TECHNICAL SUPPORT FOR ROCKY MOUNTAIN ARSENAL

Offpost Operable Unit
Remedial Investigation

Final Addendum

Volume I of II

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1.0 INTRODUCTION

This Addendum to the Rocky Mountain Arsenal (RMA) Offpost Operable Unit (OU) Remedial Investigation (RI) report has been prepared by Harding Lawson Associates (HLA) for the Program Manager for Rocky Mountain Arsenal (PMRMA). This document presents the results of additional data collection activities and interpretive efforts conducted in the Offpost OU north of RMA after the Offpost OU RI report (Final RI) (Environmental Science and Engineering, Inc. [ESE], 1988a) was completed. The Offpost OU RI Addendum investigation consisted of additional data collection programs and evaluations for offpost environmental media, including groundwater in the unconfined flow system (UFS) and Arapahoe Formation, surface water, stream-bottom sediment, soil, and biota. The results and interpretations presented in this report are being used to prepare a revised Draft Final Offpost OU Endangerment Assessment/Feasibility Study (EA/FS) report (ESE, 1989a). The locations of the RMA Onpost OU and the Offpost OU are shown in Figures 1.1 and 1.2, respectively.

1.1 PURPOSE

The purpose of the RI Addendum activities described in this report was to further characterize the nature and extent of RMA-derived contaminants offpost in groundwater, surface water, sediment, soil, and biota. RI Addendum activities included collecting and evaluating physical and chemical data and, where necessary, updating interpretations of contaminant distributions offpost. Data presented and discussed in this report include the results of analyses for samples collected under the RI Addendum program for groundwater, surface water, stream-bottom sediment, soil, and biota. Additionally, data collected under the RMA Comprehensive Monitoring Program (CMP) for groundwater and surface water were used in performing the evaluations of the nature and extent of contamination for those media. Appropriate information collected by the Colorado Department of Health (CDH) for soil was also considered in this report.

The general nature of the data collection activities conducted for the Offpost OU RI Addendum investigation was discussed among the U.S. Department of the Army (Army), Shell Oil

Company (Shell), the U.S. Environmental Protection Agency (EPA), the State (CDH), and the U.S. Fish and Wildlife Service (USFWS) during preparation of the Draft Final Work Plan for the Offpost OU RI/EA/FS. The specific activities performed for this effort were developed largely on the basis of comments received on the Final RI from the Organizations and the State (OAS). The review and comment process conducted on the Offpost OU RI report and the Offpost OU EA/FS report identified the need for additional data collection and evaluation of the extent of contamination in various media offpost.

1.2 SUMMARY OF THE TECHNICAL APPROACH

The technical approach used to complete the Offpost OU RI Addendum investigation and report consisted of (1) reviewing existing data, (2) designing a field sampling program to address identified data needs, and (3) collecting and interpreting additional field data.

The field sampling program conducted to collect data for the RI Addendum was designed to generate information necessary to address identified data needs. A summary of the data needs for each medium within the Offpost OU is provided in Table 1.1. The program was developed following review of (1) the OAS comments and (2) RMA reports that contain more recent data or data for media that were not sampled during the offpost RI program. The following RMA reports were reviewed:

1. Final Offpost OU RI report (ESE, 1988a)
2. CMP Annual Groundwater Report for 1988 (R. L. Stollar Associates [RLSA], 1989)
3. CMP Annual Groundwater Report for 1989 (RLSA, 1990a)
4. CMP Annual Groundwater Report for 1990 (RLSA, 1991a)
5. CMP Final Surface-Water Data Assessment Report for 1988 (RLSA, 1990b)
6. CMP Final Surface-Water Data Assessment Report for 1989 (RLSA, 1991b)
7. RMA Water RI report (Ebasco, 1989)
8. RMA Biota RI report (ESE, 1989b)

The reviews assisted in assessing the distribution of selected organic compounds and inorganic constituents in various media in the Offpost OU and provided a basis from which to select areas for additional sample collection.

Sample collection and data evaluation procedures followed during RI Addendum activities were consistent with those approved by the Army and are specified in the following planning documents prepared by HLA to address specific objectives for the task:

- Draft Final Work Plan (Work Plan), Offpost Operable Unit Remedial Investigation/ Endangerment Assessment/Feasibility Study, December 1989 (HLA, 1989a)
- Offpost Interim Response Action and Remedial Investigation/Feasibility Study, Draft Final Field Operations Procedures Plan (FOP) (HLA, 1989b)
- Offpost Operable Unit, Draft Final Quality Assurance Plan (QAP), August 1989 (HLA, 1989c)
- Offpost Interim Response Action and Remedial Investigation/Feasibility Study, Draft Final Health and Safety Plan (HSP), August 1989 (HLA, 1989d)
- Offpost Interim Response Action and Remedial Investigation/Feasibility Study, Draft Final Data Management Plan (DMP), August 1989 (HLA, 1989e)
- Surficial Soil Sampling Plan, April 1990 (HLA, 1990)

The Work Plan described specific data collection objectives to be incorporated in the RI Addendum report. Within the Work Plan are detailed sampling procedures and proposed sampling locations for offpost media that required further characterization. The QAP describes sample collection procedures and guidelines, analytical methods, recordkeeping, and other procedures designed to ensure the quality of the data generated during the RI Addendum activities. The FOP presents the procedures for conducting the field activities, including procedures for drilling and installation, sampling of various media, hydraulic testing, and decontamination.

The HSP describes health and safety guidelines implemented to protect personnel, equipment, materials, and property during the RI Addendum field investigations. The DMP describes field sample custody, data tracking, database management, and quality assurance/quality control (QA/QC) procedures for creating and maintaining the computerized database. The Surficial Soil Sampling Plan describes field procedures, proposed sample locations, and rationale for additional offpost surficial soil sampling. Offpost OU RI Addendum field, laboratory, and data evaluation activities were performed in accordance with the procedures described in the planning documents.

1.3 REPORT ORGANIZATION

Data collection, analysis, and monitoring programs conducted to address data needs for each medium are described in Section 2.0. The results of monitoring activities and data assessment, by medium, are provided in Sections 3.0 through 7.0. The results and conclusions of the Offpost OU RI Addendum Investigation are summarized in Section 8.0. Geologic and analytical data discussed in this report are contained in Appendixes A through H.

Geologic and groundwater analytical data are contained in Appendixes A and B. Appendix A contains lithologic data and well completion diagrams, including survey data for monitoring wells installed during RI Addendum activities. Groundwater analytical data, including results for analyses of investigative gas chromatography/mass spectroscopy (GC/MS), QA/QC, and duplicate samples, are presented in Appendix B. Appendixes C through F contain similar data for samples of other media also collected during RI Addendum activities. Appendix G contains analytical data for surficial soil samples collected by CDH in the area immediately north of RMA. Analytical results for additional surficial soil samples collected from the offpost OU in May 1991 are presented in Appendix H. Responses to OAS comments on the Draft Final RI Addendum report are presented in Appendix I.

2.0 DATA COLLECTION AND ANALYSES

The data collection programs described in this section were designed to address data needs for each Offpost OU medium identified by the Army on the basis of review comments received from the OAS following their review of the Final RI report (ESE, 1988a) and the Draft Final EA/FS report (ESE, 1989a). Additionally, data collection activities were proposed for the offpost program on the basis of OAS comments made during various working meetings. Data that required additional data collection are summarized in Table 1.1.

The following subsections describe monitoring networks, sampling methods and procedures, and analytical programs used for additional data collection from Offpost OU environmental media. The following subsections describe the field and analytical activities conducted during the RI Addendum for each medium and include the sampling locations, number of samples collected, sampling procedures, and analyses performed.

2.1 GROUNDWATER MONITORING PROGRAM

This section describes the groundwater monitoring network, groundwater sampling events, sampling methodology, and analytical program used to assess groundwater flow and contamination in the Offpost OU. Results of the groundwater monitoring program are presented and discussed in Section 3.0.

The data collected during the RI Addendum were assessed, together with the data collected during the RI, to accomplish the objectives described in the Work Plan. The objectives of the additional data collection for groundwater assessment were (1) to collect additional data required to assess contaminant plume boundaries adequately and to address the interpreted contaminant plumes and isolated detections of contaminants in some wells and (2) to collect the data necessary to supplement assessment of migration pathways.

2.1.1 Groundwater Monitoring Network and Rationale

The network of groundwater monitoring wells sampled during the Offpost OU RI Addendum investigation was selected to provide data to evaluate groundwater flow and contamination in

Offpost OU groundwater in the UFS. Groundwater samples were also collected from wells in the Arapahoe Formation to assess the occurrence of contaminants in that confined groundwater zone.

Data presented in the Final RI demonstrated that contamination in the Denver Formation generally exhibited a trend of decreasing contaminant.concentrations with depth. The highest contamination concentrations in the Denver Formation were generally observed in samples from wells completed within sandy zones of the upper Denver Formation. These zones are in direct contact with the base of the alluvium. Most of the organic contaminants observed in the Denver Formation are generally present in the overlying alluvium nearby. Downward gradients from the alluvium to the Denver Formation and relatively low lateral velocities in the Denver Formation suggest that a component of vertical migration in the offpost was present. Lateral migration of mobile contaminants within the Denver Formation that move at a rate similar to that of groundwater is expected to be relatively slow as compared to the alluvial aquifer. Based on these conclusions, additional characterization of the nature and extent of contamination in the Denver Formation is not necessary for conducting and EA/FS for the Offpost OU.

Groundwater in the UFS is present in the unconsolidated alluvial sediments overlying the Denver Formation and in the weathered upper portion of the Denver Formation. The majority of the groundwater movement and groundwater contaminant migration in the Offpost OU occurs in the UFS. As noted above, groundwater monitoring in the Denver Formation was not necessary for this addendum report because the Final RI report adequately characterized the extent of contamination in the Denver Formation for the purposes of conducting an EA and FS for the Offpost OU. Additionally, the Final RI identified the mechanisms of contaminant migration through the Denver Formation. The Army presented the conceptual model for interaction between the Denver Formation and the UFS to the OAS on October 16, 1991. Contaminant migration to the Denver Formation, which in some areas is part of the UFS, occurs where subcropping sands are in contact with contaminated groundwater in the UFS. Groundwater flow in the Denver Formation is considerably slower than in the UFS. Given the relatively slow groundwater velocities in the Denver Formation, contaminants observed in the Denver Formation in the Offpost OU must have entered the Denver Formation flow system locally. The subcropping sands of the Denver Formation, particularly those sand units that have detectable levels of contaminants, generally discharge to the UFS primarily in areas upgradient of the O'Brian Canal. Considering the relationships between contaminant migration in the Denver Formation and the UFS, additional characterization of the Denver Formation was not considered necessary in this RI Addendum.

The groundwater monitoring network sampled during RI Addendum activities consisted of existing and new monitoring wells in locations that were selected to provided sufficient data to address the groundwater program objectives. The sampling events and locations are described below.

The RI Addendum groundwater monitoring network consisted of 124 wells, including 65 existing monitoring wells and piezometers, 25 domestic-use wells, and 34 new monitoring wells and piezometers installed as part of the Groundwater Intercept and Treatment System North of RMA Interim Response Action (IRA A) and RI Addendum activities. The existing monitoring wells were sampled as part of the CMP offpost monitoring network. The domestic-use wells and new monitoring wells were sampled during IRA A and RI Addendum activities.

The locations of offpost monitoring wells completed in the UFS and domestic wells completed in the UFS or Arapahoe Formation are shown in Figures 2.1 and 2.2. Unconfined flow system wells include wells completed in saturated alluvium and wells completed in permeable Denver Formation strata that are hydraulically connected to the alluvium (ESE, 1988a). The aquifer designations assigned to wells and listed in Table 2.1 are consistent with those adopted under the CMP.

Thirteen new UFS monitoring wells and 3 Arapahoe Formation wells were installed under the RI Addendum program during 1989 and 1990. The technical justification for installing these wells was presented in the Work Plan (HLA, 1989a) and is summarized in Table 2.2.

2.1.1.1 Monitoring Well Installation Methods

The new UFS monitoring wells were installed between November 1989 and February 1990 under the RI Addendum program. They were completed in saturated alluvium with total depths ranging from 30 to 56 feet below ground surface. The lithology of each monitoring well was logged, and reference samples were obtained at 5-foot intervals using a pilot boring with a 3.25-inch-inside-diameter (ID) hollow-stem auger (HSA). The pilot boring was terminated when depth to bedrock was confirmed and was reamed to the well completion depth using an 8.25-inch-ID HSA. Monitoring wells were installed with 8.25-inch-ID HSAs that were drilled from 1 to 2 feet into bedrock.

Monitoring wells were constructed of 4-inch-diameter Schedule 40 PVC, flush-threaded casing and 0.020-inch slot screens. Each well was designed to screen the interval from the interface between competent bedrock and alluvium or weathered bedrock to an elevation above the highest seasonal groundwater fluctuation. The monitoring wells were developed before sampling using a surge and pump method with a 3-inch-diameter submersible pump. Well installation and development procedures and documentation protocol are described in the Work Plan (HLA, 1989a) and in the FOP (HLA, 1989b). Well construction details are summarized in Table 2.3. Lithologic logs and well construction summary diagrams are included in Appendix A.

Three wells were drilled and completed in the Arapahoe Formation. These wells provide groundwater quality data for the Arapahoe Formation. Each well was drilled using rotary methods and was triple-cased to minimize the potential for cross-contamination of the Arapahoe Formation. For each well, a 15- or 15-1/4-inch-diameter hole was drilled through alluvium and into the upper few feet of Denver Formation bedrock. This interval was sealed by installing and pressure grouting a 12-inch-ID steel conductor casing in place.

After a minimum of 24 hours curing time, the cement plug was drilled out and the hole was advanced to approximately the top of the Upper Arapahoe Formation using an 11-7/8-inch-diameter bit. The interval, down to that depth, was sealed off by installing and pressure grouting an 8-inch-ID steel conductor casing in place. After a minimum of 24 hours curing time, the plug was drilled out and an acoustic bond log was run to assess the casing bond. After a positive assessment of the bond log, the hole was advanced to total depth using a 7-7/8-inch bit. Upon reaching a clean, productive Arapahoe Formation sand, the drill string was removed, and the hole was geophysically logged using natural gamma, self-potential, and resistivity tools. The completion intervals were selected on the basis of these logs.

Final completion of the well was achieved using 4-inch-ID stainless-steel wire-wound well screen (0.020-inch slot size), 4- or 5-inch steel welded riser pipe, and an 8-12 or 10-20 silica sand filter pack from total depth to the top of the Lower Arapahoe Formation water-producing interval. A bentonite pellet seal was placed via tremie pipe on top of the sand-filter pack and the remaining annulus between the final casing, and the 8-inch conductor casing was grouted to the surface. After a minimum of 24 hours curing time, the well was developed by a combination of air lifting and pumping. Each well was disinfected using sodium hypochlorite according to the requirements of the State of Colorado's Engineer's Office.

2.1.2 Water-Level Monitoring and Groundwater Sampling

Water-level monitoring and groundwater quality sampling were performed in 1989 and 1990 during RI Addendum, IRA A, and CMP activities. Samples were collected from all offpost UFS monitoring and domestic wells and 10 Arapahoe Formation wells. Data from these sampling events were combined to create a comprehensive, temporally consistent database to evaluate the nature and extent of contamination in groundwater in the UFS and Arapahoe Formation.

The offpost CMP wells were sampled between October 25 and November 28, 1989, during the annual CMP sampling event. New wells installed during IRA A and RI Addendum activities were sampled during several events between September 1989 and March 1990. Most of the monitoring wells were sampled more than once during the RI Addendum. The domestic-use wells were sampled between January and April 1989. Water levels were measured in monitoring wells during the February 1990 CMP monitoring event. As further discussed in Section 3.0, groundwater-quality data from the Winter 1990-1991 CMP sampling event were also evaluated in this report.

2.1.3 Field Sampling Methodology

Sampling and field documentation procedures used during sampling and water-level measurements are described in the FOP (HLA, 1989b) and are briefly summarized here. Upon arrival at the sampling site, sampling personnel used a photoionization detector (PID) to measure background and casing head space concentrations, and readings were recorded. The aboveground casing height, depth-to-water, and total well depth were measured and recorded. The decision to pump or bail a well was made on the basis of the relative efficiency of either method with respect to the amount of purge water to be removed.

A minimum of five casing volumes of water was removed from each well before sampling. Sample bottles were rinsed with well water before filling. A chain-of-custody form and sample data sheet were completed for each sample and signed by the field team leader. All sample bottles were placed on ice and stored at 4 degrees Celsius (°C) in a sample cooler immediately after filling. All data collected during the groundwater monitoring program were recorded on preprinted field data sheets and in bound field notebooks, as described in the QAP (HLA, 1989c).

Groundwater samples were also collected from private residential wells. These samples were collected from the tap nearest the well. The tap was allowed to flow at the maximum rate for 45 minutes prior to sample collection. The approximate flow rate was measured during purging and was recorded on the field sampling data sheet. Field parameters were monitored during purging as specified in the FOP. The field parameters were also recorded in the field sheets and are used to verify that groundwater quality was stable prior to sampling. The flow rate from the individual taps was reduced during sample collection to reduce agitation of the samples. Sample handling, labeling, and chain-of-custody procedures for residential tap samples are consistent with requirements in the FOP and QAP.

2.1.4 Analytical Program

The analytical program for groundwater conducted during RI Addendum activities is consistent with the analytical program followed during the Final RI. Two additional analytes, caprolactam and bis(2-ethylhexyl)phthalate, were added to the target analyte list for the RI

Addendum. Groundwater samples were analyzed for the volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and inorganic constituents listed in Table 2.4. Analytical methods and target analyte certified reporting limits (CRLs) for the groundwater analytical program are listed in Table 2.5.

The analytical program included analyses by GC/MS for purposes of confirming GC results and as part of the QA/QC protocol. The analytical program, including the analytical policies and organization, methodologies, and QA/QC procedures and protocol used during RI Addendum activities, is described in the QAP (HLA, 1989c). All analytical activities were performed in accordance with the PMRMA Chemical QAP (CQAP) (PMRMA, 1989).

2.2 SURFACE-WATER MONITORING PROGRAM

This section describes the surface-water sampling conducted during RI Addendum activities. The sampling events, sampling locations and methods, and analytical program used during the RI Addendum are described in this section. Results from surface-water samples collected under the CMP, concurrent with samples collected during the RI Addendum, are addressed in Section 4.0.

2.2.1 Surface-Water Sampling Network and Rationale

Surface-water sampling events were performed during November 1988 and from May to June 1990. Surface-water sampling locations are shown in Figure 2.3. In November 1988, six surface-water samples were collected along First Creek between 96th Avenue and the First Creek Impoundment and directly from the First Creek Impoundment. On the basis of evaluation of these data and surface-water results reported in the Offpost OU RI report, 10 additional surface-water samples were collected, and surface-water flows were estimated from May to June 1990. Samples were collected from May to June 1990 from along First Creek, the O'Brian Canal, Burlington Ditch, and Barr Lake. The sampling events and locations are described below.

Six surface-water samples were collected along First Creek in November 1988. From May to June 1990, surface-water samples were collected from First Creek between the First Creek

Impoundment and O'Brian Canal and from along Burlington Ditch, O'Brian Canal, and Barr Lake (Figure 2.3).

2.2.2 Field Sampling Methodology

The sampling methodology employed during RI Addendum surface-water sample collection was similar to the methodology previously used during the Final RI. Surface-water samples were obtained by integrating samples over the cross-sectional area of the stream. Where the stream was too small to permit integration samples were collected from the center of the channel immediately below the water surface. Stream discharges were estimated at each sampling location at the time of sampling. The specific procedures for surface-water sample collection are outlined in the FOP (HLA, 1989b).

2.2.3 Analytical Program

The analytical program for surface-water analyses conducted during RI Addendum activities is consistent with the analytical program conducted during the Final RI. The analytical program included sampling VOCs, SVOCs, and inorganic constituents. RI Addendum surface-water target analytes were selected on the basis of target analyte lists used during previous RMA investigations. Caprolactam was added to the surface-water target analyte list for the RI Addendum investigation.

The analytical methods and CRLs used for the surface-water analytical program are shown in Table 2.5. The analytical program, including the analytical policies and organization, methodologies, and QA/QC procedures and protocol, used during RI Addendum is described in the QAP (HLA, 1989c). All analytical activities were performed in accordance with the PMRMA CQAP (PMRMA, 1989).

2.3 STREAM-BOTTOM SEDIMENT MONITORING PROGRAM

This section describes the stream-bottom sediment sampling conducted during Offpost OU RI Addendum activities. The sampling events, sampling locations and methodology, and analytical program are described below. The results of analyses of stream-bottom sediment samples are presented and discussed in Section 5.0.

2.3.1 Stream-Bottom Sediment Sampling Network and Rationale

Stream-bottom sediment samples were collected during November 1988 and from May to June 1990. The stream-bottom sediment sampling locations for the November 1988 and May to June 1990 sampling events are shown in Figure 2.4. The November 1988 sampling event included five sampling locations along the First Creek channel and near-channel areas between 96th Avenue and the First Creek Impoundment. Stream-bottom sediment samples were collocated with surface-water samples.

On the basis of evaluation of November 1988 analytical data and stream-bottom sediment results reported in the Offpost OU RI, a second sediment sampling event was performed from May to June 1990. Eleven samples were collected from locations along First Creek, the O'Brian Canal, Burlington Ditch, and in Barr Lake.

2.3.2 Field Sampling Methodology

The sample collection methodology that was followed during the RI Addendum investigation was consistent with the methodology previously followed during the Final RI. Stream-bottom sediment samples were collected with a stainless-steel trowel from the stream or pond bottom. The material collected was placed in widemouthed glass jars and was stored on ice in insulated coolers. The specific procedures followed for stream-bottom sediment sampling are described in the FOP (HLA, 1989b).

2.3.3 Analytical Program

The analytical program for sediment analyses conducted during RI Addendum activities is consistent with the analytical program conducted during the Final RI. Sediment samples were analyzed for organochlorine pesticides, organosulfur compounds, DBCP, DIMP, inductively coupled argon plasma (ICAP) spectrometry metals, arsenic, and mercury. RI Addendum sediment target analytes were selected on the basis of target analyte lists used during previous RMA investigations including the Final RI. The target analytes for sediment are listed in Table 2.4. The analytical methods and CRLs used for the sediment analytical program are listed in Table 2.5. The analytical program, including analytical policies and organization, methodologies, and QA/QC protocol and procedures used during the RI Addendum, are described in the QAP (HLA, 1989c). All analytical activities were performed in accordance with the PMRMA CQAP (PMRMA, 1989).

2.4 SOIL MONITORING PROGRAM

This section describes soil sampling conducted during the RI Addendum investigation. The sampling events, sampling locations, methodology, and the analytical program used during the Offpost OU RI Addendum soil monitoring program are described below. The results of analyses of soil samples are presented and discussed in Section 6.0.

2.4.1 Surficial and Subsurface Soil Monitoring Network and Rationale

The soil monitoring program was designed to assess the nature and extent of contamination in offpost soil. Soil monitoring and assessment were not included in the Final RI, but they were added to the RI Addendum investigation to provide data on the nature and extent of contamination in soil.

Soil samples were collected during several sampling events. In February 1989, surficial and subsurface soil samples were collected from residential properties in the 96th Avenue residential area north of the RMA boundary, as shown in Figure 2.5. On the basis of evaluation of the data from February 1989 and onpost surficial soil data collected by Ebasco and Morrison-Knudsen Engineers, Inc. (MKE), from September to October 1989, additional sampling was conducted from June and July 1990. Locations of soil samples collected from the Offpost OU during this period are shown in Figure 2.6. In July 1990, background surficial soil samples were collected from an area near Brighton, Colorado. The locations of these background samples are shown in Figure 2.7.

After the analytical data were received from the laboratories for the sampling events noted above, an additional sampling event was conducted. The purpose of this final sampling event was to address anomalously high concentrations of selected target analytes. The samples were collected in May 1991 by Woodward-Clyde Federal Services (WCFS). The locations of these samples are shown in Figure 2.6.

Soil sampling conducted in February 1989 included six subsurface soil samples collected from four locations and an additional 11 surficial soil samples, as shown in Figure 2.5. Samples were located along the southern boundary of Sections 13 and 14 outside of the suspected First Creek floodplain and irrigated areas to assess potential soil contamination from windblown transport mechanisms.

Samples were collected from the 0- to 1-foot interval at two locations (HA0986SO and HA0988SO) near the current First Creek drainage course. Samples from the 0- to 1-foot and 4- to 5-foot intervals were collected in two locations. Samples HA0985SO and HA0985SO45, collected from the 0- to 1-foot and 4- to 5-foot intervals, respectively, were collected outside of the current drainage course but within the suspected floodplain north of First Creek in Section 13. Water was encountered at a depth of 4.5 feet in this boring within the suspected floodplain. Samples HA0987SO and HA0987SO50, collected from the 0- to 1-foot and 4- to 5-feet intervals, respectively, were collected outside the suspected floodplain north of First Creek in Section 14.

CDH collected 12 surficial soil samples from locations north of RMA in February 1989. Eight of these samples were collected near the locations where HLA collected samples in February 1989. As shown in Figure 2.5, four collocated samples were also collected by CDH at sampling locations HA0989WB, HA0990WB, HA0993WB, and HA0997WB. A duplicate sample, HA0995WB, was collected at sampling location HA0994WB.

Surficial soil sampling conducted by HLA from June to July 1990 included samples from an additional 43 locations in the Offpost OU. The sampling locations are shown in Figure 2.6. The 43 samples were collected to further assess soil contamination by windblown mechanisms. The sampling locations were selected on the basis of the February 1989 offpost soil sample results for samples collected by HLA and CDH and an assessment of the onpost surficial soil results for samples collected by MKE and Ebasco, as previously described. The onpost data were evaluated regarding the prevailing and high-event wind patterns (RLSA, 1990c and ESE, 1988b) to estimate the approximate distance and direction of windblown transport of soil and, potentially, of contamination. The surficial soil sampling grid represents the estimated maximum areal extent of potential windblown soil. Surficial soil samples were collected from 43 approximately uniformly distributed sampling locations. As depicted in Figure 2.6, six duplicate samples were collected.

The May 1991 sampling event conducted by WCFS consisted of collecting 17 surficial soil samples. This sampling episode had two major objectives. The first objective was to provide additional data about the lateral distribution of organic compounds north of the existing sample locations. A second objective was to provide data to confirm the anomalously high analytical results for two samples.

Background soil samples were collected from an area northeast of Brighton, Colorado, which was selected on the basis of comments from CDH about this area's appropriateness as a background area for the CDH Pilot Exposure Study. Four samples and one duplicate sample were collected from this background area (Figure 2.7).

The Army selected surficial soil sampling locations on the basis of review of surficial soil analytical data in the RMA database and other data available from CDH. The sample locations identified by the Army were selected to provide adequate data to permit assessment of the extent of contamination in surficial soil in the Offpost OU. The sampling locations covered an area of approximately 18 square miles. The locations were also selected on the basis of anticipated distribution of contaminants associated with windblown transport from RMA sources and from farmland irrigation in selected areas in the Offpost OU.

2.4.2 Field Sampling Methodology

Soil sampling was divided into surficial and subsurface soil samples on the basis of the depth of sample collection. Surficial soil samples were collected by the Army from a composite of the top 2 inches of soil from six equally spaced locations along the circumference of a 30-foot-diameter circle. Subsurface soil samples were collected from the 0- to 1-foot interval and the 4- to 5-foot interval using an 18-inch split-barrel sampler lined with 2-1/2-inch-diameter polybuterate tubes. The specific procedures for soil sample collection are provided in the FOP

(HLA, 1989b). Based on the CDH proposed surficial soil sampling plan (CDH, 1990), surficial soil samples collected by CDH were apparently collected using procedures similar to those used by the Army.

2.4.3 Analytical Program

Subsurface soil samples were analyzed for VOCs, SVOCs, and trace metals. Surficial soil samples were analyzed for arsenic, mercury, OCPs, and selected SVOCs, DBCP, and dimethyldisulfide (DMDS) as listed in Table 2.4. A percentage of the samples were also analyzed for ICP metals. Analytical methods and CRLs used for the soil analytical program are listed in Table 2.5. The analytical program, including analytical policies and organization, methodologies, and QA/QC protocol and procedures, is described in the QAP (HLA, 1989c). All analytical activities were performed in accordance with the PMRMA CQAP (PMRMA, 1989).

2.5 BIOTA MONITORING PROGRAM

The offpost biota monitoring program was designed to collect sufficient data to assess the nature and extent of contamination of the biotic community offpost. The Offpost OU for the Biota Monitoring Program is bound by 96th Avenue on the south, Colorado State Highway 2 on the west, 108th Avenue on the north, and Potomac Street on the east. This portion of the Offpost OU was chosen for study (1) because of its potential for contamination of biota, (2) because of its proximity to RMA sources, and (3) because of the sizes of the home range of wildlife known to exist in the RMA and Offpost OU. The Offpost OU for biota was designed to phase biological sampling locations, with some locations very close to RMA, some locations at intermediate distances, and a few sampling locations near the study area's perimeter. The goals of the Biota Monitoring Program for the RI Addendum follow:

- Select target analytes for offpost biota
- Characterize the terrestrial and aquatic ecosystems of the Offpost OU and select species to sample for contaminant analysis
- Describe the varieties and concentrations of target analytes in offpost biological samples

These objectives were presented as described in the Work Plan (HLA, 1989a) and were discussed with the OAS before finalizing the sampling program. The methods of study used to fulfill the objectives of the Biota Monitoring Program are presented in this section. The results of these investigations are presented in Section 7.0, Biota Monitoring Results and Assessment.

2.5.1 Criteria for Target Analyte Selection and Biota Sampling Rationale

Target analytes for biota were selected in a process described in the Final Biota RI (ESE, 1989b). The selected analytes are a subset of the chemicals known to occur in the RMA onpost and offpost environment. The target analytes were rated as at least moderately toxic, with volumes and persistence indicating that the chemical was present in the environment in sufficient quantity and for a long enough time to pose a potential hazard to biota. The target analytes for the Offpost OU RI Addendum are consistent with those from the Final Biota RI. The selected target analytes for biota were aldrin, arsenic, dieldrin, endrin, mercury, DDE, and DDT, as shown in Table 2.4.

A list of species to be analyzed for the target analytes was developed, in part using a food chain pathways approach; species were representative of several trophic levels that were likely to come in contact with contaminated media, which predominantly included soil and surface water. Species were also selected on the basis of their having been previously studied as a component of the Biota RI and CMP. To the extent practicable, biota sample locations were collocated with soil and water sampling locations to provide an integrated sampling approach. Finally, an ecological characterization provided additional information that was used in selecting offpost species for sampling and analyses.

2.5.2 Field Sampling Methodology for Ecological Characterization

The offpost biota sampling was conducted following an ecological characterization of terrestrial and aquatic environments. The results of the ecological characterization provided additional information used to select offpost species for sample collection and analyses. The following subsections describe the methods of investigation for ecological characterization of the

Offpost OU. The methods employed were designed to yield qualitative and quantitative data on the ecological condition of the Offpost OU.

2.5.2.1 Methods for Ecological Characterization of Aquatic Systems in the Offpost OU

The objectives of ecological characterization of aquatic and wetland portions of the Offpost OU follow:

- Describe the species and distribution of submergent and emergent vegetation
- Document and estimate relative abundance of vertebrates and invertebrates present in aquatic and adjacent wetland areas
- Record data on surface-water quality, depth, degree of disturbance, use by cattle, and any observed effects potentially attributable to RMA contamination

Studies of First Creek were performed during aquatic and terrestrial sample collection. Field reconnaissance of First Creek, from the RMA boundary to Highway 2, was conducted on December 1, 1989. Characterization of the ecology of the First Creek Impoundment was performed concurrently with sample collection on September 22 and October 27, 1989. Vegetation, invertebrate, and vertebrate species were identified in the field; voucher specimens were collected; relative abundance was recorded; and water quality data were gathered. Biota specimens were preserved by freezing, and were identified by genus and species when possible.

2.5.2.2 Methods for Ecological Characterization of the Terrestrial System in the Offpost OU

The objectives of the ecological characterization of the terrestrial systems in the Offpost OU follow:

- Describe the species and distribution of terrestrial vegetation
- Categorize vegetation into distinct habitats
- Document and estimate the potential occurrence of vertebrate and invertebrate species on the basis of available habitat
- Assess human disturbance of the area and any observed effects potentially attributable to RMA contamination

The ecological characterization of terrestrial systems consisted of literature and available data review and limited field studies. The habitat map in Figure 2.8 was constructed for the

Offpost OU using geobotanical methods consistent with the Biota RI (ESE, 1989b). The map was drawn from aerial photographs and delineated areas of aquatic and terrestrial habitat including wetlands, riparian woodland, grassland, fence rows, weedy areas, and other habitats of biological significance.

Field visits were made to the area on September 7 and October 27, 1989, to confirm the validity of the habitat map, record any changes in land use or condition, and note dominant vegetation in each habitat. Wildlife observations were performed during these visits, and wildlife location and habitat were recorded. Dominant plant species in each habitat type were recorded, and voucher specimens were collected and later keyed to genus and species according to Weber (1976) and Harrington (1964). Human land uses (e.g., residential) and areas of disturbance (e.g., plowed fields, trash dumps) were also indicated. Additional verification procedures and wildlife observations were performed during the sample collection periods described below. An inventory of terrestrial vertebrate species and important invertebrate groups was prepared for the Offpost OU.

2.5.3 Methods of Sample Collection for Contaminant Analyses

Samples for contaminant analyses were collected in the fall of 1988 and 1989. Sample locations for aquatic, agricultural, and terrestrial biota are presented in Figure 2.9. All samples collected are summarized in Table 2.6. The methods below were implemented to assess the nature and extent of contamination in biota offpost.

2.5.3.1 Aquatic Sampling Methodology

Samples of aquatic biota were obtained from the First Creek Impoundment. Fish samples were collected by seine, gill net, and hand net. Aquatic plants were collected by hand, while aquatic invertebrates were collected in a dip net or by hand.

Aquatic sampling for larger organisms using 3-meter (m) seine nets was performed on September 22, 1989. The seine extended from bank to bank and was held by a biologist on each bank. The seine was pulled through the pond to a shallow area where samples were collected.

Several passes were often required to obtain an adequate sample. The First Creek Impoundment was seined in two distinct sections. One section consisted of approximately 20 m at the north end of the pond, and the other section consisted of approximately 50 m at the extreme south end of the pond extending from the inlet to the south bank. In an effort to ensure collection of large fish (if present), further sampling using two 15 m gill nets was performed on October 27, 1989. Gill nets were set concurrently at the north and south ends of the pond. Nets were checked after one hour, reset and checked again after three hours. No large fish were observed or collected from the First Creek Impoundment.

Samples were prepared and preserved according to procedures established by the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), including homogenization of samples with dry ice and storage in cryogenic freezers. Samples were stored in freezers in the ESE laboratory in Denver for subsequent analyses. Voucher specimens were collected and analyzed by ESE personnel. Plant species were identified using Weber (1976) and Harrington (1964), while invertebrate and fish species were identified according to Needham and Needham (1977). Aquatic samples collected are listed in Table 2.6.

2.5.3.2 Terrestrial Biota Sampling Methodology

Pheasant roosters and hens (Phasianus colchicus) were collected between November 29, 1989, and January 23, 1990, roughly corresponding to open pheasant season in Colorado, by hunting with shotguns loaded with steel shot. Two to six collectors equipped with shotguns traversed all available pheasant habitat in the Offpost OU and a section of Second Creek just north of the study area. When pheasants were flushed from cover by dogs, they were shot and collected following all applicable laws regulating pheasant hunting in Colorado.

Earthworms (Apporectodea sp.) were collected from September 11 to 13, 1989, by excavating the first 25 centimeters (cm) of top soil and collecting all worms present. Samples consisted of between three and five composite samples collected within a 10 m radius of a known soil or groundwater sample location or easily identifiable landmark.

Grasshoppers (mostly Melanoplus sanguinipes) were collected from September 7 to 13, 1989, by sweep netting in all available grasshopper habitat within a 100 m radius of known soil or water sample locations or easily identifiable landmarks. Grasshopper and worm samples were collected from the same locations when possible.

Small mammal samples consisted of deer mice (Peromyscus maniculatus) and prairie dogs (Cynomys ludovicianus). Deer mice were collected between September 23 and October 30, 1989. Live traps were baited and placed in probable deer mouse habitat at earthworm and/or grasshopper sampling locations. Traps were checked daily until a composite sample consisting of two deer mice of the same sex was collected from each location. Two locations did not provide adequate deer mouse habitat, and house mice (Mus musculus) were substituted (These two samples were not subsequently analyzed.). Nontarget species caught in live traps were released. Small mammals were identified to genus and species according to Burt and Grossenheider (1976) and Hall (1981).

Three distinct prairie dog towns exist within the Offpost OU (Figure 2.8), and prairie dogs were collected from each town. Prairie dogs were trapped using live traps, and samples were collocated with soil or water samples to the maximum extent practicable. In the vicinity of the First Creek Impoundment, cattle consistently disturbed live traps, and prairie dogs were collected from this area by shooting them with a .22 rifle. Nontarget species caught in live traps were released.

All samples were collected under Scientific Collecting License Nos. 89-0298 and 90-0298 issued by the Colorado Division of Wildlife (CDOW). All biota samples were prepared and preserved according to procedures established by USATHAMA and were stored in freezers in the ESE laboratory in Denver for subsequent analyses.

The number and species of terrestrial samples collected are listed in Table 2.6.

2.5.3.3 Agricultural Sample Collection

Samples were taken from cow (Bos bovis) and chicken (Gallus domesticus) tissues. These samples were taken from a farm located immediately north of 96th Avenue, as shown in

Figure 2.9. These samples were analyzed in a manner similar to the wildlife samples and were collected to assess the possible contamination of domestic animals. Concerns were raised by the OAS and local residents about possible dibromochloropropane (DBCP) contamination of cattle, which led to collecting milk samples at the farm. These samples were only analyzed for DBCP because no other certified methods were available for this matrix.

2.5.4 Analytical Program for Biological Samples

Three analytical protocols were used for the analysis of biological samples: Graphite Furnace Atomic Adsorption (Methods B-6-A & B-6-P), Cold Vapor Atomic Adsorption (C-6-A & C-6-P), and Gas Chromatography (Methods M-6 & QH-01). A summary of methods used to analyze biota samples is presented in Tables 2.5 and 2.7.

Because of insufficient sample size for one sample of earthworms (HA1246B) collected on September 11, 1989, a dilution factor for this sample was calculated by taking the usual sample size (8.00 grams) and dividing this value by the actual sample size (6.24 grams) to generate a dilution factor of 1.27. This dilution factor was reported in the PMRMA database for this sample and resulted in slightly elevated detection limits.

3.0 GROUNDWATER MONITORING RESULTS AND ASSESSMENT

This section presents a discussion of hydrogeologic and groundwater quality data developed under the RI Addendum program for the Offpost OU. The principal purpose of this section is to present (1) the current understanding of the hydrogeologic system and (2) the nature and extent of groundwater contamination in the UFS offpost..

This section is organized to first present a brief overview of interpretations contained in the Final RI (ESE, 1988a). Refinements made to interpretations contained in the Final RI report are then presented and discussed. Following this overview is a discussion of new water-level data and an interpretation of groundwater gradients and flow directions. The major focus of this section is the refinement of the nature and extent of unconfined groundwater contamination. Figures show the extent of contamination in the UFS and are compared to previous interpretations. Data used in this assessment are contained in Appendixes A and B.

3.1 GEOLOGY AND HYDROGEOLOGY

The Final RI contained detailed discussions and interpretations of the geology and hydrogeology of the Offpost OU, and this section presents a general overview of the geologic and hydrogeologic setting offpost. This section provides the reader with a general understanding of the physical setting for interpretation of contaminant distribution in offpost groundwater. Because most of the information presented here is based on data contained in the Final RI report, appropriate sections of that report are referenced.

Sediments at the land surface in the Offpost OU consist of unconsolidated alluvial and eolian deposits of Pleistocene and Holocene age. The composition of the unconsolidated sediments varies from clays to coarse gravels, and the thickness varies from less than 10 feet to approximately 100 feet. The thickest deposits of unconsolidated sediments occur in paleochannels eroded into the underlying Denver Formation.

The Denver Formation is of late Cretaceous to early Tertiary age, and consists of 250 to 300 feet of interbedded clayshale, claystone, siltstone, and sandstone with a regional dip of one-half to one degree to the southeast. The uppermost bedrock unit was subjected to erosion before deposition of the overlying unconsolidated units. Paleochannels incised into the bedrock surface are present in many areas offpost and generally contain the greatest thicknesses of unconsolidated sediments.

The presence of paleochannels in the Denver Formation surface has a significant impact on the fate and direction of groundwater flow in the UFS. Two such major paleochannels, the First Creek and Northern Paleochannels, are present north of the North Boundary Containment System (NBCS). An additional paleochannel, the Northwest Paleochannel, is present west of the Northwest Boundary Containment System (NWBCS). Coarse, unconsolidated materials commonly found within these paleochannels provide the pathway for preferential groundwater movement in the UFS. Groundwater contaminant plumes that have historically flowed across the RMA boundaries to the Offpost OU are generally confined to these paleochannels.

The Arapahoe Formation lies conformably beneath the Denver Formation at depths of 230 to 300 feet at the RMA north boundary and has a regional dip of one-half to one degree to the southeast. The Arapahoe Formation consists of 350 to 650 feet of interbedded conglomerate, sandstone, siltstone, and shale. The upper portion consists predominantly of blue to gray shale that ranges in thickness from approximately 100 to 200 feet, while the lower portion consists largely of sandstones and conglomerate. This lower portion is a completion interval for many water-supply wells in the area.

3.1.1 Geology

The geology of the Offpost OU consists of unconsolidated surficial deposits underlain by consolidated units of the Denver and Arapahoe Formations. Alluvial deposits form much of the ground surface in the Offpost OU. At some locations, generally northwest of Burlington Ditch, Denver Formation units crop out at the ground surface. The Arapahoe Formation is the oldest geologic unit present beneath the site that was investigated in the offpost RI programs. The Arapahoe Formation is not present at the ground surface anywhere in the Offpost OU.

3.1.2 Hydrogeology

The hydrogeology of the Offpost OU was described in detail in the Final RI. Additionally, the Final RI also discussed the interactions between the various aquifers present in the area and presented an assessment of the boundary containment systems' effect on the rate of contaminant migration from the Onpost OU.

The principal water-bearing units of interest in the Offpost OU are the unconsolidated, unconfined alluvial deposits, the Denver Formation, and the Arapahoe Formation. The hydrogeologic properties of these units, including hydraulic conductivity and groundwater flow velocities, are distinctly different. Hydraulically, these units generally behave as distinct hydrostratigraphic units, except for some areas of the uppermost weathered Denver Formation that are both unconfined and saturated. The Arapahoe Formation is confined at all locations investigated in the RI Addendum.

The hydrogeology of the Offpost OU consists of a UFS overlying a confined flow system (CFS). The UFS includes groundwater present in the unconsolidated alluvial materials overlying the Denver Formation and the weathered upper portion of the Denver Formation. The CFS includes the deeper portions of the Denver Formation. A detailed discussion of hydrogeologic conditions in the Denver Formation is given in the Final RI report and generally will not be further developed in this report. Conditions in the Arapahoe Formation will be briefly discussed below.

3.1.3 Groundwater Flow

The following sections present water-level information for the UFS and the Arapahoe Formation. From an evaluation of the distribution of contaminant plumes in the Offpost OU, the UFS is considered the principal migration route for groundwater contaminants from the Onpost OU to the Offpost OUs. Thus, the discussions of the potentiometric data and groundwater flow directions presented below are largely focused on the UFS, with some additional brief discussions of the conditions in the Arapahoe Formation.

3.1.3.1 Unconfined Flow System

Water-level data for the UFS were collected from all offpost monitoring wells during several separate monitoring events and for different programs. Water levels were measured several times between December 1989 and June 1990 in all wells installed under the Offpost OU RI Addendum program. Wells installed north of RMA in the First Creek and Northern Paleochannels in support of the offpost IRA A program also were monitored several times between September 1989 and June 1990. Water levels in the remaining offpost wells, which are monitored routinely as part of the offpost CMP, were measured in February 1990. Considering all of these sources of information, the most comprehensive set of water-level data was from the period of February 12 to 14, 1990. Table 3.1 presents the water-level information used to construct the potentiometric surface map for the UFS, as discussed below.

Figure 3.1 shows the potentiometric surface for the UFS on the basis of the February 1990 data set, as described above. The UFS potentiometric surface slopes predominantly toward the northwest, indicating groundwater flow in that direction, which is consistent with the interpretation that the South Platte River is a regional discharge point for the groundwater system in the Offpost OU. Hydraulic gradients in the Offpost OU range from 0.003 to 0.020 foot per foot (ft/ft) and average approximately 0.004 to 0.005 ft/ft. The hydraulic gradients are highest in the area immediately downgradient of the NBCS and in the vicinity of O'Brian Canal and Burlington Ditch. The observed hydraulic gradients are consistent with those observed in the Final RI report.

The level of the potentiometric surface is basically unchanged from that presented in the Final RI report, although water levels in a few areas have changed. In the area downgradient of the western portion of the NBCS, the water level is approximately 5 feet higher than presented in the Final RI report. This difference is interpreted to be a result of increased groundwater recharge using the recharge trenches. In the First Creek Paleochannel, increased control from wells installed under the IRA A program has resulted in a refinement in the potentiometric surface in that area. Water levels are slightly higher immediately downgradient of the NWBCS than those presented in the Final RI report. These changes are considered to be the result of seasonal fluctuation in water levels and changes in recharge-well flow rates at the northeastern end of the NWBCS (Shell, 1992).

The nature of the paleochannels north of RMA is considered an important component to understanding the migration routes of contaminants offpost. Additional hydrogeologic data collected during the installation of numerous test borings, monitoring wells, and piezometers under the RI Addendum and IRA A programs were evaluated to refine the understanding of the geometry of the paleochannels in this area. On the basis of these evaluations, the extent of unsaturated alluvium depicted on Figure 3.1 has been modified from that presented in the Final RI report.

The area covered by the IRA A program includes offpost Sections 11, 12, 13, and 14. In this area, the major pathway generally follows the course of the creek; minor flow pathways located adjacent to the First Creek Paleochannel were also delineated on the basis of new geologic and potentiometric information.

The understanding of the geometry of the Northern Paleochannel was also refined, particularly on its eastern and western boundaries. The location of the western boundary of the Northern Paleochannel has been reinterpreted slightly farther west than that presented in the Final RI. The potentiometric surface in the Northern Paleochannel has remained largely unchanged in relation to previous interpretations.

3.1.3.2 Arapahoe Formation

Water-level data were collected from three Arapahoe Formation wells installed under the RI Addendum program. The locations of these wells are shown on Figure 2.2. Water levels were measured at the time of installation. The wells installed in the Arapahoe Formation and their associated water levels follow:

Well	Installation Date	Water Level (below ground surface [bgs]) (feet)	Water Elevation (feet)
37431	09/12/89	134	4987.9
37445	08/28/90	179	4898 (est.)
37446	10/09/90	188	4876 (est.)

Because these potentiometric surface elevations are above the top of the formation, the Arapahoe Formation is a confined aquifer in these areas. Although groundwater withdrawals from the Arapahoe have locally lowered the potentiometric surface, the information from these new wells is consistent with the regional water-level conditions in the Arapahoe Formation. Data from these three wells do not permit a definitive assessment of the flow directions in the Arapahoe Formation. However, the data from these three wells are consistent with the northerly to northwesterly regional groundwater flow direction, as presented in the Final RI report.

3.2 WATER QUALITY DATA

This section presents and discusses the results of groundwater quality sampling and analyses. The principal focus of this section is the distribution of contaminants in UFS groundwater. The distribution of contaminants in samples from Arapahoe Formation wells is also presented and discussed.

Data and interpretations presented in the following sections are from groundwater samples collected from all offpost UFS monitoring wells and three Arapahoe wells. Several sampling events were used to develop a groundwater quality database sufficient for interpreting the distributions of contaminants in the Offpost OU. As previously noted in Section 2.1 and shown in Table 2.3, 14 new UFS monitoring wells were installed during the RI Addendum program. Two samples were collected from each of these wells as shown in Table 2.1. Samples from these wells were analyzed for the compounds presented in Table 2.4. In addition, 14 other offpost UFS monitoring wells were installed immediately north of RMA in support of the IRA A program. These wells were primarily installed in the First Creek and Northern Paleochannels. Samples were collected from these wells in the fall of 1989 under the IRA A program.

Three Arapahoe Formation monitoring wells installed under the RI Addendum program were analyzed for the compounds shown in Table 2.4. In addition, samples from 23 alluvial or Arapahoe Formation wells were collected and analyzed for the target analytes listed in Table 2.4.

Wells not installed during the RI Addendum or IRA A programs were sampled in the offpost CMP program. These wells were sampled in the fall of 1989, as shown in Table 2.1. The analyses performed on the samples collected under the CMP include the target analytes for the RI Addendum program. The analytical results for analysis performed under the CMP are available in the RMA database.

Distribution maps for selected compounds detected in the UFS wells are presented and discussed in the following sections. Distribution maps for the Arapahoe Formation were not necessary because detectable levels of organic compounds were only sporadically found in Arapahoe Formation wells. These sporadic occurrences appear to represent false positives or localized effects, possibly due to well construction problems, and are not considered representative of Arapahoe Formation groundwater contamination.

Data developed under the CMP, the RI Addendum, and IRA A programs have undergone a rigorous QA/QC review consistent with PMRMA CQAP (PMRMA, 1989). Those data that passed QA/QC review have been accepted in the PMRMA database. Data collected during the RI Addendum activities that did not pass the QA/QC review are flagged in the attached appendixes.

Analytical data used in generating plume maps of the UFS include (1) monitoring wells and domestic wells sampled under the RI Addendum and IRA A programs and (2) CMP data collected during the fall of 1989 and winter of 1990-1991 sampling rounds. RI Addendum analytical data and fall of 1989 CMP data were combined to provide a comprehensive database that was used to contour the plume maps shown in Figures 3.2 through 3.13.

More recent data collected during the winter of 1990-1991 CMP Sampling Round was, in general, used to verify previous CMP and RI Addendum results. The verification consisted of qualitatively comparing the more recent Winter 1990-1991 CMP data with historical data, including data collected during RI Addendum activities. This qualitative comparison permitted an assessment of the current data relative to the historical range of concentration for contaminants in the Offpost OU wells. The actual winter of 1990-1991 CMP data results were, however, used for plume map generation for those recently installed RI Addendum wells where data did not pass QA/QC assessments.

No wells were sampled under both the RIFS1 Offpost program and the fall of 1989 CMP. However, multiple rounds of data were collected at wells 37429 through 37444 and at several domestic wells sampled during the RI Addendum program. When two or more results were present in the database for a given well, the numerical average of the results was used for contouring provided that at least one result was above the CRL for the compound being contoured. The purpose of averaging the data was to provide equal weight to available data for these newly installed wells.

In a few instances, fall of 1989 CMP analytical results were highly anomalous when compared to historical CMP results and to subsequent winter of 1990-1991 CMP results at a given monitoring well. In these instances, an approximate average result was used for plume map contouring taking into consideration the historical and subsequent CMP data. Data recognized as anomalous were not used in contouring.

In a few instances, fall of 1989 CMP analytical results were either missing, rejected, or not collected for a monitoring well within the Offpost OU that had been previously and/or subsequently sampled under the CMP. In these instances, historical and subsequent CMP data collected at the monitoring well in question were evaluated and qualitatively assessed while preparing the plume maps in this report.

QA/QC sample results including sample duplicates and GC/MS conformational samples collected under the RI Addendum and CMP programs were used in a qualitative manner to assess investigative GC results. QA/QC sample results were not, however, averaged with investigative results nor were they used to determine analyte concentrations for plume map contouring.

3.2.1 Nature and Extent of Unconfined Flow System Contamination

This section presents interpretations of the organic and inorganic analytes detected in groundwater samples collected from wells in the UFS. Contaminant distribution maps for nine organic and three inorganic analytes have been prepared and are discussed. These 12 contaminants represent the target analytes detected consistently and are considered the most widespread of the analytes for which analyses were performed.

The distribution maps and general descriptions presented in this section are contrasted with the results and interpretations contained in the Final RI report. Significant changes in the distribution of contaminants in the UFS are noted. Because some improvements have been made to the analytical methods certified by PMRMA, CRLs have been lowered for some target analytes. In some cases, use of lower CRLs has resulted in an apparent increase in the distribution of selected analytes. Where a change in the CRL has contributed to an apparent significant increase in the distribution of a particular contaminant, a brief discussion of the influence of this change is presented.

Background concentrations for inorganic compounds were evaluated in the Final RI report, Table 3.3-3 (ESE, 1988a). Because recent sampling of the wells listed in that table indicate no substantial changes in inorganic concentrations in those wells, background concentrations were not revised on the basis of data presented in this report. The background values contained in the Final RI report are considered representative of current site conditions.

3.2.1.1 Unconfined Flow System Organics

The distributions of organic analytes in UFS groundwater are discussed in the following sections. Distributions for the most widespread contaminants are shown on plume maps. The distributions of other contaminants with limited extent or sporadic detections in groundwater samples are described in the following text. The nature and extent of contamination presented below is compared to the interpretations presented in the Final RI report and the Final CMP report for fiscal year (FY) 1990 (RLSA, 1991a).

3.2.1.1.1 Semivolatile Organic Compounds

The four semivolatile contaminants, (1) diisopropylmethylphosphonate (DIMP), (2) dicyclopentadiene (DCPD), (3) dieldrin, and (4) endrin, represent the most widespread and consistently detected of the semivolatile compounds for which analyses were performed. Plume maps for these compounds are presented in Figures 3.2 through 3.5. An additional 10 semivolatile compounds are also discussed, but, because of their relatively limited distributions, the data are not presented in figures.

Diisopropylmethylphosphonate

The most widespread organic contaminant detected in the Offpost OU is DIMP. In the Final RI report, DIMP was interpreted as occurring in two elongated plumes emanating from the RMA north boundary and following the First Creek and Northern Paleochannels. The DIMP plume along the Northern Paleochannel was not shown to extend past O'Brian Canal, while the DIMP plume along the First Creek Paleochannel extended nearly to the South Platte River. The maximum concentration reported was 5390 micrograms per liter (μg/l) at well 37396 in the First Creek Paleochannel. The maximum concentration in the Northern Paleochannel was reported as greater than 2030 μg/l at well 37391.

The distribution of DIMP based on data collected during RI Addendum activities is shown in Figure 3.2. As Figure 3.2 illustrates, DIMP is distributed in a continuous plume extending from the RMA north and northwest boundaries to the South Platte River. Samples from 89 monitoring wells were analyzed for DIMP. Of these 89 samples, DIMP was reported in 71 samples. Domestic well data were also used to characterize the plume. DIMP was found in 14 of 16 domestic wells sampled. The highest observed level was 5800 μg/l in monitoring well 37418 located in the First Creek Paleochannel. This well is within about 200 feet of well 37396, which had the highest level of DIMP for the Offpost OU reported in the Final RI report. In the Northern Paleochannel, the highest level of DIMP detected in samples from the RI Addendum program was 830 μg/l found in well 37409. The maximum concentration of DIMP in wells sampled under the CMP and reported in this report was 860 μg/l reported in well 37391.

Concentrations of DIMP in the Northwestern Paleochannel are considerably lower than the levels reported north of the RMA northern boundary. Concentrations in the Northwestern Paleochannel are generally below 10 μg/l. The maximum concentration of DIMP in the Northwestern Paleochannel is about 80 μg/l in a domestic-use well located approximately 2 miles northwest of the RMA boundary.

The shape and extent of the DIMP plume presented in this report is considerably different from that presented in the Final RI report. However, the principal reason for the observed changes is a considerably lower CRL used in this report. For the Final RI, the CRL for DIMP was 11 μg/l. For this report, the CRL is 0.392 μg/l, representing a CRL lower by a factor of nearly 30 from that used in the Final RI. However, considerable decreases in the concentration of DIMP has occurred over the past several years, as described in the CMP report for FY 1990. Maximum concentrations of DIMP have decreased from over 10,000 ug/l in 1980 to a maximum of 5800 ug/l in a sample collected from well 37418, located in the First Creek Paleochannel. Additionally, decreases in concentrations along 96th Avenue appear to be related to operation of the NBCS.

Dicyclopentadiene

DCPD was reported in the Final RI report only in samples collected from wells located in the First Creek Paleochannel. The maximum concentration of DCPD reported in the Final RI was 539 μg/l in well 37309. The distribution of DCPD, on the basis of data collected during RI Addendum activities, is shown in Figure 3.3. The maximum concentrations of DCPD were detected in samples collected from wells located in the First Creek Paleochannel including 560 μg/l in well 37420 and 596 μg/l in well 37309. DCPD was also detected in samples collected from wells located in the Northern Paleochannel. The highest DCPD concentrations in the Northern Paleochannel was approximately 15 μg/l in both well 37344 and well 37409.

Overall, the distribution and range of concentrations for DCPD reported in this RI Addendum are similar to those reported in the Final RI. DCPD is generally confined to a plume located along the First Creek Paleochannel with concentrations up to 600 μg/l.

Dieldrin

Dieldrin was reported in the Final RI in samples collected in the vicinity of the northern and northwestern RMA boundaries. The maximum concentration of dieldrin reported in the Final RI was 1.62 $\mu g/l$ in well 37312 located in the First Creek Paleochannel. The maximum concentration of dieldrin reported in the Final RI for well 37338 was 0.108 $\mu g/l$. As shown in the monitoring well location map, Figure 2.1, these wells are located immediately north of the RMA northern boundary and approximately 500 feet north of the NBCS. The Final RI also reported dieldrin offpost of the RMA northwestern boundary, with a maximum concentration of 1.02 $\mu g/l$ in well 37332.

The distribution of dieldrin, on the basis of data collected during RI Addendum activities, is shown in Figure 3.4, which also shows that dieldrin occurs offpost of the northern and northwestern RMA boundaries, consistent with the distribution shown in the Final RI. The highest concentrations of dieldrin are found in wells located in the First Creek Paleochannel. The highest concentrations of dieldrin were detected in wells 37308, 37369, 37373, and 37420. These four wells are located along the interpreted axis of the First Creek Paleochannel. Concentrations of dieldrin in these four wells are generally 5 to 10 times higher than concentrations found in other offpost wells. The maximum concentration of dieldrin (0.891 $\mu g/l$) was detected in samples collected from well 37420.

A dieldrin plume is also interpreted along the Northern Paleochannel. The interpreted distribution of dieldrin in this area is controlled by wells 37338 and 37378. Concentrations in these wells are approximately 0.1 $\mu g/l$.

Dieldrin occurs offpost of the northwestern RMA boundary, in two apparently distinct plumes. Both plumes are generally oriented to the northwest, consistent with the direction of groundwater flow in the area. Concentrations of dieldrin in this area range from slightly above the CRL (0.05 $\mu g/l$) to approximately 0.1 $\mu g/l$.

The distribution and range of concentration of dieldrin offpost is generally the same as that reported in the Final RI. However, the concentration of dieldrin in the First Creek Paleochannel is slightly larger than previously reported in the Final RI. Offpost of the northwestern RMA boundary, dieldrin has apparently decreased in areal extent. In both areas, the maximum concentrations of dieldrin are generally highest nearest the RMA boundaries.

Endrin

Endrin was reported in the Final RI in samples collected in the First Creek and Northern Paleochannels. Endrin was detected in only five wells offpost of the northern RMA boundary. All of these wells were within approximately one-half mile of the northern boundary. Concentrations in this area reportedly ranged from below the CRL of 0.060 $\mu g/l$ to a maximum of 1.51 $\mu g/l$ in well 37312 located approximately 500 feet north of the NBCS. Endrin was not reported in samples from offpost of the northwestern RMA boundary, except in one sample collected from well 37386. The concentration in well 37386 was 0.067 $\mu g/l$, only slightly above the CRL of 0.060 $\mu g/l$.

The distribution of endrin, based on RI Addendum data, is shown in Figure 3.5. As shown in Figure 3.5, the highest concentrations of endrin are found in the area immediately north of the RMA northern boundary. Additionally, endrin was generally not detected in samples collected from wells located offpost of the RMA northwestern boundary, except in a single sample collected from well 37345. The concentration of endrin at this location is 0.0706 $\mu g/l$, slightly above the CRL of 0.05 $\mu g/l$. Endrin detected in this well is considered an isolated occurrence and not indicative of an endrin plume in that area. The extent of endrin along the First Creek Paleochannel is slightly larger than the distribution reported in the Final RI, with detectable levels of endrin in the vicinity of wells 37396 and 37418 located near the confluence of First Creek and O'Brian Canal.

Endrin was detected in samples collected from wells located in the Northern Paleochannel. The levels of endrin in well 37392 are consistent with levels reported in the Final RI. Samples from wells 37367 and 37383 also had detectable levels of endrin. However, endrin was not detected in samples from wells 37367 and 37383. These three wells are interpreted as defining a plume in the central portion of the Northern Paleochannel. Near the RMA northern boundary, endrin was detected in well 37338 at a concentration of 0.0621 μg/l.

In general, the range of concentrations and distribution of endrin in the Offpost OU are similar to those reported in the Final RI. Although concentrations in a few wells have increased slightly, and detectable levels of endrin were found in a few wells in which endrin was not found historically, the distribution of endrin is generally similar to that reported in the Final RI. The maximum concentration of endrin found in the Offpost OU during the RI Addendum program was 0.748 μg/l in well 37309, approximately 1000 feet north of the NBCS. This finding is consistent the interpretations presented in the Final RI, which showed that the highest levels of endrin occurred within the area approximately 500 to 1000 feet north of the NBCS.

3.2.1.1.2 Other Semivolatile Organic Compounds

This section describes the distribution of other selected SVOCs detected in groundwater samples from the Offpost OU. Several other SVOCs were detected in the Offpost OU during RI Addendum activities. SVOCs detected include certain organochlorine pesticides (OCPs), nitrogen phosphorous pesticides, and organosulfur compounds, which are discussed in the following paragraphs.

Additionally, a few other SVOCs were detected, but only sporadically or in isolated areas. The SVOCs found in these isolated cases include bicycloheptadiene (BCHPD), hexchlorocyclopentadiene (CL6CP), vapona (DDVP), 1,4-dithiane (DITH), dimethylmethylphosphonate (DMMP), and 1,4-oxathiane (OXAT). Because of their infrequent occurrence and relatively limited distribution and because their extent was adequately described in the Final RI, these SVOCs are not discussed further.

The additional SVOCs discussed below include the following:

- Aldrin, isodrin, chlordane, 2,2-bis(parachlorophenyl)-1,1-dichloroethene (DDE), and 2,2-bis(parachlorophenyl)-1,1-trichloroethane (DDT) (OCPs)
- Atrazine, malathion, and parathion (nitrogen phosphorous pesticides)
- 4-Chlorophenylmethyl sulfoxide (CPMSO) and 4-Chlorophenylmethyl sulfone (CPMSO2) (organosulfur compounds)

In general, the frequency of detection and the relative distribution for these SVOCs was found to be considerably less than for the SVOCs discussed in the preceding sections.

3.2.1.1.3 Organochlorine Pesticide Compounds

The distribution of five additional OCPs (aldrin, isodrin, chlordane, DDE, and DDT) is similar to the distribution of the OCPs dieldrin and endrin, as previously discussed. The maximum concentrations of these compounds generally occur in the First Creek Paleochannel, in the area 500 to 1000 feet north of the NBCS. Only sporadic, isolated occurrences of these compounds are observed offpost of the RMA northwestern boundary.

Aldrin was detected in a number of wells in the First Creek Paleochannel. The highest concentration of aldrin was 0.354 μg/l in well 37419, which is located in the vicinity of the confluence of First Creek and O'Brian Canal. However, historical data show that aldrin has not been previously detected in samples collected from this well. Samples from a few other wells in this area also had detectable concentrations of aldrin. Concentrations in these other wells were approximately 0.15 to 0.3 μg/l. Only two wells in the Northern Paleochannel had detectable levels of aldrin. The maximum concentration of aldrin in the Northern Paleochannel was 0.25 μg/l in well 37368. Aldrin was not detected in samples collected from wells located downgradient of the canals, except in well 37345, which is located adjacent to Burlington Ditch offpost of the northwest RMA boundary.

The distribution of isodrin is similar to that of the other OCPs. The highest concentration of isodrin was 0.260 μg/l in well 37396. As was the case for aldrin, this well is also located in the vicinity of the confluence of First Creek and O'Brian Canal. Isodrin was detected in a few other wells in the First Creek and Northern Paleochannels. Concentrations in these wells ranged from approximately 0.08 to 0.2 μg/l. Offpost of the northwestern RMA boundary, isodrin was detected in a single sample collected from well 37442. This detection is considered an isolated occurrence and is not indicative of an isodrin plume in this area.

DDT and DDE, which is a degradation product of DDT, were detected in samples collected from wells located offpost of the northern RMA boundary. These compounds were not detected in wells offpost of the northwestern RMA boundary nor in wells located downgradient of the canals. The range of concentrations and distribution of DDE and DDT were generally similar. However, DDE was found at slightly higher concentrations in two wells than was DDT. The maximum concentration of DDE was 6.90 μg/l in well 37309, whereas the maximum concentration of DDT was 0.838 μg/l, also in well 37309. This well is located approximately 1500 feet downgradient of the NBCS. A review of historical offpost data and more recent data for the wells in which chlordane was detected, as indicated above, shows that chlordane is generally not detected in Offpost OU wells.

Chlordane was detected in samples collected from a few wells located offpost of the northern RMA boundary. Chlordane was not detected offpost of the northwestern RMA boundary nor downgradient of the canals. The highest concentrations of chlordane were found in five wells located in the First Creek and Northern Paleochannels where values slightly exceeded 1 μg/l. Chlordane at concentrations slightly exceeding 1 μg/l were detected in samples collected from wells located near the downgradient extreme of the paleochannels, in the vicinity of the canals, and in well 37309, which is located approximately 1500 feet downgradient of the NBCS.

The distributions of the five OCPs discussed above are consistent with the distribution of other contaminants that have migrated offpost of the northern RMA boundary, including the principal OCPs, dieldrin and endrin. The highest concentrations are found in samples collected north of the northern RMA boundary. Only sporadic, isolated occurrences of these compounds are detected offpost of the northwestern RMA boundary or downgradient of the canals.

3.2.1.1.4 Nitrogen Phosphorous Pesticides

The nitrogen phosphorous pesticides (NPPs), atrazine, malathion, and parathion, were detected in samples collected offpost of the northern RMA boundary. Atrazine was the most frequently occurring NPP and was detected at the highest concentration. Parathion and malathion were detected in only a few wells, all of which are located in the First Creek and Northern Paleochannels. Occurrences of malathion and parathion within this area do not appear to constitute a well-defined plume offpost. The five occurrences of malathion range from 0.7 to 1.7 $\mu g/l$. The three occurrences of parathion range from 0.986 to 5.43 $\mu g/l$. The NPP compounds were not target analytes for the Final RI. Additionally, these compounds were not reported as tentatively identified compounds (TICs) in the Final RI.

The distribution of atrazine offpost is similar to that of the OCPs. Atrazine was detected in 21 offpost wells, with the maximum concentrations occurring in the First Creek and Northern Paleochannels. Atrazine is generally not detected in samples collected offpost of the northwestern RMA boundary, except for two isolated occurrences in wells 37336 and 37337, located approximately 1 mile offpost. The maximum concentration of atrazine was 72.9 $\mu g/l$ found in a sample from well 37406 located at the northern end of the Northern Paleochannel. The highest concentration of atrazine found in the First Creek Paleochannel was 46.0 $\mu g/l$ in well 37418. In general, the highest levels of atrazine were found in the extreme northwestern and northern ends of the First Creek and Northern Paleochannels, respectively. Atrazine was not detected in offpost wells located in the immediate vicinity of the northern RMA boundary.

3.2.1.1.5 <u>Organosulfur Compounds</u>

In the Final RI, CPMSO was reportedly the most commonly detected organosulfur compound for offpost groundwater samples. The highest levels of CPMSO were found in samples collected from wells in the Northern Paleochannel. The highest concentration of CPMSO reported in the Final RI was 148 $\mu g/l$ in well 37391. The Final RI also reported that CPMSO2 was detected in offpost groundwater north of RMA. The maximum concentration of CPMSO2 reported in the Final RI was 39.3 $\mu g/l$ in well 37309. The compound 4-chlorophenylmethyl sulfide (CPMS) was the least frequently detected organosulfur compound reported in the Final RI. The highest concentration of CPMS was 4.16 $\mu g/l$ detected in well 37367, located about 1 mile north of the RMA boundary. The Final RI reported that the organosulfur compounds were not detected in any samples collected downgradient of O'Brian Canal.

For the RI Addendum program, the organosulfur compounds CPMSO and CPMSO2 were detected at a number of locations offpost of the northern RMA boundary. CPMS was not detected in any offpost groundwater samples presented in this report. The CPMSO and CPMSO2 distributions are distinctly different from each other. CPMSO was only found in samples collected from wells installed in the Northern Paleochannel, whereas CPMSO2 was only found in samples collected from wells located in the First Creek Paleochannel. CPMSO was generally found at levels higher than those reported for CPMSO2.

Detectable levels of CPMSO were reported for 9 wells located in the Northern Paleochannel. The highest concentrations of CPMSO were detected in samples collected from wells located at the northern end of the Northern Paleochannel. Concentrations of CPMSO ranged from 12.6 μg/l to a maximum concentration of 82.2 μg/l found in a sample collected from well 37344.

Detectable levels of CPMSO2 were reported for 5 wells located in the First Creek Paleochannel. These concentrations ranged from 7.75 μg/l to a maximum concentration of 21.0 μg/l found in a sample collected from well 37420, which is located at the northwestern end of the First Creek Paleochannel.

The organosulfur compounds were not detected in samples collected from offpost wells located immediately north of the northern RMA boundary or in wells located downgradient of O'Brian Canal. The concentrations of these compounds are generally similar to those levels reported in the Final RI. Concentrations may be slightly lower for some wells. CPMS, which was detected in samples reported in the Final RI, was not detected in samples collected during RI Addendum activities. The distribution of these compounds is similar to the distributions reported in the Final RI and the CMP report for fiscal year 1990.

3.2.1.1.6 Volatile Organic Compounds

VOCs were reported in the Final RI as occurring in offpost groundwater. The most commonly occurring VOCs reported in the Final RI were chloroform, chlorobenzene, DBCP, tetrachloroethene (TCLEE), trichloroethene (TRCLE), and 1,2-dichloroethene (12DCLE). The following sections describe the distribution of these principal VOCs, plus some additional VOCs that exhibit a lower frequency of detection, which were also reported in the Final RI.

Problems were encountered in the VOC data for samples collected from wells installed under the RI Addendum program. Several rounds of sampling of these wells were conducted between late-1989 and mid-1990. Samples collected between January 25 and March 2, 1990, exhibited anomalously high concentrations for a number of VOCs, including chloroform, TCLEE, TRCLE, carbon tetrachloride (CCL4), benzene, chlorobenzene, DBCP, toluene, and xylenes. The wells sampled under the RI Addendum program and their sampling dates are shown in Table 2.1. The results reported by the laboratories for these affected samples were considerably higher than historical results and are not considered representative of groundwater conditions offpost. The anomalous data contained in tables presented in Appendix B of this report have been clearly identified with a coded footnote.

On the basis of a review of field documentation for the sampling period in question, the source of the problem associated with these anomalous results appears to be related to improper or inadequate field decontamination procedures. The high results for the VOCs identified above can be related to the use of a particular sampling pump. This pump has a significant length of tubing that requires decontamination. It appears that inadequate decontamination of the tubing was the source of the contamination observed in the groundwater samples collected during the period between January 25 and March 2, 1990. Corrective actions consistent with the FOP have been implemented.

To provide a complete database for assessing groundwater contamination in the UFS, data from a CMP sampling round conducted in the first quarter of 1991 were used to augment the database where anomalous data could not be used. These data have been accepted into the PMRMA database as final data and were used qualitatively in assessing plume configurations for VOCs offpost. Data used in this assessment are available in the PMRMA database.

Chloroform

As shown in the Final RI, chloroform occurs primarily downgradient of the NWBCS and in the Northern Paleochannel. Chloroform was generally not found in the First Creek Paleochannel. Concentrations found in the chloroform plume emanating from the northern RMA boundary are considerably higher than concentrations offpost of the northwestern RMA boundary. The highest concentration of chloroform reported in the Final RI was 1370 $\mu g/l$ in well 37344 located at the northern end of the Northern Paleochannel. Concentrations in the Northern Paleochannel are generally above 50 $\mu g/l$. Offpost of the NWBCS, chloroform was detected in approximately seven wells. The highest concentration of chloroform was 25.8 $\mu g/l$ in well 37331, which is located at the northwestern RMA boundary approximately 1000 feet downgradient of the NWBCS.

The current distribution of chloroform on the basis of data collected during RI Addendum activities and the CMP is shown on Figure 3.6. Chloroform in the UFS occurs in two principal plumes offpost. This chloroform distribution is similar to that presented in the Final RI. Chloroform is also detected offpost of the northwestern RMA boundary but at concentrations generally considerably lower than those found in the Northern Paleochannel.

Chloroform was detected in a few wells in the First Creek Paleochannel. Maximum concentrations detected in samples collected from wells located in the First Creek Paleochannel were approximately 2 $\mu g/l$ in well 37381. However, higher concentrations of chloroform, as well as other VOCs discussed below, were encountered in samples collected in June 1990 from wells 37418 and 37420. These values were compared to historical data for this area and more recent CMP data for wells in this area. On the basis of these assessments, the high chloroform values detected in the samples collected in June 1990 are considered anomalous and are not representative of groundwater conditions.

The highest concentrations of chloroform occur at the north end of the Northern Paleochannel. Maximum concentrations of chloroform ranged from 200 to 400 $\mu g/l$ in wells 37344 and 37409. This concentration range is lower than concentrations reported in the Final RI, as noted above but follow a general trend of decreasing concentrations for chloroform in well 37344. The southern end of the chloroform plume is interpreted as occurring about 1000 feet north of the NBCS, which is in contrast to the interpreted extent of the southern end of the plume in the Final RI that showed the plume extending to the NBCS for data collected in the fall of 1987. More recent CMP data for the first part of 1991 also support this interpretation.

The extent of the chloroform plume offpost of the northwestern RMA boundary is also similar to the interpretation presented in the Final RI. However, the installation of several new monitoring wells located in this area has shown that the chloroform plume extends approximately 2 miles northwest of the northwestern RMA boundary. Concentrations detected in groundwater samples collected from wells offpost in this area are similar to levels previously reported in the Final RI. Concentrations range from below the CRL to a maximum of 19.8 μg/l in well 37330 located immediately downgradient of the NWBCS. In general, the highest levels of chloroform occur at the northwestern RMA boundary. The range of concentrations for chloroform offpost is generally the same as that reported in the Final RI.

Chlorobenzene

Chlorobenzene was reported in the Final RI offpost of the northern and northwestern RMA boundaries. The highest concentration of chlorobenzene was 27.3 μg/l detected in samples collected from well 37370, located in the First Creek Paleochannel. According to interpretations in the Final RI, the distribution of chlorobenzene did not appear to be consistent with the distribution onpost. Chlorobenzene was also sporadically detected in samples collected from wells located offpost of the northwestern RMA boundary and in wells located downgradient of the canals. In the Final RI, these data were not interpreted as indicative of a chlorobenzene plume offpost.

The distribution of chlorobenzene on the basis of data collected during RI Addendum activities and the CMP is shown in Figure 3.7. Chlorobenzene was detected in samples collected from several wells located in the Offpost OU. The highest concentrations of chlorobenzene were found in samples collected from north of RMA in the First Creek and Northern Paleochannels. The maximum concentration of chlorobenzene was 38.2 μg/l in well 37397, which is located at the northern end of the Northern Paleochannel. The highest concentration of chlorobenzene in the First Creek Paleochannel was 9.56 μg/l in a sample collected from well 37370. Additionally, sporadic occurrences of chlorobenzene northwest of the canals were also found. In general, the distribution of chlorobenzene is similar to that presented in the Final RI. Concentrations of chlorobenzene and the apparent distribution offpost have not considerably changed since the Final RI.

DBCP

The Final RI presented a discussion of the distribution of DBCP in offpost groundwater. In the Final RI, DBCP was shown to occur offpost of the northern RMA boundary. DBCP is primarily confined to the Northern Paleochannel and was not detected in groundwater samples from other Offpost OUs. The maximum concentration of DBCP was 13.3 μg/l in well 37344. DBCP was historically detected in samples collected from offpost wells located downgradient of the Irondale Boundary Containment System (IBCS). However, the Final RI reported that DBCP was not detected in wells located in that area. The location of the IBCS is shown in Figure 1.2.

The distribution of DBCP on the basis of data collected during the RI Addendum and the CMP is shown in Figure 3.8. As shown in Figure 3.8, DBCP was generally only found in samples from wells completed in the Northern Paleochannel. A few isolated occurrences of DBCP were observed in the First Creek Paleochannel and immediately downgradient of O'Brian Canal near the northern end of the Northern Paleochannel. The maximum concentration of DBCP was 6.67 μg/l in a sample collected from well 37344. DBCP was not detected in samples collected from wells located downgradient of Burlington Ditch nor offpost of the northwestern RMA boundary. The extent of DBCP contamination offpost has decreased slightly from levels reported in the Final RI. The maximum reported concentrations in this report are lower than those presented in the Final RI. Additionally, considerable decreases in the concentration of DBCP immediately north of the NBCS are evident. As a result of these decreases, the DBCP plume offpost of the northern RMA boundary appears to not extend to the NBCS, as was previously reported in the Final RI.

DBCP data from the early 1991 CMP sampling round for wells 37402, 37403, and 37404 were reviewed to confirm the eastern arm of the DBCP plume in the Northern Paleochannel. Data for the subsequent samples collected from these three wells show that DBCP was not detected. These subsequent data suggest that the extent of DBCP may be less than presented in Figure 3.8. Subsequent data will be evaluated under the Groundwater CMP to assess the distribution of DBCP over time.

Trichloroethene and Tetrachloroethene

The distributions of TRCLE and TCLEE reported in the Final RI are similar to the distribution of chloroform. The highest concentrations of these compounds are found at the northern end of the Northern Paleochannel. The maximum concentrations of TRCLE and TCLEE were 7.71 and 115 μg/l, respectively. As in the case of chloroform, the highest levels were found in well 37344.

The current distributions of TRCLE and TCLEE on the basis of data collected during RI Addendum activities and the CMP are presented in Figures 3.9 and 3.10, respectively. TRCLE and TCLEE occur in the First Creek and Northern Paleochannels. These compounds were generally not found offpost of the northwestern RMA boundary, except in a well 37355, located approximately 2 miles offpost. The concentrations of TRCLE and TCLEE in this well, have each been in the range of approximately 3 to 8 μg/l over the past several years.

The highest concentrations of TRCLE and TCLEE in the southwestern corner of the Offpost OU were detected in well 37359. TRCLE and TCLEE have also been detected in well SAC18 located approximately 1500 feet east of well 37359. The sources of TRCLE and TCLEE in these wells are likely associated with contamination originating at the Chemical Sales Company (CSC) site located southeast of the intersection of East 48th Avenue and Ivy Street. Additional sources of these contaminants upgradient of RMA, including Stapleton Airport, are suggested by their distribution onpost (RLSA, 1990a). The RI/FS for CSC OUs 1, 2, and 3 showed that significant levels of TRCLE and TCLEE are originating at the CSC site.

The concentrations of TRCLE and TCLEE in the First Creek and Northern Paleochannels are similar to those levels reported in the Final RI. The highest concentrations of these compounds were detected in samples collected from wells located at the northern end of the Northern Paleochannel, which is consistent with distributions reported in the Final RI. The maximum concentration of TCLEE was 108 μg/l in well 37344 located in the Northern Paleochannel. The highest concentrations of TRCLE in the area north of RMA ranged from approximately 5 to 7 μg/l. In general, the distributions of TRCLE and TCLEE are similar to those presented in the Final RI. Concentrations of both of these contaminants have decreased slightly from those reported in the Final RI, as evidenced by the extent of the 1 μg/l contour for TRCLE and the 10 μg/l contour for TCLEE, as depicted on Figures 3.9 and 3.10, respectively.

1,2-Dichloroethane

The distribution of 12DCLE was shown in the Final RI. According to the information presented in the Final RI, 12DCLE is generally found offpost of the northern RMA boundary. However, unlike chloroform, TCLEE, and TRCLE, the highest concentrations of 12DCLE are found in First Creek Paleochannel. The maximum concentration of 12DCLE was 15.2 μg/l in well 37396, which is located at the northwestern end of the First Creek Paleochannel. The concentrations of 12DCLE reported in the Final RI were considerably lower in the fourth quarter of FY 1987 than those reported in the third quarter of FY 1987.

The distribution of 12DCLE was assessed on the basis of data collected during the RI Addendum activities and the CMP. The compound 12DCLE was detected in wells located in the First Creek Paleochannel at concentrations similar to those presented in the Final RI. As was reported in the Final RI, the only detectable level of 12DCLE in the Northern Paleochannel was in well 37391. The concentration in that well was 2.61 μg/l and was consistent with levels reported in the Final RI.

3.2.1.1.7 Other Volatile Organic Compounds

In the Final RI, several other VOCs, including 1,1,1-trichloroethane, 1,1-dichloroethane, trans-1,2-dichloroethene, carbon tetrachloride, and benzene were detected in UFS groundwater. Benzene was detected primarily in samples collected from wells located in the Northern Paleochannel. A few samples from the First Creek Paleochannel and offpost of the northwestern RMA boundary had detectable levels of benzene. The highest concentration of benzene reported in the Final RI was 15.1 μg/l in well 37392, located approximately 2500 feet north of the northern RMA boundary. Benzene was not detected downgradient of the canals except for one isolated occurrence in well 37361, located approximately 1.5 miles northwest of the northwestern RMA boundary. The remaining other VOCs were detected sporadically in only one or two groundwater samples.

Several other VOCs were also detected in the Offpost OU during RI Addendum activities. VOCs detected include benzene, carbon tetrachloride, 1,1,1-trichloroethane, 1,1-dichloroethane, 1,2-dichloroethene, toluene, and xylenes. These compounds were generally found in only a few groundwater samples collected from wells installed in the UFS. Of these compounds, benzene was the most frequently detected. The remaining detections are considered isolated occurrences and not necessarily indicative of contaminant plumes that migrated from onpost.

Carbon tetrachloride was reported in six samples. The highest concentration of carbon tetrachloride was 8.04 μg/l in a sample from well 37404. Carbon tetrachloride was reported in the First Creek Paleochannel at a concentration of 6.98 μg/l in well 37407.

3.2.1.2 Unconfined Flow System Inorganics

This section describes the distribution of selected inorganic constituents in UFS groundwater. The inorganics presented below include arsenic, mercury, chloride, and fluoride. These analytes were selected bases on their distribution, range of concentration and considering their toxicity, except chloride. Virtually all of the inorganics discussed below are naturally occurring constituents in groundwater. The inorganic data presented are compared to background concentrations established in the Final RI and CMP report for FY 1990 (RLSA, 1991a). The following discussions present data generated under the RI Addendum program and are compared to the distribution of the inorganic constituents presented in the Final RI.

Arsenic

The distribution of arsenic was presented in the Final RI. Arsenic was reported in groundwater samples from wells located in the First Creek Paleochannel, with isolated occurrences in the Northern Paleochannel and offpost of the northwestern RMA boundary. In general, arsenic was not detected in wells downgradient of the canals, except in well 37364 located 3 miles downgradient of RMA on the west side of the South Platte River, outside of the Offpost OU.

The highest concentration of arsenic in wells located near RMA was 5.80 μg/l in well 37332, located immediately downgradient of the NWBCS. In the area north of RMA, As was detected somewhat sporadically in a number of wells at concentrations slightly above the CRL of 2.5 μg/l to a maximum of 3.65 μg/l in well 37373 located along the First Creek Paleochannel. The background value for As reported in the Final RI was below the CRL of 2.50 μg/l, indicating that arsenic was not detected in the upgradient wells selected for assessment of arsenic background levels.

The distribution of arsenic on the basis of data collected during RI Addendum activities and the CMP, is shown in Figure 3.11. The distribution of arsenic is similar to that presented in the Final RI. Arsenic occurs in a plume along the First Creek Paleochannel. The maximum concentration of arsenic in this area is 4.00 μg/l in well 37347 located on the north side of the First Creek Paleochannel northwest of Burlington Ditch. Sporadic occurrences of As are noted in the Northern Paleochannel and offpost of the northwestern RMA boundary. Additionally, arsenic was detected in the sample collected from well 37364 located along the South Platte River. In general, the range of concentration and distribution for arsenic is similar to that reported in the Final RI.

Mercury

The Final RI reported mercury in only one offpost groundwater sample. The sample, which was collected from well 37342 located in the First Creek Paleochannel, had a mercury concentration of 0.36 μg/l. Data generated during RI Addendum activities showed detectable levels of mercury in four samples collected from wells located 2000 to 7000 feet offpost of the northwestern RMA boundary. Mercury concentrations in these wells ranged from 0.210 to 1.64 μg/l. Based on the limited number of samples in which mercury was detected, the data do not suggest a mercury plume offpost and are considered sporadic. Data collected under the fall of 1989 CMP show considerably higher frequency of detection for mercury than reported in the Final RI. The FY 1990 CMP (RLSA, 1991a) reported that significant field or laboratory contamination existed for those mercury results. Thus, data for mercury are considered questionable and not representative of groundwater conditions.

Chloride

Chloride was detected in all samples reported in the Final RI. The range of chloride concentrations was from 30,000 to more than 1,000,000 μg/l. Because chloride is a naturally occurring anion in groundwater, the assessment of chloride contamination in the UFS includes a comparison with a range of concentration that is representative of background levels. The range for background chloride levels, based on data from selected upgradient wells presented in the Final RI, is 34,000 to 102,000 μg/l.

The highest concentrations of chloride reported in the Final RI occurred in samples collected from wells located in the First Creek Paleochannel near its confluence with O'Brian Canal. Concentrations of chloride in this area commonly exceeded 500,000 μg/l and reached as high as 3,380,000 μg/l in well 37396. Elevated chloride concentrations were also observed in samples collected from wells located at the northern end of the Northern Paleochannel. Although generally lower than levels in the First Creek Paleochannel, concentrations in samples from one well located in the Northern Paleochannel, well 37368, exceeded 500,000 μg/l.

Chloride concentrations offpost of the northwestern RMA boundary were also elevated above background levels. The highest concentrations occurred in the immediate vicinity of the NWBCS and were generally in the range of 300,000 to 400,000 μg/l. The maximum chloride concentration in that area was 714,000 μg/l in well 37332, located near the northern end of the NWBCS along the RMA boundary.

The distribution of chloride, on the basis of data collected during RI Addendum activities and the CMP, is shown in Figure 3.12. The distribution of chloride is similar to that presented in the Final RI. Chloride occurs in plumes offpost of the northern and northwestern RMA boundaries. The maximum concentrations of chloride occur in the First Creek Paleochannel.

Chloride concentrations in the First Creek and Northern Paleochannels generally exceed 250,000 μg/l. The maximum concentration of chloride in this area was 1,800,000 μg/l in well 37418 located in the First Creek Paleochannel. Although this concentration is considerably lower than the maximum concentration of 3,380,000 μg/l in this area reported in the Final RI, this value is consistent with more recent chloride data. In the Northern Paleochannel, the highest concentrations are approximately slightly greater than 500,000 μg/l, similar to levels reported in the Final RI.

Offpost of the northwestern RMA boundary, chloride concentrations in excess of 250,000 μg/l occur immediately downgradient of the RMA boundary. Chloride concentrations in this area are slightly lower than those reported in the Final RI. Concentrations reported in the Final RI along the RMA boundary in this area exceeded 300,000 μg/l and exceeded 600,000 μg/l in at least one well. Currently, concentrations in this area are approximately 250,000 μg/l.

A chloride plume, defined by the 100,000 μg/l isoconcentration contour, extending northwest off the northwestern RMA boundary is apparent in Figure 3.12. New wells installed under the RI Addendum have provided additional definition for this plume. Although the chloride plume was not depicted in the Final RI, concentrations in wells throughout this area have actually decreased from those reported in the Final RI. The appearance of this plume is an artifact of the contour interval and is not the result of additional contamination migrating offpost.

In general, concentrations of chloride have generally decreased since the Final RI. The pattern of chloride contamination in offpost groundwater is similar to that reported in the Final RI, but concentrations have decreased in all plume areas, particularly in the First Creek Paleochannel and offpost of the northwestern RMA boundary. Maximum concentrations in the First Creek Paleochannel are 1,800,000 μg/l compared to a maximum of 3,380,000 μg/l reported in the Final RI. Offpost of the northwestern RMA boundary, concentrations have decreased approximately 10 to 20 percent from those reported in the Final RI.

Fluoride

The Final RI reported detectable concentrations of fluoride in 68 percent (41 of 60 samples) of the samples analyzed. The range of fluoride concentrations was from 1000 to 4500 μg/l. Because fluoride is a naturally occurring anion in groundwater, the assessment of fluoride contamination in the UFS includes a comparison with a range of concentration that is representative of background levels. The range for background fluoride levels, based on data from selected upgradient wells presented in the Final RI, is 570 to <1220 μg/l.

The highest concentrations of fluoride reported in the Final RI occurred in samples collected from wells located downgradient of the extreme western end of the NBCS and in the First Creek Paleochannel between the northern RMA boundary and the confluence with O'Brian Canal. Concentrations of fluoride in these areas commonly exceeded 2000 μg/l. Fluoride concentrations were reported downgradient of the NBCS at 4650 μg/l at well 37339 and in the First Creek Paleochannel near its confluence with O'Brian Canal at 4420 μg/l at well 37396. Elevated fluoride concentrations were also observed in samples collected from wells located in the Northern Paleochannel, primarily in the western portion of Section 13. Although generally lower than concentrations in the First Creek Paleochannel, concentrations in samples from at least one well located in the Northern Paleochannel, well 37397, also exceeded 2000 μg/l.

Fluoride concentrations offpost of the northwestern RMA boundary were also elevated above background levels. The highest concentrations occurred in the immediate vicinity of the NWBCS, and were generally in the range of 1300 to 2000 μg/l. The maximum fluoride concentration in that area was 2610 μg/l in well 37382 located near the northern end of the NWBCS along the RMA boundary.

The distribution of fluoride, on the basis of data collected during RI Addendum activities and the CMP, is shown in Figure 3.13. The distribution of fluoride is similar to that presented in the Final RI. Fluoride occurs in plumes offpost of the northern and northwestern RMA boundaries. The maximum concentrations of fluoride occur in the First Creek Paleochannel and downgradient of the western end of the NBCS.

Fluoride concentrations commonly exceed 3000 μg/l in the First Creek Paleochannel and 2200 μg/l in the Northern Paleochannel. The maximum concentration of fluoride in these areas was 6300 μg/l in well 37418 located in the First Creek Paleochannel. A second sample collected from well 37418 had a fluoride concentration of 3310 μg/l, suggesting a high degree of variability in the fluoride data, as was noted in the Final RI. In the Northern Paleochannel, the highest concentrations are slightly greater than 2500 μg/l, which is similar to levels reported in the Final RI. In general, fluoride concentrations in samples collected offpost of the northern RMA boundary are similar to those reported in the Final RI.

Offpost of the northwestern RMA boundary, fluoride concentrations in excess of 2000 μg/l occur immediately downgradient of the RMA boundary. Fluoride concentrations in this area are similar to those reported in the Final RI. In the Final RI, concentrations along the RMA boundary in this area ranged from approximately 1300 to 2000 μg/l and exceeded 2600 μg/l in at least one well. Currently, concentrations in this area are approximately 2000 μg/l, although the maximum concentration was detected in well 37438 at 4070 μg/l.

A fluoride plume, defined by the 2000 μg/l isoconcentration contour, extends northwest off of the northwestern RMA boundary and north of the northern RMA boundary and is apparent in Figure 3.13. New wells installed under the RI Addendum have provided additional definition for this plume. This plume was depicted in the Final RI and was slightly smaller than that depicted in this report. Fluoride concentrations in some wells in this area have increased slightly from those reported in the Final RI. The slightly higher concentrations have increased the size of the plume in the area off of the northwestern boundary.

In general, concentrations of fluoride have remained approximately the same or increased slightly since the Final RI. The pattern of fluoride contamination in offpost groundwater is similar to that reported in the Final RI.

3.2.2 Nature and Extent of Arapahoe Formation Contamination

This section describes the distribution of organic and inorganic constituents in Arapahoe Formation groundwater. The data and interpretations presented in this section are for groundwater samples collected from seven offpost domestic and monitoring wells completed in the Arapahoe Formation. A number of the existing Arapahoe Formation wells were installed a number of years ago and may not have the same structural integrity as those wells installed more recently, particularly those installed during RI Addendum activities. This factor may have some effect on the comparability of data from the wells. Data from several sampling events, as described in Section 3.2, were used to develop the interpretations and assessment of possible contamination in the Arapahoe Formation.

Because specific information about the construction of many of the domestic wells in the Arapahoe Formation is not available, several limitations on the usefulness of data from those wells must be recognized. As discussed below, the extent of organic and inorganic contaminants in the Arapahoe Formation appears to be quite limited and probably the result of flow from contaminated groundwater in the UFS. Data from the newly installed Arapahoe Formation monitoring wells should be considered of significantly higher quality than data from the existing domestic wells. In contrast, the sporadic occurrence of organic or inorganic contaminants in samples collected from the domestic wells should not be interpreted as evidence of widespread contamination of the Arapahoe Formation.

The Arapahoe Formation wells were sampled during RI Addendum and CMP activities, as shown in Table 2.1, and were analyzed for the compounds listed in Table 2.4. Analytical results for samples collected during RI Addendum activities are included in Appendix B. Results for samples collected and analyzed during the CMP are contained in the RMA database. The analytical results for Arapahoe Formation samples collected from domestic and monitoring wells are discussed in the following subsections.

3.2.2.1 Arapahoe Formation Organics

This section presents and discusses the results of organic analyses for groundwater samples collected from domestic and monitoring wells completed in the Arapahoe Formation. Eleven samples were collected from eight Arapahoe Formation wells and were analyzed for the target analytes listed in Table 2.4.

Two organic compounds, chloroform and DIMP, were infrequently detected in samples collected from Arapahoe Formation wells (Figure 2.2). Well 09200TW090 had detectable levels of DIMP in samples collected in January and August 1989. Chloroform was not detected in samples from this well. Well 11841TW096 was sampled three times: in September 1989, January 1990, and August 1990. The sample collected in September 1989 did not contain detectable concentrations of organic compounds. Samples collected in January and August 1990 contained DIMP and chloroform, respectively. DIMP was detected at a concentration of 0.521 μg/l, and chloroform was detected at concentrations of 24.9 and 1.17 μg/l, respectively. Additionally, chloroform results for the sample collected in January 1990 are questionable on the basis of evaluation of field QA/QC information. The sample from well 13701TW104 contained DIMP at a concentration of 3.87 μg/l. Because only one sample was collected from well 13701TW104, the occurrence of DIMP cannot be verified. Additionally, as discussed in Section 3.2.2.2, this well appears to have structural problems and the organic analytical data do not reflect samples representative of the Arapahoe Formation.

The detections of DIMP and chloroform observed in these Arapahoe Formation wells do not appear to be representative of overall aquifer conditions. The majority of samples collected from Arapahoe Formation wells did not contain organic compounds. In addition, DIMP and chloroform were not detected consistently in samples collected from well 11841TW096. It is possible that the observed concentrations of DIMP and chloroform may be artifacts of field or laboratory procedures or may reflect the effects of well construction problems. On the basis of these data, organic contamination in the Arapahoe Formation appears to be sporadic and localized, possibly as a result of well construction problems. The groundwater quality data for the Arapahoe Formation wells installed and sampled under the RI Addendum program strongly support this conclusion.

3.2.2.2 Arapahoe Formation Inorganics

This section presents and discusses the inorganic chemistry results of groundwater quality sampling of domestic and monitoring wells completed in the Arapahoe Formation. Nine samples were collected from seven Arapahoe Formation wells and were analyzed for inorganic target analytes including metals and anions, as shown in Table 2.4. Inorganic target analytes detected in Arapahoe Formation well samples included arsenic, calcium, chloride, chromium, copper, fluoride, magnesium, mercury, nitrate-nitrite, potassium, sodium, sulfate, and zinc. In general, the analytical results for the inorganic constituents are within the expected concentration ranges. The analytical results for inorganic constituents are described below.

Arsenic was detected only in samples collected from wells 37445 and 37431 at concentrations of 4.89 and 3.22 μg/l, respectively. Calcium, chloride, fluoride, nitrate-nitrite, sodium, and sulfate were detected in all samples for which they were analyzed with the exception of fluoride and sulfate. Fluoride had two results rejected on the basis of QA/QC requirements, and sulfate had one rejected result. The concentration ranges for the inorganic constituents detected in the Arapahoe Formation samples follow:

- Calcium 1480 to 34,000 μg/l
- Chloride 2580 to 38,000 μg/l
- Fluoride 2850 to 3450 μg/l
- Nitrate-nitrite 44.2 to 2,000,000 μg/l
- Sodium 93,000 to 160,000 μg/l
- Sulfate 2490 to 180,000 μg/l

Chromium, copper, mercury, and potassium were each detected once at concentrations of 19.8 μg/l in well 37431, 31.8 μg/l in well 37445, 1.35 μg/l in well 11841TW096, and 916 μg/l in well 13701TW104, respectively. Zinc was detected twice at concentrations of 616 μg/l in well 37445 and 667 μg/l in well 13701TW104.

Cadmium, cyanide, iron, lead, manganese, and total organic carbon (TOC) were not detected above the CRL in any Arapahoe Formation well samples.

The inorganic water chemistry of groundwater samples collected from the Arapahoe Formation was evaluated to identify wells that displayed apparently inconsistent water chemistry signatures. Specific electrical conductivity (conductivity) measured at the time of sample collection was reviewed and compared to typical Arapahoe Formation ranges reported by Tri-County Health Department (Tri-County) (Tri-County, 1989). The conductivity values measured in the field were consistent with the Tri-County ranges, except for well 13701TW104. The conductivity value reported for this well was approximately 850 μmhos/cm at 25°C, which is about 50 percent higher than typical values for the Arapahoe Formation, although the Tri-County report (Tri-County, 1989) presents a broad range of values. These data, generally indicate that all of the Arapahoe Formation wells sampled, except well 13701TW104, appear to reflect inorganic water quality representative of the Arapahoe Formation.

Based on the results presented in this report, the Arapahoe Formation inorganic chemistry does not appear to be affected by RMA contaminants. Results for the six wells discussed above are generally within the concentration ranges expected. There were a few exceptions to this general conclusion. Analytical results for wells 10021TWPEO and 13701TW104 were anomalous with respect to results reported for the other Arapahoe Formation wells. Well 10021TWPEO contained nitrate-nitrite at a concentration of 2,000,000 μg/l. This value is 2000 times higher than the next highest nitrate-nitrite value and appears to be an erroneous result. A plausible explanation for this value is that the sample may have been incorrectly preserved in the field using nitric acid instead of sulfuric acid.

Well 13701TW104 contained most of the highest concentrations for detected inorganic constituents. In the case of magnesium, the concentration for this well was approximately 140 times higher than the next highest concentration. Well 13701TW104 contained the highest concentrations of calcium, chloride, fluoride, magnesium, sodium, sulfate, and zinc, and contained the only detectable levels of potassium. On the basis of these data and the reported field conductivity of 850 μmhos/cm at 25°C, this well appears to reflect an influence of UFS groundwater quality.

3.2.3 Summary of Gas Chromatography/Mass Spectroscopy Results

GC/MS analytical methods were used to attain groundwater sample results for two purposes. The first purpose was to provide investigative results for certain target analytes (e.g., caprolactam, bis(2-ethylhexyl)phthalate, vinyl chloride) for which a certified GC method was not available. In this case, all analytes certified under the GC/MS method were reported by the laboratory. The second purpose was to provide confirmation of GC results and to assess the presence of nontarget analytes. GC/MS results are included in Appendix B.

GC results and GC/MS results were in general agreement. In one case, GC/MS confirmation results for chloroform (sample HA1069) did not confirm a GC detection (sample 37430). Because the GC detection was only slightly higher than the CRL for the GC/MS method, this does not represent a serious discrepancy. In four cases, GC/MS confirmation results reported detections where none were reported in the investigative data. Three of these cases involved carbon tetrachloride in samples HA1168, HA1169, and HA1171 at concentrations near the GC/MS CRL of 1.0 μg/l. The fourth case involved bis(2-ethylhexyl)phthalate at 176 μg/l, which probably represents laboratory contamination.

Chloroform and chlorobenzene GC method results were very high for several samples analyzed for the Offpost OU RI Addendum and IRA A. These results were inconsistent with historical data and suggest problems associated with cross-contamination during sampling. This problem was particularly severe during two sampling events that took place from January 25 to

March 2, 1990. Both the GC and GC/MS volatiles results were higher than historical results, and the volatiles data for the two episodes are not considered reliable.

3.2.4 Summary of Quality Assurance/Quality Control Results

QA/QC samples were collected and analyzed in accordance with the QAP. The frequency of and procedures for collecting various QA/QC samples are summarized in Table 3.2. The total numbers of various QA/QC samples collected during RI Addendum activities follow:

- 5 rinse blanks
- 4 field blanks
- 4 trip blanks
- 15 duplicates
- 7 GC/MS confirmation samples

For duplicate samples, duplicate sample agreements (DSAs) were computed for all analytes with concentrations greater than the CRL in either the investigative or duplicate sample. The DSAs are shown in Table 3.3, along with the investigative and duplicate results. Since the DSA is the ratio of the difference between the two results divided by the average of the two results, a DSA value of 0.00 indicates perfect agreement, and a value very near or equal to 2.00 indicates very poor agreement.

DSA values exceeding 1.00 were calculated for compounds in one of the 15 duplicate samples. The DSA of 1.99 for nitrate-nitrite in sample HA1166 indicates a problem with this sample. The extreme difference between 4300 μg/l in HA1166 and 1,300,000 μg/l in sample 37435 suggests that sample 37435 may have been inadvertently preserved with nitric acid rather than sulfuric acid. On the basis of this information, the nitrate-nitrite result for sample 37435 has been disregarded. Sample HA1079 contains seven metals results with DSAs exceeding 1.00, which suggests a possible problem with the inductively coupled plasma (ICP) metals analysis for this sampling event.

QC samples consisting of field, rinse, and trip blanks exhibited anomalous results in 4 of 13 samples. Two samples, HA1047 (field blank) and HA1177 (trip blank), had reported chloroform results slightly exceeding the CRL. Sample HA1176, a field blank, had reported chlorobenzene results slightly exceeding the CRL. The results for these three samples support the possibility that some chloroform and chlorobenzene reported results may reflect laboratory or field contamination. Samples HA1176 and HA1177 were collected during the two January to March 1990 sampling events mentioned in the GC/MS discussion.

Rinse blank sample HA1175 had reported concentrations greatly exceeding the CRL for zinc and for seven volatile organic compounds. The presence of so many elevated concentrations in this sample suggests that problems may have been encountered during field decontamination of sampling equipment. As previously discussed in Section 3.2.1.1.6, several samples collected during the period between January 25 and March 2, 1990, showed anomalously high levels of VOCs. The presence of similar contaminants in sample HA1175 further suggest that problems associated with field decontamination are the source of the anomalous contaminants in the investigative samples, as discussed in Section 3.2.1.1.6. The results for other blanks do not show any evidence of additional field decontamination problems.

In summary, the groundwater duplicate data show that metals results may lack precision for at least one sampling event (June 21 to 22, 1990). The groundwater QC data suggest that results for chloroform, chlorobenzene, and other volatiles results for the January to March 1990 sampling events reflect field contamination problems for those sampling events. The volatiles data for these two sampling events are, therefore, considered unreliable and have not been considered in the production of contaminant distribution maps.

3.2.5 Comparison of Offpost RI Results and RI Addendum Results

Groundwater data collected since the Offpost OU RI report serve to confirm and add to the data presented in the Final RI report (ESE, 1988a). Data that were collected after the Offpost OU RI have provided additional chemical and geologic data for the UFS and Arapahoe Formation.

Based on these data, new flow pathways have been identified, and plume boundaries have been reassessed and reinterpreted.

Refinements have been made in the understanding of the UFS groundwater flow system offpost. New minor paleochannels have been identified in three areas not previously described. The first of these minor paleochannels is south of and parallel to the First Creek Paleochannel, leading from the NBCS through the southwest corner of Section 14. Analytes reported in this paleochannel include chloroform, chloride, fluoride, DIMP, dieldrin, and endrin. The second of these minor paleochannels, which may be impacted by seasonal fluctuations in water levels in the UFS, is north of the First Creek Paleochannel through a narrow area of saturated alluvium and leads through the area surrounding well 37342 in Section 14. Compounds identified in this second paleochannel include arsenic, TCLEE, DIMP, and dieldrin. The third minor paleochannel is an eastern arm or tributary to the Northern Paleochannel in Section 12. This paleochannel was identified based on an evaluation of geologic and groundwater quality data from three new RI Addendum monitoring wells. Compounds identified in these wells include chloroform, DBCP, and DIMP.

On the basis of data collected after the Final RI, contaminant plume boundaries have been revised. The distribution of DIMP, identified in the Final RI report as two distinct plumes, is now interpreted as one plume of low concentration extending from the Northwestern Paleochannel to the Northern Paleochannel with higher concentrations corresponding to the First Creek and Northern Paleochannels. This reinterpretation of the extent of DIMP contamination offpost is a function of a considerably lower CRL used in this RI Addendum report. The distribution of dieldrin offpost of the RMA northwest boundary has been modified based on analytical results for newly installed monitoring wells.

A comparison of previous and current data indicates that for several compounds such as DIMP, DCPD, chlorobenzene, and chloroform, the NBCS has apparently been successful in decreasing concentrations at and near the RMA north boundary. The trailing edges of these plumes have moved as much as approximately 1500 feet downgradient from their previous positions as reported in the Final RI. Also, downgradient from the RMA north boundary, new data indicate two isolated detections of DCPD in the Northern Paleochannel, whereas none were reported in the Final RI.

For the area between the RMA north boundary and O'Brian Canal, new data seem to support the idea stated in the Final RI that leakage from the canals has a diluting effect on groundwater. Concentrations of nearly all contaminant plumes mapped in this area decrease significantly at approximately O'Brian Canal or Burlington Ditch. Downgradient from the RMA northwest boundary, this dilution effect is not as obvious, which suggests that canal leakage is less appreciable in this area.

3.3 CONCLUSIONS

Potentiometric data collected since the Offpost OU RI are very similar to previous data, with the exception of higher water levels immediately downgradient from the NBCS. This is interpreted as an effect of the recently installed recharge trenches at the NBCS. Unconfined groundwater flows from RMA toward the north and northwest along areas of saturated alluvium known as the Northern, First Creek, and Northwest Paleochannels, as well as two unnamed minor paleochannels south and north of the First Creek Paleochannel. Confined groundwater in the Arapahoe Formation also flows northwest, although it is not directly hydraulically connected to the UFS.

Unconfined groundwater contamination and migration generally occur within the paleochannels mentioned above because of the relatively high hydraulic conductivities of the materials in those areas. Available data indicate that much of the contamination observed offpost was introduced before the NBCS and NWBCS were installed; however, recent data suggest that before recent upgrades of the NBCS and NWBCS, these two systems were not completely effective in halting offpost migration of contaminants in the UFS. Recent data indicate that contaminant levels downgradient from the NBCS are lower, suggesting that the boundary system is performing as it should. Data from the NWBCS suggest improved performance of this system.

The highest contaminant levels downgradient from the NBCS occur upgradient of O'Brian Canal. Certain volatile compounds such as chlorobenzene, chloroform, trichloroethene, and DBCP were detected at low concentrations downgradient from the canals, but well-defined plumes do not exist in this area. Semivolatile organic compounds such as dieldrin and other organochlorine pesticides are present almost exclusively upgradient from the canals.

Contamination downgradient from the NWBCS consists mainly of chlorobenzene, chloroform, DIMP, and dieldrin. The highest concentrations of chloroform occur downgradient of the RMA boundary, which suggests that the NWBCS is being relatively ineffective in reducing levels of chloroform, but appears to be an effective barrier to offpost migration of other volatiles. Semivolatiles such as dieldrin and possibly DIMP appear to have been bypassing the system on the south side. NWBCS upgrades and operational changes have been implemented to alleviate this problem. The canals seem to have no dilution effect on contamination levels in this area. Recent modifications to the NBCS and NWBCS are expected to have a significant impact on reducing downgradient contaminant levels.

The most widespread RMA-related groundwater contaminant in the Offpost OU is DIMP, which is present at low concentrations in a band from the west end of the NWBCS to the east end of the NBCS, and from the RMA boundaries to the South Platte River. The other major contaminants present in the Offpost OU are chloroform, chlorobenzene, TRCLE, TCLEE, DBCP, dieldrin, endrin, DCPD, arsenic, chloride, and fluoride.

4.0 SURFACE-WATER MONITORING RESULTS AND ASSESSMENT

This section presents a discussion of surface-water quality data developed under the RI Addendum program for the Offpost OU. The principal purpose of this section is to present the current understanding of the surface-water hydrologic system and the nature and extent of contamination in the surface-water medium in the Offpost OU. Section 4.1 presents a discussion of the nature and extent of surface-water contamination.

The first portion of Section 4.1 presents a brief overview of interpretations contained in the Final RI. Following this overview, new analytical data, which have been developed through analysis of additional surface-water samples collected during Offpost OU RI Addendum activities, are presented and discussed. Sections 4.2 and 4.3 present an assessment of the analytical results for GC/MS and QA/QC samples. Section 4.4 presents a more detailed comparison of RI Addendum results with those from the Final RI and more recent CMP reports. Section 4.5 presents conclusions about the extent of surface-water contamination in the Offpost OU. Data used in this assessment are contained in Appendix C.

4.1 NATURE AND EXTENT OF SURFACE-WATER CONTAMINATION

This section describes the concentrations and distributions of target analytes detected in surface-water samples collected in the Offpost OU. Eighteen surface-water samples were collected from 15 locations along First Creek, Burlington Ditch, O'Brian Canal, and Barr Lake as shown in Figure 2.3. Surface-water samples were collected in two sampling episodes. The first episode was conducted during November 1988 and consisted of six samples collected between 96th Avenue and the First Creek Impoundment. The second episode occurred between May and June 1990 and consisted of nine samples collected from First Creek, Burlington Ditch, O'Brian Canal, and Barr Lake. The surface-water sampling locations were collocated with sediment sampling locations (Section 5.0). Data discussed in this section have been accepted by PMRMA for inclusion in the RMA database.

The sources of surface-water contamination in the various surface-water bodies in the Offpost OU were presented in the Final RI. However, additional details regarding operation of the surface water, particularly the surface-water system, is presented below. A pipe connects O'Brian Canal and Burlington Ditch and is used infrequently to transfer water from O'Brian Canal to Burlington Ditch. Although adequate records regarding the infrequent use of the pipe are not available, the pipe was reportedly used only once during the past three years. During surface-water sampling conducted under the RI Addendum, this pipe was not in use.

Interaction between the groundwater and surface-water systems may also be a mechanism for contaminants entering O'Brian Canal or Burlington Ditch. This mechanism was investigated and reported in the Final RI. Based on survey information that showed that the bottom of the canal and ditch were above the groundwater surface in the UFS, it appears unlikely that groundwater could be entering the canal or ditch. However, in some areas, the bottom of the Burlington Ditch appears to be much lower than the levels reported in the Final RI. Based on a review of aerial photographs, the area along Burlington Ditch in the northwestern corner of Section 14 appears to contain water even when no flows are occurring in the ditch. This appears to be a result of a lower bottom elevation than in adjacent areas of the ditch. This could be an additional mechanism for the observed concentrations of typical groundwater contaminants in surface-water samples.

4.1.1 Organic Compounds

The Final RI reported that the majority of organic contamination observed in offpost surface water was directly attributable to groundwater discharge to surface water, particularly in the vicinity of the confluence of First Creek and O'Brian Canal. The surface-water samples collected from First Creek in this vicinity (sampling station 14BDD) generally contained the greatest number of contaminants and at the highest concentrations. DIMP was the most commonly detected contaminant and was found in all samples collected from First Creek at station 14BDD.

The highest concentration of DIMP was 550 $\mu g/l$, which was detected in a sample collected from station 14BDD. At other sampling stations, concentrations of DIMP that were reported in the Final RI ranged from below CRLs to a maximum of 22 μg/l. The number of samples collected from each sampling station reported in the Final RI ranged from three to nine. The average number of samples from each station was approximately seven.

The following contaminants were detected in samples that were presented in the Final RI:

- DIMP
- Aldrin
- Dieldrin
- CPMSO2
- 1,4-Dithiane
- 12DCLE
- DCPD
- Chloroform
- Benzene
- TCLEE
- 12DCE
- Endrin

However, these contaminants were generally found only sporadically. With the exception of DIMP, 1,4-dithiane, DCPD, and TCLEE, these compounds were not detected in more than one sample collected from each station. TCLEE was detected in three of eight samples collected from a sampling station located along the South Platte River approximately 2 miles upstream of the southern boundary of the Offpost OU.

Data presented in the Final RI demonstrate that the occurrence of contaminants in offpost surface water is limited. DIMP was the only compound frequently detected in offpost surface-water samples. The distribution of DIMP and a few other contaminants is clearly associated with groundwater discharging to surface water along First Creek in the vicinity of the confluence with O'Brian Canal. The relationship between contaminant distribution and groundwater/surface-water interactions is discussed in detail in the Surface-Water CMP reports for FY 1988 (RLSA, 1990b) and FY 1989 (RLSA, 1990a).

The following organic compounds were detected in offpost surface-water samples collected during RI Addendum activities:

- DIMP
- DMMP
- Dieldrin
- CPMSO2
- CPMSO
- Chloroform
- 1,4-Dithiane
- Atrazine
- Chlordane
- DCPD
- DDT
- DDE

The surface-water sampling results are provided in Appendix C. The distribution of organic compounds detected above CRLs in samples collected in November 1988 and from May to June 1990 are shown on Figures 4.1 and 4.2, respectively. A comparison of these data with those from the Final RI shows that the suite of organic compounds detected in surface water offpost are similar to those observed in the samples collected during the Final RI. The samples collected from the reach of First Creek between the northern RMA boundary and the confluence with O'Brian Canal showed the greatest number of contaminants. Concentrations of most contaminants were generally highest in this area.

DIMP was the organic compound most frequently detected in offpost surface water. DIMP was also the most widely distributed compound and was detected in 12 surface-water samples collected from First Creek, O'Brian Canal, and Burlington Ditch at concentrations ranging from

0.532 to 59.0 μg/l. DIMP concentrations averaged approximately 5 μg/l in samples collected from First Creek during November 1988, except sample HA0980SW, which contained DIMP at 13.1 μg/l. The highest concentration of DIMP, 59.0 μg/l, was observed in sample HA1154SW collected in the May to June 1990 sampling event from First Creek near the confluence with O'Brian Canal.

DIMP was not detected in samples collected from Burlington Ditch or O'Brian Canal at locations sampled upstream from the First Creek confluence. The maximum concentration of DIMP detected in surface water is considerably lower than the maximum DIMP concentration reported in the Final RI. Although concentrations in surface water are considerably lower than groundwater concentrations, the observed decreases in surface-water samples generally reflect the decreasing concentrations of DIMP in groundwater in the First Creek Paleochannel. The CMP report for FY 1990 (RLSA, 1991a) also clearly demonstrates these decreases in DIMP concentrations over the past 10 years.

The occurrence of DMMP was limited to surface-water samples collected in November 1988 from First Creek. Concentrations of DMMP in these samples ranged from 0.209 to 4.92 μg/l, but were less than 0.26 μg/l for all samples, except sample HA0980SW, which contained DMMP at a concentration of 4.92 μg/l. DMMP was not detected in any of the samples collected from May to June 1990. DMMP was not reported in groundwater or surface-water samples data presented in the Final RI.

The CRL for DMMP reported in the Final RI was 16.3 μg/l, which is considerably higher than the levels detected in the surface-water samples collected during RI Addendum activities. In general, DMMP was not consistently detected in surface-water samples, and no pattern of DMMP in the surface-water hydrologic system is observed. DMMP has not been consistently detected in UFS groundwater. Over the past six years, DMMP has been detected in only a few UFS groundwater samples. The distribution of DMMP in surface water does not appear to be related to discharges of alluvial groundwater. On the basis of these data, the detectable levels of DMMP in the surface-water samples are considered sporadic and not an indication of DMMP contamination in the Offpost OU.

Other organic compounds were also detected in surface-water samples, but they were detected in only one or two samples and were generally observed in samples in which DIMP was also detected. The greatest number and highest concentrations of organic compounds were detected in samples collected from First Creek between the northern RMA boundary and O'Brian Canal. RMA-related organic compounds were not detected in samples collected from O'Brian Canal upstream of the confluence of First Creek. Additionally, organic compounds were also not detected in sample HA1160SW, which was collected from the Burlington Ditch. Caprolactum, which is a suspected laboratory contaminant, was detected in two samples from O'Brian Canal at concentrations of 7.70 and 10.0 μg/l, respectively.

In general, the concentrations of organic compounds detected in offpost surface-water samples are highest in First Creek near O'Brian Canal. Sample HA1154SW, which was collected near the confluence of First Creek with O'Brian Canal, contained the highest observed concentrations of most of the organic compounds. This sample was collected from the reach of First Creek where surface-water and groundwater interaction is believed to occur. The nature and extent of organic compounds in surface water in the Offpost OU is generally consistent with the occurrence of those analytes detected in groundwater, particularly in the First Creek area.

As noted in the Final RI and the Surface-Water CMP report for FYs 1988 and 1989, groundwater discharging to surface water in this area is the principal contaminant source in the surface-water hydrologic system offpost. Analytical results for a few contaminants, including CPMSO, CPMSO2, and DMMP, are not consistent with previous surface-water data or with previous or current groundwater data. These results are considered anomalous.

The occurrence of RMA-related organic contaminants in First Creek, Burlington Ditch, and O'Brian Canal suggests that RMA is the source of these contaminants in offpost surface water. Additionally, the absence of these compounds in samples collected from Burlington Ditch and

O'Brian Canal upstream of First Creek also suggests an upstream source of contaminants to the ditch and canal does not exist.

4.1.2 Inorganic Constituents

The Final RI reported results for inorganic analyses conducted on surface-water samples collected from the Offpost OU. The inorganic target analytes for the Final RI are slightly different than those for which analyses were performed during RI Addendum activities. The principal difference is the addition of cyanide and nitrate-nitrite to the target analyte list for the RI Addendum. The addition of these two analytes has not considerably changed any previous interpretations regarding the nature and extent of inorganic contamination in the surface-water hydrologic system offpost.

The following inorganic constituents were detected in surface-water samples collected during RI Addendum activities between November 1988 and from May to June 1990:

- Arsenic
- Calcium
- Chloride
- Cyanide
- Fluoride
- Magnesium
- Mercury
- Nitrite-nitrate
- Potassium
- Sodium
- Sulfate
- Zinc

Inorganic constituents detected during RI Addendum activities were similar to those reported in the Final RI. A few constituents, including arsenic, calcium, chloride, fluoride, magnesium, mercury, sodium, and sulfate, occurred at concentrations exceeding typical concentrations reported in the Final RI report. Most of these higher concentrations occurred in samples collected from First Creek along the reach between the northern RMA boundary and the First Creek confluence with O'Brian Canal. This pattern is generally consistent with that reported in the Final RI and Surface-Water CMP report for FYs 1988 and 1989, which commonly reported the maximum concentrations of major inorganic constituents along First Creek at the northern RMA boundary or near the confluence with O'Brian Canal.

Arsenic was detected in six of the seven samples collected from First Creek at concentrations ranging from 2.78 to 280 μg/l. Arsenic was not detected in sample HA0973SW. Arsenic concentrations reported for samples HA0971SW and HA0980SW were 280 and 20.9 μg/l, respectively, which are generally higher than historically observed for this area. The maximum concentrations of arsenic are commonly found in surface-water samples collected from First Creek immediately downstream of the Onpost Sewage Treatment Plant. Arsenic values for that location reported in the Surface-Water CMP report for FY 1989 were approximately 30 μg/l. The arsenic concentration of 280 μg/l for sample HA0971SW is considerably higher than historically reported for this area. This value is considered anomalous and not considered representative of surface-water conditions in the Offpost OU. The concentration of arsenic in other samples from First Creek did not considerably exceed the CRL. Other metals concentrations were also elevated in this sample and may reflect problems associated with field filtering of the sample.

Arsenic was detected in only 2 of 11 samples collected from Burlington Ditch, O'Brian Canal, and Barr Lake. The concentrations of arsenic in samples HA1197SW and HA1196SW, which were collected from O'Brian Canal upstream and downstream of the confluence with First Creek, were the same, at 2.82 μg/l.

Mercury was detected above the CRL in only one of the First Creek samples at the confluence of First Creek with O'Brian Canal. This sample, HA1154SW, contained mercury at a concentration of 0.393 μg/l, approximately four times higher than the CRL of 0.100 μg/l. Mercury was detected above the CRL in one sample, HA1160SW, collected in Burlington Ditch upstream of First Creek. Mercury was consistently detected above the CRL in samples collected from Burlington Ditch upstream of First Creek to Barr Lake, at concentrations ranging from 0.230 to 0.557 μg/l. The highest concentrations of mercury were detected in the duplicate sample from Barr Lake and a sample from Burlington Ditch near the crossing with Second Creek at concentrations of 0.538 and 0.557 μg/l, respectively.

Cyanide was detected only in sample HA0971SW at a concentration of 12.3 μg/l. This was the only occurrence of cyanide and is considered anomalous and not representative of surface-water conditions in the Offpost OU. As noted above, the analytical results for this sample may represent problems associated with field filtering of the sample. Nitrate-nitrite was detected in 17 surface-water samples at concentrations ranging from 108 to 3300 μg/l. As these data show, nitrate-nitrite concentrations are relatively low and are consistent among sampling locations.

The results for other target analytes were generally consistent with those reported in the Final RI. However, a few inorganic constituents that were infrequently detected in samples reported in the Final RI, including cadmium, chromium, copper, and lead, were not detected in samples collected during RI Addendum activities. This difference could be attributable, in part to slight increases in the CRLs for these inorganic constituents. Additionally, as noted below, the distribution of these constituents is sporadic, and no evidence of discharges from RMA is observable. The highest concentrations of cadmium, chromium, and copper reported in the Final RI were detected in samples collected from the South Platte River northwest of the city of Brighton and outside of the Offpost OU. This distribution, which was reported in the Final RI, suggests that the occurrence of these constituents in offpost surface water is not related to releases from RMA.

4.2 SUMMARY OF GAS CHROMATOGRAPHY/MASS SPECTROSCOPY RESULTS

GC/MS analyses were performed on two surface-water samples to confirm results obtained by GC analyses. Samples HA1190SW and HA1191SW are GC/MS samples for surface-water samples HA1185SW and HA1196SW, respectively. Results for the GC/MS analyses are provided in Appendix C.

Sample HA1185SW and associated GC/MS sample HA1190SW did not have detections of organic compounds above CRLs.

Atrazine was detected above the CRL at a concentration of 4.13 μg/l in sample HA1196SW. Results for associated GC/MS sample HA1191SW did not confirm the atrazine detection in sample HA1196SW. The CRL for atrazine analyzed by the GC/MS method is 5.90 μg/l, which is higher than the atrazine detection of 4.13 μg/l in sample HA1196SW.

4.3 SUMMARY OF QUALITY ASSURANCE/QUALITY CONTROL RESULTS

QA/QC samples collected for the surface-water sampling program consisted of two duplicate samples. The results for the duplicate samples, with associated investigative samples noted, are listed in Appendix C. The analytical results for duplicate pairs were reviewed with respect to the compounds detected. Table 4.1 presents the calculated DSA percentage between concentrations of detected compounds. As shown in the table, DSA results are reasonable, with most of the values less than 10 percent. The highest DSA value, approximately 52 percent, is for mercury. However, considering that the concentration of mercury is less than 1 μg/l, these results are considered acceptable.

4.4 COMPARISON OF OFFPOST REMEDIAL INVESTIGATION AND REMEDIAL INVESTIGATION ADDENDUM RESULTS

A comparison of organic compounds reported for surface-water samples collected during the Final RI and RI Addendum activities indicates that, in general, the types of organic compounds detected in RI Addendum surface-water samples are similar to those reported in the Final RI. The most frequently detected compound reported in the Final RI was DIMP, with other organic compounds detected infrequently. The most frequently detected compound during the RI Addendum activities was also DIMP, with only one or two other organic compounds detected in the samples.

Several compounds, which were detected in surface-water samples collected during RI Addendum activities, including atrazine, chlordane, DDT, DDE, DMMP, and CPMSO, were not detected in surface-water samples collected during the Final RI. Aldrin, tetrachloroethene, and

1,2-dichloroethane were not detected during the RI Addendum activities but were reported in the Final RI. Organic compounds were not detected in the samples collected during RI Addendum activities from Barr Lake. Six samples were collected from Barr Lake during Final RI activities; DIMP was detected only once, however, at a concentration of 11.7 μg/l. The infrequent occurrence of DIMP in samples from Barr Lake suggests this single occurrence is not representative of site conditions.

For target analytes reported in the Final RI and RI Addendum, the concentrations of organic compounds detected in samples collected during RI Addendum activities are generally lower than concentrations reported in the Final RI. Analytical results for seven samples collected from First Creek near the confluence with O'Brian Canal (station 14BDD) reported in the Final RI showed DIMP concentrations ranging from 69.8 to 550 μg/l. Sample HA1154SW collected during RI Addendum activities near station 14BDD, contained DIMP at a concentration of 59.0 μg/l. This concentration was the highest level of DIMP detected in samples collected during RI Addendum surface-water sampling and was 10 times higher than the next highest DIMP concentration (5.90 μg/l in sample HA0973SW). The observed decreases in DIMP concentrations depicted by these data are supported by the data in the Surface-Water CMP report for FYs 1988 and 1989, which show DIMP at 135 μg/l and 88 μg/l, respectively.

DCPD shows a similar trend in concentration between those concentrations presented in the Final RI and concentrations reported in this report. In the Final RI, DCPD was detected in two of seven Offpost OU RI samples collected at station 14BDD, which is located on First Creek near the confluence with O'Brian Canal. Concentrations of DCPD in those samples were 24.1 and 31.5 μg/l. Sample HA1154SW, which was collected during RI Addendum activities, contained DCPD at a concentration of 7.43 μg/l. DCPD was not detected in any other offpost surface-water samples collected during the RI Addendum activities. The levels of DCPD detected in RI Addendum samples are generally consistent with those levels reported in the Surface-Water CMP for FYs 1988 and 1989.

CPMSO and CPMSO2 were detected in samples collected from First Creek along the reach between 96th Avenue and Peoria Street. CPMSO was detected in sample HA0979SW at a concentration of 120 μg/l. CPMSO2 was detected in two surface-water samples collected from First Creek. Samples HA0977SW and HA0979SW contained CPMSO2 at 19.4 and 170 μg/l, respectively. These levels are considerably higher than historical levels for surface water in the Offpost OU. CPMSO was not detected in any surface-water samples reported in the Final RI. CPMSO2 was detected in a single sample reported in the Final RI. The CPMSO2 concentration for that sample, which was collected from station 14BDD, was 5.20 μg/l.

CPMSO and CPMSO2 were reported above the CRL for only a few surface-water samples reported in the Surface-Water CMP for FY 1989 (RLSA, 1991b). On the basis of their sporadic occurrence in samples collected during RI Addendum activities, and considering the infrequent occurrence of these compounds reported in the Final RI and the Surface-Water CMP reports for FYs 1988 and 1989, CPMSO and CPMSO2 are considered isolated detections of organic compounds in offpost surface water.

The isolated occurrence of CPMSO and CPMSO2 in surface water may be related to interactions between groundwater and surface water along First Creek. Although the highest concentrations of CPMSO are generally limited to the Northern Paleochannel, CPMSO was detected in wells along First Creek west of Peoria Street. CPMSO2 was generally found along First Creek near the confluence with O'Brian Canal. The distribution of CPMSO and CPMSO2 in UFS groundwater was discussed in Section 3.2.1.1. According to the Surface-Water CMP for FYs 1988 and 1989, organosulfur compounds were not detected in surface-water samples collected along onpost or offpost reaches of First Creek. Considering the interaction of groundwater and surface water north of RMA, the occurrence of these organsulfur compounds is likely the result of groundwater discharge to First Creek in the Offpost OU.

A comparison of inorganic constituents detected in surface-water samples reported in the Final RI and those collected during RI Addendum activities indicates that, in general, slight increases in concentrations of calcium, chloride, fluoride, sodium, magnesium, and sulfate are apparent in samples collected during the RI Addendum activities. These small increases may be partially related to analytical variability. The highest concentrations of inorganic constituents detected in offpost surface-water samples occur between the northern RMA boundary and the confluence with O'Brian Canal. Sample HA0971SW had the highest concentrations of inorganic constituents detected in the First Creek samples and may reflect problems associated with field filtering of the sample as previously noted.

Arsenic and mercury were only sporadically observed in surface-water samples reported in the Final RI. During the RI Addendum activities, arsenic at concentrations ranging from 2.78 to 280 μg/l was consistently detected in samples collected from First Creek, although only one value was reported above 20.9 μg/l. Arsenic was detected in 2 of 11 samples collected from Burlington Ditch and O'Brian Canal. During RI Addendum activities, mercury was consistently detected at concentrations ranging from 0.230 to 0.557 μg/l in samples collected from Burlington Ditch, O'Brian Canal, and Barr Lake. Mercury was detected at a concentration of 0.363 μg/l in sample HA1154SW collected from First Creek.

One possible explanation for the apparent increase in the occurrences of arsenic and mercury in surface-water samples collected offpost during the RI Addendum is that the CRLs are currently lower than the CRLs reported in the Final RI. The CRL for arsenic decreased from approximately 3.00 μg/l during the Offpost OU RI analytical activities to 2.35 μg/l during the Offpost OU RI Addendum analytical activities. The CRL for mercury decreased from 0.240 μg/l during Final RI to 0.100 μg/l reported in the RI Addendum.

4.5 CONCLUSIONS

RI Addendum results for surface water indicate the presence of DIMP, OCPs, arsenic, and mercury, and slightly increased concentrations of some inorganic constituents. The greatest number and highest concentrations of DIMP and OCPs occur in the reach of First Creek between the northern RMA boundary and the confluence with O'Brian Canal. The highest concentrations of DIMP and OCP compounds were observed in sample HA1154SW, near the confluence of First Creek with O'Brian Canal.

Groundwater and surface-water interaction is known to occur in the reach of First Creek between the northern RMA boundary and the confluence of First Creek with O'Brian Canal. This interaction has been discussed and documented in a number of reports, including the Final RI and the Surface-Water CMP report for FYs 1988 and 1989. Comparison of the organic compounds and concentrations detected in surface-water samples with those detected in groundwater samples collected in the vicinity of this reach of First Creek supports the conclusion that contaminated groundwater discharging into First Creek may be the source of organic and inorganic contamination of surface water.

The organic contamination observed in O'Brian Canal may be attributed to contaminated surface water from First Creek, which resulted from an influx of contaminated groundwater to the surface water in First Creek. The decrease in the number and concentrations of organic compounds in Burlington Ditch and O'Brian Canal indicate that dilution of the contaminants occurs when water enters Burlington Ditch and O'Brian Canal.

The patterns of surface-water contamination observed from samples collected during RI Addendum activities are consistent with those reported during the Final RI and support the conclusion that surface-water organic compound contamination is the result of contaminated groundwater discharging to First Creek. This mechanism also appears to be responsible for elevated concentrations of some inorganic constituents, including chloride and fluoride. The occurrence of DIMP in Burlington Ditch samples may be the result of minor interactions between surface water and groundwater in this area.

The distribution of arsenic and mercury in the RI Addendum surface-water samples indicates potential sources other than groundwater discharging to First Creek. Arsenic was observed in all samples collected from First Creek, and from two samples, HA1197SW and HA1196SW, collected from O'Brian Canal, upstream and downstream of First Creek, respectively. Because the concentrations of arsenic detected in groundwater samples in the vicinity of First Creek are lower than the concentrations detected in surface-water samples, groundwater does not appear to be a probable source for arsenic detected in surface water. Analytical results presented in the Surface-Water CMP for FYs 1988 and 1989, showed arsenic at concentrations that appear to support a potential source of arsenic transported from RMA onpost.

Samples collected during the Spring and Fall of 1990 suggest that the source of arsenic in offpost surface water may be discharges from the Onpost Sewage Treatment Plant. The high arsenic concentrations noted in samples HA0979SW (280 μg/l) and HA0980SW (20.9 μg/l) appear to be anomalous and not representative of typical conditions offpost.

The distribution of mercury in offpost surface water suggests a source upstream of First Creek, possibly in Burlington Ditch. Mercury was consistently detected in several samples collected from Burlington Ditch and in one sample upstream of the confluence with First Creek.

In general, the data collected during the RI Addendum activities support the conclusions presented in the Final RI regarding the occurrence of contaminants and possible mechanisms to explain surface-water contamination in the Offpost OU. The presence of some organic compounds reported in the Final RI were confirmed by samples collected during RI Addendum activities. Concentrations of organic compounds were generally lower in samples collected during the RI Addendum. The inorganic constituents were generally detected at slightly higher concentrations during the RI Addendum than were reported in the Final RI. The overall conclusion made during the Final RI that groundwater discharge appears to be contributing to the organic and some inorganic contaminants to surface water in the Offpost OU is substantiated by data collected during RI Addendum activities.

5.0 STREAM-BOTTOM SEDIMENT MONITORING RESULTS AND ASSESSMENT

This section presents a discussion of the analytical results for stream-bottom sediment samples (sediment) collected in the Offpost OU. The principal purpose of this section is to present the current understanding of the nature and extent of contamination in sediments along principal surface-water bodies in the Offpost OU that may have been affected by contaminant migration from onpost.

Section 5.1 presents (1) the new analytical data for samples collected under the RI Addendum program and (2) a brief overview of interpretations contained in the Final RI. Refinements made to those previous interpretations are presented and discussed. Sections 5.2 and 5.3 present an assessment of the analytical results for GC/MS and QA/QC samples. Section 5.4 presents a more detailed comparison of RI Addendum results with those from the Final RI. Section 5.5 presents conclusions about the extent of sediment contamination in the Offpost OU.

5.1 NATURE AND EXTENT OF STREAM-BOTTOM SEDIMENT CONTAMINATION

This section describes the concentrations and distributions of target analytes detected in sediment samples collected from the major surface-water bodies in the Offpost OU. Samples were collected from First Creek between the northern RMA boundary and O'Brian Canal, Burlington Ditch, the First Creek Impoundment, and Barr Lake. A total of 19 sediment samples were collected from 16 locations in November 1988 and from May to June 1990. The sediment sampling locations were collocated with the surface-water sampling locations. These sampling locations are shown in Figure 2.4. Data discussed in this section have been accepted by PMRMA for inclusion in the RMA database. Data used in this assessment are contained in Appendix D.

The Final RI reported analytical results for two sampling episodes conducted in the Offpost OU. Those previous sampling episodes were conducted in April 1986 and April 1988. Samples were collected from 11 locations during the April 1986 sampling episode. During the April 1988 sampling episode, sediment samples were collected from an additional 9 locations.

5.1.1 Organic Compounds

The Final RI reported that organic compounds were not detected in sediment samples collected in April 1986, although metals were detected in several of the samples. The CRLs for the organic analytes were quite high relative to current CRLs and are considered the principal reason that organic compounds were not detected in the samples. The highest concentrations of metals were detected in samples collected from Barr Lake. Metals detected in the samples collected from Barr Lake include cadmium, chromium, copper, lead, zinc, and mercury. The most frequently detected metals were chromium, copper, lead, and zinc. Cadmium, arsenic, and mercury were detected in only 1 to 3 of the 11 samples collected in April 1986.

Organic and inorganic analytes were detected in a number of samples collected in April 1988. The organic compounds detected in the samples included DDE, DDT, and dieldrin. These analytes were detected in only a few samples, as discussed below. DDE and DDT were detected in only one sample, which was collected from O'Brian Canal approximately 1 mile upstream of the confluence with First Creek. Dieldrin was detected in two samples collected from O'Brian Canal and one sample from First Creek. Concentrations of these organic analytes ranged from 3.0 to 8.0 μg/kg. The CRLs for these samples were generally in the range of 1 to 3 μg/kilograms (kg), although a few compounds had much higher CRLs, with the CRL for CPMSO2 as high as 2,870 μg/kg.

The organic compounds detected in offpost sediment samples collected during RI Addendum activities include aldrin, chlordane, dieldrin, endrin, DDE, DDT, DBCP, and CL6CP. The stream-bottom sediment sampling results are provided in Appendix D. The distribution of organic compounds detected in sediment samples collected in November 1988 and from May to June 1990 are shown in Figures 5.1 and 5.2, respectively.

The distribution of organic compounds in sediment, on the basis of data collected during RI Addendum activities, is discussed below. As noted above, several organic compounds were reported in the Final RI. Although a few additional compounds, including DBCP and CL6CP were detected in sediment samples collected during RI Addendum activities, the types of compounds were generally those that tend to sorb to sediments. This finding is consistent with the interpretations contained in the Final RI. DBCP was detected in two samples collected from along the First Creek Paleochannel. The occurrence of DBCP in these samples is considered to be related to a groundwater DBCP plume in this vicinity. CL6CP was detected at 52.8 μg/kg in sample HA1192SE, which is a duplicate of sample HA1182SE. CL6CP was not detected in the investigative sample. This sample was located along Burlington Ditch in the vicinity of the confluence with First Creek. Because it was detected in only one sample at a concentration considerably higher then the CRL of 1.4 μg/kg and was not detected in the investigative sample or the GC/MS confirmation sample, the occurrence of CL6CP is considered anomalous and not representative of sediment conditions offpost.

Shallow sediment samples, which were collected from the upper 2 inches of sediment, were collected from five locations. These samples were analyzed only for VOCs. The sediment sampling locations where these samples were collected are identified in Appendix D.

Dieldrin was detected in nine stream-bottom sediment samples collected during RI Addendum activities. The highest concentration of dieldrin was 370 μg/kg in sample HA0972SE, collected from a groundwater seep in First Creek. Dieldrin was detected in three other samples collected in First Creek at concentrations of 25 to 28 μg/kg. Dieldrin was not reported in samples HA0976SE and HA1153SE and may reflect the low sorptive capacity of the sandy sediments at those two locations.

Dieldrin was detected in sample HA1181SE, collected from Burlington Ditch upstream of the First Creek confluence with O'Brian Canal, at a concentration of 6.90 μg/kg.
Sample HA1184SE, collected from Burlington Ditch approximately 2.5 miles downstream of the First Creek confluence with O'Brian Canal, contained dieldrin at a concentration of 5.2 μg/kg.
Sample HA1159SE, collected from O'Brian Canal, approximately 1 mile downstream of the confluence with First Creek, contained dieldrin at a concentration of 6.20 μg/kg. The sample collected from Barr Lake contained dieldrin at a concentration of 10.2 μg/kg.

These results for dieldrin show a significant decrease in dieldrin concentration with increasing distance from the RMA northern boundary. The highest concentrations of dieldrin occur within approximately 100 feet of the northern RMA boundary, immediately north of the North Bog, which is located onpost in the northwestern corner of Section 24 approximately in the center of the NBCS, as shown in Figure 5.1. Dieldrin concentrations between this location and the confluence with O'Brian Canal are typically approximately 25 $\mu g/kg$, although the result for sample HA1153SE, which is located nearest the confluence with O'Brian Canal, was below a CRL of 1.8 $\mu g/kg$.

Concentrations in sediment samples collected along O'Brian Canal and Burlington Ditch were similar upgradient and downgradient of First Creek and ranged from below the CRL to approximately 10 $\mu g/kg$. These levels strongly suggest that other sources of dieldrin exist in the Offpost OU but that the highest levels of dieldrin occur in First Creek and are associated with transport from RMA.

Endrin was detected in two sediment samples. Sample HA0975SE, which was collected from First Creek upstream of Peoria Street, had a reported endrin concentration of 7 $\mu g/kg$. Sample HA1181SE, which was collected from Burlington Ditch upstream of the First Creek confluence with O'Brian Canal, had a reported endrin concentration of 9.2 $\mu g/kg$. Both of these results are near the endrin CRLs of 4.7 to 6 $\mu g/kg$. Endrin was not detected in samples collected from O'Brian Canal. These data suggest that endrin is not widespread in the offpost sediment. No pattern to the distribution of endrin in offpost sediment can be inferred.

Aldrin was detected in three samples collected from First Creek. Samples HA0975SE, HA0974SE, and HA0981SE had concentrations of aldrin ranging from 4.0 to 14.0 $\mu g/kg$. Aldrin was also detected in only one sample collected from Burlington Ditch and O'Brian Canal. Sample HA1184SE, which was collected from Burlington Ditch approximately 2.5 miles downstream of First Creek, reported an aldrin concentration of 10.2 $\mu g/kg$. These values suggest aldrin only sporadically occurs in the Offpost OU and that aldrin is not widespread in offpost sediment.

DDE was detected in two samples collected from Burlington Ditch and in one sample collected from Barr Lake. The samples collected from Burlington Ditch, HA1181SE and HA1184SE, contained DDE at concentrations of 9.00 and 6.80 μg/kg, respectively. DDE was detected at a concentration of 6.70 μg/kg in sample HA1187SE collected from Barr Lake. DDE was not detected in samples collected from First Creek or O'Brian Canal. This distribution suggests that the source for this compound is not RMA.

DDT was detected in six offpost sediment samples. These samples are located in First Creek, O'Brian Canal, Burlington Ditch, and Barr Lake. Only one sample from First Creek, HA0974SE, which was collected from upstream of the First Creek Impoundment had detectable levels of DDT. This sample had a DDT concentration of 22.0 μg/kg. Detectable levels of DDT in O'Brian Canal and Burlington Ditch occurred in samples collected upstream and downstream of First Creek. Concentrations of DDT upstream of First Creek ranged from 6.70 to 14.8 μg/kg. Downstream of First Creek, concentrations ranged from 5.00 to 21.5 μg/kg. Sample HA1187SE, which was collected from Barr Lake, had a DDT concentration of 11.8 μg/kg. These data strongly suggest that the distribution of DDT reflects sources other than RMA. The occurrence of DDT in Burlington Ditch and O'Brian Canal upstream of First Creek and the range of concentration in these samples relative to the levels reported for First Creek also indicate additional sources of DDT.

Chlordane was fairly consistently detected in samples collected from O'Brian Canal and Burlington Ditch but was not detected in sediment samples collected from First Creek. The concentrations of chlordane in samples collected from O'Brian Canal ranged from 37.4 to 77.5 μg/kg. Chlordane was detected in Barr Lake sample HA1187SE at a concentration of 64.5 μg/kg. The highest concentration of chlordane was detected in sample HA1181SE, which is located in Burlington Ditch upstream of First Creek. The data indicate that chlordane is not related to releases from RMA.

DBCP was only detected in two samples collected from First Creek. The highest concentration of DBCP was 240 μg/kg for sample HA0981SE collected from the First Creek Impoundment.

Sample HA1153SE had a DBCP concentration of 8.80 μg/kg. These data suggest that the DBCP detected in sediment samples from First Creek may be associated with contaminated groundwater discharge from RMA occurring in that area. DBCP was only detected in two sediment samples offpost, suggesting that the distribution of DBCP in the Offpost OU is limited.

5.1.2 Inorganic Constituents

Sediment samples were analyzed for a selected number of metals, as shown in Table 2.4 and Appendix D. The distributions of arsenic and mercury are depicted on Figures 5.1 and 5.2. The distributions of the other metals are not presented in figures but are described below. The distributions of the metals and the range of concentrations are compared to typical values, as shown in Table 5.1.

Mercury was not detected in sediment samples collected from First Creek but was detected in all samples collected from Burlington Ditch, O'Brian Canal, and Barr Lake, as shown in Figures 5.1 and 5.2. The concentrations of mercury ranged from 0.0661 to 1.01 μg/gram (g). The highest concentration of mercury was detected in sample HA1152SE located on O'Brian Canal 3.5 miles downstream of First Creek. The typical concentration of mercury detected in sediment samples was approximately 0.200 to 0.250 μg/g. The lowest concentration of mercury was 0.0661 μg/g for sample HA1159SE, which is located on O'Brian Canal 1.5 miles downstream of First Creek. The data clearly indicate that the distribution of mercury is not attributable to releases from RMA.

Arsenic was detected in four sediment samples collected from First Creek and two samples collected from O'Brian Canal, as shown in Figures 5.1 and 5.2. Concentrations of arsenic in First Creek samples ranged from 2.48 to 7.17 μg/g. The highest concentration was for sample HA0972SE, which is located immediately north of the North Bog. The samples collected from O'Brian Canal had arsenic concentrations of 3.26 and 6.59 μg/g. In general, the concentrations of arsenic were fairly consistent for all samples and were only slightly above the CRL of 2.5 μg/g.

Table 5.1 presents a summary of the concentrations of metals commonly reported for uncontaminated fresh-water sediments. This table was previously presented in the Final RI. As

Table 5.1 demonstrates, the levels of mercury and arsenic are consistent with the ranges of concentrations for uncontaminated sediments. Arsenic values clearly fall within the anticipated range. Mercury also falls within the anticipated range of values, with the exception of the reported concentration of 1.01 μg/kg for sample HA1152SE. All other mercury concentrations fall within the range for uncontaminated fresh-water sediments of 0.1 to 0.5 μg/g.

The concentrations of the other metals were generally higher than the values reported for arsenic and mercury, with the exception of cadmium. Cadmium was only detected in four sediment samples at concentrations ranging from 0.926 to 4.35 μg/g. The CRL for cadmium ranged from 0.740 to 1.20 μg/g. These levels of cadmium exceed the anticipated range, as presented in Table 5.1.

The concentrations of the other metals (chromium, copper, lead, and zinc) detected in samples collected from First Creek fall within the range for uncontaminated sediments. The highest concentrations of these other metals occur in samples collected from O'Brian Canal, Burlington Ditch, and Barr Lake. Chromium concentrations for all samples fall within the range for sediments in Table 5.1. Approximately six to seven of the samples show concentrations for copper, lead, and zinc that exceed the range for uncontaminated sediments in Table 5.1. This distribution of exceedances is systematic and occurs for all three metals in the same six or seven samples. The highest concentration of chromium occurs in sample HA1181SE, which was collected from Burlington Ditch upstream of First Creek. The highest concentrations of copper, lead, and zinc occur in sample HA1152SE, which is located on Burlington Ditch approximately 3.5 miles downstream of First Creek.

The pattern of occurrence of the metals indicates that RMA is probably not the source of inorganic constituents in sediment offpost. Numerous metals detected in samples are highest in the samples that were collected from locations upstream of First Creek or from Burlington Ditch, which receives only minor, if any, flow from First Creek. Examination of the typical ranges of the metals concentrations, as shown in Table 5.1, shows that concentrations in excess of this range do not occur in First Creek sediment samples. The distributions of many of the elevated metals concentrations suggest that other sources for these metals exist in the Offpost OU. Additionally, information presented in the Final RI shows that concentrations of several metals in sediment samples collected from the South Platte River outside of the Offpost OU also exceeded the anticipated ranges shown in Table 5.1. These data further support offpost sources of metals in addition to RMA.

5.2 SUMMARY OF GAS CHROMATOGRAPHY/MASS SPECTROSCOPY RESULTS

GC/MS analyses were performed (1) to obtain investigative data for analytes for which a certified GC method was not available, and (2) to confirm results attained by GC analyses. GC/MS data and results for confirmation samples, which were collected at two locations, are provided in Appendix D.

The confirmation samples were of limited use because only one organic compound was detected in the corresponding GC investigative sample. DBCP was detected at a concentration of 0.0099 μg/g in sample HA1153SE. The CRL for DBCP by GC/MS method is 0.300 μg/g. Because this CRL is higher than the GC sample result, the detected value for DBCP could not be confirmed.

5.3 SUMMARY OF QUALITY ASSURANCE/QUALITY CONTROL RESULTS

QA/QC samples collected for the sediment monitoring program consisted of two duplicate samples. These samples were HA1192SE, a duplicate of HA1193SE; and HA1193SE, a duplicate of HA1187SE.

The agreement between duplicates was generally acceptable, but a few disagreements existed. The DSA for CL6CP in samples HA1192SE and HA1182SE was high at a value of 190 percent as shown in Table 5.2. The compound was detected at a concentration of 52.8 μg/kg in the duplicate, but it was less than the CRL of 1.4 μg/kg in the investigative sample (HA1182SE). Similarly, low levels of dieldrin and TRCLE were reported in the duplicate but not in the investigative sample.

Low levels of chlordane and DDT in sample HA1187SE were unconfirmed in duplicate sample HA1192SE. Additionally, cadmium, DBCP, and endrin were detected in the duplicate but not in the investigative sample. The highest DSA for these samples was 117 percent for DBCP.

5.4 COMPARISON OF REMEDIAL INVESTIGATION RESULTS AND REMEDIAL INVESTIGATION ADDENDUM RESULTS

RI Addendum data confirm the data and interpretations presented in the Final RI. Data presented in the RI Addendum indicate endrin, aldrin, chlordane, DBCP, and arsenic were detected at concentrations above the CRL in several samples. These compounds were not detected in stream-bottom sediment samples collected during the Final RI. The compounds DDE and DDT were detected in samples collected during the RI Addendum at higher concentrations and in more locations than in samples collected during the Final RI. Several of these discrepancies may be explained by the use of lower CRLs for RI Addendum analytical activities than were used in the Final RI. Other discrepancies may be explained by increased sampling density during the RI Addendum, especially in the area immediately north of 96th Avenue.

5.5 CONCLUSIONS

The RI Addendum data, combined with Final RI data, indicate that First Creek may be a source of downstream stream-bottom sediment contamination for dieldrin, aldrin, DDT, DBCP, and arsenic. This finding is supported by the presence of relatively higher concentrations of the constituents in First Creek near RMA and decreased concentrations or nondetections farther from RMA.

Alternate or additional sources of contamination for the constituents dieldrin, DDT, chlordane, and mercury are suggested by their occurrence upstream of First Creek. The presence of these constituents in the canals upgradient from the First Creek confluence, and by their generally infrequent occurrence or absence or relatively low concentrations in First Creek area samples indicates that RMA is not the only source for these contaminants in stream-bottom sediments in the Offpost OU. The distribution of DDE, and its absence in samples from First Creek, suggests that RMA is not the source of DDE in Offpost OU sediment. The extremely limited occurrence of endrin in sediment samples suggests that the distribution of endrin is quite limited and may not be associated with releases from RMA.

Possible mechanisms for contaminant transport via First Creek include (1) contaminated groundwater seepage into First Creek, (2) introduction of constituents to First Creek before it exits RMA, and (3) windblown transport of contaminated dust particles from RMA to the course of the creek.

6.0 SURFICIAL AND SUBSURFACE SOIL MONITORING RESULTS AND ASSESSMENT

This section presents a discussion of the chemical quality of surficial and subsurface soil samples collected in the Offpost OU. The concentrations and distributions of organic compounds and inorganic constituents detected in these samples are presented and described. The results of the analyses of QA/QC samples and GC/MS confirmation samples are also presented. A comparison of data is presented and evaluated for RI Addendum samples and those collected by CDH in the 96th Avenue residential area and other CDH samples collocated with HLA samples.

6.1 NATURE AND EXTENT OF SURFICIAL AND SUBSURFACE SOIL CONTAMINATION

This section describes the concentrations and distributions of target analytes detected in surficial and subsurface soil samples collected in the Offpost OU to the west, north, and east of RMA and to the east. The surficial and subsurface soil data consist of results for 80 samples, including eight duplicate and four background samples, collected between February 1989 and July 1990. An additional 19 samples, including two duplicate samples, were collected in May 1991 to confirm some isolated occurrences of anomalously high concentrations for a few target analytes. With the exception of the data for the 12 CDH samples collected in the vicinity of the 96th Avenue residential area, all data discussed in this section have been accepted by PMRMA for inclusion in the RMA database. Data used in this assessment are contained in Appendixes E, G, and H.

6.1.1 Surficial Soil

Surficial soil samples, which consist of the upper 2 inches of soil, were collected and analyzed for organochlorine pesticides, arsenic, and mercury. The sample locations are shown in Figures 2.5, 2.6, and 2.7. The following sections describe the distributions of the OCPs and metals detected in the surficial soil samples.

6.1.1.1 Organic Compounds

The organochlorine pesticides DDT, DDE, aldrin, chlordane, dieldrin, endrin, HCCPD, and isodrin were detected in surficial soil samples collected in the Offpost OU. Appendix E lists the surficial soil sampling results for samples collected by HLA. Analytical results for samples collected and analyzed by CDH are presented in Appendix G. Data generated in the surficial soil sample collection effort in May 1991 by WCFS are contained in Appendix H.

The distribution of the organic compounds and metals in surficial soil is shown in Figures 6.1, 6.2, and 6.3. As the figures show, the most widespread and frequently detected OCP compound was dieldrin. Aldrin, endrin, DDT, and DDE were also frequently detected and generally occurred in samples in which dieldrin was also detected. Dieldrin was detected in approximately 90 percent of the samples at concentrations ranging from 2.20 to 250 μg/kg. DDT was detected in approximately 50 percent of the samples at concentrations ranging from 2.80 to 790 μg/kg. Aldrin, endrin, and DDE were each detected in 20 to 30 percent of the samples.

The concentrations of endrin and DDE ranged broadly. Aldrin concentrations ranged from 3.2 to 7.2 μg/kg, with a median of approximately 5 μg/kg. Endrin concentrations ranged from 5.1 to 390 μg/kg. However, the median value for endrin was less than 10 μg/kg. The highest concentration of endrin occurred in a soil sample collected from a residence about 0.5 mile north of RMA. This high result for endrin is probably associated with past pesticide application by the former resident and not with migration from RMA.

DDE concentrations were slightly higher than concentrations of endrin. The concentration range for DDE was 4 to 260 μg/kg. The median concentration of DDE was about 25 μg/kg. The highest concentrations of DDE were detected in samples collected from Section 10, approximately 1.5 miles north of RMA. The three highest concentrations of DDE detected in the Offpost OU, which range from 130 to 260 μg/kg, occur in this area. These data suggest a local source of DDE that is not related to RMA.

As discussed below, the remaining OCPs, chlordane, HCCPD, and isodrin, were sporadically detected in 10 percent or fewer of the samples. Chlordane was detected in only five samples at concentrations ranging from 42.0 to 520 μg/kg. Chlordane was detected only in the area immediately north of RMA, in the 96th Avenue residential area. This compound is contained in commercially available pesticides and is known to have been applied by landowners at several of the 96th Avenue properties. The highest concentration is associated with application of this compound by a former resident.

HCCPD was detected in only two samples located north of the RMA boundary in Sections 11 and 13. Concentrations of HCCPD in those two samples were 2.7 and 20.3 μg/kg. Isodrin was reported in five samples collected from north of RMA. The concentrations of isodrin ranged from 2.2 to 3.50 μg/kg.

The distributions of OCPs in the Offpost OU appear to generally correlate with the trend observed in wind patterns at RMA, although a number of these compounds clearly have other sources, as discussed below. The prevalent wind direction at RMA is from south to north, with the high event wind direction from west to east. The trend in distribution of the OCPs generally follows this pattern. The greatest number of compounds and highest concentrations are observed in samples collected from immediately north of RMA, with fewer occurrences to the east and west of RMA.

Although a number of exceptions exist, concentrations generally decrease with distance from RMA. For example, the concentrations of dieldrin, DDT, and DDE at location HA1231WB, approximately 1.5 miles north of RMA, appear to be anomalously high. The exceptions are likely the result of one or more of the following factors: (1) several of the compounds detected in the surficial soil are or have been available commercially and may have been applied agriculturally or residentially, and (2) some areas where samples were collected have been irrigated with canal and/or groundwater.

The assumption that the OCP contaminants were transported from RMA by wind and deposited offpost does not adequately explain some of the results. Two sampling locations, HA1226WB and HA1231WB, have anomalously high results with respect to other soil samples. It was assumed that if a windblown mechanism was responsible for transporting contaminants offsite, that samples collected nearest RMA would be most representative of RMA contamination. Analysis of the relative contaminant concentrations for aldrin, chlordane, dieldrin, and DDT in samples collected near 96th Avenue and Peoria Street indicate that the concentration of dieldrin was considerably greater than the other compounds. The concentration of dieldrin is commonly 10 to 40 times greater than the other three compounds. Samples selected and averaged for the purpose of assessing the pattern were HA0990WB, HA0993WB, HA0994WB, and HA0995WB.

For sample HA1226WB, the concentration for chlordane is considerably higher than expected and has less than expected proportions of dieldrin. In addition, the magnitude of concentrations in this sample does not fit the spatial pattern for dieldrin and DDT observed for the soil samples as shown in Figures 6.1, 6.2, and 6.3. The anomalous concentrations of OCPs in this sample are likely the result of OCP application for pest control purposes by a former resident.

Anomalous results were also noted for sample HA1231WB located about 1.5 miles northwest of RMA in Section 10. In this sample, the concentration of DDT was six times greater than dieldrin; aldrin and chlordane were not detected in the sample. This pattern of occurrence indicates that the source of OCPs is potentially different than those for 96th Avenue. In addition, the magnitude of the OCP concentrations does not fit the spatial pattern shown in Figures 6.1, 6.2, and 6.3. The results for this sample suggests a source other than RMA.

In general, the distribution of the OCPs in surficial soil in the immediate vicinity of the northern RMA boundary appears to reflect a wind-transported migration mechanism. The highest concentrations of most of these compounds occur immediately north of RMA and generally decrease with distance from RMA. Concentrations of these compounds decrease fairly rapidly with distance and appear to approach levels that are typical of background values within about 1 mile of the RMA boundary. However, irrigation using contaminated groundwater is an additional plausible mechanism that could explain the observed distribution of the OCPs in surficial soils, particularly in areas northwest of the canals. It is clear from assessment of land use in the Offpost OU and evaluation of aerial photographs that cropland irrigation has historically been conducted in the area northwest of O'Brian Canal and Burlington Ditch. Use of contaminated water for irrigation purposes could have had some contribution to the occurrence of a number of the OCPs in surficial soils in the Offpost OU.

Several occurrences of anomalously high concentrations of some of these compounds, including chlordane, DDE, dieldrin, and endrin were observed. These higher concentrations are clearly associated with application of these compounds by former or current residents. This indication is important because it demonstrates that sources for the OCPS other than RMA are present in the Offpost OU. This interpretation is consistent with the results of the literature survey described in Section 6.1.3, which indicates that detectable levels of these compounds are expected to be present, on the basis of past agricultural or domestic application of these commercially available compounds.

6.1.1.2 Inorganic Constituents

Arsenic and mercury were detected in surficial soil samples collected in the Offpost OU. Appendix E contains the soil sampling results, and Figures 6.1 and 6.3 show the distribution of arsenic and mercury in offpost soil. Arsenic was detected in approximately 25 percent of the samples. Concentrations ranged from 2.61 to 4.62 μg/g. Arsenic was detected most frequently in the samples collected and analyzed by CDH. Arsenic in the CDH samples ranged from 4 to 12 μg/kg. The highest concentrations were detected in samples from 100 to 200 feet north of the RMA northern boundary. Arsenic concentrations reported for samples collocated with the CDH samples or located nearby were considerably lower than those reported by CDH or were below the CRL of 2.5 μg/g.

In general, concentrations of arsenic in the HLA samples were consistent for all locations. Additionally, concentrations in these samples were considerably lower than concentrations reported by CDH. The distribution of arsenic, as depicted in Figure 6.3, appears to show higher concentrations northeast of Burlington Ditch and lower concentrations of arsenic nearest to the RMA boundary. The concentrations of arsenic reported for the HLA samples fall within the range of 2.8 to 10.9 μg/g reported for natural surficial soils (Schacklette and Boerngen, 1984), as discussed below. These data suggest that arsenic levels found in offpost soils are not affected by migration from RMA.

Mercury was detected in approximately 10 percent of the samples. Concentrations ranged from 0.0719 to 0.325 μg/g. Mercury was only detected in samples collected near Burlington Ditch and O'Brian Canal and in one sample collected in the 96th Avenue residential area north of the RMA boundary. Mercury was not detected east or northeast of RMA or in many areas north of RMA.

The distribution of arsenic and mercury in surficial soil collected near the Burlington Ditch suggests that they may be contributed to the soil from irrigation water coming from Burlington Ditch. The concentrations of arsenic in surficial soil do not exceed the normal range, 2.80 to 10.9 μg/g, for arsenic (Schacklette and Boerngen, 1984). Mercury does not exceed the normal background range of 0.0200 to 0.110 μg/g in soil samples except in samples collected north of the canals. The majority of the flow in Burlington Ditch, which is used for irrigation, consists of treated sewage wastewater that may contain higher concentrations of metals, including arsenic and mercury, than natural background.

6.1.2 <u>Subsurface Soil</u>

Six subsurface soil samples were collected in the 96th Avenue residential area and analyzed for OCPs, arsenic, and mercury. The locations and analytical results for these samples are shown in Figure 2.5. The analytical results for these samples are shown in Figure 6.4. The following sections describe the distributions for these analytes in subsurface soil.

6.1.2.1 <u>Organic Compounds</u>

OCPs were reported in only one subsurface soil sample. Dieldrin was detected at a concentration of 7.00 μg/kg in a sample collected between 0 and 1 foot at HA0985SO.

6.1.2.2 <u>Inorganic Constituents</u>

Arsenic was detected in one subsurface soil sample at a concentration of 3.59 μg/g. The sample was collected between 0 and 1 foot at HA0988SO.

Mercury was not detected above the CRL in any subsurface soil samples.

6.1.3 Background Surficial Soil Samples

Four samples were collected from an area approximately 2 miles northeast of Brighton, Colorado. This area is generally similar in land use to the area north of RMA. The surficial soil samples collected near Brighton are believed to be representative of background chemical quality of surficial soil in the Offpost OU. The locations of the samples and the distribution of OCPs, arsenic, and mercury detected above CRLs in the background samples are shown in Figure 6.5. To support the use of the concentrations observed in the Brighton samples as background data, further analysis of the available data and literature was performed.

6.1.3.1 Site-specific Data

A statistical evaluation was performed to better assess background concentrations of OCPs in the Offpost OU. Background concentrations are defined as concentrations detected in soils that have not been impacted by RMA contaminants. In the initial step of the evaluation of background OCP concentrations, the four background sample results were compared with 12 sample results located northeast of RMA, and 1 sample located west of RMA. The samples used in this assessment are identified in Figure 2.6. Samples collected near RMA's northeast boundary generally have lower concentrations and lower frequencies of detection than other samples near the northwest and northern RMA boundaries.

The results for the group of 12 samples collected northeast of RMA were not found to be statistically different from the four background samples. Statistical procedures used were (1) method of proportions when the percentage of nondetections was greater than 50 percent and (2) the Wilcoxon rank sum test when the percentage of nondetections was less than 50 percent (EPA, 1989). A significance level of 0.1 was used in these analyses. This procedure was very conservative since it selected samples that emphasized nondetections of the target OCPs.

The next step for evaluating background concentrations of OCPs in surficial soil involved computing the arithmetic mean and 95th percentile concentration for the contaminants detected in the above-referenced surficial soil samples. Reported nondetections with quantitation levels greater than the maximum reported concentration were removed, and other nondetections were adjusted to one-half the quantitation limit (EPA, 1989). The results are contained in Table 6.1. Surficial soil exceeding the 95th percentile concentration are considered contaminated above background. The dieldrin arithmetic mean concentration is 3 μg/kg and the 95th percentile is 8 μg/kg.

6.1.3.2 Literature Data

The cyclodiene compounds aldrin, endrin, dieldrin, and isodrin have been used as insecticides from the 1940s to the mid-1970s. Aldrin was used in the early 1950s to protect cotton against boll weevils and in the 1970s for soil applications in grain crops and termite control. In Colorado, dieldrin was used to control insects in field vegetable, grain, and fruit crops (Mullins and others, 1971) and against termites and locust. Endrin was also used to control a wide range of pests. These insecticides were banned for general uses in 1975 by the EPA.

Aldrin and dieldrin may still be used for certain restricted uses such as subsurface insertion for termite control and dipping of nonfood roots. DDT and chlordane are very persistent in the environment. DDT and its degradation product DDE can be detected in samples collected today, even though it was banned for use by EPA in 1972. When in use, DDT was a broad-spectrum insecticide. Chlordane, banned from use in 1988, is a contact insecticide used to control a variety of pests including ants, grasshoppers, and termites. It is used for applications in soil, agriculture, household use, and treatment around buildings.

A literature search was conducted to assess the magnitude of residue levels (background) of the previously mentioned insecticides in soil. The results of several studies of soil residue levels are summarized in Table 6.2. Both cropland (wheat and vegetables) and residential soil were sampled. For aldrin, the arithmetic mean residue levels in cropland varied from 10 to 41 μg/kg, with a range in concentrations from <10 to >13,000 μg/kg. The arithmetic mean for dieldrin in cropland soil varied from 40 to 100 μg/kg with a range of <10 to <1000 μg/kg. The endrin arithmetic mean varied from <10 to approximately 500 μg/kg, with a range of not detected (detection limit not given) to 3500 μg/kg.

Only one study addressed isodrin levels in cropland soil. The arithmetic mean for isodrin was <10 μg/kg with a range of <10 to 20 μg/kg. For residential areas, the dieldrin means varied from <10 to 10 μg/kg, with a range of not detected to 2200 μg/kg. In most cases for cropland and residential soil samples, between 25 and 50 percent of the samples tested contained measurable amounts of dieldrin, while 9 to 70 percent contained aldrin.

A search of the available literature was conducted to evaluate residues of DDT, DDE, and chlordane in soil. The results are summarized in Table 6.2. For DDT in cropland, the arithmetic mean concentration varied from 20 to 5600 μg/kg. The arithmetic mean for DDE varied from 20 to 360 μg/kg, with a range of <5 to 5500 μg/kg. For chlordane, the arithmetic mean ranged from 20 to 60 μg/kg, with a range of <5 μg/kg to 7900 μg/kg. For noncropland use (golf courses, open fields, residential areas), DDT means varied from 60 to 940 μg/kg, with a range of not detected to 80,000 μg/kg. DDE results were not available for noncropland uses. The chlordane means varied from 90 to 5400 μg/kg, with a range of not detected to 52,000 μg/kg.

Mullins and others (1971) observed residual levels of pesticides in the soil of Weld County, Colorado. The arithmetic means for aldrin and dieldrin in soil were 410 and 70 μg/kg, respectively. The four surficial soil background samples collected from an area located 2 miles northwest of Brighton, Colorado, were collected in noncropland areas. The arithmetic mean aldrin concentration detected in the samples was 3 μg/kg with a range of <2 to 6 μg/kg. The arithmetic mean concentration of dieldrin detected in the samples was 34 μg/kg with a range of <2 to 99 μg/kg. Endrin and isodrin were not detected in any of the background samples.

All of the available literature data were published before 1980. The cyclodienes are generally recognized as the most persistent OCPs in the environment (Nash and Woolson, 1967). The removal of insecticides from soil is a first order rate reaction (Nash and Woolson, 1967). The halflives for aldrin and dieldrin are 5 years and 7 years, respectively. Current residue levels in cropland areas were calculated for aldrin and dieldrin using the following standard decay equation:

$$C = C_o e^{-kt}$$

where

C = soil concentration (mg/kg) at time t

C_o = initial soil concentration

k = decay constant (yr^{-1})

t = decay time (yr)

The calculated levels for aldrin were based on initial concentrations of 10 and 410 μg/kg, which represent the range of arithmetic means from various studies.

The period considered was 16 years (1975 to 1991). The calculated values for aldrin were 1 and 45 μg/kg, respectively. Thus, in 16 years, the concentration of aldrin dropped by one order of magnitude. Aldrin calculated concentrations from the literature compare very favorably with offpost data. The calculations for dieldrin were based on an arithmetic mean range of 40 to 100 μg/kg. The resulting residual dieldrin concentrations were 8 and 21 μg/kg. Calculated dieldrin concentrations also compare favorably (within a factor of 3) with offpost data. Aldrin is oxidized to dieldrin at a rate of 24 percent per year (Hamaker, 1964), which may actually increase dieldrin residues.

From site-specific data in the offpost and from literature data updated by degradation calculations, background concentrations of OCPs in surficial soil appear to be best defined by the 95th percentile shown in Table 6.1. The 95th percentile interval was selected because of conservative selection of the background data set and from the literature data.

6.2 SUMMARY OF GAS CHROMATOGRAPHY/MASS SPECTROSCOPY RESULTS

GC/MS analyses were performed on two surficial soil samples, one investigative sample and one background sample, to confirm results obtained by GC analyses. The results for the two GC/MS samples are listed in Appendix E.

Only a single organic compound was detected in the samples analyzed by the GC method. Dieldrin was detected at a concentration of 5.50 μg/kg in sample HA1233WB. The CRL for the analysis of dieldrin by the GC method is 1.80 μg/kg, while the CRL for the GC/MS method is 300 μg/kg. The dieldrin concentration in sample HA1233WB was not confirmed by GC/MS analysis because of the low concentration with respect to the GC/MS CRL. Analytes were not detected in either of the GC/MS confirmation samples.

6.3 SUMMARY OF QUALITY ASSURANCE/QUALITY CONTROL RESULTS

QA/QC samples collected for the surficial and subsurface soil program consisted of eight duplicate samples. The results for duplicate samples, with associated investigative samples noted, are listed in Table 6.3. Duplicate pairs were reviewed with respect to the compounds detected and the calculated DSA between concentrations of detected compounds. Five of the eight duplicate pairs had the same reported compounds. Two of the eight duplicate pairs had compounds reported in one sample only. One of the eight duplicate pairs had no compounds detected in either sample. This pair of duplicate samples, HA1217WB and HA1241WB, is not listed in Table 6.3.

Generally good agreement was observed between duplicate pairs. The few high DSA values reflect analytical results near the respective CRL. Because the reported concentration for some analytes is close to the CRL, reproducibility is expected to be lower. In general, the DSA values are considered acceptable.

6.4 COMPARISON OF REMEDIAL INVESTIGATION ADDENDUM RESULTS AND COLORADO DEPARTMENT OF HEALTH RESULTS

Table 6.4 shows a comparison of HLA and CDH analyses. Results for CDH analyses are of unknown quality because QA/QC data were not provided with the sample results, and the data could not be verified or validated. However, the CDH data are included for qualitative comparison with HLA validated data.

In general, results between the HLA and CDH collocated samples are comparable for some analytes but not for others. The HLA samples generally had detections for more target analytes than reported by CDH. Concentrations of organic compounds detected in the HLA samples are generally higher than the values reported by CDH.

For arsenic and mercury, the CDH results show a higher frequency of detection and slightly higher concentrations. For the samples presented in Table 6.4, arsenic was detected in all CDH samples but in only one HLA sample. The concentration of arsenic detected in the HLA sample was approximately three times lower than the concentration detected in the collocated CDH sample.

6.5 CONCLUSIONS

RI Addendum data for surficial soil indicate the presence of OCPs, arsenic, and mercury above CRLs in offpost surficial soil. The highest number and concentrations of contaminants occur in the area directly north of RMA, primarily in the 96th Avenue residential area. The distribution of the organic contaminants appears to correlate to the dominant wind directions at RMA but do not completely follow the trend of decreasing concentration with distance from RMA. In addition, several of the compounds detected are or have been commercially available and may have been applied by residents and/or in agricultural practices in the surrounding rural area. These patterns indicate that a mechanism of windblown contaminants, combined with agricultural or residential application, or through use of contaminated groundwater for irrigation, may be responsible for the observed distribution of OCPs.

Review of the concentrations of arsenic and mercury detected in surficial soil samples indicates that these metals did not exceed typical background concentrations, except for mercury detections in a few samples collected north of the canals. The extremely limited distribution of mercury, which was detected in a few samples generally located adjacent to Burlington Ditch, suggests that RMA is not a source of mercury in surficial soil in the Offpost OU.

RI Addendum data for six subsurface soil samples collected from the 96th Avenue residential area indicate the presence of dieldrin in only one sample. The presence of arsenic was also detected in only one sample at a concentration slightly above the CRL. Mercury was not detected above the CRL in any subsurface soil sample. These data appear to indicate that the organic and inorganic contamination of the subsurface soil is not extensive.

7.0 BIOTA MONITORING RESULTS AND ASSESSMENT

The biota monitoring program of the RI Addendum consisted of an ecological characterization of the Offpost OU and an assessment of the nature and extent of contamination in the biota in the Offpost OU. These two components, along with a comparison of contaminant levels in biota and their associated water and soil samples, are presented in this section.

7.1 ECOLOGICAL CHARACTERIZATION STUDY RESULTS

This section will provide detailed results of ecological characterization studies of the Offpost OU. These studies provided an overview of the ecological condition of the area, including whatever observations could be made of RMA contaminant effects.

7.1.1 Aquatic Characterization

The First Creek Impoundment (impoundment) and the adjacent sections of First Creek were evaluated in three subsections of similar characteristics:

- First Creek from the RMA northern boundary to the impoundment
- The impoundment
- First Creek from the impoundment to Highway 2

7.1.1.1 RMA to the Impoundment

The section of First Creek running northwest from 96th Avenue to Peoria Street was largely dry. A few small areas along the drainage contained small amounts of standing water and marshy wetlands. On the basis of visual inspection of this area, the quantity of water generally increased from east to west until a small stream of water flowing at a rate of less than 1 cubic foot/12 hours was observed from Peoria Street to the impoundment. Maximum depth of First Creek in this section was about 3 inches.

Two relatively large wetland areas characterized by dense stands of cattails (*Typha angustifolia*) and bulrush (*Scirpus* sp.) occurred along this section of First Creek. Channel banks along First Creek were choked with terrestrial grasses. However, aquatic vegetation was sparse because of the ephemeral nature of the creek. Within the channel, green and brown algae were prevalent, comprising greater than 80 percent of the bottom cover vegetation. Duckweed (*Lemna* sp.) and submergent vascular plants were limited, each accounting for less than 5 percent of the bottom cover. The remaining 10 percent of bottom cover was comprised of litter and bare substrate. This section of creek was relatively undisturbed, with a minimal amount of grazing. Cattle grazing was restricted to the inlet of the impoundment where grazing pressure was intense and essentially all aquatic vegetation had been eliminated.

7.1.1.2 First Creek Impoundment

The impoundment occurs along a reach of First Creek that apparently has been diverted and impounded by an earthen dam approximately 13 feet high. The impoundment has a maximum acreage of approximately 5 acres, but at the time of the field investigation had receded to a narrow, excavated channel approximately 25 feet by 400 feet. The maximum depth of the impoundment was 2 feet, and the substrate consisted of approximately 3 feet of thick, viscous, organic silt. Aquatic vegetation was minimal and consisted of approximately 2 percent coverage of green algae and 1 percent duckweed. Aquatic vertebrates and invertebrates were sampled using seine nets, gill nets, and hand screens. The species found in the impoundment are listed in Table 7.1.

The area surrounding the offpost impoundment and the desiccated pond bottom were subject to continual cattle grazing. This grazing has resulted in severe disturbance of the aquatic habitat and an accumulation of organic matter in pond sediments from livestock excrement.

7.1.1.3 First Creek Impoundment to Highway 2

The section of First Creek below the impoundment has been channelized into a straight channel characterized by 10- to 13-feet high steep banks for three-fourths of the channel length before emerging onto flat open terrain. On the basis of visual inspection of this area, the stream flow rate through this section is estimated at greater than 1 cubic foot/12 hours. A maximum water depth of 1 foot was obtained within the steep-sided channel, decreasing to a maximum depth of 3 inches in the flats. Aquatic vegetation along this section of First Creek consisted of the following:

Duckweed	30 percent of surface area
Green algae	60 percent of bottom cover
Brown algae	20 percent of bottom cover
Submergents	12 percent of bottom cover
Bare substrate	8 percent of bottom cover

This section of First Creek showed evidence of past and present disturbance. Channelization has limited the aquatic habitat to a narrow corridor along the creek. The surrounding area consisted of pasture subject to continuous horse (*Equus* sp.) grazing that has disturbed and destroyed much of the accessible portions of aquatic habitat along First Creek.

7.1.2 Terrestrial Characterization

The area of the Offpost OU near the northwest corner of RMA reflects intensive human land use, including dryland farming, cattle grazing, small landfills, and residences, as shown in Figure 2.8. Small vacant lots, fallow fields, wetlands along First Creek, and prairie dog colonies comprise the balance of habitat types in the immediate Offpost OU. On the basis of the habitats present on the Offpost OU and the habitats used by vertebrate species in Colorado (CDOW, 1981, 1982a, 1982b), a list of potentially occurring species was developed for the Offpost OU and is presented in Appendix F. Rare and accidental species were eliminated from the potential species list because of the negligible likelihood that they would occur in the Offpost OU. Wildlife species using these habitats in the Offpost OU were also common at RMA. However, wildlife species diversity in the Offpost OU is limited by the lack of variety in habitats and degree of human impact.

The predominant species in the weedy forbs habitat type (WF) include *Kochia* (*iranica*), prickly lettuce (*Lactuca serriola*), thistle (*Cirsium arvensis* and *Carduus nutans*), russian thistle (*Salsola iberica*), field bindweed (*Convolvulus arvense*), various sunflowers (*Helianthus* sp.), and tumble mustard (*Sisymbrium altissimum*). The grasses and weedy forbs habitat type (GWF) is similar to the WF habitat type but with an increased abundance of cheatgrass (*Bromus tectorum*), western wheatgrass (*Agropyron smithii*), and bluegrass (*Poa* sp.), in addition to the WF species mentioned above. These habitat types were also described in the Biota RI (with GWF described as cheatgrass/weedy forb in the Biota RI). WF and GWF habitat types support cattle and horse grazing in the Offpost OU, particularly along the channelized portion of First Creek below the impoundment.

Wetlands along First Creek extend along both sides of the creek from the northern RMA boundary to the impoundment. These wetlands (TG-W) contain taller grasses such as quackgrass (*Agropypron repens*), intermediate wheatgrass (*Agropyron intermediatum*), and cheatgrass. Many forbs found in the WF and GWF habitat types were also found in or adjacent to the wetland vegetation. Interspersed in this drainage are areas dominated by sedges (*Carex* sp. and *Scirpus* sp.) and cattail marshes (CTM; *Typha angustifolia*). Below the impoundment, the wetland vegetation is limited to the banks of First Creek, which has been channelized and grazed back to a GWF habitat type. No immersed wetlands occur along First Creek below the offpost impoundment until the creek empties into the O'Brian Canal. Wetlands habitat, along with WF and GWF habitats, supported the most wildlife species observed in the Offpost OU.

Prairie dog colonies (PD) offpost resemble their RMA counterparts, with perhaps a bit less vegetative cover consisting of field bindweed and occasional bunchgrasses (such as crested wheatgrass, *Agropyron cristatum*). A horse and cattle range was nearly devegetated, with only a few forbs and grasses interspersed in those areas. Fallow fields (PFF and FF) were lightly vegetated with remnant crops and grasses. The unplowed corners of the fallow fields were covered with WF type vegetation, including the common russian thistle plants. Shelter belt cottonwood trees and ornamental plants were found surrounding the residences and buildings in the Offpost OU.

7.2 NATURE AND EXTENT OF BIOTA CONTAMINATION

A number of biological samples were taken from the Offpost OU to assess the possible contamination of wildlife from RMA sources. Target analytes in biological samples, their levels in comparison to onpost analyte concentrations, and possible contamination of endangered species are presented in this section. An evaluation of analyte concentrations in biota compared to surface water and surface-water concentrations is also presented in this section. Data used in this assessment are contained in Appendix F.

7.2.1 Target Analytes in Biological Samples

Target analytes for biota samples were presented in Tables 2.4 and 2.5. Data from chemical analyses of biological samples are contained in Appendix F. This section presents a brief summary of the target analytes detected in biota samples. The locations of biota samples are presented in Figure 2.9. The analytical results for the offpost biota samples are presented in Figures 7.1 through 7.3.

Figure 7.1 shows the distribution of target analytes for agricultural biota samples. The distribution of target analytes for aquatic biota is presented in Figure 7.2. Figure 7.3 shows the distribution of target analytes in terrestrial biota. The figures also identify the type of biota species for which analytical results are presented.

Dieldrin was the contaminant found most often among offpost biota. Bovine fat, chicken tissues, fish, earthworms, deer mice, prairie dogs, and pheasant samples all had detectable concentrations of dieldrin. Arsenic concentrations were detected in (1) algal mats and crayfish from the impoundment, (2) earthworms, and (3) one prairie dog sample. Mercury was detected in fathead minnows and carp from the impoundment, and in 3 of 5 earthworm samples. DDE was detected in sample HA1042BP, which consisted of the fat and skin portion of a chicken. Aldrin, endrin, and DDT were not detected in any biological sample taken offpost. DBCP was not detected in milk samples.

7.2.2 Comparison of Onpost and Offpost Contaminant Data

Onpost biota data from the Biota RI were compared to the offpost data for aquatic plants, fish, pheasant, grasshoppers, earthworms, and prairie dogs. Deer mice, crayfish, cattle, and chickens were not sampled onpost. These comparisons were undertaken to permit general conclusions about the contaminant levels in biota in the Offpost OU. In general, target analytes were less frequently detected and at lower concentrations in biota samples collected from the Offpost OU than in the Onpost OU. The following paragraphs discuss the extent of contamination in biota samples. The target analytes discussed include arsenic, mercury, dieldrin, aldrin, endrin, DDT, and DDE.

Arsenic was detected in a planktonic sample from the onpost lakes at a concentration of 0.432 μg/g. An algal sample collected from the impoundment contained 1.02 μg/g of arsenic. Neither Onpost nor Offpost OU fish samples contained any arsenic. Concentrations of arsenic in earthworms averaged 3.17 μg/g in Section 36 onpost, 1.03 μg/g in onpost control samples, and 1.4 μg/g in the offpost samples. Grasshoppers contained up to 6.6 μg/g in Section 36 onpost, while arsenic was not detected in offpost samples. Only 7 of 42 onpost pheasant samples contained arsenic (up to 4.07 μg/g), while none of the 3 pheasants collected offpost had detectable levels of arsenic. One of the offpost prairie dogs contained arsenic at 0.771 μg/g, while 3 of 14 onpost RMA samples contained up to 4.22 μg/g. Control samples for the Biota RI (from northern Colorado) did not contain detectable levels of arsenic in terrestrial or aquatic samples of similar species.

Mercury was not detected in onpost or offpost algal/planktonic samples. Fish from the impoundment contained up to 0.155 μg/g of mercury in a carp sample, while onpost, mercury was present in most samples from the southern lakes with a maximum concentration detected in a bass from Lower Derby Lake of 0.550 μg/g.

Mercury was detected in 3 of 5 of the samples collected from the impoundment. The average concentration of mercury in these samples was 1.2 μg/g. Onpost samples of earthworms collected from the South Plants area contained up to 2.35 μg/g. Mercury was not detected in offpost grasshoppers, while grasshoppers from onpost Section 36 averaged 0.058 μg/g. Mercury was not detected in any onpost or offpost pheasant samples. Mercury was not detected in offpost prairie dog samples or in any of the whole body samples collected onpost. Prairie dog kidney samples collected from onpost Section 36 were found to contain mercury at an average concentration of 0.178 μg/g. Control samples for onpost studies (from northern Colorado) showed no mercury contamination in terrestrial samples, while all five bluegill control samples taken averaged up to 0.188 μg/g.

Dieldrin was not detected in onpost planktonic samples or in algal samples collected from the impoundment. Dieldrin was detected in channel catfish (0.251 μg/g) collected and carp (up to 0.235 μg/g) from the impoundment. Bluegill and bass samples collected from the onpost Lower Lakes contained dieldrin at concentrations of up to 0.161 to 0.860 μg/g, respectively. Onpost samples of earthworms contained from 1.37 μg/g in a South Plants sample to 5.3 μg/g in a sample collected in Section 5. Offpost earthworm samples showed dieldrin concentrations ranging from 0.0211 to 0.0282 μg/g. Dieldrin was not detected in offpost grasshoppers, while grasshoppers collected from onpost Sections 26 and 36 contained average concentrations ranging from 2.53 to 0.381 μg/g, respectively.

A pheasant liver sample collected from the Offpost OU contained 0.380 μg/g dieldrin, while onpost RMA pheasant whole carcasses contained an average of 0.767 μg/g dieldrin. One offpost prairie dog of 4 samples contained 0.0327 μg/g dieldrin. Onpost prairie dog samples from Section 36 averaged 1.44 μg/g, while samples collected from Sections 19 and 20 contained dieldrin at up to 0.346 μg/g. Control samples for the onpost studies (from northern Colorado) showed no detections of dieldrin in biota, although a pheasant sample collected on a golf course near Ft. Collins did contain detectable levels of dieldrin.

Aldrin was not detected in samples collected from the Offpost OU. Onpost grasshopper samples collected near former Basin F showed a mean concentration for aldrin of 1.59 μg/g. The only other detections of aldrin in the onpost RMA sampling were in 5 samples of large mouth bass from Lower Derby Lake. Because aldrin converts to dieldrin rapidly in soil and water and *in vivo*

(Hall and others, 1971; Metcalf and others, 1973), aldrin is not expected to be widespread in biota in the Offpost OU.

Endrin was not detected in samples collected from the Offpost OU. Endrin was detected in onpost grasshopper and earthworm samples at concentrations up to 1.65 $\mu g/g$. Control samples for onpost Biota RI studies did not contain detectable levels of endrin.

DDE was found in 2 of 18 onpost pheasant samples and in 1 chicken sample in the Offpost OU. DDT was not detected in onpost or offpost biota samples. Control samples for onpost RI studies did not contain detectable levels of DDE or DDT.

7.2.3 <u>Comparison of Biota Contaminant Levels with Concentrations in Surface Soil and Water</u>

Biota sampling locations were collocated with surface soil and water sampling locations, to the maximum extent practicable, as part of an integrated sampling approach. With the possible exception of pheasants (see below), the species sampled in the Offpost OU are generally restricted to a relatively small area. Thus, a comparison of the surface water or soil concentrations to the levels in biota was made. Concentrations of target analytes in biota compared to concentrations from nearby soil and water samples are presented in Table 7.2.

Dieldrin levels in cow and chicken tissues could be caused by accumulation from ingestion of contaminated soil. Soil samples in the vicinity of cattle grazing areas contained 0.110 $\mu g/g$. Dieldrin concentrations in soil in areas where chickens fed ranged from 0.010 to 0.020 $\mu g/g$. Dieldrin concentrations in catfish and carp samples ranged from 0.026 to 0.251 $\mu g/g$ compared to sediment concentrations of 0.025 $\mu g/g$ and water concentrations of 0.147 $\mu g/l$ in the impoundment. Earthworms contained dieldrin levels just above the CRL, while shallow soil concentrations ranged from 0.008 to 0.093 $\mu g/g$. Concentrations of dieldrin in prairie dogs and deer mice ranged from 0.0267 to 0.571 $\mu g/g$ compared to dieldrin soil concentrations of 0.0128 $\mu g/g$ to 0.020 $\mu g/g$.

Mercury and arsenic were detected in fish, earthworms, and prairie dogs offpost. However, mercury and arsenic in soil and water samples are below CRLs at many locations.

7.2.4 Threatened and Endangered Species in the Offpost OU

Threatened or endangered species samples were not collected from the Offpost OU during the RI Addendum. A single bald eagle egg was collected in 1988 from an abandoned nest at Barr Lake (ESE, 1989b). The embryo was approximately five days from hatching at the time of abandonment and exhibited normal development. Residues detected in the egg contents were 0.099 $\mu g/g$ mercury, 0.808 $\mu g/g$ dieldrin, and 6.93 $\mu g/g$ DDE. Arsenic, aldrin, endrin, and DDT were not detected. Although RMA as a source of these contaminants cannot be completely ruled out, preliminary evaluation of sediment and water data from onpost and offpost surveys and existing knowledge on the feeding habits and foraging range of the Barr Lake eagles did not indicate that the observed contaminant levels were a result of migration from RMA sources.

Other possible threatened or endangered species in the Offpost OU are peregrine falcons (*Falco perigrinus*) or black-footed ferrets (*Mustela nigripes*). The CDOW has classified peregrine falcons in the RMA vicinity as migrants, and black-footed ferret searches on prairie dog colonies onpost have concluded that ferrets probably do not occur in the area (ESE, 1989b).

7.3 QUALITY ASSURANCE AND QUALITY CONTROL FOR CHEMICAL ANALYSES

Analytical procedures were consistent with the PMRMA CQAP (PMRMA, 1989). Samples were analyzed using PMRMA-certified methods, as shown in Table 2.5. These methods use standard matrix spikes as the means of demonstrating that all analytical methods are in control during sample analysis. Control charts are generated using the standard matrix spike data, and recoveries of individual lots are compared to established control limits on the control charts to determine if the analysis is in control. These control charts are reviewed by the analyst, the Laboratory Quality Assurance Coordinator, and by the Quality Assurance Branch of the Laboratory Support Division of PMRMA. All 15 animal tissue samples were analyzed in the following three lots: QRQ (Method M-6), GVS (Method B-6-A), and QOP (Method C-6-A). The one algae sample was analyzed as a plant tissue, and its analysis results appear in the following three lots: QPA (Method QH-01), GVT (Method B-6-P), and QOQ (Method C-6-P).

Two laboratory duplicates were analyzed by the laboratory, as shown in Appendix F. The sample selected for the duplicate analysis was the pheasant flesh that was collected on January 2, 1990, and was assigned HLA site I.D. HA1255BF. The analysis of this sample and its duplicate gave analysis results that were below the CRL for all analytes. While the results for the duplicate analysis confirm the absence of analytes in the sample, no estimates of sampling and analytical accuracy and precision can be calculated from these results.

7.4 SUMMARY AND CONCLUSIONS OF CHARACTERIZATION AND CONTAMINANT STUDIES

Characterization studies examined the status of offpost ecosystems. The Offpost OU terrestrial systems are dominated by human agricultural land use, with extensive plowed and planted lands, a range for cattle and horses, and small trash dumps. Aquatic systems are limited to the First Creek drainage, with the least disturbed section of the creek occurring just north of RMA. Because of the high degree of land-use disturbance, species diversity is low in the Offpost OU compared to RMA. The land-use practices have resulted in limited assessment of the impacts of RMA-derived contaminants on the overall ecosystem Offpost OU. Some of the birds listed in Table F4, Species of Possible Occurrence in the Offpost Study Area, are protected under the Migratory Bird Treaty Act.

Contaminants in the Offpost OU biota are similar to those found at RMA, although the concentrations detected in Offpost OU biota are considerably lower than levels detected in Onpost OU samples. Contaminants most commonly detected in biota samples offpost include arsenic, mercury, and dieldrin. Although onpost RMA sources may impact some animal species found in the Offpost OU, contamination detected in offpost biota samples collected during RI Addendum activities appears to come from in-situ environmental sources rather than from migration of onpost RMA wildlife.

8.0 REMEDIAL INVESTIGATION ADDENDUM SUMMARY AND CONCLUSIONS

This RI Addendum report was prepared to present analytical results and more recent interpretations of the nature and extent of contamination in the various media in the Offpost OU since the Final RI was issued in December 1988. Additional groundwater monitoring wells have been installed in the UFS and Arapahoe Formation. Samples from these wells and existing wells sampled under the CMP have been incorporated into the interpretation of the extent of groundwater contamination in offpost UFS and Arapahoe Formation groundwater.

Additional offpost surface-water, sediment, and biota samples were also collected from the Offpost OU and were analyzed for appropriate target analytes. Surficial soil samples, which were not collected during the Final RI program, were collected during the RI Addendum program. Several episodes of surficial soil sampling were conducted to eliminate data gaps for revising the Draft Final EA/FS, which is currently under preparation. On the basis of the data and interpretations presented in this RI Addendum report, particularly comparisons to findings contained in the Final RI, where possible, sufficient data are available for revising the Offpost OU EA/FS report for the Offpost OU.

The following sections present the major conclusions for each of the offpost media sampled under this RI Addendum program. Each discussion initially presents a brief overview of the data collection activities conducted for that medium. The nature and extent of contamination for that medium is then briefly presented and discussed. The extent of contamination is then compared to interpretations contained in the Final RI.

8.1 GROUNDWATER

Section 3.0 presented the results of the groundwater monitoring program for the RI Addendum. The extent of groundwater contamination associated with RMA-derived contaminants was characterized through the installation of additional monitoring wells completed in the UFS and Arapahoe Formation. Installation of these wells also added to the understanding of the geology and hydrogeology of the Offpost OU. Water levels were measured, and water-quality samples were collected from 124 wells in the Offpost OU. A total of 34 new monitoring wells were installed in the offpost OU, including 3 wells in the Arapahoe Formation. Additionally, samples were collected from 25 domestic wells located in the Offpost OU. Assessment of the extent of contamination was also based on recent water-quality data generated in fiscal years 1988 through 1990 under the CMP. These data were used in contouring the major target analyte plumes in the UFS.

The geologic and hydrogeologic data presented in this report confirm the existence of major paleochannels north of RMA. Additionally, groundwater samples from these wells confirmed that the highest concentrations of most of the major target analytes occur in the UFS along the First Creek and Northern Paleochannels. The major organic contaminants detected in the UFS include DIMP, DCPD, dieldrin, chloroform, and TCLEE. Inorganic analytes detected in the UFS north of RMA include arsenic, chloride, and fluoride.

The operation of the NBCS has had a significant impact on reducing the concentrations of the organic and inorganic contaminants in the UFS. Additionally, recent physical and operational changes to the NBCS are apparently enhancing the reduction of contaminants in the area immediately downgradient of the NBCS.

Offpost of the RMA northwestern boundary, the principal organic contaminants detected in the UFS are chloroform and dieldrin, although DIMP was also detected in groundwater samples from this area. Inorganic analytes detected in this area include chloride and fluoride. Groundwater concentrations are considerably lower in this area than observed in the First Creek and Northern Paleochannels. The NWBCS has not been completely effective at reducing the concentrations of chloroform detected in groundwater offpost in this area. Modifications to the operation of the NWBCS are being implemented, and decreases in chloroform, and other contaminants offpost are expected to occur.

8.2 SURFACE WATER

Section 4.0 presents the results of the surface-water monitoring program for the RI Addendum. Surface-water samples were collected from a number of locations along First Creek, O'Brian Canal, Burlington Ditch, and Barr Lake. Samples were collected during two sampling episodes conducted in November 1988 and from May to June 1990. Surface-water samples were analyzed for organic and inorganic analytes.

The analytical results for the surface-water samples confirm the nature and extent of contamination reported in the Final RI. The principal organic compounds identified in the samples include DIMP and dieldrin. Inorganic compounds detected include arsenic and mercury. In general, the highest concentrations of the organic and inorganic analytes were detected in First Creek. DIMP concentrations in First Creek were highest in the area 100 to 200 feet upstream of O'Brian Canal where groundwater discharge to First Creek is occurring. Concentrations of DIMP in this area are considerably lower than levels reported in the Final RI.

The highest concentrations of arsenic were detected in the samples collected from First Creek near the northern RMA boundary. The levels are likely associated with discharges from the Onpost Sewage Treatment Plant. Mercury and arsenic were detected in surface-water samples collected from O'Brian Canal upstream of the confluence with First Creek, suggesting additional sources of the constituents. Organic compounds were not detected in the surface-water sample collected from Barr Lake. The occurrence of mercury in the Barr Lake sample is probably associated with past sludge disposal activities in Barr Lake, as described in the Final RI. These disposal activities were not associated with any RMA operations.

8.3 STREAM-BOTTOM SEDIMENT

Section 5.0 presents the results of the stream-bottom sediment monitoring program. Sediment samples were collected from several locations along First Creek, O'Brian Canal, Burlington Ditch, and Barr Lake. The sediment sampling locations were collocated with the surface-water sampling locations. Samples were collected in November 1988 and from May to June 1990. The sediment samples were analyzed for the same organic and inorganic contaminants as the surface-water samples.

The analytical results for the sediment samples confirm the results presented in the Final RI. The most commonly detected contaminants were dieldrin, arsenic, and mercury. The highest concentration of dieldrin was in a sample collected from First Creek immediately north of the northern RMA boundary. Concentrations of dieldrin in other locations were generally much lower than concentrations observed in First Creek samples. Numerous organic and inorganic contaminants were detected in sediment samples collected from O'Brian Canal and Burlington Ditch upstream of the confluence with First Creek. Contaminants detected in these samples include DDT, DDE, chlordane, dieldrin, endrin, and mercury. This distribution indicates that other sources of these analytes probably exist offpost.

8.4 SURFICIAL AND SUBSURFACE SOILS

Section 6.0 presents the results of the surficial and subsurface soil monitoring program. Surficial soil samples were collected from a broad area in the Offpost OU. A number of samples were collected outside of the Offpost OU, including nine samples from east of RMA and four samples from an area northeast of Brighton, Colorado. Surficial soils were collected by HLA in February 1989 and from June to July 1990. Additional surficial soil samples were collected by WCFS in May 1991. These samples were analyzed for OCPs, arsenic, and mercury, except for the samples collected in May 1991, which were analyzed for OCPs only. Subsurface samples were collected from a few areas in February 1989. These samples were analyzed for OCPs, arsenic, and mercury. Because surficial soil samples were not collected under the previous RI activities, these data cannot be compared to findings presented in the Final RI.

The most commonly occurring organic compound in soils was dieldrin. Dieldrin was detected in approximately 90 percent of the samples. Other organic compounds detected include DDT, DDE, aldrin, and endrin, which were detected in 25 to 50 percent of the samples. A few isolated occurrences of some analytes were observed, including chlordane, isodrin, and HCCPD. The distribution of these analytes is considered sporadic and not representative of RMA-derived contamination. Chlordane was detected in a sample approximately 0.5 mile north of RMA and was reportedly used by a former resident.

The highest levels of most of the OCPs are generally found in the immediate vicinity of the RMA northern boundary. The concentrations generally decrease with distance from RMA.

However, because these compounds were commercially available historically, there is a likely contribution to the observed concentration from such commercial or residential application. This is evidenced by the anomalously high concentrations dieldrin, DDT, and DDE approximately 1.5 miles northwest of RMA. Background levels for the OCPs were assessed by collection of surficial soil samples near Brighton, Colorado and northeast of RMA. Target analytes detected in these background samples include dieldrin, aldrin, DDT, and endrin.

Arsenic and mercury were detected in offpost surficial soil. Arsenic was detected in approximately 25 percent of the samples. The highest concentrations were detected in samples collected from northwest of Burlington Ditch. Mercury was detected less frequently than arsenic. However, the areas of highest concentration were also northwest of Burlington Ditch. These data suggest sources of these contaminants other than RMA.

Subsurface soil showed only two occurrences of organic or inorganic contaminants. Arsenic and dieldrin were each detected in only one sample.

8.5 BIOTA

Section 7.0 presents the results of the biota monitoring program. Biota samples were collected from the area immediately north of RMA. This area represents the locations of highest surface-water and surficial soil contamination, which would likely have the most significant impact on biota. Biota samples representing several trophic levels were collected in several sampling episodes. Agricultural, aquatic, and terrestrial biota samples were collected and analyzed for organic compounds, arsenic, and mercury. The biota monitoring program also included an assessment of the habitats that occur in the Offpost OU and the types of species that may exist in the area.

The Final RI reported limited biota results. The RI Addendum biota monitoring program provided significant additional data to assess the impacts, if any, on the biotic community in the Offpost OU. The most commonly occurring compounds include dieldrin, arsenic, and mercury. The concentrations of these target analytes were considerably lower than levels observed onpost.

Additionally, the types of analytes reported in these samples were consistent with those compounds reported onpost.

An assessment of endangered species that could occur in the Offpost OU showed that no endangered or threatened species occur in the Offpost OU, except for a pair of bald eagles at Barr Lake. Contaminants (mercury, dieldrin, and DDE) detected in a Bald Eagle egg collected in 1988 from an abandoned nest at Barr Lake could not be attributed to releases from RMA sources.

9.0 GLOSSARY

°C	degrees Celsius
µg/l	micrograms per liter
12DCLE	1,2-dichloroethene
Army	U.S. Department of the Army
As	arsenic
BCHPD	bicycloheptadiene
bgs	below ground surface
CCL4	carbon tetrachloride
Cd	cadmium
CDH	Colorado Department of Health
CDOW	Colorado Division of Wildlife
CFS	confined flow system
CL6CP	hexachlorocyclopentadiene
cm	centimeters
CMP	Comprehensive Monitoring Plan
COC	contaminants of concern
CPMS	4-chlorophenylmethyl sulfide
CPMSO	4-chlorophenylmethyl sulfoxide
CPMSO2	4-chlorophenylmethyl sulfone
CQAP	Chemical Quality Assurance Plan
Cr	chromium
CRL	certified reporting limit
CSC	Chemical Sales Company
Cu	copper
DBCP	dibromochloropropane
DCPD	dicyclopentadiene

DDE	2,2-bis(para-chlorophenyl)-1,1-dichloroethene
DDT	2,2-bis(para-chlorophenyl)-1,1-trichloroethane
DDVP	vapona
DIMP	diisopropylmethyl phosphonate
DITH	1,4-dithiane
DMMP	dimethylmethyl phosphonate
DMP	Data Management Plan
DSA	duplicate sample agreement
EA	endangerment assessment
EPA	U.S. Environmental Protection Agency
ESE	Environmental Science and Engineering, Inc.
FOP	Field Operations Procedure Plan
FS	feasibility study
ft	foot, feet
FY	fiscal year
g	gram
GC	gas chromatography
Hg	mercury
HLA	Harding Lawson Associates
HSA	hollow-stem auger
HSP	Health and Safety Plan
IBCS	Irondale Boundary Containment System
ICAP	inductively coupled argon plasma
ICP	inductively coupled plasma
ID	inside diameter
IRA A	Groundwater Intercept and Treatment System North of RMA
kg	kilogram

m	meter
MKE	Morrison-Knudsen Engineers, Inc.
MS	mass spectroscopy
NBCS	North Boundary Containment System
NPP	nitrogen phosphorus pesticide
NWBCS	Northwest Boundary Containment System
OAS	Organizations and State (EPA, Shell, Army, and the State)
OCP	organochlorine pesticide
OU	operable unit
Pb	lead
PID	photoionization detector
PMRMA	Program Manager for Rocky Mountain Arsenal
QA	quality assurance
QAP	Quality Assurance Plan
QC	quality control
RI	remedial investigation
RLSA	R.L. Stollar Associates
RMA	Rocky Mountain Arsenal
Shell	Shell Chemical Company
SVOC	semivolatile organic compound
TCLEE	tetrachloroethene
TDS	total dissolved solids
TOC	total organic carbon
TRCLE	trichloroethene
Tri-County	Tri-County Health Department
UFS	unconfined flow system
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency

USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WCFS	Woodward-Clyde Federal Services
Work Plan	Draft Final Work Plan

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Table 1.1: Data Needs in Each Offpost Operable Unit Medium Addressed in RI Addendum

Medium	Description of Need
Groundwater	- Additional data on contaminant distribution in the area immediately downgradient of the RMA northern boundary.
	- Additional data on contaminant distribution in the area downgradient of the RMA northwest boundary.
	- Additional data on contaminant distribution in the area downgradient of the canals.
Surface water	- Data on surface-water quality along First Creek and O'Brian Canal.
Surficial soil	- Data on contaminant distributions in surficial soil in the vicinity of First Creek and the northwest boundary, including assessment of background concentrations of selected compounds.
Sediment	- Data on distribution of contamination in sediments along First Creek and O'Brian Canal.
	- Data on distribution of contamination in sediments along Burlington Ditch.
Biota	- Data on possible contamination of native and domestic biota in area immediately north of RMA northern boundary.

RMA = Rocky Mountain Arsenal

Table 2.1: Aquifer Designations and Sampling Dates for Wells in Offpost Operable Unit
(Page 1 of 4)

Well Number	Aquifer Designation Category	Source for Aquifer Designation Information	Sampling Date(s)
37307	1	ESE	11/09/89
37308	1	ESE	11/07/89
37309	1	ESE	11/07/89
37312	1	ESE	11/07/89
37313	1	ESE	11/27/89
37320	2	ESE	10/25/89
37323	4	ESE	11/09/89
37327	1	ESE	11/08/89
37330	1	ESE	10/30/89
37331	1	ESE	10/30/89
37332	1	ESE	11/13/89
37333	2	ESE	11/10/89
37334	3	ESE	10/27/89
37335	1	ESE	10/27/89
37336	3	ESE	10/27/89
37337	2	ESE	10/25/89
37338	1	ESE	11/09/89
37339	1	ESE	11/09/89
37341	1	ESE	10/26/89
37342	1	ESE	10/31/89
37343	2	ESE	10/25/89
37344	1	ESE	10/31/89
37345	1	ESE	11/01/89
37346	1	ESE	11/16/89
37347	1	ESE	11/13/89
37348	1	ESE	10/30/89
37349	1	ESE	11/17/89
37350	2	ESE	10/30/89
37351	1	ESE	11/01/89
37352	1	ESE	11/06/89
37353	1	ESE	11/06/89
37354	1	ESE	11/01/89
37355	1	ESE	10/25/89
37356	1	ESE	10/27/89
37357	1	ESE	11/01/89
37358	1	ESE	10/30/89
37359	1	ESE	11/03/89
37360	1	ESE	11/03/89
37361	1	ESE	11/03/89
37362	1	ESE	11/14/89
37363	1	ESE	11/03/89
37364	2	ESE	11/08/89
37367	1	ESE	11/02/89
37368	1	ESE	11/07/89
37369	1	ESE	10/25/89
37370	1	ESE	11/07/89
37371(1)	4	ESE	11/08/89

Table 2.1: (Page 2 of 4)

Well Number	Aquifer Designation Category	Source for Aquifer Designation Information	Sampling Date(s)
37373	1	ESE	10/31/89
37374	1	ESE	10/31/89
37377	1	ESE	10/25/89
37378	1	ESE	11/17/89
37381	2	ESE	11/02/89
37382	3	ESE	11/18/89
37383	1	ESE	11/02/89
37385	1	ESE	11/06/89
37386	1	ESE	11/17/89
37389	3	ESE	11/08/89
37391	1	ESE	10/25/89
37392	1	ESE	10/25/89
37395	1	ESE	11/15/89
37396	1	ESE	11/08/89
37397	2	ESE	11/08/89
37402	1	HLA	09/27/89, 02/22/90
37403	1	HLA	09/25/89, 02/21/90
37404	1	HLA	09/26/89, 02/22/90
37405	1	HLA	09/26/89, 02/21/90
37406	1	HLA	09/26/89, 02/21/90
37407	1	HLA	09/26/89, 02/21/90
37408	1	HLA	12/01/89
37409	1	HLA	11/29/89
37410	1	HLA	12/04/89
37418	1	HLA	12/18/89, 06/22/90
37419	1	HLA	12/15/89
37420	1	HLA	12/13/89, 06/21/90
37428	1	HLA	12/27/89
37429	1	HLA	12/29/89, 02/26/90
37430	1	HLA	12/28/89, 02/26/90
37433	1	Appendix A	01/03/90, 02/26/90
37434	1	Appendix A	01/03/90, 02/27/90
37435	1	Appendix A	12/29/89, 02/27/90
37436	1	Appendix A	01/02/90, 02/28/90
37437	1	Appendix A	01/02/90, 02/28/90
37438	1	Appendix A	01/25/90, 02/28/90
37439	1	Appendix A	01/25/90, 03/01/90
37440	1	Appendix A	01/25/90, 03/01/90
37441	1	Appendix A	01/29/90, 03/01/90, 06/12/90
37442	1	Appendix A	03/02/90, 06/12/90
37443	1	Appendix A	03/01/90, 06/13/90
37444	1	Appendix A	03/02/90, 06/13/90
37445	ARA	Appendix A	08/28/90
37446	ARA	Appendix A	-
SAC18	1	Appendix A	10/31/89

Table 2.1: (Page 3 of 4)

Well Number	Aquifer Designation Category	Source for Aquifer Designation Information	Sampling Date(s)
Domestic Wells			
8834A TW 096	1	Per Comm	08/22/90, 08/24/90
8834B TW 096	1	Per Comm	08/22/90
8834C TW 096	ARA	Per Comm	08/22/90
09200 TW 090	1	Per Comm	01/17/89, 09/08/89
09610 TW PEO	ARA	Tri-Co	04/20/89(2)
10021 TW PEO	ARA	Tri-Co	02/27/89
10100 TW 108	1	Tri-Co	05/30/90
10150 TW HY2	1	Tri-Co	05/30/90
37431	ARA	Appendix A	09/13/89, 11/21/89
10720 TW BRI	1	Tri-Co	04/21/89(2), 09/08/89, 12/28/89
10791 TW BRI	1	Tri-Co	05/09/90
11010 TW HAV	1	Tri-Co	01/26/90 (Abandoned 10/90)
11071 TW 112	1	Tri-Co	01/31/89, 08/21/90
11295 TW 108	1	Tri-Co	01/31/89, 08/22/90, 08/24/90
11460 TW PEO	1	Tri-Co	08/21/90
11515 TW 096	ARA	Tri-Co	04/20/89(2)
11755 TW BRI	1	Tri-Co	05/30/90
11810 TW BRI	1	Tri-Co	05/10/90
11830 TW 112	1	Tri-Co	01/31/89, 09/08/89
11841 TW 096	ARA	Tri-Co	04/20/89(2), 09/07/89, 01/26/90, 08/21/90
11921 TW 096	ARA	Tri-Co	04/20/89(2), 09/07/89
12001 TW BRI	1	Tri-Co	05/10/90
13350 TW 104	1	Tri-Co	01/17/89
13701 TW 104	ARA	Tri-Co	01/17/89

Sources:

ESE = Environmental Science and Engineering, Inc., and others, 1988a. Offpost Operable Unit Remedial Investigation and Chemical Specific Applicable or Relevant and Appropriate Requirements, Final Report (Version 3.1) - 3 Volumes, December.

HLA = Harding Lawson Associates, 1990. Results of Pilot-Scale Hydraulic and Treatment Testing North of Rocky Mountain Arsenal Interim Response Action A, Draft Final Report, 2 Volumes, June.

Appendix A = Appendix A of this report.

Tri-Co = Tri-County Health Department, 1989. Draft Final Rocky Mountain Arsenal Offpost Private Well Inventory and Information Survey, August.

Per Comm = Personal communication with well owner.

Table 2.1: (Page 4 of 4)

(1)	Piezomenter; sampled for water quality analyses
(2)	All data for analyses of these samples were rejected by PMRMA
1 =	Alluvial well with screen <3 feet into claystone bedrock
2 =	Alluvial well with screen 3 to 6 feet into claystone bedrock
3 =	Screened mostly in Denver Formation but because of relative transmissivity of the alluvial and Denver materials, screen considered to be representative of alluvial water levels and water chemistry
4 =	Screened entirely in Denver Formation but because of relative transmissivity of the alluvial and Denver materials, screen considered to be representative of alluvial water levels and water chemistry

ARA = Screened entirely in Arapahoe Formation

- not sampled

Table 2.2: Technical Justification for Monitoring Wells Installed
Under Remedial Investigation Addendum Program
(Page 1 of 3)

HLA Designation	IRDMS Designation	Approximate Location	Technical Justification
RI-1	NA	Not Installed	Well 37441 was installed by South Adams County at the proposed location of this well
RI-2	NA	Not Installed	Access could not be negotiated in a timely fashion. Current groundwater-quality data indicate that this well is not necessary.
RI-4	37442	Intersection of I-76 and State Highway 85, east central area of Section 16	Useful in assessing and characterizing extent of dieldrin and chloroform plumes northwest of RMA.
RI-5	37443	OSCO Property Study Area IB, west central area of Section 15	Useful in assessing continuity of chloroform and dieldrin contamination downgradient of the NWBCS.
RI-8	37430	Highway 85 south of 104th Avenue, Study Area II, northeast corner of Section 16	Useful for increased well control to assess isolated detections of dieldrin, chlorobenzene, chloroform, tetrachloroethylene, and DIMP as well as the distal extent of plumes emanating from Study Area Ib.
RI-9	37433	Along Burlington Ditch west of Havana Street between south of 104th Avenue and southeast of I-76, Study Area II, east central area of Section 15	Useful for downgradient assessment of contaminant migration beyond O'Brian Canal and Burlington Ditch. Increases well control needed to assess isolated detections of DIMP and chlorobenzene.
RI-10	37429	Intersection of Havana Street and 104th Avenue, Study Area II, southeast corner of Section 10	Useful for increased definition of DIMP and dieldrin detections as well as for assessing dilution effects downgradient of O'Brian Canal and Burlington Ditch
RI-11	37434	On 112th Avenue northwest of I-76, Study Area II, central area of Section 11	Useful in refining the configuration of the DIMP plume in Section 11. Useful as upgradient control for plumes in Study Area II.

HLA Designation	IRDMS Designation	Approximate Location	Technical Justification
RI-12	37435	On 120th Avenue west of Peoria Street, Study Area II, southeast corner of Section 2	Useful in assessing contaminant migration along the Northern Paleochannel downgradient of O'Brian Canal. Increases well control north of the Northern Paleochannel and northwest of the canals.
RI-13	37436	Northwest of the intersection of 88th Avenue and Yosemite Street, southeast corner of Section 21	Useful in refining the extent of dieldrin and chloroform plumes, also used to assess the extent of dieldrin at the south end of the NWBCS. Geologic data from this boring useful to further define a suspected paleochannel in this area.
RI-14	37437	500 feet northeast of RI-13	Useful in refining the extent of dieldrin and chloroform at the south end of the NWBCS. Geologic data from this boring are necessary to further define a suspected paleochannel in this area.
RI-15	NA	Southeast of 96th Avenue along State Highway 2, middle of Section 22	No well installed. No alluvial groundwater encountered. Boring is useful in assessing extent of saturated alluvium in this area.
RI-16	37438	Southeast of O'Brian Canal in Section 22, located on northwest boundary of feed lot	Useful in evaluating the northern lateral extent of dieldrin and chloroform detected in well 37382.
RI-17	37439	Along Burlington Ditch in the northwest corner of Section 22	Useful in assessing the downgradient extent of dieldrin and chloroform detected in well 37382, also used to assess dilution from the canals and evaluate the continuity of the plumes extending from wells 37382 and 37336.
RI-18	NA	Not Installed	Access could not be negotiated in a timely fashion. Current groundwater-quality data indicate that this well is not necessary.
RI-19	NA	Not Installed	This well was not installed because of early objections by the OAS and was removed from the RI/EA/FS Work Plan.

Table 2.2: (Page 3 of 3)

HLA Designation	IRDMS Designation	Approximate Location	Technical Justification
RI-20	37440	On the south side of 96th Avenue, 100 yards east of the intersection of 96th Avenue and Union Pacific Railroad, northeast corner of Section 21	Useful in assessing the lateral extent and continuity of contamination between 37336 and 37337.
RI-21	37444	Along Union Pacific Railroad right-of-way, northeast of RI-20, southeast corner of Section 16	Useful in assessing downgradient extent of contaminants detected at well 37336 in an area suspected to be the terminus of the dieldrin and chloroform plumes.
AP-1	37431	East of Highway 2, southwest quarter of Section 12	Useful in assessing water quality in the Arapahoe Formation in an area of the Northern Pathway where alluvium is contaminated by chloroform, DIMP, and other compounds.
AP-2	37445	East of Havana Street in the northwest quarter of Section 11	Useful in assessing water quality in the Arapahoe Formation in an area where DIMP has been detected in the unconfined flow system downgradient from the Northern Pathway.
AP-3	37446	East of Brighton Road in the southeast quarter of Section 9	Useful in assessing water quality in the Arapahoe Formation in an area where DIMP has been detected in the unconfined flow system downgradient of the First Creek Pathway.

DIMP = diisopropylmethylphosphonate
HLA = Harding Lawson Associates
IRDMS = Installation Restoration Data Management System
NA = Not applicable; applies to wells that were planned but not installed
NWBCS = Northwest Boundary Containment System
OAS = Organizations and State
RI/EA/FS = remedial investigation/endangerment assessment/feasibility study

Table 2.3: Completion Data for New Monitoring Wells

Boring Number	Well Number	Location Coordinates UTM (meters) North	East	Ground Level Elevation (ft)	Elevation Top of Casing (ft)	Screen Interval (ft/bgl)	Top of Sand (ft/bgl)	Top of Bentonite (ft/bgl)	Depth to Bedrock (ft/bgl)
RI-4	37442	4414147.35	509455.04	5073.6	5074.85	16.0 - 33.0	11.0	6.0	33.0
RI-5	37443	4413862.59	510158.80	5081.5	5083.06	12.5 - 32.5	10.0	6.3	31.5
RI-8	37430	4414644.10	509958.07	5068.8	5070.21	14.0 - 29.0	9.0	4.0	29.0
RI-9	37433	4414167.81	511227.76	5100.0	5101.55	31.0 - 45.0	26.0	21.0	45.0
RI-10	37429	4414847.55	511539.02	5090.6	5092.06	29.0 - 44.0	25.5	20.0	44.0
RI-11	37434	4415616.14	512139.15	5090.31 (1)	5089.85	33.0 - 48.0	28.0	22.7	48.0
RI-12	37435	4416437.64	513001.19	5091.2	5091.10	31.0 - 42.0	26.0	21.0	42.0
RI-13	37436	4411806.93	509671.52	5116.89 (1)	5116.04	28.0 - 55.0	25.0	20.0	55.0
RI-14	37437	4411897.02	509757.11	5120.12 (1)	5119.56	32.0 - 52.0	28.0	23.0	52.5
RI-15 (2)	-	4412359.22	510816.57	5134.95	-	-	-	-	30.0
RI-16	37438	4412801.57	510606.01	5115.0	5116.30	25.0 - 37.0	20.3	14.7	37.5
RI-17	37439	4412742.69	510068.26	5107.4	5108.98	26.0 - 46.0	21.0	16.4	47.3
RI-20	37440	4413199.55	509505.48	5093.63 (1)	5092.95	18.0 - 38.0	13.5	8.5	37.0
RI-21	37444	4413550.68	509710.47	5085.15	5086.41	14.6 - 34.6	10.0	5.2	35.5
AP-1	37431	4415230.40	513456.66	5121.9	5124.26	280.0 - 320.0 210 - 230	170.0	160.0	52.0
AP-2	37445	-	-	-	-	380.0 - 420.0	200.0	180.6	47.0
AP-3	37446	-	-	-	-	356.0 - 396.0	270.0	258.0	33.0

(1) Flush mounted, elevation taken to top of casing
(2) RI-15 was not completed as a monitoring well. The boring was dry, and data from this boring were used as control for bedrock surface elevation.

- = Data not available
ft = feet
ft/bgl = feet below ground level
UTM = Universal Transverse Mercator

Table 2.4: Target Analyte List

Analyte	Ground-water	Surface Water	Soil/Stream and Pond Sediment	Surface Sediment	Biota	Method
	Medium					
Volatile Organic Compounds						
1,1,1-Trichloroethane	x	x	x			GC, GC/MS
1,1,2-Trichloroethane	x	x	x			GC, GC/MS
1,1-Dichloroethane	x	x	x			GC, GC/MS
1,2-Dichloroethane	x	x	x			GC, GC/MS
1,1-Dichloroethene	x	x	x			GC, GC/MS
1,2-Dichloroethenes (cis and trans)	x	x	x			GC, GC/MS
Benzene	x	x	x			GC, GC/MS
Carbon tetrachloride	x	x	x			GC, GC/MS
Chlorobenzene	x	x	x			GC, GC/MS
Chloroform	x	x	x			GC, GC/MS
Dibromochloropropane		x	x	x		GC, GC/MS
Dimethyldisulfide		x	x	x		GC, GC/MS
Ethylbenzene	x	x	x			GC, GC/MS
m-Xylene	x	x	x			GC, GC/MS
Methylene chloride	x	x	x			GC, GC/MS
Methylisobutylketone	x	x	x			GC, GC/MS
o,p-Xylenes	x	x	x			GC, GC/MS
Tetrachloroethene	x	x	x			GC, GC/MS
Toluene	x	x	x			GC, GC/MS
Trichloroethene	x	x	x			GC, GC/MS
Vinyl chloride	x	x	x			GC, GC/MS
Semivolatile Organic Compounds/Pesticides						
1,4-Oxathiane	x	x	x	x		GC, GC/MS
2,2-bis(parachlorophenyl) 1,1-Dichloroethene (DDE)	x	x	x	x	x	GC, GC/MS
2,2-bis(parachlorophenyl)	x	x	x	x	x	GC, GC/MS
1,1-Trichloroethane (DDT)	x	x				GC, GC/MS
2,3,6-Trichlorophenol	x	x				GC, GC/MS
2,4,6-Trichlorophenol	x	x				GC, GC/MS
2,4-Dichlorophenol	x	x				GC, GC/MS
2,4-Dimethylphenol	x	x				GC, GC/MS

Table 2.4: (Page 2 of 3)

Analyte	Medium: Ground-water	Surface Water	Soil/Stream and Pond Sediment	Surface Sediment	Biota	Method
Semivolatile Organic Compounds/Pesticides (con't)						
2,4-Dinitrophenol	x	x				GC, GC/MS
2-Chlorophenol	x	x				GC, GC/MS
2-Methylphenol	x	x				GC, GC/MS
2-Nitrophenol	x	x				GC, GC/MS
3-Methyl-4-chlorophenol	x	x				GC, GC/MS
4-Chlorophenylmethyl sulfide	x	x	x	x		GC, GC/MS
4-Chlorophenylmethyl sulfone	x	x	x	x		GC, GC/MS
4-Chlorphenylmethyl sulfoxide	x	x	x	x		GC, GC/MS
4-Methylphenol	x	x				GC, GC/MS
4-Nitrophenol	x	x				GC, GC/MS
Aldrin	x	x	x	x	x	GC, GC/MS
Atrazine	x	x	x	x		GC, GC/MS
Benzothiazole	x	x	x	x		GC, GC/MS
Bicyclo(2,2,1)hepta-2,5-diene	x	x	x			GC, GC/MS
bis(2-Ethylhexyl) phthalate	x	x				GC, GC/MS
Caprolactum	x	x				GC, GC/MS
Chlordane	x	x	x	x		GC, GC/MS
Dicyclopentadiene	x	x	x	x		GC, GC/MS
Dieldrin	x	x	x	x	x	GC, GC/MS
Diisopropylmethylphosphonate	x	x	x	x		GC, GC/MS
Dimethylmethylphosphonate	x	x	x			GC, GC/MS
Dithiane	x	x	x	x		GC, GC/MS
Endrin	x	x	x	x	x	GC, GC/MS
Hexachlorocyclopentadiene	x	x	x	x		GC, GC/MS
Isodrin	x	x	x	x		GC, GC/MS
Malathion	x	x	x	x		GC, GC/MS
Parathion	x	x	x	x		GC, GC/MS
Pentachlorophenol	x	x				GC, GC/MS
Phenol	x	x				GC, GC/MS
Vapona	x	x	x	x		GC, GC/MS
Supona	x	x	x	x		GC, GC/MS

Table 2.4: (Page 3 of 3)

Analyte	Medium: Ground-water	Surface Water	Soil/Stream and Pond Sediment	Surface Sediment	Biota	Method
Inorganics/General Characteristics						
Arsenic	x	x	x	x	x	ICP, GFAA, CVAA
Cadmium	x	x	x	x		ICP, GFAA, CVAA
Calcium	x	x		x		ICP, GFAA, CVAA
Chloride	x	x				ICP, GFAA, CVAA
Chromium	x	x	x	x		ICP, GFAA, CVAA
Copper	x	x	x	x		ICP, GFAA, CVAA
Cyanide	x	x	x			ICP, GFAA, CVAA
Fluoride	x	x				ICP, GFAA, CVAA
Iron	x			x		ICP, GFAA, CVAA
Lead	x	x	x	x		ICP, GFAA, CVAA
Magnesium	x	x		x		ICP, GFAA, CVAA
Manganese	x			x		ICP, GFAA, CVAA
Mercury	x	x	x	x	x	ICP, GFAA, CVAA
Nitrate/nitrite	x					ICP, GFAA, CVAA
Potassium	x	x		x		ICP, GFAA, CVAA
Sodium	x	x		x		ICP, GFAA, CVAA
Sulfate	x	x				ICP, GFAA, CVAA
Zinc	x	x	x	x		ICP, GFAA, CVAA
Total Organic Carbon	x	x	x			
Total Suspended Solids	x					

CVAA = Cold vapor atomic absorption
GC = Gas chromatography
GC/MS = Gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption
ICP = Inductively coupled plasma

Table 2.5: Analytical Methods and Certified Reporting Limits

Lab	Media	Method[1]	Method Name	Analyte	Certified Reporting Limit	Unit of Measure
ED	Animal Tissue	B6	Metals/Tissue/GFAA	Arsenic	0.250	µg/g
ED	Animal Tissue	B6A	Metals/Tissue/GFAA	Arsenic	0.250	µg/g
ED	Animal Tissue	C6	Metals/Tissue/CVAA	Mercury	0.0500	µg/g
ED	Animal Tissue	C6A	Metals/Tissue/CVAA	Mercury	0.0500	µg/g
ED	Animal Tissue	M6	Pesticides/Tissue/GCEC	Aldrin	0.0130	µg/g
				Dieldrin	0.0180	
				Endrin	0.0360	
				2,2-Bis(parachlorophenyl)1,1-Dichlorethene (DDE)	0.0630	
				2,2-Bis(parachlorophenyl)1,1-Trichlorethane (DDT)	0.132	
UB	Groundwater	AV8	Aromatics/Water/GCPID	m-Xylene	1.32	µg/l
				Benzene	1.05	
				Chlorobenzene	1.39	
				Ethyl benzene	1.37	
				Toluene	1.47	
				o,p-Xylene	1.36	
UB	Groundwater	AX8	Metals/Water/GFAA	Arsenic	2.35	µg/l
ED	Groundwater	CN1	Cyanide/Water/UVVIS	Cyanide	8.90	µg/l
UB	Groundwater	LL8	Anions/Water/Technicon	Nitrate/Nitrite	10.0	µg/l
ED	Groundwater	MM8A	Pesticides/Water/GCEC	Aldrin	0.083	µg/l
				Hexachlorocyclopentadiene	0.083	
				Chlordane	0.152	
				Dieldrin	0.0539	
				Endrin	0.0600	
				Isodrin	0.0560	
				2,2-Bis(parachlorophenyl)1,1-Dichlorethene (DDE)	0.0460	
				2,2-Bis(parachlorophenyl)1,1-Trichlorethane (DDT)	0.0590	

Lab	Media	Method[1]	Method Name	Analyte	Certified Reporting Limit	Unit of Measure
UB	Groundwater	N8	Halocarbons/Water/GCCON			
				1,1,1-Trichloroethane	0.760	µg/l
				1,1,2-Trichloroethane	0.780	
				1,1-Dichloroethene	1.70	
				1,1-Dichloroethane	0.730	
				1,2-Dichloroethenes (cis & trans)	0.760	
				1,2-Dichloroethane	1.10	
				Vinyl chloride	1.01	
				Carbon tetrachloride	0.990	
				Methylene chloride	7.40	
				Chloroform	0.500	
				Chlorobenzene	0.820	
				Tetrachloroethene	0.750	
				Trichloroethene	0.560	
ED	Groundwater	NN8	Anions/Water/Ionchrom			
				Chloride	1590	µg/l
				Fluoride	1000	
				Sulfate	5000	
ED	Groundwater	R9D	Metals/Water/ICAP			
				Arsenic	25.0	µg/l
				Calcium	50.0	
				Cadmium	5.00	
				Chromium	22.0	
				Copper	10.0	
				Magnesium	89.2	
				Sodium	251	
				Lead	52.0	
				Zinc	20.0	
ED	Groundwater	SS8	Aromatics/Water/GCPID			
				m-Xylene	1.04	µg/l
				Benzene	1.92	
				Ethyl benzene	0.620	
				Toluene	2.10	
				o,p-Xylene	1.34	
UB	Groundwater	TF20	Cyanide/Water/Technicon	Cyanide	5.00	µg/l
ES	Groundwater	TF22	Nit/Water/Technicon	Nitrate/Nitrite	10.0	µg/l

Lab	Media	Method(1)	Method Name	Analyte	Certified Reporting Limit	Unit of Measure
ED	Groundwater	TT8	Halocarbons/Water/GCHALL			
				1,1,1-Trichloroethane	1.09	µg/l
				1,1,2-Trichloroethane	1.63	
				1,1-Dichloroethene	1.85	
				1,1-Dichloroethane	1.93	
				1,2-Dichloroethenes (cis & trans)	1.75	
				1,2-Dichloroethane	2.07	
				Carbon tetrachloride	1.69	
				Methylene chloride	2.48	
				Chloroform	1.88	
				Chlorobenzene	1.36	
				Tetrachloroethene	2.76	
				Trichloroethene	1.31	
AL	Groundwater	UG05	Halocarbons/Water/GCCON			
				Carbon tetrachloride	0.151	µg/l
				Methylene chloride	2.02	
				Chloroform	0.727	
				Chlorobenzene	1.01	
				Tetrachloroethene	0.0300	
				Trichloroethene	0.365	
UB	Groundwater	UM21	Volatiles/Water/GCMS			
				1,1,1-Trichloroethane	1.0	µg/l
				1,1,2-Trichloroethane	1.0	
				1,1-Dichloroethene	1.0	
				1,1-Dichloroethane	1.0	
				1,2-Dichloroethenes (cis & trans)	5.0	
				1,2-Dichloroethane	1.0	
				m-Xylene	1.0	µg/l
				Vinyl chloride	12	
				Benzene	1.0	
				Carbon tetrachloride	1.0	
				Methylene chloride	1.0	
				Chloroform	1.0	
				Chlorobenzene	1.0	
				Ethyl benzene	1.0	
				Toluene	1.0	
				Methylisobutyl ketone	1.4	
				Tetrachloroethene	1.0	
				Trichloroethene	1.0	
				o,p-Xylene	2.0	

Lab	Media	Method[1]	Method Name	Analyte	Certified Reporting Limit	Unit of Measure
ED	Groundwater	VV8	Metals/Water/GFAA	Arsenic	2.50	µg/l
ED	Groundwater	WW8	Metals/Water/CVAA	Mercury	0.500	µg/l
ED	Plant Tissue	B6P	Metals/Tissue/GFAA	Arsenic	0.250	µg/g
ED	Plant Tissue	C6P	Metals/Tissue/CVAA	Mercury	0.0500	µg/g
ED	Plant Tissue	QH01	Pesticides/Biota/GCEC	Aldrin	0.0210	µg/g
				Dieldrin	0.0260	
				Endrin	0.0450	
				2,2-Bis(parachlorophenyl)1,1-Dichlorethene (DDE)	0.0420	
				2,2-Bis(parachlorophenyl)1,1-Trichlorethane (DDT)	0.155	
CL	Sediment	FF9	Organophosphor/Soil/GCFP	Diisopropyl methylphosphonate	0.050	µg/g
				Dimethylmethyl phosphonate	0.050	
UB	Sediment	KK9B	Pesticides/Soil/GCEC	Aldrin	0.00211	µg/g
				Hexachlorocyclopentadiene	0.00137	
				Chlordane	0.0230	
				Dieldrin	0.00181	
				Endrin	0.00471	
				Isodrin	0.00188	
				2,2-Bis(parachlorophenyl)1,1-Dichlorethene (DDE)	0.00466	
				2,2-Bis(parachlorophenyl)1,1-Trichlorethane (DDT)	0.00277	
UB	Sediment	L9	Organics/Soil/GCMS	Aldrin	0.30	µg/g
				Atrazine	0.30	
				Hexachclorcyclopentadiene	0.60	
				Chlordane	2.0	
				4-Chlorophenylmethyl sulfide	0.90	
				4-Chlorophenylmethyl sulfoxide	0.30	
				4-Chlorophenylmethyl sulfone	0.30	
				Dibromochloropropane	0.30	µg/g
				Dicyclopentadiene	1.0	
				Vapona	3.0	

Lab	Media	Method(1)	Method Name	Analyte	Certified Reporting Limit	Unit of Measure
UB (continued)	Sediment	L9	Organics/Soil/GCMS	Diisopropyl methylphosphonate	1.0	µg/g
				Dithiane	0.40	
				Dieldrin	0.30	
				Endrin	0.50	
				Isodrin	0.30	
				Malathion	0.70	
				1,4-Oxathiane	0.30	
				2,2-Bis(parachlorophenyl)1,1-Dichlorethene (DDE)	0.60	
				2,2-Bis(parachlorophenyl)1,1-Trichlorethane (DDT)	0.50	
				Parathion	0.90	
				Supona	0.60	
UB	Sediment	LM23	Volatiles/Soil/GCMS	1,1,1-Trichloroethane	0.20	µg/g
				1,1,2-Trichloroethane	0.33	
				1,1-Dichloroethene	0.27	
				1,1-Dichloroethane	0.49	
				1,2-Dichloroethenes (cis & trans)	0.32	
				1,2-Dichloroethane	0.32	
				m-Xylene	0.23	
				Vinyl chloride	1.8	
				Benzene	0.10	
				Carbon tetrachloride	0.31	
				Methylene chloride	4.4	
				Chloroform	0.24	
				Chlorobenzene	0.10	
				Ethyl benzene	0.19	
				Toluene	0.10	
				Methylisobutyl ketone	0.63	
				Tetrachloroethene	0.16	
				Trichloroethene	0.25	
				o,p-Xylene	0.78	
UB	Sediment	N9	Volatiles/Soil/GCMS	1,1,1-Trichloroethane	0.43	µg/g
				1,1,2-Trichloroethane	0.39	
				1,1-Dichloroethane	1.7	
				1,2-Dichloroethane	0.56	
				1,2-Dichloroethenes (cis & trans)	1.7	
				m-Xylene	0.74	
				Bicyclo (2,2,1) hepta-2,5-diene	0.36	
				Benzene	0.25	
				Carbon tetrachloride	0.25	
				Methylene chloride	1.5	

Lab	Media	Method[1]	Method Name	Analyte	Certified Reporting Limit	Unit of Measure
UB (continued)	Sediment	N9	Volatiles/Soil/GCMS	Chloroform	0.29	µg/g
				Chlorobenzene	1.5	
				Dibromochloropropane	2.4	
				Dicyclopentadiene	0.64	
				Dimethyl disulfide	20	
				Ethyl benzene	0.38	
				Toluene	0.25	
				Methylisobutyl ketone	0.73	
				Tetrachloroethene	0.25	
				Trichloroethene	0.54	
				o,p-Xylene	4.9	
UB	Sediment	P9	Metals/Soil/ICP	Cadmium	0.74	µg/g
				Chromium	6.5	
				Copper	4.7	
				Lead	8.4	
				Zinc	8.7	
UB	Sediment	PP9	Volatiles/Soil/GCFID	Bicyclo (2,2,1) hepta-2,5-diene	1.10	µg/g
				Dicyclopentadiene	0.450	
				Methylisobutyl ketone	0.640	
UB	Sediment	S9	Pesticides/Soil/GCEC	Dibromochloropropane	0.00500	µg/g
UB	Soil	AA9	Aromatics/Soil/GCPID	m-Xylene	0.260	µg/g
				Benzene	0.0850	
				Ethyl benzene	0.160	
				Toluene	0.190	
				o,p-Xylene	0.390	
UB	Soil	B9	Metals/Soil/GFAA	Arsenic	2.50	µg/g
UB	Soil	HH9	Organosulfurs/Soil/GCFP	Benzothiazole	2.04	µg/g
				4-Chlorophenylmethyl Sulfide	4.40	
				4-Chlorophenylmethyl Sulfoxide	4.81	
				4-Chlorophenylmethyl Sulfone	9.01	
				Dithiane	1.45	

Lab	Media	Method(1)	Method Name	Analyte	Certified Reporting Limit	Unit of Measure
UB	Soil (continued)	HH9	Organosulfurs/Soil/GCFP	Dimethyl disulfide	3.12	μg/g
				1,4-Oxathiane	1.74	
UB	Soil	JS12	Inorganic/Soil/ICP			
				Arsenic	16.4	μg/g
				Calcium	25.3	
				Cadmium	1.20	
				Chromium	1.04	
				Copper	2.84	
				Iron	6.66	
				Potassium	131	
				Magnesium	10.1	
				Manganese	9.87	
				Sodium	38.7	
				Lead	7.44	
				Zinc	2.34	
UB	Soil	KK9A	Pesticides/Soil/GCEC			
				Aldrin	0.00190	μg/g
				Hexachlorocyclopentadiene	0.00180	
				Chlordane	0.0230	
				Dieldrin	0.00330	
				Endrin	0.00580	
				Isodrin	0.00110	
				2,2-Bis(parachlorophenyl)1,1-Dichlorethene (DDE)	0.00240	
				2,2-Bis(parachlorophenyl)1,1-Trichlorethane (DDT)	0.00200	
UB	Soil	NN9	Halocarbons/Soil/GCCON			
				1,1,1-Trichloroethane	0.0880	μg/g
				1,1,2-Trichloroethane	0.260	
				1,1-Dichloroethene	0.240	
				1,1-Dichloroethane	0.0740	
				1,2-Dichloroethenes (cis & trans)	0.260	
				1,2-Dichloroethane	0.0850	
				Carbon tetrachloride	0.120	
				Methylene chloride	3.70	
				Chloroform	0.0680	
				Chlorobenzene	0.200	
				Tetrachloroethene	0.270	
				Trichloroethene	0.140	
UB	Soil	Y9	Metals/Soil/CVAA			
				Mercury	0.0500	μg/g

Lab	Media	Method[1]	Method Name	Analyte	Certified Reporting Limit	Unit of Measure
UB	Surface Water	AAA8	Organosulfurs/Water/GCFP	Benzothiazole	5.00	µg/l
				4-Chlorophenylmethyl sulfide	5.69	
				4-Chlorophenylmethyl sulfoxide	11.5	
				4-Chlorophenylmethyl sulfone	7.46	
				Dithiane	1.34	µg/l
				Dimethyl disulfide	0.550	
				1,4-Oxathiane	2.38	
				Diisopropyl methylphosphonate	0.392	
				Dimethylmethyl phosphonate	0.188	
UB	Surface Water	AT8	Organophosphor/Water/GCFP	Diisopropyl methylphosphonate	0.392	µg/l
				Dimethylmethyl phosphonate	0.188	
UB	Surface Water	CC8	Metals/Water/CVAA	Mercury	0.100	µg/l
UB	Surface Water	GG8	Metals/Water/ICP	Calcium	500	µg/l
				Cadmium	8.40	
				Chromium	24.0	
				Copper	26.0	
				Potassium	250	
				Magnesium	500	
				Sodium	940	
				Lead	74.0	
				Zinc	22.0	
UB	Surface Water	HH8A	Anions/Water/Ionchrom	Chloride	720	µg/l
				Fluoride	482	
				Sulfate	251	
UB	Surface Water	JJ8	Organics/Water/GCMS	Dieldrin	4.7	µg/l
				Dimethylmethyl phosphonate	33	
				Endrin	8.0	
				Isodrin	3.7	
				Malathion	14	
				1,4-Oxathiane	7.9	
				2,2-Bis(parachlorophenyl)1,1-Dichlorethene (DDE)	6.1	
				2,2-Bis(parachlorophenyl)1,1-Trichlorethane (DDT)	9.2	

Lab	Media	Method(1)	Method Name	Analyte	Certified Reporting Limit	Unit of Measure
UB (continued)	Surface Water	JJ8	Organics/Water/GCMS	Parathion	19	µg/l
				Supona	9.3	
				Aldrin	7.5	
				Atrazine	5.6	
				Hexachlorocyclopentadiene	21	
				Chlordane	9.4	
				4-Chlorophenylmethyl sulfide	17	
				4-Chlorophenylmethyl sulfoxide	29	
				4-Chlorophenylmethyl sulfone	7.2	
				Dibromochloropropane	19	
				Dicyclopentadiene	7.3	
				Vapona	17	
				Diisopropyl methylphosphonate	14	
				Dithiane	21	
UB	Surface Water	KK8	Pesticides/Water/GCEC	2,2-Bis(parachlorophenyl)1,1-Dichlorethene (DDE)	0.0540	µg/l
				2,2-Bis(parachlorophenyl)1,1-Trichlorethane (DDT)	0.0490	
				Aldrin	0.0500	
				Hexachlorocyclopentadiene	0.0480	
				Chlordane	0.0950	
				Dieldrin	0.0500	
				Endrin	0.0500	
				Isodrin	0.0510	
UB	Surface Water	P8	Volatiles/Water/GCFID	Bicyclo (2,2,1) hepta-2,5-diene	5.90	µg/l
				Dicyclopentadiene	5.00	
				Methylisobutyl ketone	4.90	
UB	Surface Water	SS12	Metals/Water/ICP	Arsenic	117	µg/l
				Calcium	105	
				Cadmium	6.78	
				Chromium	16.8	
				Copper	18.8	
				Iron	77.5	
				Potassium	1240	
				Magnesium	135	
				Manganese	9.67	
				Sodium	279	
				Lead	43.4	
				Zinc	18.0	

Lab	Media	Method(1)	Method Name	Analyte	Certified Reporting Limit	Unit of Measure
UB	Surface Water	TT09	Anions/Water/Ionchrom	Chloride	278	µg/l
				Fluoride	153	
				Sulfate	175	
UB	Surface Water	UH11	NP-Pesticides/Water/GCEC	Atrazine	4.03	µg/l
				Vapona	0.384	
				Malathion	0.373	
				Parathion	0.647	
				Supona	0.787	
UB	Surface Water	UM25	Organics/Water/GCMS	2,3,6-Trichlorophenol	1.7	µg/l
				2,4,5-Trichlorophenol	2.8	
				2,4,6-Trichlorophenol	3.6	
				2,4-Dichlorophenol	8.4	
				2,4-Dimethylphenol	4.4	
				2,4-Dinitrophenol	176(2)	
				2-Chlorophenol	2.8	
				2-Methylphenol	3.6	
				2-Nitrophenol	8.2	
				3-Methyl-4-Chlorophenol	8.5	
				4-Methylphenol	2.8	
				4-Nitrophenol	96	
				Aldrin	13	
				Atrazine	5.9	
				Bis-(2-Ethylhexyl) Phthalate	7.7	
				Hexachlorocyclopentadiene	54	
				Chlordane	37	
				4-Chlorophenylmethyl sulfide	10	
				4-Chlorophenylmethyl sulfoxide	15	
				4-Chlorophenylmethyl sulfone	5.3	
				Dibromochloropropane	12	
				Dicyclopentadiene	5.5	
				Vapona	8.5	
				Diisopropyl methylphosphonate	21	
				Dithiane	3.3	
				Dieldrin	26	
				Dimethylmethyl phosphonate	130	
				Endrin	18	
				Isodrin	7.8	
				Malathion	21	
				N-Nitroso dimethylamine	9.7	

Lab	Media	Method[(1)]	Method Name	Analyte	Certified Reporting Limit	Unit of Measure
UB	Surface Water (continued)	UM25	Organics/Water/GCMS	1,4-Oxathiane	27	µg/l
				Pentachlorophenol	9.1	
				Phenol	2.2	
				2,2-Bis(parachlorophenyl)1,1-Dichlorethene (DDE)	14	
				2,2-Bis(parachlorophenyl)1,1-Trichlorethane (DDT)	18	
				Parathion	37	
				Supona	19	

(1) All methods used during Remedial Investigation (RI) Addendum Analytical Program are Program Manager for Rocky Mountain Arsenal (PMRMA)-certified methods and were performed by PMRMA-certified laboratories.

(2) The certified reporting limit of 176 µg/l was obtained directly from the installation restoration data management system methods file. Method UM25 is only certified to report two figures.

µg/l = micrograms per liter
µg/g = micrograms per gram
AL = Arthur D. Little Laboratory
CL = California Analytical Laboratories, Inc.
CVAA = cold vapor atomic absorption
ED = Environmental Science & Engineering, Inc., Denver, CO
ES = Environmental Science & Engineering, Inc., Gainesville, FL
GCCON = gas chromatography/conductivity detector
GCEC = gas chromatography/electron capture
GCFID = gas chromatography/flame ionization detector
GCFP = gas chromatography/flame photometric detector
GCHALL = gas chromatography/Hall detector
GCMS = gas chromatography/mass spectroscopy
GCPID = gas chromatography/photoionization detector
GFAA = graphite furnace atomic absorption
ICAP = inductively coupled argon plasma
ICP = inductively coupled plasma
UB = DataChem Laboratories, Salt Lake City, UT
UVVIS = ultra violet visible spectrophotometry

Table 2.6: Biota Samples Collected in the Offpost Operable Unit During Remedial Investigation Addendum Program

Species	Number/Type of Sample	Collection Method
Aquatic Invertebrates	2 composite samples	Net and/or by hand
Aquatic Plants	1 composite sample	Hand collection
Bluegill	2 composite samples	Seine, gill net, hand net
Fathead minnow	1 composite sample	Seine, gill net, hand net
Carp	2 samples	Seine, gill net
Channel catfish	1 sample	Seine, gill net
Ring-necked Pheasant	2 males, 1 female	Steel shot - shotgun
Earthworms	10 composite samples	Spade soil, then sort
Grasshoppers	2 composite samples	Sweep net
Deer mice	7 composite samples (2 mice/sample)	Live Sherman Traps
House mice	2 composite samples (2 mice/sample)	Live Sherman Traps
Prairie dog	5 males	Live Have-a-Hart, .22 caliber rifle
Cow milk	2 samples	Provided by Ohle Farm
Cow fat	3 samples	Provided by Ohle Farm
Cow brain	1 sample	Provided by Ohle Farm
Cow muscle	1 sample	Provided by Ohle Farm
Cow liver	1 sample	Provided by Ohle Farm
Cow kidney	1 sample	Provided by Ohle Farm
Chicken egg	1 sample	Provided by Ohle Farm
Chicken fat/skin	1 sample	Provided by Ohle Farm
Chicken muscle	1 sample	Provided by Ohle Farm
Chicken liver	1 sample	Provided by Ohle Farm

Table 2.7: Summary of Certified Biota Analysis Methods

Method Code	Analysis Name	Analysis Type	Lower CRL (μg/g-wet)	Upper CRL (μg/g-wet)
B-6-A	Arsenic in Animal Tissue	GFAA	0.25	5.0
B-6-P	Arsenic in Plant Tissue	GFAA	0.25	5.0
C-6-A	Mercury in Animal Tissue	CVAA	0.05	0.4
C-6-P	Mercury in Plant Tissue	CVAA	0.5	0.4
M-6	Organochlorine Pesticides in Animal Tissue	GC	___(1)	___
QH-01	Organochlorine Pesticides in Plant Tissue	GC	___(2)	___

(1) Certified Reporting Limits (in μg/g-wet) for target analytes are: Aldrin - LCRL = 0.013, UCRL = 0.300; Dieldrin - LCRL = 0.018, UCRL = 0.300 Endrin - LCRL = 0.036, UCRL = 0.600; P,P'-DDE - LCRL = 0.063, UCRL = 1.88; P,P'-DDT - LCRL = 0.132, UCRL = 3.75.

(2) Certified Reporting Limits (in μg/g-wet) for target analytes are: Aldrin - LCRL = 0.021, UCRL = 0.300; Dieldrin - LCRL = 0.026, UCRL = 0.300 Endrin - LCRL = 0.045, UCRL = 0.400; P,P'-DDE - LCRL = 0.042, UCRL = 1.50; P,P'-DDT - LCRL = 0.155, UCRL = 1.87.

CRL = certified reporting limit
CVAA = cold vapor atomic adsorption spectrometry
GC = gas chromatography
GFAA = graphite furnace atomic adsorption spectrometry

Table 3.1: Unconfined Flow System Groundwater Elevations Used to Construct Potentiometric Surface Map

Well Number	Measurement Date	Depth to Water from Top of Casing (feet)	Groundwater Elevation (feet)
37307	02/13/90	14.05	5135.97
37308	02/14/90	3.55	5125.52
37309	02/13/90	4.50	5120.23
37312	02/14/90	5.89	5134.93
37313	02/13/90	4.85	5105.61
37320	02/12/90	21.05	5100.98
37323	02/13/90	10.15	5117.39
37327	02/12/90	34.95	5115.81
37330	02/14/90	34.41	5092.34
37331	02/14/90	34.21	5092.58
37332	02/14/90	45.15	5091.43
37333	02/14/90	37.08	5092.16
37334	02/12/90	41.15	5091.89
37335	02/12/90	33.40	5089.31
37336	02/12/90	22.28	5073.50
37337	02/12/90	25.53	5069.03
37338	02/12/90	12.83	5123.37
37339	02/13/90	14.80	5121.80
37341	02/12/90	28.60	5073.40
37342	02/13/90	19.84	5098.86
37343	02/13/90	6.55	5105.65
37344	02/12/90	23.58	5090.62
37345	02/12/90	29.63	5073.97
37346	02/12/90	19.45	5078.25
37347	02/12/90	31.05	5063.65
37348	02/12/90	25.35	5058.55
37349	02/12/90	35.41	5047.99
37350	02/12/90	36.85	5042.45
37351	02/12/90	22.60	5055.50
37352	02/12/90	30.78	5044.22
37353	02/12/90	34.85	5036.65
37354	02/12/90	24.53	5033.07
37355	02/12/90	15.08	5039.82
37356	02/12/90	9.68	5017.12
37357	02/12/90	7.13	5016.27
37358	02/12/90	47.93	5094.07
37359	02/12/90	32.51	5083.89
37360	02/12/90	34.65	5081.65
37361	02/12/90	28.89	5063.31
37362	02/12/90	44.18	5125.42
37363	02/12/90	9.48	5036.12
37364	02/12/90	9.05	5001.35
37367	02/12/90	20.94	5099.16
37368	02/12/90	26.29	5084.11
37369	02/13/90	3.65	5121.05

Table 3.1: (Page 2 of 3)

Well Number	Measurement Date	Depth to Water from Top of Casing (feet)	Groundwater Elevation (feet)
37370	02/13/90	10.46	5109.44
37373	02/13/90	5.40	5109.20
37374	02/13/90	12.46	5108.14
37377	02/13/90	27.80	5111.40
37378	02/13/90	28.99	5111.11
37381	02/13/90	5.31	5106.69
37382	02/14/90	34.65	5088.75
37383	02/12/90	22.48	5099.92
37385	02/12/90	31.81	5084.89
37386	02/14/90	43.11	5091.09
37389	02/13/90	6.31	5123.09
37391	02/13/90	27.45	5111.05
37392	02/13/90	25.41	5111.59
37395	02/12/90	28.06	5089.84
37396	02/13/90	5.15	5105.35
37397	02/12/90	26.48	5090.92
37398(1)	02/13/90	5.47	5109.06
37399(1)	02/13/90	5.74	5109.26
37402	02/13/90	25.12	5084.51
37403	02/12/90	22.25	5102.25
37404	02/12/90	18.28	5089.20
37405	02/13/90	41.66	5072.96
37406	02/12/90	26.05	5084.09
37407	02/13/90	9.37	5105.66
37408	02/13/90	23.20	5093.15
37409	02/13/90	21.67	5092.24
37410	02/13/90	19.85	5095.78
37411(1)	02/13/90	21.25	5092.59
37412(1)	02/13/90	21.43	5092.50
37413(1)	02/13/90	20.20	5095.32
37414(1)	02/13/90	19.98	5095.71
37415(1)	02/13/90	22.34	5093.49
37416(1)	02/13/90	21.89	5093.67
37417(1)	02/13/90	21.60	5092.39
37418	02/13/90	4.77	5106.58
37419	02/13/90	7.77	5107.69
37420	02/13/90	4.60	5107.62
37428	02/13/90	15.76	5088.37
37429	02/12/90	34.51	5075.55
37430	02/14/90	19.79	5050.42
37433	02/13/90	35.65	5065.90
37434	02/13/90	36.63	5053.22
37435	02/13/90	31.25	5059.85
37436	02/13/90	26.70	5089.34
37437	02/14/90	30.72	5088.84
37438	02/13/90	29.62	5086.68
37439	02/12/90	29.26	5079.72

Table 3.1: (Page 3 of 3)

Well Number	Measurement Date	Depth to Water from Top of Casing (feet)	Groundwater Elevation (feet)
37440	02/12/90	21.52	5071.43
37442	02/12/90	18.03	5056.82
37443	02/14/90	16.48	5066.58
37444	02/14/90	18.15	5068.26

(1) Piezometer; not used for groundwater quality

Table 3.2: Groundwater Field Quality Assurance/Quality Control Samples

QA/QC Sample Type	Required Frequency	Preparation
Volatile Trip Blank	One set of four septum vials per sampling day	Transport filled blank volatile septum vials to field, return to laboratory with samples.
Rinse Blank	One suite per day, or 5 percent of investigative samples, whichever is more	Decontaminate equipment used to collect samples. Pour deionized water into cleaned sampling equipment, then transfer to sample bottles. Perform while onsite. Not applicable if dedicated pump is used.
Field Blank	One suite per day, or 5 percent of investigative samples, whichever is more	Pour deionized water directly into sample bottles. Perform while onsite.
Duplicates	10 percent of investigative samples, or one per day, whichever is more	Collect additional sample bottles while onsite.
GC/MS Confirmation	10 percent of investigative samples	Collect additional sample bottles while onsite.

GC/MS = gas chromatography/mass spectrometry
QA/QC = quality assurance/quality control

Table 3.3: Groundwater Duplicate Sample Agreement
(Concentrations in $\mu g/l$)
(Page 1 of 5)

Analyte	Investigative Results	Duplicate Results	DSA (percent)
Investigative Sample ID: 37418			
Duplicate Sample ID: HA1045 Sample Date:	12/18/89		
1,2-Dichloroethane	21.5000	23.7000	9.73
Aldrin	0.1810	0.3000	49.48
Arsenic	3.6400	3.8000	4.30
Atrazine	4.8000	< 4.0300	17.44
Calcium	550000.0000	590000.0000	7.02
Chloride	1700000.0000	1600000.0000	6.06
Chlordane	0.9350	1.4000	39.83
4-Chlorophenylmethyl sulfone	8.0900	< 7.4600	8.10
Dicyclopentadiene	460.0000	530.0000	14.14
Diisopropyl methylphosphonate	5600.0000	4300.0000	26.26
Dithiane	27.3000	25.6000	6.43
Endrin	0.1000	< 0.0500	66.67
Fluoride	3310.0000	3290.0000	0.61
Iron	227.0000	276.0000	19.48
Isodrin	< 0.0510	0.1200	80.70
Potassium	9540.0000	10200.0000	6.69
Toluene	< 1.4700	3.8000	88.43
Magnesium	196000.0000	199000.0000	1.52
Manganese	187.0000	197.0000	5.21
Sodium	840000.0000	870000.0000	3.51
Nitrite, nitrate (nonspecific)	930.0000	1200.0000	25.35
1,4-Oxathiane	7.1200	8.9400	22.67
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	0.3410	0.4000	15.92
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.1480	0.1390	6.27
Sulfate	1500000.0000	1500000.0000	0.00
Tetrachloroethene	10.2000	11.2000	9.35
Total organic carbon	12000.0000	10000.0000	18.18
Trichloroethene	6.5200	7.0800	8.24
Zinc	90.9000	124.0000	30.81
Investigative Sample ID: 37404			
Duplicate Sample ID: HA1165 Sample Date:	02/22/90		
Calcium	160000.0000	170000.0000	6.06
Chloride	230000.0000	220000.0000	4.44
Iron	48.6000	37.5000	25.78

Table 3.3 (Page 2 of 5)
(Concentrations in $\mu g/l$)

Analyte	Investigative Results	Duplicate Results	DSA (percent)
Investigative Sample ID: 37404			
Duplicate Sample ID: HA1165 Sample Date:	02/22/90		
(continued)			
Magnesium	43000.0000	46000.0000	6.74
Sodium	210000.0000	220000.0000	4.65
Nitrite, nitrate (nonspecific)	4300.0000	4200.0000	2.35
Sulfate	540000.0000	530000.0000	1.87
Total organic carbon	5.0000	6.0000	18.18
Total suspended solids	23.0000	27.0000	16.00
Zinc	< 20.0000	24.4000	19.82
Investigative Sample ID: 37407			
Duplicate Sample ID: HA1166 Sample Date:	02/21/90		
Calcium	250000.0000	240000.0000	4.08
Chloride	370000.0000	360000.0000	2.74
Fluoride	1160.0000	1250.0000	7.47
Iron	604.0000	794.0000	27.18
Magnesium	58000.0000	58000.0000	0.00
Manganese	1250.0000	1360.0000	8.43
Sodium	360000.0000	340000.0000	5.71
Nitrite, nitrate (nonspecific)	1300000.0000	4300.0000	198.68
Sulfate	700000.0000	680000.0000	2.90
Total organic carbon	7.0000	7.0000	0.00
Zinc	< 20.0000	23.3000	15.24
Investigative Sample ID: 37435			
Duplicate Sample ID: HA1172 Sample Date:	02/27/90		
Calcium	123000.0000	118000.0000	4.15
Chloride	98000.0000	100000.0000	2.02
Diisopropyl methylphosphonate	10.8000	10.0000	7.69
Dimethylmethyl phosphonate	1.0100	< 0.1880	137.23
Fluoride	1890.0000	1740.0000	8.26
Potassium	4580.0000	4570.0000	0.22
Magnesium	37000.0000	36100.0000	2.46
Manganese	< 9.6700	12.6000	26.31
Sodium	130000.0000	130000.0000	0.00
Nitrite, nitrate (nonspecific)	1700.0000	1800.0000	5.71
Sulfate	290000.0000	300000.0000	3.39
Total organic carbon	3000.0000	3000.0000	0.00

Table 3.3 (Page 3 of 5)
(Concentrations in $\mu g/l$)

Analyte	Investigative Results	Duplicate Results	DSA (percent)
Investigative Sample ID: 37438			
Duplicate Sample ID: HA1173 Sample Date:	02/28/90		
Aldrin	0.0711	< 0.0500	34.85
Calcium	66800.0000	65600.0000	1.81
Chloride	280000.0000	280000.0000	0.00
Copper	< 18.8000	20.7000	9.62
Diisopropyl Methylphosphonate	3.4700	3.7600	8.02
Dieldrin	0.1270	0.1100	14.35
Fluoride	4070.0000	4080.0000	0.25
Potassium	2600.0000	2190.0000	17.12
Magnesium	21200.0000	21000.0000	0.95
Sodium	260000.0000	260000.0000	0.00
Nitrite, nitrate (nonspecific)	4900.0000	5000.0000	2.02
Sulfate	170000.0000	170000.0000	0.00
Total Organic Carbon	2000.0000	2000.0000	0.00
Investigative Sample ID: 37439			
Duplicate Sample ID: HA1174 Sample Date:	03/01/90		
Calcium	104000.0000	99300.0000	4.62
Chloride	200000.0000	200000.0000	0.00
Diisopropyl Methylphosphonate	2.5400	2.5600	0.78
Fluoride	2340.0000	2350.0000	0.43
Potassium	3810.0000	3880.0000	1.82
Magnesium	28200.0000	27100.0000	3.98
Manganese	28.8000	21.0000	31.33
Sodium	150000.0000	160000.0000	6.45
Nitrite, nitrate (nonspecific)	1800.0000	1800.0000	0.00
Sulfate	180000.0000	170000.0000	5.71
Total organic carbon	2000.0000	2000.0000	0.00
Investigative Sample ID: 37444			
Duplicate Sample ID: HA1198 Sample Date:	06/13/90		
Arsenic	2.6500	< 2.3500	12.00
Calcium	109000.0000	99700.0000	8.91
Chloroform	2.6500	3.2300	19.73
Chloride	140000.0000	140000.0000	0.00
Diisopropyl methylphosphonate	0.8140	5.5400	148.76
Fluoride	1330.0000	1320.0000	0.75
Mercury	1.0100	1.4900	38.40
Potassium	2610.0000	2800.0000	7.02
Magnesium	23900.0000	21900.0000	8.73
Sodium	100000.0000	100000.0000	0.00
Nitrite, nitrate (nonspecific)	4200.0000	4200.0000	0.00
Sulfate	130000.0000	130000.0000	0.00

Table 3.3 (Page 4 of 5)
(Concentrations in $\mu g/l$)

Analyte	Investigative Results	Duplicate Results	DSA (percent)
Investigative Sample ID: 37444			
Duplicate Sample ID: HA1198 Sample Date: 06/13/90			
(continued)			
Total Organic Carbon	1000.0000	1000.0000	0.00
Investigative Sample ID: 37418			
Duplicate Sample ID: HA1079 Sample Date: 06/22/90			
1,2-Dichloroethane	21.2000	22.1000	4.16
Atrazine	46.0000	< 4.0300	167.78
Benzene	2.3900	3.9000	48.01
Calcium	560000.0000	174000.0000	105.18
Chloroform	30.0000	45.1000	40.21
Chloride	1800000.0000	1800000.0000	0.00
Chlorobenzene	13.0000	29.7000	78.22
Chromium	< 16.8000	71.5000	123.90
Copper	< 18.8000	108.0000	140.69
Dibromochloropropane	0.3260	0.3910	18.13
Dicyclopentadiene	370.0000	380.0000	2.67
Diisopropyl methylphosphonate	5800.0000	3900.0000	39.18
Dithiane	28.0000	30.0000	6.90
Fluoride	6300.0000	6300.0000	0.00
Iron	1430.0000	46400.0000	188.04
Isodrin	0.1130	0.1030	9.26
Potassium	8690.0000	12200.0000	33.60
Magnesium	194000.0000	80800.0000	82.39
Malathion	1.7600	1.6300	7.67
Manganese	243.0000	2650.0000	166.40
Sodium	1100000.0000	150000.0000	152.00
Nitrite, nitrate (nonspecific)	540.0000	410.0000	27.37
1,4-Oxathiane	6.4800	6.8600	5.70
Parathion	1.2200	1.0700	13.10
Sulfate	1800000.0000	1700000.0000	5.71
Tetrachloroethene	9.7300	8.9800	8.02
Total organic carbon	14000.0000	15000.0000	6.90
Trichloroethene	6.7500	6.1800	8.82
Zinc	36.3000	117.0000	105.28
Investigative Sample ID: 11830TW112			
Duplicate Sample ID: HA1031 Sample Date: 01/31/89			
Calcium	100000.000	110000.000	9.52
Chloride	87000.000	86000.000	1.16
Cyanide	12.000	10.200	16.22
Diisopropyl methylphosphonate	5.110	5.610	9.33
Dimethylmethyl phosphonate	0.241	0.253	4.86

Table 3.3 (Page 5 of 5)
(Concentrations in $\mu g/l$)

Analyte	Investigative Results	Duplicate Results	DSA (percent)
Investigative Sample ID: 11830TW112			
Duplicate Sample ID: HA1031 Sample Date: 01/31/89			
(continued)			
Fluoride	1840.000	1520.000	19.05
Potassium	4200.000	4530.000	7.56
Magnesium	32500.000	31100.000	4.40
Sodium	78500.000	80600.000	2.64
Nitrite, nitrate (nonspecific)	3400.000	3500.000	2.90
Sulfate	200000.000	200000.000	0.00
Investigative Sample ID: 13350TW104			
Duplicate Sample ID: HA1030 Sample Date: 01/17/89			
Calcium	83500.000	84200.000	0.83
Chloride	60000.000	69000.000	13.95
Diisopropyl methylphosphonate	22.000	18.900	15.16
Fluoride	1540.000	1580.000	2.56
Potassium	1070.000	1030.000	3.81
Magnesium	8790.000	9110.000	3.58
Sodium	190000.000	200000.000	5.13
Nitrite, nitrate (nonspecific)	290.000	290.000	0.00
Sulfate	280000.000	320000.000	13.33
Zinc	23.100	24.600	6.29

Results are reported in micrograms per liter.
DSA is reported in percent.
Reported values are accurate to three significant figures.

DSA = duplicate sample agreement

Table 3.4: Tentatively Identified Compounds in Groundwater

Site ID	Tentatively Identified Compound	Concentration	Units
10590TWHY2	ACETIC ACID,BUTYL ESTER	4.50	µg/l
37410	CYCLOPROPANE,ETHENYLMETHYLENE	4.80	µg/l
37418	4,4-DIOXIDE-1,4-OXATHIANE	5.10	µg/l
37420	4,4-DIOXIDE-1,4-OXATHIANE	7.60	µg/l
37420	ETHENYLPENTADIENE ISOMER	18.00	µg/l
37430	BICYCLOHEPTADIENE ISOMER	5.80	µg/l
37435	OCTADECANE	6.90	µg/l
37435	NONADECANE	7.80	µg/l
37435	EICOSANE	4.60	µg/l
37435	BICYCLOHEPTADIENE ISOMER	5.60	µg/l
37442	BUTENE ISOMER	12.00	µg/l
37442	METHYL T-BUTYL ETHER	1200.00	µg/l
37443	1,2,3,4-tetrachloro-5-(dichloro-methylene)-1,3-cyclopentadiene	11.00	µg/l
HA1019	BENZOPHENONE	13.00	µg/l
HA1045	BICYCLO[3.2.0]HEPTA-2,6-DIENE	5.00	µg/l
HA1045	ANHYDRIDE HEXANOIC ACID	4.20	µg/l
HA1045	4,4-DIOXIDE-1,4-OXATHIANE	5.10	µg/l
HA1045	BICYCLO[2.2.1]HEPT-2-ENE, 5-ETHYLIDIENE & MIXED SPECTRA	13.00	µg/l
HA1048	4,4-DIOXIDE-1,4-OXATHIANE	5.20	µg/l
HA1048	BICYCLO[2.2.1]HEPT-2-ENE, 5-ETHYLIDIENE & MIXED SPECTRA	15.00	µg/l
HA1048	4,4-DIOXIDE-1,4-OXATHIANE	5.70	µg/l
HA1048	BICYCLO[2.2.1]HEPT-2-ENE, 5-ETHYLIDIENE & MIXED SPECTRA	15.00	µg/l
HA1048	1,3-CYCLOPENTADIENE	5.90	µg/l
HA1048	BICYCLO[3.2.0]HEPTA-2,6-DIENE	7.80	µg/l
HA1048	1,3-CYCLOPENTADIENE	5.20	µg/l
HA1048	BICYCLO[3.2.0]HEPTA-2,6-DIENE	6.80	µg/l
HA1070	HEXANOIC ACID, ANHYDRIDE	10.00	µg/l
HA1070	5-METHYL-1,3-CYCLOPENTADIENE ISOMER	4.00	µg/l
HA1072	4,4-DIOXIDE-1,4-OXATHIANE	9.90	µg/l
HA1072	5-ETHYL-BICYCLO[2.2.1]HEPT-2-ENE	7.00	µg/l
HA1072	5-METHYL-1,3-CYCLOPENTADIENE ISOMER	4.10	µg/l
HA1078	5-ETHYL-BICYCLO[2.2.1]HEPT-2-ENE	7.10	µg/l
HA1163	2-CYCLOPENTEN-1-ONE, 2-(4-METHYL-2-FURYL)-ISOMER	9.60	µg/l
HA1163	5-METHYL-ISOMER-1,3-CYCLOPENTADIENE	5.60	µg/l
HA1169	BICYCLOHEPTADIENE ISOMER	5.40	µg/l
HA1171	BICYCLOHEPTADIENE ISOMER	7.10	µg/l
HA1172	BICYCLOHEPTADIENE ISOMER	5.20	µg/l
HA1173	BICYCLOHEPTADIENE ISOMER	9.30	µg/l
HA1175	BICYCLOHEPTADIENE ISOMER	5.10	µg/l
HA37418	ANHYDRIDE HEXANOIC ACID	5.10	µg/l
HA37418	4,4-DIOXIDE-1,4-OXATHIANE	4.40	µg/l
HA37418	BICYCLO[2.2.1]HEPT-2-ENE, 5-ETHYLIDIENE & MIXED SPECTRA	11.00	µg/l
HA37419	BICYCLO[2.2.1]HEPT-2-ENE, 5-ETHYLIDIENE & MIXED SPECTRA	12.00	µg/l
HA37420	HEXANOIC ACID, ANHYDRIDE	11.00	µg/l
HA37420	4,4-DIOXIDE-1,4-OXATHIANE	5.40	µg/l
HA37420	BICYCLO[2.2.1]HEPT-2-ENE, 5-ETHYLIDIENE & MIXED SPECTRA	14.00	µg/l

Table 4.1: Surface Water Duplicate Sample Agreement
(Concentrations in $\mu g/l$)

Analyte	Investigative Results	Duplicate Results	DSA (Percent)
Investigative Sample ID: HA1185SW			
Duplicate Sample ID: HA1189SW Sample Date: 05/10/90			
Calcium	67200.0000	63000.0000	6.45
Chloride	54000.0000	49000.0000	9.71
Fluoride	1020.0000	1030.0000	0.98
Mercury	0.3150	0.5380	52.29
Potassium	5310.0000	4670.0000	12.83
Magnesium	15100.0000	14000.0000	7.56
Sodium	73000.0000	62000.0000	16.30
Nitrite, nitrate (nonspecific)	1800.0000	1800.0000	0.00
Sulfate	120000.0000	130000.0000	8.00
Total organic carbon	7700.0000	9800.0000	24.00

DSA is reported in percent.
Reported values are accurate to three significant figures.

DSA = duplicate sample agreement

Table 5.1: Metal Concentrations Commonly Found in Uncontaminated Fresh-Water Sediments
(Concentrations in $\mu g/g$ dry weight basis)

Metal	Average	Range
Cadmium	0.17	0.1-0.3
Chromium	72	10-90
Copper	33	5-40
Lead	19	2-50
Zinc	95	20-165
Arsenic	7.7	1-15
Mercury	0.19	0.1-0.5

Source: Environmental Science and Engineering, 1988a

Table 5.2: Stream-Bottom Sediment Duplicate Sample Agreement
(Concentrations in $\mu g/g$)

Analyte	Investigative Results	Duplicate Results	DSA (percent)
Investigative Sample ID: HA1182SE			
Duplicate Sample ID: HA1192SE Sample Date: 05/16/90			
Hexachlorocyclopentadiene	< 0.0014	0.0528	189.67
Chromium	26.1	30.1	14.23
Copper	13.3	16.9	23.84
Dieldrin	< 0.0018	0.0050	94.12
Mercury	0.188	0.120	44.16
Lead	32.5	40.9	22.89
Total organic carbon	4940	6810	31.83
Trichloroethene	< 0.250	0.383	42.02
Zinc	126	115	9.13
Investigative Sample ID: HA1187SE			
Duplicate Sample ID: HA1193SE Sample Date: 05/10/90			
Cadmium	< 1.20	1.97	48.58
Chlordane	0.0645	< 0.0230	94.86
Chromium	62.5	71.2	13.01
Copper	54.1	63.5	15.99
Dibromochloropropane	< 0.0050	0.0190	116.67
Dieldrin	0.0102	0.0050	68.42
Endrin	< 0.0047	0.0080	51.97
Mercury	0.1960	0.2400	20.18
Lead	90.6	100	9.86
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	0.0067	< 0.0047	35.09
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.0118	0.0052	77.65
Total organic carbon	16600	18300	9.74
Zinc	242	280	14.56

DSA is reported in percent.
Reported values are accurate to three significant figures.

DSA = duplicate sample agreement

Table 6.1: Arithmetic Mean and Upper 95th Percentile Concentrations for Selected Organic Compounds in Offpost Operable Unit Background Surficial Soil
(Concentrations in μg/kg)

Analyte	Mean Concentration	95th Percentile of Concentration
Aldrin	1	4
Dieldrin	3	8
Endrin	3	4
Isodrin	1	2
DDE	3	4
DDT	2	8

Table 6.2: Residue Levels for Selected Insecticides in Soil
(Page 1 of 4)

Land Use (a)	Aldrin Arith. Mean	Aldrin Est. Geo. Mean	Aldrin Range	Aldrin % Pos.(b)	Dieldrin Arith. Mean	Dieldrin Est. Geo. Mean	Dieldrin Range	Dieldrin % Pos.	References/comments
Cropland	0.03	0.002	0.01-13.28	8.7	0.04	0.008	0.01-6.18	27.2	Carey and others, 1979
Cropland	0.02	0.002	0.01-1.88	9.7	0.05	0.009	0.01-9.83	27.5	Carey and others, 1978
Cropland (Rice)	0.01	NA (c)	0.01-0.25	39.4	0.04	NA	0.01-0.27	84.8	Carey and others, 1980
Cropland	0.03	0.014	<0.01-0.15	19.4	0.10	0.023	<0.01-1.02	55.0	Gish, 1970
Cropland	0.07	NA	0.07-0.14	70.0	0.08	NA	0.13-0.21	50.0	Trautmann and others, 1968
Cropland (Saskatchewan)	0.03	NA	<0.01-0.28	24.4	0.06	NA	<0.01-0.77	61.0	Saha and others, 1971
Cropland (Colorado)	0.41	NA	NA	16.0	0.07	NA	NA	28.0	Mullins and others, 1971
Pasture (Grassland)	NA	NA	NA	NA	0.03	NA	ND(d)-2.2	NA	Fahey and others, 1965
Non Use (No pesticide use)	NA	NA	NA	NA	0.01	NA	ND-0.31	17.4	Lang and others, 1975 - 6 U.S. Air Bases
Non Use (No pesticide use)	NA	NA	NA	NA	0.01	NA	ND-0.1	24.0	Lang and others, 1976 - 6 U.S. Air Bases
Golf Course	NA	NA	NA	NA	0.01	NA	ND-0.05	23.5	Lang and others, 1975 - 6 U.S. Air Bases
Golf Course	NA	NA	NA	NA	0.01	NA	ND-0.03	23.5	Lang and others, 1976 - 6 U.S. Air Bases
Residential	NA	NA	NA	NA	0.01	NA	ND-0.04	55.0	Lang and others, 1975 - 6 U.S. Air Bases
Residential	NA	NA	NA	NA	<0.01	NA	ND-0.02	47.6	Lang and others, 1976 - 6 U.S. Air Bases
Urban	NA	NA	NA	NA	NA	NA	0.06-2.2	7.5	Fahey and others, 1965

Table 6.2 (Page 2 of 4)

	Endrin				Isodrin				
Land Use	Arith. Mean	Est. Geo. Mean	Range	% Pos.	Arith. Mean	Est. Geo. Mean	Range	% Pos.	References/comments
Cropland	<0.01	<0.001	0.01-2.13	0.07	NA	NA	NA	NA	Cary and others, 1979
Cropland	<0.01	<0.001	0.02-1.00	0.09	<0.01	<0.001	0.01-0.02	0.02	Carey and others, 1978
Cropland (Rice)	<0.01	NA	ND-0.17	1.1	NA	NA	NA	NA	Carey and others, 1980
Cropland	0.49	0.079	0.01-3.47	23.9	NA	NA	NA	NA	Gish, 1970
Cropland	NA	NA	NA	NA	NA	NA	NA	NA	Trautmann and others, 1968
Cropland (Saskatchewan)	NA	NA	<0.01-0.48	2.4	NA	NA	NA	NA	Saha and others, 1971
Cropland (Colorado)	<0.02	NA	NA	4.0	NA	NA	NA	NA	Mullins and others, 1971
Pasture (Grassland)	NA	NA	NA	NA	NA	NA	NA	NA	Fahey and others, 1965
Non Use (No pesticide use)	NA	NA	NA	NA	NA	NA	NA	NA	Lang and others, 1975 - 6 U.S. Air Bases
Non Use (No pesticide use)	NA	NA	NA	NA	NA	NA	NA	NA	Lang and others, 1976 - 6 U.S. Air Bases
Golf Course	NA	NA	NA	NA	NA	NA	NA	NA	Lang and others, 1975 - 6 U.S. Air Bases
Golf Course	<0.01	NA	ND-0.04	5.9	NA	NA	NA	NA	Lang and others, 1976 - 6 U.S. Air Bases
Residential	<0.01	NA	ND-0.01	5.0	NA	NA	NA	NA	Lang and others, 1975 - 6 U.S. Air Bases
Residential	NA	NA	NA	NA	NA	NA	NA	NA	Lang and others, 1976 - 6 U.S. Air Bases
Urban	NA	NA	NA	NA	NA	NA	NA	NA	Fahey and others, 1965

	DDT				DDE				
Land Use (a)	Arith. Mean	Est. Geo. Mean	Range	% Pos.(b)	Arith. Mean	Est. Geo. Mean	Range	% Pos.	References/comments
Cropland	0.13	0.007	0.01-18.93	18.5	0.05	0.006	0.01-7.16	20.2	Carey and others, 1979
Cropland	0.37	0.01	0.01-245.2	20.5	0.11	0.007	0.01-54.98	22.5	Carey and others, 1978
Cropland (Rice)	0.02	NA (c)	0.01-0.04	25.3	0.02	NA	0.01-0.57	31.3	Carey and others, 1980
Cropland	0.59	0.041	<0.005-12.73	98	0.36	0.036	<0.005-5.33	98.0	Gish, 1970
Cropland (Saskatchewan)	NA	NA	<0.01-5.57	NA	NA	NA	<0.01-0.98	NA	Saha and others, 1971
Cropland (Colorado)	5.57	NA	NA	54.0	NA	NA	NA	NA	Mullins and others, 1971
Pasture (Grassland)	NA	NA	0.07-79.98	70	0.03	NA	0.03-7.33	47	Fahey and others, 1965
Non Use (No pesticide use)	0.06	0.024	ND-0.32	48	NA	NA	NA	NA	Lang and others, 1975 - 6 U.S. Air Bases (Summation DDT)
Non Use (No pesticide use)	0.94	0.036	ND-13.93	45	NA	NA	NA	NA	Lang and others, 1976 - 6 U.S. Air Bases (Summation DDT)
Golf Course	0.19	0.06	<0.05-1.07	71	NA	NA	NA	NA	Lang and others, 1975 - 6 U.S. Air Bases (Summation DDT)
Golf Course	0.16	0.044	<0.05-0.69	59	NA	NA	NA	NA	Lang and others, 1976 - 6 U.S. Air Bases (Summation DDT)
Residential	0.86	0.23	ND-3.83	80	NA	NA	NA	NA	Lang and others, 1975 - 6 U.S. Air Bases (Summation DDT)
Residential	0.63	0.08	ND-3.83	67	NA	NA	NA	NA	Lang and others, 1976 - 6 U.S. Air Bases (Summation DDT)

Land Use	Chlordane Arith. Mean	Est. Geo. Mean	Range	% Pos.	References/comments
Cropland	0.05	0.003	0.01-7.89	7.9	Carey and others, 1979
Cropland	0.06	0.003	0.01-6.98	8	Carey and others, 1978
Cropland (Rice)	0.02	NA	0.01-0.27	21.2	Carey and others, 1980
Cropland	0.02	0.0096	<0.005-0.076	10	Gish, 1970 (gamma-Chlordane)
Cropland (Saskatchewan)	NA	NA	0.01-3.91	17	Saha and others, 1971
Cropland (Colorado)	0.02	NA	NA,	16.0	Mullins and others, 1971
Pasture (Grassland)	NA	NA	0.1-120	38	Fahey and others, 1965
Non Use (No pesticide use)	0.09	0.016	ND(d)-1.76	24	Lang and others, 1975 - 6 U.S. Air Bases (Summation DDT)
Non Use (No pesticide use)	0.18	0.018	ND-3.44	14	Lang and others, 1976 - 6 U.S. Air Bases (Summation DDT)
Golf Course	0.67	0.105	ND-4.57	59	Lang and others, 1975 - 6 U.S. Air Bases (Summation DDT)
Golf Course	0.56	0.032	ND-3.05	35	Lang and others, 1976 - 6 U.S. Air Bases (Summation DDT)
Residential	5.43	0.188	ND-52.11	65.0	Lang and others, 1975 - 6 U.S. Air Bases (Summation DDT)
Residential	0.16	0.015	ND-1.2	9.5	Lang and others, 1976 - 6 U.S. Air Bases (Summation DDT)

All values in ppm

(a) Cropland designation includes a variety crop types for several states.
(b) Percent positive detections for all samples in the individual study
(c) Not available
(c) Not detected

Table 6.3: Surficial Soil Duplicate Sample Agreement (DSA)
(Concentrations in $\mu g/g$)
(Page 1 of 2)

Analyte	Investigative Results	Duplicate Results	DSA (Percent)
Investigative Sample ID: HA1233WB			
Duplicate Sample ID: HA1237WB Sample Date: 06/18/90			
Calcium	2260.0000	2250.0000	0.44
Chromium	15.7000	15.7000	0.00
Copper	12.0000	11.8000	1.68
Dieldrin	0.0055	0.0044	22.22
Iron	16800.0000	17000.0000	1.18
Potassium	3860.0000	3870.0000	0.26
Magnesium	2650.0000	2690.0000	1.50
Manganese	351.0000	356.0000	1.41
Sodium	68.2000	66.8000	2.07
Lead	20.6000	19.9000	3.46
Zinc	47.2000	47.7000	1.05
Investigative Sample ID: HA1201WB			
Duplicate Sample ID: HA1238WB Sample Date: 06/18/90			
Arsenic	4.6200	4.3400	6.25
Dieldrin	< 0.0018	0.0090	133.33
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.0063	0.0091	36.36
Investigative Sample ID: HA1209WB			
Duplicate Sample ID: HA1240WB Sample Date: 06/18/90			
Dieldrin	0.0111	0.0053	70.73
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.0074	0.0103	32.77
Investigative Sample ID: HA1220WB			
Duplicate Sample ID: HA1242WB Sample Date: 06/15/90			
Arsenic	2.8400	3.7400	27.36
Investigative Sample ID: HA1267WB			
Duplicate Sample ID: HA1268WB Sample Date: 07/02/90			
Dieldrin	0.0063	0.0063	0.00
Mercury	0.0896	0.1110	21.34

Table 6.3: (Page 2 of 2)
(Concentrations in $\mu g/g$)

Analyte	Investigative Results	Duplicate Results	DSA (Percent)
Investigative Sample ID: HA1244WB			
Duplicate Sample ID: HA1260WB Sample Date:	07/03/90		
Aldrin	< 0.0021	0.0036	52.63
Chromium	14.1000	15.9000	12.00
Copper	7.9500	9.0200	12.61
Dieldrin	< 0.0018	0.0108	142.86
Endrin	< 0.0047	0.0065	32.14
Lead	18.2000	19.6000	7.41
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane	< 0.0028	0.0072	88.00
Zinc	47.9000	57.2000	17.70
Investigative Sample ID: HA0994WB			
Duplicate Sample ID: HA0995WB Sample Date:	02/24/89		
Aldrin	0.034	0.020	51.85
Chlordane	0.042	0.052	21.28
Dieldrin	0.250	0.210	17.39
Endrin	0.029	0.019	41.67
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.002	0.004	66.67
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.018	0.020	10.53

Reported values are accurate to three significant figures.

Table 6.4: Summary of Compounds Detected in Collocated Harding Lawson Associates and Colorado Department of Health Surficial Soil Samples from the 96th Avenue Residential Area in Offpost Operable Unit
Concentrations of organic compounds in µg/kg.
Concentrations of arsenic and mercury in µg/g.

	HA0989WB		HA0990WB		HA0993WB		HA0997WB	
Analyte	HLA[1]	CDH[2]	HLA	CDH	HLA	CDH	HLA	CDH
Aldrin	16.0	<10	10.0	<10	8.00	<10	3.00	<10
Chlordane	<23.0	<10	151	<10	100	60.0	<23.0	<10
Dieldrin	130	90.0	120	40.0	89.0	40.0	44.0	20.0
Endrin	<6.0	<10	15.0	<10	16.0	<10	<6.0	<10
DDE	36.0	<10	73.0	<10	11.0	<10	<2.0	<10
DDT	53.0	<10	230	120	23.0	<10	4.00	<10
Arsenic	<2.50	7.00	<2.50	7.00	2.89	9.00	<2.50	10.0
Mercury	<0.050	<0.02	0.127	<0.02	<0.050	<0.02	<0.050	<0.02

All samples were collected during February 1989.
Less than values listed for HLA represent certified reporting limits.
Less than values listed for CDH represent detection limits.

(1) HLA Surficial Soil Analytical Results are provided in Appendix E.
(2) CDH Surficial Soil Analytical Results are provided in Appendix G.

CDH = Colorado Department of Health
HLA = Harding Lawson Associates
DDE = 2,2-bis (parachlorophenyl)-1,1-dichloroethane
DDT = 2,2-bis(parachlorophenyl)-1,1,1-trichloroethane

Table 7.1: Aquatic Vertebrates and Invertebrates Found in the First Creek Impoundment

Common Name	Scientific Name	Relative Abundance
Fathead Minnow	Pimephales promelas	Common
Crayfish	Orconectes spp.	Common
Carp	Cyprinus carpio	Absent[1]
Waterbug	Notonecta spp.	Common
Bloodworm	Nematoda spp.	Uncommon
Leech	Planaria spp.	Uncommon

[1] Collected during high water in 1988, but not present during this study

Table 7.2: Comparisons of Target Analytes Detected in Biota Samples with Analytes Detected in Samples from Nearby Soil and Surface-Water Sampling Locations
(Page 1 of 2)

Species	Tissue	Biota Sampling Location	Analyte	Biota Concentration (μg/g)	Soil(μg/g)/Water(μg/l) Concentration	Soil/Water Sampling Location
Cow	Body Fat	HA1012BF	Dieldrin	0.053	0.110 μg/g, 0.110 μg/g	HA0991WB, HA0992WB(1)
Cow	Body Fat	HA1013BF	Dieldrin	0.078	0.110 μg/g, 0.110 μg/g	HA0991WB, HA0992WB
Chicken	Fat+Skin	HA1042BP	Dieldrin	0.230	0.010 μg/g, 0.020 μg/g	OHLE3WB(CDH), OHLE4WB(CDH)(2)
Chicken	Liver	HA1017BP	Dieldrin	0.023	0.010 μg/g, 0.020 μg/g	OHLE3WB(CDH), OHLE4WB(CDH)
Chicken	Egg	HA1006BE	Dieldrin	0.0179	0.010 μg/g, 0.020 μg/g	OHLE3WB(CDH), OHLE4WB(CDH)
Chicken	Fat+Skin	HA1042BP	DDE	0.106	<0.010 μg/g	OHLE3WB(CDH), OHLE4WB(CDH)
Catfish	Composite	HA0982B	Dieldrin	0.251	0.025 μg/g, 0.147 μg/l	HA0981SE, HA0973SW
Carp	Composite	HA0983BA	Dieldrin	0.026	0.025 μg/g, 0.147 μg/l	HA0981SE, HA0973SW
Carp	Composite	HA0984BA	Dieldrin	0.235	0.025 μg/g, 0.147 μg/l	HA0981SE, HA0973SW
Carp	Composite	HA0983BA	Mercury	0.052	<0.050 μg/g	HA0981SE, HA0973SW
Carp	Composite	HA0984BA	Mercury	0.155	<0.050 μg/g	HA0981SE, HA0973SW
Fathead Minnow	Composite	HA1061B	Mercury	0.0897	<0.050 μg/g	HA0981SE, HA0973SW
Crayfish	Composite	HA1062B	Arsenic	0.573	3.7 μg/g, 20.9 μg/l	HA0974SE, HA0980SW
Algal Mats	Composite	HA1253B	Arsenic	1.02	3.7 μg/g, 20.9 μg/l	HA0974SE, HA0980SW
Earthworms	Composite	HA1247B	Dieldrin	0.0282	0.044 μg/g	HA0997WB
Earthworms	Composite	HA1053B	Dieldrin	0.023	0.020 μg/g	OHLE4WB (CDH)
Earthworms	Composite	HA1057B	Dieldrin	0.0211	0.0128 μg/g	HA1229WB
Earthworms	Composite	HA1254B	Dieldrin	0.0221	0.008 μg/g	HA1211WB
Earthworms	Composite	HA1053B	Arsenic	1.36	7.0 μg/g	OHLE4WB (CDH)
Earthworms	Composite	HA1250B	Arsenic	1.85	3.24 μg/g	HA1205WB
Earthworms	Composite	HA1057B	Arsenic	1.33	<2.50 μg/g	HA1229WB
Earthworms	Composite	HA1254B	Arsenic	0.965	<2.50 μg/g	HA1211WB
Earthworms	Composite	HA1063B	Arsenic	1.69	<2.50 μg/g	HA1209WB
Earthworms	Composite	HA1250B	Mercury	0.0767	<0.05 μg/g	HA1205WB
Earthworms	Composite	HA1057B	Mercury	0.0612	<0.05 μg/g	HA1229WB
Earthworms	Composite	HA1063B	Mercury	0.0612	<0.05 μg/g	HA1211WB
Deer mouse	Composite	HA1051B	Dieldrin	0.571	0.0148 μg/g	HA1210WB
Deer mouse	Composite	HA1251B	Dieldrin	0.0267	0.0167 μg/g	HA1205WB
Deer mouse	Composite	HA1059B	Dieldrin	0.140	0.0128 μg/g	HA1229WB

Table 7.2: (Page 2 of 2)

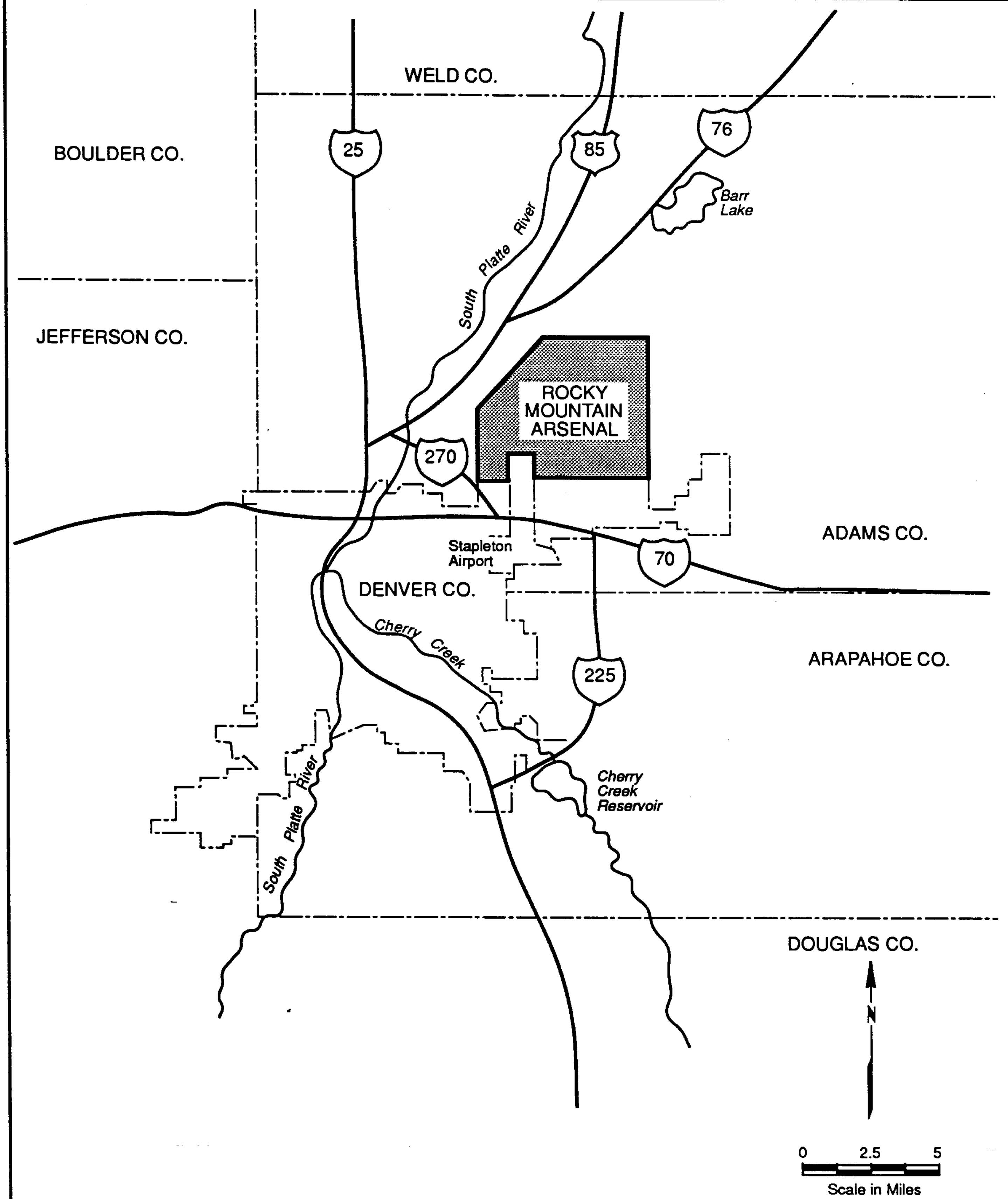
Species	Tissue	Biota Sampling Location	Analyte	Biota Concentration (µg/g)	Soil(µg/g)/Water(µg/l) Concentration	Soil/Water Sampling Location
Prairie dog	Composite	HA1055B	Dieldrin	0.0327	0.020 µg/g	OHLE4WB (CDH)
Prairie dog	Composite	HA1049B	Arsenic	0.771	<2.50 µg/g	HA1226WB
Ring-necked pheasant	Liver	HA1257BL	Dieldrin	0.380	0.0148 µg/g	HA1210WB

µg/g = micrograms per gram
µg/l = micrograms per liter

(1) Letters at the end of sample numbers represent sample type as follows:
WB = surficial soil
SE = stream-bottom sediment
SW = surface water
B, BA, BE, BF, BL, BP= Biota

(2) (CDH) = Sample collected by Colorado Department of Health

RMA1 1104



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Rocky Mountain Arsenal

Commerce City, Colorado

Figure 1.1

LOCATION MAP OF
ROCKY MOUNTAIN ARSENAL

RMA1 1101

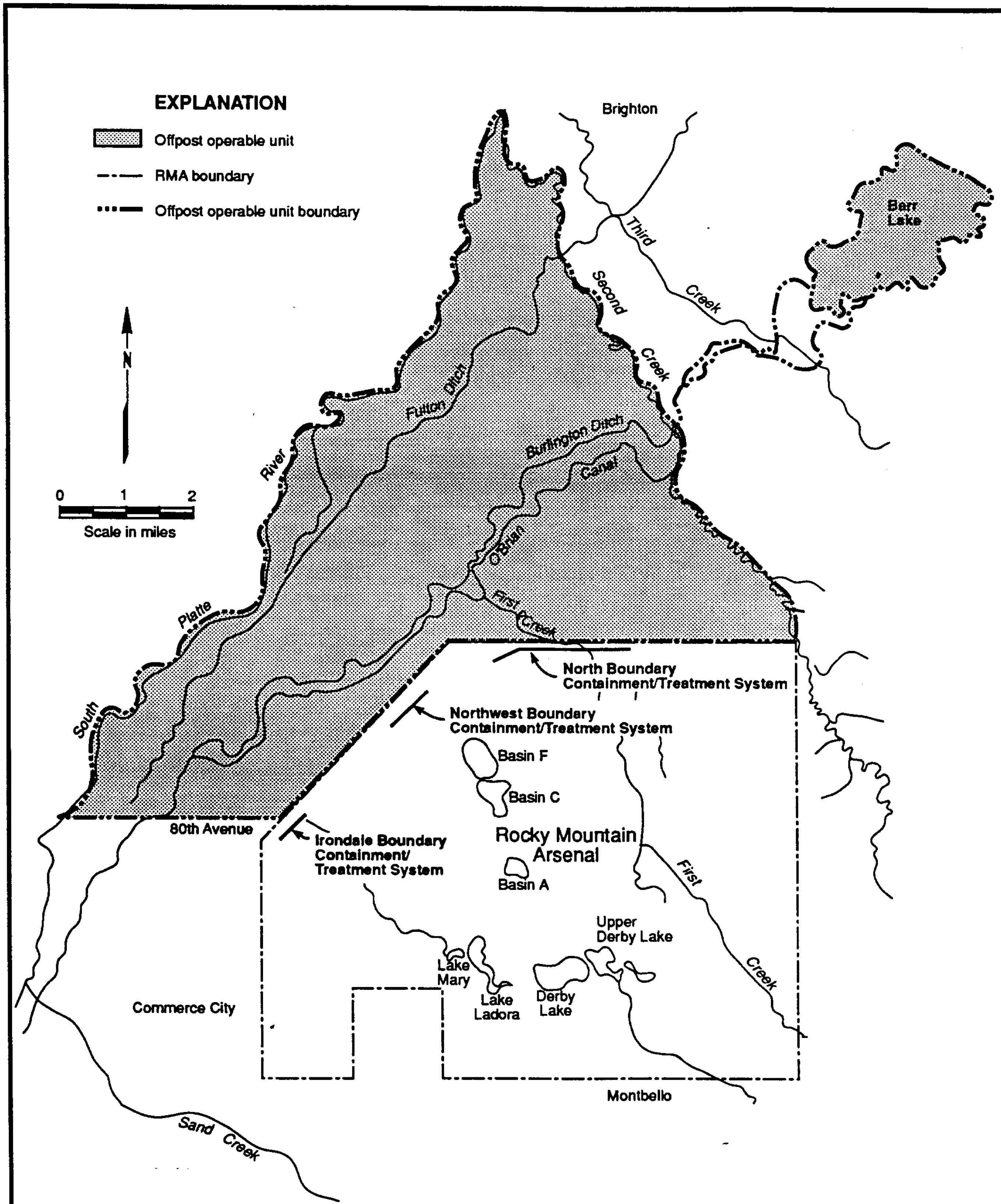

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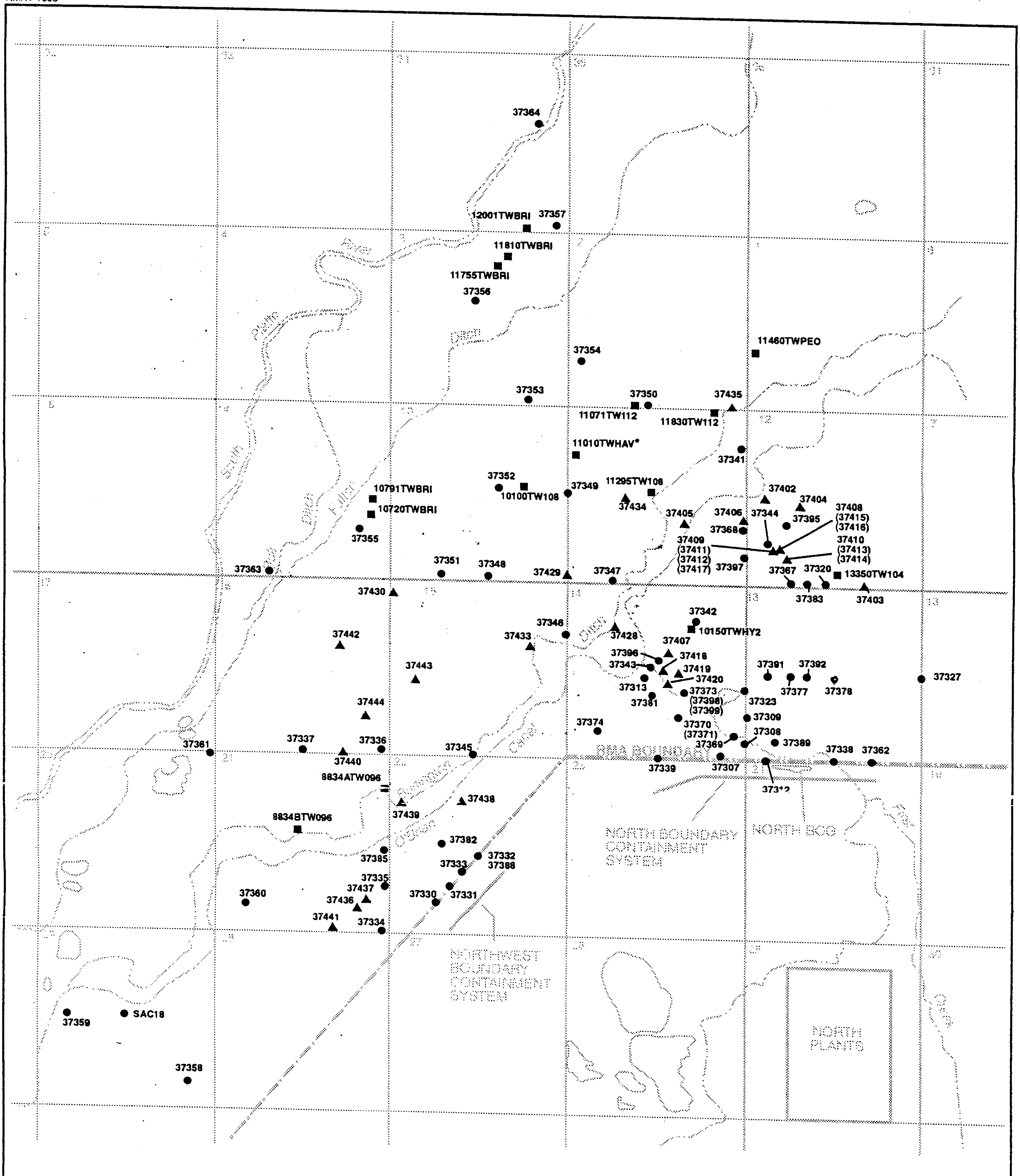
Figure 1.2

OFFPOST OPERABLE UNIT,
ROCKY MOUNTAIN ARSENAL

RMA1 1006



EXPLANATION

▲ Monitoring Well Installed and Sampled Under Offpost RI Addendum Programs and IRA A

■ Domestic Well Sampled Under Offpost RI Addendum Program

● Monitoring Wells Sampled Under CMP (Fall 1989)

( ) Piezometer

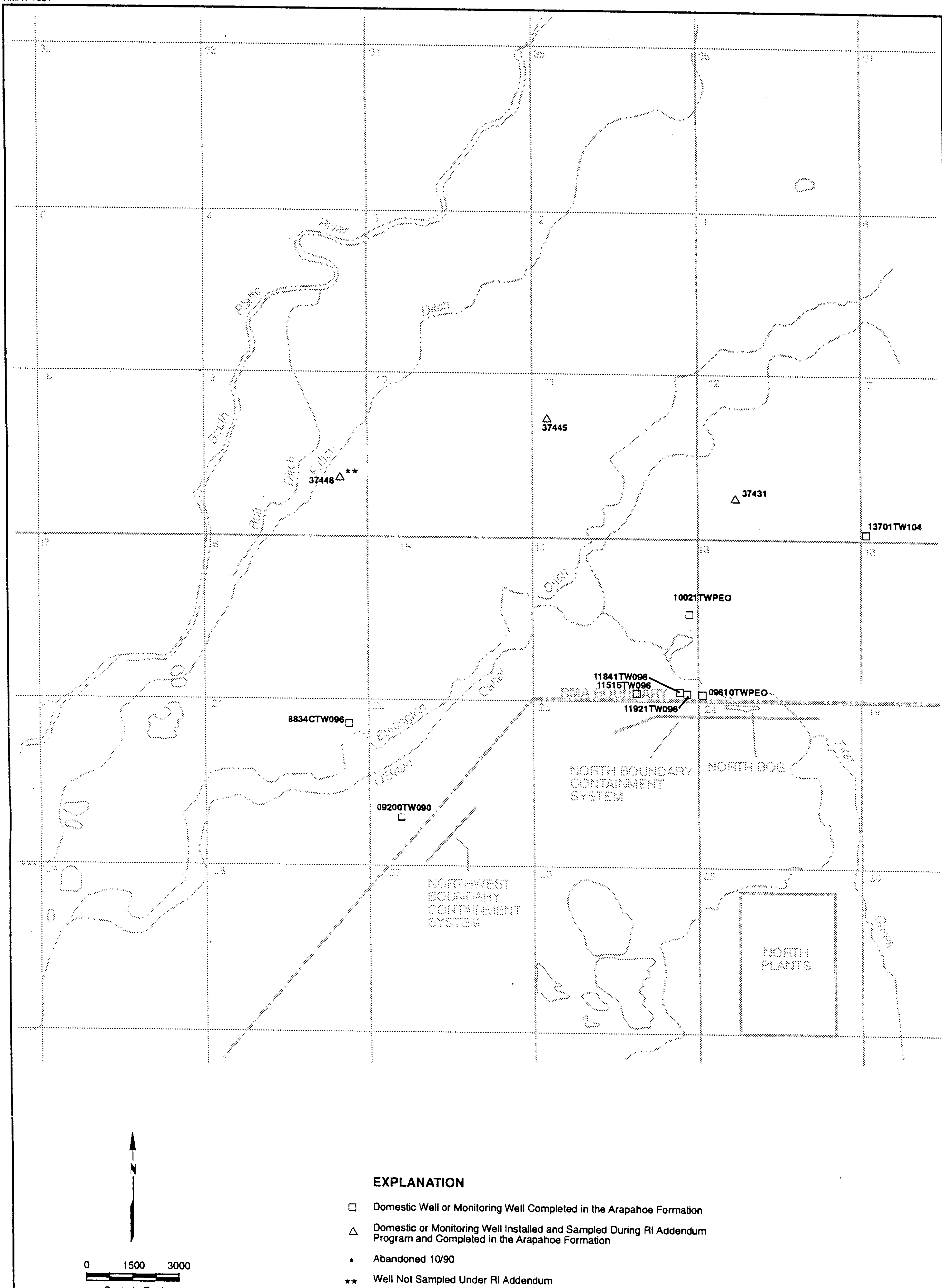
N

0 1500 3000

Scale in Feet

Prepared for: Program Manager for Rocky Mountain Arsenal Commerce City, Colorado	Figure 2.1 OFFPOST OPERABLE UNIT UNCONFINED FLOW SYSTEM WELL NETWORK

RMA1 1031



EXPLANATION

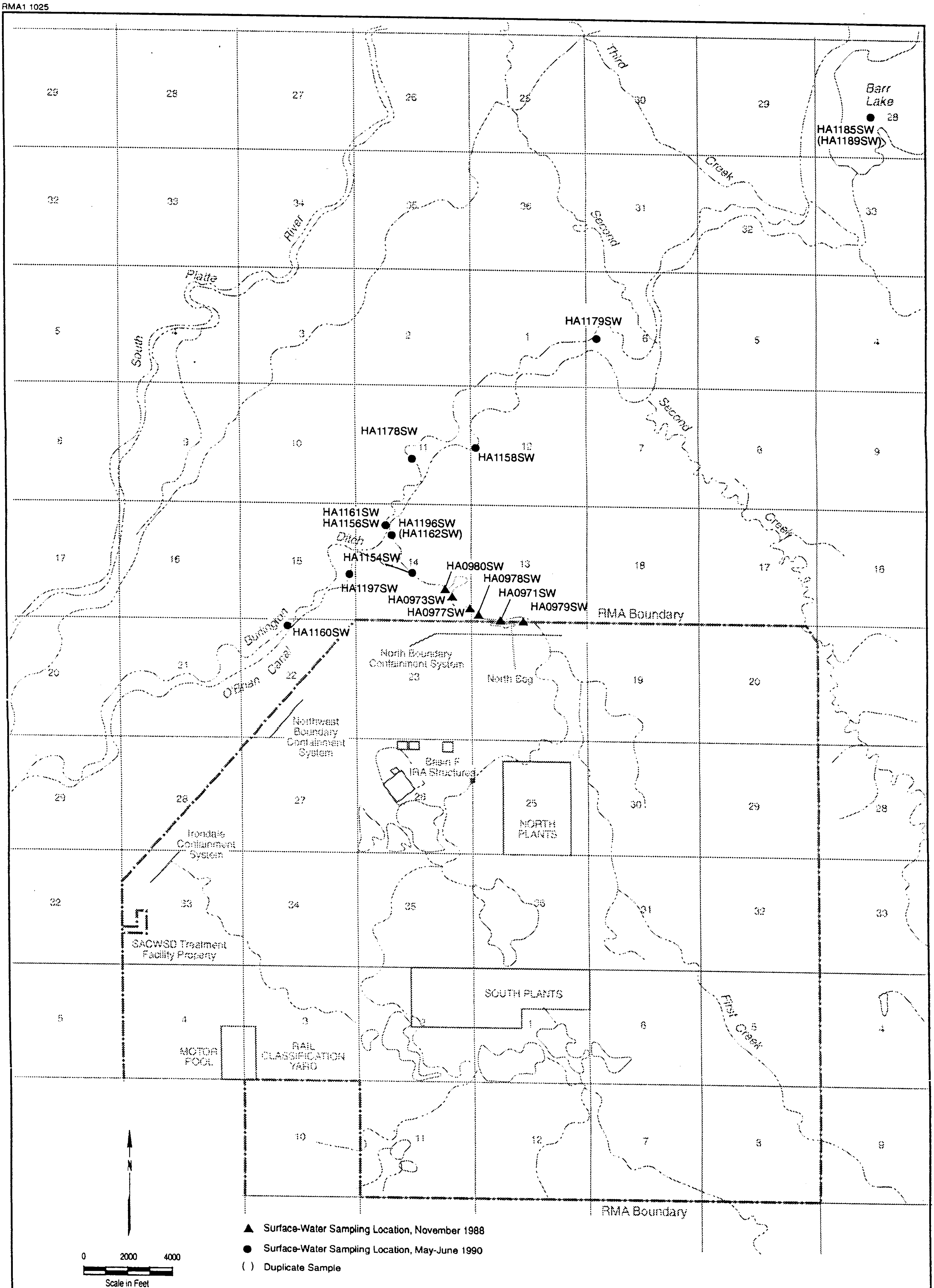
□ Domestic Well or Monitoring Well Completed in the Arapahoe Formation

△ Domestic or Monitoring Well Installed and Sampled During RI Addendum Program and Completed in the Arapahoe Formation

• Abandoned 10/90

** Well Not Sampled Under RI Addendum

Prepared for: **Program Manager for** **Rocky Mountain Arsenal** **Commerce City, Colorado**	Figure 2.2 OFFPOST OPERABLE UNIT ARAPAHOE FORMATION WELL MONITORING NETWORK



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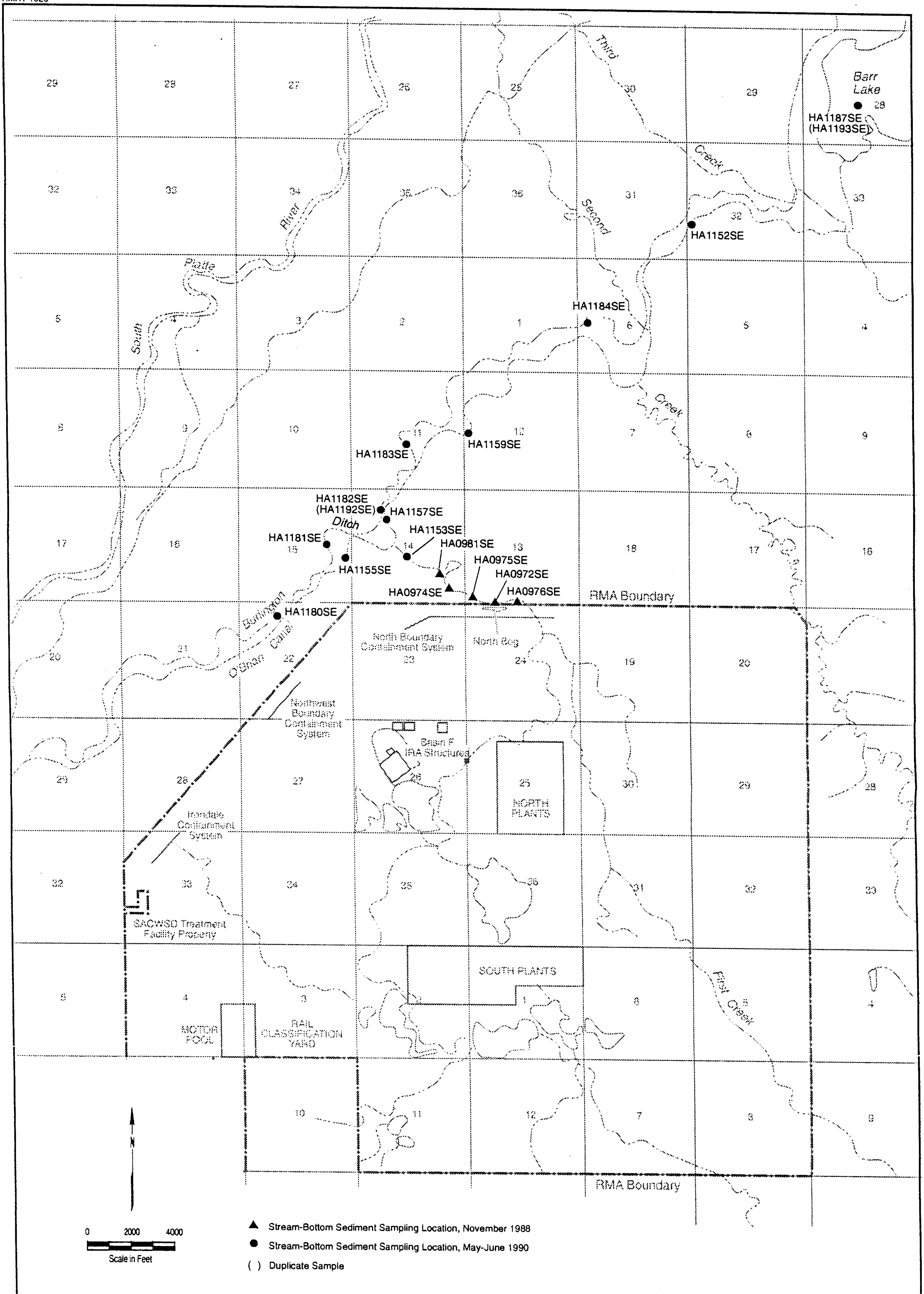
Commerce City, Colorado

Figure 2.3

OFFPOST OPERABLE UNIT SURFACE-WATER SAMPLING LOCATIONS

RMA1 1026



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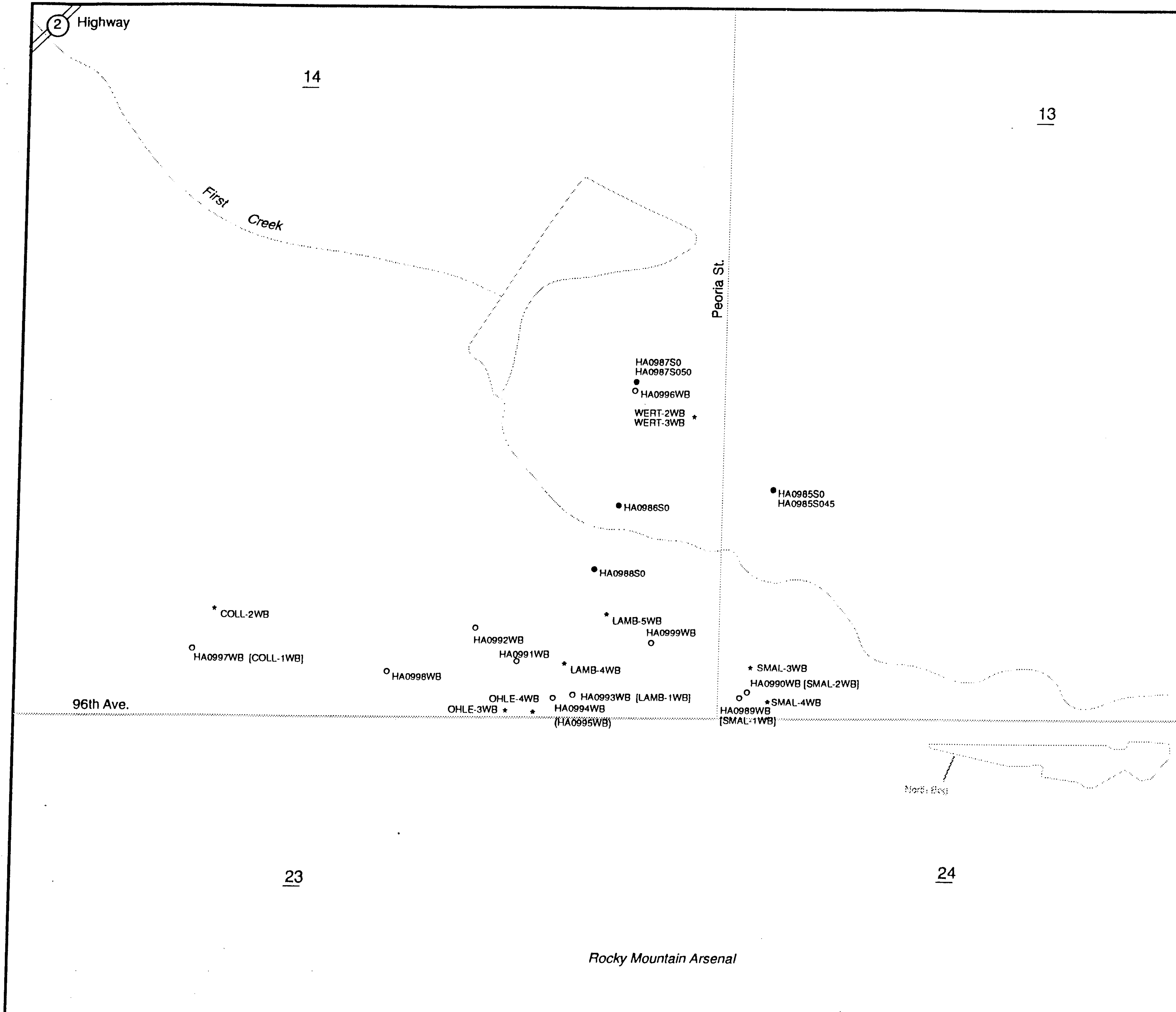
Commerce City, Colorado

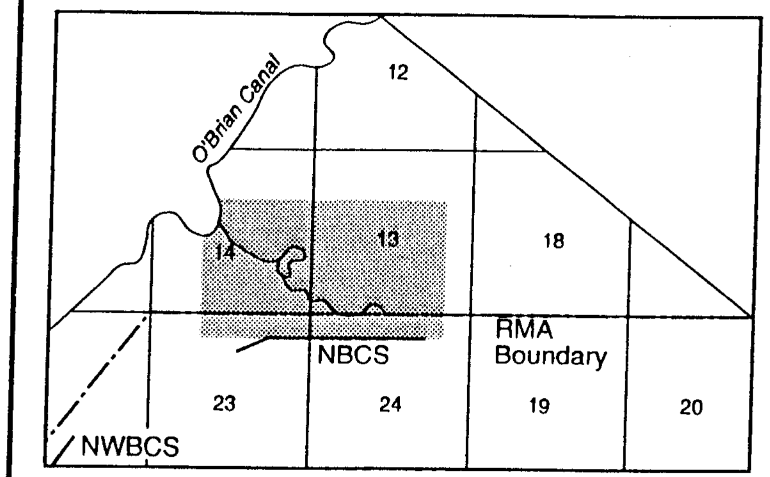
Figure 2.4

OFFPOST OPERABLE UNIT STREAM-BOTTOM SEDIMENT SAMPLING LOCATIONS



EXPLANATION

- ● Subsurface Soil Sampling Location (0-1', 4-5'), February 1989
- o Surficial Soil Sampling Location, February 1989
- * CDH Surficial Soil Sampling Location, February 1989
- [ ] CDH Surficial Soil Sampling Location Colocated w/ HLA Sampling Location, February 1989
- ( ) Sample is a Duplicate
- CDH Colorado Department of Health
- 13 Section Number



INDEX MAP

N

0 400
Scale in Feet

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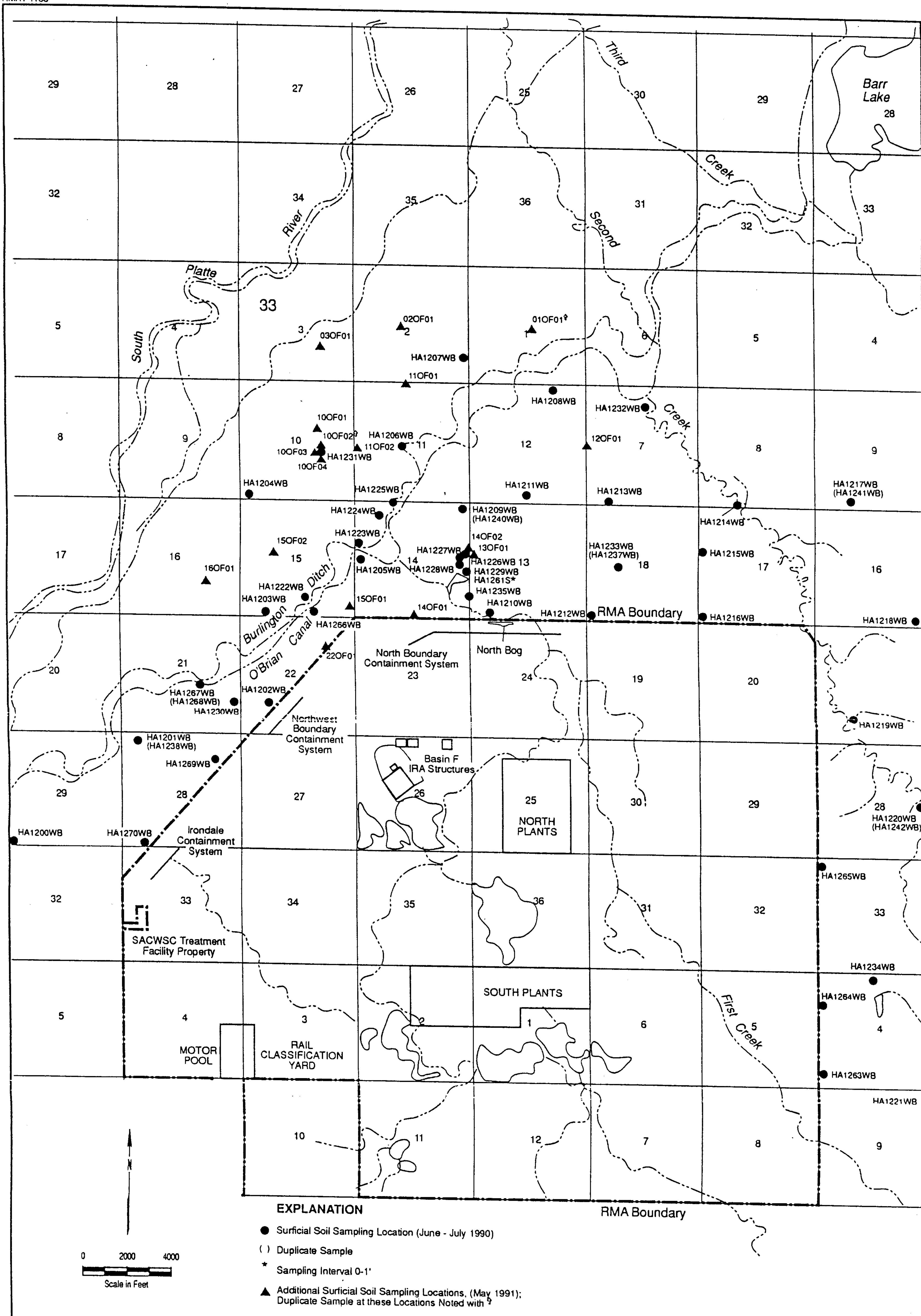
Commerce City, Colorado

Figure 2.5

OFFPOST OPERABLE UNIT SOIL SAMPLING LOCATIONS IN THE 96TH AVENUE RESIDENTIAL AREA, FEBRUARY 1989



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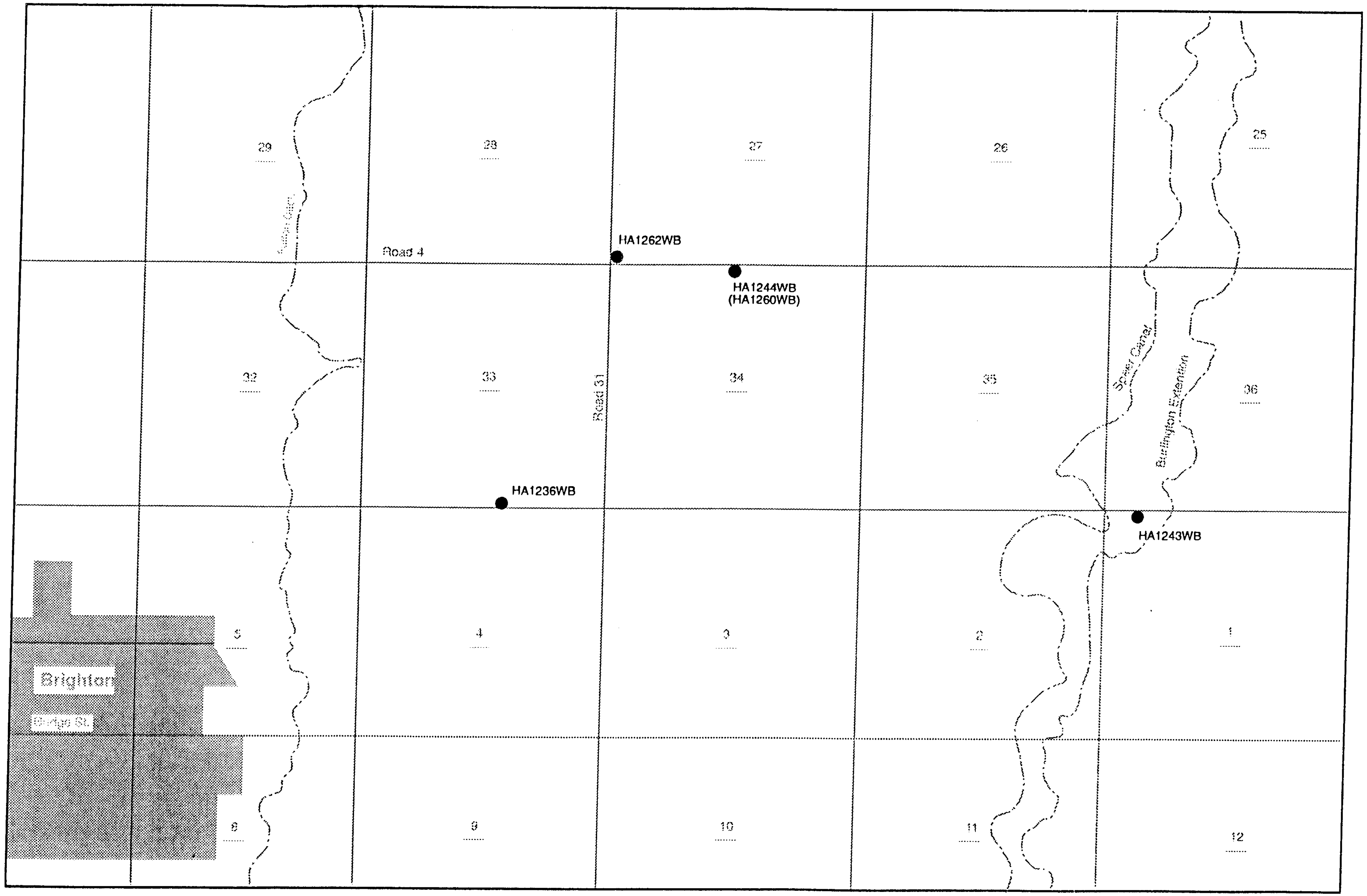
Commerce City, Colorado

Figure 2.6

OFFPOST OPERABLE UNIT SUBSURFACE AND SURFICIAL SOIL SAMPLING LOCATIONS, JUNE - JULY 1990 AND MAY 1991

RMA1 1066



N

0 1200 2400

Scale in Feet

EXPLANATION

● Soil Sampling Location, July 1990

( ) Duplicate Sample

13 Section Number

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Commerce City, Colorado

Figure 2.7

OFFPOST OPERABLE UNIT BACKGROUND SOIL SAMPLING LOCATIONS NEAR BRIGHTON, CO

RMA1 1007.2

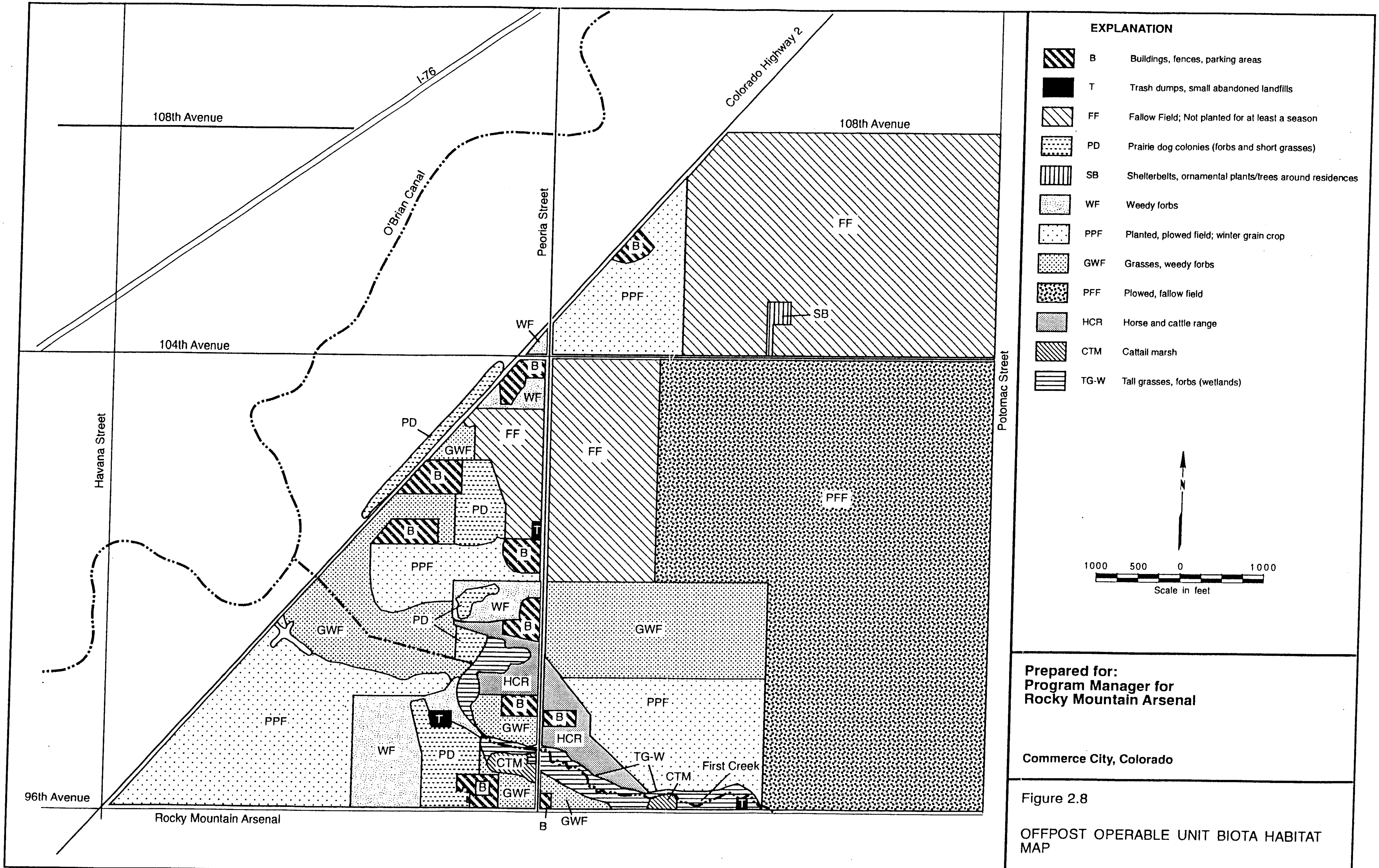

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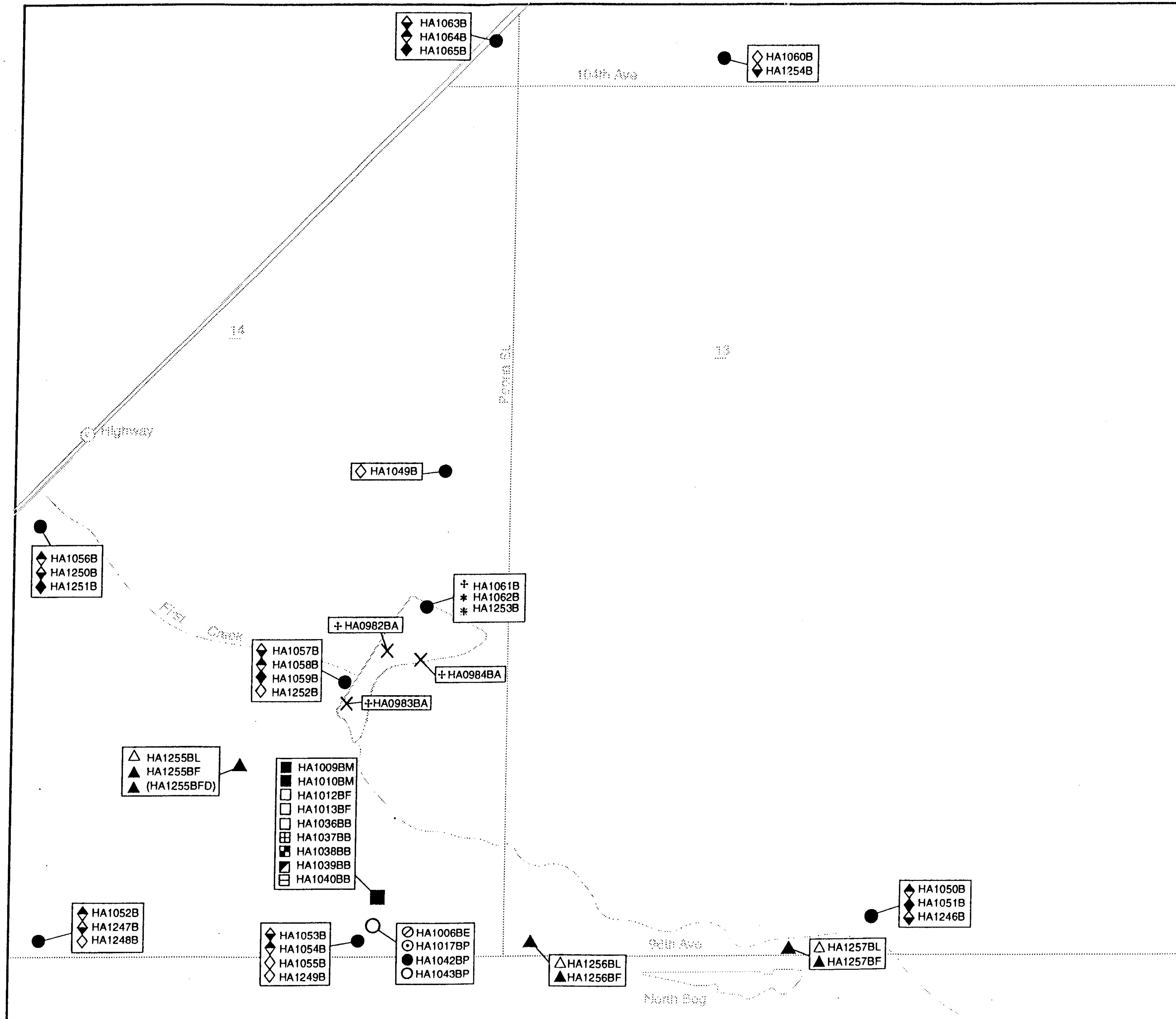
Figure 2.8

OFFPOST OPERABLE UNIT BIOTA HABITAT MAP

RMA1 1007F



EXPLANATION

Terrestrial Biota Sampling Locations
- Field Mice
- Prairie Dogs
- Grasshoppers
- Earthworms

Chicken Sampling Locations
- Chicken Egg
- Chicken Liver
- Chicken Fat/Skin
- Chicken Muscle

Aquatic Biota Sampling Locations
- Fish
- Crayfish
- Algae

Cow Sampling Locations
- Cow Milk
- Cow Fat
- Cow Brain
- Cow Muscle
- Cow Liver
- Cow Kidney

Pheasant Sampling Locations
- Pheasant Liver
- Pheasant Flesh

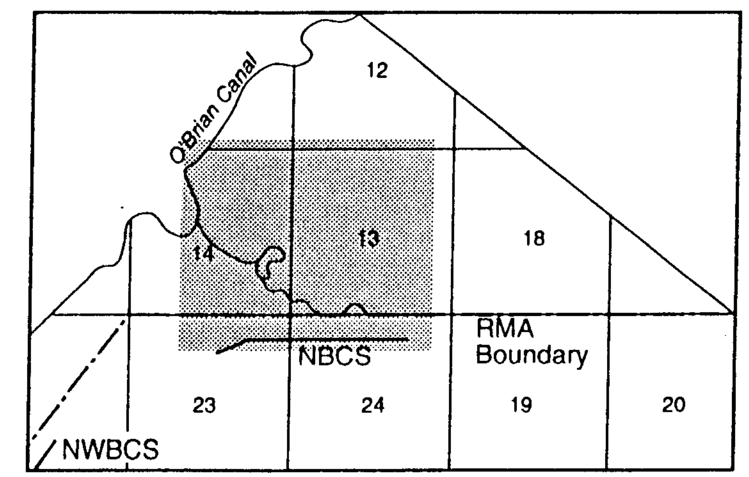
( ) Sample is a Duplicate

13 Section Number

N

0 650

Scale in Feet



INDEX MAP

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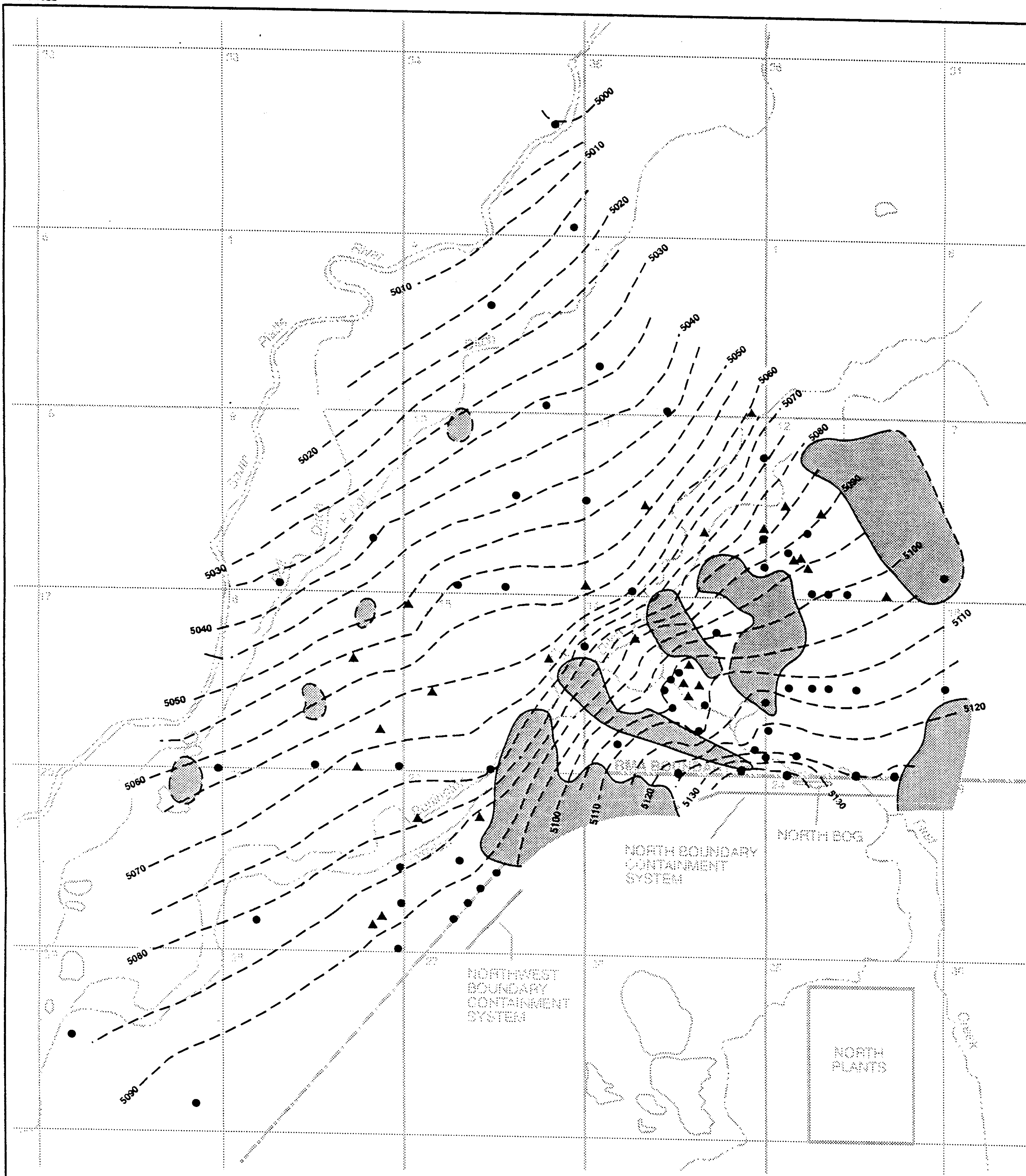
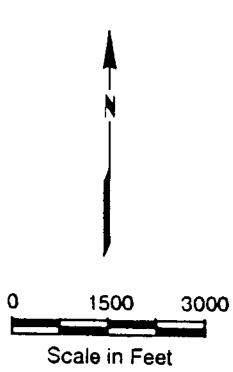
Commerce City, Colorado

Figure 2.9

OFFPOST OPERABLE UNIT BIOTA SAMPLING LOCATIONS





EXPLANATION

Contour Line, Dashed where Inferred (Feet Above Mean Sea Level)
Contour Interval = 5 Feet

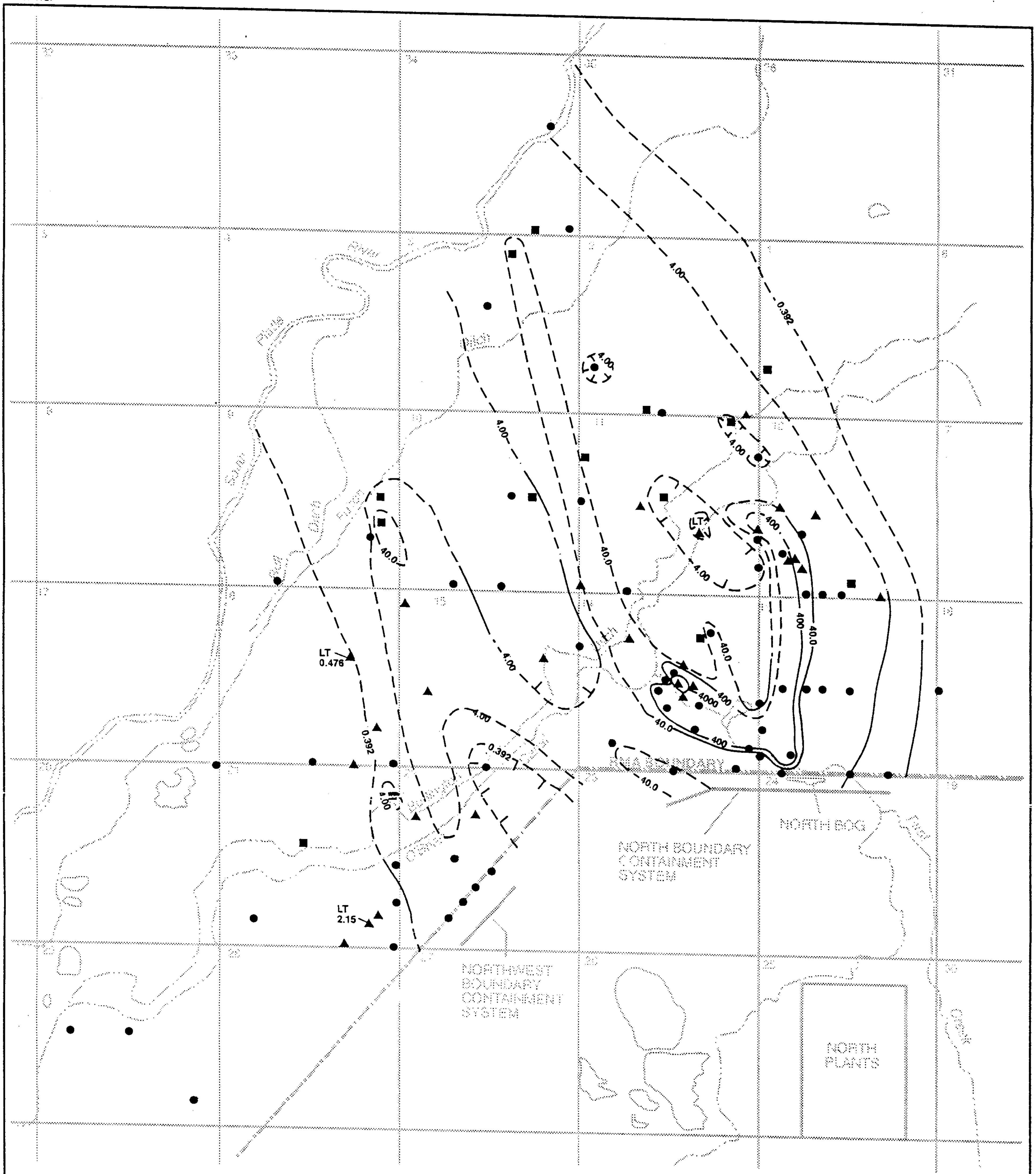
Area of Unsaturated Alluvium,
Dashed Where Inferred

▲ Monitoring Well Installed and Sampled Under Offpost RI Addendum Program (February 1990)

● Monitoring Well Sampled Under CMP (February 1990)

Prepared for:	Figure 3.1
Program Manager for Rocky Mountain Arsenal	POTENTIOMETRIC SURFACE MAP OF THE UNCONFINED FLOW SYSTEM IN THE OFFPOST OU
Commerce City, Colorado	

RMA1 1127



EXPLANATION

Concentrations in micrograms per liter (µg/l)

Isoconcentration Line, Dashed where Inferred

2.65
LT
Isolated Detection, in µg/l. Two Values Shown if Sampled Twice. LT - Indicates Analyte was not Detected Above the Certified Reporting Limit.

▲ Monitoring Well Sampled Under Offpost RI Addendum Program (1989-1990)

● Monitoring Well Sampled Under CMP (Fall 1989)

■ Domestic Well Sampled Under Offpost RI Addendum Program (1989-1990)

Isoconcentration Value (µg/l)

0.392
4.00
40.0
400
4000

N

0 1500 3000
Scale in Feet

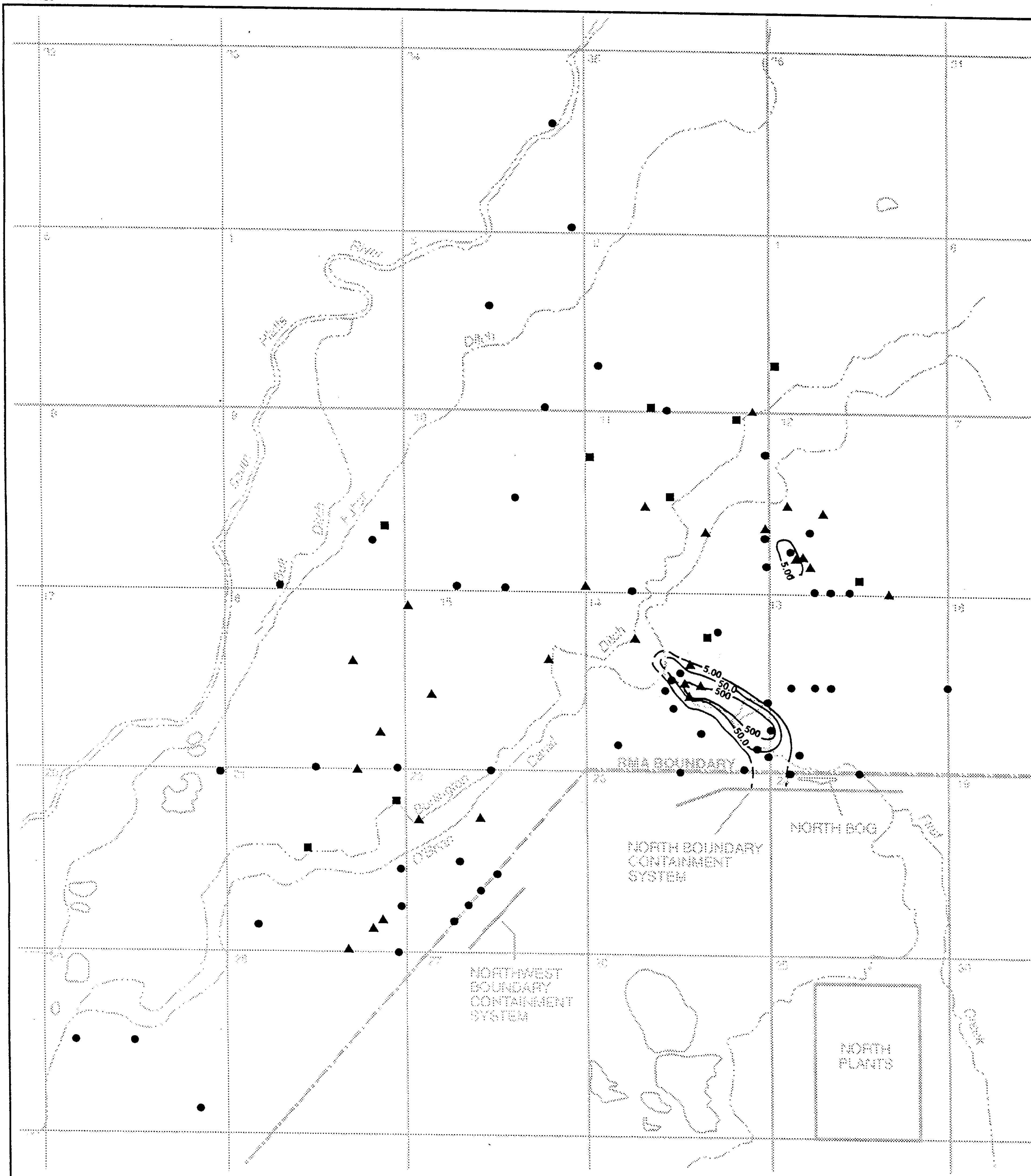
Prepared for:
Program Manager for
Rocky Mountain Arsenal

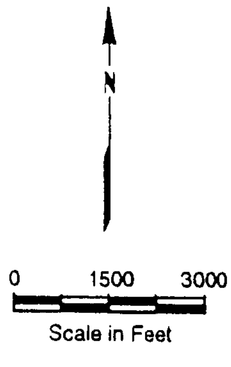
Commerce City, Colorado

Figure 3.2

DISTRIBUTION OF DIISOPROPYLMETHYL PHOSPHONATE (DIMP) IN THE OFFPOST UNCONFINED FLOW SYSTEM

RMA1 1128





EXPLANATION

Concentrations in micrograms per liter (mg/l)

Isoconcentration Line, Dashed where Inferred

s Monitoring Well Sampled Under Offpost RI Addendum Program (1989-1990)

– Monitoring Well Sampled Under CMP (Fall 1989)

■ Domestic Well Sampled Under Offpost RI Addendum Program (1989-1990)

Isoconcentration Value (mg/l)

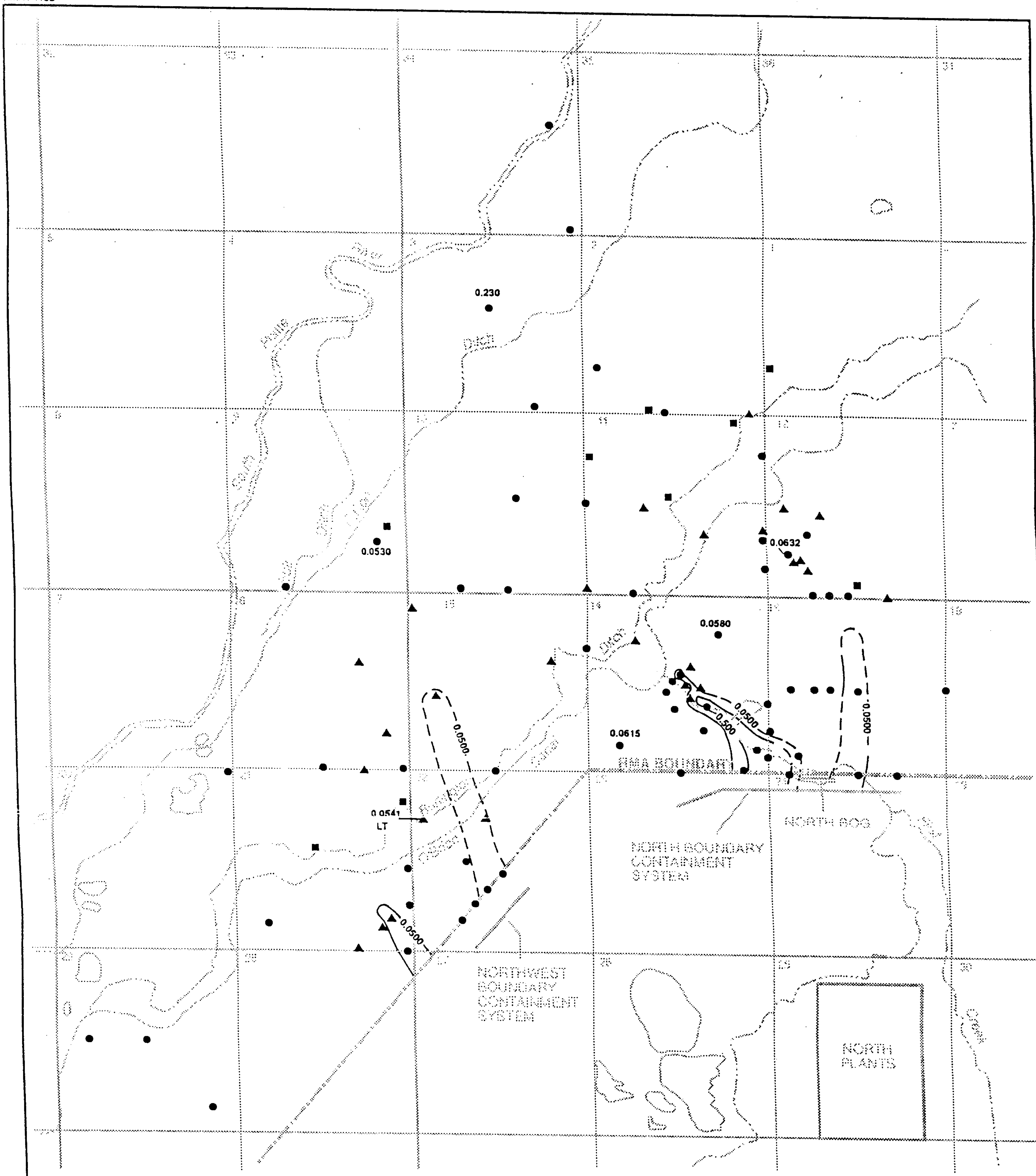
5.00
50.0
500

Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 3.3

DISTRIBUTION OF DICYCLOPENTADIENE (DCPD) IN THE OFFPOST UNCONFINED FLOW SYSTEM



EXPLANATION

Concentrations in micrograms per liter (µg/l)

Isoconcentration Line, Dashed where Inferred

2.65 LT — Isolated Detection in µg/l. Two Values Shown if Sampled Twice. LT - Indicates Analyte was not Detected Above the Certified Reporting Limit.

▲ Monitoring Well Sampled Under Offpost RI Addendum Program (1989-1990)

● Monitoring Well Sampled Under CMP (Fall 1989)

■ Domestic Well Sampled Under Offpost RI Addendum Program (1989-1990)

Isoconcentration Value (µg/l)

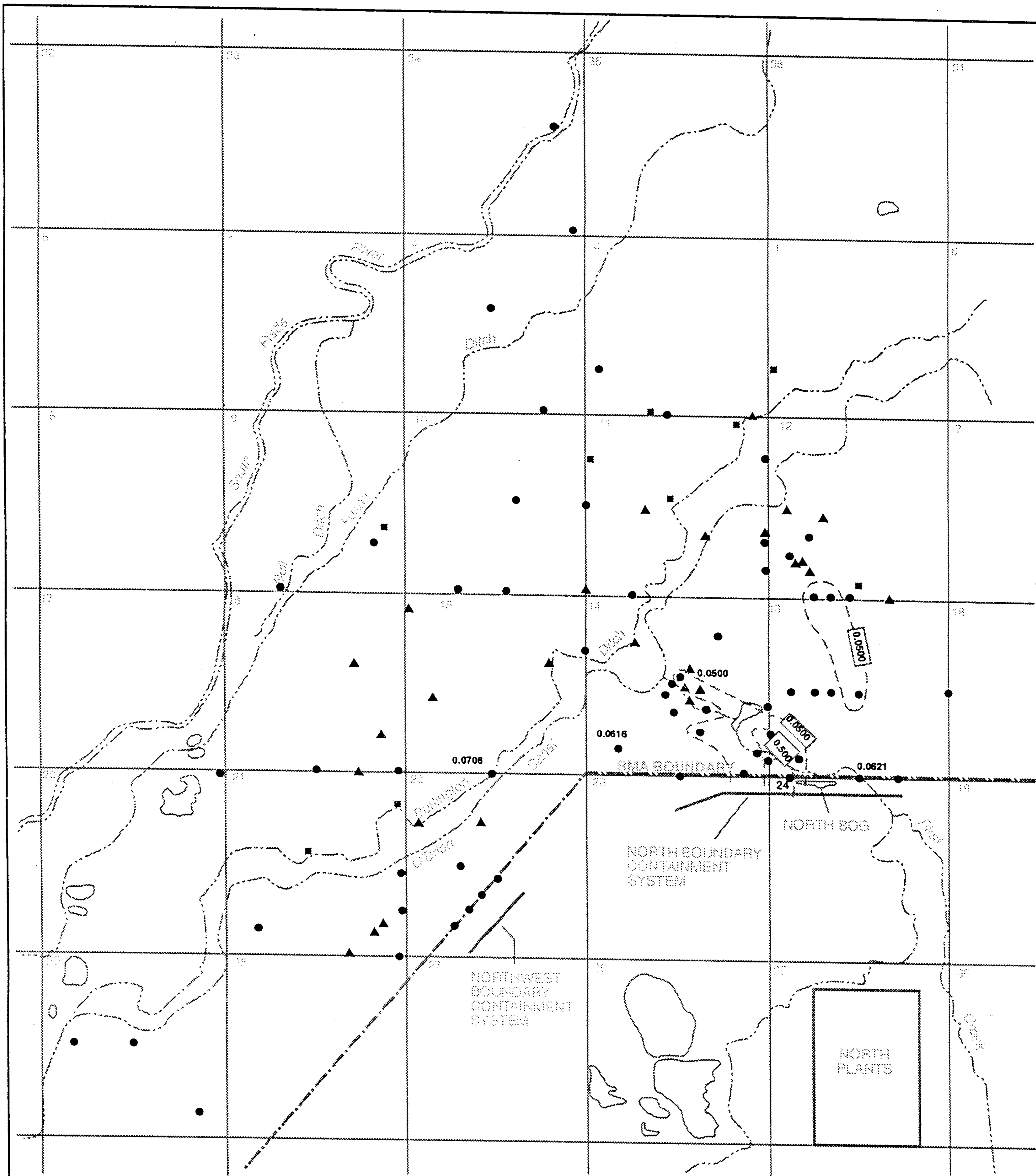
0.0500
0.500
5.00

N

0 1500 3000
Scale in Feet

Prepared for: Program Manager for Rocky Mountain Arsenal Commerce City, Colorado	Figure 3.4 DISTRIBUTION OF DIELDRIN IN THE OFFPOST UNCONFINED FLOW SYSTEM

RMA1 1129



EXPLANATION

Concentrations in micrograms per liter (µg/l)

Isoconcentration Line, Dashed where Inferred

2.65 ● Isolated Detection, in µg/l

▲ Monitoring Well Sampled Under Offpost RI Addendum Program (1989-1990)

● Monitoring Well Sampled Under CMP (Fall 1989)

■ Domestic Well Sampled Under Offpost RI Addendum Program (1989-1990)

Isoconcentration Value (µg/l)

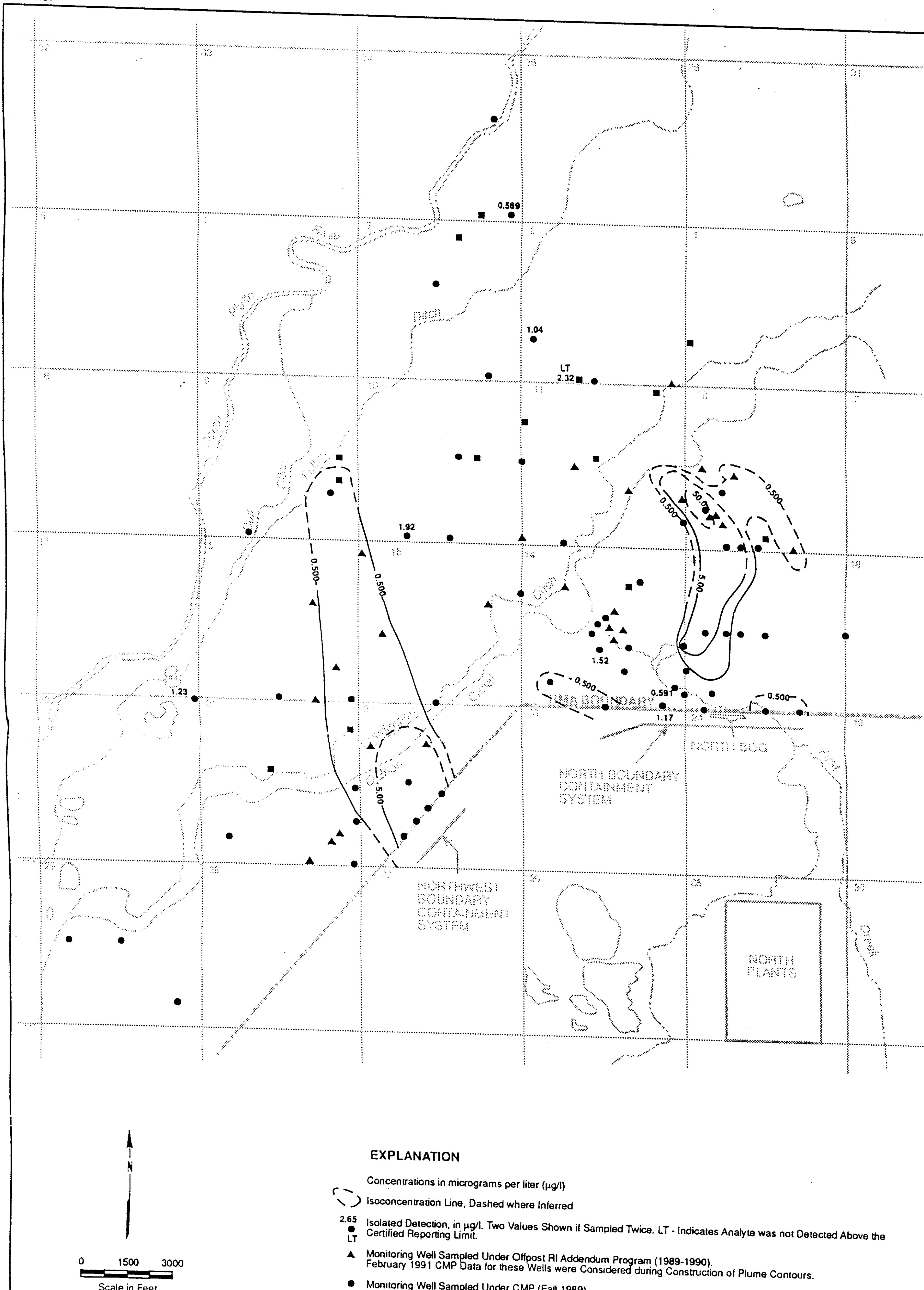
0.0500
0.500

Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 3.5

DISTRIBUTION OF ENDRIN IN THE OFFPOST UNCONFINED FLOW SYSTEM



EXPLANATION

Concentrations in micrograms per liter (µg/l)

Isoconcentration Line, Dashed where Inferred

2.65 / LT — Isolated Detection, in µg/l. Two Values Shown if Sampled Twice. LT - Indicates Analyte was not Detected Above the Certified Reporting Limit.

▲ Monitoring Well Sampled Under Offpost RI Addendum Program (1989-1990). February 1991 CMP Data for these Wells were Considered during Construction of Plume Contours.

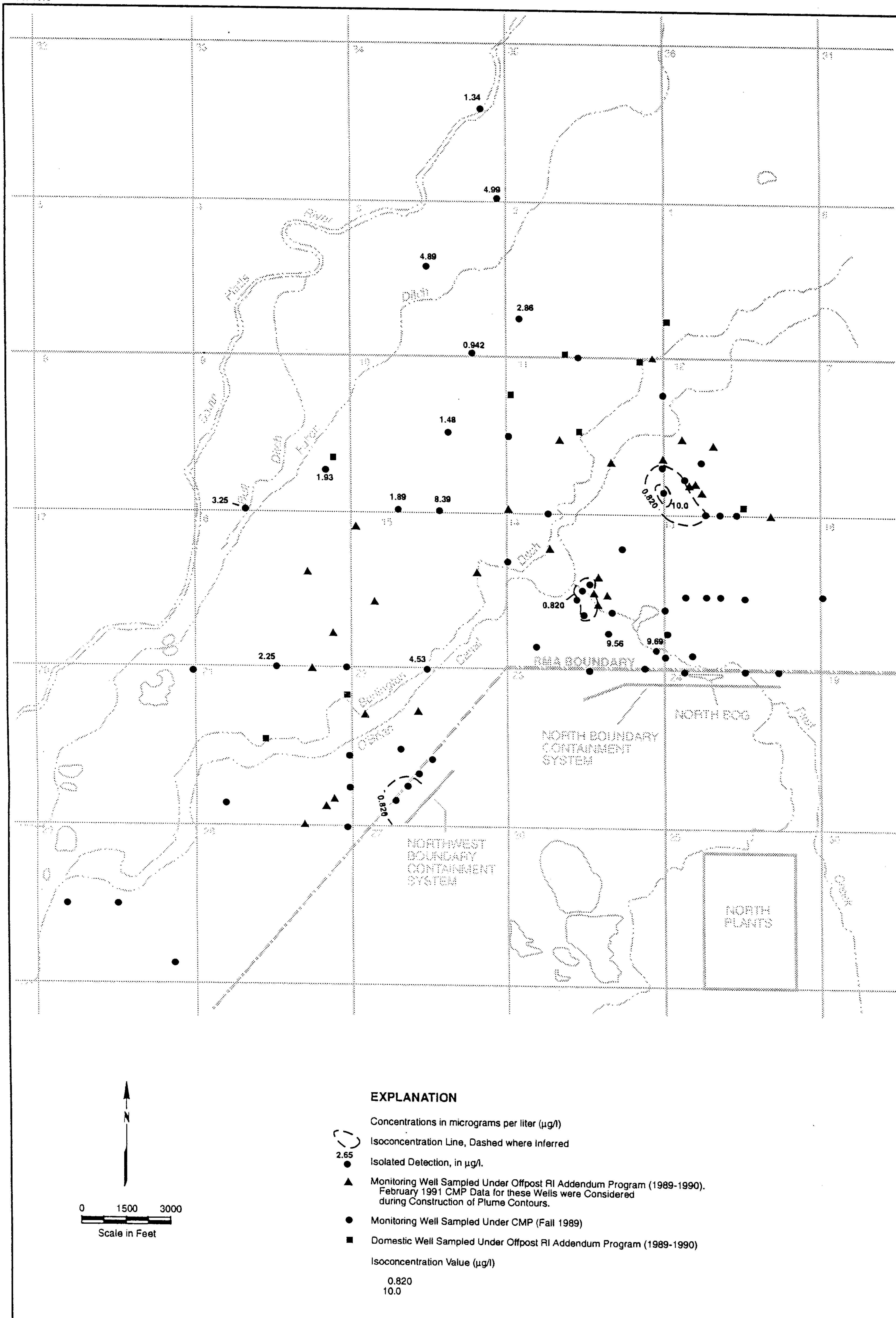
● Monitoring Well Sampled Under CMP (Fall 1989)

■ Domestic Well Sampled Under Offpost RI Addendum Program (1989-1990)

Isoconcentration Value (µg/l)
0.500
5.00
50.0

Prepared for: Program Manager for Rocky Mountain Arsenal Commerce City, Colorado	Figure 3.6 DISTRIBUTION OF CHLOROFORM IN THE OFFPOST UNCONFINED FLOW SYSTEM

RMA1 1018



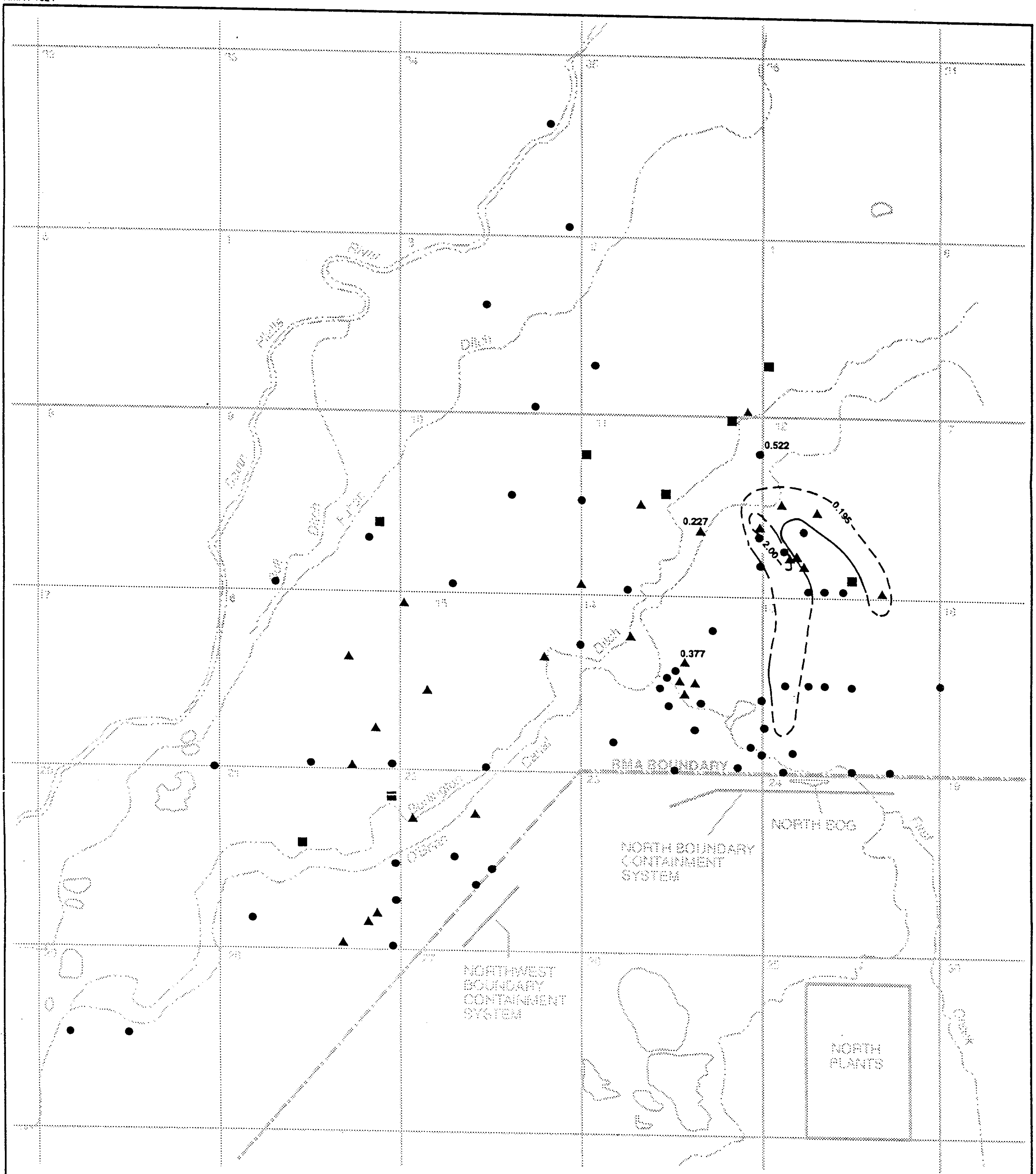
Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 3.7

DISTRIBUTION OF CHLOROBENZENE IN THE OFFPOST UNCONFINED FLOW SYSTEM

RMA1 1021



N

0 1500 3000

Scale in Feet

EXPLANATION

Concentrations in micrograms per liter (µg/l)

Isoconcentration Line, Dashed where Inferred

2.65 Isolated Detection, in µg/l.

▲ Monitoring Well Sampled Under Offpost RI Addendum Program (1989-1990). February 1991 CMP Data for these Wells were Considered during Construction of Plume Contours.

● Monitoring Well Sampled Under CMP (Fall 1989)

■ Domestic Well Sampled Under Offpost RI Addendum Program (1989-1990)

Isoconcentration Value (µg/l)

0.195
2.00

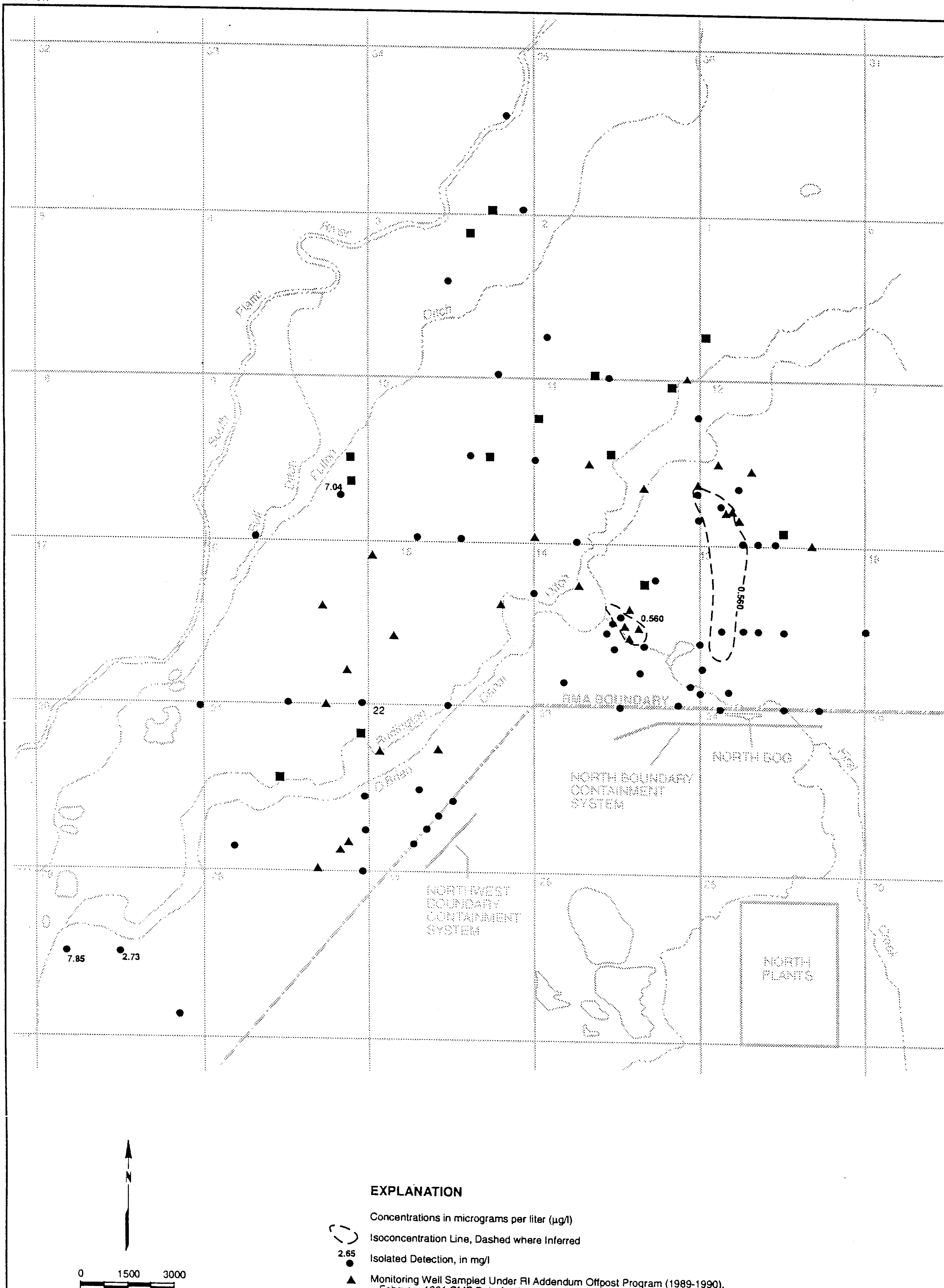
Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 3.8

DISTRIBUTION OF DIBROMOCHLOROPROPANE (DBCP) IN THE OFFPOST UNCONFINED FLOW SYSTEM

RMA1 1017



EXPLANATION

Concentrations in micrograms per liter (µg/l)

Isoconcentration Line, Dashed where Inferred

2.65 Isolated Detection, in mg/l

▲ Monitoring Well Sampled Under RI Addendum Offpost Program (1989-1990). February 1991 CMP Data for these Wells were Considered during Construction of plume Contours.

● Monitoring Well Sampled Under CMP (Fall 1989)

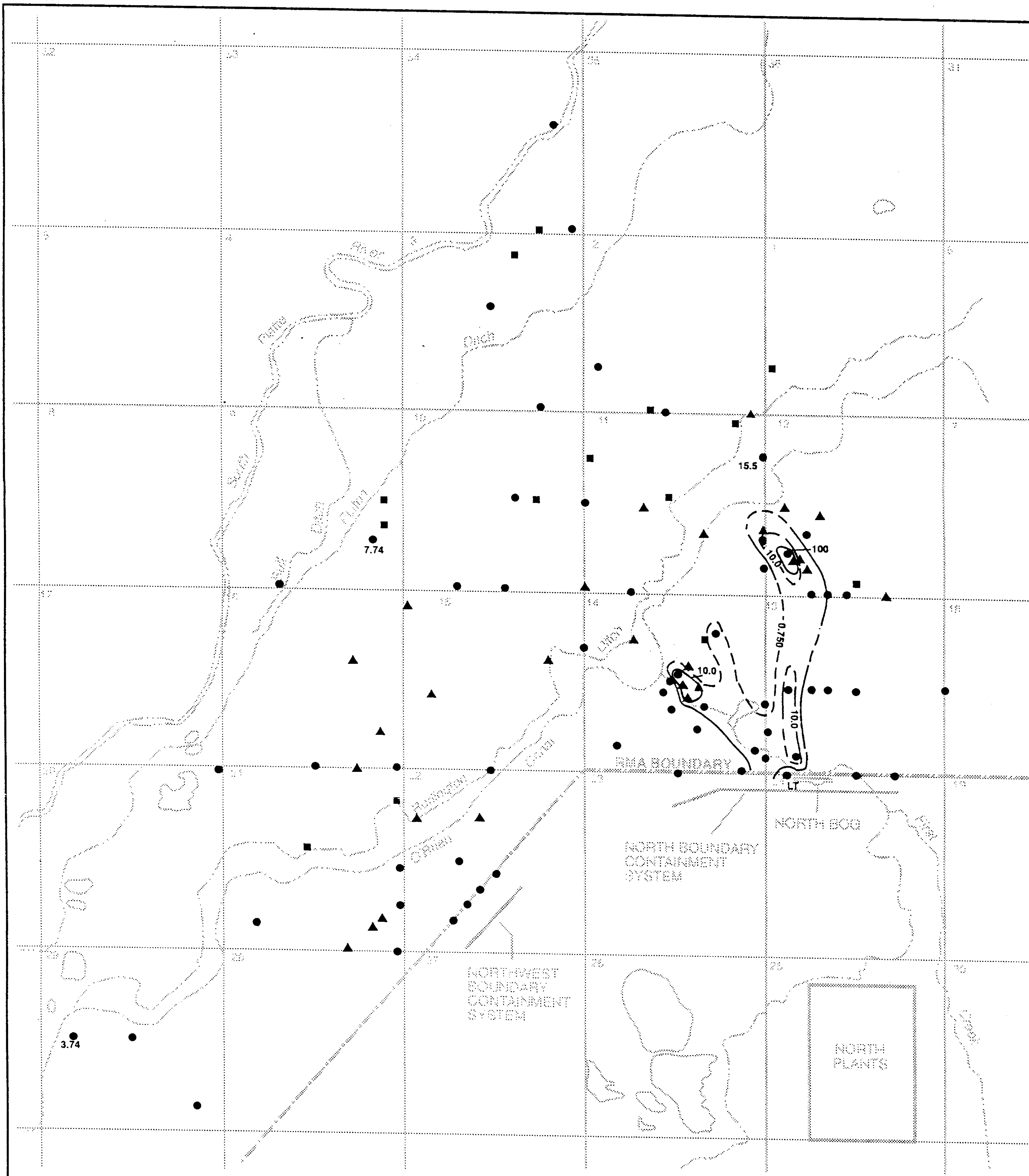
■ Domestic Well Sampled Under Offpost RI Addendum Program (1989-1990)

Isoconcentration Value (µg/l)

0.560

Prepared for:	Figure 3.9
Program Manager for Rocky Mountain Arsenal Commerce City, Colorado	DISTRIBUTION OF TRICHLOROETHENE (TRCLE) IN THE OFFPOST UNCONFINED FLOW SYSTEM

RMA1 1130



EXPLANATION

Concentrations in micrograms per liter (µg/l)

Isoconcentration Line, Dashed where Inferred

2.65 ● Isolated Detection, in µg/l

▲ Monitoring Well Sampled Under Offpost RI Addendum Program (1989-1990). February 1991 CMP Data for these Wells were Considered during Construction of Plume Contours.

● Monitoring Well Sampled Under CMP (Fall 1989)

■ Domestic Well Sampled Under Offpost RI Addendum Program (1989-1990)

Isoconcentration Value (µg/l)

0.750
10.0
100

N

0 1500 3000
Scale in Feet

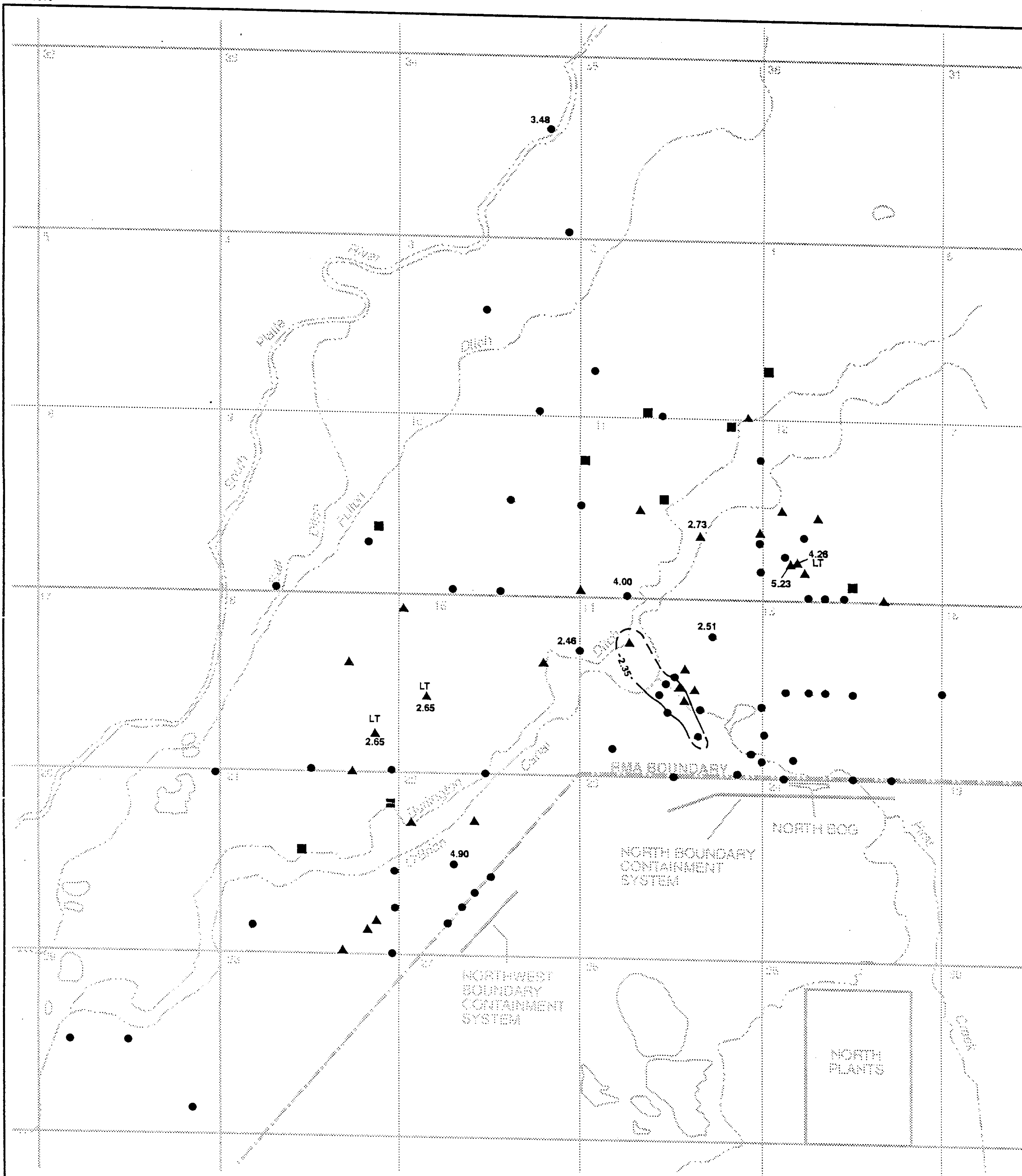
Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 3.10

DISTRIBUTION OF TETRACHLOROETHENE (TCLEE) IN THE OFFPOST UNCONFINED FLOW SYSTEM

RMA1 1016



EXPLANATION

Concentrations in micrograms per liter (µg/l)

Isoconcentration Line, Dashed where Inferred

2.65 LT — Isolated Detection, in µg/l. Two Values Shown if Sampled Twice. LT - Indicates Analyte was not Detected Above the Certified Reporting Limit.

▲ Monitoring Well Sampled Under Offpost RI Addendum Program (1989-1990)

● Monitoring Well Sampled Under CMP (Fall 1989)

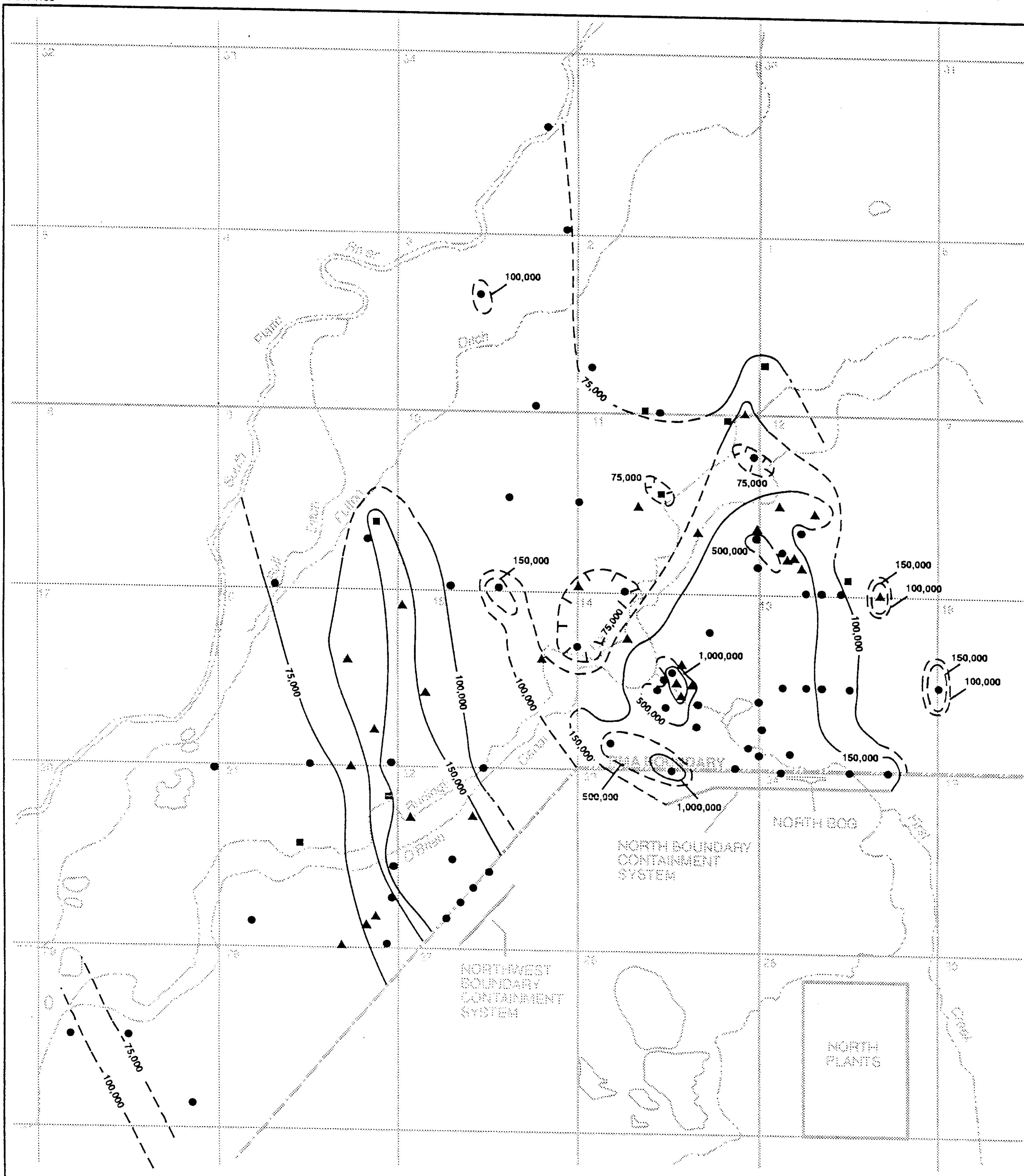
■ Domestic Well Sampled Under Offpost RI Addendum Program (1989-1990)

Isoconcentration Value (µg/l)

2.35

Prepared for: **Program Manager for** **Rocky Mountain Arsenal** **Commerce City, Colorado**	Figure 3.11 DISTRIBUTION OF ARSENIC IN THE OFFPOST UNCONFINED FLOW SYSTEM

RMA1 1186



EXPLANATION

Concentrations in micrograms per liter (µg/l)

Isoconcentration Line, Dashed where Inferred

▲ Monitoring Well Sampled Under Offpost RI Addendum Program (1989-1990)

● Monitoring Well Sampled Under CMP (Fall 1989)

■ Domestic Well Sampled Under Offpost RI Addendum Program (1989-1990)

Isoconcentration Value (µg/l)

75,000
150,000
500,000
1,000,000

N

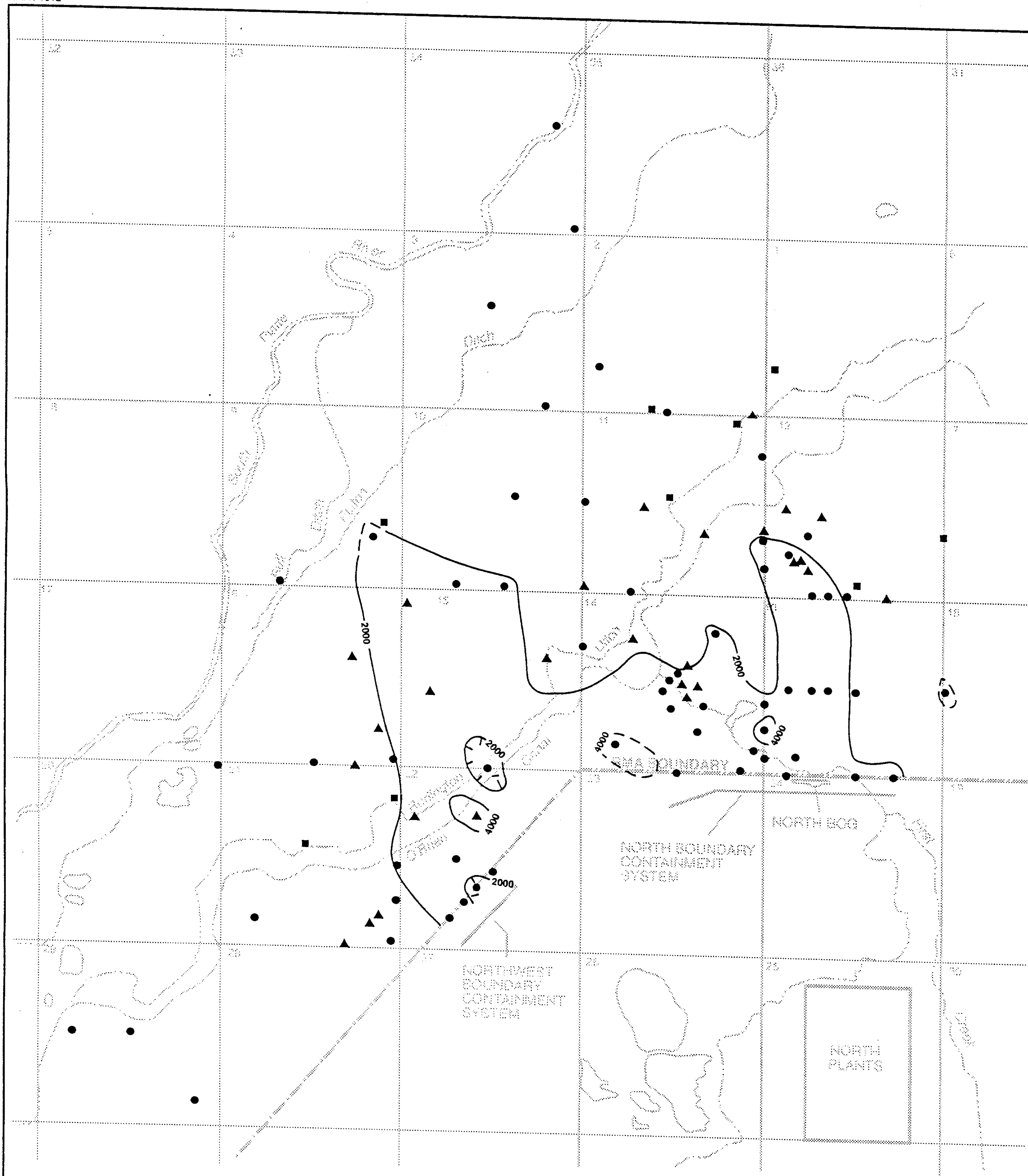
0 1500 3000
Scale in Feet

Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 3.12

DISTRIBUTION OF CHLORIDE IN THE OFFPOST UNCONFINED FLOW SYSTEM



EXPLANATION

Concentration in micrograms per liter (µg/l)

Isoconcentration Line, Dashed where Inferred

2.65 Isolated Detection or Concentration Less Than Lowest Isoconcentration Value, in µg/l

▲ Monitoring Well Sampled Under Offpost RI Addendum Program (IRA-A and RI Addendum, 1989-1990)

● Monitoring Well Sampled Under CMP (Fall 1989)

■ Domestic Well Sampled Under Offpost RI Addendum Program (1989-1990)

Isoconcentration Value (µg/l)

2000
4000

N

0 1500 3000
Scale in Feet

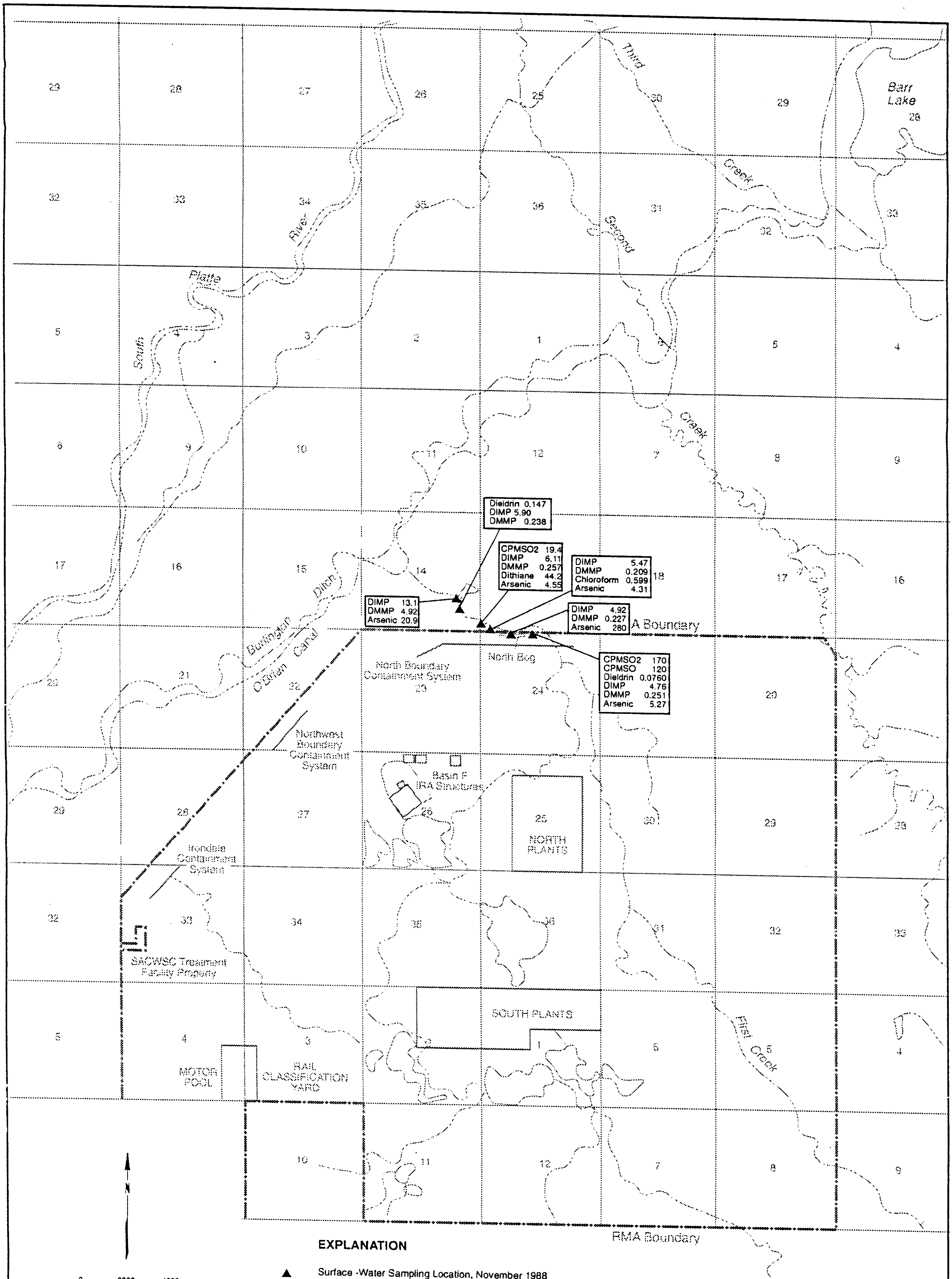
Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 3.13

DISTRIBUTION OF FLUORIDE IN THE OFFPOST UNCONFINED FLOW SYSTEM

RMA1 1025a



EXPLANATION

▲ Surface -Water Sampling Location, November 1988

Concentrations in micrograms per liter

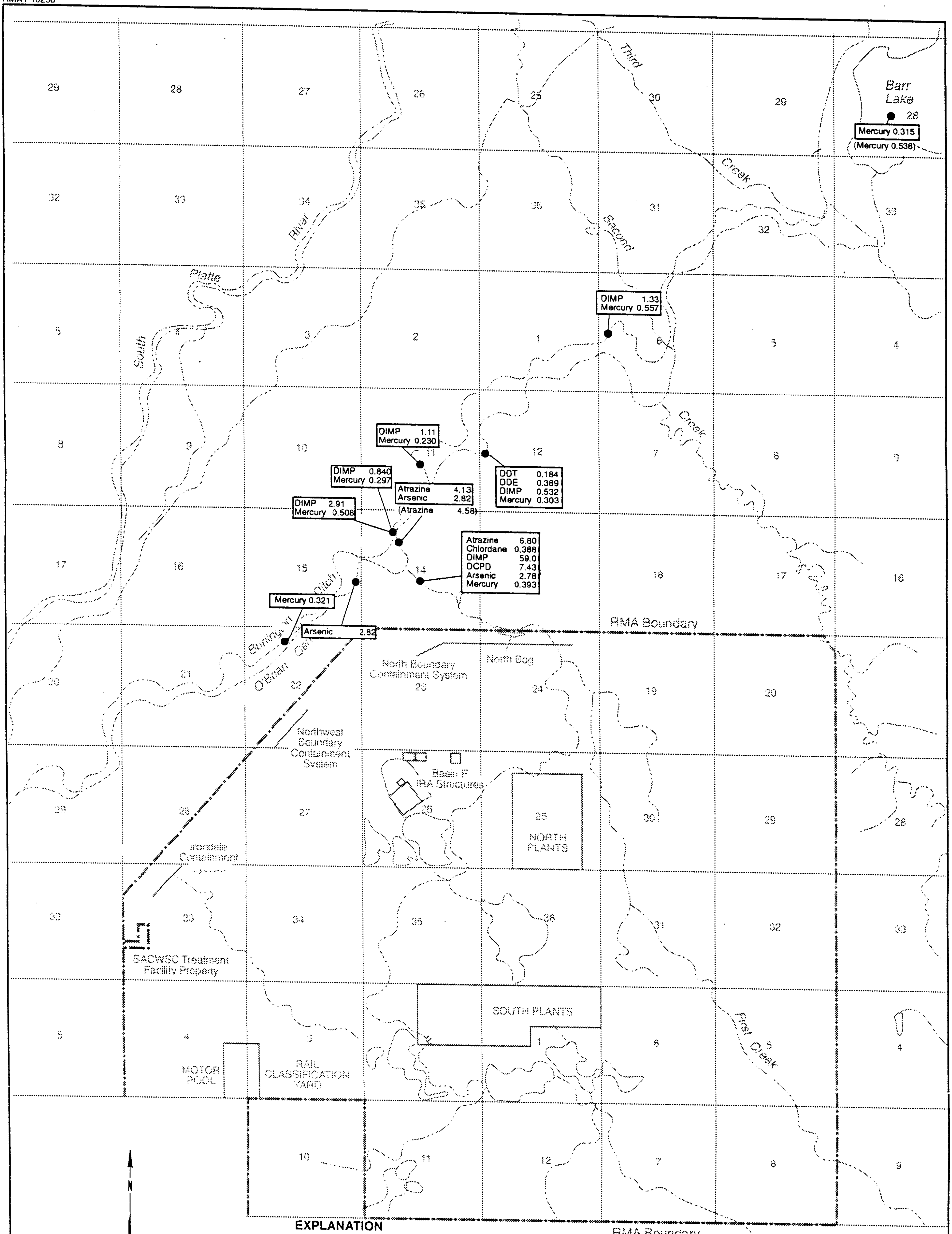
DIMP	Diisopropylmethylphosphonate
DMMP	Dimethylmethylphosphonate
CPMSO	p - Chlorophenylmethylsulfoxide
CPMSO2	p - Chlorophenylmethylsulfone

Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 4.1

DISTRIBUTION OF ORGANIC COMPOUNDS, ARSENIC, AND MERCURY DETECTED IN OFFPOST OPERABLE UNIT SURFACE WATER, NOVEMBER 1988



EXPLANATION

- ● Surface-Water Sampling Location, May-June 1990
- ( ) Duplicate Sample Results

Concentrations in micrograms per liter

DCPD	Dicyclopentadiene
DDT	2,2 – Bis (parachlorophenyl) – 1,1,1 – Trichloroethane
DDE	2,2 – Bis (parachlorophenyl) – 1,1 – Dichloroethane
DIMP	Diisopropylmethylphosphonate

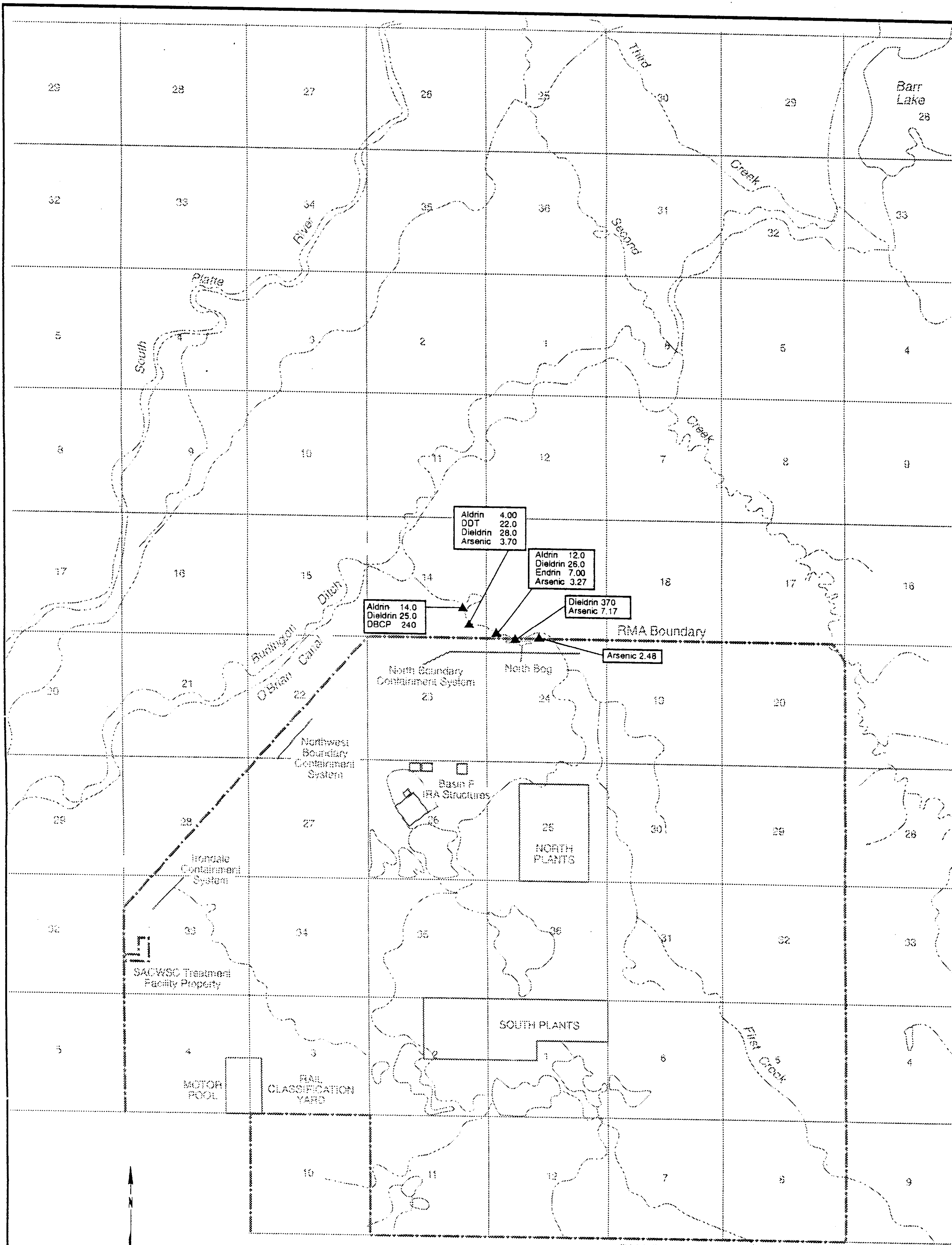
Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 4.2

DISTRIBUTION OF ORGANIC COMPOUNDS, ARSENIC, AND MERCURY DETECTED IN OFFPOST OPERABLE UNIT SURFACE WATER, MAY-JUNE 1990

RMA1 1026a



0 2000 4000

Scale in Feet

EXPLANATION

▲ Stream-Bottom Sediment Sampling Location, November 1988

( ) Duplicate Sample Results

Organic Compound Concentrations in micrograms per kilogram

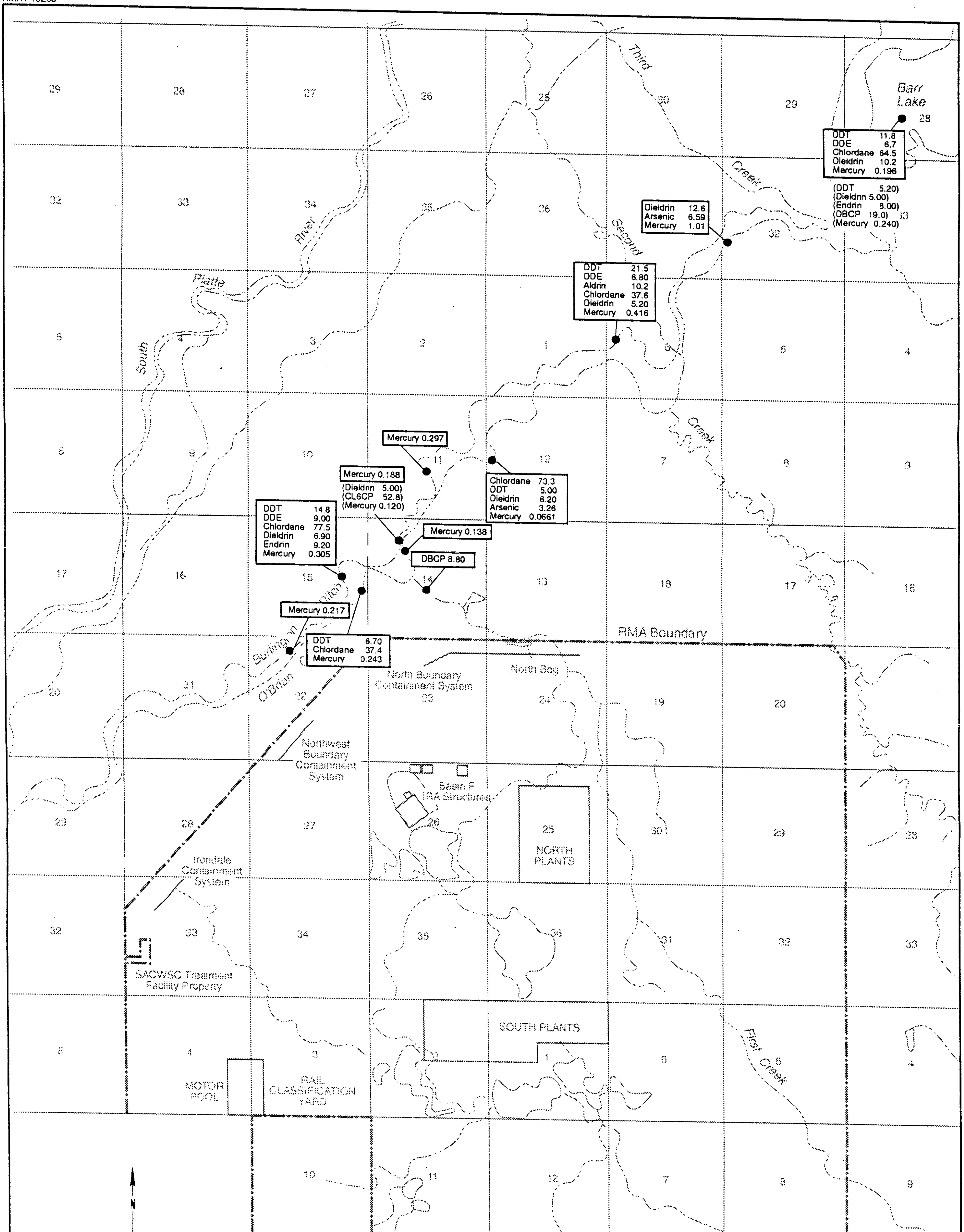
Arsenic and Mecury Concentrations in micrograms per gram

DBCP Dibromochloropropane

DDT 2,2 - Bis (parachlorophenyl) - 1,1,1 - Trichloroethane

Prepared for: **Program Manager for** **Rocky Mountain Arsenal** **Commerce City, Colorado**	Figure 5.1 DISTRIBUTION OF ORGANIC COMPOUNDS, ARSENIC, AND MERCURY DETECTED IN OFFPOST OPERABLE UNIT STREAM-BOTTOM SEDIMENT, NOVEMBER 1988

RMA1 1026b



0 2000 4000
Scale in Feet

EXPLANATION

● Stream-Bottom Sediment Sampling Location, May-June 1990
( ) Duplicate Sample Results

Organic Compound Concentrations in micrograms per kilogram
Arsenic and Mercury Concentrations in micrograms per gram

CL6CP	Hexachlorocyclopentadiene
DDT	2,2 – Bis (parachlorophenyl) – 1,1,1 – Trichloroethane
DDE	2,2 – Bis (parachlorophenyl) – 1,1 – Dichloroethane
DBCP	Dibromochloropropane

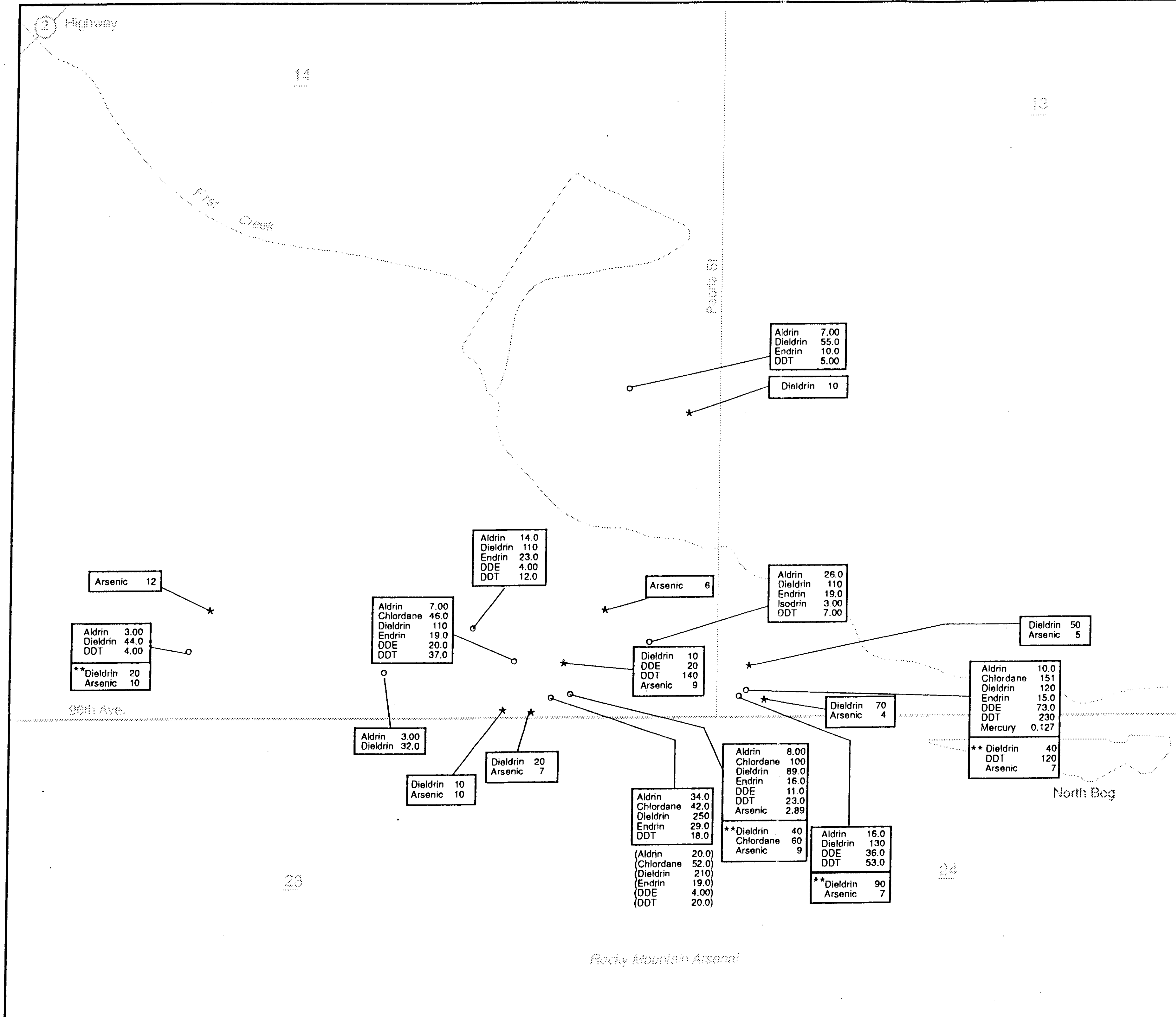
Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 5.2

DISTRIBUTION OF ORGANIC COMPOUNDS, ARSENIC, AND MERCURY DETECTED IN OFFPOST OPERABLE UNIT STREAM-BOTTOM SEDIMENT, MAY-JUNE 1990

RMA1 1007A1



EXPLANATION

o Surficial Soil Sampling Location, February 1989

( ) Duplicate Sample

★ CDH Surficial Soil Sampling Location, February 1989; Data are Accurate to Two Significant Figures.

13 Section Number

CDH Colorado Department of Health

HLA Harding Lawson Associates

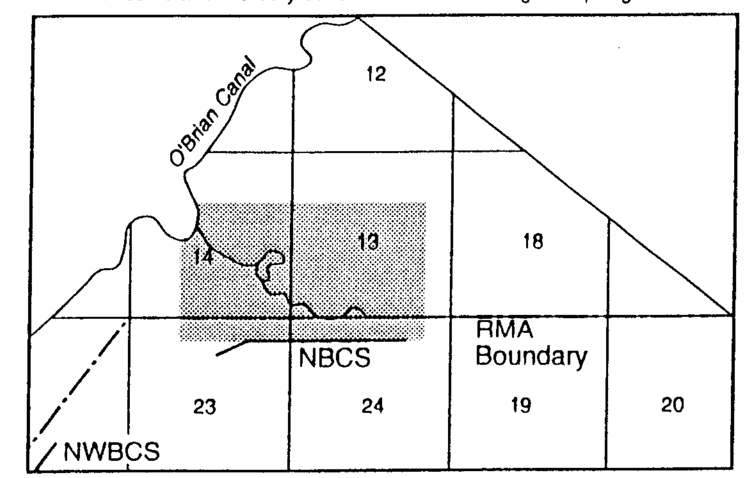
★★ Indicates CDH Results for Samples Collocated with HLA Samples

DDT 2,2 - Bis (parachlorophenyl) - 1,1,1 - Trichlorothane

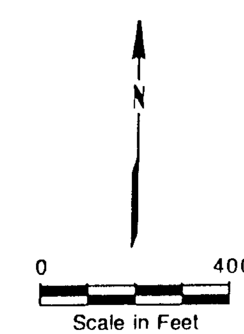
DDE 2,2 - Bis (parachlorophenyl) - 1,1 - Dichlorethene

Notes: Organochloride pesticide concentrations in micrograms per kilogram

Arsenic and Mercury concentrations in micrograms per gram



INDEX MAP

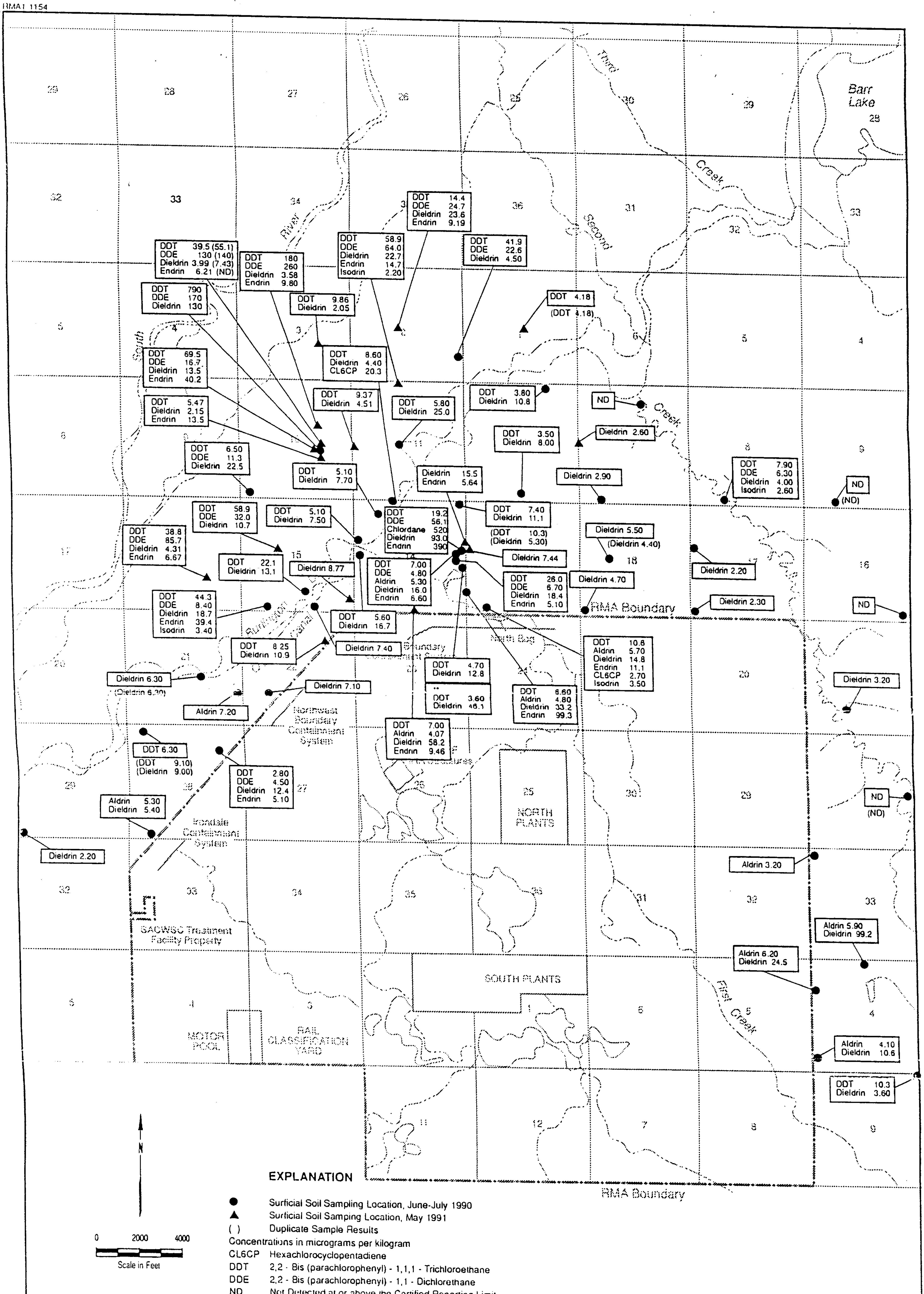


Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 6.1

DISTRIBUTION OF ORGANOCHLORINE PESTICIDES, ARSENIC, AND MERCURY DETECTED IN 96TH AVENUE RESIDENTIAL AREA OFFPOST SURFICIAL SOIL, FEBRUARY 1989



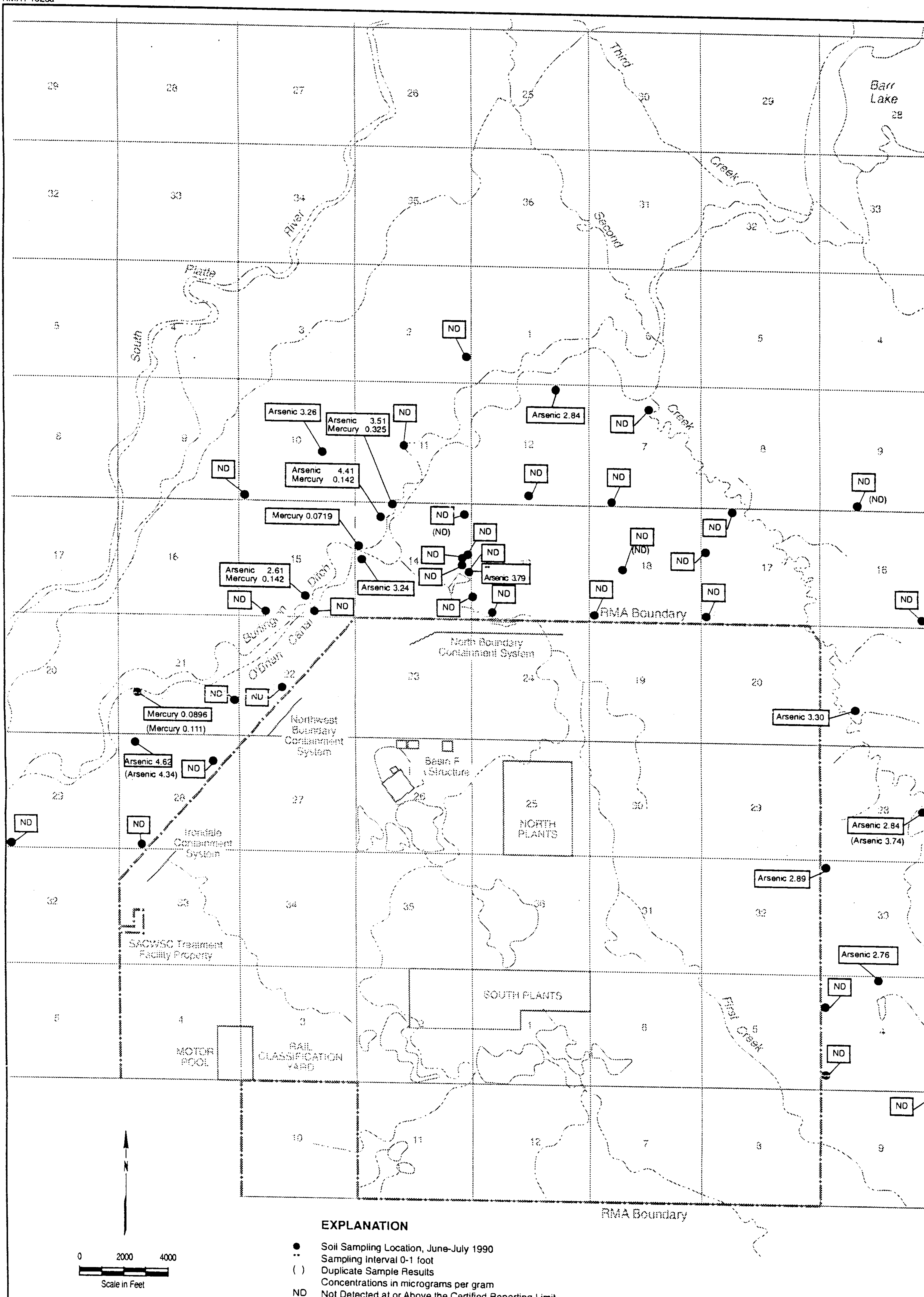
Prepared for:
Program Manager for Rocky Mountain Arsenal

Commerce City, Colorado

Figure 6.2

DISTRIBUTION OF ORGANOCHLORINE PESTICIDES DETECTED IN OFFPOST SOIL, JUNE-JULY 1990 AND MAY 1991

RMA1 1023a



EXPLANATION

● Soil Sampling Location, June-July 1990
** Sampling Interval 0-1 foot
( ) Duplicate Sample Results
Concentrations in micrograms per gram
ND Not Detected at or Above the Certified Reporting Limit

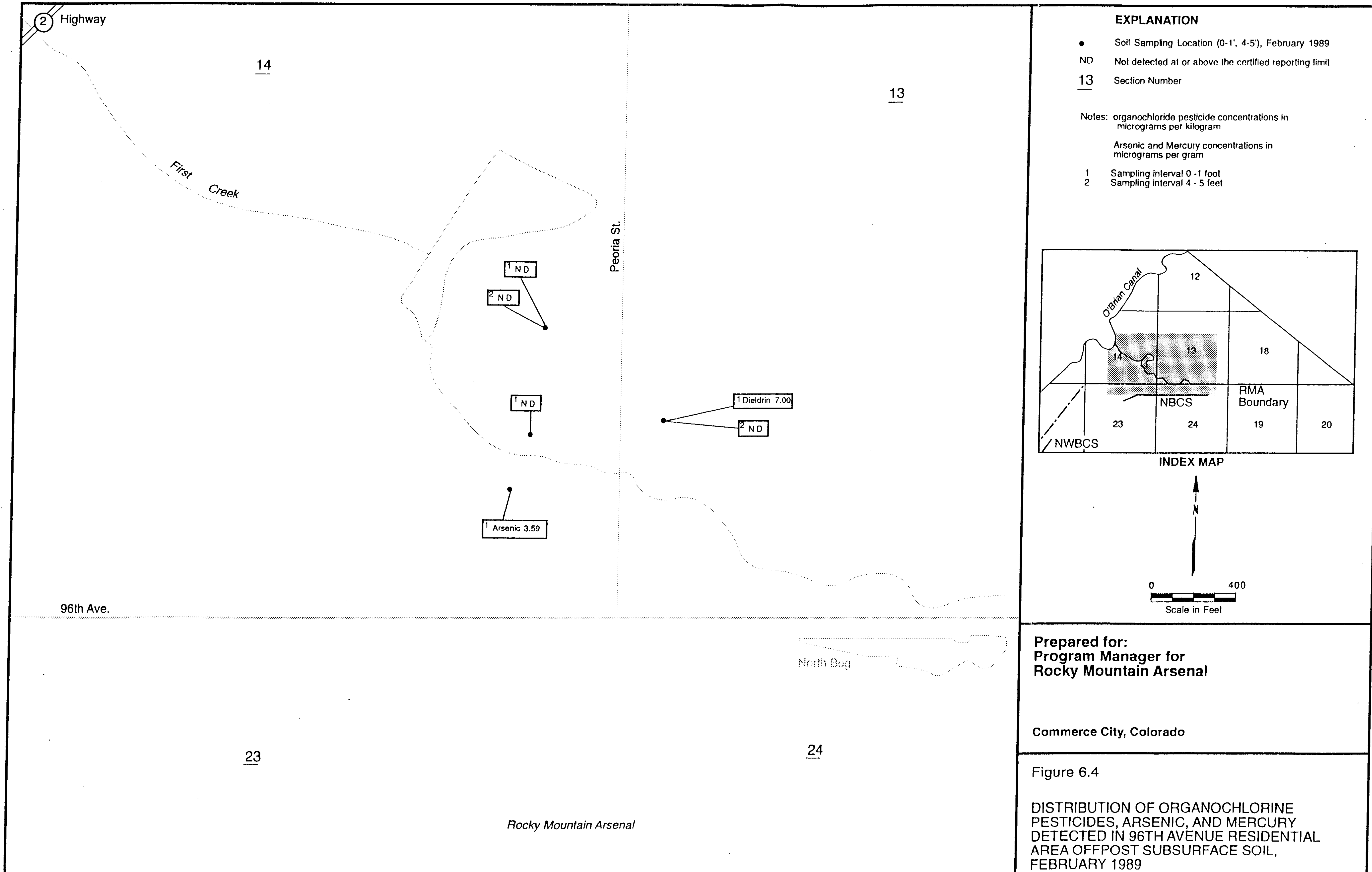
Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 6.3

DISTRIBUTION OF ARSENIC AND MERCURY DETECTED IN OFFPOST SURFICIAL SOIL, JUNE-JULY 1990

RMA1 1007aa

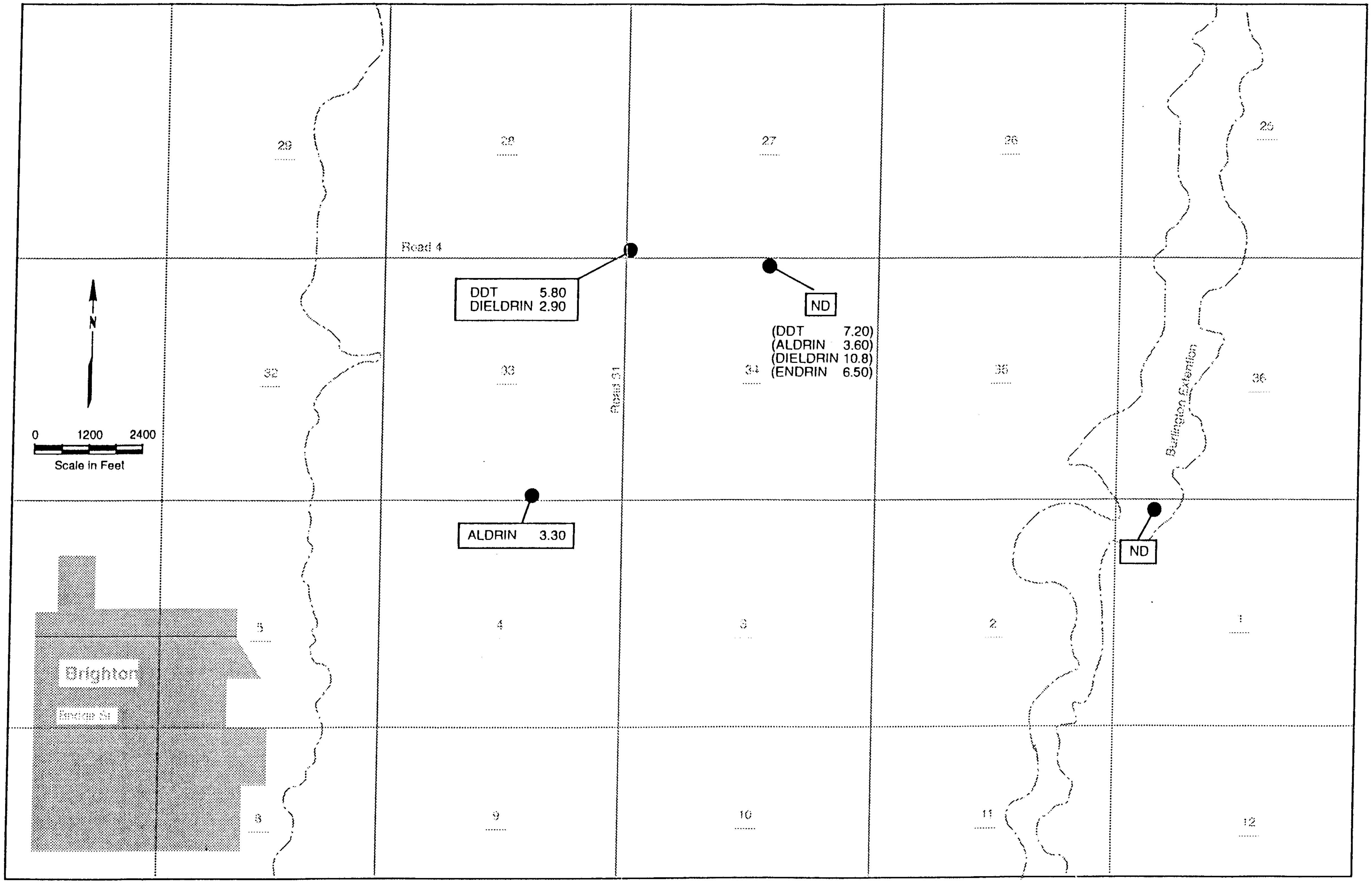


Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 6.4

DISTRIBUTION OF ORGANOCHLORINE PESTICIDES, ARSENIC, AND MERCURY DETECTED IN 96TH AVENUE RESIDENTIAL AREA OFFPOST SUBSURFACE SOIL, FEBRUARY 1989



EXPLANATION

● Background Surficial Soil Sampling Location, July 1990

() Sample is a Duplicate

Concentration in micrograms per kilogram

ND Not Detected at or Above the Certified Reporting Limit

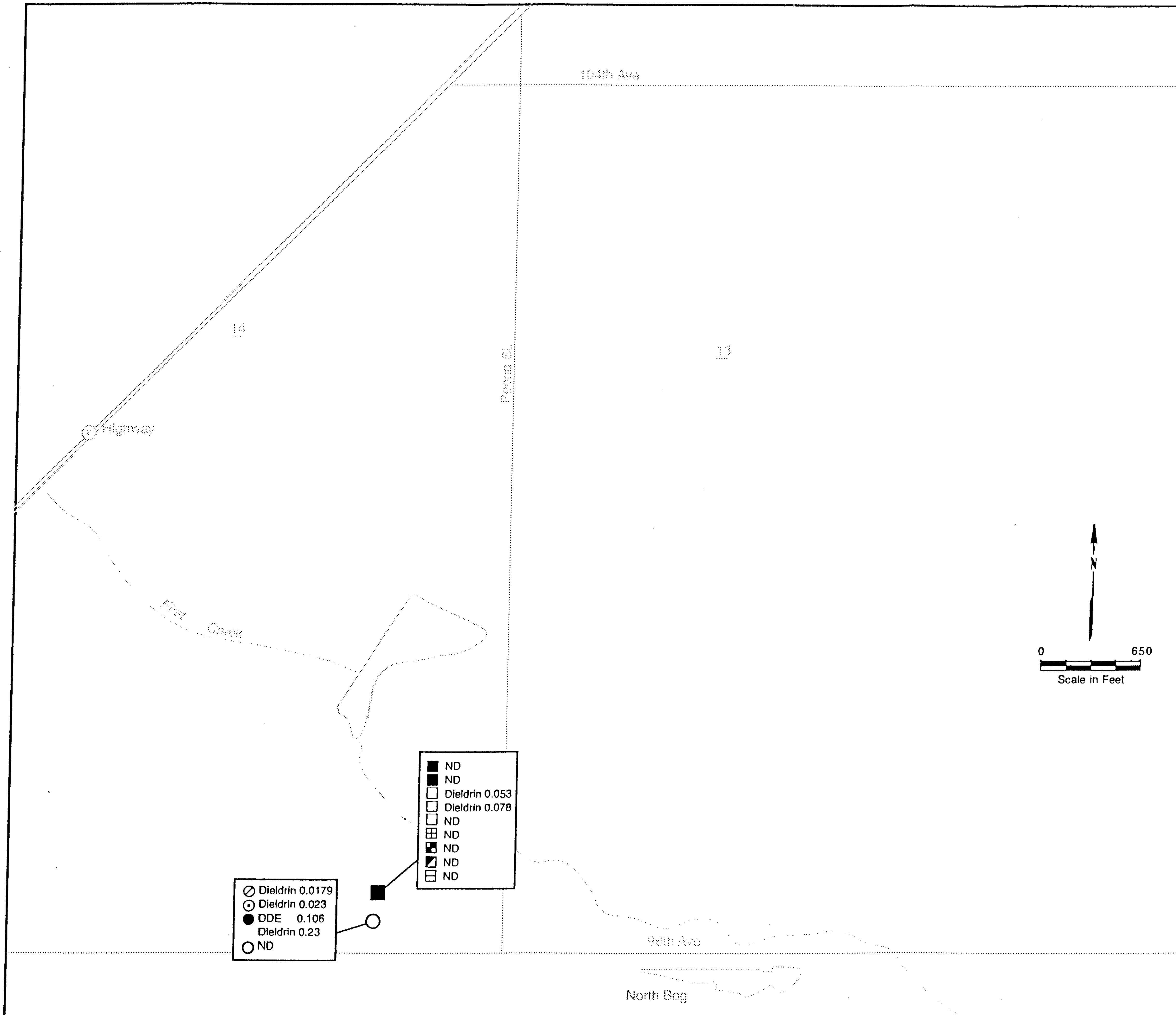
DDT 2,2 - Bis (parachlorophenyl) -1,1,1 - Trichloroethane

Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 6.5

DISTRIBUTION OF ORGANOCHLORINE PESTICIDES, ARSENIC, AND MERCURY DETECTED IN OFFPOST BACKGROUND SURFICIAL SOIL NEAR BRIGHTON, CO



EXPLANATION

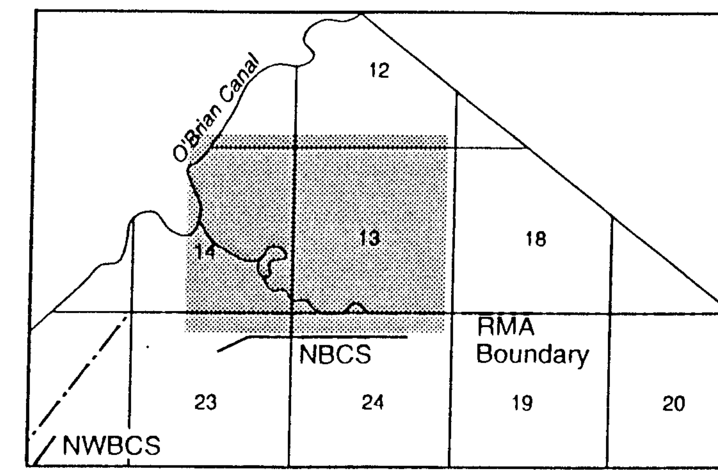
- Chicken Sampling Location
  - Chicken Egg
  - Chicken Liver
  - Chicken Fat/Skin
  - Chicken Muscle
- Cow Sampling Location
  - Cow Milk
  - Cow Fat
  - Cow Brain
  - Cow Muscle
  - Cow Liver
  - Cow Kidney

Concentrations are in micrograms per gram

DDE 2,2-Bis(parachlorophenyl)-1,1-Dichloroethene

ND Compounds not detected at or above Certified Reporting Limit

13 Section Number



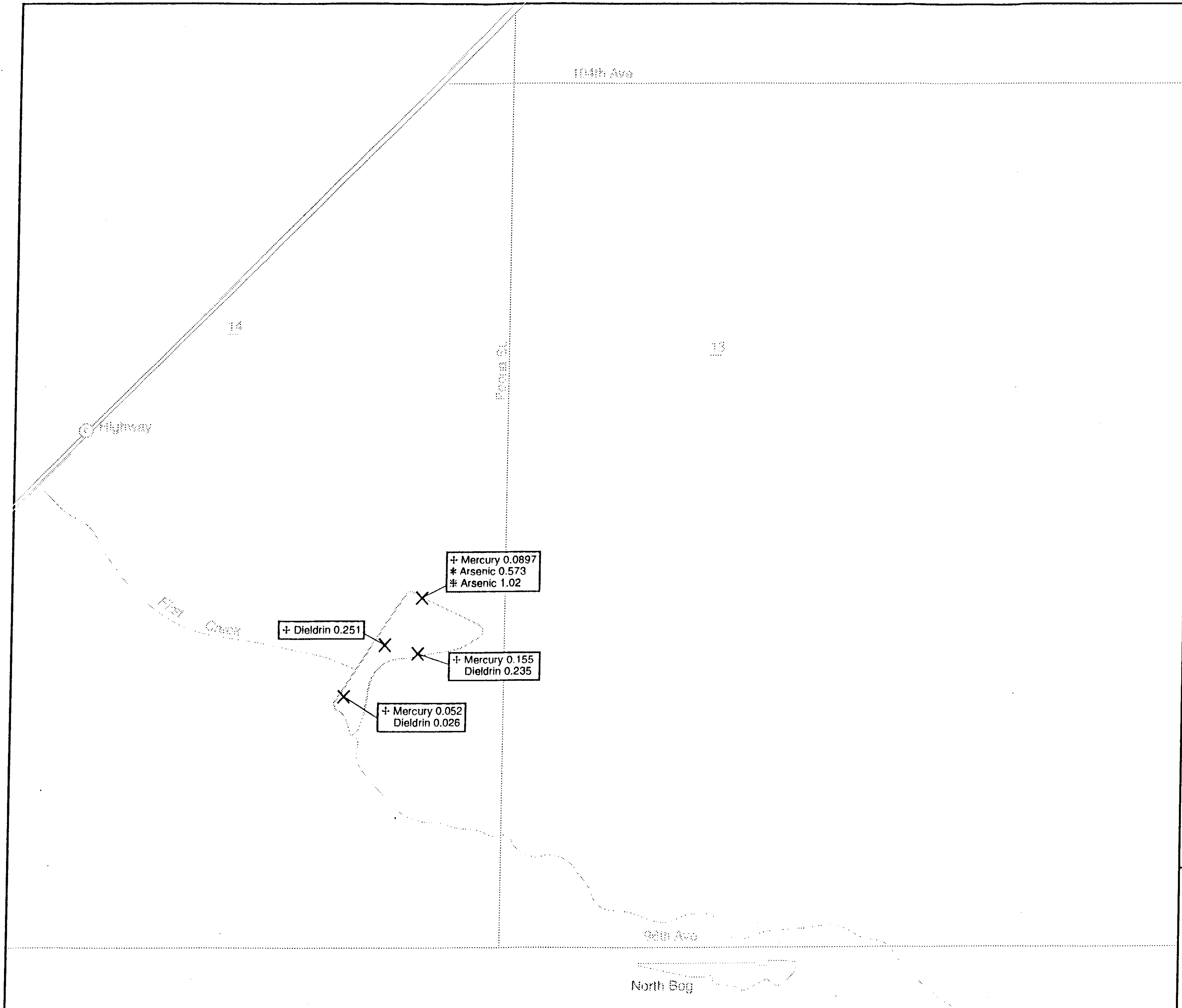
INDEX MAP

Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 7.1

DISTRIBUTION OF ORGANIC COMPOUNDS, ARSENIC, AND MERCURY IN OFFPOST OPERABLE UNIT AGRICULTURAL BIOTA

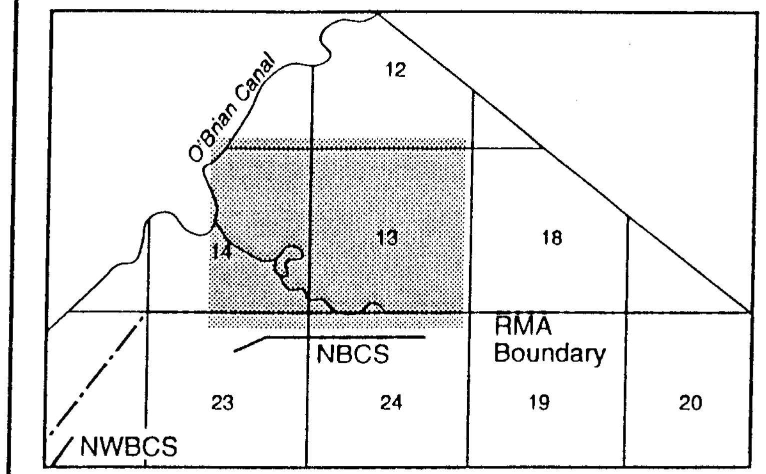


EXPLANATION

Aquatic Biota Sampling Location
- Fish
- Crayfish
- Algae

Concentrations are in micrograms per gram

13 Section Number



INDEX MAP

N

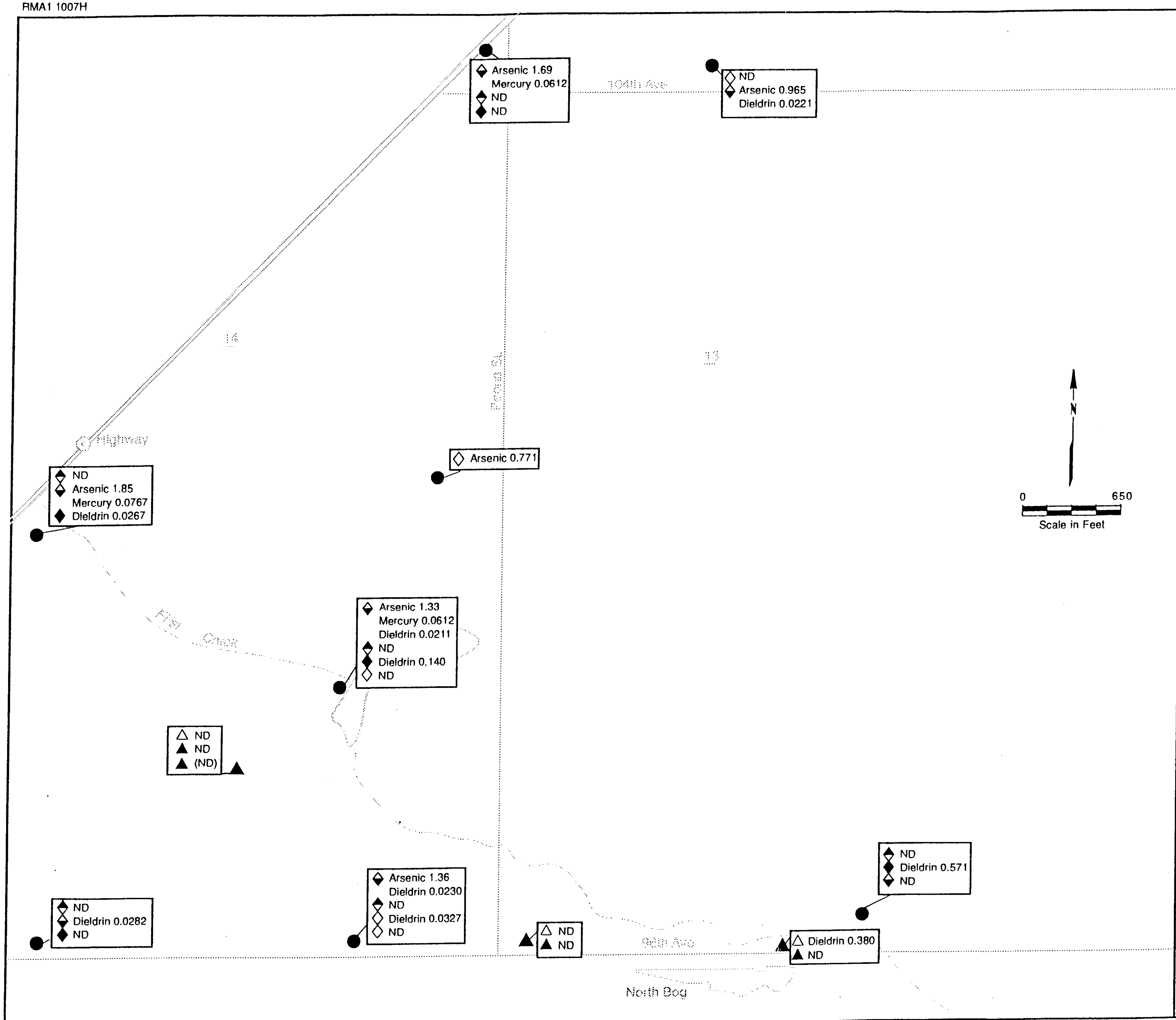
0 650
Scale in Feet

Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 7.2

DISTRIBUTION OF ORGANIC COMPOUNDS, ARSENIC, AND MERCURY IN OFFPOST OPERABLE UNIT AQUATIC BIOTA



Prepared for:
Program Manager for
Rocky Mountain Arsenal

Commerce City, Colorado

Figure 7.3

DISTRIBUTION OF ORGANIC COMPOUNDS, ARSENIC, AND MERCURY IN OFFPOST OPERABLE UNIT TERRESTRIAL BIOTA

TECHNICAL SUPPORT FOR ROCKY MOUNTAIN ARSENAL

Offpost Operable Unit
Remedial Investigation

Final Addendum

Volume II of II

March 30, 1992
Contract Number DAAA15-88-0021

PREPARED BY

Harding Lawson Associates
Environmental Science and Engineering

PREPARED FOR

PROGRAM MANAGER FOR ROCKY MOUNTAIN ARSENAL

THIS DOCUMENT IS INTENDED TO COMPLY WITH THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969.

THE INFORMATION AND CONCLUSIONS PRESENTED IN THIS REPORT REPRESENT THE OFFICIAL POSITION OF THE DEPARTMENT OF THE ARMY UNLESS EXPRESSLY MODIFIED BY A SUBSEQUENT DOCUMENT. THIS REPORT CONSTITUTES THE RELEVANT PORTION OF THE ADMINISTRATION RECORD FOR THIS CERCLA OPERABLE UNIT.

Appendix A

LITHOLOGIC LOGS, CONSTRUCTION SUMMARIES, COMPLETION REPORTS AND SURVEY DATA

LIST OF FIGURES

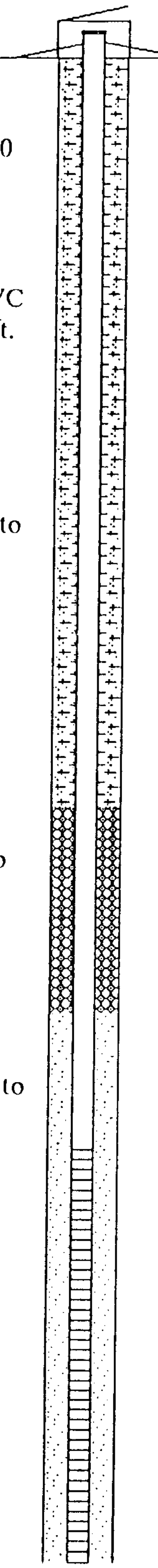
TOP OF CASING

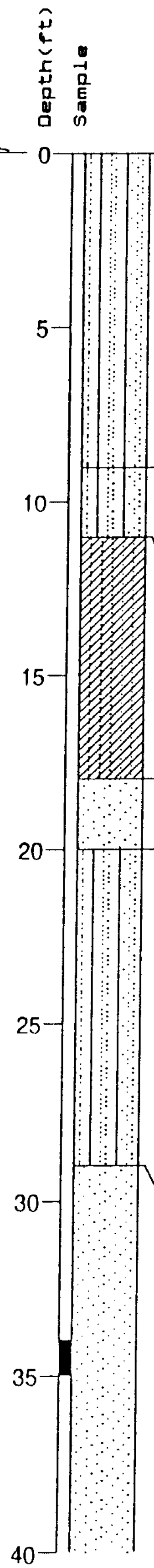
ELEVATION 5092.06 ft.

EQUIPMENT B-57 Mobile

ELEVATION 5090.6 ft. DATE 11/9/89

GROUND SURFACE

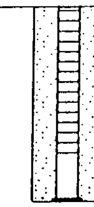


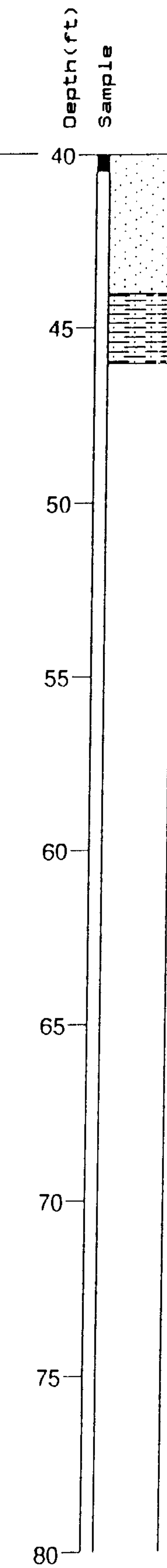


Top of Casing at 1.8 ft. above ground level	SM, silty sand, 5 YR 5/6 - medium brown, non-plastic, loose, dry, alluvium
12 1/4-In.-Dia. Borehole 0 to 45 ft.	Occasional coarse grained sand
4-In.-Dia. Schedule 40 PVC Blank Casing +1.8 to 29 ft.	SM, silty sand, 20% silt, 5% clay, very fine to fine grained, 5 YR 4/4 - medium brown, non-plastic, loose, moist, alluvium
Bentonite-Cement Seal 0 to 20 ft.	SC, clayey sand, 20% clay, 5 YR 3/4 - medium brown, slightly plastic, very soft, moist, alluvium
	Silty sand lenses of 0.5 feet at 15 and 17.5 feet
	SP, sand, fine to medium grained, trace silt, 5 YR 6/4 - light brown, non-plastic, loose, moist, alluvium
Bentonite-Pellet Seal 20 to 25.5 ft.	SM, silty clayey sand, 40% silt, 20% clay, 5 YR 5/2 - pale brown, slightly plastic, very soft, moist, alluvium
	Color changes to 10 YR 6/2 - pale yellow brown
	Organic material and mottled iron-staining
CSSI 10-20 Sandpack 25.5 to 45 ft.	Moisture increases to wet
	Decreasing sand content
	⊻ Water Level at 31.5 feet - 11/09/89
4-In.-Dia. Slotted Screen (0.020 Inch) 29 to 44 ft.	SW, gravelly sand, very coarse sand, trace silt, trace clay, 5 YR 6/4 - light brown, non-plastic, loose, saturated, alluvium
	Clay lense at 32.5 feet
	No recovery - flowing sand

(Continuation of Well)

(Continuation of Log)





	Increasing gravel content
4-In.-Dia. Schedule 40 PVC Blank Silt Trap 44 to 45 ft.	Increasing clay content
Bottom Well Cap at 45 ft.	CLAYSTONE, 10 YR 2/2 - yellow brown, low hardness, weak, slightly fissle, bedrock
Hole Cleaned Out to 45 ft.	Total Depth = 46.0 feet

Notes: See Detail A for surface completion.
All PID readings equal to background.
Munsell color chart used.

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A1

WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37429

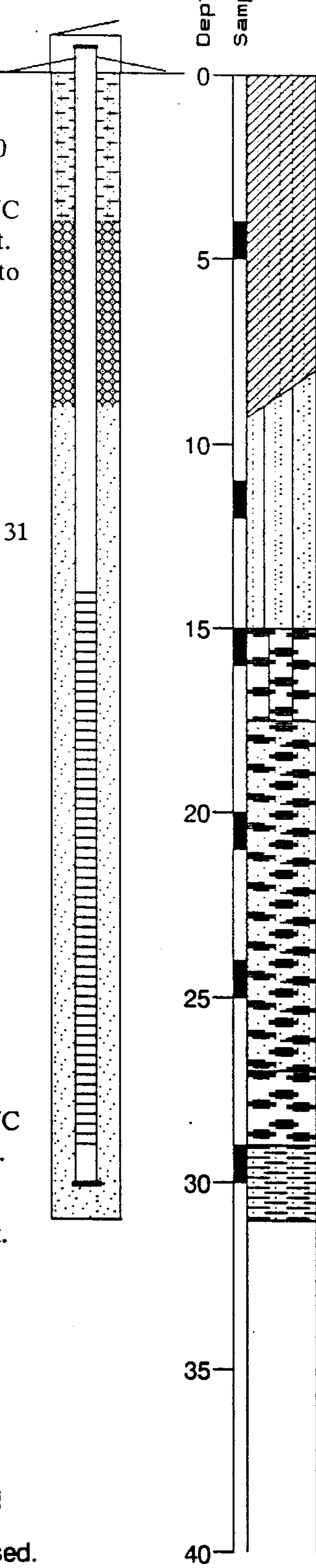
TOP OF CASING

ELEVATION 5070.21 ft.

EQUIPMENT B-57 Mobile

ELEVATION 5068.8 ft. DATE 11/13/89

GROUND SURFACE



Well completion:

Top of Casing at 1.8 ft. above ground level

12 1/4-In.-Dia. Borehole 0 to 31 ft.

4-In.-Dia. Schedule 40 PVC Blank Casing +1.8 to 14 ft.

Bentonite-Cement Seal 0 to 4 ft.

Bentonite-Pellet Seal 4 to 9 ft.

CSSI 10-20 Sandpack 9 to 31 ft.

4-In.-Dia. Slotted Screen(0.020 Inch) 14 to 29 ft.

4-In.-Dia. Schedule 40 PVC Blank Silt Trap 29 to 30 ft.

Bottom Well Cap at 30 ft.

Hole Cleaned Out to 31 ft.

Log of boring:

SC, clayey sand, trace silt, 10 YR 3/3 - dark brown, non-plastic, loose, moist, alluvium

Color changes to 10 YR 8/3 - light yellow brown, moisture decreases to dry

SM, silty sand, 10 YR 6/6 - dark yellowish orange, non-plastic, loose, moist, alluvium (trace organic material)

Color changes to 10 YR 5/4 - moderate yellowish brown, moisture increases to wet

GM, silty gravel, trace clay, 5 YR 5/6 - light brown, non-plastic, loose, wet, alluvium(feldspar rich gravel)

Water Level at 16.5 feet - 11/13/89

GP, sandy gravel, with gravels sub-rounded, some cobbles, 5 YR 5/6 - light brown, non-plastic, loose, saturated, alluvium (abundant muscovite)

Increasing clay content

GC, clayey gravel, 5 YR 5/6 - light brown, non-plastic, medium dense, saturated, alluvium

SILTSTONE, some micaceous very fine sand, trace clay, 10 YR 6/6 - dark yellowish orange, moderately hard, weak, bedrock

Total Depth = 31.0 feet

Notes: See Detail A for surface completion.
All PID readings equal to background.
Munsell color chart used.

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A2

WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37430

TOP OF CASING
ELEVATION 5101.55 ft.

EQUIPMENT B-57 Mobile

ELEVATION 5100.0 ft. DATE 11/21/89

GROUND SURFACE

Top of Casing at 1.9 ft. above ground level

12 1/4-In.-Dia. Borehole 0 to 48 ft.

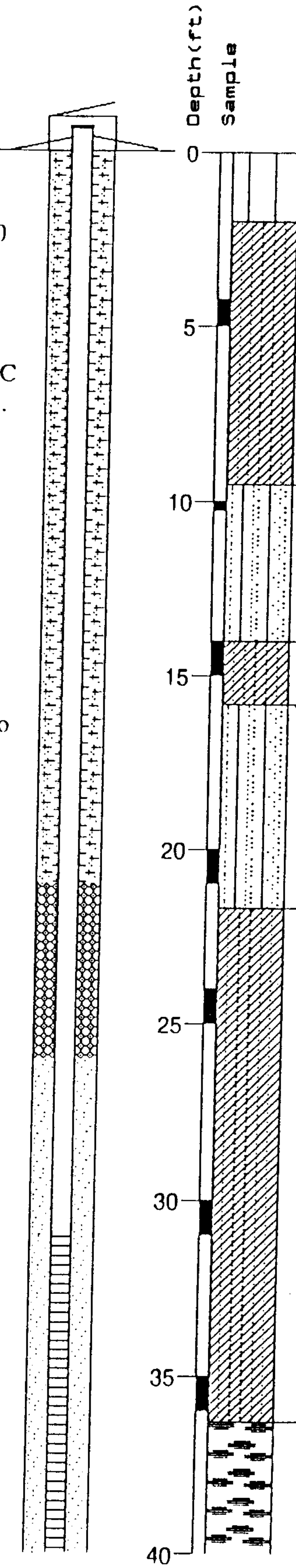
4-In.-Dia. Schedule 40 PVC Blank Casing +1.9 to 31 ft.

Bentonite-Cement Seal 0 to 21 ft.

Bentonite-Pellet Seal 21 to 26 ft.

CSSI 10-20 Sandpack 26 to 48 ft.

4-In.-Dia. Slotted Screen (0.020 Inch) 31 to 45 ft.



ML, sandy silt, very fine grained, trace clay, 10 YR 4/4 - dark yellowish brown, slightly plastic, soft, moist, alluvium

SC, clayey sand, very fine grained, trace silt, 10 YR 7/6 - yellow, non-plastic, loose, moist, alluvium

Sand size increases to fine

SM, silty sand, 10 YR 7/6 - yellow, non-plastic, loose, moist, alluvium

SC, clayey sand, some silt, 10 YR 5/8 - yellowish brown, slightly plastic, medium stiff, moist, alluvium

SM, silty sand, trace clay, 10 YR 5/8 - yellowish brown, non-plastic, loose, moist, alluvium

SC, clayey sand, some silt, 10 YR 5/8 - yellowish brown, slightly plastic, medium stiff, moist, alluvium

Moisture increases to wet

Sand size increases to medium

Water Level at 31.9 feet - 11/21/89

GC, clayey gravel, some sand, 10 YR 6/4 - light yellowish brown, non-plastic, loose, saturated, alluvium

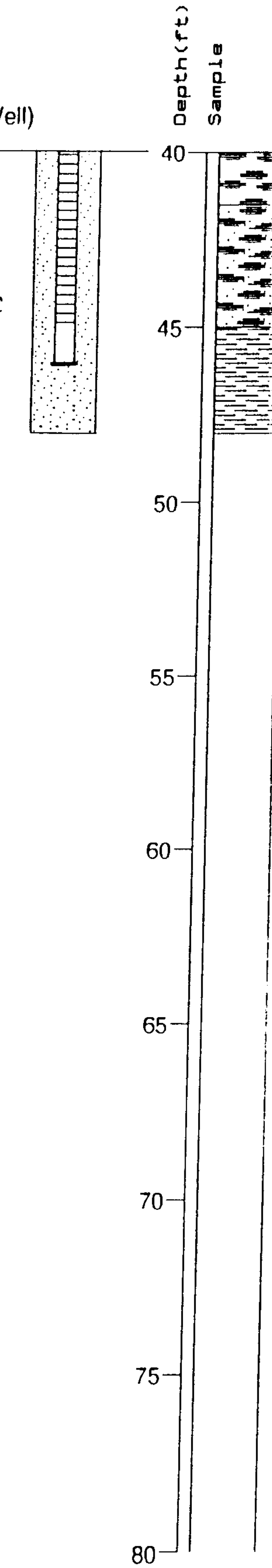
Decreasing clay content

(Continuation of Well)

4-In.-Dia. Schedule 40 PVC Blank Silt Trap 45 to 46 ft.

Bottom Well Cap at 46 ft.

Hole Cleaned Out to 48 ft.



(Continuation of Log)

GP, sandy gravel, trace silt, 10 YR 7/3 - pale brown, loose, saturated, alluvium(some arkose gravel)

SHALE, 2.5 YR 1/5 - gray, hard, moderately strong, massive, bedrock

Total Depth = 48.0 feet

Notes: See Detail A for surface completion.
All PID readings equal to background.
Munsell color chart used.

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A3

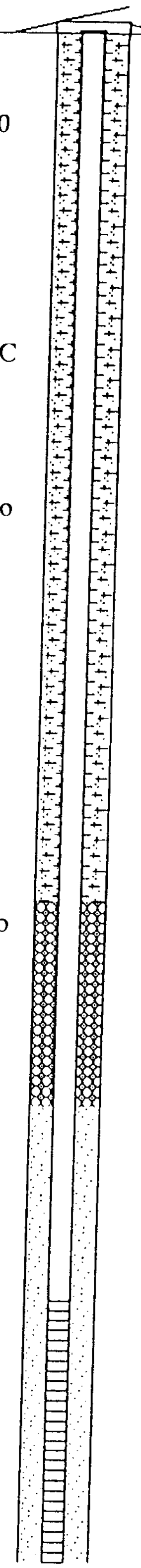
WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37433

TOP OF CASING
ELEVATION 5089.85 ft.

EQUIPMENT B-57 Mobile

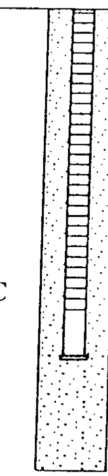
ELEVATION 5090.31 ft. DATE 11/14/89

GROUND SURFACE



Depth (ft)	Description
0	ML, sandy silt, very fine grained, trace clay, 10 YR 5/8 - yellowish brown, slightly plastic, soft, moist, alluvium
	SM, silty sand, 10 YR 5/8 - yellowish brown, non-plastic, loose, moist, alluvium
5	SP, sand, fine to medium grained, 10 YR 5/8 - yellowish brown, non-plastic, loose, moist, alluvium
10	SW, sand, fine to coarse grained, trace silt, 10 YR 5/8 - yellowish brown, non-plastic, loose, moist, alluvium
	SC, clayey sand, 10 YR 7/8 - yellow, non-plastic, moderately dense, moist, alluvium
	SM, silty sand, 10 YR 5/8 - yellowish brown, non-plastic, loose, moist, alluvium
15	Increasing clay content
	SP, sand, fine grained, 10 YR 8/8 - yellow, non-plastic, loose, moist, alluvium
20	
25	Color changes to 10 YR 8/4 - very pale brown
30	Increasing clay content
	SM, silty sand, trace clay, 5 YR 4/4 - reddish brown, non-plastic, moderately dense, moist, alluvium (little muscovite)
	SW, gravelly sand, coarse grained, 10 YR 6/8 - brownish yellow, loose, wet, alluvium
35	Water Level at 34.7 feet - 11/14/89
	GP, sandy gravel, 2.5 YR 5/8 - red, non-plastic, loose, saturated, alluvium (arkose rich gravels)
40	

(Continuation of Well)



(Continuation of Log)

Depth (ft)	Description
40	
45	
	CLAYSTONE, with some gravels, hard, moderately strong, bedrock
50	
	Total Depth = 52.0 feet
55	
60	
65	
70	
75	
80	

Notes: See Detail B for surface completion.
All PID readings equal to background
Munsell color chart used.

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A4

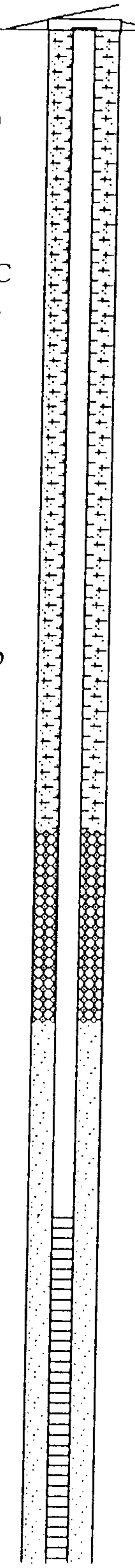
WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37434

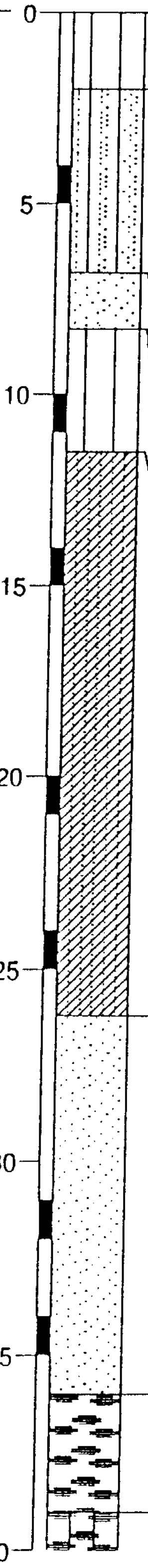
TOP OF CASING
ELEVATION 5091.10 ft.

EQUIPMENT B-57 Mobile

ELEVATION 5091.2 ft. DATE 11/17/89

GROUND SURFACE

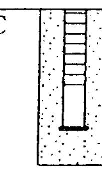


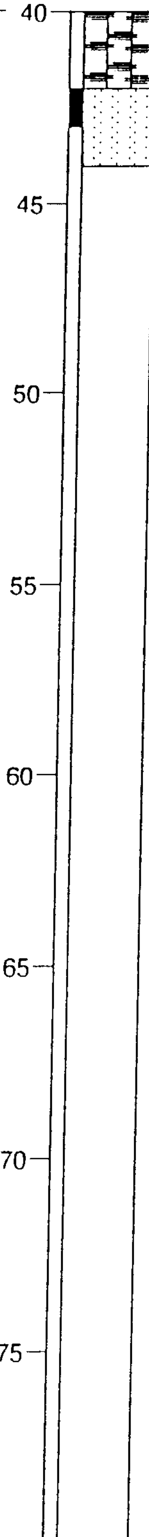


Well	Depth (ft)	Log
Top of Casing at 0.2 ft. above ground level	0	ML, sandy silt, very fine grained, trace clay, 5 YR 3/2 - dark reddish brown, slightly plastic, soft, moist, alluvium
12 1/4-In.-Dia. Borehole 0 to 44 ft.		SM, silty sand, fine grained, 10 YR 7/8 - yellow, non-plastic, loose, moist, alluvium
4-In.-Dia. Schedule 40 PVC Blank Casing +0.2 to 31 ft.	5	Decreasing silt content
		Sand size changes to medium
	10	SP, sand, medium grained, 10 YR 7/8 - yellow, non-plastic, loose, moist, alluvium
		ML, clayey silt, 10 YR 4/6 - dark yellowish brown, non-plastic, loose, moist, alluvium
		SC, clayey sand, medium grained, 10 YR 5/8 - yellowish brown, slightly plastic, medium stiff, moist, alluvium Sand size changes to coarse grained
Bentonite-Cement Seal 0 to 21 ft.	15	Color changes to 10 YR 7/6 - yellow
Bentonite-Pellet Seal 21 to 26 ft.	20	
CSSI 10-20 Sandpack 26 to 44 ft.	25	SP, sand, fine grained, 10 YR 7/8 - yellow, non-plastic, loose, moist, alluvium
	30	Sand size changes to very fine Moisture increases to wet Water Level at 32.0 feet - 11/17/89
4-In.-Dia. Slotted Screen (0.020 Inch) 31 to 42 ft.	35	GC, clayey gravel, little sand, 10 YR 8/4 - very pale brown, non-plastic, loose, saturated, alluvium
	40	

(Continuation of Well)

(Continuation of Log)





Well	Depth (ft)	Log
4-In.-Dia. Schedule 40 PVC Blank Silt Trap 42 to 43 ft.	40	GM, silty gravel, some sand, coarse grain iron-staining, 2.5 YR 4/8 - red, non-plastic, loose, saturated, alluvium
Bottom Well Cap at 43 ft.		SANDSTONE, 2.5 Y 5/6 - light olive brown, massive, moderately hard, moderately strong, bedrock(trace clay, muscovite rich)
Hole Cleaned Out to 44 ft.	45	Total Depth = 44.0 feet
	50	
	55	
	60	
	65	
	70	
	75	
	80	

Notes: See Detail B for surface completion.
All PID readings equal to background
Munsell color chart used.

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A5

WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37435

TOP OF CASING
ELEVATION 5116.04 ft.

EQUIPMENT B-57 Mobile

ELEVATION 5116.89 ft. DATE 11/27/89

GROUND SURFACE

Depth (ft) | Sample

Top of Casing at ground level

12 1/4-In.-Dia. Borehole 0 to 58 ft.

4-In.-Dia. Schedule 40 PVC Blank Casing 0 to 28 ft.

Bentonite-Cement Seal 0 to 20 ft.

Bentonite-Pellet Seal 20 to 25 ft.

CSSI 10-20 Sandpack 25 to 58 ft.

4-In.-Dia. Slotted Screen (0.020 Inch) 28 to 55 ft.

0
ML, sandy silt, very fine grained, trace clay, 10 YR 4/4 - dark yellowish brown, non-plastic, medium dense, dry, alluvium

SC, clayey sand, 10 YR 7/6 - yellow, non-plastic, loose, dry, alluvium

5
ML, clayey silt, trace sand, 10 YR 8/6 - yellow, slightly plastic, medium stiff, moist, alluvium

10

SM, silty sand, 10 YR 8/8 - yellow, non-plastic, loose, moist, alluvium

15

Increasing clay content

SC, clayey sand, some silt, 10 YR 5/4 - yellowish brown, slightly plastic, medium stiff, moist, alluvium

ML, clayey silt, some very fine grained sand, 10 YR 5/4 - yellowish brown, slightly plastic, medium stiff, moist, alluvium

20

25

Color changes to 10 YR 7/2 - light gray with heavy oxide staining

Moisture increases to wet

∇ Water Level at 28.0 feet - 11/27/89

30
GM, silty gravels, sub-rounded gravels and sand, 10 YR 6/3 - pale brown, non-plastic, loose, saturated, alluvium(arkose pebbles)

35
GP, sandy gravels, little cobbles, trace silt, 10 YR 8/6 - yellow, non-plastic, loose, saturated, alluvium

40

(Continuation of Well)

4-In.-Dia. Schedule 40 PVC Blank Silt Trap 55 to 56 ft.

Bottom Well Cap at 56 ft.

Hole Cleaned Out to 58 ft.

Depth (ft) | Sample

(Continuation of Log)

40

45

50

Increasing silt content

55
SHALE, blue, low hardness, massive, weathered, weak, bedrock

Total Depth = 58.0 feet

60

65

70

75

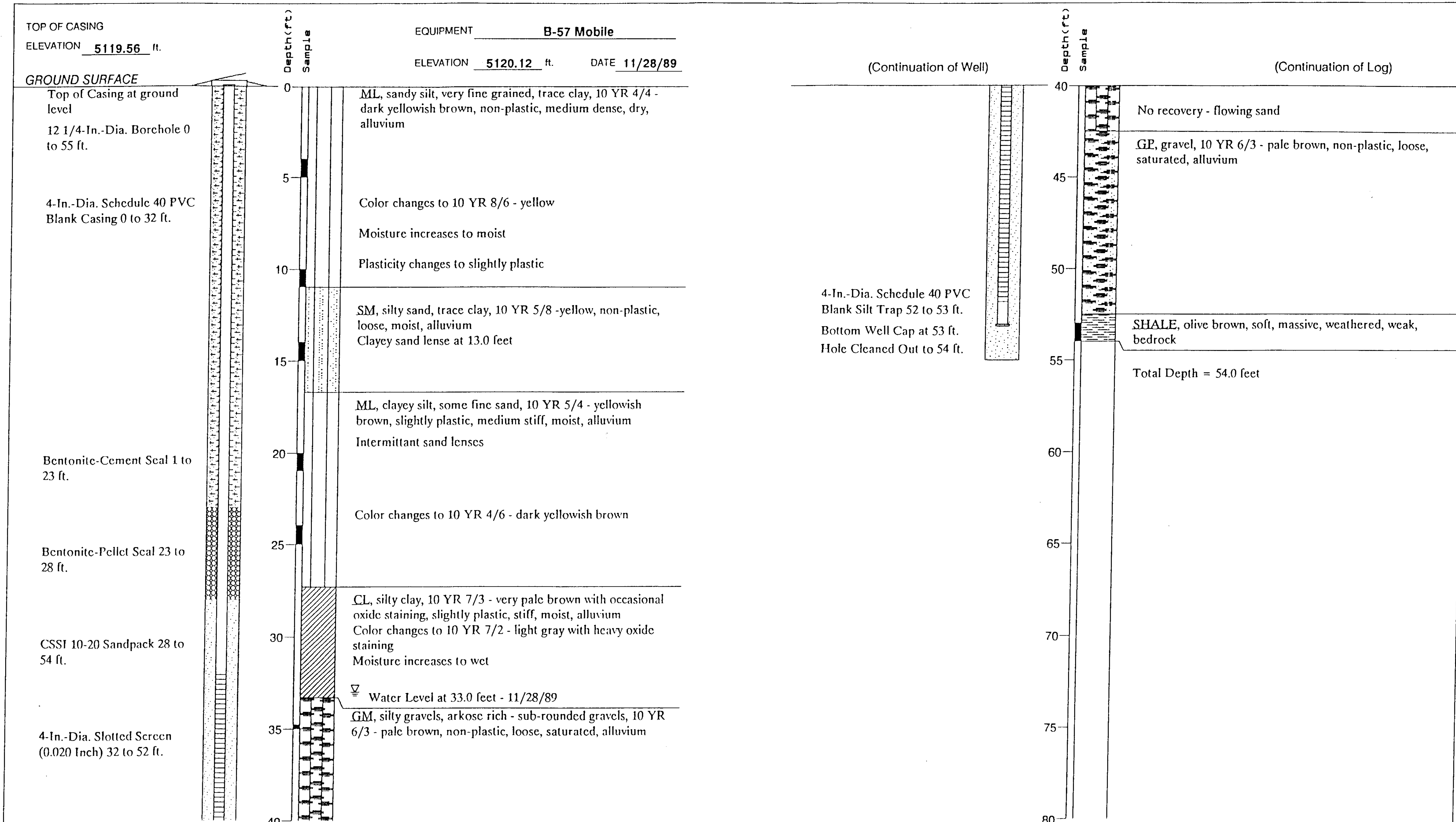
80

Notes: See Detail B for surface completion.
All PID readings equal to background
Munsell color chart used.

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A6

WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37436



Notes: See Detail B for surface completion.
All PID readings equal to background
Munsell color chart used.

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A7

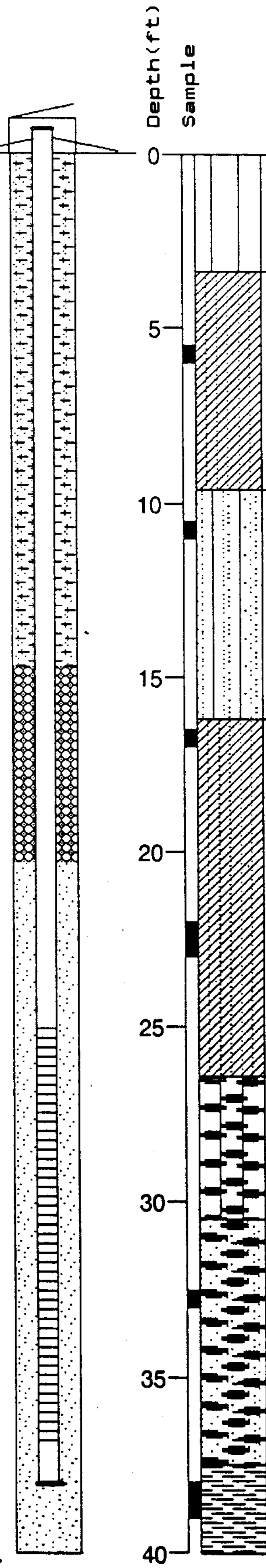
WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37437

TOP OF CASING
ELEVATION 5116.30 ft.

GROUND SURFACE

EQUIPMENT B-57 Mobile

ELEVATION 5115.0 ft. DATE 1/2/90



Top of Casing at 1.8 ft. above ground level

12 1/4-In.-Dia. Borehole 0 to 39 ft.

4-In.-Dia. Schedule 40 PVC Blank Casing +1.8 to 25 ft.

Bentonite-Cement Seal 0 to 14.7 ft.

Bentonite-Pellet Seal 14.7 to 20.3 ft.

CSSI 10-20 Sandpack 20.3 to 39 ft.

4-In.-Dia. Slotted Screen (0.020 Inch) 25 to 37 ft.

4-In.-Dia. Schedule 40 PVC Blank Silt Trap 37 to 38.3 ft.
Bottom Well Cap at 38.3 ft.

Hole Cleaned Out to 39 ft.

Notes: See Detail A for surface completion.
All PID readings equal to background.
Munsell color chart used.

ML, sandy silt, very fine grained, 10 YR 6/4 - light yellowish brown, non-plastic, loose, dry, alluvium

SC, clayey sand, some silt, 10 YR 6/6 - brownish yellow, slightly plastic, soft, moist, alluvium (biotite fragments)

Increasing sand content

SM, silty sand, trace clay, 10 YR 7/4 - very pale brown, non-plastic, loose, dry, alluvium

Decreasing clay content

Sand size increases to medium

SC, clayey sand, 10 YR 6/4 - light yellowish brown, slightly plastic, moist, medium stiff, alluvium

Increasing clay content

Occasional sand lenses < 6"

Moisture increases to wet

Water Level at 27.0 feet - 01/02/90

GM, silty gravel, 10 YR 4/6 - dark yellowish brown, non-plastic, loose, saturated, alluvium

GP, sandy gravel, sub-rounded gravels, 10 YR 4/6 - dark yellowish brown, non-plastic, loose, saturated, alluvium (feldspar rich)

SHALE, weathered, 10 YR 6/3 - pale brown, soft, massive, iron stained, bedrock
Total Depth = 40.0 feet

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A8

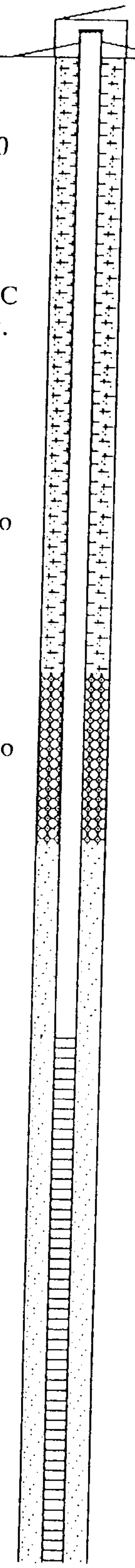
WELL COMPLETION DIAGRAM AND
LOG OF BORING FOR WELL 37438

TOP OF CASING
ELEVATION 5108.98 ft.

EQUIPMENT B-57 Mobile

ELEVATION 5107.4 ft. DATE 1/4/90

GROUND SURFACE



Top of Casing at 2.0 ft. above ground level

12 1/4-In.-Dia. Borehole 0 to 48

4-In.-Dia. Schedule 40 PVC Blank Casing +2.0 to 26 ft.

Bentonite-Cement Seal 0 to 16.4 ft.

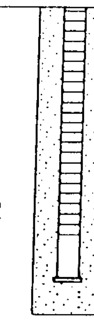
Bentonite-Pellet Seal 16.4 to 21 ft.

CSSI 10-20 Sandpack 21 to 48 ft.

4-In.-Dia. Slotted Screen (0.020 Inch) 26 to 46 ft.

Depth (ft)	Description
0	SW, sand, medium to coarse grained, trace gravel and organics, 7.5 YR 3/2 - very dark brown, non-plastic, medium dense, roadbase/fill
	SP, sand, very fine grained, little silt and clay, 5 YR 3/4 - dark reddish brown, slightly plastic, loose, moist, alluvium
5	Oxide staining along root canals
	Sand size increases to medium grained
10	Color changes to 10 YR 6/8 - brownish yellow
	Silty clay lenses
15	CL, silty clay, 10 YR 4/6 - dark yellowish brown, slightly plastic, stiff, moist, alluvium White chemical precipitates observed
	SW, sand, very fine to medium grained, trace coarse, trace silt and clay, 10 YR 6/4 - light yellowish brown, non-plastic, loose, moist, alluvium(mottling - rusty brown, mica grains)
20	ML, sandy silt, very fine grained, little clay, 10 YR 5/3 - brown, slightly plastic, medium stiff, moist, alluvium
25	Color changes to 10 YR 6/2 - light brownish gray - oxide staining
	Water Level at 27.5 feet - 01/04/90
	GP, sandy gravel, medium to coarse grained, 10 YR 5/2 - grayish brown with oxide staining, loose, saturated, alluvium
30	SW, sand, fine to coarse grained, trace gravel, 10 YR 4/6 - dark yellowish brown, non-plastic, loose, saturated, alluvium
35	
40	

(Continuation of Well)



4-In.-Dia. Schedule 40 PVC Blank Silt Trap 46 to 47 ft.

Bottom Well Cap at 47 ft.

Hole Cleaned Out to 48 ft.

(Continuation of Log)

Depth (ft)	Description
40	No recovery- flowing sand
45	
	CLAYSTONE, 2.5 YR 3/0 - very dark gray, intensely fractured, low hardness, weak, highly weathered, bedrock
50	Total Depth = 48.0 feet
55	
60	
65	
70	
75	
80	

Notes: See Detail A for surface completion.
All PID readings equal to background.
Munsell color chart used.

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

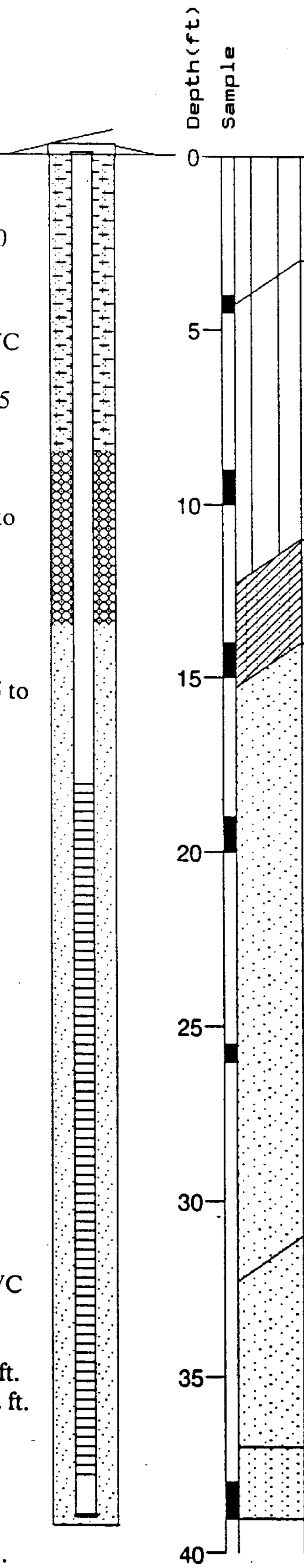
Figure A9

WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37439

TOP OF CASING

ELEVATION 5092.95 ft.

GROUND SURFACE



EQUIPMENT B-56 Mobile

ELEVATION 5093.63 ft. DATE 1/8/90

Well completion:

- Top of Casing at ground level
- 12 1/4-In.-Dia. Borehole 0 to 39.2 ft.
- 4-In.-Dia. Schedule 40 PVC Blank Casing 0 to 18 ft.
- Bentonite-Cement Seal 2.5 to 8.5 ft.
- Bentonite-Pellet Seal 8.5 to 13.5 ft.
- CSSI 10-20 Sandpack 13.5 to 39.2 ft.
- 4-In.-Dia. Slotted Screen (0.020 Inch) 18 to 38 ft.
- 4-In.-Dia. Schedule 40 PVC Blank Silt Trap 38 to 39.2 ft.
- Bottom Well Cap at 39.2 ft.
- Hole Cleaned Out to 39.2 ft.

Log of boring:

ML, sandy silt, 20% fine grained sand, 10 YR 5/4 - yellowish brown, non-plastic, medium dense, moist, alluvium

ML, clayey silt, 5% clay, trace sand, 10 YR 4/6 - dark yellowish brown, slightly plastic, medium stiff, moist, alluvium

Increasing moisture to wet

Increasing sand content to 10%

SC, clayey sand, fine grained, 10 YR 5/4 - yellowish brown, slightly plastic, medium stiff, wet, alluvium

Calcite inclusions, quartz pebbles, 1/2" sand(coarse grained) lense at 13.7 feet

SW, sand, 1/4" rounded quartz, feldspar gravel, 10 YR 6/6 - brownish yellow, non-plastic, loose, moist, alluvium

Moisture increases to wet at 17.5 feet

Moisture increases to saturated, gravel to 1 1/2 - 2 inch diameter

Water level at 21.5 feet - 01/08/90

No recovery - flowing sand

Increase fine grained sand 30%

Increasing fine grained sand 40%

SP, sand, no gravel, very fine to fine grained, 10 YR 5/4 - yellowish brown, non-plastic, loose, saturated, alluvium

Iron staining on weathered surfaces

CLAYSTONE, dark gray, bedrock

Total Depth = 39.0 feet

Notes: See Detail B for surface completion.
All PID readings equal to background.
Munsell color chart used.

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A10

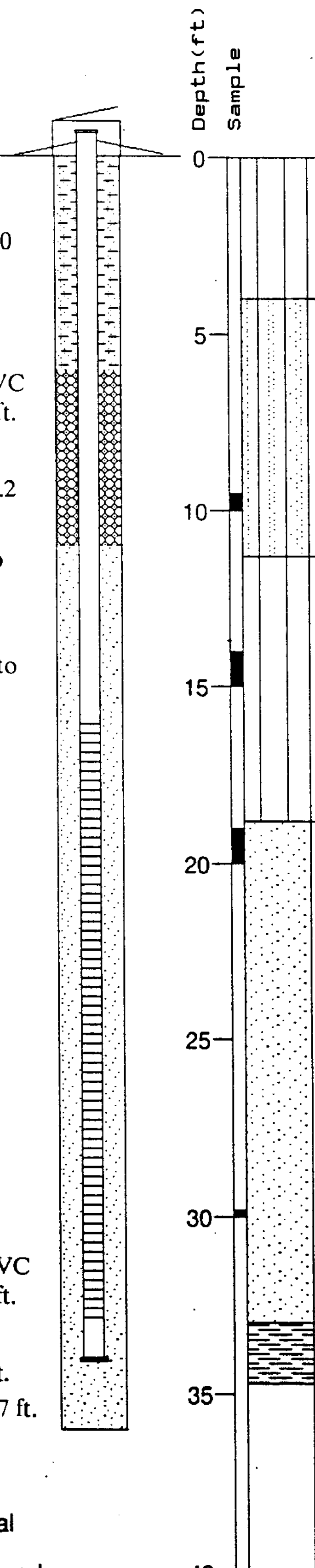
WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37440

TOP OF CASING
ELEVATION 5074.85 ft.

EQUIPMENT B-61 Mobile

ELEVATION 5073.6 ft. DATE 2/2/90

GROUND SURFACE



Top of Casing at 1.6 ft. above ground level

12 1/4-In.-Dia. Borehole 0 to 34.7 ft.

4-In.-Dia. Schedule 40 PVC Blank Casing +1.6 to 16 ft.

Bentonite-Cement Seal 1.2 to 6 ft.

Bentonite-Pellet Seal 6 to 11 ft.
ft.

CSSI 10-20 Sandpack 11 to 34.7 ft.

4-In.-Dia. Slotted Screen(0.020 Inch) 16 to 33 ft.

4-In.-Dia. Schedule 40 PVC Blank Silt Trap 33 to 34 ft.

Bottom Well Cap at 34 ft.

Hole Cleaned Out to 34.7 ft.

Notes: See Detail A for surface completion.
All PID readings equal to background.
Munsell color chart used.

ML, clayey silt, trace to little very fine to fine sand with organics, 5 YR 3/4 - dark red brown, slightly plastic, soft, dry, alluvium

Sand size changes to medium

SM, silty sand, very fine to fine grained, 5 YR 5/8 - yellowish red, non-plastic, loose, dry, alluvium

ML, clayey silt, little sand, 5 YR 6/1 - light gray with rusty mottling, slightly plastic, medium stiff, moist, alluvium

Becoming stratified

Color changes to 10 YR 3/6 - dark yellowish brown, moisture increases to wet

∇ Water level at 18.0 feet - 02/02/90

SW, gravelly sand, fine to coarse grained, 10 YR 5/6 - light olive brown, non-plastic, loose, saturated, alluvium

No recovery - flowing sand

GRAY SHALE, with sandstone siltstone stringers, hard, massive, weak, bedrock

Total Depth = 34.7 feet

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A11

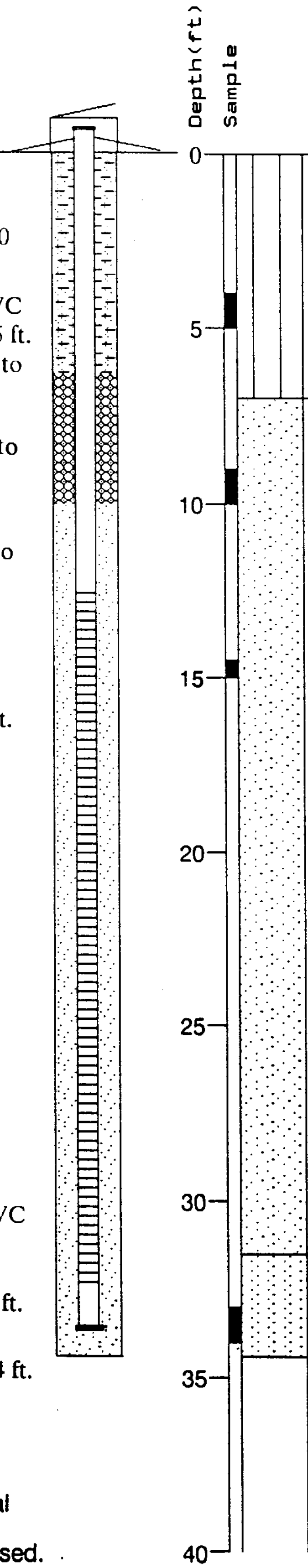
WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37442

TOP OF CASING
ELEVATION 5083.06 ft.

EQUIPMENT B-61 Mobile

ELEVATION 5081.5 ft. DATE 2/7/90

GROUND SURFACE



Top of Casing at 1.9 ft. above ground level

12 1/4-In.-Dia. Borehole 0 to 34.4 ft.

4-In.-Dia. Schedule 40 PVC Blank Casing +1.9 to 12.5 ft.

Bentonite-Cement Seal 1 to 6.3 ft.

Bentonite-Pellet Seal 6.3 to 10 ft.

CSSI 10-20 Sandpack 10 to 34.4 ft.

4-In.-Dia. Slotted Screen (0.020 Inch) 12.5 to 32.5 ft.

4-In.-Dia. Schedule 40 PVC Blank Silt Trap 32.5 to 33.6 ft.
Bottom Well Cap at 33.6 ft.

Hole Cleaned Out to 34.4 ft.

Notes: See Detail A for surface completion.
All PID readings equal to background.
Munsell color chart used.

<u>ML</u>, sandy silt, 5 YR 5/6 - yellowish red, slightly plastic, medium stiff, moist, alluvium

<u>SW</u>, sand, fine to coarse grained, little silt, trace gravel, 5 YR 5/8 - yellowish red, non-plastic, loose, moist, alluvium

Increasing gravel content
Decreasing silt content

Color changes to 5 YR 6/4 - light reddish brown
Moisture increases to wet

Color changes to 2.5 YR 5/8 - red
⊻ Water Level at 15.5 feet - 02/07/90

No recovery - flowing sand

<u>CLAYSTONE</u>, bluish green gray, soft, massive, bedrock (chlorite rich grains)

Total Depth = 34.4 feet

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A12

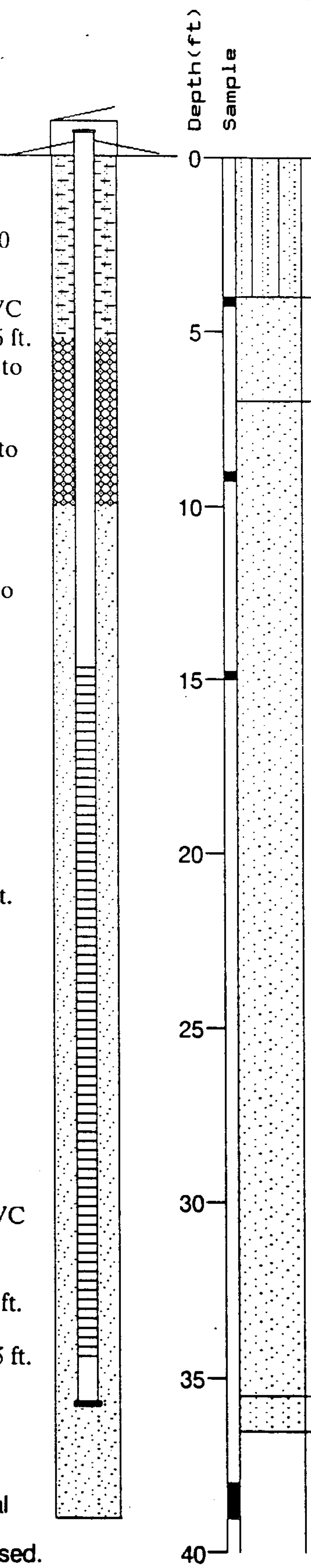
WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37443

TOP OF CASING
ELEVATION 5086.41 ft.

EQUIPMENT B-61 Mobile

ELEVATION 5085.15 ft. DATE 2/5/90

GROUND SURFACE



Top of Casing at 1.6 ft. above ground level

12 1/4-In.-Dia. Borehole 0 to 36.5 ft.

4-In.-Dia. Schedule 40 PVC Blank Casing +1.6 to 14.6 ft.
Bentonite-Cement Seal 1 to 5.2 ft.

Bentonite-Pellet Seal 5.2 to 10 ft.

CSSI 10-20 Sandpack 10 to 36.5 ft.

4-In.-Dia. Slotted Screen (0.020 Inch) 14.6 to 34.6 ft.

4-In.-Dia. Schedule 40 PVC Blank Silt Trap 34.6 to 35.7 ft.
Bottom Well Cap at 35.7 ft.

Hole Cleaned Out to 36.5 ft.

Notes: See Detail A for surface completion.
All PID readings equal to background.
Munsell color chart used.

SM, silty sand, very fine grained, 10 YR 6/4 - light yellowish brown, non-plastic, poorly graded, loose to medium dense, dry, alluvium

SP, sand, very fine to medium grained, trace to little silt, 10 YR 6/6 - brownish yellow, non-plastic, poorly graded, loose, dry, alluvium

SW, sand, medium to coarse grained, some gravel, trace very fine to fine sand, 7.5 YR 6/6 - reddish yellow, non-plastic, loose, dry, alluvium

Water Level at 17.0 feet - 02/05/90
Sand size increasing to medium to coarse

No recovery - flowing sand

CLAYSTONE, greenish gray, massive, soft, bedrock (silty, some sand lenses)

Total Depth = 36.5 feet

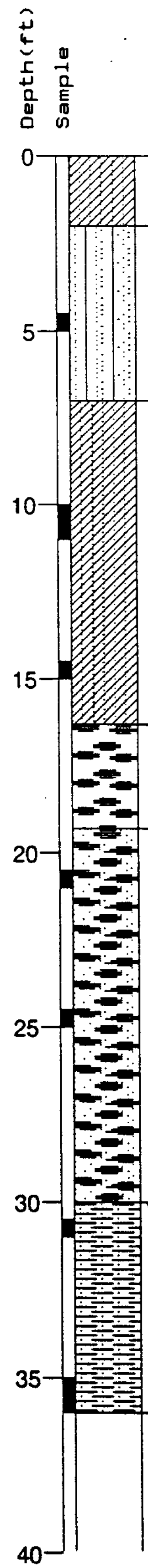
Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A13

WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37444

EQUIPMENT B-57 Mobile

ELEVATION 5134.95 ft. DATE 11/22/89



SC, clayey sand, 10 YR 7/4 - very pale brown, slightly plastic, medium stiff, dry, alluvium

SM, silty sand, 10 YR 6/8 - brownish yellow, non-plastic, loose, moist, alluvium

SC, clayey sand, 10 YR 5/8 - yellowish brown, slightly plastic, medium stiff, moist, alluvium

SC, clayey sand, trace gravel, 10 YR 6/6 - brownish yellow, loose, non-plastic, moist, alluvium

GC, clayey gravel, sub-rounded gravels, some sand, 10 YR 7/8 - yellow, non-plastic, medium dense, dry, alluvium

GP, sandy gravel, arkose rich - sub-rounded gravels, trace silt, 2.5 YR 5/4 - reddish brown, non-plastic, loose, dry, alluvium

Cobbles present

Water Level at 30.0 feet - 11/22/89

CLAYSTONE, 5 YR 5/1 - gray, low hardness, weathered bedrock

Total Depth = 36.0 feet

Notes: All PID readings equal to background. color chart used.

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A14

LOG OF BORING RI-15

TOP OF CASING
ELEVATION 5127.14 ft.

GROUND SURFACE

EQUIPMENT Standard Rotary

ELEVATION 5127.56 ft. DATE 10/19/89

Top of Casing at ground level

8-In.-Dia. Borehole 0 to 60 ft.

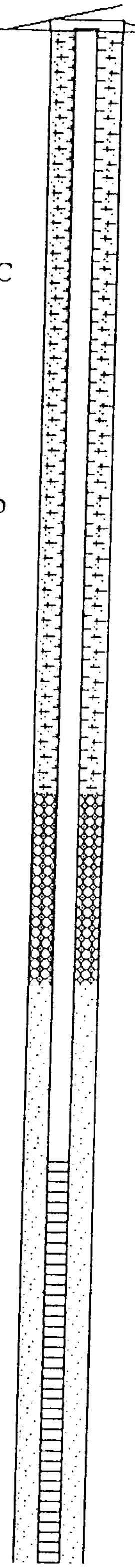
4-In.-Dia. Schedule 40 PVC Blank Casing 0 to 30 ft.

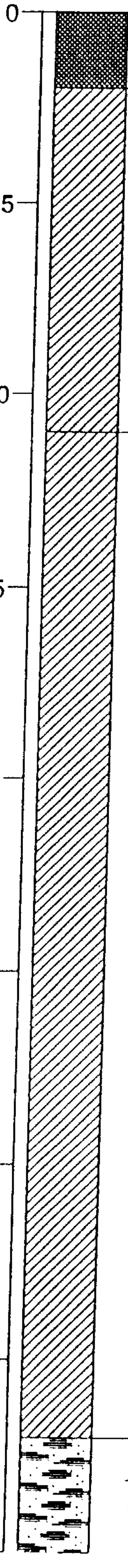
Bentonite-Cement Seal 0 to 20 ft.

Bentonite-Pellet Seal 20 to 25 ft.

CSSI 8-12 Sandpack 25 to 60 ft.

4-In.-Dia. PVC Slotted Screen (0.020 Inch) 29.5 to 59.5 ft.

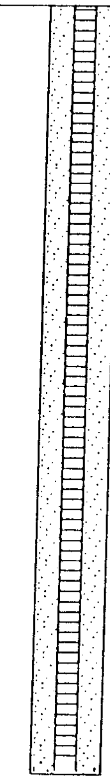




Depth (ft)	Description
0	TOPSOIL
2	CL, sandy clay, buff, moist, alluvium
11	CL, silty clay, buff to brown, moist, alluvium
30	Moisture increases to wet
33	Water level reading at 33.0 feet - 11/1/89
37	GP, cobbly gravel, medium to coarse grained, loose, saturated, alluvium

(Continuation of Well)

(Continuation of Log)



4-In.-Dia. Blank Silt Trap 59.5 to 60 ft.
Hole Cleaned Out to 60 ft.

Depth (ft)	Description
55	SHALE, bedrock
60	Total Depth = 60.0 feet

Notes:
This well was sampled for the Offpost RI Addendum field program, but was installed by another contractor for the South Adams County Water and Sanitation District. Sources of lithologic data: Colorado Division of Water Resources and Muller Engineering.

Notes: See Detail B for surface completion.
All PID readings equal to background
Munsell color chart used.

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A15

WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37441

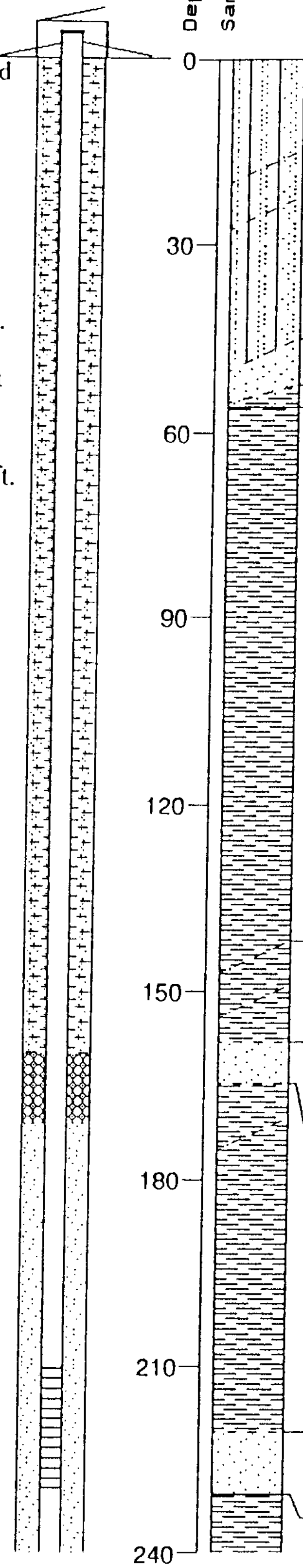
TOP OF CASING

ELEVATION 5124.26 ft.

EQUIPMENT Air Rotary

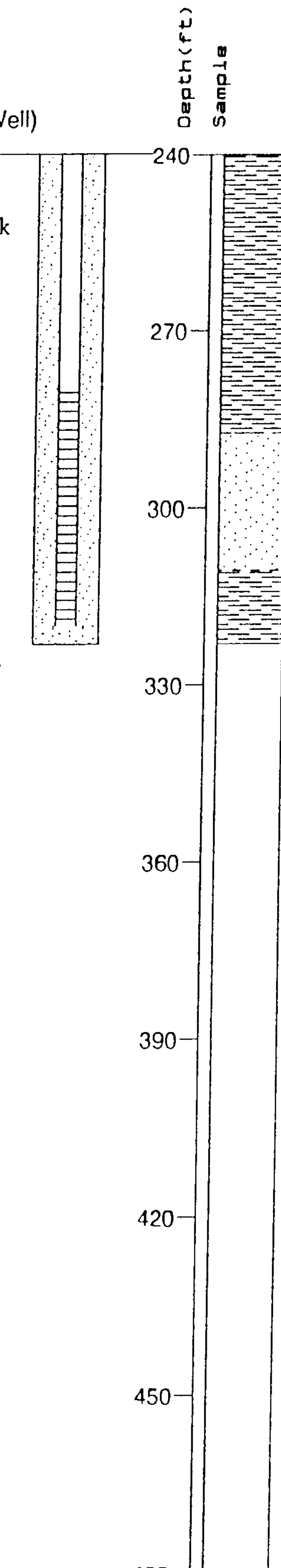
ELEVATION 5121.9 ft. DATE 9/7/89

GROUND SURFACE



Well	Log
Top of Casing above ground level	SM, silty sand, brown, loose, moist, alluvium
15-In.-Dia. Borehole 0 to 54 ft.	Increasing clay fraction
12-In.-Dia. Black Steel Conductor Casing 0 to 54 ft.	Lenses of gravels and coarse sands in a silty matrix - brown, alluvium
11-7/8-In.-Dia. Borehole 54 to 130 ft.	Lenses of gravels and sands in a silty matrix - brown, alluvium
8-In.-Dia. Black Steel Conductor Casing 0 to 130 ft.	SP, coarse grained sub-rounded sand and gravel, alluvium
7-7/8-In.-Dia. Borehole 130 to 323 ft.	CLAYSTONE, silty, dark yellow-brown, bedrock
4-In.-Dia. Black Steel Blank Casing 0 to 210 ft.	SHALE, blue, occasional lignite fragments and subangular sand
Bentonite-Cement Seal 0 to 160 ft.	Shale and sands interbedded
Bentonite-Pellet Seal 160 to 171 ft.	Dark gray shale with some subangular coarse grained quartzitic sand
CSSI 10-20 Sandpack 171 to 323 ft.	Decreasing sand fraction
4-In.-Dia. Black Steel Blank Casing 0 to 210 ft.	Cuttings show dark gray shales and yellow-brown clays and claystone to siltstone
4-In.-Dia. Stainless Steel Slotted Screen (0.020 Inch) 210 to 230 ft.	Shale fraction decreasing - medium gray clay
	Clay with occasional shale lenses
	Clay, blue-gray
	∇ Water level reading at 134.0 feet - 9/12/89
	SHALE, very sandy shale, dark gray, fissile
	Very sandy shale
	SANDSTONE, sand, very fine grained, light brown, water bearing
	SHALE, dark-gray-black, some clay lenses
	Dark-gray, fissile, abundant fossil material
	Some sandy lenses
	Abundant plant fossils with some minor sands
	SANDSTONE, fine grained, uncemented, quartzitic, water bearing
	SHALE

(Continuation of Well) (Continuation of Log)



Well	Log
4-In.-Dia. Black Steel Blank Casing 230 to 280 ft.	Sandy, dark-gray
4-In.-Dia. Stainless Steel Slotted Screen (0.020 Inch) 280 to 320 ft.	Shale and sandy shale of various colors
Hole Cleaned Out to 323 ft.	Shale, sandy, dark-gray
	SANDSTONE, fine grained, medium brown to tan, water bearing
	SHALE, clay with occasional fragments of pyrite
	Total Depth = 323.0 feet

Notes: See Detail A for surface completion.
All PID readings equal to background.
Munsell color chart used.

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A16

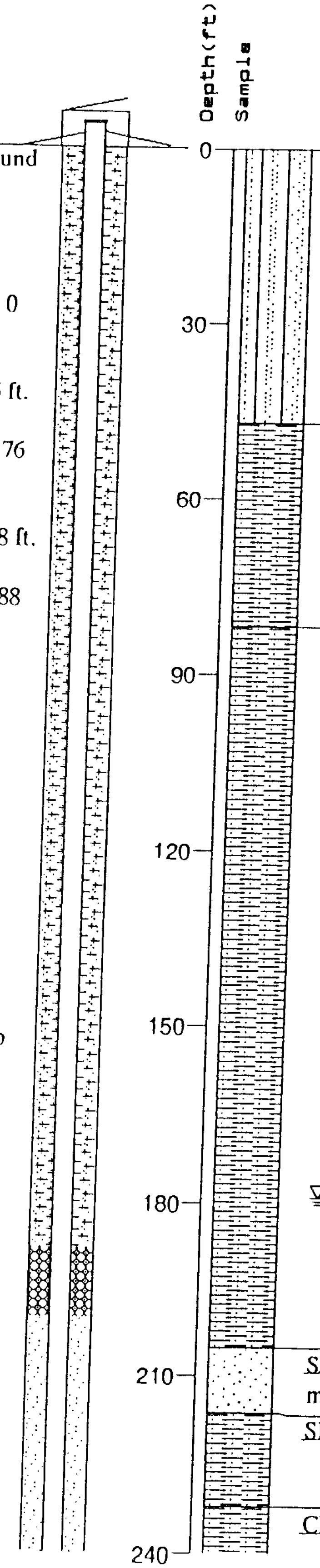
WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37431

TOP OF CASING
ELEVATION N/A ft.

EQUIPMENT Air and Mud Rotary

ELEVATION N/A ft. DATE 8/24/90

GROUND SURFACE



Top of Casing above ground level

15-1/4-In.-Dia. Borehole 0 to 76 ft.
12-In.-Dia. Black Steel Conductor Casing 0 to 76 ft.

11-7/8-In.-Dia. Borehole 76 to 188 ft.
8-In.-Dia. Black Steel Conductor Casing 0 to 188 ft.

7-7/8-In.-Dia. Borehole 188 to 442 ft.

4-In.-Dia. Welded Black Steel Blank Casing 0 to. 380 ft.

Bentonite-Cement Seal 0 to 180.6 ft.

Bentonite-Pellet Seal 180.6 to 200 ft.

SM, silty sand, fine to coarse grained, some gravel, light brown, non-plastic, loose, moist, alluvium

Increase in silt content

CLAYSTONE, blue-gray, massive, soft, bedrock

Thin stringer of sandstone, fine grained, yellow-brown, well cemented

CLAYSTONE, blue to gray, occasionally sandy, fissile, blocky, closely fractured, well indurated

Becomes soft

Water level reading at 179.0 feet - 8/28/90

SANDSTONE, silty, gray, fine to medium grained, moderately cemented with chert interbeds, water bearing

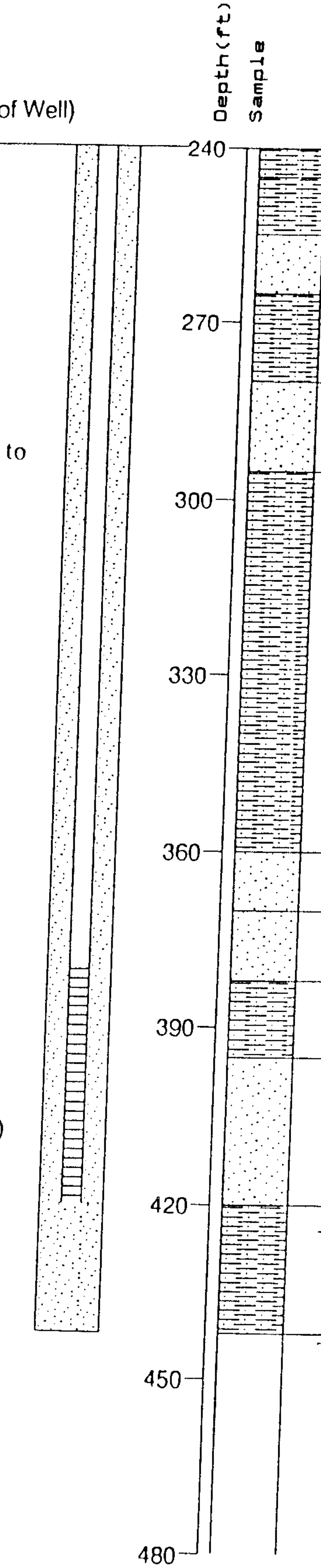
SILTSTONE, sandy, gray, trace black cherty shale

CLAYSTONE, black, platy, siliceous, moderately

Notes: See Detail A for surface completion.
All PID readings equal to background.
Munsell color chart used.

(Continuation of Well)

(Continuation of Log)



CSSI 8-12 Sandpack 200 to 442 ft.

Stainless Steel Adapter (5-In. Welded to 4-In. Threaded) at 380 ft.

4-In.-Dia. Stainless Steel Slotted Screen (0.020 Inch) 380 to 420 ft.

Hole Cleaned Out to 442.0 ft.

fractured

CLAYSTONE, gray, some black shale

SANDSTONE, silty, fine grained, moderately cemented, water bearing

CLAYSTONE, black, medium hard, lignitic

SANDSTONE, silty, fine grained, gray, little mica, moderately cemented, water bearing

CLAYSTONE, gray to black, medium hard, lignitic, waxy luster

SANDSTONE, silty, gray

SANDSTONE, fine to medium grained, no fines, uncemented, produces much water

CLAYSTONE, brown to black and SILTSTONE, sandy, gray

SANDSTONE, fine to medium grained, no fines, uncemented, produces much water

CLAYSTONE, black and brown, lignitic, soft

Total Depth = 442.0 ft

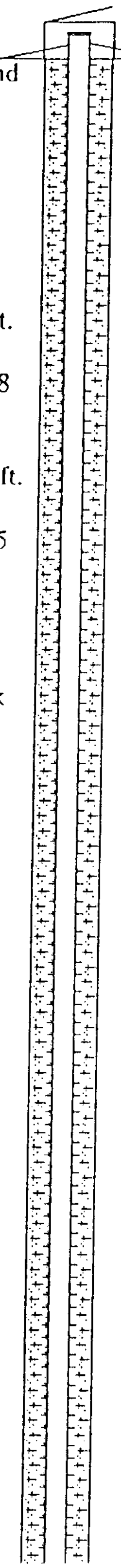
Prepared for: Program Manager for Rocky Mountain Arsenal Commerce City, Colorado	Figure A17 WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37445

TOP OF CASING
ELEVATION N/A ft.

EQUIPMENT Air and Mud Rotary

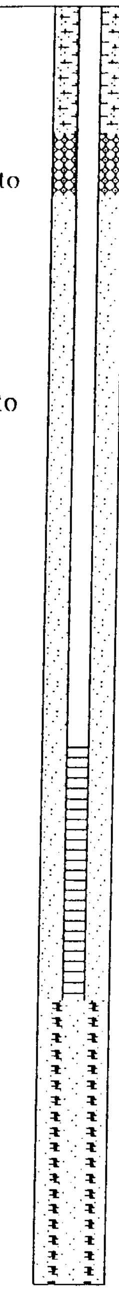
ELEVATION N/A ft. DATE 10/8/90

GROUND SURFACE



- Top of Casing above ground level
- 15-In.-Dia. Borehole 0 to 38 ft.
- 12-In.-Dia. Black Steel Conductor Casing 0 to 36 ft.
- 11-7/8-In.-Dia. Borehole 38 to 255 ft.
- 8-In.-Dia. Black Steel Conductor Casing 0 to 253 ft.
- 7-7/8-In.-Dia. Borehole 255 to 440 ft.
- 4-In.-Dia. Black Steel Blank Casing 0 to 356 ft.
- Bentonite-Cement Seal 0 to 260 ft.

(Continuation of Well)



- Bentonite-Pellet Seal 260 to 270 ft.
- CSSI 10-20 Sandpack 270 to 400 ft.
- 4-In.-Dia. Stainless Steel Slotted Screen (0.020 Inch) 356 to 396 ft.
- Backfill 400 to 440 ft.

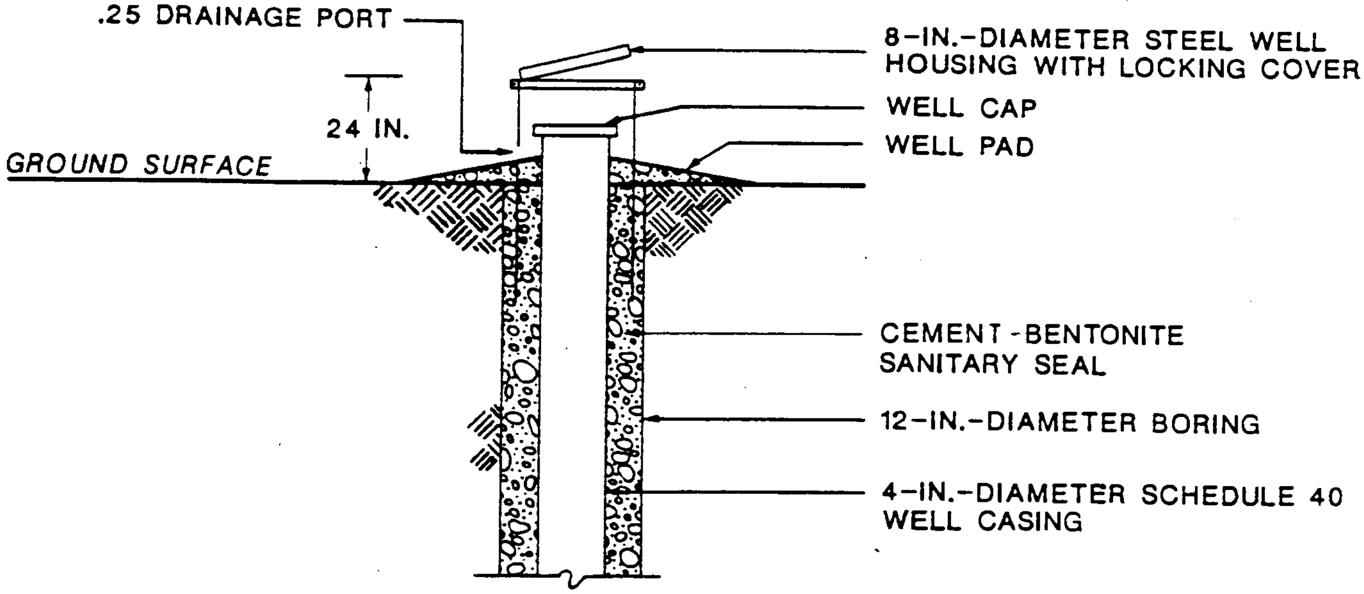
Depth(ft)	Log
0	SM, silty sand, brown, loose, moist, alluvium Becomes coarser with depth, grades to SP, gravelly sand, very coarse grained, loose, saturated, alluvium
30	SANDSTONE, very coarse, hard, cemented, bedrock
	CLAYSTONE, gray
	SANDSTONE, medium to coarse grained, very arkosic, some clay
60	SHALE AND CLAYSTONE
90	
120	
150	
180	∇ Water level reading at 188.0 feet - 10/9/90
	SANDSTONE, poorly cemented
	CLAYSTONE, sandy
210	
240	SHALE, sandy (Continuation of Log)
	SHALE
270	CLAYSTONE
	CLAYSTONE, sandy, cemented, hard
	SANDSTONE, generally poorly cemented, water bearing, very hard from 295 to 299 feet
300	
	SHALE
330	SANDSTONE
	SHALE, sandy, gray
	SANDSTONE, uncemented, water bearing
360	
	SHALE
	SHALE, sandy
390	SANDSTONE, uncemented, water bearing
	SHALE, sandy
420	
	SHALE
	Total Depth = 440.0 feet
450	
480	

Notes: See Detail A for surface completion.
All PID readings equal to background.
Munsell color chart used.

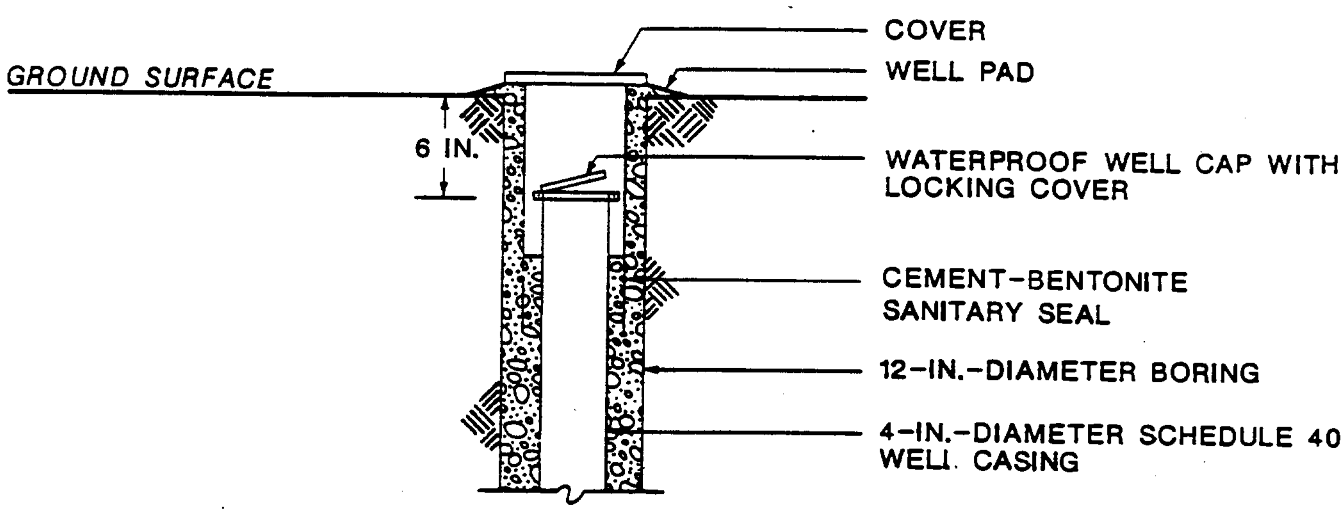
Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A18

WELL COMPLETION DIAGRAM AND LOG OF BORING FOR WELL 37446



DETAIL A: ABOVEGROUND COMPLETION



DETAIL B: SUBSURFACE COMPLETION

Prepared for: **Program Manager for** **Rocky Mountain Arsenal** **Commerce City, Colorado**	Figure A19 MONITORING WELL SURFACE COMPLETION DETAILS

MAJOR DIVISIONS				TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN No 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC	CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS WITH OR WITHOUT GRAVEL
			SC	CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL	ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

Prepared for:
Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Figure A20

UNIFIED SOIL CLASSIFICATION SYSTEM AND SYMBOLS

Appendix B

GROUNDWATER ANALYTICAL DATA

LIST OF TABLES

Table No.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37402	37402	37403	37403
Date	09/27/89	02/22/90	09/25/89	02/21/90
Analytes				
Metals/Anions/General Chem				
Arsenic	NA	< 2.50	NA	< 2.50
Cadmium	NA	< 5.00	NA	< 5.00
Calcium	NA	130000	NA	150000
Chloride	NA	190000	NA	240000
Chromium	NA	< 22.0	NA	< 22.0
Copper	NA	< 10.0	NA	< 10.0
Cyanide	NA	< 8.90	NA	< 8.90
Fluoride	NA	< 1000	NA	< 1000
Iron	NA	881	NA	39.9
Lead	NA	< 52.0	NA	< 52.0
Magnesium	NA	43000	NA	51000
Manganese	NA	2630	NA	< 20.0
Mercury	NA	< 0.500	NA	< 0.500
Nitrite, Nitrate -- Non-Specific	NA	220	NA	2200
Potassium	NA	NA	NA	NA
Sodium	NA	180000	NA	230000
Sulfate	NA	380000	NA	510000
Total Organic Carbon	NA	4.00	NA	5.00

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit. NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37402	37402	37403	37403
Date	09/27/89	02/22/90	09/25/89	02/21/90
Analytes				
Metals/Anions/General Chem				
Total Suspended Solids	NA	9.00	NA	88.0
Zinc	NA	23.3	NA	< 20.0
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	NA	< 2.38	NA
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	NA	< 0.0590	NA	< 0.0590

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit. NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of histo[illegible] dat[illegible] fie[illegible]/QC p[illegible]lures

Table B1 Groundwater Investigative Analytical Data

Sample ID	37402	37402	37403	37403
Date	09/27/89	02/22/90	09/25/89	02/21/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	NA	< 0.0460	NA	< 0.0460
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	NA	< 5.69	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	NA	< 7.46	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	NA	< 11.5	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	NA	R	NA	R
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	NA	< 4.03	NA
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	NA	< 5.00	NA
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	NA	< 5.90	NA
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	< 7.70	NA	< 7.70
Caprolactam (GCMS)	NA	< 7.70	NA	< 7.70
Chlordane	NA	< 0.152	NA	< 0.152

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37402 09/27/89	37402 02/22/90	37403 09/25/89	37403 02/21/90
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	NA	< 5.00	NA
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	< 5.50
Dieldrin	NA	< 0.0539	NA	< 0.0539
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	27.4	NA	21.4	NA
Diisopropyl Methylphosphonate (GCMS)	19.8	21.7	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	NA	< 0.188	NA
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	< 1.34	NA	< 1.34	NA
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	NA	< 0.0600	NA	< 0.0600
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	R	< 0.0480	R
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	NA	< 0.0560	NA	< 0.0560
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	NA	< 0.373	NA

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures

Table B1 Groundwater Investigative Analytical Data

Sample ID	37402	37402	37403	37403
Date	09/27/89	02/22/90	09/25/89	02/21/90
Analytes				
Semivolatiles				
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	NA	< 0.647	NA
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	NA	< 0.787	NA
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	NA	< 0.384	NA
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	NA	< 1.09	NA	< 1.09
1,1,1-Trichloroethane (GCMS)	NA	< 1.00	NA	< 1.00
1,1,2-Trichloroethane	NA	< 1.63	NA	< 1.63
1,1,2-Trichloroethane (GCMS)	NA	< 1.00	NA	< 1.00
1,1-Dichloroethane	NA	< 1.93	NA	< 1.93
1,1-Dichloroethane (GCMS)	NA	< 1.00	NA	< 1.00
1,1-Dichloroethene	NA	< 1.85	NA	< 1.85
1,1-Dichloroethene (GCMS)	NA	< 1.00	NA	< 1.00
1,2-Dichloroethane	NA	< 2.07	NA	< 2.07
1,2-Dichloroethane (GCMS)	NA	< 1.00	NA	< 1.00

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A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37402	37402	37403	37403
Date	09/27/89	02/22/90	09/25/89	02/21/90
Analytes				
Volatiles				
1,2-Dichloroethenes (cis & trans)	NA	< 1.75	NA	< 1.75
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	< 5.00	NA	< 5.00
Benzene	NA	2.77 A	NA	8.04 A
Benzene (GCMS)	NA	1.40 A	NA	3.72 A
Carbon Tetrachloride	NA	< 1.69	NA	2.35 A
Carbon Tetrachloride (GCMS)	NA	< 1.00	NA	1.47 A
Chlorobenzene	NA	32.9 A	NA	63.1 A
Chlorobenzene (GCMS)	NA	28.8 A	NA	53.8 A
Chloroform	NA	32.2 A	NA	100 A
Chloroform (GCMS)	NA	31.0 A	NA	120 A
Dibromochloropropane	0.496	NA	0.344	NA
Dibromochloropropane (GCMS)	< 12.0	< 12.0	< 12.0	< 12.0
Dimethyl Disulfide	< 0.550	NA	< 0.550	NA
Ethyl Benzene	NA	< 0.620	NA	< 0.620
Ethyl Benzene (GCMS)	NA	< 1.00	NA	< 1.00
M-Xylene	NA	< 1.04	NA	< 1.04
M-Xylene (GCMS)	NA	< 1.00	NA	< 1.00
Methylene Chloride	NA	< 2.48	NA	< 2.48

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37402		37402		37403		37403	
Date	09/27/89		02/22/90		09/25/89		02/21/90	
Analytes								
Volatiles								
Methylene Chloride (GCMS)	NA		< 1.00		NA		< 1.00	
Methylisobutyl Ketone	< 4.90		NA		< 4.90		NA	
Methylisobutyl Ketone (GCMS)	NA		< 1.40		NA		< 1.40	
O,P-Xylene	NA		< 1.34		NA		< 1.34	
O,P-Xylene (GCMS)	NA		< 2.00		NA		< 2.00	
Tetrachloroethene	NA		< 2.76		NA		< 2.76	
Tetrachloroethene (GCMS)	NA		< 1.00		NA		< 1.00	
Toluene	NA		< 2.10		NA		< 2.10	
Toluene (GCMS)	NA		< 1.00		NA		1.10	A
Trichloroethene	NA		< 1.31		NA		2.04	A
Trichloroethene (GCMS)	NA		< 1.00		NA		1.20	A
Vinyl Chloride	NA		NA		NA		NA	
Vinyl Chloride (GCMS)	NA		< 12.0		NA		< 12.0	

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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37404	37404	37405	37405
Date	09/26/89	02/22/90	09/26/89	02/21/90
Analytes				
Metals/Anions/General Chem				
Arsenic	NA	< 2.50	NA	2.73
Cadmium	NA	< 5.00	NA	< 5.00
Calcium	NA	160000	NA	100000
Chloride	NA	230000	NA	120000
Chromium	NA	< 22.0	NA	< 22.0
Copper	NA	< 10.0	NA	< 10.0
Cyanide	NA	< 8.90	NA	< 8.90
Fluoride	NA	< 1000	NA	< 1000
Iron	NA	48.6	NA	43.1
Lead	NA	< 52.0	NA	< 52.0
Magnesium	NA	43000	NA	16000
Manganese	NA	< 20.0	NA	< 20.0
Mercury	NA	< 0.500	NA	< 0.500
Nitrite, Nitrate -- Non-Specific	NA	4300	NA	2400
Potassium	NA	NA	NA	NA
Sodium	NA	210000	NA	95000
Sulfate	NA	540000	NA	160000
Total Organic Carbon	NA	5.00	NA	3.00

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37404	37404	37405	37405
Date	09/26/89	02/22/90	09/26/89	02/21/90
Analytes				
Metals/Anions/General Chem				
Total Suspended Solids	NA	23.0	NA	10.0
Zinc	NA	< 20.0	NA	< 20.0
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	NA	< 2.38	NA
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	NA	< 0.0590	NA	< 0.0590

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37404	37404	37405	37405
Date	09/26/89	02/22/90	09/26/89	02/21/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	NA	< 0.0460	NA	< 0.0460
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	NA	< 5.69	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	NA	< 7.46	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	NA	< 11.5	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	NA	R	NA	R
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	NA	< 4.03	NA
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	NA	< 5.00	NA
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	NA	< 5.90	NA
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	< 7.70	NA	< 7.70
Caprolactam (GCMS)	NA	< 7.70	NA	< 7.70
Chlordane	NA	< 0.152	NA	< 0.152

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Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37404 09/26/89	37404 02/22/90	37405 09/26/89	37405 02/21/90
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	NA	< 5.00	NA
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	< 5.50
Dieldrin	NA	< 0.0539	NA	< 0.0539
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	29.3	NA	< 0.392	NA
Diisopropyl Methylphosphonate (GCMS)	< 21.0	21.7	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	NA	< 0.188	NA
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	< 1.34	NA	< 1.34	NA
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	NA	< 0.0600	NA	< 0.0600
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	R	0.0796	R
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	NA	< 0.0560	NA	< 0.0560
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	NA	< 0.373	NA

Notes: Values are reported in micrograms per liter.
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Table B1 Groundwater Investigative Analytical Data

Sample ID	37404	37404	37405	37405
Date	09/26/89	02/22/90	09/26/89	02/21/90
Analytes				
Semivolatiles				
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	NA	< 0.647	NA
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	NA	< 0.787	NA
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	NA	< 0.384	NA
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	NA	< 1.09	NA	< 1.09
1,1,1-Trichloroethane (GCMS)	NA	< 10.0	NA	< 1.00
1,1,2-Trichloroethane	NA	< 1.63	NA	< 1.63
1,1,2-Trichloroethane (GCMS)	NA	< 10.0	NA	< 1.00
1,1-Dichloroethane	NA	< 1.93	NA	< 1.93
1,1-Dichloroethane (GCMS)	NA	< 10.0	NA	< 1.00
1,1-Dichloroethene	NA	< 1.85	NA	< 1.85
1,1-Dichloroethene (GCMS)	NA	< 10.0	NA	< 1.00
1,2-Dichloroethane	NA	< 2.07	NA	< 2.07
1,2-Dichloroethane (GCMS)	NA	< 10.0	NA	< 1.00

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37404		37404		37405		37405	
Date	09/26/89		02/22/90		09/26/89		02/21/90	
Analytes								
Volatiles								
1,2-Dichloroethenes (cis & trans)	NA		< 1.75		NA		< 1.75	
1,2-Dichloroethenes (cis & trans) (GCMS)	NA		< 50.0		NA		< 5.00	
Benzene	NA		27.0	A	NA		< 9.60	
Benzene (GCMS)	NA		12.4	A	NA		4.96	A
Carbon Tetrachloride	NA		2.71	A	NA		< 1.69	
Carbon Tetrachloride (GCMS)	NA		< 10.0		NA		< 1.00	
Chlorobenzene	NA		120	A	NA		92.0	A
Chlorobenzene (GCMS)	NA		91.3	A	NA		65.4	A
Chloroform	NA		440	A	NA		150	A
Chloroform (GCMS)	NA		460	A	NA		140	A
Dibromochloropropane	0.415		NA		0.227		NA	
Dibromochloropropane (GCMS)	< 12.0		< 12.0		< 12.0		< 12.0	
Dimethyl Disulfide	< 0.550		NA		< 0.550		NA	
Ethyl Benzene	NA		< 0.620		NA		< 0.620	
Ethyl Benzene (GCMS)	NA		< 10.0		NA		< 1.00	
M-Xylene	NA		< 1.04		NA		< 1.04	
M-Xylene (GCMS)	NA		< 10.0		NA		< 1.00	
Methylene Chloride	NA		< 2.48		NA		< 2.48	

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37404	37404	37405	37405
Date	09/26/89	02/22/90	09/26/89	02/21/90
Analytes				
Volatiles				
Methylene Chloride (GCMS)	NA	< 10.0	NA	< 1.00
Methylisobutyl Ketone	< 4.90	NA	< 4.90	NA
Methylisobutyl Ketone (GCMS)	NA	< 14.0	NA	< 1.40
O,P-Xylene	NA	< 1.34	NA	< 1.34
O,P-Xylene (GCMS)	NA	< 20.0	NA	< 2.00
Tetrachloroethene	NA	< 2.76	NA	< 2.76
Tetrachloroethene (GCMS)	NA	< 10.0	NA	< 1.00
Toluene	NA	3.37 A	NA	< 2.10
Toluene (GCMS)	NA	< 10.0	NA	1.50 A
Trichloroethene	NA	4.36 A	NA	3.13 A
Trichloroethene (GCMS)	NA	< 10.0	NA	1.80 A
Vinyl Chloride	NA	NA	NA	NA
Vinyl Chloride (GCMS)	NA	< 120	NA	< 12.0

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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of histo[illegible] dat[illegible] fiel[illegible]QC p[illegible]ures

Table B1 Groundwater Investigative Analytical Data

Sample ID	37406	37406	37407	37407
Date	09/26/89	02/21/90	09/26/89	02/21/90
Analytes				
Metals/Anions/General Chem				
Arsenic	NA	< 2.50	NA	< 2.50
Cadmium	NA	< 5.00	NA	< 5.00
Calcium	NA	190000	NA	250000
Chloride	NA	220000	NA	370000
Chromium	NA	< 22.0	NA	< 22.0
Copper	NA	< 10.0	NA	< 10.0
Cyanide	NA	< 8.90	NA	< 8.90
Fluoride	NA	928	NA	1160
Iron	NA	34.7	NA	604
Lead	NA	< 52.0	NA	< 52.0
Magnesium	NA	55000	NA	58000
Manganese	NA	< 20.0	NA	1250
Mercury	NA	< 0.500	NA	< 0.500
Nitrite, Nitrate -- Non-Specific	NA	3800	NA	1300000
Potassium	NA	NA	NA	NA
Sodium	NA	290000	NA	360000
Sulfate	NA	650000	NA	700000
Total Organic Carbon	NA	3.00	NA	7.00

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37406	37406	37407	37407
Date	09/26/89	02/21/90	09/26/89	02/21/90
Analytes				
Metals/Anions/General Chem				
Total Suspended Solids	NA	98.0	NA	< 4.00
Zinc	NA	< 20.0	NA	< 20.0
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	NA	< 2.38	NA
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	NA	< 0.0590	NA	< 0.0590

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of [illegible] dat[illegible] fiel[illegible]QC p[illegible]ures

Table B1 Groundwater Investigative Analytical Data

Sample ID	37406	37406	37407	37407
Date	09/26/89	02/21/90	09/26/89	02/21/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	NA	< 0.0460	NA	< 0.0460
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	NA	< 5.69	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	NA	< 7.46	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	49.7	NA	< 11.5	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	71.6	101	< 15.0	< 15.0
Aldrin	NA	R	NA	R
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	72.9	NA	< 4.03	NA
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	NA	< 5.00	NA
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	NA	< 5.90	NA
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	< 7.70	NA	< 7.70
Caprolactam (GCMS)	NA	< 7.70	NA	< 7.70
Chlordane	NA	< 0.152	NA	< 0.152

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37406	37406	37407	37407
Date	09/26/89	02/21/90	09/26/89	02/21/90
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	NA	< 5.00	NA
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	< 5.50
Dieldrin	NA	< 0.0539	NA	< 0.0539
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	450	NA	24.3	NA
Diisopropyl Methylphosphonate (GCMS)	> 200	> 200	< 21.0	104
Dimethylmethyl Phosphonate	< 0.188	NA	< 0.188	NA
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	< 1.34	NA	< 1.34	NA
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	NA	< 0.0600	NA	< 0.0600
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	R	< 0.0480	R
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	NA	< 0.0560	NA	< 0.0560
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	NA	< 0.373	NA

Notes: Values are reported in micrograms per liter.
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Table 81 Groundwater Investigative Analytical Data

Sample ID	37406	37406	37407	37407
Date	09/26/89	02/21/90	09/26/89	02/21/90
Analytes				
Semivolatiles				
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	NA	< 0.647	NA
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	NA	< 0.787	NA
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	NA	< 0.384	NA
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	NA	< 1.09	NA	< 1.09
1,1,1-Trichloroethane (GCMS)	NA	< 10.0	NA	< 10.0
1,1,2-Trichloroethane	NA	< 1.63	NA	< 1.63
1,1,2-Trichloroethane (GCMS)	NA	< 10.0	NA	< 10.0
1,1-Dichloroethane	NA	< 1.93	NA	< 1.93
1,1-Dichloroethane (GCMS)	NA	< 10.0	NA	< 10.0
1,1-Dichloroethene	NA	< 1.85	NA	< 1.85
1,1-Dichloroethene (GCMS)	NA	< 10.0	NA	< 10.0
1,2-Dichloroethane	NA	< 2.07	NA	< 2.07
1,2-Dichloroethane (GCMS)	NA	< 10.0	NA	< 10.0

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Table B1 Groundwater Investigative Analytical Data

Sample ID / Date	37406 09/26/89		37406 02/21/90		37407 09/26/89		37407 02/21/90	
Analytes								
Volatiles								
1,2-Dichloroethenes (cis & trans)	NA		< 1.75		NA		< 1.75	
1,2-Dichloroethenes (cis & trans) (GCMS)	NA		< 50.0		NA		< 50.0	
Benzene	NA		7.74	A	NA		59.0	A
Benzene (GCMS)	NA		< 10.0		NA		30.2	A
Carbon Tetrachloride	NA		2.20	A	NA		6.98	A
Carbon Tetrachloride (GCMS)	NA		< 10.0		NA		< 10.0	
Chlorobenzene	NA		64.6	A	NA		260	A
Chlorobenzene (GCMS)	NA		47.1	A	NA		192	A
Chloroform	NA		230	A	NA		1300	A
Chloroform (GCMS)	NA		170	A	NA		120	A
Dibromochloropropane	2.12		NA		0.377		NA	
Dibromochloropropane (GCMS)	< 12.0		< 12.0		< 12.0		< 12.0	
Dimethyl Disulfide	< 0.550		NA		< 0.550		NA	
Ethyl Benzene	NA		< 0.620		NA		0.933	A
Ethyl Benzene (GCMS)	NA		< 10.0		NA		< 10.0	
M-Xylene	NA		< 1.04		NA		< 1.04	
M-Xylene (GCMS)	NA		< 10.0		NA		< 10.0	
Methylene Chloride	NA		< 2.48		NA		< 2.48	

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37406	37406	37407	37407
Date	09/26/89	02/21/90	09/26/89	02/21/90
Analytes				
Volatiles				
Methylene Chloride (GCMS)	NA	< 10.0	NA	< 10.0
Methylisobutyl Ketone	< 4.90	NA	< 4.90	NA
Methylisobutyl Ketone (GCMS)	NA	< 14.0	NA	< 14.0
O,P-Xylene	NA	< 1.34	NA	2.11 A
O,P-Xylene (GCMS)	NA	< 20.0	NA	< 20.0
Tetrachloroethene	NA	23.5 A	NA	< 2.76
Tetrachloroethene (GCMS)	NA	12.0 A	NA	< 10.0
Toluene	NA	< 2.10	NA	8.22 A
Toluene (GCMS)	NA	< 10.0	NA	< 10.0
Trichloroethene	NA	4.13 A	NA	11.3 A
Trichloroethene (GCMS)	NA	< 10.0	NA	< 10.0
Vinyl Chloride	NA	NA	NA	NA
Vinyl Chloride (GCMS)	NA	< 120	NA	< 120

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37408	37409	37410	37418
Date	12/01/89	11/29/89	12/04/89	12/18/89
Analytes				
Metals/Anions/General Chem				
Arsenic	4.26	5.23	< 2.35	3.64
Cadmium	< 6.78	< 6.78	< 6.78	< 6.78
Calcium	187000	199000	160000	550000
Chloride	180000	370000	180000	1700000
Chromium	< 16.8	< 16.8	< 16.8	< 16.8
Copper	< 18.8	< 18.8	< 18.8	< 18.8
Cyanide	< 5.00	< 5.00	< 5.00	< 5.00
Fluoride	2320	2510	2360	3310
Iron	217	86.5	204	227
Lead	< 43.4	< 43.4	< 43.4	< 43.4
Magnesium	58000	57600	53900	196000
Manganese	45.4	14.7	11.4	187
Mercury	< 0.100	< 0.100	< 0.100	< 0.100
Nitrite, Nitrate -- Non-Specific	2200	4200	1300	930
Potassium	3850	4900	4150	9540
Sodium	330000	370000	310000	840000
Sulfate	780000	660000	710000	1500000
Total Organic Carbon	1900	3000	2500	12000

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37408	37409	37410	37418
Date	12/01/89	11/29/89	12/04/89	12/18/89
Analytes				
Metals/Anions/General Chem				
Total Suspended Solids	NA	NA	NA	NA
Zinc	70.7	99.5	41.6	90.9
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	7.12
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	0.155	< 0.0490	0.148

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37408	37409	37410	37418
Date	12/01/89	11/29/89	12/04/89	12/18/89
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	0.341
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	8.09
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	26.8	74.5	12.6	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	24.9	380	< 15.0	< 15.0
Aldrin	< 0.0500	< 0.0500	< 0.0500	0.181
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	4.84	< 4.03	4.80
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	< 7.70	< 7.70	< 7.70	< 10.0
Chlordane	> 1.00	1.05	< 0.0950	0.935

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Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37408 12/01/89	37409 11/29/89	37410 12/04/89	37418 12/18/89
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	R	R	460
Dicyclopentadiene (GCMS)	< 5.50	11.3	< 5.50	227
Dieldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	160	830	140	5600
Diisopropyl Methylphosphonate (GCMS)	94.3	> 200	67.9	> 200
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34	27.3
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	8.45
Endrin	< 0.0500	< 0.0500	< 0.0500	0.100
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	< 0.0510	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373	< 0.373

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37408	37409	37410	37418
Date	12/01/89	11/29/89	12/04/89	12/18/89
Analytes				
Semivolatiles				
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	NA	NA	NA	NA
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	21.5
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37408	37409	37410	37418
Date	12/01/89	11/29/89	12/04/89	12/18/89
Analytes				
Volatiles				
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	< 0.760	< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	< 1.05	< 1.05	< 1.05	< 1.05
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	< 0.990	2.44	< 0.990	< 0.990
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	< 0.820	< 0.820	< 0.820	< 0.820
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	14.7	420	8.85	< 0.500
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	< 0.195	5.85	< 0.195	< 0.195
Dibromochloropropane (GCMS)	< 12.0	< 12.0	< 12.0	< 12.0
Dimethyl Disulfide	< 0.550	< 0.550	< 0.550	< 0.550
Ethyl Benzene	< 1.37	< 1.37	< 1.37	< 1.37
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	< 1.32	< 1.32	< 1.32	< 1.32
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	< 7.40	< 7.40	< 7.40	< 7.40

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37408	37409	37410	37418
Date	12/01/89	11/29/89	12/04/89	12/18/89
Analytes				
Volatiles				
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	< 1.36	< 1.36	< 1.36	< 1.36
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	4.45	110	3.53	10.2
Tetrachloroethene (GCMS)	NA	NA	NA	NA
Toluene	< 1.47	< 1.47	< 1.47	< 1.47
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	0.816	3.33	< 0.560	6.52
Trichloroethene (GCMS)	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	NA
Vinyl Chloride (GCMS)	NA	NA	NA	NA

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37418	37419	37420	37420
Date	06/22/90	12/15/89	12/13/89	06/21/90
Analytes				
Metals/Anions/General Chem				
Arsenic	R	< 2.35	3.48	R
Cadmium	< 6.78	< 6.78	< 6.78	< 6.78
Calcium	560000	250000	460000	470000
Chloride	1800000	580000	1100000	1200000
Chromium	< 16.8	< 16.8	< 16.8	< 16.8
Copper	< 18.8	< 18.8	< 18.8	< 18.8
Cyanide	R	< 5.00	< 5.00	R
Fluoride	6300	3390	3180	4400
Iron	1430	216	127	2110
Lead	< 43.4	< 43.4	< 43.4	< 43.4
Magnesium	194000	91500	141000	132000
Manganese	243	33.8	155	472
Mercury	< 0.100	< 0.100	< 0.100	< 0.100
Nitrite, Nitrate -- Non-Specific	540	1200	360	260
Potassium	8690	5230	5860	5220
Sodium	1100000	560000	700000	790000
Sulfate	1800000	1100000	1200000	1400000
Total Organic Carbon	14000	6600	9100	12000

Notes: Values are reported in micrograms per liter.
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A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37418 06/22/90	37419 12/15/89	37420 12/13/89	37420 06/21/90
Analytes				
Metals/Anions/General Chem				
Total Suspended Solids	< 4000	NA	NA	< 4000
Zinc	36.3	47.9	71.0	< 18.0
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	6.48	< 2.38	< 2.38	5.35
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	R	0.161	0.184	< 0.0490

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37418	37419	37420	37420
Date	06/22/90	12/15/89	12/13/89	06/21/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	0.474	1.70	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	7.75	21.0	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	9.18	9.06
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	< 0.0500	0.354	0.311	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	46.0	< 4.03	4.80	13.8
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	13.3	83.6
Caprolactam (GCMS)	< 10.0	< 7.70	< 9.10	< 10.0
Chlordane	< 0.0950	1.60	1.70	< 0.0950

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37418	37419	37420	37420
Date	06/22/90	12/15/89	12/13/89	06/21/90
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	370	164	560	570
Dicyclopentadiene (GCMS)	277	93.2	> 300	302
Dieldrin	< 0.0500	< 0.0500	0.0891	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	5800	800	2100	2900
Diisopropyl Methylphosphonate (GCMS)	> 200	> 200	> 200	132
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	28.0	2.88	< 1.34	26.0
Dithiane (GCMS)	< 3.30	< 3.30	7.36	< 3.30
Endrin	< 0.0500	0.136	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	R	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	0.113	0.137	0.113	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	1.76	< 0.373	< 0.373	< 0.373

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37418	37419	37420	37420
Date	06/22/90	12/15/89	12/13/89	06/21/90
Analytes				
Semivolatiles				
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	1.22	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	NA	NA	< 1.00
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	NA	NA	< 1.00
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	NA	NA	< 1.00
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	NA	NA	< 1.00
1,2-Dichloroethane	21.2	< 1.10	22.7	20.6
1,2-Dichloroethane (GCMS)	< 1.00	NA	NA	< 1.00

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37418	37419	37420	37420
Date	06/22/90	12/15/89	12/13/89	06/21/90
Analytes				
Volatiles				
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	< 0.760	< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	NA	NA	< 5.00
Benzene	2.39	< 1.05	< 1.05	< 1.05
Benzene (GCMS)	1.94	NA	NA	< 1.00
Carbon Tetrachloride	< 0.990	< 0.990	< 0.990	< 0.990
Carbon Tetrachloride (GCMS)	< 1.00	NA	NA	< 1.00
Chlorobenzene	13.0	< 0.820	< 0.820	9.35
Chlorobenzene (GCMS)	22.1	NA	NA	< 1.00
Chloroform	30.0	< 0.500	< 0.500	10.6
Chloroform (GCMS)	49.0	NA	NA	< 1.00
Dibromochloropropane	0.326	< 0.195	< 0.195	< 0.195
Dibromochloropropane (GCMS)	< 12.0	< 12.0	< 12.0	< 12.0
Dimethyl Disulfide	< 0.550	< 0.550	< 0.550	< 0.550
Ethyl Benzene	< 1.37	< 1.37	< 1.37	< 1.37
Ethyl Benzene (GCMS)	< 1.00	NA	NA	< 1.00
M-Xylene	< 1.32	< 1.32	< 1.32	< 1.32
M-Xylene (GCMS)	< 1.00	NA	NA	< 1.00
Methylene Chloride	< 7.40	< 7.40	< 7.40	< 7.40

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37418	37419	37420	37420
Date	06/22/90	12/15/89	12/13/89	06/21/90
Analytes				
Volatiles				
Methylene Chloride (GCMS)	< 1.00	NA	NA	< 1.00
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40	NA	NA	< 1.40
O,P-Xylene	< 1.36	< 1.36	< 1.36	< 1.36
O,P-Xylene (GCMS)	< 2.00	NA	NA	< 2.00
Tetrachloroethene	9.73	12.3	12.1	13.1
Tetrachloroethene (GCMS)	9.17	NA	NA	< 1.00
Toluene	< 1.47	< 1.47	< 1.47	< 1.47
Toluene (GCMS)	< 1.00	NA	NA	< 1.00
Trichloroethene	6.75	2.68	4.14	5.13
Trichloroethene (GCMS)	6.00	NA	NA	< 1.00
Vinyl Chloride	NA	NA	NA	NA
Vinyl Chloride (GCMS)	< 12.0	NA	NA	< 12.0

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37428	37429	37429	37430
Date	12/27/89	12/29/89	02/26/90	12/28/89
Analytes				
Metals/Anions/General Chem				
Arsenic	3.23	< 2.35	< 2.35	< 2.35
Cadmium	< 6.78	< 6.78	< 6.78	< 6.78
Calcium	117000	97300	91200	114000
Chloride	140000	55000	63000	150000
Chromium	< 16.8	< 16.8	< 16.8	< 16.8
Copper	< 18.8	< 18.8	< 18.8	< 18.8
Cyanide	< 5.00	< 5.00	< 5.00	< 5.00
Fluoride	1610	1480	1700	2370
Iron	NA	NA	< 77.5	NA
Lead	< 43.4	< 43.4	< 43.4	< 43.4
Magnesium	34200	21900	21300	33200
Manganese	NA	NA	< 9.67	NA
Mercury	< 0.100	< 0.100	< 0.100	< 0.100
Nitrite, Nitrate -- Non-Specific	65.1	7000	3700	7400
Potassium	5020	4500	3650	3330
Sodium	170000	83000	80000	170000
Sulfate	290000	160000	160000	230000
Total Organic Carbon	2100	1300	< 1000	1000

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37428	37429	37429	37430
Date	12/27/89	12/29/89	02/26/90	12/28/89
Analytes				
Metals/Anions/General Chem				
Total Suspended Solids	NA	NA	NA	NA
Zinc	< 18.0	23.7	< 18.0	< 18.0
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	R	< 0.0490	< 0.0490	< 0.0490

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37428	37429	37429	37430
Date	12/27/89	12/29/89	02/26/90	12/28/89
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	R	< 0.0500	< 0.0500	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	< 7.70	< 7.70	< 7.70	< 7.70
Chlordane	< 0.0950	< 0.0950	< 0.0950	< 0.0950

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Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37428 12/27/89	37429 12/29/89	37429 02/26/90	37430 12/28/89
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	< 5.50
Dieldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	140	18.6	10.1	5.74
Diisopropyl Methylphosphonate (GCMS)	88.7	< 21.0	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34	< 1.34
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	0.0769	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	< 0.0510	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373	< 0.373

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Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37428 12/27/89	37429 12/29/89	37429 02/26/90	37430 12/28/89
Analytes				
Semivolatiles				
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	NA	NA	< 1.00	NA
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	NA	NA	< 1.00	NA
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	NA	NA	< 1.00	NA
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	NA	NA	< 1.00	NA
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	NA	NA	< 1.00	NA

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Table B1 Groundwater Investigative Analytical Data

Sample ID / Date	37428 12/27/89		37429 12/29/89		37429 02/26/90		37430 12/28/89	
Analytes								
Volatiles								
1,2-Dichloroethenes (cis & trans)	< 0.760		< 0.760		< 0.760		< 0.760	
1,2-Dichloroethenes (cis & trans) (GCMS)	NA		NA		< 5.00		NA	
Benzene	< 1.05		< 1.05		3.60	A	< 1.05	
Benzene (GCMS)	NA		NA		17.1	A	NA	
Carbon Tetrachloride	< 0.990		< 0.990		< 0.990		< 0.990	
Carbon Tetrachloride (GCMS)	NA		NA		< 1.00		NA	
Chlorobenzene	< 0.820		< 0.820		24.2	A	< 0.820	
Chlorobenzene (GCMS)	NA		NA		28.8	A	NA	
Chloroform	< 0.500		< 0.500		41.9	A	1.35	
Chloroform (GCMS)	NA		NA		40.0	A	NA	
Dibromochloropropane	< 0.195		< 0.195		0.261	A	< 0.195	
Dibromochloropropane (GCMS)	< 12.0		< 12.0		< 12.0		< 12.0	
Dimethyl Disulfide	< 0.550		< 0.550		< 0.550		< 0.550	
Ethyl Benzene	< 1.37		< 1.37		< 1.37		< 1.37	
Ethyl Benzene (GCMS)	NA		NA		< 1.00		NA	
M-Xylene	< 1.32		< 1.32		3.30	A	< 1.32	
M-Xylene (GCMS)	NA		NA		< 1.00		NA	
Methylene Chloride	< 7.40		< 7.40		< 7.40		< 7.40	

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37428	37429	37429	37430
Date	12/27/89	12/29/89	02/26/90	12/28/89
Analytes				
Volatiles				
Methylene Chloride (GCMS)	NA	NA	< 1.00	NA
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	NA	NA	< 1.40	NA
O,P-Xylene	< 1.36	< 1.36	2.40 A	< 1.36
O,P-Xylene (GCMS)	NA	NA	< 2.00	NA
Tetrachloroethene	< 0.750	< 0.750	< 0.750	< 0.750
Tetrachloroethene (GCMS)	NA	NA	< 1.00	NA
Toluene	< 1.47	< 1.47	2.62 A	< 1.47
Toluene (GCMS)	NA	NA	< 1.00	NA
Trichloroethene	< 0.560	< 0.560	< 0.560	< 0.560
Trichloroethene (GCMS)	NA	NA	< 1.00	NA
Vinyl Chloride	NA	NA	NA	NA
Vinyl Chloride (GCMS)	NA	NA	< 12.0	NA

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37430	37433	37433	37434
Date	02/26/90	01/03/90	02/26/90	01/03/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.35	< 2.35	< 2.35	< 2.35
Cadmium	< 6.78	< 6.78	< 6.78	< 6.78
Calcium	120000	81200	113000	79900
Chloride	170000	75000	140000	72000
Chromium	< 16.8	< 16.8	< 16.8	< 16.8
Copper	< 18.8	< 18.8	< 18.8	< 18.8
Cyanide	< 5.00	< 5.00	< 5.00	< 5.00
Fluoride	2790	1260	1570	1530
Iron	< 77.5	NA	< 77.5	NA
Lead	< 43.4	< 43.4	< 43.4	< 43.4
Magnesium	37400	15200	22300	17600
Manganese	< 9.67	NA	< 9.67	NA
Mercury	< 0.100	< 0.100	< 0.100	< 0.100
Nitrite, Nitrate -- Non-Specific	6100	3300	510	5300
Potassium	2680	6030	4420	4540
Sodium	130000	77000	99000	91000
Sulfate	250000	190000	200000	190000
Total Organic Carbon	2000	< 1000	2000	< 1000

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A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37430	37433	37433	37434
Date	02/26/90	01/03/90	02/26/90	01/03/90
Analytes				
Metals/Anions/General Chem				
Total Suspended Solids	NA	NA	NA	NA
Zinc	< 18.0	50.3	< 18.0	< 18.0
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490	< 0.0490

Notes: Values are reported in micrograms per liter.
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Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37430 02/26/90	37433 01/03/90	37433 02/26/90	37434 01/03/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	< 7.70	< 7.70	< 7.70	< 7.70
Chlordane	< 0.0950	< 0.0950	< 0.0950	< 0.0950

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37430	37433	37433	37434
Date	02/26/90	01/03/90	02/26/90	01/03/90
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	< 5.50
Dieldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	8.07	0.828	3.31	4.52
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34	< 1.34
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	< 0.0510	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373	< 0.373

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37430	37433	37433	37434
Date	02/26/90	01/03/90	02/26/90	01/03/90
Analytes				
Semivolatiles				
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	NA	< 1.00	NA
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	NA	< 1.00	NA

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37430		37433	37433		37434
Date	02/26/90		01/03/90	02/26/90		01/03/90
Analytes						
Volatiles						
1,2-Dichloroethenes (cis & trans)	< 0.760		< 0.760	< 0.760		< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00		NA	< 5.00		NA
Benzene	17.3	A	< 1.05	5.48	A	< 1.05
Benzene (GCMS)	10.9	A	NA	3.10	A	NA
Carbon Tetrachloride	< 0.990		< 0.990	< 0.990		< 0.990
Carbon Tetrachloride (GCMS)	1.38	A	NA	< 1.00		NA
Chlorobenzene	51.2	A	< 0.820	28.0	A	< 0.820
Chlorobenzene (GCMS)	82.7	A	NA	46.2	A	NA
Chloroform	300	A	< 0.500	72.7	A	< 0.500
Chloroform (GCMS)	> 150	A	NA	73.0	A	NA
Dibromochloropropane	0.926	A	< 0.195	0.275	A	< 0.195
Dibromochloropropane (GCMS)	< 12.0		< 12.0	< 12.0		< 12.0
Dimethyl Disulfide	< 0.550		< 0.550	< 0.550		< 0.550
Ethyl Benzene	< 1.37		< 1.37	< 1.37		< 1.37
Ethyl Benzene (GCMS)	< 1.00		NA	< 1.00		NA
M-Xylene	< 1.32		< 1.32	< 1.32		< 1.32
M-Xylene (GCMS)	< 1.00		NA	< 1.00		NA
Methylene Chloride	< 7.40		< 7.40	< 7.40		< 7.40

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37430		37433	37433		37434
Date	02/26/90		01/03/90	02/26/90		01/03/90
Analytes						
Volatiles						
Methylene Chloride (GCMS)	< 1.00		NA	< 1.00		NA
Methylisobutyl Ketone	< 4.90		< 4.90	< 4.90		< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40		NA	< 1.40		NA
O,P-Xylene	< 1.36		< 1.36	< 1.36		< 1.36
O,P-Xylene (GCMS)	< 2.00		NA	< 2.00		NA
Tetrachloroethene	< 0.750		< 0.750	< 0.750		< 0.750
Tetrachloroethene (GCMS)	< 1.00		NA	< 1.00		NA
Toluene	3.17	A	< 1.47	< 1.47		< 1.47
Toluene (GCMS)	2.70	A	NA	1.30	A	NA
Trichloroethene	1.65	A	< 0.560	0.803	A	< 0.560
Trichloroethene (GCMS)	< 1.00		NA	1.10	A	NA
Vinyl Chloride	NA		NA	NA		NA
Vinyl Chloride (GCMS)	< 12.0		NA	< 12.0		NA

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37434	37435	37435	37436
Date	02/27/90	12/29/89	02/27/90	12/29/89
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.35	< 2.35	< 2.35	NA
Cadmium	< 6.78	< 6.78	< 6.78	NA
Calcium	85500	134000	123000	NA
Chloride	84000	120000	98000	NA
Chromium	< 16.8	< 16.8	< 16.8	NA
Copper	< 18.8	< 18.8	< 18.8	NA
Cyanide	< 5.00	< 5.00	< 5.00	NA
Fluoride	1740	1730	1890	NA
Iron	< 77.5	NA	< 77.5	NA
Lead	< 43.4	< 43.4	< 43.4	NA
Magnesium	19600	37000	37000	NA
Manganese	10.5	NA	< 9.67	NA
Mercury	< 0.100	< 0.100	< 0.100	NA
Nitrite, Nitrate -- Non-Specific	3700	3300	1700	5800
Potassium	4130	6510	4580	NA
Sodium	100000	190000	130000	NA
Sulfate	200000	390000	290000	NA
Total Organic Carbon	2000	3000	3000	NA

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37434	37435	37435	37436
Date	02/27/90	12/29/89	02/27/90	12/29/89
Analytes				
Metals/Anions/General Chem				
Total Suspended Solids	NA	NA	NA	NA
Zinc	< 18.0	< 18.0	< 18.0	NA
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	NA
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	NA
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	NA
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	NA
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	NA
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	NA
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	NA
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	NA
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	NA
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	NA
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	NA
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	NA
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	NA
Semivolatiles				
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	NA
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490	NA

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37434	37435	37435	37436
Date	02/27/90	12/29/89	02/27/90	12/29/89
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	NA
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	NA
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	NA
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	NA
Aldrin	< 0.0500	< 0.0500	< 0.0500	NA
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	NA
Atrazine	< 4.03	< 4.03	< 4.03	NA
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	NA
Benzothiazole	< 5.00	< 5.00	< 5.00	NA
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	NA
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70	NA
Caprolactam (GCMS)	< 7.70	< 7.70	< 7.70	NA
Chlordane	< 0.0950	< 0.0950	< 0.0950	NA

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37434	37435	37435	37436
Date	02/27/90	12/29/89	02/27/90	12/29/89
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	NA
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	NA
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	NA
Dieldrin	< 0.0500	< 0.0500	< 0.0500	NA
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	NA
Diisopropyl Methylphosphonate	3.63	15.5	10.8	NA
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 21.0	NA
Dimethylmethyl Phosphonate	< 0.188	< 0.188	1.01	NA
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	NA
Dithiane	< 1.34	< 1.34	< 1.34	NA
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	NA
Endrin	< 0.0500	< 0.0500	< 0.0500	NA
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	NA
Hexachlorocyclopentadiene	< 0.0480	0.0914	< 0.0480	NA
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	NA
Isodrin	< 0.0510	< 0.0510	< 0.0510	NA
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	NA
Malathion	< 0.373	< 0.373	< 0.373	NA

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37434	37435	37435	37436
Date	02/27/90	12/29/89	02/27/90	12/29/89
Analytes				
Semivolatiles				
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	NA
Parathion	< 0.647	< 0.647	< 0.647	NA
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	NA
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	NA
Supona	< 0.787	< 0.787	< 0.787	NA
Supona (GCMS)	< 19.0	< 19.0	< 19.0	NA
Vapona	< 0.384	< 0.384	< 0.384	NA
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	NA
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	NA
1,1,1-Trichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	NA
1,1,2-Trichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	NA
1,1-Dichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	NA
1,1-Dichloroethene (GCMS)	< 1.00	NA	< 1.00	NA
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	NA
1,2-Dichloroethane (GCMS)	< 1.00	NA	< 1.00	NA

Notes: Values are reported in micrograms per liter.
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A -- Data considered anomalous based on evaluation of hist l da d fi /QC dure

Table B1 Groundwater Investigative Analytical Data

Sample ID	37434		37435	37435		37436
Date	02/27/90		12/29/89	02/27/90		12/29/89
Analytes						
Volatiles						
1,2-Dichloroethenes (cis & trans)	< 0.760		< 0.760	< 0.760		NA
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00		NA	< 5.00		NA
Benzene	4.61	A	< 1.05	10.7	A	NA
Benzene (GCMS)	2.71	A	NA	9.30	A	NA
Carbon Tetrachloride	< 0.990		< 0.990	< 0.990		NA
Carbon Tetrachloride (GCMS)	< 1.00		NA	1.10	A	NA
Chlorobenzene	39.2	A	< 0.820	58.1	A	NA
Chlorobenzene (GCMS)	40.4	A	NA	70.2	A	NA
Chloroform	64.0	A	< 0.500	214	A	NA
Chloroform (GCMS)	68.0	A	NA	> 150	A	NA
Dibromochloropropane	0.428	A	< 0.195	1.26	A	NA
Dibromochloropropane (GCMS)	< 12.0		< 12.0	< 12.0		NA
Dimethyl Disulfide	< 0.550		< 0.550	< 0.550		NA
Ethyl Benzene	< 1.37		< 1.37	< 1.37		NA
Ethyl Benzene (GCMS)	< 1.00		NA	< 1.00		NA
M-Xylene	< 1.32		< 1.32	< 1.32		NA
M-Xylene (GCMS)	< 1.00		NA	< 1.00		NA
Methylene Chloride	< 7.40		< 7.40	< 7.40		NA

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A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37434		37435		37435		37436	
Date	02/27/90		12/29/89		02/27/90		12/29/89	
Analytes								
Volatiles								
Methylene Chloride (GCMS)	< 1.00		NA		< 1.00		NA	
Methylisobutyl Ketone	< 4.90		< 4.90		< 4.90		NA	
Methylisobutyl Ketone (GCMS)	< 1.40		NA		< 1.40		NA	
O,P-Xylene	< 1.36		< 1.36		< 1.36		NA	
O,P-Xylene (GCMS)	< 2.00		NA		< 2.00		NA	
Tetrachloroethene	< 0.750		< 0.750		< 0.750		NA	
Tetrachloroethene (GCMS)	< 1.00		NA		< 1.00		NA	
Toluene	< 1.47		< 1.47		2.12	A	NA	
Toluene (GCMS)	1.10	A	NA		2.30	A	NA	
Trichloroethene	0.971	A	< 0.560		1.78	A	NA	
Trichloroethene (GCMS)	1.20	A	NA		2.30	A	NA	
Vinyl Chloride	NA		NA		NA		NA	
Vinyl Chloride (GCMS)	< 12.0		NA		< 12.0		NA	

Notes: Values are reported in micrograms per liter.
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A -- Data considered anomalous based on evaluation of hist[illegible] dat[illegible] fie[illegible]/QC [illegible]dure[illegible]

Table B1 Groundwater Investigative Analytical Data

Sample ID	37436	37436	37437	37437
Date	01/02/90	02/28/90	01/02/90	02/28/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.35	< 2.35	< 2.35	< 2.35
Cadmium	< 6.78	< 6.78	< 6.78	< 6.78
Calcium	124000	109000	76900	76100
Chloride	73000	76000	82000	84000
Chromium	< 16.8	< 16.8	< 16.8	< 16.8
Copper	< 18.8	< 18.8	< 18.8	< 18.8
Cyanide	< 5.00	< 5.00	< 5.00	< 5.00
Fluoride	1220	1350	1170	1310
Iron	NA	< 77.5	NA	< 77.5
Lead	< 43.4	< 43.4	< 43.4	< 43.4
Magnesium	24700	23200	16700	17400
Manganese	NA	12.4	NA	< 9.67
Mercury	< 0.100	< 0.100	< 0.100	< 0.100
Nitrite, Nitrate -- Non-Specific	NA	5000	2400	1500
Potassium	4380	3930	3870	3240
Sodium	73000	81000	78000	75000
Sulfate	220000	220000	110000	110000
Total Organic Carbon	2000	2000	1000	1000

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A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37436 01/02/90	37436 02/28/90	37437 01/02/90	37437 02/28/90
Analytes				
Metals/Anions/General Chem				
Total Suspended Solids	NA	NA	NA	NA
Zinc	< 18.0	< 18.0	< 18.0	< 18.0
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490	< 0.0490

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37436	37436	37437	37437
Date	01/02/90	02/28/90	01/02/90	02/28/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	< 7.70	< 7.70	< 7.70	< 7.70
Chlordane	< 0.0950	< 0.0950	< 0.0950	< 0.0950

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37436	37436	37437	37437
Date	01/02/90	02/28/90	01/02/90	02/28/90
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	< 5.50
Dieldrin	0.0468	< 0.0500	0.0744	0.0893
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	< 0.392	2.15	< 0.392	< 0.392
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34	< 1.34
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	< 0.0510	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373	< 0.373

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37436	37436	37437	37437
Date	01/02/90	02/28/90	01/02/90	02/28/90
Analytes				
Semivolatiles				
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	NA	< 1.00	NA	< 1.00
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	NA	< 1.00	NA	< 1.00
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	NA	< 1.00	NA	< 1.00
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	NA	< 1.00	NA	< 1.00
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	NA	< 1.00	NA	< 1.00

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37436		37436		37437		37437	
Date	01/02/90		02/28/90		01/02/90		02/28/90	
Analytes								
Volatiles								
1,2-Dichloroethenes (cis & trans)	< 0.760		< 0.760		< 0.760		< 0.760	
1,2-Dichloroethenes (cis & trans) (GCMS)	NA		< 5.00		NA		< 5.00	
Benzene	< 1.05		< 1.05		< 1.05		2.14	A
Benzene (GCMS)	NA		< 1.00		NA		< 1.00	
Carbon Tetrachloride	< 0.990		< 0.990		< 0.990		< 0.990	
Carbon Tetrachloride (GCMS)	NA		< 1.00		NA		< 1.00	
Chlorobenzene	< 0.820		11.0	A	< 0.820		42.8	A
Chlorobenzene (GCMS)	NA		9.62	A	NA		17.3	A
Chloroform	< 0.500		15.1	A	< 0.500		40.9	A
Chloroform (GCMS)	NA		12.0	A	NA		27.0	A
Dibromochloropropane	< 0.195		< 0.195		< 0.195		0.302	A
Dibromochloropropane (GCMS)	< 12.0		< 12.0		< 12.0		< 12.0	
Dimethyl Disulfide	< 0.550		< 0.550		< 0.550		< 0.550	
Ethyl Benzene	< 1.37		< 1.37		< 1.37		< 1.37	
Ethyl Benzene (GCMS)	NA		< 1.00		NA		< 1.00	
M-Xylene	< 1.32		< 1.32		< 1.32		< 1.32	
M-Xylene (GCMS)	NA		< 1.00		NA		< 1.00	
Methylene Chloride	< 7.40		< 7.40		< 7.40		< 7.40	

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Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37436 01/02/90	37436 02/28/90	37437 01/02/90	37437 02/28/90
Analytes				
Volatiles				
Methylene Chloride (GCMS)	NA	< 1.00	NA	< 1.00
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	NA	< 1.40	NA	< 1.40
O,P-Xylene	< 1.36	< 1.36	< 1.36	< 1.36
O,P-Xylene (GCMS)	NA	< 2.00	NA	< 2.00
Tetrachloroethene	< 0.750	< 0.750	< 0.750	< 0.750
Tetrachloroethene (GCMS)	NA	< 1.00	NA	< 1.00
Toluene	< 1.47	< 1.47	< 1.47	< 1.47
Toluene (GCMS)	NA	< 1.00	NA	< 1.00
Trichloroethene	< 0.560	< 0.560	< 0.560	0.729 A
Trichloroethene (GCMS)	NA	< 1.00	NA	< 1.00
Vinyl Chloride	NA	NA	NA	NA
Vinyl Chloride (GCMS)	NA	< 12.0	NA	< 12.0

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37438	37438	37439	37439
Date	01/25/90	02/28/90	01/25/90	03/01/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.35	< 2.35	< 2.35	< 2.35
Cadmium	< 6.78	< 6.78	< 6.78	< 6.78
Calcium	66700	66800	83600	104000
Chloride	R	280000	R	200000
Chromium	< 16.8	< 16.8	< 16.8	< 16.8
Copper	< 18.8	< 18.8	< 18.8	< 18.8
Cyanide	< 5.00	< 5.00	< 5.00	< 5.00
Fluoride	R	4070	R	2340
Iron	NA	< 77.5	NA	< 77.5
Lead	< 43.4	< 43.4	< 43.4	< 43.4
Magnesium	19300	21200	20400	28200
Manganese	NA	< 9.67	NA	28.8
Mercury	< 0.100	< 0.100	< 0.100	< 0.100
Nitrite, Nitrate -- Non-Specific	5300	4900	3000	1800
Potassium	2600	2600	3290	3810
Sodium	300000	260000	180000	150000
Sulfate	R	170000	R	180000
Total Organic Carbon	< 1000	2000	< 1000	2000

Notes: Values are reported in micrograms per liter.
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A -- Data considered anomalous based on evaluation of hist l da d fi \/QC dure

Table B1 Groundwater Investigative Analytical Data

Sample ID	37438	37438	37439	37439
Date	01/25/90	02/28/90	01/25/90	03/01/90
Analytes				
Metals/Anions/General Chem				
Total Suspended Solids	NA	NA	NA	NA
Zinc	< 18.0	< 18.0	< 18.0	< 18.0
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490	< 0.0490

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37438	37438	37439	37439
Date	01/25/90	02/28/90	01/25/90	03/01/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	< 0.0500	0.0711	< 0.0500	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	10.4	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	< 10.0	< 7.70	< 10.0	< 7.70
Chlordane	< 0.0950	< 0.0950	< 0.0950	< 0.0950

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of [illegible] dat[illegible] fie[illegible] /QC [illegible]ures

Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37438 01/25/90	37438 02/28/90	37439 01/25/90	37439 03/01/90
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	< 5.50
Dieldrin	0.150	0.127	0.0541	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	3.57	3.47	2.07	2.54
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34	< 1.34
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	< 0.0510	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373	< 0.373

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37438	37438	37439	37439
Date	01/25/90	02/28/90	01/25/90	03/01/90
Analytes				
Semivolatiles				
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00

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A -- Data considered anomalous based on evaluation of hist[illegible] l da[illegible] l fi[illegible] /QC [illegible]dure

Table B1 Groundwater Investigative Analytical Data

Sample ID	37438		37438		37439		37439	
Date	01/25/90		02/28/90		01/25/90		03/01/90	
Analytes								
Volatiles								
1,2-Dichloroethenes (cis & trans)	< 0.760		< 0.760		< 0.760		< 0.760	
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00		< 5.00		< 5.00		< 5.00	
Benzene	< 1.05		8.46	A	25.8	A	2.99	A
Benzene (GCMS)	48.8	A	6.59	A	12.4	A	1.16	A
Carbon Tetrachloride	12.7	A	< 0.990		1.86	A	< 0.990	
Carbon Tetrachloride (GCMS)	5.23	A	< 1.00		1.38	A	< 1.00	
Chlorobenzene	19.0	A	103	A	180	A	23.4	A
Chlorobenzene (GCMS)	> 150	A	84.6	A	125	A	23.1	A
Chloroform	1200	A	160	A	420	A	75.1	A
Chloroform (GCMS)	> 150	A	> 150	A	> 150	A	30.0	A
Dibromochloropropane	3.03	A	1.18	A	0.842	A	0.539	A
Dibromochloropropane (GCMS)	< 12.0		< 12.0		< 12.0		< 12.0	
Dimethyl Disulfide	< 0.550		< 0.550		< 0.550		< 0.550	
Ethyl Benzene	< 1.37		< 1.37		< 1.37		< 1.37	
Ethyl Benzene (GCMS)	1.20	A	< 1.00		< 1.00		< 1.00	
M-Xylene	< 1.32		< 1.32		< 1.32		< 1.32	
M-Xylene (GCMS)	< 1.00		< 1.00		< 1.00		< 1.00	
Methylene Chloride	< 7.40		< 7.40		< 7.40		< 7.40	

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37438	37438	37439	37439
Date	01/25/90	02/28/90	01/25/90	03/01/90
Analytes				
Volatiles				
Methylene Chloride (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40	< 1.40	< 1.40	< 1.40
O,P-Xylene	< 1.36	< 1.36	< 1.36	< 1.36
O,P-Xylene (GCMS)	1.98 A	< 2.00	< 2.00	< 2.00
Tetrachloroethene	1.66 A	< 0.750	< 0.750	< 0.750
Tetrachloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Toluene	< 1.47	2.22 A	3.42 A	< 1.47
Toluene (GCMS)	7.50 A	2.80 A	3.00 A	< 1.00
Trichloroethene	19.1 A	2.36 A	5.48 A	0.619 A
Trichloroethene (GCMS)	12.0 A	2.30 A	4.20 A	< 1.00
Vinyl Chloride	NA	NA	NA	NA
Vinyl Chloride (GCMS)	< 12.0	< 12.0	< 12.0	< 12.0

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37440	37440	37441	37441
Date	01/25/90	03/01/90	01/29/90	03/01/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.35	< 2.35	< 2.35	< 2.35
Cadmium	< 6.78	< 6.78	< 6.78	< 6.78
Calcium	77400	81200	114000	102000
Chloride	R	86000	R	53000
Chromium	< 16.8	< 16.8	< 16.8	< 16.8
Copper	< 18.8	< 18.8	< 18.8	< 18.8
Cyanide	< 5.00	< 5.00	< 5.00	< 5.00
Fluoride	R	1360	R	1230
Iron	NA	< 77.5	NA	< 77.5
Lead	< 43.4	< 43.4	< 43.4	< 43.4
Magnesium	14900	17100	20800	19900
Manganese	NA	< 9.67	NA	< 9.67
Mercury	< 0.100	< 0.100	< 0.100	< 0.100
Nitrite, Nitrate -- Non-Specific	1700	2000	8500	810
Potassium	4030	2920	4050	4540
Sodium	83000	80000	92000	78000
Sulfate	R	120000	R	160000
Total Organic Carbon	< 1000	2000	< 1000	2000

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A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37440	37440	37441	37441
Date	01/25/90	03/01/90	01/29/90	03/01/90
Analytes				
Metals/Anions/General Chem				
Total Suspended Solids	NA	NA	NA	NA
Zinc	< 18.0	< 18.0	< 18.0	< 18.0
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490	< 0.0490

Notes: Values are reported in micrograms per liter.
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Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37440 01/25/90	37440 03/01/90	37441 01/29/90	37441 03/01/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	< 10.0	< 7.70	< 10.0	< 7.70
Chlordane	< 0.0950	< 0.0950	< 0.0950	< 0.0950

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37440	37440	37441	37441
Date	01/25/90	03/01/90	01/29/90	03/01/90
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	< 5.50
Dieldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	< 0.392	< 0.392	< 0.392	< 0.392
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34	< 1.34
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	< 0.0510	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373	< 0.373

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Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37440 01/25/90	37440 03/01/90	37441 01/29/90	37441 03/01/90
Analytes				
Semivolatiles				
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37440	37440	37441	37441
Date	01/25/90	03/01/90	01/29/90	03/01/90
Analytes				
Volatiles				
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	< 0.760	< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	< 5.00	< 5.00	< 5.00
Benzene	30.6 A	< 1.05	41.3 A	< 1.05
Benzene (GCMS)	12.4 A	0.930 A	9.30 A	< 1.00
Carbon Tetrachloride	2.57 A	< 0.990	3.09 A	< 0.990
Carbon Tetrachloride (GCMS)	1.56 A	< 1.00	2.20 A	< 1.00
Chlorobenzene	192 A	14.9 A	130 A	< 0.820
Chlorobenzene (GCMS)	115 A	22.1 A	115 A	< 1.00
Chloroform	220 A	18.4 A	880 A	< 0.500
Chloroform (GCMS)	> 150 A	24.0 A	> 150 A	< 1.00
Dibromochloropropane	0.697 A	< 0.195	1.27 A	< 0.195
Dibromochloropropane (GCMS)	< 12.0	< 12.0	< 12.0	< 12.0
Dimethyl Disulfide	< 0.550	< 0.550	< 0.550	< 0.550
Ethyl Benzene	< 1.37	< 1.37	< 1.37	< 1.37
Ethyl Benzene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
M-Xylene	< 1.32	< 1.32	< 1.32	< 1.32
M-Xylene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Methylene Chloride	< 7.40	< 7.40	< 7.40	< 7.40

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of hist[illegible] l da[illegible] d fi[illegible] /QC [illegible]dure

Table B1 Groundwater Investigative Analytical Data

Sample ID	37440		37440	37441		37441
Date	01/25/90		03/01/90	01/29/90		03/01/90
Analytes						
Volatiles						
Methylene Chloride (GCMS)	< 1.00		< 1.00	< 1.00		< 1.00
Methylisobutyl Ketone	< 4.90		< 4.90	< 4.90		< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40		< 1.40	< 1.40		< 1.40
O,P-Xylene	< 1.36		< 1.36	< 1.36		< 1.36
O,P-Xylene (GCMS)	< 2.00		< 2.00	< 2.00		< 2.00
Tetrachloroethene	< 0.750		< 0.750	< 0.750		< 0.750
Tetrachloroethene (GCMS)	< 1.00		< 1.00	1.02	A	< 1.00
Toluene	4.09	A	< 1.47	4.72	A	< 1.47
Toluene (GCMS)	2.80	A	< 1.00	3.00	A	< 1.00
Trichloroethene	5.51	A	< 0.560	7.76	A	< 0.560
Trichloroethene (GCMS)	3.80	A	< 1.00	4.90	A	< 1.00
Vinyl Chloride	NA		NA	NA		NA
Vinyl Chloride (GCMS)	< 12.0		< 12.0	< 12.0		< 12.0

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37441	37442	37442	37443
Date	06/12/90	03/02/90	06/12/90	03/01/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.35	< 2.35	< 2.35	< 2.35
Cadmium	< 6.78	< 6.78	< 6.78	< 6.78
Calcium	113000	119000	118000	93500
Chloride	54000	140000	91000	130000
Chromium	< 16.8	< 16.8	< 16.8	< 16.8
Copper	< 18.8	< 18.8	< 18.8	< 18.8
Cyanide	R	< 5.00	R	< 5.00
Fluoride	1020	2020	1850	2430
Iron	NA	< 77.5	NA	< 77.5
Lead	< 43.4	< 43.4	< 43.4	< 43.4
Magnesium	20100	29400	26400	26800
Manganese	NA	391	NA	15.3
Mercury	1.64	< 0.100	0.210	< 0.100
Nitrite, Nitrate -- Non-Specific	8100	2700	1300	7100
Potassium	3410	3770	2770	4010
Sodium	73000	99000	95000	26100
Sulfate	160000	150000	150000	210000
Total Organic Carbon	2000	2000	3000	2000

Notes: Values are reported in micrograms per liter.
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Table B1 Groundwater Investigative Analytical Data

Sample ID	37441	37442	37442	37443
Date	06/12/90	03/02/90	06/12/90	03/01/90
Analytes				
Metals/Anions/General Chem				
Total Suspended Solids	NA	NA	NA	NA
Zinc	< 18.0	< 18.0	< 18.0	< 18.0
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490	< 0.0490

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37441	37442	37442	37443
Date	06/12/90	03/02/90	06/12/90	03/01/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	< 10.0	< 7.70	< 10.0	< 7.70
Chlordane	< 0.0950	< 0.0950	< 0.0950	< 0.0950

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Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37441 06/12/90	37442 03/02/90	37442 06/12/90	37443 03/01/90
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	< 5.50
Dieldrin	< 0.0500	< 0.0500	< 0.0500	0.0590
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	< 0.392	0.476	< 0.392	7.28
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34	< 1.34
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	< 0.0510	0.236	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373	< 0.373

Notes: Values are reported in micrograms per liter.
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A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37441	37442	37442	37443
Date	06/12/90	03/02/90	06/12/90	03/01/90
Analytes				
Semivolatiles				
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37441		37442		37442		37443	
Date	06/12/90		03/02/90		06/12/90		03/01/90	
Analytes								
Volatiles								
1,2-Dichloroethenes (cis & trans)	< 0.760		< 0.760		< 0.760		< 0.760	
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00		< 5.00		< 5.00		< 5.00	
Benzene	< 1.05		< 1.05		< 1.05		< 1.05	
Benzene (GCMS)	< 1.00		< 1.00		< 1.00		< 1.00	
Carbon Tetrachloride	< 0.990		< 0.990		< 0.990		< 0.990	
Carbon Tetrachloride (GCMS)	< 1.00		< 1.00		< 1.00		< 1.00	
Chlorobenzene	< 0.820		10.7	A	< 0.820		11.7	A
Chlorobenzene (GCMS)	< 1.00		11.5	A	< 1.00		11.5	A
Chloroform	< 0.500		25.9	A	< 0.500		15.2	A
Chloroform (GCMS)	< 1.00		12.0	A	< 1.00		9.30	A
Dibromochloropropane	< 0.195		0.206	A	< 0.195		< 0.195	
Dibromochloropropane (GCMS)	< 12.0		< 12.0		< 12.0		< 12.0	
Dimethyl Disulfide	< 0.550		< 0.550		< 0.550		< 0.550	
Ethyl Benzene	< 1.37		< 1.37		< 1.37		< 1.37	
Ethyl Benzene (GCMS)	< 1.00		< 1.00		< 1.00		< 1.00	
M-Xylene	< 1.32		< 1.32		< 1.32		< 1.32	
M-Xylene (GCMS)	< 1.00		< 1.00		< 1.00		< 1.00	
Methylene Chloride	< 7.40		< 7.40		< 7.40		< 7.40	

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37441	37442	37442	37443
Date	06/12/90	03/02/90	06/12/90	03/01/90
Analytes				
Volatiles				
Methylene Chloride (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40	< 1.40	< 1.40	< 1.40
O,P-Xylene	< 1.36	< 1.36	< 1.36	< 1.36
O,P-Xylene (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00
Tetrachloroethene	< 0.750	< 0.750	< 0.750	< 0.750
Tetrachloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Toluene	< 1.47	< 1.47	< 1.47	< 1.47
Toluene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Trichloroethene	< 0.560	< 0.560	< 0.560	< 0.560
Trichloroethene (GCMS)	6.00	< 1.00	9.60	< 1.00
Vinyl Chloride	NA	NA	NA	NA
Vinyl Chloride (GCMS)	< 12.0	< 12.0	< 12.0	< 12.0

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Table B1 Groundwater Investigative Analytical Data

Sample ID	37443	37444	37444
Date	06/13/90	03/02/90	06/13/90
Analytes			
Metals/Anions/General Chem			
Arsenic	2.65	< 2.35	2.65
Cadmium	< 6.78	< 6.78	< 6.78
Calcium	101000	82300	109000
Chloride	130000	110000	140000
Chromium	< 16.8	< 16.8	< 16.8
Copper	< 18.8	< 18.8	< 18.8
Cyanide	R	< 5.00	R
Fluoride	2200	1540	1330
Iron	NA	< 77.5	NA
Lead	< 43.4	< 43.4	< 43.4
Magnesium	27500	19400	23900
Manganese	NA	46.5	NA
Mercury	1.19	< 0.100	1.01
Nitrite, Nitrate -- Non-Specific	7000	3700	4200
Potassium	2920	3630	2610
Sodium	140000	110000	100000
Sulfate	180000	130000	130000
Total Organic Carbon	2000	2000	1000

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37443	37444	37444
Date	06/13/90	03/02/90	06/13/90
Analytes			
Metals/Anions/General Chem			
Total Suspended Solids	NA	NA	NA
Zinc	< 18.0	< 18.0	< 18.0
Phenols			
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20
Semivolatiles			
1,4-Oxathiane	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of his[illegible] al de[illegible] d fi[illegible] A/QC [illegible]edure

Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37443 06/13/90	37444 03/02/90	37444 06/13/90
Analytes			
Semivolatiles			
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0
Aldrin	< 0.0500	< 0.0500	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	< 10.0	< 7.70	< 10.0
Chlordane	< 0.0950	< 0.0950	< 0.0950

Notes: Values are reported in micrograms per liter.
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Table B1 Groundwater Investigative Analytical Data

Sample ID	37443	37444	37444
Date	06/13/90	03/02/90	06/13/90
Analytes			
Semivolatiles			
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50
Dieldrin	0.0619	< 0.0500	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	5.54	0.475	0.814
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30
Endrin	< 0.0500	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0
Isodrin	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373

Notes: Values are reported in micrograms per liter.
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Table B1 Groundwater Investigative Analytical Data

Sample ID Date	37443 06/13/90	37444 03/02/90	37444 06/13/90
Analytes			
Semivolatiles			
Malathion (GCMS)	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50
Volatiles			
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00	< 1.00
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit. NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B1 Groundwater Investigative Analytical Data

Sample ID	37443		37444		37444	
Date	06/13/90		03/02/90		06/13/90	
Analytes						
Volatiles						
1,2-Dichloroethenes (cis & trans)	< 0.760		< 0.760		< 0.760	
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00		< 5.00		< 5.00	
Benzene	< 1.05		1.77	A	< 1.05	
Benzene (GCMS)	< 1.00		1.09	A	< 1.00	
Carbon Tetrachloride	< 0.990		< 0.990		< 0.990	
Carbon Tetrachloride (GCMS)	< 1.00		< 1.00		< 1.00	
Chlorobenzene	< 0.820		10.6	A	< 0.820	
Chlorobenzene (GCMS)	< 1.00		19.2	A	< 1.00	
Chloroform	1.55		30.8	A	2.65	
Chloroform (GCMS)	2.20		26.0	A	3.80	
Dibromochloropropane	< 0.195		0.223	A	< 0.195	
Dibromochloropropane (GCMS)	< 12.0		< 12.0		< 12.0	
Dimethyl Disulfide	< 0.550		< 0.550		< 0.550	
Ethyl Benzene	< 1.37		< 1.37		< 1.37	
Ethyl Benzene (GCMS)	< 1.00		< 1.00		< 1.00	
M-Xylene	< 1.32		< 1.32		< 1.32	
M-Xylene (GCMS)	< 1.00		< 1.00		< 1.00	
Methylene Chloride	< 7.40		< 7.40		< 7.40	

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit. NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of hist l da d fi /QC dure

Table B1 Groundwater Investigative Analytical Data

Sample ID	37443	37444	37444
Date	06/13/90	03/02/90	06/13/90
Analytes			
Volatiles			
Methylene Chloride (GCMS)	< 1.00	< 1.00	< 1.00
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40	< 1.40	< 1.40
O,P-Xylene	< 1.36	< 1.36	< 1.36
O,P-Xylene (GCMS)	< 2.00	< 2.00	< 2.00
Tetrachloroethene	< 0.750	< 0.750	< 0.750
Tetrachloroethene (GCMS)	< 1.00	< 1.00	< 1.00
Toluene	< 1.47	< 1.47	< 1.47
Toluene (GCMS)	< 1.00	< 1.00	< 1.00
Trichloroethene	< 0.560	< 0.560	< 0.560
Trichloroethene (GCMS)	< 1.00	< 1.00	< 1.00
Vinyl Chloride	NA	NA	NA
Vinyl Chloride (GCMS)	< 12.0	< 12.0	< 12.0

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit. NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
A -- Data considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B2 Groundwater GC/MS Analytical Data

Sample ID	HA1048	HA1069	HA1163	HA1168
Date	12/18/89	12/28/89	02/01/90	02/22/90
	GC/MS of 37418	GC/MS of 37430	GC/MS of HA1072	GC/MS of 37404
Analytes				
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	NA
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	NA
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	NA
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	NA
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	NA
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	NA
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	NA
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	NA
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	NA
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	NA
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	NA
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	NA
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	NA
Semivolatiles				
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B2 Groundwater GC/MS Analytical Data

Sample ID	HA1048	HA1069	HA1163	HA1168
Date	12/18/89	12/28/89	02/01/90	02/22/90
	GC/MS of 37418	GC/MS of 37430	GC/MS of HA1072	GC/MS of 37404
Analytes				
Semivolatiles				
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	NA
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	NA
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	NA
Bis (2-Ethylhexyl) Phthalate (GCMS)	176	NA	< 7.70	NA
Caprolactam (GCMS)	< 10.0	NA	< 10.0	NA
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	NA
Dicyclopentadiene (GCMS)	264	< 5.50	365	NA
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	NA
Diisopropyl Methylphosphonate (GCMS)	> 200	< 21.0	> 200	NA
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	NA
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	NA
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	NA
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	NA
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures

Table B2 Groundwater GC/MS Analytical Data

Sample ID Date	HA1048 12/18/89 GC/MS of 37418		HA1069 12/28/89 GC/MS of 37430		HA1163 02/01/90 GC/MS of HA1072		HA1168 02/22/90 GC/MS of 37404	
Analytes								
Semivolatiles								
Malathion (GCMS)	< 21.0		< 21.0		< 21.0		NA	
Parathion (GCMS)	< 37.0		< 37.0		< 37.0		NA	
Pentachlorophenol (GCMS)	< 9.10		< 9.10		< 9.10		NA	
Supona (GCMS)	< 19.0		< 19.0		< 19.0		NA	
Vapona (GCMS)	< 8.50		< 8.50		< 8.50		NA	
Volatiles								
1,1,1-Trichloroethane (GCMS)	< 1.00		< 1.00		< 1.00		< 1.00	
1,1,2-Trichloroethane (GCMS)	< 1.00		< 1.00		< 1.00		< 1.00	
1,1-Dichloroethane (GCMS)	< 1.00		< 1.00		< 1.00		< 1.00	
1,1-Dichloroethene (GCMS)	< 1.00		< 1.00		< 1.00		< 1.00	
1,2-Dichloroethane (GCMS)	23.1		< 1.00		12.0		< 1.00	
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00		< 5.00		< 5.00		< 5.00	
Benzene (GCMS)	< 1.00		< 1.00		< 1.00		15.5	A
Carbon Tetrachloride (GCMS)	< 1.00		< 1.00		< 1.00		1.56	A
Chlorobenzene (GCMS)	< 1.00		< 1.00		< 1.00		96.2	A
Chloroform (GCMS)	< 1.00		< 1.00		< 1.00		> 150	A
Dibromochloropropane (GCMS)	< 12.0		< 12.0		< 12.0		NA	

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B2 Groundwater GC/MS Analytical Data

Sample ID	HA1048		HA1069		HA1163		HA1168	
Date	12/18/89		12/28/89		02/01/90		02/22/90	
	GC/MS of 37418		GC/MS of 37430		GC/MS of HA1072		GC/MS of 37404	
Analytes								
Volatiles								
Ethyl Benzene (GCMS)	< 1.00		< 1.00		< 1.00		< 1.00	
M-Xylene (GCMS)	< 1.00		< 1.00		< 1.00		< 1.00	
Methylene Chloride (GCMS)	< 1.00		< 1.00		< 1.00		< 1.00	
Methylisobutyl Ketone (GCMS)	< 1.40		< 1.40		< 1.40		< 1.40	
O,P-Xylene (GCMS)	< 2.00		< 2.00		< 2.00		< 2.00	
Tetrachloroethene (GCMS)	13.9		< 1.00		7.41		< 1.00	
Toluene (GCMS)	< 1.00		< 1.00		< 1.00		3.00	A
Trichloroethene (GCMS)	8.20		< 1.00		2.60		3.50	A
Vinyl Chloride (GCMS)	< 12.0		< 12.0		< 12.0		< 12.0	

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures

Table B2 Groundwater GC/MS Analytical Data

Sample ID Date	HA1169 02/27/90 GC/MS of 37435	HA1171 02/28/90 GC/MS of 37438	HA1199 06/12/90 GC/MS of 37441
Analytes			
Phenols			
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20
Semivolatiles			
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B2 Groundwater GC/MS Analytical Data

Sample ID	HA1169	HA1171	HA1199
Date	02/27/90	02/28/90	06/12/90
	GC/MS of 37435	GC/MS of 37438	GC/MS of 37441
Analytes			
Semivolatiles			
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	< 7.70	< 7.70	< 10.0
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 21.0
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30
Endrin (GCMS)	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of hist l da d fi /QC dure

Table B2 Groundwater GC/MS Analytical Data

Sample ID / Date / Analytes	HA1169 02/27/90 GC/MS of 37435		HA1171 02/28/90 GC/MS of 37438		HA1199 06/12/90 GC/MS of 37441
Semivolatiles					
Malathion (GCMS)	< 21.0		< 21.0		< 21.0
Parathion (GCMS)	< 37.0		< 37.0		< 37.0
Pentachlorophenol (GCMS)	< 9.10		< 9.10		< 9.10
Supona (GCMS)	< 19.0		< 19.0		< 19.0
Vapona (GCMS)	< 8.50		< 8.50		< 8.50
Volatiles					
1,1,1-Trichloroethane (GCMS)	< 1.00		< 1.00		< 1.00
1,1,2-Trichloroethane (GCMS)	< 1.00		< 1.00		5.23
1,1-Dichloroethane (GCMS)	< 1.00		< 1.00		< 1.00
1,1-Dichloroethene (GCMS)	< 1.00		< 1.00		< 1.00
1,2-Dichloroethane (GCMS)	< 1.00		< 1.00		< 1.00
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00		< 5.00		< 5.00
Benzene (GCMS)	7.44	A	9.30	A	< 1.00
Carbon Tetrachloride (GCMS)	1.10	A	1.47	A	< 1.00
Chlorobenzene (GCMS)	73.1	A	96.2	A	< 1.00
Chloroform (GCMS)	> 150	A	> 150	A	< 1.00
Dibromochloropropane (GCMS)	< 12.0		< 12.0		< 12.0

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B2 Groundwater GC/MS Analytical Data

Sample ID	HA1169		HA1171		HA1199
Date	02/27/90		02/28/90		06/12/90
	GC/MS of 37435		GC/MS of 37438		GC/MS of 37441
Analytes					
Volatiles					
Ethyl Benzene (GCMS)	< 1.00		< 1.00		< 1.00
M-Xylene (GCMS)	< 1.00		< 1.00		< 1.00
Methylene Chloride (GCMS)	< 1.00		< 1.00		< 1.00
Methylisobutyl Ketone (GCMS)	< 1.40		< 1.40		< 1.40
O,P-Xylene (GCMS)	< 2.00		< 2.00		< 2.00
Tetrachloroethene (GCMS)	< 1.00		< 1.00		< 1.00
Toluene (GCMS)	2.30	A	3.30	A	< 1.00
Trichloroethene (GCMS)	2.30	A	3.20	A	27.0
Vinyl Chloride (GCMS)	< 12.0		< 12.0		< 12.0

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of hist [illegible] l d [illegible] d fi [illegible] \/QC [illegible] dur [illegible]

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1018	HA1019	HA1021	HA1025	HA1046
Date	09/27/89	09/27/89	10/26/89	11/09/89	02/12/90
	RB of 37402	FB of 37402	RB of 37341	TB of 37307	RB of 37408
Analytes					
Metals/Anions/General Chem					
Arsenic	NA	NA	NA	NA	< 2.35
Cadmium	NA	NA	NA	NA	< 6.78
Calcium	NA	NA	NA	NA	459
Chloride	NA	NA	NA	NA	< 278
Chromium	NA	NA	NA	NA	< 16.8
Copper	NA	NA	NA	NA	< 18.8
Cyanide	NA	NA	NA	NA	< 5.00
Fluoride	NA	NA	NA	NA	< 153
Iron	NA	NA	NA	NA	266
Lead	NA	NA	NA	NA	< 43.4
Magnesium	NA	NA	NA	NA	< 135
Manganese	NA	NA	NA	NA	< 9.67
Mercury	NA	NA	NA	NA	< 0.100
Nitrite, Nitrate -- Non-Specific	NA	NA	NA	NA	116
Potassium	NA	NA	NA	NA	< 1240
Sodium	NA	NA	NA	NA	456

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< - indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
RB - Rinse Blank TB - Trip Blank FB - Field Blank.

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1018	HA1019	HA1021	HA1025	HA1046
Date	09/27/89	09/27/89	10/26/89	11/09/89	02/12/90
	RB of 37402	FB of 37402	RB of 37341	TB of 37307	RB of 37408
Analytes					
Metals/Anions/General Chem					
Sulfate	NA	NA	NA	NA	362
Total Organic Carbon	NA	NA	NA	NA	< 1000
Total Suspended Solids	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	< 18.0
Phenols					
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	NA	NA	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	NA	NA	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	NA	NA	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	NA	NA	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	NA	NA	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	NA	NA	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	NA	NA	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	NA	NA	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	NA	NA	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	NA	NA	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	NA	NA	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	NA	NA	< 96.0

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< - indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
Rinse k rip FB eld

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1018	HA1019	HA1021	HA1025	HA1046
Date	09/27/89	09/27/89	10/26/89	11/09/89	02/12/90
	RB of 37402	FB of 37402	RB of 37341	TB of 37307	RB of 37408
Analytes					
Phenols					
Phenol (GCMS)	< 2.20	< 2.20	NA	NA	< 2.20
Semivolatiles					
1,4-Oxathiane	< 2.38	< 2.38	NA	NA	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	NA	NA	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	NA	NA	NA	NA	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	NA	NA	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	NA	NA	NA	NA	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	NA	NA	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	NA	NA	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	NA	NA	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	NA	NA	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	NA	NA	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	NA	NA	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	NA	NA	< 15.0
Aldrin	NA	NA	NA	NA	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	NA	NA	< 13.0
Atrazine	< 4.03	< 4.03	NA	NA	< 4.03

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
RB - Rinse Blank TB - Trip Blank FB - Field Blank.

Table B3 Groundwater QA/QC Analytical Data

Sample ID / Date / Analytes	HA1018 09/27/89 RB of 37402	HA1019 09/27/89 FB of 37402	HA1021 10/26/89 RB of 37341	HA1025 11/09/89 TB of 37307	HA1046 02/12/90 RB of 37408
Semivolatiles					
Atrazine (GCMS)	< 5.90	< 5.90	NA	NA	< 5.90
Benzothiazole	< 5.00	< 5.00	NA	NA	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	NA	NA	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	NA	NA	NA	< 7.70
Caprolactam (GCMS)	NA	NA	NA	NA	< 10.0
Chlordane	NA	NA	NA	NA	< 0.0950
Chlordane (GCMS)	< 37.0	< 37.0	NA	NA	< 37.0
Dicyclopentadiene	< 5.00	< 5.00	NA	NA	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	NA	NA	< 5.50
Dieldrin	NA	NA	NA	NA	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	NA	NA	< 26.0
Diisopropyl Methylphosphonate	< 0.392	< 0.392	NA	NA	< 0.392
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	NA	NA	< 21.0
Dimethylmethyl Phosphonate	< 0.188	< 0.188	NA	NA	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	NA	NA	< 130
Dithiane	< 1.34	< 1.34	NA	NA	< 1.34

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
Rins nk rip FB eld

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1018	HA1019	HA1021	HA1025	HA1046
Date	09/27/89	09/27/89	10/26/89	11/09/89	02/12/90
	RB of 37402	FB of 37402	RB of 37341	TB of 37307	RB of 37408
Analytes					
Semivolatiles					
Dithiane (GCMS)	< 3.30	< 3.30	NA	NA	< 3.30
Endrin	NA	NA	NA	NA	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	NA	NA	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	NA	NA	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	NA	NA	< 54.0
Isodrin	NA	NA	NA	NA	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	NA	NA	< 7.80
Malathion	< 0.373	< 0.373	NA	NA	< 0.373
Malathion (GCMS)	< 21.0	< 21.0	NA	NA	< 21.0
Parathion	< 0.647	< 0.647	NA	NA	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	NA	NA	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	NA	NA	< 9.10
Supona	< 0.787	< 0.787	NA	NA	R
Supona (GCMS)	< 19.0	< 19.0	NA	NA	< 19.0
Vapona	< 0.384	< 0.384	NA	NA	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	NA	NA	< 8.50

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
RB - Rinse Blank TB - Trip Blank FB - Field Blank.

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1018	HA1019	HA1021	HA1025	HA1046
Date	09/27/89	09/27/89	10/26/89	11/09/89	02/12/90
	RB of	FB of	RB of	TB of	RB of
	37402	37402	37341	37307	37408
Analytes					
Volatiles					
1,1,1-Trichloroethane	NA	NA	NA	NA	< 0.760
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA	< 1.00
1,1,2-Trichloroethane	NA	NA	NA	NA	< 0.780
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA	< 1.00
1,1-Dichloroethane	NA	NA	NA	NA	< 0.730
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA	< 1.00
1,1-Dichloroethene	NA	NA	NA	NA	< 1.70
1,1-Dichloroethene (GCMS)	NA	NA	NA	NA	< 1.00
1,2-Dichloroethane	NA	NA	NA	NA	< 1.10
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA	< 1.00
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA	< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA	< 5.00
Benzene	NA	NA	NA	NA	< 1.05
Benzene (GCMS)	NA	NA	NA	NA	< 1.00
Carbon Tetrachloride	NA	NA	NA	NA	< 0.990
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA	< 1.00

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
-- Rins[illegible]nk [illegible]rip [illegible] FB[illegible] eld [illegible].

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1018	HA1019	HA1021	HA1025	HA1046
Date	09/27/89	09/27/89	10/26/89	11/09/89	02/12/90
	RB of 37402	FB of 37402	RB of 37341	TB of 37307	RB of 37408
Analytes					
Volatiles					
Chlorobenzene	NA	NA	NA	NA	< 0.820
Chlorobenzene (GCMS)	NA	NA	NA	NA	< 1.00
Chloroform	NA	NA	NA	NA	< 0.500
Chloroform (GCMS)	NA	NA	NA	NA	< 1.00
Dibromochloropropane	< 0.195	< 0.195	NA	NA	< 0.195
Dibromochloropropane (GCMS)	< 12.0	< 12.0	NA	NA	< 12.0
Dimethyl Disulfide	< 0.550	< 0.550	NA	NA	< 0.550
Ethyl Benzene	NA	NA	NA	NA	< 1.37
Ethyl Benzene (GCMS)	NA	NA	NA	NA	< 1.00
M-Xylene	NA	NA	NA	NA	< 1.32
M-Xylene (GCMS)	NA	NA	NA	NA	< 1.00
Methylene Chloride	NA	NA	NA	NA	< 7.40
Methylene Chloride (GCMS)	NA	NA	NA	NA	< 1.00
Methylisobutyl Ketone	< 4.90	< 4.90	NA	NA	< 4.90
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA	< 1.40
O,P-Xylene	NA	NA	NA	NA	< 1.36

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R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
RB - Rinse Blank TB - Trip Blank FB - Field Blank.

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1018	HA1019	HA1021	HA1025	HA1046
Date	09/27/89	09/27/89	10/26/89	11/09/89	02/12/90
	RB of	FB of	RB of	TB of	RB of
	37402	37402	37341	37307	37408
Analytes					
Volatiles					
O,P-Xylene (GCMS)	NA	NA	NA	NA	< 2.00
Tetrachloroethene	NA	NA	NA	NA	< 0.750
Tetrachloroethene (GCMS)	NA	NA	NA	NA	< 1.00
Toluene	NA	NA	NA	NA	< 1.47
Toluene (GCMS)	NA	NA	NA	NA	< 1.00
Trichloroethene	NA	NA	NA	NA	< 0.560
Trichloroethene (GCMS)	NA	NA	NA	NA	< 1.00
Vinyl Chloride	NA	NA	< 0.460	< 0.460	NA
Vinyl Chloride (GCMS)	NA	NA	NA	NA	< 12.0

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NA -- Not Analyzed.
[illegible] Rins[illegible]nk [illegible]rip [illegible] FB [illegible]eld [illegible]

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1047	HA1066	HA1067	HA1164	HA1167
Date	12/18/89	12/29/89	12/29/89	02/01/90	02/21/90
	FB of 37418	RB of 37429	FB of 37429	TB of HA1072	TB of 37407
Analytes					
Metals/Anions/General Chem					
Arsenic	< 2.35	< 2.35	< 2.35	NA	NA
Cadmium	< 6.78	< 6.78	< 6.78	NA	NA
Calcium	< 105	127	< 105	NA	NA
Chloride	< 278	< 278	< 278	NA	NA
Chromium	< 16.8	< 16.8	< 16.8	NA	NA
Copper	< 18.8	< 18.8	< 18.8	NA	NA
Cyanide	< 5.00	< 5.00	< 5.00	NA	NA
Fluoride	< 153	< 153	< 153	NA	NA
Iron	< 77.5	NA	NA	NA	NA
Lead	< 43.4	< 43.4	< 43.4	NA	NA
Magnesium	< 135	< 135	< 135	NA	NA
Manganese	< 9.67	NA	NA	NA	NA
Mercury	< 0.100	< 0.100	< 0.100	NA	NA
Nitrite, Nitrate -- Non-Specific	490	20.7	20.5	NA	NA
Potassium	< 1240	< 1240	< 1240	NA	NA
Sodium	< 279	< 279	< 279	NA	NA

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R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
RB - Rinse Blank TB - Trip Blank FB - Field Blank.

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1047	HA1066	HA1067	HA1164	HA1167
Date	12/18/89	12/29/89	12/29/89	02/01/90	02/21/90
	FB of 37418	RB of 37429	FB of 37429	TB of HA1072	TB of 37407
Analytes					
Metals/Anions/General Chem					
Sulfate	< 175	< 175	< 175	NA	NA
Total Organic Carbon	< 500	< 500	< 500	NA	NA
Total Suspended Solids	< 4000	NA	NA	NA	NA
Zinc	< 18.0	< 18.0	< 18.0	NA	NA
Phenols					
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	NA	NA
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	NA	NA
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	NA	NA
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	NA	NA
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	NA	NA
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	NA	NA
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	NA	NA
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	NA	NA
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	NA	NA
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	NA	NA
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	NA	NA
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	NA	NA

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NA -- Not Analyzed.
Rins nk rip FB eld

Table B3 Groundwater QA/QC Analytical Data

Sample ID Date	HA1047 12/18/89 FB of 37418	HA1066 12/29/89 RB of 37429	HA1067 12/29/89 FB of 37429	HA1164 02/01/90 TB of HA1072	HA1167 02/21/90 TB of 37407
Analytes					
Phenols					
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	NA	NA
Semivolatiles					
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	NA	NA
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	NA	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	NA	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	NA	NA
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	NA	NA
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	NA	NA
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	NA	NA
Aldrin	< 0.0500	< 0.0500	< 0.0500	NA	NA
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	NA	NA
Atrazine	< 4.03	< 4.03	< 4.03	NA	NA

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Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1047	HA1066	HA1067	HA1164	HA1167
Date	12/18/89	12/29/89	12/29/89	02/01/90	02/21/90
	FB of 37418	RB of 37429	FB of 37429	TB of HA1072	TB of 37407
Analytes					
Semivolatiles					
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	NA	NA
Benzothiazole	< 5.00	< 5.00	< 5.00	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	NA	NA
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70	NA	NA
Caprolactam (GCMS)	< 10.0	< 7.70	< 7.70	NA	NA
Chlordane	< 0.0950	< 0.0950	< 0.0950	NA	NA
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	NA	NA
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	NA	NA
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	NA	NA
Dieldrin	< 0.0500	< 0.0500	< 0.0500	NA	NA
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	NA	NA
Diisopropyl Methylphosphonate	< 0.392	< 0.392	< 0.392	NA	NA
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 21.0	NA	NA
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 0.188	NA	NA
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	NA	NA
Dithiane	< 1.34	< 1.34	< 1.34	NA	NA

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
Rins nk Trip FB eld .

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1047	HA1066	HA1067	HA1164	HA1167
Date	12/18/89	12/29/89	12/29/89	02/01/90	02/21/90
	FB of 37418	RB of 37429	FB of 37429	TB of HA1072	TB of 37407
Analytes					
Semivolatiles					
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	NA	NA
Endrin	< 0.0500	< 0.0500	< 0.0500	NA	NA
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	NA	NA
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	NA	NA
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	NA	NA
Isodrin	< 0.0510	< 0.0510	< 0.0510	NA	NA
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	NA	NA
Malathion	< 0.373	< 0.373	< 0.373	NA	NA
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	NA	NA
Parathion	< 0.647	< 0.647	< 0.647	NA	NA
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	NA	NA
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	NA	NA
Supona	< 0.787	< 0.787	< 0.787	NA	NA
Supona (GCMS)	< 19.0	< 19.0	< 19.0	NA	NA
Vapona	< 0.384	< 0.384	< 0.384	NA	NA
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	NA	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
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NA -- Not Analyzed.
RB - Rinse Blank TB - Trip Blank FB - Field Blank.

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1047	HA1066	HA1067	HA1164	HA1167
Date	12/18/89	12/29/89	12/29/89	02/01/90	02/21/90
	FB of 37418	RB of 37429	FB of 37429	TB of HA1072	TB of 37407
Analytes					
Volatiles					
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760	< 1.09
1,1,1-Trichloroethane (GCMS)	< 1.00	NA	NA	NA	NA
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780	< 1.63
1,1,2-Trichloroethane (GCMS)	< 1.00	NA	NA	NA	NA
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730	< 1.93
1,1-Dichloroethane (GCMS)	< 1.00	NA	NA	NA	NA
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70	< 1.85
1,1-Dichloroethene (GCMS)	< 1.00	NA	NA	NA	NA
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	< 1.10	< 2.07
1,2-Dichloroethane (GCMS)	< 1.00	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	< 0.760	< 0.760	< 1.75
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	NA	NA	NA	NA
Benzene	< 1.05	< 1.05	< 1.05	< 1.05	< 1.92
Benzene (GCMS)	< 1.00	NA	NA	NA	NA
Carbon Tetrachloride	< 0.990	< 0.990	< 0.990	< 0.990	< 1.69
Carbon Tetrachloride (GCMS)	< 1.00	NA	NA	NA	NA

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
Rins nk Trip FB eld .

Table B3 Groundwater QA/QC Analytical Data

Sample ID Date	HA1047 12/18/89 FB of 37418	HA1066 12/29/89 RB of 37429	HA1067 12/29/89 FB of 37429	HA1164 02/01/90 TB of HA1072	HA1167 02/21/90 TB of 37407
Analytes					
Volatiles					
Chlorobenzene	< 0.820	< 0.820	< 0.820	< 0.820	< 1.36
Chlorobenzene (GCMS)	< 1.00	NA	NA	NA	NA
Chloroform	1.01	< 0.500	< 0.500	< 0.500	< 1.88
Chloroform (GCMS)	< 1.00	NA	NA	NA	NA
Dibromochloropropane	< 0.195	< 0.195	< 0.195	NA	NA
Dibromochloropropane (GCMS)	< 12.0	< 12.0	< 12.0	NA	NA
Dimethyl Disulfide	< 0.550	< 0.550	< 0.550	NA	NA
Ethyl Benzene	< 1.37	< 1.37	< 1.37	< 1.37	< 0.620
Ethyl Benzene (GCMS)	< 1.00	NA	NA	NA	NA
M-Xylene	< 1.32	< 1.32	< 1.32	< 1.32	< 1.04
M-Xylene (GCMS)	< 1.00	NA	NA	NA	NA
Methylene Chloride	< 7.40	< 7.40	< 7.40	< 7.40	< 2.48
Methylene Chloride (GCMS)	< 1.00	NA	NA	NA	NA
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	NA	NA
Methylisobutyl Ketone (GCMS)	< 1.40	NA	NA	NA	NA
O,P-Xylene	< 1.36	< 1.36	< 1.36	< 1.36	< 1.34

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< - indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
RB - Rinse Blank TB - Trip Blank FB - Field Blank.

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1047	HA1066	HA1067	HA1164	HA1167
Date	12/18/89	12/29/89	12/29/89	02/01/90	02/21/90
	FB of	RB of	FB of	TB of	TB of
	37418	37429	37429	HA1072	37407
Analytes					
Volatiles					
O,P-Xylene (GCMS)	< 2.00	NA	NA	NA	NA
Tetrachloroethene	< 0.750	< 0.750	< 0.750	< 0.750	< 2.76
Tetrachloroethene (GCMS)	< 1.00	NA	NA	NA	NA
Toluene	< 1.47	< 1.47	< 1.47	< 1.47	< 2.10
Toluene (GCMS)	< 1.00	NA	NA	NA	NA
Trichloroethene	< 0.560	< 0.560	< 0.560	< 0.560	< 1.31
Trichloroethene (GCMS)	< 1.00	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	NA	NA
Vinyl Chloride (GCMS)	< 12.0	NA	NA	NA	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< - indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
Rins [illegible] nk [illegible] Trip [illegible] FB [illegible] eld [illegible]

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1175	HA1176	HA1177
Date	02/28/90	02/28/90	02/28/90
	RB of 37438	FB of 37438	TB of 37438
Analytes			
Metals/Anions/General Chem			
Arsenic	< 2.35	< 2.35	NA
Cadmium	< 6.78	< 6.78	NA
Calcium	19800	< 105	NA
Chloride	14000	< 278	NA
Chromium	< 16.8	< 16.8	NA
Copper	< 18.8	< 18.8	NA
Cyanide	< 5.00	< 5.00	NA
Fluoride	863	< 153	NA
Iron	< 77.5	< 77.5	NA
Lead	< 43.4	< 43.4	NA
Magnesium	4300	< 135	NA
Manganese	< 9.67	< 9.67	NA
Mercury	< 0.100	< 0.100	NA
Nitrite, Nitrate -- Non-Specific	260	32.3	NA
Potassium	< 1240	< 1240	NA
Sodium	11400	337	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< - indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
RB - Rinse Blank TB - Trip Blank FB - Field Blank.

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1175	HA1176	HA1177
Date	02/28/90	02/28/90	02/28/90
	RB of 37438	FB of 37438	TB of 37438
Analytes			
Metals/Anions/General Chem			
Sulfate	42000	< 175	NA
Total Organic Carbon	< 1000	< 1000	NA
Total Suspended Solids	NA	NA	NA
Zinc	117	< 18.0	NA
Phenols			
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	NA
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	NA
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	NA
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	NA
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	NA
2,4-Dinitrophenol (GCMS)	< 176	< 176	NA
2-Chlorophenol (GCMS)	< 2.80	< 2.80	NA
2-Methylphenol (GCMS)	< 3.60	< 3.60	NA
2-Nitrophenol (GCMS)	< 8.20	< 8.20	NA
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	NA
4-Methylphenol (GCMS)	< 2.80	< 2.80	NA
4-Nitrophenol (GCMS)	< 96.0	< 96.0	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
Rir ink Tri k Fl eld :.

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1175	HA1176	HA1177
Date	02/28/90	02/28/90	02/28/90
	RB of 37438	FB of 37438	TB of 37438
Analytes			
Phenols			
Phenol (GCMS)	< 2.20	< 2.20	NA
Semivolatiles			
1,4-Oxathiane	< 2.38	< 2.38	NA
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	NA
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	NA
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	NA
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	NA
Aldrin	< 0.0500	< 0.0500	NA
Aldrin (GCMS)	< 13.0	< 13.0	NA
Atrazine	< 4.03	< 4.03	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
RB - Rinse Blank TB - Trip Blank FB - Field Blank.

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1175	HA1176	HA1177
Date	02/28/90	02/28/90	02/28/90
	RB of 37438	FB of 37438	TB of 37438
Analytes			
Semivolatiles			
Atrazine (GCMS)	< 5.90	< 5.90	NA
Benzothiazole	< 5.00	< 5.00	NA
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	NA
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	NA
Caprolactam (GCMS)	< 7.70	< 7.70	NA
Chlordane	< 0.0950	< 0.0950	NA
Chlordane (GCMS)	< 37.0	< 37.0	NA
Dicyclopentadiene	< 5.00	< 5.00	NA
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	NA
Dieldrin	< 0.0500	< 0.0500	NA
Dieldrin (GCMS)	< 26.0	< 26.0	NA
Diisopropyl Methylphosphonate	< 0.392	< 0.392	NA
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	NA
Dimethylmethyl Phosphonate	< 0.188	< 0.188	NA
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	NA
Dithiane	< 1.34	< 1.34	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
-- Rins [illegible]nk -- Trip [illegible] FE [illegible]eld [illegible].

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1175	HA1176	HA1177
Date	02/28/90	02/28/90	02/28/90
	RB of 37438	FB of 37438	TB of 37438
Analytes			
Semivolatiles			
Dithiane (GCMS)	< 3.30	< 3.30	NA
Endrin	< 0.0500	< 0.0500	NA
Endrin (GCMS)	< 18.0	< 18.0	NA
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	NA
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	NA
Isodrin	< 0.0510	< 0.0510	NA
Isodrin (GCMS)	< 7.80	< 7.80	NA
Malathion	< 0.373	< 0.373	NA
Malathion (GCMS)	< 21.0	< 21.0	NA
Parathion	< 0.647	< 0.647	NA
Parathion (GCMS)	< 37.0	< 37.0	NA
Pentachlorophenol (GCMS)	< 9.10	< 9.10	NA
Supona	< 0.787	< 0.787	NA
Supona (GCMS)	< 19.0	< 19.0	NA
Vapona	< 0.384	< 0.384	NA
Vapona (GCMS)	< 8.50	< 8.50	NA

Notes: Values are reported in micrograms per liter.
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> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
RB - Rinse Blank TB - Trip Blank FB - Field Blank.

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1175	HA1176	HA1177
Date	02/28/90	02/28/90	02/28/90
	RB of 37438	FB of 37438	TB of 37438
Analytes			
Volatiles			
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00	NA
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00	NA
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00	NA
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00	NA
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00	NA
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	< 5.00	NA
Benzene	11.4	< 1.05	< 1.05
Benzene (GCMS)	6.98	< 1.00	NA
Carbon Tetrachloride	< 0.990	< 0.990	< 0.990
Carbon Tetrachloride (GCMS)	1.10	< 1.00	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
RB -- Rinse Blank, TB -- Trip Blank, FB -- Field Blank.

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1175	HA1176	HA1177
Date	02/28/90	02/28/90	02/28/90
	RB of 37438	FB of 37438	TB of 37438
Analytes			
Volatiles			
Chlorobenzene	90.0	< 0.820	< 0.820
Chlorobenzene (GCMS)	80.8	1.25	NA
Chloroform	193	< 0.500	0.612
Chloroform (GCMS)	> 150	< 1.00	NA
Dibromochloropropane	0.813	< 0.195	NA
Dibromochloropropane (GCMS)	< 12.0	< 12.0	NA
Dimethyl Disulfide	< 0.550	< 0.550	NA
Ethyl Benzene	< 1.37	< 1.37	< 1.37
Ethyl Benzene (GCMS)	< 1.00	< 1.00	NA
M-Xylene	< 1.32	< 1.32	< 1.32
M-Xylene (GCMS)	< 1.00	< 1.00	NA
Methylene Chloride	< 7.40	< 7.40	< 7.40
Methylene Chloride (GCMS)	< 1.00	< 1.00	NA
Methylisobutyl Ketone	< 4.90	< 4.90	NA
Methylisobutyl Ketone (GCMS)	< 1.40	< 1.40	NA
O,P-Xylene	< 1.36	< 1.36	< 1.36

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
RB - Rinse Blank TB - Trip Blank FB - Field Blank.

Table B3 Groundwater QA/QC Analytical Data

Sample ID	HA1175	HA1176	HA1177
Date	02/28/90	02/28/90	02/28/90
	RB of 37438	FB of 37438	TB of 37438
Analytes			
Volatiles			
O,P-Xylene (GCMS)	< 2.00	< 2.00	NA
Tetrachloroethene	< 0.750	< 0.750	< 0.750
Tetrachloroethene (GCMS)	< 1.00	< 1.00	NA
Toluene	2.67	< 1.47	< 1.47
Toluene (GCMS)	2.60	< 1.00	NA
Trichloroethene	2.09	< 0.560	< 0.560
Trichloroethene (GCMS)	2.40	< 1.00	NA
Vinyl Chloride	NA	NA	NA
Vinyl Chloride (GCMS)	< 12.0	< 12.0	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> - indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected.
NA -- Not Analyzed.
[illegible] Rins[illegible]nk T[illegible]rip [illegible] FB [illegible]eld [illegible].

Table B4 Groundwater Duplicate Analytical Data

Sample ID Date	HA1022 10/31/89 Dup of 37330	HA1023 11/02/89 Dup of 37367	HA1024 11/27/89 Dup of Boiler	HA1026 10/31/89 Dup of 37374
Analytes				
Metals/Anions/General Chem				
Arsenic	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Chloride	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA
Fluoride	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	NA	NA	NA	NA
Nitrite, Nitrate -- Non-Specific	NA	NA	NA	NA
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B4 Groundwater Duplicate Analytical Data

Sample ID Date	HA1022 10/31/89 Dup of 37330	HA1023 11/02/89 Dup of 37367	HA1024 11/27/89 Dup of Boller	HA1026 10/31/89 Dup of 37374
Analytes				
Metals/Anions/General Chem				
Sulfate	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA
Total Suspended Solids	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Phenols				
2,3,6-Trichlorophenol (GCMS)	NA	NA	NA	NA
2,4,5-Trichlorophenol (GCMS)	NA	NA	NA	NA
2,4,6-Trichlorophenol (GCMS)	NA	NA	NA	NA
2,4-Dichlorophenol (GCMS)	NA	NA	NA	NA
2,4-Dimethylphenol (GCMS)	NA	NA	NA	NA
2,4-Dinitrophenol (GCMS)	NA	NA	NA	NA
2-Chlorophenol (GCMS)	NA	NA	NA	NA
2-Methylphenol (GCMS)	NA	NA	NA	NA
2-Nitrophenol (GCMS)	NA	NA	NA	NA
3-Methyl-4-Chlorophenol (GCMS)	NA	NA	NA	NA
4-Methylphenol (GCMS)	NA	NA	NA	NA
4-Nitrophenol (GCMS)	NA	NA	NA	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of histo[illegible] dat[illegible] fie[illegible]/QC p[illegible]dures

Table B4 Groundwater Duplicate Analytical Data

Sample ID Date	HA1022 10/31/89 Dup of 37330	HA1023 11/02/89 Dup of 37367	HA1024 11/27/89 Dup of Boller	HA1026 10/31/89 Dup of 37374
Analytes				
Phenols				
Phenol (GCMS)	NA	NA	NA	NA
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	NA	NA	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	NA	NA	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	NA	NA	NA
2,2-Bis(parachloropheny()-1,1-Dichloroethene (DDE)	NA	NA	NA	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA
Aldrin (GCMS)	NA	NA	NA	NA
Atrazine	NA	NA	NA	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1022	HA1023	HA1024	HA1026
Date	10/31/89	11/02/89	11/27/89	10/31/89
	Dup of 37330	Dup of 37367	Dup of Boller	Dup of 37374
Analytes				
Semivolatiles				
Atrazine (GCMS)	NA	NA	NA	NA
Benzothiazole	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	NA	NA	NA
Caprolactam (GCMS)	NA	NA	NA	NA
Chlordane	NA	NA	NA	NA
Chlordane (GCMS)	NA	NA	NA	NA
Dicyclopentadiene	NA	NA	NA	NA
Dicyclopentadiene (GCMS)	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA
Dieldrin (GCMS)	NA	NA	NA	NA
Diisopropyl Methylphosphonate	NA	NA	NA	NA
Diisopropyl Methylphosphonate (GCMS)	NA	NA	NA	NA
Dimethylmethyl Phosphonate	NA	NA	NA	NA
Dimethylmethyl Phosphonate (GCMS)	NA	NA	NA	NA
Dithiane	NA	NA	NA	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of istc dat fiel 'QC p lures

Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1022	HA1023	HA1024	HA1026
Date	10/31/89	11/02/89	11/27/89	10/31/89
	Dup of 37330	Dup of 37367	Dup of Boiler	Dup of 37374
Analytes				
Semivolatiles				
Dithiane (GCMS)	NA	NA	NA	NA
Endrin	NA	NA	NA	NA
Endrin (GCMS)	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA
Hexachlorocyclopentadiene (GCMS)	NA	NA	NA	NA
Isodrin	NA	NA	NA	NA
Isodrin (GCMS)	NA	NA	NA	NA
Malathion	NA	NA	NA	NA
Malathion (GCMS)	NA	NA	NA	NA
Parathion	NA	NA	NA	NA
Parathion (GCMS)	NA	NA	NA	NA
Pentachlorophenol (GCMS)	NA	NA	NA	NA
Supona	NA	NA	NA	NA
Supona (GCMS)	NA	NA	NA	NA
Vapona	NA	NA	NA	NA
Vapona (GCMS)	NA	NA	NA	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B4 Groundwater Duplicate Analytical Data

Sample ID Date Analytes	HA1022 10/31/89 Dup of 37330	HA1023 11/02/89 Dup of 37367	HA1024 11/27/89 Dup of Boiler	HA1026 10/31/89 Dup of 37374
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,1-Dichloroethene (GCMS)	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of hist[illegible] l da[illegible] d fie[illegible]/QC [illegible]dure[illegible]

Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1022	HA1023	HA1024	HA1026
Date	10/31/89	11/02/89	11/27/89	10/31/89
	Dup of 37330	Dup of 37367	Dup of Boller	Dup of 37374
Analytes				
Volatiles				
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	NA	NA	NA	NA
Dimethyl Disulfide	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
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Table B4 Groundwater Duplicate Analytical Data

Sample ID Date	HA1022 10/31/89 Dup of 37330	HA1023 11/02/89 Dup of 37367	HA1024 11/27/89 Dup of Boiler	HA1026 10/31/89 Dup of 37374
Analytes				
Volatiles				
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA
Vinyl Chloride	< 0.460	< 0.460	< 0.460	< 0.460
Vinyl Chloride (GCMS)	NA	NA	NA	NA

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R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of hist[illegible] l dat[illegible] l fie[illegible]/QC [illegible]dure[illegible]

Table B4 Groundwater Duplicate Analytical Data

Sample ID Date Analytes	HA1027 11/08/89 Dup of 37396	HA1028 10/31/89 Dup of 37344	HA1029 11/09/89 Dup of 37323	HA1045 12/18/89 Dup of 37418
Metals/Anions/General Chem				
Arsenic	NA	NA	NA	3.80
Cadmium	NA	NA	NA	< 6.78
Calcium	NA	NA	NA	590000
Chloride	NA	NA	NA	1600000
Chromium	NA	NA	NA	< 16.8
Copper	NA	NA	NA	< 18.8
Cyanide	NA	NA	NA	< 5.00
Fluoride	NA	NA	NA	3290
Iron	NA	NA	NA	276
Lead	NA	NA	NA	< 43.4
Magnesium	NA	NA	NA	199000
Manganese	NA	NA	NA	197
Mercury	NA	NA	NA	< 0.100
Nitrite, Nitrate -- Non-Specific	NA	NA	NA	1200
Potassium	NA	NA	NA	10200
Sodium	NA	NA	NA	870000

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A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1027	HA1028	HA1029	HA1045
Date	11/08/89	10/31/89	11/09/89	12/18/89
	Dup of 37396	Dup of 37344	Dup of 37323	Dup of 37418
Analytes				
Metals/Anions/General Chem				
Sulfate	NA	NA	NA	1500000
Total Organic Carbon	NA	NA	NA	10000
Total Suspended Solids	NA	NA	NA	4000
Zinc	NA	NA	NA	124
Phenols				
2,3,6-Trichlorophenol (GCMS)	NA	NA	NA	< 1.70
2,4,5-Trichlorophenol (GCMS)	NA	NA	NA	< 2.80
2,4,6-Trichlorophenol (GCMS)	NA	NA	NA	< 3.60
2,4-Dichlorophenol (GCMS)	NA	NA	NA	< 8.40
2,4-Dimethylphenol (GCMS)	NA	NA	NA	< 4.40
2,4-Dinitrophenol (GCMS)	NA	NA	NA	< 176
2-Chlorophenol (GCMS)	NA	NA	NA	< 2.80
2-Methylphenol (GCMS)	NA	NA	NA	< 3.60
2-Nitrophenol (GCMS)	NA	NA	NA	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	NA	NA	NA	< 8.50
4-Methylphenol (GCMS)	NA	NA	NA	< 2.80
4-Nitrophenol (GCMS)	NA	NA	NA	< 96.0

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Table B4 Groundwater Duplicate Analytical Data

Sample ID Date	HA1027 11/08/89 Dup of 37396	HA1028 10/31/89 Dup of 37344	HA1029 11/09/89 Dup of 37323	HA1045 12/18/89 Dup of 37418
Analytes				
Phenols				
Phenol (GCMS)	NA	NA	NA	< 2.20
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	8.94
1,4-Oxathiane (GCMS)	NA	NA	NA	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	NA	NA	NA	0.139
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	NA	NA	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	NA	NA	NA	0.400
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	NA	NA	< 14.0
4-Chlorophenylmethyl Sulfide	NA	NA	NA	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	NA	NA	NA	< 10.0
4-Chlorophenylmethyl Sulfone	NA	NA	NA	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	NA	NA	NA	< 5.30
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	NA	NA	< 15.0
Aldrin	NA	NA	NA	0.300
Aldrin (GCMS)	NA	NA	NA	< 13.0
Atrazine	NA	NA	NA	< 4.03

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Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1027	HA1028	HA1029	HA1045
Date	11/08/89	10/31/89	11/09/89	12/18/89
	Dup of	Dup of	Dup of	Dup of
	37396	37344	37323	37418
Analytes				
Semivolatiles				
Atrazine (GCMS)	NA	NA	NA	< 5.90
Benzothiazole	NA	NA	NA	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	NA	NA	< 7.70
Caprolactam (GCMS)	NA	NA	NA	< 10.0
Chlordane	NA	NA	NA	1.40
Chlordane (GCMS)	NA	NA	NA	< 37.0
Dicyclopentadiene	NA	NA	NA	530
Dicyclopentadiene (GCMS)	NA	NA	NA	227
Dieldrin	NA	NA	NA	< 0.0500
Dieldrin (GCMS)	NA	NA	NA	< 26.0
Diisopropyl Methylphosphonate	NA	NA	NA	4300
Diisopropyl Methylphosphonate (GCMS)	NA	NA	NA	> 200
Dimethylmethyl Phosphonate	NA	NA	NA	< 0.188
Dimethylmethyl Phosphonate (GCMS)	NA	NA	NA	< 130
Dithiane	NA	NA	NA	25.6

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Table B4 Groundwater Duplicate Analytical Data

Sample ID Date	HA1027 11/08/89 Dup of 37396	HA1028 10/31/89 Dup of 37344	HA1029 11/09/89 Dup of 37323	HA1045 12/18/89 Dup of 37418
Analytes				
Semivolatiles				
Dithiane (GCMS)	NA	NA	NA	7.73
Endrin	NA	NA	NA	< 0.0500
Endrin (GCMS)	NA	NA	NA	< 18.0
Hexachlorocyclopentadiene	NA	NA	NA	< 0.0480
Hexachlorocyclopentadiene (GCMS)	NA	NA	NA	< 54.0
Isodrin	NA	NA	NA	0.120
Isodrin (GCMS)	NA	NA	NA	< 7.80
Malathion	NA	NA	NA	< 0.373
Malathion (GCMS)	NA	NA	NA	< 21.0
Parathion	NA	NA	NA	< 0.647
Parathion (GCMS)	NA	NA	NA	< 37.0
Pentachlorophenol (GCMS)	NA	NA	NA	< 9.10
Supona	NA	NA	NA	< 0.787
Supona (GCMS)	NA	NA	NA	< 19.0
Vapona	NA	NA	NA	< 0.384
Vapona (GCMS)	NA	NA	NA	< 8.50

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Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1027	HA1028	HA1029	HA1045
Date	11/08/89	10/31/89	11/09/89	12/18/89
	Dup of 37396	Dup of 37344	Dup of 37323	Dup of 37418
Analytes				
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	< 0.760
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	< 1.00
1,1,2-Trichloroethane	NA	NA	NA	< 0.780
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	< 1.00
1,1-Dichloroethane	NA	NA	NA	< 0.730
1,1-Dichloroethane (GCMS)	NA	NA	NA	< 1.00
1,1-Dichloroethene	NA	NA	NA	< 1.70
1,1-Dichloroethene (GCMS)	NA	NA	NA	< 1.00
1,2-Dichloroethane	NA	NA	NA	23.7
1,2-Dichloroethane (GCMS)	NA	NA	NA	19.1
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	< 5.00
Benzene	NA	NA	NA	< 1.05
Benzene (GCMS)	NA	NA	NA	< 1.00
Carbon Tetrachloride	NA	NA	NA	< 0.990
Carbon Tetrachloride (GCMS)	NA	NA	NA	< 1.00

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Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1027	HA1028	HA1029	HA1045
Date	11/08/89	10/31/89	11/09/89	12/18/89
	Dup of 37396	Dup of 37344	Dup of 37323	Dup of 37418
Analytes				
Volatiles				
Chlorobenzene	NA	NA	NA	< 0.820
Chlorobenzene (GCMS)	NA	NA	NA	< 1.00
Chloroform	NA	NA	NA	< 0.500
Chloroform (GCMS)	NA	NA	NA	< 1.00
Dibromochloropropane	NA	NA	NA	< 0.195
Dibromochloropropane (GCMS)	NA	NA	NA	< 12.0
Dimethyl Disulfide	NA	NA	NA	< 0.550
Ethyl Benzene	NA	NA	NA	< 1.37
Ethyl Benzene (GCMS)	NA	NA	NA	< 1.00
M-Xylene	NA	NA	NA	< 1.32
M-Xylene (GCMS)	NA	NA	NA	< 1.00
Methylene Chloride	NA	NA	NA	< 7.40
Methylene Chloride (GCMS)	NA	NA	NA	< 1.00
Methylisobutyl Ketone	NA	NA	NA	< 4.90
Methylisobutyl Ketone (GCMS)	NA	NA	NA	< 1.40
O,P-Xylene	NA	NA	NA	< 1.36

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Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1027	HA1028	HA1029	HA1045
Date	11/08/89	10/31/89	11/09/89	12/18/89
	Dup of 37396	Dup of 37344	Dup of 37323	Dup of 37418
Analytes				
Volatiles				
O,P-Xylene (GCMS)	NA	NA	NA	< 2.00
Tetrachloroethene	NA	NA	NA	11.2
Tetrachloroethene (GCMS)	NA	NA	NA	7.50
Toluene	NA	NA	NA	3.80
Toluene (GCMS)	NA	NA	NA	< 1.00
Trichloroethene	NA	NA	NA	7.08
Trichloroethene (GCMS)	NA	NA	NA	4.80
Vinyl Chloride	< 0.460	< 0.460	< 0.460	NA
Vinyl Chloride (GCMS)	NA	NA	NA	< 12.0

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Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1079	HA1165	HA1166	HA1172
Date	06/22/90	02/22/90	02/21/90	02/27/90
	Dup of 37418	Dup of 37404	Dup of 37407	Dup of 37435
Analytes				
Metals/Anions/General Chem				
Arsenic	R	< 2.50	< 2.50	< 2.35
Cadmium	< 6.78	< 5.00	< 5.00	< 6.78
Calcium	174000	170000	240000	118000
Chloride	1800000	220000	360000	100000
Chromium	71.5	< 22.0	< 22.0	< 16.8
Copper	108	< 10.0	< 10.0	< 18.8
Cyanide	R	< 8.90	< 8.90	< 5.00
Fluoride	6300	< 1000	1250	1740
Iron	46400	37.5	794	< 77.5
Lead	< 43.4	< 52.0	< 52.0	< 43.4
Magnesium	80800	46000	58000	36100
Manganese	2650	< 20.0	1360	12.6
Mercury	< 0.100	< 0.500	< 0.500	< 0.100
Nitrite, Nitrate -- Non-Specific	410	4200	4300	1800
Potassium	12200	NA	NA	4570
Sodium	150000	220000	340000	130000

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R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1079	HA1165	HA1166	HA1172
Date	06/22/90	02/22/90	02/21/90	02/27/90
	Dup of 37418	Dup of 37404	Dup of 37407	Dup of 37435
Analytes				
Metals/Anions/General Chem				
Sulfate	1700000	530000	680000	300000
Total Organic Carbon	15000	6.00	7.00	3000
Total Suspended Solids	< 4000	27.0	< 4.00	NA
Zinc	117	24.4	23.3	< 18.0
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0

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Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1079	HA1165	HA1166	HA1172
Date	06/22/90	02/22/90	02/21/90	02/27/90
	Dup of 37418	Dup of 37404	Dup of 37407	Dup of 37435
Analytes				
Phenols				
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	6.86	NA	NA	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	R	< 0.0590	< 0.0590	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0460	< 0.0460	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	NA	NA	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	NA	NA	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	NA	NA	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	< 0.0500	R	R	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	NA	NA	< 4.03

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Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1079	HA1165	HA1166	HA1172
Date	06/22/90	02/22/90	02/21/90	02/27/90
	Dup of 37418	Dup of 37404	Dup of 37407	Dup of 37435
Analytes				
Semivolatiles				
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	NA	NA	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	NA	NA	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	< 10.0	< 7.70	< 7.70	< 7.70
Chlordane	< 0.0950	< 0.152	< 0.152	< 0.0950
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	380	NA	NA	< 5.00
Dicyclopentadiene (GCMS)	202	< 5.50	< 5.50	< 5.50
Dieldrin	< 0.0500	< 0.0539	< 0.0539	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	3900	NA	NA	10.0
Diisopropyl Methylphosphonate (GCMS)	> 200	< 21.0	76.4	< 21.0
Dimethylmethyl Phosphonate	< 0.188	NA	NA	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	30.0	NA	NA	< 1.34

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Table B4 Groundwater Duplicate Analytical Data

Sample ID Date	HA1079 06/22/90 Dup of 37418	HA1165 02/22/90 Dup of 37404	HA1166 02/21/90 Dup of 37407	HA1172 02/27/90 Dup of 37435
Analytes				
Semivolatiles				
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	< 0.0500	< 0.0600	< 0.0600	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	R	R	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	0.103	< 0.0560	< 0.0560	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	1.63	NA	NA	< 0.373
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	1.07	NA	NA	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	NA	NA	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	NA	NA	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50

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Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1079		HA1165		HA1166		HA1172	
Date	06/22/90		02/22/90		02/21/90		02/27/90	
	Dup of 37418		Dup of 37404		Dup of 37407		Dup of 37435	
Analytes								
Volatiles								
1,1,1-Trichloroethane	< 0.760		< 1.09		< 1.09		< 0.760	
1,1,1-Trichloroethane (GCMS)	< 1.00		< 1.00		< 10.0		< 1.00	
1,1,2-Trichloroethane	< 0.780		< 1.63		< 1.63		< 0.780	
1,1,2-Trichloroethane (GCMS)	< 1.00		< 1.00		< 10.0		< 1.00	
1,1-Dichloroethane	< 0.730		< 1.93		< 1.93		< 0.730	
1,1-Dichloroethane (GCMS)	< 1.00		< 1.00		< 10.0		< 1.00	
1,1-Dichloroethene	< 1.70		< 1.85		< 1.85		< 1.70	
1,1-Dichloroethene (GCMS)	< 1.00		< 1.00		< 10.0		< 1.00	
1,2-Dichloroethane	22.1		< 2.07		< 2.07		< 1.10	
1,2-Dichloroethane (GCMS)	< 1.00		< 1.00		< 10.0		< 1.00	
1,2-Dichloroethenes (cis & trans)	< 0.760		< 1.75		< 1.75		< 0.760	
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00		< 5.00		< 50.0		< 5.00	
Benzene	3.90		4.62	A	30.0	A	19.2	A
Benzene (GCMS)	< 1.00		2.56	A	12.4	A	7.67	A
Carbon Tetrachloride	< 0.990		< 1.69		3.44	A	1.32	A
Carbon Tetrachloride (GCMS)	< 1.00		< 1.00		< 10.0		1.01	A

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of hist[illegible] da[illegible] fie[illegible]/QC [illegible]dures

Table B4 Groundwater Duplicate Analytical Data

Sample ID / Date / Analytes	HA1079 06/22/90 Dup of 37418		HA1165 02/22/90 Dup of 37404		HA1166 02/21/90 Dup of 37407		HA1172 02/27/90 Dup of 37435	
Volatiles								
Chlorobenzene	29.7		38.5	A	150	A	71.6	A
Chlorobenzene (GCMS)	2.98		31.7	A	91.3	A	64.4	A
Chloroform	45.1		49.6	A	540	A	380	A
Chloroform (GCMS)	5.30		40.0	A	510	A	> 150	A
Dibromochloropropane	0.391		NA		NA		1.37	A
Dibromochloropropane (GCMS)	< 12.0		< 12.0		< 12.0		< 12.0	
Dimethyl Disulfide	< 0.550		NA		NA		< 0.550	
Ethyl Benzene	< 1.37		< 0.620		< 0.620		< 1.37	
Ethyl Benzene (GCMS)	< 1.00		< 1.00		< 10.0		< 1.00	
M-Xylene	< 1.32		< 1.04		< 1.04		< 1.32	
M-Xylene (GCMS)	< 1.00		< 1.00		< 10.0		< 1.00	
Methylene Chloride	< 7.40		< 2.48		< 2.48		< 7.40	
Methylene Chloride (GCMS)	< 1.00		< 1.00		< 10.0		< 1.00	
Methylisobutyl Ketone	< 4.90		NA		NA		< 4.90	
Methylisobutyl Ketone (GCMS)	< 1.40		< 1.40		< 14.0		< 1.40	
O,P-Xylene	< 1.36		< 1.34		< 1.34		< 1.36	

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1079	HA1165	HA1166	HA1172
Date	06/22/90	02/22/90	02/21/90	02/27/90
	Dup of 37418	Dup of 37404	Dup of 37407	Dup of 37435
Analytes				
Volatiles				
O,P-Xylene (GCMS)	< 2.00	< 2.00	< 20.0	< 2.00
Tetrachloroethene	8.98	< 2.76	< 2.76	< 0.750
Tetrachloroethene (GCMS)	< 1.00	< 1.00	< 10.0	< 1.00
Toluene	< 1.47	< 2.10	4.35 A	3.23 A
Toluene (GCMS)	< 1.00	< 1.00	< 10.0	2.10 A
Trichloroethene	6.18	< 1.31	6.65 A	2.43 A
Trichloroethene (GCMS)	< 1.00	< 1.00	< 10.0	2.10 A
Vinyl Chloride	NA	NA	NA	NA
Vinyl Chloride (GCMS)	< 12.0	< 12.0	< 120	< 12.0

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R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of hist[illegible] dat[illegible] fie[illegible]/QC [illegible]dure[illegible]

Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1173	HA1174	HA1198
Date	02/28/90	03/01/90	06/13/90
	Dup of 37438	Dup of 37439	Dup of 37444
Analytes			
Metals/Anions/General Chem			
Arsenic	< 2.35	< 2.35	< 2.35
Cadmium	< 6.78	< 6.78	< 6.78
Calcium	65600	99300	99700
Chloride	280000	200000	140000
Chromium	< 16.8	< 16.8	< 16.8
Copper	20.7	< 18.8	< 18.8
Cyanide	< 5.00	< 5.00	R
Fluoride	4080	2350	1320
Iron	< 77.5	< 77.5	NA
Lead	< 43.4	< 43.4	< 43.4
Magnesium	21000	27100	21900
Manganese	< 9.67	21.0	NA
Mercury	< 0.100	< 0.100	1.49
Nitrite, Nitrate -- Non-Specific	5000	1800	4200
Potassium	2190	3880	2800
Sodium	260000	160000	100000

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R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
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Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1173	HA1174	HA1198
Date	02/28/90	03/01/90	06/13/90
	Dup of 37438	Dup of 37439	Dup of 37444
Analytes			
Metals/Anions/General Chem			
Sulfate	170000	170000	130000
Total Organic Carbon	2000	2000	1000
Total Suspended Solids	NA	NA	NA
Zinc	< 18.0	< 18.0	< 18.0
Phenols			
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0

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Table B4 Groundwater Duplicate Analytical Data

Sample ID Date	HA1173 02/28/90 Dup of 37438	HA1174 03/01/90 Dup of 37439	HA1198 06/13/90 Dup of 37444
Analytes			
Phenols			
Phenol (GCMS)	< 2.20	< 2.20	< 2.20
Semivolatiles			
1,4-Oxathiane	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0
Aldrin	< 0.0500	< 0.0500	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	< 4.03	< 4.03

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Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1173	HA1174	HA1198
Date	02/28/90	03/01/90	06/13/90
	Dup of 37438	Dup of 37439	Dup of 37444
Analytes			
Semivolatiles			
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	< 7.70	< 7.70	< 10.0
Chlordane	< 0.0950	< 0.0950	< 0.0950
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50
Dieldrin	0.110	< 0.0500	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	3.76	2.56	5.54
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34

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Table B4 Groundwater Duplicate Analytical Data

Sample ID Date Analytes	HA1173 02/28/90 Dup of 37438	HA1174 03/01/90 Dup of 37439	HA1198 06/13/90 Dup of 37444
Semivolatiles			
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30
Endrin	< 0.0500	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0
Isodrin	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373
Malathion (GCMS)	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50

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Table B4 Groundwater Duplicate Analytical Data

Sample ID	HA1173		HA1174		HA1198
Date	02/28/90		03/01/90		06/13/90
	Dup of 37438		Dup of 37439		Dup of 37444
Analytes					
Volatiles					
1,1,1-Trichloroethane	< 0.760		< 0.760		< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00		< 1.00		< 1.00
1,1,2-Trichloroethane	< 0.780		< 0.780		< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00		< 1.00		< 1.00
1,1-Dichloroethane	< 0.730		< 0.730		< 0.730
1,1-Dichloroethane (GCMS)	< 1.00		< 1.00		< 1.00
1,1-Dichloroethene	< 1.70		< 1.70		< 1.70
1,1-Dichloroethene (GCMS)	< 1.00		< 1.00		< 1.00
1,2-Dichloroethane	< 1.10		< 1.10		< 1.10
1,2-Dichloroethane (GCMS)	< 1.00		< 1.00		< 1.00
1,2-Dichloroethenes (cis & trans)	< 0.760		< 0.760		< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00		< 5.00		< 5.00
Benzene	21.9	A	2.07	A	< 1.05
Benzene (GCMS)	13.2	A	2.25	A	< 1.00
Carbon Tetrachloride	2.13	A	< 0.990		< 0.990
Carbon Tetrachloride (GCMS)	2.02	A	< 1.00		< 1.00

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Table B4 Groundwater Duplicate Analytical Data

Sample ID Date	HA1173 02/28/90 Dup of 37438		HA1174 03/01/90 Dup of 37439		HA1198 06/13/90 Dup of 37444
Analytes					
Volatiles					
Chlorobenzene	110	A	18.2	A	< 0.820
Chlorobenzene (GCMS)	115	A	40.4	A	< 1.00
Chloroform	440	A	34.4	A	3.23
Chloroform (GCMS)	> 150	A	94.0	A	3.10
Dibromochloropropane	1.10	A	0.463	A	< 0.195
Dibromochloropropane (GCMS)	< 12.0		< 12.0		< 12.0
Dimethyl Disulfide	< 0.550		< 0.550		< 0.550
Ethyl Benzene	< 1.37		< 1.37		< 1.37
Ethyl Benzene (GCMS)	< 1.00		< 1.00		< 1.00
M-Xylene	< 1.32		< 1.32		< 1.32
M-Xylene (GCMS)	< 1.00		< 1.00		< 1.00
Methylene Chloride	< 7.40		< 7.40		< 7.40
Methylene Chloride (GCMS)	< 1.00		< 1.00		< 1.00
Methylisobutyl Ketone	< 4.90		< 4.90		< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40		< 1.40		< 1.40
O,P-Xylene	< 1.36		< 1.36		< 1.36

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A -- Results considered anomalous based on evaluation of historical data and field QA/QC procedures.

Table B4 Groundwater Duplicate Analytical Data

Sample ID Date	HA1173 02/28/90 Dup of 37438		HA1174 03/01/90 Dup of 37439		HA1198 06/13/90 Dup of 37444
Analytes					
Volatiles					
O,P-Xylene (GCMS)	< 2.00		< 2.00		< 2.00
Tetrachloroethene	< 0.750		< 0.750		< 0.750
Tetrachloroethene (GCMS)	< 1.00		< 1.00		< 1.00
Toluene	3.77	A	< 1.47		< 1.47
Toluene (GCMS)	3.90	A	1.20	A	< 1.00
Trichloroethene	3.47	A	< 0.560		< 0.560
Trichloroethene (GCMS)	NA		1.20	A	< 1.00
Vinyl Chloride	NA		NA		NA
Vinyl Chloride (GCMS)	< 12.0		< 12.0		< 12.0

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R -- Data did not meet quality control criteria and were rejected. Dup - Duplicate. NA -- Not Analyzed.
A -- Results considered anomalous based on evaluation of hist l da / fie /QC dure

Table 85 Investigative Analytical Data
for Domestic Well Samples

Sample ID	09200TW090	09200TW090	10021TWPEO	10100TW108
Date	01/17/89	09/08/89	02/27/90	05/30/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.35	NA	< 2.35	NA
Cadmium	< 8.40	NA	< 6.78	NA
Calcium	2170	NA	1600	NA
Chloride	5130	NA	3000	NA
Chromium	< 24.0	NA	< 16.8	NA
Copper	< 26.0	NA	< 18.8	NA
Cyanide	< 5.00	NA	< 5.00	NA
Fluoride	2330	NA	3090	NA
Iron	NA	NA	< 77.5	NA
Lead	< 74.0	NA	< 43.4	NA
Magnesium	< 500	NA	149	NA
Manganese	NA	NA	< 9.67	NA
Mercury	< 0.100	NA	< 0.100	NA
Nitrite, Nitrate -- Non-Specific	290	NA	2000000	NA
Potassium	< 250	NA	< 1240	NA
Sodium	78000	NA	96000	NA
Sulfate	13300	NA	10300	NA
Total Organic Carbon	NA	NA	< 1000	NA

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	09200TW090 01/17/89	09200TW090 09/08/89	10021TWPEO 02/27/90	10100TW108 05/30/90
Analytes				
Metals/Anions/General Chem				
Zinc	< 22.0	NA	< 18.0	NA
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	NA
2,4,5-Trichlorophenol (GCMS)	NA	< 2.80	< 2.80	NA
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	NA
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	NA
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	NA
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	NA
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	NA
2-Methylphenol (GCMS)	< 3.60	< 0.600	< 3.60	NA
2-Nitrophenol (GCMS)	< 8.20	< 3.00	< 8.20	NA
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 0.300	< 8.50	NA
4-Methylphenol (GCMS)	< 2.80	< 0.600	< 2.80	NA
4-Nitrophenol (GCMS)	< 96.0	< 0.400	< 96.0	NA
Phenol (GCMS)	< 2.20	< 0.320	< 2.20	NA
Semivolatiles				
1,4-Oxathiane	< 2.38	< 1.97	< 2.38	NA
1,4-Oxathiane (GCMS)	< 27.0	< 0.160	< 27.0	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	NA	< 0.0490	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 1.20	< 18.0	NA

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	09200TW090 01/17/89	09200TW090 09/08/89	10021TWPEO 02/27/90	10100TW108 05/30/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	NA	< 0.0540	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 3.39	< 14.0	NA
4-Chlorophenylmethyl Sulfide	< 5.69	< 10.5	< 5.69	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 1.30	< 10.0	NA
4-Chlorophenylmethyl Sulfone	< 7.46	< 4.70	< 7.46	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 0.750	< 5.30	NA
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 15.2	< 11.5	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 0.500	< 15.0	NA
Aldrin	< 0.0500	NA	< 0.0500	NA
Aldrin (GCMS)	< 13.0	< 0.800	< 13.0	NA
Atrazine	< 4.03	< 4.03	< 4.03	NA
Atrazine (GCMS)	< 5.90	< 0.500	< 5.90	NA
Benzothiazole	< 5.00	< 0.00234	< 5.00	NA
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	NA
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	NA	< 7.70	NA
Caprolactam (GCMS)	NA	NA	< 7.70	NA
Chlordane	< 0.0950	NA	< 0.0950	NA
Chlordane (GCMS)	< 37.0	< 0.260	< 37.0	NA

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	09200TW090 01/17/89	09200TW090 09/08/89	10021TWPEO 02/27/90	10100TW108 05/30/90
Analytes				
Semivolatiles				
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	NA
Dicyclopentadiene (GCMS)	< 5.50	< 0.560	< 5.50	NA
Dieldrin	< 0.0500	NA	< 0.0500	NA
Dieldrin (GCMS)	< 26.0	< 0.930	< 26.0	NA
Diisopropyl Methylphosphonate	1.32	1.38	< 0.392	< 0.392
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 1.60	< 21.0	NA
Dimethylmethyl Phosphonate	< 0.188	< 4.23	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 0.700	< 130	NA
Dithiane	< 1.34	< 0.114	< 1.34	NA
Dithiane (GCMS)	< 3.30	< 0.710	< 3.30	NA
Endrin	< 0.0500	NA	< 0.0500	NA
Endrin (GCMS)	< 18.0	< 0.100	< 18.0	NA
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	NA
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 0.520	< 54.0	NA
Isodrin	< 0.0510	NA	< 0.0510	NA
Isodrin (GCMS)	< 7.80	< 0.990	< 7.80	NA
Malathion	< 0.373	< 0.373	< 0.373	NA
Malathion (GCMS)	< 21.0	< 0.620	< 21.0	NA

Notes: Values are reported in micrograms per liter.
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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	09200TW090 01/17/89	09200TW090 09/08/89	10021TWPEO 02/27/90	10100TW108 05/30/90
Analytes				
Semivolatiles				
Parathion	< 0.647	< 0.647	< 0.647	NA
Parathion (GCMS)	< 37.0	< 8.10	< 37.0	NA
Pentachlorophenol (GCMS)	< 9.10	< 0.290	< 9.10	NA
Supona	< 0.787	< 0.787	< 0.787	NA
Supona (GCMS)	< 19.0	< 3.90	< 19.0	NA
Vapona	< 0.384	< 0.384	< 0.384	NA
Vapona (GCMS)	< 8.50	< 0.670	< 8.50	NA
Volatiles				
1,1,1-Trichloroethane	< 0.760	NA	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	NA	NA	< 1.00	NA
1,1,2-Trichloroethane	< 0.780	NA	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	NA	NA	< 1.00	NA
1,1-Dichloroethane	< 0.730	NA	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	NA	NA	< 1.00	NA
1,1-Dichloroethene	< 1.70	NA	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	NA	NA	< 1.00	NA
1,2-Dichloroethane	< 1.10	NA	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	NA	NA	< 1.00	NA
1,2-Dichloroethenes (cis & trans)	< 0.760	NA	< 0.760	< 0.760

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	09200TW090	09200TW090	10021TWPEO	10100TW108
Date	01/17/89	09/08/89	02/27/90	05/30/90
Analytes				
Volatiles				
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	< 5.00	NA
Benzene	< 1.05	NA	< 1.05	NA
Benzene (GCMS)	NA	NA	< 1.00	NA
Carbon Tetrachloride	< 0.990	NA	< 0.990	< 0.990
Carbon Tetrachloride (GCMS)	NA	NA	< 1.00	NA
Chlorobenzene	< 0.820	NA	< 0.820	< 0.820
Chlorobenzene (GCMS)	NA	NA	< 1.00	NA
Chloroform	< 0.500	NA	< 0.500	< 0.500
Chloroform (GCMS)	NA	NA	< 1.00	NA
Dibromochloropropane	< 0.195	< 0.195	< 0.195	NA
Dibromochloropropane (GCMS)	< 12.0	< 0.250	< 12.0	NA
Dimethyl Disulfide	< 0.550	< 0.133	< 0.550	NA
Ethyl Benzene	< 1.37	NA	< 1.37	NA
Ethyl Benzene (GCMS)	NA	NA	< 1.00	NA
M-Xylene	< 1.32	NA	< 1.32	NA
M-Xylene (GCMS)	NA	NA	< 1.00	NA
Methylene Chloride	< 7.40	NA	< 7.40	< 7.40
Methylene Chloride (GCMS)	NA	NA	< 1.00	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	09200TW090 01/17/89	09200TW090 09/08/89	10021TWPEO 02/27/90	10100TW108 05/30/90
Analytes				
Volatiles				
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	NA
Methylisobutyl Ketone (GCMS)	NA	NA	< 1.40	NA
O,P-Xylene	< 1.36	NA	< 1.36	NA
O,P-Xylene (GCMS)	NA	NA	< 2.00	NA
Tetrachloroethene	< 0.750	NA	< 0.750	< 0.750
Tetrachloroethene (GCMS)	NA	NA	< 1.00	NA
Toluene	< 1.47	NA	< 1.47	NA
Toluene (GCMS)	NA	NA	< 1.00	NA
Trichloroethene	< 0.560	NA	< 0.560	< 0.560
Trichloroethene (GCMS)	NA	NA	< 1.00	NA
Vinyl Chloride (GCMS)	NA	NA	< 12.0	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	10150TWHY2	10720TWBRI	10720TWBRI	10791TWBRI
Date	05/30/90	09/08/89	12/28/89	05/09/90
Analytes				
Metals/Anions/General Chem				
Arsenic	NA	NA	< 2.35	NA
Cadmium	NA	NA	< 6.78	NA
Calcium	NA	NA	143000	NA
Chloride	NA	NA	150000	NA
Chromium	NA	NA	< 16.8	NA
Copper	NA	NA	< 18.8	NA
Cyanide	NA	NA	< 5.00	NA
Fluoride	NA	NA	1830	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	< 43.4	NA
Magnesium	NA	NA	34100	NA
Manganese	NA	NA	NA	NA
Mercury	NA	NA	< 0.100	NA
Nitrite, Nitrate -- Non-Specific	NA	NA	7800	NA
Potassium	NA	NA	4180	NA
Sodium	NA	NA	160000	NA
Sulfate	NA	NA	300000	NA
Total Organic Carbon	NA	NA	1400	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID / Date	10150TWHY2 05/30/90	10720TWBRI 09/08/89	10720TWBRI 12/28/89	10791TWBRI 05/09/90
Analytes				
Metals/Anions/General Chem				
Zinc	NA	NA	54.8	NA
Phenols				
2,3,6-Trichlorophenol (GCMS)	NA	< 1.70	< 1.70	NA
2,4,5-Trichlorophenol (GCMS)	NA	< 2.80	< 2.80	NA
2,4,6-Trichlorophenol (GCMS)	NA	< 3.60	< 3.60	NA
2,4-Dichlorophenol (GCMS)	NA	< 8.40	< 8.40	NA
2,4-Dimethylphenol (GCMS)	NA	< 4.40	< 4.40	NA
2,4-Dinitrophenol (GCMS)	NA	< 176	< 176	NA
2-Chlorophenol (GCMS)	NA	< 2.80	< 2.80	NA
2-Methylphenol (GCMS)	NA	< 0.600	< 3.60	NA
2-Nitrophenol (GCMS)	NA	< 3.00	< 8.20	NA
3-Methyl-4-Chlorophenol (GCMS)	NA	< 0.300	< 8.50	NA
4-Methylphenol (GCMS)	NA	< 0.600	< 2.80	NA
4-Nitrophenol (GCMS)	NA	< 0.400	< 96.0	NA
Phenol (GCMS)	NA	< 0.320	< 2.20	NA
Semivolatiles				
1,4-Oxathiane	NA	< 1.97	< 2.38	NA
1,4-Oxathiane (GCMS)	NA	< 0.160	< 27.0	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	NA	NA	< 0.0490	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	< 1.20	< 18.0	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	10150TWHY2 05/30/90	10720TWBRI 09/08/89	10720TWBRI 12/28/89	10791TWBRI 05/09/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	NA	NA	< 0.0540	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	< 3.39	< 14.0	NA
4-Chlorophenylmethyl Sulfide	NA	< 10.5	< 5.69	NA
4-Chlorophenylmethyl Sulfide (GCMS)	NA	< 1.30	< 10.0	NA
4-Chlorophenylmethyl Sulfone	NA	< 4.70	< 7.46	NA
4-Chlorophenylmethyl Sulfone (GCMS)	NA	< 0.750	< 5.30	NA
4-Chlorophenylmethyl Sulfoxide	NA	< 15.2	< 11.5	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	< 0.500	< 15.0	NA
Aldrin	NA	NA	< 0.0500	NA
Aldrin (GCMS)	NA	< 0.800	< 13.0	NA
Atrazine	NA	< 4.03	< 4.03	NA
Atrazine (GCMS)	NA	< 0.500	< 5.90	NA
Benzothiazole	NA	< 0.00234	< 5.00	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	< 5.90	< 5.90	NA
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	NA	< 7.70	NA
Caprolactam (GCMS)	NA	NA	< 7.70	NA
Chlordane	NA	NA	< 0.0950	NA
Chlordane (GCMS)	NA	< 0.260	< 37.0	NA

Notes: Values are reported in micrograms per liter.
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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID / Date	10150TWHY2 05/30/90	10720TWBRI 09/08/89	10720TWBRI 12/28/89	10791TWBRI 05/09/90
Analytes				
Semivolatiles				
Dicyclopentadiene	NA	< 5.00	< 5.00	NA
Dicyclopentadiene (GCMS)	NA	< 0.560	< 5.50	NA
Dieldrin	NA	NA	< 0.0500	NA
Dieldrin (GCMS)	NA	< 0.930	< 26.0	NA
Diisopropyl Methylphosphonate	5.11	81.0	80.0	13.4
Diisopropyl Methylphosphonate (GCMS)	NA	77.3	56.6	NA
Dimethylmethyl Phosphonate	< 0.188	< 4.23	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	NA	< 0.700	< 130	NA
Dithiane	NA	< 0.114	< 1.34	NA
Dithiane (GCMS)	NA	< 0.710	< 3.30	NA
Endrin	NA	NA	< 0.0500	NA
Endrin (GCMS)	NA	< 0.100	< 18.0	NA
Hexachlorocyclopentadiene	NA	< 0.0480	< 0.0480	NA
Hexachlorocyclopentadiene (GCMS)	NA	< 0.520	< 54.0	NA
Isodrin	NA	NA	< 0.0510	NA
Isodrin (GCMS)	NA	< 0.990	< 7.80	NA
Malathion	NA	< 0.373	< 0.373	NA
Malathion (GCMS)	NA	< 0.620	< 21.0	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	10150TWHY2 05/30/90	10720TWBRI 09/08/89	10720TWBRI 12/28/89	10791TWBRI 05/09/90
Analytes				
Semivolatiles				
Parathion	NA	< 0.647	< 0.647	NA
Parathion (GCMS)	NA	< 8.10	< 37.0	NA
Pentachlorophenol (GCMS)	NA	< 0.290	< 9.10	NA
Supona	NA	< 0.787	< 0.787	NA
Supona (GCMS)	NA	< 3.90	< 19.0	NA
Vapona	NA	< 0.384	< 0.384	NA
Vapona (GCMS)	NA	< 0.670	< 8.50	NA
Volatiles				
1,1,1-Trichloroethane	< 0.760	NA	3.34	< 0.760
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	< 0.780	NA	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	< 0.730	NA	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	< 1.70	NA	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	NA	NA	NA	NA
1,2-Dichloroethane	< 1.10	NA	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	< 0.760	NA	< 0.760	< 0.760

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	10150TWHY2 05/30/90	10720TWBRI 09/08/89	10720TWBRI 12/28/89	10791TWBRI 05/09/90
Analytes				
Volatiles				
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	< 1.05	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	< 0.990	NA	< 0.990	< 0.990
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	< 0.820	NA	< 0.820	< 0.820
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	< 0.500	NA	0.961	< 0.500
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	< 0.195	< 0.195	NA
Dibromochloropropane (GCMS)	NA	< 0.250	< 12.0	NA
Dimethyl Disulfide	NA	< 0.133	< 0.550	NA
Ethyl Benzene	NA	NA	< 1.37	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	< 1.32	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	< 7.40	NA	< 7.40	< 7.40
Methylene Chloride (GCMS)	NA	NA	NA	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	10150TWHY2 05/30/90	10720TWBRI 09/08/89	10720TWBRI 12/28/89	10791TWBRI 05/09/90
Analytes				
Volatiles				
Methylisobutyl Ketone	NA	< 4.90	< 4.90	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	< 1.36	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	< 0.750	NA	< 0.750	< 0.750
Tetrachloroethene (GCMS)	NA	NA	NA	NA
Toluene	NA	NA	< 1.47	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	< 0.560	NA	< 0.560	< 0.560
Trichloroethene (GCMS)	NA	NA	NA	NA
Vinyl Chloride (GCMS)	NA	NA	NA	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11010TWHAV	11071TW112	11071TW112	11295TW108
Date	01/26/90	01/31/89	08/21/90	01/31/89
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.35	< 2.35	< 2.35	< 2.35
Cadmium	< 6.78	< 8.40	< 6.78	< 8.40
Calcium	93500	101000	117000	60600
Chloride	R	58000	92000	35000
Chromium	< 16.8	< 24.0	< 16.8	< 24.0
Copper	< 18.8	< 26.0	< 18.8	< 26.0
Cyanide	< 5.00	6.16	< 8.90	5.87
Fluoride	R	1630	1660	1640
Iron	NA	NA	< 77.5	NA
Lead	< 43.4	< 74.0	< 43.4	< 74.0
Magnesium	28900	25600	30800	14800
Manganese	NA	NA	< 9.67	NA
Mercury	< 0.100	< 0.100	1.64	< 0.100
Nitrite, Nitrate -- Non-Specific	9300	7000	5300	3100
Potassium	3120	3190	4290	1970
Sodium	100000	80500	130000	60700
Sulfate	R	220000	230000	100000
Total Organic Carbon	< 1000	NA	2400	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID / Date	11010TWHAV 01/26/90	11071TW112 01/31/89	11071TW112 08/21/90	11295TW108 01/31/89
Analytes				
Metals/Anions/General Chem				
Zinc	245	36.5	28.7	24.9
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0

Notes: Values are reported in micrograms per liter.
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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	11010TWHAV 01/26/90	11071TW112 01/31/89	11071TW112 08/21/90	11295TW108 01/31/89
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS).	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	NA	< 7.70	NA
Caprolactam (GCMS)	< 10.0	NA	< 7.70	NA
Chlordane	< 0.0950	< 0.0950	< 0.0950	< 0.0950
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11010TWHAV	11071TW112	11071TW112	11295TW108
Date	01/26/90	01/31/89	08/21/90	01/31/89
Analytes				
Semivolatiles				
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	< 5.50
Dieldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	14.9	13.7	10.0	R
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	0.382	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34	< 1.34
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	< 0.0510	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373	< 0.373
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11010TWHAV	11071TW112	11071TW112	11295TW108
Date	01/26/90	01/31/89	08/21/90	01/31/89
Analytes				
Semivolatiles				
Parathion	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	NA	< 1.00	NA
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	< 0.760	< 0.760

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R -- Data did not meet quality control criteria and were rejected.

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11010TWHAV	11071TW112	11071TW112	11295TW108
Date	01/26/90	01/31/89	08/21/90	01/31/89
Analytes				
Volatiles				
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	NA	< 5.00	NA
Benzene	< 1.05	< 1.05	< 1.05	< 1.05
Benzene (GCMS)	< 1.00	NA	< 1.00	NA
Carbon Tetrachloride	< 0.990	< 0.990	< 0.990	< 0.990
Carbon Tetrachloride (GCMS)	< 1.00	NA	< 1.00	NA
Chlorobenzene	< 0.820	< 0.820	< 0.820	< 0.820
Chlorobenzene (GCMS)	< 1.00	NA	< 1.00	NA
Chloroform	< 0.500	< 0.500	2.32	< 0.500
Chloroform (GCMS)	< 1.00	NA	23.0	NA
Dibromochloropropane	< 0.195	< 0.195	< 0.195	< 0.195
Dibromochloropropane (GCMS)	< 12.0	< 12.0	< 12.0	< 12.0
Dimethyl Disulfide	< 0.550	< 0.550	< 0.550	< 0.550
Ethyl Benzene	< 1.37	< 1.37	< 1.37	< 1.37
Ethyl Benzene (GCMS)	< 1.00	NA	< 1.00	NA
M-Xylene	< 1.32	< 1.32	< 1.32	< 1.32
M-Xylene (GCMS)	< 1.00	NA	< 1.00	NA
Methylene Chloride	< 7.40	< 7.40	< 7.40	< 7.40
Methylene Chloride (GCMS)	< 1.00	NA	< 1.00	NA

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID / Date	11010TWHAV 01/26/90	11071TW112 01/31/89	11071TW112 08/21/90	11295TW108 01/31/89
Analytes				
Volatiles				
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40	NA	< 1.40	NA
O,P-Xylene	< 1.36	< 1.36	< 1.36	< 1.36
O,P-Xylene (GCMS)	< 2.00	NA	< 2.00	NA
Tetrachloroethene	< 0.750	< 0.750	< 0.750	< 0.750
Tetrachloroethene (GCMS)	< 1.00	NA	< 1.00	NA
Toluene	< 1.47	< 1.47	< 1.47	< 1.47
Toluene (GCMS)	< 1.00	NA	< 1.00	NA
Trichloroethene	< 0.560	< 0.560	< 0.560	< 0.560
Trichloroethene (GCMS)	< 1.00	NA	< 1.00	NA
Vinyl Chloride (GCMS)	< 12.0	NA	< 12.0	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID / Date	11295TW108 08/22/90	11295TW108 08/24/90	11460TWPEO 08/21/90	11755TWBRI 05/30/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.35	NA	< 2.35	NA
Cadmium	< 6.78	NA	< 6.78	NA
Calcium	79900	NA	113000	NA
Chloride	65000	NA	86000	NA
Chromium	< 16.8	NA	< 16.8	NA
Copper	< 18.8	NA	< 18.8	NA
Cyanide	< 8.90	NA	< 8.90	NA
Fluoride	1520	NA	1510	NA
Iron	< 77.5	NA	< 77.5	NA
Lead	44.7	NA	< 43.4	NA
Magnesium	18900	NA	29600	NA
Manganese	< 9.67	NA	< 9.67	NA
Mercury	1.34	NA	1.09	NA
Nitrite, Nitrate -- Non-Specific	3400	NA	5300	NA
Potassium	3240	NA	5490	NA
Sodium	76000	NA	120000	NA
Sulfate	140000	NA	160000	NA
Total Organic Carbon	NA	1900	2500	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID / Date	11295TW108 08/22/90	11295TW108 08/24/90	11460TWPEO 08/21/90	11755TWBRI 05/30/90
Analytes				
Metals/Anions/General Chem				
Zinc	34.8	NA	< 18.0	NA
Phenols				
2,3,6-Trichlorophenol (GCMS)	NA	< 1.70	< 1.70	NA
2,4,5-Trichlorophenol (GCMS)	NA	< 2.80	< 2.80	NA
2,4,6-Trichlorophenol (GCMS)	NA	< 3.60	< 3.60	NA
2,4-Dichlorophenol (GCMS)	NA	< 8.40	< 8.40	NA
2,4-Dimethylphenol (GCMS)	NA	< 4.40	< 4.40	NA
2,4-Dinitrophenol (GCMS)	NA	< 176	< 176	NA
2-Chlorophenol (GCMS)	NA	< 2.80	< 2.80	NA
2-Methylphenol (GCMS)	NA	< 3.60	< 3.60	NA
2-Nitrophenol (GCMS)	NA	< 8.20	< 8.20	NA
3-Methyl-4-Chlorophenol (GCMS)	NA	< 8.50	< 8.50	NA
4-Methylphenol (GCMS)	NA	< 2.80	< 2.80	NA
4-Nitrophenol (GCMS)	NA	< 96.0	< 96.0	NA
Phenol (GCMS)	NA	< 2.20	< 2.20	NA
Semivolatiles				
1,4-Oxathiane	NA	< 2.38	< 2.38	NA
1,4-Oxathiane (GCMS)	NA	< 27.0	< 27.0	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	NA	< 0.0490	< 0.0490	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	< 18.0	< 18.0	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID / Date	11295TW108 08/22/90	11295TW108 08/24/90	11460TWPEO 08/21/90	11755TWBRI 05/30/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	NA	< 0.0540	< 0.0540	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	< 14.0	< 14.0	NA
4-Chlorophenylmethyl Sulfide	NA	< 5.69	< 5.69	NA
4-Chlorophenylmethyl Sulfide (GCMS)	NA	< 10.0	< 10.0	NA
4-Chlorophenylmethyl Sulfone	NA	< 7.46	< 7.46	NA
4-Chlorophenylmethyl Sulfone (GCMS)	NA	< 5.30	< 5.30	NA
4-Chlorophenylmethyl Sulfoxide	NA	< 11.5	< 11.5	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	< 15.0	< 15.0	NA
Aldrin	NA	< 0.0500	< 0.0500	NA
Aldrin (GCMS)	NA	< 13.0	< 13.0	NA
Atrazine	NA	< 4.03	< 4.03	NA
Atrazine (GCMS)	NA	< 5.90	< 5.90	NA
Benzothiazole	NA	< 5.00	< 5.00	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	< 5.90	< 5.90	NA
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	< 7.70	< 7.70	NA
Caprolactam (GCMS)	NA	< 10.0	< 7.70	NA
Chlordane	NA	< 0.0950	< 0.0950	NA
Chlordane (GCMS)	NA	< 37.0	< 37.0	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11295TW108	11295TW108	11460TWPEO	11755TWBRI
Date	08/22/90	08/24/90	08/21/90	05/30/90
Analytes				
Semivolatiles				
Dicyclopentadiene	NA	< 5.00	< 5.00	NA
Dicyclopentadiene (GCMS)	NA	< 5.50	< 5.50	NA
Dieldrin	NA	< 0.0500	< 0.0500	NA
Dieldrin (GCMS)	NA	< 26.0	< 26.0	NA
Diisopropyl Methylphosphonate	NA	3.24	0.830	< 0.392
Diisopropyl Methylphosphonate (GCMS)	NA	< 21.0	< 21.0	NA
Dimethylmethyl Phosphonate	NA	< 0.188	< 0.188	26.6
Dimethylmethyl Phosphonate (GCMS)	NA	< 130	< 130	NA
Dithiane	NA	< 1.34	< 1.34	NA
Dithiane (GCMS)	NA	< 3.30	< 3.30	NA
Endrin	NA	< 0.0500	< 0.0500	NA
Endrin (GCMS)	NA	< 18.0	< 18.0	NA
Hexachlorocyclopentadiene	NA	< 0.0480	< 0.0480	NA
Hexachlorocyclopentadiene (GCMS)	NA	< 54.0	< 54.0	NA
Isodrin	NA	< 0.0510	< 0.0510	NA
Isodrin (GCMS)	NA	< 7.80	< 7.80	NA
Malathion	NA	< 0.373	< 0.373	NA
Malathion (GCMS)	NA	< 21.0	< 21.0	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	11295TW108 08/22/90	11295TW108 08/24/90	11460TWPEO 08/21/90	11755TWBRI 05/30/90
Analytes				
Semivolatiles				
Parathion	NA	< 0.647	< 0.647	NA
Parathion (GCMS)	NA	< 37.0	< 37.0	NA
Pentachlorophenol (GCMS)	NA	< 9.10	< 9.10	NA
Supona	NA	< 0.787	< 0.787	NA
Supona (GCMS)	NA	< 19.0	< 19.0	NA
Vapona	NA	< 0.384	< 0.384	NA
Vapona (GCMS)	NA	< 8.50	< 8.50	NA
Volatiles				
1,1,1-Trichloroethane	< 0.760	NA	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,1,2-Trichloroethane	< 0.780	NA	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,1-Dichloroethane	< 0.730	NA	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,1-Dichloroethene	< 1.70	NA	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	NA	< 1.00	NA
1,2-Dichloroethane	< 1.10	NA	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	NA	< 1.00	NA
1,2-Dichloroethenes (cis & trans)	< 0.760	NA	< 0.760	< 0.760

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11295TW108	11295TW108	11460TWPEO	11755TWBRI
Date	08/22/90	08/24/90	08/21/90	05/30/90
Analytes				
Volatiles				
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	NA	< 5.00	NA
Benzene	< 1.05	NA	< 1.05	NA
Benzene (GCMS)	< 1.00	NA	< 1.00	NA
Carbon Tetrachloride	< 0.990	NA	< 0.990	< 0.990
Carbon Tetrachloride (GCMS)	< 1.00	NA	< 1.00	NA
Chlorobenzene	< 0.820	NA	< 0.820	< 0.820
Chlorobenzene (GCMS)	< 1.00	NA	< 1.00	NA
Chloroform	< 0.500	NA	< 0.500	< 0.500
Chloroform (GCMS)	< 1.00	NA	< 1.00	NA
Dibromochloropropane	< 0.195	NA	< 0.195	NA
Dibromochloropropane (GCMS)	NA	< 12.0	< 12.0	NA
Dimethyl Disulfide	NA	< 0.550	< 0.550	NA
Ethyl Benzene	< 1.37	NA	< 1.37	NA
Ethyl Benzene (GCMS)	< 1.00	NA	< 1.00	NA
M-Xylene	< 1.32	NA	< 1.32	NA
M-Xylene (GCMS)	< 1.00	NA	< 1.00	NA
Methylene Chloride	< 7.40	NA	< 7.40	< 7.40
Methylene Chloride (GCMS)	< 1.00	NA	< 1.00	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11295TW108	11295TW108	11460TWPEO	11755TWBRI
Date	08/22/90	08/24/90	08/21/90	05/30/90
Analytes				
Volatiles				
Methylisobutyl Ketone	NA	< 4.90	< 4.90	NA
Methylisobutyl Ketone (GCMS)	< 1.40	NA	< 1.40	NA
O,P-Xylene	< 1.36	NA	< 1.36	NA
O,P-Xylene (GCMS)	< 2.00	NA	< 2.00	NA
Tetrachloroethene	< 0.750	NA	< 0.750	< 0.750
Tetrachloroethene (GCMS)	< 1.00	NA	< 1.00	NA
Toluene	< 1.47	NA	< 1.47	NA
Toluene (GCMS)	< 1.00	NA	< 1.00	NA
Trichloroethene	< 0.560	NA	< 0.560	< 0.560
Trichloroethene (GCMS)	< 1.00	NA	< 1.00	NA
Vinyl Chloride (GCMS)	< 12.0	NA	< 12.0	NA

Notes: Values are reported in micrograms per liter.
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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	11810TWBRI 05/10/90	11830TW112 01/31/89	11830TW112 09/08/89	11841TW096 09/07/89
Analytes				
Metals/Anions/General Chem				
Arsenic	NA	< 2.35	NA	NA
Cadmium	NA	< 8.40	NA	NA
Calcium	NA	100000	NA	NA
Chloride	NA	87000	NA	NA
Chromium	NA	< 24.0	NA	NA
Copper	NA	< 26.0	NA	NA
Cyanide	NA	12.0	NA	NA
Fluoride	NA	1840	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	< 74.0	NA	NA
Magnesium	NA	32500	NA	NA
Manganese	NA	NA	NA	NA
Mercury	NA	< 0.100	NA	NA
Nitrite, Nitrate -- Non-Specific	NA	3400	NA	NA
Potassium	NA	4200	NA	NA
Sodium	NA	78500	NA	NA
Sulfate	NA	200000	NA	NA
Total Organic Carbon	NA	NA	NA	NA

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	11810TWBRI 05/10/90	11830TW112 01/31/89	11830TW112 09/08/89	11841TW096 09/07/89
Analytes				
Metals/Anions/General Chem				
Zinc	NA	< 22.0	NA	NA
Phenols				
2,3,6-Trichlorophenol (GCMS)	NA	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	NA	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	NA	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	NA	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	NA	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	NA	< 176	< 176	< 176
2-Chlorophenol (GCMS)	NA	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	NA	< 3.60	< 0.600	< 0.600
2-Nitrophenol (GCMS)	NA	< 8.20	< 3.00	< 3.00
3-Methyl-4-Chlorophenol (GCMS)	NA	< 8.50	< 0.300	< 0.300
4-Methylphenol (GCMS)	NA	< 2.80	< 0.600	< 0.600
4-Nitrophenol (GCMS)	NA	< 96.0	< 0.400	< 0.400
Phenol (GCMS)	NA	< 2.20	< 0.320	< 0.320
Semivolatiles				
1,4-Oxathiane	NA	< 2.38	< 1.97	< 1.97
1,4-Oxathiane (GCMS)	NA	< 27.0	< 0.160	< 0.160
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	NA	< 0.0490	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	< 18.0	< 1.20	< 1.20

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej[illegible].

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	11810TWBRI 05/10/90	11830TW112 01/31/89	11830TW112 09/08/89	11841TW096 09/07/89
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	NA	< 0.0540	NA	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	< 14.0	< 3.39	< 3.39
4-Chlorophenylmethyl Sulfide	NA	< 5.69	< 10.5	< 10.5
4-Chlorophenylmethyl Sulfide (GCMS)	NA	< 10.0	< 1.30	< 1.30
4-Chlorophenylmethyl Sulfone	NA	< 7.46	< 4.70	< 4.70
4-Chlorophenylmethyl Sulfone (GCMS)	NA	< 5.30	< 0.750	< 0.750
4-Chlorophenylmethyl Sulfoxide	NA	< 11.5	< 15.2	< 15.2
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	< 15.0	< 0.500	< 0.500
Aldrin	NA	< 0.0500	NA	NA
Aldrin (GCMS)	NA	< 13.0	< 0.800	< 0.800
Atrazine	NA	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	NA	< 5.90	< 0.500	< 0.500
Benzothiazole	NA	< 5.00	< 0.00234	< 0.00234
Bicyclo [2,2,1] hepta-2,5-diene	NA	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	NA	NA	NA
Caprolactam (GCMS)	NA	NA	NA	NA
Chlordane	NA	< 0.0950	NA	NA
Chlordane (GCMS)	NA	< 37.0	< 0.260	< 0.260

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11810TWBRI	11830TW112	11830TW112	11841TW096
Date	05/10/90	01/31/89	09/08/89	09/07/89
Analytes				
Semivolatiles				
Dicyclopentadiene	NA	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	NA	< 5.50	< 0.560	< 0.560
Dieldrin	NA	< 0.0500	NA	NA
Dieldrin (GCMS)	NA	< 26.0	< 0.930	< 0.930
Diisopropyl Methylphosphonate	140	5.11	0.477	< 1.26
Diisopropyl Methylphosphonate (GCMS)	NA	< 21.0	< 1.60	< 1.60
Dimethylmethyl Phosphonate	< 0.188	0.241	< 4.23	< 4.23
Dimethylmethyl Phosphonate (GCMS)	NA	< 130	< 0.700	< 0.700
Dithiane	NA	< 1.34	< 0.114	< 0.114
Dithiane (GCMS)	NA	< 3.30	< 0.710	< 0.710
Endrin	NA	< 0.0500	NA	NA
Endrin (GCMS)	NA	< 18.0	< 0.100	< 0.100
Hexachlorocyclopentadiene	NA	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	NA	< 54.0	< 0.520	< 0.520
Isodrin	NA	< 0.0510	NA	NA
Isodrin (GCMS)	NA	< 7.80	< 0.990	< 0.990
Malathion	NA	< 0.373	< 0.373	< 0.373
Malathion (GCMS)	NA	< 21.0	< 0.620	< 0.620

Notes: Values are reported in micrograms per liter.
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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID / Date	11810TWBRI 05/10/90	11830TW112 01/31/89	11830TW112 09/08/89	11841TW096 09/07/89
Analytes				
Semivolatiles				
Parathion	NA	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	NA	< 37.0	< 8.10	< 8.10
Pentachlorophenol (GCMS)	NA	< 9.10	< 0.290	< 0.290
Supona	NA	< 0.787	< 0.787	< 0.787
Supona (GCMS)	NA	< 19.0	< 3.90	< 3.90
Vapona	NA	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	NA	< 8.50	< 0.670	< 0.670
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	NA	NA
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	< 0.780	< 0.780	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	< 0.730	< 0.730	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	< 1.70	< 1.70	NA	NA
1,1-Dichloroethene (GCMS)	NA	NA	NA	NA
1,2-Dichloroethane	< 1.10	< 1.10	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	NA	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11810TWBRI	11830TW112	11830TW112	11841TW096
Date	05/10/90	01/31/89	09/08/89	09/07/89
Analytes				
Volatiles				
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	< 1.05	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	< 0.990	< 0.990	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	< 0.820	< 0.820	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	< 0.500	< 0.500	NA	NA
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	< 0.195	< 0.195	< 0.195
Dibromochloropropane (GCMS)	NA	< 12.0	< 0.250	< 0.250
Dimethyl Disulfide	NA	< 0.550	< 0.133	< 0.133
Ethyl Benzene	NA	< 1.37	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	< 1.32	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	< 7.40	< 7.40	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID / Date	11810TWBRI 05/10/90	11830TW112 01/31/89	11830TW112 09/08/89	11841TW096 09/07/89
Analytes				
Volatiles				
Methylisobutyl Ketone	NA	< 4.90	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	< 1.36	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	< 0.750	< 0.750	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA
Toluene	NA	< 1.47	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	< 0.560	< 0.560	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA
Vinyl Chloride (GCMS)	NA	NA	NA	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11841TW096	11841TW096	11921TW096	12001TWBRI
Date	01/26/90	08/21/90	09/07/89	05/10/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.35	< 2.35	NA	NA
Cadmium	< 6.78	< 6.78	NA	NA
Calcium	1510	1480	NA	NA
Chloride	R	3390	NA	NA
Chromium	< 16.8	< 16.8	NA	NA
Copper	< 18.8	< 18.8	NA	NA
Cyanide	< 5.00	< 8.90	NA	NA
Fluoride	R	2920	NA	NA
Iron	NA	< 77.5	NA	NA
Lead	< 43.4	< 43.4	NA	NA
Magnesium	< 135	51.3	NA	NA
Manganese	NA	< 9.67	NA	NA
Mercury	< 0.100	1.35	NA	NA
Nitrite, Nitrate -- Non-Specific	44.2	150	NA	NA
Potassium	< 1240	< 1240	NA	NA
Sodium	100000	93000	NA	NA
Sulfate	R	21000	NA	NA
Total Organic Carbon	< 1000	< 1000	NA	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	11841TW096 01/26/90	11841TW096 08/21/90	11921TW096 09/07/89	12001TWBRI 05/10/90
Analytes				
Metals/Anions/General Chem				
Zinc	< 18.0	< 18.0	NA	NA
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	NA
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	NA
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	NA
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	NA
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	NA
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	NA
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	NA
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 0.600	NA
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 3.00	NA
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 0.300	NA
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 0.600	NA
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 0.400	NA
Phenol (GCMS)	< 2.20	< 2.20	< 0.320	NA
Semivolatiles				
1,4-Oxathiane	< 2.38	< 2.38	< 1.97	NA
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 0.160	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 1.20	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11841TW096	11841TW096	11921TW096	12001TWBRI
Date	01/26/90	08/21/90	09/07/89	05/10/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	NA	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 3.39	NA
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 10.5	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 1.30	NA
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 4.70	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 0.750	NA
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 15.2	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 0.500	NA
Aldrin	< 0.0500	< 0.0500	NA	NA
Aldrin (GCMS)	< 13.0	< 13.0	< 0.800	NA
Atrazine	< 4.03	< 4.03	< 4.03	NA
Atrazine (GCMS)	< 5.90	< 5.90	< 0.500	NA
Benzothiazole	< 5.00	< 5.00	< 0.00234	NA
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	NA
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	NA	NA
Caprolactam (GCMS)	< 10.0	< 7.70	NA	NA
Chlordane	< 0.0950	< 0.0950	NA	NA
Chlordane (GCMS)	< 37.0	< 37.0	< 0.260	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11841TW096	11841TW096	11921TW096	12001TWBRI
Date	01/26/90	08/21/90	09/07/89	05/10/90
Analytes				
Semivolatiles				
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	NA
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 0.560	NA
Dieldrin	< 0.0500	< 0.0500	NA	NA
Dieldrin (GCMS)	< 26.0	< 26.0	< 0.930	NA
Diisopropyl Methylphosphonate	0.521	< 0.392	< 1.26	6.52
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 1.60	NA
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 4.23	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 0.700	NA
Dithiane	< 1.34	< 1.34	< 0.114	NA
Dithiane (GCMS)	< 3.30	< 3.30	< 0.710	NA
Endrin	< 0.0500	< 0.0500	NA	NA
Endrin (GCMS)	< 18.0	< 18.0	< 0.100	NA
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	NA
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 0.520	NA
Isodrin	< 0.0510	< 0.0510	NA	NA
Isodrin (GCMS)	< 7.80	< 7.80	< 0.990	NA
Malathion	< 0.373	< 0.373	< 0.373	NA
Malathion (GCMS)	< 21.0	< 21.0	< 0.620	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	11841TW096 01/26/90	11841TW096 08/21/90	11921TW096 09/07/89	12001TWBRI 05/10/90
Analytes				
Semivolatiles				
Parathion	< 0.647	< 0.647	< 0.647	NA
Parathion (GCMS)	< 37.0	< 37.0	< 8.10	NA
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 0.290	NA
Supona	< 0.787	< 0.787	< 0.787	NA
Supona (GCMS)	< 19.0	< 19.0	< 3.90	NA
Vapona	< 0.384	< 0.384	< 0.384	NA
Vapona (GCMS)	< 8.50	< 8.50	< 0.670	NA
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	NA	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00	NA	NA
1,1,2-Trichloroethane	< 0.780	< 0.780	NA	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00	NA	NA
1,1-Dichloroethane	< 0.730	< 0.730	NA	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00	NA	NA
1,1-Dichloroethene	< 1.70	< 1.70	NA	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00	NA	NA
1,2-Dichloroethane	< 1.10	< 1.10	NA	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00	NA	NA
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	NA	< 0.760

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11841TW096	11841TW096	11921TW096	12001TWBRI
Date	01/26/90	08/21/90	09/07/89	05/10/90
Analytes				
Volatiles				
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	< 5.00	NA	NA
Benzene	< 1.05	< 1.05	NA	NA
Benzene (GCMS)	< 1.00	< 1.00	NA	NA
Carbon Tetrachloride	< 0.990	< 0.990	NA	< 0.990
Carbon Tetrachloride (GCMS)	< 1.00	< 1.00	NA	NA
Chlorobenzene	< 0.820	< 0.820	NA	< 0.820
Chlorobenzene (GCMS)	< 1.00	< 1.00	NA	NA
Chloroform	24.9	1.17	NA	< 0.500
Chloroform (GCMS)	< 1.00	< 1.00	NA	NA
Dibromochloropropane	< 0.195	< 0.195	< 0.195	NA
Dibromochloropropane (GCMS)	< 12.0	< 12.0	< 0.250	NA
Dimethyl Disulfide	< 0.550	< 0.550	< 0.133	NA
Ethyl Benzene	< 1.37	< 1.37	NA	NA
Ethyl Benzene (GCMS)	< 1.00	< 1.00	NA	NA
M-Xylene	< 1.32	< 1.32	NA	NA
M-Xylene (GCMS)	< 1.00	< 1.00	NA	NA
Methylene Chloride	< 7.40	< 7.40	NA	< 7.40
Methylene Chloride (GCMS)	< 1.00	< 1.00	NA	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	11841TW096	11841TW096	11921TW096	12001TWBRI
Date	01/26/90	08/21/90	09/07/89	05/10/90
Analytes				
Volatiles				
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	NA
Methylisobutyl Ketone (GCMS)	< 1.40	< 1.40	NA	NA
O,P-Xylene	< 1.36	< 1.36	NA	NA
O,P-Xylene (GCMS)	< 2.00	< 2.00	NA	NA
Tetrachloroethene	< 0.750	< 0.750	NA	< 0.750
Tetrachloroethene (GCMS)	< 1.00	< 1.00	NA	NA
Toluene	< 1.47	< 1.47	NA	NA
Toluene (GCMS)	< 1.00	< 1.00	NA	NA
Trichloroethene	< 0.560	< 0.560	NA	< 0.560
Trichloroethene (GCMS)	< 1.00	< 1.00	NA	NA
Vinyl Chloride (GCMS)	< 12.0	< 12.0	NA	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	13350TW104	13701TW104	37431	37431
Date	01/17/89	01/17/89	09/13/89	11/21/89
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.35	< 2.35	NA	3.22
Cadmium	< 8.40	< 8.40	NA	< 6.78
Calcium	83500	34000	NA	1810
Chloride	60000	38000	NA	2580
Chromium	< 24.0	< 24.0	NA	19.8
Copper	< 26.0	< 26.0	NA	< 18.8
Cyanide	< 5.00	< 5.00	NA	< 5.00
Fluoride	1540	3450	NA	NA
Iron	NA	NA	NA	NA
Lead	< 74.0	< 74.0	NA	< 43.4
Magnesium	8790	7110	NA	< 135
Manganese	NA	NA	NA	NA
Mercury	< 0.100	< 0.100	NA	< 0.100
Nitrite, Nitrate -- Non-Specific	290	57.5	NA	1000
Potassium	1070	916	NA	< 1240
Sodium	190000	160000	NA	120000
Sulfate	280000	180000	NA	2490
Total Organic Carbon	NA	NA	NA	< 500

Notes: Values are reported in micrograms per liter.
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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	13350TW104	13701TW104	37431	37431
Date	01/17/89	01/17/89	09/13/89	11/21/89
Analytes				
Metals/Anions/General Chem				
Zinc	23.1	667	NA	< 18.0
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	NA	NA	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 0.600	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 3.00	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 0.300	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 0.600	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 0.400	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 0.320	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	< 2.38	< 1.97	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 0.160	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	NA	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 1.20	< 18.0

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID / Date	13350TW104 01/17/89	13701TW104 01/17/89	37431 09/13/89	37431 11/21/89
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	NA	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 3.39	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 10.5	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 1.30	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 4.70	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 0.750	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 15.2	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 0.500	< 15.0
Aldrin	< 0.0500	< 0.0500	NA	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 0.800	< 13.0
Atrazine	< 4.03	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	< 5.90	< 5.90	< 0.500	< 5.90
Benzothiazole	< 5.00	< 5.00	< 0.00234	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	NA	NA	< 7.70
Caprolactam (GCMS)	NA	NA	NA	< 10.0
Chlordane	< 0.0950	< 0.0950	NA	< 0.0950
Chlordane (GCMS)	< 37.0	< 37.0	< 0.260	< 37.0

Notes: Values are reported in micrograms per liter.
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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	13350TW104	13701TW104	37431	37431
Date	01/17/89	01/17/89	09/13/89	11/21/89
Analytes				
Semivolatiles				
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 0.560	< 5.50
Dieldrin	< 0.0500	< 0.0500	NA	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 0.930	< 26.0
Diisopropyl Methylphosphonate	22.0	3.87	< 1.26	< 0.392
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 1.60	< 21.0
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 4.23	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 0.700	< 130
Dithiane	< 1.34	< 1.34	< 0.114	< 1.34
Dithiane (GCMS)	< 3.30	< 3.30	< 0.710	< 3.30
Endrin	< 0.0500	< 0.0500	NA	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 0.100	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 0.520	< 54.0
Isodrin	< 0.0510	< 0.0510	NA	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 0.990	< 7.80
Malathion	< 0.373	< 0.373	< 0.373	< 0.373
Malathion (GCMS)	< 21.0	< 21.0	< 0.620	< 21.0

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	13350TW104 01/17/89	13701TW104 01/17/89	37431 09/13/89	37431 11/21/89
Analytes				
Semivolatiles				
Parathion	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 8.10	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 0.290	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 3.90	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 0.670	< 8.50
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	NA	< 0.760
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	< 0.780	< 0.780	NA	< 0.780
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	< 0.730	< 0.730	NA	< 0.730
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	< 1.70	< 1.70	NA	< 1.70
1,1-Dichloroethene (GCMS)	NA	NA	NA	NA
1,2-Dichloroethane	< 1.10	< 1.10	NA	< 1.10
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	NA	< 0.760

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	13350TW104	13701TW104	37431	37431
Date	01/17/89	01/17/89	09/13/89	11/21/89
Analytes				
Volatiles				
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	< 1.05	< 1.05	NA	< 1.05
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	< 0.990	< 0.990	NA	< 0.990
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	< 0.820	< 0.820	NA	< 0.820
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	< 0.500	< 0.500	NA	< 0.500
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	< 0.195	< 0.195	< 0.195	< 0.195
Dibromochloropropane (GCMS)	< 12.0	< 12.0	< 0.250	< 12.0
Dimethyl Disulfide	< 0.550	< 0.550	< 0.133	< 0.550
Ethyl Benzene	< 1.37	< 1.37	NA	< 1.37
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	< 1.32	< 1.32	NA	< 1.32
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	< 7.40	< 7.40	NA	< 7.40
Methylene Chloride (GCMS)	NA	NA	NA	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	13350TW104	13701TW104	37431	37431
Date	01/17/89	01/17/89	09/13/89	11/21/89
Analytes				
Volatiles				
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	< 1.36	< 1.36	NA	< 1.36
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	< 0.750	< 0.750	NA	< 0.750
Tetrachloroethene (GCMS)	NA	NA	NA	NA
Toluene	< 1.47	< 1.47	NA	< 1.47
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	< 0.560	< 0.560	NA	< 0.560
Trichloroethene (GCMS)	NA	NA	NA	NA
Vinyl Chloride (GCMS)	NA	NA	NA	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	37445	8834ATW096	8834ATW096	8834BTW096
Date	08/28/90	08/22/90	08/24/90	08/22/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 4.89	< 2.35	NA	< 2.35
Cadmium	< 6.78	NA	NA	NA
Calcium	2450	NA	NA	NA
Chloride	9960	120000	NA	64000
Chromium	< 16.8	NA	NA	NA
Copper	31.8	NA	NA	NA
Cyanide	< 8.90	NA	NA	NA
Fluoride	2850	1370	NA	1080
Iron	NA	NA	NA	NA
Lead	< 43.4	NA	NA	NA
Magnesium	161	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.100	< 0.100	NA	< 0.100
Nitrite, Nitrate -- Non-Specific	140	2500	NA	7000
Potassium	< 1240	NA	NA	NA
Sodium	120000	NA	NA	NA
Sulfate	38000	110000	NA	170000
Total Organic Carbon	< 1500	NA	1500	NA

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	37445	8834ATW096	8834ATW096	8834BTW096
Date	08/28/90	08/22/90	08/24/90	08/22/90
Analytes				
Metals/Anions/General Chem				
Zinc	616	NA	NA	NA
Phenols				
2,3,6-Trichlorophenol (GCMS)	< 1.70	NA	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	NA	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	NA	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	NA	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	NA	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	NA	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	NA	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	NA	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	NA	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	NA	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	NA	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	NA	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	NA	< 2.20	< 2.20
Semivolatiles				
1,4-Oxathiane	< 2.38	NA	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	NA	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	NA	< 0.0490	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	NA	< 18.0	< 18.0

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	37445	8834ATW096	8834ATW096	8834BTW096
Date	08/28/90	08/22/90	08/24/90	08/22/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	NA	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	NA	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	NA	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	NA	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	NA	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	NA	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	NA	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	NA	< 15.0	< 15.0
Aldrin	< 0.0500	NA	< 0.0500	< 0.0500
Aldrin (GCMS)	< 13.0	NA	< 13.0	< 13.0
Atrazine	< 4.03	NA	< 4.03	< 4.03
Atrazine (GCMS)	< 5.90	NA	< 5.90	< 5.90
Benzothiazole	< 5.00	NA	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	NA	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	NA	< 7.70	< 7.70
Caprolactam (GCMS)	< 10.0	NA	< 7.70	< 7.70
Chlordane	< 0.0950	NA	< 0.0950	< 0.0950
Chlordane (GCMS)	< 37.0	NA	< 37.0	< 37.0

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	37445 08/28/90	8834ATW096 08/22/90	8834ATW096 08/24/90	8834BTW096 08/22/90
Analytes				
Semivolatiles				
Dicyclopentadiene	< 5.00	NA	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	NA	< 5.50	< 5.50
Dieldrin	< 0.0500	NA	< 0.0500	< 0.0500
Dieldrin (GCMS)	< 26.0	NA	< 26.0	< 26.0
Diisopropyl Methylphosphonate	< 0.392	NA	7.86	< 0.392
Diisopropyl Methylphosphonate (GCMS)	< 21.0	NA	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	NA	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	NA	< 130	< 130
Dithiane	< 1.34	NA	< 1.34	< 1.34
Dithiane (GCMS)	< 3.30	NA	< 3.30	< 3.30
Endrin	< 0.0500	NA	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	NA	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	NA	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	NA	< 54.0	< 54.0
Isodrin	< 0.0510	NA	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	NA	< 7.80	< 7.80
Malathion	< 0.373	NA	< 0.373	< 0.373
Malathion (GCMS)	< 21.0	NA	< 21.0	< 21.0

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	37445	8834ATW096	8834ATW096	8834BTW096
Date	08/28/90	08/22/90	08/24/90	08/22/90
Analytes				
Semivolatiles				
Parathion	< 0.647	NA	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	NA	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	NA	< 9.10	< 9.10
Supona	< 0.787	NA	< 0.787	< 0.787
Supona (GCMS)	< 19.0	NA	< 19.0	< 19.0
Vapona	< 0.384	NA	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	NA	< 8.50	< 8.50
Volatiles				
1,1,1-Trichloroethane	< 0.760	< 0.760	NA	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00	NA	< 1.00
1,1,2-Trichloroethane	< 0.780	< 0.780	NA	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00	NA	< 1.00
1,1-Dichloroethane	< 0.730	< 0.730	NA	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00	NA	< 1.00
1,1-Dichloroethene	< 1.70	< 1.70	NA	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00	NA	< 1.00
1,2-Dichloroethane	< 1.10	< 1.10	NA	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00	NA	< 1.00
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	NA	< 0.760

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	37445 08/28/90	8834ATW096 08/22/90	8834ATW096 08/24/90	8834BTW096 08/22/90
Analytes				
Volatiles				
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	< 5.00	NA	< 5.00
Benzene	< 1.05	< 1.05	NA	< 1.05
Benzene (GCMS)	< 1.00	< 1.00	NA	< 1.00
Carbon Tetrachloride	< 0.990	< 0.990	NA	< 0.990
Carbon Tetrachloride (GCMS)	< 1.00	< 1.00	NA	< 1.00
Chlorobenzene	< 0.820	< 0.820	NA	< 0.820
Chlorobenzene (GCMS)	< 1.00	< 1.00	NA	< 1.00
Chloroform	< 0.500	2.74	NA	< 0.500
Chloroform (GCMS)	< 1.00	33.0	NA	< 1.00
Dibromochloropropane	< 0.195	< 0.195	NA	< 0.195
Dibromochloropropane (GCMS)	< 12.0	NA	< 12.0	< 12.0
Dimethyl Disulfide	< 0.550	NA	< 0.550	< 0.550
Ethyl Benzene	< 1.37	< 1.37	NA	< 1.37
Ethyl Benzene (GCMS)	< 1.00	< 1.00	NA	< 1.00
M-Xylene	< 1.32	< 1.32	NA	< 1.32
M-Xylene (GCMS)	< 1.00	< 1.00	NA	< 1.00
Methylene Chloride	< 7.40	< 7.40	NA	< 7.40
Methylene Chloride (GCMS)	< 1.00	< 1.00	NA	< 1.00

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID Date	37445 08/28/90	8834ATW096 08/22/90	8834ATW096 08/24/90	8834BTW096 08/22/90
Analytes				
Volatiles				
Methylisobutyl Ketone	< 4.90	NA	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40	< 1.40	NA	< 1.40
O,P-Xylene	< 1.36	< 1.36	NA	< 1.36
O,P-Xylene (GCMS)	< 2.00	< 2.00	NA	< 2.00
Tetrachloroethene	< 0.750	< 0.750	NA	< 0.750
Tetrachloroethene (GCMS)	< 1.00	< 1.00	NA	< 1.00
Toluene	< 1.47	< 1.47	NA	< 1.47
Toluene (GCMS)	< 1.00	< 1.00	NA	< 1.00
Trichloroethene	< 0.560	< 0.560	NA	< 0.560
Trichloroethene (GCMS)	< 1.00	< 1.00	NA	< 1.00
Vinyl Chloride (GCMS)	< 12.0	< 12.0	NA	< 12.0

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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	8834CTW096
Date	08/22/90
Analytes	
Metals/Anions/General Chem	
Arsenic	< 2.35
Cadmium	< 6.78
Calcium	2470
Chloride	2710
Chromium	< 16.8
Copper	< 18.8
Cyanide	NA
Fluoride	2890
Iron	< 77.5
Lead	< 43.4
Magnesium	< 135
Manganese	< 9.67
Mercury	< 0.100
Nitrite, Nitrate -- Non-Specific	240
Potassium	< 1240
Sodium	100000
Sulfate	9180
Total Organic Carbon	< 1000

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	8834CTW096
Date	08/22/90
Analytes	
Metals/Anions/General Chem	
Zinc	< 18.0
Phenols	
2,3,6-Trichlorophenol (GCMS)	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40
2,4-Dinitrophenol (GCMS)	< 176
2-Chlorophenol (GCMS)	< 2.80
2-Methylphenol (GCMS)	< 3.60
2-Nitrophenol (GCMS)	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50
4-Methylphenol (GCMS)	< 2.80
4-Nitrophenol (GCMS)	< 96.0
Phenol (GCMS)	< 2.20
Semivolatiles	
1,4-Oxathiane	< 2.38
1,4-Oxathiane (GCMS)	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were re;

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	8834CTW096
Date	08/22/90
Analytes	
Semivolatiles	
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0
Aldrin	< 0.0500
Aldrin (GCMS)	< 13.0
Atrazine	< 4.03
Atrazine (GCMS)	< 5.90
Benzothiazole	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70
Caprolactam (GCMS)	< 7.70
Chlordane	< 0.0950
Chlordane (GCMS)	< 37.0

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	8834CTW096
Date	08/22/90
Analytes	
Semivolatiles	
Dicyclopentadiene	< 5.00
Dicyclopentadiene (GCMS)	< 5.50
Dieldrin	< 0.0500
Dieldrin (GCMS)	< 26.0
Diisopropyl Methylphosphonate	< 0.392
Diisopropyl Methylphosphonate (GCMS)	< 21.0
Dimethylmethyl Phosphonate	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130
Dithiane	< 1.34
Dithiane (GCMS)	< 3.30
Endrin	< 0.0500
Endrin (GCMS)	< 18.0
Hexachlorocyclopentadiene	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0
Isodrin	< 0.0510
Isodrin (GCMS)	< 7.80
Malathion	< 0.373
Malathion (GCMS)	< 21.0

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
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Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	8834CTW096
Date	08/22/90
Analytes	
Semivolatiles	
Parathion	< 0.647
Parathion (GCMS)	< 37.0
Pentachlorophenol (GCMS)	< 9.10
Supona	< 0.787
Supona (GCMS)	< 19.0
Vapona	< 0.384
Vapona (GCMS)	< 8.50
Volatiles	
1,1,1-Trichloroethane	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00
1,1,2-Trichloroethane	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00
1,1-Dichloroethane	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00
1,1-Dichloroethene	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00
1,2-Dichloroethane	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00
1,2-Dichloroethenes (cis & trans)	< 0.760

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	8834CTW096
Date	08/22/90
Analytes	
Volatiles	
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00
Benzene	< 1.05
Benzene (GCMS)	< 1.00
Carbon Tetrachloride	< 0.990
Carbon Tetrachloride (GCMS)	< 1.00
Chlorobenzene	< 0.820
Chlorobenzene (GCMS)	< 1.00
Chloroform	< 0.500
Chloroform (GCMS)	< 1.00
Dibromochloropropane	< 0.195
Dibromochloropropane (GCMS)	< 12.0
Dimethyl Disulfide	< 0.550
Ethyl Benzene	< 1.37
Ethyl Benzene (GCMS)	< 1.00
M-Xylene	< 1.32
M-Xylene (GCMS)	< 1.00
Methylene Chloride	< 7.40
Methylene Chloride (GCMS)	< 1.00

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were re[illegible]

Table B5 Investigative Analytical Data
for Domestic Well Samples

Sample ID	8834CTW096
Date	08/22/90
Analytes	
Volatiles	
Methylisobutyl Ketone	< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40
O,P-Xylene	< 1.36
O,P-Xylene (GCMS)	< 2.00
Tetrachloroethene	< 0.750
Tetrachloroethene (GCMS)	< 1.00
Toluene	< 1.47
Toluene (GCMS)	< 1.00
Trichloroethene	< 0.560
Trichloroethene (GCMS)	< 1.00
Vinyl Chloride (GCMS)	< 12.0

Notes: Values are reported in micrograms per liter.
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Table B6 GC/MS Analytical Data
for Domestic Well Samples

Sample ID	HA1150	HA1170
Date	01/26/90	02/27/90
	GC/MS of	GC/MS of
	11841TW096	10021TWPEO
Analytes		
Phenols		
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20
Semivolatiles		
1,4-Oxathiane (GCMS)	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0

Notes: Values are reported in micrograms per liter.
Values are reported to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B6 GC/MS Analytical Data
for Domestic Well Samples

Sample ID	HA1150	HA1170
Date	01/26/90	02/27/90
	GC/MS of 11841TW096	GC/MS of 10021TWPEO
Analytes		
Semivolatiles		
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0
Aldrin (GCMS)	< 13.0	< 13.0
Atrazine (GCMS)	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70
Caprolactam (GCMS)	< 10.0	< 7.70
Chlordane (GCMS)	< 37.0	< 37.0
Dicyclopentadiene (GCMS)	< 5.50	< 5.50
Dieldrin (GCMS)	< 26.0	< 26.0
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130
Dithiane (GCMS)	< 3.30	< 3.30
Endrin (GCMS)	< 18.0	< 18.0
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0
Isodrin (GCMS)	< 7.80	< 7.80

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej

Table B6 GC/MS Analytical Data
for Domestic Well Samples

Sample ID	HA1150	HA1170
Date	01/26/90	02/27/90
	GC/MS of	GC/MS of
	11841TW096	10021TWPEO
Analytes		
Semivolatiles		
Malathion (GCMS)	< 21.0	< 21.0
Parathion (GCMS)	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10
Supona (GCMS)	< 19.0	< 19.0
Vapona (GCMS)	< 8.50	< 8.50
Volatiles		
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	< 5.00
Benzene (GCMS)	< 1.00	< 1.00
Carbon Tetrachloride (GCMS)	< 1.00	< 1.00
Chlorobenzene (GCMS)	< 1.00	< 1.00
Chloroform (GCMS)	< 1.00	< 1.00
Dibromochloropropane (GCMS)	< 12.0	< 12.0

Notes: Values are reported in micrograms per liter.
Values are reported to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B6 GC/MS Analytical Data
for Domestic Well Samples

Sample ID	HA1150	HA1170
Date	01/26/90	02/27/90
	GC/MS of	GC/MS of
	11841TW096	10021TWPEO
Analytes		
Volatiles		
Ethyl Benzene (GCMS)	< 1.00	< 1.00
M-Xylene (GCMS)	< 1.00	< 1.00
Methylene Chloride (GCMS)	< 1.00	< 1.00
Methylisobutyl Ketone (GCMS)	< 1.40	< 1.40
O,P-Xylene (GCMS)	< 2.00	< 2.00
Tetrachloroethene (GCMS)	< 1.00	< 1.00
Toluene (GCMS)	< 1.00	< 1.00
Trichloroethene (GCMS)	< 1.00	< 1.00
Vinyl Chloride (GCMS)	< 12.0	< 12.0

Notes: Values are reported in micrograms per liter.
Values are reported to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were re[illegible].

Table B7 QA/QC Analytical Data
for Domestic Well Samples

Sample ID	HA1151
Date	01/26/90
	TB of 11841TW096
Analytes	
Volatiles	
1,1,1-Trichloroethane	< 0.760
1,1,2-Trichloroethane	< 0.780
1,1-Dichloroethane	< 0.730
1,1-Dichloroethene	< 1.70
1,2-Dichloroethane	< 1.10
1,2-Dichloroethenes (cis & trans)	< 0.760
Benzene	< 1.05
Carbon Tetrachloride	< 0.990
Chlorobenzene	< 0.820
Chloroform	< 0.500
Ethyl Benzene	< 1.37
M-Xylene	< 1.32
Methylene Chloride	< 7.40
O,P-Xylene	< 1.36
Tetrachloroethene	< 0.750

Notes: Values are reported in micrograms per liter.
Values are reported to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
TB -- Trip Blank

Table B7 QA/QC Analytical Data
for Domestic Well Samples

Sample ID	HA1151
Date	01/26/90
	TB of 11841TW096
Analytes	
Volatiles	
Toluene	< 1.47
Trichloroethene	< 0.560

Notes: Values are reported in micrograms per liter.
Values are reported to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
-- Trip [illegible]k

Table B9: Vinyl Chloride Analytical Results for Groundwater Samples

Sample ID	Sample Date	Value
37307	11/09/89	< 0.4600
37308	11/07/89	< 0.4600
37309	11/07/89	< 0.4600
37312	11/07/89	< 0.4600
37313	11/27/89	< 0.4600
37316	11/08/89	< 0.4600
37317	11/08/89	< 0.4600
37318	11/16/89	< 0.4600
37320	10/25/89	< 0.4600
37321	10/26/89	< 0.4600
37322	10/26/89	< 0.4600
37323	11/09/89	< 0.4600
37327	11/08/89	< 0.4600
37330	10/31/89	< 0.4600
37338	11/09/89	< 0.4600
37339	11/09/89	< 0.4600
37341	10/26/89	< 0.4600
37342	10/31/89	< 0.4600
37343	10/25/89	< 0.4600
37344	10/31/89	< 0.4600
37362	11/14/89	< 0.4600
37365	11/07/89	< 0.4600
37367	11/02/89	< 0.4600
37368	11/07/89	< 0.4600
37369	10/25/89	< 0.4600
37370	11/07/89	< 0.4600
37371	11/08/89	< 0.4600
37372	11/07/89	< 0.4600
37373	10/31/89	< 0.4600
37374	10/31/89	< 0.4600
37376	11/14/89	< 0.4600
37377	10/25/89	< 0.4600
37378	11/17/89	< 0.4600
37379	11/16/89	< 0.4600
37380	11/15/89	< 0.4600
37381	11/02/89	< 0.4600
37383	11/02/89	< 0.4600
37387	11/15/89	< 0.4600
37388	11/02/89	< 0.4600
37389	11/08/89	< 0.4600
37391	10/25/89	< 0.4600
37392	10/25/89	< 0.4600
37395	11/15/89	< 0.4600
37396	11/08/89	< 0.4600
37397	11/08/89	< 0.4600
BOLLER	11/27/89	< 0.4600

Notes: Values are reported in micrograms per liter.

Table B8 Duplicate Analytical Data
for Domestic Well Samples

Sample ID Date	HA1030 01/17/89 Dup of 13350TW104	HA1031 01/31/89 Dup of 11830TW112	HA1068 12/28/89 Dup of 10720TWBRI	HA1149 01/26/90 Dup of 11841TW096	HA1271 08/21/90 Dup of 11841TW096
Analytes					
Metals/Anions/General Chem					
Arsenic	< 2.35	< 2.35	< 2.35	< 2.35	< 2.35
Cadmium	< 8.40	< 8.40	< 6.78	< 6.78	< 6.78
Calcium	84200	110000	134000	1460	1380
Chloride	69000	86000	140000	R	3420
Chromium	< 24.0	< 24.0	< 16.8	< 16.8	< 16.8
Copper	< 26.0	< 26.0	< 18.8	< 18.8	< 18.8
Cyanide	< 5.00	10.2	< 5.00	< 5.00	< 8.90
Fluoride	1580	1520	1890	R	2910
Iron	NA	NA	NA	NA	< 77.5
Lead	< 74.0	< 74.0	< 43.4	< 43.4	< 43.4
Magnesium	9110	31100	32000	< 135	< 135
Manganese	NA	NA	NA	NA	< 9.67
Mercury	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100
Nitrite, Nitrate -- Non-Specific	290	3500	7400	37.7	140
Potassium	1030	4530	3330	< 1240	< 1240
Sodium	200000	80600	160000	100000	93000

Notes: Values are reported in micrograms per liter.
Values are reported to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected

Table B8 Duplicate Analytical Data
for Domestic Well Samples

Sample ID	HA1030	HA1031	HA1068	HA1149	HA1271
Date	01/17/89	01/31/89	12/28/89	01/26/90	08/21/90
	Dup of 13350TW104	Dup of 11830TW112	Dup of 10720TWBRI	Dup of 11841TW096	Dup of 11841TW096
Analytes					
Metals/Anions/General Chem					
Sulfate	320000	200000	290000	R	21000
Total Organic Carbon	NA	NA	600	< 1000	< 1000
Zinc	24.6	< 22.0	51.3	< 18.0	< 18.0
Phenols					
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	NA	< 2.80	< 2.80	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20	< 2.20

Notes: Values are reported in micrograms per liter.
Values are reported to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B8 Duplicate Analytical Data
for Domestic Well Samples

Sample ID / Date / Analytes	HA1030 01/17/89 Dup of 13350TW104	HA1031 01/31/89 Dup of 11830TW112	HA1068 12/28/89 Dup of 10720TWBRI	HA1149 01/26/90 Dup of 11841TW096	HA1271 08/21/90 Dup of 11841TW096
Volatiles					
Chlorobenzene (GCMS)	NA	NA	NA	< 1.00	< 1.00
Chloroform	< 0.500	< 0.500	0.962	< 0.500	< 0.500
Chloroform (GCMS)	NA	NA	NA	< 1.00	< 1.00
Dibromochloropropane	< 0.195	< 0.195	< 0.195	< 0.195	< 0.195
Dibromochloropropane (GCMS)	< 12.0	< 12.0	< 12.0	< 12.0	< 12.0
Dimethyl Disulfide	< 0.550	< 0.550	< 0.550	< 0.550	< 0.550
Ethyl Benzene	< 1.37	< 1.37	< 1.37	< 1.37	< 1.37
Ethyl Benzene (GCMS)	NA	NA	NA	< 1.00	< 1.00
M-Xylene	< 1.32	< 1.32	< 1.32	< 1.32	< 1.32
M-Xylene (GCMS)	NA	NA	NA	< 1.00	< 1.00
Methylene Chloride	< 7.40	< 7.40	< 7.40	< 7.40	< 7.40
Methylene Chloride (GCMS)	NA	NA	NA	< 1.00	< 1.00
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	NA	NA	NA	< 1.40	< 1.40
O,P-Xylene	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36
O,P-Xylene (GCMS)	NA	NA	NA	< 2.00	< 2.00

Notes: Values are reported in micrograms per liter.
Values are reported to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B8 Duplicate Analytical Data
for Domestic Well Samples

Sample ID	HA1030	HA1031	HA1068	HA1149	HA1271
Date	01/17/89	01/31/89	12/28/89	01/26/90	08/21/90
	Dup of 13350TW104	Dup of 11830TW112	Dup of 10720TWBRI	Dup of 11841TW096	Dup of 11841TW096
Analytes					
Volatiles					
Tetrachloroethene	< 0.750	< 0.750	< 0.750	< 0.750	< 0.750
Tetrachloroethene (GCMS)	NA	NA	NA	< 1.00	< 1.00
Toluene	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47
Toluene (GCMS)	NA	NA	NA	< 1.00	< 1.00
Trichloroethene	< 0.560	< 0.560	< 0.560	< 0.560	< 0.560
Trichloroethene (GCMS)	NA	NA	NA	< 1.00	< 1.00
Vinyl Chloride (GCMS)	NA	NA	NA	< 12.0	< 12.0

Notes: Values are reported in micrograms per liter.
Values are reported to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B8 Duplicate Analytical Data
for Domestic Well Samples

Sample ID Date Analytes	HA1030 01/17/89 Dup of 13350TW104	HA1031 01/31/89 Dup of 11830TW112	HA1068 12/28/89 Dup of 10720TWBRI	HA1149 01/26/90 Dup of 11841TW096	HA1271 08/21/90 Dup of 11841TW096
Semivolatiles					
Endrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	< 0.0510	< 0.0510	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373	< 0.373	< 0.373
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles					
1,1,1-Trichloroethane	< 0.760	< 0.760	3.26	< 0.760	< 0.760

Notes: Values are reported in micrograms per liter.
Values are reported to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B8 Duplicate Analytical Data
for Domestic Well Samples

Sample ID	HA1030	HA1031	HA1068	HA1149	HA1271
Date	01/17/89	01/31/89	12/28/89	01/26/90	08/21/90
	Dup of 13350TW104	Dup of 11830TW112	Dup of 10720TWBRI	Dup of 11841TW096	Dup of 11841TW096
Analytes					
Volatiles					
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	< 1.00	< 1.00
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	< 1.00	< 1.00
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	NA	NA	NA	< 1.00	< 1.00
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	NA	NA	NA	< 1.00	< 1.00
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	NA	NA	NA	< 1.00	< 1.00
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	< 0.760	< 0.760	< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	< 5.00	< 5.00
Benzene	< 1.05	< 1.05	< 1.05	< 1.05	< 1.05
Benzene (GCMS)	NA	NA	NA	< 1.00	< 1.00
Carbon Tetrachloride	< 0.990	< 0.990	< 0.990	< 0.990	< 0.990
Carbon Tetrachloride (GCMS)	NA	NA	NA	< 1.00	< 1.00
Chlorobenzene	< 0.820	< 0.820	< 0.820	< 0.820	< 0.820

Notes: Values are reported in micrograms per liter.
Values are reported to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table B8 Duplicate Analytical Data
for Domestic Well Samples

Sample ID / Date / Analytes	HA1030 01/17/89 Dup of 13350TW104	HA1031 01/31/89 Dup of 11830TW112	HA1068 12/28/89 Dup of 10720TWBRI	HA1149 01/26/90 Dup of 11841TW096	HA1271 08/21/90 Dup of 11841TW096
Semivolatiles					
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490	< 0.0490	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	< 4.03	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90	< 5.90

Notes: Values are reported in micrograms per liter.
Values are reported to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected

Table B8 Duplicate Analytical Data
for Domestic Well Samples

Sample ID	HA1030	HA1031	HA1068	HA1149	HA1271
Date	01/17/89	01/31/89	12/28/89	01/26/90	08/21/90
	Dup of	Dup of	Dup of	Dup of	Dup of
	13350TW104	11830TW112	10720TWBRI	11841TW096	11841TW096
Analytes					
Semivolatiles					
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	NA	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	NA	NA	< 7.70	< 10.0	< 7.70
Chlordane	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	< 5.50	< 5.50
Dieldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	18.9	5.61	79.0	< 0.392	< 0.392
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	77.4	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	0.253	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34	< 1.34	< 1.34
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30	< 3.30

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Appendix C

SURFACE-WATER ANALYTICAL DATA

LIST OF TABLES

Table No.

Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA0971SW	HA0973SW	HA0977SW	HA0978SW	HA0979SW
Date	11/11/88	11/11/88	11/15/88	11/15/88	11/15/88
Analytes					
Metals/Anions/General Chem					
Arsenic	280	< 2.35	4.55	4.31	5.27
Cadmium	< 8.40	< 8.40	< 8.40	< 8.40	< 8.40
Calcium	790000	190000	150000	160000	160000
Chloride	530000	320000	280000	300000	310000
Chromium	< 24.0	< 24.0	< 24.0	< 24.0	< 24.0
Copper	< 26.0	< 26.0	< 26.0	< 26.0	< 26.0
Cyanide	12.3	< 5.00	< 5.00	< 5.00	< 5.00
Fluoride	6360	3960	3740	3810	4590
Lead	< 74.0	< 74.0	< 74.0	< 74.0	< 74.0
Magnesium	180000	78500	66700	68900	70200
Mercury	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100
Nitrite, Nitrate -- Non-Specific	5000	2600	3000	3300	1900
Potassium	8570	4290	4530	4140	4740
Sodium	510000	290000	230000	240000	240000
Sulfate	1500000	480000	410000	440000	430000
Total Organic Carbon	NA	NA	NA	NA	NA
Zinc	93.3	33.6	< 22.0	< 22.0	< 22.0
Phenols					
2,3,6-Trichlorophenol (GCMS)	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol (GCMS)	NA	NA	NA	NA	NA

Notes: Values are reported in micrograms per liter.
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Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA0971SW	HA0973SW	HA0977SW	HA0978SW	HA0979SW
Date	11/11/88	11/11/88	11/15/88	11/15/88	11/15/88
Analytes					
Phenols					
2,4,6-Trichlorophenol (GCMS)	NA	NA	NA	NA	NA
2,4-Dichlorophenol (GCMS)	NA	NA	NA	NA	NA
2,4-Dimethylphenol (GCMS)	NA	NA	NA	NA	NA
2,4-Dinitrophenol (GCMS)	NA	NA	NA	NA	NA
2-Chlorophenol (GCMS)	NA	NA	NA	NA	NA
2-Methylphenol (GCMS)	NA	NA	NA	NA	NA
2-Nitrophenol (GCMS)	NA	NA	NA	NA	NA
3-Methyl-4-Chlorophenol (GCMS)	NA	NA	NA	NA	NA
4-Methylphenol (GCMS)	NA	NA	NA	NA	NA
4-Nitrophenol (GCMS)	NA	NA	NA	NA	NA
Phenol (GCMS)	NA	NA	NA	NA	NA
Semivolatiles					
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 7.90	< 7.90	< 7.90	< 7.90	< 7.90
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490	< 0.0490	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 9.20	< 9.20	< 9.20	< 9.20	< 9.20
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 6.10	< 6.10	< 6.10	< 6.10	< 6.10
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 17.0	< 17.0	< 17.0	< 17.0	< 17.0

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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were re[illegible]d.

Table C1 Surface-Water Investigative Analytical Data

Sample ID Date	HA0971SW 11/11/88	HA0973SW 11/11/88	HA0977SW 11/15/88	HA0978SW 11/15/88	HA0979SW 11/15/88
Analytes					
Semivolatiles					
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	19.4	< 7.46	170
4-Chlorophenylmethyl Sulfone (GCMS)	< 7.20	< 7.20	< 7.20	< 7.20	< 7.20
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	< 11.5	120
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 29.0	< 29.0	< 29.0	< 29.0	< 29.0
Aldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Aldrin (GCMS)	< 7.50	< 7.50	< 7.50	< 7.50	< 7.50
Atrazine	< 4.03	< 4.03	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	< 5.60	< 5.60	< 5.60	< 5.60	< 5.60
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	NA	NA	NA	NA
Caprolactam (GCMS)	NA	NA	NA	NA	NA
Chlordane	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950
Chlordane (GCMS)	< 9.40	< 9.40	< 9.40	< 9.40	< 9.40
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 7.30	< 7.30	< 7.30	< 7.30	< 7.30
Dieldrin	< 0.0500	0.147	< 0.0500	< 0.0500	0.0764
Dieldrin (GCMS)	< 4.70	< 4.70	< 4.70	< 4.70	< 4.70
Diisopropyl Methylphosphonate	4.92	5.90	6.11	5.47	4.76

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Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA0971SW	HA0973SW	HA0977SW	HA0978SW	HA0979SW
Date	11/11/88	11/11/88	11/15/88	11/15/88	11/15/88
Analytes					
Semivolatiles					
Diisopropyl Methylphosphonate (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0	< 14.0
Dimethylmethyl Phosphonate	0.227	0.238	0.257	0.209	0.251
Dimethylmethyl Phosphonate (GCMS)	< 33.0	< 33.0	< 33.0	< 33.0	< 33.0
Dithiane	< 1.34	< 1.34	< 1.34	< 1.34	< 1.34
Dithiane (GCMS)	< 21.0	< 21.0	44.2	< 21.0	< 21.0
Endrin	NA	NA	NA	NA	NA
Endrin (GCMS)	< 8.00	< 8.00	< 8.00	< 8.00	< 8.00
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	< 0.0480	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0	< 21.0
Isodrin	< 0.0510	< 0.0510	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	< 3.70	< 3.70	< 3.70	< 3.70	< 3.70
Malathion	< 0.373	< 0.373	< 0.373	< 0.373	< 0.373
Malathion (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0	< 14.0
Parathion	< 0.647	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0	< 19.0
Pentachlorophenol (GCMS)	NA	NA	NA	NA	NA
Supona	R	R	R	R	R
Supona (GCMS)	< 9.30	< 9.30	< 9.30	< 9.30	< 9.30
Vapona	< 0.384	< 0.384	< 0.384	< 0.384	< 0.384

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
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Table C1 Surface-Water Investigative Analytical Data

Sample ID Date	HA0971SW 11/11/88	HA0973SW 11/11/88	HA0977SW 11/15/88	HA0978SW 11/15/88	HA0979SW 11/15/88
Analytes					
Semivolatiles					
Vapona (GCMS)	< 17.0	< 17.0	< 17.0	< 17.0	< 17.0
Volatiles					
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	< 0.760	< 0.760	< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Benzene	< 1.05	< 1.05	< 1.05	< 1.05	< 1.05
Benzene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Carbon Tetrachloride	< 0.990	< 0.990	< 0.990	< 0.990	< 0.990
Carbon Tetrachloride (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Chlorobenzene	< 0.820	< 0.820	< 0.820	< 0.820	< 0.820
Chlorobenzene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rejected.

Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA0971SW	HA0973SW	HA0977SW	HA0978SW	HA0979SW
Date	11/11/88	11/11/88	11/15/88	11/15/88	11/15/88
Analytes					
Volatiles					
Chloroform	< 0.500	< 0.500	< 0.500	0.599	< 0.500
Chloroform (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Dibromochloropropane	< 0.195	< 0.195	< 0.195	< 0.195	< 0.195
Dibromochloropropane (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0	< 19.0
Dimethyl Disulfide	< 0.550	< 0.550	< 0.550	< 0.550	< 0.550
Ethyl Benzene	< 1.37	< 1.37	< 1.37	< 1.37	< 1.37
Ethyl Benzene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
M-Xylene	< 1.32	< 1.32	< 1.32	< 1.32	< 1.32
M-Xylene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Methylene Chloride	< 7.40	< 7.40	< 7.40	< 7.40	< 7.40
Methylene Chloride (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	< 4.90	< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40	< 1.40	< 1.40	< 1.40	< 1.40
O,P-Xylene	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36
O,P-Xylene (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00
Tetrachloroethene	< 0.750	< 0.750	< 0.750	< 0.750	< 0.750
Tetrachloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Toluene	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47
Toluene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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Table C1 Surface-Water Investigative Analytical Data

Sample ID Date	HA0971SW 11/11/88	HA0973SW 11/11/88	HA0977SW 11/15/88	HA0978SW 11/15/88	HA0979SW 11/15/88
Analytes					
Volatiles					
Trichloroethene	< 0.560	< 0.560	< 0.560	< 0.560	< 0.560
Trichloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Vinyl Chloride (GCMS)	< 12.0	< 12.0	< 12.0	< 12.0	< 12.0

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA0980SW	HA1154SW	HA1156SW	HA1158SW	HA1160SW
Date	11/18/88	05/17/90	05/17/90	05/15/90	05/11/90
Analytes					
Metals/Anions/General Chem					
Arsenic	20.9	2.78	< 2.35	< 2.35	< 2.35
Cadmium	< 8.40	< 6.78	< 6.78	< 6.78	< 6.78
Calcium	40000	87700	55500	61200	58800
Chloride	200000	140000	40000	40000	38000
Chromium	< 24.0	< 16.8	< 16.8	< 16.8	< 16.8
Copper	< 26.0	< 18.8	< 18.8	< 18.8	< 18.8
Cyanide	< 5.00	R	R	R	R
Fluoride	4690	2330	976	1060	867
Lead	< 74.0	< 43.4	< 43.4	< 43.4	< 43.4
Magnesium	20600	44700	12500	13800	13200
Mercury	< 0.100	0.393	0.508	0.303	0.321
Nitrite, Nitrate -- Non-Specific	108	< 10.0	1800	1800	2000
Potassium	5230	4330	4210	4220	3620
Sodium	220000	210000	49700	50500	45100
Sulfate	3900	360000	130000	110000	100000
Total Organic Carbon	NA	7470	5190	3620	4800
Zinc	< 22.0	< 18.0	< 18.0	< 18.0	< 18.0
Phenols					
2,3,6-Trichlorophenol (GCMS)	NA	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	NA	< 2.80	< 2.80	< 2.80	< 2.80

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej[illegible]

Table C1 Surface-Water Investigative Analytical Data

Sample ID Date	HA0980SW 11/18/88	HA1154SW 05/17/90	HA1156SW 05/17/90	HA1158SW 05/15/90	HA1160SW 05/11/90
Analytes					
Phenols					
2,4,6-Trichlorophenol (GCMS)	NA	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	NA	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	NA	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	NA	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	NA	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	NA	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	NA	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	NA	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	NA	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	NA	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	NA	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles					
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	NA	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.490	< 0.0490	< 0.0490	0.184	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.540	< 0.0540	< 0.0540	0.389	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	NA	< 10.0	< 10.0	< 10.0	< 10.0

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Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA0980SW	HA1154SW	HA1156SW	HA1158SW	HA1160SW
Date	11/18/88	05/17/90	05/17/90	05/15/90	05/11/90
Analytes					
Semivolatiles					
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	NA	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	< 0.500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Aldrin (GCMS)	NA	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	6.80	< 4.03	< 4.03	< 4.03
Atrazine (GCMS)	NA	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	NA	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	NA	22.0	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	NA	< 10.0	< 10.0	< 10.0	< 10.0
Chlordane	< 0.950	0.388	< 0.0950	< 0.0950	< 0.0950
Chlordane (GCMS)	NA	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	NA	R	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	NA	7.43	< 5.50	< 5.50	< 5.50
Dieldrin	< 0.500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Dieldrin (GCMS)	NA	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	13.1	59.0	2.91	0.532	< 0.392

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Table C1 Surface-Water Investigative Analytical Data

Sample ID / Date	HA0980SW 11/18/88	HA1154SW 05/17/90	HA1156SW 05/17/90	HA1158SW 05/15/90	HA1160SW 05/11/90
Analytes					
Semivolatiles					
Diisopropyl Methylphosphonate (GCMS)	NA	39.6	< 21.0	< 21.0	< 21.0
Dimethylmethyl Phosphonate	4.92	< 0.188	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	NA	< 130	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34	< 1.34	< 1.34
Dithiane (GCMS)	NA	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	< 0.500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Endrin (GCMS)	NA	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.480	< 0.0480	< 0.0480	< 0.0480	R
Hexachlorocyclopentadiene (GCMS)	NA	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	< 0.510	< 0.0510	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	NA	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373	< 0.373	< 0.373
Malathion (GCMS)	NA	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	NA	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	NA	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	NA	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384	< 0.384

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Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA0980SW	HA1154SW	HA1156SW	HA1158SW	HA1160SW
Date	11/18/88	05/17/90	05/17/90	05/15/90	05/11/90
Analytes					
Semivolatiles					
Vapona (GCMS)	NA	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles					
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	< 0.760	< 0.760	< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Benzene	< 1.05	< 1.05	< 1.05	< 1.05	< 1.05
Benzene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Carbon Tetrachloride	< 0.990	< 0.990	< 0.990	< 0.990	< 0.990
Carbon Tetrachloride (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Chlorobenzene	< 0.820	< 0.820	< 0.820	< 0.820	< 0.820
Chlorobenzene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00

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Table C1 Surface-Water Investigative Analytical Data

Sample ID / Date	HA0980SW 11/18/88	HA1154SW 05/17/90	HA1156SW 05/17/90	HA1158SW 05/15/90	HA1160SW 05/11/90
Analytes					
Volatiles					
Chloroform	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500
Chloroform (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Dibromochloropropane	< 0.195	< 0.195	< 0.195	< 0.195	< 0.195
Dibromochloropropane (GCMS)	NA	< 12.0	< 12.0	< 12.0	< 12.0
Dimethyl Disulfide	< 0.550	< 0.550	< 0.550	< 0.550	< 0.550
Ethyl Benzene	< 1.37	< 1.37	< 1.37	< 1.37	< 1.37
Ethyl Benzene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
M-Xylene	< 1.32	< 1.32	< 1.32	< 1.32	< 1.32
M-Xylene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Methylene Chloride	< 7.40	< 7.40	< 7.40	< 7.40	< 7.40
Methylene Chloride (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Methylisobutyl Ketone	NA	< 4.90	< 4.90	< 4.90	R
Methylisobutyl Ketone (GCMS)	< 1.40	< 1.40	< 1.40	< 1.40	< 1.40
O,P-Xylene	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36
O,P-Xylene (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00
Tetrachloroethene	< 0.750	< 0.750	< 0.750	< 0.750	< 0.750
Tetrachloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Toluene	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47
Toluene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00

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Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA0980SW	HA1154SW	HA1156SW	HA1158SW	HA1160SW
Date	11/18/88	05/17/90	05/17/90	05/15/90	05/11/90
Analytes					
Volatiles					
Trichloroethene	< 0.560	< 0.560	< 0.560	< 0.560	< 0.560
Trichloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Vinyl Chloride (GCMS)	< 12.0	< 12.0	< 12.0	< 12.0	< 12.0

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Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA1161SW	HA1178SW	HA1179SW	HA1185SW	HA1196SW
Date	05/15/90	05/15/90	05/15/90	05/10/90	06/01/90
Analytes					
Metals/Anions/General Chem					
Arsenic	< 2.35	< 2.35	< 2.35	< 2.35	2.82
Cadmium	< 6.78	< 6.78	< 6.78	< 6.78	< 6.78
Calcium	63500	62000	61800	67200	57600
Chloride	41000	42000	40000	54000	57000
Chromium	< 16.8	< 16.8	< 16.8	< 16.8	< 16.8
Copper	< 18.8	< 18.8	< 18.8	< 18.8	< 18.8
Cyanide	R	R	R	R	R
Fluoride	1130	1070	1090	1020	905
Lead	< 43.4	< 43.4	< 43.4	< 43.4	< 43.4
Magnesium	14000	13600	13500	15100	12400
Mercury	0.297	0.230	0.557	0.315	< 0.100
Nitrite, Nitrate -- Non-Specific	1900	2000	1900	1800	2300
Potassium	3970	3990	4860	5310	3640
Sodium	52000	48600	49500	73000	52400
Sulfate	110000	110000	110000	120000	130000
Total Organic Carbon	2670	3970	3920	7700	5000
Zinc	< 18.0	< 18.0	< 18.0	< 18.0	< 18.0
Phenols					
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70	< 1.70	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80	< 2.80

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Table C1 Surface-Water Investigative Analytical Data

Sample ID Date	HA1161SW 05/15/90	HA1178SW 05/15/90	HA1179SW 05/15/90	HA1185SW 05/10/90	HA1196SW 06/01/90
Analytes					
Phenols					
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40	< 8.40	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40	< 4.40	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176	< 176	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60	< 3.60	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20	< 8.20	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80	< 2.80	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0	< 96.0	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20	< 2.20	< 2.20	< 2.20
Semivolatiles					
1,4-Oxathiane	< 2.38	< 2.38	< 2.38	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0	< 27.0	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490	< 0.0490	< 0.0490	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540	< 0.0540	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0	< 14.0	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69	< 5.69	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0

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Table C1 Surface-Water Investigative Analytical Data

Sample ID Date	HA1161SW 05/15/90	HA1178SW 05/15/90	HA1179SW 05/15/90	HA1185SW 05/10/90	HA1196SW 06/01/90
Analytes					
Semivolatiles					
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46	< 7.46	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30	< 5.30	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5	< 11.5	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0
Aldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500	R
Aldrin (GCMS)	< 13.0	< 13.0	< 13.0	< 13.0	< 13.0
Atrazine	< 4.03	< 4.03	< 4.03	< 4.03	4.13
Atrazine (GCMS)	< 5.90	< 5.90	< 5.90	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90	< 5.90	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70	< 7.70	< 7.70	< 7.70
Caprolactam (GCMS)	< 10.0	< 10.0	< 10.0	< 10.0	< 7.70
Chlordane	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950
Chlordane (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50	< 5.50	< 5.50	< 5.50
Dieldrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0	< 26.0	< 26.0	< 26.0
Diisopropyl Methylphosphonate	0.840	1.11	1.33	< 0.392	< 0.392

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Table C1 Surface-Water Investigative Analytical Data

Sample ID / Date	HA1161SW 05/15/90	HA1178SW 05/15/90	HA1179SW 05/15/90	HA1185SW 05/10/90	HA1196SW 06/01/90
Analytes					
Semivolatiles					
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	< 0.188	< 0.188	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130	< 130	< 130	< 130
Dithiane	< 1.34	< 1.34	< 1.34	< 1.34	< 1.34
Dithiane (GCMS)	< 3.30	< 3.30	< 3.30	< 3.30	< 3.30
Endrin	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0	< 18.0	< 18.0	< 18.0
Hexachlorocyclopentadiene	< 0.0480	< 0.0480	< 0.0480	R	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0	< 54.0	< 54.0	< 54.0
Isodrin	< 0.0510	< 0.0510	< 0.0510	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80	< 7.80	< 7.80	< 7.80
Malathion	< 0.373	< 0.373	< 0.373	< 0.373	< 0.373
Malathion (GCMS)	< 21.0	< 21.0	< 21.0	< 21.0	< 21.0
Parathion	< 0.647	< 0.647	< 0.647	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0	< 37.0	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10	< 9.10	< 9.10	< 9.10
Supona	< 0.787	< 0.787	< 0.787	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0	< 19.0	< 19.0	< 19.0
Vapona	< 0.384	< 0.384	< 0.384	< 0.384	< 0.384

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were re[illegible].

Table C1 Surface-Water Investigative Analytical Data

Sample ID Date	HA1161SW 05/15/90	HA1178SW 05/15/90	HA1179SW 05/15/90	HA1185SW 05/10/90	HA1196SW 06/01/90
Analytes					
Semivolatiles					
Vapona (GCMS)	< 8.50	< 8.50	< 8.50	< 8.50	< 8.50
Volatiles					
1,1,1-Trichloroethane	< 0.760	< 0.760	< 0.760	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1,2-Trichloroethane	< 0.780	< 0.780	< 0.780	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethane	< 0.730	< 0.730	< 0.730	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethene	< 1.70	< 1.70	< 1.70	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethane	< 1.10	< 1.10	< 1.10	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760	< 0.760	< 0.760	< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Benzene	< 1.05	< 1.05	< 1.05	< 1.05	< 1.05
Benzene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Carbon Tetrachloride	< 0.990	< 0.990	< 0.990	< 0.990	< 0.990
Carbon Tetrachloride (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Chlorobenzene	< 0.820	< 0.820	< 0.820	< 0.820	< 0.820
Chlorobenzene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA1161SW	HA1178SW	HA1179SW	HA1185SW	HA1196SW
Date	05/15/90	05/15/90	05/15/90	05/10/90	06/01/90
Analytes					
Volatiles					
Chloroform	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500
Chloroform (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Dibromochloropropane	< 0.195	< 0.195	< 0.195	< 0.195	< 0.195
Dibromochloropropane (GCMS)	< 12.0	< 12.0	< 12.0	< 12.0	< 12.0
Dimethyl Disulfide	< 0.550	< 0.550	< 0.550	< 0.550	< 0.550
Ethyl Benzene	< 1.37	< 1.37	< 1.37	< 1.37	< 1.37
Ethyl Benzene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
M-Xylene	< 1.32	< 1.32	< 1.32	< 1.32	< 1.32
M-Xylene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Methylene Chloride	< 7.40	< 7.40	< 7.40	< 7.40	< 7.40
Methylene Chloride (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Methylisobutyl Ketone	< 4.90	< 4.90	< 4.90	R	< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40	< 1.40	< 1.40	< 1.40	< 1.40
O,P-Xylene	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36
O,P-Xylene (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00
Tetrachloroethene	< 0.750	< 0.750	< 0.750	< 0.750	< 0.750
Tetrachloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Toluene	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47
Toluene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
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Table C1 Surface-Water Investigative Analytical Data

Sample ID Date	HA1161SW 05/15/90	HA1178SW 05/15/90	HA1179SW 05/15/90	HA1185SW 05/10/90	HA1196SW 06/01/90
Analytes					
Volatiles					
Trichloroethene	< 0.560	< 0.560	< 0.560	< 0.560	< 0.560
Trichloroethene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Vinyl Chloride (GCMS)	< 12.0	< 12.0	< 12.0	< 12.0	< 12.0

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA1197SW
Date	06/01/90
Analytes	
Metals/Anions/General Chem	
Arsenic	2.82
Cadmium	< 6.78
Calcium	59300
Chloride	56000
Chromium	< 16.8
Copper	< 18.8
Cyanide	R
Fluoride	906
Lead	< 43.4
Magnesium	12600
Mercury	< 0.100
Nitrite, Nitrate -- Non-Specific	2300
Potassium	3660
Sodium	54000
Sulfate	130000
Total Organic Carbon	5000
Zinc	< 18.0
Phenols	
2,3,6-Trichlorophenol (GCMS)	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80

Notes: Values are reported in micrograms per liter.
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R -- Data did not meet quality control criteria and were rej

Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA1197SW
Date	06/01/90
Analytes	
Phenols	
2,4,6-Trichlorophenol (GCMS)	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40
2,4-Dinitrophenol (GCMS)	< 176
2-Chlorophenol (GCMS)	< 2.80
2-Methylphenol (GCMS)	< 3.60
2-Nitrophenol (GCMS)	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50
4-Methylphenol (GCMS)	< 2.80
4-Nitrophenol (GCMS)	< 96.0
Phenol (GCMS)	< 2.20
Semivolatiles	
1,4-Oxathiane	< 2.38
1,4-Oxathiane (GCMS)	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
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Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA1197SW
Date	06/01/90
Analytes	
Semivolatiles	
4-Chlorophenylmethyl Sulfone	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0
Aldrin	R
Aldrin (GCMS)	< 13.0
Atrazine	< 4.03
Atrazine (GCMS)	< 5.90
Benzothiazole	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70
Caprolactam (GCMS)	< 10.0
Chlordane	< 0.0950
Chlordane (GCMS)	< 37.0
Dicyclopentadiene	< 5.00
Dicyclopentadiene (GCMS)	< 5.50
Dieldrin	< 0.0500
Dieldrin (GCMS)	< 26.0
Diisopropyl Methylphosphonate	< 0.392

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Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA1197SW
Date	06/01/90
Analytes	
Semivolatiles	
Diisopropyl Methylphosphonate (GCMS)	< 21.0
Dimethylmethyl Phosphonate	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130
Dithiane	< 1.34
Dithiane (GCMS)	< 3.30
Endrin	< 0.0500
Endrin (GCMS)	< 18.0
Hexachlorocyclopentadiene	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0
Isodrin	< 0.0510
Isodrin (GCMS)	< 7.80
Malathion	< 0.373
Malathion (GCMS)	< 21.0
Parathion	< 0.647
Parathion (GCMS)	< 37.0
Pentachlorophenol (GCMS)	< 9.10
Supona	< 0.787
Supona (GCMS)	< 19.0
Vapona	< 0.384

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Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA1197SW
Date	06/01/90
Analytes	
Semivolatiles	
Vapona (GCMS)	< 8.50
Volatiles	
1,1,1-Trichloroethane	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00
1,1,2-Trichloroethane	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00
1,1-Dichloroethane	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00
1,1-Dichloroethene	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00
1,2-Dichloroethane	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00
1,2-Dichloroethenes (cis & trans)	< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00
Benzene	< 1.05
Benzene (GCMS)	< 1.00
Carbon Tetrachloride	< 0.990
Carbon Tetrachloride (GCMS)	< 1.00
Chlorobenzene	< 0.820
Chlorobenzene (GCMS)	< 1.00

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
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Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA1197SW
Date	06/01/90
Analytes	
Volatiles	
Chloroform	< 0.500
Chloroform (GCMS)	< 1.00
Dibromochloropropane	< 0.195
Dibromochloropropane (GCMS)	< 12.0
Dimethyl Disulfide	< 0.550
Ethyl Benzene	< 1.37
Ethyl Benzene (GCMS)	< 1.00
M-Xylene	< 1.32
M-Xylene (GCMS)	< 1.00
Methylene Chloride	< 7.40
Methylene Chloride (GCMS)	< 1.00
Methylisobutyl Ketone	< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40
O,P-Xylene	< 1.36
O,P-Xylene (GCMS)	< 2.00
Tetrachloroethene	< 0.750
Tetrachloroethene (GCMS)	< 1.00
Toluene	< 1.47
Toluene (GCMS)	< 1.00

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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table C1 Surface-Water Investigative Analytical Data

Sample ID	HA1197SW
Date	06/01/90
Analytes	
Volatiles	
Trichloroethene	< 0.560
Trichloroethene (GCMS)	< 1.00
Vinyl Chloride (GCMS)	< 12.0

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were re[illegible]l.

Table C2 Surface-Water GC/MS Analytical Data

Sample ID	HA1190SW	HA1191SW
Date	05/10/90	06/01/90
	GC/MS OF	GC/MS OF
	HA1185SW	HA1196SW
Analytes		
Phenols		
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20
Semivolatiles		
1,4-Oxathiane (GCMS)	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table C2 Surface-Water GC/MS Analytical Data

Sample ID Date Analytes	HA1190SW 05/10/90 GC/MS OF HA1185SW	HA1191SW 06/01/90 GC/MS OF HA1196SW
Semivolatiles		
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0
Aldrin (GCMS)	< 13.0	< 13.0
Atrazine (GCMS)	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70
Caprolactam (GCMS)	< 10.0	< 10.0
Chlordane (GCMS)	< 37.0	< 37.0
Dicyclopentadiene (GCMS)	< 5.50	< 5.50
Dieldrin (GCMS)	< 26.0	< 26.0
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130
Dithiane (GCMS)	< 3.30	< 3.30
Endrin (GCMS)	< 18.0	< 18.0
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0
Isodrin (GCMS)	< 7.80	< 7.80
Malathion (GCMS)	< 21.0	< 21.0
Parathion (GCMS)	< 37.0	< 37.0

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table C2 Surface-Water GC/MS Analytical Data

Sample ID	HA1190SW	HA1191SW
Date	05/10/90	06/01/90
	GC/MS OF	GC/MS OF
	HA1185SW	HA1196SW
Analytes		
Semivolatiles		
Pentachlorophenol (GCMS)	< 9.10	< 9.10
Supona (GCMS)	< 19.0	< 19.0
Vapona (GCMS)	< 8.50	< 8.50
Volatiles		
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	< 5.00
Benzene (GCMS)	< 1.00	< 1.00
Carbon Tetrachloride (GCMS)	< 1.00	< 1.00
Chlorobenzene (GCMS)	< 1.00	< 1.00
Chloroform (GCMS)	< 1.00	< 1.00
Dibromochloropropane (GCMS)	< 12.0	< 12.0
Ethyl Benzene (GCMS)	< 1.00	< 1.00
M-Xylene (GCMS)	< 1.00	< 1.00
Methylene Chloride (GCMS)	< 1.00	< 1.00

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table C2 Surface-Water GC/MS Analytical Data

Sample ID	HA1190SW	HA1191SW
Date	05/10/90	06/01/90
	GC/MS OF	GC/MS OF
	HA1185SW	HA1196SW
Analytes		
Volatiles		
Methylisobutyl Ketone (GCMS)	< 1.40	< 1.40
O,P-Xylene (GCMS)	< 2.00	< 2.00
Tetrachloroethene (GCMS)	< 1.00	< 1.00
Toluene (GCMS)	< 1.00	< 1.00
Trichloroethene (GCMS)	< 1.00	< 1.00
Vinyl Chloride (GCMS)	< 12.0	< 12.0

Notes: Values are reported in micrograms per liter.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were re[illegible].

Table C3 Surface-Water Duplicate Analytical Data

Sample ID	HA1189SW	HA1162SW
Date	05/10/90	06/01/90
	Dup of HA1185SW	Dup of HA1196SW
Analytes		
Metals/Anions/General Chem		
Arsenic	< 2.35	< 2.35
Cadmium	< 6.78	< 6.78
Calcium	63000	58700
Chloride	49000	54000
Chromium	< 16.8	< 16.8
Copper	< 18.8	< 18.8
Cyanide	R	R
Fluoride	1030	907
Lead	< 43.4	< 43.4
Magnesium	14000	12600
Mercury	0.538	< 0.100
Nitrite, Nitrate -- Non-Specific	1800	2200
Potassium	4670	4430
Sodium	62000	53000
Sulfate	130000	130000
Total Organic Carbon	9800	5000
Zinc	< 18.0	< 18.0

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table C3 Surface-Water Duplicate Analytical Data

Sample ID	HA1189SW	HA1162SW
Date	05/10/90	06/01/90
	Dup of HA1185SW	Dup of HA1196SW
Analytes		
Phenols		
2,3,6-Trichlorophenol (GCMS)	< 1.70	< 1.70
2,4,5-Trichlorophenol (GCMS)	< 2.80	< 2.80
2,4,6-Trichlorophenol (GCMS)	< 3.60	< 3.60
2,4-Dichlorophenol (GCMS)	< 8.40	< 8.40
2,4-Dimethylphenol (GCMS)	< 4.40	< 4.40
2,4-Dinitrophenol (GCMS)	< 176	< 176
2-Chlorophenol (GCMS)	< 2.80	< 2.80
2-Methylphenol (GCMS)	< 3.60	< 3.60
2-Nitrophenol (GCMS)	< 8.20	< 8.20
3-Methyl-4-Chlorophenol (GCMS)	< 8.50	< 8.50
4-Methylphenol (GCMS)	< 2.80	< 2.80
4-Nitrophenol (GCMS)	< 96.0	< 96.0
Phenol (GCMS)	< 2.20	< 2.20
Semivolatiles		
1,4-Oxathiane	< 2.38	< 2.38
1,4-Oxathiane (GCMS)	< 27.0	< 27.0
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0490	< 0.0490
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 18.0	< 18.0

Notes: Values are reported in micrograms per liter.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table C3 Surface-Water Duplicate Analytical Data

Sample ID	HA1189SW	HA1162SW
Date	05/10/90	06/01/90
	Dup of HA1185SW	Dup of HA1196SW
Analytes		
Semivolatiles		
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0540	< 0.0540
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 14.0	< 14.0
4-Chlorophenylmethyl Sulfide	< 5.69	< 5.69
4-Chlorophenylmethyl Sulfide (GCMS)	< 10.0	< 10.0
4-Chlorophenylmethyl Sulfone	< 7.46	< 7.46
4-Chlorophenylmethyl Sulfone (GCMS)	< 5.30	< 5.30
4-Chlorophenylmethyl Sulfoxide	< 11.5	< 11.5
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 15.0	< 15.0
Aldrin	< 0.0500	R
Aldrin (GCMS)	< 13.0	< 13.0
Atrazine	< 4.03	4.58
Atrazine (GCMS)	< 5.90	< 5.90
Benzothiazole	< 5.00	< 5.00
Bicyclo [2,2,1] hepta-2,5-diene	< 5.90	< 5.90
Bis (2-Ethylhexyl) Phthalate (GCMS)	< 7.70	< 7.70
Caprolactam (GCMS)	< 10.0	< 10.0
Chlordane	< 0.0950	< 0.0950

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Table C3 Surface-Water Duplicate Analytical Data

Sample ID	HA1189SW	HA1162SW
Date	05/10/90	06/01/90
	Dup of HA1185SW	Dup of HA1196SW
Analytes		
Semivolatiles		
Chlordane (GCMS)	< 37.0	< 37.0
Dicyclopentadiene	< 5.00	< 5.00
Dicyclopentadiene (GCMS)	< 5.50	< 5.50
Dieldrin	< 0.0500	< 0.0500
Dieldrin (GCMS)	< 26.0	< 26.0
Diisopropyl Methylphosphonate	< 0.392	< 0.392
Diisopropyl Methylphosphonate (GCMS)	< 21.0	< 21.0
Dimethylmethyl Phosphonate	< 0.188	< 0.188
Dimethylmethyl Phosphonate (GCMS)	< 130	< 130
Dithiane	< 1.34	< 1.34
Dithiane (GCMS)	< 3.30	< 3.30
Endrin	< 0.0500	< 0.0500
Endrin (GCMS)	< 18.0	< 18.0
Hexachlorocyclopentadiene	R	< 0.0480
Hexachlorocyclopentadiene (GCMS)	< 54.0	< 54.0
Isodrin	< 0.0510	< 0.0510
Isodrin (GCMS)	< 7.80	< 7.80

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R -- Data did not meet quality control criteria and were rejected.

Table C3 Surface-Water Duplicate Analytical Data

Sample ID	HA1189SW	HA1162SW
Date	05/10/90	06/01/90
	Dup of HA1185SW	Dup of HA1196SW
Analytes		
Semivolatiles		
Malathion	< 0.373	< 0.373
Malathion (GCMS)	< 21.0	< 21.0
Parathion	< 0.647	< 0.647
Parathion (GCMS)	< 37.0	< 37.0
Pentachlorophenol (GCMS)	< 9.10	< 9.10
Supona	< 0.787	< 0.787
Supona (GCMS)	< 19.0	< 19.0
Vapona	< 0.384	< 0.384
Vapona (GCMS)	< 8.50	< 8.50
Volatiles		
1,1,1-Trichloroethane	< 0.760	< 0.760
1,1,1-Trichloroethane (GCMS)	< 1.00	< 1.00
1,1,2-Trichloroethane	< 0.780	< 0.780
1,1,2-Trichloroethane (GCMS)	< 1.00	< 1.00
1,1-Dichloroethane	< 0.730	< 0.730
1,1-Dichloroethane (GCMS)	< 1.00	< 1.00
1,1-Dichloroethene	< 1.70	< 1.70
1,1-Dichloroethene (GCMS)	< 1.00	< 1.00

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Table C3 Surface-Water Duplicate Analytical Data

Sample ID	HA1189SW	HA1162SW
Date	05/10/90	06/01/90
	Dup of HA1185SW	Dup of HA1196SW
Analytes		
Volatiles		
1,2-Dichloroethane	< 1.10	< 1.10
1,2-Dichloroethane (GCMS)	< 1.00	< 1.00
1,2-Dichloroethenes (cis & trans)	< 0.760	< 0.760
1,2-Dichloroethenes (cis & trans) (GCMS)	< 5.00	< 5.00
Benzene	< 1.05	< 1.05
Benzene (GCMS)	< 1.00	< 1.00
Carbon Tetrachloride	< 0.990	< 0.990
Carbon Tetrachloride (GCMS)	< 1.00	< 1.00
Chlorobenzene	< 0.820	< 0.820
Chlorobenzene (GCMS)	< 1.00	< 1.00
Chloroform	< 0.500	< 0.500
Chloroform (GCMS)	< 1.00	< 1.00
Dibromochloropropane	< 0.195	< 0.195
Dibromochloropropane (GCMS)	< 12.0	< 12.0
Dimethyl Disulfide	< 0.550	< 0.550
Ethyl Benzene	< 1.37	< 1.37
Ethyl Benzene (GCMS)	< 1.00	< 1.00

Notes: Values are reported in micrograms per liter.
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Table C3 Surface-Water Duplicate Analytical Data

Sample ID	HA1189SW	HA1162SW
Date	05/10/90	06/01/90
	Dup of HA1185SW	Dup of HA1196SW
Analytes		
Volatiles		
M-Xylene	< 1.32	< 1.32
M-Xylene (GCMS)	< 1.00	< 1.00
Methylene Chloride	< 7.40	< 7.40
Methylene Chloride (GCMS)	< 1.00	< 1.00
Methylisobutyl Ketone	R	< 4.90
Methylisobutyl Ketone (GCMS)	< 1.40	< 1.40
O,P-Xylene	< 1.36	< 1.36
O,P-Xylene (GCMS)	< 2.00	< 2.00
Tetrachloroethene	< 0.750	< 0.750
Tetrachloroethene (GCMS)	< 1.00	< 1.00
Toluene	< 1.47	< 1.47
Toluene (GCMS)	< 1.00	< 1.00
Trichloroethene	< 0.560	< 0.560
Trichloroethene (GCMS)	< 1.00	< 1.00
Vinyl Chloride (GCMS)	< 12.0	< 12.0

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Table C3 Surface-Water Duplicate Analytical Data

Sample ID	HA1189SW	HA1162SW
Date	05/10/90	06/01/90
	Dup of HA1185SW	Dup of HA1196SW
Analytes		

Notes: Values are reported in micrograms per liter.
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Appendix D

STREAM-BOTTOM SEDIMENT ANALYTICAL DATA

LIST OF TABLES

Table No.

Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID Depth Date Analytes	HA0972SE 5 cm 11/11/88	HA0974SE 15 cm 11/14/88	HA0975SE 15 cm 11/14/88	HA0976SE 15 cm 11/14/88
Metals/Anions/General Chem				
Arsenic	7.17	3.70	3.27	2.48
Cadmium	< 0.740	0.926	< 0.740	< 0.740
Chromium	< 6.50	9.93	< 6.50	< 6.50
Copper	< 4.70	10.1	6.16	< 4.70
Cyanide	NA	NA	NA	NA
Lead	< 8.40	24.4	< 8.40	< 8.40
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Total Organic Carbon	NA	NA	NA	NA
Zinc	11.8	45.9	26.3	< 8.70
Semivolatiles				
1,4-Oxathiane	< 1.74	< 1.74	< 1.74	< 1.74
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00200	0.0222	< 0.00200	< 0.00200
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00240	< 0.00240	< 0.00240	< 0.00240
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
4-Chlorophenylmethyl Sulfide	< 4.40	< 4.40	< 4.40	< 4.40
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID Depth Date Analytes	HA0972SE 5 cm 11/11/88	HA0974SE 15 cm 11/14/88	HA0975SE 15 cm 11/14/88	HA0976SE 15 cm 11/14/88
Semivolatiles				
4-Chlorophenylmethyl Sulfone	< 9.01	< 9.01	< 9.01	< 9.01
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
4-Chlorophenylmethyl Sulfoxide	< 4.81	< 4.81	< 4.81	< 4.81
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Aldrin	< 0.00190	0.00391	0.0120	< 0.00190
Aldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Atrazine	NA	NA	NA	NA
Atrazine (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Benzothiazole	< 2.04	< 2.04	< 2.04	< 2.04
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	< 0.360	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00
Dicyclopentadiene	NA	NA	NA	NA
Dicyclopentadiene (GCMS)	< 0.640	< 1.00	< 1.00	< 1.00
Dieldrin	0.370	0.0277	0.0264	< 0.00330
Dieldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA0972SE	HA0974SE	HA0975SE	HA0976SE
Depth	5 cm	15 cm	15 cm	15 cm
Date	11/11/88	11/14/88	11/14/88	11/14/88
Analytes				
Semivolatiles				
Diisopropyl Methylphosphonate	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dimethylmethyl Phosphonate	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Dithiane	< 1.45	< 1.45	< 1.45	< 1.45
Dithiane (GCMS)	< 0.400	< 0.400	< 0.400	< 0.400
Endrin	< 0.00580	< 0.00580	0.00743	< 0.00580
Endrin (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500
Hexachlorocyclopentadiene	< 0.00180	< 0.00180	< 0.00180	< 0.00180
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Isodrin	< 0.00110	< 0.00110	< 0.00110	< 0.00110
Isodrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Malathion	NA	NA	NA	NA
Malathion (GCMS)	< 0.700	< 0.700	< 0.700	< 0.700
Parathion	NA	NA	NA	NA
Parathion (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
Supona	NA	NA	NA	NA
Supona (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA0972SE	HA0974SE	HA0975SE	HA0976SE
Depth	5 cm	15 cm	15 cm	15 cm
Date	11/11/88	11/14/88	11/14/88	11/14/88
Analytes				
Semivolatiles				
Vapona	NA	NA	NA	NA
Vapona (GCMS)	< 3.00	< 3.00	< 3.00	< 3.00
Volatiles				
1,1,1-Trichloroethane	< 0.0880	< 0.0880	< 0.0880	< 0.0880
1,1,1-Trichloroethane (GCMS)	< 0.430	NA	NA	NA
1,1,2-Trichloroethane	< 0.260	< 0.260	< 0.260	< 0.260
1,1,2-Trichloroethane (GCMS)	< 0.390	NA	NA	NA
1,1-Dichloroethane	< 0.0740	< 0.0740	< 0.0740	< 0.0740
1,1-Dichloroethane (GCMS)	< 1.70	NA	NA	NA
1,1-Dichloroethene	< 0.240	< 0.240	< 0.240	< 0.240
1,2-Dichloroethane	< 0.0850	< 0.0850	< 0.0850	< 0.0850
1,2-Dichloroethane (GCMS)	< 0.560	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	< 0.260	< 0.260	< 0.260	< 0.260
1,2-Dichloroethenes (cis & trans) (GCMS)	< 1.70	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	< 0.250	NA	NA	NA
Carbon Tetrachloride	< 0.120	< 0.120	< 0.120	< 0.120
Carbon Tetrachloride (GCMS)	< 0.250	NA	NA	NA

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA0972SE	HA0974SE	HA0975SE	HA0976SE
Depth	5 cm	15 cm	15 cm	15 cm
Date	11/11/88	11/14/88	11/14/88	11/14/88
Analytes				
Volatiles				
Chlorobenzene	< 0.200	< 0.200	< 0.200	< 0.200
Chlorobenzene (GCMS)	< 1.50	NA	NA	NA
Chloroform	< 0.0680	< 0.0680	< 0.0680	< 0.0680
Chloroform (GCMS)	< 0.290	NA	NA	NA
Dibromochloropropane	< 0.00500	< 0.00500	< 0.00500	< 0.00500
Dibromochloropropane (GCMS)	< 2.40	< 0.300	< 0.300	< 0.300
Dimethyl Disulfide	< 3.12	< 3.12	< 3.12	< 3.12
Dimethyl Disulfide (GCMS)	< 20.0	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	< 0.380	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	< 0.740	NA	NA	NA
Methylene Chloride	< 3.70	< 3.70	< 3.70	< 3.70
Methylene Chloride (GCMS)	< 1.50	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	< 0.730	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA0972SE	HA0974SE	HA0975SE	HA0976SE
Depth	5 cm	15 cm	15 cm	15 cm
Date	11/11/88	11/14/88	11/14/88	11/14/88
Analytes				
Volatiles				
O,P-Xylene (GCMS)	< 4.90	NA	NA	NA
Tetrachloroethene	< 0.270	< 0.270	< 0.270	< 0.270
Tetrachloroethene (GCMS)	< 0.250	NA	NA	NA
Toluene	NA	NA	NA	NA
Toluene (GCMS)	< 0.250	NA	NA	NA
Trichloroethene	< 0.140	< 0.140	< 0.140	< 0.140
Trichloroethene (GCMS)	< 0.540	NA	NA	NA
Vinyl Chloride	NA	NA	NA	NA

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID Depth Date Analytes	HA0981SE 0 cm 11/18/88	HA1152SE 60 cm 05/11/90	HA1153SE 15 cm 05/11/90	HA1155SE 50 cm 05/14/90
Metals/Anions/General Chem				
Arsenic	< 2.50	6.59	< 2.50	< 2.50
Cadmium	< 0.740	4.35	< 1.20	< 1.20
Chromium	15.5	30.0	11.7	61.1
Copper	7.90	62.7	6.96	39.7
Cyanide	NA	R	R	R
Lead	16.1	131	< 7.44	117
Mercury	< 0.0500	1.01	< 0.0500	0.243
Total Organic Carbon	NA	13000	1010	7180
Zinc	43.6	414	30.7	245
Semivolatiles				
1,4-Oxathiane	< 1.74	< 1.74	< 1.74	< 1.74
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.0100	< 0.00277	< 0.00277	0.00672
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0120	< 0.00466	< 0.00466	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
4-Chlorophenylmethyl Sulfide	< 4.40	< 4.40	< 4.40	< 4.40
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA0981SE	HA1152SE	HA1153SE	HA1155SE
Depth	0 cm	60 cm	15 cm	50 cm
Date	11/18/88	05/11/90	05/11/90	05/14/90
Analytes				
Semivolatiles				
4-Chlorophenylmethyl Sulfone	< 9.01	< 9.01	< 9.01	< 9.01
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
4-Chlorophenylmethyl Sulfoxide	< 4.81	< 4.81	< 4.81	< 4.81
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Aldrin	0.0140	< 0.00211	< 0.00211	< 0.00211
Aldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Atrazine	NA	R	R	R
Atrazine (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Benzothiazole	< 2.04	< 2.04	< 2.04	< 2.04
Bicyclo [2,2,1] hepta-2,5-diene	NA	< 1.10	< 1.10	< 1.10
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.115	< 0.0230	< 0.0230	0.0374
Chlordane (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00
Dicyclopentadiene	NA	< 0.450	< 0.450	< 0.450
Dicyclopentadiene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dieldrin	0.0250	0.0126	< 0.00181	< 0.00181
Dieldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA0981SE	HA1152SE	HA1153SE	HA1155SE
Depth	0 cm	60 cm	15 cm	50 cm
Date	11/18/88	05/11/90	05/11/90	05/14/90
Analytes				
Semivolatiles				
Diisopropyl Methylphosphonate	NA	NA	NA	NA
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dimethylmethyl Phosphonate	NA	NA	NA	NA
Dithiane	< 1.45	< 1.45	< 1.45	< 1.45
Dithiane (GCMS)	< 0.400	< 0.400	< 0.400	< 0.400
Endrin	< 0.0290	< 0.00471	< 0.00471	< 0.00471
Endrin (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500
Hexachlorocyclopentadiene	< 0.00900	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Isodrin	< 0.00550	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Malathion	NA	R	R	R
Malathion (GCMS)	< 0.700	< 0.700	< 0.700	< 0.700
Parathion	NA	R	R	R
Parathion (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
Supona	NA	R	R	R
Supona (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA0981SE	HA1152SE	HA1153SE	HA1155SE
Depth	0 cm	60 cm	15 cm	50 cm
Date	11/18/88	05/11/90	05/11/90	05/14/90
Analytes				
Semivolatiles				
Vapona	NA	R	R	R
Vapona (GCMS)	< 3.00	< 3.00	< 3.00	< 3.00
Volatiles				
1,1,1-Trichloroethane	< 0.0880	< 0.200	< 0.200	< 0.200
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	< 0.260	< 0.330	< 0.330	< 0.330
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	< 0.0740	< 0.490	< 0.490	< 0.490
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	< 0.240	< 0.270	< 0.270	< 0.270
1,2-Dichloroethane	< 0.0850	< 0.320	< 0.320	< 0.320
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	< 0.260	< 0.320	< 0.320	< 0.320
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	< 0.0850	< 0.100	< 0.100	< 0.100
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	< 0.120	< 0.310	< 0.310	< 0.310
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA0981SE	HA1152SE	HA1153SE	HA1155SE
Depth	0 cm	60 cm	15 cm	50 cm
Date	11/18/88	05/11/90	05/11/90	05/14/90
Analytes				
Volatiles				
Chlorobenzene	< 0.200	< 0.100	< 0.100	< 0.100
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	< 0.0680	< 0.240	< 0.240	< 0.240
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	0.240	< 0.00500	0.00882	< 0.00500
Dibromochloropropane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Dimethyl Disulfide	< 3.12	< 3.12	< 3.12	< 3.12
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	< 0.160	< 0.190	< 0.190	< 0.190
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	< 0.260	< 0.230	< 0.230	< 0.230
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	< 3.70	< 4.40	< 4.40	< 4.40
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	< 0.640	< 0.640	< 0.640
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	< 0.390	< 0.780	< 0.780	< 0.780

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA0981SE	HA1152SE	HA1153SE	HA1155SE
Depth	0 cm	60 cm	15 cm	50 cm
Date	11/18/88	05/11/90	05/11/90	05/14/90
Analytes				
Volatiles				
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	< 0.270	< 0.160	< 0.160	< 0.160
Tetrachloroethene (GCMS)	NA	NA	NA	NA
Toluene	< 0.190	< 0.100	< 0.100	< 0.100
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	< 0.140	< 0.250	< 0.250	< 0.250
Trichloroethene (GCMS)	NA	NA	NA	NA
Vinyl Chloride	NA	< 1.80	< 1.80	< 1.80

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA1157SE	HA1157SE	HA1159SE	HA1159SE
Depth	30 cm	4 cm	15 cm	4 cm
Date	05/16/90	06/14/90	05/16/90	06/14/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	NA	3.26	NA
Cadmium	< 1.20	NA	< 1.20	NA
Chromium	77.8	NA	40.9	NA
Copper	14.4	NA	14.2	NA
Cyanide	R	NA	R	NA
Lead	25.2	NA	44.5	NA
Mercury	0.138	NA	0.0661	NA
Total Organic Carbon	4150	NA	2270	NA
Zinc	69.1	NA	123	NA
Semivolatiles				
1,4-Oxathiane	< 1.74	NA	< 1.74	NA
1,4-Oxathiane (GCMS)	< 0.300	NA	< 0.300	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	NA	0.00500	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	NA	< 0.500	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	NA	< 0.00466	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	NA	< 0.600	NA
4-Chlorophenylmethyl Sulfide	< 4.40	NA	< 4.40	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	NA	< 0.900	NA

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID Depth Date Analytes	HA1157SE 30 cm 05/16/90	HA1157SE 4 cm 06/14/90	HA1159SE 15 cm 05/16/90	HA1159SE 4 cm 06/14/90
Semivolatiles				
4-Chlorophenylmethyl Sulfone	< 9.01	NA	< 9.01	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	NA	< 0.300	NA
4-Chlorophenylmethyl Sulfoxide	< 4.81	NA	< 4.81	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	NA	< 0.300	NA
Aldrin	< 0.00211	NA	< 0.00211	NA
Aldrin (GCMS)	< 0.300	NA	< 0.300	NA
Atrazine	R	NA	R	NA
Atrazine (GCMS)	< 0.300	NA	< 0.300	NA
Benzothiazole	< 2.04	NA	< 2.04	NA
Bicyclo [2,2,1] hepta-2,5-diene	< 1.10	NA	< 1.10	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	NA	0.0733	NA
Chlordane (GCMS)	< 2.00	NA	< 2.00	NA
Dicyclopentadiene	< 0.450	NA	< 0.450	NA
Dicyclopentadiene (GCMS)	< 1.00	NA	< 1.00	NA
Dieldrin	< 0.00181	NA	0.00624	NA
Dieldrin (GCMS)	< 0.300	NA	< 0.300	NA

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA1157SE	HA1157SE	HA1159SE	HA1159SE
Depth	30 cm	4 cm	15 cm	4 cm
Date	05/16/90	06/14/90	05/16/90	06/14/90
Analytes				
Semivolatiles				
Diisopropyl Methylphosphonate	NA	NA	NA	NA
Diisopropyl Methylphosphonate (GCMS)	< 1.00	NA	< 1.00	NA
Dimethylmethyl Phosphonate	NA	NA	NA	NA
Dithiane	< 1.45	NA	< 1.45	NA
Dithiane (GCMS)	< 0.400	NA	< 0.400	NA
Endrin	< 0.00471	NA	< 0.00471	NA
Endrin (GCMS)	< 0.500	NA	< 0.500	NA
Hexachlorocyclopentadiene	< 0.00137	NA	< 0.00137	NA
Hexachlorocyclopentadiene (GCMS)	< 0.600	NA	< 0.600	NA
Isodrin	< 0.00188	NA	< 0.00188	NA
Isodrin (GCMS)	< 0.300	NA	< 0.300	NA
Malathion	R	NA	R	NA
Malathion (GCMS)	< 0.700	NA	< 0.700	NA
Parathion	R	NA	R	NA
Parathion (GCMS)	< 0.900	NA	< 0.900	NA
Supona	R	NA	R	NA
Supona (GCMS)	< 0.600	NA	< 0.600	NA

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA1157SE	HA1157SE	HA1159SE	HA1159SE
Depth	30 cm	4 cm	15 cm	4 cm
Date	05/16/90	06/14/90	05/16/90	06/14/90
Analytes				
Semivolatiles				
Vapona	R	NA	R	NA
Vapona (GCMS)	< 3.00	NA	< 3.00	NA
Volatiles				
1,1,1-Trichloroethane	< 0.200	< 0.200	< 0.200	< 0.200
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	< 0.330	< 0.330	< 0.330	< 0.330
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	< 0.490	< 0.490	< 0.490	< 0.490
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	< 0.270	< 0.270	< 0.270	< 0.270
1,2-Dichloroethane	< 0.320	< 0.320	< 0.320	< 0.320
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	< 0.320	< 0.320	< 0.320	< 0.320
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	< 0.100	< 0.100	< 0.100	< 0.100
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	< 0.310	< 0.310	< 0.310	< 0.310
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID Depth Date Analytes	HA1157SE 30 cm 05/16/90	HA1157SE 4 cm 06/14/90	HA1159SE 15 cm 05/16/90	HA1159SE 4 cm 06/14/90
Volatiles				
Chlorobenzene	< 0.100	< 0.100	< 0.100	< 0.100
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	< 0.240	< 0.240	< 0.240	< 0.240
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	< 0.00500	NA	< 0.00500	NA
Dibromochloropropane (GCMS)	< 0.300	NA	< 0.300	NA
Dimethyl Disulfide	< 3.12	NA	< 3.12	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	< 0.190	< 0.190	< 0.190	< 0.190
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	< 0.230	< 0.230	< 0.230	< 0.230
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	< 4.40	< 4.40	< 4.40	< 4.40
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	< 0.640	< 0.630	< 0.640	< 0.630
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	< 0.780	< 0.780	< 0.780	< 0.780

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA1157SE	HA1157SE	HA1159SE	HA1159SE
Depth	30 cm	4 cm	15 cm	4 cm
Date	05/16/90	06/14/90	05/16/90	06/14/90
Analytes				
Volatiles				
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	< 0.160	< 0.160	< 0.160	< 0.160
Tetrachloroethene (GCMS)	NA	NA	NA	NA
Toluene	< 0.100	< 0.100	< 0.100	< 0.100
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	< 0.250	< 0.250	< 0.250	< 0.250
Trichloroethene (GCMS)	NA	NA	NA	NA
Vinyl Chloride	< 1.80	< 1.80	< 1.80	< 1.80

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA1180SE	HA1181SE	HA1182SE	HA1182SE
Depth	60 cm	60 cm	60 cm	4 cm
Date	05/11/90	05/14/90	05/16/90	06/14/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	< 2.50	< 2.50	NA
Cadmium	< 1.20	1.73	< 1.20	NA
Chromium	47.5	80.3	26.1	NA
Copper	44.8	53.5	13.3	NA
Cyanide	R	R	R	NA
Lead	81.9	90.0	32.5	NA
Mercury	0.217	0.305	0.188	NA
Total Organic Carbon	14200	5070	4940	NA
Zinc	275	283	126	NA
Semivolatiles				
1,4-Oxathiane	NA	< 1.74	< 1.74	NA
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	< 0.300	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	0.0148	< 0.00277	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	< 0.500	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	0.00901	< 0.00466	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	< 0.600	NA
4-Chlorophenylmethyl Sulfide	< 4.40	< 4.40	< 4.40	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	< 0.900	NA

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID Depth Date Analytes	HA1180SE 60 cm 05/11/90	HA1181SE 60 cm 05/14/90	HA1182SE 60 cm 05/16/90	HA1182SE 4 cm 06/14/90
Semivolatiles				
4-Chlorophenylmethyl Sulfone	< 9.01	< 9.01	< 9.01	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	< 0.300	NA
4-Chlorophenylmethyl Sulfoxide	< 4.81	< 4.81	< 4.81	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	< 0.300	NA
Aldrin	< 0.00211	< 0.00211	< 0.00211	NA
Aldrin (GCMS)	< 0.300	< 0.300	< 0.300	NA
Atrazine	R	R	R	NA
Atrazine (GCMS)	< 0.300	< 0.300	< 0.300	NA
Benzothiazole	< 2.04	< 2.04	< 2.04	NA
Bicyclo [2,2,1] hepta-2,5-diene	< 1.10	< 1.10	< 1.10	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	0.0775	< 0.0230	NA
Chlordane (GCMS)	< 2.00	< 2.00	< 2.00	NA
Dicyclopentadiene	< 0.450	< 0.450	< 0.450	NA
Dicyclopentadiene (GCMS)	< 1.00	< 1.00	< 1.00	NA
Dieldrin	< 0.00181	0.00685	< 0.00181	NA
Dieldrin (GCMS)	< 0.300	< 0.300	< 0.300	NA

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID Depth Date Analytes	HA1180SE 60 cm 05/11/90	HA1181SE 60 cm 05/14/90	HA1182SE 60 cm 05/16/90	HA1182SE 4 cm 06/14/90
Semivolatiles				
Diisopropyl Methylphosphonate	NA	NA	NA	NA
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	< 1.00	NA
Dimethylmethyl Phosphonate	NA	NA	NA	NA
Dithiane	< 1.45	< 1.45	< 1.45	NA
Dithiane (GCMS)	< 0.400	< 0.400	< 0.400	NA
Endrin	< 0.00471	0.00925	< 0.00471	NA
Endrin (GCMS)	< 0.500	< 0.500	< 0.500	NA
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137	NA
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	< 0.600	NA
Isodrin	< 0.00188	< 0.00188	< 0.00188	NA
Isodrin (GCMS)	< 0.300	< 0.300	< 0.300	NA
Malathion	R	R	R	NA
Malathion (GCMS)	< 0.700	< 0.700	< 0.700	NA
Parathion	R	R	R	NA
Parathion (GCMS)	< 0.900	< 0.900	< 0.900	NA
Supona	R	R	R	NA
Supona (GCMS)	< 0.600	< 0.600	< 0.600	NA

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA1180SE	HA1181SE	HA1182SE	HA1182SE
Depth	60 cm	60 cm	60 cm	4 cm
Date	05/11/90	05/14/90	05/16/90	06/14/90
Analytes				
Semivolatiles				
Vapona	R	R	R	NA
Vapona (GCMS)	< 3.00	< 3.00	< 3.00	NA
Volatiles				
1,1,1-Trichloroethane	< 0.200	< 0.200	< 0.200	< 0.200
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	< 0.330	< 0.330	< 0.330	< 0.330
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	< 0.490	< 0.490	< 0.490	< 0.490
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	< 0.270	< 0.270	< 0.270	< 0.270
1,2-Dichloroethane	< 0.320	< 0.320	< 0.320	< 0.320
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	< 0.320	< 0.320	< 0.320	< 0.320
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	< 0.100	< 0.100	< 0.100	< 0.100
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	< 0.310	< 0.310	< 0.310	< 0.310
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA

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Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID Depth Date Analytes	HA1180SE 60 cm 05/11/90	HA1181SE 60 cm 05/14/90	HA1182SE 60 cm 05/16/90	HA1182SE 4 cm 06/14/90
Volatiles				
Chlorobenzene	< 0.100	< 0.100	< 0.100	< 0.100
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	< 0.240	< 0.240	< 0.240	< 0.240
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	< 0.00500	< 0.00500	< 0.00500	NA
Dibromochloropropane (GCMS)	< 0.300	< 0.300	< 0.300	NA
Dimethyl Disulfide	< 3.12	< 3.12	< 3.12	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	< 0.190	< 0.190	< 0.190	< 0.190
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	< 0.230	< 0.230	< 0.230	< 0.230
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	< 4.40	< 4.40	< 4.40	< 4.40
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	< 0.640	< 0.640	< 0.640	< 0.630
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	< 0.780	< 0.780	< 0.780	< 0.780

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA1180SE	HA1181SE	HA1182SE	HA1182SE
Depth	60 cm	60 cm	60 cm	4 cm
Date	05/11/90	05/14/90	05/16/90	06/14/90
Analytes				
Volatiles				
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	< 0.160	< 0.160	< 0.160	< 0.160
Tetrachloroethene (GCMS)	NA	NA	NA	NA
Toluene	< 0.100	< 0.100	< 0.100	< 0.100
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	< 0.250	< 0.250	< 0.250	< 0.250
Trichloroethene (GCMS)	NA	NA	NA	NA
Vinyl Chloride	< 1.80	< 1.80	< 1.80	< 1.80

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej .

Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA1183SE	HA1184SE	HA1187SE
Depth	60 cm	120 cm	244 cm
Date	05/14/90	05/14/90	05/10/90
Analytes			
Metals/Anions/General Chem			
Arsenic	< 2.50	< 2.50	< 2.50
Cadmium	< 1.20	3.33	< 1.20
Chromium	68.6	59.7	62.5
Copper	41.2	51.4	54.1
Cyanide	R	R	R
Lead	94.1	109	90.6
Mercury	0.297	0.416	0.196
Total Organic Carbon	5800	5070	16600
Zinc	267	337	242
Semivolatiles			
1,4-Oxathiane	< 1.74	< 1.74	< 1.74
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	0.0215	0.0118
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	< 0.500
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	0.00679	0.00669
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	< 0.600
4-Chlorophenylmethyl Sulfide	< 4.40	< 4.40	< 4.40
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	< 0.900

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA1183SE	HA1184SE	HA1187SE
Depth,	60 cm	120 cm	244 cm
Date	05/14/90	05/14/90	05/10/90
Analytes			
Semivolatiles			
4-Chlorophenylmethyl Sulfone	< 9.01	< 9.01	< 9.01
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	< 0.300
4-Chlorophenylmethyl Sulfoxide	< 4.81	< 4.81	< 4.81
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	< 0.300
Aldrin	< 0.00211	0.0102	< 0.00211
Aldrin (GCMS)	< 0.300	< 0.300	< 0.300
Atrazine	R	R	R
Atrazine (GCMS)	< 0.300	< 0.300	< 0.300
Benzothiazole	< 2.04	< 2.04	< 2.04
Bicyclo [2,2,1] hepta-2,5-diene	< 1.10	< 1.10	< 1.10
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA
Chlordane	< 0.0230	0.0376	0.0645
Chlordane (GCMS)	< 2.00	< 2.00	< 2.00
Dicyclopentadiene	< 0.450	< 0.450	< 0.450
Dicyclopentadiene (GCMS)	< 1.00	< 1.00	< 1.00
Dieldrin	< 0.00181	0.00515	0.0102
Dieldrin (GCMS)	< 0.300	< 0.300	< 0.300

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej .

Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA1183SE	HA1184SE	HA1187SE
Depth	60 cm	120 cm	244 cm
Date	05/14/90	05/14/90	05/10/90
Analytes			
Semivolatiles			
Diisopropyl Methylphosphonate	NA	NA	NA
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	< 1.00
Dimethylmethyl Phosphonate	NA	NA	NA
Dithiane	< 1.45	< 1.45	< 1.45
Dithiane (GCMS)	< 0.400	< 0.400	< 0.400
Endrin	< 0.00471	< 0.00471	< 0.00471
Endrin (GCMS)	< 0.500	< 0.500	< 0.500
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	< 0.600
Isodrin	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	< 0.300	< 0.300	< 0.300
Malathion	R	R	R
Malathion (GCMS)	< 0.700	< 0.700	< 0.700
Parathion	R	R	R
Parathion (GCMS)	< 0.900	< 0.900	< 0.900
Supona	R	R	R
Supona (GCMS)	< 0.600	< 0.600	< 0.600

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA1183SE	HA1184SE	HA1187SE
Depth	60 cm	120 cm	244 cm
Date	05/14/90	05/14/90	05/10/90
Analytes			
Semivolatiles			
Vapona	R	R	R
Vapona (GCMS)	< 3.00	< 3.00	< 3.00
Volatiles			
1,1,1-Trichloroethane	< 0.200	< 0.200	< 0.200
1,1,1-Trichloroethane (GCMS)	NA	NA	NA
1,1,2-Trichloroethane	< 0.330	< 0.330	< 0.330
1,1,2-Trichloroethane (GCMS)	NA	NA	NA
1,1-Dichloroethane	< 0.490	< 0.490	< 0.490
1,1-Dichloroethane (GCMS)	NA	NA	NA
1,1-Dichloroethene	< 0.270	< 0.270	< 0.270
1,2-Dichloroethane	< 0.320	< 0.320	< 0.320
1,2-Dichloroethane (GCMS)	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	< 0.320	< 0.320	< 0.320
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA
Benzene	< 0.100	< 0.100	< 0.100
Benzene (GCMS)	NA	NA	NA
Carbon Tetrachloride	< 0.310	< 0.310	< 0.310
Carbon Tetrachloride (GCMS)	NA	NA	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej .

Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID	HA1183SE	HA1184SE	HA1187SE
Depth	60 cm	120 cm	244 cm
Date	05/14/90	05/14/90	05/10/90
Analytes			
Volatiles			
Chlorobenzene	< 0.100	< 0.100	< 0.100
Chlorobenzene (GCMS)	NA	NA	NA
Chloroform	< 0.240	< 0.240	< 0.240
Chloroform (GCMS)	NA	NA	NA
Dibromochloropropane	< 0.00500	< 0.00500	< 0.00500
Dibromochloropropane (GCMS)	< 0.300	< 0.300	< 0.300
Dimethyl Disulfide	< 3.12	< 3.12	< 3.12
Dimethyl Disulfide (GCMS)	NA	NA	NA
Ethyl Benzene	< 0.190	< 0.190	< 0.190
Ethyl Benzene (GCMS)	NA	NA	NA
M-Xylene	< 0.230	< 0.230	< 0.230
M-Xylene (GCMS)	NA	NA	NA
Methylene Chloride	< 4.40	< 4.40	< 4.40
Methylene Chloride (GCMS)	NA	NA	NA
Methylisobutyl Ketone	< 0.640	< 0.640	< 0.640
Methylisobutyl Ketone (GCMS)	NA	NA	NA
O,P-Xylene	< 0.780	< 0.780	< 0.780

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table D1 Stream-Bottom Sediment
Investigative Analytical Data

Sample ID / Depth / Date / Analytes	HA1183SE	HA1184SE	HA1187SE
Depth	60 cm	120 cm	244 cm
Date	05/14/90	05/14/90	05/10/90
Volatiles			
O,P-Xylene (GCMS)	NA	NA	NA
Tetrachloroethene	< 0.160	< 0.160	< 0.160
Tetrachloroethene (GCMS)	NA	NA	NA
Toluene	< 0.100	< 0.100	< 0.100
Toluene (GCMS)	NA	NA	NA
Trichloroethene	< 0.250	< 0.250	< 0.250
Trichloroethene (GCMS)	NA	NA	NA
Vinyl Chloride	< 1.80	< 1.80	< 1.80

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej .

Table D2 Stream-Bottom Sediment
GC/MS Analytical Data

Sample ID	HA1194SE	HA1195SE	HA1195SE
Depth	15 cm	30 cm	4 cm
Date	05/11/90	05/16/90	06/14/90
	GC/MS of HA1153SE	GC/MS of HA1157SE	GC/MS of HA1157SE
Analytes			
Semivolatiles			
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	NA
Aldrin (GCMS)	< 0.300	< 0.300	NA
Atrazine (GCMS)	< 0.300	< 0.300	NA
Chlordane (GCMS)	< 2.00	< 2.00	NA
Dicyclopentadiene (GCMS)	< 1.00	< 1.00	NA
Dieldrin (GCMS)	< 0.300	< 0.300	NA
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	NA
Dithiane (GCMS)	< 0.400	< 0.400	NA
Endrin (GCMS)	< 0.500	< 0.500	NA
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	NA
Isodrin (GCMS)	< 0.300	< 0.300	NA
Malathion (GCMS)	< 0.700	< 0.700	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.

Table D2 Stream-Bottom Sediment
GC/MS Analytical Data

Sample ID	HA1194SE	HA1195SE	HA1195SE
Depth	15 cm	30 cm	4 cm
Date	05/11/90	05/16/90	06/14/90
	GC/MS of HA1153SE	GC/MS of HA1157SE	GC/MS of HA1157SE
Analytes			
Semivolatiles			
Parathion (GCMS)	< 0.900	< 0.900	NA
Supona (GCMS)	< 0.600	< 0.600	NA
Vapona (GCMS)	< 3.00	< 3.00	NA
Volatiles			
1,1,1-Trichloroethane	< 0.200	< 0.200	< 0.200
1,1,2-Trichloroethane	< 0.330	< 0.330	< 0.330
1,1-Dichloroethane	< 0.490	< 0.490	< 0.490
1,1-Dichloroethene	< 0.270	< 0.270	< 0.270
1,2-Dichloroethane	< 0.320	< 0.320	< 0.320
1,2-Dichloroethenes (cis & trans)	< 0.320	< 0.320	< 0.320
Benzene	< 0.100	< 0.100	< 0.100
Carbon Tetrachloride	< 0.310	< 0.310	< 0.310
Chlorobenzene	< 0.100	< 0.100	< 0.100
Chloroform	< 0.240	< 0.240	< 0.240
Dibromochloropropane (GCMS)	< 0.300	< 0.300	NA
Ethyl Benzene	< 0.190	< 0.190	< 0.190
M-Xylene	< 0.230	< 0.230	< 0.230
Methylene Chloride	< 4.40	< 4.40	< 4.40

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
I Not zed.

Table D2 Stream-Bottom Sediment
GC/MS Analytical Data

Sample ID	HA1194SE	HA1195SE	HA1195SE
Depth	15 cm	30 cm	4 cm
Date	05/11/90	05/16/90	06/14/90
	GC/MS of HA1153SE	GC/MS of HA1157SE	GC/MS of HA1157SE
Analytes			
Volatiles			
Methylisobutyl Ketone	< 0.630	< 0.630	< 0.630
O,P-Xylene	< 0.780	< 0.780	< 0.780
Tetrachloroethene	< 0.160	< 0.160	< 0.160
Toluene	< 0.100	< 0.100	< 0.100
Trichloroethene	< 0.250	< 0.250	< 0.250
Vinyl Chloride	< 1.80	< 1.80	< 1.80

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
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NA -- Not Analyzed.

Table D3 Stream-Bottom Sediment
Duplicate Analytical Data

Sample ID	HA1192SE	HA1192SE	HA1193SE
Depth	60 cm	4 cm	244 cm
Date	05/16/90	06/14/90	05/10/90
	Dup of HA1187SE	Dup of HA1182SE	Dup of HA1187SE
Analytes			
Metals/Anions/General Chem			
Arsenic	< 2.50	NA	< 2.50
Cadmium	< 1.20	NA	1.97
Chromium	30.1	NA	71.2
Copper	16.9	NA	63.5
Cyanide	R	NA	R
Lead	40.9	NA	100
Mercury	0.120	NA	0.240
Total Organic Carbon	6810	NA	18300
Zinc	115	NA	280
Semivolatiles			
1,4-Oxathiane	< 1.74	NA	< 1.74
1,4-Oxathiane (GCMS)	< 0.300	NA	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	NA	0.00515
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	NA	< 0.500
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	NA	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	NA	< 0.600

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
Dup -- Duplicate
R -- Data did not meet quality control criteria and were rejected.

Table D3 Stream-Bottom Sediment
Duplicate Analytical Data

Sample ID	HA1192SE	HA1192SE	HA1193SE
Depth	60 cm	4 cm	244 cm
Date	05/16/90	06/14/90	05/10/90
	Dup of HA1187SE	Dup of HA1182SE	Dup of HA1187SE
Analytes			
Semivolatiles			
4-Chlorophenylmethyl Sulfide	< 4.40	NA	< 4.40
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	NA	< 0.900
4-Chlorophenylmethyl Sulfone	< 9.01	NA	< 9.01
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	NA	< 0.300
4-Chlorophenylmethyl Sulfoxide	< 4.81	NA	< 4.81
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	NA	< 0.300
Aldrin	< 0.00211	NA	< 0.00211
Aldrin (GCMS)	< 0.300	NA	< 0.300
Atrazine	R	NA	R
Benzothiazole	< 2.04	NA	< 2.04
Bicyclo [2,2,1] hepta-2,5-diene	< 1.10	NA	< 1.10
Chlordane	< 0.0230	NA	< 0.0230
Chlordane (GCMS)	< 2.00	NA	< 2.00
Dicyclopentadiene	< 0.450	NA	< 0.450
Dicyclopentadiene (GCMS)	< 1.00	NA	< 1.00

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
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NA -- Not Analyzed.
Dup -- Duplicate
R -- Data did not meet quality control criteria and were rejected

Table D3 Stream-Bottom Sediment
Duplicate Analytical Data

Sample ID	HA1192SE	HA1192SE	HA1193SE
Depth	60 cm	4 cm	244 cm
Date	05/16/90	06/14/90	05/10/90
	Dup of HA1187SE	Dup of HA1182SE	Dup of HA1187SE
Analytes			
Semivolatiles			
Dieldrin	0.00501	NA	0.00495
Dieldrin (GCMS)	< 0.300	NA	< 0.300
Diisopropyl Methylphosphonate (GCMS)	< 1.00	NA	< 1.00
Dithiane	< 1.45	NA	< 1.45
Dithiane (GCMS)	< 0.400	NA	< 0.400
Endrin	< 0.00471	NA	0.00797
Endrin (GCMS)	< 0.500	NA	< 0.500
Hexachlorocyclopentadiene	0.0528	NA	< 0.00137
Hexachlorocyclopentadiene (GCMS)	< 0.600	NA	< 0.600
Isodrin	< 0.00188	NA	< 0.00188
Isodrin (GCMS)	< 0.300	NA	< 0.300
Malathion	R	NA	R
Parathion	R	NA	R
Supona	R	NA	R
Vapona	R	NA	R

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
Dup -- Duplicate
R -- Data did not meet quality control criteria and were rejected.

Table D3 Stream-Bottom Sediment
Duplicate Analytical Data

Sample ID	HA1192SE	HA1192SE	HA1193SE
Depth	60 cm	4 cm	244 cm
Date	05/16/90	06/14/90	05/10/90
	Dup of HA1187SE	Dup of HA1182SE	Dup of HA1187SE
Analytes			
Volatiles			
1,1,1-Trichloroethane	< 0.200	< 0.200	< 0.200
1,1,2-Trichloroethane	< 0.330	< 0.330	< 0.330
1,1-Dichloroethane	< 0.490	< 0.490	< 0.490
1,1-Dichloroethene	< 0.270	< 0.270	< 0.270
1,2-Dichloroethane	< 0.320	< 0.320	< 0.320
1,2-Dichloroethenes (cis & trans)	< 0.320	< 0.320	< 0.320
Benzene	< 0.100	< 0.100	< 0.100
Carbon Tetrachloride	< 0.310	< 0.310	< 0.310
Chlorobenzene	< 0.100	< 0.100	< 0.100
Chloroform	< 0.240	< 0.240	< 0.240
Dibromochloropropane	< 0.00500	NA	0.0190
Dibromochloropropane (GCMS)	< 0.300	NA	< 0.300
Dimethyl Disulfide	< 3.12	NA	< 3.12
Ethyl Benzene	< 0.190	< 0.190	< 0.190
M-Xylene	< 0.230	< 0.230	< 0.230

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
Dup -- Duplicate
R -- Data did not meet quality control criteria and were rejected.

Table D3 Stream-Bottom Sediment
Duplicate Analytical Data

Sample ID	HA1192SE	HA1192SE	HA1193SE
Depth	60 cm	4 cm	244 cm
Date	05/16/90	06/14/90	05/10/90
	Dup of HA1187SE	Dup of HA1182SE	Dup of HA1187SE
Analytes			
Volatiles			
Methylene Chloride	< 4.40	< 4.40	< 4.40
Methylisobutyl Ketone	< 0.640	< 0.630	< 0.640
O,P-Xylene	< 0.780	< 0.780	< 0.780
Tetrachloroethene	< 0.160	< 0.160	< 0.160
Toluene	< 0.100	< 0.100	< 0.100
Trichloroethene	0.383	0.383	< 0.250
Vinyl Chloride	< 1.80	< 1.80	< 1.80

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
Dup -- Duplicate
R -- Data did not meet quality control criteria and were rejected.

Appendix E

SURFICIAL AND SUBSURFACE SOIL ANALYTICAL DATA

LIST OF TABLES

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0985SO	HA0985SO45	HA0986SO	HA0987SO
Depth	15 cm	137 cm	15 cm	15 cm
Date	02/23/89	02/23/89	02/23/89	02/23/89
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	< 2.50	< 2.50	< 2.50
Cadmium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Semivolatiles				
1,4-Oxathiane	< 1.74	< 1.74	< 1.74	< 1.74
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00200	< 0.00200	< 0.00200	< 0.00200
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID / Depth / Date / Analytes	HA0985SO	HA0985S045	HA0986SO	HA0987SO
Depth	15 cm	137 cm	15 cm	15 cm
Date	02/23/89	02/23/89	02/23/89	02/23/89
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00240	< 0.00240	< 0.00240	< 0.00240
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
4-Chlorophenylmethyl Sulfide	< 4.40	< 4.40	< 4.40	< 4.40
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
4-Chlorophenylmethyl Sulfone	< 9.01	< 9.01	< 9.01	< 9.01
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
4-Chlorophenylmethyl Sulfoxide	R	R	R	R
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Aldrin	< 0.00190	< 0.00190	< 0.00190	< 0.00190
Aldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Atrazine (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Benzothiazole	< 2.04	< 2.04	< 2.04	< 2.04
Bicyclo [2,2,1] hepta-2,5-diene	NA	R	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	< 0.360	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00
Dicyclopentadiene	NA	R	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0985SO	HA0985SO45	HA0986SO	HA0987SO
Depth	15 cm	137 cm	15 cm	15 cm
Date	02/23/89	02/23/89	02/23/89	02/23/89
Analytes				
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	< 0.430	NA	NA
1,1,2-Trichloroethane	NA	< 0.260	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	< 0.390	NA	NA
1,1-Dichloroethane	NA	< 0.0740	NA	NA
1,1-Dichloroethane (GCMS)	NA	< 1.70	NA	NA
1,1-Dichloroethene	NA	< 0.240	NA	NA
1,2-Dichloroethane	NA	< 0.0850	NA	NA
1,2-Dichloroethane (GCMS)	NA	< 0.560	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	< 0.260	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	< 1.70	NA	NA
Benzene	NA	< 0.0850	NA	NA
Benzene (GCMS)	NA	< 0.250	NA	NA
Carbon Tetrachloride	NA	< 0.120	NA	NA
Carbon Tetrachloride (GCMS)	NA	< 0.250	NA	NA
Chlorobenzene	NA	< 0.200	NA	NA
Chlorobenzene (GCMS)	NA	< 1.50	NA	NA
Chloroform	NA	< 0.0680	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0985SO	HA0985SO45	HA0986SO	HA0987SO
Depth	15 cm	137 cm	15 cm	15 cm
Date	02/23/89	02/23/89	02/23/89	02/23/89
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dieldrin	0.00704	< 0.00330	< 0.00330	< 0.00330
Dieldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dithiane	< 1.45	< 1.45	< 1.45	< 1.45
Dithiane (GCMS)	< 0.400	< 0.400	< 0.400	< 0.400
Endrin	< 0.00580	< 0.00580	< 0.00580	< 0.00580
Endrin (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500
Hexachlorocyclopentadiene	< 0.00180	< 0.00180	< 0.00180	< 0.00180
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Isodrin	< 0.00110	< 0.00110	< 0.00110	< 0.00110
Isodrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Malathion (GCMS)	< 0.700	< 0.700	< 0.700	< 0.700
Parathion (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
Supona (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Vapona (GCMS)	< 3.00	< 3.00	< 3.00	< 3.00
Volatiles				
1,1,1-Trichloroethane	NA	< 0.0880	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0985SO	HA0985SO45	HA0986SO	HA0987SO
Depth	15 cm	137 cm	15 cm	15 cm
Date	02/23/89	02/23/89	02/23/89	02/23/89
Analytes				
Volatiles				
Chloroform (GCMS)	NA	< 0.290	NA	NA
Dibromochloropropane	R	R	R	R
Dibromochloropropane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Dimethyl Disulfide	< 3.12	< 3.12	< 3.12	< 3.12
Dimethyl Disulfide (GCMS)	NA	< 20.0	NA	NA
Ethyl Benzene	NA	< 0.160	NA	NA
Ethyl Benzene (GCMS)	NA	< 0.380	NA	NA
M-Xylene	NA	< 0.260	NA	NA
M-Xylene (GCMS)	NA	< 0.740	NA	NA
Methylene Chloride	NA	< 3.70	NA	NA
Methylene Chloride (GCMS)	NA	< 1.50	NA	NA
Methylisobutyl Ketone	NA	R	NA	NA
Methylisobutyl Ketone (GCMS)	NA	< 0.730	NA	NA
O,P-Xylene	NA	< 0.390	NA	NA
O,P-Xylene (GCMS)	NA	< 4.90	NA	NA
Tetrachloroethene	NA	< 0.270	NA	NA
Tetrachloroethene (GCMS)	NA	< 0.250	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0985SO	HA0985SO45	HA0986SO	HA0987SO
Depth	15 cm	137 cm	15 cm	15 cm
Date	02/23/89	02/23/89	02/23/89	02/23/89
Analytes				
Volatiles				
Toluene	NA	< 0.190	NA	NA
Toluene (GCMS)	NA	< 0.250	NA	NA
Trichloroethene	NA	< 0.140	NA	NA
Trichloroethene (GCMS)	NA	< 0.540	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0987S050	HA0988SO	HA0989WB	HA0990WB
Depth	152 cm	15 cm	3 cm	3 cm
Date	02/23/89	02/23/89	02/24/89	02/24/89
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	3.59	< 2.50	< 2.50
Cadmium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	0.127
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Semivolatiles				
1,4-Oxathiane	< 1.74	< 1.74	< 1.74	< 1.74
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00200	< 0.00200	0.0535	0.230
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0987S050	HA0988SO	HA0989WB	HA0990WB
Depth	152 cm	15 cm	3 cm	3 cm
Date	02/23/89	02/23/89	02/24/89	02/24/89
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00240	< 0.00240	0.0363	0.0730
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
4-Chlorophenylmethyl Sulfide	< 4.40	< 4.40	< 4.40	< 4.40
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
4-Chlorophenylmethyl Sulfone	< 9.01	< 9.01	< 9.01	< 9.01
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
4-Chlorophenylmethyl Sulfoxide	R	R	R	R
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Aldrin	< 0.00190	< 0.00190	0.0164	0.0103
Aldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Atrazine (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Benzothiazole	< 2.04	< 2.04	< 2.04	< 2.04
Bicyclo [2,2,1] hepta-2,5-diene	R	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	< 0.360	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	0.151
Chlordane (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00
Dicyclopentadiene	R	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0987S050	HA0988SO	HA0989WB	HA0990WB
Depth	152 cm	15 cm	3 cm	3 cm
Date	02/23/89	02/23/89	02/24/89	02/24/89
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dieldrin	< 0.00330	< 0.00330	0.130	0.120
Dieldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dithiane	< 1.45	< 1.45	< 1.45	< 1.45
Dithiane (GCMS)	< 0.400	< 0.400	< 0.400	< 0.400
Endrin	< 0.00580	< 0.00580	< 0.0290	0.0152
Endrin (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500
Hexachlorocyclopentadiene	< 0.00180	< 0.00180	< 0.00180	< 0.00180
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Isodrin	< 0.00110	< 0.00110	< 0.00110	< 0.00110
Isodrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Malathion (GCMS)	< 0.700	< 0.700	< 0.700	< 0.700
Parathion (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
Supona (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Vapona (GCMS)	< 3.00	< 3.00	< 3.00	< 3.00
Volatiles				
1,1,1-Trichloroethane	< 0.0880	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID Depth Date Analytes	HA0987SO50 152 cm 02/23/89	HA0988SO 15 cm 02/23/89	HA0989WB 3 cm 02/24/89	HA0990WB 3 cm 02/24/89
Volatiles				
1,1,1-Trichloroethane (GCMS)	< 0.430	NA	NA	NA
1,1,2-Trichloroethane	< 0.260	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	< 0.390	NA	NA	NA
1,1-Dichloroethane	< 0.0740	NA	NA	NA
1,1-Dichloroethane (GCMS)	< 1.70	NA	NA	NA
1,1-Dichloroethene	< 0.240	NA	NA	NA
1,2-Dichloroethane	< 0.0850	NA	NA	NA
1,2-Dichloroethane (GCMS)	< 0.560	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	< 0.260	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	< 1.70	NA	NA	NA
Benzene	< 0.0850	NA	NA	NA
Benzene (GCMS)	< 0.250	NA	NA	NA
Carbon Tetrachloride	< 0.120	NA	NA	NA
Carbon Tetrachloride (GCMS)	< 0.250	NA	NA	NA
Chlorobenzene	< 0.200	NA	NA	NA
Chlorobenzene (GCMS)	< 1.50	NA	NA	NA
Chloroform	< 0.0680	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0987SO50	HA0988SO	HA0989WB	HA0990WB
Depth	152 cm	15 cm	3 cm	3 cm
Date	02/23/89	02/23/89	02/24/89	02/24/89
Analytes				
Volatiles				
Chloroform (GCMS)	< 0.290	NA	NA	NA
Dibromochloropropane	R	R	R	R
Dibromochloropropane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Dimethyl Disulfide	< 3.12	< 3.12	< 3.12	< 3.12
Dimethyl Disulfide (GCMS)	< 20.0	NA	NA	NA
Ethyl Benzene	< 0.160	NA	NA	NA
Ethyl Benzene (GCMS)	< 0.380	NA	NA	NA
M-Xylene	< 0.260	NA	NA	NA
M-Xylene (GCMS)	< 0.740	NA	NA	NA
Methylene Chloride	< 3.70	NA	NA	NA
Methylene Chloride (GCMS)	< 1.50	NA	NA	NA
Methylisobutyl Ketone	R	NA	NA	NA
Methylisobutyl Ketone (GCMS)	< 0.730	NA	NA	NA
O,P-Xylene	< 0.390	NA	NA	NA
O,P-Xylene (GCMS)	< 4.90	NA	NA	NA
Tetrachloroethene	< 0.270	NA	NA	NA
Tetrachloroethene (GCMS)	< 0.250	NA	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID. Depth Date Analytes	HA0987SO50 152 cm 02/23/89	HA0988SO 15 cm 02/23/89	HA0989WB 3 cm 02/24/89	HA0990WB 3 cm 02/24/89
Volatiles				
Toluene	< 0.190	NA	NA	NA
Toluene (GCMS)	< 0.250	NA	NA	NA
Trichloroethene	< 0.140	NA	NA	NA
Trichloroethene (GCMS)	< 0.540	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0991WB	HA0992WB	HA0993WB	HA0994WB
Depth	3 cm	3 cm	3 cm	3 cm
Date	02/24/89	02/24/89	02/24/89	02/24/89
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	< 2.50	2.89	< 2.50
Cadmium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Semivolatiles				
1,4-Oxathiane	< 1.74	< 1.74	< 1.74	< 1.74
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.0370	0.0118	0.0229	0.0175
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0991WB	HA0992WB	HA0993WB	HA0994WB
Depth	3 cm	3 cm	3 cm	3 cm
Date	02/24/89	02/24/89	02/24/89	02/24/89
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	0.0198	0.00416	0.0110	< 0.00240
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
4-Chlorophenylmethyl Sulfide	< 4.40	< 4.40	< 4.40	< 4.40
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
4-Chlorophenylmethyl Sulfone	< 9.01	< 9.01	< 9.01	< 9.01
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
4-Chlorophenylmethyl Sulfoxide	R	R	R	R
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Aldrin	0.00727	0.0143	0.00754	0.0337
Aldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Atrazine (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Benzothiazole	< 2.04	< 2.04	< 2.04	< 2.04
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	0.0458	< 0.0230	0.0997	0.0415
Chlordane (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00
Dicyclopentadiene	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej[illegible]

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0991WB	HA0992WB	HA0993WB	HA0994WB
Depth	3 cm	3 cm	3 cm	3 cm
Date	02/24/89	02/24/89	02/24/89	02/24/89
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dieldrin	0.110	0.110	0.0890	0.250
Dieldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dithiane	< 1.45	< 1.45	< 1.45	< 1.45
Dithiane (GCMS)	< 0.400	< 0.400	< 0.400	< 0.400
Endrin	0.0189	0.0233	0.0160	0.0289
Endrin (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500
Hexachlorocyclopentadiene	< 0.00180	< 0.00180	< 0.00180	< 0.00180
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Isodrin	< 0.00110	< 0.00110	< 0.00110	< 0.00110
Isodrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Malathion (GCMS)	< 0.700	< 0.700	< 0.700	< 0.700
Parathion (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
Supona (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Vapona (GCMS)	< 3.00	< 3.00	< 3.00	< 3.00
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0991WB	HA0992WB	HA0993WB	HA0994WB
Depth	3 cm	3 cm	3 cm	3 cm
Date	02/24/89	02/24/89	02/24/89	02/24/89
Analytes				
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0991WB	HA0992WB	HA0993WB	HA0994WB
Depth	3 cm	3 cm	3 cm	3 cm
Date	02/24/89	02/24/89	02/24/89	02/24/89
Analytes				
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	R	R	R	R
Dibromochloropropane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Dimethyl Disulfide	< 3.12	< 3.12	< 3.12	< 3.12
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0991WB	HA0992WB	HA0993WB	HA0994WB
Depth	3 cm	3 cm	3 cm	3 cm
Date	02/24/89	02/24/89	02/24/89	02/24/89
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0996WB	HA0997WB	HA0998WB	HA0999WB
Depth	3 cm	3 cm	3 cm	3 cm
Date	02/24/89	02/24/89	02/24/89	02/24/89
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	< 2.50	< 2.50	< 2.50
Cadmium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Semivolatiles				
1,4-Oxathiane	< 1.74	< 1.74	< 1.74	< 1.74
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.00474	0.00441	< 0.00200	0.00734
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0996WB	HA0997WB	HA0998WB	HA0999WB
Depth	3 cm	3 cm	3 cm	3 cm
Date	02/24/89	02/24/89	02/24/89	02/24/89
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00240	< 0.00240	< 0.00240	< 0.00240
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
4-Chlorophenylmethyl Sulfide	< 4.40	< 4.40	< 4.40	< 4.40
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
4-Chlorophenylmethyl Sulfone	< 9.01	< 9.01	< 9.01	< 9.01
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
4-Chlorophenylmethyl Sulfoxide	R	R	R	R
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Aldrin	0.00713	0.00304	0.00269	0.0264
Aldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Atrazine (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Benzothiazole	< 2.04	< 2.04	< 2.04	< 2.04
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00
Dicyclopentadiene	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0996WB	HA0997WB	HA0998WB	HA0999WB
Depth	3 cm	3 cm	3 cm	3 cm
Date	02/24/89	02/24/89	02/24/89	02/24/89
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dieldrin	0.0550	0.0440	0.0319	0.110
Dieldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dithiane	< 1.45	< 1.45	< 1.45	< 1.45
Dithiane (GCMS)	< 0.400	< 0.400	< 0.400	< 0.400
Endrin	0.0101	< 0.00580	< 0.00580	0.0192
Endrin (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500
Hexachlorocyclopentadiene	< 0.00180	< 0.00180	< 0.00180	< 0.00180
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Isodrin	< 0.00110	< 0.00110	< 0.00110	0.00264
Isodrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Malathion (GCMS)	< 0.700	< 0.700	< 0.700	< 0.700
Parathion (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
Supona (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Vapona (GCMS)	< 3.00	< 3.00	< 3.00	< 3.00
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0996WB	HA0997WB	HA0998WB	HA0999WB
Depth	3 cm	3 cm	3 cm	3 cm
Date	02/24/89	02/24/89	02/24/89	02/24/89
Analytes				
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0996WB	HA0997WB	HA0998WB	HA0999WB
Depth	3 cm	3 cm	3 cm	3 cm
Date	02/24/89	02/24/89	02/24/89	02/24/89
Analytes				
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	R	R	R	R
Dibromochloropropane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Dimethyl Disulfide	< 3.12	< 3.12	< 3.12	< 3.12
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA0996WB	HA0997WB	HA0998WB	HA0999WB
Depth	3 cm	3 cm	3 cm	3 cm
Date	02/24/89	02/24/89	02/24/89	02/24/89
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1200WB	HA1201WB	HA1202WB	HA1203WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/14/90	06/18/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	4.62	< 2.50	< 2.50
Cadmium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	NA	NA	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	0.00631	< 0.00277	0.0443
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1200WB	HA1201WB	HA1202WB	HA1203WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/14/90	06/18/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	< 0.00466	< 0.00466	0.00844
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	NA	NA	NA
Aldrin	< 0.00211	< 0.00211	< 0.00211	< 0.00211
Aldrin (GCMS)	NA	NA	NA	NA
Atrazine (GCMS)	NA	NA	NA	NA
Benzothiazole	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	NA	NA	NA	NA
Dicyclopentadiene	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1200WB	HA1201WB	HA1202WB	HA1203WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/14/90	06/18/90
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	NA	NA	NA	NA
Dieldrin	0.00223	< 0.00181	0.00706	0.0187
Dieldrin (GCMS)	NA	NA	NA	NA
Diisopropyl Methylphosphonate (GCMS)	NA	NA	NA	NA
Dithiane	NA	NA	NA	NA
Dithiane (GCMS)	NA	NA	NA	NA
Endrin	< 0.00471	< 0.00471	< 0.00471	0.0394
Endrin (GCMS)	NA	NA	NA	NA
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	NA	NA	NA	NA
Isodrin	< 0.00188	< 0.00188	< 0.00188	0.00339
Isodrin (GCMS)	NA	NA	NA	NA
Malathion (GCMS)	NA	NA	NA	NA
Parathion (GCMS)	NA	NA	NA	NA
Supona (GCMS)	NA	NA	NA	NA
Vapona (GCMS)	NA	NA	NA	NA
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1200WB	HA1201WB	HA1202WB	HA1203WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/14/90	06/18/90
Analytes				
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej[illegible].

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1200WB	HA1201WB	HA1202WB	HA1203WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/14/90	06/18/90
Analytes				
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	NA	NA	NA	NA
Dimethyl Disulfide	NA	NA	NA	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1200WB	HA1201WB	HA1202WB	HA1203WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/14/90	06/18/90
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej[illegible].

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1204WB	HA1205WB	HA1206WB	HA1207WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/13/90	06/13/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	3.24	< 2.50	< 2.50
Cadmium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	NA	NA	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.00654	0.00561	0.00579	0.0419
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1204WB	HA1205WB	HA1206WB	HA1207WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/13/90	06/13/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	0.0113	< 0.00466	< 0.00466	0.0226
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	NA	NA	NA
Aldrin	< 0.00211	< 0.00211	< 0.00211	< 0.00211
Aldrin (GCMS)	NA	NA	NA	NA
Atrazine (GCMS)	NA	NA	NA	NA
Benzothiazole	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	NA	NA	NA	NA
Dicyclopentadiene	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1204WB	HA1205WB	HA1206WB	HA1207WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/13/90	06/13/90
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	NA	NA	NA	NA
Dieldrin	0.0225	0.0167	0.0250	0.00451
Dieldrin (GCMS)	NA	NA	NA	NA
Diisopropyl Methylphosphonate (GCMS)	NA	NA	NA	NA
Dithiane	NA	NA	NA	NA
Dithiane (GCMS)	NA	NA	NA	NA
Endrin	< 0.00471	< 0.00471	< 0.00471	< 0.00471
Endrin (GCMS)	NA	NA	NA	NA
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	NA	NA	NA	NA
Isodrin	< 0.00188	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	NA	NA	NA	NA
Malathion (GCMS)	NA	NA	NA	NA
Parathion (GCMS)	NA	NA	NA	NA
Supona (GCMS)	NA	NA	NA	NA
Vapona (GCMS)	NA	NA	NA	NA
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1204WB	HA1205WB	HA1206WB	HA1207WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/13/90	06/13/90
Analytes				
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1204WB	HA1205WB	HA1206WB	HA1207WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/13/90	06/13/90
Analytes				
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	NA	NA	NA	NA
Dimethyl Disulfide	NA	NA	NA	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1204WB	HA1205WB	HA1206WB	HA1207WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/13/90	06/13/90
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1208WB	HA1209WB	HA1210WB	HA1211WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/13/90	06/18/90	06/18/90	06/13/90
Analytes				
Metals/Anions/General Chem				
Arsenic	2.84	< 2.50	< 2.50	< 2.50
Cadmium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	NA	NA	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.00376	0.00743	0.0106	0.00349
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1208WB	HA1209WB	HA1210WB	HA1211WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/13/90	06/18/90	06/18/90	06/13/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	< 0.00466	< 0.00466	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	NA	NA	NA
Aldrin	< 0.00211	< 0.00211	0.00571	< 0.00211
Aldrin (GCMS)	NA	NA	NA	NA
Atrazine (GCMS)	NA	NA	NA	NA
Benzothiazole	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	NA	NA	NA	NA
Dicyclopentadiene	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1208WB	HA1209WB	HA1210WB	HA1211WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/13/90	06/18/90	06/18/90	06/13/90
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	NA	NA	NA	NA
Dieldrin	0.0108	0.0111	0.0148	0.00803
Dieldrin (GCMS)	NA	NA	NA	NA
Diisopropyl Methylphosphonate (GCMS)	NA	NA	NA	NA
Dithiane	NA	NA	NA	NA
Dithiane (GCMS)	NA	NA	NA	NA
Endrin	< 0.00471	< 0.00471	0.0111	< 0.00471
Endrin (GCMS)	NA	NA	NA	NA
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	0.00270	< 0.00137
Hexachlorocyclopentadiene (GCMS)	NA	NA	NA	NA
Isodrin	< 0.00188	< 0.00188	0.00353	< 0.00188
Isodrin (GCMS)	NA	NA	NA	NA
Malathion (GCMS)	NA	NA	NA	NA
Parathion (GCMS)	NA	NA	NA	NA
Supona (GCMS)	NA	NA	NA	NA
Vapona (GCMS)	NA	NA	NA	NA
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1208WB	HA1209WB	HA1210WB	HA1211WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/13/90	06/18/90	06/18/90	06/13/90
Analytes				
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1208WB	HA1209WB	HA1210WB	HA1211WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/13/90	06/18/90	06/18/90	06/13/90
Analytes				
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	NA	NA	NA	NA
Dimethyl Disulfide	NA	NA	NA	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1208WB	HA1209WB	HA1210WB	HA1211WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/13/90	06/18/90	06/18/90	06/13/90
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1212WB	HA1213WB	HA1214WB	HA1215WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/18/90	06/13/90	06/14/90	06/18/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	< 2.50	< 2.50	< 2.50
Cadmium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	NA	NA	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	< 0.00277	0.00793	< 0.00277
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID Depth Date Analytes	HA1212WB 5 cm 06/18/90	HA1213WB 5 cm 06/13/90	HA1214WB 5 cm 06/14/90	HA1215WB 5 cm 06/18/90
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	< 0.00466	0.00628	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	NA	NA	NA
Aldrin	< 0.00211	< 0.00211	< 0.00211	< 0.00211
Aldrin (GCMS)	NA	NA	NA	NA
Atrazine (GCMS)	NA	NA	NA	NA
Benzothiazole	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	NA	NA	NA	NA
Dicyclopentadiene	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1212WB	HA1213WB	HA1214WB	HA1215WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/18/90	06/13/90	06/14/90	06/18/90
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	NA	NA	NA	NA
Dieldrin	0.00467	0.00294	0.00399	0.00222
Dieldrin (GCMS)	NA	NA	NA	NA
Diisopropyl Methylphosphonate (GCMS)	NA	NA	NA	NA
Dithiane	NA	NA	NA	NA
Dithiane (GCMS)	NA	NA	NA	NA
Endrin	< 0.00471	< 0.00471	< 0.00471	< 0.00471
Endrin (GCMS)	NA	NA	NA	NA
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	NA	NA	NA	NA
Isodrin	< 0.00188	< 0.00188	0.00256	< 0.00188
Isodrin (GCMS)	NA	NA	NA	NA
Malathion (GCMS)	NA	NA	NA	NA
Parathion (GCMS)	NA	NA	NA	NA
Supona (GCMS)	NA	NA	NA	NA
Vapona (GCMS)	NA	NA	NA	NA
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1212WB	HA1213WB	HA1214WB	HA1215WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/18/90	06/13/90	06/14/90	06/18/90
Analytes				
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1212WB	HA1213WB	HA1214WB	HA1215WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/18/90	06/13/90	06/14/90	06/18/90
Analytes				
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	NA	NA	NA	NA
Dimethyl Disulfide	NA	NA	NA	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1212WB	HA1213WB	HA1214WB	HA1215WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/18/90	06/13/90	06/14/90	06/18/90
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1216WB	HA1217WB	HA1218WB	HA1219WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/18/90	06/18/90	06/15/90	06/15/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	< 2.50	< 2.50	3.30
Cadmium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	NA	NA	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	< 0.00277	< 0.00277	< 0.00277
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1216WB	HA1217WB	HA1218WB	HA1219WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/18/90	06/18/90	06/15/90	06/15/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	< 0.00466	< 0.00466	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	NA	NA	NA
Aldrin	< 0.00211	< 0.00211	< 0.00211	< 0.00211
Aldrin (GCMS)	NA	NA	NA	NA
Atrazine (GCMS)	NA	NA	NA	NA
Benzothiazole	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	NA	NA	NA	NA
Dicyclopentadiene	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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R -- Data did not meet quality control criteria and were rej[illegible]

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID Depth Date Analytes	HA1216WB 5 cm 06/18/90	HA1217WB 5 cm 06/18/90	HA1218WB 5 cm 06/15/90	HA1219WB 5 cm 06/15/90
Semivolatiles				
Dicyclopentadiene (GCMS)	NA	NA	NA	NA
Dieldrin	0.00232	< 0.00181	< 0.00181	0.00315
Dieldrin (GCMS)	NA	NA	NA	NA
Diisopropyl Methylphosphonate (GCMS)	NA	NA	NA	NA
Dithiane	NA	NA	NA	NA
Dithiane (GCMS)	NA	NA	NA	NA
Endrin	< 0.00471	< 0.00471	< 0.00471	< 0.00471
Endrin (GCMS)	NA	NA	NA	NA
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	NA	NA	NA	NA
Isodrin	< 0.00188	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	NA	NA	NA	NA
Malathion (GCMS)	NA	NA	NA	NA
Parathion (GCMS)	NA	NA	NA	NA
Supona (GCMS)	NA	NA	NA	NA
Vapona (GCMS)	NA	NA	NA	NA
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID Depth Date Analytes	HA1216WB 5 cm 06/18/90	HA1217WB 5 cm 06/18/90	HA1218WB 5 cm 06/15/90	HA1219WB 5 cm 06/15/90
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID Depth Date Analytes	HA1216WB 5 cm 06/18/90	HA1217WB 5 cm 06/18/90	HA1218WB 5 cm 06/15/90	HA1219WB 5 cm 06/15/90
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	NA	NA	NA	NA
Dimethyl Disulfide	NA	NA	NA	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1216WB	HA1217WB	HA1218WB	HA1219WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/18/90	06/18/90	06/15/90	06/15/90
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1220WB	HA1221WB	HA1222WB	HA1223WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/15/90	06/15/90	06/14/90	06/14/90
Analytes				
Metals/Anions/General Chem				
Arsenic	2.84	< 2.50	2.61	< 2.50
Cadmium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	< 0.0500	0.142	0.0719
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	NA	NA	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	0.0103	0.0221	0.00514
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1220WB	HA1221WB	HA1222WB	HA1223WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/15/90	06/15/90	06/14/90	06/14/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	< 0.00466	< 0.00466	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	NA	NA	NA
Aldrin	< 0.00211	< 0.00211	< 0.00211	< 0.00211
Aldrin (GCMS)	NA	NA	NA	NA
Atrazine (GCMS)	NA	NA	NA	NA
Benzothiazole	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	NA	NA	NA	NA
Dicyclopentadiene	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1220WB	HA1221WB	HA1222WB	HA1223WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/15/90	06/15/90	06/14/90	06/14/90
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	NA	NA	NA	NA
Dieldrin	< 0.00181	0.00361	0.0131	0.00749
Dieldrin (GCMS)	NA	NA	NA	NA
Diisopropyl Methylphosphonate (GCMS)	NA	NA	NA	NA
Dithiane	NA	NA	NA	NA
Dithiane (GCMS)	NA	NA	NA	NA
Endrin	< 0.00471	< 0.00471	< 0.00471	< 0.00471
Endrin (GCMS)	NA	NA	NA	NA
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	NA	NA	NA	NA
Isodrin	< 0.00188	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	NA	NA	NA	NA
Malathion (GCMS)	NA	NA	NA	NA
Parathion (GCMS)	NA	NA	NA	NA
Supona (GCMS)	NA	NA	NA	NA
Vapona (GCMS)	NA	NA	NA	NA
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID Depth Date Analytes	HA1220WB 5 cm 06/15/90	HA1221WB 5 cm 06/15/90	HA1222WB 5 cm 06/14/90	HA1223WB 5 cm 06/14/90
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

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NA -- Not Analyzed.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1220WB	HA1221WB	HA1222WB	HA1223WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/15/90	06/15/90	06/14/90	06/14/90
Analytes				
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	NA	NA	NA	NA
Dimethyl Disulfide	NA	NA	NA	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1220WB	HA1221WB	HA1222WB	HA1223WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/15/90	06/15/90	06/14/90	06/14/90
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1224WB	HA1225WB	HA1226WB	HA1227WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/14/90	07/02/90	07/03/90
Analytes				
Metals/Anions/General Chem				
Arsenic	4.41	3.51	< 2.50	< 2.50
Cadmium	NA	NA	< 1.20	< 1.20
Calcium	NA	NA	NA	NA
Chromium	NA	NA	15.5	13.1
Copper	NA	NA	10.1	11.1
Iron	NA	NA	NA	NA
Lead	NA	NA	40.6	27.0
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	0.142	0.325	< 0.0500	< 0.0500
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	89.3	61.2
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	NA	NA	< 0.300	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.00507	0.00865	0.0192	0.00704
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	NA	< 0.500	< 0.500

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1224WB	HA1225WB	HA1226WB	HA1227WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/14/90	07/02/90	07/03/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	< 0.00466	0.0561	0.00478
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	NA	< 0.600	< 0.600
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	NA	NA	< 0.900	< 0.900
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	NA	NA	< 0.300	< 0.300
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	NA	< 0.300	< 0.300
Aldrin	< 0.00211	< 0.00211	< 0.00211	0.00533
Aldrin (GCMS)	NA	NA	< 0.300	< 0.300
Atrazine (GCMS)	NA	NA	< 0.300	< 0.300
Benzothiazole	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	0.520	< 0.0230
Chlordane (GCMS)	NA	NA	7.71	< 2.00
Dicyclopentadiene	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1224WB	HA1225WB	HA1226WB	HA1227WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/14/90	07/02/90	07/03/90
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	NA	NA	< 1.00	< 1.00
Dieldrin	0.00775	0.00440	0.0930	0.0160
Dieldrin (GCMS)	NA	NA	< 0.300	< 0.300
Diisopropyl Methylphosphonate (GCMS)	NA	NA	< 1.00	< 1.00
Dithiane	NA	NA	NA	NA
Dithiane (GCMS)	NA	NA	< 0.400	< 0.400
Endrin	< 0.00471	< 0.00471	0.390	0.00659
Endrin (GCMS)	NA	NA	< 0.500	< 0.500
Hexachlorocyclopentadiene	< 0.00137	0.0203	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	NA	NA	< 0.600	< 0.600
Isodrin	< 0.00188	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	NA	NA	< 0.300	< 0.300
Malathion (GCMS)	NA	NA	< 0.700	< 0.700
Parathion (GCMS)	NA	NA	< 0.900	< 0.900
Supona (GCMS)	NA	NA	< 0.600	< 0.600
Vapona (GCMS)	NA	NA	< 3.00	< 3.00
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1224WB	HA1225WB	HA1226WB	HA1227WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/14/90	07/02/90	07/03/90
Analytes				
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej [illegible].

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1224WB	HA1225WB	HA1226WB	HA1227WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/14/90	07/02/90	07/03/90
Analytes				
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	NA	NA	< 0.300	< 0.300
Dimethyl Disulfide	NA	NA	NA	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1224WB	HA1225WB	HA1226WB	HA1227WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/14/90	07/02/90	07/03/90
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1228WB	HA1229WB	HA1230WB	HA1231WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	07/03/90	07/03/90	06/14/90	06/13/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	< 2.50	< 2.50	3.26
Cadmium	< 1.20	< 1.20	< 1.20	< 1.20
Calcium	NA	NA	12600	4760
Chromium	12.3	17.3	17.6	23.2
Copper	12.0	12.9	11.5	20.9
Iron	NA	NA	19600	25600
Lead	35.2	18.9	14.4	29.5
Magnesium	NA	NA	4100	5010
Manganese	NA	NA	278	530
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Potassium	NA	NA	4190	6400
Sodium	NA	NA	142	118
Zinc	82.1	53.2	47.8	87.1
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.0260	0.00472	< 0.00277	0.790
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1228WB	HA1229WB	HA1230WB	HA1231WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	07/03/90	07/03/90	06/14/90	06/13/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	0.00675	< 0.00466	< 0.00466	0.170
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Aldrin	< 0.00211	< 0.00211	0.00719	< 0.00211
Aldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Atrazine (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Benzothiazole	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00
Dicyclopentadiene	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1228WB	HA1229WB	HA1230WB	HA1231WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	07/03/90	07/03/90	06/14/90	06/13/90
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dieldrin	0.0184	0.0128	< 0.00181	0.130
Dieldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dithiane	NA	NA	NA	NA
Dithiane (GCMS)	< 0.400	< 0.400	< 0.400	< 0.400
Endrin	0.00511	< 0.00471	< 0.00471	< 0.00471
Endrin (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Isodrin	< 0.00188	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Malathion (GCMS)	< 0.700	< 0.700	< 0.700	< 0.700
Parathion (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
Supona (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Vapona (GCMS)	< 3.00	< 3.00	< 3.00	< 3.00
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1228WB	HA1229WB	HA1230WB	HA1231WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	07/03/90	07/03/90	06/14/90	06/13/90
Analytes				
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1228WB	HA1229WB	HA1230WB	HA1231WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	07/03/90	07/03/90	06/14/90	06/13/90
Analytes				
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Dimethyl Disulfide	NA	NA	NA	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1228WB	HA1229WB	HA1230WB	HA1231WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	07/03/90	07/03/90	06/14/90	06/13/90
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1232WB	HA1233WB	HA1234WB	HA1235WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/15/90	07/03/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	< 2.50	2.76	< 2.50
Cadmium	< 1.20	< 1.20	< 1.20	< 1.20
Calcium	2200	2260	14600	NA
Chromium	8.37	15.7	15.4	11.2
Copper	6.09	12.0	13.5	8.95
Iron	13100	16800	20300	NA
Lead	14.7	20.6	19.1	16.4
Magnesium	2600	2650	4070	NA
Manganese	240	351	298	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Potassium	1570	3860	4260	NA
Sodium	65.4	68.2	116	NA
Zinc	45.4	47.2	53.7	36.6
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	< 0.00277	< 0.00277	0.00657
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1232WB	HA1233WB	HA1234WB	HA1235WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/15/90	07/03/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	< 0.00466	< 0.00466	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Aldrin	< 0.00211	< 0.00211	0.00590	0.00480
Aldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Atrazine (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Benzothiazole	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00
Dicyclopentadiene	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1232WB	HA1233WB	HA1234WB	HA1235WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/15/90	07/03/90
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dieldrin	< 0.00181	0.00545	0.00992	0.0332
Dieldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dithiane	NA	NA	NA	NA
Dithiane (GCMS)	< 0.400	< 0.400	< 0.400	< 0.400
Endrin	< 0.00471	< 0.00471	< 0.00471	0.00993
Endrin (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Isodrin	< 0.00188	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Malathion (GCMS)	< 0.700	< 0.700	< 0.700	< 0.700
Parathion (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
Supona (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Vapona (GCMS)	< 3.00	< 3.00	< 3.00	< 3.00
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1232WB	HA1233WB	HA1234WB	HA1235WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/15/90	07/03/90
Analytes				
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1232WB	HA1233WB	HA1234WB	HA1235WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/15/90	07/03/90
Analytes				
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Dimethyl Disulfide	NA	NA	NA	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1232WB	HA1233WB	HA1234WB	HA1235WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/14/90	06/18/90	06/15/90	07/03/90
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1261S	HA1263WB	HA1264WB	HA1265WB
Depth	30 cm	5 cm	5 cm	5 cm
Date	07/03/90	07/02/90	07/02/90	07/02/90
Analytes				
Metals/Anions/General Chem				
Arsenic	3.79	< 2.50	< 2.50	2.89
Cadmium	< 1.20	NA	NA	NA
Calcium	NA	NA	NA	NA
Chromium	31.3	NA	NA	NA
Copper	21.7	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	32.4	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	98.9	NA	NA	NA
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	< 0.300	NA	NA	NA
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.00364	< 0.00277	< 0.00277	< 0.00277
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1261S	HA1263WB	HA1264WB	HA1265WB
Depth	30 cm	5 cm	5 cm	5 cm
Date	07/03/90	07/02/90	07/02/90	07/02/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	< 0.00466	< 0.00466	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	NA	NA	NA
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	NA	NA	NA
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	NA	NA	NA
Aldrin	< 0.00211	0.00414	0.00623	0.00320
Aldrin (GCMS)	< 0.300	NA	NA	NA
Atrazine (GCMS)	< 0.300	NA	NA	NA
Benzothiazole	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	< 2.00	NA	NA	NA
Dicyclopentadiene	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1261S	HA1263WB	HA1264WB	HA1265WB
Depth	30 cm	5 cm	5 cm	5 cm
Date	07/03/90	07/02/90	07/02/90	07/02/90
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	< 1.00	NA	NA	NA
Dieldrin	0.0461	0.0106	0.0245	< 0.00181
Dieldrin (GCMS)	< 0.300	NA	NA	NA
Diisopropyl Methylphosphonate (GCMS)	< 1.00	NA	NA	NA
Dithiane	NA	NA	NA	NA
Dithiane (GCMS)	< 0.400	NA	NA	NA
Endrin	< 0.00471	< 0.00471	< 0.00471	< 0.00471
Endrin (GCMS)	< 0.500	NA	NA	NA
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	< 0.600	NA	NA	NA
Isodrin	< 0.00188	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	< 0.300	NA	NA	NA
Malathion (GCMS)	< 0.700	NA	NA	NA
Parathion (GCMS)	< 0.900	NA	NA	NA
Supona (GCMS)	< 0.600	NA	NA	NA
Vapona (GCMS)	< 3.00	NA	NA	NA
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1261S	HA1263WB	HA1264WB	HA1265WB
Depth	30 cm	5 cm	5 cm	5 cm
Date	07/03/90	07/02/90	07/02/90	07/02/90
Analytes				
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rej

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1261S	HA1263WB	HA1264WB	HA1265WB
Depth	30 cm	5 cm	5 cm	5 cm
Date	07/03/90	07/02/90	07/02/90	07/02/90
Analytes				
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	< 0.300	NA	NA	NA
Dimethyl Disulfide	NA	NA	NA	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1261S	HA1263WB	HA1264WB	HA1265WB
Depth	30 cm	5 cm	5 cm	5 cm
Date	07/03/90	07/02/90	07/02/90	07/02/90
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were reje

Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1266WB	HA1267WB	HA1269WB	HA1270WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	07/02/90	07/02/90	07/02/90	07/03/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	< 2.50	< 2.50	< 2.50
Cadmium	NA	NA	NA	< 1.20
Calcium	NA	NA	NA	NA
Chromium	NA	NA	NA	14.5
Copper	NA	NA	NA	10.4
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	39.0
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	0.0896	< 0.0500	< 0.0500
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	NA	55.6
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	NA	NA	NA	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	< 0.00277	0.00280	< 0.00277
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	NA	NA	< 0.500

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1266WB	HA1267WB	HA1269WB	HA1270WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	07/02/90	07/02/90	07/02/90	07/03/90
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	< 0.00466	0.00452	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	NA	NA	< 0.600
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	NA	NA	NA	< 0.900
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	NA	NA	NA	< 0.300
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	NA	NA	< 0.300
Aldrin	< 0.00211	< 0.00211	< 0.00211	0.00534
Aldrin (GCMS)	NA	NA	NA	< 0.300
Atrazine (GCMS)	NA	NA	NA	< 0.300
Benzothiazole	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene	NA	NA	NA	NA
Bicyclo [2,2,1] hepta-2,5-diene (GCMS)	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	NA	NA	NA	< 2.00
Dicyclopentadiene	NA	NA	NA	NA

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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1266WB	HA1267WB	HA1269WB	HA1270WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	07/02/90	07/02/90	07/02/90	07/03/90
Analytes				
Semivolatiles				
Dicyclopentadiene (GCMS)	NA	NA	NA	< 1.00
Dieldrin	0.00741	0.00629	0.0124	0.00536
Dieldrin (GCMS)	NA	NA	NA	< 0.300
Diisopropyl Methylphosphonate (GCMS)	NA	NA	NA	< 1.00
Dithiane	NA	NA	NA	NA
Dithiane (GCMS)	NA	NA	NA	< 0.400
Endrin	< 0.00471	< 0.00471	0.00509	< 0.00471
Endrin (GCMS)	NA	NA	NA	< 0.500
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	NA	NA	NA	< 0.600
Isodrin	< 0.00188	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	NA	NA	NA	< 0.300
Malathion (GCMS)	NA	NA	NA	< 0.700
Parathion (GCMS)	NA	NA	NA	< 0.900
Supona (GCMS)	NA	NA	NA	< 0.600
Vapona (GCMS)	NA	NA	NA	< 3.00
Volatiles				
1,1,1-Trichloroethane	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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NA -- Not Analyzed.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1266WB	HA1267WB	HA1269WB	HA1270WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	07/02/90	07/02/90	07/02/90	07/03/90
Analytes				
Volatiles				
1,1,1-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethane (GCMS)	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethane (GCMS)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans)	NA	NA	NA	NA
1,2-Dichloroethenes (cis & trans) (GCMS)	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Benzene (GCMS)	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA
Carbon Tetrachloride (GCMS)	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chlorobenzene (GCMS)	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1266WB	HA1267WB	HA1269WB	HA1270WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	07/02/90	07/02/90	07/02/90	07/03/90
Analytes				
Volatiles				
Chloroform (GCMS)	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	NA	NA	NA	< 0.300
Dimethyl Disulfide	NA	NA	NA	NA
Dimethyl Disulfide (GCMS)	NA	NA	NA	NA
Ethyl Benzene	NA	NA	NA	NA
Ethyl Benzene (GCMS)	NA	NA	NA	NA
M-Xylene	NA	NA	NA	NA
M-Xylene (GCMS)	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA
Methylene Chloride (GCMS)	NA	NA	NA	NA
Methylisobutyl Ketone	NA	NA	NA	NA
Methylisobutyl Ketone (GCMS)	NA	NA	NA	NA
O,P-Xylene	NA	NA	NA	NA
O,P-Xylene (GCMS)	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Tetrachloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
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Table E1 Surficial and Subsurface Soil
Investigative Analytical Data

Sample ID	HA1266WB	HA1267WB	HA1269WB	HA1270WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	07/02/90	07/02/90	07/02/90	07/03/90
Analytes				
Volatiles				
Toluene	NA	NA	NA	NA
Toluene (GCMS)	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Trichloroethene (GCMS)	NA	NA	NA	NA

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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Table E2 Surficial and Subsurface Soil
GC/MS Analytical Data

Sample ID	HA1237WB	HA1260WB
Depth	5 cm	5 cm
Date	06/18/90	07/03/90
	GC/MS of HA1233WB	GC/MS of HA1244WB
Analytes		
Metals/Anions/General Chem		
Arsenic	< 2.50	< 2.50
Cadmium	< 1.20	< 1.20
Calcium	2250	NA
Chromium	15.7	15.9
Copper	11.8	9.02
Iron	17000	NA
Lead	19.9	19.6
Magnesium	2690	NA
Manganese	356	NA
Mercury	< 0.0500	< 0.0500
Potassium	3870	NA
Sodium	66.8	NA
Zinc	47.7	57.2
Semivolatiles		
1,4-Oxathiane (GCMS)	< 0.300	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	0.00718

Notes: Values are reported in micrograms per gram.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected

Table E2 Surficial and Subsurface Soil
GC/MS Analytical Data

Sample ID	HA1237WB	HA1260WB
Depth	5 cm	5 cm
Date	06/18/90	07/03/90
	GC/MS of HA1233WB	GC/MS of HA1244WB
Analytes		
Semivolatiles		
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300
Aldrin	< 0.00211	0.00361
Aldrin (GCMS)	< 0.300	< 0.300
Atrazine (GCMS)	< 0.300	< 0.300
Chlordane	< 0.0230	< 0.0230
Chlordane (GCMS)	< 2.00	< 2.00
Dicyclopentadiene (GCMS)	< 1.00	< 1.00
Dieldrin .	0.00443	0.0108
Dieldrin (GCMS)	< 0.300	< 0.300
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were
re[illegible]

Table E2 Surficial and Subsurface Soil
GC/MS Analytical Data

Sample ID	HA1237WB	HA1260WB
Depth	5 cm	5 cm
Date	06/18/90	07/03/90
	GC/MS of HA1233WB	GC/MS of HA1244WB
Analytes		
Semivolatiles		
Dithiane (GCMS)	< 0.400	< 0.400
Endrin	< 0.00471	0.00646
Endrin (GCMS)	< 0.500	< 0.500
Hexachlorocyclopentadiene	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600
Isodrin	< 0.00188	< 0.00188
Isodrin (GCMS)	< 0.300	< 0.300
Malathion (GCMS)	< 0.700	< 0.700
Parathion (GCMS)	< 0.900	< 0.900
Supona (GCMS)	< 0.600	< 0.600
Vapona (GCMS)	< 3.00	< 3.00
Volatiles		
Dibromochloropropane (GCMS)	< 0.300	< 0.300

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected

Table E3 Surficial and Subsurface Soil
Duplicate Analytical Data

Sample ID	HA0995WB	HA1237WB	HA1238WB	HA1240WB
Depth	3 cm	5 cm	5 cm	5 cm
Date	02/24/89	06/18/90	06/18/90	06/18/90
	Dup of HA0994WB	Dup of HA1233WB	Dup of HA1201WB	Dup of HA1209WB
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	< 2.50	4.34	< 2.50
Cadmium	NA	< 1.20	NA	NA
Calcium	NA	2250	NA	NA
Chromium	NA	15.7	NA	NA
Copper	NA	11.8	NA	NA
Iron	NA	17000	NA	NA
Lead	NA	19.9	NA	NA
Magnesium	NA	2690	NA	NA
Manganese	NA	356	NA	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Potassium	NA	3870	NA	NA
Sodium	NA	66.8	NA	NA
Zinc	NA	47.7	NA	NA
Semivolatiles				
1,4-Oxathiane	< 1.74	NA	NA	NA
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	NA	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
Dup -- Duplicate

Table E3 Surficial and Subsurface Soil
Duplicate Analytical Data

Sample ID	HA0995WB	HA1237WB	HA1238WB	HA1240WB
Depth	3 cm	5 cm	5 cm	5 cm
Date	02/24/89	06/18/90	06/18/90	06/18/90
	Dup of HA0994WB	Dup of HA1233WB	Dup of HA1201WB	Dup of HA1209WB
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	0.0198	< 0.00277	0.00911	0.0103
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	NA	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	0.00367	< 0.00466	< 0.00466	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	NA	NA
4-Chlorophenylmethyl Sulfide	< 4.40	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	NA	NA
4-Chlorophenylmethyl Sulfone	< 9.01	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	NA	NA
4-Chlorophenylmethyl Sulfoxide	R	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	NA	NA
Aldrin	0.0202	< 0.00211	< 0.00211	< 0.00211
Aldrin (GCMS)	< 0.300	< 0.300	NA	NA
Atrazine (GCMS)	< 0.300	< 0.300	NA	NA
Benzothiazole	< 2.04	NA	NA	NA
Chlordane	0.0515	< 0.0230	< 0.0230	< 0.0230

Notes: Values are reported in micrograms per gram.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
-- D[illegible]te

Table E3 Surficial and Subsurface Soil
Duplicate Analytical Data

Sample ID	HA0995WB	HA1237WB	HA1238WB	HA1240WB
Depth	3 cm	5 cm	5 cm	5 cm
Date	02/24/89	06/18/90	06/18/90	06/18/90
	Dup of HA0994WB	Dup of HA1233WB	Dup of HA1201WB	Dup of HA1209WB
Analytes				
Semivolatiles				
Chlordane (GCMS)	< 2.00	< 2.00	NA	NA
Dicyclopentadiene (GCMS)	< 1.00	< 1.00	NA	NA
Dieldrin	0.210	0.00443	0.00896	0.00529
Dieldrin (GCMS)	< 0.300	< 0.300	NA	NA
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	NA	NA
Dithiane	< 1.45	NA	NA	NA
Dithiane (GCMS)	< 0.400	< 0.400	NA	NA
Endrin	0.0187	< 0.00471	< 0.00471	< 0.00471
Endrin (GCMS)	< 0.500	< 0.500	NA	NA
Hexachlorocyclopentadiene	< 0.00180	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	NA	NA
Isodrin	< 0.00110	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	< 0.300	< 0.300	NA	NA
Malathion (GCMS)	< 0.700	< 0.700	NA	NA
Parathion (GCMS)	< 0.900	< 0.900	NA	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
Dup -- Duplicate

Table E3 Surficial and Subsurface Soil
Duplicate Analytical Data

Sample ID	HA0995WB	HA1237WB	HA1238WB	HA1240WB
Depth	3 cm	5 cm	5 cm	5 cm
Date	02/24/89	06/18/90	06/18/90	06/18/90
	Dup of HA0994WB	Dup of HA1233WB	Dup of HA1201WB	Dup of HA1209WB
Analytes				
Semivolatiles				
Supona (GCMS)	< 0.600	< 0.600	NA	NA
Vapona (GCMS)	< 3.00	< 3.00	NA	NA
Volatiles				
Dibromochloropropane	R	NA	NA	NA
Dibromochloropropane (GCMS)	< 0.300	< 0.300	NA	NA
Dimethyl Disulfide	< 3.12	NA	NA	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
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Table E3 Surficial and Subsurface Soil
Duplicate Analytical Data

Sample ID	HA1241WB	HA1242WB	HA1260WB	HA1268WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/18/90	06/15/90	07/03/90	07/02/90
	Dup of HA1217WB	Dup of HA1220WB	Dup of HA1244WB	Dup of HA1267WB
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	3.74	< 2.50	< 2.50
Cadmium	NA	NA	< 1.20	NA
Calcium	NA	NA	NA	NA
Chromium	NA	NA	15.9	NA
Copper	NA	NA	9.02	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	19.6	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	< 0.0500	< 0.0500	< 0.0500	0.111
Potassium	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Zinc	NA	NA	57.2	NA
Semivolatiles				
1,4-Oxathiane	NA	NA	NA	NA
1,4-Oxathiane (GCMS)	NA	NA	< 0.300	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
Dup -- Duplicate

Table E3 Surficial and Subsurface Soil
Duplicate Analytical Data

Sample ID / Depth / Date	HA1241WB	HA1242WB	HA1260WB	HA1268WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/18/90	06/15/90	07/03/90	07/02/90
	Dup of HA1217WB	Dup of HA1220WB	Dup of HA1244WB	Dup of HA1267WB
Analytes				
Semivolatiles				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	< 0.00277	0.00718	< 0.00277
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	NA	NA	< 0.500	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	< 0.00466	< 0.00466	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	NA	NA	< 0.600	NA
4-Chlorophenylmethyl Sulfide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfide (GCMS)	NA	NA	< 0.900	NA
4-Chlorophenylmethyl Sulfone	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfone (GCMS)	NA	NA	< 0.300	NA
4-Chlorophenylmethyl Sulfoxide	NA	NA	NA	NA
4-Chlorophenylmethyl Sulfoxide (GCMS)	NA	NA	< 0.300	NA
Aldrin	< 0.00211	< 0.00211	0.00361	< 0.00211
Aldrin (GCMS)	NA	NA	< 0.300	NA
Atrazine (GCMS)	NA	NA	< 0.300	NA
Benzothiazole	NA	NA	NA	NA
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
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Table E3 Surficial and Subsurface Soil
Duplicate Analytical Data

Sample ID	HA1241WB	HA1242WB	HA1260WB	HA1268WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/18/90	06/15/90	07/03/90	07/02/90
	Dup of HA1217WB	Dup of HA1220WB	Dup of HA1244WB	Dup of HA1267WB
Analytes				
Semivolatiles				
Chlordane (GCMS)	NA	NA	< 2.00	NA
Dicyclopentadiene (GCMS)	NA	NA	< 1.00	NA
Dieldrin	< 0.00181	< 0.00181	0.0108	0.00629
Dieldrin (GCMS)	NA	NA	< 0.300	NA
Diisopropyl Methylphosphonate (GCMS)	NA	NA	< 1.00	NA
Dithiane	NA	NA	NA	NA
Dithiane (GCMS)	NA	NA	< 0.400	NA
Endrin	< 0.00471	< 0.00471	0.00646	< 0.00471
Endrin (GCMS)	NA	NA	< 0.500	NA
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	NA	NA	< 0.600	NA
Isodrin	< 0.00188	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	NA	NA	< 0.300	NA
Malathion (GCMS)	NA	NA	< 0.700	NA
Parathion (GCMS)	NA	NA	< 0.900	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
Dup -- Duplicate

Table E3 Surficial and Subsurface Soil
Duplicate Analytical Data

Sample ID	HA1241WB	HA1242WB	HA1260WB	HA1268WB
Depth	5 cm	5 cm	5 cm	5 cm
Date	06/18/90	06/15/90	07/03/90	07/02/90
	Dup of HA1217WB	Dup of HA1220WB	Dup of HA1244WB	Dup of HA1267WB
Analytes				
Semivolatiles				
Supona (GCMS)	NA	NA	< 0.600	NA
Vapona (GCMS)	NA	NA	< 3.00	NA
Volatiles				
Dibromochloropropane	NA	NA	NA	NA
Dibromochloropropane (GCMS)	NA	NA	< 0.300	NA
Dimethyl Disulfide	NA	NA	NA	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
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Table E4 Surficial and Subsurface Soil
Background Analytical Data

Sample ID	HA1236WB	HA1243WB	HA1244WB	HA1262WB
Depth	0 cm	6 cm	6 cm	6 cm
Date	07/03/90	07/03/90	07/03/90	07/03/90
Analytes				
Metals/Anions/General Chem				
Arsenic	< 2.50	< 2.50	< 2.50	< 2.50
Cadmium	< 1.20	< 1.20	< 1.20	< 1.20
Chromium	14.9	11.4	14.1	17.1
Copper	8.14	6.61	7.95	9.35
Lead	13.0	10.6	18.2	19.3
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Zinc	37.4	30.7	47.9	52.9
Semivolatiles				
1,4-Oxathiane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.00277	< 0.00277	< 0.00277	0.00578
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.00466	< 0.00466	< 0.00466	< 0.00466
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
4-Chlorophenylmethyl Sulfide (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
4-Chlorophenylmethyl Sulfone (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
4-Chlorophenylmethyl Sulfoxide (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Aldrin	0.00328	< 0.00211	< 0.00211	< 0.00211
Aldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Table E4 Surficial and Subsurface Soil
Background Analytical Data

Sample ID	HA1236WB	HA1243WB	HA1244WB	HA1262WB
Depth	0 cm	6 cm	6 cm	6 cm
Date	07/03/90	07/03/90	07/03/90	07/03/90
Analytes				
Semivolatiles				
Atrazine (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Chlordane	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Chlordane (GCMS)	< 2.00	< 2.00	< 2.00	< 2.00
Dicyclopentadiene (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dieldrin	< 0.00181	< 0.00181	< 0.00181	0.00294
Dieldrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Diisopropyl Methylphosphonate (GCMS)	< 1.00	< 1.00	< 1.00	< 1.00
Dithiane (GCMS)	< 0.400	< 0.400	< 0.400	< 0.400
Endrin	< 0.00471	< 0.00471	< 0.00471	< 0.00471
Endrin (GCMS)	< 0.500	< 0.500	< 0.500	< 0.500
Hexachlorocyclopentadiene	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Hexachlorocyclopentadiene (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600
Isodrin	< 0.00188	< 0.00188	< 0.00188	< 0.00188
Isodrin (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300
Malathion (GCMS)	< 0.700	< 0.700	< 0.700	< 0.700
Parathion (GCMS)	< 0.900	< 0.900	< 0.900	< 0.900
Supona (GCMS)	< 0.600	< 0.600	< 0.600	< 0.600

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
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NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were re.

Table E4 Surficial and Subsurface Soil
Background Analytical Data

Sample ID	HA1236WB	HA1243WB	HA1244WB	HA1262WB
Depth	0 cm	6 cm	6 cm	6 cm
Date	07/03/90	07/03/90	07/03/90	07/03/90
Analytes				
Semivolatiles				
Vapona (GCMS)	< 3.00	< 3.00	< 3.00	< 3.00
Volatiles				
Dibromochloropropane (GCMS)	< 0.300	< 0.300	< 0.300	< 0.300

Notes: Values are reported to microgram per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.

Appendix F

BIOTA ANALYTICAL DATA

LIST OF TABLES

Table F1 Biota Investigative Analytical Data

Sample ID Date	HA0982BA 11/18/88	HA0983BA 11/18/88	HA0984BA 11/18/88	HA1006BE 04/20/89	HA1009BM 08/07/89	HA1010BM 08/07/89
Analytes						
Metals/Anions/General Chem						
Arsenic	< 0.250	< 0.250	< 0.250	< 0.2500	NA	NA
Mercury	< 0.0500	0.0518	0.155	< 0.0500	NA	NA
Semivolatiles						
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.132	< 0.132	< 0.132	< 0.1320	NA	NA
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0630	< 0.0630	< 0.0630	< 0.0630	NA	NA
Aldrin	< 0.0130	< 0.0130	< 0.0130	< 0.0130	NA	NA
Dieldrin	0.251	0.0264	0.235	0.0179	NA	NA
Endrin	< 0.0360	< 0.0360	< 0.0360	< 0.0360	NA	NA
Volatiles						
Dibromochloropropane	NA	NA	NA	NA	< 0.195	< 0.195

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
Sample ID suffixes: BA - fish, BB - bovine, BE - egg, BF - fat, BM - milk, BP - poultry.

Table F1 Biota Investigative Analytical Data

Sample ID Date	HA1012BF 08/07/89	HA1013BF 08/07/89	HA1017BP 09/07/89	HA1036BB 10/19/89	HA1037BB 10/19/89	HA1038BB 10/19/89
Analytes						
Metals/Anions/General Chem						
Arsenic	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Semivolatiles						
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.132	< 0.132	< 0.132	< 0.132	< 0.132	< 0.132
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0630	< 0.0630	< 0.0630	< 0.0630	< 0.0630	< 0.0630
Aldrin	< 0.0130	< 0.0130	< 0.0130	< 0.0130	< 0.0130	< 0.0130
Dieldrin	0.0533	0.0784	0.0230	< 0.0180	< 0.0180	< 0.0180
Endrin	< 0.0360	< 0.0360	< 0.0360	< 0.0360	< 0.0360	< 0.0360
Volatiles						
Dibromochloropropane	NA	NA	NA	NA	NA	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
Sample ID suffixes: BA - fish, BB - bovine, BE - egg,
fat · mil - p y.

Table F1 Biota Investigative Analytical Data

Sample ID Date	HA1039BB 10/19/89	HA1040BB 10/19/89	HA1042BP 09/07/89	HA1043BP 09/07/89	HA1049B 09/25/89	HA1050B 09/07/89
Analytes						
Metals/Anions/General Chem						
Arsenic	< 0.250	< 0.250	< 0.250	< 0.250	0.771	< 0.250
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Semivolatiles						
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.132	< 0.132	< 0.132	< 0.132	< 0.132	< 0.132
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0630	< 0.0630	0.106	< 0.0630	< 0.0630	< 0.0630
Aldrin	< 0.0130	< 0.0130	< 0.0130	< 0.0130	< 0.0130	< 0.0130
Dieldrin	< 0.0180	< 0.0180	0.230	< 0.0180	< 0.0180	< 0.0180
Endrin	< 0.0360	< 0.0360	< 0.0360	< 0.0360	< 0.0360	< 0.0360
Volatiles						
Dibromochloropropane	NA	NA	NA	NA	NA	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
Sample ID suffixes: BA - fish, BB - bovine, BE - egg, BF - fat, BM - milk, BP - poultry.

Table F1 Biota Investigative Analytical Data

Sample ID / Date	HA1051B 09/23/89	HA1052B 09/13/89	HA1053B 09/12/89	HA1054B 09/13/89	HA1055B 10/24/89	HA1056B 09/12/89
Analytes						
Metals/Anions/General Chem						
Arsenic	< 0.250	NA	1.36	< 0.250	< 0.250	< 0.250
Mercury	< 0.0500	NA	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Semivolatiles						
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.132	< 0.132	< 0.132	< 0.132	< 0.132	< 0.132
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0630	< 0.0630	< 0.0630	< 0.0630	< 0.0630	< 0.0630
Aldrin	< 0.0130	< 0.0130	< 0.0130	< 0.0130	< 0.0130	< 0.0130
Dieldrin	0.571	< 0.0180	0.0230	< 0.0180	0.0327	< 0.0180
Endrin	< 0.0360	< 0.0360	< 0.0360	< 0.0360	< 0.0360	< 0.0360
Volatiles						
Dibromochloropropane	NA	NA	NA	NA	NA	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
Sample ID suffixes: BA - fish, BB - bovine, BE - egg,
fat, mill - px '.

Table F1 Biota Investigative Analytical Data

Sample ID Date	HA1057B 09/13/89	HA1058B 09/13/89	HA1059B 09/23/89	HA1060B 10/27/89	HA1061B 09/22/89	HA1062B 09/22/89
Analytes						
Metals/Anions/General Chem						
Arsenic	1.33	< 0.250	< 0.250	< 0.250	< 0.250	0.573
Mercury	0.0612	< 0.0500	< 0.0500	< 0.0500	0.0897	< 0.0500
Semivolatiles						
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.132	< 0.132	< 0.132	< 0.132	< 0.132	< 0.132
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0630	< 0.0630	< 0.0630	< 0.0630	< 0.0630	< 0.0630
Aldrin	< 0.0130	< 0.0130	< 0.0130	< 0.0130	< 0.0130	< 0.0130
Dieldrin	0.0211	< 0.0180	0.140	< 0.0180	< 0.0180	< 0.0180
Endrin	< 0.0360	< 0.0360	< 0.0360	< 0.0360	< 0.0360	< 0.0360
Volatiles						
Dibromochloropropane	NA	NA	NA	NA	NA	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
Sample ID suffixes: BA - fish, BB - bovine, BE - egg, BF - fat, BM - milk, BP - poultry.

Table F1 Biota Investigative Analytical Data

Sample ID	HA1063B	HA1064B	HA1065B	HA1246B	HA1247B	HA1248B
Date	09/13/89	09/14/89	09/23/89	09/11/89	09/11/89	10/26/89
Analytes						
Metals/Anions/General Chem						
Arsenic	1.69	< 0.250	< 0.250	NA	NA	< 0.250
Mercury	0.0612	< 0.0500	< 0.0500	NA	NA	< 0.0500
Semivolatiles						
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.132	< 0.132	< 0.132	< 0.171	< 0.132	< 0.132
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0630	< 0.0630	< 0.0630	< 0.0819	< 0.0630	< 0.0630
Aldrin	< 0.0130	< 0.0130	< 0.0130	< 0.0169	< 0.0130	< 0.0130
Dieldrin	< 0.0180	< 0.0180	< 0.0180	< 0.0234	0.0282	< 0.0180
Endrin	< 0.0360	< 0.0360	< 0.0360	< 0.0468	< 0.0360	< 0.0360
Volatiles						
Dibromochloropropane	NA	NA	NA	NA	NA	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
Sample ID suffixes: BA - fish, BB - bovine, BE - egg,
fat, milk - po .

Table F1 Biota Investigative Analytical Data

Sample ID / Date	HA1249B 09/12/89	HA1249B 10/24/89	HA1250B 09/12/89	HA1251B 09/23/89	HA1252B 10/27/89	HA1253B 09/22/89
Analytes						
Metals/Anions/General Chem						
Arsenic	NA	< 0.250	1.85	< 0.250	< 0.250	1.02
Mercury	NA	< 0.0500	0.0767	< 0.0500	< 0.0500	< 0.0500
Semivolatiles						
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.132	NA	< 0.132	< 0.132	< 0.132	< 0.155
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	NA	< 0.0630	< 0.0630	< 0.0630	< 0.0630	< 0.0420
Aldrin	NA	< 0.0130	< 0.0130	< 0.0130	< 0.0130	< 0.0210
Dieldrin	NA	< 0.0180	< 0.0180	0.0267	< 0.0180	< 0.0260
Endrin	NA	< 0.0360	< 0.0360	< 0.0360	< 0.0360	< 0.0450
Volatiles						
Dibromochloropropane	NA	NA	NA	NA	NA	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
Sample ID suffixes: BA - fish, BB - bovine, BE - egg, BF - fat, BM - milk, BP - poultry.

Table F1 Biota Investigative Analytical Data

Sample ID	HA1254B	HA1255BF	HA1255BL	HA1256BF	HA1256BL	HA1257BF
Date	09/13/89	01/02/90	01/02/90	01/21/90	01/21/90	01/23/90
Analytes						
Metals/Anions/General Chem						
Arsenic	0.965	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250
Mercury	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Semivolatiles						
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.132	< 0.132	< 0.132	< 0.132	< 0.132	< 0.132
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0630	< 0.0630	< 0.0630	< 0.0630	< 0.0630	< 0.0630
Aldrin	< 0.0130	< 0.0130	< 0.0130	< 0.0130	< 0.0130	< 0.0130
Dieldrin	0.0221	< 0.0180	< 0.0180	< 0.0180	< 0.0180	< 0.0180
Endrin	< 0.0360	< 0.0360	< 0.0360	< 0.0360	< 0.0360	< 0.0360
Volatiles						
Dibromochloropropane	NA	NA	NA	NA	NA	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
Sample ID suffixes: BA - fish, BB - bovine, BE - egg,
[illegible] fat, [illegible] mil[illegible] - p[illegible].

Table F1 Biota Investigative Analytical Data

Sample ID	HA1257BL
Date	01/23/90
Analytes	
Metals/Anions/General Chem	
Arsenic	NA
Mercury	NA
Semivolatiles	
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.132
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0630
Aldrin	< 0.0130
Dieldrin	0.380
Endrin	< 0.0360
Volatiles	
Dibromochloropropane	NA

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
Sample ID suffixes: BA - fish, BB - bovine, BE - egg, BF - fat, BM - milk, BP - poultry.

Table F2 Biota QA/QC Analytical Data

Sample ID	HA1011BM	HA1014BM	HA1015BM	HA1016BM
Date	08/07/89	08/07/89	08/07/89	08/07/89
	FB of HA1009BM	LS of HA1009BM	HS of HA1009BM	HS of HA1009BM
Analytes				
Volatiles				
Dibromochloropropane	< 0.195	0.396	2.95	2.53

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
FB -- Field Blank
LS -- Low Spike
HS -- High Spike

Table F3 Biota Duplicate Analytical Data

Sample ID Date Analytes	HA0982BAD 11/18/88 Dup of HA0982BA	HA1255BFD 01/02/90 Dup of HA1255BF
Metals/Anions/General Chem		
Arsenic	< 0.250	< 0.250
Mercury	< 0.0500	< 0.0500
Semivolatiles		
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT)	< 0.132	< 0.132
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE)	< 0.0630	< 0.0630
Aldrin	< 0.0130	< 0.0130
Dieldrin	0.153	< 0.0180
Endrin	< 0.0360	< 0.0360

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that the target analyte was detected at or above the Maximum Reporting Limit.
NA -- Not Analyzed.
R -- Data did not meet quality control criteria and were rejected.
Sample ID suffixes: BA - fish, BF - fat.

Table F4: Species of Possible Occurrence in the Offpost Study Area
(Page 1 of 8)

Family	Genus	Species	Common Name	Status	Habitat	Observed Offpost
Reptiles						
Chelydridae	Chelydra	serpentina	Snapping turtle	b	RpL, Ms, OW-St/Ri, OW-L/R	
Colubridae	Coluber	constrictor flaviventris	Eastern yellowbelly racer	B	SgP, MXP, TgP, RpL, Ag, U	
Colubridae	Heterodon	nasicus	Western hognose snake	B	SgP, TgP, RpL, Ag, sd	
Colubridae	Lampropeltis	triangulum	Milk snake	B	SgP, TgP, RpL, Ag, sd	
Colubridae	Masticophis	flagellum	Coachwhip	B	SgP, TgP, RpL, cl	
Colubridae	Nerodia	sipedon	Northern water snake	B	RpL, Ms, OW-St/Ri, OW-L/R	
Colubridae	Pituophis	melanoleucus	Bullsnake	B	SgP, MXP, TgP, RpL, Ag, U, Sd	x
Colubridae	Thamnophis	elegans	Western Terrestrial garter	B	RpL, Ms, In	
Colubridae	Thamnophis	radix	Plains garter snake	B	RpL, Ms, In, SgP, TgP, U	
Colubridae	Thamnophis	sirtalis	Red-sided garter snake	B	RpL, Ms, In	
Colubridae	Tropidoclonion	lineatum	Lined snake	B	SgP, U, RpL	
Emydidae	Chrysemys	picta	Western Painted turtle	B	RpL, Ms, OW-St/Ri, OW-L/R	
Emydidae	Terrapene	ornata	Western box turtle	B	SgP, sd, TgP, RpL	
Iguanidae	Holbrookia	maculata maculata	Northern earless lizard	B	SgP, MXP, TgP, Ag, sd	
Iguanidae	Phrynosoma	douglassi	Short-horned lizard	B	SgP, TgP, SgSD, cl	
Iguanidae	Sceloporus	undulatus erythrochlus	Eastern fence lizard	B	SgP, RpL, cl	
Iguanidae	Sceloporus	undulatus garmani	Northern fence lizard	B	SgP, TgP, sd	
Scincidae	Eumeces	multivirgatus	Many-lined skink	B	SgP, TgP, Ag, U, sd	
Scincidae	Eumeces	obsoletus	Great Plains skink	b	SgP, TgP, Ag, RpL	
Teiidae	Cnemidophorus	sexlineatus	Six-lined racerunner	B	SgP, sd, TgP, RpL	
Trionychidae	Trionyx	spiniferus	Spiny soft-shelled turtle	b	RpL, OW-St/Ri, OW-L/R, Ms, In	x
Viperidae	Crotalus	viridis	Prairie rattlesnake	B	SgP, TgP, cl	
Amphibians						
Ambystomatidae	Ambystoma	tigrinum	Tiger salamander	B	Ms, In; All other types	
Bufonidae	Bufo	cognatus	Great Plains toad	B	In, SgP, MXP, TgP, RpL, Ag, U	
Bufonidae	Bufo	woodhousei	Woodhouse's toad	B	SgP, SgSD, MXP, TgP, RpL, Ag	
Hylidae	Pseudacris	triseriata	Chorus frog	B	Ms, In, RpL, Ag	
Pelobatidae	Scaphiopus	bombifrons	Plains spadefoot	B	In, SgP, sd, TgP	
Ranidae	Rana	catesbiana	Bullfrog	B	Ms, In, RpL	
Ranidae	Rana	pipiens	Northern leopard frog	B	Ms, In, RpL	
Antilocapridae	Antilocapra	americana	Pronghorn	B	SgP, MXP	
Canidae	Canis	latrans	Coyote	B	All types	x
Canidae	Urocyon	cinereoargenteus	Gray fox	B	SgP, TgP, RpL	
Canidae	Vulpes	velox	Swift fox	B	SgP, Ag	
Canidae	Vulpes	vulpes	Red fox	B	Ms, Ag	x
Cervidae	Odocoileus	hemionus	Mule deer	B	RpL, SgP, TgP	x
Cervidae	Odocoileus	virginianus	White-tailed deer	B	RpL	
Cricetidae	Microtus	ochrogaster	Prairie vole	B	SgP, TgP, RpL, Ms	
Cricetidae	Microtus	pennsylvanicus	Meadow vole	B	RpL, Ms	x

Family	Genus	Species	Common Name	Status	Habitat	Observed Offpost
Cricetidae	Ondatra	zibethicus	Muskrat	B	Ms, OW-Ri/St	
Cricetidae	Onychomys	leucogaster	Northern grasshopper mouse	B	SgP, MXP, TgP	x
Cricetidae	Peromyscus	maniculatus	Deer mouse	B	All types (esp. MXP)	x
Cricetidae	Reithrodontomys	megalotis	Western harvest mouse	B	SgP, MXP, RpL, Ms, Ag	
Cricetidae	Reithrodontomys	montanus	Plains harvest mouse	B	SgP, RpL	
Didelphida	Didelphis	virginiana	Opossum	B	RpL, Ag, U	
Erethizontidae	Erethizon	dorsatum	Porcupine	B	RpL	
Felidae	Lynx	rufus	Bobcat	B	RpL, Ms	
Geomyidae	Geomys	bursarius	Plains pocket gopher	B	SgP, MXP, TgP, Ag	
Geomyidae	Thomomys	talpoides	Northern pocket gopher	B	SgP, Ag	x
Heteromyidae	Dipodomys	ordii	Ord's kangaroo rat	B	SgP, MXP, TgP, RpL	
Heteromyidae	Perognathus	fasciatus	Olive-backed pocket mouse	B	SgP	
Heteromyidae	Perognathus	flavescens	Plains pocket mouse	B	SgP, TgP	
Heteromyidae	Perognathus	flavus	Silky pocket mouse	B	SgP, MXP, TgP	
Heteromyidae	Perognathus	hispidus	Hispid pocket mouse	B	SgP, MXP, SS, RpL	
Leporidae	Lepus	californicus	Black-tailed jackrabbit	B	SgP, MXP, TgP	x
Leporidae	Lepus	townsendii	White-tailed jackrabbit	B	SgP, MXP	
Leporidae	Sylvilagus	audubonii	Desert cottontail	B	SgP, RpL	x
Leporidae	Sylvilagus	floridanus	Eastern cottontail	B	RpL	
Muridae	Mus	musculus	House mouse	B,I	RpL, Ms, Cr, U	x
Muridae	Rattus	norvegicus	Norway rat	B,I	RpL, Cr, U	
Mustelidae	Mephitis	mephitis	Striped skunk	B	All types	x
Mustelidae	Mustela	frenata	Long-tailed weasel	B	All types	
Mustelidae	Mustela	nigripes	Black-footed ferret	E	SgP, MXP	
Mustelidae	Mustela	vison	Mink	b	RpL	
Mustelidae	Spilogale	putorius	Spotted skunk	B	RpL	
Mustelidae	Taxidea	taxus	Badger	B	SgP, SgSD, TgP	x
Procyonidae	Procyon	lotor	Raccoon	B	RpL, Ms, Ag	
Sciuridae	Cynomys	ludovicianus	Black-tailed prairie dog	B	SgP, MXP, U	x
Sciuridae	Sciurus	niger	Fox squirrel	B	RpL, U	x
Sciuridae	Spermophilus	spilosoma	Spotted ground squirrel	B	SgP, TgP	
Sciuridae	Spermophilus	tridecemlineatus	13-lined ground squirrel	B	MXP, TgP	
Sciuridae	Spermophilus	variegatus	Rock squirrel	B	MXP, RpL	
Soricidae	Cryptotis	parva	Least shrew	B	RpL, Ms, Roadsides	
Soricidae	Sorex	cinereus	Masked shrew	B	Ms, RpL	
Soricidae	Sorex	merriami	Merriam's shrew	B	SgP	
Vespertilionidae	Eptesicus	fuscus	Big brown bat	B	RpL, U	
Vespertilionidae	Lasionycteris	noctivagans	Silver-haired bat	M	RpL	
Vespertilionidae	Myotis	lucifugus	Little brown myotis	b	U	
Vespertilionidae	Myotis	sublatus	Small footed myotis	b	U, SgP, MXP, TgP	
Vespertilionidae	Nycteris	cinerea	Hoary bat	M	RpL	
Zapodidae	Zapus	hudsonius	Meadow jumping mouse	B	Ms	

Family	Genus	Species	Common Name	Status	Habitat	Observed Offpost
Birds						
Accipitridae	Aquila	chrysaetos	Golden eagle	R	Ag, SgP	x
Accipitridae	Buteo	jamaicensis	Red-tailed hawk	R	Ag, all types	
Accipitridae	Buteo	lagopus	Rough-legged hawk	W	Ag, SgP	
Accipitridae	Buteo	regalis	Ferruginous hawk	R	SgP, Ag, RpL	x
Accipitridae	Buteo	swainsoni	hawk	B	Ag, RpL	x
Accipitridae	Circus	cyaneus	Northern Harrier	R	Ms, Cr, Ag, Aq	x
Accipitridae	Haliaeetus	leucocephalus	Bald eagle	W,E	U, Ag, SgP, MXP	x
Alaudidae	Eremophila	alpestris	Horned lark	R	GL, U	x
Alcedinidae	Ceryle	alcyon	Belted kingfisher	R	RpL, Ri, L	
Anatidae	Anas	acuta	Northern Pintail	R	Aq, L	
Anatidae	Anas	americana	American wigeon	R	Aq, L	
Anatidae	Anas	clypeata	Northern shoveler	R	Aq, L	
Anatidae	Anas	crecca	Green-winged teal	R	Aq, L	x
Anatidae	Anas	cyanoptera	Cinnamon teal	B	Aq, L	
Anatidae	Anas	discors	Blue-winged teal	B	Aq, L	
Anatidae	Anas	platyrhynchos	Mallard	R	Aq, Cr	x
Anatidae	Anas	strepera	Gadwall	R	Aq	
Anatidae	Branta	canadensis	Canada goose	R	Aq, Cr	
Anatidae	Chen	caerulescens	Snow goose	M	L, Ms, Cr	
Anatidae	Lophodytes	cucullatus	Hooded merganser	W	Ms, RpL, Ri	
Anatidae	Mergus	merganser	Common merganser	W	Aq, RpL	
Anatidae	Mergus	serrator	Red-breasted merganser	M	Aq	
Ardeidae	Ardea	herodias	Great blue heron	R	Aq, RpL	x
Ardeidae	Botaurus	lentiginosus	American bittern	b	Ms	
Ardeidae	Bubulcus	ibis	Cattle egret	n	Ms, RpL, Ri, L, Cr	
Ardeidae	Butorides	striatus	Green-backed heron	M	RpL, Ms, L, Ri	
Ardeidae	Egretta	thula	Snowy egret	B	Ms, RpL, Aq	
Ardeidae	Nycticorax	nycticorax	Black crowned night heron	B	Aq, RpL	
Bombycillidae	Bombycilla	cedrorum	Cedar waxwing	W	Ag, U	
Bombycillidae	Bombycilla	garrulus	Bohemian waxwing	W	RpL, Ag, U	
Caprimulgidae	Chordeiles	minor	Common nighthawk	B	GL, U	
Caprimulgidae	Phalaenoptilus	nuttalii	Common poorwill	B	RpL	
Cathartidae	Cathartes	aura	Turkey vulture	B	RpL, GL	
Charadriidae	Charadrius	montanus	Mountain plover	b	SgP, Cr, W/OG, L	
Charadriidae	Charadrius	semipalmatus	Semipalmated plover	M	W/OG, L	
Charadriidae	Charadrius	vociferus	Killdeer	R	GL, Cr, Ag, U	
Columbidae	Columba	fasciata	Band-tailed pigeon	B	Cr, Ag	
Columbidae	Columba	livia	Rock dove	R	U, Ag	x
Columbidae	Zenaida	macroura	Mourning dove	R	GL, Ag, RpL, U	
Corvidae	Corvus	brachyrhynchos	Common crow	R	Ag, U, RpL; All types	

Family	Genus	Species	Common Name	Status	Habitat	Observed Offpost
Corvidae	Corvus	corax	Common raven	W	GL, Ag	
Corvidae	Cyanocitta	cristata	Blue jay	R	RpL, U, Ag	
Corvidae	Pica	pica	Black-billed magpie	R	Ag, U	x
Emberizidae	Agelaius	phoeniceus	Red-winged blackbird	R	Ms, Ag, GL	
Emberizidae	Aimophila	cassinii	Cassin's sparrow	b	SgP	
Emberizidae	Ammodramus	savannarum	Grasshopper sparrow	GL		
Emberizidae	Calamospiza	melanocorys	Lark bunting	B	GL, Ag	
Emberizidae	Calcarius	lapponicus	Lapland longspur	W	GL, Cr	
Emberizidae	Calcarius	mccownii	McCown's longspur	M	SgP	
Emberizidae	Calcarius	ornatus	Chestnut-collared longspur	M	SgP, MXP	
Emberizidae	Chondestes	grammacus	Lark sparrow	B	GL, RpL	
Emberizidae	Dendroica	coronata	Yellow warbler	M	U, Ag, RpL	
Emberizidae	Dendroica	pensylvanica	Chestnut-sided warbler	M	RpL, Ag, U	
Emberizidae	Dendroica	petchnia	Yellow warbler	B	RpL, U, Ag	
Emberizidae	Dendroica	striata	Blackpoll warbler	M	RpL, Ag, U	
Emberizidae	Dolichonyx	oryzivorus	Bobolink	B	GL, Cr	
Emberizidae	Euphagus	carolinus	Rusty blackbird	W	RpL, Ag	
Emberizidae	Euphagus	cyanocephalus	Brewer's blackbird	R	Ag, RpL, U	
Emberizidae	Geothlypis	trichas	Common yellowthroat	B	Ms, Ag	
Emberizidae	Icteria	virens	Yellow-breasted chat	B	Ag, U	
Embèrizidae	Icterus	galbula	Northern oriole	B	RpL, Ag, U	x
Emberizidae	Icterus	spurius	Orchard oriole	B	RpL, Ag, U	
Emberizidae	Junco	hyemalis	Dark-eyed junco	W	U	
Emberizidae	Melospiza	georgiana	Swamp sparrow	W	Ms, RpL	
Emberizidae	Melospiza	lincolnii	Lincoln's sparrow	M	U, Ms	
Emberizidae	Melospiza	melodia	Song sparrow	R	Ms, U	
Emberizidae	Mniotilta	varia	Black & white warbler	M	RpL, U	
Emberizidae	Molothrus	ater	Brown-headed cowbird	B	Ag, U, Ms	
Emberizidae	Oporornis	tolmiei	MacGillivray warbler	M	U, Ag	
Emberizidae	Parula	americana	Northern parula	M	RpL	
Emberizidae	Passerculus	sandwichensis	Savannah Sparrow	B	GL, Ms	
Emberizidae	Passerella	iliaca	Fox sparrow	W	RpL	
Emberizidae	Pheucticus	ludovicianus	Rose-breasted grosbeak	M	RpL, Ag, U	
Emberizidae	Pipilo	erythrophthalum	Rufous-sided towhee	B	RpL, U	
Emberizidae	Pooecetes	gramineus	Vesper sparrow	B	GL	
Emberizidae	Quiscalus	quiscula	Common grackle	B	RpL, Ag, U	
Emberizidae	Seiurus	aurocapillus	Ovenbird	B	RpL, Ag, U	
Emberizidae	Seiurus	noveboracensis	Northern waterthrush	M	RpL, Ag, U, Ms	
Emberizidae	Setophaga	ruticilla	American redstart	B	RpL	
Emberizidae	Spiza	americana	Dickcissel	B	GL	
Emberizidae	Spizella	arborea	American tree sparrow	W	RpL, GL, Ag, U	
Emberizidae	Spizella	breweri	Brewer's sparrow	M	GL	

Family	Genus	Species	Common Name	Status	Habitat	Observed Offpost
Emberizidae	Spizella	pallida	Clay-colored sparrow	M	GL, Ag, U	
Emberizidae	Spizella	passerina	Chipping sparrow	B	GL, U, Ag	
Emberizidae	Sturnella	neglecta	Western meadowlark	R	Ag, Cr, GL	x
Emberizidae	Vermivora	celata	Orange-crown warbler	M	Ag	
Emberizidae	Vermivora	peregrina	Tennessee warbler	M	U, Ag	
Emberizidae	Wilsonia	pusilla	Wilson's warbler	M	Ag, U	
Emberizidae	Xanthocephalus	xanthocephalus	Yellow-headed blackbird	B	Ms, Ag, RpL, U	
Emberizidae	Zonotrichia	leucophrys	White-crowned sparrow	W	U, Ag	
Falconidae	Falco	columbarius	Merlin	W	GL, RpL, Ms, Ag, U	
Falconidae	Falco	mexicanus	Prairie falcon	R	GL, Ag, Cr, SgP	
Falconidae	Falco	peregrinus	Peregrine falcon	M	GL, Ms	
Falconidae	Falco	sparverius	American kestrel	R	Ag, RpL, SgP, U, GL	x
Fringillidae	Carduelis	flammea	Common redpoll	W	GL	
Fringillidae	Carduelis	pinus	Pine siskin	W	RpL, U	
Fringillidae	Carduelis	psaltria	Lesser goldfinch	B	RpL	
Fringillidae	Carduelis	tristis	American goldfinch	R	RpL, Ag, U	
Fringillidae	Carpodacus	mexicanus	House finch	R	U, RpL, Ag	
Fringillidae	Leucosticte	arctoa	Rosy finch	W	U, SgP	
Hirundinidae	Hirundo	pyrrhonota	Cliff swallow	B	Ag, Aq	
Hirundinidae	Hirundo	rustica	Barn swallow	B	Ag, Aq	
Hirundinidae	Riparia	riparia	Bank swallow	B	Ag, Aq	
Hirundinidae	Stelgidopteryx	serripennis	North. Rough-winged swallow	B	Ag, Aq	
Hirundinidae	Tachycineta	bicolor	Tree swallow	B	Aq	
Hirundinidae	Tachycineta	thalassina	Violet-green swallow	M	RpL, Aq	
Laniidae	Lanius	excubitor	Northern shrike	W	Ag, RpL, U, GL	
Laniidae	Lanius	ludovicianus	Loggerhead shrike	B	SgP, RpL, GL, Ag	
Laridae	Chlidonias	niger	Black tern	B	Ms, L	
Laridae	Larus	argentatus	Herring gull	W	L, U (dumps)	
Laridae	Larus	californicus	California gull	N	L, Ri, Cr, U (dumps)	
Laridae	Larus	delawarensis	Ring-billed gull	N	L, Ri, Cr, U (dumps)	
Laridae	Larus	philadelphia	Bonaparte's gull	M	L, Ms	
Laridae	Larus	pipixcan	Franklin's gull	M	Cr, Ag, GL	
Laridae	Sterna	forsteri	Forster's tern	B	L, Ms	
Laridae	Sterna	hirundo	Common tern	M	L, Ms	
Mimidae	Dumetella	carolinensis	Gray catbird	B	RpL	
Mimidae	Mimus	polyglottos	Northern mockingbird	R	Ag, RpL	
Mimidae	Toxostoma	rufum	Brown thrasher	B	RpL, Ag, U	
Motacillidae	Anthus	spinoletta	Water pipit	M	Aq, SgP, Ag	
Muscicapidae	Catharus	ustulatus	Swainson's thrus	B	RpL, U, Ag	
Muscicapidae	Myadestes	townsendii	Townsend's solitaire	W	RpL, U, Ag	
Muscicapidae	Sialia	currucoides	Mountain bluebird	M	Ag, U, GL	
Muscicapidae	Sialia	mexicana	Western bluebird	B	GL, U, Ag, RpL	

Family	Genus	Species	Common Name	Status	Habitat	Observed Offpost
Muscicapidae	Sialia	sialis	Eastern bluebird	M	RpL, Ag	
Muscicapidae	Turdus	migratorius	American robin	R	Ag, U, RpL	x
Paridae	Parus	atricapillus	Black-capped chickadee	R	RpL, U, Ag	
Paridae	Parus	gambeli	Mountain chickadee	W	U, RpL	
Passeridae	Passer	domesticus	House sparrow	R,I	Ag, U	x
Pelecanidae	Pelecanus	erythrorhynchos	American White pelican	n	Ms, L	x
Phalaropodidae	Phalaropus	lobatus	Northern phalarope	M	W/OG, Ms, L, U	
Phalaropodidae	Phalaropus	tricolor	Wilson's phalarope	B	W/OG, Ms, Cr	
Phasianidae	Alectoris	chukar	Chukar	N,I	Cr, Ag	
Phasianidae	Callipepla	squamata	Scaled quail	b	Ag, RpL	
Phasianidae	Colinus	virginianus	Northern bobwhite	R	Ag, RpL	
Phasianidae	Phasianus	colchicus	Ring-necked pheasant	R,I	Ag, Cr, RpL	x
Picidae	Colaptes	auratus	Northern flicker	R	U	
Picidae	Melanerpes	erythrocephalus	Red-headed woodpecker	B	Ag, RpL, U	
Picidae	Picoides	pubescens	Downy woodpecker	R	U, RpL	
Picidae	Picoides	villosus	Hairy woodpecker	R	U	
Podicipedidae	Aechmophorus	occidentalis	Western grebe	B	L, Ri, Ms	
Podicipedidae	Podiceps	auritus	Horned grebe	M	Ms, L	
Podicipedidae	Podiceps	nigricollis	Eared grebe	b	Ms, L	
Podicipedidae	Podilymbus	podiceps	Pied-billed grebe	R	Ms, L	
Rallidae	Fulica	americana	American coot	R	Ms, L	
Rallidae	Porzana	carolina	Sora	B	Ms	
Rallidae	Rallus	limicola	Virginia rail	R	Ms	
Recurvirostridae	Himantopus	mexicanus	Black-necked stilt	M	L, Ms, W/OG	
Recurvirostridae	Recurvirostra	americana	American avocet	B	L, Ms, W/OG	
Scolopacidae	Bartramia	longicauda	Upland sandpiper	b	TgP, SgP, Cr	
Scolopacidae	Calidris	alba	Sanderling	M	W/OG, L, S	
Scolopacidae	Calidris	himantopus	Stilt sandpiper	M	L, Ms, W/OG	
Scolopacidae	Calidris	mauri	Western sandpiper	M	L, Ms, Cr, W/OG	
Scolopacidae	Calidris	melanotos	Pectoral sandpiper	M	L, W/OG	
Scolopacidae	Calidris	minutilla	Least sandpiper	M	L, Ms, W/OG	
Scolopacidae	Calidris	pusilla	Semipalmated sandpiper	M	L, Ms, W/OG	
Scolopacidae	Catoptrophorus	semipalmatus	Willet	M	Ms, L, W/OG	
Scolopacidae	Gallinago	gallinago	Common snipe	R	GL, Ms, W/OG, Ag	
Scolopacidae	Limnodromus	scolopaceus	Long-billed dowitcher	M	L, Ms, W/OG, Cr	
Scolopacidae	Limosa	fedoa	Marbled godwit	M	L, W/OG, Ms	
Scolopacidae	Numenius	americanus	Long-billed curlew	M	SgP, Cr.Wheat, Ms, L, W/OG	
Scolopacidae	Tringa	flavipes	Lesser yellowlegs	M	L, Ri, Ms, W/OG	
Scolopacidae	Tringa	melanoleuca	Greater yellowlegs	M	Ms, L, Ri, W/OG	
Scolopacidae	Tringa	solitaria	Solitary sandpiper	M	Aq	
Sittidae	Certhia	americana	Brown creeper	R	U, RpL	
Solopacidae	Actitis	macularia	Spotted sandpiper	B	Aq	

Family	Genus	Species	Common Name	Status	Habitat	Observed Offpost
Strigidae	Asio	flammeus	Short-eared owl	R	GL, Ms, Ag	
Strigidae	Asio	otus	Long-eared owl	R	RpL, Ag	
Strigidae	Athene	cunicularia	Burrowing owl	B	GL, Rodent burrows	
Strigidae	Bubo	virginianus	Great horned owl	R	Ag, RpL	x
Strigidae	Otus	asio	Eastern screech owl	R	RpL, Ag, U	
Strigidae	Otus	kennicottii	Western screech owl	R	RpL, Ag, U	
Sturnidae	Sturnus	vulgaris	Starling	R,I	Ag, RpL, U	x
Threskiorniithidae	Plegadis	chihi	White-faced ibis	M	Ms, Aq, Ag	
Troglodytidae	Cistothorus	palustris	Long-bill marsh wren	R	Ms	
Tyrannidae	Contopus	borealis	Olive-sided flycatcher	M	Ag	
Tyrannidae	Empidonax	traillii	Willow flycatcher	M	RpL	
Tyrannidae	Sayornis	saya	Say's phoebe	B	Ag, GL, U, RpL	
Tyrannidae	Tyrannus	tyrannus	Eastern kingbird	B	Ag, RpL, U	
Tyrannidae	Tyrannus	verticalis	Western kingbird	B	Ag, RpL, U	
Tyrannidae	Tyrannus	vociferans	Cassin's kingbird	b	Ag, RpL	
Tytonidae	Tyto	alba	Common barn owl	R	Ag, RpL, U, Buildings	
Vireonidae	Vireo	gilvus	Warbling vireo	B	U	
Vireonidae	Vireo	olivaceus	Red-eyed vireo	B	RpL, Ag, U	
Vireonidae	Vireo	solitarius	Solitary vireo	B	Ag, U	

Status:
- B = definite breeder
- b = likely breeder
- E = endangered
- G = game
- I = introduced
- M = migrant
- n = non-breeder
- R = resident
- W = winter visitor

Habitat Type:
- GL = grassland
- SgP = short-grass prairie
- CG = cactus/grassland
- Sg/SD = shortgrass/semi-desert
- MXP = mixed grass prairie

TgP = tallgrass plains
Ms = marshes, bogs
W/OG = wet open ground
OW-St/Ri, Ri = open water (rivers/streams)
OW-L/R, L = lakes/reservoirs
Ag = agricultural areas
Cr = croplands
U = urban
RpL = riparian lowland
In = Intermittant ponds/lakes/streams
sd = sand dunes
cl = cliff/dirt bank/exposed bedrock

References: Environmental Science and Engineering, Inc. (ESE). 1989. Biota Remedial Investigation Final Report.
Colorado Division of Wildlife (CDOW). 1982. Colorado Reptile and Amphibian Distribution Latilong Study. G. Hammeson and D. Langlois, Eds. CDOW Nongame Section.

Appendix G

COLORADO DEPARTMENT OF HEALTH SURFICIAL SOIL ANALYTICAL DATA

Letter dated June 2, 1989, from Mr. Jeff Edson of CDH to Mr. Connally Mears of EPA Region VIII, transmitting analytical results for offpost surficial soils collected immediately north of RMA.

STATE OF COLORADO

COLORADO DEPARTMENT OF HEALTH
4210 East 11th Avenue
Denver, Colorado 80220
Phone (303) 320-8333

Roy Romer
Governor

Thomas M. Vernon, M.D.
Executive Director

Rec. 3/13/90

June 2. 1989

Mr. Connally Mears. 8HWM-SR
U. S. EPA, Region VIII
One Denver Place
999 18th Street. Suite #500
Denver, CO 80202-2413

Re: Offpost Surficial Soil Sampling North of RMA

Dear Mr. Mears:

Attached are the data for the CDH surficial soil samples collected earlier this year north of RMA at various residences in the vicinity of 96th Avenue and Peoria Street. Also enclosed is a copy of the Chain of Custody Record. a narrative describing sample locations, and a sample location map.

Two errors have been noted on the lab results from Hagar Laboratories (Report on Service Number 40289EN, March 20, 1989). After a cross-check with the field notes and chain of custody records. it was discovered that the lab misread two sample numbers. The first correction changes sample number SMAL5WB-CDH (Table 4) to SMAL4WB-CDH. The second correction changes sample number LAMB1WB-CDH (Table 8) to LAMB4WB-CDH. In addition, note that samples WERT2WB-CDH and WERT3WB-CDH are colocated duplicates and WERT-TB is a field blank.

CDH is currently calculating risks to the offpost residents exposed to contaminants identified in this sampling. Accordingly, CDH requests that before any agency of the United States or Shell Oil releases calculated risk determinations to the public, a meeting be held to discuss this issue.

Sincerely,

Jeff Edson

Jeff Edson
RMA Coordinator
Hazardous Materials and
Waste Management Division

/cf

SN 40289EN
March 20, 1989

TABLE 1

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
SMAL1WB HA0989WB	AA-58148	arsenic	7	
		cadmium	1.0	
		copper	20	
		chromium	14	
		lead	60	
		mercury	ND	0.02
		selenium	ND	8
		zinc	140	

Analysis	Concentration (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	ND	10
beta-BHC	ND	10
delta-BHC	ND	10
gamma-BHC (Lindane)	ND	10
heptachlor	ND	10
aldrin	LT(10)	
isodrin	ND	10
heptachlor epoxide	ND	10
a-endosulfan	ND	10
dieldrin	90	
4,4'-DDE	ND	10
endrin	ND	10
b-endosulfan	ND	10
4,4'-DDD	ND	10
endosulfan sulfate	ND	100
4,4'-DDT	ND	10
methoxychlor	ND	1000
alpha-chlordane	ND	10
gamma-chlordane	ND	10
toxaphene	ND	1000
endrin aldehyde	ND	100
aroclor-1016	ND	500
aroclor-1221	ND	500
aroclor-1232	ND	500
aroclor-1242	ND	500
aroclor-1248	ND	500
aroclor-1254	ND	500
aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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TABLE 2

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
3MAL2WB HA0990WB	AA-58149	arsenic	7	
		cadmium	LT(1.0)	
		copper	20	
		chromium	12	
		lead	50	
		mercury	ND	0.02
		selenium	LT(8)	
		zinc	120	

Analysis	Concentration (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	ND	10
beta-BHC	ND	10
delta-BHC	ND	10
gamma-BHC (Lindane)	ND	10
heptachlor	ND	10
aldrin	ND	10
isodrin	ND	10
heptachlor epoxide	ND	10
a-endosulfan	ND	10
dieldrin	40	
4,4'-DDE	ND	10
endrin	ND	10
b-endosulfan	ND	10
4,4'-DDD	ND	10
endosulfan sulfate	ND	100
4,4'-DDT	120	
methoxychlor	ND	1000
alpha-chlordane	ND	10
gamma-chlordane	ND	10
toxaphene	ND	1000
endrin aldehyde	ND	100
aroclor-1016	ND	500
aroclor-1221	ND	500
aroclor-1232	ND	500
aroclor-1242	ND	500
aroclor-1248	ND	500
aroclor-1254	ND	500
aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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TABLE 3

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
SMAL3WB-CDH	AA-58150	arsenic	5	
		cadmium	LT(1.1)	
CDH only		copper	10	
		chromium	10	
		lead	50	
		mercury	ND	0.02
		selenium	ND	8
		zinc	80	
			Concentration (ug/kg)	**Detection Limit (ug/kg)**
		alpha-BHC	ND	10
		beta-BHC	ND	10
		delta-BHC	ND	10
		gamma-BHC (Lindane)	ND	10
		heptachlor	ND	10
		aldrin	LT(10)	
		isodrin	ND	10
		heptachlor epoxide	ND	10
		a-endosulfan	ND	10
		dieldrin	50	
		4,4'-DDE	ND	10
		endrin	ND	10
		b-endosulfan	ND	10
		4,4'-DDD	ND	10
		endosulfan sulfate	ND	100
		4,4'-DDT	ND	10
		methoxychlor	ND	1000
		alpha-chlordane	ND	10
		gamma-chlordane	ND	10
		toxaphene	ND	1000
		endrin aldehyde	ND	100
		aroclor-1016	ND	500
		aroclor-1221	ND	500
		aroclor-1232	ND	500
		aroclor-1242	ND	500
		aroclor-1248	ND	500
		aroclor-1254	ND	500
		aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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TABLE 4

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
SMAL4WB-CDH SMAL5WB-CDH	AA-58151	arsenic	4	
		cadmium	LT(1.0)	
CAD 3/22		copper	10	
		chromium	11	
		lead	30	
		mercury	ND	0.02
CDH only		selenium	LT(8)	
		zinc	50	

Analysis	Concentration (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	ND	10
beta-BHC	ND	10
delta-BHC	ND	10
gamma-BHC (Lindane)	ND	10
heptachlor	ND	10
aldrin	LT(10)	
isodrin	ND	10
heptachlor epoxide	ND	10
a-endosulfan	ND	10
dieldrin	70	
4,4'-DDE	ND	10
endrin	LT(10)	
b-endosulfan	ND	10
4,4'-DDD	ND	10
endosulfan sulfate	ND	100
4,4'-DDT	ND	10
methoxychlor	ND	1000
alpha-chlordane	ND	10
gamma-chlordane	ND	10
toxaphene	ND	1000
endrin aldehyde	ND	100
aroclor-1016	ND	500
aroclor-1221	ND	500
aroclor-1232	ND	500
aroclor-1242	ND	500
aroclor-1248	ND	500
aroclor-1254	ND	500
aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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TABLE 5

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
OHLE3WB-CDH	AA-58152	arsenic	10	
CDH Only		cadmium	LT(1.1)	
		copper	10	
		chromium	17	
		lead	20	
		mercury	ND	0.02
		selenium	ND	4
		zinc	50	

Analysis	Concentration (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	ND	10
beta-BHC	ND	10
delta-BHC	ND	10
gamma-BHC (Lindane)	ND	10
heptachlor	ND	10
aldrin	LT(10)	
isodrin	ND	10
heptachlor epoxide	ND	10
a-endosulfan	ND	10
dieldrin	10	
4,4'-DDE	ND	10
endrin	ND	10
b-endosulfan	ND	10
4,4'-DDD	ND	10
endosulfan sulfate	ND	100
4,4'-DDT	ND	10
methoxychlor	ND	1000
alpha-chlordane	ND	10
gamma-chlordane	ND	10
toxaphene	ND	1000
endrin aldehyde	ND	100
aroclor-1016	ND	500
aroclor-1221	ND	500
aroclor-1232	ND	500
aroclor-1242	ND	500
aroclor-1248	ND	500
aroclor-1254	ND	500
aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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TABLE 6

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
OHLE4WB-CDH	AA-58153	arsenic	7	
CDH only		cadmium	LT(1)	
		copper	10	
		chromium	13	
		lead	20	
		mercury	ND	0.02
		selenium	ND	15
		zinc	40	

Analysis	Concentration (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	ND	10
beta-BHC	ND	10
delta-BHC	ND	10
gamma-BHC (Lindane)	ND	10
heptachlor	ND	10
aldrin	LT(10)	
isodrin	ND	10
heptachlor epoxide	ND	10
a-endosulfan	ND	10
dieldrin	20	
4,4'-DDE	ND	10
endrin	ND	10
b-endosulfan	ND	10
4,4'-DDD	ND	10
endosulfan sulfate	ND	100
4,4'-DDT	ND	10
methoxychlor	ND	1000
alpha-chlordane	ND	10
gamma-chlordane	ND	10
toxaphene	ND	1000
endrin aldehyde	ND	100
aroclor-1016	ND	500
aroclor-1221	ND	500
aroclor-1232	ND	500
aroclor-1242	ND	500
aroclor-1248	ND	500
aroclor-1254	ND	500
aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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TABLE 7

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
LAMB1WB HA0993WB	AA-58154	arsenic	9	
		cadmium	1.1	
		copper	20	
		chromium	15	
		lead	70	
		mercury	ND	0.02
		selenium	ND	8
		zinc	110	
			Concentration (ug/kg)	**Detection Limit (ug/kg)**
		alpha-BHC	ND	10
		beta-BHC	ND	10
		delta-BHC	ND	10
		gamma-BHC (Lindane)	ND	10
		heptachlor	ND	10
		aldrin	ND	10
		isodrin	ND	10
		heptachlor epoxide	LT(10)	
		a-endosulfan	ND	10
		dieldrin	40	
		4,4'-DDE	ND	10
		endrin	ND	10
		b-endosulfan	ND	10
		4,4'-DDD	ND	10
		endosulfan sulfate	ND	100
		4,4'-DDT	ND	10
		methoxychlor	ND	1000
		alpha-chlordane	40	
		gamma-chlordane	20	
		toxaphene	ND	1000
		endrin aldehyde	ND	100
		aroclor-1016	ND	500
		aroclor-1221	ND	500
		aroclor-1232	ND	500
		aroclor-1242	ND	500
		aroclor-1248	ND	500
		aroclor-1254	ND	500
		aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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TABLE 8

→ LAMB4WB-CDH

CAD 3/22

CDH only

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
LAMB1WB-CDH	AA-58155	arsenic	9	
		cadmium	1.0	
		copper	10	
		chromium	LT(30)	
		lead	20	
		mercury	ND	0.02
		selenium	ND	8
		zinc	90	

Analysis	Concentration (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	ND	10
beta-BHC	ND	10
delta-BHC	ND	10
gamma-BHC (Lindane)	ND	10
heptachlor	ND	10
aldrin	LT(10)	
isodrin	ND	10
heptachlor epoxide	ND	10
a-endosulfan	ND	10
dieldrin	10	
4,4'-DDE	20	
endrin	LT(10)	
b-endosulfan	ND	10
4,4'-DDD	ND	10
endosulfan sulfate	ND	100
4,4'-DDT	140	
methoxychlor	ND	1000
alpha-chlordane	ND	10
gamma-chlordane	ND	10
toxaphene	ND	1000
endrin aldehyde	ND	100
aroclor-1016	ND	500
aroclor-1221	ND	500
aroclor-1232	ND	500
aroclor-1242	ND	500
aroclor-1248	ND	500
aroclor-1254	ND	500
aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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TABLE 9

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
LAMB5WB-CDH	AA-58156	arsenic	6	
CDH only		cadmium	ND	0.9
		copper	10	
		chromium	9	
		lead	10	
		mercury	ND	0.02
		selenium	ND	14
		zinc	30	

Analysis	Concentration (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	ND	10
beta-BHC	ND	10
delta-BHC	ND	10
gamma-BHC (Lindane)	ND	10
heptachlor	ND	10
aldrin	LT(10)	
isodrin	ND	10
heptachlor epoxide	ND	10
a-endosulfan	ND	10
dieldrin	LT(10)	
4,4'-DDE	ND	10
endrin	LT(10)	
b-endosulfan	ND	10
4,4'-DDD	ND	10
endosulfan sulfate	ND	100
4,4'-DDT	ND	10
methoxychlor	ND	1000
alpha-chlordane	ND	10
gamma-chlordane	ND	10
toxaphene	ND	1000
endrin aldehyde	ND	100
aroclor-1016	ND	500
aroclor-1221	ND	500
aroclor-1232	ND	500
aroclor-1242	ND	500
aroclor-1248	ND	500
aroclor-1254	ND	500
aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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TABLE 10

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
WERT2WB-CDH	AA-58157	arsenic	LT(5)	
CDH only		cadmium	ND	1
		copper	7	
		chromium	7	
		lead	10	
		mercury	ND	0.02
		selenium	ND	14
		zinc	30	

Analysis	Concentration (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	ND	10
beta-BHC	ND	10
delta-BHC	ND	10
gamma-BHC (Lindane)	ND	10
heptachlor	ND	10
aldrin	LT(10)	
isodrin	ND	10
heptachlor epoxide	ND	10
a-endosulfan	ND	10
dieldrin	10	
4,4'-DDE	ND	10
endrin	LT(10)	
b-endosulfan	ND	10
4,4'-DDD	ND	10
endosulfan sulfate	ND	100
4,4'-DDT	LT(10)	
methoxychlor	ND	1000
alpha-chlordane	ND	10
gamma-chlordane	ND	10
toxaphene	ND	1000
endrin aldehyde	ND	100
aroclor-1016	ND	500
aroclor-1221	ND	500
aroclor-1232	ND	500
aroclor-1242	ND	500
aroclor-1248	ND	500
aroclor-1254	ND	500
aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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TABLE 11

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
WERT3WB-CDH	AA-58158	arsenic	LT(5)	
		cadmium	ND	1
Duplicate of		copper	6	
Wert2WB-CDH		chromium	6	
(co-located duplicate)		lead	10	
		mercury	ND	0.02
		selenium	ND	15
		zinc	20	

Analysis	Concentration (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	ND	10
beta-BHC	ND	10
delta-BHC	ND	10
gamma-BHC (Lindane)	ND	10
heptachlor	ND	10
aldrin	LT(10)	
isodrin	ND	10
heptachlor epoxide	ND	10
a-endosulfan	ND	10
dieldrin	LT(10)	
4,4'-DDE	ND	10
endrin	LT(10)	
b-endosulfan	ND	10
4,4'-DDD	ND	10
endosulfan sulfate	ND	100
4,4'-DDT	LT(10)	
methoxychlor	ND	1000
alpha-chlordane	ND	10
gamma-chlordane	ND	10
toxaphene	ND	1000
endrin aldehyde	ND	100
aroclor-1016	ND	500
aroclor-1221	ND	500
aroclor-1232	ND	500
aroclor-1242	ND	500
aroclor-1248	ND	500
aroclor-1254	ND	500
aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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March 20, 1989

TABLE 12

Sample Number	Hager Reference #	Analysis	Concentration (ug/kg)	Detection Limit (ug/kg)
WERT-TB	AA-58159	alpha-BHC	ND	10
		beta-BHC	ND	10
		delta-BHC	ND	10
		gamma-BHC (Lindane)	ND	10
		heptachlor	ND	10
		aldrin	ND	10
		isodrin	ND	10
		heptachlor epoxide	ND	10
		a-endosulfan	ND	10
		dieldrin	ND	10
		4,4'-DDE	ND	10
		endrin	ND	10
		b-endosulfan	ND	10
		4,4'-DDD	ND	10
		endosulfan sulfate	ND	100
		4,4'-DDT	ND	10
		methoxychlor	ND	1000
		alpha-chlordane	ND	10
		gamma-chlordane	ND	10
		toxaphene	ND	1000
		endrin aldehyde	ND	100
		aroclor-1016	ND	500
		aroclor-1221	ND	500
		aroclor-1232	ND	500
		aroclor-1242	ND	500
		aroclor-1248	ND	500
		aroclor-1254	ND	500
		aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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March 20, 1989

TABLE 13

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
COLL1WB	AA-58160	arsenic	10	
HA0997 WB		cadmium	LT(1)	
		copper	10	
		chromium	LT(15)	
		lead	20	
		mercury	ND	0.02
		selenium	ND	14
		zinc	40	
			Concentration (ug/kg)	**Detection Limit (ug/kg)**
		alpha-BHC	ND	10
		beta-BHC	ND	10
		delta-BHC	ND	10
		gamma-BHC (Lindane)	ND	10
		heptachlor	ND	10
		aldrin	LT(10)	
		isodrin	ND	10
		heptachlor epoxide	ND	10
		a-endosulfan	ND	10
		dieldrin	20	
		4,4'-DDE	ND	10
		endrin	ND	10
		b-endosulfan	ND	10
		4,4'-DDD	ND	10
		endosulfan sulfate	ND	100
		4,4'-DDT	ND	10
		methoxychlor	ND	1000
		alpha-chlordane	ND	10
		gamma-chlordane	ND	10
		toxaphene	ND	1000
		endrin aldehyde	ND	100
		aroclor-1016	ND	500
		aroclor-1221	ND	500
		aroclor-1232	ND	500
		aroclor-1242	ND	500
		aroclor-1248	ND	500
		aroclor-1254	ND	500
		aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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March 20, 1989

TABLE 14

Sample Number	Hager Reference #	Analysis	Concentration (mg/kg)	Detection Limit (mg/kg)
COLL2WB-CDH	AA-58161	arsenic	12	
CDH only		cadmium	LT(1)	
		copper	10	
		chromium	16	
		lead	20	
		mercury	ND	0.02
		selenium	ND	30
		zinc	50	

Analysis	Concentration (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	ND	10
beta-BHC	ND	10
delta-BHC	ND	10
gamma-BHC (Lindane)	ND	10
heptachlor	ND	10
aldrin	LT(10)	
isodrin	ND	10
heptachlor epoxide	ND	10
a-endosulfan	ND	10
dieldrin	LT(10)	
4,4'-DDE	ND	10
endrin	LT(10)	
b-endosulfan	ND	10
4,4'-DDD	ND	10
endosulfan sulfate	ND	100
4,4'-DDT	ND	10
methoxychlor	ND	1000
alpha-chlordane	ND	10
gamma-chlordane	ND	10
toxaphene	ND	1000
endrin aldehyde	ND	100
aroclor-1016	ND	500
aroclor-1221	ND	500
aroclor-1232	ND	500
aroclor-1242	ND	500
aroclor-1248	ND	500
aroclor-1254	ND	500
aroclor-1260	ND	500

Note: ND - not detected at the specified detection limits.

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March 20, 1989

TABLE 15

Non-Aqueous Surrogate Percent Recovery Summary

Surrogate Name:	DBC
Sample Numbers:	
AA-58148	104%
AA-58148 Dup.	73%
AA-58149	89%
AA-58150	70%
AA-58151	80%
AA-58152	73%
AA-58153	85%
AA-58154	75%
AA-58155	74%
AA-58156	72%
AA-58157	84%
AA-58158	62%
AA-58158 Dup	80%
AA-58159	100%
AA-58160	76%
AA-58161	44%
AA-58161 MS	33%
AA-58161 MSD	9%

OFFPOST CDH SURFICIAL SOIL SAMPLING
NORTH OF RMA
February 24, 1989

Description of sample locations:

Smalldone Residence

1. Smal 1wb (co-located) south side of house, 18" from foundation, below window.

2. Smal 2wb (co-located) 10 ft. from east side of house, 3 ft. south of patio in flowerbed area.

3. Smal 3wb (CDH) backyard, 8 ft. east of tree, 20 ft. south of barn.

4. Smal 4wb (CDH) southeast area of yard, 20 ft. north of front (south) fence, 25 ft. west of east fence.

Ohle Residence

1. Ohle 1wb (Army), backyard, in corner, on southwest side of workshed.

2. Ohle 2wb (Army), backyard, west side of property, 250 ft. northwest of house, on west side of dog pens.

3. Ohle 3wb (CDH), southwest corner of front yard approximately 16 ft. north of 96th Avenue, 20 ft. east of west property line.

4. Ohle 4wb (CDH), front yard, 12' east of driveway entrance, 20 ft. north of 96th Avenue.

Lambert Residence

1. Lamb 1wb (co-located) near southwest corner of house.

2. Lamb 2wb (Army) near west boundary property line, approximately 60 ft. north of 96th Avenue.

3. Lamb 3wb, same locality as #2 - duplicate.

4. Lamb 4wb (CDH) near center of backyard garden.

5. Lamb 5wb (CDH), northeastern area of backyard, near flood plain boundary.

6. Lamb 6wb, (ARMY) between Lambert and Smalldone residence, in field.

Werth Residence

1. Wert 1wb (Army), backyard between work sheds.

2. Wert 2wb (CDH), front yard, approximately 50 ft. east of driveway, 10 ft. south of pine tree.

3. Wert 3wb (CDH), same location as #2 - duplicate.

Collins Residence

1. Coll 1wb (co-located), 25 ft. west of front yard.

2. Coll 2wb (CDH), approximately 100 ft. north of house, in grassy area of field.

Spencer Property

1. Spen 1wb (Army), even with Collins' house, midway between Collins and Ohle residences (in open field).

1?34 East Colfax Avenue
Englewood, Colorado 80111
(303) 790 2727 (800) 282-1835
FAX # (303) 790 2756

HAGER
LABORATORIES, INC.

REPORT ON SERVICE NUMBER 40289EN
March 20, 1989

Customer Project Code:

To: Mr. Chris Dacey
GeoTrans
3300 Mitchell, Suite 250
Boulder, CO 80301

Analysis: The following samples were submitted for analysis:
Thirteen soil samples for arsenic, cadmium, copper, chromium, lead, mercury, selenium, zinc, and EPA Method 8080.
One water sample for arsenic, cadmium, copper, chromium, lead, mercury, selenium, zinc, and EPA Method 8080.

Method: METALS
A measured aliquot of the sample material was acid-ashed and diluted to a known volume. The quantity of the metal of interest was determined by atomic absorption spectroscopy. The absorbance readings for each sample were compared to a calibration curve obtained from standard metal solutions.

MERCURY
A measured aliquot of sample was digested with acid, potassium permanganate and potassium persulfate solutions in a hot water bath. The dissolved mercury was reduced to the vapor state and analyzed with flameless atomic absorption spectroscopy. Mercury concentration was determined by comparison to standard mercury solutions.

EPA Method 8080: Organochlorine Pesticides and/or PCB's
30 grams of soil is extracted with a solvent using a soxhlet extractor for 24 hours. The extract is dried, concentrated and exchanged for hexane. The pesticides and PCB's of interest are then determined by gas chromatography employing an electron capture detector by comparison to known concentrations of pesticides and PCB's.

Results: The results are found on Tables 1 through 16.

Discussion: The water sample was analyzed as if it was a soil per clients request.

LT( ) indicates "less than" with the lower limit of quantification shown in parentheses.

All samples for metal analysis have been corrected for the blank values found in sample WERT-TB (AA-58159).

Discussion (cont.)

Hager Laboratories, Inc., has been AIHA accredited since 1977.

Laboratory data are filed and available upon request.

If you have any questions, please contact Harry Borg, of our Technical Services Department, at (303)790-2727 or toll free at (800)282-1835.

Submitted by: [signature]

Michael Aaronson, Ph.D.
Environmental Chemistry Manager

MA/sn

SN 40289EN
March 20, 1989

TABLE 16

Non-Aqueous Matrix Spike/Duplicate Matrix Spike Recovery

Compound	Spiked Sample Result (SSR) (ug)	Duplicate Spiked Sample Result (ug)	Sample Result (SR) (ug/g)	Spike Amount Added (SA) (ug)	% Spiked Sample Recovery	Duplicate Spiked Sample % Recovery
g-BHC	0.18	off scale	ND	0.2	90	peak off scale
heptachlor	0.16	0.14	ND	0.2	80	70
aldrin	0.18	off scale	0.001	0.2	90	peak off scale
dieldrin	0.21	0.02	0.005	0.5	41	3
endrin	0.33	0.60	0.001	0.5	86	113
DDT	0.138	0.154	ND	0.5	277	154

HAGER LABORATORIES, INC.

ENVIRONMENTAL CHAIN-OF-CUSTODY RECORD

Service Number 40289 Fw

Client Name	Client Address
GeoTrans Inc	Boulder, CO

Client Sample Number	Laboratory Sample Number	Number of Containers	Size & Type of Containers	Sample Preservative	Sample Matrix Description	Seals Intact ?	Condition of Sample	Transfer Number (check items transferred) 1	2	3	4	5
Smal1WB	9A58148	1	8 oz glass w/ teflon lids	4°C	Soil	Yes	OK	✓	✓	/	/	
Smal2WB	58149	1		4°C	Soil			✓	✓	/	/	
Smal3WB-CDH	58150	1		4°C	Soil			✓	✓	/	/	
Smal4WB-CDH	58151	1	"	4°C	Soil			✓	✓	/	/	
Ohle3WB-CDH	58152	1	"	4°C	Soil			✓	✓	/	/	
Ohle4WB-CDH	58153	1	"	4°C	Soil			✓	✓	/	/	
LAMB1WB	58154	1	"	4°C	Soil			✓	✓	/	/	
LAMB4WB-CDH	58155	1	"	4°C	Soil			✓	✓	/	/	
LAMB5WB-CDH	58156	1	"	4°C	Soil			✓	✓	/	/	
WERT2WB-CDH	58157	1	"	4°C	Soil			✓	✓	/	/	
WERT3WB-CDH	58158	1	"	4°C	Soil			✓	✓	/	/	
WERT-TB	58159	1	"	4°C	Water			✓	✓	/	/	
COLL1WB	58160	1	"	4°C	Soil			✓	✓	/	/	
COLL2WB-CDH	58161	1	"	4°C	Soil			✓	✓	/	/	

Signature of Sampler Clyde W. Dacey Print Last Name DACEY

Date of Sampling 2/24/89 Samples Shipped to Lab By Car Date Shipped 2/24/89

Samples Relinquished to Lab By C. Dacey Date 2/24/89

Samples Received at Lab By A.P. VTSR 2/24 2:00

Transfer Number	Received By	Date	Time
1.	[illegible]	2/24/89	1:30
2.	"	2/28/89	8:00
3.	[illegible]	3/5/89	7:45 am
4.	[illegible]	3/8/89	
5.			

Form Log-1

1/89

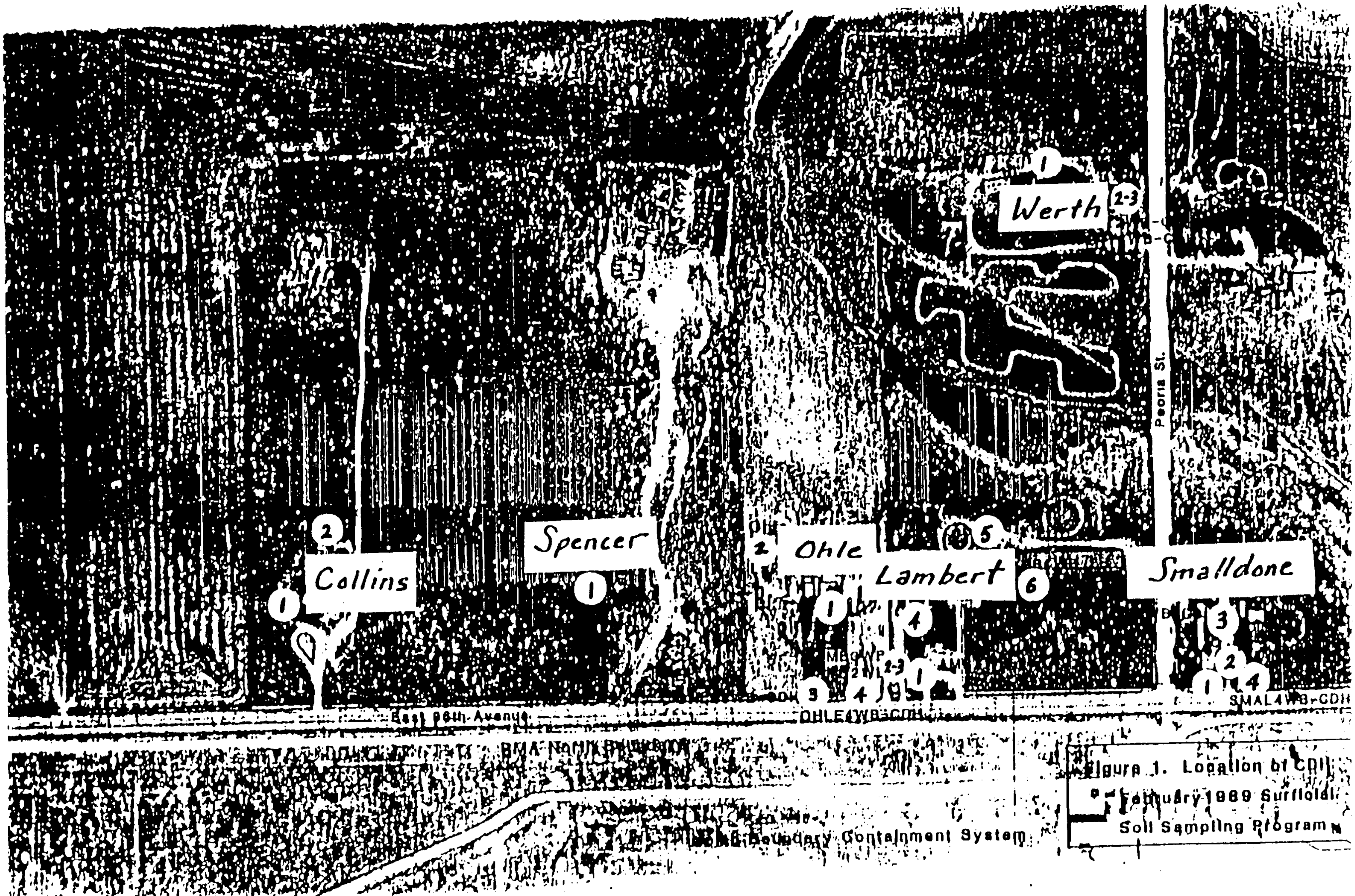

Figure 1. Location of CDH February 1989 Surficial Soil Sampling Program

HAGER LABORATORIES, INC.

ENVIRONMENTAL CHAIN-OF-CUSTODY RECORD

(Invo)ice Number ______

(Cli)ent Name: GeoTrans Inc

Client Address: Boulder, CO

Client Sample Number	Laboratory Sample Number	Number of Containers	Size & Type of Containers	Sample Preservative	Sample Matrix Description	Seals Intact ?	Condition of Sample	Transfer Number 1	2	3	4	5
		1	8 oz glass	4°C	Soil							
ma1 1WB		1	w/ teflon	4°C	Soil							
ma1 2WB		1	lids	4°C	Soil							
ma1 3WB-CDH		1	"	4°C	Soil							
ma1 4WB-CDH		1	"	4°C	Soil							
ble 3WB-CDH		1	"	4°C	Soil							
ble 4WB-CDH		1	"	4°C	Soil							
AMB 1WB		1	"	4°C	Soil							
AMB 1WB-CDH		1	"	4°C	Soil							
LAMB 5WB-CDH	[illegible]	1	"	4°C	Soil							
WERT 2WB-CDH	dup-CDH	1	"	4°C	Soil							
WERT 3WB-CDH		1	"	4°C	Water							
WERT-TB		1	"	4°C	Soil							
COLL 1WB		1	"	4°C	Soil							
COLL 2WB-CDH			"									

Signature of Sampler: Clyde W. Dacey [signature] Print Last Name: DACEY

Date of Sampling: 2/24/89 Samples Shipped to Lab By: Car Date Shipped: 2/24/89

Samples Relinquished to Lab By: C. Dacey Date: 2/24/89

Samples Received at Lab By: [signature] VTSR: 2/24 2:00

Transfer Number	Received By	Date	Time
1.			
2.			
3.			
4.			
5.			

1/89

Form Log-1

Appendix H

ANALYTICAL RESULTS FOR ADDITIONAL OFFPOST SURFICIAL SOIL SAMPLES COLLECTED BY WOODWARD-CLYDE FEDERAL SERVICES (WCFS), MAY 1991

UNITED STATES DEPARTMENT OF THE INTERIOR COMMENTS REGARDING THE OFFPOST OPERABLE UNIT DRAFT FINAL REMEDIAL INVESTIGATION ADDENDUM

GENERAL COMMENTS

Comment No. 1, paragraphs 2 and 3

First, it is stated that based on onpost and offpost surveys and existing knowledge of the feeding habits and foraging range of the Barr Lake bald eagles, it does not appear that contaminant levels (0.099 ug/g mercury, 0.808 ug/g dieldrin, and 6.93 ug/g DDE) found in Barr Lake bald eagle egg are from Rocky Mountain Arsenal (Arsenal) sources (page 106, paragraph 1). The Service cannot fully support this statement. On November 17, 1989, the female bald eagle from Barr Lake was trapped on the Arsenal and radiotransmittered. Her mate was perched nearby. While the female was never relocated on the Arsenal by radiotelemetry during the 1989-90 wintering session, her presence on the Arsenal cannot be ruled out. It should also be noted that a nesting female bald eagle is very sedentary compared to the male, who may also provide food for the nesting female and her chicks. However, based on available data, use of the Arsenal by the Barr Lake eagles does appear to be minimal.

Additionally, contaminants (e.g., dieldrin) found in Barr Lake sediments may be from Arsenal sources (page 78, paragraph 4). Therefore, Arsenal contaminant sources cannot be completely ruled out based on the limited information available. The Service requests that this statement be modified to indicate that contaminants found in the bald eagle egg may or may not be from Arsenal sources as per the identified contaminant transport mechanisms.

Response

The text has been revised to indicate that although Rocky Mountain Arsenal (RMA) cannot be completely ruled out as a source of contaminants in the bald eagle egg, existing data regarding the distribution of contaminants and the foraging range of the eagles at Barr Lake did not indicate that the observed contaminants are the result of migration from RMA sources.

Comment No. 2, paragraph 4

Second, it is stated that contamination of offpost biota appears to come from in-situ environmental sources rather than from migration of onpost wildlife. Offpost biota sampling was very limited both in species and number; many species of wildlife, both mammalian and avian, migrate on and off the Arsenal and were not sampled, therefore, the above statement is not justified based on the limited information available. The Service requests that this statement be modified to address offpost biota exposure to Arsenal contaminant sources either directly or indirectly through secondary exposures.

Response

The U.S. Fish and Wildlife Service (USFWS) comment addresses the last paragraph on page 111. The text has been revised to indicate that although onpost RMA sources may impact some animal species found in the Offpost OU, contamination detected in offpost biota samples collected during Offpost Remedial Investigation (RI) Addendum activities appears to be the result of in situ environmental sources rather than from migration of onpost RMA wildlife.

Table H1 Analytical Results for Surficial Soils Samples *

Sample ID	010F01	020F01	030F01	100F01
Date	05/21/91	05/21/91	05/20/91	05/20/91
Analytes				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	0.00418	0.0247	0.00986	0.180
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.00466	0.0144	< 0.00466	0.260
Aldrin (GCMS)	< 0.00211	< 0.00211	< 0.00211	< 0.00211
Chlordane (GCMS)	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Dieldrin (GCMS)	< 0.00181	0.0236	0.00205	0.00358
Endrin (GCMS)	< 0.00471	0.00919	< 0.00471	0.00980
Hexachlorocyclopentadiene (GCMS)	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Isodrin (GCMS)	< 0.00188	< 0.00188	< 0.00188	< 0.00188

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that target analyte was detected at or above the Maximum Reporting Limit.
* -- Analytical results for Offpost Surficial Soil Samples collected by Woodward Clyde - Federal Services.
NA -- Not Analyzed.

Table H1 Analytical Results for Surficial Soils Samples *

Sample ID	100F02	100F03	100F04	110F01
Date	05/21/91	05/21/91	05/21/91	05/21/91
Analytes				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	0.0395	0.0695	0.00547	0.0589
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	0.130	0.0167	< 0.00466	0.0640
Aldrin (GCMS)	< 0.00211	< 0.00211	< 0.00211	< 0.00211
Chlordane (GCMS)	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Dieldrin (GCMS)	0.00399	0.0135	0.00215	0.0227
Endrin (GCMS)	0.00621	0.0402	0.0135	0.0147
Hexachlorocyclopentadiene (GCMS)	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Isodrin (GCMS)	< 0.00188	< 0.00188	< 0.00188	0.00220

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that target analyte was detected at or above the Maximum Reporting Limit.
* -- Analytical results for Offpost Surficial Soil Samples collected by Woodward Clyde - Federal Services.
N [illegible] Not [illegible]ed.

Table H1 Analytical Results for Surficial Soils Samples *

Sample ID	110F02	120F01	130F01	140F01
Date	05/21/91	05/20/91	05/20/91	05/20/91
Analytes				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	0.00937	< 0.00277	< 0.00277	0.00700
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.00466	< 0.00466	< 0.00466	< 0.00466
Aldrin (GCMS)	< 0.00211	< 0.00211	< 0.00211	0.00407
Chlordane (GCMS)	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Dieldrin (GCMS)	0.00451	0.00260	0.00744	0.0582
Endrin (GCMS)	< 0.00471	< 0.00471	< 0.00471	0.00946
Hexachlorocyclopentadiene (GCMS)	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Isodrin (GCMS)	< 0.00188	< 0.00188	< 0.00188	< 0.00188

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that target analyte was detected at or above the Maximum Reporting Limit.
* -- Analytical results for Offpost Surficial Soil Samples collected by Woodward Clyde - Federal Services.
NA -- Not Analyzed.

Table H1 Analytical Results for Surficial Soils Samples *

Sample ID	140F02	150F01	150F02	160F01
Date	05/20/91	05/20/91	05/20/91	05/20/91
Analytes				
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	< 0.00277	< 0.00277	0.0589	0.0388
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.00466	< 0.00466	< 0.00466	0.0857
Aldrin (GCMS)	< 0.00211	< 0.00211	< 0.00211	< 0.00211
Chlordane (GCMS)	< 0.0230	< 0.0230	< 0.0230	< 0.0230
Dieldrin (GCMS)	0.0155	0.00877	0.0320	0.00431
Endrin (GCMS)	0.00564	< 0.00471	0.0107	0.00667
Hexachlorocyclopentadiene (GCMS)	< 0.00137	< 0.00137	< 0.00137	< 0.00137
Isodrin (GCMS)	< 0.00188	< 0.00188	< 0.00188	< 0.00188

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that target analyte was detected at or above the Maximum Reporting Limit.
* -- Analytical results for Offpost Surficial Soil Samples collected by Woodward Clyde - Federal Services.
† Not zed.

Table H1 Analytical Results for Surficial Soils Samples *

Sample ID	220F01
Date	05/20/91
Analytes	
2,2-Bis(parachlorophenyl)-1,1,1-Trichloroethane (DDT) (GCMS)	0.00825
2,2-Bis(parachlorophenyl)-1,1-Dichloroethene (DDE) (GCMS)	< 0.00466
Aldrin (GCMS)	< 0.00211
Chlordane (GCMS)	< 0.0230
Dieldrin (GCMS)	0.0109
Endrin (GCMS)	< 0.00471
Hexachlorocyclopentadiene (GCMS)	< 0.00137
Isodrin (GCMS)	< 0.00188

Notes: Values are reported in micrograms per gram.
Reported values are accurate to three significant figures.
< -- indicates that the target analyte was not detected at or above the Certified Reporting Limit.
> -- indicates that target analyte was detected at or above the Maximum Reporting Limit.
* -- Analytical results for Offpost Surficial Soil Samples collected by Woodward Clyde - Federal Services.
NA -- Not Analyzed.

Appendix I

COMMENTS AND RESPONSES TO THE OFFPOST OPERABLE UNIT REMEDIAL INVESTIGATION, DRAFT FINAL ADDENDUM, NOVEMBER 1991

RESPONSES TO U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS REGARDING THE OFFPOST OPERABLE UNIT DRAFT FINAL REMEDIAL INVESTIGATION ADDENDUM

GENERAL COMMENTS

Comment No. 1

EPA is concerned that the CRLs for two compounds, atrazine and vinyl chloride, exceed the MCLs. Appropriate CRLs must be utilized in the FS to avoid the preparation of an incomplete FS.

Response

The certified reporting limits (CRLs) for atrazine and vinyl chloride are based on analytical protocols established in the Program Manager for Rocky Mountain Arsenal (PMRMA) Chemical Quality Assurance Plan (CQAP) (PMRMA, 1989). The CRLs for these two compounds are the best achievable levels based on the quality assurance/quality control (QA/QC) requirements specified in the CQAP. However, the U.S. Department of the Army (Army) conducted an additional sampling episode in conjunction with the Comprehensive Monitoring Program (CMP) to specifically assess the distribution of vinyl chloride in Unconfined Flow System (UFS) ground-water in the Offpost Operable Unit (OU) at levels below the EPA maximum contaminant level (MCL). The CRL for that episode was 0.46 $\mu g/l$. All results for that sampling round, which was conducted in November 1989, were below detection. Because of a minor laboratory reporting problem, these data were erroneously omitted from the Draft Final Remedial Investigation (RI) Addendum report issued in November 1991. The report has been revised, and these vinyl chloride results have been included Appendix B. The FS will consider this issue and other technical limitations, consistent with guidance.

Comment No. 2

EPA does not agree that the deeper aquifers (Denver and Arapahoe) are adequately characterized. Characterization of the Arapahoe is not possible based on three wells covering a ten square mile area. This points out a significant gap in the data for the Arapahoe Aquifer which needs to be addressed in order to adequately evaluate the hydrogeology of this important deeper aquifer. In addition, there are instances where the CRLs exceed the MCLs in the Denver aquifer.

Response

The Army strongly disagrees with the comment. Characterization of the Denver and Arapahoe formations has been conducted over the past several years. Monitoring wells have been installed in both formations, and groundwater samples have been collected from domestic and monitoring wells.

The Army presented its conceptual model for interaction between the Denver Formation and the UFS in the Final RI and at a feasibility study (FS) technical meeting on October 16, 1991. Based on the discussion in that meeting, consensus was reached that Denver Formation contamination occurs primarily as local effects of interaction between the UFS and the weathered upper portion of the Denver Formation. Additional data regarding contaminant distribution in the Denver Formation are not necessary for conducting the EA and FS for the Offpost OU.

The monitoring network for the Arapahoe Formation is not limited to three wells as suggested by EPA. The Army has collected over 90 groundwater samples from Arapahoe Formation wells in the Offpost OU, including eight locations depicted in Figure 2.2 of the Draft Final RI Addendum. The data from these wells permit a sufficient understanding of the nature and extent of contamination in the Arapahoe Formation for conducting the EA and FS for the Offpost OU.

Comment No. 3

EPA has also noted that there were historic DIMP detections in the alluvium that are outside the DIMP plume as currently portrayed in this document. Since there has not been any recent sampling in this area, the extent of the DIMP plume remains in question.

Response

The Army strongly disagrees with this comment. The extent of DIMP was adequately portrayed in the Draft Final RI Addendum for the purposes of conducting the EA and FS for the Offpost OU. The extent of DIMP depicted in this report is consistent with previous interpretations presented in the Final RI and annually in the Groundwater CMP report. The infrequent, isolated occurrence of low levels of DIMP does not suggest the need for additional sampling to support the EA/FS. No changes to the report are necessary.

Comment No. 4

Please describe in the text what criteria were used to select soil sampling sites.

Response

The text has been revised to include additional information regarding the basis for selecting soil sampling sites.

Comment No. 5

Please include the 12 additional soil samples that were taken, in the methodology section of the document. Please present these data in a corresponding appendix. If the samples are already included in an appendix, please clearly flag the appropriate 12 samples.

Response

The 12 samples collected by CDH in 1989 are discussed in Section 2.4.1 and shown in Figure 2.5. Revisions to the text have been made to clarify that the 12 CDH samples are included in the report. The analytical results for these samples are discussed in Section 6.0 and are presented in Appendix G of the report. Appendix G is labeled as containing the CDH surficial soil analytical results.

The letter from CDH dated June 2, 1989, which contains the analytical results for the CDH surficial soil sampling program, does not report the sampling methodology used by CDH for sample collection. However, review of the CDH's Proposed Soil Sampling Plan Offpost, North and Northwest of the Rocky Mountain Arsenal (RMA), dated April 9, 1990, suggests that sampling protocols used by CDH were similar to Army procedures. Section 2.4.2 has been revised to indicate this similarity in sampling methodology.

SPECIFIC COMMENTS

Comment No. 1, page 6, paragraph 1, third sentence

EPA does not agree that ground water in the Denver formation has been adequately characterized. As we stated in our review of the original EA/FS, comment number 12, Page 3-11, P.1., "The text states that, regarding Denver Fmn. contamination and remediation, more data collection is recommended prior to any remedial alternatives assessments for the Denver Fmn. This seems to imply that the present FS document is only a partial and/or interim FS, pending assessment of Denver Fmn. remedial action assessments. To which the Army response was, "If additional data indicates that an alternative analysis for the Denver Formation is required, this alternative analysis will be provided in the revised EA/FS report. What was the justification for not collecting additional data? In addition, there are several instances where contaminants have CRLs that are greater than MCLs.

Response

The Army strongly disagrees with this comment. The nature and extent of contamination in the Denver Formation in the Offpost OU has been adequately characterized for conducting the EA and FS of the Offpost OU. Nature and extent of contamination in the Denver Formation was discussed in the Final RI and subsequent CMP reports. In the Final RI, the Army presented its conceptual model for interaction between the UFS and Denver Formation. Additionally, the Army restated this conceptual model in an FS technical review meeting on October 16, 1991.

The comment also states that EPA considers the FS currently under preparation as "...a partial and/or interim FS..." The FS currently under preparation is not a partial or interim FS. The Army firmly believes that the analytical data for all media in the Offpost OU have been adequately characterized for conducting the EA and FS.

The RI Addendum presents additional data and interpretations for samples collected under the RI Addendum programs. Additional data for the Denver Formation were not considered necessary for the RI Addendum programs, but have been collected under the Groundwater CMP. These data are discussed in the revised Draft Final EA/FS. Those data are evaluated in the FS with respect to the need for a separate alternatives analysis for the Denver Formation. As stated in the Introduction to the revised Draft Final EA/FS, Nature and Extent of Contamination, additional data for 14 Denver Formation monitoring wells are discussed in that report. These data indicate that an alternatives analysis for the Denver Formation separate from the UFS is not necessary. Additionally, as the Army has stated on many occasions, because of localized hydraulic communication between the Denver Formation and the UFS and the limited extent of contaminants in the Denver Formation, the effective remediation of the UFS will have a beneficial impact on contaminant distribution in the Denver Formation.

The Army recognizes that CRLs exceed MCLs for a few contaminants. The Army has made attempts to reduce CRLs for a number of compounds. However, the NCP provides appropriate procedures for situations when technical limitations, including those associated with analytical procedures, are encountered in the RI/FS process. The development of Preliminary Remediation Goals (PRGs) in the FS will consider the relationships between CRLs and MCLs, consistent with guidance.

No changes to the report are necessary.

Comment No. 2, page 6, paragraph 1

EPA agrees that the contamination in the Denver aquifer may have entered the system locally. However, a review of hydrographs for wells near the NBS clearly show an almost immediate response in the Denver Fm. correlating to changes in the alluvial water levels indicating that there is good communication between the alluvium and the Denver aquifer in this area. This pathway needs to be clearly investigated for completion of the FS.

Response

The FS will consider interaction between the UFS and Denver Formation in developing groundwater alternatives for the Offpost OU. Also, the hydraulic response noted in the comment applies to Denver wells in the UFS. The statement is not generally true for confined Denver Formation wells. No revisions to the report are necessary.

Comment No. 3, page 15, paragraph 1

The CDH sampling locations are not shown on Figure 2.5.

Response

All CDH sampling locations are shown on Figure 2.5. In the CDH letter to Mr. Connally Mears of EPA dated June 2, 1989, CDH reported collecting a total of 12 investigative samples, one duplicate sample, and a field blank on February 24, 1989. These samples, excluding the field blank, are identified in the explanation contained in the upper right corner of the figure.

Comment No. 4, page 15, paragraph 2

How was the approximate distance and direction of the windblown dust estimated? Where are these estimations presented?

Response

The prevailing wind directions were estimated on the basis of information obtained from several sources, including the U.S. Weather Service and the RMA Comprehensive Monitoring Program Air Quality Data Assessment Report dated June 1990. These sources indicate that the prevailing wind direction is from the south. The estimated distance from RMA for which surficial soil samples were collected was based on two principal factors. First, the Army considered CDH's Proposed Soil Sampling Plan Offpost, North and Northwest of the RMA, dated April 9, 1990. The Army's proposed sampling program was designed to encompass the locations proposed by CDH. Second, the Army conducted a preliminary evaluation of surficial soil data from onpost and offpost areas within approximately one-half mile of the northern RMA boundary. This evaluation suggested approximately an order of magnitude decrease in concentration of selected target analytes over approximately 5000 feet of distance from the suspected sources near former Basin F. This information was used to estimate the maximum extent of OCPs in surface soil caused by windblown transport from onpost RMA sources. The Army's proposed sampling plan, which was presented to the Organizations and State (OAS) on June 26, 1990, identified sampling locations up to 12,000 feet from the northern RMA boundary. These locations were selected to encompass the area within which wind-transported soils were anticipated, assuming that the offpost distribution of contaminants followed a pattern similar to that observed for the onpost and near offpost samples. The report has been revised accordingly to include this discussion.

Comment No. 5, page 25, paragraph 1

When was the assessment of the boundary systems effects on the rate of contaminants migration performed? Where are the results of this assessment presented?

Response

The assessments referred to in this paragraph were conducted in conjunction with and reported in the Final RI. This paragraph has been modified to clarify that the Final RI is the source of the information.

Comment No. 6, Figure 2.5

CDH sampling locations are not shown on this figure as indicated in the text.

Response

See the response to EPA Specific Comment No. 3.

Comment No. 7, Figure 3.1

Why are all of the contours inferred? Is the Army that uncertain of this interpretation or are the data insufficient to allow for a more definitive interpretation.

Response

The contours on Figure 3.1 are inferred to reflect some degree of uncertainty in the shape of the potentiometric surface for the UFS. However, the potentiometric surface of the UFS is sufficiently understood for use in conducting an EA/FS for the Offpost OU. No revisions to the report are necessary.

Comment No. 8, page 28, paragraph 1

EPA agrees with the Army's conclusion that the data from three wells do not permit a definitive assessment of the flow directions in the Arapahoe. It is possible that local flow patterns do not coincide with the regional pattern. Such cases are not unusual in the onpost. i.e.. southerly flow south of South Plants, a more westerly flow in the Basin A neck area, etc.

Response

The Army has not concluded that the data do not permit a definitive assessment of flow directions in the Arapahoe Formation. As stated in the referenced paragraph, "...data from these wells are consistent with the northerly to northwesterly regional groundwater flow direction..." in the Arapahoe Formation. Additionally, as discussed in the RI Addendum in Section 3.1.3.2 and the Final RI, groundwater pumping from numerous wells in the Arapahoe Formation has resulted in local variations in the flow directions in the Arapahoe Formation. However, basin-wide flow in the Arapahoe Formation flows north to northwest. The data from the newly installed Arapahoe wells identified at the top of page 28 are consistent with regional flow directions.

Comment No. 9, page 28, paragraph 3

Were any data used from any domestic well samplings?

Response

As stated on page 29, paragraph 5, "Analytical data considered in generation plume maps of the UFS include...domestic wells sampled under the RI Addendum and IRA A programs".

Comment No. 10, page 29, paragraph 3

EPA agrees that distribution maps for the Arapahoe are not possible based on three wells covering a ten square mile area. This points out a significant gap in the data for the Arapahoe Aquifer which needs to be addressed in order to adequately evaluate the hydrogeology of this important deeper aquifer.

Also the references here to sporadic detections, false positives, and localized effects is inappropriate without a discussion of the sampling of the domestic wells. Much of the sporadic detections, false positives, and localized effects may be due to the fact that these data were collected from domestic wells rather than monitor wells. The domestic wells introduce a large number of variables into the sampling program which may effect the results. Such things as the amount of water that was pumped from the well by the residents prior to the arrival of the sampling team varies from *well to well and sample to sample. The rate at which the pump runs during sampling and the amount and type of piping that the water traverses during sampling also differs from well to well. The type and construction of the pump may also effect the sample. It is also unknown which portion or zone of the Arapahoe these domestic wells are completed in, therefore the results from one well may not be comparable to another nearby well. Therefore, while the data collected from these wells is still useful, it has several limitations imposed upon it of which the reader needs to be aware. These limitations make it very difficult to adequately characterize the Arapahoe formation.*

Response

The EPA has misstated the Army's position regarding preparation of distribution maps for the Arapahoe Formation. The Army has stated in the referenced paragraph that distribution maps are not necessary for adequately assessing the extent of contamination in the Arapahoe Formation for the purposes of conducting an EA and FS for the Arapahoe Formation. Data for the Arapahoe Formation clearly show that only low levels of a limited number of contaminants have been detected in the Arapahoe Formation and that concentrations are well below levels that are considered safe for protection of human health and the environment.

The Army has frequently stated its position on possible migration routes from the UFS to the Arapahoe Formation. It is highly unlikely that contaminants observed in Arapahoe Formation domestic wells are the result of migration from the UFS or Denver Formation through overlying geologic formations. Additionally, organic contaminants detected in samples from the Arapahoe Formation appear to be associated with older domestic wells, which may have construction problems. As described in the Final RI, the geology of the Arapahoe Formation consists of an upper clay/shale unit up to 100 feet thick that generally directly underlies the Denver Formation. At the northern RMA boundary, the top of Arapahoe Formation lies at a depth of 250 to 300 feet below ground surface. The lower portion of the Arapahoe Formation consists of a thick conglomerate and sandstone sequence up to 270 feet thick. These sandstone units are typically the aquifers used for production of domestic-use groundwater. Considering this geologic setting and the travel times that would be necessary for contaminants to migrate through the upper shale sequence, the contaminants observed in the Arapahoe Formation are localized and the result of contaminant migration through preferred pathways, such as poorly constructed wells that penetrate the UFS and Denver Formation.

Comment No. 11, page 29, paragraph 4

The phrase "Analytical data considered" implies that not all analytical data was used or was used in a limited or qualified context. Please explain what is meant by this phrase and what the criteria are for selecting the data considered.

Response

The Army assumes that EPA is actually referencing paragraph 5 of this page, not paragraph 4 as indicated in the comment. Paragraph 5 has been modified to clarify that data from (1) monitoring wells and domestic wells sampled under the RI Addendum and IRA A programs and (2) CMP data collected during the Fall of 1989 and Winter of 1990-1991 sampling rounds were used to generate plume maps.

Comment No. 12, page 29, paragraph 5

Please explain the meaning of that statement, "More recent data collected during the winter of 1990-1991 CMP Sampling Round was . . . used in a qualitative manner..." What is a "qualitative manner" and specifically how were the data used.

Response

The Army assumes that EPA is actually referencing paragraph 6 of this page, not paragraph 5 as indicated in the comment. The Army conducted an assessment of the Winter of 1990-1991 data to provide a qualitative evaluation of more recent data being collected under the RMA Groundwater CMP. These data, except for selected analytes as discussed in Section 3.2.1.1.6, were not used for contouring, but only to confirm contours generated with the data referenced on the contour maps. The text has been modified to clarify the qualitative use of more recent data.

Comment No. 13, page 32, Diisopropylmethylphosphonate

EPA is concerned that the map showing the DIMP distribution may be incomplete. The RMA database clearly shows that there have been historic DIMP detections outside of the area currently *delineated as the DIMP plume. This well is located in the extreme eastern portion of Section 12, which is outside the currently plotted DIMP plume. Well 37340 had the following DIMP detections.*

DATE	*CONCUOM [SIC]*
85323	*17.1 ug/l*
86085	*29.2 ug/l*
86156	*36.9 ug/l*
86231	*28.2 ug/l*
87083	*39.1 ug/l*
87267	*35.3 ug/l*

There are not records of this having been sampled since 1987. Please explain why there has not been any further sampling of this well and subsequently how the eastern edge of the plume was established. EPA is concerned that there may be another unidentified pathway to the east of the current DIMP plume.

Response

The Army used data collected under the RI Addendum to construct the diisopropylmethyl phosphonate (DIMP) distribution map as discussed in the report. The eastern edge of the DIMP distribution was assessed considering the data for wells shown in Figure 3.2. Historical data for well 37340 were not considered because the data were several years old at the time the figure was prepared. This distribution is consistent with historical DIMP distribution maps prepared under the RMA Groundwater CMP. Sampling of well 37340 has been attempted by the Army on several occasions. However, the well produces little, if any, water during purging and, as a result, a representative groundwater sample cannot be collected for well 37340.

Comment No. 14, page 38, Section 3.2.1.1.4

The CRLs for atrazine and vinyl chloride are greater than the MCLs for these compounds. For atrazine the CRL is 4.03 ug/l and the MCL is 3 ug/l. Vinyl chloride has a CRL of 12.0 ug/l when the MCL is 2.0 ug/l. This complicates the determination of the amount of contamination. and the effectiveness of any remediation alternatives selected in the FS based on this data.

Response

See response to General Comment No. 1 and Specific Comment No. 1.

Comment No. 15, page 70, Section 4.2

The data for atrazine indicates a CRL of 4.13 ug/l. This CRL exceeds the MCL for atrazine which is 3 ug/l. See comment for Page 38, Section 3.2.1.1.4.

Response

See response to General Comment No. 1 and Specific Comment No. 1.

Comment No. 16, page 92, Section 6.1.3

EPA has several comments, which are detailed below, related to the statistical evaluation that was performed to assess background concentrations.

(a) *EPA does not believe that four samples are adequate to characterize the background levels of an area covering several square miles. A minimum of 10 samples would be more representative of an area of that size of this site.*

Response

The Army shared EPA's concern that the four originally designated background sites were too few to adequately characterize background levels. Consequently, other sampling sites were evaluated to see whether additional samples were representative of background conditions, and a statistical evaluation demonstrated that 12 other sites not directly downwind under prevailing wind conditions were also representative of background. Thus, the Army has shown that 16 sites can be and were used to characterize background soil levels.

(b) *Chlordane is listed as a chemical of concern for soils in the Offpost EA/FS. Why was chlordane not included in the analyte list in Table 6.1.*

Response

Chlordane was detected less frequently than the other OCPs and was not detected in the comparison data set. In addition, Table 6.1 was not developed for chemicals of concern for the Revised Draft Final EA/FS.

(c) *The first paragraph indicates that, "A variety of RMA indicator contaminants, including dieldrin, was not detected in offpost surficial soil near RMA's northeast boundary." This* *statement is ambiguous. Please specifically enumerate which RMA contaminants were not detected.*

Response

The text has been revised to indicate that samples collected near RMA's northeastern boundary generally have lower concentrations and lower frequency of detection than other samples near the northwestern and northern RMA boundaries. Figure 2.6 has been revised to identify those sites used to assess background concentrations. Analytical results for these sites are presented in Appendix E.

(d) *How were the data from the 13 samples handled: individually, or was the mean and 95th percentile of all the data for all the samples computed for comparison with background.*

Response

The data sets, represented by individual values, were compared following guidance cited in the text. Although nonparametric tests were used in most comparisons, the hypothesis test is whether the means of the compared data sets are significantly different.

(e) *The Wilcoxon rank sum test appears to be recognized in the literature as an appropriate method for paired data such as these. The method of proportion used by the Army, however, seems to be a bit more esoteric. Please provide an explanation of the applicability of this method to these circumstances, as well as a description of the parameters.*

Response

The Army method and its limitations are fully described in the cited reference (EPA, 1989), which is a publicly available document. A complete recitation of this information is not warranted.

Comment No. 17, Figure 2.1 through 2.6

Please superimpose zone boundaries on these figures.

Response

Zones were developed during the EA/FS process by considering technical issues that are not part of this report. It is not appropriate to present them in this document. No revisions to the report are necessary.

Comment No. 18, Figure 7.1, 7.2, and 7.2

All data used in these figures are reported in obscure units of parts per thousand. Suggest that more conventional units of parts per million or parts per billion be used.

Response

The comment refers to Figure 7.2 twice. The Army assumes that the comment actually refers to Figures 7.1, 7.2, and 7.3. However, the concentrations shown in the figures are in micrograms per gram, or parts per million, not parts per thousand as indicated in the comment. These units are consistent with those presented in Table 2.5 and Appendix F. No revision to the report is necessary.

RESPONSES TO DRAFT SHELL OIL COMPANY COMMENTS REGARDING THE OFFPOST OPERABLE UNIT DRAFT FINAL REMEDIAL INVESTIGATION ADDENDUM

GENERAL COMMENTS

Comment No. 1

Groundwater quality data sets from 1989, 1990, and 1991 were used in the RI Addendum evaluation. During those years, modifications to both the NBCS and NWBCS have been made which have significantly reduced groundwater contaminant concentrations downgradient from these systems. Of the three data sets, the 1991 CMP data present the most accurate picture of the rapidly changing offpost contaminant distributions. Combining data sets to prepare distribution maps as performed in this report does not give the reader a sense of the declining contaminant concentrations or the actual current contaminant distributions.

The entire EA/FS is potentially affected and will not be accurate or realistic if the current offpost contamination distribution is not shown accurately. Furthermore, since the decrease in plume concentrations appear to be relatively rapid, the discrepancies between the 1989 and 1990 data sets and future distributions will be even greater. If the preferred alternatives selected in the EA/FS are to be accepted by EPA for the Final Remedy, the strongest supporting evidence must be presented. Therefore, Shell strongly believes that the 1991 CMP data should be used preferentially over the 1989 and 1990 data sets to depict offpost contaminant distributions in the RI Addendum.

Response

The data sets used to construct the contaminant distribution maps for unconfined flow system (UFS) groundwater were the most comprehensive data sets available at the time the Remedial Investigation (RI) Addendum report was being prepared. This required the use of data from several Rocky Mountain Arsenal (RMA) programs, including the Groundwater Comprehensive Monitoring Program (CMP). The U.S. Department of the Army (Army) made every effort to use the most recent data sets and to correctly reflect the extent of contamination in the UFS. However, because of the time required to collect samples, receive analytical data from the laboratories, conduct preliminary data management activities, perform data validation and correct errors or problems, and finalize the data management activities and elevate data to final, it was not possible to use all early-1991 CMP data for the RI Addendum. Additionally, it appears that some early-1991 CMP data have not yet been elevated to final, making it impossible to use at this time. No changes to the report are necessary.

Comment No. 2

Portions of the 1989 and 1990 groundwater quality data sets are considered to be anomalous or erroneous by the Army but have in some cases been used in the assessment. For example, erroneous 1990 RI Addendum volatile organic compound (VOC) data are cited in the text without qualification. Also, we believe that the interpretation of the DBCP plume is incorrect because of the use of anomalous 1989 RI addendum data. This is further justification for basing the analysis on 1991 CMP data.

The anomalous groundwater data sets discussed both in the text and in the attached specific comments include the 1989 CMP, 1990 RI Addendum, and possible components of the 1989 RI Addendum groundwater data.

Response

The Army has reevaluated the anomalous groundwater data cited in the report and has made several clarifications in the text regarding the anomalous data. However, the Army disagrees with Shell Oil Company's (Shell's) conclusion that early-1991 CMP data should be used exclusively in the report. Additionally, Shell indicates that "erroneous...data are cited in the text without qualification." However, Shell does not provide any specifics or examples and the Army has not been able to locate any citations of anomalous data in the text. No other changes to the report are necessary.

Comment No. 3

The presence of the erroneous 1990 RI Addendum VOC groundwater data in the RMA database has created confusion and wasted time and resources for Shell and the Army (in this report) in interpreting offpost groundwater contaminant distributions and will continue to do so. Some of these erroneous 1990 data were mistakenly used in this assessment. Therefore, we request that the 1990 RI Addendum VOC data be removed from the RMA database.

Response

The Army has initiated additional changes to the RMA database intended to flag any anomalous data in the database.

Comment No. 4

The distribution of offpost surficial soil contamination is likely the result of multiple and complex transport processes from RMA and offpost sources. The highest levels of offpost surficial contamination correspond well with the areal distribution of alluvial aquifer contaminant plumes. Since the area downgradient of the irrigation canals has been heavily irrigated alluvial groundwater during the past 30 years, it is worth quantitatively evaluating how much of the surficial soil contamination may be from this transport mechanism. As is typical of similar agricultural areas, the use of pesticides in these areas is also likely to be a substantial source of the observed contamination.

The following observations lend credence to these hypotheses. First, many of the elevated soil detections of dieldrin downgradient of the canals lie along extensions of the two prominent ground water pathways emanating from the RMA and are generally in areas that have historically been heavily irrigated. These areas, like other similar agricultural areas in Colorado, are likely to have used pesticides extensively. Secondly, with the exception of a couple relatively high detections along the eastern boundary, there is a general pattern of much lower surficial contaminant levels outside of the other RMA boundaries. Although wind patterns are likely to be partially responsible for this, the higher contaminant levels downgradient of the canals are not fully explained by this wind blown transport alone.

The importance of emphasizing multiple potential pathways for the offpost surficial soil contamination lies in its potential impact on the final onpost remedy. If the ground water irrigation pathway has been a significant source of the offpost surficial soil contamination, then placing complete emphasis on controlling windblown dust from onpost to the offpost area may be inappropriate. This is important particularly because the source of the offpost groundwater contaminants is being controlled by the North Boundary System and will be further abated by the offpost IRA.

Response

The Army agrees with Shell's comment that "The distribution of offpost surficial soil contamination is likely the result of multiple and complex transport processes from RMA and offpost sources." However, the Army does not believe that a quantitative evaluation of the contribution of the surficial soil contamination from irrigation over the past 30 years is warranted or even possible. The numerous factors that will affect any conclusions regarding the contribution from historical irrigation with contaminated groundwater are impossible to quantify with any reasonable degree of certainty. No changes to the report are necessary.

Comment No. 5

The argument that offpost surface water contaminants are the result of ground water exfiltration offpost can be strengthened by also including water quality data from First Creek where it exits the RMA. An evaluation of seasonal and onpost data to back up the hypothesis should be included in this document.

Response

The report includes information regarding surface-water sampling conducted under the surface-water element of the CMP. Analytical results for surface-water samples collected along First Creek, are presented to support the conclusion that most of the contaminants observed in First Creek surface water between the northern RMA boundary and Highway 2 result from ground-water discharge to First Creek along this reach. No revisions to the report are necessary.

Comment No. 6

Shell does not believe that presenting water quality data from wells of questionable construction together with newly installed monitoring wells will provide reliable information on the question of impact to the Arapahoe. The available data for the three "impacted" Arapahoe wells indicates they were installed in the 1960s and early 1970s. Nearly all of the available data for these wells (inorganic water chemistry, specific conductivity, proximity to DIMP plumes in the alluvium and time frame of installation) suggest that the observed DIMP is a result of cross-contamination from poor well construction. A more direct position stating that these wells are not reliable water quality wells would prevent having to address their inadequacies every time an anomalous detection is observed.

It is also unclear from reading this document why no further examination of the Denver Formation has been proposed. Shell believes that the existing data from the Denver Formation is sufficient for purposes of conducting the FS. Since this historically been the Army's position as well, we believe it should be clearly stated in this report. Also, the logic of evaluating a deeper formation while completely excluding discussion of an intermediate formation needs clarification in this document.

Response

Sufficient discussion of the integrity of domestic wells in the Arapahoe Formation and the usefulness of data from those wells in assessing the distribution of contaminants in the Arapahoe Formation has been provided in the Draft Final RI Addendum report. However, additional discussion that more clearly states the limitations of data from those wells has been added to the Proposed Final RI Addendum report.

The Army's position regarding the Denver Formation was stated in the Final RI and is summarized in Section 2.1.1 of the Draft Final RI Addendum report. The RI Addendum was prepared to eliminate data gaps for the Offpost OU. Because sufficient data for the Denver Formation were presented in the Final RI for conducting an endangerment assessment (EA)/FS, additional discussion of the Denver Formation is not necessary in this report. However, a brief statement regarding the adequacy regarding the Denver Formation data for conducting an EA/FS has been added to the text in Section 2.1.1 of the report. Additionally, the introduction section of the revised Draft Final EA/FS presents the nature and extent of contamination in the Denver Formation and restates the adequacy of the Denver Formation data for conducting an EA/FS for the Offpost OU.

SPECIFIC COMMENTS

Comment No. 1, page 9, Section 2.1.2

In various parts of Section 3, it is stated that Winter 1990-1991 groundwater CMP sampling results were used to assess plume boundaries. This fact should also be mentioned here.

Response

The text has been revised in accordance with the comment.

Comment No. 2, page 26, last paragraph; page 27, first paragraph

Higher water levels at the NWBCS in February 1990 relative to the 1987 water levels in the Final RI Report were, in fact, due to a change in operation of the NWBCS. At the end of 1988, recharge-well flowrates at the northeastern end of the system were increased to improve the reverse hydraulic gradient along the slurry wall. This created higher water levels both in the recharge wells and offpost and helped to prevent bypass on the northeastern end of the NWBCS that, unknown to the Army at that time, had been occurring. The recent lowering of groundwater contaminant concentrations offpost near the NWBCS indicted in the RI Addendum Report was caused primarily by this operational change. The NWBCS IRA modifications will further improve the system's performance.

Response

The text has been revised to indicate that changes in the operation of the Northwest Boundary Containment System (NWBCS) contributed to the observed increases in water levels downgradient of the NWBCS.

Comment No. 3, page 28, first paragraph, first sentence

Water level data in three wells does not demonstrate that the Arapahoe aquifers are confined in all areas of the offpost OU. Perhaps this sentence should be appended with the phrase, "in these areas."

Response

The text has been revised in accordance with the comment.

Comment No. 4, page 29, third paragraph

Data from the Arapahoe Formation which is of poor quality and is not representative of the formation is misleading and should not be included in the document.

Response

The Army disagrees with the comment. The data to which Shell is referring are not considered of "poor quality." In fact, the isolated, sporadic occurrence of contaminants in Arapahoe Formation wells substantiates the interpretation of only localized, low-level contamination in the Arapahoe Formation that is largely the result of migration through poorly constructed domestic wells. No changes to the report are necessary.

Comment No. 5, paragraph 29, fourth paragraph

This paragraph states that CMP, RI Addendum, and IRA A water quality data have passed QA/QC review and have been accepted into the RMA database. This statement implies that all of these data were accepted, which is untrue and should be revised since some of the RI Addendum VOC data did not pass QA/QC review and were flagged as being anomalous.

It is stated that if data did not pass QA/QC review, they were either flagged in the appendices or eliminated from the database. The 1990 RI Addendum VOC data that were flagged as being anomalous due to inadequate decontamination of sampling equipment and subsequent cross-contamination of samples have not been eliminated from the RMA database as of January 31, 1992. In fact, DP Associates (Jim Clark) was not aware that a problem with these data existed. These data were not used in the RI Addendum assessment and plume interpretations for which they were collected. Therefore, these data are of no further use and are a potential source of serious misinterpretations of offpost groundwater contaminant distributions. Although with the DP Associates "RKPMCGW" table, the flagcode field could be used to indicate that they are erroneous, it would be preferable to remove this data set from the database since every potential user will not know of the faulty nature of the VOC data and may not check the flagcodes.

Because the above data were obviously erroneous, flagged as such in this report and unusable for the purpose for which they were collected, these data should not have been accepted into the RMA database. Are rinse blank results not considered in the QA/QC review? If not, the PMRMA procedures should be revised to account for such a situation.

Response

The text has been revised in accordance with the first paragraph of the comment. Additional discussions have been recently initiated with D.P. Associates to evaluate procedures for flagging anomalous data.

Comment No. 6, page 29, last paragraph

The 1990-1991 CMP data should have been used as the primary data set for plume map generation, because these data reflect the most recent contaminant distribution and the influence of recent boundary system modifications and operational changes.

Response

See response to General Comment No. 1.

Comment No. 7, page 30, second paragraph, first sentence

Some of the fall 1989 CMP data seem to be questionable for OCPs and DBCP. For which compounds and wells were the fall 1989 CMP results "highly anomalous?" If the anomalous 1990 RI Addendum VOC data were not used in mapping, why were the anomalous 1989 data averaged with other data sets and used for mapping? In the discussion of the distribution of compounds that were not mapped, the anomalous 1989 data should be qualified if they are retained.

Response

The Army is not aware of any anomalous data from Fall 1989 for OCPs or DBCP. The wells and analytes for which VOC data are considered anomalous and are identified as such in Appendix B. Because no anomalous data for OCPs or DBCP are recognized, the remaining portions of the comment do not require a response.

Comment No. 8, page 30, second paragraph, second sentence

This sentence appears to indicate that the anomalous data were used to develop the approximate averages for plume mapping. The last sentence in the third paragraph on page 58 indicates that these data were not used. Please clarify.

Response

The distribution of groundwater contaminants did not include data recognized as anomalous. The text has been revised in accordance with the comment.

Comment No. 9, page 32, last paragraph

A detection of DIMP 2 miles northwest of RMA could also be indicative of migration along one of the pathways from the RMA North Boundary.

Response

Based on available data regarding the interpreted distribution of dispropylmethyl phosphonate (DIMP), as depicted in Figure 3.2 and historically presented in groundwater element CMP reports, it appears that the occurrence of DIMP in well 10720TWBRI is most likely attributable to historical flows from the vicinity of the NWBCS. No changes to the report are necessary.

Comment No. 10, page 35, third paragraph, second sentence

Does this sentence refer to data collected in the RI Addendum?

Response

The specific data cited in this paragraph were collected under the groundwater element of the CMP. Groundwater-quality data generated under the RI Addendum are presented in Appendix B. No changes to the report are necessary.

Comment No. 11, page 37, Section 3.2.1.1.3

See the Specific Comment regarding page 30, second paragraph, first sentence.

Response

See response to Specific Comment No. 7.

Comment No. 12, page 37, second paragraph

The 1991 CMP aldrin sample result for well 37419 was < 0.05 ug/l. Was the 1989 concentration of 0.354 ug/l for well 37419 considered to be one of the "highly anomalous" CMP detections mentioned on page 30, second paragraph? If so, this sentence should be qualified.

The 1989 aldrin detection in well 37345 also appears to be anomalous as it is the only detection out of 11 analyses since 1987 and, as stated, it is an exception to the lack of aldrin detections downgradient of the canals. Please add qualification.

Response

The sample collected from well 37419, which had a reported aldrin concentration of 0.354 micrograms per liter (µg/l), was sampled under the RI Addendum program, not under the CMP. The result is not considered anomalous and does not require qualification. The text has been revised to indicate that aldrin has not been previously detected in samples from well 37345.

Comment No. 13, page 38, first full paragraph

The consistent chlordane detections of approximately 1 ug/l in the fall 1989 CMP sampling round seem questionable. See the Specific Comment regarding page 30, second paragraph, first sentence.

Response

The text has been revised to indicate that a review of historical data and more recent data for the offpost wells in which chlordane was detected shows that chlordane is generally not detected in offpost wells.

Comment No. 14, page 40, Section 3.2.1.1.6

Refer to Comment No. 3.

Response

See response to General Comment No. 3.

Comment No. 15, page 44, second paragraph

On Figure 3.8, detections of DBCP in the eastern extension of the Northern Paleochannel plume in Section 12 appear anomalous compared to the 1991 CMP data, which were below CRL for all three RI Addendum Wells (37402, 37403, and 37404). All three of these detections were from the fall 1989 RI Addendum sampling round and samples from these three wells were not analyzed by GC methods in 1990, so comparison of results is not possible until 1991. Since DBCP was included in *the list of VOCs that were affected by inadequate decontamination of sampling equipment between wells in the 1990 RI Addendum sampling round, might the 1989 RI Addendum data for these three wells also have been affected by the same problem? If so, Figure 3.8 should be modified.*

Response

There is no evidence that dibromochloropropane (DBCP) data from the Fall 1989 RI Addendum sampling round were affected by the cross-contamination problem identified for other volatile organic compounds in later sampling rounds. However, the text has been revised to note that DBCP was not detected in groundwater samples collected from wells 37402, 37403, or 37404 during the early-1991 CMP sampling event. Because no additional data are available for these wells, no changes to Figure 3.8 have been made.

Comment No. 16, page 47, first paragraph

The reported carbon tetrachloride detection of 6.98 ug/l in well 37407 was from the January through March 1990 RI Addendum sampling round that was problematic and should not have been cited in the text without qualification, if at all. Duplicate 1990 data and 1991 CMP sample data confirm that this reported concentration was false. In addition, all of the erroneous carbon tetrachloride analyses are not flagged with an "A" in Appendix B Table B1. Also, the ID numbers for duplicate samples HA1166 and HA1165 are reversed for wells 37407 and 37404 in Table 3.3. These discrepancies affect the QA evaluation for these wells and cause one to question whether the erroneous 1990 RI Addendum VOC data set has been used by mistake elsewhere in this report.

Response

Appendix B has been revised to show that the result for carbon tetrachloride is anomalous. Additional review has been performed to verify (1) the proper flagging of anomalous data in Appendix B and (2) that the anomalous data has not been used to interpret the extent of contamination in the Offpost OU. The ID numbers for duplicate samples HA1166 and HA1165 are correct as shown in Table 3.3. However, they were reversed in Appendix B. Table B4 has been corrected.

Comment No. 17, page 52, fourth paragraph, last sentence

Please rephrase the sentence to read "...and assessment of possible contamination in the Arapahoe Formation."

Response

The text has been revised in accordance with the comment.

Comment No. 18, page 53, second paragraph, fourth sentence

This sentence is confusing. DIMP was not found in January 1990.

Response

DIMP was found in the sample collected from well 11841TW096 in January 1990 at a concentration of 0.521 $\mu g/l$, as shown in the text and Appendix B. However, the text has been revised to clarify in which wells DIMP and chloroform were detected.

Comment No. 19, page 53, Section 3.2.2.1

The sample results from the three new Arapahoe Formation monitoring wells are probably more indicative of Arapahoe water quality than are the sampling results from the existing domestic wells. This is because well drilling and construction practices were probably much superior for the monitoring wells than for the domestic wells, preventing mixing of water from different aquifers. The fact that no organic compounds were detected in the monitoring wells is significant and should be emphasized in the text.

Response

The Army agrees with Shell's comment. The text has been revised to indicate that groundwater-quality data from the newly installed Arapahoe Formation wells strongly support the Army's conclusion that contamination observed in the Arapahoe Formation is sporadic and localized, possibly as a result of well construction problems.

Comment No. 20, page 55, first paragraph, second sentence

We do not believe that the values of hardness and conductivity reported by the Tri-County Health Department (TCHD) in their 1989 private well inventory report are based upon an independent review of actual data in the offpost area by TCHD. These values are probably based upon ranges reported in other documents.

Response

The text has been revised to clarify that these ranges were reported by the Tri-County Health Department (TCHD) in their private well inventory report.

Comment No. 21, page 56, last paragraph

As stated in Section 3.2.1.1.6, the RI Addendum samples collected from January through March 1990 were anonymously high for volatiles because of inadequate decontamination of sampling equipment, not because of analytical problems. Both the GC and GC/MS results would be affected and the GC/MS results should not have been used as a guide for contour mapping. This report is inconsistent in its use of this erroneous data set and should be revised.

Response

The text has been revised to indicate that the anomalous volatile organic compound data are also reflected in the gas chromatography/mass spectrometry (GC/MS) results. The statement that the GC/MS results were used in contour mapping is not correct and has been deleted from the report. None of the anomalous data identified in Appendix B were used for contouring, averaging, or assessing the distribution of contamination in the UFS.

Comment No. 22, page 57, last paragraph

The DSA values exceeded 1.0 for several volatiles because HA1165 is actually the duplicate for well 37407, not for well 37404 as shown in Table 3.3, and not because of analytical problems. Table B4 in Appendix B contains the correct ID numbers. If the correct duplicate is used for well 37407, the DSA values for those volatiles should be much less than 1.0. Furthermore, a DSA analysis on the erroneous 1990 RI Addendum VOC data is unnecessary.

Response

The Army has reviewed chains of custody and information in the RMA database and compared analytical results for the samples in question. The correct investigative/duplicate sample pairs have been compared in Table 3.3. That is, sample HA1165 is a duplicate of sample 37404 and sample HA1165 is a duplicate of sample 37407. Table B4 in Appendix B, Groundwater Duplicate Analytical Data, incorrectly identified the investigate/duplicate sample pairs. Table B4 has been revised accordingly.

Comment No. 23, page 58, second paragraph

Not only is rinse blank HA1175 a true rinse blank, it is a telling rinse blank. Please review Section 3.2.1.1.6. Five rinse blanks were collected during RI Addendum activities, yet only one (HA1175) is identified and discussed. Please provide the ID numbers and results for the other four.

Response

Table B3 in Appendix B has been revised to identify the types of quality assurance/quality control (QA/QC) samples represented by the analytical results presented in Table B3, including all trip, rinse, and field blanks. The text on page 58, second paragraph, has also been revised to indicate that the analytical results for sample HA1175 are thought to represent field decontamination problems as discussed in Section 3.2.1.1.6.

Comment No. 24, page 58, second paragraph

The Offpost OU RI reported sporadic and unexplainable detections of volatile compounds such as chlorobenzene and chloroform in Denver Formation wells. Is it possible that inadequate decontamination procedures were also responsible for these anomalous results?

Response

The evaluation of QA/QC analytical results were presented, discussed, and interpreted in the Final RI.

Comment No. 25, page 58, third paragraph

Please revise this paragraph to reflect the above comments.

Response

The text has been revised in accordance with the comment.

Comment No. 26, page 59, first full paragraph

The groundwater flow velocity and volume in the minor paleochannel located south of the First Creek Paleochannel is much less than in the First Creek Paleochannel and the analytes detected in this area may be relic contaminants and do not reflect the present effectiveness of the NBCS.

The plume maps do not indicate that trichloroethene or chlorobenzene are present in the eastern arm of the Northern Paleochannel in Section 12. Also, the DBCP detections in this area were questionable. See the Specific Comment regarding page 44, second paragraph.

Response

The text has been revised to indicate that only chloroform, DBCP, and DIMP were identified in the eastern arm of the Northern Paleochannel. Reference to chlorobenzene and trichloroethene have been removed from this sentence.

Comment No. 27, page 60, first paragraph

Historically, a diluting effect has also been noted downgradient of the NWBCS as a result of canal leakage. Although not as significant as downgradient of the NBCS, historical data indicate it is present. A probable reason for it not being apparent lately is the decreasing concentrations immediately downgradient of the NWBCS as a result of increased efficiency of this system.

Response

The Army agrees with Shell's comment. The text has been revised to indicate that the dilution effect downgradient of the NWBCS is less obvious in that area.

Comment No. 28, page 60, second paragraph

There is no doubt that the increased water table elevations immediately downgradient of the NBCS are due to the operation of the recharge trenches.

Response

The Army agrees with Shell's comment. The text has been revised in accordance with the comment.

Comment No. 29, page 65, second paragraph

Was the siphon which routes First Creek water directly to Burlington Ditch open when the samples which exhibited DIMP were collected? If not, what is the explanation of the detections in Burlington Ditch? An explanation of the mechanism for directly routing water to Burlington Ditch and the frequency with which it is used would be helpful to the reader.

Response

The siphon was not in use during surface-water sampling events conducted during the RI Addendum program. The occurrence of DIMP in Burlington Ditch is considered the result of groundwater/surface-water interaction along the reach of Burlington Ditch in the northwest corner of Section 14. Additional discussion of the surface-water system has been added to Section 4.1 of the report.

Comment No. 30, page 74, first paragraph

Section 4.1.1 states that "DIMP was the organic compound most frequently detected in offpost surface water" thus, DIMP should be mentioned in Section 4.5.

Response

The text has been revised in accordance with the comment.

Comment No. 31, page 77, third paragraph, first sentence

DBCP is written twice in the listing in this sentence.

Response

The text has been revised in accordance with the comment.

Comment No. 32, page 78, first paragraph

DBCP and hexachlorocyclopentadiene have moderate and high affinity for organic matter, respectively. Organic matter is commonly present in stream and lake-bottom sediment; therefore, these compounds may have affinity for sediments as is indicated by their detections.

Two acronyms for hexachlorocyclopentadiene are used in this report (CL6CP and HCCPD), which may lead to confusion.

Response

The text has been revised to indicate that DBCP and CL6CP tend to sorb to sediments. The text has also been revised by removing the HCCPD acronym for hexachlorocyclopentadiene.

Comment No. 33, page 84, last paragraph

As stated on page 79, second paragraph, other sources of dieldrin are indicated to be present in the Offpost OU; therefore, dieldrin should be added to the list of compounds with additional sources in this paragraph.

The previous discussion of contaminant distributions in the text did not establish that RMA was a source of endrin and DDE in sediments. Therefore, the last sentence should be revised to be more accurate.

Response

The text has been revised to include dieldrin as a compound for which additional sources exist in the Offpost OU. The last paragraph on page 84 has been revised to clarify the source of endrin and DDE.

Comment No. 34, page 88, third full paragraph

The surficial soil data presented in the report do not display any clear distribution pattern which would support a single source or a dominant mechanism of transport. Instead, the data suggest multiple sources and perhaps numerous transport mechanisms. To state that windblown contamination from Onpost to Offpost is the primary cause of the observed contamination with only sporadic influences from other sources or transport routes is inconsistent with the data.

Response

The Army disagrees with the comment. The Army has repeatedly stated that multiple sources of organochlorine pesticides (OCPs) exist in the Offpost OU. However, the distribution of the OCPs near the northern RMA boundary appears to follow a pattern that is consistent with windblown transport. No changes to the report are necessary.

Comment No. 35, page 89, last paragraph

The wind-transport mechanism for OCPs in offpost surficial soils is most plausible for dieldrin within a mile of the north boundary of RMA in Sections 13 and 14. In other offpost areas this mechanism is less plausible for dieldrin and other OCPs and their distribution is better explained by other offpost sources. The conclusions reached for the distribution of OCPs in surface soil are based on an overly qualitative and generalized analysis.

Response

The text has been revised to clarify that (1) windblown transport is most plausible for areas immediately north of RMA and (2) other sources, including irrigation northwest of the canals, are likely mechanisms in the other areas.

Comment No. 36, page 97, second paragraph

Please add that the mercury detections exceeding background concentrations north of the canals are from sources other than RMA.

Response

The text has been revised in accordance with the comment.

Comment No. 37, page 108, second paragraph

It is unfortunate that the review process for the RI Addendum Report was not completed prior to issuing the Offpost EA/FS Draft Report. Anomalous and erroneous groundwater quality data sets have been used in the RI Addendum that may have resulted in misinterpretations of plumes in the EA/FS.

Response

Comment noted. See also the response to Shell General Comment Nos. 2 and 3.

Comment No. 38, page 109, fourth paragraph

Modifications to the NWBCS include physical changes as well as operational ones. In addition to reducing chloroform offpost, these modifications will reduce concentrations of all RMA-related compounds offpost including dieldrin, DIMP, chloride, and fluoride.

Response

The text has been revised to note that reductions in other contaminants offpost are expected to occur as a result of modifications to the NWBCS.

Comment No. 39, page 110, second full paragraph, third sentence

Please add that the detection of mercury and arsenic in surface water upstream of First Creek indicates offpost sources of these compounds.

Response

The text has been revised in accordance with the comment.

Comment No. 40, page 112, second paragraph, second and third sentence

The highest concentrations of arsenic and mercury in surface soil were detected northwest of Burlington Ditch, not "northeast" of the ditch as stated. It should be added that these detections were from sources other than RMA.

Response

The text has been revised in accordance with the comment.

Comment No. 41, page 113, only paragraph

Section 7.2.4 of this report indicates that contaminants attributed to RMA sources were not detected in an egg from an abandoned bald eagle nest at Barr Lake. This fact should be added to the paragraph.

Response

The comment does not accurately reflect the statement made in the text. The correct interpretation, as presented in the referenced section, is that the contaminants could not be clearly associated with releases from RMA. No revisions to the report are necessary.

Comment No. 42, Figure 3.2, Distribution of DIMP in the Offpost UFS; and Figure 3.6, Distribution of Chloroform in the Offpost UFS

It would be helpful to illustrate the similarities and/or differences between the Final RI and RI Addendum data sets for these two maps by using the same isoconcentration values as were used for contouring in the Final RI Report or the CMP Reports. Similar isoconcentration values were used in the plume maps for the other analytes.

Response

The Army believes that the isoconcentration lines used for these figures best depict the distribution of DIMP and chloroform in the UFS. For DIMP, the minimum isoconcentration contour represented in the Final RI was 11 μg/l, which is considered too high for the current database. Additionally, the contour intervals for DIMP and chloroform used in the CMP report for 1989 (RSLA, 1990a) are not the same as those in the Final RI, as suggested by the comment. No changes to the report are necessary.

Comment No. 43, Figure 3.4, Distribution of Dieldrin in the Offpost UFS; and Figure 3.5, Distribution of Endrin in the Offpost UFS

At well 37307, the dieldrin and endrin plumes are drawn as part of the plumes located in the First Creek Paleochannel. Figure 3.1 shows an area of unsaturated alluvium separating Well 37307 and the First Creek Paleochannel. Therefore, isolated detections should be drawn for Well 37307 and based upon onpost data, the western margins of the First Creek dieldrin and endrin plumes should be moved east to Peoria Street.

Response

The extent and variability in the shape of the unsaturated zones is uncertain. The purpose of depicting these zones is to give a general indication of the major groundwater flow pathways in the UFS. However, because water levels rise and fall over time, the extent of dieldrin and endrin cannot be tied directly to any particular depiction of these zones. The dieldrin and endrin plumes are consistent with their distributions shown in the Final RI and Groundwater CMP report for FY90 (RLSA, 1991a). No changes to the report are necessary.

RESPONSES TO COLORADO DEPARTMENT OF HEALTH COMMENTS REGARDING THE OFFPOST OPERABLE UNIT DRAFT FINAL REMEDIAL INVESTIGATION ADDENDUM

GENERAL COMMENTS

Comment No. 1

The Army has asserted that "[g]roundwater monitoring in the Denver Formation was not necessary for this addendum report because the Final RI adequately characterized the extent of contamination in the Denver Formation" and that "...mechanisms of contamination migration through the Denver Formation" were adequately identified in the Final Off-post RI (page 6). While several mechanisms of contaminant migration were presented in the document, historical operation of the North Boundary Containment System (NBCS) and resultant contamination of Denver Formation (Fm) sands was not included in the discussion. The State presented a conceptual model for Denver Fm-alluvial aquifer interaction at the October 16, 1991, Technical Subcommittee Meeting at which our representatives identified historical operation of the NBCS as the predominant mechanism for contamination of Denver Fm sands in the vicinity and downgradient of the NBCS. In a report distributed to the organizations at the meeting, the State also proposed a monitoring program to determine the current impact of the system on lateral and vertical contaminant migration within the Denver Fm and the alluvial aquifer. The Army promised to review the report and respond to the State's proposal.

Additionally, at Feasibility Study data needs meetings being conducted during the same time period, the Army stated that NBCS Operations personnel had been evaluating detailed data on vertical and lateral gradients in the vicinity of the system. Without a summary of this evaluation, and without an Army review of the State's proposed NBCS monitoring program, we are not able to agree that Denver Fm contamination has been properly characterized. If the studies indicate a reversed gradient across the slurry wall and upward gradients between Denver Fm sands and the alluvial aquifer, the proposed program will not be necessary. We request a response to the State proposal, and will comment on the need for additional Denver Fm characterization in the vicinity of the NBCS after reviewing the response.

Response

The U.S. Department of the Army (Army) disagrees with the Colorado Department of Health (CDH) claim that the Denver Formation has not been adequately characterized for the purposes of conducting an Endangerment Assessment/Feasibility Study (EA/FS) for the Offpost Operable Unit (OU). The Final Remedial Investigation (RI) provided a description of the geology and hydrogeology of the Denver Formation and interactions between the Denver Formation and the Unconfined Flow System (UFS). In the FS technical meeting held on October 16, 1991, the Army restated its conceptual model for the interaction between the Denver Formation and UFS and migration routes for contaminants from the UFS. Based on the discussion and statements by the CDH representatives at that meeting, consensus was reached in that meeting that Denver

Formation contamination occurs primarily as local effects of interaction between the UFS and the weathered upper portion of the Denver Formation. Additionally, the focus of the CDH comments is on the nature of contamination in the vicinity of the North Boundary Containment System (NBCS). The Army will respond to the CDH proposal under a separate cover following complete review of the CDH document. However, based on the nature of the CDH comments and the response to the Army's presentation in the October 16, 1991, meeting, the only remaining issues associated with the Denver Formation contamination is assessment of the migration of contaminants to the Denver Formation in the vicinity of the NBCS, particularly in the immediate proximity of the pilot portion of the NBCS.

Comment No. 2

The State remains concerned that the nature and extent of groundwater contamination has not been sufficiently characterized for the Arapahoe Formation. In addition, the geology and hydrology have not been studied in sufficient detail to understand the relationship between the confined flow system, the confined Denver and the Arapahoe Formation. The State requests a response to the results of our Arapahoe sampling program which indicated Arapahoe Fm contamination, and a follow-up technical meeting to discuss Arapahoe contamination and future investigations of the Arapahoe Formation.

Response

The Army strongly disagrees with the comment. The Army has collected over 90 groundwater samples from monitoring or domestic wells in the Arapahoe Formation. These data indicate that where contamination occurs, it is at low concentrations and appears to be highly localized. On the basis of these data, contamination in the Arapahoe Formation is likely the result of vertical migration of contamination from the UFS through poorly constructed domestic wells. The Army will respond to the CDH proposed Arapahoe Formation sampling program under separate cover. No revisions to the report are necessary.

Comment No. 3

In numerous instances soil and sediment contamination detected in the off-post OU is being attributed to sources other than RMA (e.g., mercury in Burlington Ditch sediments is attributed to the wastewater treatment facility and pesticide contamination is attributed to personal application). These conclusions are arbitrary and should be purely tentative in nature. Additional soil sampling will be needed to substantiate.

Response

The Army has presented a voluminous amount of analytical data for soil and sediment in the Offpost OU. The data were presented in the Final RI and RI Addendum reports. The data show that some of the contaminants detected in soil and sediment likely the result of past releases from RMA, and the reports have provided such interpretations. However, other data and interpretations suggest that other sources of some of the contaminants may also be present in the Offpost OU or in other areas that impact the Offpost OU. The data for these media presented in the Final RI and RI Addendum reports are sufficient for the purposes of conducting an EA/FS for the Offpost OU. No additional sampling for these media are necessary to allow the completion of the RMA Offpost OU RI and EA/FS programs. The Army has repeatedly and consistently stated its commitment to continue monitoring programs for the Offpost OU. No revisions to the report are necessary.

Comment No. 4

The Off-post Operable Unit should be expanded or additional operable units created to adequately characterize the nature and extent of surficial soil contamination that has been detected outside of the boundaries of the existing Off-post OU. High concentrations of dieldrin have been detected in surficial soils at localities east of RMA and the area south of RMA has yet to be investigated.

Response

The boundaries of the Offpost OU were identified in the Federal Facility Agreement (FFA) for Rocky Mountain Arsenal (RMA). In the FFA, the Army committed to a number of programs and activities, including conducting an RI/FS for the Offpost OU. The Army intends to complete those programs in a timely fashion. No compelling reasons to change the boundaries or definition of the Offpost OU have been presented. The nature and extent of contamination in the Offpost OU has been adequately characterized for conducting and EA and FS.

Comment No. 5

Colorado Department of Health surficial soil sampling data should be incorporated into this report. These data would augment existing Army data and would provide a better understanding of the nature and extent of off-post surficial soils contamination. If the Army is unwilling to use the data from CDH surficial soil sampling efforts due to concerns pertaining to State QA/QC analytical/sampling protocol, locations identified by CDH to have significant concentrations of RMA contaminants should be resampled by the Army to confirm contaminant presence. The State will transmit all existing surficial soils data under separate cover and assist in whatever manner desired to facilitate this effort.

Response

The Army has included the data provided by CDH for the 12 surficial soil samples collected in February 1989. The CDH sampling locations are shown in Figure 2.5, and data are discussed in Section 6.0 and presented in Figure 6.1. The Army elected to use these data at the encouragement of CDH, although CDH repeatedly denied requests for the quality assurance/quality control (QA/QC) information for these data. Thus, although the data are included in the report, the reliability of the data cannot be verified. No revisions to the report are necessary.

Comment No. 6

The State does not concur with the choice of the 12 additional soil sample locations to represent background contamination values. Eleven of these locations are within the off-post OU, down-wind from RMA, and a majority showed detections of dieldrin. Different locations more distant from RMA, or limitation of representative background samples to the 4 locations east of Brighton (minus the duplicate sample in Section 34, see Comment #15) is warranted.

Response

The statistical comparison of the four Brighton samples with the 12 additional soil samples, using EPA-recommended statistical procedures (EPA, 1989), demonstrated that the additional 12 sites are not statistically different from the four Brighton sites. This analysis strongly supports the conclusion that the 12 additional sites are representative of background conditions. Wind sometimes blows from all points downwind of RMA (R.L. Stollar and Associates, Inc., and others, 1990 and ESE, 1988); however, previous investigations show that the prevailing wind direction is from the south not the southwest, while the strongest winds are from the northwestern quadrant, indicating that the additional 12 sites are not "downwind". Additional references have been added to the report to clarify the sources of information supporting the prevailing wind directions and the EPA reference for performing the statistical analyses. No additional revisions to the report are necessary.

Comment No. 7

The seven off-post biota target analytes were not chosen as the product of an independent review but rather as part of the On-post Biota Remedial Investigation. This was inappropriate since the on-post selection process was itself flawed. For example, historical studies (see Table 4.1-5 of the On-post Biota RI) detected contaminants in on-post wildlife in addition to the seven selected to be present. These contaminants should at least have been treated as candidates for off-post biota sampling. Furthermore, the on-post selection process is not applicable to off-post. Among the critical listed on page 3-32 of the Biota RI is that the compound "Occurred in high volumes and/or with an areal extent of >5 acres." The relevance of this criterion off-post is unclear.

Response

The Army disagrees with the CDH comment. The biota target analytes were selected on the basis of an evaluation of the types and nature of contaminants detected in onpost and offpost media. These compounds were selected because they were considered the most likely contaminants to be detected in biota samples collected in the Offpost OU. These data are adequate for conducting an EA/FS for the Offpost OU. No revisions to the report are necessary.

Comment No. 8

The requirements of statistical significance do not appear to have been considered when choosing the sample sizes to be taken for the off-post biota program. Sample sizes given in Table 2.6 are not adequate to draw more than anecdotal conclusions regarding off-post biota contamination.

Response

The biota sampling and analytical program conducted in the Offpost OU was adequate for conducting an EA/FS for the Offpost OU. In many instances, the adequacy of the sample size was limited by the availability of the specific biotic community in the area from which samples were being collected. For example, many limitations were encountered in collecting fish samples from the First Creek Impoundment and in collecting pheasants in the Offpost OU making it impossible to obtain a statistically based sample size. No revisions to the report are necessary.

Comment No. 9

Throughout the Draft Implementation Document for the Ground Water Intercept and Treatment System North of RMA, the Army states that the distribution of contaminants above Remedial Action Objectives (RAOs) extend beyond the off-post study area A boundary (e.g., Part II, pages 2, 5, and 12). In the Results of Pilot-Scale Hydraulic and Treatment Testing North of Rocky Mountain Arsenal Interim Response Action A Draft Final Report, June 1990, the Army states (pages ES-2):

> *"Because contaminants are present in excess of remediation goals at the down-gradient study area boundary in First Creek, remediation through ground water flow extraction using wells placed transverse to ground water flow direction is not preferred in this area (emphasis added)."*

In other words, the Army decided that because they could not capture all off-post contaminant concentrations exceeding RAOs with an extraction system located within the study area boundaries defined in the Final Decision Document, it would instead optimize contaminant removal within those boundaries using an axial extraction well design. This action indicates, and data in Plates 11 and 12 of the Pilot-Scale Report support, that at least two contaminants of concern (dieldrin and diisopropylmethylphosphonate, DIMP), have and currently continue to migrate downgradient of the proposed First Creek pathway extraction system at concentrations exceeding ARARs.

Because the proposed system will fail to capture all contaminants exceed health-based limits, it is probable that modifications to the extraction system will be necessary to extract and treat ground-water downgradient of the O'Brian Canal. Therefore, hydrogeologic and geophysical investigations (similar to those conducted in Study Area A) must be conducted in this area, and the distribution of contaminants characterized.

The State previously submitted this comment on the Army's Draft Implementation Document for the off-post IRA; the Army responded as follows:

> *"The Army disagrees with the State's contention that selection of a new study area and preparation of a work plan are warranted at this time. As stated in Draft Implementation Document, the IRA, as designed, will meet the goals specified in the Final Decision Document for the Off-post IRA (HLA, 1989). The results of the off-post Remedial Investigation/Feasibility Study (RI/FS) will be used to assess the need for remediation downgradient of the IRA A*

study area. If deemed necessary, remediation downgradient of the study area will be addressed either during operation of the IRA or as part of the final remedy selected for the off-post area."

Unfortunately, the Army has neglected to gather any additional data which would determine the leading edge of the First Creek plume exceeding health-based limits. The data which are available for DIMP indicate that approximately one order of magnitude of dilution may be taking place; this same amount of dilution would not reduce dieldrin to below the health-based standard of .002 ug/l. This problem, of course, is compounded by the fact that the Army's detection limit, to our knowledge, remains greater than one order of magnitude above the health-based limit. The Army must characterize the extent of this contamination. The State and EPA have previously requested that efforts be made to lower this detection limit. In the alternative, samples should be sent to other certified labs with lower detection limits.

Response

The Army disagrees with the CDH contention that additional site characterization downgradient of the IRA A study area is needed to complete the Offpost RI/FS program. Analytical results from the offpost groundwater programs conducted in support of IRA A, the Offpost Final RI and the RI Addendum, and Comprehensive Monitoring Program (CMP), indicate that diisopropylmethyl phosphonate (DIMP) and dieldrin are present within the First Creek pathway at concentrations exceeding remedial action objectives (RAOs) near the downgradient boundary of the IRA A study area. However, DIMP and dieldrin have not been detected in excess of RAOs downgradient of the IRA A study area within the First Creek pathway.

The CDH comment states that the Army has "...neglected to gather any additional data which would determine the leading edge of the First Creek plume exceeding health-based limits." However, the Army installed two additional groundwater monitoring wells immediately down-gradient of O'Brian Canal and four monitoring wells upgradient of O'Brian Canal to assess contaminant migration in the First Creek pathway in this area. In total there are approximately 15 monitoring wells in the immediate vicinity of O'Brian Canal and Burlington Ditch near the confluence with First Creek. The analytical data from these wells and the previously existing wells is presented in the RI Addendum. The distribution of DIMP in this area is depicted in Figure 3.2. The distribution of dieldrin is similarly shown in Figure 3.4. The figures clearly show that concentrations of these contaminants downgradient of the canals do not exceed health-based limits. The maximum concentration of DIMP in the area downgradient of the canals was 140 micrograms per liter (μg/l) in well 37428. This is significantly lower than the EPA Health Advisory for DIMP of 600 μg/l. Dieldrin was not detected in wells immediately downgradient of the canals. The Army has been working with Oak Ridge National Laboratory to develop a new analytical method for dieldrin that has a lower certified reporting limit. Following method certification by the Army, the new analytical method will be used in subsequent programs. The existing data are sufficient to characterize the First Creek plume for conducting the EA/FS for the Offpost OU. No revisions to the report are necessary.

SPECIFIC COMMENTS

Comment No. 1 - Page 40, 3.2.1.1.6, Volatile Organic Compounds, fourth paragraph

The Army states:

> *"Samples collected between January 25 and March 2, 1990, [from wells installed under the RI Addendum program] exhibited anomalously high concentrations for a number of VOCs... The results reported by the laboratories for these affected samples were considerably higher than historical results and are not considered representative of groundwater conditions off-post... It appears that inadequate decontamination of the tubing [from the particular sampling pump] was the source of contamination observed in the groundwater samples collected during the period..."*

To facilitate future reference of questionable data collected between 1/25/90 and 3/02/90, please include well name, dates and analytical results listed in Appendix B, Table B1 in a separate table. Evaluation of the anomalous VOC results are important, since any off-post areas that have true increases in concentration above historical levels would be masked by the inadequate decontamination problem. Wells needing particularly careful QA/QC evaluation include wells 37402, 37403, and 37404, which appear to define a minor paleochannel tributary to the Northern Paleochannel (see Specific Comment 6). The State further requests that those wells exhibiting anomalous VOCs due to poor sampling technique be resampled.

Response

Data considered anomalous because of suspected decontamination problems are identified in the respective table in Appendix B. Moving these data to a separate table is unwarranted and would not substantively change the manner in which these data have been identified in the report. Wells in the Offpost OU will be resampled under the RMA Groundwater CMP. No revisions to the report are necessary.

Comment No. 2 - Page 41, 3.2.1.1.6 Volatile Organic Compounds, second paragraph

The Army states:

> *"To provide a complete database for assessing groundwater contamination in the UFS, data from a CMP sampling round conducted in the first quarter of 1991 were used to augment the database where anomalous data [discussed in State Specific Comment 1] could not be used... Data used in this assessment are included in Appendix H."*

Appendix H only includes analytical results from surficial soil samples, it does not include 1991 CMP groundwater sampling data. Because verification data are needed to support the exclusion of the anomalous data discussed in Specific Comment 1, please include the CMP data in the Final RI Addendum. This is especially important in the case of wells 37402, 37403, and 37404, as discussed in Specific Comment 1.

Response

The reference to Appendix H was erroneous. The text has been revised to indicate that CMP data are available in the Program Manager for Rocky Mountain Arsenal (PMRMA) database.

Comment No. 3 - Page 53, 3.2.2.1 Arapahoe Formation Organics, second paragraph

The Army states:

> *"The sample from well 13701TW104 contained DIMP at a concentration of 3.87 ug/l. Because only one sample was collected from well 1370TW104, the occurrence of DIMP cannot be verified. Additionally,... this well appears to have structural problems..."*

This well needs to be resampled for DIMP. If the well does in fact contain DIMP, it indicates that the contaminant is present in the UFS (at potentially greater concentrations than those found in the Arapahoe Formation due to dilution effects) farther to the east than currently projected by the Army. If the well is determined to be structurally unsound, it should be closed.

Response

This well is scheduled to be sampled by Tri-County Health Department (TCHD) in April 1992. Based on the results of subsequent sampling events for this well, the Army will propose future actions. However, the available analytical results for this well do no indicate additional information is necessary before conducing the EA/FS for the Offpost OU.

Comment No. 4 - Page 53, 3.2.2.1 Arapahoe Formation Organics, third paragraph

It is presumptuous to assume that "organic contamination of the Arapahoe Formation appears to be localized, possibly as a result of well construction problems" on the basis of analytical results from only 10 wells. While the State agrees that well construction problems likely contribute to localized contamination of the Arapahoe Formation, additional data obtained by the State and presented to the parties in November 1991 suggest that the contamination could be more widespread than suggested by the Army (see General Comment 2).

Response

See response to CDH General Comment No. 2.

Comment No. 5 - Page 55, 3.2.2.2 Arapahoe Formation Inorganics, first paragraph

The Army states:

> *"[t]he conductivity values measured in the field were consistent with the Tri-County ranges, except for well 13701TW104. The conductivity value reported for this well was approximately 850 uhos/cm at 25°C, which is about 50 percent higher that typical values for the Arapahoe Formation..."*

The State would suggest that inorganic water chemistry (conductivity and hardness) are good indicators of well integrity. Inasmuch as well 13701TW104 appears to deviate significantly from the typical Arapahoe values, we would suggest replacing well 13701TW104 with another Arapahoe well for future data collection. If, as stated in Specific Comment #3, "this well appears to have structural problems..." (page 53) it is not a good source of reliable Arapahoe Aquifer water quality data and should no longer be incorporated in the off-post monitoring program.

Response

The Army disagrees with the CDH's conclusion that this well should be replaced. There are no compelling reasons to replace this well, particularly considering that only two samples have been collected from this well, and the concentrations of DIMP are far below health-based limits. The well provides a monitoring location for the Arapahoe Formation that is useful in assessing the possible extent of contamination in the Arapahoe Formation and the relationships between the Arapahoe Formation and the UFS.

Comment No. 6 - Page 59, 3.2.5 Comparison of Off-post RI Results and RI Addendum Results, first paragraph

The Army states:

> *"The third minor paleochannel is an eastern arm or tributary to the Northern Paleochannel in Section 12. This paleochannel was identified by the installation of three new IRA A monitoring wells..."*

Separation of the minor pathway from the predominant Norther Paleochannel appears to be evident in Figures 3.6 and 3.8. However, current interpretations of the distribution of unsaturated alluvium do not support this observation (Figure 3.1).

The three wells completed in the Northern Paleochannel as part of the IRA A program are wells 37408, 37409, and 37410 (see Results of Pilot-Scale Hydraulic and Treatment Testing North of the Rocky Mountain Arsenal Interim Response Action A, Draft Final Report.June 1990 [IRA A Pilot Study Document]). An examination of these well locations indicates that the wells are not completed in a minor paleochannel, but actually define the dominant flowpath of the northern pathway. The minor pathway referenced above appears to be identified by wells 37402, 37403, and 37404, which were not installed as part of the IRA A program. Contaminants identified in these *wells include chloroform, DIMP (IRA A Pilot Study Document), and DBCP (Draft Final Off-post RI Addendum).*

Response

The Army agrees with the CDH comment. The identification of the minor paleochannel east of the Northern Paleochannel is predominantly based on the observed distribution of selected contaminants in groundwater samples from these and nearby wells. The text has been revised to clarify the basis for the identification of this minor paleochannel. The text has also been revised to correct the list of contaminants used to identify the minor paleochannel and the offpost program under which the wells were installed.

Comment No. 7 - Page 60, 3.2.5 Comparison of Off-post RI Results and RI Addendum Results, first paragraph

The Army states:

> *"Nearly all the contaminant plumes mapped in this area [between the RMA north boundary and O'Brian Canal] end at approximately O'Brian Canal or Burlington Ditch."*

Based on minimal well coverage downgradient of the O'Brian Canal and the Burlington Ditch, the plumes are still present, but are diluted when compared to upgradient concentrations. Please revise the text accordingly.

Response

The text has been revised accordingly .

Comment No. 8 - Page 77, 5.1.1 Organic Compounds, first paragraph

Regarding the April 1986 sediment sampling locations, the text indicates that "(t)he CRLs for the organic analytes were quite high relative to current CRLs and are considered the principal reason that organic compounds were not detected in the samples." It is unclear if the subsequent sampling locations collected in November 1988 and May-June 1990 included the locations sampled in April 1986? If the April 1986 locations have not been resampled using the lower CRLs, they are inadequately characterized and accordingly must be resampled.

Response

It is not necessary that all locations be resampled when technology improvements result in an improved certified reporting limit (CRL). The data collected during the RI Addendum sediment sampling program were developed with consideration of the various limitations imposed on previous sampling and analysis programs. The available database for samples collected by the Army under previous sampling episodes is adequate for conducting an EA/FS for the Offpost OU. No revisions to the report are necessary.

Comment No. 9 - Page 78, 5.1.1 Organic Compounds, first paragraph

Additional sampling must be conducted prior to concluding that the detection of hexachloro-cyclopentadiene in duplicate sample HA 1192SE is anomalous and not representative of sediment conditions off-post. The detection of 52.8 ug/kg is significantly greater than the certified reporting limit (CRL) of 1.4 ug/kg, and hence warrants further investigation.

Response

The Army disagrees with the CDH comment. Approximately 16 sediment samples were collected from the Offpost OU during RI Addendum activities. Hexachlorocyclopentadiene was not detected in any of the investigative samples at a CRL of less than 2 micrograms per kilogram (μg/kg). However, this analyte was detected in a single duplicate sample at a concentration of 52.8 μg/kg. This result is quite anomalous and is not considered representative of site conditions. This single result also does not warrant resampling. No revisions to the report are necessary.

Comment No. 10 - Page 81, 5.1.2 Inorganic Constituents, second paragraph

Additional sediment sampling for mercury must be conducted to determine potential contribution from RMA prior to concluding that the distribution of mercury detected along the O'Brian Canal are not attributable to releases from RMA. In addition, it would appear that RMA is a potential source given that Sample HA11525SE, located downstream of the Off-post Operable Unit, exceeded the values commonly reported for uncontaminated fresh water sediments (Table 5.1).

Response

The Army disagrees with the CDH comment. Additional sampling for mercury along O'Brian Canal is not warranted to verify that RMA is not the source. The data for the samples collected during the Final RI and RI Addendum programs support the conclusion that RMA is not a likely source for mercury in Offpost OU sediment. The location of samples with elevated levels of mercury are located both upstream and downstream of RMA. Mercury was not detected in sediment samples collected along First Creek. These data suggest that mercury is probably not solely attributable to discharges from RMA. No revisions to the report are necessary.

Comment No. 11 - Page 82, 5.1.2 Inorganic Constituents, last paragraph

The text indicates that RMA is probably not the source of inorganic constituents in sediment off-post." Additional sediment sampling must be conducted upstream of the RMA to verify this assumption. Also, Sample HA1152SE, located on Burlington Ditch approximately 1 mile down-stream of the Off-post Operable Unit had the highest concentration of copper, lead, and zinc, suggesting that RMA may indeed be the source. Further investigation is warranted.

Response

The Army disagrees with the CDH comment. On the basis of the observed distributions of inorganic constituents in the offpost sediment samples, additional sampling is not necessary. The highest concentrations of all inorganic constituents detected in these samples were detected in samples collected from O'Brian Canal, Burlington Ditch, or Barr Lake, except for arsenic, which was detected in First Creek and O'Brian Canal at similar concentrations. The range of concentrations and the relative concentrations of these metals in sediments suggest that RMA is not a source of the generally higher concentrations of metals in sediments in the Offpost OU. Additionally, sample HA1152SE is 3.5 miles downstream of First Creek, not 1 mile downstream, as indicated in the CDH comment. No revisions to the report are necessary.

Comment No. 12 - Page 83, 5.1.2 Inorganic Constituents, first paragraph

The text indicates that "(a)dditionally, information presented in the Final RI shows that concentrations of several metals in sediment samples collected from the South Platte River outside the Off-post Operable Unit also exceeded the anticipated ranges shown in Table 5.1. These data further support off-post sources of metals other than RMA." The State does not concur with this conclusion. In most instances, concentrations of metals presented in the Final RI for localities outside and downstream of the Off-post Operable Unit were greater than corresponding sampling locations upstream. Accordingly, the text should more accurately read "these data may further support off-post sources of metals in addition to RMA. Future sampling efforts will clarify this issue."

Response

The text has been modified to clarify that these data further support sources of metals in addition to RMA. However, the data presented in the Final RI and RI Addendum reports are sufficient for conducting an RI/EA/FS for the Offpost OU. No additional soil sampling is necessary.

Comment No. 13 - Page 84, 5.5 Conclusions, second paragraph

The last part of the second sentence should read "RMA may not be the only source for these contaminants in the stream-bottom sediments in the Off-post Operable Unit. Future sampling efforts will address this question."

Response

The Army disagrees with the CDH comment. As noted in the responses to CDH Specific Comments Nos. 9 through 12, sufficient analytical data for sediment samples are available for the purposes of conducting the EA/FS for the Offpost OU. No revisions to the report are necessary.

Comment No. 14 - Page 91, 6.1.1.2 Inorganic Constituents, second paragraph

The text indicates that "the majority of the flow in Burlington Ditch, which is used for irrigation, consists of treated sewage wastewater that may contain higher concentrations of metals, including arsenic and mercury, than natural background." To what wastewater treatment facility is the text referring? Please provide additional data and information to substantiate this statement.

Response

The Denver Northside Plant is located about 1000 feet upstream of the headgate of Burlington Ditch. Before to 1966, this plant discharged effluent to the South Platte River following primary treatment. After 1966, the effluent was piped to the Denver Metropolitan Waste Water Plant for secondary treatment. The Denver Northside Plant became inactive in 1981 or 1982. These suspected historical discharges may be a possible source of some of the metals detected in stream sediment samples collected from Burlington Ditch and O'Brian Canal.

Comment No. 15 - Page 92, 6.1.3.1 Site Specific Data, first paragraph

The text indicates that "four background sample results were compared with 12 sample results located northeast of RMA, and one sample located west of RMA." Figures 2.7 and 6.5 present only the sample locations and data results for the four background samples near Brighton, Colorado. The locations and analytical results for the 12 samples located northeast of RMA and one sample located west of RMA are not contained in this report. It is impossible for the reader to adequately assess the statistical evaluation that was performed without knowing the locations and contaminant concentrations of the additional samples collected.

Using other sources we have identified the location and contaminant concentrations for the 12 additional samples deemed by the Army as representative of background conditions. The State does not concur that these 12 samples represent background because of the repeated detections of dieldrin at most of these sample locations northeast of RMA. In contrast, dieldrin was detected in only one of the four samples collected east of Brighton (the analytical results for duplicate sample HA 1260WB indicate a likely breech in QA/QC protocol and should not be used).

The last sentence of the first paragraph states that "(a) variety of RMA indicator contaminants, including dieldrin, was not detected in off-post surficial soil near RMA's northeast boundary." This statement is incorrect and should be deleted from the text. Dieldrin was detected in off-post surficial soil samples HA1212WB (4.7 ug/kg); HA1213WB (2.9 ug/kg); HA1214WB (4.0 ug/kg); HA1215WB (2.2 ug/kg); HA1215WB (2.3 ug/kg); HA1219WB (3.2 ug/kg); and HA1233WB (5.5 ug/kg), all of which are located near RMA's northeast boundary.

Response

Figure 2.6 has been revised to show the 12 surficial soil sampling locations northeast and west of RMA used to estimate background concentrations. Analytical results for these samples are presented in Appendix E. The Army disagrees with the CDH claim that "...the analytical results for duplicate sample HA1260WB indicate a likely breech [sic] in QA/QC protocol and should not be used...." The collection of duplicate samples for soil samples is inherently difficult because of the heterogeneous nature of soil. Sampling protocols were followed during sample collection, and internal laboratory QA/QC criteria were met for these analyses. No breaches in protocol were found. The data for both of the samples collected from this location are considered valid for the purposes of assessing the distribution of contaminants in surficial soil.

The last sentence of the first paragraph of Section 6.1.3.1, Site-specific Data, has been revised to indicate that samples collected near RMA's northeast boundary generally have lower concentrations and lower frequency of detection than other samples near the northwest and northern RMA boundaries.

Comment No. 16 - Page 93, 6.1.3.2 Literature Data, third paragraph

Complete references must be cited in the report in addition to the abbreviated references presented in Table 6.2. The reference information, as currently presented, does not allow the parties to verify the applicability of the reference presented.

Because only abbreviated references were presented in Table 6.2, and the standard decay equation was omitted, the validity of the initial concentrations that have been calculated (which represent the range of arithmetic means) remain in question. The State reserves the right to further comment on this section upon provision of the above referenced information.

Response

The reference list for the RI Addendum contained complete references for all citations in Table 6.2, with the exception of Laubscher and others (1971) which was inadvertently omitted. Because a complete reference to Laubscher and others (1971) could not be obtained, Table 6.2 has been modified to remove information obtained from that source. The decay equation has been added to Section 6.1.3.2 of the report.

Comment No. 17 - Page'95, 6.1.3.2 Literature Data, first paragraph

The objective and methodology for determining soil background levels described are unclear. The characterization of off-post soil contamination should be determined from site-specific data in the off-post, not from literature studies updated by degradation calculations. The State requests clarification of how this information will be used and why it is included in the RI report.

Response

Literature data for background levels of pesticides are cited for informational purposes. As these data are all 12 to 20 years old, they are no longer representative of background concentrations unless decay is considered. This section provides updated calculated soil concentrations for aldrin and dieldrin. The text has been rewritten to clarify the decay equation used. The results support the data from Table 6.1 on the estimated mean and upper 95th percentile estimated background concentrations of aldrin and dieldrin in the Offpost OU.

Comment No. 18 - Page 97, 6.5 Conclusions, first paragraph

The text indicates that "several of the compounds detected are or have been commercially available and may have been applied by residents and/or in agricultural practices in the surrounding rural area." The Army must verify the extent of private or agricultural use of the various contaminants detected off-post of RMA if it wishes to avoid liability for cleanup of that contamination. Additional soil sampling around residences or other sampling strategies and surveys may be needed to satisfactorily address this issue.

Response

The statement quoted in CDH's comment is a factual statement. Several of the contaminants detected in the Offpost OU surface soil have been commercially available, and their occurrence in some areas may be related to past applications by current or former residents. Several references are cited in the report that support the commercial availability and persistence of these compounds in the environment. Additional characterization is neither necessary or possible. The approach of comparing sample data to background or ambient levels from literature sources is appropriate for these constituents. No additional soil sampling is necessary for the purposes of conducting an EA/FS for the Offpost OU. No revisions to the report are necessary.

Comment No. 19 - Pages 103 - 105, 7.2.2 Comparison of On-post and Off-post Contaminant Data

The first paragraph states "These comparisons were undertaken to permit general conclusions about the contaminant levels in biota in the Off-post OU." The State questions how a comparison of contaminated wildlife with contaminated wildlife will derive any strong conclusions about the *condition of off-post biota. In addition, the report compares different biota substrate, (ie; off-post pheasant liver with on-post pheasant whole carcus), flip-flops between average and maximum concentrations (mercury in fish) or fails to provide an on-post/off-post comparison (DDE in pheasants).*

In some instances the section compares off-post contaminant levels to on-post controls identified in the Biota RI. The State objects to considering biota samples captured and sampled from the Arsenal to be considered "controls." These samples were taken in areas that were considered uncontaminated before the results of the surficial soil program was completed. The surficial soil program proved this assumption to be false.

It is reasonable to believe that the biota living off-post of the Arsenal will be less contaminated than on-post as a consequence of their decreased exposure; however, it is not the responsibility of the remedial investigation report to compare contaminant levels, but instead to identify the nature and extent of contamination. It appears this section is presented to give a biased conclusion regarding the contaminant levels in off-post wildlife, and should be deleted from the text.

Response

The Army disagrees with the CDH comment. The RI Addendum report provides necessary information regarding the nature and extent of contamination in biota samples in the Offpost OU. The text does not present a biased conclusion, and no changes to the text are necessary.

Comment No. 20 - Page 105, 7.2.3 Comparison of Biota Contaminant Levels with Concentrations in Surface Soil and Water

Although the text states that the biota and soil samples were collocated, the maps provided to the State indicate that in most instances the two samples are significant distances from each other. For example, on Table 7.2 sampling location HA1057B (earthworms) indicated a dieldrin concentration of 0.0211 ug/g in the composite of worms and a collocated soil sample containing a dieldrin concentration of 0.0128 ug/g. After review of the soil contamination distribution map (Figure 6.2) the soil sample allegedly collocated to HA1057B appears to be hundreds of yards away, a distance that is greater than the migratory distance of an earthworm. In the same general location of the 0.0128 detection is a sample with 0.093 ug/g dieldrin. This result is not included in the report.

The section also unsuccessfully attempts to relate contaminant concentration ranges of biota and soil in the Off-Post OU. The text states "Earthworms contained dieldrin levels just above the CRL, while shallow soil concentrations ranged from 8.0 to 44 ug/g." (this statement should read ug/kg) Since these soil/biota samples were not truly collocated, the ranges of dieldrin soil contamination should from 8.0 ug/kg to 93 ug/kg.

The section is not representative of a true comparison between biota samples and soil/water samples and should be deleted from the text.

Response

The text has been revised in a number of places to address the CDH comment, particularly regarding the distances between soil or surface-water sampling locations and the nearby biota sampling locations. The text has been revised to indicate that biota, surface-soil, and surface-water samples were collected as part of an integrated sampling approach and that the biota sampling locations were collocated with these other media to the maximum extent practicable. Sampling of the various media in the Offpost OU immediately north of RMA had to be performed while considering a number of logistical and physical limitations. However, the Army conducted these sampling programs, including the biota sampling program, to provide sufficient data to perform an EA/FS for the Offpost OU. The data developed for the biota in the Offpost OU are sufficient to conduct an EA/FS, and the discussion in the RI Addendum does not present intentional misstatements or incorrect interpretation of the available data.

The CDH comment indicates that the analytical result for sample HA1227WB (i.e., 93.0 μg/kg dieldrin) was not included in the report. However, the results for this sample are clearly shown in Figure 6.2. The text has been revised to indicate that the range of dieldrin concentrations in surface soil located near sample HA1057B is 0.008 to 0.093 μg/g.

Comment No. 21 - Page 106, 7.2.4 Threatened and Endangered Species in the Off-post OU

The text states "Residues detected in the egg contents were 0.099 ug/g mercury, 0.808 ug/g dieldrin, and 6.93 ug/g DDE. Preliminary evaluation of sediment and water data from on-post and off-post surveys and existing knowledge on the feeding habits and foraging range of the Barr Lake eagles did not indicate that the contaminant levels were from RMA sources." The State requests all pertinent information used by the Army to make this conclusion.

Response

These data were reported in the Final RI for the Offpost OU, as indicated by the reference. No revisions to the report are necessary.

Comment No. 22 - Pages 106 and 107, 7.3 Quality Assurance and Quality Control for Chemical Analyses

It appears from the report that the biota Quality Assurance/Quality Control (QA/QC)program was nonexistent. Of the 32 biota samples identified on Table 7.2 the Army chose to perform 1 laboratory duplicate and this sample was below detection for all compounds. The State has to question the accuracy and adequacy of the biota analytical program when the Army cannot provide any QA/QC data. The Army should consult the EPA document Guidance for Data Usability in Risk Assessment (1990) for support of their quality assurance program.

Response

Because of a laboratory reporting error, a second laboratory duplicate was not previously reported in the Draft Final RI Addendum. Because biota samples were analyzed in three laboratory lots, the two laboratory duplicates are sufficient to assess laboratory performance. Table F3 has been modified to include the additional laboratory duplicate.

Comment No. 23 - Page 107, 7.4 Summary and Conclusions of Characterization and Contaminant Studies

The summary again attempts to compare contaminated biota with contaminated biota instead of a comparison of the off-post biota to controls or literature values. The text also states without references or justification that "..the areal extent of contaminated biota was less in the Off-post OU compared to RMA." The text should be modified to include support for this statement, or it should be deleted.

The last sentence of the summary, "Contamination of off-post biota appears to come from in-situ environmental sources rather than from migration of on-post RMA wildlife" is without any follow-up discussion as to how this conclusion was derived. It is evident from the text that the contaminants detected in the tissue of the off-post biota result from contamination that has migrated and continues to migrate from the RMA. In addition, we must assume that various species of wildlife (ie; birds) identified in the Off-Post OU spend varying degrees of their life span on the Arsenal where exposure to contaminants may increase significantly. Therefore, the statement must be modified or deleted.

Response

The last paragraph of the text in this section has been modified.

Comment No. 24 - Page 111, 8.3 Stream-Bottom Sediment, first paragraph

The text of the last sentence should be changed to read "(t)his distribution indicates that other sources of these analytes may exist off-post." Additional sampling is needed to verify this *conclusion. CDH welcomes the opportunity to assist the Army in designing future sampling programs to address this issue.*

Response

The text has been revised to indicate that additional sources of these constituents are likely to exist in the Offpost OU. However, no additional stream-bottom sediment sampling is necessary for conducting the EA/FS for the Offpost OU.

Comment No. 25 - Page 111, 8.4 Surficial and Subsurface Soils, first paragraph

Additional surficial soil sampling is needed to adequately characterize the extent of aldrin and dieldrin contamination detected in samples east of RMA, including: HA1219WB (dieldrin 3.2 ug/kg); HA1265WB (aldrin 3.2 ug/kg); HA1234WB (aldrin 5.9 ug/kg, dieldrin 99.2 ug/kg); HA1264WB (aldrin 6.2 ug/kg, dieldrin 24.5 ug/kg); HA1263WB (aldrin 4.1 ug/kg, dieldrin 10.6 ug/kg); and HA1221WB (ddt 10.3 ug/kg, dieldrin 3.6 ug/kg). The Off-post OU may need to be expanded or a new OU created to include these localities.

Response

See response to General Comment No. 4.

Comment No. 26 - Page 112, 8.4 Surficial and Subsurface Soils, second paragraph

Additional surficial soil sampling is needed to adequately characterize the nature, extent, and source of arsenic and mercury, contamination detected northeast of Burlington Ditch.

Response

The Army disagrees with the CDH comment. Sufficient data are available for conducting the EA/FS for the Offpost OU.

Comment No. 27 - Page 112, 8.5 Biota

This section again compares off-post and on-post biota instead of a comparison to controls. This section misrepresents actual contamination of off-post wildlife and must be modified or deleted from the text.

Response

The Army disagrees with the CDH comment. Adequate data evaluation has been performed by the Army to conduct an EA/FS for the Offpost OU.

Comment No. 28 - Page 113, 8.5 Biota

The text should also reflect whether migratory birds, protected under the Migratory Bird Act, exist in the off-post OU.

Response

Species that may occur in the Offpost OU are listed in Table F4. The text has been modified to reflect that a number of birds listed in Table F4 are protected under the Migratory Bird Treaty Act.

Comment No. 29 - Table 2.1, Aquifer Designations and Sampling Dates for Wells in Off-post Operable Unit (Page 4 of 4)

The definitions for aquifer designators 3 and 4 reveal a probable migration pathway for contaminants from the alluvial aquifer to the Denver aquifer. The State would therefore recommend closure of wells 37323, 37334, 37336, 37371, 37382, and 37389.

Response

Aquifer designation categories for wells installed onpost and offpost of RMA have been developed and refined by PMRMA over the past several years. The designators for the Offpost OU indicate that several wells, which are partially screened in the alluvium, are representative of groundwater conditions in the UFS. The basis of the CDH comment is not clear and the evidence that the wells in question are "a probable migration pathway for contaminants from the alluvial aquifer to the Denver aquifer" is not presented. The well network has been adequately reviewed and provides potentiometric and water-quality information that accurately reflect conditions in the UFS. No revisions to the report are necessary.

Comment No. 30 - Table 2.2 Technical Justification for Monitoring Wells Installed Under Remedial Investigation Addendum Program

In a letter to CDH dated 10/25/89, the Army proposed a monitoring program for Study Area Ib, which included the completion of wells RI-2, -18, and -19. Although the State initially opposed completion of RI-19, we later agreed to the well and requested that it again be included in the program in a letter to the Army dated 1/26/90. All parties present at Technical Subcommittee Meetings held in November 1989 agreed to the proposed Study Area Ib program, which included completion of the above three wells. However, Table 2.2 indicates that the three wells were not completed as part of the program and does not provide a rationale for the exclusion. Please provide a rationale in the Final RI Addendum. Because the wells were proposed to provide data in areas of limited well control and no chemical data, and because the State requested that all parties be appraised of any changes to the program, we may request completion of the three wells after evaluating the rationale.

Response

The rationale for not installing wells RI-2, RI-18, and RI-19 has been added to Table 2.2. The Army disagrees with the CDH statement suggesting that these wells should now be installed in the Offpost OU. The current monitoring well network, which includes the wells installed under the RI Addendum program, provides an adequate monitoring network for assessing the extent of contamination in the UFS offpost. Also, the original objectives for installing three wells have generally been met by the other wells installed in this area by the Army. The CDH justification for installing these wells (i.e., that they were previously identified in earlier correspondence) is not sufficient justification for their installation at this time. Because data from wells RI-2, RI-18, and RI-19 are not necessary for completing the EA/FS for the Offpost OU, these wells will not be installed.

Comment No. 31 - Table 6.1 Arithmetic Mean and Upper 95th Percentile Concentrations for Selected organic Compounds in Off-post Operable Unit Background Surficial Soil

The State does not concur with the statistical results as presented in this table. Data that appear to be anomalous (see Specific Comment #37) plus the use of 12 additional sample locations, most of which are located in the off-post OU and may not represent background conditions, were utilized as the basis for generating the values presented. This table should be derived from the four Brighton samples (minus the anomalous duplicate) or different, true background samples taken.

Response

The Army disagrees with the CDH comment. The statistical results for the 16 total samples depicted in Table 6.1 are reasonable estimates of the background levels in surficial soil for conducting an EA/FS for the Offpost OU. Table 6.1 has been revised slightly to reflect the actual degree of precision reflected by the results.

Comment No. 32 - Tables F1, F2, and F3, Biota Investigative Analytical Data

Use of these tables would be greatly facilitated by inclusion of descriptive terms in addition to the sample identification numbers, for example, labeling sample HA1010BM as "cow milk".

Response

The tables have been revised according to the comment.

Comment No. 33 - Figure 2.6 Off-post Operable Unit Subsurface and Surficial Soil Sampling Locations, June - July 1990 and May 1991

Colorado Department of Health surficial soil sampling locations should be included. For example, CDH collected and identified contamination in 7 surficial soil samples at the Irondale Trailer Court, 3 samples from the Davis residence (96th Avenue and Highway 2), and in many other localities off-post of RMA. If the Army is unwilling to accept CDH data because of concerns pertaining to State QA/QC sampling protocol, CDH locations should be resampled by the Army to gain a better understanding of the surficial soils contamination existing off-post of RMA.

Response

The Army disagrees with the CDH comment. The Army has included other data for surficial soil samples collected and analyzed by CDH, where laboratory QA/QC information was provided by CDH. The Army will not include any additional data in this report. The database for this report and the conclusions presented are adequate for conducting an EA/FS for the Offpost OU.

Comment No. 34 - Figure 6.2 Distribution of Organochlorine Pesticides Detected in Off-post soil, June - July 1990 and May 1991

Additional soil sampling is needed to adequately characterize the nature and extent of the organochlorine pesticide detections north and east of RMA. In numerous instances outlying sample locations indicate significant detections of various organochlorine pesticides (e.g., samples 020FO1, HA1207WB; 100F01; HA1204WB; 160F01; HA1268WB). Also, see Specific Comment #26 for locations east of RMA.

Response

Contaminant distribution in offpost surficial soil, as well as in other media in the Offpost OU, has been sufficiently characterized to permit conducting an EA/FS for the Offpost OU. See also the responses to CDH Specific Comment Nos. 25 and 26.

Comment No. 35 - Figure 6.2, Distribution of Organochlorine Pesticides Detected in Off-post Soil, June-July 1990 and May 1991

Colorado Department of Health off-post surficial soil sampling data should be included to augment Army data.

Response

See response to CDH General Comment No. 3.

Comment No. 36 - Figure 6.4 Distribution of Organochlorine pesticides, Arsenic and Mercury Detected in 96th Avenue Residential Area Off-post Subsurface Soil, February 1989

Figure 6.4 should be expanded to include surface as well as subsurface data to reflect a more accurate picture of soils contamination in this area. Also, CDH soil sampling data for this area, which includes a number of organochlorine pesticides and arsenic detections, should be included.

Response

Figure 6.4 presents only subsurface data. See also the response to CDH General Comment No. 3 regarding surface soil. No revisions to the report are necessary.

Comment No. 37 - Figure 6.5 Distribution of organochlorine pesticides, Arsenic, and Mercury detected in Off-post Background Surficial Soil Near Brighton, Colorado

The contaminant concentrations detected in duplicate sample HA1260WB are anomalous when compared to its mate or other adjacent sample locations. Accordingly, this data cannot be used as the basis for statistical evaluation or for directly establishing background contaminant values. QA/QC protocol appears to have been breached while collecting this sample.

Response

The Army disagrees with the CDH comment. See response to CDH Specific Comment No. 15.

Comment No. 38 - Appendix A

Please include the borelog for well 37431.

Response

The boring log and well completion diagram for well 37431 was included in the Draft Final RI report, as Figure A16. The location of this figure in Appendix A appears out of sequence, but was placed near the back of the appendix because the well is an Arapahoe Formation well. However, to avoid additional confusion, the Army has added a list of figures to Appendix A that provides a list of borings and associated figure numbers.

Comment No. 39 - Appendix B

Please include the analytical results for Arapahoe wells 37446, 11515TW096, and 09610TWPEO. Additionally, monitoring wells completed in the Arapahoe Fm and listed in Table B5 (domestic wells) should instead be included in Table B1. An aquifer designation should be included in the table.

Response

Data for wells 37431 and 37445 have not been moved to Table B1. These data will remain in Table B5. Well 37446 was not sampled under the RI Addendum. This well will be sampled in upcoming groundwater sampling events. Samples were collected from wells 11515TW096 and 096107WPEO during RI Addendum activities, but data were rejected for the RMA database because of laboratory certification problems.

Comment No. 40 - Appendix B, Table B-3, Groundwater QA/QC Analytical Data

In the "Notes" on Table B-3, it indicates that the samples will be designated as RB, TB, or FB. These do not appear in the table as they were in the Final RI. Please include these designators as indicated.

Response

Table B3 of Appendix B has been revised to designate which samples are rinse, trip, or field blanks.

Comment No. 41 - Appendix B, Table B-3, Groundwater QA/QC Analytical Data

Was HA1175 the only rinse blank collected during the 1/25/90-3/2/90 sampling rounds? If other rinse blanks were collected during this period, then HA1175 is the only sample with elevated VOC concentrations. These concentrations are not high enough however to explain elevated VOC levels. Explain what relationship these elevated VOC levels have with the pump problem discussed on page 41.

Response

Sample HA1175 was the only rinse blank collected during the period between January 25 and March 2, 1990. However, the assessment of elevated VOC levels is not based solely on data from this rinse blank. Historical and recent data were also evaluated to verify the VOC concentrations reported for the samples. Based on several factors, including the presence of VOCs in the rinse blank, the highly elevated concentrations in samples and the documented sampling procedures that identified which particular sampling group was used, the elevated VOC levels are considered the result of inadequate field decontamination procedures. Corrective actions have been implemented. No revisions to the report are necessary.