***	NA	0.0E+00	NA			
gamma-Chlordane	NA	***	NA	0.0E+00	NA			
Dibenzo(a,h)anthracene	NA	***	NA	***	NA			
Heptachlor Epoxide	NA	***	NA	0.0E+00	NA	Total Carcinogenic Risks = 2.3E-05		
Lead	NA	***	NA	***	NA			
Total:				2.3E-05				
Radionuclides (Risk)								
Cesium-137 (pCi)	NA	2.3E-13	NA	4.2E-09	1.5E-06			
Plutonium-238 (pCi)	NA	1.0E-10	NA	1.2E-08	4.1E-12			
Plutonium-242 (pCi)	NA	***	NA	***	***	Total Radionuclide Risks = 1.5E-06		
Potassium-40 (pCi)	NA	***	NA	***	***			
Total:		1.0E-10		1.6E-08	1.5E-06			

*** - Toxicity values not available.
NA - Not applicable.

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table Appendix F.11. Characterization of Residual Risks at Release Block H - Site Employee (Groundwater - Current - Background)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee		
Non-carcinogens (HQ)								
1,1,1-Trichloroethane (1)	NA	NA	7.3E-05	NA	NA			
Cadmium	NA	NA	0.0E+00	NA	NA			
Copper	NA	NA	***	NA	NA			
1,1-Dichloroethene	NA	NA	0.0E+00	NA	NA			
Lead	NA	NA	***	NA	NA			
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.0E+00	NA	NA	Total HI (1) 7.3E-05	Total HI (2) 0.0E+00	Total HI (3) 0.0E+00
Carcinogens (Risk)								
1,1-Dichloroethene	NA	NA	NA	NA	NA	Total Carcinogenic Risks = NA		
Radionuclides (Risk)								
Actinium-227 (pCi)	NA	NA	0.0E+00	NA	NA			
Bismuth-210 (pCi)	NA	NA	***	NA	NA			
Plutonium-239/240 (pCi)	NA	NA	2.5E-07	NA	NA			
Tritium (pCi)	NA	NA	6.7E-07	NA	NA	Total Radionuclide Risks = 1.4E-06		
Uranium-234 (pCi)	NA	NA	2.2E-07	NA	NA			
Uranium-238 (pCi)	NA	NA	2.7E-07	NA	NA			
Total:			1.4E-06					

*** - Toxicity values not available.
NA - Not applicable.

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table Appendix F.12. Characterization of Residual Risks at Release Block H Site Employee (Groundwater - Future - Background)

Constituent	Pathway 3 Groundwtr. Ingestion	Site Employee		
Non-carcinogens (HQ)				
1,1,1-Trichloroethane (1)	7.3E-05			
Chromium (2)	1.2E-02			
Molybdenum (2)	1.1E-02			
Beryllium	0.0E+00			
Bismuth	***			
Cadmium	0.0E+00			
Cobalt	***			
Copper	***			
1,1-Dichloroethene	0.0E+00			
Lead	***			
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0E+00	Total HI (1) 7.3E-05	Total HI (2) 2.3E-02	Total HI (3) 0.0E+00
Carcinogens (Risk)		Total Carcinogenic Risks = 0.0E+00		
Beryllium	0.0E+00			
Total:	0.0E+00			
Radionuclides (Risk)				
Actinium-227 (pCi)	0.0E+00			
Bismuth-210 (pCi)	***			
Plutonium-239/240 (pCi)	2.5E-07			
Tritium (pCi)	6.7E-07	Total Radionuclide Risks = 1.4E-06		
Uranium-234 (pCi)	2.2E-07			
Uranium-238 (pCi)	2.7E-07			
Total:	1.4E-06			

*** - Toxicity values not available.

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table Appendix F.13. Construction Worker Calculated Constituent Intakes from Soil (Total) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External** Radiation	Pathway 8 Soil Dermal
Organics								
Acenaphthene	NA	8.230E-12	NA	NA	NA	8.454E-07	NA	1.761E-07
Acenaphthylene	NA	3.201E-11	NA	NA	NA	3.288E-06	NA	6.849E-07
Aldrin (carcinogen)	NA	1.012E-14	NA	NA	NA	1.040E-09	NA	2.167E-10
Aldrin (non-carcinogen)	NA	1.417E-13	NA	NA	NA	1.456E-08	NA	3.033E-09
Benzo(a)pyrene	NA	3.642E-12	NA	NA	NA	3.741E-07	NA	7.793E-08
Benzo(g,h,i)perylene	NA	3.470E-12	NA	NA	NA	3.564E-07	NA	7.426E-08
delta-BHC	NA	1.143E-14	NA	NA	NA	1.174E-09	NA	2.446E-10
Carbazole	NA	1.919E-12	NA	NA	NA	1.971E-07	NA	4.106E-08
alpha-Chlordane (carcinogen)	NA	3.266E-14	NA	NA	NA	3.355E-09	NA	6.989E-10
alpha-Chlordane (non-carcinogen)	NA	4.572E-13	NA	NA	NA	4.697E-08	NA	9.785E-09
gamma-Chlordane (carcinogen)	NA	2.417E-14	NA	NA	NA	2.483E-09	NA	5.172E-10
gamma-Chlordane (non-carcinogen)	NA	3.384E-13	NA	NA	NA	3.476E-08	NA	7.241E-09
4-Chloro-3-methylphenol	NA	2.149E-12	NA	NA	NA	2.207E-07	NA	4.599E-08
Dibenzo(a,h)anthracene	NA	2.547E-12	NA	NA	NA	2.617E-07	NA	5.451E-08
Dibenzofuran	NA	4.732E-11	NA	NA	NA	4.861E-06	NA	1.013E-06
Fluorene	NA	6.630E-11	NA	NA	NA	6.810E-06	NA	1.419E-06
Heptachlor Epoxide (carcinogen)	NA	7.185E-15	NA	NA	NA	7.380E-10	NA	1.538E-10
Heptachlor Epoxide (non-carcinogen)	NA	1.006E-13	NA	NA	NA	1.033E-08	NA	2.153E-09
2-Methylnaphthalene	NA	4.207E-11	NA	NA	NA	4.321E-06	NA	9.002E-07
Naphthalene	NA	1.200E-10	NA	NA	NA	1.233E-05	NA	2.568E-06
Phenanthrene	NA	1.715E-10	NA	NA	NA	1.761E-05	NA	3.669E-06
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	9.145E-14	NA	NA	NA	9.393E-09	NA	1.957E-09
Inorganics								
Arsenic (carcinogen)	NA	3.560E-11	NA	NA	NA	3.657E-06	NA	7.618E-08
Arsenic (non-carcinogen)	NA	4.984E-10	NA	NA	NA	5.119E-05	NA	1.067E-06
Bismuth	NA	2.679E-09	NA	NA	NA	2.752E-04	NA	5.734E-06
Copper	NA	1.207E-09	NA	NA	NA	1.240E-04	NA	2.583E-06
Lead	NA	5.323E-10	NA	NA	NA	5.468E-05	NA	1.139E-06
Lithium	NA	1.838E-09	NA	NA	NA	1.888E-04	NA	3.933E-06
Radionuclides								
Cesium-137 (pCi)	NA	1.110E-02	NA	NA	NA	1.140E+03	2.847E+00	NA
Plutonium-238 (pCi)	NA	7.360E-03	NA	NA	NA	7.560E+02	1.888E+00	NA
Plutonium-242 (pCi)	NA	8.353E-05	NA	NA	NA	8.580E+00	2.143E-02	NA
Potassium-40 (pCi)	NA	2.652E-01	NA	NA	NA	2.724E+04	6.803E+01	NA

NA - Not applicable.
** - External Radiation Exposure has units of pCi-yr/gm (Pathway 7).
Note: Intakes for carcinogens are calculated as average daily dose-lifetime.
Intakes for non-carcinogens are calculated as average daily doses.
Carcinogen status presented in Section 4 of this report.

Table Appendix F.14. Construction Worker Calculated Constituent Intakes from Groundwater (Current - Total) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal
Organics								
1,1-Dichloroethene	NA	NA	1.663E-05	8.268E-08	3.401E-06	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	6.548E-06	4.556E-07	1.842E-06	NA	NA	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	8.513E-05	5.923E-06	NAv	NA	NA	NA
Inorganics								
Cadmium	NA	NA	1.859E-05	NA	6.023E-08	NA	NA	NA
Copper	NA	NA	5.802E-03	NA	1.880E-05	NA	NA	NA
Lead	NA	NA	2.455E-05	NA	3.182E-10	NA	NA	NA
Radionuclides								
Actinium-227 (pCi)	NA	NA	4.188E+02	NA	NA	NA	NA	NA
Bismuth-210 (pCi)	NA	NA	4.875E+02	NA	NA	NA	NA	NA
Plutonium-239/240 (pCi)	NA	NA	2.500E+03	NA	NA	NA	NA	NA
Tritium (pCi)	NA	NA	3.387E+06	3.156E+04	1.612E+04	NA	NA	NA
Uranium-234 (pCi)	NA	NA	1.018E+04	NA	NA	NA	NA	NA
Uranium-238 (pCi)	NA	NA	1.031E+04	NA	NA	NA	NA	NA

NAv - Data not available to perform this calculation.
NA - Not applicable.

Table Appendix F.15. Construction Worker Calculated Constituent Intakes from Groundwater (Future - Total) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal
Organics			
1,1-Dichloroethene	1.663E-05	8.268E-08	3.401E-06
1,1,1-Trichloroethane	5.284E-05	3.677E-06	1.486E-05
1,1,2-Trichloro-1,2,2-trifluoroethane	8.513E-05	5.923E-06	NAv
Inorganics			
Beryllium (carcinogen)	6.989E-08	NA	2.264E-10
Beryllium (non-carcinogen)	9.785E-07	NA	3.170E-09
Bismuth	1.566E-05	NA	5.072E-08
Cadmium	1.859E-05	NA	6.023E-08
Chromium	4.854E-03	NA	3.145E-05
Cobalt	3.816E-05	NA	4.945E-08
Copper	5.836E-03	NA	1.891E-05
Lead	2.455E-05	NA	3.182E-10
Molybdenum	9.393E-05	NA	3.043E-07
Radionuclides			
Actinium-227 (pCi)	4.188E+02	NA	NA
Bismuth-210 (pCi)	4.875E+02	NA	NA
Plutonium-239/240 (pCi)	2.525E+03	NA	NA
Tritium (pCi)	7.420E+06	6.915E+04	3.532E+04
Uranium-234 (pCi)	1.018E+04	NA	NA
Uranium-238 (pCi)	1.031E+04	NA	NA

NAv - Data not available to perform this calculation.
NA - Not applicable.

Table Appendix F.16. Site Employee Calculated Constituent Intakes from Soil (Total) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External** Radiation
Organics					
Acenaphthene	NA	8.230E-12	NA	8.806E-08	NA
Acenaphthylene	NA	3.201E-11	NA	3.425E-07	NA
Aldrin (carcinogen)	NA	5.062E-14	NA	5.417E-10	NA
Aldrin (non-carcinogen)	NA	1.417E-13	NA	1.517E-09	NA
Benzo(a)pyrene	NA	1.821E-11	NA	1.948E-07	NA
Benzo(g,h,i)perylene	NA	1.735E-11	NA	1.856E-07	NA
delta-BHC	NA	1.143E-14	NA	1.223E-10	NA
Carbazole	NA	9.594E-12	NA	1.027E-07	NA
alpha-Chlordane (carcinogen)	NA	1.633E-13	NA	1.747E-09	NA
alpha-Chlordane (non-carcinogen)	NA	4.572E-13	NA	4.892E-09	NA
gamma-Chlordane (carcinogen)	NA	1.208E-13	NA	1.293E-09	NA
gamma-Chlordane (non-carcinogen)	NA	3.384E-13	NA	3.620E-09	NA
4-Chloro-3-methylphenol	NA	2.149E-12	NA	2.299E-08	NA
Dibenzo(a,h)anthracene	NA	1.274E-11	NA	1.363E-07	NA
Dibenzofuran	NA	4.732E-11	NA	5.064E-07	NA
Fluorene	NA	6.630E-11	NA	7.094E-07	NA
Heptachlor Epoxide (carcinogen)	NA	3.593E-14	NA	3.844E-10	NA
Heptachlor Epoxide (non-carcinogen)	NA	1.006E-13	NA	1.076E-09	NA
2-Methylnaphthalene	NA	4.207E-11	NA	4.501E-07	NA
Naphthalene	NA	1.200E-10	NA	1.284E-06	NA
Phenanthrene	NA	1.715E-10	NA	1.835E-06	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	9.145E-14	NA	9.785E-10	NA
Inorganics					
Arsenic (carcinogen)	NA	1.780E-10	NA	1.905E-06	NA
Arsenic (non-carcinogen)	NA	4.984E-10	NA	5.333E-06	NA
Bismuth	NA	2.679E-09	NA	2.867E-05	NA
Copper	NA	1.010E-09	NA	1.081E-05	NA
Lead	NA	2.662E-09	NA	2.848E-05	NA
Lithium	NA	8.687E-10	NA	9.295E-06	NA
Radionuclides					
Cesium-137 (pCi)	NA	5.549E-02	NA	5.938E+02	3.165E+00
Plutonium-238 (pCi)	NA	3.943E-02	NA	4.219E+02	2.249E+00
Plutonium-242 (pCi)	NA	4.176E-04	NA	4.469E+00	2.382E-02
Potassium-40 (pCi)	NA	6.133E-01	NA	6.563E+03	3.499E+01

NA - Not applicable.
** - External Radiation Exposure has units of pCi-yr/gm (Pathway 7).

Table Appendix F.17. Site Employee Calculated Constituent Intakes from Groundwater (Current - Total) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External Radiation
Organics					
1,1-Dichloroethene	NA	NA	1.663E-05	NA	NA
1,1,1-Trichloroethane	NA	NA	6.548E-06	NA	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	8.513E-05	NA	NA
Inorganics					
Cadmium	NA	NA	1.859E-05	NA	NA
Copper	NA	NA	5.802E-03	NA	NA
Lead	NA	NA	2.455E-05	NA	NA
Radionuclides					
Actinium-227 (pCi)	NA	NA	2.094E+03	NA	NA
Bismuth-210 (pCi)	NA	NA	2.438E+03	NA	NA
Plutonium-239/240 (pCi)	NA	NA	1.250E+04	NA	NA
Tritium (pCi)	NA	NA	1.693E+07	NA	NA
Uranium-234 (pCi)	NA	NA	5.088E+04	NA	NA
Uranium-238 (pCi)	NA	NA	5.156E+04	NA	NA

NA - Not applicable.

Table Appendix F.18. Site Employee Calculated Constituent Intakes from Groundwater (Future - Total) for Release Block H

Constituent (mg/kg-da) unless otherwise noted	Pathway 3 Groundwtr. Ingestion
Organics	
1,1-Dichloroethene	1.663E-05
1,1,1-Trichloroethane	5.284E-05
1,1,2-Trichloro-1,2,2-trifluoroethane	8.513E-05
Inorganics	
Beryllium (carcinogen)	3.495E-07
Beryllium (non-carcinogen)	9.785E-07
Bismuth	1.566E-05
Cadmium	1.859E-05
Chromium	4.854E-03
Cobalt	3.816E-05
Copper	5.836E-03
Lead	2.455E-05
Molybdenum	9.393E-05
Radionuclides	
Actinium-227 (pCi)	2.094E+03
Bismuth-210 (pCi)	2.438E+03
Plutonium-239/240 (pCi)	1.262E+04
Tritium (pCi)	3.710E+07
Uranium-234 (pCi)	5.088E+04
Uranium-238 (pCi)	5.156E+04

Table Appendix F.19. Characterization of Residual Risks at Release Block H - Construction Worker (Soil Pathways - Total)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker		
Non-carcinogens (HQ)											
Aldrin (1)	NA	***	NA	NA	NA	4.9E-04	NA	1.0E-04			
alpha-Chlordane (1)	NA	***	NA	NA	NA	7.8E-04	NA	1.6E-04			
gamma-Chlordane (1)	NA	***	NA	NA	NA	5.8E-04	NA	1.2E-04			
Heptachlor Epoxide (1)	NA	***	NA	NA	NA	7.9E-04	NA	1.7E-04			
Acenaphthene (3)	NA	***	NA	NA	NA	1.4E-05	NA	2.9E-06			
Arsenic (3)	NA	***	NA	NA	NA	1.7E-01	NA	3.6E-03			
Fluorene (3)	NA	***	NA	NA	NA	1.7E-04	NA	3.5E-05			
Naphthalene (3)	NA	***	NA	NA	NA	2.5E-07	NA	5.1E-08			
1,1,2-Trichloro-1,2,2-trifluoroethane (3)	NA	***	NA	NA	NA	3.1E-10	NA	6.5E-11			
Acenaphthylene	NA	***	NA	NA	NA	***	NA	***			
delta-BHC	NA	***	NA	NA	NA	***	NA	***			
Bismuth	NA	***	NA	NA	NA	***	NA	***			
4-Chloro-3-methylphenol	NA	***	NA	NA	NA	***	NA	***			
Copper	NA	***	NA	NA	NA	***	NA	***			
Dibenzofuran	NA	***	NA	NA	NA	***	NA	***			
Lithium	NA	***	NA	NA	NA	***	NA	***			
2-Methylnaphthalene	NA	***	NA	NA	NA	***	NA	***			
Phenanthrene	NA	***	NA	NA	NA	***	NA	***	Total HI (1) 3.2E-03	Total HI (2) 0.E+00	Total HI (3) 1.7E-01
Carcinogens (Risk)											
Aldrin	NA	***	NA	NA	NA	1.8E-08	NA	3.7E-09			
Arsenic	NA	***	NA	NA	NA	5.5E-05	NA	1.1E-08			
Benzo(a)pyrene	NA	***	NA	NA	NA	2.7E-06	NA	5.7E-07			
Benzo(g,h,i)perylene	NA	***	NA	NA	NA	***	NA	***			
Carbazole	NA	***	NA	NA	NA	***	NA	***			
alpha-Chlordane	NA	***	NA	NA	NA	4.4E-09	NA	9.1E-10			
gamma-Chlordane	NA	***	NA	NA	NA	3.2E-09	NA	6.7E-10			
Dibenzo(a,h)anthracene	NA	***	NA	NA	NA	***	NA	***			
Heptachlor Epoxide	NA	***	NA	NA	NA	6.7E-09	NA	1.4E-09	Total Carcinogenic Risks = 5.9E-05		
Lead	NA	***	NA	NA	NA	***	NA	***			
Total:						5.8E-05		1.7E-06			
Radionuclides (Risk)											
Cesium-137 (pCi)	NA	2.1E-13	NA	NA	NA	3.6E-08	6.0E-06	NA			
Plutonium-238 (pCi)	NA	2.0E-10	NA	NA	NA	2.3E-07	3.6E-11	NA			
Plutonium-242 (pCi)	NA	***	NA	NA	NA	***	***	NA	Total Radionuclide Risks = 6.2E-06		
Potassium-40 (pCi)	NA	***	NA	NA	NA	***	***	NA			
Total:		2.0E-10				2.6E-07	6.0E-06				

*** - Toxicity values not available.
NA - Not applicable.

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table Appendix F.20. Characterization of Residual Risks at Release Block H - Construction Worker (Groundwater - Current - Total)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Construction Worker		
Non-carcinogens (HQ)										
1,1-Dichloroethene (1)	NA	NA	1.8E-06	NA	3.8E-07	NA	NA			
1,1,1-Trichloroethane (1)	NA	NA	7.3E-05	***	2.0E-05	NA	NA			
Cadmium (2)	NA	NA	3.7E-02	NA	1.2E-04	NA	NA			
1,1,2-Trichloro-1,2,2-trifluoroethane (3)	NA	NA	2.8E-06	***	NAv	NA	NA			
Copper	NA	NA	***	NA	***	NA	NA			
Lead	NA	NA	***	NA	***	NA	NA	Total HI (1) 9.5E-05	Total HI (2) 3.7E-02	Total HI (3) 2.8E-06
Carcinogens (Risk)								Total Carcinogenic Risks = 9.9E-08		
1,1-Dichloroethene	NA	NA	NA	9.9E-08	NA	NA	NA			
Total:				9.9E-08						
Radionuclides (Risk)										
Actinium-227 (pCi)	NA	NA	2.6E-07	NA	NA	NA	NA			
Bismuth-210 (pCi)	NA	NA	***	NA	NA	NA	NA			
Plutonium-239/240 (pCi)	NA	NA	8.0E-07	NA	NA	NA	NA			
Tritium (pCi)	NA	NA	2.4E-07	3.0E-09	1.2E-09	NA	NA	Total Radionuclide Risks = 2.4E-06		
Uranium-234 (pCi)	NA	NA	4.5E-07	NA	NA	NA	NA			
Uranium-238 (pCi)	NA	NA	6.4E-07	NA	NA	NA	NA			
Total:			2.4E-06	3.0E-09	1.2E-09					

*** - Toxicity values not available.
NA - Not applicable.
NAv - dermal parameters not available

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table Appendix F.21. Characterization of Residual Risks at Release Block H
Construction Worker (Groundwater - Future - Total)

Constituent	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Construction Worker		
Non-carcinogens (HQ)						
1,1-Dichloroethene (1)	1.8E-06	NA	3.8E-07			
1,1,1-Trichloroethane (1)	5.9E-04	***	1.7E-04			
Cadmium (2)	3.7E-02	NA	1.2E-04			
Chromium (2)	9.7E-01	NA	6.3E-03			
Molybdenum (2)	1.9E-02	NA	6.1E-05			
Beryllium (3)	2.0E-04	NA	6.3E-07			
1,1,2-Trichloro-1,2,2-trifluoroethane (3)	2.8E-06	NAv	***			
Bismuth	***	NA	***			
Cobalt	***	NA	***			
Copper	***	NA	***			
Lead	***	NA	***	Total HI (1) 7.5E-04	Total HI (2) 1.0E+00	Total HI (3) 2.0E-04
Carcinogens (Risk)						
Beryllium	3.0E-07	NA	9.7E-10	Total Carcinogenic Risks = 4.0E-07		
1,1-Dichloroethene	NA	9.9E-08	NA			
Total:	3.0E-07	9.9E-08	9.7E-10			
Radionuclides (Risk)						
Actinium-227 (pCi)	2.6E-07	NA	NA			
Bismuth-210 (pCi)	***	NA	NA			
Plutonium-239/240 (pCi)	8.1E-07	NA	NA			
Tritium (pCi)	5.3E-07	6.6E-09	2.5E-09	Total Radionuclide Risks = 2.7E-06		
Uranium-234 (pCi)	4.5E-07	NA	NA			
Uranium-238 (pCi)	6.4E-07	NA	NA			
Total:	2.7E-06	6.6E-09	2.5E-09			

*** - Toxicity values not available.
NA - Not applicable.
NAv - Dermal parameters not available

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table Appendix F.22. Characterization of Residual Risks at Release Block H - Site Employee (Soil Pathways - Total)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee		
Non-carcinogens (HQ)								
Aldrin (1)	NA	***	NA	5.1E-05	NA			
alpha-Chlordane (1)	NA	***	NA	8.2E-05	NA			
gamma-Chlordane (1)	NA	***	NA	6.0E-05	NA			
Heptachlor Epoxide (1)	NA	***	NA	8.3E-05	NA			
Acenaphthene (3)	NA	***	NA	1.5E-06	NA			
Arsenic (3)	NA	***	NA	1.8E-02	NA			
Fluorene (3)	NA	***	NA	1.8E-05	NA			
Naphthalene (3)	NA	***	NA	2.6E-08	NA			
1,1,2-Trichloro-1,2,2-trifluoroethane (3)	NA	***	NA	3.3E-11	NA			
Acenaphthylene	NA	***	NA	***	NA			
delta-BHC	NA	***	NA	***	NA			
Bismuth	NA	***	NA	***	NA			
4-Chloro-3-methylphenol	NA	***	NA	***	NA			
Copper	NA	***	NA	***	NA			
Dibenzofuran	NA	***	NA	***	NA			
Lithium	NA	***	NA	***	NA			
2-Methylnaphthalene	NA	***	NA	***	NA			
Phenanthrene	NA	***	NA	***	NA	Total HI (1) 2.8E-04	Total HI (2) 0	Total HI (3) 1.8E-02
Carcinogens (Risk)								
Aldrin	NA	***	NA	9.2E-09	NA			
Arsenic	NA	***	NA	2.9E-05	NA			
Benzo(a)pyrene	NA	***	NA	1.4E-06	NA			
Benzo(g,h,i)perylene	NA	***	NA	***	NA			
Carbazole	NA	***	NA	***	NA			
alpha-Chlordane	NA	***	NA	2.3E-09	NA			
gamma-Chlordane	NA	***	NA	1.7E-09	NA			
Dibenzo(a,h)anthracene	NA	***	NA	***	NA			
Heptachlor Epoxide	NA	***	NA	3.5E-09	NA	Total Carcinogenic Risks = 3.0E-05		
Lead	NA	***	NA	***	NA			
Total:				3.0E-05				
Radionuclides (Risk)								
Cesium-137 (pCi)	NA	1.1E-12	NA	1.9E-08	6.6E-06			
Plutonium-238 (pCi)	NA	1.1E-09	NA	1.3E-07	4.3E-11			
Plutonium-242 (pCi)	NA	***	NA	***	***	Total Radionuclide Risks = 6.8E-06		
Potassium-40 (pCi)	NA	***	NA	***	***			
Total:		1.1E-09		1.5E-07	6.6E-06			

*** - Toxicity values not available.
NA - Not applicable.

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table Appendix F.23. Characterization of Residual Risks at Release Block H - Site Employee (Groundwater - Current - Total)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee		
Non-carcinogens (HQ)								
1,1-Dichloroethene (1)	NA	NA	1.8E-06	NA	NA			
1,1,1-Trichloroethane (1)	NA	NA	7.3E-05	NA	NA			
Cadmium (2)	NA	NA	3.7E-02	NA	NA			
1,1,2-Trichloro-1,2,2-trifluoroethane (3)	NA	NA	2.8E-06	NA	NA			
Copper	NA	NA	***	NA	NA			
Lead	NA	NA	***	NA	NA	Total HI (1) 7.5E-05	Total HI (2) 3.7E-02	Total HI (3) 2.8E-06
Carcinogens (Risk)								
1,1-Dichloroethene	NA	NA	NA	NA	NA	Total Carcinogenic Risks = NA		
Radionuclides (Risk)								
Actinium-227 (pCi)	NA	NA	1.3E-06	NA	NA			
Bismuth-210 (pCi)	NA	NA	***	NA	NA			
Plutonium-239/240 (pCi)	NA	NA	4.0E-06	NA	NA			
Tritium (pCi)	NA	NA	1.2E-06	NA	NA	Total Radionuclide Risks = 1.2E-05		
Uranium-234 (pCi)	NA	NA	2.2E-06	NA	NA			
Uranium-238 (pCi)	NA	NA	3.2E-06	NA	NA			
Total:			1.2E-05					

*** - Toxicity values not available.
NA - Not applicable.

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

Table Appendix F.24. Characterization of Residual Risks at Release Block H Site Employee (Groundwater - Future - Total)

Constituent	Pathway 3 Groundwtr. Ingestion	Site Employee		
Non-carcinogens (HQ)				
1,1-Dichloroethene (1)	1.8E-06			
1,1,1-Trichloroethane (1)	5.9E-04			
Cadmium (2)	3.7E-02			
Chromium (2)	9.7E-01			
Molybdenum (2)	1.9E-02			
Beryllium (3)	2.0E-04			
1,1,2-Trichloro-1,2,2-trifluoroethane (3)	2.8E-06			
Bismuth	***			
Cobalt	***			
Copper	***			
Lead	***	Total HI (1) 5.9E-04	Total HI (2) 1.0E+00	Total HI (3) 2.0E-04
Carcinogens (Risk)		Total Carcinogenic Risks = 1.5E-06		
Beryllium	1.5E-06			
Total:	1.5E-06			
Radionuclides (Risk)				
Actinium-227 (pCi)	1.3E-06			
Bismuth-210 (pCi)	***			
Plutonium-239/240 (pCi)	4.0E-06			
Tritium (pCi)	2.7E-06	Total Radionuclide Risks = 1.3E-05		
Uranium-234 (pCi)	2.2E-06			
Uranium-238 (pCi)	3.2E-06			
Total:	1.3E-05			

*** - Toxicity values not available.

(1) Noncarcinogenic effects to liver
(2) Noncarcinogenic effects to kidney
(3) Other Noncarcinogenic effects

APPENDIX G

SOIL CONSTITUENTS FOR RELEASE BLOCK H

Header Information for Appendix G table

station -	station identifier
smp_id -	sample identifier
date_col -	date sample collected
s_dep -	starting sample depth (feet)
e_dep -	ending sample depth (feet)
par_name -	parameter name
calc_results -	Result used for calculations, either sample result for detected analyses or ½ the detection limit for non-detected analyses. Also contains averaged results for samples with field or laboratory duplicate
units -	units of measurement
type	type of sample - either grab or screening
qual -	data qualifier
	U - below detection limit
	J - estimated value (considered detectable, may have secondary qualifiers)
	B - detected in associated method blank (for organics) reported value is <CRDL but >IDL (for inorganics)

APPENDIX H

CHROMIUM AND GROUNDWATER -

RELEASE BLOCK H RRE

An assumption has been made here that the chromium detected in the shallow bedrock wells, which in turn enters the underlying Buried Valley Aquifer (BVA), is entirely the Cr^{+6} species. This is a relatively conservative assumption in that chromium found in the environment tends to be the relatively insoluble Cr^{+3}, rather than the more soluble Cr^{+6}. A possible amount of Cr^{+6} as a percent of the total chromium is 1/7, with 6/7 being Cr^{+3}.

Overall incremental Hazard Indexes (HI) and risks, attributable to Mound related activities were calculated with the assumption of all chromium being Cr^{+6}. Assuming the 1/7 ratio to be representative of potential Cr^{+6} detected at the Mound facility, the incremental HI values can be recalculated. The calculations reflect the different toxicity of the Cr^{+3} and the Cr^{+6} species. The oral reference dose (oral RfD), applicable to ingested chromium, for Cr^{+3} is 1.0 mg/kg-da, while the oral RfD for Cr^{+6} is 0.005 mg/kg-da. The resulting recalculated HI values are presented below.

As can be seen from Table H.1, the resulting HI values for the Construction Worker and Pathway 3 associated with exposure to Cr^{+3} and Cr^{+6} were 4.11E-3 and 0.137, respectively. The resulting HI values for the Construction Worker and Pathway 5 (the only other pathway considered) associated with exposure to Cr^{+3} and Cr^{+6} were 2.66E-5 and 8.88E-4, respectively. The resulting HI values for the Site Employee and Pathway 3 (the only pathway considered) associated with exposure to Cr^{+3} and Cr^{+6} were 4.11E-3 and 0.137, respectively.

The recalculated summed HI values across all contaminants and applicable pathways are summarized in Table H.2. As can be seen, the summed hazards decrease from about 1.0 to about 0.18 for each of the two exposure scenarios. If the portion of the total chromium is different than the 1/7 Cr+6 and 6/7 Cr+3 assumed in the calculations in the tables below, the summed HI values would be proportionally different as well. Overall it appears that the assumption used in Section V of this report (100% Cr+6) overestimates the HI values potentially by a factor of about six-fold.

APPENDIX I

CONTAMINANTS IN ASPHALT PARKING LOT RUNOFF
(Research Articles Provided to Terran Corporation by Analytical Innovations, Incorporated)

Contaminants in Asphalt Parking Lot Runoff
Research Articles Provided to Terran Corporation by Analytical Innovations, Incorporated

No literature references have been located to show that runoff water can be contaminated by PAHs that are leached from asphalt. Most of the literature indicates the source of the runoff contamination is oil and metal from cars that use the asphalt roadways and parking areas. The following seven references list PAH, metal and ion concentrations that researchers have measured in runoff and in sediment impacted by runoff.

Cole et al., 1984

- Preliminary summary of U.S. EPA's Nationwide Urban Runoff Program
- Studied urban storm water runoff from low and medium density residential and commercial areas
- Paper lists priority pollutants detected, frequency and concentrations
- Sixteen PAHs listed on page 903 with concentration ranges
- Tables also list metals and other detected in runoff
- 10% or more of samples contained phenanthrene, pyrene, naphthalene and fluoranthene

Hoffman et al., 1985

- Highway storm water runoff analyzed for petroleum hydrocarbons, 14 PAHs and metals
- Unfortunately data for individual PAHs not available in the paper (references a presentation)
- Table on page 357 lists loading factors for the sum of PAHs and Fe, Mn, Cu, Pb, Cd and Zn
- Highway runoff into river contributed over 50% of suspended solids, PAHs Pb and Zn

Latimer et al., 1990

- Studied the following:
  - Products: No. 2 and No. 6 fuel oil, used and virgin crankcase oil and gasoline
  - Sources: street dust, roadside soil, roadside vegetation and atmospheric fallout
  - Areas: commercial (parking lot), residential, highway and industrial
  - Measured: saturated and aromatic hydrocarbons, Cd, Pb, Mn, Cu, Fe and Zn
- virgin crankcase oil did not contain PAHs but used oil contained two to six ring PAHs
- hydrocarbons in commercial, residential, highway and industrial runoff samples had same general chromatographic distributions as used crankcase oil
- PAHs in weathered crankcase oil and urban runoff (Figure 3) were similar: approx. 36% fluoranthene, approx. 38% pyrene and 12 % to 14% benzo(e)pyrene and benzo(a)pyrene
- Figure 4 on page 13 gives PAH distributions; street dust and roadside soil have similar distributions of PAHs for commercial, highway, residential and industrial sites
- Dominant PAHs were phenanthrene, fluoranthene and pyrene
- Table IVB on page 14 lists concentrations for the metals in urban runoff

Bomboi and Hernandez, 1991

- Studied urban areas of Madrid, Principle de Vergara is a commercial zone with parking area
- Figure 4 shows seasonal PAH distributions for areas including P. de Vergara (hard to read)
- Table 2 on page 564 lists PAH concentrations measured in urban runoff
- Authors use PAH ratios to argue that PAHs in runoff are from used crankcase oil that is adsorbed to particulate

Hewitt and Rashed, 1992

- Studied runoff from major rural highway
- Table 1 lists concentrations of Pb, Cd, Cu, organic Pb, PAHs and solids in runoff from storms
- Table 3 lists concentrations of nine PAHs (eight concentrations)
- PAHs are associated with solids, similar PAH distribution in road dust and runoff
- No correlation between length of antecedent dry period and PAH concentration in the runoff was detected so PAHs lost because of volatilization or oxidation

Lutes et al., 1994

- Studied atmospheric emissions from hot paving asphalt (including recycled rubber additive)
- Phenanthrene, pyrene and fluoranthene identified in Soxhlet extract of asphalt
- Concentrations listed for some PAHs in air emissions from asphalt hot-mix facility
- Table 2 lists estimated air emission values for PAHs

Maltby et al., 1995

- Studied highway runoff and effects on water and sediment
- PAH concentration in drainage water ranged from 20 to 64 μg chrysene equivalents/L
- Phenanthrene, pyrene and fluoranthene were highest PAHs in stream sediment, data for PAHs on page 1083
- Fluoranthene and pyrene are important components of crankcase oil and account for 74% of PAHs
- This paper summarizes the used crankcase oil/PAH connection on page 1088
- Zn, Cd, Cr and Pb were highest heavy metals in stream sediment, data for metals on page 1084
- Metal sources: Pb-fuel, Cu-brake linings, Zn and Cd-tires, Cu and Cr-deicing salt

APPENDIX I REFERENCES

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facsimile transmittal

To:	Tim Fischer	**Fax:**	(312) 353-8426
	Brian Nickel		(937) 285-6404
From:	Linda Bauer LRB	**Date:**	04/21/99
Re:	**RB H TPR, Page Changes for**	**Pages:**	7 (including cover)
CC:	A. Kleinrath, D. Rakel, F. Schmaltz		

☐ Urgent ☒ For Review ☐ Please Comment ☒ Please Reply ☐ Please Recycle

Four of the six pages accompanying this fax respond to OEPA comments on the Release Block H TPR. Specifically, Pb-210 analyses were indeed performed and the results are now documented in the revised Table II.1. Since neither a RBGV nor a background value were available for Pb-210, I calculated the risk-based guideline values; those calculations have been reproduced in their entirety and show that Pb-210 screens out. Regarding the other two pages: since a RBGV was needed for Pb-210, I took the opportunity to update the Th-228 RBGVs to reflect the newer external slope factor; those calculations are shown on the final two pages.

Any questions or comments, please call. Unless this response generates additional changes, or unless Tim has comments, I have no further plans to modify the TPR and consider it ready-in-wait for the public review cycle.

Revised Table II.1. Summary Table of All Soil Contaminants Detected in Release Block H

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
Lithium	40.2	19	26			2/2	Yes	Conc. > Bkgd.
Magnesium (total)	54100	39900	40000			11/11	No	Common soil constituent
Manganese (total)	1200	1200	1400	27000[1]	150000[1]	11/11	No	Conc. < G.V. & Bkgd.
Mercury (total)	0.04	0.04		64[1]	610[1]	3/11	No	Conc. < G.V.
Molybdenum	7.7	0.935	27			2/2	No	Conc. < Bkgd.
Nickel (total)	29.5	23.4	32	4300[2]	41000[2]	22/22	No	Conc. < G.V. & Bkgd.
Nitrate	1.32	---				1/1	No	Common soil constituent
Nitrate/Nitrite	9	9	26			6/6	No	Conc. < Bkgd.
Organic Carbon	216670	216670				4/4	No	Common soil constituent
Potassium (total)	3750	1680	1900			11/11	No	Common soil constituent
Silver (total)	8.9	0.56	1.7	1100[2]	10000[2]	4/11	No	Conc. < G.V.
Sodium (total)	2670	2670	240			11/11	No	Common soil constituent
Sulfate	322	322	150			5/6	No	Common soil constituent
Vanadium	30.8	27.9	25	1500[2]	14000[2]	11/11	No	Conc. < G.V.
Zinc (total)	311	311	140	64000[2]	610000[2]	11/11	No	Conc. < G. V.
RADIONUCLIDES (pCi/g)								
Cesium-137	1.9	1.9	0.42	0.46[5]	0.42[5]	9/14	Yes	Conc. > G.V. & Bkgd.
Lead-210	1.42	1.42		1.7[8]	3.2[8]	5/11	No	Conc. < G.V.
Plutonium-238	56	56	0.13	5.5[5]	11[5]	563/573	Yes	Conc. > G.V. & Bkgd.
Plutonium-239/240	0.0328	0.0328	0.18	5.5[5]	10[5]	3/12	No	Conc. < G.V. & Bkgd.
Plutonium-242	0.0143	0.0143				2/5	Yes	F.O.D.[7] = 40%
Potassium-40	45.4	21	37			12/12	Yes	Conc. > Bkgd.
Radium-226	3.15	3.15	2	0.14[5]	0.13[5]	12/14	Yes	Conc. > G.V. & Bkgd.
Strontium-90	0.845	0.384	0.72	3.0[5]	57[5]	2/6	No	Conc. < G.V.
Thorium-228	1.17	0.847	1.5	0.11[5,9]	0.10[5,9]	11/11	No	Conc. < Bkgd.
Thorium-230	1.6	1.6	1.9	44[5]	81[5]	11/11	No	Conc. < Bkgd.
Thorium-232	4.47	2.3	1.4	0.11[5,6]	0.10[5,6]	475/561	Yes	Conc. > G.V. & Bkgd.

Revised Table II.1. Summary Table of All Soil Contaminants Detected in Release Block H

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
Tritium	0.3	---	1.6	23500[5]	45000[5]	1/3	No	Conc. < G.V. & Bkgd.
Uranium-234	1.02	0.851	1.1	37.5[5]	70[5]	10/11	No	Conc. < G.V. & Bkgd.
Uranium-235	0.0659	0.0659	0.11	3.35[5]	3.1[5]	3/11	No	Conc. < G.V. & Bkgd.
Uranium-238	0.962	0.962	1.2	11.0[5]	13.0[5]	10/11	No	Conc. < G.V. & Bkgd.

NOTES: Blanks indicate background or Guideline Value not available. The more restrictive G.V. was used to determine which contaminants were carried through the RRE.

--- No shallow data available.

[1] - Hazard Quotient for both ingestion and inhalation. (Decision made on 0.1 x G.V.)

[2] - Hazard Quotient for ingestion only. (Decision made on 0.1 x G.V.)

[3] - Total Risk 10^{-6} for both ingestion and inhalation.

[4] - Total Risk 10^{-6} for ingestion only.

[5] - Total Risk 10^{-6} for ingestion, inhalation and external.

[6] - Guideline values from thorium-228 + D used to account for Th-228 + D ingrowth.

[7] - F.O.D. = Frequency of detection. Contaminants with a F.O.D. greater than 5% were carried through the RRE.

[8] - Pb-210 guideline value not previously available. G.V. calculations are shown in the Appendix.

[9] - Th-228 guideline values have been revised to reflect updated slope factors. G.V. calculations are shown in the Appendix.

Risk Calculations for Pb-210 Soil Inhalation, Soil Ingestion and External Exposure
For use in establishing risk-based guideline values for Pb-210.
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Pb-210 Soil Concentration

1.7	pCi/g	Construction worker
3.2	pCi/g	Site employee

Pb-210+D Slope Factors

1.01E-09	risk/pCi ingested
3.86E-09	risk/pCi inhaled
1.45E-10	risk/yr/pCi/g

Construction Worker Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	1.7	pCi/g	(CS = concentration in soil)
ED =	5	years	(ED = exposure duration)
EF =	250	days/year	(EF = exposure frequency)
IR =	480	mg/day	(IR = ingestion rate)

Intake = **1.02E+03** pCi

Construction Worker Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	1.7	pCi/g	(CS = concentration in soil)
PEF =	4.28E+09	m^3/kg	(PEF = particulate emission factor)
ED =	5	years	(ED = exposure duration)
EF =	250	days/year	(EF = exposure frequency)
IR =	20	m^3/day	(IR = inhalation rate)

Intake = **9.93E-03** pCi

Construction Worker External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	1.7	pCi/g	
TE =	3.33E-01	TE = gamma shielding factor, dimensionless	
SE =	1.00E-01	SE =gamma exposure time factor, dimensionless	
ED =	5.00E+00	yr	(ED = exposure duration)

Exposure = 2.55E+00 pCi-yr/g

Site Employee Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	3.2	mg/kg (CS = concentration in soil)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)

Intake = **1.00E+03** pCi

Site Employee Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	3.2	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = **9.35E-02** pCi

Site Employee External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	3.2	pCi/g
TE =	8.30E-02	TE = gamma shielding factor, dimensionless
SE =	2.00E-01	SE =gamma exposure time factor, dimensionless
ED =	25	yr (ED = exposure duration)

Exposure = 5.31E+00 pCi-yr/g

Pb-210+D Risk Values
Soil Ingestion, Soil Inhalation, and External Exposure

Risk = Intake * Slope Factor

Construction Worker	Risk
Soil ingestion	1.0E-06
Soil inhalation	3.8E-11
Ext Exp	3.7E-10

Site Employee	Risk
Soil ingestion	1.0E-06
Soil inhalation	3.6E-10
Ext Exp	7.70E-10

Risk Calculations for Th-228 Soil Inhalation, Soil Ingestion and External Exposure
For use in establishing risk-based guideline values for Th-228.

Th-228 Soil Concentration

0.11 pCi/g	Construction worker
0.10 pCi/g	Site employee

Th-228+D Slope Factors

2.31E-10 risk/pCi ingested
9.68E-08 risk/pCi inhaled
6.20E-06 risk/yr/pCi/g

Construction Worker Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	0.11	pCi/g (CS = concentration in soil)
ED =	5	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)

Intake = **6.60E+01** pCi

Construction Worker Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	0.11	pCi/g (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	5	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = **6.43E-04** pCi

Construction Worker External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	0.11	pCi/g
TE =	3.33E-01	TE = gamma shielding factor, dimensionless
SE =	1.00E-01	SE =gamma exposure time factor, dimensionless
ED =	5.00E+00	yr (ED = exposure duration)

Exposure = 1.65E-01 pCi-yr/g

Site Employee Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	0.1	mg/kg (CS = concentration in soil)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)

Intake = **3.13E+01** pCi

Site Employee Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	0.1	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = **2.92E-03** pCi

Site Employee External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	0.1	pCi/g
TE =	8.30E-02	TE = gamma shielding factor, dimensionless
SE =	2.00E-01	SE =gamma exposure time factor, dimensionless
ED =	25	yr (ED = exposure duration)

Exposure = 1.66E-01 pCi-yr/g

Th-228+D Risk Values
Soil Ingestion, Soil Inhalation, and External Exposure

Risk = Intake • Slope Factor

Construction Worker	Risk
Soil ingestion	1.5E-08
Soil inhalation	6.2E-11
Ext Exp	1.0E-06

Site Employee	Risk
Soil ingestion	7.2E-09
Soil inhalation	2.8E-10
Ext Exp	1.0E-06

FINAL DRAFT

TECHNICAL POSITION REPORT IN SUPPORT OF THE RELEASE BLOCK H RESIDUAL RISK EVALUATION

FINAL DRAFT
Rev. 1

MOUND PLANT
MIAMISBURG, OHIO

April 1999

Miamisburg Environmental Management Project
U.S. Department of Energy

Report prepared by
Babcock & Wilcox of Ohio, Inc.
under Contract No. DE-AC24-97OH20044

FINAL DRAFT

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FINAL DRAFT

TECHNICAL POSITION REPORT IN SUPPORT OF THE RELEASE BLOCK H RESIDUAL RISK EVALUATION

1.0 BACKGROUND AND PURPOSE

The original Residual Risk Evaluation (RRE) for Release Block (RB) H was published in August of 1997. Since that time, some of the risk conversion factors for chemicals and radionuclides have changed. Additionally, some errors in the soil and groundwater sections of the RRE have been detected. Also, new soil samples were collected from RB H in February of 1999. As a result, the Mound 2000 Core Team requested a review of the RRE for RB H. This report summarizes the review. The review addressed the following questions:

(1) what hazard and risk conversion factors have changed since the Mound Guideline Values (GVs) were established,
(2) what errors were present in the original RRE,
(3) how do those changes/errors affect the collection of compounds that screened through, or were eliminated from, the RB H hazard and risk calculations, and
(4) what is a reasonable estimate of the overall impact of these changes on the hazard and risk analyses performed for RB H.

2.0 METHODOLOGY

Chronologies of change for the Health Effects Assessment Summary Tables (HEAST) and Integrated Risk Information System (IRIS) data bases were developed. The chronologies document changes to HEAST and IRIS since the Mound Plant GVs were published. As a result of this exercise, previously conducted for RB D, a listing of the changes to risk data for compounds of interest to Mound was generated (Table 2-1).

Updated reference dose and slope factor data were then compared to values used in the RRE to ensure: (1) the appropriate collection of compounds was carried through the RRE process, and (2) the appropriate risk conversion factors (e.g., reference doses, slope factors) were used. This review was conducted first for compounds detected in RB H soil, then for compounds detected, or projected to be present, in the groundwater regimes of the Buried Valley Aquifer and/or the Mound Plant bedrock. The risk data associated with ambient air pathways (inhalation of tritium and isotopes of plutonium) were also reviewed. All results are presented in Section 3.

Table 2-1. IRIS and HEAST Chronologies of Change for Compounds of Interest to the Mound Plant Exit Project.

Chemical	IRIS Updated	Description of Changes
INORGANICS		
Antimony	Feb-91	
Arsenic	Apr-98	No change to RfD, UR for INH established (4.3E-3/ug/m3), INH SF withdrawn, INH UR established (4.3E-3/ug/m3), Oral SF established (1.5E0/mg/kg-d), DW UR established (5E-5/ug/L water)
Barium	Jan-99	Text changes to oral RfD section (numerical value unchanged)
Beryllium	Apr-98	Lowered the RfD (5E-3 -> 2E-3), added an RfC (2E-2ug/m3), replaced INH SF with UR (2.4E-3/ug/m3), withdrew oral SF
Bismuth	X	
Cadmium	Feb-94	
Calcium	X	
Chloride	X	
Chromium (III)	Sep-98	Raised RfD slightly (1.0E0 -> 1.5E0 mg/kg-d), no RfC value
Chromium (VI)	Sep-98	Reduced RfD from 5E-3 -> 3E-3 mg/kg-d, added RfC (8E-6 mg/m3), no SFs
Cobalt	X	
Copper	Aug-91	
Cyanide	Feb-93	
Fluoride		
Iron	X	
Lead	Nov-93	
Lithium	X	
Magnesium	X	
Manganese	Dec-96	No change to RfD, RfC
Mercury	Jun-95	No change to RfC
Molybdenum	Aug-93	
Nickel	Dec-96	No change to RfD
Nitrate	Oct-91	
Nitrate/Nitrite	X	
Phosphate	X	
Potassium	X	
Silicon	X	
Silver	Dec-96	No change to RfD
Sulfate	X	
Thallium	X	
Tin	X	
Vandium (pentoxide)	Dec-96	RfD raised from 7E-3 -> 9E-3 mg/kg-d
Zinc	Oct-92	

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Table 2-1 (continued).

Chemical	IRIS Updated	Description of Changes
ORGANICS		
Acenaphthene	Apr-94	
Acenaphthylene	Jan-91	
Acetone	Aug-93	
Anthracene	Sep-94	
Aroclor-1016	Nov-96	RfD = 7E-5 mg/kg-d
Aroclor-1248	Nov-96	RfD data deemed inadequate
Aroclor-1254	Nov-96	RfD deemed OK
Aroclor-1260	X	
Benzene	Oct-98	Oral SF established (2.9E-2/mg/kg-d), DW UR established (8.3E-7/ug/L water), INH UR established (≤7.8E-6/ug/m3)
Benz(a)anthracene	Sep-94	
Benzo(a)pyrene	Nov-94	
Benzo(b)fluoranthene	Mar-94	
Benzo(g,h,i)perylene	Dec-90	
Benzo(k)fluoranthene	Mar-94	
Benzoic acid	Jul-93	
Bromodichloromethane	Mar-93	
2-Butanone (methyl ethyle ketone)	May-93	
Carbazole	X	
Carbon disulfide	Aug-95	Established RfC (0.7 mg/m3)
Carbon tetrachloride	Jun-91	
Chloroform	Sep-92	
2-Chlorophenol	Jul-93	
Chrysene	Mar-94	
Dibutyl phthalate	Feb-93	
Di-n-octyl phthalate	X	
Dibenz(a,h)anthracene	Mar-94	
Dibenzofuran	May-92	
1,1-Dichloroethane	Dec-96	(no RfC, no RfD)
1,1-Dichloroethene	X	
1,2-Dichloroethene	X	
1,2-cis-Dichloroethene	X	
1,2-trans-Dichloroethene	X	
Dichloromethane	Feb-95	Oral SF = 7.5E-3/mg/kg-d, DW UR = 2.1E-7/ug/L water
Ethylbenzene	Aug-91	
bis(2-ethylhexyl) phthalate	X	
Fluoranthene	Sep-94	
Fluorene	Dec-90	Note: Oral RfD in past RRE documents = 0.4 mg/kg-d Correct oral RfD = 0.04 mg/kg-d

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Table 2-1 (continued).

Chemical	IRIS Updated	Description of Changes
Indeno(1,2,3-cd) pyrene	Mar-94	
Isophorone	Nov-92	
Methoxychlor	Dec-93	
2-Methylnaphthalene	X	
4-Methyl-2-pentanone = MIBK	Aug-93	
4-Methylphenol	Aug-93	
Naphthalene	Sep-98	Oral RfD reduced from 50 -> 0.02 mg/kg-d Carcinogen class changed to C
N-Nitrosodiphenylamine	Jul-93	
Pentachlorophenol	Jul-93	
Phenol	Mar-91	
Pyrene	Sep-94	
Tetrachloroethene	X	
1,1,1-Trichloroethane	Feb-96	Oral RfD withdrawn
Trichloroethene	X	
Trichloroethylene	Jul-94	
Trichlorofluoromethane	Aug-92	
1,1,2-Trichloro-1,2,2-trifluoroethane	Feb-96	RfD = 3E+1mg/kg-d
Toluene	Apr-94	
Xylenes	Mar-91	

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Table 2-1 (continued).

HEAST STATUS

RADIONUCLIDES	Slope Factors Ingestion (risk/pCi)	Inhalation (risk/pCi)	External (risk/yr/pCi/g soil)
Ac-227+D	6.26E-10	7.87E-08	***9.30E-07***
Bi-210	7.29E-12	5.12E-11	N/A
Cs-137+D	3.16E-11	1.91E-11	2.09E-06
H-3	7.15E-14	9.59E-14	N/A
K-40	1.25E-11	7.46E-12	6.11E-07
Pb-210+D	***1.01E-09***	***3.86E-09***	***1.45E-10***
Pu-238	2.95E-10	2.74E-08	1.94E-11
Pu-239/240	3.16E-10	2.78E-08	1.26E-11
Pu-242	3.00E-10	2.64E-08	1.55E-11
Ra-224	1.49E-10	2.25E-09	2.48E-08
Ra-226+D	2.96E-10	2.75E-09	6.74E-06
Ra-228+D	2.48E-10	9.94E-10	3.28E-06
Sr-85	1.40E-12	1.14E-12	1.54E-06
Sr-90	5.59E-11	6.93E-11	N/A
Th-228+D	2.31E-10	9.68E-08	***6.20E-06***
Th-230	3.75E-11	1.72E-08	4.40E-11
Th-232	3.28E-11	1.93E-08	1.97E-11
Th-234	1.93E-11	1.90E-11	3.50E-09
U-233/234	4.48E-11	1.41E-08	3.52E-11
U-235+D	4.70E-11	1.30E-08	2.65E-07
U-238+D	6.20E-11	1.24E-08	***6.57E-08***

Values in bold, italics were not considered during the development of the Guideline Values for Mound.

3.0 RESULTS

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3.1 Soil Data

Based on the review, new risk information for three (3) chemicals of concern detected in RB H soil required evaluation. Additionally, the original RRE erroneously reported that slope factors were not available for two (2) radionuclides: potassium-40 and plutonium-242. Also, radium-226 was screened out from the RRE on the basis of its parent-daughter relationship with thorium-232. However, the Th-232 slope factor does not include decay products. Therefore, supplemental radionuclide risk data were required and are described below. (Note that given the natural occurrence of potassium-40, and the levels of K-40 detected in RB H relative to background, residual risks from this radionuclide are inconsequential and not further evaluated in this report.)

Necessary corrections and changes to the RRE have been made; the calculations and resultant risk or hazard quotient (HQ) values are shown in the Appendix to this report. The changes are also described below. As documented in Tables 3.1a and 3.1b, the Hazard Indices (HIs) and risk values did change appreciably but remain in the acceptable range. In the interest of completeness, revised (relative to the 1997 RRE) Tables II.1, V.1, V.4, F.7, F.10, F.19, and F.22 have also been included in the Appendix to this report. Note that the additional sampling performed in February of 1999 did not impact the RRE. More specifically, the new results did not change the list of compounds that screened through, or were screened out of, the RRE.

3.1.1 Arsenic

The IRIS oral slope factor for arsenic has been reduced from 15 mg/kg-d to 1.5 mg/kg-d. Therefore, the incremental risks from the ingestion of arsenic in soil for the construction worker and site employee were reduced from 1.2×10^{-5} to 1.2×10^{-6} and from 6.0×10^{-6} to 6.0×10^{-7}, respectively. Given the linear nature of the risk calculations, the background and total risks from ingestion of arsenic in soil were also reduced by an order of magnitude. Neither the risks for other pathways, nor the HQs for all pathways, were affected by this change.

3.1.2 α- and γ-Chlordane

In 1998, the oral slope factor for chlordane was reduced from 1.3 to 0.35. Similarly, the oral reference dose was increased from 6.0×10^{-5} to 5.0×10^{-4}. Therefore, the incremental and total risks and HQs from ingestion of chlordane

in soil changed for both forms of chlordane, and for both the construction worker and site employee exposure scenarios. For the construction worker, the incremental/total HQ decreased from 7.8×10^{-4} to 9.4×10^{-5} and from 5.8×10^{-4} to 7.0×10^{-5} for α- and γ-chlordane, respectively. For the construction worker, the incremental/total risks decreased from 4.4×10^{-9} to 1.2×10^{-9} and from 3.2×10^{-9} to 8.7×10^{-10} for α- and γ-chlordane, respectively.

For the site employee, the incremental/total HQ decreased from 8.2×10^{-5} to 9.8×10^{-6} and from 6.0×10^{-5} to 7.2×10^{-6} for α- and γ-chlordane, respectively. For the site employee, the incremental/total risks decreased from 2.3×10^{-9} to 6.1×10^{-10} and from 1.7×10^{-9} to 4.5×10^{-10} for α- and γ-chlordane, respectively.

(Note: Incremental and total risks are numerically equivalent because the background risk is assumed to be zero. This assumption also applies to Sections 3.1.3 and 3.1.4 below.)

3.1.3 Naphthalene

The appropriate oral RfD for naphthalene is 0.02 mg/kg-d (down from 50 mg/kg-d). The HQs for incremental and total soil ingestion were therefore increased from 2.5×10^{-7} to 6.2×10^{-4} and from 2.6×10^{-8} to 6.4×10^{-5}, respectively, for the construction worker and site employee.

3.1.4 Plutonium-242

The RRE reported that HEAST data were not available for Pu-242. However, ingestion, inhalation, and external exposure slope factors are available. Based on the HEAST data, the incremental and total soil risk values for the construction worker are 2.6×10^{-9}, 2.2×10^{-12}, and 3.3×10^{-13} for the ingestion, inhalation, and external exposure pathways, respectively. For the site employee, the incremental and total soil risk values are 1.3×10^{-9}, 1.1×10^{-11}, and 3.7×10^{-13} for the ingestion, inhalation, and external exposure pathways, respectively.

3.1.5 Radium-226

The RRE excluded Ra-226 from analysis based on the parent-daughter relationship with Th-232. However, the Th-232 slope factor does not include

decay products. Based on HEAST data for Ra-226 + D, the incremental soil risk values for the construction worker are 2.0×10^{-7}, 1.8×10^{-11}, and 1.2×10^{-5} for the ingestion, inhalation, and external exposure pathways, respectively. For the site employee, the incremental soil risk values are 1.1×10^{-7}, 9.2×10^{-11}, and 1.3×10^{-5} for the ingestion, inhalation, and external exposure pathways, respectively.

3.2 Groundwater Data

Based on the review of groundwater data conducted during the validation of the RB D RRE, numerous corrections and updates were necessary. Many of the same changes were required for the RB H RRE and are documented below. However, as also shown below, additional corrections, beyond those required for the RB D RRE, were required for the RB H RRE. All groundwater calculations have been reviewed and validated. Tables II.2. and II.3 from the RRE have been revised and appear in the Appendix. The resultant risks shown in Tables 3-1a and 3-1b reflect all necessary corrections and/or updates.

3.2.1 Beryllium

Beryllium was not included in the current groundwater scenario, but was projected to present in future groundwater. The oral RfD for beryllium has been lowered by a factor of 2.5 and the oral slope factor has been withdrawn. These updates would trigger a change in the beryllium HQ for future incremental groundwater ingestion from 2×10^{-4} to 4.9×10^{-4} for both the construction worker and site employee. The updated risk data would also eliminate the carcinogenic risk estimate for beryllium since the slope factor has been withdrawn. Given the magnitude of the contribution to the HQ from beryllium, these changes are not significant.

3.2.2 Chromium

Chromium is present in the bedrock under various areas of the site, but was not included in the current groundwater scenario because the maximum concentration detected was below the guideline value. The chromium is, however, assumed to enter the BVA and be consumed in the future. As such, chromium is a dominant contributor to the future groundwater hazard index.

Since the 1997 RRE, the oral RfD for chromium (VI) was lowered by a factor of 1.7. This update would trigger a change in the chromium (VI) HQ for future

incremental groundwater ingestion from 0.96 to 1.6 for both the construction worker and site employee. Though the increase in the HQ is significant, the possible need to apply institutional controls to restrict future groundwater consumption was recognized via the RB D RRE. Therefore, the conclusions regarding chromium remain valid. However, given that all chromium detected in groundwater is not in the hexavalent state, some consideration should be given to normalizing the chromium HQ to account for the ratio of chromium (VI) to chromium (III). The data needed to determine this ratio will be collected as part of an on-going investigation of chromium sources and their migration patterns. When the investigation is complete, the groundwater RRE will require re-evaluation.

3.2.3 1,1,1-Trichloroethane

The oral RfD for 1,1,1-trichloroethane has been withdrawn. Revisiting the RRE is not recommended.

3.2.4 1,1,1-Trichloro-1,2,2-trifluoroethane

An oral RfD was added for 1,1,1-trichloro-1,2,2-trifluoroethane. Given that the oral RfD is 30 mg/kg-d, the RRE would not be significantly affected. Specifically, the contribution to the HQ for incremental groundwater ingestion for both the construction worker and site employee is 2.8×10^{-6}.

3.2.5 Bismuth-210

Risk calculations for Bi-210 were not performed for the RRE; the RRE indicated slope factors were not available. Bi-210 slope factors are available; however, the "missed risks" were 3.6×10^{-9} and 1.8×10^{-8} for the construction worker and site employee, respectively. These risk increments are not significant.

3.2.6 Strontium-85

Stronium-85 erroneously appears in specific risk tables of the RRE (e.g., V.2, V.3, and V.5). For groundwater, there was a single detect for Sr-85. Based on a single positive result and the short half-life of Sr-85, it was appropriate to screen the radionuclide from the RRE. Therefore, the fact that the tables incorrectly state that toxicity data are not available for Sr-85 is of no consequence to the analysis.

3.2.7 Thorium-228 + Daughters

In the RRE, Th-228 + D was reported as eliminated (i.e., not carried through the RRE) because Th-228 is a decay product of Th-232. However, the Th-232 slope factors do not include daughters, and Th-232 was subsequently screened from the RRE because the 95% UCL concentration was less than background. Additionally, although Th-228 was reportedly screened out of the RRE, Th-228 risk values appear sporadically in tables. For example, Th-228 risk values are included in Table V.5 but not in Table V.2. Because of the inconsistencies encountered in the RRE, all thorium-228 + daughter intake and risk calculations were re-calculated as described below.

Using the maximum concentration of Th-228 detected/projected for current and future BVA, the radionuclide risk values for groundwater ingestion were calculated for this report. For the current use scenario, the overall radionuclide total risk from groundwater ingestion increased from 2.4×10^{-6} to 3.0×10^{-6} (construction worker), and from 1.2×10^{-5} to 1.5×10^{-5} (site employee). For the future use scenario, the total risk from groundwater ingestion of radionuclides would have increased from 2.7×10^{-6} to 3.4×10^{-6} (construction worker), and from 1.3×10^{-5} to 3.2×10^{-5} (site employee).

Though the magnitude of these changes is significant on a relative basis, the overall risks remain in the acceptable range and the conclusions of the RRE remain valid.

3.2.8 Tritium

In the RRE, tritium was not listed in Table V.2, but the "shower inhalation" and "groundwater dermal" risk values for tritium were included and are numerically correct. The "groundwater ingestion" risk value, however, is missing from the table, but is not a significant contributor to risk (1.1×10^{-7}). The corrected risk value appears in Tables 3-1a and 3-1b.

3.2.9 Uranium-234, Uranium-238

Risk data for these radionuclides were omitted from Table V.5 of the RRE. The missed risks were 2.0×10^{-6} and 2.9×10^{-6}, respectively, for U-234 and U-238. The corrected risk values appear in Tables 3-1a and 3-1b.

3.3 Air Data

For purposes of evaluating cumulative residual risk, air pathway data are also reported in each RRE. Per the Residual Risk Evaluation Methodology document, 1994 data collected at the Mound Plant perimeter air sampling stations are used to bound the concentrations and therefore the risks from inhalation of radionuclides present in ambient air. The risk data for tritium (HTO), Pu-238, and Pu-239/240 reported in the RB H RRE were reviewed and found to require no update or changes. It was observed, however, that the site employee risk calculations did not include an adjustment factor to account for the time spent indoors. While this approach is inconsistent with that applied to analogous outdoor pathways, it is conservative in nature.

3.4 Risk Data Summary

The residual risks for RB H, adjusted for updated and corrected data, are shown in Tables 3-1a and 3-1b for the construction worker and site employee, respectively. These data are appropriate for use in documenting the current and cumulative residual risks for Release Block H.

4.0 CONCLUSIONS AND RECOMMENDATIONS

For purposes of evaluating the need for institutional controls, the RB H RRE adequately characterizes the residual risks associated with the release block. However, changes to the risk data in IRIS and HEAST do occur and should be anticipated. IRIS updates are published monthly; HEAST updates occur much less frequently. A mechanism should be developed to ensure such changes are reviewed and adopted as appropriate.

It is also recommended that the changes noted in this report for groundwater-related risks be formally adopted. Since the groundwater risks will be identical for many of the parcels, a stand-alone report documenting the changes may be appropriate. The report should note prominently, though, that each subsequent RRE must be evaluated for parcel-specific leaching concerns that were not included in the site-wide analysis. Given that groundwater from numerous parcels may migrate toward the BVA, this evaluation should apply to any parcel in which new groundwater concerns arise – not just the parcel under consideration for sale.

A final recommendation is that consideration be given to the mechanism to update/re-validate the guideline values. The GV manual is a large document to which a small number of changes need to be made. The appropriate vehicle for documenting and adopting those changes should be identified.

Table 3-1a. Current and Cumulative RB H RRE Data for the Construction Worker.

Construction Worker	Hazard Index (HI) or Risk		
	Incremental	Background	Total
Soil – current			
HI	4.0E-02	1.3E-01	1.7E-01
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	1.7E-05	2.3E-05	4.0E-05
Groundwater – current			
HI	3.7E-02	9.6E-05	3.7E-02
Non-rad risk	N/A	N/A	N/A
Rad risk	2.5E-06	5.1E-07	3.0E-06
Air – current (1994)			
HI	N/A	N/A	N/A
Non-rad risk	N/A	N/A	N/A
Rad risk	2.0E-07	7.7E-09	2.1E-07
Totals – current			
HI	7.7E-02	1.3E-01	2.1E-01
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	2.0E-05	2.3E-05	4.3E-05
Groundwater – future			
HI	1.6E+00	3.1E-02	1.7E+00
Non-rad risk	N/A	N/A	N/A
Rad risk	2.9E-06	5.1E-07	3.4E-06
Totals – cumulative			
HI	1.7E+00	1.6E-01	1.9E+00
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	2.3E-05	2.4E-05	4.7E-05

Notes: N/A = Not applicable.
Data represent RRE calculations prior to the implementation of the remedy.
HI calculated based on assumption that all chromium is Cr(VI). This approach significantly over-estimates the Cr risk as not all chromium present in groundwater is in the hexavalent state.

Table 3-1b. Current and Cumulative RB H RRE Data for the Site Employee.

Site Employee	Hazard Index (HI) or Risk Incremental	Background	Total
Soil – current			
HI	4.0E-03	1.4E-02	1.8E-02
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	1.8E-05	2.4E-05	4.2E-05
Groundwater – current			
HI	3.7E-02	7.6E-05	3.7E-02
Non-rad risk	N/A	N/A	N/A
Rad risk	1.3E-05	2.5E-06	1.5E-05
Air – current (1994)			
HI	N/A	N/A	N/A
Non-rad risk	N/A	N/A	N/A
Rad risk	9.9E-07	3.9E-08	1.0E-06
Totals – current			
HI	4.1E-02	1.4E-02	5.5E-02
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	3.2E-05	2.6E-05	5.8E-05
Groundwater – future			
HI	1.6E+00	3.1E-02	1.6E+00
Non-rad risk	N/A	N/A	N/A
Rad risk	1.4E-05	2.5E-06	1.7E-05
Totals – cumulative			
HI	1.6E+00	4.5E-02	1.7E+00
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	4.6E-05	2.9E-05	7.5E-05

Notes: N/A = Not applicable.
Data represent RRE calculations prior to the implementation of the remedy.
HI calculated based on assumption that all chromium is Cr(VI). This approach significantly over-estimates the Cr risk as not all chromium present in groundwater is in the hexavalent state.

5.0 REFERENCES

1. **Risk-Based Guideline Values**, Mound Plant, Miamisburg, Ohio, Final, Revision 4, Revised by EG&G Mound Applied Technologies, Miamisburg, Ohio, March 1997.

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5. **Health Effects Assessment Summary Tables (HEAST)** and updates to same, U.S. EPA web sites, December 1998.

6. **Mound 2000 Residual Risk Evaluation Methodology, Mound Plant**, U.S. Department of Energy, Miamisburg, Ohio, January 1997.

7. **Technical Position Report in Support of the Release Block D Residual Risk Evaluation**, U.S. Department of Energy, Miamisburg, Ohio, January 1999.

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APPENDIX

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Revised Table II.1. Summary Table of All Soil Contaminants Detected in Release Block H

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
ORGANICS (mg/kg)								
Acenaphthene	0.18	0.18				3/10	Yes	F.O.D.[7] = 30%
Acenaphthylene	0.7	0.7				1/10	Yes	F.O.D.[7] = 10%
Acetone	0.0355	0.0355		21000[2]	200000[2]	2/10	No	Conc. < G.V.
Aldrin	0.0031	0.0031				2 /11	Yes	F.O.D.[7] = 18%
Anthracene	1.25	1.25		64000[2]	610000[2]	2/10	No	Conc. < G.V.
Aroclor-1254	0.0037	0.0037	58	4.3[2]	41[2]	1/11	No	Conc. < G.V. and Bkgd.
Benzene	0.0015	0.0015		32[3]	8.9[3]	1/10	No	Conc. < G.V.
Benzo(a)anthracene	1.4	1.4		4.1[4]	7.8[4]	5/10	No	Conc. < G.V.
Benzo(a)pyrene	1.115	1.115		0.41[4]	0.78[4]	5/10	Yes	Conc. > G.V.
Benzo(b)fluoranthene	0.9125	0.9125		4.1[4]	7.8[4]	5/10	No	Conc < G.V.
Benzo(g,h,i) perylene	1.0625	1.0625				4/10	Yes	F.O.D.[7] = 40%
Benzo(k)fluoranthene	0.915	0.915		41[4]	78[4]	3/10	No	Conc < G.V.
Benzoic acid	0.072	0.072		850000[2]	8200000[2]	1/9	No	Conc. < G.V.
delta-BHC	0.00025	0.00025				1/11	Yes	F.O.D.[7] = 9%
2-Butanone	0.0115	0.0115		9300[1]	9300[1]	1/10	No	Conc. < G.V.
Carbazole	0.5875	0.5875				1/6	Yes	F.O.D.[7] = 17%
alpha Chlordane	0.01	0.01				4/7	Yes	F.O.D.[7] = 57%
gamma Chlordane	0.0074	0.0074				4/7	Yes	F.O.D.[7] = 57%
4-chloro-3-methyl phenol	0.047	0.047				1/10	Yes	F.O.D.[7] = 10%
Chrysene	1.4	1.4		410[4]	780[4]	5/10	No	Conc. < G.V.
Dibenzo(a,h)anthracene	0.78	0.78		0.41[4]	0.78[4]	2/10	Yes	Conc. > G.V.
Dibenzofuran	1.035	1.035				1/10	Yes	F.O.D.[7] = 10%
Dieldrin	0.145	0.145		0.185[3]	0.36[3]	3/11	No	Conc. < G.V.
bis(2-ethylhexyl)phthalate	3.4	0.13		215[4]	410[4]	5/10	No	Conc. < G.V.
Fluoranthene	2.325	2.325		8500[2]	82000[2]	7/10	No	Conc. < G.V.
Fluorene	1.45	1.45				1/10	Yes	F.O.D.[7] = 10%

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Revised Table II.1. Summary Table of All Soil Contaminants Detected in Release Block H

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
Heptachlor epoxide	0.0022	0.0022				2/11	Yes	F.O.D.[7] = 18%
Indeno(1,2,3-cd)pyrene	0.99	0.99		4.1[4]	7.8[4]	5/10	No	Conc. < G.V.
Methylene chloride	0.0065	0.0065		1000[1]	1000[1]	4/10	No	Conc. < G.V.
2-Methylnaphthalene	0.92	0.92				1/10	Yes	F.O.D.[7] = 10%
Napthalene	2.625	2.625				1/10	Yes	F.O.D.[7] = 10%
Phenanthrene	3.75	3.75				5/10	Yes	F.O.D.[7] = 50%
Pyrene	1.975	1.975		6400[2]	61000[2]	6/10	No	Conc. < G.V.
Toluene	0.002	0.002		250[1]	250[1]	1/10	No	Conc. < G.V.
1,1,2-Trichloro-1,2,2-trifluoroethane	0.002	0.002				1/5	Yes	F.O.D.[7] = 20%
Xylenes, total	0.0018	0.0018		430000[2]	4100000[2]	1/10	No	Conc. < G.V.
INORGANICS (mg/kg)								
Aluminum	15900	13500	19000			11/11	No	Conc. < Bkgd.
Antimony	0.235	0.235		85[2]	820[2]	1/8	No	Conc. < G.V.
Arsenic (total)	10.9	10.9	8.6	64[2]	610[2]	11/11	Yes	Conc. > G.V. & Bkgd.
Barium (total)	249	249	180	15000[1]	140000[1]	11/11	No	Conc. < G.V.
Beryllium	0.89	0.89	1.3	0.7[3]	1.3[3]	11/11	No	Conc. < Bkgd.
Bismuth	58.6	58.6				4/7	Yes	F.O.D.[7] = 57%
Cadmium (total)	0.35	0.255	2.1	210[2]	2000[2]	12/22	No	Conc. < Bkgd. & G.V.
Calcium (total)	152000	152000	310000			11/11	No	Conc. < Bkgd.
Chloride	1300	1300	107			6/6	No	Common soil constituent
Chromium (total)	23.9	19.8	20	1100[2]	10000[2]	22/22	No	Conc. < G.V.
Cobalt (total)	12.3	12.3	19			11/11	No	Conc. < Bkgd.
Copper (total)	26.4	22.1	26			11/11	Yes	Conc. > Bkgd.
Cyanide	1.7	1.7		4300[2]	41000[2]	2/11	No	Conc. < G.V.
Fluoride	7.8	7.8	6.7			6/6	No	Common soil constituent
Iron (total)	34700	34700	35000			11/11	No	Conc. < Bkgd.
Lead (total)	163	163	48			22/22	Yes	Conc. > Bkgd.

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Revised Table II.1. Summary Table of All Soil Contaminants Detected in Release Block H

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
Lithium	40.2	19	26			2/2	Yes	Conc. > Bkgd.
Magnesium (total)	54100	39900	40000			11/11	No	Common soil constituent
Manganese (total)	1200	1200	1400	27000[1]	150000[1]	11/11	No	Conc. < G.V. & Bkgd.
Mercury (total)	0.04	0.04		64[1]	610[1]	3/11	No	Conc. < G.V.
Molybdenum	7.7	0.935	27			2/2	No	Conc. < Bkgd.
Nickel (total)	29.5	23.4	32	4300[2]	41000[2]	22/22	No	Conc. < G.V. & Bkgd.
Nitrate	1.32	---				1/1	No	Common soil constituent
Nitrate/Nitrite	9	9	26			6/6	No	Conc. < Bkgd.
Organic Carbon	216670	216670				4/4	No	Common soil constituent
Potassium (total)	3750	1680	1900			11/11	No	Common soil constituent
Silver (total)	8.9	0.56	1.7	1100[2]	10000[2]	4/11	No	Conc. < G.V.
Sodium (total)	2670	2670	240			11/11	No	Common soil constituent
Sulfate	322	322	150			5/6	No	Common soil constituent
Vanadium	30.8	27.9	25	1500[2]	14000[2]	11/11	No	Conc. < G.V.
Zinc (total)	311	311	140	64000[2]	610000[2]	11/11	No	Conc. < G. V.
RADIONUCLIDES (pCi/g)								
Cesium-137	1.9	1.9	0.42	0.46[5]	0.42[5]	9/14	Yes	Conc. > G.V. & Bkgd.
Plutonium-238	56	56	0.13	5.5[5]	11[5]	563/573	Yes	Conc. > G.V. & Bkgd.
Plutonium-239/240	0.0328	0.0328	0.18	5.5[5]	10[5]	3/12	No	Conc. < G.V. & Bkgd.
Plutonium-242	0.0143	0.0143				2/5	Yes	F.O.D.[7] = 40%
Potassium-40	45.4	21	37			12/12	Yes	Conc. > Bkgd.
Radium-226	3.15	3.15	2	0.14[5]	0.13[5]	12/14	Yes	Conc. > G.V. & Bkgd.
Strontium-90	0.845	0.384	0.72	3.0[5]	57[5]	2/6	No	Conc. < G.V.
Thorium-228	1.17	0.847	1.5	0.85[5]	0.83[5]	11/11	No	Conc. < Bkgd.
Thorium-230	1.6	1.6	1.9	44[5]	81[5]	11/11	No	Conc. < Bkgd.
Thorium-232	4.47	2.3	1.4	0.85[5,6]	0.83[5,6]	475/561	Yes	Conc. > G.V. & Bkgd.
Tritium	0.3	---	1.6	23500[5]	45000[5]	1/3	No	Conc. < G.V. & Bkgd.

Revised Table II.1. Summary Table of All Soil Contaminants Detected in Release Block H

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
Uranium-234	1.02	0.851	1.1	37.5[5]	70[5]	10/11	No	Conc. < G.V. & Bkgd.
Uranium-235	0.0659	0.0659	0.11	3.35[5]	3.1[5]	3/11	No	Conc. < G.V. & Bkgd.
Uranium-238	0.962	0.962	1.2	11.0[5]	13.0[5]	10/11	No	Conc. < G.V. & Bkgd.

NOTES: Contaminants with no background or Guideline Value available were left blank.
--- No shallow data available.

[1] - Hazard Quotient for both ingestion and inhalation. (Decision made on 0.1 x G.V.)
[2] - Hazard Quotient for ingestion only. (Decision made on 0.1 x G.V.)
[3] - Total Risk 10^{-6} for both ingestion and inhalation.
[4] - Total Risk 10^{-6} for ingestion only.
[5] - Total Risk 10^{-6} for ingestion, inhalation and external.
[6] - Guideline values from thorium-228 + D.
[7] - F.O.D. = Frequency of detection. Contaminants with a F.O.D. greater than 5% were carried through the RRE.

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Revised Table II.3. Summary Table of All Future Groundwater Contaminants Assumed to be in Production Wells with Input from the Bedrock Aquifer

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
ORGANICS (mg/L)						
Acetone	0.0129		10[1]	10[2]	No	Conc. < G.V.
Benzene	0.0001		0.0087[3]	0.0099[4]	No	Conc. < G.V.
Benzoic acid	0.071		400[1]	410[2]	No	Conc. < G.V.
Bromodichloromethane	0.0037		0.0045[3]	0.0046[4]	No	Conc. < G.V.
2-Butanone	0.0543		53[1]	61[1]	No	Conc. < G.V.
Carbon tetrachloride	0.0000135		0.002[3]	0.0022[4]	No	Conc. < G.V.
Chloroform	0.0022	0.0005	0.024[3]	0.047[4]	No	Conc. < G.V.
1,1-Dichloroethane	0.0035		9.5[1]	10[2]	No	Conc. < G.V.
1,1-Dichloroethene	0.0017				Yes	No screening values
1,2-Dichloroethene	0.0050		2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-cis-Dichloroethene	0.0023	0.0010	2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-trans-Dichloroethene	0.0032		2.0[2]	2.0[2]	No	Conc. < G.V.
Bis (2-ethylhexyl)phthalate	0.0153	0.0084	0.019[3]	0.02[3]	No	Conc. < G.V.
Isophorone	0.0100		0.3[3]	0.3[4]	No	Conc. < G.V.
4-Methylphenol	0.0004		0.48[1]	0.51[2]	No	Conc. < G.V.
Tetrachloroethene	0.0021		0.46[1]	1.0[2]	No	Conc. < G.V.
1,1,1-Trichloroethane	0.0065	0.0007			Yes	Conc. > Bkgd.
Trichloroethene	0.0050		0.024[3]	0.026[4]	No	Conc. < G.V.
Trichlorofluoromethane	0.0025		26[1]	31[2]	No	Conc. < G.V.
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087				Yes	No screening values
Toluene	0.0002		16[1]	20[2]	No	Conc. < G.V.
Xylenes (total)	0.000043		200[2]	200[2]	No	Conc. < G.V.
INORGANICS (mg/L)						
Antimony	0.0008	0.0006	0.041[1]	0.041[2]	No	Conc. < G.V.
Barium	0.0884	0.3102	7.1[1]	7.2[2]	No	Conc. < G.V.

Revised Table II.3. Summary Table of All Future Groundwater Contaminants Assumed to be in Production Wells with Input from the Bedrock Aquifer

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
Beryllium	0.0001		0.000066[3]	0.000067[4]	Yes	Conc. > G.V.
Bismuth	0.0016				Yes	No screening values
Cadmium	0.0077		0.051[1]	0.051[2]	Yes	Conc. > G.V.
Chromium	0.4961	0.0061	0.51[1]	0.51[2]	Yes	Conc. > G.V.
Cobalt	0.0039				Yes	No screening values
Copper	0.5964	0.0012			Yes	Conc. > Bkgd.
Cyanide	0.0001		2.0[1]	2.0[2]	No	Conc. < G.V.
Iron	0.78	4.065			No	Conc. < Bkgd.
Lead (soluble)	0.04	0.0101			Yes	Conc. > Bkgd.
Lithium	0.0036	0.0557			No	Conc. < Bkgd.
Magnesium	43.974	40.428			No	Water quality parameter
Manganese	0.0248	0.2296	0.51[1]	0.51[2]	No	Conc. < G.V.
Molybdenum	0.0096	0.0056			Yes	Conc. > Bkgd.
Nickel	0.1003	0.0350	2.0[1]	2.0[2]	No	Conc. < Bkgd.
Phosphate	0.3664	0.231			No	Water quality parameter
Potassium	6.0034	4.461			No	Water quality parameter
Silver	0.0242		0.51[1]	0.51[2]	No	Conc. < G.V.
Vanadium	0.028	0.0171	0.71[1]	0.72[2]	No	Conc. < G.V.
Zinc	0.0577	0.1196	31[1]	31[2]	No	Conc. < G.V.
RADIONUCLIDES (pCi/L)						
Actinium-227	0.335		1.3[4]	0.26[4]	Yes	Conc. > Site employee G.V.
Bismuth-210	0.39				Yes	No screening values
Plutonium-238	0.0034	0.087	2.7[4]	0.54[4]	No	Conc. < G.V.
Plutonium-239,240	2.0199	0.125	2.5[4]	0.51[4]	Yes	Conc. > Site employee G.V.
Radium-226	0.6402	0.996	2.7[4]	0.54[4]	No	Conc. < Background
Stronium-85	25				No	Short half-life, single detect

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Revised Table II.3. Summary Table of All Future Groundwater Contaminants Assumed to be in Production Wells with Input from the Bedrock Aquifer

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
Strontium-90	0.3121	0.975	14[4]	2.9[4]	No	Conc. < G.V.
Thorium-228	2.17	0.779	3.5[4]	0.69[4]	Yes	Conc. > Site employee G.V.
Thorium-230	2.0645	0.289	21[4]	4.3[4]	No	Conc. < G.V.
Thorium-232	0.1422		24[4,5]	0.69[4,5]	No	Conc. < G.V.
Tritium	10427	1485	11000[4]	2200[4]	Yes	Conc. > Site employee G.V.
Uranium-233	0.0002		18[4]	3.6[4]	No	Conc. < G.V.
Uranium-234	8.14	0.792	18[4]	3.6[4]	Yes	Conc. > Site employee G.V.
Uranium-235	0.0036	0.045	17[4]	3.4[4]	No	Conc. < G.V.
Uranium-235,236	0.0003		17[4]	3.4[4]	No	Conc. < G.V.
Uranium-238	8.25	0.688	13[4]	2.6[4]	Yes	Conc. > Site employee G.V.

[1] - Hazard Quotient for ingestion, dermal and inhalation. (Decision made on 0.1 x G.V.)
[2] - Hazard Quotient for ingestion only. (Decision made on 0.1 x G.V.)
[3] - Total Risk 10^{-6} for ingestion, dermal and inhalation.
[4] - Total Risk 10^{-6} for ingestion only.
[5] - Guideline values from thorium-228 + D.

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Revised Table II.2. Summary Table of All Current Groundwater Contaminants Detected in BVA Production Wells

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
ORGANICS (mg/L)						
Acetone	0.012		10[1]	10[2]	No	Conc. < G.V.
Bromodichloromethane	0.0037		0.0045[3]	0.0046[4]	No	Conc. < G.V.
2-Butanone	0.041		53[1]	61[1]	No	Conc. < G.V.
Chloroform	0.0022	0.0005	0.024[3]	0.047[4]	No	Conc. < G.V.
1,1-Dichloroethane	0.0035		9.5[1]	10[2]	No	Conc. < G.V.
1,1-Dichloroethene	0.0017				Yes	No screening values
1,2-Dichloroethene	0.0047		2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-cis-Dichloroethene	0.0021	0.0010	2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-trans-Dichloroethene	0.003		2.0[2]	2.0[2]	No	Conc. < G.V.
Dichloromethane - Methylene chloride	0.0098		0.038[3]	0.038[4]	No	Conc. < G.V.
Isophorone	0.010		0.3[3]	0.3[4]	No	Conc. < G.V.
Tetrachloroethene	0.002		0.46[1]	1.0[2]	No	Conc. < G.V.
1,1,1-Trichloroethane	0.0018	0.0007			Yes	Conc. > Background
Trichloroethene	0.0046		0.024[3]	0.026[4]	No	Conc. < G.V.
Trichlorofluoromethane	0.0025		26[1]	31[2]	No	Conc. < G.V.
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.0087				Yes	No screening values
INORGANICS (mg/L)						
Alkalinity	335				No	Water quality parameter
Aluminum	0.0737	0.0375			No	Water quality parameter
Ammonia	0.58	0.162			No	Water quality parameter
Barium	0.0884	0.3102	7.1[1]	7.2[1]	No	Conc. < G.V.
Cadmium	0.0077		0.051[1]	0.051[2]	Yes	Conc. > G.V.
Calcium	126	111			No	Water quality parameter
Chloride	133	106			No	Water quality parameter
Chromium (total)	0.0249	0.0061	0.51[1]	0.51[2]	No	Conc. < G.V.
Copper	0.593	0.0012			Yes	Conc. > Bkgd.

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Revised Table II.2. Summary Table of All Current Groundwater Contaminants Detected in BVA Production Wells

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
Dissolved Solids	719	603			No	Water quality parameter
Fluoride	0.18	0.419			No	Water quality parameter
Iron	0.780	4.065			No	Conc. < Background
Lead (soluble)	0.040	0.0101			Yes	Conc. > Background
Magnesium	39.6	40.43			No	Conc. < Background
Manganese	0.0248	0.2296	0.51[1]	0.51[2]	No	Conc. < G.V.
Nitrate/Nitrite	4.9	5.349			No	Conc. < Background
Nitrate	2.55				No	Water quality parameter
Nitrite	0.066				No	Water quality parameter
Nitrogen	0.62	0.324			No	Water quality parameter
Organic Carbon	1.1	1.987			No	Conc. < Background
Phosphate	0.22	0.231			No	Conc. < Background
Potassium	3.8	4.461			No	Conc. < Background
Silver	0.0242		0.51[1]	0.51[2]	No	Conc. < G.V.
Sodium	82.4	62.43			No	Water quality parameter
Sulfate	83.0	142.7			No	Conc. < Background
Suspended Solids	8.0	26.44			No	Conc. < Background
Vanadium	0.0244	0.0171	0.71[1]	0.72[2]	No	Conc. < G.V.
Zinc	0.0577	0.1196	31[1]	31[2]	No	Conc. < G.V.
RADIONUCLIDES (pCi/L)						
Actinium-227	0.335		1.34[4]	0.26[4]	Yes	Conc. > Site employee G.V.
Bismuth-210	0.39				Yes	No screening values
Plutonium-239,240	2.0	0.125	2.5[4]	0.51[4]	Yes	Conc. > Site employee G.V.
Radium-226	0.4	0.996	2.74[4]	0.54[4]	No	Conc. < Background
Stronium-85	25				No	Short half-life, single detect
Strontium-90	0.3	0.975	14[4]	2.9[4]	No	Conc. < G.V.
Thorium-228	2.17	0.779	3.5[4]	0.69[4]	Yes	Conc. > Site employee G.V.

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Revised Table II.2. Summary Table of All Current Groundwater Contaminants Detected in BVA Production Wells

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
Thorium-230	1.99	0.289	21[4]	4.3[4]	No	Conc. < G.V.
Thorium-232	0.1		24[4,5]	0.69[4,5]	No	Conc. < G.V.
Tritium	7200	1485	11000[3]	2200[4]	Yes	Conc. > Site employee G.V.
Uranium-234	8.14	0.792	18[4]	3.6[4]	Yes	Conc. > Site employee G.V.
Uranium-238	8.25	0.688	13[4]	2.6[4]	Yes	Conc. > Site employee G.V.

[1] - Hazard Quotient for ingestion, dermal and inhalation. (Decision made on 0.1 x G.V.)
[2] - Hazard Quotient for ingestion only. (Decision made on 0.1 x G.V.)
[3] - Total Risk 10^{-6} for ingestion, dermal and inhalation.
[4] - Total Risk 10^{-6} for ingestion only.
[5] - Guideline values from thorium-228 + D.

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Revised **Table V.1 Characterization of Residual Risks at Release Block H $_1$ Construction Worker Soil Pathways - Incremental**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)						
Aldrin	NA	***	4.9E-04	NA	1.0E-04	
α-Chlordane	NA	***	9.4E-05	NA	1.6E-04	
γ-Chlordane	NA	***	7.0E-05	NA	1.2E-04	
Heptachlor epoxide	NA	***	7.9E-04	NA	1.7E-04	
Acenaphthene	NA	***	1.4E-05	NA	2.9E-06	
Arsenic	NA	***	3.6E-02	NA	7.5E-04	
Fluorene	NA	***	1.7E-04	NA	3.5E-05	
Naphthalene	NA	***	6.2E-04	NA	5.1E-08	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.1E-10	NA	6.5E-11	
Acenaphthylene	NA	***	***	NA	NA	
δ-BHC	NA	***	***	NA	NA	
Bismuth	NA	***	***	NA	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	NA	
Copper	NA	***	***	NA	NA	
Dibenzofuran	NA	***	***	NA	NA	
Lithium	NA	***	***	NA	NA	
2-Methlynaphthalene	NA	***	***	NA	NA	
Phenanthrene	NA	***	***	NA	NA	Total HI =
Total:			3.8E-02		1.3E-03	4.0E-02
Carcinogens (Risk)						
Aldrin	NA	***	1.8E-08	NA	3.7E-09	
Arsenic	NA	***	1.2E-06	NA	2.4E-07	
Benzo(a)pyrene	NA	***	2.7E-06	NA	5.7E-07	
Benzo(g,h,i)perylene	NA	***	***	NA	***	
Carbazole	NA	***	***	NA	***	
α-Chlordane	NA	***	1.2E-09	NA	9.1E-10	
γ-Chlordane	NA	***	8.7E-10	NA	6.7E-10	
Dibenzo(a,h)anthracene	NA	***	***	NA	***	
Heptachlor epoxide	NA	***	6.7E-09	NA	1.4E-09	Total Carcinogenic
Lead	NA	***	***	NA	***	Risk =
Total:			3.9E-06		8.2E-07	4.7E-06
Radionuclides (Risk)						
Cesium-137	NA	1.6E-13	2.8E-08	4.7E-06	NA	
Plutonium-238	NA	1.8E-10	2.0E-07	3.2E-11	NA	Total Radionuclide
Plutonium-242	NA	2.2E-12	2.6E-09	3.3E-13	NA	Risk =
Radium-226	NA	1.8E-11	2.0E-07	1.2E-05	NA	
Total:		2.0E-10	4.3E-07	1.7E-05		1.7E-05

*** - Toxicity values not available.

NA - Not applicable.

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Revised **Table V.4 Characterization of Residual Risks at Release Block H - Site Employee Soil Pathways - Incremental**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)					
Aldrin	NA	***	5.1E-05	NA	
α-Chlordane	NA	***	9.8E-06	NA	
γ-Chlordane	NA	***	7.2E-06	NA	
Heptachlor epoxide	NA	***	8.3E-05	NA	
Acenaphthene	NA	***	1.5E-06	NA	
Arsenic	NA	***	3.8E-03	NA	
Fluorene	NA	***	1.8E-05	NA	
Naphthalene	NA	***	6.4E-05	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.3E-11	NA	
Acenaphthylene	NA	***	***	NA	
δ-BHC	NA	***	***	NA	
Bismuth	NA	***	***	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	
Copper	NA	***	***	NA	
Dibenzofuran	NA	***	***	NA	
Lithium	NA	***	***	NA	
2-Methlynaphthalene	NA	***	***	NA	
Phenanthrene	NA	***	***	NA	Total HI =
Total:			4.0E-03		4.0E-03
Carcinogens (Risk)					
Aldrin	NA	***	9.2E-09	NA	
Arsenic	NA	***	6.0E-07	NA	
Benzo(a)pyrene	NA	***	1.4E-06	NA	
Benzo(g,h,i)perylene	NA	***	***	NA	
Carbazole	NA	***	***	NA	
α-Chlordane	NA	***	6.1E-10	NA	
γ-Chlordane	NA	***	4.5E-10	NA	
Dibenzo(a,h)anthracene	NA	***	***	NA	
Heptachlor epoxide	NA	***	3.5E-09	NA	Total Carcinogenic
Lead	NA	***	***	NA	Risk =
Total:			2.0E-06		2.0E-06
Radionuclides (Risk)					
Cesium-137	NA	8.2E-13	1.5E-08	5.2E-06	
Plutonium-238	NA	9.0E-10	1.1E-07	3.9E-11	Total Radionuclide
Plutonium-242	NA	1.1E-11	1.3E-09	3.7E-13	Risk =
Radium-226	NA	9.2E-11	1.1E-07	1.3E-05	
Total:		1.0E-09	2.4E-07	1.8E-05	1.8E-05

*** - Toxicity values not available.

NA - Not applicable.

FINAL DRAFT

Revised **Table F.7 Characterization of Residual Risks at Release Block H - Construction Worker Soil Pathways - Background**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)						
Arsenic	NA	***	1.3E-01	NA	2.8E-03	
Acenaphthalene	NA	***	0.0E+00	NA	0.0E+00	
Acenapthlyene	NA	***	***	NA	***	
Aldrin	NA	***	0.0E+00	NA	0.0E+00	
δ-BHC	NA	***	***	NA	***	
Bismuth	NA	***	***	NA	***	
α-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
γ-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
4-Chloro-3-methylphenol	NA	***	***	NA	***	
Copper	NA	***	***	NA	***	
Dibenzofuran	NA	***	***	NA	***	
Fluorene	NA	***	0.0E+00	NA	0.0E+00	
Heptachlor epoxide	NA	***	0.0E+00	NA	0.0E+00	
Lithium	NA	***	***	NA	***	
2-Methlynaphthalene	NA	***	***	NA	***	
Naphthalene	NA	***	0.0E+00	NA	0.0E+00	
Phenanthrene	NA	***	***	NA	***	
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	***	0.0E+00	NA	0.0E+00	Total HI =
Total:			1.3E-01		2.8E-03	1.3E-01
Carcinogens (Risk)						
Aldrin	NA	***	0.0E+00	NA	0.0E+00	
Arsenic	NA	***	4.3E-06	NA	9.0E-07	
Benzo(a)pyrene	NA	***	0.0E+00	NA	0.0E+00	
Benzo(g,h,i)perylene	NA	***	***	NA	***	
Carbazole	NA	***	***	NA	***	
α-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
γ-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
Dibenzo(a,h)anthracene	NA	***	***	NA	***	
Heptachlor epoxide	NA	***	0.0E+00	NA	0.0E+00	Total Carcinogenic
Lead	NA	***	***	NA	***	Risk =
Total:			4.3E-06		9.0E-07	5.2E-06
Radionuclides (Risk)						
Cesium-137	NA	4.7E-14	8.1E-09	1.3E-06	NA	
Plutonium-238	NA	2.1E-11	2.3E-08	3.7E-12	NA	Total Radionuclide
Plutonium-242	NA	NA	NA	NA	NA	Risk =
Radium-226	NA	3.1E-11	3.5E-07	2.1E-05	NA	
Total:		5.2E-11	3.8E-07	2.2E-05		2.3E-05

*** - Toxicity values not available.

NA - Not applicable.

FINAL DRAFT

Revised **Table F.10 Characterization of Residual Risks at Release Block HI - Site Employee Soil Pathways - Background**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)					
Arsenic	NA	***	1.4E-02	NA	
Acenaphthalene	NA	***	0.0E+00	NA	
Acenapthlyene	NA	***	***	NA	
Aldrin	NA	***	0.0E+00	NA	
δ-BHC	NA	***	***	NA	
Bismuth	NA	***	***	NA	
α-Chlordane	NA	***	0.0E+00	NA	
γ-Chlordane	NA	***	0.0E+00	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	
Copper	NA	***	***	NA	
Dibenzofuran	NA	***	***	NA	
Fluorene	NA	***	0.0E+00	NA	
Heptachlor epoxide	NA	***	0.0E+00	NA	
Lithium	NA	***	***	NA	
2-Methlynaphthalene	NA	***	***	NA	
Naphthalene	NA	***	0.0E+00	NA	
Phenanthrene	NA	***	***	NA	
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	***	0.0E+00	NA	Total HI =
Total:			1.4E-02		1.4E-02
Carcinogens (Risk)					
Aldrin	NA	***	0.0E+00	NA	
Arsenic	NA	***	2.3E-06	NA	
Benzo(a)pyrene	NA	***	0.0E+00	NA	
Benzo(g,h,i)perylene	NA	***	***	NA	
Carbazole	NA	***	***	NA	
α-Chlordane	NA	***	0.0E+00	NA	
γ-Chlordane	NA	***	0.0E+00	NA	
Dibenzo(a,h)anthracene	NA	***	***	NA	
Heptachlor epoxide	NA	***	0.0E+00	NA	Total Carcinogenic
Lead	NA	***	***	NA	Risk =
Total:			2.3E-06		2.3E-06
Radionuclides (Risk)					
Cesium-137	NA	2.3E-13	4.2E-09	1.5E-06	
Plutonium-238	NA	1.0E-10	1.2E-08	4.1E-12	Total Radionuclide
Plutonium-242	NA	NA	NA	NA	Risk =
Radium-226	NA	1.6E-10	1.9E-07	2.2E-05	
Total:		2.6E-10	2.1E-07	2.4E-05	2.4E-05

*** - Toxicity values not available.

NA - Not applicable.

FINAL DRAFT

Revised **Table F.19 Characterization of Residual Risks at Release Block H - Construction Worker Soil Pathways - Total**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)						
Aldrin	NA	***	4.9E-04	NA	1.0E-04	
α-Chlordane	NA	***	9.4E-05	NA	1.6E-04	
γ-Chlordane	NA	***	7.0E-05	NA	1.2E-04	
Heptachlor epoxide	NA	***	7.9E-04	NA	1.7E-04	
Acenaphthene	NA	***	1.4E-05	NA	2.9E-06	
Arsenic	NA	***	1.7E-01	NA	3.6E-03	
Fluorene	NA	***	1.7E-04	NA	3.5E-05	
Naphthalene	NA	***	6.2E-04	NA	5.1E-08	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.1E-10	NA	6.5E-11	
Acenaphthylene	NA	***	***	NA	NA	
δ-BHC	NA	***	***	NA	NA	
Bismuth	NA	***	***	NA	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	NA	
Copper	NA	***	***	NA	NA	
Dibenzofuran	NA	***	***	NA	NA	
Lithium	NA	***	***	NA	NA	
2-Methlynaphthalene	NA	***	***	NA	NA	
Phenanthrene	NA	***	***	NA	NA	Total HI =
Total:			1.7E-01		4.2E-03	1.7E-01
Carcinogens (Risk)						
Aldrin	NA	***	1.8E-08	NA	3.7E-09	
Arsenic	NA	***	5.5E-06	NA	1.1E-06	
Benzo(a)pyrene	NA	***	2.7E-06	NA	5.7E-07	
Benzo(g,h,i)perylene	NA	***	***	NA	***	
Carbazole	NA	***	***	NA	***	
α-Chlordane	NA	***	1.2E-09	NA	9.1E-10	
γ-Chlordane	NA	***	8.7E-10	NA	6.7E-10	
Dibenzo(a,h)anthracene	NA	***	***	NA	***	
Heptachlor epoxide	NA	***	6.7E-09	NA	1.4E-09	Total Carcinogenic
Lead	NA	***	***	NA	***	Risk =
Total:			8.2E-06		1.7E-06	9.9E-06
Radionuclides (Risk)						
Cesium-137	NA	2.1E-13	3.6E-08	6.0E-06	NA	
Plutonium-238	NA	2.0E-10	2.3E-07	3.6E-11	NA	Total Radionuclide
Plutonium-242	NA	2.2E-12	2.6E-09	3.3E-13	NA	Risk =
Radium-226	NA	4.9E-11	5.5E-07	3.3E-05	NA	
Total:		2.5E-10	8.2E-07	3.9E-05		4.0E-05

*** - Toxicity values not available.

NA - Not applicable.

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Revised **Table F22. Characterization of Residual Risks at Release Block H_t - Site Employee Soil Pathways - Total**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)					
Aldrin	NA	***	5.1E-05	NA	
α-Chlordane	NA	***	9.8E-06	NA	
γ-Chlordane	NA	***	7.2E-06	NA	
Heptachlor epoxide	NA	***	8.3E-05	NA	
Acenaphthene	NA	***	1.5E-06	NA	
Arsenic	NA	***	1.8E-02	NA	
Fluorene	NA	***	1.8E-05	NA	
Naphthalene	NA	***	6.4E-05	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.3E-11	NA	
Acenaphthylene	NA	***	***	NA	
δ-BHC	NA	***	***	NA	
Bismuth	NA	***	***	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	
Copper	NA	***	***	NA	
Dibenzofuran	NA	***	***	NA	
Lithium	NA	***	***	NA	
2-Methlynaphthalene	NA	***	***	NA	
Phenanthrene	NA	***	***	NA	Total HI =
Total:			1.8E-02		1.8E-02
Carcinogens (Risk)					
Aldrin	NA	***	9.2E-09	NA	
Arsenic	NA	***	2.9E-06	NA	
Benzo(a)pyrene	NA	***	1.4E-06	NA	
Benzo(g,h,i)perylene	NA	***	***	NA	
Carbazole	NA	***	***	NA	
α-Chlordane	NA	***	6.1E-10	NA	
γ-Chlordane	NA	***	4.5E-10	NA	
Dibenzo(a,h)anthracene	NA	***	***	NA	
Heptachlor epoxide	NA	***	3.5E-09	NA	Total Carcinogenic
Lead	NA	***	***	NA	Risk =
Total:			4.3E-06		4.3E-06
Radionuclides (Risk)					
Cesium-137	NA	1.1E-12	1.9E-08	6.6E-06	
Plutonium-238	NA	1.1E-09	1.3E-07	4.3E-11	Total Radionuclide
Plutonium-242	NA	1.1E-11	1.3E-09	3.7E-13	Risk =
Radium-226+D	N/A	2.5E-10	3.0E-07	3.5E-05	
Total:		1.4E-09	4.5E-07	4.2E-05	4.2E-05

*** - Toxicity values not available.

NA - Not applicable.

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Release Block H
Risk and HI Calculations for Arsenic Soil Inhalation and Ingestion
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental Soil Concentration
2.3 mg/kg Construction Worker/Site Employee

Oral Slope Factor
1.5E+00 mg/kg-d

Oral Reference Dose
3.0E-04 mg/kg-d

Construction Worker Intake, Carcinogenic

Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	480	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **7.72E-07** mg/kg-d

Construction Worker Intake, Non-Carcinogenic

Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.08E-05** mg/kg-d

Site Employee Intakes, Carcinogenic

Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	25	years (ED = exposure duration)
IR =	50	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **4.02E-07** mg/kg-d

Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.13E-06** mg/kg-d

Arsenic Risk and Hazard Index (HI) Values
Soil Ingestion and Inhalation

Risk = Intake * Slope Factor
HI = Intake/Reference Dose

Construction Worker	Risk	HI
Soil ingestion	1.2E-06	3.6E-02
Soil inhalation	N/A	N/A

Site Employee	Risk	HI
Soil ingestion	6.0E-07	3.8E-03
Soil inhalation	N/A	N/A

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Release Block H
Risk and HI Calculations for α- and γ-Chlordane Soil Inhalation and Ingestion
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental and Total Soil Concentrations

0.01 mg/kg	α-chlordane: Construction Worker/Site Employee
0.0074 mg/kg	γ-chlordane: Construction Worker/Site Employee

Oral Slope Factor
3.5E-01 mg/kg-d

Oral Reference Dose
5.0E-04 mg/kg-d

Construction Worker Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	480	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **3.35E-09** mg/kg-d

γ-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	480	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **2.48E-09** mg/kg-d

Construction Worker Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **4.70E-08** mg/kg-d

γ-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **3.48E-08** mg/kg-d

Construction Worker Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	20	m^3/day (IR = inhalation rate)
BW =	70	kilograms (BW = body weight)
AT =	70	years (AT = averaging time)

Intake = **3.27E-14** mg/kg-d

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γ-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	20	m^3/day (IR = inhalation rate)
BW =	70	kilograms (BW = body weight)
AT =	70	years (AT = averaging time)

Intake = **2.42E-14** mg/kg-d

Construction Worker Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
IR =	20	m^3/day (IR = inhalation rate)
EF =	250	days/year (EF = exposure frequency)
BW =	70	kilograms (BW = body weight)

Intake = **4.57E-13** mg/kg-d

γ-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
IR =	20	m^3/day (IR = inhalation rate)
EF =	250	days/year (EF = exposure frequency)
BW =	70	kilograms (BW = body weight)

Intake = **3.38E-13** mg/kg-d

Site Employee Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	25	years (ED = exposure duration)
IR =	50	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **1.75E-09** mg/kg-d

γ-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	25	years (ED = exposure duration)
IR =	50	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **1.29E-09** mg/kg-d

Site Employee Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **4.89E-09** mg/kg-d

γ-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

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CS = 0.0074 mg/kg (CS = concentration in soil)
EF = 250 days/year (EF = exposure frequency)
IR = 50 mg/day (IR = ingestion rate)
BW = 70 kilograms (BW = body weight)

Intake = 3.62E-09 mg/kg-d

Site Employee Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)
CS = 0.01 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
EF = 250 days/year (EF = exposure frequency)
ED = 25 years (ED = exposure duration)
IR = 20 m^3/day (IR = inhalation rate)
BW = 70 kilograms (BW = body weight)
AT = 70 years (AT = averaging time)

Intake = 1.63E-13 mg/kg-d

γ-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)
CS = 0.0074 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
EF = 250 days/year (EF = exposure frequency)
ED = 25 years (ED = exposure duration)
IR = 20 m^3/day (IR = inhalation rate)
BW = 70 kilograms (BW = body weight)
AT = 70 years (AT = averaging time)

Intake = 1.21E-13 mg/kg-d

Construction Worker Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)
CS = 0.01 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
IR = 20 m^3/day (IR = inhalation rate)
EF = 250 days/year (EF = exposure frequency)
BW = 70 kilograms (BW = body weight)

Intake = 4.57E-13 mg/kg-d

γ-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)
CS = 0.0074 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
IR = 20 m^3/day (IR = inhalation rate)
EF = 250 days/year (EF = exposure frequency)
BW = 70 kilograms (BW = body weight)

Intake = 3.38E-13 mg/kg-d

Chlordane Risk and Hazard Index (HI) Values
Soil Ingestion and Inhalation

Risk = Intake * Slope Factor
HI = Intake/Reference Dose

	α-Chlordane		γ-Chlordane	
Construction Worker	Risk	HI	Risk	HI
Soil ingestion	1.2E-09	9.4E-05	8.7E-10	7.0E-05
Soil inhalation	N/A	N/A	N/A	N/A

	α-Chlordane		γ-Chlordane	
Site Employee	Risk	HI	Risk	HI
Soil ingestion	6.1E-10	9.8E-06	4.5E-10	7.2E-06
Soil inhalation	N/A	N/A	N/A	N/A

FINAL DRAFT

Release Block H
HI Calculations for Naphthalene Soil Ingestion
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental and Total Soil Concentrations
2.625 mg/kg Construction Worker/Site Employee

Oral Reference Dose
2.0E-02 mg/kg-d

Construction Worker Intake, Non-Carcinogenic

Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.625	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.23E-05** mg/kg-d

Site Employee Intake, Non-Carcinogenic

Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.625	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.28E-06** mg/kg-d

Naphthalene Hazard Index (HI) Values
Soil Ingestion

HI = Intake/Reference Dose

Construction Worker	Risk	HI
Soil ingestion	N/A	6.2E-04
Soil inhalation	N/A	N/A

Site Employee	Risk	HI
Soil ingestion	N/A	6.4E-05
Soil inhalation	N/A	N/A

FINAL DRAFT

Release Block H
Risk Calculations for Pu-242 Soil Inhalation, Soil Ingestion and External Exposure
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental and Total Soil Concentrations
0.0143 pCi/g — Construction Worker/Site Employee

Slope Factors
3.00E-10 risk/pCi ingested
2.64E-08 risk/pCi inhaled
1.55E-11 risk/yr/pCi/g

Construction Worker Ingestion

Intake, pCi = CS*ED*EF*0.001*IR
CS = 0.0143 pCi/g (CS = concentration in soil)
ED = 5 years (ED = exposure duration)
EF = 250 days/year (EF = exposure frequency)
IR = 480 mg/day (IR = ingestion rate)

Intake = 8.58E+00 pCi

Construction Worker Inhalation
Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR
CS = 0.0143 pCi/g (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
ED = 5 years (ED = exposure duration)
EF = 250 days/year (EF = exposure frequency)
IR = 20 m^3/day (IR = inhalation rate)

Intake = 8.35E-05 pCi

Construction Worker External Exposure
Exposure = CS*TE*(1-SE)*ED
CS = 1.43E-02 pCi/g
TE = 3.33E-01 TE = gamma shielding factor, dimensionless
SE = 1.00E-01 SE =gamma exposure time factor, dimensionless
ED = 5.00E+00 yr (ED = exposure duration)

Exposure = 2.14E-02 pCi-yr/g

Site Employee Ingestion
Intake, pCi = CS*ED*EF*0.001*IR
CS = 0.0143 mg/kg (CS = concentration in soil)
ED = 25 years (ED = exposure duration)
EF = 250 days/year (EF = exposure frequency)
IR = 50 mg/day (IR = ingestion rate)

Intake = 4.47E+00 pCi

Site Employee Inhalation
Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR
CS = 0.0143 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
ED = 25 years (ED = exposure duration)
EF = 250 days/year (EF = exposure frequency)
IR = 20 m^3/day (IR = inhalation rate)

Intake = 4.18E-04 pCi

Site Employee External Exposure
Exposure = CS*TE*(1-SE)*ED
CS = 1.43E-02 pCi/g
TE = 8.30E-02 TE = gamma shielding factor, dimensionless
SE = 2.00E-01 SE =gamma exposure time factor, dimensionless
ED = 25 yr (ED = exposure duration)

Exposure = 2.37E-02 pCi-yr/g

Pu-242 Risk Values
Soil Ingestion, Soil Inhalation, and External Exposure

Risk = Intake * Slope Factor

Construction Worker	Risk
Soil ingestion	2.6E-09
Soil inhalation	2.2E-12
Ext Exp	3.3E-13

Site Employee	Risk
Soil ingestion	1.3E-09
Soil inhalation	1.1E-11
Ext Exp	3.68E-13

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Release Block H
Risk Calculations for Ra-226 Soil Inhalation, Soil Ingestion and External Exposure
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental Soil Concentration
1.15 pCi/g Construction Worker/Site Employee

Slope Factors
2.96E-10 risk/pCi ingested
2.75E-09 risk/pCi inhaled
6.74E-06 risk/yr/pCi/g

Construction Worker Ingestion

Intake, pCi = CS*ED*EF*0.001*IR
CS = 1.15 pCi/g (CS = concentration in soil)
ED = 5 years (ED = exposure duration)
EF = 250 days/year (EF = exposure frequency)
IR = 480 mg/day (IR = ingestion rate)

Intake = 6.90E+02 pCi

Construction Worker Inhalation
Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR
CS = 1.15 pCi/g (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
ED = 5 years (ED = exposure duration)
EF = 250 days/year (EF = exposure frequency)
IR = 20 m^3/day (IR = inhalation rate)

Intake = 6.72E-03 pCi

Construction Worker External Exposure
Exposure = CS*TE*(1-SE)*ED
CS = 1.15E+00 pCi/g
TE = 3.33E-01 TE = gamma shielding factor, dimensionless
SE = 1.00E-01 SE =gamma exposure time factor, dimensionless
ED = 5.00E+00 yr (ED = exposure duration)

Exposure = 1.72E+00 pCi-yr/g

Site Employee Ingestion
Intake, pCi = CS*ED*EF*0.001*IR
CS = 1.15 mg/kg (CS = concentration in soil)
ED = 25 years (ED = exposure duration)
EF = 250 days/year (EF = exposure frequency)
IR = 50 mg/day (IR = ingestion rate)

Intake = 3.59E+02 pCi

Site Employee Inhalation
Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR
CS = 1.15 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
ED = 25 years (ED = exposure duration)
EF = 250 days/year (EF = exposure frequency)
IR = 20 m^3/day (IR = inhalation rate)

Intake = 3.36E-02 pCi

Site Employee External Exposure
Exposure = CS*TE*(1-SE)*ED
CS = 1.15E+00 pCi/g
TE = 8.30E-02 TE = gamma shielding factor, dimensionless
SE = 2.00E-01 SE =gamma exposure time factor, dimensionless
ED = 25 yr (ED = exposure duration)

Exposure = 1.91E+00 pCi-yr/g

Ra-226 Risk Values
Soil Ingestion, Soil Inhalation, and External Exposure

Risk = Intake * Slope Factor

Construction Worker	Risk
Soil ingestion	2.0E-07
Soil inhalation	1.8E-11
Ext Exp	1.2E-05

Site Employee	Risk
Soil ingestion	1.1E-07
Soil inhalation	9.2E-11
Ext Exp	1.29E-05

FINAL DRAFT

Table 3-1a. Current and Cumulative RB H RRE Data for the Construction Worker.

Construction Worker	Hazard Index (HI) or Risk		
	Incremental	Background	Total
Soil – current			
HI	4.0E-02	1.3E-01	1.7E-01
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	1.7E-05	2.3E-05	4.0E-05
Groundwater – current			
HI	3.7E-02	9.6E-05	3.7E-02
Non-rad risk	N/A	N/A	N/A
Rad risk	2.5E-06	5.1E-07	3.0E-06
Air – current (1994)			
HI	N/A	N/A	N/A
Non-rad risk	N/A	N/A	N/A
Rad risk	2.0E-07	7.7E-09	2.1E-07
Totals – current			
HI	7.7E-02	1.3E-01	2.1E-01
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	2.0E-05	2.3E-05	4.3E-05
Groundwater – future			
HI	1.6E+00	3.1E-02	1.7E+00
Non-rad risk	N/A	N/A	N/A
Rad risk	2.9E-06	5.1E-07	3.4E-06
Totals – cumulative			
HI	1.7E+00	1.6E-01	1.9E+00
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	2.3E-05	2.4E-05	4.7E-05

Notes: N/A = Not applicable.
Data represent RRE calculations prior to the implementation of the remedy.
HI calculated based on assumption that all chromium is Cr(VI). This approach significantly over-estimates the Cr risk as not all chromium present in groundwater is in the hexavalent state.

Table 3-1b. Current and Cumulative RB H RRE Data for the Site Employee.

Site Employee	Hazard Index (HI) or Risk Incremental	Background	Total
Soil – current			
HI	4.0E-03	1.4E-02	1.8E-02
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	1.8E-05	2.4E-05	4.2E-05
Groundwater – current			
HI	3.7E-02	7.6E-05	3.7E-02
Non-rad risk	N/A	N/A	N/A
Rad risk	1.3E-05	2.5E-06	1.5E-05
Air – current (1994)			
HI	N/A	N/A	N/A
Non-rad risk	N/A	N/A	N/A
Rad risk	9.9E-07	3.9E-08	1.0E-06
Totals – current			
HI	4.1E-02	1.4E-02	5.5E-02
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	3.2E-05	2.6E-05	5.8E-05
Groundwater – future			
HI	1.6E+00	3.1E-02	1.6E+00
Non-rad risk	N/A	N/A	N/A
Rad risk	1.4E-05	2.5E-06	1.7E-05
Totals – cumulative			
HI	1.6E+00	4.5E-02	1.7E+00
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	4.6E-05	2.9E-05	7.5E-05

Notes: N/A = Not applicable.
Data represent RRE calculations prior to the implementation of the remedy.
HI calculated based on assumption that all chromium is Cr(VI). This approach significantly over-estimates the Cr risk as not all chromium present in groundwater is in the hexavalent state.

D. RAKEC

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-045/99
February 23, 1999

99-TC/02-23

Mr. Richard B. Provencher, Director
Miamisburg Environmental Management Project
U.S. Department of Energy
P.O. Box 3020
Miamisburg, Ohio 45343-3020

SUBJECT: **Contract No. DE-AC24-97OH20044**
RELEASE BLOCK H TPR

ATTENTION: Mr. Frank Schmaltz

Dear Mr. Provencher:

Enclosed please find a copy of the Technical Position Report (TPR) for the Release Block H Residual Risk Evaluation (RRE). The TPR has been developed based on the assumption that the chromium trench sampling activities near GH Building will not impact the RRE. Should that assumption prove false, the TPR will require revision.

The TPR has been approved for release to the Core Team by Frank Schmaltz of your staff. Should you or members of your staff have any questions regarding the enclosure, please contact me at extension 3057.

Sincerely,

Linda R. Bauer, Ph.D.
Environmental Safeguards and Compliance Manager

Enclosure (1)

cc: A. Kleinrath, MEMP (with attachment)
T. Fischer, US EPA (with attachment)
B. Nickel, OEPA (with attachment)
DCC (without attachment)

TECHNICAL POSITION REPORT IN SUPPORT OF THE RELEASE BLOCK H RESIDUAL RISK EVALUATION

CORE TEAM REVIEW DRAFT
Rev. 0

MOUND PLANT
MIAMISBURG, OHIO

February 1999

Miamisburg Environmental Management Project
U.S. Department of Energy

Report prepared by
Babcock & Wilcox of Ohio, Inc.
under Contract No. DE-AC24-97OH20044

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TECHNICAL POSITION REPORT IN SUPPORT OF THE RELEASE BLOCK H RESIDUAL RISK EVALUATION

1.0 BACKGROUND AND PURPOSE

The original Residual Risk Evaluation (RRE) for Release Block (RB) H was published in August of 1997. Since that time, some of the risk conversion factors for chemicals and radionuclides have changed. Additionally, some errors in the groundwater section of the RRE have been detected. As a result, the Mound 2000 Core Team requested a review of the RRE for RB H. This report summarizes the review. The review addressed the following questions:

(1) what hazard and risk conversion factors have changed since the Mound Guideline Values (GVs) were established,
(2) how do those changes affect the collection of compounds that screened through, or were eliminated from, the RB H hazard and risk calculations, and
(3) what is a reasonable estimate of the overall impact of these changes on the hazard and risk analyses performed for RB H.

2.0 METHODOLOGY

Chronologies of change for the Health Effects Assessment Summary Tables (HEAST) and Integrated Risk Information System (IRIS) data bases were developed. The chronologies document changes to HEAST and IRIS since the Mound Plant GVs were published. As a result of this exercise, previously conducted for RB D, a listing of the changes to risk data for compounds of interest to Mound was generated (Table 2-1).

Updated reference dose and slope factor data were then compared to values used in the RRE to ensure: (1) the appropriate collection of compounds was carried through the RRE process, and (2) the appropriate risk conversion factors (e.g., reference doses, slope factors) were used. This review was conducted first for compounds detected in RB H soil, then for compounds detected, or projected to be present, in the groundwater regimes of the Buried Valley Aquifer and/or the Mound Plant bedrock. The risk data associated with ambient air pathways (inhalation of tritium and isotopes of plutonium) were also reviewed. All results are presented in Section 3.

Table 2-1. IRIS and HEAST Chronologies of Change for Compounds of Interest to the Mound Plant Exit Project.

Chemical	IRIS Updated	Description of Changes
INORGANICS		
Antimony	Feb-91	
Arsenic	Apr-98	No change to RfD, UR for INH established (4.3E-3/ug/m3), INH SF withdrawn, INH UR established (4.3E-3/ug/m3), Oral SF established (1.5E0/mg/kg-d), DW UR established (5E-5/ug/L water)
Barium	Mar-98	No change to RfD, INH RfC withdrawn
Beryllium	Apr-98	Lowered the RfD (5E-3 -> 2E-3), added an RfC (2E-2ug/m3), replaced INH SF with UR (2.4E-3/ug/m3), withdrew oral SF
Bismuth	X	
Cadmium	Feb-94	
Calcium	X	
Chloride	X	
Chromium (III)	Sep-98	Raised RfD slightly (1.0E0 -> 1.5E0 mg/kg-d), no RfC value
Chromium (VI)	Sep-98	Reduced RfD from 5E-3 -> 3E-3 mg/kg-d, added RfC (8E-6 mg/m3), no SFs
Cobalt	X	
Copper	Aug-91	
Cyanide	Feb-93	
Fluoride		
Iron	X	
Lead	Nov-93	
Lithium	X	
Magnesium	X	
Manganese	Dec-96	No change to RfD, RfC
Mercury	Jun-95	No change to RfC
Molybdenum	Aug-93	
Nickel	Dec-96	No change to RfD
Nitrate	Oct-91	
Nitrate/Nitrite	X	
Phosphate	X	
Potassium	X	
Silicon	X	
Silver	Dec-96	No change to RfD
Sulfate	X	
Thallium	X	
Tin	X	
Vandium (pentoxide)	Dec-96	RfD raised from 7E-3 -> 9E-3 mg/kg-d
Zinc	Oct-92	

Table 2-1 (continued).

Chemical	IRIS Updated	Description of Changes
ORGANICS		
Acenaphthene	Apr-94	
Acenaphthylene	Jan-91	
Acetone	Aug-93	
Anthracene	Sep-94	
Aroclor-1016	Nov-96	RfD = 7E-5 mg/kg-d
Aroclor-1248	Nov-96	RfD data deemed inadequate
Aroclor-1254	Nov-96	RfD deemed OK
Aroclor-1260	X	
Benzene	Oct-98	Oral SF established (2.9E-2/mg/kg-d), DW UR established (8.3E-7/ug/L water), INH UR established (≤7.8E-6/ug/m3)
Benz(a)anthracene	Sep-94	
Benzo(a)pyrene	Nov-94	
Benzo(b)fluoranthene	Mar-94	
Benzo(g,h,i)perylene	Dec-90	
Benzo(k)fluoranthene	Mar-94	
Benzoic acid	Jul-93	
Bromodichloromethane	Mar-93	
2-Butanone (methyl ethyle ketone)	May-93	
Carbazole	X	
Carbon disulfide	Aug-95	Established RfC (0.7 mg/m3)
Carbon tetrachloride	Jun-91	
Chloroform	Sep-92	
2-Chlorophenol	Jul-93	
Chrysene	Mar-94	
Dibutyl phthalate	Feb-93	
Di-n-octyl phthalate	X	
Dibenz(a,h)anthracene	Mar-94	
Dibenzofuran	May-92	
1,1-Dichloroethane	Dec-96	(no RfC, no RfD)
1,1-Dichloroethene	X	
1,2-Dichloroethene	X	
1,2-cis-Dichloroethene	X	
1,2-trans-Dichloroethene	X	
Dichloromethane	Feb-95	Oral SF = 7.5E-3/mg/kg-d, DW UR = 2.1E-7/ug/L water
Ethylbenzene	Aug-91	
bis(2-ethylhexyl) phthalate	X	
Fluoranthene	Sep-94	
Fluorene	Dec-90	Note: Oral RfD in past RRE documents = 0.4 mg/kg-d Correct oral RfD = 0.04 mg/kg-d

Table 2-1 (continued).

Chemical	IRIS Updated	Description of Changes
Indeno(1,2,3-cd) pyrene	Mar-94	
Isophorone	Nov-92	
Methoxychlor	Dec-93	
2-Methylnaphthalene	X	
4-Methyl-2-pentanone = MIBK	Aug-93	
4-Methylphenol	Aug-93	
Naphthalene	Sep-98	Oral RfD reduced from 50 -> 0.02 mg/kg-d Carcinogen class changed to C
N-Nitrosodiphenylamine	Jul-93	
Pentachlorophenol	Jul-93	
Phenol	Mar-91	
Pyrene	Sep-94	
Tetrachloroethene	X	
1,1,1-Trichloroethane	Feb-96	Oral RfD withdrawn
Trichloroethene	X	
Trichloroethylene	Jul-94	
Trichlorofluoromethane	Aug-92	
1,1,2-Trichloro-1,2,2-trifluoroethane	Feb-96	RfD = 3E+1mg/kg-d
Toluene	Apr-94	
Xylenes	Mar-91	

Table 2-1 (continued).

HEAST STATUS

RADIONUCLIDES	Slope Factors Ingestion (risk/pCi)	Inhalation (risk/pCi)	External (risk/yr/pCi/g soil)
Ac-227+D	6.26E-10	7.87E-08	***9.30E-07***
Bi-210	7.29E-12	5.12E-11	N/A
Cs-137+D	3.16E-11	1.91E-11	2.09E-06
H-3	7.15E-14	9.59E-14	N/A
K-40	1.25E-11	7.46E-12	6.11E-07
Pb-210+D	***1.01E-09***	***3.86E-09***	***1.45E-10***
Pu-238	2.95E-10	2.74E-08	1.94E-11
Pu-239/240	3.16E-10	2.78E-08	1.26E-11
Pu-242	3.00E-10	2.64E-08	1.55E-11
Ra-224	1.49E-10	2.25E-09	2.48E-08
Ra-226+D	2.96E-10	2.75E-09	6.74E-06
Ra-228+D	2.48E-10	9.94E-10	3.28E-06
Sr-85	1.40E-12	1.14E-12	1.54E-06
Sr-90	5.59E-11	6.93E-11	N/A
Th-228+D	2.31E-10	9.68E-08	***6.20E-06***
Th-230	3.75E-11	1.72E-08	4.40E-11
Th-232	3.28E-11	1.93E-08	1.97E-11
Th-234	1.93E-11	1.90E-11	3.50E-09
U-233/234	4.48E-11	1.41E-08	3.52E-11
U-235+D	4.70E-11	1.30E-08	2.65E-07
U-238+D	6.20E-11	1.24E-08	***6.57E-08***

Values in bold, italics were not considered during the development of the Guideline Values for Mound.

3.0 RESULTS

3.1 Soil Data

Based on the review, new risk information for three (3) chemicals of concern detected in RB H soil required evaluation. Additionally, the original RRE erroneously reported that slope factors were not available for two (2) radionuclides: potassium-40 and plutonium-242. Given the natural occurrence of potassium-40, and the levels detected in RB H relative to background, residual risks from this radionuclide are inconsequential and not further evaluated in this report.

Necessary corrections and changes to the RRE have been made; the calculations and resultant risk or hazard quotient (HQ) values are shown in the Appendix to this report. The changes are also described below. As documented in Tables 3.1a and 3.1b, the Hazard Indices (HIs) and risk values did not change dramatically and remain in the acceptable range. In the interest of completeness, revised (relative to the 1997 RRE) Tables V.1, V.4, F.7, F.10, F.19, and F.22 have also been included in the Appendix to this report.

3.1.1 Arsenic

The IRIS oral slope factor for arsenic has been reduced from 15 mg/kg-d to 1.5 mg/kg-d. Therefore, the incremental risks from the ingestion of arsenic in soil for the construction worker and site employee were reduced from 1.2×10^{-5} to 1.2×10^{-6} and from 6.0×10^{-6} to 6.0×10^{-7}, respectively. Given the linear nature of the risk calculations, the background and total risks from ingestion of arsenic in soil were also reduced by an order of magnitude. Neither the risks for other pathways, nor the HQs for all pathways, were affected by this change.

3.1.2 α- and γ-Chlordane

In 1998, the oral slope factor for chlordane was reduced from 1.3 to 0.35. Similarly, the oral reference dose was increased from 6.0×10^{-5} to 5.0×10^{-4}. Therefore, the incremental and total risks and HQs from ingestion of chlordane in soil changed for both forms of chlordane, and for both the construction worker and site employee exposure scenarios. For the construction worker, the incremental/total HQ decreased from 7.8×10^{-4} to 9.4×10^{-5} and from 5.8×10^{-4} to

7.0×10^{-5} for α- and γ-chlordane, respectively. For the construction worker, the incremental/total risks decreased from 4.4×10^{-9} to1.2×10^{-9} and from 3.2×10^{-9} to 8.7×10^{-10} for α- and γ-chlordane, respectively.

For the site employee, the incremental/total HQ decreased from 8.2×10^{-5} to 9.8×10^{-6} and from 6.0×10^{-5} to 7.2×10^{-6} for α- and γ-chlordane, respectively. For the site employee, the incremental/total risks decreased from 2.3×10^{-9} to 6.1×10^{-10} and from 1.7×10^{-9} to 4.5×10^{-10} for α- and γ-chlordane, respectively.

3.1.3 Naphthalene

The appropriate oral RfD for naphthalene is 0.02 mg/kg-d (down from 50 mg/kg-d). The HQs for incremental and total soil ingestion were therefore increased from 2.5×10^{-7} to 6.2×10^{-4} and from 2.6×10^{-8} to 6.4×10^{-5}, respectively, for the construction worker and site employee.

3.1.4 Plutonium-242

The RRE reported that HEAST data were not available for Pu-242. However, ingestion, inhalation, and external exposure slope factors are available. Based on the HEAST data, the incremental and total soil risk values for the construction worker are 2.6×10^{-9}, 2.2×10^{-12}, and 3.3×10^{-13} for the ingestion, inhalation, and external exposure pathways, respectively. For the site employee, the incremental and total soil risk values are 1.3×10^{-9}, 1.1×10^{-11}, and 3.7×10^{-13} for the ingestion, inhalation, and external exposure pathways, respectively.

3.2 Groundwater Data

Based on the review of groundwater data conducted during the validation of the RB D RRE, numerous corrections and updates were necessary. Many of the same changes were required for the RB H RRE and are documented below. However, as also shown below, additional corrections, beyond those required for the RB D RRE, were required for the RB H RRE. All groundwater calculations have been reviewed and validated. The results shown in Tables 3-1a and 3-1b reflect all of the corrections and/or updates described below.

3.2.1 Beryllium

Beryllium was not included in the current groundwater scenario, but was projected to present in future groundwater. The oral RfD for beryllium has been lowered by a factor of 2.5 and the oral slope factor has been withdrawn. These updates would trigger a change in the beryllium HQ for future incremental groundwater ingestion from $2x10^{-4}$ to $4.9x10^{-4}$ for both the construction worker and site employee. The updated risk data would also eliminate the carcinogenic risk estimate for beryllium since the slope factor has been withdrawn. Given the magnitude of the contribution to the HQ from beryllium, these changes are not significant.

3.2.2 Chromium

Chromium is present in the bedrock under various areas of the site, but was not included in the current groundwater scenario because the maximum concentration detected was below the guideline value. The chromium is, however, assumed to enter the BVA and be consumed in the future. As such, chromium is a dominant contributor to the future groundwater hazard index.

Since the 1997 RRE, the oral RfD for chromium (VI) was lowered by a factor of 1.7. This update would trigger a change in the chromium (VI) HQ for future incremental groundwater ingestion from 0.96 to 1.6 for both the construction worker and site employee. Though the increase in the HQ is significant, the possible need to apply institutional controls to restrict future groundwater consumption was recognized via the RB D RRE. Therefore, the conclusions regarding chromium remain valid. However, given that all chromium detected in groundwater is not in the hexavalent state, some consideration should be given to normalizing the chromium HQ to account for the ratio of chromium (VI) to chromium (III). The data needed to determine this ratio will be collected as part of an on-going investigation of chromium sources and their migration patterns. When the investigation is complete, the groundwater RRE will require re-evaluation.

3.2.3 1,1,1-Trichloroethane

The oral RfD for 1,1,1-trichloroethane has been withdrawn. Revisiting the RRE is not recommended.

3.2.4 1,1,1-Trichloro-1,2,2-trifluoroethane

An oral RfD was added for 1,1,1-trichloro-1,2,2-trifluoroethane. Given that the oral RfD is 30 mg/kg-d, the RRE would not be significantly affected. Specifically, the contribution to the HQ for incremental groundwater ingestion for both the construction worker and site employee is 2.8×10^{-6}.

3.2.5 Bismuth-210

Risk calculations for Bi-210 were not performed for the RRE; the RRE indicated slope factors were not available. Bi-210 slope factors are available; however, the "missed risks" were 3.6×10^{-9} and 1.8×10^{-8} for the construction worker and site employee, respectively. These risk increments are not significant.

3.2.6 Strontium-85

Stronium-85 erroneously appears in specific risk tables of the RRE (e.g., V.2, V.3, and V.5). For groundwater, there was a single detect for Sr-85. Based on a single positive result and the short half-life of Sr-85, it was appropriate to screen the radionuclide from the RRE. Therefore, the fact that the tables incorrectly state that toxicity data are not available for Sr-85 is of no consequence to the analysis.

3.2.7 Thorium-228 + Daughters

In the RRE, Th-228 + D was reported as eliminated (i.e., not carried through the RRE) because Th-228 is a decay product of Th-232. However, the Th-232 slope factors do not include daughters, and Th-232 was subsequently screened from the RRE because the 95% UCL concentration was less than background. Additionally, although Th-228 was reportedly screened out of the RRE, Th-228 risk values appear sporadically in tables. For example, Th-228 risk values are included in Table V.5 but not in Table V.2. Because of the inconsistencies encountered in the RRE, all thorium-228 + daughter intake and risk calculations were re-calculated as described below.

Using the maximum concentration of Th-228 detected/projected for current and future BVA, the radionuclide risk values for groundwater ingestion were calculated for this report. For the current use scenario, the overall radionuclide

total risk from groundwater ingestion increased from 2.4×10^{-6} to 3.0×10^{-6} (construction worker), and from 1.2×10^{-5} to 1.5×10^{-5} (site employee). For the future use scenario, the total risk from groundwater ingestion of radionuclides would have increased from 2.7×10^{-6} to 3.4×10^{-6} (construction worker), and from 1.3×10^{-5} to 3.2×10^{-5} (site employee).

Though the magnitude of these changes is significant on a relative basis, the overall risks remain in the acceptable range and the conclusions of the RRE remain valid.

3.2.8 Tritium

In the RRE, tritium was not listed in Table V.2, but the "shower inhalation" and "groundwater dermal" risk values for tritium were included and are numerically correct. The "groundwater ingestion" risk value, however, is missing from the table, but is not a significant contributor to risk (1.1×10^{-7}). The corrected risk value appears in Tables 3-1a and 3-1b.

3.2.9 Uranium-234, Uranium-238

Risk data for these radionuclides were omitted from Table V.5 of the RRE. The missed risks were 2.0×10^{-6} and 2.9×10^{-6}, respectively, for U-234 and U-238. The corrected risk values appear in Tables 3-1a and 3-1b.

3.3 Air Data

For purposes of evaluating cumulative residual risk, air pathway data are also reported in each RRE. Per the Residual Risk Evaluation Methodology document, 1994 data collected at the Mound Plant perimeter air sampling stations are used to bound the concentrations and therefore the risks from inhalation of radionuclides present in ambient air. The risk data for tritium (HTO), Pu-238, and Pu-239/240 reported in the RB H RRE were reviewed and found to require no update or changes. It was observed, however, that the site employee risk calculations did not include an adjustment factor to account for the time spent indoors. While this approach is inconsistent with that applied to analogous outdoor pathways, it is conservative in nature.

3.4 Risk Data Summary

The residual risks for RB H, adjusted for updated and corrected data, are shown in Tables 3-1a and 3-1b for the construction worker and site employee, respectively. These data are appropriate for use in documenting the current and cumulative residual risks for Release Block H.

4.0 CONCLUSIONS AND RECOMMENDATIONS

For purposes of evaluating the need for institutional controls, the RB H RRE adequately characterizes the residual risks associated with the release block. However, changes to the risk data in IRIS and HEAST do occur and should be anticipated. IRIS updates are published monthly; HEAST updates occur much less frequently. A mechanism should be developed to ensure such changes are reviewed and adopted as appropriate.

It is also recommended that the changes noted in this report for groundwater-related risks be formally adopted. Since the groundwater risks will be identical for many of the parcels, a stand-alone report documenting the changes may be appropriate. The report should note prominently, though, that each subsequent RRE must be evaluated for parcel-specific leaching concerns that were not included in the site-wide analysis. Given that groundwater from numerous parcels may migrate toward the BVA, this evaluation should apply to any parcel in which new groundwater concerns arise – not just the parcel under consideration for sale.

A final recommendation is that consideration be given to the mechanism to update/re-validate the guideline values. The GV manual is a large document to which a small number of changes need to be made. An addendum to the manual documenting those changes should be considered.

Table 3-1a. Current and Cumulative RB H RRE Data for the Construction Worker.

Construction Worker	Hazard Index (HI) or Risk		
	Incremental	Background	Total
Soil – current			
HI	4.0E-02	1.3E-01	1.7E-01
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	4.9E-06	1.3E-06	6.2E-06
Groundwater – current			
HI	3.7E-02	9.6E-05	3.7E-02
Non-rad risk	N/A	N/A	N/A
Rad risk	2.5E-06	5.1E-07	3.0E-06
Air – current (1994)			
HI	N/A	N/A	N/A
Non-rad risk	N/A	N/A	N/A
Rad risk	2.0E-07	7.7E-09	2.1E-07
Totals – current			
HI	7.7E-02	1.3E-01	2.1E-01
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	7.6E-06	1.8E-06	9.4E-06
Groundwater – future			
HI	1.6E+00	3.1E-02	1.7E+00
Non-rad risk	N/A	N/A	N/A
Rad risk	2.9E-06	5.1E-07	3.4E-06
Totals – cumulative			
HI	1.7E+00	1.6E-01	1.9E+00
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	1.1E-05	2.3E-06	1.3E-05

Notes: N/A = Not applicable.
Data represent RRE calculations prior to the implementation of the remedy.
HI calculated based on assumption that all chromium is Cr(VI). This approach significantly over-estimates the Cr risk as not all chromium present in groundwater is in the hexavalent state.

Table 3-1b. Current and Cumulative RB H RRE Data for the Site Employee.

Site Employee	Hazard Index (HI) or Risk		
	Incremental	Background	Total
Soil – current			
HI	4.0E-03	1.4E-02	1.8E-02
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	5.3E-06	1.5E-06	6.8E-06
Groundwater – current			
HI	3.7E-02	7.6E-05	3.7E-02
Non-rad risk	N/A	N/A	N/A
Rad risk	1.3E-05	2.5E-06	1.5E-05
Air – current (1994)			
HI	N/A	N/A	N/A
Non-rad risk	N/A	N/A	N/A
Rad risk	9.9E-07	3.9E-08	1.0E-06
Totals – current			
HI	4.1E-02	1.4E-02	5.5E-02
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	1.9E-05	4.0E-06	2.3E-05
Groundwater – future			
HI	1.6E+00	3.1E-02	1.6E+00
Non-rad risk	N/A	N/A	N/A
Rad risk	1.4E-05	2.5E-06	1.7E-05
Totals – cumulative			
HI	1.6E+00	4.5E-02	1.7E+00
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	3.3E-05	6.5E-06	4.0E-05

Notes: N/A = Not applicable.
Data represent RRE calculations prior to the implementation of the remedy.
HI calculated based on assumption that all chromium is Cr(VI). This approach significantly over-estimates the Cr risk as not all chromium present in groundwater is in the hexavalent state.

5.0 REFERENCES

1. **Risk-Based Guideline Values**, Mound Plant, Miamisburg, Ohio, Final, Revision 4, Revised by EG&G Mound Applied Technologies, Miamisburg, Ohio, March 1997.

2. **Residual Risk Evaluation – Release Block D**, Mound Plant, Miamisburg, Ohio, Final, Revision 0, U.S. Department of Energy, Miamisburg, Ohio, December 1996.

3. **Residual Risk Evaluation – Release Block D – Revision Summary**, Mound Plant, Miamisburg, Ohio, Public Review Draft, U.S. Department of Energy, Miamisburg, Ohio, December 1998.

4. **Integrated Risk Information System (IRIS)** and updates to same, U.S. EPA web sites, December 1998.

5. **Health Effects Assessment Summary Tables (HEAST)** and updates to same, U.S. EPA web sites, December 1998.

6. **Mound 2000 Residual Risk Evaluation Methodology, Mound Plant**, U.S. Department of Energy, Miamisburg, Ohio, January 1997.

7. **Technical Position Report in Support of the Release Block D Residual Risk Evaluation**, U.S. Department of Energy, Miamisburg, Ohio, January 1999.

APPENDIX

Revised **Table V.1 Characterization of Residual Risks at Release Block H - Construction Worker**
Soil Pathways - Incremental

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)						
Aldrin	NA	***	4.9E-04	NA	1.0E-04	
α-Chlordane	NA	***	9.4E-05	NA	1.6E-04	
γ-Chlordane	NA	***	7.0E-05	NA	1.2E-04	
Heptachlor epoxide	NA	***	7.9E-04	NA	1.7E-04	
Acenaphthene	NA	***	1.4E-05	NA	2.9E-06	
Arsenic	NA	***	3.6E-02	NA	7.5E-04	
Fluorene	NA	***	1.7E-04	NA	3.5E-05	
Naphthalene	NA	***	6.2E-04	NA	5.1E-08	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.1E-10	NA	6.5E-11	
Acenaphthylene	NA	***	***	NA	NA	
δ-BHC	NA	***	***	NA	NA	
Bismuth	NA	***	***	NA	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	NA	
Copper	NA	***	***	NA	NA	
Dibenzofuran	NA	***	***	NA	NA	
Lithium	NA	***	***	NA	NA	
2-Methlynaphthalene	NA	***	***	NA	NA	
Phenanthrene	NA	***	***	NA	NA	Total HI =
Total:			3.8E-02		1.3E-03	4.0E-02
Carcinogens (Risk)						
Aldrin	NA	***	1.8E-08	NA	3.7E-09	
Arsenic	NA	***	1.2E-06	NA	2.4E-07	
Benzo(a)pyrene	NA	***	2.7E-06	NA	5.7E-07	
Benzo(g,h,i)perylene	NA	***	***	NA	***	
Carbazole	NA	***	***	NA	***	
α-Chlordane	NA	***	1.2E-09	NA	9.1E-10	
γ-Chlordane	NA	***	8.7E-10	NA	6.7E-10	
Dibenzo(a,h)anthracene	NA	***	***	NA	***	
Heptachlor epoxide	NA	***	6.7E-09	NA	1.4E-09	Total Carcinogenic
Lead	NA	***	***	NA	***	Risk =
Total:			3.9E-06		8.2E-07	4.7E-06
Radionuclides (Risk)						
Cesium-137	NA	1.6E-13	2.8E-08	4.7E-06	NA	
Plutonium-238	NA	1.8E-10	2.0E-07	3.2E-11	NA	Total Radionuclide
Plutonium-242	NA	2.2E-12	2.6E-09	3.3E-13	NA	Risk =
Total:		1.8E-10	2.3E-07	4.7E-06		4.9E-06

*** - Toxicity values not available.

NA - Not applicable.

Revised **Table V.4 Characterization of Residual Risks at Release Block H - Site Employee**
Soil Pathways - Incremental

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)					
Aldrin	NA	***	5.1E-05	NA	
α-Chlordane	NA	***	9.8E-06	NA	
γ-Chlordane	NA	***	7.2E-06	NA	
Heptachlor epoxide	NA	***	8.3E-05	NA	
Acenaphthene	NA	***	1.5E-06	NA	
Arsenic	NA	***	3.8E-03	NA	
Fluorene	NA	***	1.8E-05	NA	
Naphthalene	NA	***	6.4E-05	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.3E-11	NA	
Acenaphthylene	NA	***	***	NA	
δ-BHC	NA	***	***	NA	
Bismuth	NA	***	***	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	
Copper	NA	***	***	NA	
Dibenzofuran	NA	***	***	NA	
Lithium	NA	***	***	NA	
2-Methlynaphthalene	NA	***	***	NA	
Phenanthrene	NA	***	***	NA	Total HI =
Total:			4.0E-03		4.0E-03
Carcinogens (Risk)					
Aldrin	NA	***	9.2E-09	NA	
Arsenic	NA	***	6.0E-07	NA	
Benzo(a)pyrene	NA	***	1.4E-06	NA	
Benzo(g,h,i)perylene	NA	***	***	NA	
Carbazole	NA	***	***	NA	
α-Chlordane	NA	***	6.1E-10	NA	
γ-Chlordane	NA	***	4.5E-10	NA	
Dibenzo(a,h)anthracene	NA	***	***	NA	
Heptachlor epoxide	NA	***	3.5E-09	NA	Total Carcinogenic
Lead	NA	***	***	NA	Risk =
Total:			2.0E-06		2.0E-06
Radionuclides (Risk)					
Cesium-137	NA	8.2E-13	1.5E-08	5.2E-06	
Plutonium-238	NA	9.0E-10	1.1E-07	3.9E-11	Total Radionuclide
Plutonium-242	NA	1.1E-11	1.3E-09	3.7E-13	Risk =
Total:		9.1E-10	1.3E-07	5.2E-06	5.3E-06

*** - Toxicity values not available.

NA - Not applicable.

Revised **Table F.7 Characterization of Residual Risks at Release Block H - Construction Worker**
Soil Pathways - Background

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)						
Arsenic	NA	***	1.3E-01	NA	2.8E-03	
Acenaphthalene	NA	***	0.0E+00	NA	0.0E+00	
Acenapthlyene	NA	***	***	NA	***	
Aldrin	NA	***	0.0E+00	NA	0.0E+00	
δ-BHC	NA	***	***	NA	***	
Bismuth	NA	***	***	NA	***	
α-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
γ-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
4-Chloro-3-methylphenol	NA	***	***	NA	***	
Copper	NA	***	***	NA	***	
Dibenzofuran	NA	***	***	NA	***	
Fluorene	NA	***	0.0E+00	NA	0.0E+00	
Heptachlor epoxide	NA	***	0.0E+00	NA	0.0E+00	
Lithium	NA	***	***	NA	***	
2-Methlynaphthalene	NA	***	***	NA	***	
Naphthalene	NA	***	0.0E+00	NA	0.0E+00	
Phenanthrene	NA	***	***	NA	***	
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	***	0.0E+00	NA	0.0E+00	Total HI =
Total:			1.3E-01		2.8E-03	1.3E-01
Carcinogens (Risk)						
Aldrin	NA	***	0.0E+00	NA	0.0E+00	
Arsenic	NA	***	4.3E-06	NA	9.0E-07	
Benzo(a)pyrene	NA	***	0.0E+00	NA	0.0E+00	
Benzo(g,h,i)perylene	NA	***	***	NA	***	
Carbazole	NA	***	***	NA	***	
α-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
γ-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
Dibenzo(a,h)anthracene	NA	***	***	NA	***	
Heptachlor epoxide	NA	***	0.0E+00	NA	0.0E+00	Total Carcinogenic
Lead	NA	***	***	NA	***	Risk =
Total:			4.3E-06		9.0E-07	5.2E-06
Radionuclides (Risk)						
Cesium-137	NA	4.7E-14	8.1E-09	1.3E-06	NA	
Plutonium-238	NA	2.1E-11	2.3E-08	3.7E-12	NA	Total Radionuclide
Plutonium-242	NA	NA	NA	NA	NA	Risk =
Total:		2.1E-11	3.1E-08	1.3E-06		1.3E-06

*** - Toxicity values not available.

NA - Not applicable.

Revised **Table F.10 Characterization of Residual Risks at Release Block H - Site Employee**
Soil Pathways - Background

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)					
Arsenic	NA	***	1.4E-02	NA	
Acenaphthalene	NA	***	0.0E+00	NA	
Acenapthlyene	NA	***	***	NA	
Aldrin	NA	***	0.0E+00	NA	
δ-BHC	NA	***	***	NA	
Bismuth	NA	***	***	NA	
α-Chlordane	NA	***	0.0E+00	NA	
γ-Chlordane	NA	***	0.0E+00	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	
Copper	NA	***	***	NA	
Dibenzofuran	NA	***	***	NA	
Fluorene	NA	***	0.0E+00	NA	
Heptachlor epoxide	NA	***	0.0E+00	NA	
Lithium	NA	***	***	NA	
2-Methlynaphthalene	NA	***	***	NA	
Naphthalene	NA	***	0.0E+00	NA	
Phenanthrene	NA	***	***	NA	
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	***	0.0E+00	NA	Total HI =
Total:			1.4E-02		1.4E-02
Carcinogens (Risk)					
Aldrin	NA	***	0.0E+00	NA	
Arsenic	NA	***	2.3E-06	NA	
Benzo(a)pyrene	NA	***	0.0E+00	NA	
Benzo(g,h,i)perylene	NA	***	***	NA	
Carbazole	NA	***	***	NA	
α-Chlordane	NA	***	0.0E+00	NA	
γ-Chlordane	NA	***	0.0E+00	NA	
Dibenzo(a,h)anthracene	NA	***	***	NA	
Heptachlor epoxide	NA	***	0.0E+00	NA	Total Carcinogenic
Lead	NA	***	***	NA	Risk =
Total:			2.3E-06		2.3E-06
Radionuclides (Risk)					
Cesium-137	NA	2.3E-13	4.2E-09	1.5E-06	
Plutonium-238	NA	1.0E-10	1.2E-08	4.1E-12	Total Radionuclide
Plutonium-242	NA	NA	NA	NA	Risk =
Total:		1.0E-10	1.6E-08	1.5E-06	1.5E-06

*** - Toxicity values not available.

NA - Not applicable.

Revised **Table F.19 Characterization of Residual Risks at Release Block H - Construction Worker Soil Pathways - Total**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)						
Aldrin	NA	***	4.9E-04	NA	1.0E-04	
α-Chlordane	NA	***	9.4E-05	NA	1.6E-04	
γ-Chlordane	NA	***	7.0E-05	NA	1.2E-04	
Heptachlor epoxide	NA	***	7.9E-04	NA	1.7E-04	
Acenaphthene	NA	***	1.4E-05	NA	2.9E-06	
Arsenic	NA	***	1.7E-01	NA	3.6E-03	
Fluorene	NA	***	1.7E-04	NA	3.5E-05	
Naphthalene	NA	***	6.2E-04	NA	5.1E-08	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.1E-10	NA	6.5E-11	
Acenaphthylene	NA	***	***	NA	NA	
δ-BHC	NA	***	***	NA	NA	
Bismuth	NA	***	***	NA	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	NA	
Copper	NA	***	***	NA	NA	
Dibenzofuran	NA	***	***	NA	NA	
Lithium	NA	***	***	NA	NA	
2-Methlynaphthalene	NA	***	***	NA	NA	
Phenanthrene	NA	***	***	NA	NA	Total HI =
Total:			1.7E-01		4.2E-03	1.7E-01
Carcinogens (Risk)						
Aldrin	NA	***	1.8E-08	NA	3.7E-09	
Arsenic	NA	***	5.5E-06	NA	1.1E-06	
Benzo(a)pyrene	NA	***	2.7E-06	NA	5.7E-07	
Benzo(g,h,i)perylene	NA	***	***	NA	***	
Carbazole	NA	***	***	NA	***	
α-Chlordane	NA	***	1.2E-09	NA	9.1E-10	
γ-Chlordane	NA	***	8.7E-10	NA	6.7E-10	
Dibenzo(a,h)anthracene	NA	***	***	NA	***	
Heptachlor epoxide	NA	***	6.7E-09	NA	1.4E-09	Total Carcinogenic
Lead	NA	***	***	NA	***	Risk =
Total:			8.2E-06		1.7E-06	9.9E-06
Radionuclides (Risk)						
Cesium-137	NA	2.1E-13	3.6E-08	6.0E-06	NA	
Plutonium-238	NA	2.0E-10	2.3E-07	3.6E-11	NA	Total Radionuclide
Plutonium-242	NA	2.2E-12	2.6E-09	3.3E-13	NA	Risk =
Total:		2.0E-10	2.7E-07	6.0E-06		6.2E-06

*** - Toxicity values not available.

NA - Not applicable.

Revised **Table F22. Characterization of Residual Risks at Release Block H - Site Employee Soil Pathways - Total**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)					
Aldrin	NA	***	5.1E-05	NA	
α-Chlordane	NA	***	9.8E-06	NA	
γ-Chlordane	NA	***	7.2E-06	NA	
Heptachlor epoxide	NA	***	8.3E-05	NA	
Acenaphthene	NA	***	1.5E-06	NA	
Arsenic	NA	***	1.8E-02	NA	
Fluorene	NA	***	1.8E-05	NA	
Naphthalene	NA	***	6.4E-05	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.3E-11	NA	
Acenaphthylene	NA	***	***	NA	
δ-BHC	NA	***	***	NA	
Bismuth	NA	***	***	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	
Copper	NA	***	***	NA	
Dibenzofuran	NA	***	***	NA	
Lithium	NA	***	***	NA	
2-Methlynaphthalene	NA	***	***	NA	
Phenanthrene	NA	***	***	NA	Total HI =
Total:			1.8E-02		1.8E-02
Carcinogens (Risk)					
Aldrin	NA	***	9.2E-09	NA	
Arsenic	NA	***	2.9E-06	NA	
Benzo(a)pyrene	NA	***	1.4E-06	NA	
Benzo(g,h,i)perylene	NA	***	***	NA	
Carbazole	NA	***	***	NA	
α-Chlordane	NA	***	6.1E-10	NA	
γ-Chlordane	NA	***	4.5E-10	NA	
Dibenzo(a,h)anthracene	NA	***	***	NA	
Heptachlor epoxide	NA	***	3.5E-09	NA	Total Carcinogenic
Lead	NA	***	***	NA	Risk =
Total:			4.3E-06		4.3E-06
Radionuclides (Risk)					
Cesium-137	NA	1.1E-12	1.9E-08	6.6E-06	
Plutonium-238	NA	1.1E-09	1.3E-07	4.3E-11	Total Radionuclide
Plutonium-242	NA	1.1E-11	1.3E-09	3.7E-13	Risk =
Total:		1.1E-09	1.5E-07	6.6E-06	6.8E-06

*** - Toxicity values not available.

NA - Not applicable.

Release Block H

Risk and HQ Calculations for Arsenic Soil Inhalation and Ingestion

(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental Soil Concentration

2.3 mg/kg Construction Worker/Site Employee

Oral Slope Factor

1.5E+00 mg/kg-d

Oral Reference Dose

3.0E-04 mg/kg-d

Construction Worker Intake, Carcinogenic

Carcinogenic, Ingestion

Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	480	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **7.72E-07** mg/kg-d

Construction Worker Intake, Non-Carcinogenic

Non-Carcinogenic, Ingestion

Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.08E-05** mg/kg-d

Site Employee Intakes, Carcinogenic

Carcinogenic, Ingestion

Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	25	years (ED = exposure duration)
IR =	50	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **4.02E-07** mg/kg-d

Non-Carcinogenic, Ingestion

Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.13E-06** mg/kg-d

Arsenic Risk and Hazard Quotient (HQ) Values
Soil Ingestion and Inhalation

Risk = Intake * Slope Factor
HQ = Intake/Reference Dose

Construction Worker	Risk	HQ
Soil ingestion	1.2E-06	3.6E-02
Soil inhalation	N/A	N/A

Site Employee	Risk	HQ
Soil ingestion	6.0E-07	3.8E-03
Soil inhalation	N/A	N/A

Release Block H

Risk and HQ Calculations for α- and γ-Chlordane Soil Inhalation and Ingestion

(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental and Total Soil Concentrations

0.01	mg/kg	α-chlordane: Construction Worker/Site Employee
0.0074	mg/kg	γ-chlordane: Construction Worker/Site Employee

Oral Slope Factor

3.5E-01 mg/kg-d

Oral Reference Dose

5.0E-04 mg/kg-d

Construction Worker Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Ingestion

Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	480	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **3.35E-09** mg/kg-d

γ-Chlordane, Carcinogenic, Ingestion

Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	480	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **2.48E-09** mg/kg-d

Construction Worker Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Ingestion

Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **4.70E-08** mg/kg-d

γ-Chlordane, Non-Carcinogenic, Ingestion

Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **3.48E-08** mg/kg-d

Construction Worker Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Inhalation

Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	20	m^3/day (IR = inhalation rate)
BW =	70	kilograms (BW = body weight)
AT =	70	years (AT = averaging time)

Intake = **3.27E-14** mg/kg-d

γ-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	20	m^3/day (IR = inhalation rate)
BW =	70	kilograms (BW = body weight)
AT =	70	years (AT = averaging time)

Intake = **2.42E-14** mg/kg-d

Construction Worker Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
IR =	20	m^3/day (IR = inhalation rate)
EF =	250	days/year (EF = exposure frequency)
BW =	70	kilograms (BW = body weight)

Intake = **4.57E-13** mg/kg-d

γ-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
IR =	20	m^3/day (IR = inhalation rate)
EF =	250	days/year (EF = exposure frequency)
BW =	70	kilograms (BW = body weight)

Intake = **3.38E-13** mg/kg-d

Site Employee Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	25	years (ED = exposure duration)
IR =	50	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **1.75E-09** mg/kg-d

γ-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	25	years (ED = exposure duration)
IR =	50	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **1.29E-09** mg/kg-d

Site Employee Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **4.89E-09** mg/kg-d

γ-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = 3.62E-09 mg/kg-d

Site Employee Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
EF =	250	days/year (EF = exposure frequency)
ED =	25	years (ED = exposure duration)
IR =	20	m^3/day (IR = inhalation rate)
BW =	70	kilograms (BW = body weight)
AT =	70	years (AT = averaging time)

Intake = 1.63E-13 mg/kg-d

γ-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
EF =	250	days/year (EF = exposure frequency)
ED =	25	years (ED = exposure duration)
IR =	20	m^3/day (IR = inhalation rate)
BW =	70	kilograms (BW = body weight)
AT =	70	years (AT = averaging time)

Intake = 1.21E-13 mg/kg-d

Construction Worker Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
IR =	20	m^3/day (IR = inhalation rate)
EF =	250	days/year (EF = exposure frequency)
BW =	70	kilograms (BW = body weight)

Intake = 4.57E-13 mg/kg-d

γ-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
IR =	20	m^3/day (IR = inhalation rate)
EF =	250	days/year (EF = exposure frequency)
BW =	70	kilograms (BW = body weight)

Intake = 3.38E-13 mg/kg-d

Chlordane Risk and Hazard Quotient (HQ) Values
Soil Ingestion and Inhalation

Risk = Intake * Slope Factor
HQ = Intake/Reference Dose

	α-Chlordane		γ-Chlordane	
Construction Worker	Risk	HQ	Risk	HQ
Soil ingestion	1.2E-09	9.4E-05	8.7E-10	7.0E-05
Soil inhalation	N/A	N/A	N/A	N/A

	α-Chlordane		γ-Chlordane	
Site Employee	Risk	HQ	Risk	HQ
Soil ingestion	6.1E-10	9.8E-06	4.5E-10	7.2E-06
Soil inhalation	N/A	N/A	N/A	N/A

Release Block H
HQ Calculations for Naphthalene Soil Ingestion

(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental and Total Soil Concentrations

2.625 mg/kg Construction Worker/Site Employee

Oral Reference Dose

2.0E-02 mg/kg-d

Construction Worker Intake, Non-Carcinogenic

Ingestion

Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.625	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.23E-05** mg/kg-d

Site Employee Intake, Non-Carcinogenic

Ingestion

Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.625	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.28E-06** mg/kg-d

Naphthalene Hazard Quotient (HQ) Values
Soil Ingestion

HQ = Intake/Reference Dose

Construction Worker	Risk	HQ
Soil ingestion	N/A	6.2E-04
Soil inhalation	N/A	N/A

Site Employee	Risk	HQ
Soil ingestion	N/A	6.4E-05
Soil inhalation	N/A	N/A

Release Block H

Risk Calculations for Pu-242 Soil Inhalation, Soil Ingestion and External Exposure

(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental and Total Soil Concentrations

0.0143 pCi/g — Construction Worker/Site Employee

Slope Factors

3.00E-10 risk/pCi ingested
2.64E-08 risk/pCi inhaled
1.55E-11 risk/yr/pCi/g

Construction Worker Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	0.0143	pCi/g (CS = concentration in soil)
ED =	5	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)

Intake = 8.58E+00 pCi

Construction Worker Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	0.0143	pCi/g (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	5	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = 8.35E-05 pCi

Construction Worker External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	1.43E-02	pCi/g
TE =	3.33E-01	TE = gamma shielding factor, dimensionless
SE =	1.00E-01	SE =gamma exposure time factor, dimensionless
ED =	5.00E+00	yr (ED = exposure duration)

Exposure = 2.14E-02 pCi-yr/g

Site Employee Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	0.0143	mg/kg (CS = concentration in soil)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)

Intake = 4.47E+00 pCi

Site Employee Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	0.0143	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = 4.18E-04 pCi

Site Employee External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	1.43E-02	pCi/g
TE =	8.30E-02	TE = gamma shielding factor, dimensionless
SE =	2.00E-01	SE =gamma exposure time factor, dimensionless
ED =	25	yr (ED = exposure duration)

Exposure = 2.37E-02 pCi-yr/g

Pu-242 Risk Values

Soil Ingestion, Soil Inhalation, and External Exposure

Risk = Intake * Slope Factor

Construction Worker	Risk
Soil ingestion	2.6E-09
Soil inhalation	2.2E-12
Ext Exp	3.3E-13

Site Employee	Risk
Soil ingestion	1.3E-09
Soil inhalation	1.1E-11
Ext Exp	3.68E-13

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TECHNICAL POSITION REPORT IN SUPPORT OF THE RELEASE BLOCK H RESIDUAL RISK EVALUATION

CORE TEAM REVIEW DRAFT
Rev. 0

Rec'd 2/15
2/15 Read thru for content.
One word (maybe) missing p8.

MOUND PLANT
MIAMISBURG, OHIO

February 1999

Miamisburg Environmental Management Project
U.S. Department of Energy

Report prepared by
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DRAFT

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DRAFT

TECHNICAL POSITION REPORT IN SUPPORT OF THE RELEASE BLOCK H RESIDUAL RISK EVALUATION

1.0 BACKGROUND AND PURPOSE

The original Residual Risk Evaluation (RRE) for Release Block (RB) H was published in August of 1997. Since that time, some of the risk conversion factors for chemicals and radionuclides have changed. Additionally, some errors in the groundwater section of the RRE have been detected. As a result, the Mound 2000 Core Team requested a review of the RRE for RB H. This report summarizes the review. The review addressed the following questions:

(1) what hazard and risk conversion factors have changed since the Mound Guideline Values (GVs) were established,
(2) how do those changes affect the collection of compounds that screened through, or were eliminated from, the RB H hazard and risk calculations, and
(3) what is a reasonable estimate of the overall impact of these changes on the hazard and risk analyses performed for RB H.

2.0 METHODOLOGY

Chronologies of change for the Health Effects Assessment Summary Tables (HEAST) and Integrated Risk Information System (IRIS) data bases were developed. The chronologies document changes to HEAST and IRIS since the Mound Plant GVs were published. As a result of this exercise, previously conducted for RB D, a listing of the changes to risk data for compounds of interest to Mound was generated (Table 2-1).

Updated reference dose and slope factor data were then compared to values used in the RRE to ensure: (1) the appropriate collection of compounds was carried through the RRE process, and (2) the appropriate risk conversion factors (e.g., reference doses, slope factors) were used. This review was conducted first for compounds detected in RB H soil, then for compounds detected, or projected to be present, in the groundwater regimes of the Buried Valley Aquifer and/or the Mound Plant bedrock. The risk data associated with ambient air pathways (inhalation of tritium and isotopes of plutonium) were also reviewed. All results are presented in Section 3.

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Table 2-1. IRIS and HEAST Chronologies of Change for Compounds of Interest to the Mound Plant Exit Project.

Chemical	IRIS Updated	Description of Changes
INORGANICS		
Antimony	Feb-91	
Arsenic	Apr-98	No change to RfD, UR for INH established (4.3E-3/ug/m3), INH SF withdrawn, INH UR established (4.3E-3/ug/m3), Oral SF established (1.5E0/mg/kg-d), DW UR established (5E-5/ug/L water)
Barium	Mar-98	No change to RfD, INH RfC withdrawn
Beryllium	Apr-98	Lowered the RfD (5E-3 -> 2E-3), added an RfC (2E-2ug/m3), replaced INH SF with UR (2.4E-3/ug/m3), withdrew oral SF
Bismuth	X	
Cadmium	Feb-94	
Calcium	X	
Chloride	X	
Chromium (III)	Sep-98	Raised RfD slightly (1.0E0 -> 1.5E0 mg/kg-d), no RfC value
Chromium (VI)	Sep-98	Reduced RfD from 5E-3 -> 3E-3 mg/kg-d, added RfC (8E-6 mg/m3), no SFs
Cobalt	X	
Copper	Aug-91	
Cyanide	Feb-93	
Fluoride		
Iron	X	
Lead	Nov-93	
Lithium	X	
Magnesium	X	
Manganese	Dec-96	No change to RfD, RfC
Mercury	Jun-95	No change to RfC
Molybdenum	Aug-93	
Nickel	Dec-96	No change to RfD
Nitrate	Oct-91	
Nitrate/Nitrite	X	
Phosphate	X	
Potassium	X	
Silicon	X	
Silver	Dec-96	No change to RfD
Sulfate	X	
Thallium	X	
Tin	X	
Vandium (pentoxide)	Dec-96	RfD raised from 7E-3 -> 9E-3 mg/kg-d
Zinc	Oct-92	

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Table 2-1 (continued).

Chemical	IRIS Updated	Description of Changes
ORGANICS		
Acenaphthene	Apr-94	
Acenaphthylene	Jan-91	
Acetone	Aug-93	
Anthracene	Sep-94	
Aroclor-1016	Nov-96	RfD = 7E-5 mg/kg-d
Aroclor-1248	Nov-96	RfD data deemed inadequate
Aroclor-1254	Nov-96	RfD deemed OK
Aroclor-1260	X	
Benzene	Oct-98	Oral SF established (2.9E-2/mg/kg-d), DW UR established (8.3E-7/ug/L water), INH UR established (≤7.8E-6/ug/m3)
Benz(a)anthracene	Sep-94	
Benzo(a)pyrene	Nov-94	
Benzo(b)fluoranthene	Mar-94	
Benzo(g,h,i)perylene	Dec-90	
Benzo(k)fluoranthene	Mar-94	
Benzoic acid	Jul-93	
Bromodichloromethane	Mar-93	
2-Butanone (methyl ethyle ketone)	May-93	
Carbazole	X	
Carbon disulfide	Aug-95	Established RfC (0.7 mg/m3)
Carbon tetrachloride	Jun-91	
Chloroform	Sep-92	
2-Chlorophenol	Jul-93	
Chrysene	Mar-94	
Dibutyl phthalate	Feb-93	
Di-n-octyl phthalate	X	
Dibenz(a,h)anthracene	Mar-94	
Dibenzofuran	May-92	
1,1-Dichloroethane	Dec-96	(no RfC, no RfD)
1,1-Dichloroethene	X	
1,2-Dichloroethene	X	
1,2-cis-Dichloroethene	X	
1,2-trans-Dichloroethene	X	
Dichloromethane	Feb-95	Oral SF = 7.5E-3/mg/kg-d, DW UR = 2.1E-7/ug/L water
Ethylbenzene	Aug-91	
bis(2-ethylhexyl) phthalate	X	
Fluoranthene	Sep-94	
Fluorene	Dec-90	Note: Oral RfD in past RRE documents = 0.4 mg/kg-d Correct oral RfD = 0.04 mg/kg-d

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Table 2-1 (continued).

Chemical	IRIS Updated	Description of Changes
Indeno(1,2,3-cd) pyrene	Mar-94	
Isophorone	Nov-92	
Methoxychlor	Dec-93	
2-Methylnaphthalene	X	
4-Methyl-2-pentanone = MIBK	Aug-93	
4-Methylphenol	Aug-93	
Naphthalene	Sep-98	Oral RfD reduced from 50 -> 0.02 mg/kg-d Carcinogen class changed to C
N-Nitrosodiphenylamine	Jul-93	
Pentachlorophenol	Jul-93	
Phenol	Mar-91	
Pyrene	Sep-94	
Tetrachloroethene	X	
1,1,1-Trichloroethane	Feb-96	Oral RfD withdrawn
Trichloroethene	X	
Trichloroethylene	Jul-94	
Trichlorofluoromethane	Aug-92	
1,1,2-Trichloro-1,2,2-trifluoroethane	Feb-96	RfD = 3E+1mg/kg-d
Toluene	Apr-94	
Xylenes	Mar-91	

Table 2-1 (continued).

HEAST STATUS

RADIONUCLIDES	Slope Factors Ingestion (risk/pCi)	Inhalation (risk/pCi)	External (risk/yr/pCi/g soil)
Ac-227+D	6.26E-10	7.87E-08	***9.30E-07***
Bi-210	7.29E-12	5.12E-11	N/A
Cs-137+D	3.16E-11	1.91E-11	2.09E-06
H-3	7.15E-14	9.59E-14	N/A
K-40	1.25E-11	7.46E-12	6.11E-07
Pb-210+D	***1.01E-09***	***3.86E-09***	***1.45E-10***
Pu-238	2.95E-10	2.74E-08	1.94E-11
Pu-239/240	3.16E-10	2.78E-08	1.26E-11
Pu-242	3.00E-10	2.64E-08	1.55E-11
Ra-224	1.49E-10	2.25E-09	2.48E-08
Ra-226+D	2.96E-10	2.75E-09	6.74E-06
Ra-228+D	2.48E-10	9.94E-10	3.28E-06
Sr-85	1.40E-12	1.14E-12	1.54E-06
Sr-90	5.59E-11	6.93E-11	N/A
Th-228+D	2.31E-10	9.68E-08	***6.20E-06***
Th-230	3.75E-11	1.72E-08	4.40E-11
Th-232	3.28E-11	1.93E-08	1.97E-11
Th-234	1.93E-11	1.90E-11	3.50E-09
U-233/234	4.48E-11	1.41E-08	3.52E-11
U-235+D	4.70E-11	1.30E-08	2.65E-07
U-238+D	6.20E-11	1.24E-08	***6.57E-08***

Values in bold, italics were not considered during the development of the Guideline Values for Mound.

3.0 RESULTS

3.1 Soil Data

Based on the review, new risk information for three (3) chemicals of concern detected in RB H soil required evaluation. Additionally, the original RRE erroneously reported that slope factors were not available for two (2) radionuclides: potassium-40 and plutonium-242. Given the natural occurrence of potassium-40, and the levels detected in RB H relative to background, residual risks from this radionuclide are inconsequential and not further evaluated in this report.

Necessary corrections and changes to the RRE have been made; the calculations and resultant risk or hazard quotient (HQ) values are shown in the Appendix to this report. The changes are also described below. As documented in Tables 3.1a and 3.1b, the Hazard Indices (HIs) and risk values did not change dramatically and remain in the acceptable range. In the interest of completeness, revised (relative to the 1997 RRE) Tables V.1, V.4, F.7, F.10, F.19, and F.22 have also been included in the Appendix to this report.

3.1.1 Arsenic

The IRIS oral slope factor for arsenic has been reduced from 15 mg/kg-d to 1.5 mg/kg-d. Therefore, the incremental risks from the ingestion of arsenic in soil for the construction worker and site employee were reduced from 1.2×10^{-5} to 1.2×10^{-6} and from 6.0×10^{-6} to 6.0×10^{-7}, respectively. Given the linear nature of the risk calculations, the background and total risks from ingestion of arsenic in soil were also reduced by an order of magnitude. Neither the risks for other pathways, nor the HQs for all pathways, were affected by this change.

3.1.2 α- and γ-Chlordane

In 1998, the oral slope factor for chlordane was reduced from 1.3 to 0.35. Similarly, the oral reference dose was increased from 6.0×10^{-5} to 5.0×10^{-4}. Therefore, the incremental and total risks and HQs from ingestion of chlordane in soil changed for both forms of chlordane, and for both the construction worker and site employee exposure scenarios. For the construction worker, the incremental/total HQ decreased from 7.8×10^{-4} to 9.4×10^{-5} and from 5.8×10^{-4} to

7.0×10^{-5} for α- and γ-chlordane, respectively. For the construction worker, the incremental/total risks decreased from 4.4×10^{-9} to1.2×10^{-9} and from 3.2×10^{-9} to 8.7×10^{-10} for α- and γ-chlordane, respectively.

For the site employee, the incremental/total HQ decreased from 8.2×10^{-5} to 9.8×10^{-6} and from 6.0×10^{-5} to 7.2×10^{-6} for α- and γ-chlordane, respectively. For the site employee, the incremental/total risks decreased from 2.3×10^{-9} to 6.1×10^{-10} and from 1.7×10^{-9} to 4.5×10^{-10} for α- and γ-chlordane, respectively.

3.1.3 Naphthalene

The appropriate oral RfD for naphthalene is 0.02 mg/kg-d (down from 50 mg/kg-d). The HQs for incremental and total soil ingestion were therefore increased from 2.5×10^{-7} to 6.2×10^{-4} and from 2.6×10^{-8} to 6.4×10^{-5}, respectively, for the construction worker and site employee.

3.1.4 Plutonium-242

The RRE reported that HEAST data were not available for Pu-242. However, ingestion, inhalation, and external exposure slope factors are available. Based on the HEAST data, the incremental and total soil risk values for the construction worker are 2.6×10^{-9}, 2.2×10^{-12}, and 3.3×10^{-13} for the ingestion, inhalation, and external exposure pathways, respectively. For the site employee, the incremental and total soil risk values are 1.3×10^{-9}, 1.1×10^{-11}, and 3.7×10^{-13} for the ingestion, inhalation, and external exposure pathways, respectively.

3.2 Groundwater Data

Based on the review of groundwater data conducted during the validation of the RB D RRE, numerous corrections and updates were necessary. Many of the same changes were required for the RB H RRE and are documented below. However, as also shown below, additional corrections, beyond those required for the RB D RRE, were required for the RB H RRE. All groundwater calculations have been reviewed and validated. The results shown in Tables 3-1a and 3-1b reflect all of the corrections and/or updates described below.

3.2.1 Beryllium

Beryllium was be not included in the current groundwater scenario, but was projected to present in future groundwater. The oral RfD for beryllium has been lowered by a factor of 2.5 and the oral slope factor has been withdrawn. These updates would trigger a change in the beryllium HQ for future incremental groundwater ingestion from $2x10^{-4}$ to $4.9x10^{-4}$ for both the construction worker and site employee. The updated risk data would also eliminate the carcinogenic risk estimate for beryllium since the slope factor has been withdrawn. Given the magnitude of the contribution to the HQ from beryllium, these changes are not significant.

3.2.2 Chromium

Chromium is present in the bedrock under various areas of the site, but was not included in the current groundwater scenario because the maximum concentration detected was below the guideline value. The chromium is, however, assumed to enter the BVA and be consumed in the future. As such, chromium is a dominant contributor to the future groundwater hazard index.

Since the 1997 RRE, the oral RfD for chromium (VI) was lowered by a factor of 1.7. This update would trigger a change in the chromium (VI) HQ for future incremental groundwater ingestion from 0.96 to 1.6 for both the construction worker and site employee. Though the increase in the HQ is significant, the possible need to apply institutional controls to restrict future groundwater consumption was recognized via the RB D RRE. Therefore, the conclusions regarding chromium remain valid. However, given that all chromium detected in groundwater is not in the hexavalent state, some consideration should be given to normalizing the chromium HQ to account for the ratio of chromium (VI) to chromium (III). The data needed to determine this ratio will be collected as part of an on-going investigation of chromium sources and their migration patterns. When the investigation is complete, the groundwater RRE will require re-evaluation.

3.2.3 1,1,1-Trichloroethane

The oral RfD for 1,1,1-trichloroethane has been withdrawn. Revisiting the RRE is not recommended.

3.2.4 1,1,1-Trichloro-1,2,2-trifluoroethane

An oral RfD was added for 1,1,1-trichloro-1,2,2-trifluoroethane. Given that the oral RfD is 30 mg/kg-d, the RRE would not be significantly affected. Specifically, the contribution to the HQ for incremental groundwater ingestion for both the construction worker and site employee is 2.8×10^{-6}.

3.2.5 Bismuth-210

Risk calculations for Bi-210 were not performed for the RRE; the RRE indicated slope factors were not available. Bi-210 slope factors are available; however, the "missed risks" were 3.6×10^{-9} and 1.8×10^{-8} for the construction worker and site employee, respectively. These risk increments are not significant.

3.2.6 Strontium-85

Stronium-85 erroneously appears in specific risk tables of the RRE (e.g., V.2, V.3, and V.5). For groundwater, there was a single detect for Sr-85. Based on a single positive result and the short half-life of Sr-85, it was appropriate to screen the radionuclide from the RRE. Therefore, the fact that the tables incorrectly state that toxicity data are not available for Sr-85 is of no consequence to the analysis.

3.2.7 Thorium-228 + Daughters

In the RRE, Th-228 + D was reported as eliminated (i.e., not carried through the RRE) because Th-228 is a decay product of Th-232. However, the Th-232 slope factors do not include daughters, and Th-232 was subsequently screened from the RRE because the 95% UCL concentration was less than background. Additionally, although Th-228 was reportedly screened out of the RRE, Th-228 risk values appear sporadically in tables. For example, Th-228 risk values are included in Table V.5 but not in Table V.2. Because of the inconsistencies encountered in the RRE, all thorium-228 + daughter intake and risk calculations were re-calculated as described below.

Using the maximum concentration of Th-228 detected/projected for current and future BVA, the radionuclide risk values for groundwater ingestion were calculated for this report. For the current use scenario, the overall radionuclide

total risk from groundwater ingestion increased from $2.4x10^{-6}$ to $3.0x10^{-6}$ (construction worker), and from $1.2x10^{-5}$ to $1.5x10^{-5}$ (site employee). For the future use scenario, the total risk from groundwater ingestion of radionuclides would have increased from $2.7x10^{-6}$ to $3.4x10^{-6}$ (construction worker), and from $1.3x10^{-5}$ to $3.2x10^{-5}$ (site employee).

Though the magnitude of these changes is significant on a relative basis, the overall risks remain in the acceptable range and the conclusions of the RRE remain valid.

3.2.8 Tritium

In the RRE, tritium was not listed in Table V.2, but the "shower inhalation" and "groundwater dermal" risk values for tritium were included and are numerically correct. The "groundwater ingestion" risk value, however, is missing from the table, but is not a significant contributor to risk ($1.1x10^{-7}$). The corrected risk value appears in Tables 3-1a and 3-1b.

3.2.9 Uranium-234, Uranium-238

Risk data for these radionuclides were omitted from Table V.5 of the RRE. The missed risks were $2.0x10^{-6}$ and $2.9x10^{-6}$, respectively, for U-234 and U-238. The corrected risk values appear in Tables 3-1a and 3-1b.

3.3 Air Data

For purposes of evaluating cumulative residual risk, air pathway data are also reported in each RRE. Per the Residual Risk Evaluation Methodology document, 1994 data collected at the Mound Plant perimeter air sampling stations are used to bound the concentrations and therefore the risks from inhalation of radionuclides present in ambient air. The risk data for tritium (HTO), Pu-238, and Pu-239/240 reported in the RB H RRE were reviewed and found to require no update or changes. It was observed, however, that the site employee risk calculations did not include an adjustment factor to account for the time spent indoors. While this approach is inconsistent with that applied to analogous outdoor pathways, it is conservative in nature.

3.4 Risk Data Summary

The residual risks for RB H, adjusted for updated and corrected data, are shown in Tables 3-1a and 3-1b for the construction worker and site employee, respectively. These data are appropriate for use in documenting the current and cumulative residual risks for Release Block H.

4.0 CONCLUSIONS AND RECOMMENDATIONS

For purposes of evaluating the need for institutional controls, the RB H RRE adequately characterizes the residual risks associated with the release block. However, changes to the risk data in IRIS and HEAST do occur and should be anticipated. IRIS updates are published monthly; HEAST updates occur much less frequently. A mechanism should be developed to ensure such changes are reviewed and adopted as appropriate.

It is also recommended that the changes noted in this report for groundwater-related risks be formally adopted. Since the groundwater risks will be identical for many of the parcels, a stand-alone report documenting the changes may be appropriate. The report should note prominently, though, that each subsequent RRE must be evaluated for parcel-specific leaching concerns that were not included in the site-wide analysis. Given that groundwater from numerous parcels may migrate toward the BVA, this evaluation should apply to any parcel in which new groundwater concerns arise – not just the parcel under consideration for sale.

A final recommendation is that consideration be given to the mechanism to update/re-validate the guideline values. The GV manual is a large document to which a small number of changes need to be made. An addendum to the manual documenting those changes should be considered.

Table 3-1a. Current and Cumulative RB H RRE Data for the Construction Worker.

Construction Worker	Hazard Index (HI) or Risk		
	Incremental	Background	Total
Soil – current			
HI	4.0E-02	1.3E-01	1.7E-01
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	4.9E-06	1.3E-06	6.2E-06
Groundwater – current			
HI	3.7E-02	9.6E-05	3.7E-02
Non-rad risk	N/A	N/A	N/A
Rad risk	2.5E-06	5.1E-07	3.0E-06
Air – current (1994)			
HI	N/A	N/A	N/A
Non-rad risk	N/A	N/A	N/A
Rad risk	2.0E-07	7.7E-09	2.1E-07
Totals – current			
HI	7.7E-02	1.3E-01	2.1E-01
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	7.6E-06	1.8E-06	9.4E-06
Groundwater – future			
HI	1.6E+00	3.1E-02	1.7E+00
Non-rad risk	N/A	N/A	N/A
Rad risk	2.9E-06	5.1E-07	3.4E-06
Totals – cumulative			
HI	1.7E+00	1.6E-01	1.9E+00
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	1.1E-05	2.3E-06	1.3E-05

Notes: N/A = Not applicable.
Data represent RRE calculations prior to the implementation of the remedy.
HI calculated based on assumption that all chromium is Cr(VI). This approach significantly over-estimates the Cr risk as not all chromium present in groundwater is in the hexavalent state.

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Table 3-1b. Current and Cumulative RB H RRE Data for the Site Employee.

Site Employee	Hazard Index (HI) or Risk Incremental	Background	Total
Soil – current			
HI	4.0E-03	1.4E-02	1.8E-02
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	5.3E-06	1.5E-06	6.8E-06
Groundwater – current			
HI	3.7E-02	7.6E-05	3.7E-02
Non-rad risk	N/A	N/A	N/A
Rad risk	1.3E-05	2.5E-06	1.5E-05
Air – current (1994)			
HI	N/A	N/A	N/A
Non-rad risk	N/A	N/A	N/A
Rad risk	9.9E-07	3.9E-08	1.0E-06
Totals – current			
HI	4.1E-02	1.4E-02	5.5E-02
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	1.9E-05	4.0E-06	2.3E-05
Groundwater – future			
HI	1.6E+00	3.1E-02	1.6E+00
Non-rad risk	N/A	N/A	N/A
Rad risk	1.4E-05	2.5E-06	1.7E-05
Totals – cumulative			
HI	1.6E+00	4.5E-02	1.7E+00
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	3.3E-05	6.5E-06	4.0E-05

Notes: N/A = Not applicable.
Data represent RRE calculations prior to the implementation of the remedy.
HI calculated based on assumption that all chromium is Cr(VI). This approach significantly over-estimates the Cr risk as not all chromium present in groundwater is in the hexavalent state.

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5.0 REFERENCES

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2. **Residual Risk Evaluation – Release Block D**, Mound Plant, Miamisburg, Ohio, Final, Revision 0, U.S. Department of Energy, Miamisburg, Ohio, December 1996.

3. **Residual Risk Evaluation – Release Block D – Revision Summary**, Mound Plant, Miamisburg, Ohio, Public Review Draft, U.S. Department of Energy, Miamisburg, Ohio, December 1998.

4. **Integrated Risk Information System (IRIS)** and updates to same, U.S. EPA web sites, December 1998.

5. **Health Effects Assessment Summary Tables (HEAST)** and updates to same, U.S. EPA web sites, December 1998.

6. **Mound 2000 Residual Risk Evaluation Methodology, Mound Plant**, U.S. Department of Energy, Miamisburg, Ohio, January 1997.

7. **Technical Position Report in Support of the Release Block D Residual Risk Evaluation**, U.S. Department of Energy, Miamisburg, Ohio, January 1999.

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APPENDIX

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Revised **Table V.1 Characterization of Residual Risks at Release Block H - Construction Worker**
Soil Pathways - Incremental

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)						
Aldrin	NA	***	4.9E-04	NA	1.0E-04	
α-Chlordane	NA	***	9.4E-05	NA	1.6E-04	
γ-Chlordane	NA	***	7.0E-05	NA	1.2E-04	
Heptachlor epoxide	NA	***	7.9E-04	NA	1.7E-04	
Acenaphthene	NA	***	1.4E-05	NA	2.9E-06	
Arsenic	NA	***	3.6E-02	NA	7.5E-04	
Fluorene	NA	***	1.7E-04	NA	3.5E-05	
Naphthalene	NA	***	6.2E-04	NA	5.1E-08	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.1E-10	NA	6.5E-11	
Acenaphthylene	NA	***	***	NA	NA	
δ-BHC	NA	***	***	NA	NA	
Bismuth	NA	***	***	NA	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	NA	
Copper	NA	***	***	NA	NA	
Dibenzofuran	NA	***	***	NA	NA	
Lithium	NA	***	***	NA	NA	
2-Methlynaphthalene	NA	***	***	NA	NA	
Phenanthrene	NA	***	***	NA	NA	Total HI =
Total:			3.8E-02		1.3E-03	4.0E-02
Carcinogens (Risk)						
Aldrin	NA	***	1.8E-08	NA	3.7E-09	
Arsenic	NA	***	1.2E-06	NA	2.4E-07	
Benzo(a)pyrene	NA	***	2.7E-06	NA	5.7E-07	
Benzo(g,h,i)perylene	NA	***	***	NA	***	
Carbazole	NA	***	***	NA	***	
α-Chlordane	NA	***	1.2E-09	NA	9.1E-10	
γ-Chlordane	NA	***	8.7E-10	NA	6.7E-10	
Dibenzo(a,h)anthracene	NA	***	***	NA	***	
Heptachlor epoxide	NA	***	6.7E-09	NA	1.4E-09	Total Carcinogenic
Lead	NA	***	***	NA	***	Risk =
Total:			3.9E-06		8.2E-07	4.7E-06
Radionuclides (Risk)						
Cesium-137	NA	1.6E-13	2.8E-08	4.7E-06	NA	
Plutonium-238	NA	1.8E-10	2.0E-07	3.2E-11	NA	Total Radionuclide
Plutonium-242	NA	2.2E-12	2.6E-09	3.3E-13	NA	Risk =
Total:		1.8E-10	2.3E-07	4.7E-06		4.9E-06

*** - Toxicity values not available.

NA - Not applicable.

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Revised **Table V.4 Characterization of Residual Risks at Release Block H - Site Employee Soil Pathways - Incremental**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)					
Aldrin	NA	***	5.1E-05	NA	
α-Chlordane	NA	***	9.8E-06	NA	
γ-Chlordane	NA	***	7.2E-06	NA	
Heptachlor epoxide	NA	***	8.3E-05	NA	
Acenaphthene	NA	***	1.5E-06	NA	
Arsenic	NA	***	3.8E-03	NA	
Fluorene	NA	***	1.8E-05	NA	
Naphthalene	NA	***	6.4E-05	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.3E-11	NA	
Acenaphthylene	NA	***	***	NA	
δ-BHC	NA	***	***	NA	
Bismuth	NA	***	***	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	
Copper	NA	***	***	NA	
Dibenzofuran	NA	***	***	NA	
Lithium	NA	***	***	NA	
2-Methlynaphthalene	NA	***	***	NA	
Phenanthrene	NA	***	***	NA	Total HI =
Total:			4.0E-03		4.0E-03
Carcinogens (Risk)					
Aldrin	NA	***	9.2E-09	NA	
Arsenic	NA	***	6.0E-07	NA	
Benzo(a)pyrene	NA	***	1.4E-06	NA	
Benzo(g,h,i)perylene	NA	***	***	NA	
Carbazole	NA	***	***	NA	
α-Chlordane	NA	***	6.1E-10	NA	
γ-Chlordane	NA	***	4.5E-10	NA	
Dibenzo(a,h)anthracene	NA	***	***	NA	
Heptachlor epoxide	NA	***	3.5E-09	NA	Total Carcinogenic
Lead	NA	***	***	NA	Risk =
Total:			2.0E-06		2.0E-06
Radionuclides (Risk)					
Cesium-137	NA	8.2E-13	1.5E-08	5.2E-06	
Plutonium-238	NA	9.0E-10	1.1E-07	3.9E-11	Total Radionuclide
Plutonium-242	NA	1.1E-11	1.3E-09	3.7E-13	Risk =
Total:		9.1E-10	1.3E-07	5.2E-06	5.3E-06

*** - Toxicity values not available.

NA - Not applicable.

DRAFT

Revised **Table F.7 Characterization of Residual Risks at Release Block H - Construction Worker Soil Pathways - Background**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)						
Arsenic	NA	***	1.3E-01	NA	2.8E-03	
Acenaphthalene	NA	***	0.0E+00	NA	0.0E+00	
Acenapthlyene	NA	***	***	NA	***	
Aldrin	NA	***	0.0E+00	NA	0.0E+00	
δ-BHC	NA	***	***	NA	***	
Bismuth	NA	***	***	NA	***	
α-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
γ-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
4-Chloro-3-methylphenol	NA	***	***	NA	***	
Copper	NA	***	***	NA	***	
Dibenzofuran	NA	***	***	NA	***	
Fluorene	NA	***	0.0E+00	NA	0.0E+00	
Heptachlor epoxide	NA	***	0.0E+00	NA	0.0E+00	
Lithium	NA	***	***	NA	***	
2-Methlynaphthalene	NA	***	***	NA	***	
Naphthalene	NA	***	0.0E+00	NA	0.0E+00	
Phenanthrene	NA	***	***	NA	***	
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	***	0.0E+00	NA	0.0E+00	Total HI =
Total:			1.3E-01		2.8E-03	1.3E-01
Carcinogens (Risk)						
Aldrin	NA	***	0.0E+00	NA	0.0E+00	
Arsenic	NA	***	4.3E-06	NA	9.0E-07	
Benzo(a)pyrene	NA	***	0.0E+00	NA	0.0E+00	
Benzo(g,h,i)perylene	NA	***	***	NA	***	
Carbazole	NA	***	***	NA	***	
α-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
γ-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
Dibenzo(a,h)anthracene	NA	***	***	NA	***	
Heptachlor epoxide	NA	***	0.0E+00	NA	0.0E+00	Total Carcinogenic
Lead	NA	***	***	NA	***	Risk =
Total:			4.3E-06		9.0E-07	5.2E-06
Radionuclides (Risk)						
Cesium-137	NA	4.7E-14	8.1E-09	1.3E-06	NA	
Plutonium-238	NA	2.1E-11	2.3E-08	3.7E-12	NA	Total Radionuclide
Plutonium-242	NA	NA	NA	NA	NA	Risk =
Total:		2.1E-11	3.1E-08	1.3E-06		1.3E-06

*** - Toxicity values not available.

NA - Not applicable.

DRAFT

Revised **Table F.10 Characterization of Residual Risks at Release Block H - Site Employee Soil Pathways - Background**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)					
Arsenic	NA	***	1.4E-02	NA	
Acenaphthalene	NA	***	0.0E+00	NA	
Acenapthlyene	NA	***	***	NA	
Aldrin	NA	***	0.0E+00	NA	
δ-BHC	NA	***	***	NA	
Bismuth	NA	***	***	NA	
α-Chlordane	NA	***	0.0E+00	NA	
γ-Chlordane	NA	***	0.0E+00	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	
Copper	NA	***	***	NA	
Dibenzofuran	NA	***	***	NA	
Fluorene	NA	***	0.0E+00	NA	
Heptachlor epoxide	NA	***	0.0E+00	NA	
Lithium	NA	***	***	NA	
2-Methlynaphthalene	NA	***	***	NA	
Naphthalene	NA	***	0.0E+00	NA	
Phenanthrene	NA	***	***	NA	
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	***	0.0E+00	NA	Total HI =
Total:			1.4E-02		1.4E-02
Carcinogens (Risk)					
Aldrin	NA	***	0.0E+00	NA	
Arsenic	NA	***	2.3E-06	NA	
Benzo(a)pyrene	NA	***	0.0E+00	NA	
Benzo(g,h,i)perylene	NA	***	***	NA	
Carbazole	NA	***	***	NA	
α-Chlordane	NA	***	0.0E+00	NA	
γ-Chlordane	NA	***	0.0E+00	NA	
Dibenzo(a,h)anthracene	NA	***	***	NA	
Heptachlor epoxide	NA	***	0.0E+00	NA	Total Carcinogenic
Lead	NA	***	***	NA	Risk =
Total:			2.3E-06		2.3E-06
Radionuclides (Risk)					
Cesium-137	NA	2.3E-13	4.2E-09	1.5E-06	
Plutonium-238	NA	1.0E-10	1.2E-08	4.1E-12	Total Radionuclide
Plutonium-242	NA	NA	NA	NA	Risk =
Total:		1.0E-10	1.6E-08	1.5E-06	1.5E-06

*** - Toxicity values not available.

NA - Not applicable.

DRAFT

Revised **Table F.19 Characterization of Residual Risks at Release Block H - Construction Worker Soil Pathways - Total**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)						
Aldrin	NA	***	4.9E-04	NA	1.0E-04	
α-Chlordane	NA	***	9.4E-05	NA	1.6E-04	
γ-Chlordane	NA	***	7.0E-05	NA	1.2E-04	
Heptachlor epoxide	NA	***	7.9E-04	NA	1.7E-04	
Acenaphthene	NA	***	1.4E-05	NA	2.9E-06	
Arsenic	NA	***	1.7E-01	NA	3.6E-03	
Fluorene	NA	***	1.7E-04	NA	3.5E-05	
Naphthalene	NA	***	6.2E-04	NA	5.1E-08	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.1E-10	NA	6.5E-11	
Acenaphthylene	NA	***	***	NA	NA	
δ-BHC	NA	***	***	NA	NA	
Bismuth	NA	***	***	NA	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	NA	
Copper	NA	***	***	NA	NA	
Dibenzofuran	NA	***	***	NA	NA	
Lithium	NA	***	***	NA	NA	
2-Methlynaphthalene	NA	***	***	NA	NA	
Phenanthrene	NA	***	***	NA	NA	Total HI =
Total:			1.7E-01		4.2E-03	1.7E-01
Carcinogens (Risk)						
Aldrin	NA	***	1.8E-08	NA	3.7E-09	
Arsenic	NA	***	5.5E-06	NA	1.1E-06	
Benzo(a)pyrene	NA	***	2.7E-06	NA	5.7E-07	
Benzo(g,h,i)perylene	NA	***	***	NA	***	
Carbazole	NA	***	***	NA	***	
α-Chlordane	NA	***	1.2E-09	NA	9.1E-10	
γ-Chlordane	NA	***	8.7E-10	NA	6.7E-10	
Dibenzo(a,h)anthracene	NA	***	***	NA	***	
Heptachlor epoxide	NA	***	6.7E-09	NA	1.4E-09	Total Carcinogenic
Lead	NA	***	***	NA	***	Risk =
Total:			8.2E-06		1.7E-06	9.9E-06
Radionuclides (Risk)						
Cesium-137	NA	2.1E-13	3.6E-08	6.0E-06	NA	
Plutonium-238	NA	2.0E-10	2.3E-07	3.6E-11	NA	Total Radionuclide
Plutonium-242	NA	2.2E-12	2.6E-09	3.3E-13	NA	Risk =
Total:		2.0E-10	2.7E-07	6.0E-06		6.2E-06

*** - Toxicity values not available.

NA - Not applicable.

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Revised **Table F22. Characterization of Residual Risks at Release Block H - Site Employee Soil Pathways - Total**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)					
Aldrin	NA	***	5.1E-05	NA	
α-Chlordane	NA	***	9.8E-06	NA	
γ-Chlordane	NA	***	7.2E-06	NA	
Heptachlor epoxide	NA	***	8.3E-05	NA	
Acenaphthene	NA	***	1.5E-06	NA	
Arsenic	NA	***	1.8E-02	NA	
Fluorene	NA	***	1.8E-05	NA	
Naphthalene	NA	***	6.4E-05	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.3E-11	NA	
Acenaphthylene	NA	***	***	NA	
δ-BHC	NA	***	***	NA	
Bismuth	NA	***	***	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	
Copper	NA	***	***	NA	
Dibenzofuran	NA	***	***	NA	
Lithium	NA	***	***	NA	
2-Methlynaphthalene	NA	***	***	NA	
Phenanthrene	NA	***	***	NA	Total HI =
Total:			1.8E-02		1.8E-02
Carcinogens (Risk)					
Aldrin	NA	***	9.2E-09	NA	
Arsenic	NA	***	2.9E-06	NA	
Benzo(a)pyrene	NA	***	1.4E-06	NA	
Benzo(g,h,i)perylene	NA	***	***	NA	
Carbazole	NA	***	***	NA	
α-Chlordane	NA	***	6.1E-10	NA	
γ-Chlordane	NA	***	4.5E-10	NA	
Dibenzo(a,h)anthracene	NA	***	***	NA	
Heptachlor epoxide	NA	***	3.5E-09	NA	Total Carcinogenic
Lead	NA	***	***	NA	Risk =
Total:			4.3E-06		4.3E-06
Radionuclides (Risk)					
Cesium-137	NA	1.1E-12	1.9E-08	6.6E-06	
Plutonium-238	NA	1.1E-09	1.3E-07	4.3E-11	Total Radionuclide
Plutonium-242	NA	1.1E-11	1.3E-09	3.7E-13	Risk =
Total:		1.1E-09	1.5E-07	6.6E-06	6.8E-06

*** - Toxicity values not available.

NA - Not applicable.

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Release Block H
Risk and HQ Calculations for α- and γ-Chlordane Soil Inhalation and Ingestion
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental and Total Soil Concentrations

0.01 mg/kg	α-chlordane: Construction Worker/Site Employee
0.0074 mg/kg	γ-chlordane: Construction Worker/Site Employee

Oral Slope Factor
3.5E-01 mg/kg-d

Oral Reference Dose
5.0E-04 mg/kg-d

Construction Worker Intakes, Carcinogenic [redacted]

α-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	480	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = 3.35E-09 mg/kg-d

γ-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	480	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = 2.48E-09 mg/kg-d

Construction Worker Intakes, Non-Carcinogenic [redacted]

α-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = 4.70E-08 mg/kg-d

γ-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = 3.48E-08 mg/kg-d

Construction Worker Intakes, Carcinogenic [redacted]

α-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	20	m^3/day (IR = inhalation rate)
BW =	70	kilograms (BW = body weight)
AT =	70	years (AT = averaging time)

Intake = 3.27E-14 mg/kg-d

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Release Block H
Risk and HQ Calculations for Arsenic Soil Inhalation and Ingestion
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental Soil Concentration
2.3 mg/kg Construction Worker/Site Employee

Oral Slope Factor
1.5E+00 mg/kg-d

Oral Reference Dose
3.0E-04 mg/kg-d

Construction Worker Intake, Carcinogenic

Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	480	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = 7.72E-07 mg/kg-d

Construction Worker Intake, Non-Carcinogenic

Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = 1.08E-05 mg/kg-d

Site Employee Intakes, Carcinogenic

Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	25	years (ED = exposure duration)
IR =	50	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = 4.02E-07 mg/kg-d

Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = 1.13E-06 mg/kg-d

Arsenic Risk and Hazard Quotient (HQ) Values
Soil Ingestion and Inhalation

Risk = Intake * Slope Factor
HQ = Intake/Reference Dose

Construction Worker	Risk	HQ
Soil ingestion	1.2E-06	3.6E-02
Soil inhalation	N/A	N/A

Site Employee	Risk	HQ
Soil ingestion	6.0E-07	3.8E-03
Soil inhalation	N/A	N/A

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γ-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)

CS =	0.0074	mg/kg	(CS = concentration in soil)
PEF =	4.28E+09	m^3/kg	(PEF = particulate emission factor)
EF =	250	days/year	(EF = exposure frequency)
ED =	5	years	(ED = exposure duration)
IR =	20	m^3/day	(IR = inhalation rate)
BW =	70	kilograms	(BW = body weight)
AT =	70	years	(AT = averaging time)

Intake = 2.42E-14 mg/kg-d

Construction Worker Intakes, Non-Carcinogenic [redacted]

α-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)

CS =	0.01	mg/kg	(CS = concentration in soil)
PEF =	4.28E+09	m^3/kg	(PEF = particulate emission factor)
IR =	20	m^3/day	(IR = inhalation rate)
EF =	250	days/year	(EF = exposure frequency)
BW =	70	kilograms	(BW = body weight)

Intake = 4.57E-13 mg/kg-d

γ-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)

CS =	0.0074	mg/kg	(CS = concentration in soil)
PEF =	4.28E+09	m^3/kg	(PEF = particulate emission factor)
IR =	20	m^3/day	(IR = inhalation rate)
EF =	250	days/year	(EF = exposure frequency)
BW =	70	kilograms	(BW = body weight)

Intake = 3.38E-13 mg/kg-d

Site Employee Intakes, Carcinogenic [redacted]

α-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.01	mg/kg	(CS = concentration in soil)
EF =	250	days/year	(EF = exposure frequency)
ED =	25	years	(ED = exposure duration)
IR =	50	mg/day	(IR = ingestion rate)
AT =	70	years	(AT = averaging time)
BW =	70	kilograms	(BW = body weight)

Intake = 1.75E-09 mg/kg-d

γ-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.0074	mg/kg	(CS = concentration in soil)
EF =	250	days/year	(EF = exposure frequency)
ED =	25	years	(ED = exposure duration)
IR =	50	mg/day	(IR = ingestion rate)
AT =	70	years	(AT = averaging time)
BW =	70	kilograms	(BW = body weight)

Intake = 1.29E-09 mg/kg-d

Site Employee Intakes, Non-Carcinogenic [redacted]

α-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.01	mg/kg	(CS = concentration in soil)
EF =	250	days/year	(EF = exposure frequency)
IR =	50	mg/day	(IR = ingestion rate)
BW =	70	kilograms	(BW = body weight)

Intake = 4.89E-09 mg/kg-d

γ-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.0074	mg/kg	(CS = concentration in soil)
EF =	250	days/year	(EF = exposure frequency)
IR =	50	mg/day	(IR = ingestion rate)
BW =	70	kilograms	(BW = body weight)

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Intake = 3.62E-09 mg/kg-d

Site Employee Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)
CS = 0.01 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
EF = 250 days/year (EF = exposure frequency)
ED = 25 years (ED = exposure duration)
IR = 20 m^3/day (IR = inhalation rate)
BW = 70 kilograms (BW = body weight)
AT = 70 years (AT = averaging time)

Intake = 1.63E-13 mg/kg-d

γ-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)
CS = 0.0074 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
EF = 250 days/year (EF = exposure frequency)
ED = 25 years (ED = exposure duration)
IR = 20 m^3/day (IR = inhalation rate)
BW = 70 kilograms (BW = body weight)
AT = 70 years (AT = averaging time)

Intake = 1.21E-13 mg/kg-d

Construction Worker Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)
CS = 0.01 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
IR = 20 m^3/day (IR = inhalation rate)
EF = 250 days/year (EF = exposure frequency)
BW = 70 kilograms (BW = body weight)

Intake = 4.57E-13 mg/kg-d

γ-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)
CS = 0.0074 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
IR = 20 m^3/day (IR = inhalation rate)
EF = 250 days/year (EF = exposure frequency)
BW = 70 kilograms (BW = body weight)

Intake = 3.38E-13 mg/kg-d

Chlordane Risk and Hazard Quotient (HQ) Values
Soil Ingestion and Inhalation

Risk = Intake * Slope Factor
HQ = Intake/Reference Dose

	α-Chlordane		γ-Chlordane	
Construction Worker	Risk	HQ	Risk	HQ
Soil ingestion	1.2E-09	9.4E-05	8.7E-10	7.0E-05
Soil inhalation	N/A	N/A	N/A	N/A

	α-Chlordane		γ-Chlordane	
Site Employee	Risk	HQ	Risk	HQ
Soil ingestion	6.1E-10	9.8E-06	4.5E-10	7.2E-06
Soil inhalation	N/A	N/A	N/A	N/A

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Release Block H
HQ Calculations for Naphthalene Soil Ingestion

(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental and Total Soil Concentrations

2.625 mg/kg Construction Worker/Site Employee

Oral Reference Dose

2.0E-02 mg/kg-d

Construction Worker Intake, Non-Carcinogenic

Ingestion

Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.625	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.23E-05** mg/kg-d

Site Employee Intake, Non-Carcinogenic

Ingestion

Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.625	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.28E-06** mg/kg-d

Naphthalene Hazard Quotient (HQ) Values
Soil Ingestion

HQ = Intake/Reference Dose

Construction Worker	Risk	HQ
Soil ingestion	N/A	6.2E-04
Soil inhalation	N/A	N/A

Site Employee	Risk	HQ
Soil ingestion	N/A	6.4E-05
Soil inhalation	N/A	N/A

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Release Block H
Risk Calculations for Pu-242 Soil Inhalation, Soil Ingestion and External Exposure
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental and Total Soil Concentrations
0.0143 pCi/g Construction Worker/Site Employee

Slope Factors
3.00E-10 risk/pCi ingested
2.64E-08 risk/pCi inhaled
1.55E-11 risk/yr/pCi/g

Construction Worker Ingestion

Intake, pCi = CS*ED*EF*0.001*IR
CS = 0.0143 pCi/g (CS = concentration in soil)
ED = 5 years (ED = exposure duration)
EF = 250 days/year (EF = exposure frequency)
IR = 480 mg/day (IR = ingestion rate)

Intake = 8.58E+00 pCi

Construction Worker Inhalation
Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR
CS = 0.0143 pCi/g (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
ED = 5 years (ED = exposure duration)
EF = 250 days/year (EF = exposure frequency)
IR = 20 m^3/day (IR = inhalation rate)

Intake = 8.35E-05 pCi

Construction Worker External Exposure
Exposure = CS*TE*(1-SE)*ED
CS = 1.43E-02 pCi/g
TE = 3.33E-01 TE = gamma shielding factor, dimensionless
SE = 1.00E-01 SE =gamma exposure time factor, dimensionless
ED = 5.00E+00 yr (ED = exposure duration)

Exposure = 2.14E-02 pCi-yr/g

Site Employee Ingestion
Intake, pCi = CS*ED*EF*0.001*IR
CS = 0.0143 mg/kg (CS = concentration in soil)
ED = 25 years (ED = exposure duration)
EF = 250 days/year (EF = exposure frequency)
IR = 50 mg/day (IR = ingestion rate)

Intake = 4.47E+00 pCi

Site Employee Inhalation
Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR
CS = 0.0143 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
ED = 25 years (ED = exposure duration)
EF = 250 days/year (EF = exposure frequency)
IR = 20 m^3/day (IR = inhalation rate)

Intake = 4.18E-04 pCi

Site Employee External Exposure
Exposure = CS*TE*(1-SE)*ED
CS = 1.43E-02 pCi/g
TE = 8.30E-02 TE = gamma shielding factor, dimensionless
SE = 2.00E-01 SE =gamma exposure time factor, dimensionless
ED = 25 yr (ED = exposure duration)

Exposure = 2.37E-02 pCi-yr/g

Pu-242 Risk Values
Soil Ingestion, Soil Inhalation, and External Exposure

Risk = Intake * Slope Factor

Construction Worker	Risk
Soil ingestion	2.6E-09
Soil inhalation	2.2E-12
Ext Exp	3.3E-13

Site Employee	Risk
Soil ingestion	1.3E-09
Soil inhalation	1.1E-11
Ext Exp	3.68E-13