RADFORD ARMY AMMUNITION PLANT, VIRGINIA

Eastern Horseshoe Area
HWMU 16 and SWMUs 13, 48, 49, 50, 51, and 59
April 2006 Sampling Event
Groundwater Data Summary Report

Prepared for:

USACE Baltimore District
10 S. Howard St.
Baltimore, MD 21201

Prepared by:

Shaw Environmental, Inc.
2113 Emmorton Park Rd.
Edgewood, MD 21040
Contract No. DACA31-01-F-0085

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LIST OF ACRONYMS AND ABBREVIATIONS

°C .....degrees Celsius
µg/L.....micrograms per liter
bgs.....below ground surface
CVAA .....cold vapor atomic absorption
COD .....Chemical Oxygen Demand
CCV .....continuing calibration verification
DI .....distilled water
DIUF .....de-ionized ultra-filtered water
DQO.....data quality objectives
ECD.....electron capture detector
EPIC……Environmental Photographic Interpretation Center
ft .....feet
GC.....gas chromatograph
HPLC .....high pressure liquid chromatograph
HRGC .....high resolution gas chromatograph
HRMS .....high resolution mass spectrometer
HSA.....Horseshoe Area
HWMU .....Hazardous Waste Management Unit
IDW.....investigation derived waste
ICP .....inductively coupled plasma
IT.....IT Corporation
L/min.....liters per minute
LCS .....laboratory control sample
MCAWW.....Methods for Chemical Analysis of Water and Wastes
MCL.....Maximum Contaminant Level
MDL.....method detection limit
ml .....milliliter
MRL.....method reporting limit
MS.....matrix spike
MS.....mass spectrometer
MSD.....matrix spike duplicate
msl.....mean sea level
MWP.....Master Work Plan
NG.....Nitroglycerine
ng/L.....nanograms per liter
NGVD.....National Geodetic Vertical Datum
PAH.....Polynuclear Aromatic Hydrocarbon
Parsons.....Parsons Engineering Science, Inc.
PCB.....Polychlorinated Biphenyl
PETN.....Pentaerythritol tetranitrate
PID .....photoionization detector
QA.....quality assurance

QC .....quality control
RBC.....Risk Based Concentration
RCRA.....Resource Conservation and Recovery Act
RFA.....RCRA Facility Assessment
RFAAP.....Radford Army Ammunition Plant
RFI .....RCRA Facility Investigation
RI.....Remedial Investigation
RPD.....relative percent difference
Shaw.....Shaw Environmental, Inc.
SIM .....selective ion monitoring
SOP .....standard operating procedure
SVOC.....Semivolatile Organic Compound
SWMU .....Solid Waste Management Unit
TAL.....Target Analyte List
TCL .....Target Compound List
TOC.....top of casing
tw-RBC .....Tap Water Risk Based Concentration
USACE .....U.S. Army Corps of Engineers
USEPA.....U.S. Environmental Protection Agency
UV.....ultraviolet
VI .....Verification Investigation
VOC .....Volatile Organic Compound
VPDES.....Virginia Pollutant Discharge Elimination System
WPA.....Work Plan Addendum

1.0 INTRODUCTION

The United States Army Corps of Engineers (USACE) has tasked Shaw Environmental, Inc. (Shaw) to perform groundwater environmental sampling at Radford Army Ammunition Plant (RFAAP), located in Radford, Virginia (**Figure 1-1**). The work reported in this document is being conducted to determine the current nature and extent of groundwater contamination in the RFAAP Eastern Horseshoe Area (HSA) (**Figure 1-2**) and to determine if any future investigation is warranted. Work for this assignment is being performed under Contract No. DACA31-01-F0085. The combined study area includes groundwater monitoring wells in Hazardous Waste Management Unit (HWMU) 16 and Solid Waste Management Units (SWMUs) 13, 28, 48, 49, 50, 51, and 59. This area is located in the southeastern portion of the RFAAP HSA, east of the main bridge over the New River. As illustrated on **Figure 2-1**, the HWMU/SWMUs are co-located, with SWMU 28 in the northern portion of the combined study area. SWMU 51 consists of one trench, approximately 140 ft long by 23 ft wide, located immediately to the southwest of SWMU 28 and adjacent to SWMU 30 (Closed Asbestos Waste Site). A barbed-wire fence surrounds SWMU 51. HWMU 16 is located adjacent on the southeast border of SWMU 28. SWMU 48 is located south of SWMU 51 and is approximately 30 feet (ft) north of SWMU 50, 75 ft west of SWMU 59, and 200 ft northwest of SWMU 49. SWMU 13 and the New River are located approximately 120 ft below the bluff of SWMU 48. The land surface in the combined study area gently slopes from approximately 1,830 ft above mean sea level (msl) on the north side of SWMUs 48 and 59, to approximately 1,814 ft msl on the south of SWMU 50. Based on topography, surface water runoff is expected to flow approximately 700 ft southwest to the New River.

1.1 PREVIOUS INVESTIGATIONS

Previous groundwater investigative activities in the HSA were conducted in conjunction with Installation permit requirements and included the analysis of inorganic and organic compounds chemicals of concern. The chemicals of concern are classified as explosives, metals, semivolatile organic compounds, and volatile organic compounds. The following discussion data set does not include the quarterly groundwater monitoring data collected in conjunction with the VPDES permit. Results of the chemical data included sporadic hits with no real trends observed. Previous groundwater investigations indicated the presence of 2,6-dinitrotoluene at SWMUs 28, 51, and 52; antimony at SWMUs 31, 39, and 54; barium for SWMUs 31 and 48; beryllium for SWMU 54; chromium at SWMUs 31 and 39; bis(2-ethylhexyl)phthalate at SWMUs 26, 28, 48, 51, and 52; compounds 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, and methylene chloride at SWMUs 28, 51, and 52; and carbon tetrachloride and trichloroethene at SWMUs 13 and 48. A brief description of the previous groundwater investigations that have been conducted within the HSA are provided below.

- A RCRA Facility Assessment (RFA) was conducted to assess water quality parameters of groundwater samples from monitoring wells in SWMUs 27, 29, and 53 (USEPA, 1987);
- A Verification Investigation (VI) was performed in three portions of the HSA. The investigation included installation and/or sampling of groundwater monitoring wells within SWMUs 26, 32, 39, 54, 57, and 74 (Dames & Moore, 1992);

- A RCRA Facility Investigation (RFI) was conducted in two portions of the HSA. The investigation included installation of groundwater monitoring wells and analysis of the associated groundwater samples from SWMUs 13, 28, 51, and 52 (Dames & Moore, 1992);
- A Phase II VI was performed at three neighboring SWMUs (SWMUs 27, 29, and 53) and for SWMU 39. The investigation included the collection and analysis of groundwater samples from these SWMUs and the installation and sampling of groundwater monitoring wells within SWMU 39 (Dames & Moore, 1994);
- An RFI was conducted at SWMUs 31, 48, and 49. The investigation included the installation of groundwater monitoring wells, analysis of the associated groundwater sample, and aquifer testing of selected wells (Parsons, 1996);
- A supplemental RFI (dye tracing study) was conducted in the vicinity of SWMU 48. A dye tracing study was performed as a result of data gaps identified in assessing groundwater flow at SWMU 48 and to provide better identification of groundwater discharge points from SWMU clusters (Parsons, 1996).
- An RFI was conducted at SWMUs 31, 39, 48, and 49. The investigation included sampling and analysis of groundwater samples (ICF KE, 1999).
- An RFI study was conducted at SWMU 31. The investigation included sampling and analysis of groundwater samples to assess potential contaminant migration (IT, 2002a).

Several previous soil investigations have been conducted at the combined HSA study area. In 1987, the USEPA conducted an RFA to evaluate potential hazardous waste or hazardous constituent releases and implement corrective actions, as necessary. In 1992, Dames & Moore performed a VI which included surface and subsurface soil sampling and a soil gas survey to characterize the nature and extent of contamination of SWMUs 48, 49, 50, & 59 as well as RFI sampling to evaluate potential contamination resulting from site activities of SWMU 51. Also in 1992, Environmental Photographic Interpretation Center provided aerial photographic analysis of SWMU 51. In 1996, Parsons Engineering Science conducted an RFI to further delineate the extent of contamination identified during the 1992 VI sampling of SWMUs 48, 49, 50, & 59. ICF Kaiser Engineers (ICF KE) also performed an RFI in 1998 to further refine the understanding of the nature and extent of contamination identified during the previous investigations. In 2002, Argonne National Laboratory performed a geophysical survey of SWMU 51 to delineate both the lateral and vertical extent of the former trench. IT Corporation performed a site characterization at the main manufacturing area for SWMUs 39, 48, 49, 50, 58, 59, FLFA, and Building 4343 in 2002 to address data gaps that were identified from a desktop audit for each site. These soil investigations pertinent to the eastern HSA are summarized in **Table 1-1**.

1.2 GROUNDWATER SUMMARY

Within RFAAP, and particularly within the HSA, sinkholes and fractures, which may be associated with sinkhole development, are areas for groundwater recharge. The western half of the HSA contains a number of sinkholes observed from the aerial photographs (circa 1937) and topographic maps, most of which have been covered due to site development. The eastern half of the HSA contains a number of fracture traces and few sinkholes. This eastern area is also the topographically highest point in the HSA. The fracture traces in this area can be zones of high secondary porosity due to fissured and solutionally enhanced carbonate rock, allowing surface water to migrate very quickly into the subsurface. **Figure 1-2** illustrates the groundwater elevation contours in the bedrock aquifer for the eastern end of the HSA and gives an approximation as to where water is entering the HSA. The contours show a radial pattern with the gradient moving away in every direction from the groundwater high point at well 28MW1 toward the New River. Recharge in the eastern HSA occurs through karst features in the region of the topographic highs near SWMUs 28, 51, and 30 and, to a smaller extent, through porous infiltration at lower elevations.

The monitoring well information for the sampled eastern HSA may be found in **Table 2-1**. As part of continuing investigation, groundwater samples have been collected and analyzed in the eastern HSA to assess current nature and extent of any contaminant in the groundwater. The remedial data is intended to supply current groundwater information for future actions at RFAAP. Complete results and comparisons of data gathered throughout the sampling program will be presented in a future investigation reports. This document presents a summary of the data for use prior to further investigations.

Table 1-1
Previous Soil Investigations Environmental Samples and Analyses at Horseshoe Area

Media	Sample ID	Depth (ft bgs)	Analyses
SWMU 48			
1992 Verification Investigation, Dames & Moore			
Subsurface Soil	48SB1	7.5-9.5	TAL metals, VOCs, SVOCs, TCLP metals
	48SB1	13-15	TAL metals, VOCs, SVOCs, TCLP metals
	48SB2	10-12	TAL metals, VOCs, SVOCs, TCLP metals
	48SB2	20-22	TAL metals, VOCs, SVOCs, TCLP metals
1996 RCRA Facility Investigation, Parsons Engineering Science			
Surface Soil	48SS1	0-1	TAL metals, VOCs, SVOCs, explosives, TPH
	48SS2	0-1	TAL metals, VOCs, SVOCs, explosives, TPH
	48SS3	0-1	TAL metals, VOCs, SVOCs, explosives, TPH
Subsurface Soil	48SB4A11	10-11	VOCs, SVOCs, explosives, TPH
	48SB4B21	20-21	VOCs, SVOCs, explosives, TPH, TOC
1998 RCRA Facility Investigation, ICF Kaiser Engineers			
Surface Soil	48SB6C	1-3	TAL metals, VOCs, SVOCs, PAHs, explosives
	48SB6C2	1-3	VOCs (methanol preservation)
Subsurface Soil	48SB6A	6-7	TAL metals, VOCs, SVOCs, PAHs, explosives
	48SB6A2	6-7	VOCs (methanol preservation)
	48SB6B	14-16	TAL metals, VOCs, SVOCs, PAHs, explosives
	48SB6B2	14-16	VOCs (methanol preservation)
	48SB7A	8-9	TAL metals, VOCs, SVOCs, PAHs, explosives
	48SB7A2	8-9	VOCs (methanol preservation)
	48SB7B	10-11	TAL metals, VOCs, SVOCs, PAHs, explosives
	48TP1	6-6.5	TAL metals, VOCs, SVOCs, PAHs, explosives
	48TP2	6-6.5	TAL metals, VOCs, SVOCs, PAHs, explosives
	48TP3	6-6.5	TAL metals, VOCs, SVOCs, PAHs, explosives
	48TP4	6-6.5	TAL metals, VOCs, SVOCs, PAHs, explosives

Table 1-1
Previous Soil Investigations Environmental Samples and Analyses at Horseshoe Area, Continued

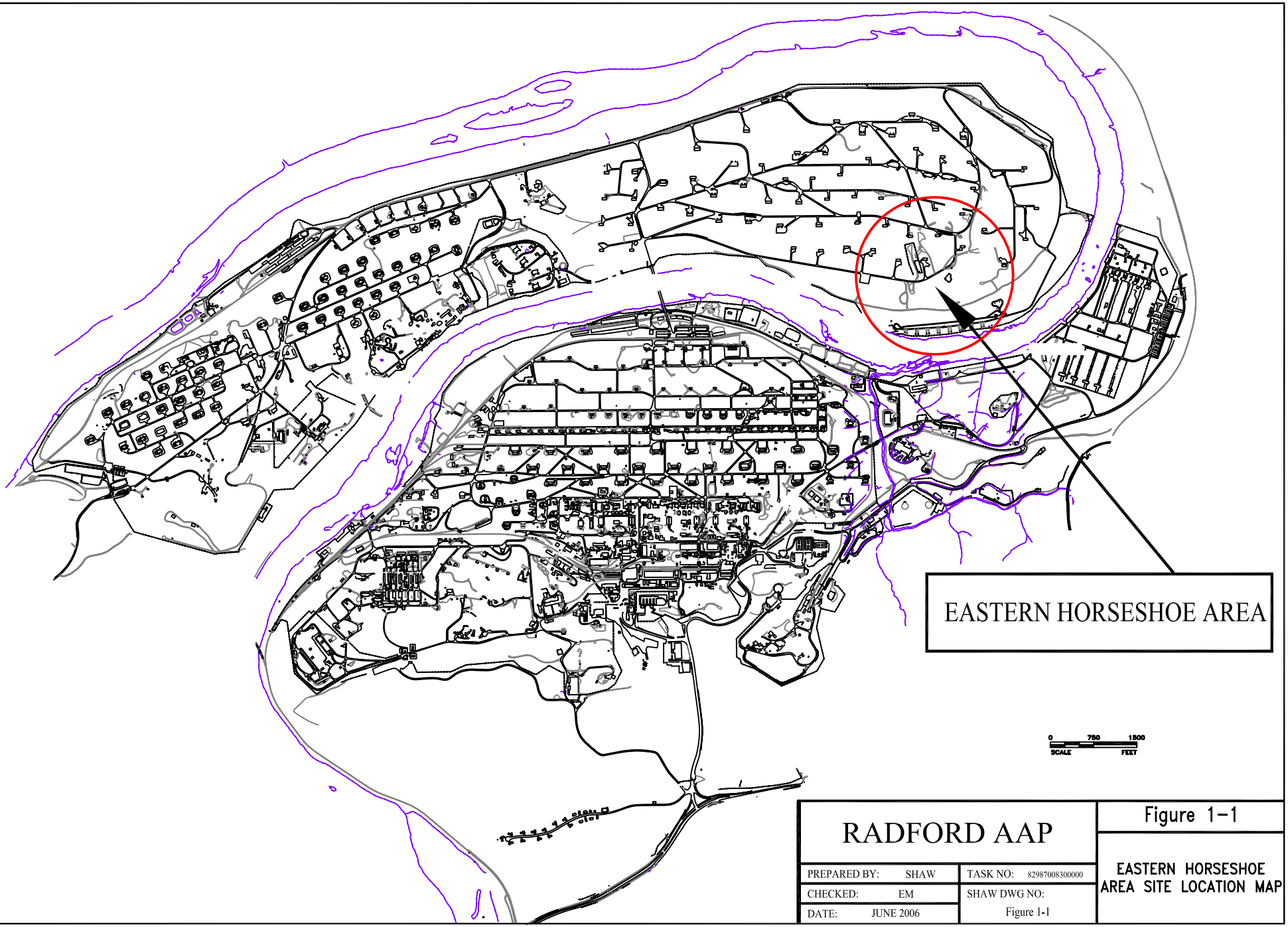
Media	Sample ID	Depth (ft bgs)	Analyses
2002 Site Characterization, IT Corporation			
Surface Soil	48SB08A	0-0.5	TCL VOCs, SVOCs, pesticides/PCBs, herbicides, PAHs, explosives, TAL metals, dioxins/furans, TOC, grain size, pH
	48SB09A	0-0.5	Explosives, dioxins/furans
	48SB10A	0-0.5	TCL VOCs, SVOCs, pesticides/PCBs, herbicides, PAHs, explosives, TAL metals, dioxins/furans
Subsurface Soil	48SB08B	4–6	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals, dioxins/furans
	48SB08C	8–10	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals, dioxins/furans, TOC, grain size, pH
	48SB09B	4–6	Explosives, dioxins/furans
	48SB09C	8–10	Explosives, dioxins/furans
	48SB10B	4-6	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals, dioxins/furans
	48SB10C	8-10	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals, dioxins/furans
SWMU 49			
1992 Verification Investigation, Dames & Moore			
Subsurface Soil	48SB3	10-12	TAL metals, VOCs, SVOCs, TCLP metals
1996 RCRA Facility Investigation, Parsons Engineering Science			
Surface Soil	48SS4	0-1	TAL metals, SVOCs, TPH
	48SS5	0-1	TAL metals, SVOCs, TPH
	48SS6	0-1	TAL metals, SVOCs, TPH
Subsurface Soil	48SB5A19	17-19	SVOCs, TPH
	48SB4B37	35-37	SVOCs, TPH, TOC
	48MW1A22	20-22	SVOCs, TPH
	48MW1B54	52-54	SVOCs, TPH, TOC
	48MW2A42	40-42	SVOCs, TPH
Subsurface soil (continued)	48MW2B46	44-46	SVOCs, TPH, TOC
	48MW3A22	20-22	SVOCs, TPH
	48MW3B32	30-32	SVOCs, TPH, TOC

Table 1-1
Previous Soil Investigations Environmental Samples and Analyses at Horseshoe Area, Continued

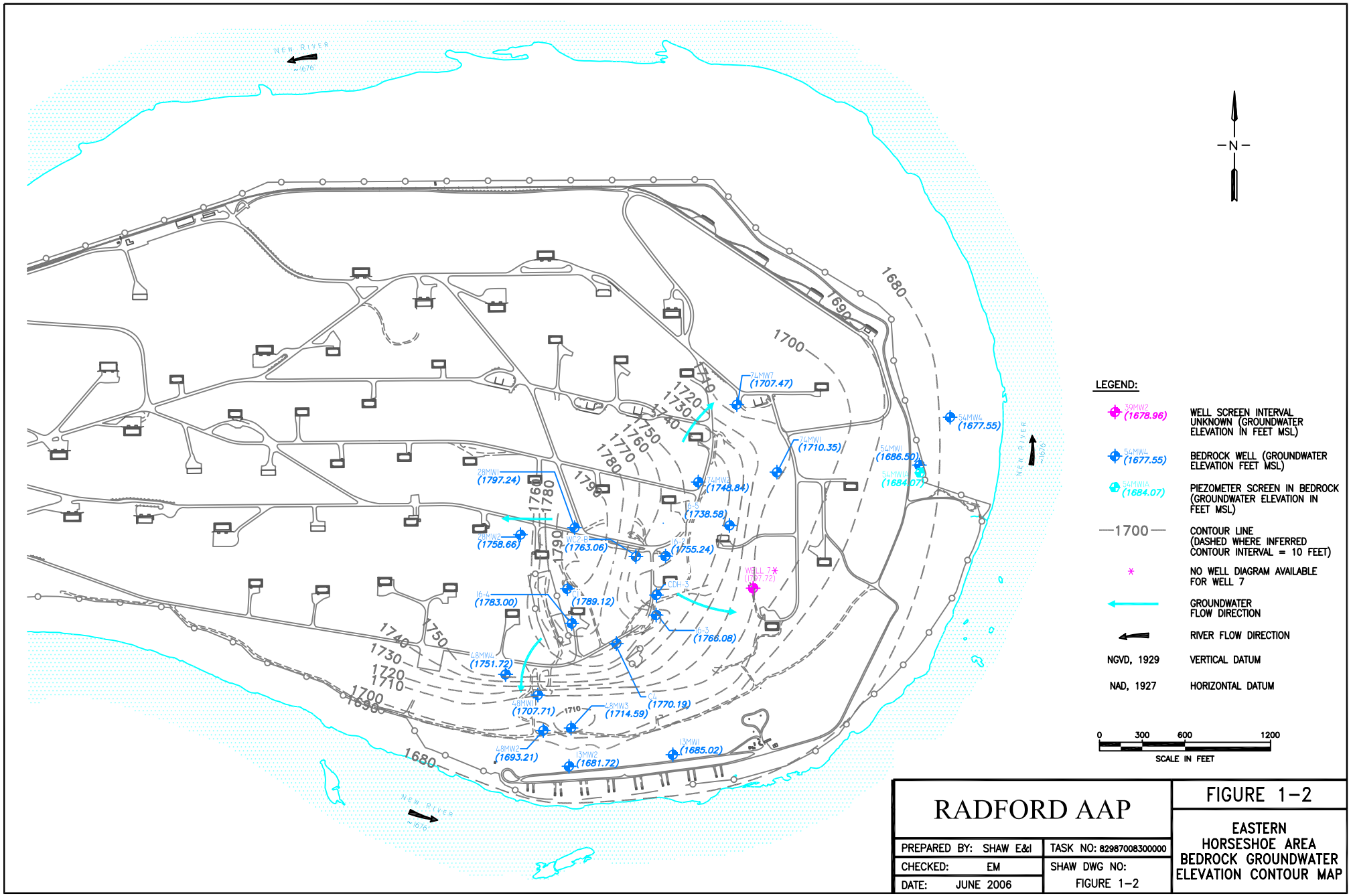
Media	Sample ID	Depth (ft bgs)	Analyses
1998 RCRA Facility Investigation, ICF Kaiser Engineers			
Subsurface Soil	49SB1A	8-10	TAL metals, VOCs, SVOCs, PAHs, explosives
	49SB1B	18-24	TAL metals, VOCs, SVOCs, PAHs, explosives
	49SB1B2	18-24	VOCs (methanol preservation)
	49SB1C	28-32	TAL metals, VOCs, SVOCs, PAHs, explosives
	49SB1C2	28-32	VOCs (methanol preservation)
	49SB1D	38-40	TAL metals, VOCs, SVOCs, PAHs, explosives
	49SB1D2	38-40	VOCs (methanol preservation)
	49SB1E	48-50	TAL metals, VOCs, SVOCs, PAHs, explosives
	49SB1F	58-60	TAL metals, VOCs, SVOCs, PAHs, explosives
2002 Site Characterization, IT Corporation			
Surface Soil	49SS01	0–0.5	TCL VOCs, SVOCs, pesticides/PCBs, herbicides, PAHs, explosives, TAL metals, dioxins/furans, TOC, grain size, pH
	49SB02A	0–0.5	TCL VOCs, SVOCs, pesticides/PCBs, herbicides, PAHs, explosives, TAL metals, dioxins/furans
Subsurface Soil	49SB02B	4–6	TCL PCBs, PAHs, TAL metals, dioxins/furans
	49SB02C	8–10	TCL PCBs, PAHs, TAL metals, dioxins/furans
	49SB02D	17-19	TCL PCBs, PAHs, TAL metals, dioxins/furans, TPH, TOC, grain size, pH
SWMU 50			
1992 Verification Investigation, Dames & Moore			
Subsurface Soil	50SL1	0-5	VOCs, SVOCs, TCLP metals
	50SL2	0-5	VOCs, SVOCs, TCLP metals
2002 Site Characterization, IT Corporation			
Surface Soil	50SS01	0–0.5	TCL VOCs, SVOCs, pesticides/PCBs, herbicides, PAHs, explosives, TAL metals, TOC, grain size, pH
	50SS02	0–0.5	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals
	50SS03	0–0.5	TCL VOCs, SVOCs, pesticides/PCBs, herbicides, PAHs, explosives, TAL metals
	50SB04A	0–0.5	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals
	50SB05A	0–0.5	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals

Table 1-1
Previous Soil Investigations Environmental Samples and Analyses at Horseshoe Area, Continued

Media	Sample ID	Depth (ft bgs)	Analyses
Subsurface Soil	50SB04B	4–6	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals
	50SB04C	8–10	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals
	50SB05B	4–6	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals
	50SB05C	8–10	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals
	50SB04B	4–6	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals
	50SB04C	8–10	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals
SWMU 59			
1992 Verification Investigation, Dames & Moore			
Surface Soil	59SS1	0-1	TAL metals, SVOCs
	59SS2	0-1	TAL metals, SVOCs
2002 Site Characterization, IT Corporation			
Surface Soil	59SS03	0–0.5	TCL VOCs, SVOCs, pesticides/PCBs, herbicides, PAHs, explosives, TAL metals, dioxins/furans, TOC, grain size, pH
	59SS04	0–0.5	TAL metals
	59SS05	0–0.5	TCL VOCs, SVOCs, pesticides/PCBs, herbicides, PAHs, explosives, TAL metals, dioxins/furans
	59SB01A	0–0.5	TCL VOCs, SVOCs, pesticides/PCBs, herbicides, PAHs, explosives, TAL metals, dioxins/furans
Subsurface Soil	59SB01B	4–6	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals, dioxins/furans
	59SB01C	8–10	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals, dioxins/furans



RADFORD AAP			Figure 1-1
PREPARED BY:	SHAW	TASK NO: 82987008300000	EASTERN HORSESHOE AREA SITE LOCATION MAP
CHECKED:	EM	SHAW DWG NO: Figure 1-1	
DATE:	JUNE 2006		



RADFORD AAP

FIGURE 1-2

EASTERN HORSESHOE AREA BEDROCK GROUNDWATER ELEVATION CONTOUR MAP

PREPARED BY: SHAW E&I	TASK NO: 82987008300000
CHECKED: EM	SHAW DWG NO: FIGURE 1-2
DATE: JUNE 2006	

2.0 FIELD METHODS

The field activities consisted of sampling on-site monitoring wells and collecting water level measurements. Investigative activities were conducted in accordance with the Field Sampling Plan for Groundwater Sampling in the Horseshoe Area (Shaw, 2006); in conjunction with the Master Work Plan (MWP) Master Health and Safety Plan (URS, 2003) and Work Plan Addendum (WPA) 012 (IT, 2002b). A brief discussion of the completed field activities and the methods utilized are presented in this section.

2.1 FIELD MEASUREMENTS

Figure 2-1 shows the sampling locations for the April 2006 sampling event. The monitoring well information for the sampled eastern HSA may be found in **Table 2-1**. A MiniRAE2000 photoionization detector (PID) was used to screen the monitoring wells for VOCs during the collection of water level measurements (**Section 2.2**). All PID readings measured during the water level survey were non-detected at 0.0 parts per million. A multi-parameter probe was used to measure the temperature, specific conductivity, pH, oxidation reduction potential, dissolved oxygen, and turbidity of the water sampled. When sampling RFAAP Horseshoe Area wells, the water parameter results were evaluated for stabilization to determine when a representative sample of the formation water could be acquired in accordance with low-flow sampling procedures. Stabilization is defined as three consecutive readings that are within the following criteria:

- ±0.1 for pH;
- ±3% for specific conductance;
- ±10 mV for oxidation/reduction potential (Eh); and
- ±10% for turbidity and dissolved oxygen.

The water quality parameters, water level measurements, and PID readings were recorded on the well purging forms (**Appendix A**).

2.2 WATER LEVEL MEASUREMENTS

Groundwater level measurements were acquired from all sampled monitoring wells during the April 2006 sampling event. The depth of the static water level was measured to the nearest 0.01 foot using an electric water level meter. Water level measurements for all wells were taken prior to all sampling activities and noted in **Table 2-1**. Water levels were also taken during all field measurements to measure any groundwater drop down during the purging process. These results are further discussed in **Section 4.1**.

2.3 LABORATORY ANALYSIS

The groundwater samples collected were shipped in sealed coolers on ice to Accutest Laboratories, Inc. in Orlando, Florida and were analyzed for target compound list (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), TCL pesticides and PCBs, target analyte list (TAL) metals, explosives, and dioxin furans analyses. Generated investigative derived waste (IDW) was analyzed for chemical oxygen demand (COD) and pH. The chemical analysis performed for each sample is noted in **Table 2-2**. Chain of custody records (**Appendix B**) accompanied all sample shipments. Samples were sent for chemical analysis in appropriate sample containers with USEPA prescribed preservation on ice at a temperature of 4ºC ± 2ºC.

2.4 SAMPLE COLLECTION

All monitoring wells, field QC samples, sample descriptions, and laboratory analysis collected during the sampling event are listed in **Table 2-2**. Sampling locations are shown on **Figure 2-1**. All samples scheduled for collection for the April 2006 sampling event were collected. This included thirteen groundwater wells, two field duplicates, one rinse blank, and two trip blanks. In some cases limited volume was collected due to poor purging wells; however, sufficient volumes were still available to perform the full suite of scoped chemical analyses. The detected data values have been included in this report and may be found in **Table 4-1**.

Groundwater samples collected from the eastern HSA wells were acquired using the low-flow groundwater sampling procedures with a QED SamplePro portable micropurge bladder pump. For each sample, a clean piece of plastic sheeting was spread on the ground around the well to protect the sampling equipment. Immediately after opening the well, headspace readings in the well and in the breathing zone immediately above the well were taken with a PID. No VOCs were detected from any of the wells. If VOCs were measured in the well, the well would have been allowed to ventilate for several minutes. If the readings were continuous, then Level C protection will be worn while purging and sampling the well. The depth to water was then measured with an electric water-level indicator.

For purging the well and collecting the samples, new pieces of Teflon tubing were connected to the bladder pump and air inlet and placed within the well. The pump was also supported with nylon rope and the tube inlet placed at the center of the well screen. The bladder pump was then started at a low pumping rate (low-flow sampling of less than 0.500 L/min). The pumping rate was then adjusted until it equals the groundwater recharge rate. Where possible, groundwater was not drawn down below the top of the well screen. In cases where the water table is within the screened interval, groundwater draw down was limited to 10% of the height of the water column.

While purging, an in-line flow-through cell was used to measure groundwater temperature, pH, dissolved oxygen, turbidity, and oxidation reduction potential. These readings were used to determine if conditions in the well have had stabilized as well as the water level recorded to measure groundwater drop down. Measurements were recorded for every 5 minutes. The water quality readings were recorded on the Well Purge Forms along with the time of the reading, the water level reading, pump setting, purge rate, depth to screen, description of water, and the cumulative volume extracted. A Hydrolab instrument was used to determine the water quality parameters. The groundwater was considered stable when draw down has reached an equilibrium level, and the total volume of water purged exceeds the water volume in the screened interval and the surrounding filter pack, and parameters stabilize to within ten percent over three consecutive readings.

Sample bottles were labeled, custody-sealed, enclosed in a plastic bag, and placed in a cooler with ice in double bags to be maintained at 4°C ± 2°C immediately after sample collection and preservation. Purge water was containerized in 55-gallon drums, sealed, and labeled to identify the drum contents for later disposition. Disposable sampling equipment was discarded.

Pumps and non-expendable equipment were decontaminated after each collected sample. The decontamination procedure for sampling equipment included the following: 1) Scrub the sampler pump to remove visible contamination using brushes (if necessary) with distilled (DI) water and non-phosphate detergent; 2) Rinse equipment with DI water; 3) Rinse equipment (i.e. water level indicator, pump) with reagent-grade nitric acid and methanol; 4) Rinse equipment with de-ionized ultra-filtered (DIUF) water; and 5) Place sampling equipment in supplied plastic tube.

Table 2-1
Eastern Horseshoe Area Monitoring Well Information, April 2006

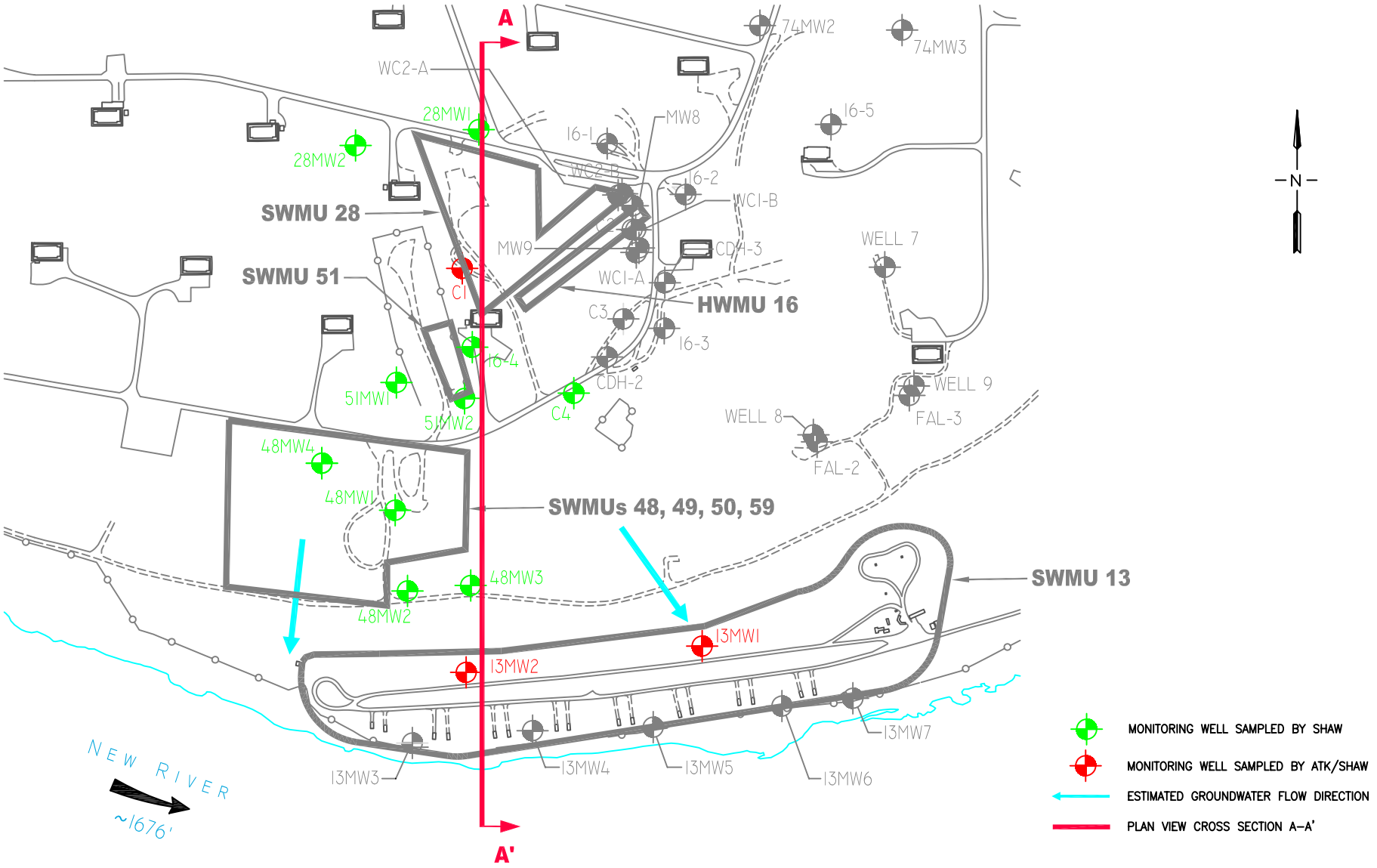
Site ID	Well ID	Date Installed	Screened Zone	Elevation TOC (ft msl - NVGD, 1929)	Well Depth (ft bgs)	Screened Interval (ft bgs)	DTW (ft TOC) 4/06	Water Elev (ft msl) 4/06	Water Elev (ft msl) 4/00	Depth to Bedrock (ft bgs)
SWMU 13	13MW1	8/20/91	Bedrock	1701.44	28	18-28	21.76	1679.68	1685.02	18
	13MW2	8/29/91	Bedrock	1702.62	29	19-29	21.68	1680.94	1681.72	19
HWMU 16	16-4	11/2/84	Bedrock	1836.76	80	45-80	52.91	1783.85	1783.00	37
	C1	7/31/80	Bedrock	1840.14	70	55-70	50.78	1789.36	1788.52	48
	C4	7/29/80	Bedrock	1824.57	70	55-70	53.88	1770.69	1770.19	46
SWMU 28	28MW1	9/4/91	Bedrock	1827.18	63	43-63	29.05	1798.13	1797.24	26
	28MW2	9/10/91	Bedrock	1821.56	83	68-83	62.56	1759.00	1758.66	55
SWMU 48	48MW4	7/22/95	Bedrock	1832.60	94	74-94	80.41	1752.19	1751.72	NA
SWMU 49	48MW1	12/19/94	Bedrock	1819.95	140	110-140	111.39	1708.56	1707.71	60
	48MW2	1/7/95	Bedrock	1818.88	133.7	113.7-133.7	125.30	1693.58	1693.21	40
	48MW3	1/8/95	Bedrock	1812.17	120	100-120	96.75	1715.42	1714.59	32
SWMU 51	51MW1	9/24/91	Unconsol	1823.13	35	25-35	33.08	1790.05	1816.01	33
	51MW2	9/9/81	Interface	1834.77	53	43-53	50.07	1784.70	1784.42	47

NOTES: TOC = top of casing; msl = mean sea level; bgs = below ground surface; NA = not available, Unconsol = well screened in unconsolidated sediments; Interface = well screened across unconsolidated-bedrock interface; DTW = depth to water.

Table 2-2
Analytical Samples Collected for Groundwater Analysis, April 2006

Sample Identification (ID)	Description	Chemical Analysis
Groundwater Monitoring Wells Horseshoe Area		
16-4	Groundwater Sample HWMU 16	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
C1	Groundwater Sample HWMU 16	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
C4	Groundwater Sample HWMU 16	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
13MW1	Groundwater Sample SWMU 13	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
13MW2	Groundwater Sample SWMU 13	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
28MW1	Groundwater Sample SWMU 28	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
28MW2	Groundwater Sample SWMU 28	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
48MW1	Groundwater Sample SWMU 48	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
48MW2	Groundwater Sample SWMU 48	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
48MW3	Groundwater Sample SWMU 48	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
48MW4	Groundwater Sample SWMU 48	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
51MW1	Groundwater Sample SWMU 51	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
51MW2	Groundwater Sample SWMU 51	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
Quality Control Samples		
041206R	Rinse blank of Low Flow pump and tubing	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
TM13MW1	Field Duplicate of 13MW1	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
TM48MW1	Field Duplicate of 48MW1	TCL VOCs, TCL SVOCs, PAHs, TCL Pesticides & PCBs, TAL Metals, Dioxins & Furans
041006T	Trip blank shipped April 10, 2006	TCL VOCs
041306T	Trip blank shipped April 13, 2006	TCL VOCs
Investigative Derived Waste		
041306DW	All Groundwater Wells	COD & pH

Notes: Samples were analyzed using USEPA SW-846 Update IIIA methodology (April, 1998) and *USEPA Methods for Chemical Analysis of Water and Wastes* (USEPA, 1983).

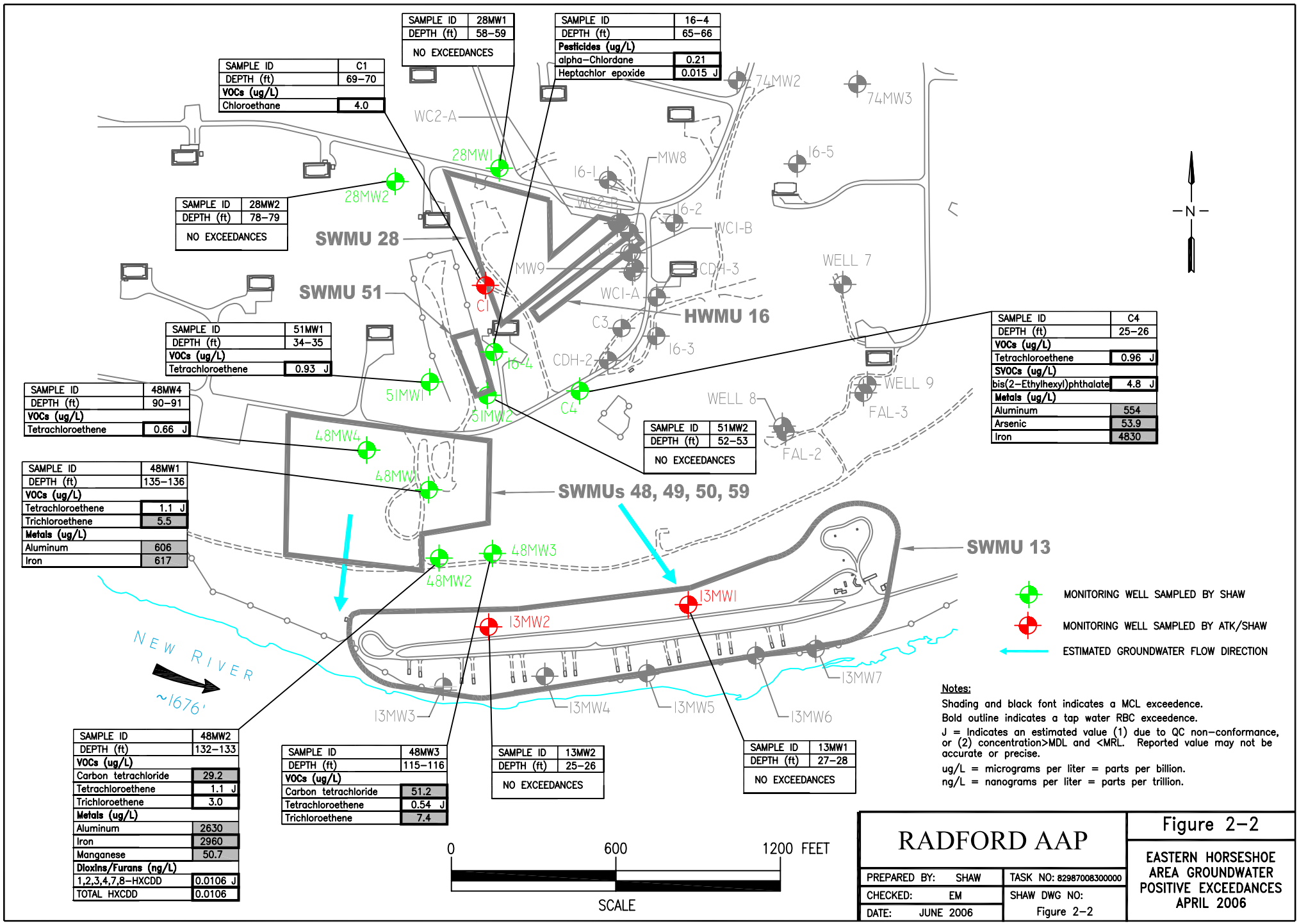


RADFORD AAP

Figure 2–1

EASTERN HORSESHOE AREA GROUNDWATER SAMPLING LOCATIONS APRIL 2006

PREPARED BY: SHAW	TASK NO: 82987008300000
CHECKED: EM	SHAW DWG NO: Figure 2–1
DATE: JUNE 2006	



Notes:

Shading and black font indicates a MCL exceedence.

Bold outline indicates a tap water RBC exceedence.

J = Indicates an estimated value (1) due to QC non–conformance, or (2) concentration>MDL and <MRL. Reported value may not be accurate or precise.

ug/L = micrograms per liter = parts per billion.

ng/L = nanograms per liter = parts per trillion.

RADFORD AAP

PREPARED BY: SHAW	TASK NO: 82987008300000
CHECKED: EM	SHAW DWG NO: Figure 2–2
DATE: JUNE 2006	

Figure 2–2

EASTERN HORSESHOE AREA GROUNDWATER POSITIVE EXCEEDANCES APRIL 2006

3.0 QUALITY ASSURANCE/QUALITY CONTROL AND DATA MANAGEMENT

This section provides Quality Assurance (QA)/Quality Control (QC) information pertaining to the April 2006 sampling event. Quality assurance is defined as the overall system for assuring the reliability of data produced. The system integrates the quality planning, assessment, and improvement efforts of various groups in the organization to provide the independent QA program necessary to establish and maintain an effective system for collection and analysis of environmental samples and related activities. The program also encompasses the generation of valid and complete data as well as its subsequent review, validation, and documentation.

3.1 OVERVIEW OF QUALITY ASSURANCE PROGRAM

All investigative activities including field work and data evaluation were conducted in accordance with the Field Sampling Plan for Groundwater Sampling in the Horseshoe Area (USACE, 2006), which was used in conjunction with the Master Work Plan (MWP) Master Health and Safety Plan (URS, 2003) and Work Plan Addendum (WPA) 012 (IT, 2002b). In addition, the requirements of the USACE Shell for Analytical Chemistry Requirements (USACE, 2001) were used. Data management, corrective actions, and QA reports are fully described in the MWP.

3.2 REVIEW OF DOCUMENTATION

Sampling activities were performed in compliance with standard operating procedures (SOPs) and each individual performing sampling was aware of the requisite protocols for collection of environmental samples. Documentation required for this project was reviewed and deficiencies, if any, were identified. Documentation required included the following:

- **Field Logbooks:** Hardback logbooks with numbered pages were used to log daily activities, and data collected during the course of field activities. Designated logbooks were also used to record calibration records and equipment maintenance as they were performed. Entries into field logbooks were evaluated for completeness and accuracy.
- **Groundwater Purge Forms:** During groundwater sampling, well purging data was recorded on the Groundwater Purge Form. Information included date, time, water quality measurements, purge rate, volume of water extracted, and a description of water removed.
- **Chain-of-Custody:** Samples were collected and relinquished under stringent chain-of-custody protocols as specified in the project MWP. A review of Chain-of-Custody forms indicates that all information was correctly supplied.
- **Document Control:** Documents generated in support of project activities were input into the Document Control System. A unique control number was assigned to each document prior to its being archived into the system. Access into and out of the document control system was restricted to designated personnel.

3.3 ANALYTICAL SERVICES AND METHODOLOGY

The analytical services for the project were provided by Accutest Laboratories, Inc. located in Orlando, FL. The groundwater samples were analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives, TCL pesticides and PCBs, TAL metals, and Dioxin Furans analyses. The investigative derived waste sample was analyzed for COD and pH. Chain of custody records (**Appendix B**) accompanied all sample shipments. The laboratory used *USEPA Third Edition, SW-846 Test Methods for Evaluating Solid Waste, Update IIIA* (USEPA, 1998) and *USEPA Methods for Chemical Analysis of Water and Wastes* (MCAWW) (USEPA, 1983) methodology for the groundwater and investigative derived waste analyses. Samples were sent for chemical analysis in appropriate sealed sample containers with USEPA prescribed preservation on ice and received at a temperature within 4ºC ± 2ºC. The following sections present the USEPA methods that were performed for the samples for the 2006 groundwater effort.

TCL VOCs. Samples were analyzed for TCL VOCs using USEPA SW-846 Method 5030B/8260B for aqueous samples using purge and trap technology. An inert gas was bubbled through a 5 ml aqueous sample contained at ambient temperature. The vapor was swept through a sorbent column where the purgeable compounds were trapped. After purging was completed for the aqueous samples, the sorbent column was heated and backflushed with the inert gas to desorb the purgeable compounds onto a gas chromatograph (GC) programmed to separate the purgeable compounds, which are then detected with a mass spectrometer (MS). The GC/MS instrument was calibrated for a series of target analytes using chemical standards of known concentration and purity. Quantification of these target analytes was performed against specific internal standards as identified in the respective method. Identification of these target analytes was based on a comparison of the analyte to the chemical standards used during calibration based on the analyte's retention time and mass spectra.

TCL SVOCs. Samples were analyzed for TCL SVOCs using USEPA SW-846 Method 8270C. Aqueous samples were extracted using a separatory funnel liquid-liquid extraction technique according to USEPA SW-846 Method 3510C. The extract was injected into a GC programmed to separate the compounds, which are then detected with an MS. The GC/MS instrument was calibrated for a series of target analytes using chemical standards of known concentration and purity. Quantification of these target analytes was performed against specific internal standards as identified in the respective method. Identification of these target analytes was based on a comparison of the analyte to the chemical standards used during calibration based on the analyte's retention time and mass spectra.

PAHs. Samples were analyzed for PAHs using USEPA SW-846 Method 8270C selective ion monitoring (SIM) procedures. The use of USEPA SW-846 Method 8270C SIM was employed for PAH analysis to achieve lower quantitation and detection limits in order to meet screening criteria. The remaining methodology is the same as for TCL SVOCs.

TCL Pesticides/PCBs. Samples were analyzed for TCL pesticides and PCBs using USEPA SW-846 Methods 8081A and 8082, respectively. Aqueous samples were extracted using a separatory funnel liquid-liquid extraction technique by USEPA SW-846 Method 3510C. The extract was injected into a GC programmed to separate the compounds, which are then detected with an electron capture detector (ECD). Sulfur cleanups were employed to aid in the quantification based upon the matrix interferences. Sample concentrations are confirmed on dissimilar columns. Identification of these target analytes was based on a comparison of the analyte to the chemical standards used during calibration based on the analyte's retention time using primary and secondary columns.

TAL Metals. TAL metals were analyzed using a combination of the following methodologies: inductively coupled plasma (ICP) and cold vapor atomic absorption (CVAA). For aqueous samples, trace ICP metals were digested using USEPA SW-846 Methods 3010A followed by method 6010B for analysis. The ICP method involves the simultaneous or sequential multi-element assessment of trace elements in solution. The basis of the method was the measurement of atomic emission by optical spectrometry. Samples are nebulized and the aerosol that was produced was transported to the plasma torch where excitation occurs. Characteristic atomic-line emission spectra are produced by a radio-frequency ICP. A background correction technique was utilized to compensate for variable background contribution for the assessment of trace elements.

Mercury was analyzed using CVAA according to USEPA SW-846 Method 7470A for aqueous samples. A sample aliquot was initially digested with nitric acid to free combined mercury. The mercury was then reduced to its elemental state and aerated from the solution into a closed system. The mercury vapor was passed through a cell positioned in the path of the mercury light source and the measured abundance was proportional to the concentration of mercury in the sample.

Explosives. Samples were analyzed for explosives using USEPA SW-846 Method 8330A. Aqueous samples of low concentration were extracted by a salting-out extraction procedure with acetonitrile and sodium chloride. The small volume of acetonitrile that remains undissolved above the salt water was drawn off and transferred to a smaller volumetric flask. It was back extracted by vigorous stirring with a specific volume of salt water. After equilibration, the phases were allowed to separate and the small volume of acetonitrile residing in the narrow neck of the volumetric flask was removed. The concentrated extracts were diluted with reagent grade water, and an aliquot was separated on a C-18 reverse phase column. The wavelength was set at 254 nm and confirmed on a cyanide reverse column. Identification of these target analytes was based on a comparison of the analyte to the chemical standards used during calibration based on the analyte's retention time using primary and secondary columns.

Nitroglycerine(NG)/PETN. Samples were analyzed for NG and PETN using USEPA SW-846 Method 8332. Aqueous samples were extracted according to USEPA SW-846 Method 8330, using a double salting-out procedure with acetonitrile. The extract is mixed with calcium chloride just prior to analysis. The concentration was quantified using an isocratic HPLC system equipped with a column heater and UV detector. Sample concentrations were confirmed on dissimilar columns.

Dioxins/furans. Samples were analyzed for dioxin/furans using USEPA SW-846 Method 8290. The analytical method used high-resolution gas chromatography and high-resolution mass spectrometry (HRGC/HRMS) on purified sample extracts. This method is specific for the analysis of 2,3,7,8-tetrachlorinated dibenzofuran (2,3,7,8-TCDD), substituted penta-, hexa-, hepta- and octachlorinated dibenzo-p-dioxins and substituted penta-, hexa-, hepta- and octachlorinated dibenzofurans in water and solid samples. The extracts were injected onto a HRGC programmed to separate the compounds, which are then detected with a HRMS as confirmation.

COD. COD was analyzed using USEPA MCAWW Method 410.1. A sample was heated under acidic conditions at a slow, constant rate in an oven or block digestor in the presence of potassium dichromate at 150ºC for two hours. The COD was then titrated with ferrous ammonium sulfate.

pH. Samples were analyzed for pH using USEPA SW-846 Method 9040C for aqueous samples. A sample pH was directly measured electrometrically using either a glass electrode in combination with a reference potential or a combination electrode.

3.4 DATA MANAGEMENT

Analytical data packages were provided by the laboratory in a format similar to contract lab program for full data validation. Related sampling information and chemical data necessary to complete the chemical data files were provided by the laboratory. The electronic data format provided by the laboratory was in a specified RFAAP site-related format.

3.5 DATA REDUCTION AND VALIDATION

Data obtained were reviewed by the QA Manager to determine whether the project-specific data quality objectives, as defined in the associated MWP, were met. The laboratory data were validated for the groundwater samples by Shaw using a combination of *USEPA-SW846, Third Edition, Test Methods for Evaluating Solid Waste, Update IIIA* (USEPA, 1998), *USACE Requirements for the Preparation of Sampling and Analysis Plans, Shell Guidance for Analytical Chemistry Requirements EM 200-1-3* (USACE, 2001), laboratory SOP criteria, *Master Work Plan (MWP) Master Health and Safety Plan* (URS, 2003), and *Work Plan Addendum (WPA) 012* (IT, 2002b) to provide the QC criteria. The *USEPA Region III Modification to the National Functional Guidelines for Organic Data Review, Multimedia, Multi-concentration* (USEPA, 1994), *USEPA Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993), and *USEPA Region III Dioxin/Furan Data Validation Guidance* (March, 1999) were used in providing the validation qualifier schemes and further guidance in support for this project.

In meeting these specifications, various lab performance criteria were evaluated. These evaluations included (as applicable) a review of the 1) sample preservation and holding times; 2) instrument performance checks; 3) calibration (initial and continuing); 4) field and laboratory blanks; 5) matrix spike and spike duplicate recoveries and RPDs; 6) field and lab sample duplicates; 7) surrogate spike recoveries; 8) laboratory control samples; 9) internal standards and retention times; and 10) quantitative verification. Data associated with parameters in compliance with the QC specifications were not qualified. Data associated with parameters that did not comply with QC specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications. The quality of the data collected in support of the sampling activity was considered acceptable, unless qualified as rejected "R" during the validation process. Samples qualified as estimated "J", estimated with low bias "L", or estimated with high bias "K" were considered acceptable as estimated. Samples qualified "B" should be considered non-detect at the reporting level or at the level reported, whichever was greater. Data validation reports are provided in **Appendix C**.

3.6 DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) were developed concurrently with the work plan to ensure: 1) the reliability of field sampling, chemical analyses, and physical analyses; 2) the collection of sufficient data; 3) the quality of data generated was acceptable for its intended use; and, 4) valid assumptions could be inferred from the data. Attainment of DQOs was assessed through evaluation of all data collected using the following data quality indicators:

- **Precision** – a quantitative measure of the variability of a group of measurements in comparison to the average value;
- **Accuracy** – the bias in a measurement system;
- **Representativeness** – the degree to which the measured results accurately reflect the medium being sampled. Representativeness will be assessed based on accuracy, precision, and completeness;
- **Completeness** – the percentage of measurements which are judged to be useable;
- **Comparability** – a qualitative parameter expressing the confidence with which one data set can be compared with another; and,
- **Sensitivity** – describes the method detection, quantitation, and reporting limits. It also may be expressed as the slope of the analytical curve (intensity verses concentration).

Data quality was assessed through the evaluation of sampling activities and field measurements associated with the chemical analytical data in order to determine the reliability of the chemical analyses and the accuracy and precision of information acquired from the laboratories.

3.6.1 Precision

Duplicates were collected to identify the cumulative precision of the sampling and analytical process, which includes the homogenization of samples. Field precision was checked by obtaining duplicate samples for each parameter and each media on a site-wide basis at a 10% frequency. Analytical precision for the laboratory and overall sampling precision were evaluated during validation process and data review by calculating and evaluating the relative percent difference (RPD) between the results of sample and its associated duplicate pair. The RPD is calculated by the following equation:

$$RPD\ (\%) = \frac{|(XA - XB)|}{XM * 100}$$

Where:
XA and XB are duplicate analyses, and
XM is the mean value of duplicate analyses (XA + XB)/2

Laboratory precision criteria were derived from the USACE Shell guidance in conjunction with laboratory generated criteria. The field duplicate criteria were established at RPD≤50%. All positive results for TCL VOCs, TCL SVOCs, PAHs, explosives, TCL pesticides/PCBs, TAL metals, and dioxin furans in the original and duplicate samples that exceeded the precision criteria was considered quantitative estimates as indicated by a "J" validation qualifier code. Further details may be found in the validation reports located in **Appendix C**.

Two field duplicate pairs (13MW1 and TM13MW1; 48MW1 and TM48MW1) were analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives, TCL pesticides/PCBs, TAL metals, and dioxin furans from the April 2006 sampling event. For sample pair 13MW1 and TM13MW1, all criteria were met. For sample pair 48MW1 and TM48MW1, manganese, zinc, 1,2,3,4,6,7,8-HpCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,7,8-PeCDD, 2,3,7,8-TCDF, and OCDD exceeded the field precision criteria and were considered quantitative estimates as indicated by a "J" validation qualifier code. All other results in the original and duplicate samples were within criteria. Further details may be found in the validation reports located in **Appendix C**.

3.6.2 Accuracy

Accuracy is the measure of bias in a system. This section discusses sources of error or bias due to field or laboratory contamination. Contamination was assessed by evaluating the results of method blanks, rinse blanks, and trip blanks. In accordance with the USEPA data validation guidelines, the detected concentration in the sample was considered a "non-detect" if the field sample concentration was within 5 times the concentration of the associated field or laboratory blank (10 times for common contaminants such as methylene chloride, 2-butanone, acetone, phthalate esters, OCDD, and OCDF). Analytical accuracy was assessed through the use of laboratory control samples (LCS), matrix spikes (MS) and spike duplicates (MSD) and was reviewed during the validation of data. Analytical accuracy for the laboratory was evaluated during validation process and data review by calculating and evaluating the percent recovery for each analyte spiked with a known concentration.

Method and Calibration Blanks. The method blank and calibration blank contamination assessment was performed to determine the impact of potential contaminant contributions originating from laboratory procedures. Low level aluminum, antimony, beryllium, cobalt, copper, lead, iron, magnesium, manganese, potassium, sodium, thallium, and mercury were detected at estimated trace levels below the reporting limit levels (i.e. <MRL) in the associated calibration/method blanks. This is resultant from the low method detection limit levels the laboratory reported to for metals analyses. All samples with detections within the 5x/10x rule were qualified "B" and should be considered non-detect at the reporting level or at the level reported, whichever was greater. For all other analytes, there were no detections in the method blank. Further details may be found in the validation reports located in **Appendix C**.

Rinse Blanks. The rinse blank contamination assessment was performed to determine the impact of potential contaminant contributions originating from non-point sources, such as field sampling equipment decontamination procedures. Rinse blanks were collected by pouring DIUF water over sampling equipment or material. The results of chemical analysis of the rinse blank were used to evaluate whether the decontamination procedure was adequately performed and whether there is cross-contamination of samples from the equipment itself. The positive analytical detections for rinse blank sample collected in April 2006 are presented in **Table 3-1**. One rinse blank sample (041206R) was collected for the bladder pump used for sampling and analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives, TCL pesticides/PCBs, TAL metals, and dioxin furans. Aluminum, beryllium, magnesium, manganese, acetone, chloroform, methyl ethyl ketone, methylene chloride, and toluene were detected at estimated low concentrations in the associated rinse blank. The metals contamination is resultant from the low method detection limit levels the laboratory reported to for metals analyses and VOC contamination (acetone, chloroform, methyl ethyl ketone, and methylene chloride) are common laboratory contaminants. All samples with detections within the 5x/10x rule were qualified "B" and should be considered non-detect at the reporting level or at the level reported, whichever was greater. For all other analytes, there were no detections in the rinse blank. Further details may be found in the validation reports located in **Appendix C**.

Trip Blanks. Trip blanks are intended to identify contamination from exposure to atmospheric contaminants that may occur during various stages of the sampling process including: shipment of bottles on-site, storage of bottles on-site, collection of samples on-site, storage of samples on-site, shipment of samples to the laboratory, and storage of samples in the laboratory. Two trip blank samples (041006T and 041306T) were collected and analyzed for TCL VOCs. For each sample cooler containing VOC samples, a trip blank was placed in the cooler (at 4°C ± 2°C) and analyzed for TCL VOCs. The positive analytical detections for trip blank samples collected in April 2006 are presented in **Table 3-1**. Methylene chloride (a common laboratory contaminant) was detected at estimated low concentrations in both associated trip blanks. All samples with detections within the 5x/10x rule were qualified "B" and should be considered non-detect at the reporting level or at the level reported, whichever was greater. For all other analytes, there were no detections in the trip blanks. Further details may be found in the validation reports located in **Appendix C**.

Laboratory Control Sample. The LCS was analyzed to assess general method performance by the ability of the laboratory to successfully recover the target analytes from a control matrix. The LCS is similar in composition to the method blank. For aqueous analyses, spiked analyte-free reagent water was used. The LCS is spiked with all single-component target analytes before it is carried through the preparation, cleanup, and determinative procedures. LCSs were performed at a rate of one per preparation batch per matrix. When samples are not subjected to a separate preparatory procedure [i.e., purge and trap VOC analyses, or aqueous mercury analysis], the continuing calibration verification (CCV) may be used as the LCS, provided the CCV acceptance limits are used for evaluation. All LCS samples were within specified criteria except for endrin aldehyde, benzoic acid, 4-nitrophenol, phenol, acetone, 2-hexanone, 1,1,2,2-tetrachloroethane, and vinyl chloride for select samples. Data was qualified estimated if required. Further details may be found in the validation reports in **Appendix C**.

Matrix Spikes. The MS and MSD were used to assess the performance of the method as applied to a particular project matrix. A MS and MSD are an environmental sample to which known concentrations of certain target analytes have been added before sample manipulation from the preparation, cleanup, and determinative procedures have been implemented. For all samples, the original field sample was mixed or shaken to ensure homogeneous fractions when allowed by the method. MS were performed at a rate of one per preparation batch or 5% whichever was more frequent per matrix. All MS and MSD samples were within specified criteria except for endrin aldehyde, bis(2-chloroethyl)ether, bis(2-chloroisopropyl)ether, 1,2-dichlorobenzene, benzoic acid, 2,4-dimethylphenol, phenol, hexachlorobutadiene, hexachlorocyclopentadiene, chloroethane, methyl bromide, methyl chloride, and vinyl chloride for select samples. Data was qualified estimated if required. Further details may be found in the validation reports in **Appendix C**.

3.6.3 Representativeness

Representativeness is a measure of the degree to which the measured results accurately reflect the medium being sampled. It is a qualitative parameter that is addressed through the proper design of the sampling program in terms of sample location, number of samples, and actual material collected as a "sample" of the whole.

Sampling protocols have been developed to assure that samples collected are representative of the media. Field handling protocols (e.g., storage, handling in the field, and shipping) have also been designed to protect the representativeness of the collected samples. Proper field documentation and QC inspections will be used to establish that protocols have been followed and that sample identification and integrity have been maintained.

3.6.4 Completeness

Completeness is a measure of the amount of information that must be collected during the field investigation to allow for successful achievement of the objectives. An adequate amount and type of data must be collected for conclusions to be valid. Missing data may reduce the precision of estimates or introduce bias, thus lowering the confidence level of the conclusions. While completeness has been historically presented as a percentage of the data that is considered useable, this does not take into account critical sample locations or critical analytical parameters.

The amount and type of data that may be lost due to sampling or analytical error cannot be predicted or evaluated in advance. The importance of any lost or suspect data will be evaluated in terms of the sample location, analytical parameter, nature of the problem, decision to be made, and the consequence of an erroneous decision. Critical locations or parameters for which data is determined to be inadequate will either be re-sampled and re-analyzed or the data will be appropriately qualified based on the decision of the Project Officer. The analytical completeness goal percentage of useable data is set at 98 ± 2%. The quality of the data collected in support of the sampling activity was considered acceptable, unless it was qualified as rejected "R" during the validation process.

Sampling completeness was assessed through evaluation of the total number of samples proposed for collection in the work plan versus the actual number of samples collected and analyzed. For the groundwater investigation, a total of thirteen groundwater wells, two field duplicates, one rinse blank, and two trip blanks were proposed and collected for a sampling completeness of 100%.

Analytical completeness was assessed by comparing the number of useable data points collected to the total number of data points generated. Based on 3156 overall sample data points, 3156 out of 3156 data points were deemed to be useable generating an overall completeness of 100%.

3.6.5 Comparability

Comparability is the confidence with which one data set can be compared to another. Comparability will be controlled through the use of field and laboratory SOPs that have been developed to standardize the collection of measurements and samples and approved analytical technique with defined QC criteria. *USEPA-SW846, Third Edition, Test Methods for Evaluating Solid Waste, Update IIIA* (USEPA, 1998) and *USEPA Methods for Chemical Analysis of Water and Wastes* (MCAWW) (USEPA, 1983) methodologies were used in providing laboratory analytical support for this project. Laboratory SOPs were derived from these methods. Consistent and proper calibration of equipment throughout the field exercises, as described in the MWP and addenda, will assist in the comparability of measurements. Field documentation and QA audits are used to establish that protocols for sampling and measurement follow appropriate SOPs.

3.6.6 Sensitivity

The method detection limit (MDL) is defined as the minimum concentration of a substance that can be detected and reported with 99% confidence that the analyte is greater than zero. The MDLs incorporate sample preparation effects, and therefore are not derived directly from the instrument detection limit. Since quantitation of a substance near the MDL becomes questionable, the method reporting limit (MRL) is determined for each analyte at lease twice the MDL level and is used as a threshold value. Detections above the MDL but below the MRL were considered as estimated values and are flagged with a "J". The MDLs and MRLs are presented in **Table 4-1**. The MDLs were evaluated against the USEPA Maximum Contaminant Levels (MCLs) and USEPA Region III Risk Based Concentrations (RBC) for tap water (tw-RBC) since they represent the lowest concentration level of useable data for groundwater comparison. Shading in the MDL and MRL columns in **Table 4-1** indicates the MDL or MRL that exceeded a criterion. The MDL for pentachlorophenol did not meet MCL levels; however, it is a routinely reported compound for the given TCL SVOC methodology. All other MDLs were at or below MCLs and were sufficiently sensitive to detect compounds that meet or exceed MCLs. The MDLs did not meet the USEPA Region III tap water RBC for compounds 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromodichloromethane, bromomethane, carbon tetrachloride, chloroform, tetrachloroethene, trichloroethene, vinyl chloride, benzo(a)pyrene, dibenz(a,h)anthracene, 1,4-dichlorobenzene, 3,3'-dichlorobenzidine, bis(2-chloroethyl)ether, bis(chloroisopropyl)ether, hexachlorobenzene, hexachlorobutadiene, nitrobenzene, n-nitrosodi-n-propylamine, pentachlorophenol, aldrin, alpha-BHC, dieldrin, heptachlor epoxide, heptachlor, toxaphene, PCB-1016, PCB-1221, PCB-1232, PCB-1242, PCB-1248, PCB-1254, PCB-1260, 2,3,7,8-TCDD, antimony, arsenic, and thallium. The majority of these compounds given their carcinogenic properties have very low RBC concentrations which are below the given sensitivities for the standard USEPA methodology.

Table 3-1
Chemical Detections in Rinse and Trip Blank Samples, April 2006

Sample ID	Sample Date	Analyte	Concentration (µg/L)	Lab Qualifier	Validation Qualifier	Comments
Rinse Blank						
041206R	04/12/06	Aluminum	72	J	J	Rinse blank for bladder pump.
		Beryllium	1.7	J	J	
		Magnesium	11.5	J	J	
		Manganese	0.26	J	J	
		Acetone	21.0	J	J	
		Chloroform	8.0			
		Methyl ethyl ketone	6.5			
		Methylene chloride	2.8	J	J	
		Toluene	0.69	J	J	
Trip Blanks						
041006T	04/10/06	Methylene Chloride	2.0	J	J	Trip bank accompanying shipments.
041306T	04/13/06	Methylene Chloride	1.7	J	J	

Notes:
µg/L = micrograms per liter = parts per billion

Laboratory Qualifiers:
J = The reported value was obtained from a reading <MRL and >MDL and is considered estimated.

Validation Qualifiers:
J = Indicates an estimated value for (1) estimated value due to QC non-conformance, or (2) estimating a concentration >MDL and <MRL. Reported value may not be accurate or precise.

4.0 RESULTS

4.1 REVIEW OF WATER LEVEL MEASUREMENT DATA

Groundwater elevations measured from the April 2000 and April 2006 events are presented in **Table 2-1**. The April 2000 data are presented in the table for comparison and were found to be similar (i.e. ± 1 foot) for the majority of the 2006 water level measurement data. The April 2000 groundwater contour map for the eastern HSA is shown on **Figure 1-2**. The April 2006 groundwater contour map for the eastern HSA is shown on **Figure 4-1**. The Eastern Horseshoe Area April 2006 Geological Cross Section is shown on **Figure 4-2**. The plan view of this cross section (A→A') is depicted on **Figure 2-1**. It is acknowledged that due to the karst nature of the aquifer, more than one flow regime could be present; however, the 2000 and 2006 data indicate similar water levels. The contour map shows a radial pattern with the gradient moving away in every direction from the groundwater elevation high point near well 28MW1 toward the New River. This groundwater trend is confirmed in **Figure 4-2**, which suggests that the groundwater is flowing toward the New River. The geological cross section Recharge in the eastern HSA occurs through karst features in the region of the topographic highs near SWMUs 28, 51, and 30 and, to a smaller extent, through porous infiltration at lower elevations, which is consistent with previous surveys.

4.2 GROUNDWATER ANALYTICAL RESULTS

The concentrations of TCL VOCs, TCL SVOCs, PAHs, explosives, TCL pesticides and PCBs, TAL metals, and Dioxin Furans detected in the groundwater samples collected during the April 2006 sampling events are shown in **Table 4-1** and are briefly discussed below. The data that exceeded regulatory criteria are presented on **Figure 2-2**. Shading and black font indicates a MCL exceedence and a bold outline indicates a tap water RBC exceedence. The "J" validation qualifier noted below with the results indicates an estimated value (1) due to QC non-conformance, or (2) concentration >MDL and <MRL. This data is considered useable for this report. The "B" validation qualifier noted below with the results indicates contaminants were detected in the rinse and/or laboratory blanks and value was considered non-detect at the level found. All data noted was reported in parts per billion as micrograms per liter (µg/L), except for dioxins and furans which was reported in parts per trillion as nanograms per liter (ng/L).

4.2.1 VOC Results

VOCs were detected in monitoring wells 28MW1, 48MW1, 48MW2, 48MW3, 48MW4, 51MW1, C1, C4, and TM48MW1 as shown in **Table 4-1**. Sample TM48MW1 is the field duplicate for well 48MW1. The detected TCL VOCs included compounds 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethylene, tetrachloroethene, trichloroethene, acetone, carbon tetrachloride, chloroform, 2-butanone, chloroethane, and methylene chloride. The majority of the chlorinated solvents detected were found at SWMU 48 wells. Chloroform, methylene chloride, 2-butanone, and acetone are common laboratory contaminants and were detected in the rinse and/or laboratory blanks and considered non-detect at level found. The data summaries follow. All other TCL VOC compounds were non-detect for the Horseshoe Area April 2006 sampling event groundwater samples.

Trichloroethene exceeded the MCL of 5 µg/L and tap-RBC of 0.026 µg/L for samples 48MW1 (5.5 µg/L), 48MW3 (7.4 µg/L), and TM48MW1 (5.5 µg/L; field duplicate for 48MW1) and exceeded the tap-RBC for sample 48MW2 (3.0 µg/L).

Tetrachloroethene exceeded the tap-RBC of 0.1 µg/L for samples 48MW1 (1.1J µg/L), 48MW2 (1.1J µg/L), 48MW3 (0.54J µg/L), 48MW4 (0.66J µg/L), 51MW1 (0.93J µg/L), C4 (0.96J µg/L), and TM48MW1 (1.0J µg/L; field duplicate for 48MW1). All detected samples were below current MCL of 5 µg/L for tetrachloroethene.

Carbon tetrachloride exceeded the MCL of 5 µg/L and tap-RBC of 0.16 µg/L for samples 48MW2 (29.2 µg/L) and 48MW3 (51.2 µg/L).

Chloroethane exceeded the tap-RBC of 3.6 µg/L for sample C1 (4.0 µg/L). Chloroethane was detected below the tap-RBC for sample 28MW1 (1.4J µg/L). There is currently no MCL for chloroethane.

1,1,1-Trichloroethane was found below the MCL of 200 µg/L and tap-RBC of 170 µg/L for samples 28MW1 (0.95J µg/L), 48MW1 (1.3J µg/L), C1 (1.3J µg/L), and TM48MW1 (1.2J µg/L; field duplicate for 48MW1).

1,1-Dichloroethane was found below the tap-RBC of 90 µg/L for samples 28MW1 (2.9 µg/L), 48MW1 (1.3J µg/L), C1 (8.5 µg/L), and TM48MW1 (1.4J µg/L; field duplicate for 48MW1). There is currently no MCL for 1,1-dichloroethane.

1,1-Dichloroethene was found below the MCL of 7 µg/L and tap-RBC of 35 µg/L for samples 28MW1 (0.88J µg/L), 48MW1 (0.55J µg/L), and TM48MW1 (0.56J µg/L; field duplicate for 48MW1).

Cis-1,2-dichloroethene was found below the MCL of 70 µg/L for samples 48MW1 (0.71J µg/L), and TM48MW1 (0.77J µg/L; field duplicate for 48MW1). There is currently no tap-RBC for cis-1,2-dichloroethene; however, total 1,2-dichloroethene (5.5 µg/L) has a tap-RBC. All samples were less than tap-RBC for total 1,2-dichloroethene.

Chloroform exceeded the tap-RBC of 3.6 µg/L for samples 48MW2 (5.9B µg/L) and 48MW3 (5.5B µg/L); however, should be considered non-detect at that level for it was found in the field blank. All chloroform detections were less than MCL of 80 µg/L.

Methylene chloride exceeded the MCL of 5 µg/L and tap-RBC of 4.1 µg/L for sample C1 (8.0B µg/L); however, should be considered non-detect at that level for it was found in the laboratory and field blanks.

Acetone was found below the tap-RBC of 550 µg/L for sample 48MW2 (61.5B µg/L); however, should be considered non-detect at that level for it was found in the field blank. There is currently no MCL for acetone.

2-Butanone was found below the tap-RBC of 700 µg/L for sample 48MW2 (4.5B µg/L); however, should be considered non-detect at that level for it was found in the field blank. There is currently no MCL for 2-butanone.

4.2.2 PAH Results

All groundwater samples were non-detect for PAHs for the Horseshoe Area April 2006 sampling event.

4.2.3 SVOC Results

TCL SVOC bis(2-ethylhexyl)phthalate was detected for monitoring well C4 as shown in **Table 4-1**. The data summary follows. All other TCL SVOC compounds were non-detect for the Horseshoe Area April 2006 sampling event groundwater samples.

Bis(2-ethylhexyl)phthalate was detected at the tap-RBC level of 4.8 µg/L for sample C4 (4.8J µg/L). Bis(2-ethylhexyl)phthalate was below the MCL of 6.0 µg/L.

4.2.4 Pesticide Results

TCL pesticides alpha-chlordane and heptachlor epoxide were detected for monitoring well 16-4 as shown in **Table 4-1**. The data summaries follows. All other TCL pesticide compounds were non-detect for the Horseshoe Area April 2006 sampling event groundwater samples.

Alpha-chlordane exceeded the tap-RBC of 0.19 µg/L for sample 16-4 (0.21 µg/L). Alpha-chlordane was below the MCL of 2 µg/L.

Heptachlor epoxide exceeded the tap-RBC of 0.0074 µg/L for sample 16-4 (0.015J µg/L). Heptachlor epoxide was below the MCL of 0.2 µg/L.

4.2.5 PCB Results

All groundwater samples were non-detect for TCL PCBs for the Horseshoe Area April 2006 sampling event.

4.2.6 Explosive Results

All groundwater samples were non-detect for explosive compounds for the Horseshoe Area April 2006 sampling event.

4.2.7 Metal Results

TAL metals were detected in all of the monitoring wells 13MW1, 13MW2, 16-4, 28MW1, 28MW2, 48MW1, 48MW2, 48MW3, 48MW4, 51MW1, 51MW2, C1, C4, TM13MW1 (field duplicate for 13MW1), and TM48MW1 (field duplicate for 48MW1) as shown in **Table 4-1**. The detected TAL metals included aluminum, antimony, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, sodium, vanadium, and zinc. The majority of the metals detected were at trace levels and were found in the laboratory and/or rinse blanks and should be considered non-detect at the level found. The metals contamination is resultant from the low method detection limit levels the laboratory reported at for metals analyses. The metals data summaries follow. All other TAL metals were non-detect for the Horseshoe Area April 2006 sampling event groundwater samples.

Aluminum exceeded the MCL of 50 µg/L for samples 13MW1 (360B µg/L), 13MW2 (133B µg/L), 16-4 (236B µg/L), 28MW1 (88.6B µg/L), 28MW2 (109B µg/L), 48MW1 (606 µg/L), 48MW2 (2630 µg/L), 48MW3 (82.6B µg/L), 48MW4 (113B µg/L), 51MW1 (282B µg/L), 51MW2 (100B µg/L), C1 (57.0B µg/L), C4 (554 µg/L), TM13MW1 (435B µg/L), and TM48MW1 (452B µg/L); however, should be considered non-detect at that level for it was found in the field and laboratory blanks. There is currently no tap-RBC for aluminum.

Antimony exceeded the tap-RBC of 1.5 µg/L for samples 16-4 (3.2B µg/L), 28MW2 (3.7B µg/L), 48MW3 (4.3B µg/L), 51MW1 (3.6B µg/L), C1 (2.6B µg/L), C4 (4.2B µg/L), TM13MW1 (3.7B µg/L); however, should be considered non-detect at that level for it was found in the laboratory blanks. Antimony was found below the MCL of 6 µg/L for all detected samples.

Arsenic exceeded the MCL of 10 µg/L and tap-RBC of 0.045 µg/L for sample C4 (53.9 µg/L).

Barium was found below the MCL of 2000 µg/L and tap-RBC of 730 µg/L for samples 13MW1 (134J µg/L), 13MW2 (156J µg/L), 16-4 (149J µg/L), 28MW1 (455 µg/L), 28MW2 (384 µg/L), 48MW1 (105J µg/L), 48MW2 (615 µg/L), 48MW3 (50.4J µg/L), 48MW4 (167J µg/L), 51MW1 (45.3J µg/L), 51MW2 (40.8J µg/L), C1 (181J µg/L), C4 (177J µg/L), TM13MW1 (136J µg/L), and TM48MW1 (92.6J µg/L).

Beryllium was found below the MCL of 4 µg/L and tap-RBC of 7.3 µg/L for samples 13MW1 (2.1B µg/L), 13MW2 (2.0B µg/L), 16-4 (2.0B µg/L), 28MW1 (2.1B µg/L), 28MW2 (2.0B µg/L), 48MW1 (1.8B µg/L), 48MW2 (2.0B µg/L), 48MW3 (2.2B µg/L), 48MW4 (2.1B µg/L), 51MW1 (2.0B µg/L), 51MW2 (2.1B µg/L), C1 (1.9B µg/L), C4 (2.1B µg/L), TM13MW1 (2.1B µg/L), and TM48MW1 (2.0B µg/L); however, should be considered non-detect at that level for it was found in the field and laboratory blanks.

Calcium was detected in samples 13MW1 (114000 µg/L), 13MW2 (94900 µg/L),16-4 (36300 µg/L), 28MW1 (78200 µg/L), 28MW2 (40100 µg/L), 48MW1 (67400 µg/L), 48MW2 (89700 µg/L), 48MW3 (102000 µg/L), 48MW4 (58600 µg/L), 51MW1 (18900 µg/L), 51MW2 (53700 µg/L), C1 (105000 µg/L), C4 (34700 µg/L), TM13MW1 (117000 µg/L), and TM48MW1 (69900 µg/L). There is currently no MCL or tap-RBC for calcium.

Chromium was found below the MCL of 100 µg/L and tap-RBC of 11 µg/L for samples 13MW1 (2.8J µg/L), 13MW2 (3.2J µg/L), 16-4 (0.74J µg/L), 28MW2 (1.3J µg/L), 48MW1 (1.7J µg/L), 48MW2 (6.4J µg/L), 48MW3 (1.0J µg/L), 48MW4 (0.86J µg/L), 51MW1 (0.59J µg/L), 51MW2 (1.3J µg/L), C4 (2.0J µg/L), TM13MW1 (4.6J µg/L), and TM48MW1 (1.2J µg/L).

Cobalt was detected in sample 48MW2 (1.3B µg/L); however, should be considered non-detect at that level for it was found in the laboratory blanks. There is currently no MCL or tap-RBC for cobalt.

Copper was found below the MCL of 1300 µg/L and tap-RBC of 150 µg/L for samples 48MW2 (0.83B µg/L) and C4 (6.9B µg/L); however, should be considered non-detect at that level for it was found in the laboratory blanks.

Iron exceeded the MCL of 300 µg/L for samples 48MW1 (617 µg/L), 51MW1 (547 µg/L), TM13MW1 (376 µg/L), and TM48MW1 (387 µg/L). Iron exceeded the tap-RBC of 1100 µg/L for samples 48MW2 (2960 µg/L) and C4 (4830 µg/L). Iron was found below the MCL and tap-RBC for samples 13MW1 (264J µg/L), 13MW2 (29.7B µg/L), 16-4 (174J µg/L), 28MW2 (31.8B µg/L), 48MW3 (8.9B µg/L), 48MW4 (62.8B µg/L), 51MW2 (42.2B µg/L); however, where qualified "B", they should be considered non-detect at that level for it was found in the laboratory blanks.

Lead was found below the MCL of 15 µg/L for samples 13MW2 (1.6B µg/L), 16-4 (2.0B µg/L), 28MW2 (1.8B µg/L), 48MW1 (2.0B µg/L), 48MW2 (1.3B µg/L), 48MW3 (2.7B µg/L), 51MW1 (1.3B µg/L), and C4 (7.8B µg/L); however, should be considered non-detect at that level for it was found in the laboratory blanks. There is currently no tap-RBC for lead.

Magnesium was detected in samples 13MW1 (34400 µg/L), 13MW2 (38800 µg/L), 16-4 (22700 µg/L), 28MW1 (49800 µg/L), 28MW2 (20000 µg/L), 48MW1 (35300 µg/L), 48MW2 (44800 µg/L), 48MW3 (42800 µg/L), 48MW4 (49600 µg/L), 51MW1 (7440 µg/L), 51MW2 (15600 µg/L), C1 (38100 µg/L), C4 (20400 µg/L), TM13MW1 (35100 µg/L), and TM48MW1 (35400 µg/L).

Manganese exceeded the MCL of 50 µg/L for samples 48MW2 (50.7 µg/L) and 51MW1 (60.6 µg/L). Manganese was detected in samples 13MW1 (5.4J µg/L), 13MW2 (1.3B µg/L), 16-4 (5.1J µg/L), 28MW1 (22.4 µg/L), 28MW2 (1.5B µg/L), 48MW1 (10.3J µg/L), 48MW3 (1.8B µg/L), 48MW4 (2.6B µg/L), 51MW2 (1.8B µg/L), C1 (7.1J µg/L), C4 (47.6 µg/L), TM13MW1 (6.6J µg/L), and TM48MW1 (5.6J µg/L); however, where qualified "B", they should be considered non-detect at that level for it was found in the laboratory and field blanks. All of the manganese detections were below the tap-RBC of 73 µg/L.

Nickel was found below the tap-RBC of 73 µg/L for samples 48MW1 (1.2J µg/L), 48MW2 (4.9J µg/L), 51MW1 (1.1J µg/L), and C4 (1.1J µg/L). There is currently no MCL for nickel.

Potassium was detected in samples 13MW1 (1480J µg/L), 13MW2 (1190J µg/L), 16-4 (1030J µg/L), 28MW1 (1530J µg/L), 28MW2 (1710J µg/L), 48MW1 (2020J µg/L), 48MW2 (1690J µg/L), 48MW3 (1230J µg/L), 48MW4 (1600J µg/L), 51MW1 (1070J µg/L), 51MW2 (1220J µg/L), C1 (2720J µg/L), C4 (867J µg/L), TM13MW1 (1540J µg/L), and TM48MW1 (2060J µg/L).

Selenium was found below the MCL of 50 µg/L and tap-RBC of 18 µg/L for samples 13MW1 (5.5J µg/L), 28MW1 (4.9J µg/L), 48MW1 (3.2J µg/L), 48MW2 (2.4J µg/L), 48MW3 (5.2J µg/L), C1 (2.8J µg/L), and TM13MW1 (7.2J µg/L).

Sodium was detected in samples 13MW1 (9310L µg/L), 13MW2 (81.0B µg/L), 16-4 (385B µg/L), 28MW1 (2570B µg/L), 28MW2 (2170B µg/L), 48MW1 (13700 µg/L), 48MW2 (311B µg/L), 48MW3 (1030B µg/L), 48MW4 (8230L µg/L), 51MW1 (256B µg/L), 51MW2 (713B µg/L), C1 (4250L µg/L), C4 (104B µg/L), TM13MW1 (10300 µg/L), and TM48MW1 (14900 µg/L); however, where qualified "B", they should be considered non-detect at that level for it was found in the laboratory and field blanks. There is currently no MCL or tap-RBC for sodium.

Vanadium exceeded the tap-RBC of 3.7 µg/L for sample 48MW2 (6.3B µg/L); however, should be considered non-detect at that level for it was found in the laboratory blanks. Vanadium was found below the tap-RBC for samples 13MW1 (0.98B µg/L), 16-4 (0.70B µg/L), 28MW1 (0.64B µg/L), 48MW1 (1.3B µg/L), 48MW3 (0.91B µg/L), C1 (0.82B µg/L), C4 (1.8B µg/L), TM13MW1 (1.6B µg/L), and TM48MW1 (1.2B µg/L); however, should be considered non-detect at that level for it was found in the field and laboratory blanks. There is currently no MCL for vanadium.

Zinc was found below the MCL of 5000 µg/L and tap-RBC of 1100 µg/L for samples 13MW1 (1.4J µg/L), 16-4 (0.91J µg/L), 28MW2 (4.8J µg/L), 48MW1 (3.0J µg/L), 48MW2 (11.7J µg/L), 48MW4 (1.4J µg/L), 51MW1 (3.4J µg/L), 51MW2 (2.1J µg/L), C4 (22.3 µg/L), TM13MW1 (1.5J µg/L), and TM48MW1 (1.7J µg/L).

4.2.8 Dioxin Furan Results

Dioxins and furans were detected in monitoring wells 48MW2, 48MW3, 51MW1, C4, TM48MW1 (field duplicate of 48MW1) as shown in **Table 4-1**. The detected dioxins and furans included congeners 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,4,6,7,8-HpCDD, OCDD, TOTAL PeCDD, TOTAL HxCDD, TOTAL HpCDD, and TOTAL TCDF. The data summaries follow. The dioxin furan data is reported in ng/L (parts per trillion). All other dioxin and furan congeners were non-detect for the Horseshoe Area April 2006 sampling event groundwater samples.

2,3,7,8-TCDF was detected in sample TM48MW1 (0.0128J ng/L). There is currently no MCL or tap-RBC for 2,3,7,8-TCDF.

1,2,3,7,8-PeCDD was detected in samples 48MW2 (0.0283J ng/L), 48MW3 (0.0112J ng/L), and TM48MW1 (0.0873J ng/L). There is currently no MCL or tap-RBC for 1,2,3,7,8-PeCDD.

1,2,3,4,7,8-HxCDD exceeded the tap-RBC of 0.011 ng/L for sample TM48MW1 (0.0215J ng/L) and was detected at the tap-RBC concentration for 48MW2 (0.0106J ng/L). There is currently no MCL for 1,2,3,4,7,8-HxCDD.

1,2,3,4,6,7,8-HpCDD was detected in samples 48MW2 (0.0331J ng/L), 48MW3 (0.0168J ng/L), and TM48MW1 (0.0857J ng/L). There is currently no MCL or tap-RBC for 1,2,3,4,6,7,8-HpCDD.

OCDD was detected in samples 51MW1 (0.0376J ng/L), C4 (0.0361J ng/L), and TM48MW1 (0.0180J ng/L). There is currently no MCL or tap-RBC for OCDD.

TOTAL TCDF was detected in sample TM48MW1 (0.0128 ng/L). There is currently no MCL or tap-RBC for TOTAL TCDF.

TOTAL PeCDD was detected in samples 48MW2 (0.0283 ng/L), 48MW3 (0.0112 ng/L), and TM48MW1 (0.0873J ng/L). There is currently no MCL or tap-RBC for TOTAL PeCDD.

TOTAL HxCDD exceeded the tap-RBC of 0.011 ng/L for sample TM48MW1 (0.0215 ng/L) and was detected at the tap-RBC concentration for 48MW2 (0.0106J ng/L). There is currently no MCL for TOTAL HxCDD.

TOTAL HpCDD was detected in samples 48MW2 (0.0331 ng/L), 48MW3 (0.0168 ng/L), and TM48MW1 (0.0857 ng/L). There is currently no MCL or tap-RBC for TOTAL HpCDD.

Table 4-1 Chemical Detections in Groundwater Samples, April 2006

Analyte		Sample ID	13MW1					13MW2					16-4				
		Sample Date	4/12/06					4/12/06					4/10/06				
		Sample Depth	27-28					25-26					65-66				
	MCL	tw-RBC	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/L)																	
1,1,1-Trichloroethane	200	170	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
1,1-Dichloroethane	na	90	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
1,1-Dichloroethene	7	35	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
2-Butanone	na	700	5	U		*2.5*	*5*	5	U		*2.5*	*5*	5	U		*2.5*	*5*
Acetone	na	550	25	U		*5*	*25*	25	U		*5*	*25*	25	U		*5*	*25*
Carbon tetrachloride	5	0.16	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
Chloroethane	na	3.6	2	U		*1*	*2*	2	U		*1*	*2*	2	U		*1*	*2*
Chloroform	80	0.15	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
cis-1,2-Dichloroethene	70	5.5	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
Methylene chloride	5	4.1	5	U		*1*	*5*	5	U		*1*	*5*	5	U		*1*	*5*
Tetrachloroethene	5	0.1	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
Trichloroethene	5	0.026	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
PAHs (ug/L)																	
All groundwater samples were non-detect for PAHs.																	
SVOCs (ug/L)																	
bis(2-Ethylhexyl)phthalate	6	4.8	6.3	U		*3.1*	*6.3*	5.6	U		*2.8*	*5.6*	5.6	U		*2.8*	*5.6*
Pesticides (ug/L)																	
alpha-Chlordane	2	0.19	0.067	U		*0.013*	*0.067*	0.063	U		*0.013*	*0.063*	0.21			*0.013*	*0.067*
Heptachlor epoxide	0.2	0.0074	0.067	U		*0.013*	*0.067*	0.063	U		*0.013*	*0.063*	0.015	J	J	*0.013*	*0.067*
PCBs (ug/L)																	
All groundwater samples were non-detect for PCBs.																	
Explosives (ug/L)																	
All groundwater samples were non-detect for explosives.																	
Metals (ug/L)																	
Aluminum	50	na	360		B	*16*	*200*	133	J	B	*16*	*200*	236		B	*16*	*200*
Antimony	6	1.5	2.2	U		*2.2*	*5*	2.2	U		*2.2*	*5*	3.2	J	B	*2.2*	*5*
Arsenic	10	0.045	2.9	U		*2.9*	*10*	2.9	U		*2.9*	*10*	2.9	U		*2.9*	*10*
Barium	2000	730	134	J	J	*0.5*	*200*	156	J	J	*0.5*	*200*	149	J	J	*0.5*	*200*
Beryllium	4	7.3	2.1	J	B	*0.7*	*4*	2	J	B	*0.7*	*4*	2	J	B	*0.7*	*4*
Calcium	na	na	114000			*26*	*1000*	94900			*26*	*1000*	36300			*26*	*1000*
Chromium	100	11	2.8	J	J	*0.5*	*10*	3.2	J	J	*0.5*	*10*	0.74	J	J	*0.5*	*10*
Cobalt	na	na	0.4	U		*0.4*	*50*	0.4	U		*0.4*	*50*	0.4	U		*0.4*	*50*
Copper	1300	150	0.8	U		*0.8*	*25*	0.8	U		*0.8*	*25*	0.8	U		*0.8*	*25*
Iron	300	1100	264	J	J	*7.5*	*300*	29.7	J	B	*7.5*	*300*	174	J	J	*7.5*	*300*
Lead	15	na	1.2	U		*1.2*	*5*	1.6	J	B	*1.2*	*5*	2	J	B	*1.2*	*5*
Magnesium	na	na	34400			*5.8*	*5000*	38800			*5.8*	*5000*	22700			*5.8*	*5000*
Manganese	50	73	5.4	J	J	*0.2*	*15*	1.3	J	B	*0.2*	*15*	5.1	J	J	*0.2*	*15*
Nickel	na	73	1.1	U		*1.1*	*40*	1.1	U		*1.1*	*40*	1.1	U		*1.1*	*40*
Potassium	na	na	1480	J	J	*36*	*5000*	1190	J	J	*36*	*5000*	1030	J	J	*36*	*5000*
Selenium	50	18	5.5	J	J	*2.4*	*10*	2.4	U		*2.4*	*10*	2.4	U		*2.4*	*10*
Sodium	na	na	9310		L	*77*	*5000*	81	J	B	*77*	*5000*	385	J	B	*77*	*5000*
Vanadium	na	3.7	0.98	J	B	*0.6*	*50*	0.6	U		*0.6*	*50*	0.7	J	B	*0.6*	*50*
Zinc	5000	1100	1.4	J	J	*0.8*	*20*	0.8	U		*0.8*	*20*	0.91	J	J	*0.8*	*20*

Table 4-1 Chemical Detections in Groundwater Samples, April 2006

		Sample ID	13MW1					13MW2					16-4				
Analyte		Sample Date	4/12/06					4/12/06					4/10/06				
		Sample Depth	27-28					25-26					65-66				
	MCL	tw-RBC	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
Dioxins/Furans (ng/L)																	
2,3,7,8-TCDF	na	na	0.00445	U		*0.00445*	*0.00445*	0.00443	U		*0.00443*	*0.00443*	0.00372	U		*0.00372*	*0.00372*
1,2,3,7,8-PECDD	na	na	0.0061	U		*0.0061*	*0.0061*	0.00654	U		*0.00654*	*0.00654*	0.0061	U		*0.0061*	*0.0061*
1,2,3,4,7,8-HXCDD	na	0.011	0.0129	U		*0.0129*	*0.0129*	0.0104	U		*0.0104*	*0.0104*	0.00871	U		*0.00871*	*0.00871*
1,2,3,4,6,7,8-HPCDD	na	na	0.00836	U		*0.00836*	*0.00836*	0.0134	U		*0.0134*	*0.0134*	0.00915	U		*0.00915*	*0.00915*
OCDD	na	na	0.0264	U		*0.0264*	*0.0264*	0.0504	U		*0.0504*	*0.0504*	0.0348	U		*0.0348*	*0.0348*
TOTAL PECDD	na	na	0.0061	U		*0.0061*	*0.0061*	0.00654	U		*0.00654*	*0.00654*	0.0061	U		*0.0061*	*0.0061*
TOTAL HXCDD	na	0.011	0.0131	U		*0.0131*	*0.0131*	0.0105	U		*0.0105*	*0.0105*	0.00882	U		*0.00882*	*0.00882*
TOTAL HPCDD	na	na	0.00836	U		*0.00836*	*0.00836*	0.0134	U		*0.0134*	*0.0134*	0.00915	U		*0.00915*	*0.00915*
TOTAL TCDF	na	na	0.00445	U		*0.00445*	*0.00445*	0.00443	U		*0.00443*	*0.00443*	0.00372	U		*0.00372*	*0.00372*

Notes:

Shading and black font indicates a MCL exceedence.

Bold outline indicates a tap water RBC exceedence.

Shading in the MDL/MRL columns indicates the MDL or MRL exceeded a criterion.

RBCs for non-carcinogenic compounds have been recalculated to an HI of 0.1.

RBCs for carcinogenic compounds are shown in red font.

The pyrene RBC was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene and are shown in blue.

RBC source: USEPA Region III Risk Based Concentration Table, April 2006.

MCL source: USEPA 2004 Edition of the Drinking Water Standard and Health Advisories (EPA 822-R-04-005), Winter 2004.

µg/L = micrograms per liter = parts per billion

ng/L = nanograms per liter = parts per trillion

Laboratory Qualifiers:

U = Not detected.

A = J = The reported value is <MRL and >MDL and considered estimated.

Validation Qualifiers:

B = The analyte detected in the sample and the lab or field blank and considered non-detect.

J = Indicates an estimated value (1) due to QC non-conformance, or (2) concentration >MDL and <MRL. Reported value may not be accurate or precise.

L = Analyte present. Reported value may be biased low due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Table 4-1 Chemical Detections in Groundwater Samples, April 2006

Analyte	MCL	tw-RBC	Sample ID	28MW1					28MW2					48MW1				
			Sample Date	4/11/06					4/11/06					4/13/06				
			Sample Depth	58-59					78-79					135-136				
				Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/L)																		
1,1,1-Trichloroethane	200	170		0.95	J	J	*0.5*	*1*	1	U		*0.5*	*1*	1.3		J	*0.5*	*1*
1,1-Dichloroethane	na	90		2.9			*0.5*	*1*	1	U		*0.5*	*1*	1.3		J	*0.5*	*1*
1,1-Dichloroethene	7	35		0.88	J	J	*0.5*	*1*	1	U		*0.5*	*1*	0.55	J	J	*0.5*	*1*
2-Butanone	na	700		5	U		*2.5*	*5*	5	U		*2.5*	*5*	5	U		*2.5*	*5*
Acetone	na	550		25	U		*5*	*25*	25	U		*5*	*25*	25	U		*5*	*25*
Carbon tetrachloride	5	0.16		1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
Chloroethane	na	3.6		1.4	J	J	*1*	*2*	2	U		*1*	*2*	2	U		*1*	*2*
Chloroform	80	0.15		1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
cis-1,2-Dichloroethene	70	5.5		1	U		*0.5*	*1*	1	U		*0.5*	*1*	0.71	J	J	*0.5*	*1*
Methylene chloride	5	4.1		5	U		*1*	*5*	5	U		*1*	*5*	5	U		*1*	*5*
Tetrachloroethene	5	0.1		1	U		*0.5*	*1*	1	U		*0.5*	*1*	1.1		J	*0.5*	*1*
Trichloroethene	5	0.026		1	U		*0.5*	*1*	1	U		*0.5*	*1*	5.5			*0.5*	*1*
PAHs (ug/L)																		
All groundwater samples were non-detect for PAHs.																		
SVOCs (ug/L)																		
bis(2-Ethylhexyl)phthalate	6	4.8		6.3	U		*3.1*	*6.3*	5.6	U		*2.8*	*5.6*	5.6	U		*2.8*	*5.6*
Pesticides (ug/L)																		
alpha-Chlordane	2	0.19		0.063	U		*0.013*	*0.063*	0.063	U		*0.013*	*0.063*	0.062	U		*0.012*	*0.062*
Heptachlor epoxide	0.2	0.0074		0.063	U		*0.013*	*0.063*	0.063	U		*0.013*	*0.063*	0.062	U		*0.012*	*0.062*
PCBs (ug/L)																		
All groundwater samples were non-detect for PCBs.																		
Explosives (ug/L)																		
All groundwater samples were non-detect for explosives.																		
Metals (ug/L)																		
Aluminum	50	na		88.6	J	B	*16*	*200*	109	J	B	*16*	*200*	606			*16*	*200*
Antimony	6	1.5		2.2	U		*2.2*	*5*	3.7	J	B	*2.2*	*5*	2.2	U		*2.2*	*5*
Arsenic	10	0.045		2.9	U		*2.9*	*10*	2.9	U		*2.9*	*10*	2.9	U		*2.9*	*10*
Barium	2000	730		455			*0.5*	*200*	384			*0.5*	*200*	105	J	J	*0.5*	*200*
Beryllium	4	7.3		2.1	J	B	*0.7*	*4*	2	J	B	*0.7*	*4*	1.8	J	B	*0.7*	*4*
Calcium	na	na		78200			*26*	*1000*	40100			*26*	*1000*	67400			*26*	*1000*
Chromium	100	11		0.5	U		*0.5*	*10*	1.3	J	J	*0.5*	*10*	1.7	J	J	*0.5*	*10*
Cobalt	na	na		0.4	U		*0.4*	*50*	0.4	U		*0.4*	*50*	0.4	U		*0.4*	*50*
Copper	1300	150		0.8	U		*0.8*	*25*	0.8	U		*0.8*	*25*	0.8	U		*0.8*	*25*
Iron	300	1100		7.5	U		*7.5*	*300*	31.8	J	B	*7.5*	*300*	617			*7.5*	*300*
Lead	15	na		1.2	U		*1.2*	*5*	1.8	J	B	*1.2*	*5*	2	J	B	*1.2*	*5*
Magnesium	na	na		49800			*5.8*	*5000*	20000			*5.8*	*5000*	35300			*5.8*	*5000*
Manganese	50	73		22.4			*0.2*	*15*	1.5	J	B	*0.2*	*15*	10.3	J	J	*0.2*	*15*
Nickel	na	73		1.1	U		*1.1*	*40*	1.1	U		*1.1*	*40*	1.2	J	J	*1.1*	*40*
Potassium	na	na		1530	J	J	*36*	*5000*	1710	J	J	*36*	*5000*	2020	J	J	*36*	*5000*
Selenium	50	18		4.9	J	J	*2.4*	*10*	2.4	U		*2.4*	*10*	3.2	J	J	*2.4*	*10*
Sodium	na	na		2570	J	B	*77*	*5000*	2170	J	B	*77*	*5000*	13700			*77*	*5000*
Vanadium	na	3.7		0.64	J	B	*0.6*	*50*	0.6	U		*0.6*	*50*	1.3	J	B	*0.6*	*50*
Zinc	5000	1100		0.8	U		*0.8*	*20*	4.8	J	J	*0.8*	*20*	3	J	J	*0.8*	*20*

Table 4-1 Chemical Detections in Groundwater Samples, April 2006

		Sample ID	28MW1					28MW2					48MW1				
Analyte		Sample Date	4/11/06					4/11/06					4/13/06				
		Sample Depth	58-59					78-79					135-136				
	MCL	tw-RBC	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
Dioxins/Furans (ng/L)																	
2,3,7,8-TCDF	na	na	0.00447	U		*0.00447*	*0.00447*	0.00381	U		*0.00381*	*0.00381*	0.00727	U	UJ	*0.00727*	*0.00727*
1,2,3,7,8-PECDD	na	na	0.00683	U		*0.00683*	*0.00683*	0.0058	U		*0.0058*	*0.0058*	0.00528	U	UJ	*0.00528*	*0.00528*
1,2,3,4,7,8-HXCDD	na	0.011	0.0142	U		*0.0142*	*0.0142*	0.0151	U		*0.0151*	*0.0151*	0.00876	U		*0.00876*	*0.00876*
1,2,3,4,6,7,8-HPCDD	na	na	0.0144	U		*0.0144*	*0.0144*	0.0131	U		*0.0131*	*0.0131*	0.0126	U	UJ	*0.0126*	*0.0126*
OCDD	na	na	0.0377	U		*0.0377*	*0.0377*	0.025	U		*0.025*	*0.025*	0.0213	U		*0.0213*	*0.0213*
TOTAL PECDD	na	na	0.00683	U		*0.00683*	*0.00683*	0.0058	U		*0.0058*	*0.0058*	0.00528	U		*0.00528*	*0.00528*
TOTAL HXCDD	na	0.011	0.0144	U		*0.0144*	*0.0144*	0.0153	U		*0.0153*	*0.0153*	0.00887	U		*0.00887*	*0.00887*
TOTAL HPCDD	na	na	0.0144	U		*0.0144*	*0.0144*	0.0131	U		*0.0131*	*0.0131*	0.0126	U		*0.0126*	*0.0126*
TOTAL TCDF	na	na	0.00447	U		*0.00447*	*0.00447*	0.00381	U		*0.00381*	*0.00381*	0.00727	U		*0.00727*	*0.00727*

Notes:

Shading and black font indicates a MCL exceedence.

Bold outline indicates a tap water RBC exceedence.

Shading in the MDL/MRL columns indicates the MDL or MRL exceeded a criterion.

RBCs for non-carcinogenic compounds have been recalculated to an HI of 0.1.

RBCs for carcinogenic compounds are shown in red font.

The pyrene RBC was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene and are shown in blue.

RBC source: USEPA Region III Risk Based Concentration Table, April 2006.

MCL source: USEPA 2004 Edition of the Drinking Water Standard and Health Advisories (EPA 822-R-04-005), Winter 2004.

µg/L = micrograms per liter = parts per billion

ng/L = nanograms per liter = parts per trillion

Laboratory Qualifiers:

U = Not detected.

A = J = The reported value is <MRL and >MDL and considered estimated.

Validation Qualifiers:

B = The analyte detected in the sample and the lab or field blank and considered non-detect.

J = Indicates an estimated value (1) due to QC non-conformance, or (2) concentration >MDL and <MRL. Reported value may not be accurate or precise.

L = Analyte present. Reported value may be biased low due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Table 4-1 Chemical Detections in Groundwater Samples, April 2006

Analyte	MCL	tw-RBC	Sample ID	48MW2					48MW3					48MW4				
			Sample Date	4/13/06					4/13/06					4/11/06				
			Sample Depth	132-133					115-116					90-91				
				Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/L)																		
1,1,1-Trichloroethane	200	170		1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
1,1-Dichloroethane	na	90		1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
1,1-Dichloroethene	7	35		1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
2-Butanone	na	700		4.5	J	B	*2.5*	*5*	5	U		*2.5*	*5*	5	U		*2.5*	*5*
Acetone	na	550		61.5		B	*5*	*25*	25	U		*5*	*25*	25	U		*5*	*25*
Carbon tetrachloride	5	0.16		29.2			*0.5*	*1*	51.2			*0.5*	*1*	1	U		*0.5*	*1*
Chloroethane	na	3.6		2	U		*1*	*2*	2	U		*1*	*2*	2	U		*1*	*2*
Chloroform	80	0.15		5.9		B	*0.5*	*1*	5.5		B	*0.5*	*1*	1	U		*0.5*	*1*
cis-1,2-Dichloroethene	70	5.5		1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
Methylene chloride	5	4.1		5	U		*1*	*5*	5	U		*1*	*5*	5	U		*1*	*5*
Tetrachloroethene	5	0.1		1.1		J	*0.5*	*1*	0.54	J	J	*0.5*	*1*	0.66	J	J	*0.5*	*1*
Trichloroethene	5	0.026		3			*0.5*	*1*	7.4			*0.5*	*1*	1	U		*0.5*	*1*
PAHs (ug/L)																		
All groundwater samples were non-detect for PAHs.																		
SVOCs (ug/L)																		
bis(2-Ethylhexyl)phthalate	6	4.8		7.9	U		*4*	*7.9*	5.4	U	UL	*2.7*	*5.4*	5.8	U		*2.9*	*5.8*
Pesticides (ug/L)																		
alpha-Chlordane	2	0.19		0.064	U		*0.013*	*0.064*	0.056	U		*0.011*	*0.056*	0.063	U		*0.013*	*0.063*
Heptachlor epoxide	0.2	0.0074		0.064	U		*0.013*	*0.064*	0.056	U		*0.011*	*0.056*	0.063	U		*0.013*	*0.063*
PCBs (ug/L)																		
All groundwater samples were non-detect for PCBs.																		
Explosives (ug/L)																		
All groundwater samples were non-detect for explosives.																		
Metals (ug/L)																		
Aluminum	50	na		2630			*16*	*200*	82.6	J	B	*16*	*200*	113	J	B	*16*	*200*
Antimony	6	1.5		2.2	U		*2.2*	*5*	4.3	J	B	*2.2*	*5*	2.2	U		*2.2*	*5*
Arsenic	10	0.045		2.9	U		*2.9*	*10*	2.9	U		*2.9*	*10*	2.9	U		*2.9*	*10*
Barium	2000	730		615			*0.5*	*200*	50.4	J	J	*0.5*	*200*	167	J	J	*0.5*	*200*
Beryllium	4	7.3		2	J	B	*0.7*	*4*	2.2	J	B	*0.7*	*4*	2.1	J	B	*0.7*	*4*
Calcium	na	na		89700			*26*	*1000*	102000			*26*	*1000*	58600			*26*	*1000*
Chromium	100	11		6.4	J	J	*0.5*	*10*	1	J	J	*0.5*	*10*	0.86	J	J	*0.5*	*10*
Cobalt	na	na		1.3	J	B	*0.4*	*50*	0.4	U		*0.4*	*50*	0.4	U		*0.4*	*50*
Copper	1300	150		0.83	J	B	*0.8*	*25*	0.8	U		*0.8*	*25*	0.8	U		*0.8*	*25*
Iron	300	1100		2960			*7.5*	*300*	8.9	J	B	*7.5*	*300*	62.8	J	B	*7.5*	*300*
Lead	15	na		1.3	J	B	*1.2*	*5*	2.7	J	B	*1.2*	*5*	1.2	U		*1.2*	*5*
Magnesium	na	na		44800			*5.8*	*5000*	42800			*5.8*	*5000*	49600			*5.8*	*5000*
Manganese	50	73		50.7			*0.2*	*15*	1.8	J	B	*0.2*	*15*	2.6	J	B	*0.2*	*15*
Nickel	na	73		4.9	J	J	*1.1*	*40*	1.1	U		*1.1*	*40*	1.1	U		*1.1*	*40*
Potassium	na	na		1690	J	J	*36*	*5000*	1230	J	J	*36*	*5000*	1600	J	J	*36*	*5000*
Selenium	50	18		2.4	J	J	*2.4*	*10*	5.2	J	J	*2.4*	*10*	2.4	U		*2.4*	*10*
Sodium	na	na		311	J	B	*77*	*5000*	1030	J	B	*77*	*5000*	8230		L	*77*	*5000*
Vanadium	na	3.7		6.3	J	B	*0.6*	*50*	0.91	J	B	*0.6*	*50*	0.6	U		*0.6*	*50*
Zinc	5000	1100		11.7	J	J	*0.8*	*20*	0.8	U		*0.8*	*20*	1.4	J	J	*0.8*	*20*

Table 4-1 Chemical Detections in Groundwater Samples, April 2006

		Sample ID	48MW2					48MW3					48MW4				
Analyte		Sample Date	4/13/06					4/13/06					4/11/06				
		Sample Depth	132-133					115-116					90-91				
	MCL	**tw-RBC**	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
Dioxins/Furans (ng/L)																	
2,3,7,8-TCDF	na	na	0.00772	U		*0.00772*	*0.00772*	0.00671	U		*0.00671*	*0.00671*	0.00334	U		*0.00334*	*0.00334*
1,2,3,7,8-PECDD	na	na	0.0283	A	J	*NA*	*NA*	0.0112	A	J	*NA*	*NA*	0.00658	U		*0.00658*	*0.00658*
1,2,3,4,7,8-HXCDD	na	0.011	0.0106	A	J	*NA*	*NA*	0.0123	U		*0.0123*	*0.0123*	0.0111	U		*0.0111*	*0.0111*
1,2,3,4,6,7,8-HPCDD	na	na	0.0331	A	J	*NA*	*NA*	0.0168	A	J	*NA*	*NA*	0.0156	U		*0.0156*	*0.0156*
OCDD	na	na	0.0352	U		*0.0352*	*0.0352*	0.0242	U		*0.0242*	*0.0242*	0.0309	U		*0.0309*	*0.0309*
TOTAL PECDD	na	na	0.0283			*NA*	*NA*	0.00112			*NA*	*NA*	0.00658	U		*0.00658*	*0.00658*
TOTAL HXCDD	na	0.011	0.0106			*NA*	*NA*	0.0125	U		*0.0125*	*0.0125*	0.0112	U		*0.0112*	*0.0112*
TOTAL HPCDD	na	na	0.0331			*NA*	*NA*	0.0168			*NA*	*NA*	0.0156	U		*0.0156*	*0.0156*
TOTAL TCDF	na	na	0.00772	U		*0.00772*	*0.00772*	0.00671	U		*0.00671*	*0.00671*	0.00334	U		*0.00334*	*0.00334*

Notes:

Shading and black font indicates a MCL exceedence.

Bold outline indicates a tap water RBC exceedence.

Shading in the MDL/MRL columns indicates the MDL or MRL exceeded a criterion.

RBCs for non-carcinogenic compounds have been recalculated to an HI of 0.1.

RBCs for carcinogenic compounds are shown in red font.

The pyrene RBC was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene and are shown in blue.

RBC source: USEPA Region III Risk Based Concentration Table, April 2006.

MCL source: USEPA 2004 Edition of the Drinking Water Standard and Health Advisories (EPA 822-R-04-005), Winter 2004.

µg/L = micrograms per liter = parts per billion

ng/L = nanograms per liter = parts per trillion

Laboratory Qualifiers:

U = Not detected.

A = J = The reported value is <MRL and >MDL and considered estimated.

Validation Qualifiers:

B = The analyte detected in the sample and the lab or field blank and considered non-detect.

J = Indicates an estimated value (1) due to QC non-conformance, or (2) concentration >MDL and <MRL. Reported value may not be accurate or precise.

L = Analyte present. Reported value may be biased low due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Table 4-1 Chemical Detections in Groundwater Samples, April 2006

Analyte		Sample ID	51MW1					51MW2					C1				
		Sample Date	4/11/06					4/10/06					4/12/06				
		Sample Depth	34-35					52-53					69-70				
	MCL	tw-RBC	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/L)																	
1,1,1-Trichloroethane	200	170	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1.3		J	*0.5*	*1*
1,1-Dichloroethane	na	90	1	U		*0.5*	*1*	1	U		*0.5*	*1*	8.5			*0.5*	*1*
1,1-Dichloroethene	7	35	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
2-Butanone	na	700	5	U		*2.5*	*5*	5	U		*2.5*	*5*	5	U		*2.5*	*5*
Acetone	na	550	25	U		*5*	*25*	25	U		*5*	*25*	25	U		*5*	*25*
Carbon tetrachloride	5	0.16	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
Chloroethane	na	3.6	2	U		*1*	*2*	2	U		*1*	*2*	4			*1*	*2*
Chloroform	80	0.15	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
cis-1,2-Dichloroethene	70	5.5	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
Methylene chloride	5	4.1	5	U		*1*	*5*	5	U		*1*	*5*	8		B	*1*	*5*
Tetrachloroethene	5	0.1	0.93	J	J	*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
Trichloroethene	5	0.026	1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
PAHs (ug/L)																	
All groundwater samples were non-detect for PAHs.																	
SVOCs (ug/L)																	
bis(2-Ethylhexyl)phthalate	6	4.8	6.8	U		*3.4*	*6.8*	5.6	U		*2.8*	*5.6*	5.9	U		*2.9*	*5.9*
Pesticides (ug/L)																	
alpha-Chlordane	2	0.19	0.066	U		*0.013*	*0.066*	0.063	U		*0.013*	*0.063*	0.063	U		*0.013*	*0.063*
Heptachlor epoxide	0.2	0.0074	0.066	U		*0.013*	*0.066*	0.063	U		*0.013*	*0.063*	0.063	U		*0.013*	*0.063*
PCBs (ug/L)																	
All groundwater samples were non-detect for PCBs.																	
Explosives (ug/L)																	
All groundwater samples were non-detect for explosives.																	
Metals (ug/L)																	
Aluminum	50	na	282		B	*16*	*200*	100	J	B	*16*	*200*	57	J	B	*16*	*200*
Antimony	6	1.5	3.6	J	B	*2.2*	*5*	2.2	U		*2.2*	*5*	2.6	J	B	*2.2*	*5*
Arsenic	10	0.045	2.9	U		*2.9*	*10*	2.9	U		*2.9*	*10*	2.9	U		*2.9*	*10*
Barium	2000	730	45.3	J	J	*0.5*	*200*	40.8	J	J	*0.5*	*200*	181	J	J	*0.5*	*200*
Beryllium	4	7.3	2	J	B	*0.7*	*4*	2.1	J	B	*0.7*	*4*	1.9	J	B	*0.7*	*4*
Calcium	na	na	18900			*26*	*1000*	53700			*26*	*1000*	105000			*26*	*1000*
Chromium	100	11	0.59	J	J	*0.5*	*10*	1.3	J	J	*0.5*	*10*	0.5	U		*0.5*	*10*
Cobalt	na	na	0.4	U		*0.4*	*50*	0.4	U		*0.4*	*50*	0.4	U		*0.4*	*50*
Copper	1300	150	0.8	U		*0.8*	*25*	0.8	U		*0.8*	*25*	0.8	U		*0.8*	*25*
Iron	300	1100	547			*7.5*	*300*	42.2	J	B	*7.5*	*300*	7.5	U		*7.5*	*300*
Lead	15	na	1.3	J	B	*1.2*	*5*	1.2	U		*1.2*	*5*	1.2	U		*1.2*	*5*
Magnesium	na	na	7440			*5.8*	*5000*	15600			*5.8*	*5000*	38100			*5.8*	*5000*
Manganese	50	73	60.6			*0.2*	*15*	1.8	J	B	*0.2*	*15*	7.1	J	J	*0.2*	*15*
Nickel	na	73	1.1	J	J	*1.1*	*40*	1.1	U		*1.1*	*40*	1.1	U		*1.1*	*40*
Potassium	na	na	1070	J	J	*36*	*5000*	1220	J	J	*36*	*5000*	2720	J	J	*36*	*5000*
Selenium	50	18	2.4	U		*2.4*	*10*	2.4	U		*2.4*	*10*	2.8	J	J	*2.4*	*10*
Sodium	na	na	256	J	B	*77*	*5000*	713	J	B	*77*	*5000*	4250	J	L	*77*	*5000*
Vanadium	na	3.7	0.6	U		*0.6*	*50*	0.6	U		*0.6*	*50*	0.82	J	B	*0.6*	*50*
Zinc	5000	1100	3.4	J	J	*0.8*	*20*	2.1	J	J	*0.8*	*20*	0.8	U		*0.8*	*20*

Table 4-1 Chemical Detections in Groundwater Samples, April 2006

		Sample ID	51MW1					51MW2					C1				
Analyte		Sample Date	4/11/06					4/10/06					4/12/06				
		Sample Depth	34-35					52-53					69-70				
	MCL	**tw-RBC**	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
Dioxins/Furans (ng/L)																	
2,3,7,8-TCDF	na	na	0.00329	U		*0.00329*	*0.00329*	0.00358	U		*0.00358*	*0.00358*	0.00348	U		*0.00348*	*0.00348*
1,2,3,7,8-PECDD	na	na	0.0061	U		*0.0061*	*0.0061*	0.00651	U		*0.00651*	*0.00651*	0.00612	U		*0.00612*	*0.00612*
1,2,3,4,7,8-HXCDD	na	0.011	0.0089	U		*0.0089*	*0.0089*	0.0131	U		*0.0131*	*0.0131*	0.0107	U		*0.0107*	*0.0107*
1,2,3,4,6,7,8-HPCDD	na	na	0.00875	U		*0.00875*	*0.00875*	0.0103	U		*0.0103*	*0.0103*	0.0126	U		*0.0126*	*0.0126*
OCDD	na	na	0.0376	A	J	*NA*	*NA*	0.0208	U		*0.0208*	*0.0208*	0.0378	U		*0.0378*	*0.0378*
TOTAL PECDD	na	na	0.0061	U		*0.0061*	*0.0061*	0.00651	U		*0.00651*	*0.00651*	0.00612	U		*0.00612*	*0.00612*
TOTAL HXCDD	na	0.011	0.00901	U		*0.00901*	*0.00901*	0.0132	U		*0.0132*	*0.0132*	0.0108	U		*0.0108*	*0.0108*
TOTAL HPCDD	na	na	0.00875	U		*0.00875*	*0.00875*	0.0104	U		*0.0104*	*0.0104*	0.0126	U		*0.0126*	*0.0126*
TOTAL TCDF	na	na	0.00329	U		*0.00329*	*0.00329*	0.00358	U		*0.00358*	*0.00358*	0.00348	U		*0.00348*	*0.00348*

Notes:

Shading and black font indicates a MCL exceedence.

Bold outline indicates a tap water RBC exceedence.

Shading in the MDL/MRL columns indicates the MDL or MRL exceeded a criterion.

RBCs for non-carcinogenic compounds have been recalculated to an HI of 0.1.

RBCs for carcinogenic compounds are shown in red font.

The pyrene RBC was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene and are shown in blue.

RBC source: USEPA Region III Risk Based Concentration Table, April 2006.

MCL source: USEPA 2004 Edition of the Drinking Water Standard and Health Advisories (EPA 822-R-04-005), Winter 2004.

µg/L = micrograms per liter = parts per billion

ng/L = nanograms per liter = parts per trillion

Laboratory Qualifiers:

U = Not detected.

A = J = The reported value is <MRL and >MDL and considered estimated.

Validation Qualifiers:

B = The analyte detected in the sample and the lab or field blank and considered non-detect.

J = Indicates an estimated value (1) due to QC non-conformance, or (2) concentration >MDL and <MRL. Reported value may not be accurate or precise.

L = Analyte present. Reported value may be biased low due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Table 4-1 Chemical Detections in Groundwater Samples, April 2006

Analyte	MCL	tw-RBC	Sample ID	C4					TM13MW1					TM48MW1				
			Sample Date	4/11/06					4/12/06					4/13/06				
			Sample Depth	65-66					27-28					135-136				
				Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/L)																		
1,1,1-Trichloroethane	200	170		1	U		*0.5*	*1*	1	U		*0.5*	*1*	1.2		J	*0.5*	*1*
1,1-Dichloroethane	na	90		1	U		*0.5*	*1*	1	U		*0.5*	*1*	1.4		J	*0.5*	*1*
1,1-Dichloroethene	7	35		1	U		*0.5*	*1*	1	U		*0.5*	*1*	0.56	J	J	*0.5*	*1*
2-Butanone	na	700		5	U		*2.5*	*5*	5	U		*2.5*	*5*	5	U		*2.5*	*5*
Acetone	na	550		25	U		*5*	*25*	25	U		*5*	*25*	25	U		*5*	*25*
Carbon tetrachloride	5	0.16		1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
Chloroethane	na	3.6		2	U		*1*	*2*	2	U		*1*	*2*	2	U		*1*	*2*
Chloroform	80	0.15		1	U		*0.5*	*1*	1	U		*0.5*	*1*	1	U		*0.5*	*1*
cis-1,2-Dichloroethene	70	5.5		1	U		*0.5*	*1*	1	U		*0.5*	*1*	0.77	J	J	*0.5*	*1*
Methylene chloride	5	4.1		5	U		*1*	*5*	5	U		*1*	*5*	5	U		*1*	*5*
Tetrachloroethene	5	0.1		0.96	J	J	*0.5*	*1*	1	U		*0.5*	*1*	1		J	*0.5*	*1*
Trichloroethene	5	0.026		1	U		*0.5*	*1*	1	U		*0.5*	*1*	5.5			*0.5*	*1*
PAHs (ug/L)																		
All groundwater samples were non-detect for PAHs.																		
SVOCs (ug/L)																		
bis(2-Ethylhexyl)phthalate	6	4.8		4.8	J	J	*3.1*	*6.3*	5.6	U		*2.8*	*5.6*	5.9	U		*2.9*	*5.9*
Pesticides (ug/L)																		
alpha-Chlordane	2	0.19		0.066	U		*0.013*	*0.066*	0.063	U		*0.013*	*0.063*	0.061	U		*0.012*	*0.061*
Heptachlor epoxide	0.2	0.0074		0.066	U		*0.013*	*0.066*	0.063	U		*0.013*	*0.063*	0.061	U		*0.012*	*0.061*
PCBs (ug/L)																		
All groundwater samples were non-detect for PCBs.																		
Explosives (ug/L)																		
All groundwater samples were non-detect for explosives.																		
Metals (ug/L)																		
Aluminum	50	na		554			*16*	*200*	435		B	*16*	*200*	452		B	*16*	*200*
Antimony	6	1.5		4.2	J	B	*2.2*	*5*	3.7	J	B	*2.2*	*5*	2.2	U		*2.2*	*5*
Arsenic	10	0.045		53.9			*2.9*	*10*	2.9	U		*2.9*	*10*	2.9	U		*2.9*	*10*
Barium	2000	730		177	J	J	*0.5*	*200*	136	J	J	*0.5*	*200*	92.6	J	J	*0.5*	*200*
Beryllium	4	7.3		2.1	J	B	*0.7*	*4*	2.1	J	B	*0.7*	*4*	2	J	B	*0.7*	*4*
Calcium	na	na		34700			*26*	*1000*	117000			*26*	*1000*	69900			*26*	*1000*
Chromium	100	11		2	J	J	*0.5*	*10*	4.6	J	J	*0.5*	*10*	1.2	J	J	*0.5*	*10*
Cobalt	na	na		0.4	U		*0.4*	*50*	0.4	U		*0.4*	*50*	0.4	U		*0.4*	*50*
Copper	1300	150		6.9	J	B	*0.8*	*25*	0.8	U		*0.8*	*25*	0.8	U		*0.8*	*25*
Iron	300	1100		4830			*7.5*	*300*	376			*7.5*	*300*	387			*7.5*	*300*
Lead	15	na		7.8		B	*1.2*	*5*	1.2	U		*1.2*	*5*	1.2	U		*1.2*	*5*
Magnesium	na	na		20400			*5.8*	*5000*	35100			*5.8*	*5000*	35400			*5.8*	*5000*
Manganese	50	73		47.6			*0.2*	*15*	6.6	J	J	*0.2*	*15*	5.6	J	J	*0.2*	*15*
Nickel	na	73		1.1	J	J	*1.1*	*40*	1.1	U		*1.1*	*40*	1.1	U		*1.1*	*40*
Potassium	na	na		867	J	J	*36*	*5000*	1540	J	J	*36*	*5000*	2060	J	J	*36*	*5000*
Selenium	50	18		2.4	U		*2.4*	*10*	7.2	J	J	*2.4*	*10*	2.4	U		*2.4*	*10*
Sodium	na	na		104	J	B	*77*	*5000*	10300			*77*	*5000*	14900			*77*	*5000*
Vanadium	na	3.7		1.8	J	B	*0.6*	*50*	1.6	J	B	*0.6*	*50*	1.2	J	B	*0.6*	*50*
Zinc	5000	1100		22.3			*0.8*	*20*	1.5	J	J	*0.8*	*20*	1.7	J	J	*0.8*	*20*

Table 4-1 Chemical Detections in Groundwater Samples, April 2006

		Sample ID	C4					TM13MW1					TM48MW1				
Analyte		Sample Date	4/11/06					4/12/06					4/13/06				
		Sample Depth	65-66					27-28					135-136				
	MCL	tw-RBC	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
Dioxins/Furans (ng/L)																	
2,3,7,8-TCDF	na	na	0.00456	U		*0.00456*	*0.00456*	0.0039	U		*0.0039*	*0.0039*	0.0128		J	*NA*	*NA*
1,2,3,7,8-PECDD	na	na	0.00697	U		*0.00697*	*0.00697*	0.00537	U		*0.00537*	*0.00537*	0.0873		J	*NA*	*NA*
1,2,3,4,7,8-HXCDD	na	0.011	0.0112	U		*0.0112*	*0.0112*	0.0107	U		*0.0107*	*0.0107*	0.0215	A	J	*NA*	*NA*
1,2,3,4,6,7,8-HPCDD	na	na	0.00977	U		*0.00977*	*0.00977*	0.0138	U		*0.0138*	*0.0138*	0.0857		J	*NA*	*NA*
OCDD	na	na	0.0361	A	J	*NA*	*NA*	0.0286	U		*0.0286*	*0.0286*	0.018	A	J	*NA*	*NA*
TOTAL PECDD	na	na	0.00697	U		*0.00697*	*0.00697*	0.00537	U		*0.00537*	*0.00537*	0.0873			*NA*	*NA*
TOTAL HXCDD	na	0.011	0.0114	U		*0.0114*	*0.0114*	0.0109	U		*0.0109*	*0.0109*	0.0215			*NA*	*NA*
TOTAL HPCDD	na	na	0.00977	U		*0.00977*	*0.00977*	0.0138	U		*0.0138*	*0.0138*	0.0857			*NA*	*NA*
TOTAL TCDF	na	na	0.00456	U		*0.00456*	*0.00456*	0.0039	U		*0.0039*	*0.0039*	0.0128			*NA*	*NA*

Notes:

Shading and black font indicates a MCL exceedence.

Bold outline indicates a tap water RBC exceedence.

Shading in the MDL/MRL columns indicates the MDL or MRL exceeded a criterion.

RBCs for non-carcinogenic compounds have been recalculated to an HI of 0.1.

RBCs for carcinogenic compounds are shown in red font.

The pyrene RBC was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene and are shown in blue.

RBC source: USEPA Region III Risk Based Concentration Table, April 2006.

MCL source: USEPA 2004 Edition of the Drinking Water Standard and Health Advisories (EPA 822-R-04-005), Winter 2004.

µg/L = micrograms per liter = parts per billion

ng/L = nanograms per liter = parts per trillion

Laboratory Qualifiers:

U = Not detected.

A = J = The reported value is <MRL and >MDL and considered estimated.

Validation Qualifiers:

B = The analyte detected in the sample and the lab or field blank and considered non-detect.

J = Indicates an estimated value (1) due to QC non-conformance, or (2) concentration >MDL and <MRL. Reported value may not be accurate or precise.

L = Analyte present. Reported value may be biased low due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

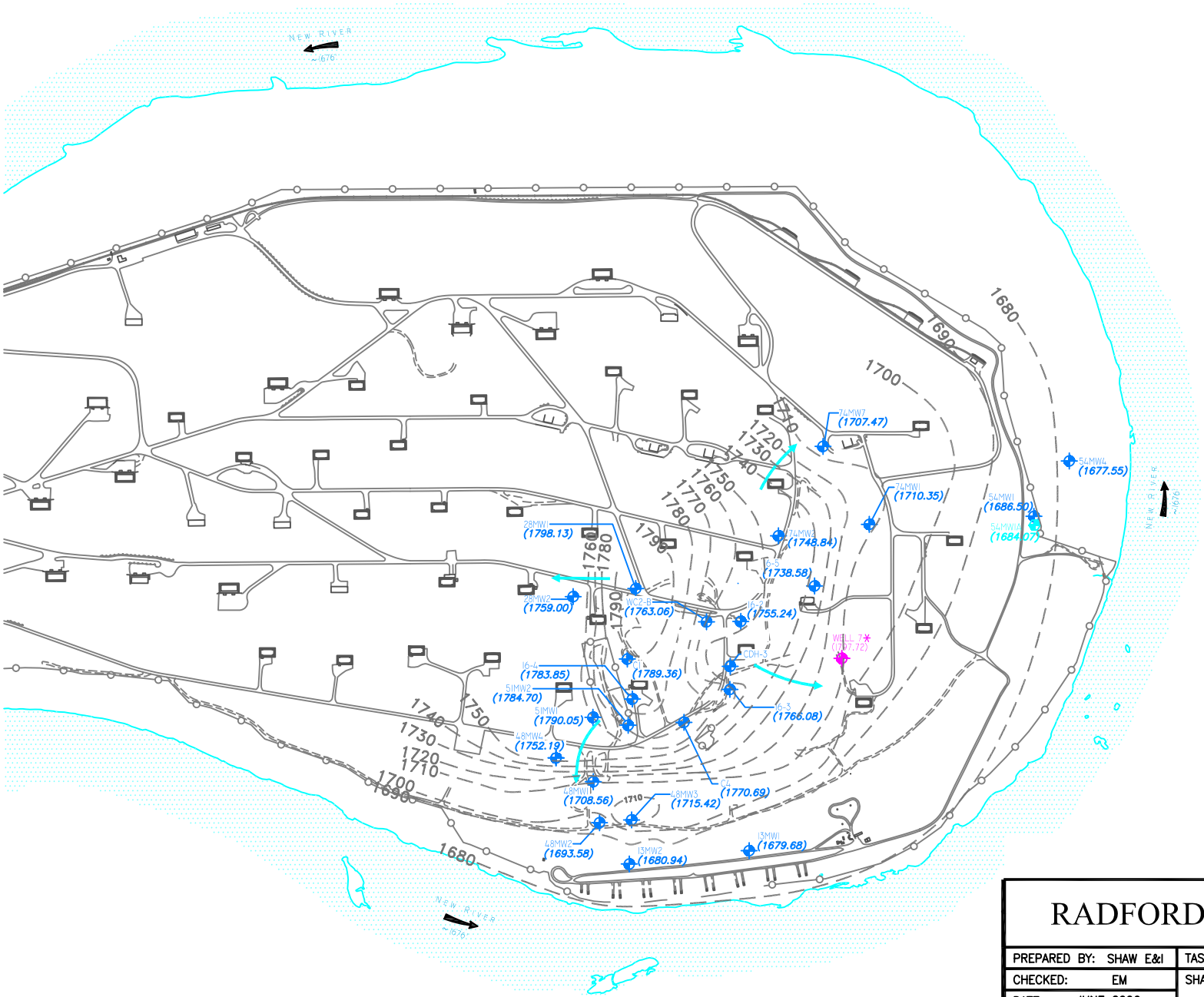


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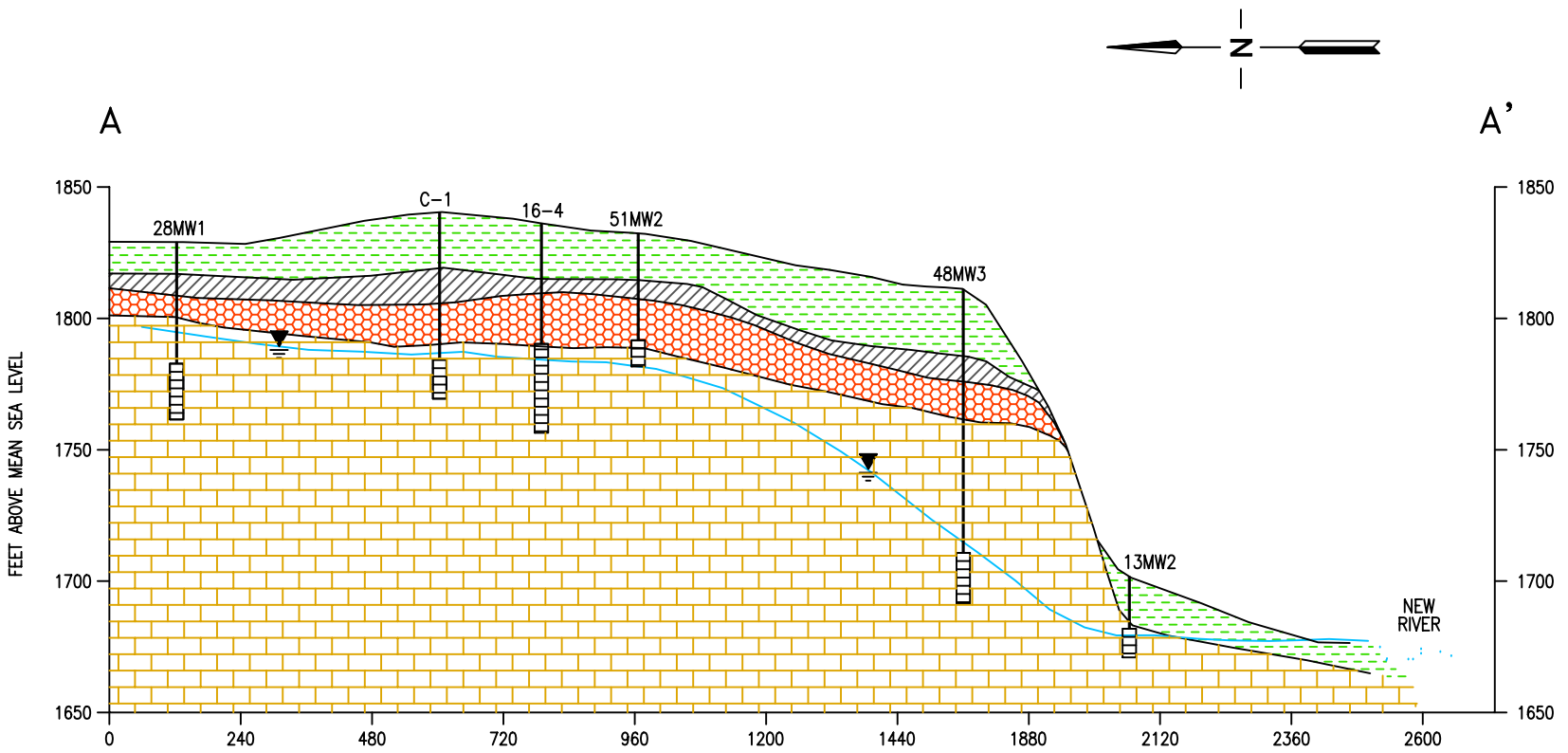
FIGURE 4-1

EASTERN HORSESHOE AREA APRIL 2006 GROUNDWATER ELEVATION CONTOUR MAP

PREPARED BY: SHAW E&I	TASK NO: 82987008300000
CHECKED: EM	SHAW DWG NO: FIGURE 4-1
DATE: JUNE 2006	



HORIZ. SCALE: 0 240 480

VERT. SCALE: 100 50 0

LEGEND

- BEDROCK (DOLOSTONE, LIMESTONE AND INTERLAYERED SHALE)
- UNDIFFERENTIATED SILTS, CLAYS, THIN SAND LAYERS
- SAPROLITE (IN-SITU WEATHERED BEDROCK)
- RIVERJACK (FINE TO COURSE GRAVEL, VARYING SAND, SILT)
- MONITORING WELL
- SCREEN INTERVAL
- GROUNDWATER ELEVATION (APRIL 2006)

RADFORD AAP

Figure 4-2

EASTERN HORSESHOE AREA GEOLOGIC CROSS SECTION

PREPARED BY: SHAW	TASK NO: 82987008300000
CHECKED: EM	SHAW DWG NO: Figure 4-2
DATE: JUNE 2006	

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APPENDIX A

Well Purging Forms

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 16-4 Date 4/10/06
Field Personnel M. Thomas, E. Malarek
Sample Organization Shaw Environmental
Identify MP Protective Case
Depth to 45 (top) / 80 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) 65
Purging Device (e.g., Redi Flo2) QED MicroPurge
PID Reading (ppm) 0.0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1] CPM/ID	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
1840	~~53.80~~ 53.81	2/50	200	~~7.6~~	7.65	0.207	111	12.76	14.99	128	Air pressure 80 psi
1845	53.19	2/50	200	~~0.4~~ 1.60	7.69	0.219	~~89~~ 96	13.62	14.64	123	
1850	53.34	2/50	200	~~0.6~~ 2.0	7.81	0.215	144	13.97	14.04	109	
1855	53.40	2/50	225	~~0.8~~ 3.13	8.06	0.213	165	12.88	13.85	91	
1900	53.48	2/50	150	3.88	8.31	0.214	~~1~~67	12.71	13.78	81	↑ Air pressure 90 psi
1905	53.51	2/50	~~150~~ 175	4.75	8.42	0.213	213	9.44	13.76	76	
1910	53.53	2/50	180	5.65	8.56	0.212	217	6.26	13.72	67	
1915	53.54	2/50	185	6.58	8.73	0.212	221	8.74	13.68	63	
1920	53.56	2/50	185	7.50	8.75	0.211	228	8.48	13.66	57	
1925	53.56	2/50	175	8.38	8.78	0.211	240	8.15	13.59	55	
1930	53.56	2/50	185	9.30	8.78	0.211	251	6.03	13.55	56	
1935	53.56	2/50	185	10.23	8.81	0.212	252	8.46	13.55	53	
1940	53.56	2/50	185	11.15	8.81	0.212	250	8.23	13.54	53	
1940	Collect sample 16-4 for VOCs, SVOCs, Explosives, Pest/PCB, TAL metals, diox/furans, PAHs										

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number C1 Date 4/12/06
Field Personnel M. Thomas, E. Malarek
Sample Organization Shaw Environmental
Identify MP ~~Top~~ Cap on top of well

Depth to 55 (top) / 70 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) 70
Purging Device (e.g., Redi Flo2) Bladder pump
PID Reading (ppm) 0.0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1] CPM	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO % ~~mg/L~~	Temp. deg. C	ORP/Eh[2] mv	Comments
1140	50.78	4	250	—	6.74	0.729	N/A	18.6	13.65	173	
1145	50.81	4	325	1.63	6.74	0.730		10.5	13.58	168	
1150	50.80	4	200	2.63	6.74	0.731		7.8	13.91	164	
1155	50.81	4	375	4.50	6.74	0.731		7.1	13.78	162	
1200	50.81	4	350	6.25	6.74	0.729		6.0	13.58	161	
1205	50.81	4	350	8.00	6.74	0.728		5.6	13.48	160	
1210	50.81	4	350	9.75	6.75	0.725		7.1	13.36	161	
1215	50.81	4	350	11.50	6.77	0.724		8.8	13.81	161	
1220	50.81	4	365	13.33	6.77	0.726		9.6	13.82	160	
1225	50.81	4	450	15.58	6.77	0.725		10.3	13.52	162	
1230	50.81	4	300	17.08	6.77	0.725	↓	10.4	13.86	162	
1240	Collect sample C1 for VOCs, SVOCs, PAHs, Pest/PCBs, Explosives, TAL metals, Dioxins/Furans										

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number C4 Date 4/11/06
Field Personnel M. Thomas, E. Malarek
Sample Organization Shaw Environmental
Identify MP Mark on protective casing
Depth to 55 (top) / 70 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) 65
Purging Device (e.g., Redi Flo2) RED MicroPurge
PID Reading (ppm) 0.0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1] CPM/ID	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
1345	53.88	2/47	150	—	10.88	0.219	237	6.44	17.33	-69	
1350	55.50	2/47	175	0.88	10.24	0.211	121	2.42	15.25	-53	
1355	56.15	2/45	150	1.63	10.35	0.210	135	0.79	15.33	-62	
1400	56.61	2/43	75	2.00	10.44	0.207	39.4	0.70	15.90	-74	
1405	56.92	2/43	75	2.38	10.51	0.207	21.2	0.56	16.30	-78	
1410	57.21	2/43	75	2.75	10.58	0.209	23.3	0.46	16.22	-83	
1415	57.53	2/43	75	3.13	10.78	0.209	27.2	0.40	16.29	-93	
1420	57.78	2/43	75	3.50	11.03	0.210	21.6	0.82	16.45	-102	
1425	58.02	2/43	75	3.88	11.21	0.211	20.9	0.71	16.21	-107	
1430	58.31	2/43	75	4.25	11.28	0.211	20.1	0.62	16.20	-110	
1435	58.68	2/43	75	4.63	11.29	0.212	11.6	0.66	16.06	-110	
1440	58.91	2/43	75	5.00	11.29	0.212	10.2	0.60	15.98	-109	
1445	Collect samples for VOCs, SVOCs, Pest/PCBs, Explosives, PAHs, TAL-metals, dioxins/furans										

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 13MW1 Date 4/12/06
Field Personnel M. Thomas, E. Malarek
Sample Organization Shaw Environmental
Identify MP Top of well cap

Depth to 18 (top) / 28 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) 27
Purging Device (e.g., Redi Flo2) Bladder pump
PID Reading (ppm) 0.0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1] cpm	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO % ~~mg/L~~	Temp. deg. C	ORP/Eh[2] mv	Comments
0900	21.76	4	300	—	6.88	0.823	N/A	46.6	13.35	160	
0905	21.80	4	300	1.50	6.91	0.825		43.6	13.43	153	
0910	21.83	4	300	3.00	6.92	0.827		42.5	13.52	152	
0915	21.80	4	300	4.50	6.93	0.820		39.9	13.24	156	
0920	21.80	4	400	6.50	6.95	0.811		37.8	13.13	157	
0925	21.78	4	~~400~~ 300	8.00	6.96	0.808		36.7	13.12	158	
0930	21.80	4	300	9.50	6.96	0.809		36.7	13.11	158	
0940	Collect samples 13MW1 and TM13MW1 (duplicate) for VOCs, SVOCs, PAHs, Explosives, Pest/PCBs, TAL metals, Dioxins/furans										

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 13MW2 Date 4/12/06
Field Personnel M. Thomas, E. Malarek
Sample Organization Shaw Environmental
Identify MP Top of well cap

Depth to 14 (top) / 29 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) 25
Purging Device (e.g., Redi Flo2) Bladder pump
PID Reading (ppm) 0.0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1] CPM	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity ~~NTU~~	DO % ~~mg/L~~	Temp. deg. C	ORP/Eh[2] mv	Comments
1020	21.68	4	300	—	7.11	0.674	N/A	59.0	14.12	162	
1025	22.71	4	400	2.00	7.11	0.674		50.1	14.08	160	
1030	23.93	4	300	3.50	7.11	0.674		48.5	14.15	159	
1035	23.09	4	300	5.00	7.11	0.676		48.4	14.12	160	
1040	23.59	4	400	7.00	7.12	0.674		48.2	14.05	160	
1045	23.91	4	300	8.50	7.12	0.675		48.3	14.03	161	
1050	Collect sample 13MW2 for VOCs, SVOCs, PAHs, Pest/PCBs, Explosives, TAL metals, dioxins/furans										

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 28MW1 Date 4/11/06
Field Personnel M. Thomas, E. Malatek
Sample Organization Shaw Environmental
Identify MP Mark

Depth to 43 (top) / 63 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) 58
Purging Device (e.g., Redi Flo2) QED MicroPurge
PID Reading (ppm) 0.0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1] CPM/ID	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
1115	29.05	2/47	150	—	6.81	0.426	0	2.57	14.73	171	
1120	29.50	2/47	150	0.75	7.62	0.450	0	1.31	14.59	95	
1125	30.06	2/47	150	1.50	8.02	0.457	0	0.99	14.73	79	
1130	30.18	2/47	150	2.25	8.29	0.461	0	0.88	14.81	66	
1135	30.38	2/47	150	3.00	8.42	0.466	0	0.69	14.70	59	
1140	30.50	2/47	150	3.75	8.53	0.465	0	0.90	14.88	52	
1145	30.58	2/47	160	4.55	8.65	0.465	0	0.86	14.93	47	
1150	30.71	2/47	150	5.30	8.68	0.466	0	0.75	14.93	46	
1155	30.79	2/47	135	5.98	8.66	0.467	0	0.73	14.91	48	
1200	30.87	2/47	150	6.73	8.69	0.466	0	0.69	14.96	44	
1205	Collect Sample 28MW1 for VOCs, SVOCs, Pest/PCBs, Explosives, PAHs, Diox/furans, TAL metals										

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 28MW2 Date 4/11/06
Field Personnel M. Thomas, E. Malarkk
Sample Organization Shaw Environmental
Identify MP Mark

Depth to 68 (top) / 83 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) 78
Purging Device (e.g., Redi Flo2) QED Micropurge
PID Reading (ppm) 0.0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1] CMP/ID	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
0840	62.56	2/50	350	—	5.09	0.274	0	13.57	11.23	208	
0845	63.56	2/47	300	1.50	6.83	0.245	99.2	13.87	11.76	145	
0850	63.87	2/47	225	2.63	7.33	0.234	102	13.89	11.80	129	
0855	64.01	2/47	225	3.75	7.66	0.238	78.8	13.93	11.84	113	
0900	64.25	2/47	200	4.75	7.80	0.238	16.3	13.21	11.83	107	
0905	64.38	2/47	225	5.88	7.89	0.245	39.8	13.94	11.93	102	
0910	64.52	2/47	175	6.75	7.89	0.237	35.6	14.51	11.90	105	
0915	64.68	2/46	185	7.68	8.08	0.232	25.2	14.12	11.91	88	
0920	64.76	2/46	175	8.56	8.14	0.231	28.8	14.17	11.91	91	
0925	64.76	2/45	100	9.05	8.19	0.236	41.8	14.35	11.86	86	
0930	64.73	2/45	125	9.68	7.98	0.236	68.2	13.27	11.85	99	
0935	64.52	2/45	135	10.35	7.93	0.235	115	12.84	11.71	98	
0940	64.56	2/45	135	11.03	7.96	0.225	114	12.09	11.87	97	
0945	64.54	2/45	135	11.70	8.07	0.235	127	12.08	11.94	89	
0950	64.56	2/45	135	12.38	8.40	0.235	128	12.84	12.10	73	
0955	64.56	2/45	135	13.05	8.47	0.234	132	11.54	12.20	77	
1000	64.57	2/45	135	13.73	8.50	0.234	140	11.49	12.26	67	
1005	64.57	2/45	135	14.40	8.47	0.233	147	11.87	12.32	69	
~~1010~~	1005	Collect Sample 28MW2 for VOCs, SVOCs, Explosives, Pest/PCB, Diox/Furans, PAHs, Metals									
~~10~~											

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 48MW1 Date 4/13/06
Field Personnel M. Thomas, E. Malarek
Sample Organization Shaw Environmental
Identify MP Notch

Depth to 110 (top) / 140 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) 135
Purging Device (e.g., Redi Flo2) QED MicroPurge
PID Reading (ppm) 0.0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1] CPM/10	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
0900	111.39	2/50	175	—	5.94	0.376	131	10.45	12.57	186	
0905	112.27	3/82	200	1.00	7.76	0.386	97.6	9.74	12.73	90	
0910	112.50	3/82	200	2.00	8.37	0.384	94.2	8.50	12.92	63	
0915	112.60	3/82	200	3.00	8.52	0.381	83.3	7.62	12.81	61	
0920	112.84	3/82	200	4.00	8.62	0.375	83.7	7.06	12.82	57	
0925	113.05	3/82	200	5.00	8.68	0.369	84.1	6.58	12.82	52	
0930	113.19	3/82	200	6.00	8.65	0.367	86.8	6.24	12.82	56	
0935	113.35	3/82	200	7.00	8.52	0.367	92.0	5.91	12.89	64	
0940	113.48	3/82	~~200~~ 175	7.88	8.55	0.370	95.0	5.61	12.93	61	↕ air pressure
0945	113.59	3/82	175	8.75	8.51	0.371	95.9	5.43	12.99	66	↑ air pressure
0950	113.68	3/82	175	9.63	8.51	0.373	98.2	5.36	13.02	63	
0955	Collect samples 48MW1 ~~(MS/MSD)~~ and TM48MW1 (duplicate) for VOCs, SVOCs, PAHs, Pest/PCBs, Explosives, TAL metals, dioxins/furans										

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 48MW2 Date 4/13/06
Field Personnel M. Thomas, E. Maldrek
Sample Organization Shaw Environmental
Identify MP Notch

Depth to 113.7 (top) / 133.7 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) ~~128~~ (MT) 133
Purging Device (e.g., Redi Flo2) Micropurge-(QED)
PID Reading (ppm) 0.0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1]	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
1150	125.30 well went dry prior to obtaining readings										
1725	Collect sample 48MW2 for VOCs, SVOCs, PAHs, Explosives, Pest/PCBs, TAL metals, Dioxins/furans (1 bottle for each only)										
	following recharge of well										

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 48MW3 Date 4/13/06
Field Personnel M. Thomas, E. Malarek
Sample Organization Shaw Environmental
Identify MP Notch

Depth to 100 / 120 of screen (below MP) (top / bottom)
Pump Intake at (ft. below MP) 115
Purging Device (e.g., Redi Flo2) QED MicroPurge
PID Reading (ppm) 0.0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1] CPM/ID	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
1500	96.75	2/50	175	—	6.52	0.495	113	12.92	15.69	150	↑ air pressure
1505	97.55	2/50	215	1.08	7.02	0.505	96.2	12.16	14.60	109	
1510	97.74	2/50	215	2.15	7.88	0.505	58.1	9.44	14.30	84	
1515	97.96	2/50	215	3.23	8.16	0.505	58.5	9.32	13.89	72	
1520	98.15	2/50	215	4.30	8.32	0.506	46.8	9.72	14.00	71	
1525	98.33	2/50	215	5.38	8.37	0.503	59.2	9.54	13.95	71	
1530	98.41	2/50	225	6.50	8.38	0.502	68.7	9.41	14.31	74	
1535	98.61	2/50	225	7.63	8.34	0.500	78.8	9.38	13.98	75	
1540	98.81	2/50	225	8.75	8.34	0.503	14.4	9.31	14.02	73	
1545	98.95	2/50	225	9.88	8.35	0.504	19.2	9.12	14.05	75	
1550	99.10	2/50	225	11.00	8.38	0.503	23.7	9.17	13.94	73	
1555	99.30	2/50	225	12.13	8.37	0.504	24.3	9.14	13.93	74	
1600	Collect sample 48MW3 (plus MS/MSD) for VOCs, SVOCs, PAHs, Pest/PCBs, Explosives, TAL metals, Dioxins/furans										

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 48MW4 Date 4/11/06
Field Personnel M. Thomas, E. Maldrek
Sample Organization Shaw Environmental
Identify MP Mark

Depth to 74 (top) / 94 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) 90
Purging Device (e.g., Redi Flo2) QED
PID Reading (ppm) 0.0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1] CPM/ID	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
1620	80.41	2/47	100	—	7.81	0.399	863	10.48	18.06	103	
1625	80.79	2/47	125	0.63	7.87	0.446	111.4	6.17	16.10	92	
1630	80.82	2/47	125	1.25	8.00	0.475	46.9	5.47	15.60	88	
1635	80.91	2/47	135	1.93	8.35	0.474	58.1	5.23	15.34	70	
1640	80.91	2/47	135	2.60	8.97	0.472	60.2	5.19	15.25	36	
1645	80.99	2/47	125	3.23	9.06	0.471	67.3	5.14	15.15	37	
1650	81.00	2/47	125	3.85	9.19	0.469	74.2	5.13	15.10	29	
1655	81.05	2/47	125	4.48	9.24	0.463	92.1	5.19	15.01	27	
1700	81.06	2/47	125	5.10	9.25	0.462	178	5.25	14.93	27	
1705	81.04	2/47	125	5.73	9.23	0.458	190	5.28	15.14	31	
1710	81.07	2/47	125	6.35	9.25	0.456	202	5.28	15.13	30	
1715	Collect samples for VOCs, SVOCs, PAHs, Pest/PCBs, Explosives, Dioxins/Furans, TAL metals										

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 5(MW)1 **Date** 4/10/06
Field Personnel M. Thomas, E. Malarek
Sample Organization Shaw Environmental
Identify MP Mark

Depth to 25 (top) / 35 (bottom) **of screen (below MP)**
Pump Intake at (ft. below MP) 34
Purging Device (e.g., Redi Flo2) QED MicroPurge
PID Reading (ppm) 0.0 ppm

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1] CPM/ID	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
1150	33.08	1/20	150	+	6.67	0	270	8.9	22.70	115	
1200	33.18	1/20	150	1.50	6.61	0	268	10.61	18.40	112	
1205	33.28	1/20	150	2.25	6.67	0	283	11.13	16.41	102	
1210	33.44	1/18	100	2.75	6.71	0	285	11.51	15.39	99	
1215	33.53	1/18	100	3.25	6.71	0	287	11.48	14.96	99	
1220	33.64	1/16	50	3.50	6.86	0	289	11.49	15.07	98	
1225	33.70	1/16	50	3.75	6.87	0	289	11.48	15.36	90	~~Well~~ Pump stopped pumping water
1230	33.65	1/16	50	4.00	7.05	0	299	11.17	16.53	83	Lowered pump to bottom of well
1235	33.79	1/12	200	5.00	7.02	0	69.9	11.14	16.39	80	
1240	33.85	1/10	~~225~~ 175	5.38	6.24	0	4.7	11.55	15.99	137	
1245	33.93	1/5	50	5.63	6.89	0	4.1	11.49	16.06	116	
1250	33.95	1/8	50	5.88	7.54	0.002	~~0~~3.8	11.32	16.48	86	
1255	33.99	1/8	50	6.13	8.00	0.099	4.8	11.32	16.82	69	
1300	34.02	1/8	~~50~~ 65	6.45	7.95	0.099	2.2	11.30	16.73	67	
1305	34.11	1/8	75	6.83	7.98	0.103	1.4	10.89	16.55	66	
1310	34.18	1/8	100	7.33	7.88	0.104	0.4	10.29	16.37	70	
1315	34.23	1/8	100	7.83	7.77	0.104	1.5	10.18	16.12	76	
1318	Well went dry - pump stopped pumping water - will sample after well recharges										
4/11/06	1820	Collect sample 5(MW)1 for VOCs, SVOCs, PAHs, Pest/PCBs, Explosives, TAL metals, Dioxins/furans									

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

* refill

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 51 MW2 Date 4/10/06
Field Personnel M. Thomas, E. Malarek
Sample Organization Shaw Environmental
Identify MP Mark

Depth to 43 (top) / 53 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) 52
Purging Device (e.g., Redi Flo2) QED Micropurge
PID Reading (ppm) 0.0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1] CPM/ID	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
1535	50.07	1/15	125	—	6.20	0.223	162.0	9.93	17.87	187	
1540	50.11	1/15	125	0.63	6.33	0.238	194	11.01	17.24	182	
1545	50.09	1/15	115	1.20	6.60	0.232	158	11.12	15.45	168	
1550	50.09	1/20	175	2.08	6.82	0.224	172	12.36	14.96	158	
1555	50.11	1/20	175	2.95	7.13	0.236	133	11.86	14.16	144	
1600	50.12	1/22	200	3.95	7.26	0.233	116	12.62	14.10	139	
1605	50.12	1/22	225	5.08	7.61	0.235	120	12.69	13.83	118	
1610	50.11	1/22	225	6.20	7.81	0.233	181	12.13	13.82	109	
1615	50.11	1/20	150	6.95	7.90	0.235	82.4	11.56	13.95	104	
1625	50.12	1/20	215	9.10	8.07	0.227	172	12.55	13.84	92	
1630	50.11	1/20	200	10.10	8.28	0.231	120	11.94	13.81	85	
1635	50.12	1/20	200	11.10	8.37	0.234	138	12.54	13.80	84	
1640	50.12	1/20	200	12.10	8.37	0.232	130	12.86	13.74	84	
1645	50.12	1/20	200	13.10	8.37	0.232	148	12.45	13.71	83	
1645	Collect sample 51MW2 for VOCs, SVOCs, Explosives, Pest/PCBs, Metals, PAHs, Diox/Fur										

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

APPENDIX B

Chain of Custody Records

CHAIN OF CUSTODY

ACCUTEST Laboratories

4405 VINELAND ROAD • SUITE C-15
ORLANDO, FL 32811
TEL: 407-425-6700 • FAX: 407-425-0707

ACCUTEST JOB #: F39990
ACCUTEST QUOTE #:

CLIENT INFORMATION

SHAW E+I
NAME
2113 Emmorton Park Rd
ADDRESS
Edgewood MD 21040
CITY, STATE ZIP
ERIC MALARK
SEND REPORT TO:
PHONE # 410-612-6322

FACILITY INFORMATION

REAAP
PROJECT NAME
SWMU 48, 49, 50, 51 AND 59
LOCATION
829870 - 08300000
PROJECT NO.
FAX # 410-612-6351

ANALYTICAL INFORMATION

MATRIX CODES: DW - DRINKING WATER; GW - GROUND WATER; WW - WASTE WATER; SO - SOIL; SL - SLUDGE; OI - OIL; LIQ - OTHER LIQUID; SOL - OTHER SOLID

ACCUTEST SAMPLE #	FIELD ID / POINT OF COLLECTION	COLLECTION DATE	TIME	SAMPLED BY:	MATRIX	# OF BOTTLES	PRESERVATION HCl	NaOH	HNO3	NONE	TCL SVOCs + PAHs	TCL Pest/PCBs	Explosives incl. Petn+NG 8330	TAL Metals	TCL VOCs	PAHs (SIM)	Dioxin Furans	LAB USE ONLY
1	51MW1	4/[illegible]/06	18:20	Em/MT	GW	[illegible]	3		1	9	2	2	2	1	3	1	2	
2	51 MW2	4/10/06	16:45	Em/MT	GW	[illegible]	3		1	9	2	2	2	1	3	1	2	
3	16-4	4/10/06	19:40	Em/MT	GW	[illegible]	3		1	9	2	2	2	1	3	1	2	
4	28MW2	4/11/06	10:05	Em/MT	GW	[illegible]	3		1	9	2	2	2	1	3	1	2	
5	28MW1	4/11/06	12:05	Em/MT	GW	[illegible]	3		1	9	2	2	2	1	3	1	2	
6	C4	4/11/06	14:45	Em/MT	GW	[illegible]	3		1	8	2	1	2	1	3	1	2	Only 1 Bottle for Pest/PCB's per WMU
7	48MW4	4/11/06	17:15	Em/MT	GW	13	3		1	9	2	2	2	1	3	1	2	
8	041206R	4/12/06	07:45	Em/MT	QC	13	3		1	9	2	2	2	1	3	1	2	
9	13MW1	4/12/06	09:40	Em/MT	GW	13	3		1	9	2	2	2	1	3	1	2	
10	TM13MW1	4/12/06	09:40	Em/MT	GW	13	3		1	9	2	2	2	1	3	1	2	
11	13MW2	4/12/06	10:50	Em/MT	GW	13	3		1	9	2	2	2	1	3	1	2	

DATA TURNAROUND INFORMATION

- ☐ STANDARD
- ☐ 48 HOUR RUSH
- ☐ 24 HOUR EMERGENCY
- ☒ OTHER 14 Day TAT

APPROVED BY: _____

EMERGENCY OR RUSH IS FAX DATA UNLESS PREVIOUSLY APPROVED

DATA DELIVERABLE INFORMATION

- ☐ STANDARD
- ☐ COMMERCIAL "B"
- ☐ DISK DELIVERABLE
- ☐ STATE FORMS
- ☒ OTHER (SPECIFY) CLP Format / EDD

COMMENTS/REMARKS

Temp Blank included

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESION, INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER:	DATE TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE TIME:	RECEIVED BY:
1. [signature]	4/12/06 17:00	1. [signature]	2. [signature]	04/13/06 0900	2. [signature]
RELINQUISHED BY: 3.	DATE TIME:	RECEIVED BY: 3.	RELINQUISHED BY: 4.	DATE TIME:	RECEIVED BY: 4.
RELINQUISHED BY: 5.	DATE TIME:	RECEIVED BY: 5.	SEAL #	PRESERVE WHERE APPLICABLE ☒	ON ICE ☒

TEMPERATURE _____ C

CHAIN OF CUSTODY

ACCUTEST Laboratories

4405 VINELAND ROAD • SUITE C-15
ORLANDO, FL 32811
TEL: 407-425-6700 • FAX: 407-425-0707

ACCUTEST JOB #:
ACCUTEST QUOTE #: F39990

CLIENT INFORMATION

NAME: SHAW E+I
ADDRESS: 2113 Emmorton Park Road
CITY: Edgewood STATE: MD ZIP: 21040
SEND REPORT TO: Eric Malmrick
PHONE #: 410-612-6322

FACILITY INFORMATION

PROJECT NAME: RFAAP
PROJECT NO.: SWMU 48, 49, 50, 51, and 59
LOCATION: 829870-083000 00
FAX #: 410-612-6351

ANALYTICAL INFORMATION

MATRIX CODES

DW - DRINKING WATER
GW - GROUND WATER
WW - WASTE WATER
SO - SOIL
SL - SLUDGE
OI - OIL
LIQ - OTHER LIQUID
SOL - OTHER SOLID

ACCUTEST SAMPLE #	FIELD ID / POINT OF COLLECTION	COLLECTION DATE	COLLECTION TIME	SAMPLED BY:	MATRIX	# OF BOTTLES	PRESERVATION HCl	PRESERVATION NaOH	PRESERVATION HNO3	PRESERVATION H2SO4	PRESERVATION NONE	TCL SVOCs	TCL Pest/PCBs	Explosives w/ Perchlorate	TAL Metals	TCL VOCs	PAHs (SIM)	Dioxin Furans	LAB USE ONLY
12	C1	4/12/06	12:40	Em/mt	GW	13	3		1		9	2	2	2	1	3	1	2	

DATA TURNAROUND INFORMATION

- ☐ STANDARD
- ☐ 48 HOUR RUSH
- ☐ 24 HOUR EMERGENCY
- ☒ OTHER 14 DAY TAT

APPROVED BY:

EMERGENCY OR RUSH IS FAX DATA UNLESS PREVIOUSLY APPROVED

DATA DELIVERABLE INFORMATION

- ☐ STANDARD
- ☐ COMMERCIAL "B"
- ☐ DISK DELIVERABLE
- ☐ STATE FORMS
- ☒ OTHER (SPECIFY) CLP Format + EPD

COMMENTS/REMARKS

Temp Blank included

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESION, INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER:	DATE TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE TIME:	RECEIVED BY:
1.	4/12/06 17:00	1.	2.	04/13/06 0800	2.
RELINQUISHED BY: 3.	DATE TIME:	RECEIVED BY: 3.	RELINQUISHED BY: 4.	DATE TIME:	RECEIVED BY: 4.
RELINQUISHED BY: 5.	DATE TIME:	RECEIVED BY: 5.	SEAL #	PRESERVE WHERE APPLICABLE ☐	ON ICE ☐ TEMPERATURE °C

ACCUTEST Laboratories

CHAIN OF CUSTODY

4405 VINELAND ROAD • SUITE C-15
ORLANDO, FL 32811
TEL: 407-425-6700 • FAX: 407-425-0707

ACCUTEST JOB #: F39990
ACCUTEST QUOTE #:

CLIENT INFORMATION

NAME: SHAW E+T
ADDRESS: 2113 Emmorton Park RD
CITY: Edgewood STATE: MD ZIP: 21040
SEND REPORT TO: Eric Malarek
PHONE #: 410-612-6322

FACILITY INFORMATION

PROJECT NAME: RFAAP
LOCATION: SWMUs 48, 49, 50, 51, and 59
PROJECT NO.: 829870-08300000
FAX #: 410-612-6351

ANALYTICAL INFORMATION

MATRIX CODES

DW - DRINKING WATER
GW - GROUND WATER
WW - WASTE WATER
SO - SOIL
SL - SLUDGE
OI - OIL
LIQ - OTHER LIQUID
SOL - OTHER SOLID

ACCUTEST SAMPLE #	FIELD ID / POINT OF COLLECTION	COLLECTION DATE	TIME	SAMPLED BY:	MATRIX	# OF BOTTLES	PRESERVATION HCl	NaOH	HNO3	H2SO4	NONE	TCL SVOCs	TCL Pest/PCBs	Explosives and Perc NG	TAL Metals	TCL VOCs	PAHs (SIM)	Dioxin Furans	COD	PH	LAB USE ONLY
14	48MW1	4/13/06	09:55	EM/MT	GW	16	6		1		9	2	2	2	1	6	1	2			MS/MSD VOC ONLY
15	TM48MW1	4/13/06	09:53	EM/MT	GW	13	3		1		9	2	2	2	1	3	1	2			
16	48MW2	4/13/06	17:25	EM/MT	GW	10	3		1		6	2	1	1	1	3	1	1			Limited Volume
17	48MW3	4/13/06	16:00	EM/MT	GW	23	3		2		21	4	4	4	2	3	2	4			MS/MSD except VOC
18	041306DW	4/13/06	13:50	EM/MT	DW	2				1	1								1	1	
19	041306T	4/13/06	—	EM/MT	QC	2										2					

DATA TURNAROUND INFORMATION

- ☐ STANDARD
- ☐ 48 HOUR RUSH
- ☐ 24 HOUR EMERGENCY
- ☒ OTHER 14 DAY TAT

APPROVED BY: _____

EMERGENCY OR RUSH IS FAX DATA UNLESS PREVIOUSLY APPROVED

DATA DELIVERABLE INFORMATION

- ☐ STANDARD
- ☐ COMMERCIAL "B"
- ☐ DISK DELIVERABLE
- ☐ STATE FORMS
- ☒ OTHER (SPECIFY) CLP Format / EDD

COMMENTS/REMARKS

Temp Blank Included

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESION, INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER:	DATE TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE TIME:	RECEIVED BY:
1.	4/14/06 09:15	1.	2.	04/15/06 0760	
RELINQUISHED BY:	DATE TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE TIME:	RECEIVED BY:
3.		3.	4.		4.
RELINQUISHED BY:	DATE TIME:	RECEIVED BY:	SEAL #	PRESERVE WHERE APPLICABLE ☐	ON ICE ☐
5.		5.			TEMPERATURE C

APPENDIX C

Data Validation Reports

Shaw Environmental, Inc.

2113 Emmorton Park Road
Edgewood, MD 21040-1037
410.612.6350
Fax 410.612.6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Semi-Volatiles
Accutest Laboratories, Inc., SDG F39990

DATE: May 3, 2006

The purpose of this memorandum is to present the data validation report for the samples collected for RFAAP SWMUs 48, 49, 50, 51, and 59 on April 10, 2006, April 11, 2006, April 12, 2006, and April 13, 2006 for groundwater analysis. Samples were analyzed for semivolatile organic compounds (SVOCs) using USEPA SW846 Methods 3510C/8270C. The polynuclear aromatic hydrocarbons (PAHs) were analyzed using selective ion monitoring (SIM) techniques. A total of fifteen aqueous samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
51MW1	F39990-1	TM13MW1	F39990-10
51MW2	F39990-2	13MW2	F39990-11
16-4	F39990-3	C1	F39990-12
28MW2	F39990-4	48MW1	F39990-14
28MW1	F39990-5	TM48MW1	F39990-15
C4	F39990-6	48MW2	F39990-16
48MW4	F39990-7	48MW3	F39990-17
13MW1	F39990-9		

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *USACE Shell for Analytical Chemistry Requirements*, method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in Table 1. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
X		Surrogate Spikes
	X	Internal Standards
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

5/3/06
Date

RFAAP VALIDATION REPORT
SEMIVOLATILES AND PAH REVIEW
SDG F39990

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For semivolatile (SVOC) and polynuclear aromatic hydrocarbons (PAH) compounds is cooled (@4°C ± 2°C) for aqueous samples, the maximum holding time is 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 04/10/06, 04/11/06, and 04/12/06, the coolers were received by the primary laboratory (Accutest) on 04/13/06 at 4.2°C, 3.0°C, 2.4°C, 1.8°C, 2.4°C, 2.6°C, 1.6°C, 3.4°C, 2.8°C, 2.6°C, 3.2°C, and 3.0°C. For samples collected on 04/13/06, the coolers were received by the primary laboratory on 04/15/06 at 1.6°C, 2.0°C, 2.8°C, 3.4°C, and 4.2°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.1°C, 3.8°C, and 2.7°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 04/10/06, 04/11/06, 04/12/06, and 04/13/06. For samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12), the SVOCs and PAHs were extracted on 04/14/06 and analyzed on 04/18/06 and 04/19/06. For samples, 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17), the SVOCs and PAHs by SIM were extracted on 04/18/06 and analyzed on 04/26/06 and 04/27/06. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
GC/MS instrument performance checks are performed to ensure mass resolution, identification and, to some degree, sensitivity. The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, decafluorotriphenylphosphine (DFTPP), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for compounds on the semivolatile target compound list (TCL). Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.99. The minimum relative response factor (RRF) criteria must be ≥0.05. Initial calibration percent relative standard deviation (%RSD) must be ≤15% on the average for all compounds (<30% for CCCs). All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- Initial calibration for the SVOCs was performed on 04/26/06 on instrument MSBNA02. Target compounds 2,4-dinitrophenol (25.0%) and 4,6-dinitro-2-methylphenol (17.8%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds 2,4-dinitrophenol (r=0.9953) and 4,6-dinitro-2-methylphenol (r=0.9980) were quantified using linear or second order regression with correlation coefficients >0.99, therefore, no qualifiers were applied based upon the high %RSDs. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) were analyzed using this initial calibration.

- Initial calibration for the SVOCs was performed on 04/14/06 on instrument MSBNA3. Target compounds 2,4-dinitrophenol (36.1%; grossly exceeding), 4-nitrophenol (18.6%), 4,6-dinitro-2-methylphenol (27.0%), butylbenzylphthalate (19.7%), 3,3'-dichlorobenzene (17.9%), bis(2-ethylhexyl)phthalate (19.4%), di-n-octylphthalate (27.0%), indeno(1,2,3-cd)perylene (23.1%), and dibenz(a,h)anthracene (19.0%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds 2,4-dinitrophenol (r=0.9950), 4-nitrophenol (r=0.9979), 4,6-dinitro-2-methylphenol (r=0.9981), butylbenzylphthalate (r=0.9983), 3,3'-dichlorobenzene (r=0.9979), bis(2-ethylhexyl)phthalate (r=0.9986), di-n-octylphthalate (r=0.9981), indeno(1,2,3-cd)perylene (r=0.9991), and dibenz(a,h)anthracene (r=0.9984) were quantified using linear or second order regression with correlation coefficients >0.99, therefore, no qualifiers were applied based upon the high %RSDs. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) were analyzed using this initial calibration.

- Initial calibration for the SVOCs was performed on 04/21/06 on instrument MSBNA3. Target compound 4,6-dinitro-2-methylphenol (17.1%) was outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compound 4,6-dinitro-2-methylphenol (r=0.9990) was quantified using linear regression with correlation coefficients >0.99, therefore, no qualifiers were applied based upon the high %RSD. Sample 48MW3 (F39990-17) re-analysis was analyzed using this initial calibration.

- Initial calibration for the PAHs by SIM was performed on 03/11/06 on instrument MSBNA01. All target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) were analyzed using this initial calibration.

- Initial calibration for the PAHs by SIM was performed on 04/26/06 on instrument MSBNA01. Target compound benzo(b)fluoranthene (15.2%) was outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compound benzo(b)fluoranthene (r=0.9983) was quantified using linear regression with correlation coefficients >0.99, therefore, no qualifiers were applied based upon the high %RSD. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) were analyzed using this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used was capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration standards containing both target and surrogates compounds are analyzed at the beginning of each 12-hour analysis period following the analysis of the instrument performance check and prior to the analysis of blanks and samples. The minimum relative response factors (RRF) for semivolatile target compounds and surrogates must be $\geq$ 0.05. The percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within $\pm$ 20% for all target compounds. Grossly exceeding is defined where %D>40%. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- For SVOC continuing calibration performed on 04/26/06 @15:43 on instrument MSBNA02, all criteria were met for all target compounds. No qualifiers were applied. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this continuing calibration.

- For SVOC continuing calibration performed on 04/18/06 @10:37 on instrument MSBNA3, all criteria were met for all target compounds. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), and 13MW2 (F39990-11) apply to this continuing calibration.

- For SVOC continuing calibration performed on 04/19/06 @09:54 on instrument MSBNA3, target compound hexachlorocyclopentadiene (27.1%) was outside criteria. All other target compounds were within criteria (%D≤20%; RRF≥0.05). Compound hexachlorocyclopentadiene was non-detect for all samples, therefore, no qualifiers were applied based upon this outlier. Sample C1 (F39990-12) applies to this continuing calibration.

- For SVOC continuing calibration performed on 04/27/06 @10:11 on instrument MSBNA3, all criteria were met for all target compounds. No qualifiers were applied. Sample 48MW3 (F39990-17) re-analysis applies to this continuing calibration.

- For PAH by SIM continuing calibration performed on 04/19/06 @09:13 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), and 13MW2 (F39990-11) apply to this continuing calibration.

- For PAH by SIM continuing calibration performed on 04/20/06 @09:41 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. Sample C1 (F39990-12) applies to this continuing calibration.

- For PAH by SIM continuing calibration performed on 04/26/06 @16:20 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of DFTPP. No contaminants should be detected in any of the associated blanks > the MDL. USACE Shell criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants phthalate esters). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants phthalate esters, or 5 times (5X) the maximum amount for other semivolatile target compounds. **Table 2** summarizes the blank contamination analysis. Rinse blank 041206R (F39990-8) (low-flow pump) applies to all samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
04/18/06	OP16306-MB	All SVOC target <MRL	NA	NA	None
04/19/06	OP16306-MB	All SVOC target <MRL	NA	NA	None
04/26/06	OP16337-MB	All SVOC target <MRL	NA	NA	None
04/27/06	OP16337-MB	All SVOC target <MRL	NA	NA	None
04/19/06	OP16311-MB	All PAH SIM target <MRL	NA	NA	None
04/20/06	OP16311-MB	All PAH SIM target <MRL	NA	NA	None
04/26/06	OP16336-MB	All PAH SIM target <MRL	NA	NA	None
04/18/06	041206R	All SVOC target <MRL	NA	NA	None
04/19/06	041206R	All PAH SIM target <MRL	NA	NA	None

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".
B = Compound detected in associated laboratory blank.

VI-Surrogate Spikes

Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits.

Criteria: 2-Fluorophenol (19-90%) – S1 (USACE Shell Criteria: 35-140%)
Phenol – d5 (10-68%) – S2 (USACE Shell Criteria: 35-140%)
2,4,6-Tribromophenol (36-137%) – S3 (USACE Shell Criteria: 35-140%)
Nitrobenzene-d5 (49-119%) – S4 (USACE Shell Criteria: 45-135%)
2-Fluorobiphenyl (45-118%) – S5 (USACE Shell Criteria: 45-135%)
p-Terphenyl – d14 (46-135%) – S6 (USACE Shell Criteria: 45-135%)

- For sample 28MW2 (F39990-4), surrogates 2-fluorophenol (27%) and phenol-d5 (16%) were below USACE recommended limits and within laboratory control limits. Since these recoveries were greater than 10%, within the laboratory limits, and all other base neutral surrogates were within all criteria limits, no qualifiers were applied based upon these outliers.

- For sample 28MW1 (F39990-5), surrogates 2-fluorophenol (33%) and phenol-d5 (19%) were below USACE recommended limits and within laboratory control limits. Since these recoveries were greater than 10%, within the laboratory limits, and all other base neutral surrogates were within all criteria limits, no qualifiers were applied based upon these outliers.

- For sample C4 (F39990-6), surrogates 2-fluorophenol (34%) and phenol-d5 (19%) were below USACE recommended limits and within laboratory control limits. Since these recoveries were greater than 10%, within the laboratory limits, and all other base neutral surrogates were within all criteria limits, no qualifiers were applied based upon these outliers.

- For sample 48MW1 (F39990-14), surrogates 2-fluorophenol (32%) and phenol-d5 (17%) were below USACE recommended limits and within laboratory control limits. Since these recoveries were greater than 10%, within the laboratory limits, and all other base neutral surrogates were within all criteria limits, no qualifiers were applied based upon these outliers.

- For sample TM48MW1 (F39990-15), surrogates 2-fluorophenol (33%) and phenol-d5 (18%) were below USACE recommended limits and within laboratory control limits. Since these recoveries were greater than 10%, within the laboratory limits, and all other base neutral surrogates were within all criteria limits, no qualifiers were applied based upon these outliers.

- For sample 48MW2 (F39990-16), surrogates 2-fluorophenol (26%) and phenol-d5 (15%) were below USACE recommended limits and within laboratory control limits. Since these recoveries were greater than 10%, within the laboratory limits, and all other base neutral surrogates were within all criteria limits, no qualifiers were applied based upon these outliers.

- For sample 48MW3 (F39990-17), surrogates 2-fluorophenol (16%) and phenol-d5 (9%) were below laboratory and USACE criteria limits. The sample was re-analyzed and surrogates 2-fluorophenol (18%) and phenol-d5 (12%) were still outside criteria. Sample 48MW3 (F39990-17) was non-detect for all target compounds. All non-detects were qualified estimated bias low "UL" for this sample based upon the low surrogate recoveries.

- Surrogate phenol-d5 (S2) was below USACE recommended limits, however greater than 10% and within laboratory control limits for samples 51MW1 (23%), 51MW2 (22%), 16-4 (21%), 48MW4 (20%), 13MW1 (29%), TM13MW1 (25%), 13MW2 (26%), and C1 (30%). Since these recoveries were greater than 10%, within the laboratory limits, and all other base neutral surrogates were within all criteria limits, no qualifiers were applied based upon these outliers.

- For all other field samples, all other surrogates were within criteria limits.

VII-Internal Standards
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Internal standard area counts for samples and blanks must not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. The retention time of the internal standards in samples and blanks must not vary by more than ±30 seconds from the retention time of the associated calibration standard.

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Sample
Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. USACE Shell limits for SVOCs are 45-135%; RPD≤50% (15-150%; RPD≤60% for sporadic marginal failures (SMF)).

- Sample OP16306-BS was used as the LCS for the SVOC analysis on 04/18/06. A total of 49 compounds were spiked, allowing for 3 SMF tolerances. Benzoic acid (27%), 4-nitrophenol (36%), and phenol (36%) were outside USACE criteria, but within SMF and laboratory criteria. No qualifiers were applied to benzoic acid, 4-nitrophenol, and phenol based upon these low recoveries. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) apply to this LCS.

- Sample OP16337-BS was used as the LCS for the SVOC analysis on 04/26/06. A total of 49 compounds were spiked, allowing for 3 SMF tolerances. Benzoic acid (17%), 4-nitrophenol (29%), and phenol (28%) were outside USACE criteria, but within SMF and laboratory criteria. 2-Methylphenol (53%) was outside laboratory criteria, but within USACE and SMF criteria. No qualifiers were applied to benzoic acid, 4-nitrophenol, 2-methylphenol, and phenol based upon these low recoveries. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this LCS.

- Sample OP16311-BS was used as the LCS for the PAH SIM analysis on 04/19/06. A total of 18 compounds were spiked, allowing for 2 SMF tolerances. All criteria were met. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) apply to this LCS.

- Sample OP16336-BS was used as the LCS for the PAH SIM analysis on 04/26/06. A total of 18 compounds were spiked, allowing for 2 SMF tolerances. All criteria were met. No qualifiers were applied. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this LCS.

IX-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. USACE Shell limits are 45-135%; RPD≤50% (15-150%; RPD≤60% for sporadic marginal failures (SMF)).

- Sample 13MW2 (F39990-11) was used for the MS/MSD for SVOC analysis on 04/18/06. A total of 98 compounds were spiked allowing for 10 SMFs. Hexachlorobutadiene (96%, 97%) was outside laboratory accuracy criteria, however within USACE and SMF criteria. Benzoic acid (33%; 21%; RPD=45%) was outside USACE criteria, however within laboratory and SMF criteria. No qualifiers were applied for benzoic acid or hexachlorobutadiene based upon these outliers.

- Sample 48MW3 (F39990-17) was used for the MS/MSD for SVOC analysis on 04/26/06. A total of 98 compounds were spiked allowing for 10 SMFs. Bis(2-Chloroethyl)ether (RPD=25%), bis(2-Chloroisopropyl)ether (RPD=24%), and 1,2-dichlorobenzene (RPD=25%) were outside laboratory precision criteria, however within USACE and SMF criteria. Benzoic acid (41%; 42%), 2,4-dimethylphenol (40%), phenol (38%), and hexachlorocyclopentadiene (43%) were outside USACE accuracy criteria, however within laboratory and SMF criteria. No qualifiers were applied for bis(2-chloroethyl)ether, bis(2-Chloroisopropyl)ether, 1,2-dichlorobenzene, benzoic acid, 2,4-dimethylphenol, phenol, or hexachlorocyclopentadiene based upon these outliers.

- Sample 13MW1 (F39990-9) was used for the MS/MSD for PAH SIM analysis on 04/19/06. A total of 36 compounds were spiked allowing for 4 SMFs. All criteria were met. No qualifiers were applied.

- Sample 48MW3 (F39990-17) was used for the MS/MSD for PAH SIM analysis on 04/26/06. A total of 36 compounds were spiked allowing for 4 SMFs. All criteria were met. No qualifiers were applied.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field groundwater sample duplicate pair 13MW1 (F39990-9) and TM13MW1 (F39990-10) was collected for SVOCs and PAH SIM. All target compounds were non-detect. All criteria were met. No qualifiers were applied.

- Field groundwater sample duplicate pair 48MW1 (F39990-14) and TM48MW1 (F39990-15) was collected for SVOCs and PAH SIM. All target compounds were non-detect. All criteria were met. No qualifiers were applied.

XI-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. Percent difference (%D) between the calculated and reported values must be ≤10%. Any sample value > MDL and < MRL or < 3*MDL (whichever is greater) was qualified as estimated, "J." Any tentatively identified compounds found were qualified as estimated "J".

Sample: 48MW3MS (F39990-17MS), bis(2-ethylhexyl)phthalate

$$Conc_{sample} = \frac{A_x x I_s x V_t}{A_{is} x RRF_A x V_o x V_i}$$

where:

	$Conc_{sample}$	=	Sample concentration in ug/L
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 uL.
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_o	=	Volume of water extracted (mL).
	V_i	=	Volume of extract injected (uL).

Conc. µg/L = (1126729 * 40ng * 1000µL) / (1385395 * 0.752 * 400mL * 1 µL) = 108 ng/mL
= 108 µg/L

Reported Value = 108 µg/L
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Form I Copy

Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW1		
Lab Sample ID:	F39990-1	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R02143.D	1	04/18/06	MRE	04/14/06	OP16306	SR99
Run #2							

	Initial Volume	Final Volume
Run #1	740 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	34	14	ug/l	
95-57-8	2-Chlorophenol	ND	6.8	2.7	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	6.8	2.7	ug/l	
120-83-2	2,4-Dichlorophenol	ND	6.8	2.7	ug/l	
105-67-9	2,4-Dimethylphenol	ND	6.8	2.7	ug/l	
51-28-5	2,4-Dinitrophenol	ND	34	14	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	14	6.8	ug/l	
95-48-7	2-Methylphenol	ND	6.8	2.7	ug/l	
	3&4-Methylphenol	ND	6.8	2.7	ug/l	
88-75-5	2-Nitrophenol	ND	6.8	2.7	ug/l	
100-02-7	4-Nitrophenol	ND	34	14	ug/l	
87-86-5	Pentachlorophenol	ND	34	14	ug/l	
108-95-2	Phenol	ND	6.8	2.7	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	6.8	2.7	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	6.8	2.7	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	6.8	1.4	ug/l	
85-68-7	Butyl benzyl phthalate	ND	6.8	2.7	ug/l	
100-51-6	Benzyl Alcohol	ND	6.8	1.4	ug/l	
91-58-7	2-Chloronaphthalene	ND	6.8	1.4	ug/l	
106-47-8	4-Chloroaniline	ND	14	5.4	ug/l	
86-74-8	Carbazole	ND	6.8	1.4	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	6.8	1.4	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	6.8	2.7	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	6.8	1.4	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	6.8	1.4	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	6.8	1.4	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	6.8	1.4	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	6.8	1.4	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	6.8	2.7	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	6.8	2.7	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	14	6.8	ug/l	
132-64-9	Dibenzofuran	ND	6.8	1.4	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I copy

Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW1		
Lab Sample ID:	F39990-1	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	6.8	2.7	ug/l	
117-84-0	Di-n-octyl phthalate	ND	6.8	3.4	ug/l	
84-66-2	Diethyl phthalate	ND	6.8	2.7	ug/l	
131-11-3	Dimethyl phthalate	ND	6.8	2.7	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	6.8	3.4	ug/l	
118-74-1	Hexachlorobenzene	ND	6.8	1.4	ug/l	
87-68-3	Hexachlorobutadiene	ND	6.8	2.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	6.8	2.7	ug/l	
67-72-1	Hexachloroethane	ND	6.8	2.7	ug/l	
78-59-1	Isophorone	ND	6.8	1.4	ug/l	
88-74-4	2-Nitroaniline	ND	14	5.4	ug/l	
99-09-2	3-Nitroaniline	ND	14	5.4	ug/l	
100-01-6	4-Nitroaniline	ND	14	5.4	ug/l	
98-95-3	Nitrobenzene	ND	6.8	1.4	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	6.8	2.7	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	6.8	2.7	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	6.8	1.4	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	36%		19-90%
4165-62-2	Phenol-d5	23%		10-68%
118-79-6	2,4,6-Tribromophenol	73%		36-137%
4165-60-0	Nitrobenzene-d5	60%		49-119%
321-60-8	2-Fluorobiphenyl	64%		45-118%
1718-51-0	Terphenyl-d14	82%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW1		
Lab Sample ID:	F39990-1	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028448.D	1	04/19/06	NJ	04/14/06	OP16311	SW1493
Run #2							

	Initial Volume	Final Volume
Run #1	740 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.4	0.68	ug/l	
208-96-8	Acenaphthylene	ND	1.4	0.68	ug/l	
120-12-7	Anthracene	ND	1.4	0.68	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.27	0.068	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.27	0.14	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.27	0.068	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.27	0.14	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.27	0.14	ug/l	
218-01-9	Chrysene	ND	0.27	0.14	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.27	0.068	ug/l	
206-44-0	Fluoranthene	ND	1.4	0.34	ug/l	
86-73-7	Fluorene	ND	1.4	0.34	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.27	0.068	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.4	0.34	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.4	0.34	ug/l	
91-20-3	Naphthalene	ND	1.4	0.34	ug/l	
85-01-8	Phenanthrene	ND	1.4	0.68	ug/l	
129-00-0	Pyrene	ND	1.4	0.34	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW2		
Lab Sample ID:	F39990-2	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R02144.D	1	04/18/06	MRE	04/14/06	OP16306	SR99
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	28	11	ug/l	
95-57-8	2-Chlorophenol	ND	5.6	2.2	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.6	2.2	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.6	2.2	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.6	2.2	ug/l	
51-28-5	2,4-Dinitrophenol	ND	28	11	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	11	5.6	ug/l	
95-48-7	2-Methylphenol	ND	5.6	2.2	ug/l	
	3&4-Methylphenol	ND	5.6	2.2	ug/l	
88-75-5	2-Nitrophenol	ND	5.6	2.2	ug/l	
100-02-7	4-Nitrophenol	ND	28	11	ug/l	
87-86-5	Pentachlorophenol	ND	28	11	ug/l	
108-95-2	Phenol	ND	5.6	2.2	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.6	2.2	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.6	2.2	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.6	1.1	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.6	2.2	ug/l	
100-51-6	Benzyl Alcohol	ND	5.6	1.1	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.6	1.1	ug/l	
106-47-8	4-Chloroaniline	ND	11	4.4	ug/l	
86-74-8	Carbazole	ND	5.6	1.1	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.6	1.1	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.6	2.2	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.6	1.1	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.6	1.1	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.6	1.1	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.6	1.1	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.6	1.1	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.6	2.2	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.6	2.2	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	11	5.6	ug/l	
132-64-9	Dibenzofuran	ND	5.6	1.1	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form 3 Copy

Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW2		
Lab Sample ID:	F39990-2	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.6	2.2	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.6	2.8	ug/l	
84-66-2	Diethyl phthalate	ND	5.6	2.2	ug/l	
131-11-3	Dimethyl phthalate	ND	5.6	2.2	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.6	2.8	ug/l	
118-74-1	Hexachlorobenzene	ND	5.6	1.1	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.6	2.2	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.6	2.2	ug/l	
67-72-1	Hexachloroethane	ND	5.6	2.2	ug/l	
78-59-1	Isophorone	ND	5.6	1.1	ug/l	
88-74-4	2-Nitroaniline	ND	11	4.4	ug/l	
99-09-2	3-Nitroaniline	ND	11	4.4	ug/l	
100-01-6	4-Nitroaniline	ND	11	4.4	ug/l	
98-95-3	Nitrobenzene	ND	5.6	1.1	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.6	2.2	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.6	2.2	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.6	1.1	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	38%		19-90%
4165-62-2	Phenol-d5	22%		10-68%
118-79-6	2,4,6-Tribromophenol	90%		36-137%
4165-60-0	Nitrobenzene-d5	63%		49-119%
321-60-8	2-Fluorobiphenyl	67%		45-118%
1718-51-0	Terphenyl-d14	81%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW2		
Lab Sample ID:	F39990-2	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028449.D	1	04/19/06	NJ	04/14/06	OP16311	SW1493
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	0.56	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.56	ug/l	
120-12-7	Anthracene	ND	1.1	0.56	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.22	0.056	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.22	0.11	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.22	0.056	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.22	0.11	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.22	0.11	ug/l	
218-01-9	Chrysene	ND	0.22	0.11	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.22	0.056	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.28	ug/l	
86-73-7	Fluorene	ND	1.1	0.28	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.22	0.056	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-20-3	Naphthalene	ND	1.1	0.28	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.56	ug/l	
129-00-0	Pyrene	ND	1.1	0.28	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	16-4		
Lab Sample ID:	F39990-3	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R02145.D	1	04/18/06	MRE	04/14/06	OP16306	SR99
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	28	11	ug/l	
95-57-8	2-Chlorophenol	ND	5.6	2.2	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.6	2.2	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.6	2.2	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.6	2.2	ug/l	
51-28-5	2,4-Dinitrophenol	ND	28	11	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	11	5.6	ug/l	
95-48-7	2-Methylphenol	ND	5.6	2.2	ug/l	
	3&4-Methylphenol	ND	5.6	2.2	ug/l	
88-75-5	2-Nitrophenol	ND	5.6	2.2	ug/l	
100-02-7	4-Nitrophenol	ND	28	11	ug/l	
87-86-5	Pentachlorophenol	ND	28	11	ug/l	
108-95-2	Phenol	ND	5.6	2.2	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.6	2.2	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.6	2.2	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.6	1.1	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.6	2.2	ug/l	
100-51-6	Benzyl Alcohol	ND	5.6	1.1	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.6	1.1	ug/l	
106-47-8	4-Chloroaniline	ND	11	4.4	ug/l	
86-74-8	Carbazole	ND	5.6	1.1	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.6	1.1	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.6	2.2	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.6	1.1	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.6	1.1	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.6	1.1	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.6	1.1	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.6	1.1	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.6	2.2	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.6	2.2	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	11	5.6	ug/l	
132-64-9	Dibenzofuran	ND	5.6	1.1	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	16-4		
Lab Sample ID:	F39990-3	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.6	2.2	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.6	2.8	ug/l	
84-66-2	Diethyl phthalate	ND	5.6	2.2	ug/l	
131-11-3	Dimethyl phthalate	ND	5.6	2.2	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.6	2.8	ug/l	
118-74-1	Hexachlorobenzene	ND	5.6	1.1	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.6	2.2	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.6	2.2	ug/l	
67-72-1	Hexachloroethane	ND	5.6	2.2	ug/l	
78-59-1	Isophorone	ND	5.6	1.1	ug/l	
88-74-4	2-Nitroaniline	ND	11	4.4	ug/l	
99-09-2	3-Nitroaniline	ND	11	4.4	ug/l	
100-01-6	4-Nitroaniline	ND	11	4.4	ug/l	
98-95-3	Nitrobenzene	ND	5.6	1.1	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.6	2.2	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.6	2.2	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.6	1.1	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	36%		19-90%
4165-62-2	Phenol-d5	21%		10-68%
118-79-6	2,4,6-Tribromophenol	80%		36-137%
4165-60-0	Nitrobenzene-d5	60%		49-119%
321-60-8	2-Fluorobiphenyl	65%		45-118%
1718-51-0	Terphenyl-d14	79%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	16-4		
Lab Sample ID:	F39990-3	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028450.D	1	04/19/06	NJ	04/14/06	OP16311	SW1493
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	0.56	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.56	ug/l	
120-12-7	Anthracene	ND	1.1	0.56	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.22	0.056	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.22	0.11	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.22	0.056	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.22	0.11	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.22	0.11	ug/l	
218-01-9	Chrysene	ND	0.22	0.11	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.22	0.056	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.28	ug/l	
86-73-7	Fluorene	ND	1.1	0.28	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.22	0.056	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-20-3	Naphthalene	ND	1.1	0.28	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.56	ug/l	
129-00-0	Pyrene	ND	1.1	0.28	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	28MW2		
Lab Sample ID:	F39990-4	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R02146.D	1	04/18/06	MRE	04/14/06	OP16306	SR99
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	28	11	ug/l	
95-57-8	2-Chlorophenol	ND	5.6	2.2	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.6	2.2	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.6	2.2	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.6	2.2	ug/l	
51-28-5	2,4-Dinitrophenol	ND	28	11	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	11	5.6	ug/l	
95-48-7	2-Methylphenol	ND	5.6	2.2	ug/l	
	3&4-Methylphenol	ND	5.6	2.2	ug/l	
88-75-5	2-Nitrophenol	ND	5.6	2.2	ug/l	
100-02-7	4-Nitrophenol	ND	28	11	ug/l	
87-86-5	Pentachlorophenol	ND	28	11	ug/l	
108-95-2	Phenol	ND	5.6	2.2	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.6	2.2	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.6	2.2	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.6	1.1	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.6	2.2	ug/l	
100-51-6	Benzyl Alcohol	ND	5.6	1.1	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.6	1.1	ug/l	
106-47-8	4-Chloroaniline	ND	11	4.4	ug/l	
86-74-8	Carbazole	ND	5.6	1.1	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.6	1.1	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.6	2.2	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.6	1.1	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.6	1.1	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.6	1.1	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.6	1.1	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.6	1.1	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.6	2.2	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.6	2.2	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	11	5.6	ug/l	
132-64-9	Dibenzofuran	ND	5.6	1.1	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	28MW2		
Lab Sample ID:	F39990-4	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.6	2.2	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.6	2.8	ug/l	
84-66-2	Diethyl phthalate	ND	5.6	2.2	ug/l	
131-11-3	Dimethyl phthalate	ND	5.6	2.2	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.6	2.8	ug/l	
118-74-1	Hexachlorobenzene	ND	5.6	1.1	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.6	2.2	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.6	2.2	ug/l	
67-72-1	Hexachloroethane	ND	5.6	2.2	ug/l	
78-59-1	Isophorone	ND	5.6	1.1	ug/l	
88-74-4	2-Nitroaniline	ND	11	4.4	ug/l	
99-09-2	3-Nitroaniline	ND	11	4.4	ug/l	
100-01-6	4-Nitroaniline	ND	11	4.4	ug/l	
98-95-3	Nitrobenzene	ND	5.6	1.1	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.6	2.2	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.6	2.2	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.6	1.1	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	27%		19-90%
4165-62-2	Phenol-d5	16%		10-68%
118-79-6	2,4,6-Tribromophenol	75%		36-137%
4165-60-0	Nitrobenzene-d5	55%		49-119%
321-60-8	2-Fluorobiphenyl	59%		45-118%
1718-51-0	Terphenyl-d14	70%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	28MW2		
Lab Sample ID:	F39990-4	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028451.D	1	04/19/06	NJ	04/14/06	OP16311	SW1493
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	0.56	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.56	ug/l	
120-12-7	Anthracene	ND	1.1	0.56	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.22	0.056	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.22	0.11	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.22	0.056	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.22	0.11	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.22	0.11	ug/l	
218-01-9	Chrysene	ND	0.22	0.11	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.22	0.056	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.28	ug/l	
86-73-7	Fluorene	ND	1.1	0.28	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.22	0.056	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-20-3	Naphthalene	ND	1.1	0.28	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.56	ug/l	
129-00-0	Pyrene	ND	1.1	0.28	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	28MW1		
Lab Sample ID:	F39990-5	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R02147.D	1	04/18/06	MRE	04/14/06	OP16306	SR99
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	31	13	ug/l	
95-57-8	2-Chlorophenol	ND	6.3	2.5	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	6.3	2.5	ug/l	
120-83-2	2,4-Dichlorophenol	ND	6.3	2.5	ug/l	
105-67-9	2,4-Dimethylphenol	ND	6.3	2.5	ug/l	
51-28-5	2,4-Dinitrophenol	ND	31	13	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	13	6.3	ug/l	
95-48-7	2-Methylphenol	ND	6.3	2.5	ug/l	
	3&4-Methylphenol	ND	6.3	2.5	ug/l	
88-75-5	2-Nitrophenol	ND	6.3	2.5	ug/l	
100-02-7	4-Nitrophenol	ND	31	13	ug/l	
87-86-5	Pentachlorophenol	ND	31	13	ug/l	
108-95-2	Phenol	ND	6.3	2.5	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	6.3	2.5	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	6.3	2.5	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	6.3	1.3	ug/l	
85-68-7	Butyl benzyl phthalate	ND	6.3	2.5	ug/l	
100-51-6	Benzyl Alcohol	ND	6.3	1.3	ug/l	
91-58-7	2-Chloronaphthalene	ND	6.3	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	13	5.0	ug/l	
86-74-8	Carbazole	ND	6.3	1.3	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	6.3	1.3	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	6.3	2.5	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	6.3	1.3	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	6.3	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	6.3	1.3	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	6.3	1.3	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	6.3	1.3	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	6.3	2.5	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	6.3	2.5	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	13	6.3	ug/l	
132-64-9	Dibenzofuran	ND	6.3	1.3	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	28MW1		
Lab Sample ID:	F39990-5	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	6.3	2.5	ug/l	
117-84-0	Di-n-octyl phthalate	ND	6.3	3.1	ug/l	
84-66-2	Diethyl phthalate	ND	6.3	2.5	ug/l	
131-11-3	Dimethyl phthalate	ND	6.3	2.5	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	6.3	3.1	ug/l	
118-74-1	Hexachlorobenzene	ND	6.3	1.3	ug/l	
87-68-3	Hexachlorobutadiene	ND	6.3	2.5	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	6.3	2.5	ug/l	
67-72-1	Hexachloroethane	ND	6.3	2.5	ug/l	
78-59-1	Isophorone	ND	6.3	1.3	ug/l	
88-74-4	2-Nitroaniline	ND	13	5.0	ug/l	
99-09-2	3-Nitroaniline	ND	13	5.0	ug/l	
100-01-6	4-Nitroaniline	ND	13	5.0	ug/l	
98-95-3	Nitrobenzene	ND	6.3	1.3	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	6.3	2.5	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	6.3	2.5	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	6.3	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	33%		19-90%
4165-62-2	Phenol-d5	19%		10-68%
118-79-6	2,4,6-Tribromophenol	92%		36-137%
4165-60-0	Nitrobenzene-d5	66%		49-119%
321-60-8	2-Fluorobiphenyl	72%		45-118%
1718-51-0	Terphenyl-d14	87%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	28MW1		
Lab Sample ID:	F39990-5	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028452.D	1	04/19/06	NJ	04/14/06	OP16311	SW1493
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.3	0.63	ug/l	
208-96-8	Acenaphthylene	ND	1.3	0.63	ug/l	
120-12-7	Anthracene	ND	1.3	0.63	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.25	0.063	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.25	0.13	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.25	0.063	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.25	0.13	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.25	0.13	ug/l	
218-01-9	Chrysene	ND	0.25	0.13	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.25	0.063	ug/l	
206-44-0	Fluoranthene	ND	1.3	0.31	ug/l	
86-73-7	Fluorene	ND	1.3	0.31	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.25	0.063	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.3	0.31	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.3	0.31	ug/l	
91-20-3	Naphthalene	ND	1.3	0.31	ug/l	
85-01-8	Phenanthrene	ND	1.3	0.63	ug/l	
129-00-0	Pyrene	ND	1.3	0.31	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	C4		
Lab Sample ID:	F39990-6	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R02148.D	1	04/18/06	MRE	04/14/06	OP16306	SR99
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	31	13	ug/l	
95-57-8	2-Chlorophenol	ND	6.3	2.5	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	6.3	2.5	ug/l	
120-83-2	2,4-Dichlorophenol	ND	6.3	2.5	ug/l	
105-67-9	2,4-Dimethylphenol	ND	6.3	2.5	ug/l	
51-28-5	2,4-Dinitrophenol	ND	31	13	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	13	6.3	ug/l	
95-48-7	2-Methylphenol	ND	6.3	2.5	ug/l	
	3&4-Methylphenol	ND	6.3	2.5	ug/l	
88-75-5	2-Nitrophenol	ND	6.3	2.5	ug/l	
100-02-7	4-Nitrophenol	ND	31	13	ug/l	
87-86-5	Pentachlorophenol	ND	31	13	ug/l	
108-95-2	Phenol	ND	6.3	2.5	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	6.3	2.5	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	6.3	2.5	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	6.3	1.3	ug/l	
85-68-7	Butyl benzyl phthalate	ND	6.3	2.5	ug/l	
100-51-6	Benzyl Alcohol	ND	6.3	1.3	ug/l	
91-58-7	2-Chloronaphthalene	ND	6.3	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	13	5.0	ug/l	
86-74-8	Carbazole	ND	6.3	1.3	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	6.3	1.3	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	6.3	2.5	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	6.3	1.3	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	6.3	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	6.3	1.3	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	6.3	1.3	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	6.3	1.3	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	6.3	2.5	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	6.3	2.5	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	13	6.3	ug/l	
132-64-9	Dibenzofuran	ND	6.3	1.3	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	C4		
Lab Sample ID:	F39990-6	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	6.3	2.5	ug/l	
117-84-0	Di-n-octyl phthalate	ND	6.3	3.1	ug/l	
84-66-2	Diethyl phthalate	ND	6.3	2.5	ug/l	
131-11-3	Dimethyl phthalate	ND	6.3	2.5	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	4.8 J	6.3	3.1	ug/l	J
118-74-1	Hexachlorobenzene	ND	6.3	1.3	ug/l	
87-68-3	Hexachlorobutadiene	ND	6.3	2.5	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	6.3	2.5	ug/l	
67-72-1	Hexachloroethane	ND	6.3	2.5	ug/l	
78-59-1	Isophorone	ND	6.3	1.3	ug/l	
88-74-4	2-Nitroaniline	ND	13	5.0	ug/l	
99-09-2	3-Nitroaniline	ND	13	5.0	ug/l	
100-01-6	4-Nitroaniline	ND	13	5.0	ug/l	
98-95-3	Nitrobenzene	ND	6.3	1.3	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	6.3	2.5	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	6.3	2.5	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	6.3	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	34%		19-90%
4165-62-2	Phenol-d5	19%		10-68%
118-79-6	2,4,6-Tribromophenol	94%		36-137%
4165-60-0	Nitrobenzene-d5	64%		49-119%
321-60-8	2-Fluorobiphenyl	70%		45-118%
1718-51-0	Terphenyl-d14	78%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	C4		
Lab Sample ID:	F39990-6	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028453.D	1	04/19/06	NJ	04/14/06	OP16311	SW1493
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.3	0.63	ug/l	
208-96-8	Acenaphthylene	ND	1.3	0.63	ug/l	
120-12-7	Anthracene	ND	1.3	0.63	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.25	0.063	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.25	0.13	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.25	0.063	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.25	0.13	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.25	0.13	ug/l	
218-01-9	Chrysene	ND	0.25	0.13	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.25	0.063	ug/l	
206-44-0	Fluoranthene	ND	1.3	0.31	ug/l	
86-73-7	Fluorene	ND	1.3	0.31	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.25	0.063	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.3	0.31	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.3	0.31	ug/l	
91-20-3	Naphthalene	ND	1.3	0.31	ug/l	
85-01-8	Phenanthrene	ND	1.3	0.63	ug/l	
129-00-0	Pyrene	ND	1.3	0.31	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F39990-7	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R02149.D	1	04/18/06	MRE	04/14/06	OP16306	SR99
Run #2							

	Initial Volume	Final Volume
Run #1	860 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	29	12	ug/l	
95-57-8	2-Chlorophenol	ND	5.8	2.3	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.8	2.3	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.8	2.3	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.8	2.3	ug/l	
51-28-5	2,4-Dinitrophenol	ND	29	12	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	12	5.8	ug/l	
95-48-7	2-Methylphenol	ND	5.8	2.3	ug/l	
	3&4-Methylphenol	ND	5.8	2.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.8	2.3	ug/l	
100-02-7	4-Nitrophenol	ND	29	12	ug/l	
87-86-5	Pentachlorophenol	ND	29	12	ug/l	
108-95-2	Phenol	ND	5.8	2.3	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.8	2.3	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.8	2.3	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.8	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.8	2.3	ug/l	
100-51-6	Benzyl Alcohol	ND	5.8	1.2	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.8	1.2	ug/l	
106-47-8	4-Chloroaniline	ND	12	4.7	ug/l	
86-74-8	Carbazole	ND	5.8	1.2	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.8	1.2	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.8	2.3	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.8	1.2	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.8	1.2	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.8	1.2	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.8	1.2	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.8	1.2	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.8	2.3	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.8	2.3	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	12	5.8	ug/l	
132-64-9	Dibenzofuran	ND	5.8	1.2	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F39990-7	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.8	2.3	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.8	2.9	ug/l	
84-66-2	Diethyl phthalate	ND	5.8	2.3	ug/l	
131-11-3	Dimethyl phthalate	ND	5.8	2.3	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.8	2.9	ug/l	
118-74-1	Hexachlorobenzene	ND	5.8	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.8	2.3	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.8	2.3	ug/l	
67-72-1	Hexachloroethane	ND	5.8	2.3	ug/l	
78-59-1	Isophorone	ND	5.8	1.2	ug/l	
88-74-4	2-Nitroaniline	ND	12	4.7	ug/l	
99-09-2	3-Nitroaniline	ND	12	4.7	ug/l	
100-01-6	4-Nitroaniline	ND	12	4.7	ug/l	
98-95-3	Nitrobenzene	ND	5.8	1.2	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.8	2.3	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.8	2.3	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.8	1.2	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	35%		19-90%
4165-62-2	Phenol-d5	20%		10-68%
118-79-6	2,4,6-Tribromophenol	88%		36-137%
4165-60-0	Nitrobenzene-d5	71%		49-119%
321-60-8	2-Fluorobiphenyl	77%		45-118%
1718-51-0	Terphenyl-d14	81%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F39990-7	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028454.D	1	04/19/06	NJ	04/14/06	OP16311	SW1493
Run #2							

	Initial Volume	Final Volume
Run #1	860 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.2	0.58	ug/l	
208-96-8	Acenaphthylene	ND	1.2	0.58	ug/l	
120-12-7	Anthracene	ND	1.2	0.58	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.23	0.058	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.23	0.12	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.23	0.058	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.23	0.12	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.23	0.12	ug/l	
218-01-9	Chrysene	ND	0.23	0.12	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.23	0.058	ug/l	
206-44-0	Fluoranthene	ND	1.2	0.29	ug/l	
86-73-7	Fluorene	ND	1.2	0.29	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.23	0.058	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.2	0.29	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.2	0.29	ug/l	
91-20-3	Naphthalene	ND	1.2	0.29	ug/l	
85-01-8	Phenanthrene	ND	1.2	0.58	ug/l	
129-00-0	Pyrene	ND	1.2	0.29	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW1		
Lab Sample ID:	F39990-9	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R02151.D	1	04/18/06	MRE	04/14/06	OP16306	SR99
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	31	13	ug/l	
95-57-8	2-Chlorophenol	ND	6.3	2.5	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	6.3	2.5	ug/l	
120-83-2	2,4-Dichlorophenol	ND	6.3	2.5	ug/l	
105-67-9	2,4-Dimethylphenol	ND	6.3	2.5	ug/l	
51-28-5	2,4-Dinitrophenol	ND	31	13	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	13	6.3	ug/l	
95-48-7	2-Methylphenol	ND	6.3	2.5	ug/l	
	3&4-Methylphenol	ND	6.3	2.5	ug/l	
88-75-5	2-Nitrophenol	ND	6.3	2.5	ug/l	
100-02-7	4-Nitrophenol	ND	31	13	ug/l	
87-86-5	Pentachlorophenol	ND	31	13	ug/l	
108-95-2	Phenol	ND	6.3	2.5	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	6.3	2.5	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	6.3	2.5	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	6.3	1.3	ug/l	
85-68-7	Butyl benzyl phthalate	ND	6.3	2.5	ug/l	
100-51-6	Benzyl Alcohol	ND	6.3	1.3	ug/l	
91-58-7	2-Chloronaphthalene	ND	6.3	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	13	5.0	ug/l	
86-74-8	Carbazole	ND	6.3	1.3	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	6.3	1.3	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	6.3	2.5	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	6.3	1.3	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	6.3	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	6.3	1.3	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	6.3	1.3	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	6.3	1.3	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	6.3	2.5	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	6.3	2.5	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	13	6.3	ug/l	
132-64-9	Dibenzofuran	ND	6.3	1.3	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW1		
Lab Sample ID:	F39990-9	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	6.3	2.5	ug/l	
117-84-0	Di-n-octyl phthalate	ND	6.3	3.1	ug/l	
84-66-2	Diethyl phthalate	ND	6.3	2.5	ug/l	
131-11-3	Dimethyl phthalate	ND	6.3	2.5	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	6.3	3.1	ug/l	
118-74-1	Hexachlorobenzene	ND	6.3	1.3	ug/l	
87-68-3	Hexachlorobutadiene	ND	6.3	2.5	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	6.3	2.5	ug/l	
67-72-1	Hexachloroethane	ND	6.3	2.5	ug/l	
78-59-1	Isophorone	ND	6.3	1.3	ug/l	
88-74-4	2-Nitroaniline	ND	13	5.0	ug/l	
99-09-2	3-Nitroaniline	ND	13	5.0	ug/l	
100-01-6	4-Nitroaniline	ND	13	5.0	ug/l	
98-95-3	Nitrobenzene	ND	6.3	1.3	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	6.3	2.5	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	6.3	2.5	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	6.3	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	48%		19-90%
4165-62-2	Phenol-d5	29%		10-68%
118-79-6	2,4,6-Tribromophenol	90%		36-137%
4165-60-0	Nitrobenzene-d5	75%		49-119%
321-60-8	2-Fluorobiphenyl	82%		45-118%
1718-51-0	Terphenyl-d14	81%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW1		
Lab Sample ID:	F39990-9	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028456.D	1	04/19/06	NJ	04/14/06	OP16311	SW1493
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.3	0.63	ug/l	
208-96-8	Acenaphthylene	ND	1.3	0.63	ug/l	
120-12-7	Anthracene	ND	1.3	0.63	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.25	0.063	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.25	0.13	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.25	0.063	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.25	0.13	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.25	0.13	ug/l	
218-01-9	Chrysene	ND	0.25	0.13	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.25	0.063	ug/l	
206-44-0	Fluoranthene	ND	1.3	0.31	ug/l	
86-73-7	Fluorene	ND	1.3	0.31	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.25	0.063	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.3	0.31	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.3	0.31	ug/l	
91-20-3	Naphthalene	ND	1.3	0.31	ug/l	
85-01-8	Phenanthrene	ND	1.3	0.63	ug/l	
129-00-0	Pyrene	ND	1.3	0.31	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM13MW1		
Lab Sample ID:	F39990-10	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R02155.D	1	04/18/06	MRE	04/14/06	OP16306	SR99
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	28	11	ug/l	
95-57-8	2-Chlorophenol	ND	5.6	2.2	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.6	2.2	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.6	2.2	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.6	2.2	ug/l	
51-28-5	2,4-Dinitrophenol	ND	28	11	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	11	5.6	ug/l	
95-48-7	2-Methylphenol	ND	5.6	2.2	ug/l	
	3&4-Methylphenol	ND	5.6	2.2	ug/l	
88-75-5	2-Nitrophenol	ND	5.6	2.2	ug/l	
100-02-7	4-Nitrophenol	ND	28	11	ug/l	
87-86-5	Pentachlorophenol	ND	28	11	ug/l	
108-95-2	Phenol	ND	5.6	2.2	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.6	2.2	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.6	2.2	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.6	1.1	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.6	2.2	ug/l	
100-51-6	Benzyl Alcohol	ND	5.6	1.1	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.6	1.1	ug/l	
106-47-8	4-Chloroaniline	ND	11	4.4	ug/l	
86-74-8	Carbazole	ND	5.6	1.1	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.6	1.1	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.6	2.2	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.6	1.1	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.6	1.1	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.6	1.1	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.6	1.1	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.6	1.1	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.6	2.2	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.6	2.2	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	11	5.6	ug/l	
132-64-9	Dibenzofuran	ND	5.6	1.1	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	TM13MW1		
Lab Sample ID:	F39990-10	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.6	2.2	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.6	2.8	ug/l	
84-66-2	Diethyl phthalate	ND	5.6	2.2	ug/l	
131-11-3	Dimethyl phthalate	ND	5.6	2.2	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.6	2.8	ug/l	
118-74-1	Hexachlorobenzene	ND	5.6	1.1	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.6	2.2	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.6	2.2	ug/l	
67-72-1	Hexachloroethane	ND	5.6	2.2	ug/l	
78-59-1	Isophorone	ND	5.6	1.1	ug/l	
88-74-4	2-Nitroaniline	ND	11	4.4	ug/l	
99-09-2	3-Nitroaniline	ND	11	4.4	ug/l	
100-01-6	4-Nitroaniline	ND	11	4.4	ug/l	
98-95-3	Nitrobenzene	ND	5.6	1.1	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.6	2.2	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.6	2.2	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.6	1.1	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	41%		19-90%
4165-62-2	Phenol-d5	25%		10-68%
118-79-6	2,4,6-Tribromophenol	87%		36-137%
4165-60-0	Nitrobenzene-d5	68%		49-119%
321-60-8	2-Fluorobiphenyl	75%		45-118%
1718-51-0	Terphenyl-d14	86%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	TM13MW1		
Lab Sample ID:	F39990-10	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028459.D	1	04/19/06	NJ	04/14/06	OP16311	SW1493
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.3	0.63	ug/l	
208-96-8	Acenaphthylene	ND	1.3	0.63	ug/l	
120-12-7	Anthracene	ND	1.3	0.63	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.25	0.063	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.25	0.13	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.25	0.063	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.25	0.13	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.25	0.13	ug/l	
218-01-9	Chrysene	ND	0.25	0.13	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.25	0.063	ug/l	
206-44-0	Fluoranthene	ND	1.3	0.31	ug/l	
86-73-7	Fluorene	ND	1.3	0.31	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.25	0.063	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.3	0.31	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.3	0.31	ug/l	
91-20-3	Naphthalene	ND	1.3	0.31	ug/l	
85-01-8	Phenanthrene	ND	1.3	0.63	ug/l	
129-00-0	Pyrene	ND	1.3	0.31	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW2		
Lab Sample ID:	F39990-11	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R02152.D	1	04/18/06	MRE	04/14/06	OP16306	SR99
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	28	11	ug/l	
95-57-8	2-Chlorophenol	ND	5.6	2.2	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.6	2.2	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.6	2.2	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.6	2.2	ug/l	
51-28-5	2,4-Dinitrophenol	ND	28	11	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	11	5.6	ug/l	
95-48-7	2-Methylphenol	ND	5.6	2.2	ug/l	
	3&4-Methylphenol	ND	5.6	2.2	ug/l	
88-75-5	2-Nitrophenol	ND	5.6	2.2	ug/l	
100-02-7	4-Nitrophenol	ND	28	11	ug/l	
87-86-5	Pentachlorophenol	ND	28	11	ug/l	
108-95-2	Phenol	ND	5.6	2.2	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.6	2.2	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.6	2.2	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.6	1.1	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.6	2.2	ug/l	
100-51-6	Benzyl Alcohol	ND	5.6	1.1	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.6	1.1	ug/l	
106-47-8	4-Chloroaniline	ND	11	4.4	ug/l	
86-74-8	Carbazole	ND	5.6	1.1	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.6	1.1	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.6	2.2	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.6	1.1	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.6	1.1	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.6	1.1	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.6	1.1	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.6	1.1	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.6	2.2	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.6	2.2	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	11	5.6	ug/l	
132-64-9	Dibenzofuran	ND	5.6	1.1	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW2		
Lab Sample ID:	F39990-11	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.6	2.2	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.6	2.8	ug/l	
84-66-2	Diethyl phthalate	ND	5.6	2.2	ug/l	
131-11-3	Dimethyl phthalate	ND	5.6	2.2	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.6	2.8	ug/l	
118-74-1	Hexachlorobenzene	ND	5.6	1.1	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.6	2.2	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.6	2.2	ug/l	
67-72-1	Hexachloroethane	ND	5.6	2.2	ug/l	
78-59-1	Isophorone	ND	5.6	1.1	ug/l	
88-74-4	2-Nitroaniline	ND	11	4.4	ug/l	
99-09-2	3-Nitroaniline	ND	11	4.4	ug/l	
100-01-6	4-Nitroaniline	ND	11	4.4	ug/l	
98-95-3	Nitrobenzene	ND	5.6	1.1	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.6	2.2	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.6	2.2	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.6	1.1	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	45%		19-90%
4165-62-2	Phenol-d5	26%		10-68%
118-79-6	2,4,6-Tribromophenol	90%		36-137%
4165-60-0	Nitrobenzene-d5	75%		49-119%
321-60-8	2-Fluorobiphenyl	83%		45-118%
1718-51-0	Terphenyl-d14	80%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW2		
Lab Sample ID:	F39990-11	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028460.D	1	04/19/06	NJ	04/14/06	OP16311	SW1493
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	0.56	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.56	ug/l	
120-12-7	Anthracene	ND	1.1	0.56	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.22	0.056	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.22	0.11	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.22	0.056	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.22	0.11	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.22	0.11	ug/l	
218-01-9	Chrysene	ND	0.22	0.11	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.22	0.056	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.28	ug/l	
86-73-7	Fluorene	ND	1.1	0.28	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.22	0.056	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-20-3	Naphthalene	ND	1.1	0.28	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.56	ug/l	
129-00-0	Pyrene	ND	1.1	0.28	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C1		
Lab Sample ID:	F39990-12	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R02174.D	1	04/19/06	MRE	04/14/06	OP16306	SR100
Run #2							

	Initial Volume	Final Volume
Run #1	850 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	29	12	ug/l	
95-57-8	2-Chlorophenol	ND	5.9	2.4	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.9	2.4	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.9	2.4	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.9	2.4	ug/l	
51-28-5	2,4-Dinitrophenol	ND	29	12	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	12	5.9	ug/l	
95-48-7	2-Methylphenol	ND	5.9	2.4	ug/l	
	3&4-Methylphenol	ND	5.9	2.4	ug/l	
88-75-5	2-Nitrophenol	ND	5.9	2.4	ug/l	
100-02-7	4-Nitrophenol	ND	29	12	ug/l	
87-86-5	Pentachlorophenol	ND	29	12	ug/l	
108-95-2	Phenol	ND	5.9	2.4	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.9	2.4	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.9	2.4	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.9	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.9	2.4	ug/l	
100-51-6	Benzyl Alcohol	ND	5.9	1.2	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.9	1.2	ug/l	
106-47-8	4-Chloroaniline	ND	12	4.7	ug/l	
86-74-8	Carbazole	ND	5.9	1.2	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.9	1.2	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.9	2.4	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.9	1.2	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.9	1.2	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.9	1.2	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.9	1.2	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.9	1.2	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.9	2.4	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.9	2.4	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	12	5.9	ug/l	
132-64-9	Dibenzofuran	ND	5.9	1.2	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C1		
Lab Sample ID:	F39990-12	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.9	2.4	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.9	2.9	ug/l	
84-66-2	Diethyl phthalate	ND	5.9	2.4	ug/l	
131-11-3	Dimethyl phthalate	ND	5.9	2.4	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.9	2.9	ug/l	
118-74-1	Hexachlorobenzene	ND	5.9	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.9	2.4	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.9	2.4	ug/l	
67-72-1	Hexachloroethane	ND	5.9	2.4	ug/l	
78-59-1	Isophorone	ND	5.9	1.2	ug/l	
88-74-4	2-Nitroaniline	ND	12	4.7	ug/l	
99-09-2	3-Nitroaniline	ND	12	4.7	ug/l	
100-01-6	4-Nitroaniline	ND	12	4.7	ug/l	
98-95-3	Nitrobenzene	ND	5.9	1.2	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.9	2.4	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.9	2.4	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.9	1.2	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	51%		19-90%
4165-62-2	Phenol-d5	30%		10-68%
118-79-6	2,4,6-Tribromophenol	95%		36-137%
4165-60-0	Nitrobenzene-d5	77%		49-119%
321-60-8	2-Fluorobiphenyl	85%		45-118%
1718-51-0	Terphenyl-d14	89%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C1		
Lab Sample ID:	F39990-12	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028476.D	1	04/20/06	NJ	04/14/06	OP16311	SW1494
Run #2							

	Initial Volume	Final Volume
Run #1	850 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.2	0.59	ug/l	
208-96-8	Acenaphthylene	ND	1.2	0.59	ug/l	
120-12-7	Anthracene	ND	1.2	0.59	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.24	0.059	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.24	0.12	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.24	0.059	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.24	0.12	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.24	0.12	ug/l	
218-01-9	Chrysene	ND	0.24	0.12	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.24	0.059	ug/l	
206-44-0	Fluoranthene	ND	1.2	0.29	ug/l	
86-73-7	Fluorene	ND	1.2	0.29	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.24	0.059	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.2	0.29	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.2	0.29	ug/l	
91-20-3	Naphthalene	ND	1.2	0.29	ug/l	
85-01-8	Phenanthrene	ND	1.2	0.59	ug/l	
129-00-0	Pyrene	ND	1.2	0.29	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F39990-14	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L031044.D	1	04/26/06	MRE	04/18/06	OP16337	SL1611
Run #2							

	Initial Volume	Final Volume
Run #1	890 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	28	11	ug/l	
95-57-8	2-Chlorophenol	ND	5.6	2.2	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.6	2.2	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.6	2.2	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.6	2.2	ug/l	
51-28-5	2,4-Dinitrophenol	ND	28	11	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	11	5.6	ug/l	
95-48-7	2-Methylphenol	ND	5.6	2.2	ug/l	
	3&4-Methylphenol	ND	5.6	2.2	ug/l	
88-75-5	2-Nitrophenol	ND	5.6	2.2	ug/l	
100-02-7	4-Nitrophenol	ND	28	11	ug/l	
87-86-5	Pentachlorophenol	ND	28	11	ug/l	
108-95-2	Phenol	ND	5.6	2.2	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.6	2.2	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.6	2.2	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.6	1.1	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.6	2.2	ug/l	
100-51-6	Benzyl Alcohol	ND	5.6	1.1	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.6	1.1	ug/l	
106-47-8	4-Chloroaniline	ND	11	4.5	ug/l	
86-74-8	Carbazole	ND	5.6	1.1	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.6	1.1	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.6	2.2	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.6	1.1	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.6	1.1	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.6	1.1	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.6	1.1	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.6	1.1	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.6	2.2	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.6	2.2	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	11	5.6	ug/l	
132-64-9	Dibenzofuran	ND	5.6	1.1	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Corr

Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F39990-14	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.6	2.2	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.6	2.8	ug/l	
84-66-2	Diethyl phthalate	ND	5.6	2.2	ug/l	
131-11-3	Dimethyl phthalate	ND	5.6	2.2	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.6	2.8	ug/l	
118-74-1	Hexachlorobenzene	ND	5.6	1.1	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.6	2.2	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.6	2.2	ug/l	
67-72-1	Hexachloroethane	ND	5.6	2.2	ug/l	
78-59-1	Isophorone	ND	5.6	1.1	ug/l	
88-74-4	2-Nitroaniline	ND	11	4.5	ug/l	
99-09-2	3-Nitroaniline	ND	11	4.5	ug/l	
100-01-6	4-Nitroaniline	ND	11	4.5	ug/l	
98-95-3	Nitrobenzene	ND	5.6	1.1	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.6	2.2	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.6	2.2	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.6	1.1	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	32%		19-90%
4165-62-2	Phenol-d5	17%		10-68%
118-79-6	2,4,6-Tribromophenol	64%		36-137%
4165-60-0	Nitrobenzene-d5	57%		49-119%
321-60-8	2-Fluorobiphenyl	62%		45-118%
1718-51-0	Terphenyl-d14	78%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F39990-14	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028584.D	1	04/26/06	NJ	04/18/06	OP16336	SW1500
Run #2							

	Initial Volume	Final Volume
Run #1	890 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	0.56	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.56	ug/l	
120-12-7	Anthracene	ND	1.1	0.56	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.22	0.056	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.22	0.11	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.22	0.056	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.22	0.11	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.22	0.11	ug/l	
218-01-9	Chrysene	ND	0.22	0.11	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.22	0.056	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.28	ug/l	
86-73-7	Fluorene	ND	1.1	0.28	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.22	0.056	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-20-3	Naphthalene	ND	1.1	0.28	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.56	ug/l	
129-00-0	Pyrene	ND	1.1	0.28	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I COM

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Report of Analysis

Client Sample ID:	TM48MW1		
Lab Sample ID:	F39990-15	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L031045.D	1	04/26/06	MRE	04/18/06	OP16337	SL1611
Run #2							

	Initial Volume	Final Volume
Run #1	850 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	29	12	ug/l	
95-57-8	2-Chlorophenol	ND	5.9	2.4	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.9	2.4	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.9	2.4	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.9	2.4	ug/l	
51-28-5	2,4-Dinitrophenol	ND	29	12	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	12	5.9	ug/l	
95-48-7	2-Methylphenol	ND	5.9	2.4	ug/l	
	3&4-Methylphenol	ND	5.9	2.4	ug/l	
88-75-5	2-Nitrophenol	ND	5.9	2.4	ug/l	
100-02-7	4-Nitrophenol	ND	29	12	ug/l	
87-86-5	Pentachlorophenol	ND	29	12	ug/l	
108-95-2	Phenol	ND	5.9	2.4	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.9	2.4	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.9	2.4	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.9	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.9	2.4	ug/l	
100-51-6	Benzyl Alcohol	ND	5.9	1.2	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.9	1.2	ug/l	
106-47-8	4-Chloroaniline	ND	12	4.7	ug/l	
86-74-8	Carbazole	ND	5.9	1.2	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.9	1.2	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.9	2.4	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.9	1.2	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.9	1.2	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.9	1.2	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.9	1.2	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.9	1.2	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.9	2.4	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.9	2.4	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	12	5.9	ug/l	
132-64-9	Dibenzofuran	ND	5.9	1.2	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM48MW1		
Lab Sample ID:	F39990-15	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.9	2.4	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.9	2.9	ug/l	
84-66-2	Diethyl phthalate	ND	5.9	2.4	ug/l	
131-11-3	Dimethyl phthalate	ND	5.9	2.4	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.9	2.9	ug/l	
118-74-1	Hexachlorobenzene	ND	5.9	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.9	2.4	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.9	2.4	ug/l	
67-72-1	Hexachloroethane	ND	5.9	2.4	ug/l	
78-59-1	Isophorone	ND	5.9	1.2	ug/l	
88-74-4	2-Nitroaniline	ND	12	4.7	ug/l	
99-09-2	3-Nitroaniline	ND	12	4.7	ug/l	
100-01-6	4-Nitroaniline	ND	12	4.7	ug/l	
98-95-3	Nitrobenzene	ND	5.9	1.2	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.9	2.4	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.9	2.4	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.9	1.2	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	33%		19-90%
4165-62-2	Phenol-d5	18%		10-68%
118-79-6	2,4,6-Tribromophenol	65%		36-137%
4165-60-0	Nitrobenzene-d5	56%		49-119%
321-60-8	2-Fluorobiphenyl	63%		45-118%
1718-51-0	Terphenyl-d14	79%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM48MW1		
Lab Sample ID:	F39990-15	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028585.D	1	04/26/06	NJ	04/18/06	OP16336	SW1500
Run #2							

	Initial Volume	Final Volume
Run #1	850 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.2	0.59	ug/l	
208-96-8	Acenaphthylene	ND	1.2	0.59	ug/l	
120-12-7	Anthracene	ND	1.2	0.59	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.24	0.059	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.24	0.12	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.24	0.059	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.24	0.12	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.24	0.12	ug/l	
218-01-9	Chrysene	ND	0.24	0.12	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.24	0.059	ug/l	
206-44-0	Fluoranthene	ND	1.2	0.29	ug/l	
86-73-7	Fluorene	ND	1.2	0.29	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.24	0.059	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.2	0.29	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.2	0.29	ug/l	
91-20-3	Naphthalene	ND	1.2	0.29	ug/l	
85-01-8	Phenanthrene	ND	1.2	0.59	ug/l	
129-00-0	Pyrene	ND	1.2	0.29	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F39990-16	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L031046.D	1	04/26/06	MRE	04/18/06	OP16337	SL1611
Run #2							

	Initial Volume	Final Volume
Run #1	630 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	40	16	ug/l	
95-57-8	2-Chlorophenol	ND	7.9	3.2	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	7.9	3.2	ug/l	
120-83-2	2,4-Dichlorophenol	ND	7.9	3.2	ug/l	
105-67-9	2,4-Dimethylphenol	ND	7.9	3.2	ug/l	
51-28-5	2,4-Dinitrophenol	ND	40	16	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	16	7.9	ug/l	
95-48-7	2-Methylphenol	ND	7.9	3.2	ug/l	
	3&4-Methylphenol	ND	7.9	3.2	ug/l	
88-75-5	2-Nitrophenol	ND	7.9	3.2	ug/l	
100-02-7	4-Nitrophenol	ND	40	16	ug/l	
87-86-5	Pentachlorophenol	ND	40	16	ug/l	
108-95-2	Phenol	ND	7.9	3.2	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	7.9	3.2	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	7.9	3.2	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	7.9	1.6	ug/l	
85-68-7	Butyl benzyl phthalate	ND	7.9	3.2	ug/l	
100-51-6	Benzyl Alcohol	ND	7.9	1.6	ug/l	
91-58-7	2-Chloronaphthalene	ND	7.9	1.6	ug/l	
106-47-8	4-Chloroaniline	ND	16	6.3	ug/l	
86-74-8	Carbazole	ND	7.9	1.6	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	7.9	1.6	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	7.9	3.2	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	7.9	1.6	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	7.9	1.6	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	7.9	1.6	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	7.9	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	7.9	1.6	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	7.9	3.2	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	7.9	3.2	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	16	7.9	ug/l	
132-64-9	Dibenzofuran	ND	7.9	1.6	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F39990-16	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	7.9	3.2	ug/l	
117-84-0	Di-n-octyl phthalate	ND	7.9	4.0	ug/l	
84-66-2	Diethyl phthalate	ND	7.9	3.2	ug/l	
131-11-3	Dimethyl phthalate	ND	7.9	3.2	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	7.9	4.0	ug/l	
118-74-1	Hexachlorobenzene	ND	7.9	1.6	ug/l	
87-68-3	Hexachlorobutadiene	ND	7.9	3.2	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	7.9	3.2	ug/l	
67-72-1	Hexachloroethane	ND	7.9	3.2	ug/l	
78-59-1	Isophorone	ND	7.9	1.6	ug/l	
88-74-4	2-Nitroaniline	ND	16	6.3	ug/l	
99-09-2	3-Nitroaniline	ND	16	6.3	ug/l	
100-01-6	4-Nitroaniline	ND	16	6.3	ug/l	
98-95-3	Nitrobenzene	ND	7.9	1.6	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	7.9	3.2	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	7.9	3.2	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	7.9	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	26%		19-90%
4165-62-2	Phenol-d5	15%		10-68%
118-79-6	2,4,6-Tribromophenol	64%		36-137%
4165-60-0	Nitrobenzene-d5	60%		49-119%
321-60-8	2-Fluorobiphenyl	68%		45-118%
1718-51-0	Terphenyl-d14	81%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F39990-16	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028586.D	1	04/26/06	NJ	04/18/06	OP16336	SW1500
Run #2							

	Initial Volume	Final Volume
Run #1	630 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.6	0.79	ug/l	
208-96-8	Acenaphthylene	ND	1.6	0.79	ug/l	
120-12-7	Anthracene	ND	1.6	0.79	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.32	0.079	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.32	0.16	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.32	0.079	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.32	0.16	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.32	0.16	ug/l	
218-01-9	Chrysene	ND	0.32	0.16	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.32	0.079	ug/l	
206-44-0	Fluoranthene	ND	1.6	0.40	ug/l	
86-73-7	Fluorene	ND	1.6	0.40	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.32	0.079	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.6	0.40	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.6	0.40	ug/l	
91-20-3	Naphthalene	ND	1.6	0.40	ug/l	
85-01-8	Phenanthrene	ND	1.6	0.79	ug/l	
129-00-0	Pyrene	ND	1.6	0.40	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F39990-17	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L031047.D	1	04/26/06	MRE	04/18/06	OP16337	SL1611
Run #2 [a]	R02355.D	1	04/27/06	NJ	04/18/06	OP16337	SR109

	Initial Volume	Final Volume
Run #1	920 ml	1.0 ml
Run #2	920 ml	1.0 ml

ABN TCL List w/o PAHs

CAS No.	Compound	Result		RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	UL	27	11	ug/l	
95-57-8	2-Chlorophenol	ND	UL	5.4	2.2	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	UL	5.4	2.2	ug/l	
120-83-2	2,4-Dichlorophenol	ND	UL	5.4	2.2	ug/l	
105-67-9	2,4-Dimethylphenol	ND	UL	5.4	2.2	ug/l	
51-28-5	2,4-Dinitrophenol	ND	UL	27	11	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	UL	11	5.4	ug/l	
95-48-7	2-Methylphenol	ND	UL	5.4	2.2	ug/l	
	3&4-Methylphenol	ND	UL	5.4	2.2	ug/l	
88-75-5	2-Nitrophenol	ND	UL	5.4	2.2	ug/l	
100-02-7	4-Nitrophenol	ND	UL	27	11	ug/l	
87-86-5	Pentachlorophenol	ND	UL	27	11	ug/l	
108-95-2	Phenol	ND	UL	5.4	2.2	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	UL	5.4	2.2	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	UL	5.4	2.2	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	UL	5.4	1.1	ug/l	
85-68-7	Butyl benzyl phthalate	ND	UL	5.4	2.2	ug/l	
100-51-6	Benzyl Alcohol	ND	UL	5.4	1.1	ug/l	
91-58-7	2-Chloronaphthalene	ND	UL	5.4	1.1	ug/l	
106-47-8	4-Chloroaniline	ND	UL	11	4.3	ug/l	
86-74-8	Carbazole	ND	UL	5.4	1.1	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	UL	5.4	1.1	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	UL	5.4	2.2	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	UL	5.4	1.1	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	UL	5.4	1.1	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	UL	5.4	1.1	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	UL	5.4	1.1	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	UL	5.4	1.1	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	UL	5.4	2.2	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	UL	5.4	2.2	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	UL	11	5.4	ug/l	
132-64-9	Dibenzofuran	ND	UL	5.4	1.1	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F39990-17	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND UL	5.4	2.2	ug/l	
117-84-0	Di-n-octyl phthalate	ND UL	5.4	2.7	ug/l	
84-66-2	Diethyl phthalate	ND UL	5.4	2.2	ug/l	
131-11-3	Dimethyl phthalate	ND UL	5.4	2.2	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND UL	5.4	2.7	ug/l	
118-74-1	Hexachlorobenzene	ND UL	5.4	1.1	ug/l	
87-68-3	Hexachlorobutadiene	ND UL	5.4	2.2	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND UL	5.4	2.2	ug/l	
67-72-1	Hexachloroethane	ND UL	5.4	2.2	ug/l	
78-59-1	Isophorone	ND UL	5.4	1.1	ug/l	
88-74-4	2-Nitroaniline	ND UL	11	4.3	ug/l	
99-09-2	3-Nitroaniline	ND UL	11	4.3	ug/l	
100-01-6	4-Nitroaniline	ND UL	11	4.3	ug/l	
98-95-3	Nitrobenzene	ND UL	5.4	1.1	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND UL	5.4	2.2	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND UL	5.4	2.2	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND UL	5.4	1.1	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	16% [b]	18%	19-90%
4165-62-2	Phenol-d5	9%	12%	10-68%
118-79-6	2,4,6-Tribromophenol	70%	81%	36-137%
4165-60-0	Nitrobenzene-d5	60%	65%	49-119%
321-60-8	2-Fluorobiphenyl	68%	71%	45-118%
1718-51-0	Terphenyl-d14	75%	74%	46-135%

(a) Confirmation run.
(b) Confirmed by reanalysis. Insufficient sample for re-extraction.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
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J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F39990-17	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028587.D	1	04/26/06	NJ	04/18/06	OP16336	SW1500
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result		RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	VL	1.1	0.54	ug/l	
208-96-8	Acenaphthylene	ND	VL	1.1	0.54	ug/l	
120-12-7	Anthracene	ND	VL	1.1	0.54	ug/l	
56-55-3	Benzo(a)anthracene	ND	VL	0.22	0.054	ug/l	
50-32-8	Benzo(a)pyrene	ND	VL	0.22	0.11	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	VL	0.22	0.054	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	VL	0.22	0.11	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	VL	0.22	0.11	ug/l	
218-01-9	Chrysene	ND	VL	0.22	0.11	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	VL	0.22	0.054	ug/l	
206-44-0	Fluoranthene	ND	VL	1.1	0.27	ug/l	
86-73-7	Fluorene	ND	VL	1.1	0.27	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	VL	0.22	0.054	ug/l	
90-12-0	1-Methylnaphthalene	ND	VL	1.1	0.27	ug/l	
91-57-6	2-Methylnaphthalene	ND	VL	1.1	0.27	ug/l	
91-20-3	Naphthalene	ND	VL	1.1	0.27	ug/l	
85-01-8	Phenanthrene	ND	VL	1.1	0.54	ug/l	
129-00-0	Pyrene	ND	VL	1.1	0.27	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	041206R		
Lab Sample ID:	F39990-8	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R02150.D	1	04/18/06	MRE	04/14/06	OP16306	SR99
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	28	11	ug/l	
95-57-8	2-Chlorophenol	ND	5.6	2.2	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.6	2.2	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.6	2.2	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.6	2.2	ug/l	
51-28-5	2,4-Dinitrophenol	ND	28	11	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	11	5.6	ug/l	
95-48-7	2-Methylphenol	ND	5.6	2.2	ug/l	
	3&4-Methylphenol	ND	5.6	2.2	ug/l	
88-75-5	2-Nitrophenol	ND	5.6	2.2	ug/l	
100-02-7	4-Nitrophenol	ND	28	11	ug/l	
87-86-5	Pentachlorophenol	ND	28	11	ug/l	
108-95-2	Phenol	ND	5.6	2.2	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.6	2.2	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.6	2.2	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.6	1.1	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.6	2.2	ug/l	
100-51-6	Benzyl Alcohol	ND	5.6	1.1	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.6	1.1	ug/l	
106-47-8	4-Chloroaniline	ND	11	4.4	ug/l	
86-74-8	Carbazole	ND	5.6	1.1	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.6	1.1	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.6	2.2	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.6	1.1	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.6	1.1	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.6	1.1	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.6	1.1	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.6	1.1	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.6	2.2	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.6	2.2	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	11	5.6	ug/l	
132-64-9	Dibenzofuran	ND	5.6	1.1	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	041206R		
Lab Sample ID:	F39990-8	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.6	2.2	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.6	2.8	ug/l	
84-66-2	Diethyl phthalate	ND	5.6	2.2	ug/l	
131-11-3	Dimethyl phthalate	ND	5.6	2.2	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.6	2.8	ug/l	
118-74-1	Hexachlorobenzene	ND	5.6	1.1	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.6	2.2	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.6	2.2	ug/l	
67-72-1	Hexachloroethane	ND	5.6	2.2	ug/l	
78-59-1	Isophorone	ND	5.6	1.1	ug/l	
88-74-4	2-Nitroaniline	ND	11	4.4	ug/l	
99-09-2	3-Nitroaniline	ND	11	4.4	ug/l	
100-01-6	4-Nitroaniline	ND	11	4.4	ug/l	
98-95-3	Nitrobenzene	ND	5.6	1.1	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.6	2.2	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.6	2.2	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.6	1.1	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	40%		19-90%
4165-62-2	Phenol-d5	24%		10-68%
118-79-6	2,4,6-Tribromophenol	83%		36-137%
4165-60-0	Nitrobenzene-d5	66%		49-119%
321-60-8	2-Fluorobiphenyl	73%		45-118%
1718-51-0	Terphenyl-d14	82%		46-135%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	041206R		
Lab Sample ID:	F39990-8	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W028455.D	1	04/19/06	NJ	04/14/06	OP16311	SW1493
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	0.56	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.56	ug/l	
120-12-7	Anthracene	ND	1.1	0.56	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.22	0.056	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.22	0.11	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.22	0.056	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.22	0.11	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.22	0.11	ug/l	
218-01-9	Chrysene	ND	0.22	0.11	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.22	0.056	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.28	ug/l	
86-73-7	Fluorene	ND	1.1	0.28	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.22	0.056	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-20-3	Naphthalene	ND	1.1	0.28	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.56	ug/l	
129-00-0	Pyrene	ND	1.1	0.28	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.

2113 Emmorton Park Road
Edgewood, MD 21040-1037
410.612.6350
Fax 410.612.6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Pesticides and PCBs
Accutest Laboratories, Inc., SDG F39990

DATE: May 4, 2006

The purpose of this memorandum is to present the data validation report for the samples collected for RFAAP SWMUs 48, 49, 50, 51, and 59 on April 10, 2006, April 11, 2006, April 12, 2006, and April 13, 2006 for groundwater analysis. Samples were analyzed for pesticides and PCBs using USEPA Method 3510C/8081A and 3510C/8082, respectively. A total of fifteen aqueous samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
51MW1	F39990-1	TM13MW1	F39990-10
51MW2	F39990-2	13MW2	F39990-11
16-4	F39990-3	C1	F39990-12
28MW2	F39990-4	48MW1	F39990-14
28MW1	F39990-5	TM48MW1	F39990-15
C4	F39990-6	48MW2	F39990-16
48MW4	F39990-7	48MW3	F39990-17
13MW1	F39990-9		

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *USACE Shell for Analytical Chemistry Requirements*, method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in Table 1. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	System Monitoring Compounds
X		Laboratory Control Samples
X		Matrix Spike/Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

5/4/06

Date

RFAAP VALIDATION REPORT
PESTICIDE/PCB REVIEW
SDG F39990

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For pesticides and PCB compounds in cooled (@4°C ± 2°C) aqueous samples, the maximum holding time is 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 04/10/06, 04/11/06, and 04/12/06, the coolers were received by the primary laboratory (Accutest) on 04/13/06 at 4.2°C, 3.0°C, 2.4°C, 1.8°C, 2.4°C, 2.6°C, 1.6°C, 3.4°C, 2.8°C, 2.6°C, 3.2°C, and 3.0°C. For samples collected on 04/13/06, the coolers were received by the primary laboratory on 04/15/06 at 1.6°C, 2.0°C, 2.8°C, 3.4°C, and 4.2°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.1°C, 3.8°C, and 2.7°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 04/10/06, 04/11/06, 04/12/06, and 04/13/06. For samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12), the pesticides and PCBs were extracted on 04/14/06 and analyzed on 04/17/06. For samples, 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17), the pesticides and PCBs were extracted on 04/19/06 and analyzed on 04/20/06. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check (Degradation Standard)
Performance checks on the gas chromatograph with electron capture detector (GC/ECD) system are performed to ensure adequate resolution and instrument sensitivity. The performance evaluation mixture (PEM) must be analyzed at the beginning of the analytical sequence. The breakdown of Endrin and 4,4'-DDT must be ≤15% on both columns.

- For analysis performed on 03/01/06 @09:31, endrin and 4,4'-DDT percent breakdowns were 5.1% and 2.9% on column #1 and 3.3% and 5.3% on column #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 04/17/06 @09:35, endrin and 4,4'-DDT percent breakdowns were 9.1% and 2.6% on column #1 and 5.3% and 5.5% on column #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 04/20/06 @11:18, endrin and 4,4'-DDT percent breakdowns were 10.5% and 3.3% on column #1 and 6.8% and 4.7% on column #2, respectively. All criteria were met. No qualifiers were applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5 point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Calibration factors are generated for each compound. The percent relative standard deviation (%RSD) for all single peak target analytes; and aroclors 1016, 1242, 1254, and 1260 must be <20% or the mean %RSD for all analytes in the standard must be ≤20%. If linear regression is used, the correlation coefficient must be ≥0.990. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits.

- For the pesticide initial calibration performed on 03/01/06 on instrument ECD5, 4,4'-DDT (23.4%) was outside criteria for column #2. 4,4'-DDT (r=0.9973) was quantified for column #2 using linear regression with correlation coefficients >0.99, therefore, no qualifiers were applied based upon the high %RSD. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), C1 (F39990-12), 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) were analyzed using this initial calibration.

- For the PCB initial calibration performed on 04/17/06 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), C1 (F39990-12), 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) were analyzed using this initial calibration.

IV-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for pesticide/PCB target compounds. Continuing calibration standards containing both target compounds and surrogates are analyzed at the beginning of each 12-hour analytical shift and after every 20 samples. The percent difference (%D) or the average %Ds for all analytes in the standard from the initial calibration should be no greater than ±15%.

- For pesticide continuing calibration performed on 04/17/06 @10:00 on instrument ECD5, 4,4'-DDD (22.6%) and methoxychlor (23.0%) were outside criteria for column #1. All criteria were met on the column #2. 4,4'-DDD and methoxychlor were non-detect for all associated samples, therefore no qualifiers were applied based upon these outliers. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), and 48MW4 (F39990-7) were analyzed using this continuing calibration.

- For toxaphene pesticide continuing calibration performed on 04/17/06 @10:22 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 04/17/06 @14:22 on instrument ECD5, 4,4'-DDE (16.2%), 4,4'-DDD (17.4%), 4,4'-DDT (15.1%), and methoxychlor (15.2%) were outside criteria for the column #1. 4,4'-DDT (20.6%) was outside criteria for column #2. 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, and methoxychlor were non-detect for all associated samples, therefore no qualifiers were applied based upon these outliers. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 04/17/06 @17:35 on instrument ECD5, alpha-chlordane (15.9%), dieldrin (17.3%), endosulfan sulfate (17.4%), and endrin ketone (16.3%) were outside criteria for the column #2. All criteria were met for column #1. Alpha-chlordane, dieldrin, endosulfan sulfate, and endrin ketone were non-detect for all associated samples, therefore no qualifiers were applied based upon these outliers. Samples 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 04/20/06 @11:40 on instrument ECD5, endrin (16.7%), 4,4'-DDD (21.3%), and methoxychlor (28.2%) were outside criteria for the column #1. All criteria were met for column #2. Endrin, 4,4'-DDD, and methoxychlor were non-detect for all associated samples, therefore no qualifiers were applied based upon these outliers. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) were analyzed using this continuing calibration.

- For toxaphene pesticide continuing calibration performed on 04/20/06 @12:02 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 04/20/06 @16:04 on instrument ECD5, methoxychlor (15.9%) and endrin ketone (16.1%) were outside criteria for the column #1. Aldrin (19.6%), heptachlor epoxide (16.6%), alpha-chlordane (18.2%), endosulfan I (16.6%), dieldrin (18.9%), endosulfan II (16.8%), endrin aldehyde (18.2%), and endrin ketone (25.1%) were outside criteria for column #2. Heptachlor epoxide, alpha-chlordane, aldrin, endosulfan I, dieldrin, endosulfan II, endrin aldehyde, endrin ketone, and methoxychlor were non-detect for all associated samples, therefore no qualifiers were applied based upon these outliers. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 04/17/06 @17:14 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 04/17/06 @19:00 on instrument ECD3, all criteria were met for signal #1. For signal #2, PCB1016-A (18.6%), PCB1016-B (18.2%), PCB1016-C (17.5%), PCB1016-D (21.3%), PCB1016-E (23.1%), and PCB1016-F (25.2%) with a resulting average recovery of 20.6%. For signal #2, PCB1260-A (24.3%), PCB1260-B (24.3%), PCB1260-C (23.5%), PCB1260-D (13.9%), PCB1260-E (20.7%), and PCB1260-F (18.4%) with a resulting average recovery of 20.9%. PCB 1016 and PCB 1260 were non-detect for all samples, therefore no qualifiers were applied based upon the high %Ds. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 04/20/06 @10:07 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 04/20/06 @15:49 on instrument ECD3, all criteria were met for signal #1. For signal #2, PCB1016-A (6.4%), PCB1016-B (5.9%), PCB1016-C (9.6%), PCB1016-D (12.3%), PCB1016-E (15.6%), and PCB1016-F (14.5%) with a resulting average recovery of 10.7%. For signal #2, PCB1260-A (18.7%), PCB1260-B (25.6%), PCB1260-C (17.0%), PCB1260-D (17.6%), PCB1260-E (22.1%), and PCB1260-F (26.1%) with a resulting average recovery of 21.2%. PCB 1016 and PCB 1260 were non-detect for all samples, therefore no qualifiers were applied based upon the high %Ds. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 04/20/06 @17:50 on instrument ECD3, all criteria were met for signal #1. For signal #2, PCB1016-A (15.4%), PCB1016-B (17.6%), PCB1016-C (13.7%), PCB1016-D (18.0%), PCB1016-E (24.9%), and PCB1016-F (24.5%) with a resulting average recovery of 19.0%. For signal #2, PCB1260-A (26.3%), PCB1260-B (26.7%), PCB1260-C (24.8%), PCB1260-D (19.6%), PCB1260-E (26.5%), and PCB1260-F (26.1%) with a resulting average recovery of 25.0%. PCB 1016 and PCB 1260 were non-detect for all samples, therefore no qualifiers were applied based upon the high %Ds. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) were analyzed using this continuing calibration.

V-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be present in the blanks >MDL or >MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for pesticide and PCB target compounds. **Table 2** summarizes the blank contamination analysis. Rinse blank 041206R (F39990-8) (low-flow pump) applies to all samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Parameter	Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
Pesticides	04/17/06	OP16309-MB	All <MRL	NA	NA	None
Pesticides	04/20/06	OP16347-MB	All <MRL	NA	NA	None
Pesticides	04/17/06	041206R	All <MRL	NA	NA	None
PCBs	04/17/06	OP16308-MB	All <MRL	NA	NA	None
PCBs	04/20/06	OP16345-MB	All <MRL	NA	NA	None
PCBs	04/17/06	041206R	All <MRL	NA	NA	None

NA = Not Applicable
MRL = Method Reporting Limit

VI-System Monitoring Compound (Surrogates)

Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits.

Criteria: Tetrachloro-m-xylene: Pesticides: 60-138% (USACE Shell Criteria: 50-130%)
Decachlorobiphenyl: Pesticides: 31-148% (USACE Shell Criteria: 50-130%)

Criteria: Tetrachloro-m-xylene: PCBs: 49-124% (USACE Shell Criteria: 50-130%)
Decachlorobiphenyl: PCBs: 26-137% (USACE Shell Criteria: 50-130%)

- All criteria were met. No qualifiers were applied.

VII-Laboratory Control Samples
Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. USACE Shell limits for pesticides and PCBs are 50-130%; RPD≤50% (30-150%; RPD≤60% for sporadic marginal failures (SMF)).

- Sample OP16309-BS was used as the LCS for the pesticide analysis on 04/17/06. A total of 20 compounds were spiked, allowing for 2 SMF tolerances. Compound endrin aldehyde (11%) was outside USACE and SMF criteria, however within laboratory criteria. Compound endrin aldehyde was qualified estimated bias low "L" for detects and "UL" for non-detects based upon very low recovery. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) apply to this LCS.

- Sample OP16347-BS was used as the LCS for the pesticide analysis on 04/20/06. A total of 20 compounds were spiked, allowing for 2 SMF tolerances. Compound endrin aldehyde (15%) was outside USACE and SMF criteria, however within laboratory criteria. Compound endrin aldehyde was qualified estimated bias low "L" for detects and "UL" for non-detects based upon very low recovery. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this LCS.

- Sample OP16308-BS was used as the LCS for the PCB analysis on 04/17/06. A total of 2 compounds were spiked, allowing for 0 SMF tolerances. All criteria were met. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) apply to this LCS.

- Sample OP16345-BS was used as the LCS for the PCB analysis on 04/20/06. A total of 2 compounds were spiked, allowing for 0 SMF tolerances. All criteria were met. No qualifiers were applied. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this LCS.

VIII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. USACE Shell limits for pesticides and PCBs are 40-140%; RPD≤50% (30-150%; RPD≤60% for sporadic marginal failures (SMF)).

- Sample 48MW4 (F39990-7) was used as the MS/MSD for the pesticide analysis on 04/17/06. A total of 40 compounds were spiked, allowing for 4 SMF tolerances. Compound endrin aldehyde (21%, 25%) was outside USACE and SMF criteria, however within laboratory criteria. Compound endrin aldehyde was qualified estimated bias low "UL" for non-detects for the spiked sample based upon very low recoveries.

- Sample 48MW3 (F39990-17) was used as the MS/MSD for the pesticide analysis on 04/20/06. A total of 40 compounds were spiked, allowing for 4 SMF tolerances. Compound endrin aldehyde (18%, 21%) was outside USACE and SMF criteria, however within laboratory criteria. Compound endrin aldehyde was qualified estimated bias low "UL" for non-detects for the spiked sample based upon very low recoveries.

- Sample 28MW2 (F39990-4) was used as the MS/MSD for the PCB analysis on 04/17/06. A total of 4 compounds were spiked, allowing for 0 SMF tolerances. All criteria were met. No qualifiers were applied.

- Sample 48MW3 (F39990-17) was used as the MS/MSD for the PCB analysis on 04/20/06. A total of 4 compounds were spiked, allowing for 0 SMF tolerances. All criteria were met. No qualifiers were applied.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field groundwater sample duplicate pair 13MW1 (F39990-9) and TM13MW1 (F39990-10) was collected for pesticides and PCBs. All target compounds were non-detect. All criteria were met. No qualifiers were applied.

- Field groundwater sample duplicate pair 48MW1 (F39990-14) and TM48MW1 (F39990-15) was collected for pesticides and PCBs. All target compounds were non-detect. All criteria were met. No qualifiers were applied.

X-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The difference between the calculated value and the reported value must be within 10% difference. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value > MDL and < MRL is qualified as estimated, "J". All criteria were met.

- The %D between the primary and secondary columns was within criteria for pesticides and PCBs for all detected samples.

Sample: 16-4 (F39990-3), alpha-chlordane

Conc.µg/L = (Amt * DF * Vt) / (CF * Vo)

where: Amt is the response on column (ng/mL) of the sample
CF = Calibration Factor (from initial calibration)
Vt is the volume of final extract (mL)
DF is the dilution factor
Vo is the volume of the sample extracted (mL)

Conc. µg/L = (310787 ng/mL * 1 * 10 mL) / (20100 * 750 mL)
= 0.21 ng/mL = 0.21 µg/L

Reported Conc. = 0.21 µg/L
%D = 0.0%
Values were within 10% difference

Sample: 48MW3-MS (F39990-17MS), Aroclor 1260

Conc. µg/L = (Ax * Vt * DF) / (CF * Vi * Vs)

where: Conc. = Sample concentration in µg/L
Ax = Area/response for compound being measured.
Vt = Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10000 µL.
CF = Ave calibration response factor for compound being measured from ICAL (Area/pg)
Vi = Volume of extract injected (µL).
Vs = Volume of sample extracted (L).
DF = Dilution factor

Signal #1
Conc1 µg/L = (148112 Area * 10000µL* 1) / (392.5 Area/pg *(1000000 pg/µg) * 1µL * 0.4 L) = 9.43 µg/L
Conc2 µg/L = (298785 Area * 10000µL* 1) / (783.9 Area/pg *(1000000 pg/µg) * 1µL * 0.4 L) = 9.53 µg/L
Conc3 µg/L = (343924 Area * 10000µL* 1) / (889.4 Area/pg*(1000000 pg/µg) * 1µL * 0.4 L) = 9.67 µg/L
Conc4 µg/L = (556439 Area * 10000µL* 1) / (1472 Area/pg *(1000000 pg/µg) * 1µL * 0.4 L) = 9.45 µg/L
Conc5 µg/L = (220496 Area * 10000µL* 1) / (615.5 Area/pg *(1000000 pg/µg) * 1µL * 0.4 L) = 8.96 µg/L
Conc6 µg/L = (143060 Area * 10000µL* 1) / (381.1 Area/pg *(1000000 pg/µg) * 1µL * 0.4 L) = 9.38 µg/L
Average concentration = 9.4 µg/L

Signal #2
Conc1 µg/L = (973927 Area * 10000µL* 1) / (2519 Area/pg *(1000000 pg/µg) * 1µL * 0.4 L) = 9.67 µg/L
Conc2 µg/L = (1567213 Area * 10000µL* 1) / (4218 Area/pg *(1000000 pg/µg) * 1µL * 0.4 L) = 9.29 µg/L
Conc3 µg/L = (1816154 Area * 10000µL* 1) / (4854 Area/pg*(1000000 pg/µg) * 1µL * 0.4 L) = 9.35 µg/L
Conc4 µg/L = (2796384 Area * 10000µL* 1) / (7725 Area/pg *(1000000 pg/µg) * 1µL * 0.4 L) = 9.05 µg/L
Conc5 µg/L = (1160348 Area * 10000µL* 1) / (3408 Area/pg *(1000000 pg/µg) * 1µL * 0.4 L) = 8.51 µg/L
Conc6 µg/L = (612326 Area * 10000µL* 1) / (1657 Area/pg *(1000000 pg/µg) * 1µL * 0.4 L) = 9.24 µg/L
Average concentration = 9.2 µg/L

Reported Value = 9.8 µg/L (from signal #1)
% Difference = 4.1%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Form I COM

Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW1		
Lab Sample ID:	F39990-1	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12265.D	1	04/17/06	AA	04/14/06	OP16309	GKK458
Run #2							

	Initial Volume	Final Volume
Run #1	760 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.066	0.026	ug/l	
319-84-6	alpha-BHC	ND	0.066	0.020	ug/l	
319-85-7	beta-BHC	ND	0.066	0.026	ug/l	
319-86-8	delta-BHC	ND	0.066	0.026	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.066	0.020	ug/l	
5103-71-9	alpha-Chlordane	ND	0.066	0.013	ug/l	
5103-74-2	gamma-Chlordane	ND	0.066	0.013	ug/l	
60-57-1	Dieldrin	ND	0.066	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.026	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.026	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.026	ug/l	
72-20-8	Endrin	ND	0.13	0.053	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.026	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.13	0.053	ug/l	
53494-70-5	Endrin ketone	ND	0.13	0.026	ug/l	
959-98-8	Endosulfan-I	ND	0.066	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.026	ug/l	
76-44-8	Heptachlor	ND	0.066	0.026	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.066	0.013	ug/l	
72-43-5	Methoxychlor	ND	0.13	0.053	ug/l	
8001-35-2	Toxaphene	ND	3.3	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	93%		60-138%
2051-24-3	Decachlorobiphenyl	92%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW1		
Lab Sample ID:	F39990-1	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46611.D	1	04/17/06	KE	04/14/06	OP16308	GST1366
Run #2							

	Initial Volume	Final Volume
Run #1	760 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.66	0.33	ug/l	
11104-28-2	Aroclor 1221	ND	0.66	0.53	ug/l	
11141-16-5	Aroclor 1232	ND	0.66	0.53	ug/l	
53469-21-9	Aroclor 1242	ND	0.66	0.33	ug/l	
12672-29-6	Aroclor 1248	ND	0.66	0.33	ug/l	
11097-69-1	Aroclor 1254	ND	0.66	0.33	ug/l	
11096-82-5	Aroclor 1260	ND	0.66	0.33	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	102%		49-124%
2051-24-3	Decachlorobiphenyl	99%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW2		
Lab Sample ID:	F39990-2	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12266.D	1	04/17/06	AA	04/14/06	OP16309	GKK458
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.063	0.025	ug/l	
319-84-6	alpha-BHC	ND	0.063	0.019	ug/l	
319-85-7	beta-BHC	ND	0.063	0.025	ug/l	
319-86-8	delta-BHC	ND	0.063	0.025	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.063	0.019	ug/l	
5103-71-9	alpha-Chlordane	ND	0.063	0.013	ug/l	
5103-74-2	gamma-Chlordane	ND	0.063	0.013	ug/l	
60-57-1	Dieldrin	ND	0.063	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.025	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.025	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.025	ug/l	
72-20-8	Endrin	ND	0.13	0.050	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.025	ug/l	
7421-93-4	Endrin aldehyde	ND	0.13	0.050	ug/l	UL
53494-70-5	Endrin ketone	ND	0.13	0.025	ug/l	
959-98-8	Endosulfan-I	ND	0.063	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.025	ug/l	
76-44-8	Heptachlor	ND	0.063	0.025	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.063	0.013	ug/l	
72-43-5	Methoxychlor	ND	0.13	0.050	ug/l	
8001-35-2	Toxaphene	ND	3.1	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	100%		60-138%
2051-24-3	Decachlorobiphenyl	103%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	51MW2		
Lab Sample ID:	F39990-2	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46612.D	1	04/17/06	KE	04/14/06	OP16308	GST1366
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.63	0.31	ug/l	
11104-28-2	Aroclor 1221	ND	0.63	0.50	ug/l	
11141-16-5	Aroclor 1232	ND	0.63	0.50	ug/l	
53469-21-9	Aroclor 1242	ND	0.63	0.31	ug/l	
12672-29-6	Aroclor 1248	ND	0.63	0.31	ug/l	
11097-69-1	Aroclor 1254	ND	0.63	0.31	ug/l	
11096-82-5	Aroclor 1260	ND	0.63	0.31	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	103%		49-124%
2051-24-3	Decachlorobiphenyl	109%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	16-4		
Lab Sample ID:	F39990-3	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK12267.D	1	04/17/06	AA	04/14/06	OP16309	GKK458
Run #2							

	Initial Volume	Final Volume
Run #1	750 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.067	0.027	ug/l	
319-84-6	alpha-BHC	ND	0.067	0.020	ug/l	
319-85-7	beta-BHC	ND	0.067	0.027	ug/l	
319-86-8	delta-BHC	ND	0.067	0.027	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.067	0.020	ug/l	
5103-71-9	alpha-Chlordane	0.21	0.067	0.013	ug/l	
5103-74-2	gamma-Chlordane	0.25	0.067	0.013	ug/l	
60-57-1	Dieldrin	ND	0.067	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.027	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.027	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.027	ug/l	
72-20-8	Endrin	ND	0.13	0.053	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.027	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.13	0.053	ug/l	
53494-70-5	Endrin ketone	ND	0.13	0.027	ug/l	
959-98-8	Endosulfan-I	ND	0.067	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.027	ug/l	
76-44-8	Heptachlor	ND	0.067	0.027	ug/l	
1024-57-3	Heptachlor epoxide	0.015 J	0.067	0.013	ug/l	J
72-43-5	Methoxychlor	ND	0.13	0.053	ug/l	
8001-35-2	Toxaphene	ND	3.3	1.7	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	89%		60-138%
2051-24-3	Decachlorobiphenyl	89%		31-148%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	16-4		
Lab Sample ID:	F39990-3	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46613.D	1	04/17/06	KE	04/14/06	OP16308	GST1366
Run #2							

	Initial Volume	Final Volume
Run #1	750 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.67	0.33	ug/l	
11104-28-2	Aroclor 1221	ND	0.67	0.53	ug/l	
11141-16-5	Aroclor 1232	ND	0.67	0.53	ug/l	
53469-21-9	Aroclor 1242	ND	0.67	0.33	ug/l	
12672-29-6	Aroclor 1248	ND	0.67	0.33	ug/l	
11097-69-1	Aroclor 1254	ND	0.67	0.33	ug/l	
11096-82-5	Aroclor 1260	ND	0.67	0.33	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	96%		49-124%
2051-24-3	Decachlorobiphenyl	97%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	28MW2		
Lab Sample ID:	F39990-4	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12268.D	1	04/17/06	AA	04/14/06	OP16309	GKK458
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.063	0.025	ug/l	
319-84-6	alpha-BHC	ND	0.063	0.019	ug/l	
319-85-7	beta-BHC	ND	0.063	0.025	ug/l	
319-86-8	delta-BHC	ND	0.063	0.025	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.063	0.019	ug/l	
5103-71-9	alpha-Chlordane	ND	0.063	0.013	ug/l	
5103-74-2	gamma-Chlordane	ND	0.063	0.013	ug/l	
60-57-1	Dieldrin	ND	0.063	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.025	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.025	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.025	ug/l	
72-20-8	Endrin	ND	0.13	0.050	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.025	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.13	0.050	ug/l	
53494-70-5	Endrin ketone	ND	0.13	0.025	ug/l	
959-98-8	Endosulfan-I	ND	0.063	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.025	ug/l	
76-44-8	Heptachlor	ND	0.063	0.025	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.063	0.013	ug/l	
72-43-5	Methoxychlor	ND	0.13	0.050	ug/l	
8001-35-2	Toxaphene	ND	3.1	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	103%		60-138%
2051-24-3	Decachlorobiphenyl	107%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	28MW2		
Lab Sample ID:	F39990-4	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46614.D	1	04/17/06	KE	04/14/06	OP16308	GST1366
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.63	0.31	ug/l	
11104-28-2	Aroclor 1221	ND	0.63	0.50	ug/l	
11141-16-5	Aroclor 1232	ND	0.63	0.50	ug/l	
53469-21-9	Aroclor 1242	ND	0.63	0.31	ug/l	
12672-29-6	Aroclor 1248	ND	0.63	0.31	ug/l	
11097-69-1	Aroclor 1254	ND	0.63	0.31	ug/l	
11096-82-5	Aroclor 1260	ND	0.63	0.31	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	117%		49-124%
2051-24-3	Decachlorobiphenyl	118%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	28MW1		
Lab Sample ID:	F39990-5	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12269.D	1	04/17/06	AA	04/14/06	OP16309	GKK458
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.063	0.025	ug/l	
319-84-6	alpha-BHC	ND	0.063	0.019	ug/l	
319-85-7	beta-BHC	ND	0.063	0.025	ug/l	
319-86-8	delta-BHC	ND	0.063	0.025	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.063	0.019	ug/l	
5103-71-9	alpha-Chlordane	ND	0.063	0.013	ug/l	
5103-74-2	gamma-Chlordane	ND	0.063	0.013	ug/l	
60-57-1	Dieldrin	ND	0.063	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.025	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.025	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.025	ug/l	
72-20-8	Endrin	ND	0.13	0.050	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.025	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.13	0.050	ug/l	
53494-70-5	Endrin ketone	ND	0.13	0.025	ug/l	
959-98-8	Endosulfan-I	ND	0.063	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.025	ug/l	
76-44-8	Heptachlor	ND	0.063	0.025	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.063	0.013	ug/l	
72-43-5	Methoxychlor	ND	0.13	0.050	ug/l	
8001-35-2	Toxaphene	ND	3.1	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	93%		60-138%
2051-24-3	Decachlorobiphenyl	96%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	28MW1		
Lab Sample ID:	F39990-5	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46617.D	1	04/17/06	KE	04/14/06	OP16308	GST1366
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.63	0.31	ug/l	
11104-28-2	Aroclor 1221	ND	0.63	0.50	ug/l	
11141-16-5	Aroclor 1232	ND	0.63	0.50	ug/l	
53469-21-9	Aroclor 1242	ND	0.63	0.31	ug/l	
12672-29-6	Aroclor 1248	ND	0.63	0.31	ug/l	
11097-69-1	Aroclor 1254	ND	0.63	0.31	ug/l	
11096-82-5	Aroclor 1260	ND	0.63	0.31	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	99%		49-124%
2051-24-3	Decachlorobiphenyl	107%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C4		
Lab Sample ID:	F39990-6	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12270.D	1	04/17/06	AA	04/14/06	OP16309	GKK458
Run #2							

	Initial Volume	Final Volume
Run #1	760 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.066	0.026	ug/l	
319-84-6	alpha-BHC	ND	0.066	0.020	ug/l	
319-85-7	beta-BHC	ND	0.066	0.026	ug/l	
319-86-8	delta-BHC	ND	0.066	0.026	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.066	0.020	ug/l	
5103-71-9	alpha-Chlordane	ND	0.066	0.013	ug/l	
5103-74-2	gamma-Chlordane	ND	0.066	0.013	ug/l	
60-57-1	Dieldrin	ND	0.066	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.026	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.026	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.026	ug/l	
72-20-8	Endrin	ND	0.13	0.053	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.026	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.13	0.053	ug/l	
53494-70-5	Endrin ketone	ND	0.13	0.026	ug/l	
959-98-8	Endosulfan-I	ND	0.066	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.026	ug/l	
76-44-8	Heptachlor	ND	0.066	0.026	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.066	0.013	ug/l	
72-43-5	Methoxychlor	ND	0.13	0.053	ug/l	
8001-35-2	Toxaphene	ND	3.3	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	100%		60-138%
2051-24-3	Decachlorobiphenyl	97%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C4		
Lab Sample ID:	F39990-6	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46618.D	1	04/17/06	KE	04/14/06	OP16308	GST1366
Run #2							

	Initial Volume	Final Volume
Run #1	760 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.66	0.33	ug/l	
11104-28-2	Aroclor 1221	ND	0.66	0.53	ug/l	
11141-16-5	Aroclor 1232	ND	0.66	0.53	ug/l	
53469-21-9	Aroclor 1242	ND	0.66	0.33	ug/l	
12672-29-6	Aroclor 1248	ND	0.66	0.33	ug/l	
11097-69-1	Aroclor 1254	ND	0.66	0.33	ug/l	
11096-82-5	Aroclor 1260	ND	0.66	0.33	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	103%		49-124%
2051-24-3	Decachlorobiphenyl	106%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F39990-7	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12271.D	1	04/17/06	AA	04/14/06	OP16309	GKK458
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.063	0.025	ug/l	
319-84-6	alpha-BHC	ND	0.063	0.019	ug/l	
319-85-7	beta-BHC	ND	0.063	0.025	ug/l	
319-86-8	delta-BHC	ND	0.063	0.025	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.063	0.019	ug/l	
5103-71-9	alpha-Chlordane	ND	0.063	0.013	ug/l	
5103-74-2	gamma-Chlordane	ND	0.063	0.013	ug/l	
60-57-1	Dieldrin	ND	0.063	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.025	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.025	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.025	ug/l	
72-20-8	Endrin	ND	0.13	0.050	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.025	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.13	0.050	ug/l	
53494-70-5	Endrin ketone	ND	0.13	0.025	ug/l	
959-98-8	Endosulfan-I	ND	0.063	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.025	ug/l	
76-44-8	Heptachlor	ND	0.063	0.025	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.063	0.013	ug/l	
72-43-5	Methoxychlor	ND	0.13	0.050	ug/l	
8001-35-2	Toxaphene	ND	3.1	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	103%		60-138%
2051-24-3	Decachlorobiphenyl	108%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F39990-7	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46621.D	1	04/17/06	KE	04/14/06	OP16308	GST1366
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.63	0.31	ug/l	
11104-28-2	Aroclor 1221	ND	0.63	0.50	ug/l	
11141-16-5	Aroclor 1232	ND	0.63	0.50	ug/l	
53469-21-9	Aroclor 1242	ND	0.63	0.31	ug/l	
12672-29-6	Aroclor 1248	ND	0.63	0.31	ug/l	
11097-69-1	Aroclor 1254	ND	0.63	0.31	ug/l	
11096-82-5	Aroclor 1260	ND	0.63	0.31	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	99%		49-124%
2051-24-3	Decachlorobiphenyl	111%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW1		
Lab Sample ID:	F39990-9	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12277.D	1	04/17/06	AA	04/14/06	OP16309	GKK458
Run #2							

	Initial Volume	Final Volume
Run #1	750 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.067	0.027	ug/l	
319-84-6	alpha-BHC	ND	0.067	0.020	ug/l	
319-85-7	beta-BHC	ND	0.067	0.027	ug/l	
319-86-8	delta-BHC	ND	0.067	0.027	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.067	0.020	ug/l	
5103-71-9	alpha-Chlordane	ND	0.067	0.013	ug/l	
5103-74-2	gamma-Chlordane	ND	0.067	0.013	ug/l	
60-57-1	Dieldrin	ND	0.067	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.027	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.027	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.027	ug/l	
72-20-8	Endrin	ND	0.13	0.053	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.027	ug/l	
7421-93-4	Endrin aldehyde	ND	0.13	0.053	ug/l	
53494-70-5	Endrin ketone	ND	0.13	0.027	ug/l	
959-98-8	Endosulfan-I	ND	0.067	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.027	ug/l	
76-44-8	Heptachlor	ND	0.067	0.027	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.067	0.013	ug/l	
72-43-5	Methoxychlor	ND	0.13	0.053	ug/l	
8001-35-2	Toxaphene	ND	3.3	1.7	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	93%		60-138%
2051-24-3	Decachlorobiphenyl	91%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW1		
Lab Sample ID:	F39990-9	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46623.D	1	04/17/06	KE	04/14/06	OP16308	GST1366
Run #2							

	Initial Volume	Final Volume
Run #1	750 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.67	0.33	ug/l	
11104-28-2	Aroclor 1221	ND	0.67	0.53	ug/l	
11141-16-5	Aroclor 1232	ND	0.67	0.53	ug/l	
53469-21-9	Aroclor 1242	ND	0.67	0.33	ug/l	
12672-29-6	Aroclor 1248	ND	0.67	0.33	ug/l	
11097-69-1	Aroclor 1254	ND	0.67	0.33	ug/l	
11096-82-5	Aroclor 1260	ND	0.67	0.33	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	94%		49-124%
2051-24-3	Decachlorobiphenyl	98%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM13MW1		
Lab Sample ID:	F39990-10	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12278.D	1	04/17/06	AA	04/14/06	OP16309	GKK458
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.063	0.025	ug/l	
319-84-6	alpha-BHC	ND	0.063	0.019	ug/l	
319-85-7	beta-BHC	ND	0.063	0.025	ug/l	
319-86-8	delta-BHC	ND	0.063	0.025	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.063	0.019	ug/l	
5103-71-9	alpha-Chlordane	ND	0.063	0.013	ug/l	
5103-74-2	gamma-Chlordane	ND	0.063	0.013	ug/l	
60-57-1	Dieldrin	ND	0.063	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.025	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.025	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.025	ug/l	
72-20-8	Endrin	ND	0.13	0.050	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.025	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.13	0.050	ug/l	
53494-70-5	Endrin ketone	ND	0.13	0.025	ug/l	
959-98-8	Endosulfan-I	ND	0.063	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.025	ug/l	
76-44-8	Heptachlor	ND	0.063	0.025	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.063	0.013	ug/l	
72-43-5	Methoxychlor	ND	0.13	0.050	ug/l	
8001-35-2	Toxaphene	ND	3.1	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	93%		60-138%
2051-24-3	Decachlorobiphenyl	88%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM13MW1		
Lab Sample ID:	F39990-10	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46624.D	1	04/17/06	KE	04/14/06	OP16308	GST1366
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.63	0.31	ug/l	
11104-28-2	Aroclor 1221	ND	0.63	0.50	ug/l	
11141-16-5	Aroclor 1232	ND	0.63	0.50	ug/l	
53469-21-9	Aroclor 1242	ND	0.63	0.31	ug/l	
12672-29-6	Aroclor 1248	ND	0.63	0.31	ug/l	
11097-69-1	Aroclor 1254	ND	0.63	0.31	ug/l	
11096-82-5	Aroclor 1260	ND	0.63	0.31	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	90%		49-124%
2051-24-3	Decachlorobiphenyl	94%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW2		
Lab Sample ID:	F39990-11	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12279.D	1	04/17/06	AA	04/14/06	OP16309	GKK458
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.063	0.025	ug/l	
319-84-6	alpha-BHC	ND	0.063	0.019	ug/l	
319-85-7	beta-BHC	ND	0.063	0.025	ug/l	
319-86-8	delta-BHC	ND	0.063	0.025	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.063	0.019	ug/l	
5103-71-9	alpha-Chlordane	ND	0.063	0.013	ug/l	
5103-74-2	gamma-Chlordane	ND	0.063	0.013	ug/l	
60-57-1	Dieldrin	ND	0.063	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.025	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.025	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.025	ug/l	
72-20-8	Endrin	ND	0.13	0.050	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.025	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.13	0.050	ug/l	
53494-70-5	Endrin ketone	ND	0.13	0.025	ug/l	
959-98-8	Endosulfan-I	ND	0.063	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.025	ug/l	
76-44-8	Heptachlor	ND	0.063	0.025	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.063	0.013	ug/l	
72-43-5	Methoxychlor	ND	0.13	0.050	ug/l	
8001-35-2	Toxaphene	ND	3.1	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	81%		60-138%
2051-24-3	Decachlorobiphenyl	84%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW2		
Lab Sample ID:	F39990-11	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46625.D	1	04/17/06	KE	04/14/06	OP16308	GST1366
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.63	0.31	ug/l	
11104-28-2	Aroclor 1221	ND	0.63	0.50	ug/l	
11141-16-5	Aroclor 1232	ND	0.63	0.50	ug/l	
53469-21-9	Aroclor 1242	ND	0.63	0.31	ug/l	
12672-29-6	Aroclor 1248	ND	0.63	0.31	ug/l	
11097-69-1	Aroclor 1254	ND	0.63	0.31	ug/l	
11096-82-5	Aroclor 1260	ND	0.63	0.31	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		49-124%
2051-24-3	Decachlorobiphenyl	86%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C1		
Lab Sample ID:	F39990-12	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12280.D	1	04/17/06	AA	04/14/06	OP16309	GKK458
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.063	0.025	ug/l	
319-84-6	alpha-BHC	ND	0.063	0.019	ug/l	
319-85-7	beta-BHC	ND	0.063	0.025	ug/l	
319-86-8	delta-BHC	ND	0.063	0.025	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.063	0.019	ug/l	
5103-71-9	alpha-Chlordane	ND	0.063	0.013	ug/l	
5103-74-2	gamma-Chlordane	ND	0.063	0.013	ug/l	
60-57-1	Dieldrin	ND	0.063	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.025	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.025	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.025	ug/l	
72-20-8	Endrin	ND	0.13	0.050	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.025	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.13	0.050	ug/l	
53494-70-5	Endrin ketone	ND	0.13	0.025	ug/l	
959-98-8	Endosulfan-I	ND	0.063	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.025	ug/l	
76-44-8	Heptachlor	ND	0.063	0.025	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.063	0.013	ug/l	
72-43-5	Methoxychlor	ND	0.13	0.050	ug/l	
8001-35-2	Toxaphene	ND	3.1	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	89%		60-138%
2051-24-3	Decachlorobiphenyl	97%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C1		
Lab Sample ID:	F39990-12	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46626.D	1	04/17/06	KE	04/14/06	OP16308	GST1366
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.63	0.31	ug/l	
11104-28-2	Aroclor 1221	ND	0.63	0.50	ug/l	
11141-16-5	Aroclor 1232	ND	0.63	0.50	ug/l	
53469-21-9	Aroclor 1242	ND	0.63	0.31	ug/l	
12672-29-6	Aroclor 1248	ND	0.63	0.31	ug/l	
11097-69-1	Aroclor 1254	ND	0.63	0.31	ug/l	
11096-82-5	Aroclor 1260	ND	0.63	0.31	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	92%		49-124%
2051-24-3	Decachlorobiphenyl	104%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F39990-14	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12290.D	1	04/20/06	AA	04/19/06	OP16347	GKK459
Run #2							

	Initial Volume	Final Volume
Run #1	810 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.062	0.025	ug/l	
319-84-6	alpha-BHC	ND	0.062	0.019	ug/l	
319-85-7	beta-BHC	ND	0.062	0.025	ug/l	
319-86-8	delta-BHC	ND	0.062	0.025	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.062	0.019	ug/l	
5103-71-9	alpha-Chlordane	ND	0.062	0.012	ug/l	
5103-74-2	gamma-Chlordane	ND	0.062	0.012	ug/l	
60-57-1	Dieldrin	ND	0.062	0.012	ug/l	
72-54-8	4,4'-DDD	ND	0.12	0.025	ug/l	
72-55-9	4,4'-DDE	ND	0.12	0.025	ug/l	
50-29-3	4,4'-DDT	ND	0.12	0.025	ug/l	
72-20-8	Endrin	ND	0.12	0.049	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.12	0.025	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.12	0.049	ug/l	
53494-70-5	Endrin ketone	ND	0.12	0.025	ug/l	
959-98-8	Endosulfan-I	ND	0.062	0.012	ug/l	
33213-65-9	Endosulfan-II	ND	0.12	0.025	ug/l	
76-44-8	Heptachlor	ND	0.062	0.025	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.062	0.012	ug/l	
72-43-5	Methoxychlor	ND	0.12	0.049	ug/l	
8001-35-2	Toxaphene	ND	3.1	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	89%		60-138%
2051-24-3	Decachlorobiphenyl	89%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F39990-14	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46689.D	1	04/20/06	KE	04/19/06	OP16345	GST1368
Run #2							

	Initial Volume	Final Volume
Run #1	810 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.62	0.31	ug/l	
11104-28-2	Aroclor 1221	ND	0.62	0.49	ug/l	
11141-16-5	Aroclor 1232	ND	0.62	0.49	ug/l	
53469-21-9	Aroclor 1242	ND	0.62	0.31	ug/l	
12672-29-6	Aroclor 1248	ND	0.62	0.31	ug/l	
11097-69-1	Aroclor 1254	ND	0.62	0.31	ug/l	
11096-82-5	Aroclor 1260	ND	0.62	0.31	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	100%		49-124%
2051-24-3	Decachlorobiphenyl	107%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM48MW1		
Lab Sample ID:	F39990-15	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12291.D	1	04/20/06	AA	04/19/06	OP16347	GKK459
Run #2							

	Initial Volume	Final Volume
Run #1	820 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.061	0.024	ug/l	
319-84-6	alpha-BHC	ND	0.061	0.018	ug/l	
319-85-7	beta-BHC	ND	0.061	0.024	ug/l	
319-86-8	delta-BHC	ND	0.061	0.024	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.061	0.018	ug/l	
5103-71-9	alpha-Chlordane	ND	0.061	0.012	ug/l	
5103-74-2	gamma-Chlordane	ND	0.061	0.012	ug/l	
60-57-1	Dieldrin	ND	0.061	0.012	ug/l	
72-54-8	4,4'-DDD	ND	0.12	0.024	ug/l	
72-55-9	4,4'-DDE	ND	0.12	0.024	ug/l	
50-29-3	4,4'-DDT	ND	0.12	0.024	ug/l	
72-20-8	Endrin	ND	0.12	0.049	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.12	0.024	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.12	0.049	ug/l	
53494-70-5	Endrin ketone	ND	0.12	0.024	ug/l	
959-98-8	Endosulfan-I	ND	0.061	0.012	ug/l	
33213-65-9	Endosulfan-II	ND	0.12	0.024	ug/l	
76-44-8	Heptachlor	ND	0.061	0.024	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.061	0.012	ug/l	
72-43-5	Methoxychlor	ND	0.12	0.049	ug/l	
8001-35-2	Toxaphene	ND	3.0	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	88%		60-138%
2051-24-3	Decachlorobiphenyl	91%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	TM48MW1		
Lab Sample ID:	F39990-15	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46690.D	1	04/20/06	KE	04/19/06	OP16345	GST1368
Run #2							

	Initial Volume	Final Volume
Run #1	820 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.61	0.30	ug/l	
11104-28-2	Aroclor 1221	ND	0.61	0.49	ug/l	
11141-16-5	Aroclor 1232	ND	0.61	0.49	ug/l	
53469-21-9	Aroclor 1242	ND	0.61	0.30	ug/l	
12672-29-6	Aroclor 1248	ND	0.61	0.30	ug/l	
11097-69-1	Aroclor 1254	ND	0.61	0.30	ug/l	
11096-82-5	Aroclor 1260	ND	0.61	0.30	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	96%		49-124%
2051-24-3	Decachlorobiphenyl	103%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F39990-16	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12292.D	1	04/20/06	AA	04/19/06	OP16347	GKK459
Run #2							

	Initial Volume	Final Volume
Run #1	780 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.064	0.026	ug/l	
319-84-6	alpha-BHC	ND	0.064	0.019	ug/l	
319-85-7	beta-BHC	ND	0.064	0.026	ug/l	
319-86-8	delta-BHC	ND	0.064	0.026	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.064	0.019	ug/l	
5103-71-9	alpha-Chlordane	ND	0.064	0.013	ug/l	
5103-74-2	gamma-Chlordane	ND	0.064	0.013	ug/l	
60-57-1	Dieldrin	ND	0.064	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.026	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.026	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.026	ug/l	
72-20-8	Endrin	ND	0.13	0.051	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.026	ug/l	
7421-93-4	Endrin aldehyde	ND UL	0.13	0.051	ug/l	
53494-70-5	Endrin ketone	ND	0.13	0.026	ug/l	
959-98-8	Endosulfan-I	ND	0.064	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.026	ug/l	
76-44-8	Heptachlor	ND	0.064	0.026	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.064	0.013	ug/l	
72-43-5	Methoxychlor	ND	0.13	0.051	ug/l	
8001-35-2	Toxaphene	ND	3.2	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	92%		60-138%
2051-24-3	Decachlorobiphenyl	63%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F39990-16	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46691.D	1	04/20/06	KE	04/19/06	OP16345	GST1368
Run #2							

	Initial Volume	Final Volume
Run #1	780 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.64	0.32	ug/l	
11104-28-2	Aroclor 1221	ND	0.64	0.51	ug/l	
11141-16-5	Aroclor 1232	ND	0.64	0.51	ug/l	
53469-21-9	Aroclor 1242	ND	0.64	0.32	ug/l	
12672-29-6	Aroclor 1248	ND	0.64	0.32	ug/l	
11097-69-1	Aroclor 1254	ND	0.64	0.32	ug/l	
11096-82-5	Aroclor 1260	ND	0.64	0.32	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	96%		49-124%
2051-24-3	Decachlorobiphenyl	68%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F39990-17	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12293.D	1	04/20/06	AA	04/19/06	OP16347	GKK459
Run #2							

	Initial Volume	Final Volume
Run #1	890 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.056	0.022	ug/l	
319-84-6	alpha-BHC	ND	0.056	0.017	ug/l	
319-85-7	beta-BHC	ND	0.056	0.022	ug/l	
319-86-8	delta-BHC	ND	0.056	0.022	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.056	0.017	ug/l	
5103-71-9	alpha-Chlordane	ND	0.056	0.011	ug/l	
5103-74-2	gamma-Chlordane	ND	0.056	0.011	ug/l	
60-57-1	Dieldrin	ND	0.056	0.011	ug/l	
72-54-8	4,4'-DDD	ND	0.11	0.022	ug/l	
72-55-9	4,4'-DDE	ND	0.11	0.022	ug/l	
50-29-3	4,4'-DDT	ND	0.11	0.022	ug/l	
72-20-8	Endrin	ND	0.11	0.045	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.11	0.022	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.11	0.045	ug/l	
53494-70-5	Endrin ketone	ND	0.11	0.022	ug/l	
959-98-8	Endosulfan-I	ND	0.056	0.011	ug/l	
33213-65-9	Endosulfan-II	ND	0.11	0.022	ug/l	
76-44-8	Heptachlor	ND	0.056	0.022	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.056	0.011	ug/l	
72-43-5	Methoxychlor	ND	0.11	0.045	ug/l	
8001-35-2	Toxaphene	ND	2.8	1.4	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	93%		60-138%
2051-24-3	Decachlorobiphenyl	96%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F39990-17	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46692.D	1	04/20/06	KE	04/19/06	OP16345	GST1368
Run #2							

	Initial Volume	Final Volume
Run #1	890 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.56	0.28	ug/l	
11104-28-2	Aroclor 1221	ND	0.56	0.45	ug/l	
11141-16-5	Aroclor 1232	ND	0.56	0.45	ug/l	
53469-21-9	Aroclor 1242	ND	0.56	0.28	ug/l	
12672-29-6	Aroclor 1248	ND	0.56	0.28	ug/l	
11097-69-1	Aroclor 1254	ND	0.56	0.28	ug/l	
11096-82-5	Aroclor 1260	ND	0.56	0.28	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	94%		49-124%
2051-24-3	Decachlorobiphenyl	105%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	041206R		
Lab Sample ID:	F39990-8	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK12276.D	1	04/17/06	AA	04/14/06	OP16309	GKK458
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.063	0.025	ug/l	
319-84-6	alpha-BHC	ND	0.063	0.019	ug/l	
319-85-7	beta-BHC	ND	0.063	0.025	ug/l	
319-86-8	delta-BHC	ND	0.063	0.025	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.063	0.019	ug/l	
5103-71-9	alpha-Chlordane	ND	0.063	0.013	ug/l	
5103-74-2	gamma-Chlordane	ND	0.063	0.013	ug/l	
60-57-1	Dieldrin	ND	0.063	0.013	ug/l	
72-54-8	4,4'-DDD	ND	0.13	0.025	ug/l	
72-55-9	4,4'-DDE	ND	0.13	0.025	ug/l	
50-29-3	4,4'-DDT	ND	0.13	0.025	ug/l	
72-20-8	Endrin	ND	0.13	0.050	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.13	0.025	ug/l	
7421-93-4	Endrin aldehyde	ND	0.13	0.050	ug/l	
53494-70-5	Endrin ketone	ND	0.13	0.025	ug/l	
959-98-8	Endosulfan-I	ND	0.063	0.013	ug/l	
33213-65-9	Endosulfan-II	ND	0.13	0.025	ug/l	
76-44-8	Heptachlor	ND	0.063	0.025	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.063	0.013	ug/l	
72-43-5	Methoxychlor	ND	0.13	0.050	ug/l	
8001-35-2	Toxaphene	ND	3.1	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	91%		60-138%
2051-24-3	Decachlorobiphenyl	73%		31-148%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	041206R		
Lab Sample ID:	F39990-8	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST46622.D	1	04/17/06	KE	04/14/06	OP16308	GST1366
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.63	0.31	ug/l	
11104-28-2	Aroclor 1221	ND	0.63	0.50	ug/l	
11141-16-5	Aroclor 1232	ND	0.63	0.50	ug/l	
53469-21-9	Aroclor 1242	ND	0.63	0.31	ug/l	
12672-29-6	Aroclor 1248	ND	0.63	0.31	ug/l	
11097-69-1	Aroclor 1254	ND	0.63	0.31	ug/l	
11096-82-5	Aroclor 1260	ND	0.63	0.31	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	92%		49-124%
2051-24-3	Decachlorobiphenyl	79%		26-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.

2113 Emmorton Park Road
Edgewood, MD 21040-1037
410.612.6350
Fax 410.612.6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – TAL Metals
Accutest Laboratories, Inc., SDG F39990

DATE: May 8, 2006

The purpose of this memorandum is to present the data validation report for the samples collected collected for RFAAP SWMUs 48, 49, 50, 51, and 59 on April 10, 2006, April 11, 2006, April 12, 2006, and April 13, 2006 for groundwater analysis. Samples were analyzed for target analyte list (TAL) metals using USEPA SW-846 3010A/6010B for ICP metals and SW-846 7470A for mercury. A total of fifteen aqueous samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
51MW1	F39990-1	TM13MW1	F39990-10
51MW2	F39990-2	13MW2	F39990-11
16-4	F39990-3	C1	F39990-12
28MW2	F39990-4	48MW1	F39990-14
28MW1	F39990-5	TM48MW1	F39990-15
C4	F39990-6	48MW2	F39990-16
48MW4	F39990-7	48MW3	F39990-17
13MW1	F39990-9		

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *USACE Shell for Analytical Chemistry Requirements*, method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
X		Initial and Continuing Calibration
X		Blank Analysis
	X	ICP Interference Check Sample (ICS)
	X	Laboratory Control Sample (LCS)
	X	Laboratory Sample Duplicate
	X	Matrix Spike and Spike Duplicate
X		ICP Serial Dilution
X		Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

5/8/06
Date

RFAAP VALIDATION REPORT
METALS REVIEW
SDG F39990

I-Holding Times

The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: Cool @4°C±2°C, preserved to pH<2 with HNO_3, the maximum holding time is 180 days for metals and 28 days for mercury.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 04/10/06, 04/11/06, and 04/12/06, the coolers were received by the primary laboratory (Accutest) on 04/13/06 at 4.2°C, 3.0°C, 2.4°C, 1.8°C, 2.4°C, 2.6°C, 1.6°C, 3.4°C, 2.8°C, 2.6°C, 3.2°C, and 3.0°C. For samples collected on 04/13/06, the coolers were received by the primary laboratory on 04/15/06 at 1.6°C, 2.0°C, 2.8°C, 3.4°C, and 4.2°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.1°C, 3.8°C, and 2.7°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: Samples were collected 04/10/06, 04/11/06, 04/12/06, and 04/13/06 for metals analysis. They were digested on 04/18/06 for ICP metals and 04/14/06 and 04/17/06 for mercury. They were analyzed for ICP metals on 04/18/06 and for mercury on 04/14/06 and 04/17/06. All criteria were met. No qualifiers were applied.

II-Initial and Continuing Calibration

Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

ICP:	1- blank (USACE <MDL)	Hg:	1 – blank (USACE <MDL)
	3 – standards (r≥0.995)		5 – standards (r≥0.995)
	ICV/CCV (90-110%) (USACE 90-110%)		ICV/CCV (80-120%) (USACE ICV 90-110% / CCV 80-120%)
	MRL (70-130%) (USACE 80-120%)		MRL (80-120%)

- The samples were analyzed for ICP metals on 04/18/06. Mercury was analyzed on 04/14/06 with a correlation coefficient of 0.9997. Mercury was analyzed on 04/17/06 with a correlation coefficient of 0.9998. All ICV/CCV criteria were met. No qualifiers were applied. **Table 2** summarizes the MRL standard analysis. Samples with concentrations detected less than two times the MRL with out of criteria MRL recovery were qualified.

Table 2 MRL Analysis Summary

Analysis Date	Analysis	MRL (µg/L)	MRL %Recovery	Qualified samples @ <2xMRL	Validation Qualifiers
04/18/06	ICP-Sb	5.0	148%	16-4, 28MW2, 48MW3, 51MW1, C1, C4, TM13MW1	K
04/18/06	ICP-Be	4.0	122%, 150%, 130%	13MW1, 13MW2, 16-4, 28MW1, 28MW2, 48MW1, 48MW2, 48MW3, 48MW4, 51MW1, 51MW2, C1, C4, TM13MW1, TM48MW1	K
04/18/06	ICP-K	5000	64.4%, 71.0%, 52.2%, 70.4%	13MW1, 13MW2, 16-4, 28MW1, 28MW2, 48MW1, 48MW2, 48MW3, 48MW4, 51MW1, 51MW2, C1, C4, TM13MW1, TM48MW1	L, UL
04/18/06	ICP-Na	5000	62.0%, 70.0%, 52.2%, 70.4%	13MW1, 13MW2, 16-4, 28MW1, 28MW2, 48MW2, 48MW3, 48MW4, 51MW1, 51MW2, C1, C4	L, UL
04/14/06	Hg	1.0	75.0%	13MW1, 13MW2, 16-4, 28MW1, 28MW2, 48MW4, 51MW1, 51MW2, C1, C4, TM13MW1	L, UL
04/17/06	Hg	1.0	All within criteria	None	None

III-Blanks

Blanks (preparation and calibration blanks) are assessed to determine the existence and magnitude of contamination problems. No contaminants should be detected (i.e. <MDL) in any of the associated blanks. USACE Shell limits are <½MRL for the method blank. Samples are qualified "B" when they are less than 5X the absolute value of the maximum blank concentration. **Table 3** summarizes the blank contamination analysis. Rinse blank 041206R (F39990-8) (low-flow pump) applies to all samples in this SDG.

Table 3 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/L	Action Level µg/L	B qualified samples
04/18/06	Aluminum	ICB/CCBs	96.9J	485	13MW1, 13MW2, 16-4, 28MW1, 28MW2, 48MW3, 48MW4, 51MW1, 51MW2, C1, TM13MW1, TM48MW1
04/18/06	Antimony	ICB/CCBs	3.7J	18.5	16-4, 28MW2, 48MW3, 51MW1, C1, C4, TM13MW1
04/18/06	Beryllium	ICB/CCBs	2.3J	11.5	13MW1, 13MW2, 16-4, 28MW1, 28MW2, 48MW1, 48MW2, 48MW3, 48MW4, 51MW1, 51MW2, C1, C4, TM13MW1, TM48MW1
04/18/06	Cobalt	ICB/CCBs	0.58J	2.9	48MW2
04/18/06	Copper	ICB/CCBs	1.7J	8.5	48MW2, C4
04/18/06	Iron	ICB/CCBs	19.3J	96.5	13MW2, 28MW2, 48MW3, 48MW4, 51MW2
04/18/06	Lead	ICB/CCBs	1.6J	8.0	13MW2, 16-4, 28MW2, 48MW1, 48MW2, 48MW3, 51MW1, C4
04/18/06	Magnesium	ICB/CCBs	28.1J	141	None
04/18/06	Manganese	ICB/CCBs	0.54J	2.7	13MW2, 28MW2, 48MW3, 48MW4, 51MW2
04/18/06	Potassium	ICB/CCBs	41.5J	208	None
04/18/06	Sodium	ICB/CCBs	550J	2750	13MW2, 16-4, 28MW1, 28MW2, 48MW2, 48MW3, 51MW1, 51MW2, C4
04/18/06	Vanadium	ICB/CCBs	0.69J	3.5	13MW1, 16-4, 28MW1, 48MW1, 48MW2, 48MW3, C1, C4, TM13MW1, TM48MW1
04/14/06	Mercury	ICB/CCBs	<MDL	NA	None
04/17/06	Mercury	ICB/CCBs	0.11J	0.55	None

Table 3 Blank Contamination Analysis Summary, Continued

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/L	Action Level µg/L	B qualified samples
04/18/06	Aluminum	MP9496-MB	76.6J	383	13MW1, 13MW2, 16-4, 28MW1, 28MW2, 48MW3, 48MW4, 51MW1, 51MW2, C1
04/18/06	Beryllium	MP9496-MB	2.0J	10.0	13MW1, 13MW2, 16-4, 28MW1, 28MW2, 48MW1, 48MW2, 48MW3, 48MW4, 51MW1, 51MW2, C1, C4, TM13MW1, TM48MW1
04/18/06	Copper	MP9496-MB	1.4J	7.0	48MW2, C4
04/18/06	Iron	MP9496-MB	8.8J	44.0	13MW2, 28MW2, 48MW3, 51MW2
04/18/06	Magnesium	MP9496-MB	7.8J	39.0	None
04/18/06	Manganese	MP9496-MB	0.29J	1.5	13MW2, 28MW2
04/18/06	Sodium	MP9496-MB	220J	1100	13MW2, 16-4, 48MW2, 48MW3, 51MW1, 51MW2, C4
04/18/06	Thallium	MP9496-MB	4.0J	20.0	None
04/14/06	Mercury	MP9477-MB	<MDL	NA	None
04/17/06	Mercury	MP9486-MB	<MDL	NA	None
04/18/06	Aluminum	041206R	72J	360	13MW1, 13MW2, 16-4, 28MW1, 28MW2, 48MW3, 48MW4, 51MW1, 51MW2, C1
04/18/06	Beryllium	041206R	1.7J	8.5	13MW1, 13MW2, 16-4, 28MW1, 28MW2, 48MW1, 48MW2, 48MW3, 48MW4, 51MW1, 51MW2, C1, C4, TM13MW1, TM48MW1
04/18/06	Magnesium	041206R	11.5J	57.5	None
04/18/06	Manganese	041206R	0.26J	1.3	13MW2
04/14/06	Mercury	041206R	<MDL	NA	None

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".

IV-ICP Interference Check Sample (ICS)

The ICP interference check sample (ICS) verifies interelement and background correction factors. ICP Interference Check is performed at the beginning and end of each sample analysis run. Control limits are 80-120% (USACE limits 80-120%).

- All criteria were met. No qualifiers were applied.

V-Laboratory Control Samples (LCS)

The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. All aqueous LCS results must fall within the control limits of 80-120% for ICP and mercury. USACE Shell limits for metals are 80-120% (60-140% for sporadic marginal failures (SMF)).

- Sample MP9496-BS was used as LCS for ICP metals analysis. All criteria were met. No qualifiers were applied.

- Sample MP9477-BS was used as LCS for mercury analysis performed on 04/14/06. All criteria were met. No qualifiers were applied.

- Sample MP9486-BS was used as LCS for mercury analysis performed on 04/17/06. All criteria were met. No qualifiers were applied.

VI-Duplicate Sample Analysis
Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analyses are also performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits. USACE Shell limits for metals are 25% RPD for ICP metals and 20% RPD for mercury.

- Sample 48MW3 (F39990-17) was used as laboratory duplicate for ICP metals analysis. Antimony (68.8%), chromium (26.1%), lead (200%), sodium (60.3%), and vanadium (27.5%) were above criteria limits. Antimony, chromium, lead, sodium, and vanadium were outside due to low sample concentrations (i.e. <MRL); therefore, no qualifiers were applied based upon these outliers. For all other metals, all criteria were met. No qualifiers were applied.

- Sample F39863-5 was performed as laboratory duplicate for mercury on 04/14/06. This sample is not a RFAAP source sample; therefore, it was not evaluated.

- Sample F40032-8 was performed as laboratory duplicate for mercury on 04/17/06. This sample is not a RFAAP source sample; therefore, it was not evaluated.

VII-Matrix Spike/Spike Duplicate
MS/MSD are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike and matrix spike duplicate samples at a frequency of one MS and MSD per 20 samples of similar matrix. MS and MSD recoveries and relative percent differences between MS and MSD recoveries should be within the specified limits. USACE Shell limits for metals are 75-125%; RPD≤25% for ICP metals and 80-120%; RPD≤20% for mercury. Post digestion spikes limits are 75-125% for ICP metals and 85-115% for mercury.

- Sample 48MW3 (F39990-17) was used as laboratory MS/MSD for ICP metals analysis. All criteria were met. No qualifiers were applied.

- Sample F39863-5 was performed as MS/MSD for mercury on 04/14/06. This sample is not a RFAAP source sample; therefore, it was not evaluated.

- Sample F40032-8 was performed as MS/MSD for mercury on 04/17/06. This sample is not a RFAAP source sample; therefore, it was not evaluated.

VIII-ICP Serial Dilution
An ICP serial dilution is performed to determine whether significant physical or chemical interferences exist due to sample matrix at high concentrations. An analysis of a 5-fold dilution should agree within 10% difference of the original result when the concentration in sample is a factor of 50 above MDL.

- The serial dilution for total metals for the ICP was analyzed using sample 48MW3 (F39990-17). Aluminum (363%), antimony (100%), beryllium (409%), chromium (100%), lead (100%), manganese (17.6%), potassium (36.4%), selenium (232%), sodium (100%), and vanadium (100%) were outside of criteria limits. Sample concentrations were <50 times MDL for aluminum, antimony, beryllium, chromium, lead, manganese, selenium, sodium, and vanadium; therefore, no qualifiers were applied based upon these outliers. For potassium, all detects were qualified estimated "J" and non-detects no qualifier based upon this outlier.

IX-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field groundwater sample duplicate pair 13MW1 (F39990-9) and TM13MW1 (F39990-10) was collected for TAL metals. All detected metals found in the sample and its duplicate pair and associated %RPD are noted in **Table 4**. All other metals were non-detect. All detected metals were within criteria. No qualifiers were applied.

Table 4 Field Precision Hits Analysis Summary for Metals for Duplicate Pair 13MW1 (F39990-9) and TM13MW1 (F39990-10)

Compound	Original Sample (µg/L)	Duplicate Pair (µg/L)	%RPD
Aluminum	360	435	18.9
Antimony	2.2U	3.7J	NA
Barium	134J	136J	1.5
Beryllium	2.1J	2.1J	0.0
Calcium	114000	117000	2.6
Chromium	2.8J	4.6J	48.7
Iron	264J	376	35.0
Magnesium	34400	35100	2.0
Manganese	5.4J	6.6J	20.0
Potassium	1480J	1540J	4.0
Selenium	5.5J	7.2J	26.8
Sodium	9310	10300	10.1
Vanadium	0.98J	1.6J	48.1
Zinc	1.4J	1.5J	6.9

U = Value non-detect as <MDL.
J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".
NA = Not Applicable.

- Field groundwater sample duplicate pair 48MW1 (F39990-14) and TM48MW1 (F39990-15) was collected for TAL metals. All detected metals found in the sample and its duplicate pair and associated %RPD are noted in **Table 5**. All other metals were non-detect. Manganese (59.1%) and zinc (55.3%) were outside field precision criteria and were qualified estimated "J" for the duplicate pair based upon the high %RPDs. The high %RPDs for manganese and zinc are probably resultant of high variability given the low concentrations below the laboratory MRL and/or matrix effects. All other detected metals were within criteria.

Table 5 Field Precision Hits Analysis Summary for Metals for Duplicate Pair 48MW1 (F39990-14) and TM48MW1 (F39990-15)

Compound	Original Sample (µg/L)	Duplicate Pair (µg/L)	%RPD
Aluminum	606	452	29.1
Barium	105J	92.6J	12.6
Beryllium	1.8J	2.0J	10.5
Calcium	67400	69900	3.6
Chromium	1.7J	1.2J	34.5
Iron	617	387	45.8
Lead	2.0J	1.2U	NA
Magnesium	35300	35400	0.3
Manganese	10.3J	5.6J	59.1
Nickel	1.2J	1.1U	NA
Potassium	2020J	2060J	2.0
Selenium	3.2J	2.4U	NA
Sodium	13700	14900	8.4
Vanadium	1.3J	1.2J	8.0
Zinc	3.0J	1.7J	55.3

U = Value non-detect as <MDL.
J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".
NA = Not Applicable.

X-Quantitation Verification

The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." The following calculations were performed for verification.

ICP Sample: 51MW1 (F39990-1), Total Barium

Conc. (µg/L) = (conc. µg/L) *(Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (µg/L) = (45.3 µg/L)*(50 mL)*(1) / (50 mL) = 45.3 µg/L

Reported concentration = 45.3 µg/L
%D = 0.0%
Values were within 10% difference.

CVAA Sample: MP9477-BS, Total Mercury

Conc. (µg/L) = (conc. µg/L) *(Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (µg/L) = (2.91 µg/L)*(50 mL)*(1) / (50 mL) = 2.9 µg/L

Reported concentration = 2.9 µg/L
%D = 0.0%.
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Form 1 Copy

Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW1		
Lab Sample ID:	F39990-1	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	282 B	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.6 J B	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	45.3 J J	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.0 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	18900	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.59 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	547	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	1.3 J B	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	7440	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	60.6	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U VL	1.0	0.080	ug/l	1	04/14/06	04/14/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 J J	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1070 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.4 U	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	256 J B	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	0.60 U	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	3.4 J J	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4917
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9477
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I copy

Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW2		
Lab Sample ID:	F39990-2	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	100 J B	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	2.2 U	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	40.8 J J	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.1 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	53700	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	1.3 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	42.2 J B	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	1.2 U	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	15600	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	1.8 J B	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U UL	1.0	0.080	ug/l	1	04/14/06	04/14/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 U	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1220 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.4 U	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	713 J B	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	0.60 U	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	2.1 J J	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4917
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9477
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	16-4		
Lab Sample ID:	F39990-3	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	236 B	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.2 J B	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	149 J J	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.0 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	36300	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.74 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	174 J J	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	2.0 J B	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	22700	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	5.1 J J	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U VL	1.0	0.080	ug/l	1	04/14/06	04/14/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 U	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1030 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.4 U	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	385 J B	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	0.70 J B	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	0.91 J J	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4917
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9477
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	28MW2		
Lab Sample ID:	F39990-4	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	109 J B	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.7 J B	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	384	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.0 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	40100	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	1.3 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	31.8 J B	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	1.8 J B	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	20000	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	1.5 J B	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U VL	1.0	0.080	ug/l	1	04/14/06	04/14/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 U	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1710 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.4 U	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	2170 J B	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	0.60 U	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	4.8 J J	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4917
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9477
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

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2.5 2

Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	28MW1		
Lab Sample ID:	F39990-5	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	88.6 J B	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	2.2 U	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	455	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.1 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	78200	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.50 U	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	7.5 U	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	1.2 U	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	49800	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	22.4	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U VL	1.0	0.080	ug/l	1	04/14/06	04/14/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 U	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1530 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	4.9 J J	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	2570 J B	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	0.64 J B	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	0.80 U	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4917
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9477
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I CORY

Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	C4		
Lab Sample ID:	F39990-6	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	554	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	4.2 J B	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	53.9	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	177 J J	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.1 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	34700	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	2.0 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	6.9 J B	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	4830	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	7.8 B	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	20400	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	47.6	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U VL	1.0	0.080	ug/l	1	04/14/06	04/14/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 J J	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	867 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.4 U	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	104 J B	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.8 J B	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	22.3	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4917
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9477
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F39990-7	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	113 J B	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	2.2 U	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	167 J J	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.1 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	58600	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.86 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	62.8 J B	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	1.2 U	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	49600	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	2.6 J B	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U VL	1.0	0.080	ug/l	1	04/14/06	04/14/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 U	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1600 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.4 U	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	8230 L	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	0.60 U	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	1.4 J J	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4917
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9477
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	13MW1		
Lab Sample ID:	F39990-9	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	360 B	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	2.2 U	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	134 J J	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.1 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	114000	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	2.8 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	264 J J	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	1.2 U	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	34400	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	5.4 J J	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U VL	1.0	0.080	ug/l	1	04/14/06	04/14/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 U	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1480 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	5.5 J J	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	9310 L	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	0.98 J B	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	1.4 J J	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4917
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9477
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	TM13MW1		
Lab Sample ID:	F39990-10	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	435 B	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.7 J B	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	136 J J	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.1 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	117000	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	4.6 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	376	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	1.2 U	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	35100	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	6.6 J J	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U VL	1.0	0.080	ug/l	1	04/14/06	04/14/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 U	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1540 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	7.2 J J	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	10300	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.6 J B	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	1.5 J J	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4917
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9477
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

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Report of Analysis

Client Sample ID:	13MW2		
Lab Sample ID:	F39990-11	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	133 J B	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	2.2 U	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	156 J J	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.0 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	94900	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	3.2 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	29.7 J B	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	1.6 J B	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	38800	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	1.3 J B	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U VL	1.0	0.080	ug/l	1	04/14/06	04/14/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 U	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1190 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.4 U	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	81.0 J B	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	0.60 U	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	0.80 U	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4917
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9477
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	C1		
Lab Sample ID:	F39990-12	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	57.0 J B	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	2.6 J B	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	181 J J	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.9 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	105000	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.50 U	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	7.5 U	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	1.2 U	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	38100	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	7.1 J J	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U UL	1.0	0.080	ug/l	1	04/14/06	04/14/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 U	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	2720 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.8 J J	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	4250 J L	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	0.82 J B	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	0.80 U	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4917
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9477
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F39990-14	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	606	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	2.2 U	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	105 J J	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.8 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	67400	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	1.7 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	617	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	2.0 J B	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	35300	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	10.3 J J	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U	1.0	0.080	ug/l	1	04/17/06	04/17/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.2 J J	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	2020 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	3.2 J J	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	13700	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.3 J B	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	3.0 J J	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4920
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9486
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	TM48MW1		
Lab Sample ID:	F39990-15	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	452 B	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	2.2 U	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	92.6 J J	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.0 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	69900	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	1.2 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	387	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	1.2 U	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	35400	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	5.6 J J	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U	1.0	0.080	ug/l	1	04/17/06	04/17/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 U	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	2060 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.4 U	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	14900	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.2 J B	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	1.7 J J	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4920
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9486
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F39990-16	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	2630	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	2.2 U	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	615	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.0 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	89700	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	6.4 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.3 J B	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.83 J B	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	2960	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	1.3 J B	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	44800	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	50.7	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U* J	1.0	0.080	ug/l	1	04/17/06	04/17/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	4.9 J J	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1690 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.4 J J	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	311 J B	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	6.3 J B	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	11.7 J J	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4920
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9486
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F39990-17	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	82.6 J B	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	4.3 J B	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	50.4 J J	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	2.2 J B	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	102000	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	1.0 J J	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	8.9 J B	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	2.7 J B	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	42800	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	1.8 J B	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U	1.0	0.080	ug/l	1	04/17/06	04/17/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 U	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1230 J J	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	5.2 J J	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	1030 J B	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	0.91 J B	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	0.80 U	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4920
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9486
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	041206R		
Lab Sample ID:	F39990-8	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
		Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	72.0 J J	200	16	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	2.2 U	5.0	2.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.9 U	10	2.9	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	0.50 U	200	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.7 J J	4.0	0.70	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	0.60 U	5.0	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	26 U	1000	26	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.50 U	10	0.50	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	0.40 U	50	0.40	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	0.80 U	25	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	7.5 U	300	7.5	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	1.2 U	5.0	1.2	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	11.5 J J	5000	5.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	0.26 J J	15	0.20	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.080 U	1.0	0.080	ug/l	1	04/14/06	04/14/06	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 U	40	1.1	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	36 U	5000	36	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.4 U	10	2.4	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	77 U	5000	77	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	3.8 U	10	3.8	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	0.60 U	50	0.60	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	0.80 U	20	0.80	ug/l	1	04/18/06	04/18/06	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA4917
(2) Instrument QC Batch: MA4923
(3) Prep QC Batch: MP9477
(4) Prep QC Batch: MP9496

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Shaw Environmental, Inc.

2113 Emmorton Park Road
Edgewood, MD 21040-1037
410.612.6350
Fax 410.612.6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Explosives, PETN, & Nitroglycerine
Accutest Laboratories, Inc., SDG F39990

DATE: May 5, 2006

The purpose of this memorandum is to present the data validation report for the samples collected for RFAAP SWMUs 48, 49, 50, 51, and 59 on April 10, 2006, April 11, 2006, April 12, 2006, and April 13, 2006 for groundwater analysis. Samples were analyzed for explosives using USEPA SW-846 3535A/8330A and for nitroglycerine and PETN using USEPA SW-846 3535A/8332. A total of fifteen aqueous samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
51MW1	F39990-1	TM13MW1	F39990-10
51MW2	F39990-2	13MW2	F39990-11
16-4	F39990-3	C1	F39990-12
28MW2	F39990-4	48MW1	F39990-14
28MW1	F39990-5	TM48MW1	F39990-15
C4	F39990-6	48MW2	F39990-16
48MW4	F39990-7	48MW3	F39990-17
13MW1	F39990-9		

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *USACE Shell for Analytical Chemistry Requirements*, method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in Table 1. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Initial Calibration
	X	Continuing Calibration
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable.

Eric Malarek, Chemist

5/5/06
Date

RFAAP VALIDATION REPORT
EXPLOSIVES REVIEW
SDG F39990

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For explosive compounds in cooled (@4°C ± 2°C) aqueous samples, the maximum holding time is 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 04/10/06, 04/11/06, and 04/12/06, the coolers were received by the primary laboratory (Accutest) on 04/13/06 at 4.2°C, 3.0°C, 2.4°C, 1.8°C, 2.4°C, 2.6°C, 1.6°C, 3.4°C, 2.8°C, 2.6°C, 3.2°C, and 3.0°C. For samples collected on 04/13/06, the coolers were received by the primary laboratory on 04/15/06 at 1.6°C, 2.0°C, 2.8°C, 3.4°C, and 4.2°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.1°C, 3.8°C, and 2.7°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 04/10/06, 04/11/06, 04/12/06, and 04/13/06. For samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12), the explosives were extracted on 04/17/06 and analyzed on 04/21/06 and 04/22/06. PETN and nitroglycerine were extracted 04/17/06 and analyzed 04/17/06. For samples, 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17), the explosives were extracted on 04/20/06 and analyzed on 04/22/06. PETN and nitroglycerine were extracted 04/20/06 and analyzed 04/27/06. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be present in the blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for explosive target compounds. Table 2 summarizes the blank contamination analysis. Rinse blank 041206R (F39990-8) (low-flow pump) applies to all samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
04/21/06	OP16313-MB	All target explosives < MRL	NA	NA	None
04/22/06	OP16360-MB	All target explosives < MRL	NA	NA	None
04/24/06	OP16360-MB	All target explosives < MRL	NA	NA	None
04/25/06	OP16360-MB	All target explosives < MRL	NA	NA	None
04/17/06	OP16314-MB	PETN & NG < MRL	NA	NA	None
04/27/06	OP16361-MB	PETN & NG < MRL	NA	NA	None
04/22/06	041206R	All target explosives < MRL	NA	NA	None
04/17/06	041206R	PETN & NG < MRL	NA	NA	None

MRL = Method Reporting Limit
NA = Not Applicable

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5-point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. The correlation coefficient (r^2) must be ≥0.990 and/or the percent relative standard deviation (%RSD) must be ≤15%. All detects were qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- For the explosives initial calibration performed on 03/14/06 on instrument G1315B, all criteria were met for target compounds. All compounds were determined using calibration factors with RSDs ≤15%. No qualifiers were applied. No samples reported apply to this initial calibration.

- For the explosives initial calibration performed on 03/29/06 on instrument G1315B, all criteria were met for target compounds. All compounds were determined using calibration factors with RSDs ≤15%. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), C1 (F39990-12), 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this initial calibration.

- For the PETN and nitroglycerine initial calibration performed on 12/08/05 on instrument G1315B, all criteria were met for target compounds. All compounds were determined using calibration factors with RSDs ≤15%. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), C1 (F39990-12), 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this initial calibration.

IV-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. Continuing calibration standards are analyzed after every 10 injections, and at the end of the analysis sequence. The percent difference (%D) from initial calibration should be no greater than ±15%. All detects were qualified as estimated "J" for where there were exceeding %Ds, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- For explosives continuing calibration performed on 04/21/06 @21:05 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), and 48MW4 (F39990-7) apply to this continuing calibration.

- For explosives continuing calibration performed on 04/22/06 @02:09 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), C1 (F39990-12), 48MW1 (F39990-14), TM48MW1 (F39990-15) apply to this continuing calibration.

- For explosives continuing calibration performed on 04/22/06 @07:39 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), C1 (F39990-12), 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this continuing calibration.

- For explosives continuing calibration performed on 04/22/06 @13:10 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this continuing calibration.

- For explosives continuing calibration performed on 04/24/06 @09:35 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For explosives continuing calibration performed on 04/24/06 @12:48 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 51MW1 (F39990-1), C1 (F39990-12), and 48MW1 (F39990-14) re-analysis check applies to this continuing calibration.

- For explosives continuing calibration performed on 04/25/06 @08:02 on instrument G1315B, m-nitrotoluene (16.4%) was outside criteria for signal #2. Signal #1 was within criteria. All samples were non-detect for m-nitrotoluene, therefore no qualifiers were applied based upon this outlier. Samples 51MW1 (F39990-1), C1 (F39990-12), and 48MW1 (F39990-14) re-analysis check applies to this continuing calibration.

- For explosives continuing calibration performed on 04/25/06 @12:21 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For PETN and nitroglycerine continuing calibration performed on 04/17/06 @20:32 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), and 48MW4 (F39990-7), apply to this continuing calibration.

- For PETN and nitroglycerine continuing calibration performed on 04/17/06 @22:06 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) apply to this continuing calibration.

- For PETN and nitroglycerine continuing calibration performed on 04/17/06 @23:23 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) apply to this continuing calibration.

- For PETN and nitroglycerine continuing calibration performed on 04/27/06 @15:57 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this continuing calibration.

- For PETN and nitroglycerine continuing calibration performed on 04/27/06 @17:14 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this continuing calibration.

V-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is established by means of spiking activities. The percent recovery (%R) for all samples and blanks must be within the laboratory control limits.

Criteria: 3,4-dinitrotoluene (61-124%) (USACE Shell Criteria: 50-150%)

- All criteria were met for explosives, PETN, and nitroglycerine. No qualifiers were applied.

VI-Laboratory Control Sample
Laboratory control samples (LCS) are used to monitor long-term accuracy of the analytical method. The analysis is performed at a frequency of 1 per analytical batch. The percent recoveries (%Rs) must be within the laboratory control limits. USACE Shell limits for explosives are 60-120% (40-150% for sporadic marginal failures (SMF)).

- Sample OP16313-BS was used as LCS for explosives analyzed on 04/21/06. A total of 14 compounds were spiked, allowing for 1 SMF tolerance. All criteria were met. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) apply to this LCS.

- Sample OP16360-BS was used as LCS for explosives analyzed on 04/22/06. A total of 14 compounds were spiked, allowing for 1 SMF tolerance. Compound 1,3,5-trinitrobenzene (116%) was above laboratory criteria, however within USACE and SMF criteria. No qualifiers were applied based upon this outlier. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this LCS.

- Sample OP16360-BS was used as LCS for explosives analyzed on 04/25/06. A total of 14 compounds were spiked, allowing for 1 SMF tolerance. All criteria were met. No qualifiers were applied. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this LCS.

- Sample OP16314-BS was used as LCS for PETN and nitroglycerine analyzed on 04/17/06. A total of 2 compounds were spiked, allowing for 0 SMF tolerances. All criteria were met. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) apply to this LCS.

- Sample OP16361-BS was used as LCS for PETN and nitroglycerine analyzed on 04/27/06. A total of 2 compounds were spiked, allowing for 0 SMF tolerances. All criteria were met. No qualifiers were applied. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the laboratory control limits. USACE Shell limits for explosives are 50-140% (40-150% for sporadic marginal failures (SMF)).

- Sample TM13MW1 (F39990-10) was used as the MS/MSD for the explosive analysis on 04/22/06. A total of 28 compounds were spiked, allowing for 2 SMF tolerances. All criteria were met. No qualifiers were applied.

- Sample 48MW3 (F39990-17) was used as the MS/MSD for the explosive analysis on 04/22/06. A total of 28 compounds were spiked, allowing for 2 SMF tolerances. All criteria were met. No qualifiers were applied.

- Sample TM13MW1 (F39990-10) was used as the MS/MSD for the PETN and nitroglycerine analysis on 04/17/06. A total of 4 compounds were spiked, allowing for 0 SMF tolerances. All criteria were met. No qualifiers were applied.

- Sample 48MW3 (F39990-17) was used as the MS/MSD for the PETN and nitroglycerine analysis on 04/27/06. A total of 4 compounds were spiked, allowing for 0 SMF tolerances. All criteria were met. No qualifiers were applied.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field groundwater sample duplicate pair 13MW1 (F39990-9) and TM13MW1 (F39990-10) was collected for all explosive compounds. All target compounds were non-detect. All criteria were met. No qualifiers were applied.

- Field groundwater sample duplicate pair 48MW1 (F39990-14) and TM48MW1 (F39990-15) was collected for all explosive compounds. All target compounds were non-detect. All criteria were met. No qualifiers were applied.

IX-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The calculation was based calibration factors. The absolute percent difference (%D) between the calculated and the reported value must be within 10% difference. All values >MDL and <MRL or <3*MDL (whichever was greater) were qualified as estimated "J".

- The %D between the primary and secondary columns was within criteria for all explosives, PETN, and nitroglycerine. All samples were non-detect for all target explosive compounds.

Sample: TM13MW1-MS (F39990-10MS), 2,4,6-trinitrotoluene

Conc. µg/L = (Ax * Vt * DF) / (CF * Vs)

where: Conc. = Sample concentration in µg/L
Ax = Area of characteristic ion for compound being measured.
Vt = Volume of total extract (mL).
CF = Average relative calibration factor for compound being measured (from ICAL)
Vs = Volume of sample extracted (mL).
DF = Dilution factor

Conc. µg/L = (1952890 * 10 * 1) / (7359 * 450) = 5.9 µg/L (Signal #1)

Reported Value = 5.9 µg/L
% Difference = 0.0%
Values were within 10% difference

Sample: TM13MW1-MS (F39990-10MS), nitroglycerine

Conc. µg/L = (Ax * Vt * DF) / (CF * Vs)

where: Conc. = Sample concentration in µg/L
Ax = Area of characteristic ion for compound being measured.
Vt = Volume of total extract (mL).
CF = Average relative calibration factor for compound being measured (from ICAL)
Vs = Volume of sample extracted (mL).
DF = Dilution factor

Conc. µg/L = (3305690 * 10 * 1) / (1187 * 470) = 59.3 µg/L (Signal #1)

Reported Value = 59.3 µg/L
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

D = Indicates sample was analyzed at a dilution.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW1		
Lab Sample ID:	F39990-1	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015422.D	1	04/21/06	SD	04/17/06	OP16313	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.082	ug/l	
121-82-4	RDX	ND	0.22	0.082	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.054	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.054	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.054	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.065	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.054	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.054	ug/l	
479-45-8	Tetryl	ND	0.22	0.082	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.054	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW1		
Lab Sample ID:	F39990-1	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012740.D	1	04/17/06	SD	04/17/06	OP16314	GPP435
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.2	0.54	ug/l	
55-63-0	Nitroglycerine	ND	2.2	0.54	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	111%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW2		
Lab Sample ID:	F39990-2	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015423.D	1	04/21/06	SD	04/17/06	OP16313	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.082	ug/l	
121-82-4	RDX	ND	0.22	0.082	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.054	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.054	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.054	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.065	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.054	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.054	ug/l	
479-45-8	Tetryl	ND	0.22	0.082	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.054	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	51MW2		
Lab Sample ID:	F39990-2	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012741.D	1	04/17/06	SD	04/17/06	OP16314	GPP435
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.2	0.54	ug/l	
55-63-0	Nitroglycerine	ND	2.2	0.54	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	16-4		
Lab Sample ID:	F39990-3	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015424.D	1	04/21/06	SD	04/17/06	OP16313	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.082	ug/l	
121-82-4	RDX	ND	0.22	0.082	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.054	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.22	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.054	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.054	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.065	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.054	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.054	ug/l	
479-45-8	Tetryl	ND	0.22	0.082	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.054	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	16-4		
Lab Sample ID:	F39990-3	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012742.D	1	04/17/06	SD	04/17/06	OP16314	GPP435
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.2	0.54	ug/l	
55-63-0	Nitroglycerine	ND	2.2	0.54	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	110%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	28MW2		
Lab Sample ID:	F39990-4	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015425.D	1	04/21/06	SD	04/17/06	OP16313	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	930 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.081	ug/l	
121-82-4	RDX	ND	0.22	0.081	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.054	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.054	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.054	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.065	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.054	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.054	ug/l	
479-45-8	Tetryl	ND	0.22	0.081	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.054	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	28MW2		
Lab Sample ID:	F39990-4	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012743.D	1	04/17/06	SD	04/17/06	OP16314	GPP435
Run #2							

	Initial Volume	Final Volume
Run #1	930 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.2	0.54	ug/l	
55-63-0	Nitroglycerine	ND	2.2	0.54	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	123%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	28MW1		
Lab Sample ID:	F39990-5	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015426.D	1	04/22/06	SD	04/17/06	OP16313	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.082	ug/l	
121-82-4	RDX	ND	0.22	0.082	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.054	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.054	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.054	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.065	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.054	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.054	ug/l	
479-45-8	Tetryl	ND	0.22	0.082	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.054	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	28MW1		
Lab Sample ID:	F39990-5	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012744.D	1	04/17/06	SD	04/17/06	OP16314	GPP435
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.2	0.54	ug/l	
55-63-0	Nitroglycerine	ND	2.2	0.54	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	117%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C4		
Lab Sample ID:	F39990-6	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015427.D	1	04/22/06	SD	04/17/06	OP16313	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	740 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.27	0.10	ug/l	
121-82-4	RDX	ND	0.27	0.10	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.27	0.068	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.27	0.068	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.27	0.068	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.27	0.068	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.27	0.068	ug/l	
98-95-3	Nitrobenzene	ND	0.27	0.068	ug/l	
88-72-2	o-Nitrotoluene	ND	0.27	0.081	ug/l	
99-08-1	m-Nitrotoluene	ND	0.27	0.068	ug/l	
99-99-0	p-Nitrotoluene	ND	0.27	0.068	ug/l	
479-45-8	Tetryl	ND	0.27	0.10	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.27	0.068	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.27	0.068	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	109%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C4		
Lab Sample ID:	F39990-6	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012745.D	1	04/17/06	SD	04/17/06	OP16314	GPP435
Run #2							

	Initial Volume	Final Volume
Run #1	740 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.7	0.68	ug/l	
55-63-0	Nitroglycerine	ND	2.7	0.68	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	105%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F39990-7	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015428.D	1	04/22/06	SD	04/17/06	OP16313	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.083	ug/l	
121-82-4	RDX	ND	0.22	0.083	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.056	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.056	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.056	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.056	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.056	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.056	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.067	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.056	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.056	ug/l	
479-45-8	Tetryl	ND	0.22	0.083	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.056	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.056	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	112%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F39990-7	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012746.D	1	04/17/06	SD	04/17/06	OP16314	GPP435
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.2	0.56	ug/l	
55-63-0	Nitroglycerine	ND	2.2	0.56	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	114%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	041206R		
Lab Sample ID:	F39990-8	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015429.D	1	04/22/06	SD	04/17/06	OP16313	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.082	ug/l	
121-82-4	RDX	ND	0.22	0.082	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.054	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.054	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.054	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.065	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.054	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.054	ug/l	
479-45-8	Tetryl	ND	0.22	0.082	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.054	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	108%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	041206R		
Lab Sample ID:	F39990-8	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012747.D	1	04/17/06	SD	04/17/06	OP16314	GPP435
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.2	0.54	ug/l	
55-63-0	Nitroglycerine	ND	2.2	0.54	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	108%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW1		
Lab Sample ID:	F39990-9	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015432.D	1	04/22/06	SD	04/17/06	OP16313	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.082	ug/l	
121-82-4	RDX	ND	0.22	0.082	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.054	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.054	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.054	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.065	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.054	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.054	ug/l	
479-45-8	Tetryl	ND	0.22	0.082	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.054	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW1		
Lab Sample ID:	F39990-9	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012750.D	1	04/17/06	SD	04/17/06	OP16314	GPP435
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.2	0.54	ug/l	
55-63-0	Nitroglycerine	ND	2.2	0.54	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	113%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM13MW1		
Lab Sample ID:	F39990-10	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015433.D	1	04/22/06	SD	04/17/06	OP16313	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.083	ug/l	
121-82-4	RDX	ND	0.22	0.083	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.056	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.056	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.056	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.056	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.056	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.056	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.067	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.056	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.056	ug/l	
479-45-8	Tetryl	ND	0.22	0.083	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.056	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.056	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	114%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM13MW1		
Lab Sample ID:	F39990-10	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012751.D	1	04/17/06	SD	04/17/06	OP16314	GPP435
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.2	0.56	ug/l	
55-63-0	Nitroglycerine	ND	2.2	0.56	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	116%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW2		
Lab Sample ID:	F39990-11	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015436.D	1	04/22/06	SD	04/17/06	OP16313	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.083	ug/l	
121-82-4	RDX	ND	0.22	0.083	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.056	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.056	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.056	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.056	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.056	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.056	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.067	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.056	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.056	ug/l	
479-45-8	Tetryl	ND	0.22	0.083	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.056	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.056	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	110%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW2		
Lab Sample ID:	F39990-11	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012754.D	1	04/17/06	SD	04/17/06	OP16314	GPP435
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.2	0.56	ug/l	
55-63-0	Nitroglycerine	ND	2.2	0.56	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	124%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C1		
Lab Sample ID:	F39990-12	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015437.D	1	04/22/06	SD	04/17/06	OP16313	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.082	ug/l	
121-82-4	RDX	ND	0.22	0.082	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.054	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.054	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.054	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.054	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.065	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.054	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.054	ug/l	
479-45-8	Tetryl	ND	0.22	0.082	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.054	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	106%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C1		
Lab Sample ID:	F39990-12	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012755.D	1	04/17/06	SD	04/17/06	OP16314	GPP435
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.2	0.54	ug/l	
55-63-0	Nitroglycerine	ND	2.2	0.54	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	105%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F39990-14	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015440.D	1	04/22/06	SD	04/20/06	OP16360	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	890 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.084	ug/l	
121-82-4	RDX	ND	0.22	0.084	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.056	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.056	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.056	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.056	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.056	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.056	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.067	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.056	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.056	ug/l	
479-45-8	Tetryl	ND	0.22	0.084	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.056	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.056	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	104%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F39990-14	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012920.D	1	04/27/06	SD	04/20/06	OP16361	GPP442
Run #2							

	Initial Volume	Final Volume
Run #1	890 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.2	0.56	ug/l	
55-63-0	Nitroglycerine	ND	2.2	0.56	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	97%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM48MW1		
Lab Sample ID:	F39990-15	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015441.D	1	04/22/06	SD	04/20/06	OP16360	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	880 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.23	0.085	ug/l	
121-82-4	RDX	ND	0.23	0.085	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.23	0.057	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.23	0.057	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.23	0.057	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.23	0.057	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.23	0.057	ug/l	
98-95-3	Nitrobenzene	ND	0.23	0.057	ug/l	
88-72-2	o-Nitrotoluene	ND	0.23	0.068	ug/l	
99-08-1	m-Nitrotoluene	ND	0.23	0.057	ug/l	
99-99-0	p-Nitrotoluene	ND	0.23	0.057	ug/l	
479-45-8	Tetryl	ND	0.23	0.085	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.23	0.057	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.23	0.057	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	110%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM48MW1		
Lab Sample ID:	F39990-15	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012921.D	1	04/27/06	SD	04/20/06	OP16361	GPP442
Run #2							

	Initial Volume	Final Volume
Run #1	880 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.3	0.57	ug/l	
55-63-0	Nitroglycerine	ND	2.3	0.57	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	105%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F39990-16	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015444.D	1	04/22/06	SD	04/20/06	OP16360	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	860 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.23	0.087	ug/l	
121-82-4	RDX	ND	0.23	0.087	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.23	0.058	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.23	0.058	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.23	0.058	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.23	0.058	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.23	0.058	ug/l	
98-95-3	Nitrobenzene	ND	0.23	0.058	ug/l	
88-72-2	o-Nitrotoluene	ND	0.23	0.070	ug/l	
99-08-1	m-Nitrotoluene	ND	0.23	0.058	ug/l	
99-99-0	p-Nitrotoluene	ND	0.23	0.058	ug/l	
479-45-8	Tetryl	ND	0.23	0.087	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.23	0.058	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.23	0.058	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F39990-16	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012922.D	1	04/27/06	SD	04/20/06	OP16361	GPP442
Run #2							

	Initial Volume	Final Volume
Run #1	860 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.3	0.58	ug/l	
55-63-0	Nitroglycerine	ND	2.3	0.58	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	114%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F39990-17	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG015445.D	1	04/22/06	SD	04/20/06	OP16360	GGG710
Run #2							

	Initial Volume	Final Volume
Run #1	880 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.23	0.085	ug/l	
121-82-4	RDX	ND	0.23	0.085	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.23	0.057	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.23	0.057	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.23	0.057	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.23	0.057	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.23	0.057	ug/l	
98-95-3	Nitrobenzene	ND	0.23	0.057	ug/l	
88-72-2	o-Nitrotoluene	ND	0.23	0.068	ug/l	
99-08-1	m-Nitrotoluene	ND	0.23	0.057	ug/l	
99-99-0	p-Nitrotoluene	ND	0.23	0.057	ug/l	
479-45-8	Tetryl	ND	0.23	0.085	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.23	0.057	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.23	0.057	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	113%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F39990-17	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8332 SW846 3535A	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP012923.D	1	04/27/06	SD	04/20/06	OP16361	GPP442
Run #2							

	Initial Volume	Final Volume
Run #1	880 ml	10.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
78-11-5	PETN	ND	2.3	0.57	ug/l	
55-63-0	Nitroglycerine	ND	2.3	0.57	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	114%		61-124%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.

2113 Emmorton Park Road
Edgewood, MD 21040-1037
410.612.6350
Fax 410.612.6351

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MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Dioxin Furans
SGS Paradigm Analytical Laboratories, Inc. SDG G383-433
(Accutest SDG F39990)

DATE: May 11, 2006

The purpose of this memorandum is to present the data validation report for the samples collected for RFAAP SWMUs 48, 49, 50, 51, and 59 on April 10, 2006, April 11, 2006, April 12, 2006, and April 13, 2006 for groundwater analysis. The sample was analyzed for Dioxin Furan compounds using USEPA SW-846 Method 8290 High Resolution Gas Chromatography/High Resolution Mass Spectroscopy (HRGC/HRMS). A total of four aqueous samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
48MW1	F39990-14	48MW2	F39990-16
TM48MW1	F39990-15	48MW3	F39990-17

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *USACE Shell for Analytical Chemistry Requirements*, method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *USEPA Region III Dioxin/Furan Data Validation Guidance* (March, 1999). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Internal Standards (IS) Recovery Standard Solutions
	X	Cleanup Standards
	X	Laboratory Control Standard or Ongoing Precision Result (OPR)
	X	Matrix Spike and Spike Duplicate
X		Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

5/11/06
Date

RFAAP VALIDATION REPORT
DIOXIN FURAN REVIEW
SDG G383-433
(Accutest SDG F39990)

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For dioxin furan compounds in cooled @4°C ± 2°C aqueous samples, the maximum holding time is 30 days from sample collection to preparative extraction and 45 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 04/10/06, 04/11/06, and 04/12/06, the coolers were received by the primary laboratory (Accutest) on 04/13/06 at 4.2°C, 3.0°C, 2.4°C, 1.8°C, 2.4°C, 2.6°C, 1.6°C, 3.4°C, 2.8°C, 2.6°C, 3.2°C, and 3.0°C. For samples collected on 04/13/06, the coolers were received by the primary laboratory on 04/15/06 at 1.6°C, 2.0°C, 2.8°C, 3.4°C, and 4.2°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.1°C, 3.8°C, and 2.7°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples in this SDG were collected on 04/13/06. The samples were extracted on 04/21/06 and analyzed on 04/22/06 and 04/26/06. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory (or field) blank analyses is to determine the existence and magnitude of contamination problems resulting from field and laboratory activities. No contamination should be found in any of the blanks >MDL. Samples are qualified "B" when they are less than 5X the absolute value of the maximum blank concentration (10x for OCDD/OCDF). **Table 2** summarizes the blank contamination analysis. Rinse blank 041206R (F39990-8) (low-flow pump) applies to all samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. ng/L	Action Level ng/L	B qualified samples
04/22/06	LMB12444	All target <MRL	NA	NA	None
04/22/06	041206R	All target <MRL	NA	NA	None

NA = Not Applicable.

III-Instrument Performance Check

Instrument must be tuned with perfluorokerosene (PFK) to achieve a static resolving power of at least 10,000 (10% valley). Documentation of the mass spectrometer resolving power is accomplished by recording the peak profile of the high-mass reference signal (typically m/z 330.9792) obtained during a peak examination by using the low-mass PFK ion at m/z 292.9825 or lower in mass as reference. At the beginning of the each 12-hour period, the chromatographic resolution is verified in the same fashion as in the initial calibration through the analysis of HRCC solution on the DB-5 (or equivalent) column or through the analysis of the column performance solution on the SP-2331 or SP-225 (or equivalent) column. A 25% valley must be achieved between the close eluters.

- All PFK forms were verified and found to be in compliance with method specification. No qualifiers were applied.

IV-Initial Calibration
Once the window defining mix has been analyzed and the descriptor switching times have been verified, the five point calibration solutions can be analyzed prior to sample analysis. Initial calibration criteria are as follows:

- The percent relative standard deviations for the mean response factors RRF(n) from the 17 unlabeled standards must not exceed ±20%, and those for the labeled reference compounds must not exceed ±30%
- Isotopic ratio must be within the specified control limits in Table 8 (SW846 Method 8290).

- For initial calibration performed on 03/24/06 for all target compounds on instrument HRMS1, all criteria were met. No qualifiers were applied.

V-Continuing Calibration
The continuing calibration consists of two parts: evaluation of the mass resolution and retention time check. The following stipulates the continuing calibration criteria.

- The signal signal-to-noise ratio (S/N) must be at least 10:1 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard for each analyte.
- The relative response factor of each analyte for the unlabeled standard must be within ±20% of the average RF obtained from the initial calibration, and the RRF of each labeled standard must be within ±30% of the average RRF established during initial calibration. This is expressed in term of percent difference %D.

- For continuing calibration performed on 04/19/06 @10:46 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/19/06 @22:03 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/20/06 @08:49 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/20/06 @15:25 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/21/06 @02:47 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/21/06 @14:10 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/21/06 @02:47 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/22/06 @01:10 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples apply to this continuing calibration.
- For continuing calibration performed on 04/22/06 @12:31 on instrument HRMS1, all criteria were met. No qualifiers were applied. Sample 48MW1 (F39990-14) applies to this continuing calibration.

- For continuing calibration performed on 04/22/06 @23:53 on instrument HRMS1, all criteria were met. No qualifiers were applied. Sample 48MW1 (F39990-14) applies to this continuing calibration.

- For continuing calibration performed on 04/26/06 @09:59 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this continuing calibration.

- For continuing calibration performed on 04/26/06 @20:28 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this continuing calibration.

- For continuing calibration performed on 04/27/06 @07:49 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

VI-Internal Standards (IS) Recovery Standard Solutions
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: Recoveries of the isotopically-labeled recovery standards to fall within the 40 to 135 percent range for the tetra- through octachlorinated congeners, or as stated in the data package

- All criteria were met. No qualifiers were applied.

VII-Cleanup Standards
Cleanup standards are added to every sample, blank, quality control sample, and calibration solution. This compound is added to the samples after extraction but prior to cleanup and is used to verify the percent recovery obtained using the isotope dilution technique. The control limits are 40 to 135 percent.

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Standard (LCS) or Ongoing Precision Result (OPR)
LCSs are used to monitor laboratory accuracy and precision by calculating the percent recoveries of the spiked compounds. Acceptable performance is determined by:

1. Recoveries of the isotopically-labeled extraction standards to fall within 40-135% control limits for the tetra- through octachlorinated congeners, or as stated in the data package;

2. Recoveries (accuracy) of the unlabeled compounds should be within $\pm$35% when spiked at the method quantitation limit and within $\pm$30% when spiked above 20 times the method quantitation limit, or as stated in the data package;

3. When duplicate OPR are required, the relative percent difference (RPD) of the unlabeled analytes concentrations should be within 30% when spiked at the method quantitation limit and within $\pm$ 25% when spiked above 20 times the method quantitation limit.

- Sample OPR12444 was used as LCS. All criteria were met. No qualifiers were applied.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits (40-135%; 50%RPD).

- No MS/MSD was performed for this SDG.

X-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field groundwater sample duplicate pair 48MW1 (F39990-14) and TM48MW1 (F39990-15) was collected for Dioxin Furans. All detected congeners found in the sample and its duplicate pair and associated %RPD are noted in **Table 3**. All other congeners were non-detect. Since the congeners 1,2,3,4,6,7,8-HpCDD, 1,2,3,7,8-PeCDD, and 2,3,7,8-TCDF were detected above the reporting limit for the duplicate sample and non-detect in the original sample, these compounds were qualified estimated "J" for detects and "UJ" for non-detects for the duplicate pair based upon these outliers. Congeners 1,2,3,4,7,8-HxCDD and OCDD were detected below the reporting limit and were qualified as estimated "J" for the duplicate sample TM48MW1.

Table 3 Field Precision Hits Analysis Summary for Dioxins Furans for Duplicate Pair 48MW1 (F39990-14) and TM48MW1 (F39990-15)

Compound	Original Sample (ng/L)	Duplicate Pair (ng/L)	%RPD
1,2,3,4,6,7,8-HpCDD	0.0126U	0.0857	NA
1,2,3,4,7,8-HxCDD	0.00876U	0.0215A	NA
1,2,3,7,8-PeCDD	0.00528U	0.0873	NA
2,3,7,8-TCDF	0.00727U	0.0128	NA
OCDD	0.0213U	0.018A	NA
Total HpCDDs	0.0126U	0.0857	NA
Total HxCDDs	0.00887U	0.0215	NA
Total PeCDDs	0.00528U	0.0873	NA
Total TCDFs	0.00727U	0.0128	NA

U = Value non-detect as <MRL.
A = Estimated value <MRL and >MDL. Data point qualified was estimated "J".
NA = Not Applicable.

XI-Quantitation Verification

The accuracy of analytical results was verified through the calculation of at least one the several parameters such as the %D, %RSD, % recovery, and/or compound concentration. Values were found to be within 10%. Any value reported by the laboratory as estimated "A" based on an analyte to internal standard ratio below the calibration curve was qualified as estimated "J". The signal signal-to-noise ratio (S/N) must be greater than 2.5 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard. Any detected value with ether interference (DPE-lab flag) was qualified as estimated "J". For where the ion ratio failed the 25% criteria, the estimated maximum possible concentration (EMPC) was reported and flagged estimated "J".

Sample: TM48MW1 (F39990-15), OCDD

A(x) = sum of the integrated ion abundances of the quantitation ions for the unlabeled ions;
A(is) = sum of the integrated ion abundances of the quantitation ions for the labeled ions;
Q(is) = quantity, in ng/ul, of the internal standard added to the sample before extraction;
W = weight, in g, of the sample (solid or organic liquid) as dry weight, or volume in mL of an aqueous sample; and
Avg.RRF(n) = calculated mean relative response factor for the unlabeled analyte.

$$\text{Conc. (ng/L)} = \frac{(A(x))*Q(is)*1000}{A(is)*W*Avg.RRF} = \frac{(27400+34200)*2.0*1000}{(5440000+6500000)*510*1.1256}$$

= 0.0180 ng/L

Reported Value = 0.0180 ng/L
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

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Paradigm Analytical Labs

Method 8290
F39990-14
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00750				
1,2,3,7,8-PeCDD	ND UJ	0.00528				
1,2,3,4,7,8-HxCDD	ND	0.00876				
1,2,3,6,7,8-HxCDD	ND	0.00807				
1,2,3,7,8,9-HxCDD	ND	0.00887				
1,2,3,4,6,7,8-HpCDD	ND UJ	0.0126				
OCDD	ND	0.0213				
2,3,7,8-TCDF	ND UJ	0.00727				
1,2,3,7,8-PeCDF	ND	0.00292				
2,3,4,7,8-PeCDF	ND	0.00285				
1,2,3,4,7,8-HxCDF	ND	0.00493				
1,2,3,6,7,8-HxCDF	ND	0.00434				
2,3,4,6,7,8-HxCDF	ND	0.00492				
1,2,3,7,8,9-HxCDF	ND	0.00588				
1,2,3,4,6,7,8-HpCDF	ND	0.00636				
1,2,3,4,7,8,9-HpCDF	ND	0.00824				
OCDF	ND	0.0135				
Total TCDDs	ND	0.00750				
Total PeCDDs	ND	0.00528				
Total HxCDDs	ND	0.00887				
Total HpCDDs	ND	0.0126				
Total TCDFs	ND	0.00727				
Total PeCDFs	ND	0.00292				
Total HxCDFs	ND	0.00588				
Total HpCDFs	ND	0.00824				
WHO TEQ (ND=0)	ND		ND			
WHO TEQ (ND=½)	0.00996		0.00996			

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-14		Weight / Volume:	500 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-433		Instrument:	hrms1
Sample ID:	G383-433-1C		Filename:	a21apr06a_3-13
Collection Date/Time:	04/13/06	9:55	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/18/06	9:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	23:05	Initial Cal:	m8290-032406b

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Method 8290
F39990-14
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.866	86.6	31:06	0.79	
13C12-1,2,3,7,8-PeCDD	1.0	0.788	78.8	34:00	1.55	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.788	78.8	36:39	1.17	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.787	78.7	39:54	1.03	
13C12-OCDD	2.0	1.18	59.2	44:04	0.85	
13C12-2,3,7,8-TCDF	1.0	0.806	80.6	30:19	0.80	
13C12-1,2,3,7,8-PeCDF	1.0	0.753	75.3	33:12	1.57	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.771	77.1	35:57	0.50	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.709	70.9	38:40	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.179	89.3	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.159	79.3	33:49	1.55	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.186	92.9	36:34	1.18	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.172	85.9	35:51	0.52	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.155	77.6	40:34	0.47	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.82	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:52	1.18	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-14		Weight / Volume:	500 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-433		Instrument:	hrms1
Sample ID:	G383-433-1C		Filename:	a21apr06a_3-13
Collection Date/Time:	04/13/06	9:55	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/18/06	9:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	23:05	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: JF
Date: 04/27/06

Reviewed by: [signature]
Date: 4/27/06

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Method 8290
F39990-15
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00751				
1,2,3,7,8-PeCDD	0.0873 J			34:01	1.65	
1,2,3,4,7,8-HxCDD	0.0215 J			36:34	1.26	A
1,2,3,6,7,8-HxCDD	ND	0.00946				
1,2,3,7,8,9-HxCDD	ND	0.0104				
1,2,3,4,6,7,8-HpCDD	0.0857 J			39:55	1.04	
OCDD	0.0180 J			44:04	0.80	A
2,3,7,8-TCDF	0.0128 J			30:22	0.75	
1,2,3,7,8-PeCDF	ND	0.00273				
2,3,4,7,8-PeCDF	ND	0.00266				
1,2,3,4,7,8-HxCDF	ND	0.00439				
1,2,3,6,7,8-HxCDF	ND	0.00387				
2,3,4,6,7,8-HxCDF	ND	0.00438				
1,2,3,7,8,9-HxCDF	ND	0.00523				
1,2,3,4,6,7,8-HpCDF	ND	0.00686				
1,2,3,4,7,8,9-HpCDF	ND	0.00889				
OCDF	ND	0.0210				
Total TCDDs	ND	0.00751				
Total PeCDDs	0.0873					
Total HxCDDs	0.0215					
Total HpCDDs	0.0857					
Total TCDFs	0.0128					
Total PeCDFs	ND	0.00273				
Total HxCDFs	ND	0.00523				
Total HpCDFs	ND	0.00889				
WHO TEQ (ND=0)	0.0916		0.0916			
WHO TEQ (ND=½)	0.0980		0.0980			

Client Information			**Sample Information**		
Project Name:	F39990		Report Basis:		
			Matrix:	Water	
Sample ID:	F39990-15		Weight / Volume:	510 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG12444	
Project ID:	G383-433		Instrument:	hrms1	
Sample ID:	G383-433-2C		Filename:	a26apr06a-11	
Collection Date/Time:	04/13/06	9:55	Retchk:	a26apr06a-1	
Receipt Date/Time:	04/18/06	9:30	Begin ConCal:	a26apr06a-1	
Extraction Date:	04/21/06		End ConCal:	a26apr06a-14	
Analysis Date/Time:	04/26/06	18:03	Initial Cal:	m8290-032406b	

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Method 8290
F39990-15
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.749	74.9	31:06	0.84	
13C12-1,2,3,7,8-PeCDD	1.0	0.747	74.7	34:00	1.56	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.779	77.9	36:39	1.22	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.745	74.5	39:55	1.05	
13C12-OCDD	2.0	1.07	53.4	44:04	0.84	
13C12-2,3,7,8-TCDF	1.0	0.719	71.9	30:19	0.81	
13C12-1,2,3,7,8-PeCDF	1.0	0.709	70.9	33:12	1.61	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.744	74.4	35:58	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.691	69.1	38:40	0.46	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.143	71.7	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.147	73.5	33:49	1.64	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.163	81.5	36:34	1.38	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.154	77.0	35:51	0.52	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.136	68.2	40:34	0.45	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.84	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:54	1.23	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-15		Weight / Volume:	510 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-433		Instrument:	hrms1
Sample ID:	G383-433-2C		Filename:	a26apr06a-11
Collection Date/Time:	04/13/06	9:55	Retchk:	a26apr06a-1
Receipt Date/Time:	04/18/06	9:30	Begin ConCal:	a26apr06a-1
Extraction Date:	04/21/06		End ConCal:	a26apr06a-14
Analysis Date/Time:	04/26/06	18:03	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: JF
Date: 04/27/06

Reviewed by: CH
Date: 4/27/06

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Method 8290
F39990-16
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00856				
1,2,3,7,8-PeCDD	0.0283 J			34:01	1.69	A
1,2,3,4,7,8-HxCDD	0.0106 J			36:34	1.12	A
1,2,3,6,7,8-HxCDD	ND	0.00929				
1,2,3,7,8,9-HxCDD	ND	0.0102				
1,2,3,4,6,7,8-HpCDD	0.0331 J			39:55	1.02	A
OCDD	ND	0.0352				
2,3,7,8-TCDF	ND	0.00772				
1,2,3,7,8-PeCDF	ND	0.00461				
2,3,4,7,8-PeCDF	ND	0.00450				
1,2,3,4,7,8-HxCDF	ND	0.00386				
1,2,3,6,7,8-HxCDF	ND	0.00340				
2,3,4,6,7,8-HxCDF	ND	0.00385				
1,2,3,7,8,9-HxCDF	ND	0.00460				
1,2,3,4,6,7,8-HpCDF	ND	0.00746				
1,2,3,4,7,8,9-HpCDF	ND	0.00967				
OCDF	ND	0.0261				
Total TCDDs	ND	0.00856				
Total PeCDDs	0.0283					
Total HxCDDs	0.0106					
Total HpCDDs	0.0331					
Total TCDFs	ND	0.00772				
Total PeCDFs	ND	0.00461				
Total HxCDFs	ND	0.00460				
Total HpCDFs	ND	0.00967				
WHO TEQ (ND=0)	0.0297		0.0297			
WHO TEQ (ND=½)	0.0374		0.0374			

Client Information			**Sample Information**		
Project Name:	F39990		Report Basis:		
			Matrix:	Water	
Sample ID:	F39990-16		Weight / Volume:	511 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG12444	
Project ID:	G383-433		Instrument:	hrms1	
Sample ID:	G383-433-3B		Filename:	a26apr06a-12	
Collection Date/Time:	04/13/06	17:25	Retchk:	a26apr06a-1	
Receipt Date/Time:	04/18/06	9:30	Begin ConCal:	a26apr06a-1	
Extraction Date:	04/21/06		End ConCal:	a26apr06a-14	
Analysis Date/Time:	04/26/06	18:51	Initial Cal:	m8290-032406b	

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Method 8290
F39990-16
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.680	68.0	31:06	0.83	
13C12-1,2,3,7,8-PeCDD	1.0	0.657	65.7	34:00	1.57	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.665	66.5	36:39	1.19	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.648	64.8	39:55	1.09	
13C12-OCDD	2.0	0.940	47.0	44:04	0.84	
13C12-2,3,7,8-TCDF	1.0	0.670	67.0	30:19	0.81	
13C12-1,2,3,7,8-PeCDF	1.0	0.620	62.0	33:12	1.67	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.661	66.1	35:58	0.51	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.590	59.0	38:40	0.46	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.140	69.8	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.136	67.8	33:49	1.71	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.156	78.0	36:34	1.23	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.145	72.6	35:51	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.129	64.3	40:34	0.44	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.84	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:54	1.19	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-16		Weight / Volume:	511 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-433		Instrument:	hrms1
Sample ID:	G383-433-3B		Filename:	a26apr06a-12
Collection Date/Time:	04/13/06	17:25	Retchk:	a26apr06a-1
Receipt Date/Time:	04/18/06	9:30	Begin ConCal:	a26apr06a-1
Extraction Date:	04/21/06		End ConCal:	a26apr06a-14
Analysis Date/Time:	04/26/06	18:51	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: AF
Date: 04/27/06

Reviewed by: [illegible]
Date: 4/27/06

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Paradigm Analytical Labs

Method 8290
F39990-17
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00675				
1,2,3,7,8-PeCDD	0.0112 J			34:01	1.39	A
1,2,3,4,7,8-HxCDD	ND	0.0123				
1,2,3,6,7,8-HxCDD	ND	0.0113				
1,2,3,7,8,9-HxCDD	ND	0.0125				
1,2,3,4,6,7,8-HpCDD	0.0168 J			39:55	1.10	A
OCDD	ND	0.0242				
2,3,7,8-TCDF	ND	0.00671				
1,2,3,7,8-PeCDF	ND	0.00307				
2,3,4,7,8-PeCDF	ND	0.00300				
1,2,3,4,7,8-HxCDF	ND	0.00598				
1,2,3,6,7,8-HxCDF	ND	0.00527				
2,3,4,6,7,8-HxCDF	ND	0.00596				
1,2,3,7,8,9-HxCDF	ND	0.00713				
1,2,3,4,6,7,8-HpCDF	ND	0.00601				
1,2,3,4,7,8,9-HpCDF	ND	0.00778				
OCDF	ND	0.0191				
Total TCDDs	ND	0.00675				
Total PeCDDs	0.0112					
Total HxCDDs	ND	0.0125				
Total HpCDDs	0.0168					
Total TCDFs	ND	0.00671				
Total PeCDFs	ND	0.00307				
Total HxCDFs	ND	0.00713				
Total HpCDFs	ND	0.00778				
WHO TEQ (ND=0)	0.0114		0.0114			
WHO TEQ (ND=½)	0.0190		0.0190			

Client Information			**Sample Information**		
Project Name:	F39990		Report Basis:		
			Matrix:	Water	
Sample ID:	F39990-17		Weight / Volume:	506 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG12444	
Project ID:	G383-433		Instrument:	hrms1	
Sample ID:	G383-433-4E		Filename:	a26apr06a-13	
Collection Date/Time:	04/13/06	16:00	Retchk:	a26apr06a-1	
Receipt Date/Time:	04/18/06	9:30	Begin ConCal:	a26apr06a-1	
Extraction Date:	04/21/06		End ConCal:	a26apr06a-14	
Analysis Date/Time:	04/26/06	19:39	Initial Cal:	m8290-032406b	

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Method 8290
F39990-17
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.723	72.3	31:06	0.81	
13C12-1,2,3,7,8-PeCDD	1.0	0.703	70.3	34:00	1.59	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.761	76.1	36:39	1.19	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.753	75.3	39:55	1.05	
13C12-OCDD	2.0	1.04	51.8	44:04	0.82	
13C12-2,3,7,8-TCDF	1.0	0.684	68.4	30:19	0.81	
13C12-1,2,3,7,8-PeCDF	1.0	0.663	66.3	33:13	1.63	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.734	73.4	35:58	0.50	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.677	67.7	38:40	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.149	74.7	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.151	75.7	33:49	1.63	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.182	90.9	36:34	1.20	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.164	82.2	35:51	0.48	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.151	75.6	40:34	0.46	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.83	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:54	1.18	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-17		Weight / Volume:	506 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-433		Instrument:	hrms1
Sample ID:	G383-433-4E		Filename:	a26apr06a-13
Collection Date/Time:	04/13/06	16:00	Retchk:	a26apr06a-1
Receipt Date/Time:	04/18/06	9:30	Begin ConCal:	a26apr06a-1
Extraction Date:	04/21/06		End ConCal:	a26apr06a-14
Analysis Date/Time:	04/26/06	19:39	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: AT
Date: 04/27/06

Reviewed by: CAL
Date: 4/27/06

Shaw Environmental, Inc.

2113 Emmorton Park Road
Edgewood, MD 21040-1037
410.612.6350
Fax 410.612.6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Dioxin Furans
SGS Paradigm Analytical Laboratories, Inc. SDG G383-431
(Accutest SDG F39990)

DATE: May 10, 2006

The purpose of this memorandum is to present the data validation report for the samples collected for RFAAP SWMUs 48, 49, 50, 51, and 59 on April 10, 2006, April 11, 2006, April 12, 2006, and April 13, 2006 for groundwater analysis. The sample was analyzed for Dioxin Furan compounds using USEPA SW-846 Method 8290 High Resolution Gas Chromatography/High Resolution Mass Spectroscopy (HRGC/HRMS). A total of eleven aqueous samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
51MW1	F39990-1	48MW4	F39990-7
51MW2	F39990-2	13MW1	F39990-9
16-4	F39990-3	TM13MW1	F39990-10
28MW2	F39990-4	13MW2	F39990-11
28MW1	F39990-5	C1	F39990-12
C4	F39990-6		

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *USACE Shell for Analytical Chemistry Requirements*, method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *USEPA Region III Dioxin/Furan Data Validation Guidance* (March, 1999). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Internal Standards (IS) Recovery Standard Solutions
	X	Cleanup Standards
	X	Laboratory Control Standard or Ongoing Precision Result (OPR)
	X	Matrix Spike and Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

5/10/06
Date

RFAAP VALIDATION REPORT
DIOXIN FURAN REVIEW
SDG G383-431
(Accutest SDG F39990)

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For dioxin furan compounds in cooled @4°C ± 2°C aqueous samples, the maximum holding time is 30 days from sample collection to preparative extraction and 45 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 04/10/06, 04/11/06, and 04/12/06, the coolers were received by the primary laboratory (Accutest) on 04/13/06 at 4.2°C, 3.0°C, 2.4°C, 1.8°C, 2.4°C, 2.6°C, 1.6°C, 3.4°C, 2.8°C, 2.6°C, 3.2°C, and 3.0°C. For samples collected on 04/13/06, the coolers were received by the primary laboratory on 04/15/06 at 1.6°C, 2.0°C, 2.8°C, 3.4°C, and 4.2°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.1°C, 3.8°C, and 2.7°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples in this SDG were collected on 04/10/06, 04/11/06, and 04/12/06. The samples were extracted on 04/21/06 and analyzed 04/22/06. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory (or field) blank analyses is to determine the existence and magnitude of contamination problems resulting from field and laboratory activities. No contamination should be found in any of the blanks >MDL. Samples are qualified "B" when they are less than 5X the absolute value of the maximum blank concentration (10x for OCDD/OCDF). **Table 2** summarizes the blank contamination analysis. Rinse blank 041206R (F39990-8) (low-flow pump) applies to all samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. ng/L	Action Level ng/L	B qualified samples
04/22/06	LMB12444	All target <MRL	NA	NA	None
04/22/06	041206R	All target <MRL	NA	NA	None

NA = Not Applicable.

III-Instrument Performance Check

Instrument must be tuned with perfluorokerosene (PFK) to achieve a static resolving power of at least 10,000 (10% valley). Documentation of the mass spectrometer resolving power is accomplished by recording the peak profile of the high-mass reference signal (typically m/z 330.9792) obtained during a peak examination by using the low-mass PFK ion at m/z 292.9825 or lower in mass as reference. At the beginning of the each 12-hour period, the chromatographic resolution is verified in the same fashion as in the initial calibration through the analysis of HRCC solution on the DB-5 (or equivalent) column or through the analysis of the column performance solution on the SP-2331 or SP-225 (or equivalent) column. A 25% valley must be achieved between the close eluters.

- All PFK forms were verified and found to be in compliance with method specification. No qualifiers were applied.

IV-Initial Calibration
Once the window defining mix has been analyzed and the descriptor switching times have been verified, the five point calibration solutions can be analyzed prior to sample analysis. Initial calibration criteria are as follows:

- The percent relative standard deviations for the mean response factors RRF(n) from the 17 unlabeled standards must not exceed ±20%, and those for the labeled reference compounds must not exceed ±30%
- Isotopic ratio must be within the specified control limits in Table 8 (SW846 Method 8290).

- For initial calibration performed on 03/24/06 for all target compounds on instrument HRMS1, all criteria were met. No qualifiers were applied.

V-Continuing Calibration
The continuing calibration consists of two parts: evaluation of the mass resolution and retention time check. The following stipulates the continuing calibration criteria.

- The signal signal-to-noise ratio (S/N) must be at least 10:1 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard for each analyte.
- The relative response factor of each analyte for the unlabeled standard must be within ±20% of the average RF obtained from the initial calibration, and the RRF of each labeled standard must be within ±30% of the average RRF established during initial calibration. This is expressed in term of percent difference %D.

- For continuing calibration performed on 04/19/06 @10:46 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/19/06 @22:03 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/20/06 @08:49 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/20/06 @15:25 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/21/06 @02:47 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/21/06 @14:10 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/21/06 @02:47 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.
- For continuing calibration performed on 04/22/06 @01:10 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), and 16-4 (F39990-3) apply to this continuing calibration.

- For continuing calibration performed on 04/22/06 @12:31 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) apply to this continuing calibration.

- For continuing calibration performed on 04/22/06 @23:53 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) apply to this continuing calibration.

VI-Internal Standards (IS) Recovery Standard Solutions
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: Recoveries of the isotopically-labeled recovery standards to fall within the 40 to 135 percent range for the tetra- through octachlorinated congeners, or as stated in the data package

- All criteria were met. No qualifiers were applied.

VII-Cleanup Standards
Cleanup standards are added to every sample, blank, quality control sample, and calibration solution. This compound is added to the samples after extraction but prior to cleanup and is used to verify the percent recovery obtained using the isotope dilution technique. The control limits are 40 to 135 percent.

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Standard (LCS) or Ongoing Precision Result (OPR)
LCSs are used to monitor laboratory accuracy and precision by calculating the percent recoveries of the spiked compounds. Acceptable performance is determined by:

1. Recoveries of the isotopically-labeled extraction standards to fall within 40-135% control limits for the tetra- through octachlorinated congeners, or as stated in the data package;

2. Recoveries (accuracy) of the unlabeled compounds should be within $\pm$35% when spiked at the method quantitation limit and within $\pm$30% when spiked above 20 times the method quantitation limit, or as stated in the data package;

3. When duplicate OPR are required, the relative percent difference (RPD) of the unlabeled analytes concentrations should be within 30% when spiked at the method quantitation limit and within $\pm$ 25% when spiked above 20 times the method quantitation limit.

- Sample OPR12444 was used as LCS. All criteria were met. No qualifiers were applied.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits (40-135%; 50%RPD).

- No MS/MSD was performed for this SDG.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field groundwater sample duplicate pair 13MW1 (F39990-9) and TM13MW1 (F39990-10) was collected for Dioxin Furans. All target compounds were non-detect. All criteria were met. No qualifiers were applied.

XI-Quantitation Verification
The accuracy of analytical results was verified through the calculation of at least one the several parameters such as the %D, %RSD, % recovery, and/or compound concentration. Values were found to be within 10%. Any value reported by the laboratory as estimated "A" based on an analyte to internal standard ratio below the calibration curve was qualified as estimated "J". The signal signal-to-noise ratio (S/N) must be greater than 2.5 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard. Any detected value with ether interference (DPE-lab flag) was qualified as estimated "J". For where the ion ratio failed the 25% criteria, the estimated maximum possible concentration (EMPC) was reported and flagged estimated "J".

Sample: 51MW1 (F39990-1), OCDD

A(x) = sum of the integrated ion abundances of the quantitation ions for the unlabeled ions;
A(is) = sum of the integrated ion abundances of the quantitation ions for the labeled ions;
Q(is) = quantity, in ng/ul, of the internal standard added to the sample before extraction;
W = weight, in g, of the sample (solid or organic liquid) as dry weight, or volume in mL of an aqueous sample; and
Avg.RRF(n) = calculated mean relative response factor for the unlabeled analyte.

$$\text{Conc. (ng/L)} = \frac{(A(x))*Q(is)*1000}{A(is)*W*Avg.RRF} = \frac{(70800+69700)*2.0*1000}{(6120000+7070000)*504*1.1256}$$

= 0.0376 ng/L

Reported Value = 0.0376 ng/L
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

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Paradigm Analytical Labs

Method 8290
F39990-1
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00332				
1,2,3,7,8-PeCDD	ND	0.00610				
1,2,3,4,7,8-HxCDD	ND	0.00890				
1,2,3,6,7,8-HxCDD	ND	0.00821				
1,2,3,7,8,9-HxCDD	ND	0.00901				
1,2,3,4,6,7,8-HpCDD	ND	0.00875				
OCDD	0.0376 J			44:06	1.02	A
2,3,7,8-TCDF	ND	0.00329				
1,2,3,7,8-PeCDF	ND	0.00340				
2,3,4,7,8-PeCDF	ND	0.00332				
1,2,3,4,7,8-HxCDF	ND	0.00529				
1,2,3,6,7,8-HxCDF	ND	0.00466				
2,3,4,6,7,8-HxCDF	ND	0.00528				
1,2,3,7,8,9-HxCDF	ND	0.00631				
1,2,3,4,6,7,8-HpCDF	ND	0.00541				
1,2,3,4,7,8,9-HpCDF	ND	0.00701				
OCDF	ND	0.0167				
Total TCDDs	ND	0.00332				
Total PeCDDs	ND	0.00610				
Total HxCDDs	ND	0.00901				
Total HpCDDs	ND	0.00875				
Total TCDFs	ND	0.00329				
Total PeCDFs	ND	0.00340				
Total HxCDFs	ND	0.00631				
Total HpCDFs	ND	0.00701				
WHO TEQ (ND=0)	0.00000376		0.00000376			
WHO TEQ (ND=½)	0.00828		0.00828			

Client Information			**Sample Information**		
Project Name:	F39990		Report Basis:		
			Matrix:	Water	
Sample ID:	F39990-1		Weight / Volume:	504 mL	
			Solids / Lipids:	NA	%
			Original pH :	7	
Laboratory Information			Batch ID:	WG12444	
Project ID:	G383-431		Instrument:	hrms1	
Sample ID:	G383-431-1C		Filename:	a21apr06a_2-11	
Collection Date/Time:	04/11/06	18:20	Retchk:	a21apr06a-13	
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a-13	
Extraction Date:	04/21/06		End ConCal:	a21apr06a_2-14	
Analysis Date/Time:	04/22/06	10:06	Initial Cal:	m8290-032406b	

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Form 5 Copy

Paradigm Analytical Labs

Method 8290
F39990-1
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.815	81.5	31:07	0.80	
13C12-1,2,3,7,8-PeCDD	1.0	0.795	79.5	34:00	1.56	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.742	74.2	36:39	1.24	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.767	76.7	39:55	1.05	
13C12-OCDD	2.0	1.16	58.1	44:04	0.87	
13C12-2,3,7,8-TCDF	1.0	0.745	74.5	30:19	0.82	
13C12-1,2,3,7,8-PeCDF	1.0	0.748	74.8	33:13	1.56	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.680	68.0	35:58	0.50	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.660	66.0	38:40	0.47	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.158	78.8	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.151	75.6	33:49	1.54	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.166	83.2	36:34	1.24	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.151	75.6	35:52	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.140	69.8	40:34	0.48	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:34	0.80	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:54	1.19	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-1		Weight / Volume:	504 mL
			Solids / Lipids:	NA %
			Original pH :	7
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-1C		Filename:	a21apr06a_2-11
Collection Date/Time:	04/11/06	18:20	Retchk:	a21apr06a-13
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a-13
Extraction Date:	04/21/06		End ConCal:	a21apr06a_2-14
Analysis Date/Time:	04/22/06	10:06	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: AF
Date: 04/26/06

Reviewed by: [signature]
Date: 4/24/06

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Paradigm Analytical Labs

Method 8290
F39990-2
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00368				
1,2,3,7,8-PeCDD	ND	0.00651				
1,2,3,4,7,8-HxCDD	ND	0.0131				
1,2,3,6,7,8-HxCDD	ND	0.0121				
1,2,3,7,8,9-HxCDD	ND	0.0132				
1,2,3,4,6,7,8-HpCDD	ND	0.0103				
OCDD	ND	0.0208				
2,3,7,8-TCDF	ND	0.00358				
1,2,3,7,8-PeCDF	ND	0.00360				
2,3,4,7,8-PeCDF	ND	0.00352				
1,2,3,4,7,8-HxCDF	ND	0.00683				
1,2,3,6,7,8-HxCDF	ND	0.00602				
2,3,4,6,7,8-HxCDF	ND	0.00681				
1,2,3,7,8,9-HxCDF	ND	0.00814				
1,2,3,4,6,7,8-HpCDF	ND	0.00613				
1,2,3,4,7,8,9-HpCDF	ND	0.00794				
OCDF	ND	0.0166				
Total TCDDs	ND	0.00368				
Total PeCDDs	ND	0.00651				
Total HxCDDs	ND	0.0132				
Total HpCDDs	ND	0.0103				
Total TCDFs	ND	0.00358				
Total PeCDFs	ND	0.00360				
Total HxCDFs	ND	0.00814				
Total HpCDFs	ND	0.00794				
WHO TEQ (ND=0)	ND		ND			
WHO TEQ (ND=½)	0.00968		0.00968			

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-2		Weight / Volume:	510 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-2C		Filename:	a21apr06a_2-12
Collection Date/Time:	04/10/06	16:45	Retchk:	a21apr06a-13
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a-13
Extraction Date:	04/21/06		End ConCal:	a21apr06a_2-14
Analysis Date/Time:	04/22/06	10:54	Initial Cal:	m8290-032406b

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Paradigm Analytical Labs

Method 8290
F39990-2
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.869	86.9	31:07	0.80	
13C12-1,2,3,7,8-PeCDD	1.0	0.852	85.2	34:00	1.53	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.783	78.3	36:39	1.25	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.807	80.7	39:54	1.03	
13C12-OCDD	2.0	1.27	63.3	44:04	0.87	
13C12-2,3,7,8-TCDF	1.0	0.813	81.3	30:19	0.80	
13C12-1,2,3,7,8-PeCDF	1.0	0.786	78.6	33:12	1.55	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.734	73.4	35:58	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.702	70.2	38:40	0.47	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.181	90.3	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.170	85.1	33:49	1.57	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.194	97.1	36:34	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.168	84.2	35:52	0.48	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.153	76.6	40:34	0.49	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.81	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:52	1.29	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-2		Weight / Volume:	510 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-2C		Filename:	a21apr06a_2-12
Collection Date/Time:	04/10/06	16:45	Retchk:	a21apr06a-13
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a-13
Extraction Date:	04/21/06		End ConCal:	a21apr06a_2-14
Analysis Date/Time:	04/22/06	10:54	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: _____
Date: 04/26/06

Reviewed by: _____
Date: 4/24/06

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Form I Copy

Paradigm Analytical Labs

Method 8290
F39990-3
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00365				
1,2,3,7,8-PeCDD	ND	0.00610				
1,2,3,4,7,8-HxCDD	ND	0.00871				
1,2,3,6,7,8-HxCDD	ND	0.00803				
1,2,3,7,8,9-HxCDD	ND	0.00882				
1,2,3,4,6,7,8-HpCDD	ND	0.00915				
OCDD	ND	0.0348				
2,3,7,8-TCDF	ND	0.00372				
1,2,3,7,8-PeCDF	ND	0.00330				
2,3,4,7,8-PeCDF	ND	0.00322				
1,2,3,4,7,8-HxCDF	ND	0.00554				
1,2,3,6,7,8-HxCDF	ND	0.00489				
2,3,4,6,7,8-HxCDF	ND	0.00553				
1,2,3,7,8,9-HxCDF	ND	0.00661				
1,2,3,4,6,7,8-HpCDF	ND	0.00578				
1,2,3,4,7,8,9-HpCDF	ND	0.00749				
OCDF	ND	0.0209				
Total TCDDs	ND	0.00365				
Total PeCDDs	ND	0.00610				
Total HxCDDs	ND	0.00882				
Total HpCDDs	ND	0.00915				
Total TCDFs	ND	0.00372				
Total PeCDFs	ND	0.00330				
Total HxCDFs	ND	0.00661				
Total HpCDFs	ND	0.00749				
WHO TEQ (ND=0)	ND		ND			
WHO TEQ (ND=½)	0.00847		0.00847			

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-3		Weight / Volume:	505 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-3C		Filename:	a21apr06a_2-13
Collection Date/Time:	04/10/06	14:40	Retchk:	a21apr06a-13
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a-13
Extraction Date:	04/21/06		End ConCal:	a21apr06a_2-14
Analysis Date/Time:	04/22/06	11:43	Initial Cal:	m8290-032406b

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Paradigm Analytical Labs

Method 8290
F39990-3
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.817	81.7	31:06	0.81	
13C12-1,2,3,7,8-PeCDD	1.0	0.777	77.7	34:00	1.56	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.759	75.9	36:39	1.22	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.767	76.7	39:54	1.06	
13C12-OCDD	2.0	1.22	60.8	44:04	0.87	
13C12-2,3,7,8-TCDF	1.0	0.775	77.5	30:19	0.80	
13C12-1,2,3,7,8-PeCDF	1.0	0.741	74.1	33:12	1.57	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.706	70.6	35:58	0.53	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.665	66.5	38:40	0.47	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.172	85.8	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.162	81.1	33:49	1.58	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.177	88.7	36:34	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.171	85.3	35:52	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.147	73.5	40:34	0.48	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.81	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:52	1.27	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-3		Weight / Volume:	505 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-3C		Filename:	a21apr06a_2-13
Collection Date/Time:	04/10/06	14:40	Retchk:	a21apr06a-13
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a-13
Extraction Date:	04/21/06		End ConCal:	a21apr06a_2-14
Analysis Date/Time:	04/22/06	11:43	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: KF
Date: 04/26/06

Reviewed by: CD
Date: 4/24/06

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Paradigm Analytical Labs

Method 8290
F39990-4
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00477				
1,2,3,7,8-PeCDD	ND	0.00580				
1,2,3,4,7,8-HxCDD	ND	0.0151				
1,2,3,6,7,8-HxCDD	ND	0.0139				
1,2,3,7,8,9-HxCDD	ND	0.0153				
1,2,3,4,6,7,8-HpCDD	ND	0.0131				
OCDD	ND	0.0250				
2,3,7,8-TCDF	ND	0.00381				
1,2,3,7,8-PeCDF	ND	0.00331				
2,3,4,7,8-PeCDF	ND	0.00324				
1,2,3,4,7,8-HxCDF	ND	0.00693				
1,2,3,6,7,8-HxCDF	ND	0.00611				
2,3,4,6,7,8-HxCDF	ND	0.00692				
1,2,3,7,8,9-HxCDF	ND	0.00827				
1,2,3,4,6,7,8-HpCDF	ND	0.00652				
1,2,3,4,7,8,9-HpCDF	ND	0.00844				
OCDF	ND	0.0193				
Total TCDDs	ND	0.00477				
Total PeCDDs	ND	0.00580				
Total HxCDDs	ND	0.0153				
Total HpCDDs	ND	0.0131				
Total TCDFs	ND	0.00381				
Total PeCDFs	ND	0.00331				
Total HxCDFs	ND	0.00827				
Total HpCDFs	ND	0.00844				
WHO TEQ (ND=0)	ND		ND			
WHO TEQ (ND=½)	0.0101		0.0101			

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-4		Weight / Volume:	502 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-4C		Filename:	a21apr06a_3-4
Collection Date/Time:	04/11/06	10:05	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	15:49	Initial Cal:	m8290-032406b

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Paradigm Analytical Labs

Method 8290
F39990-4
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.765	76.5	31:06	0.82	
13C12-1,2,3,7,8-PeCDD	1.0	0.703	70.3	34:00	1.60	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.693	69.3	36:39	1.20	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.700	70.0	39:54	1.05	
13C12-OCDD	2.0	1.06	53.1	44:04	0.85	
13C12-2,3,7,8-TCDF	1.0	0.713	71.3	30:19	0.81	
13C12-1,2,3,7,8-PeCDF	1.0	0.661	66.1	33:12	1.55	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.667	66.7	35:58	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.620	62.0	38:40	0.46	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.162	80.9	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.151	75.3	33:49	1.57	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.174	86.9	36:34	1.32	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.161	80.5	35:52	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.140	69.8	40:34	0.44	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.81	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:52	1.23	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-4		Weight / Volume:	502 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-4C		Filename:	a21apr06a_3-4
Collection Date/Time:	04/11/06	10:05	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	15:49	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: JF
Date: 04/26/06

Reviewed by: CLC
Date: 4/24/06

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Paradigm Analytical Labs

Method 8290
F39990-5
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00402				
1,2,3,7,8-PeCDD	ND	0.00683				
1,2,3,4,7,8-HxCDD	ND	0.0142				
1,2,3,6,7,8-HxCDD	ND	0.0131				
1,2,3,7,8,9-HxCDD	ND	0.0144				
1,2,3,4,6,7,8-HpCDD	ND	0.0144				
OCDD	ND	0.0377				
2,3,7,8-TCDF	ND	0.00447				
1,2,3,7,8-PeCDF	ND	0.00417				
2,3,4,7,8-PeCDF	ND	0.00407				
1,2,3,4,7,8-HxCDF	ND	0.00719				
1,2,3,6,7,8-HxCDF	ND	0.00633				
2,3,4,6,7,8-HxCDF	ND	0.00717				
1,2,3,7,8,9-HxCDF	ND	0.00857				
1,2,3,4,6,7,8-HpCDF	ND	0.00735				
1,2,3,4,7,8,9-HpCDF	ND	0.00952				
OCDF	ND	0.0225				
Total TCDDs	ND	0.00402				
Total PeCDDs	ND	0.00683				
Total HxCDDs	ND	0.0144				
Total HpCDDs	ND	0.0144				
Total TCDFs	ND	0.00447				
Total PeCDFs	ND	0.00417				
Total HxCDFs	ND	0.00857				
Total HpCDFs	ND	0.00952				
WHO TEQ (ND=0)	ND		ND			
WHO TEQ (ND=½)	0.0105		0.0105			

Client Information			**Sample Information**		
Project Name:	F39990		Report Basis:		
			Matrix:	Water	
Sample ID:	F39990-5		Weight / Volume:	500 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG12444	
Project ID:	G383-431		Instrument:	hrms1	
Sample ID:	G383-431-5C		Filename:	a21apr06a_3-5	
Collection Date/Time:	04/11/06	12:05	Retchk:	a21apr06a_2-14	
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14	
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14	
Analysis Date/Time:	04/22/06	16:38	Initial Cal:	m8290-032406b	

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Method 8290
F39990-5
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.721	72.1	31:06	0.79	
13C12-1,2,3,7,8-PeCDD	1.0	0.657	65.7	34:00	1.54	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.663	66.3	36:39	1.18	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.647	64.7	39:55	1.04	
13C12-OCDD	2.0	0.959	48.0	44:04	0.85	
13C12-2,3,7,8-TCDF	1.0	0.675	67.5	30:19	0.79	
13C12-1,2,3,7,8-PeCDF	1.0	0.625	62.5	33:12	1.56	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.628	62.8	35:58	0.51	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.577	57.7	38:40	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.157	78.6	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.143	71.5	33:49	1.57	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.157	78.7	36:34	1.22	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.154	77.0	35:52	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.133	66.6	40:34	0.46	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.81	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:52	1.21	

Client Information			**Sample Information**		
Project Name:	F39990		Report Basis:		
			Matrix:	Water	
Sample ID:	F39990-5		Weight / Volume:	500 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG12444	
Project ID:	G383-431		Instrument:	hrms1	
Sample ID:	G383-431-5C		Filename:	a21apr06a_3-5	
Collection Date/Time:	04/11/06	12:05	Retchk:	a21apr06a_2-14	
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14	
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14	
Analysis Date/Time:	04/22/06	16:38	Initial Cal:	m8290-032406b	

Form Version:[8290_DB_2.04]Report

Analyzed by: AF
Date: 04/26/06

Reviewed by: [illegible]
Date: 4/24/06

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Paradigm Analytical Labs

Method 8290
F39990-6
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00452				
1,2,3,7,8-PeCDD	ND	0.00697				
1,2,3,4,7,8-HxCDD	ND	0.0112				
1,2,3,6,7,8-HxCDD	ND	0.0104				
1,2,3,7,8,9-HxCDD	ND	0.0114				
1,2,3,4,6,7,8-HpCDD	ND	0.00977				
OCDD	0.0361 J			44:04	0.91	A
2,3,7,8-TCDF	ND	0.00456				
1,2,3,7,8-PeCDF	ND	0.00333				
2,3,4,7,8-PeCDF	ND	0.00325				
1,2,3,4,7,8-HxCDF	ND	0.00527				
1,2,3,6,7,8-HxCDF	ND	0.00464				
2,3,4,6,7,8-HxCDF	ND	0.00526				
1,2,3,7,8,9-HxCDF	ND	0.00628				
1,2,3,4,6,7,8-HpCDF	ND	0.00627				
1,2,3,4,7,8,9-HpCDF	ND	0.00812				
OCDF	ND	0.0161				
Total TCDDs	ND	0.00452				
Total PeCDDs	ND	0.00697				
Total HxCDDs	ND	0.0114				
Total HpCDDs	ND	0.00977				
Total TCDFs	ND	0.00456				
Total PeCDFs	ND	0.00333				
Total HxCDFs	ND	0.00628				
Total HpCDFs	ND	0.00812				
WHO TEQ (ND=0)	0.00000361		0.00000361			
WHO TEQ (ND=½)	0.00972		0.00972			

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-6		Weight / Volume:	502 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-6C		Filename:	a21apr06a_3-6
Collection Date/Time:	04/11/06	14:45	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	17:26	Initial Cal:	m8290-032406b

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Paradigm Analytical Labs

Method 8290
F39990-6
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.737	73.7	31:06	0.82	
13C12-1,2,3,7,8-PeCDD	1.0	0.679	67.9	34:00	1.56	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.694	69.4	36:39	1.24	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.653	65.3	39:54	1.05	
13C12-OCDD	2.0	0.974	48.7	44:04	0.85	
13C12-2,3,7,8-TCDF	1.0	0.700	70.0	30:19	0.80	
13C12-1,2,3,7,8-PeCDF	1.0	0.642	64.2	33:13	1.54	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.637	63.7	35:58	0.50	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.602	60.2	38:40	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.162	81.0	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.149	74.7	33:49	1.58	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.163	81.3	36:34	1.23	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.154	76.9	35:52	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.138	69.0	40:34	0.47	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.80	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:52	1.23	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-6		Weight / Volume:	502 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-6C		Filename:	a21apr06a_3-6
Collection Date/Time:	04/11/06	14:45	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	17:26	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: _____
Date: 04/26/06

Reviewed by: _____
Date: 4/24/06

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Paradigm Analytical Labs

Method 8290
F39990-7
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00403				
1,2,3,7,8-PeCDD	ND	0.00658				
1,2,3,4,7,8-HxCDD	ND	0.0111				
1,2,3,6,7,8-HxCDD	ND	0.0102				
1,2,3,7,8,9-HxCDD	ND	0.0112				
1,2,3,4,6,7,8-HpCDD	ND	0.0156				
OCDD	ND	0.0309				
2,3,7,8-TCDF	ND	0.00334				
1,2,3,7,8-PeCDF	ND	0.00334				
2,3,4,7,8-PeCDF	ND	0.00326				
1,2,3,4,7,8-HxCDF	ND	0.00479				
1,2,3,6,7,8-HxCDF	ND	0.00422				
2,3,4,6,7,8-HxCDF	ND	0.00478				
1,2,3,7,8,9-HxCDF	ND	0.00572				
1,2,3,4,6,7,8-HpCDF	ND	0.00741				
1,2,3,4,7,8,9-HpCDF	ND	0.00960				
OCDF	ND	0.0168				
Total TCDDs	ND	0.00403				
Total PeCDDs	ND	0.00658				
Total HxCDDs	ND	0.0112				
Total HpCDDs	ND	0.0156				
Total TCDFs	ND	0.00334				
Total PeCDFs	ND	0.00334				
Total HxCDFs	ND	0.00572				
Total HpCDFs	ND	0.00960				
WHO TEQ (ND=0)	ND		ND			
WHO TEQ (ND=½)	0.00913		0.00913			

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-7		Weight / Volume:	513 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-7C		Filename:	a21apr06a_3-7
Collection Date/Time:	04/11/06	17:15	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	18:14	Initial Cal:	m8290-032406b

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Paradigm Analytical Labs

Method 8290
F39990-7
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.770	77.0	31:06	0.80	
13C12-1,2,3,7,8-PeCDD	1.0	0.704	70.4	34:00	1.53	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.718	71.8	36:39	1.22	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.692	69.2	39:54	1.03	
13C12-OCDD	2.0	1.06	52.8	44:04	0.84	
13C12-2,3,7,8-TCDF	1.0	0.726	72.6	30:19	0.80	
13C12-1,2,3,7,8-PeCDF	1.0	0.675	67.5	33:12	1.56	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.662	66.2	35:58	0.50	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.626	62.6	38:40	0.46	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.161	80.6	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.148	73.8	33:49	1.53	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.161	80.5	36:34	1.23	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.156	78.2	35:52	0.48	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.140	69.9	40:34	0.46	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.81	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:52	1.22	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-7		Weight / Volume:	513 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-7C		Filename:	a21apr06a_3-7
Collection Date/Time:	04/11/06	17:15	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	18:14	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: [signature]
Date: 04/26/06

Reviewed by: [signature]
Date: 4/24/06

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Paradigm Analytical Labs

Method 8290
F39990-9
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00324				
1,2,3,7,8-PeCDD	ND	0.00610				
1,2,3,4,7,8-HxCDD	ND	0.0129				
1,2,3,6,7,8-HxCDD	ND	0.0119				
1,2,3,7,8,9-HxCDD	ND	0.0131				
1,2,3,4,6,7,8-HpCDD	ND	0.00836				
OCDD	ND	0.0264				
2,3,7,8-TCDF	ND	0.00445				
1,2,3,7,8-PeCDF	ND	0.00325				
2,3,4,7,8-PeCDF	ND	0.00317				
1,2,3,4,7,8-HxCDF	ND	0.00665				
1,2,3,6,7,8-HxCDF	ND	0.00586				
2,3,4,6,7,8-HxCDF	ND	0.00663				
1,2,3,7,8,9-HxCDF	ND	0.00792				
1,2,3,4,6,7,8-HpCDF	ND	0.00369				
1,2,3,4,7,8,9-HpCDF	ND	0.00478				
OCDF	ND	0.0182				
Total TCDDs	ND	0.00324				
Total PeCDDs	ND	0.00610				
Total HxCDDs	ND	0.0131				
Total HpCDDs	ND	0.00836				
Total TCDFs	ND	0.00445				
Total PeCDFs	ND	0.00325				
Total HxCDFs	ND	0.00792				
Total HpCDFs	ND	0.00478				
WHO TEQ (ND=0)	ND		ND			
WHO TEQ (ND=½)	0.00910		0.00910			

Client Information			**Sample Information**		
Project Name:	F39990		Report Basis:		
			Matrix:	Water	
Sample ID:	F39990-9		Weight / Volume:	520 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG12444	
Project ID:	G383-431		Instrument:	hrms1	
Sample ID:	G383-431-9C		Filename:	a21apr06a_3-9	
Collection Date/Time:	04/12/06	9:40	Retchk:	a21apr06a_2-14	
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14	
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14	
Analysis Date/Time:	04/22/06	19:51	Initial Cal:	m8290-032406b	

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Method 8290
F39990-9
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.862	86.2	31:06	0.82	
13C12-1,2,3,7,8-PeCDD	1.0	0.787	78.7	34:00	1.55	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.789	78.9	36:39	1.22	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.763	76.3	39:54	1.04	
13C12-OCDD	2.0	1.13	56.4	44:04	0.84	
13C12-2,3,7,8-TCDF	1.0	0.800	80.0	30:19	0.84	
13C12-1,2,3,7,8-PeCDF	1.0	0.742	74.2	33:12	1.54	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.736	73.6	35:58	0.51	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.687	68.7	38:40	0.46	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.164	81.9	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.153	76.7	33:49	1.53	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.164	82.2	36:34	1.22	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.161	80.4	35:52	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.138	69.1	40:34	0.45	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.84	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:52	1.23	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-9		Weight / Volume:	520 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-9C		Filename:	a21apr06a_3-9
Collection Date/Time:	04/12/06	9:40	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	19:51	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: AF
Date: 04/26/06

Reviewed by: DD
Date: 4/24/06

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Paradigm Analytical Labs

Method 8290
F39990-10
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00487				
1,2,3,7,8-PeCDD	ND	0.00537				
1,2,3,4,7,8-HxCDD	ND	0.0107				
1,2,3,6,7,8-HxCDD	ND	0.00991				
1,2,3,7,8,9-HxCDD	ND	0.0109				
1,2,3,4,6,7,8-HpCDD	ND	0.0138				
OCDD	ND	0.0286				
2,3,7,8-TCDF	ND	0.00390				
1,2,3,7,8-PeCDF	ND	0.00326				
2,3,4,7,8-PeCDF	ND	0.00318				
1,2,3,4,7,8-HxCDF	ND	0.00687				
1,2,3,6,7,8-HxCDF	ND	0.00605				
2,3,4,6,7,8-HxCDF	ND	0.00686				
1,2,3,7,8,9-HxCDF	ND	0.00819				
1,2,3,4,6,7,8-HpCDF	ND	0.00777				
1,2,3,4,7,8,9-HpCDF	ND	0.0101				
OCDF	ND	0.0205				
Total TCDDs	ND	0.00487				
Total PeCDDs	ND	0.00537				
Total HxCDDs	ND	0.0109				
Total HpCDDs	ND	0.0138				
Total TCDFs	ND	0.00390				
Total PeCDFs	ND	0.00326				
Total HxCDFs	ND	0.00819				
Total HpCDFs	ND	0.0101				
WHO TEQ (ND=0)	ND		ND			
WHO TEQ (ND=½)	0.00933		0.00933			

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-10		Weight / Volume:	503 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-10C		Filename:	a21apr06a_3-10
Collection Date/Time:	04/12/06	9:40	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	20:39	Initial Cal:	m8290-032406b

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Paradigm Analytical Labs

Method 8290
F39990-10
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.810	81.0	31:06	0.78	
13C12-1,2,3,7,8-PeCDD	1.0	0.722	72.2	34:00	1.56	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.735	73.5	36:39	1.24	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.705	70.5	39:54	1.05	
13C12-OCDD	2.0	1.02	51.1	44:04	0.84	
13C12-2,3,7,8-TCDF	1.0	0.748	74.8	30:19	0.81	
13C12-1,2,3,7,8-PeCDF	1.0	0.690	69.0	33:13	1.56	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.699	69.9	35:58	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.630	63.0	38:40	0.46	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.160	80.2	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.141	70.5	33:49	1.58	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.164	81.8	36:34	1.23	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.156	77.8	35:52	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.130	65.0	40:34	0.44	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.81	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:52	1.22	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-10		Weight / Volume:	503 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-10C		Filename:	a21apr06a_3-10
Collection Date/Time:	04/12/06	9:40	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	20:39	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: JF
Date: 04/24/06

Reviewed by: MM
Date: 4/24/06

002085

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Paradigm Analytical Labs

Method 8290
F39990-11
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00436				
1,2,3,7,8-PeCDD	ND	0.00654				
1,2,3,4,7,8-HxCDD	ND	0.0104				
1,2,3,6,7,8-HxCDD	ND	0.00956				
1,2,3,7,8,9-HxCDD	ND	0.0105				
1,2,3,4,6,7,8-HpCDD	ND	0.0134				
OCDD	ND	0.0504				
2,3,7,8-TCDF	ND	0.00443				
1,2,3,7,8-PeCDF	ND	0.00393				
2,3,4,7,8-PeCDF	ND	0.00383				
1,2,3,4,7,8-HxCDF	ND	0.00564				
1,2,3,6,7,8-HxCDF	ND	0.00496				
2,3,4,6,7,8-HxCDF	ND	0.00562				
1,2,3,7,8,9-HxCDF	ND	0.00672				
1,2,3,4,6,7,8-HpCDF	ND	0.00914				
1,2,3,4,7,8,9-HpCDF	ND	0.0118				
OCDF	ND	0.0290				
Total TCDDs	ND	0.00436				
Total PeCDDs	ND	0.00654				
Total HxCDDs	ND	0.0105				
Total HpCDDs	ND	0.0134				
Total TCDFs	ND	0.00443				
Total PeCDFs	ND	0.00393				
Total HxCDFs	ND	0.00672				
Total HpCDFs	ND	0.0118				
WHO TEQ (ND=0)	ND		ND			
WHO TEQ (ND=½)	0.00957		0.00957			

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-11		Weight / Volume:	507 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-11C		Filename:	a21apr06a_3-11
Collection Date/Time:	04/12/06	10:50	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	21:28	Initial Cal:	m8290-032406b

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Paradigm Analytical Labs

Method 8290
F39990-11
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.744	74.4	31:06	0.80	
13C12-1,2,3,7,8-PeCDD	1.0	0.677	67.7	34:00	1.58	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.685	68.5	36:39	1.22	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.651	65.1	39:54	1.05	
13C12-OCDD	2.0	0.905	45.2	44:04	0.84	
13C12-2,3,7,8-TCDF	1.0	0.702	70.2	30:19	0.82	
13C12-1,2,3,7,8-PeCDF	1.0	0.643	64.3	33:12	1.55	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.646	64.6	35:58	0.51	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.586	58.6	38:40	0.46	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.164	82.0	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.146	73.1	33:49	1.56	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.160	80.1	36:34	1.24	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.160	80.0	35:52	0.54	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.138	69.1	40:34	0.47	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.82	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:52	1.22	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-11		Weight / Volume:	507 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-11C		Filename:	a21apr06a_3-11
Collection Date/Time:	04/12/06	10:50	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	21:28	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: AT
Date: 04/26/06

Reviewed by: CM
Date: 4/24/06

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Paradigm Analytical Labs

Method 8290
F39990-12
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00427				
1,2,3,7,8-PeCDD	ND	0.00612				
1,2,3,4,7,8-HxCDD	ND	0.0107				
1,2,3,6,7,8-HxCDD	ND	0.00985				
1,2,3,7,8,9-HxCDD	ND	0.0108				
1,2,3,4,6,7,8-HpCDD	ND	0.0126				
OCDD	ND	0.0378				
2,3,7,8-TCDF	ND	0.00348				
1,2,3,7,8-PeCDF	ND	0.00365				
2,3,4,7,8-PeCDF	ND	0.00357				
1,2,3,4,7,8-HxCDF	ND	0.00518				
1,2,3,6,7,8-HxCDF	ND	0.00456				
2,3,4,6,7,8-HxCDF	ND	0.00517				
1,2,3,7,8,9-HxCDF	ND	0.00618				
1,2,3,4,6,7,8-HpCDF	ND	0.00708				
1,2,3,4,7,8,9-HpCDF	ND	0.00917				
OCDF	ND	0.0190				
Total TCDDs	ND	0.00427				
Total PeCDDs	ND	0.00612				
Total HxCDDs	ND	0.0108				
Total HpCDDs	ND	0.0126				
Total TCDFs	ND	0.00348				
Total PeCDFs	ND	0.00365				
Total HxCDFs	ND	0.00618				
Total HpCDFs	ND	0.00917				
WHO TEQ (ND=0)	ND		ND			
WHO TEQ (ND=½)	0.00912		0.00912			

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-12		Weight / Volume:	505 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-12C		Filename:	a21apr06a_3-12
Collection Date/Time:	04/12/06	12:40	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	22:16	Initial Cal:	m8290-032406b

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Paradigm Analytical Labs

Method 8290
F39990-12
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.802	80.2	31:06	0.80	
13C12-1,2,3,7,8-PeCDD	1.0	0.734	73.4	34:00	1.55	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.748	74.8	36:39	1.18	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.724	72.4	39:54	1.03	
13C12-OCDD	2.0	1.08	53.9	44:04	0.82	
13C12-2,3,7,8-TCDF	1.0	0.755	75.5	30:19	0.80	
13C12-1,2,3,7,8-PeCDF	1.0	0.694	69.4	33:12	1.56	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.721	72.1	35:57	0.50	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.659	65.9	38:40	0.46	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.165	82.7	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.149	74.5	33:49	1.54	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.176	87.9	36:34	1.21	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.157	78.4	35:52	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.141	70.7	40:34	0.44	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.81	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:52	1.22	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-12		Weight / Volume:	505 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-12C		Filename:	a21apr06a_3-12
Collection Date/Time:	04/12/06	12:40	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	22:16	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: KF
Date: 04/26/06

Reviewed by: [illegible]
Date: 4/24/06

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Paradigm Analytical Labs

Method 8290
F39990-8
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00472				
1,2,3,7,8-PeCDD	ND	0.00670				
1,2,3,4,7,8-HxCDD	ND	0.00941				
1,2,3,6,7,8-HxCDD	ND	0.00868				
1,2,3,7,8,9-HxCDD	ND	0.00953				
1,2,3,4,6,7,8-HpCDD	ND	0.0213				
OCDD	ND	0.0571				
2,3,7,8-TCDF	ND	0.00441				
1,2,3,7,8-PeCDF	ND	0.00340				
2,3,4,7,8-PeCDF	ND	0.00332				
1,2,3,4,7,8-HxCDF	ND	0.00561				
1,2,3,6,7,8-HxCDF	ND	0.00494				
2,3,4,6,7,8-HxCDF	ND	0.00560				
1,2,3,7,8,9-HxCDF	ND	0.00669				
1,2,3,4,6,7,8-HpCDF	ND	0.0124				
1,2,3,4,7,8,9-HpCDF	ND	0.0160				
OCDF	ND	0.0295				
Total TCDDs	ND	0.00472				
Total PeCDDs	ND	0.00670				
Total HxCDDs	ND	0.00953				
Total HpCDDs	ND	0.0213				
Total TCDFs	ND	0.00441				
Total PeCDFs	ND	0.00340				
Total HxCDFs	ND	0.00669				
Total HpCDFs	ND	0.0160				
WHO TEQ (ND=0)	ND		ND			
WHO TEQ (ND=½)	0.00962		0.00962			

Client Information			**Sample Information**		
Project Name:	F39990		Report Basis:		
			Matrix:	Water	
Sample ID:	F39990-8		Weight / Volume:	503 mL	
			Solids / Lipids:	NA	%
			Original pH :	5	
Laboratory Information			Batch ID:	WG12444	
Project ID:	G383-431		Instrument:	hrms1	
Sample ID:	G383-431-8C		Filename:	a21apr06a_3-8	
Collection Date/Time:	04/12/06	7:45	Retchk:	a21apr06a_2-14	
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14	
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14	
Analysis Date/Time:	04/22/06	19:03	Initial Cal:	m8290-032406b	

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Paradigm Analytical Labs

Method 8290
F39990-8
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	1.0	0.740	74.0	31:06	0.82	
13C12-1,2,3,7,8-PeCDD	1.0	0.661	66.1	34:00	1.53	
13C12-1,2,3,6,7,8-HxCDD	1.0	0.686	68.6	36:39	1.22	
13C12-1,2,3,4,6,7,8-HpCDD	1.0	0.662	66.2	39:54	1.06	
13C12-OCDD	2.0	0.955	47.7	44:04	0.83	
13C12-2,3,7,8-TCDF	1.0	0.690	69.0	30:19	0.80	
13C12-1,2,3,7,8-PeCDF	1.0	0.637	63.7	33:12	1.57	
13C12-1,2,3,6,7,8-HxCDF	1.0	0.652	65.2	35:58	0.51	
13C12-1,2,3,4,6,7,8-HpCDF	1.0	0.597	59.7	38:40	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.2	0.155	77.7	31:07	-	
13C12-2,3,4,7,8-PeCDF	0.2	0.144	72.0	33:49	1.58	
13C12-1,2,3,4,7,8-HxCDD	0.2	0.160	79.8	36:34	1.20	
13C12-1,2,3,4,7,8-HxCDF	0.2	0.157	78.5	35:52	0.48	
13C12-1,2,3,4,7,8,9-HpCDF	0.2	0.132	66.2	40:34	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30:33	0.80	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36:52	1.24	

Client Information			**Sample Information**	
Project Name:	F39990		Report Basis:	
			Matrix:	Water
Sample ID:	F39990-8		Weight / Volume:	503 mL
			Solids / Lipids:	NA %
			Original pH :	5
Laboratory Information			Batch ID:	WG12444
Project ID:	G383-431		Instrument:	hrms1
Sample ID:	G383-431-8C		Filename:	a21apr06a_3-8
Collection Date/Time:	04/12/06	7:45	Retchk:	a21apr06a_2-14
Receipt Date/Time:	04/14/06	10:30	Begin ConCal:	a21apr06a_2-14
Extraction Date:	04/21/06		End ConCal:	a21apr06a_3-14
Analysis Date/Time:	04/22/06	19:03	Initial Cal:	m8290-032406b

Form Version:[8290_DB_2.04]Report

Analyzed by: BF
Date: 04/26/06

Reviewed by: QV
Date: 4/24/06

002048

Shaw Environmental, Inc.

2113 Emmorton Park Road
Edgewood, MD 21040-1037
410.612.6350
Fax 410.612.6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation - Volatiles
Accutest Laboratories, Inc., SDG F39990

DATE: May 3, 2006

The purpose of this memorandum is to present the data validation report for the samples collected for RFAAP SWMUs 48, 49, 50, 51, and 59 on April 10, 2006, April 11, 2006, April 12, 2006, and April 13, 2006 for groundwater analysis. The samples were analyzed for volatile organic compounds (VOCs) using USEPA SW846 Method 5030B/8260B. A total of fifteen aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
51MW1	F39990-1	TM13MW1	F39990-10
51MW2	F39990-2	13MW2	F39990-11
16-4	F39990-3	C1	F39990-12
28MW2	F39990-4	48MW1	F39990-14
28MW1	F39990-5	TM48MW1	F39990-15
C4	F39990-6	48MW2	F39990-16
48MW4	F39990-7	48MW3	F39990-17
13MW1	F39990-9		

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *USACE Shell for Analytical Chemistry Requirements*, method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated under data validation procedure Level M3 are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Results
X		Initial Calibration
	X	Continuing Calibration
X		Blank Analysis
	X	Laboratory Control Sample
	X	Matrix Spike / Spike Duplicate Sample
	X	System Monitoring Compounds
	X	Internal Standards
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

5/3/06
Date

RFAAP VALIDATION REPORT
VOLATILES REVIEW
SDG F39990

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: For aqueous samples cooled @ 4°C±2°C; pH<2 HCl, the maximum holding time is 14 days from sample collection to analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 04/10/06, 04/11/06, and 04/12/06, the coolers were received by the primary laboratory (Accutest) on 04/13/06 at 4.2°C, 3.0°C, 2.4°C, 1.8°C, 2.4°C, 2.6°C, 1.6°C, 3.4°C, 2.8°C, 2.6°C, 3.2°C, and 3.0°C. For samples collected on 04/13/06, the coolers were received by the primary laboratory on 04/15/06 at 1.6°C, 2.0°C, 2.8°C, 3.4°C, and 4.2°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.1°C, 3.8°C, and 2.7°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected for VOCs on 04/10/06, 04/11/06, 04/12/06, and 04/13/06. They were analyzed on 04/21/06, 04/24/05, and 04/25/06. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, bromofluorobenzene (BFB), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. Percent relative standard deviation (%RSD) must be ≤15% for each target compound and must be ≤30% for each calibration check compound. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.99. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- For initial calibration performed on 04/12/06 on instrument MSVOA4, target compounds chloromethane (15.8%), bromomethane (19.9%), 4-methyl-2-pentanone (24.5%), 2-hexanone (37.3%; grossly exceeding), styrene (16.1%), and 1,1,2,2-tetrachloroethane (18.1%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds bromomethane (r=0.9999), acetone (r=0.9973), 2-hexanone (r=0.9965), and 4-methyl-2-pentanone (r=0.9996) were quantified using linear or second order regression with correlation coefficients >0.99, therefore, no qualifiers were applied based upon these outliers. Compounds chloromethane and 1,1,2,2-tetrachloroethane were non-detect for all samples, therefore no qualifiers were applied based upon the high %RSDs. Sample 16-4 (F39990-3) was analyzed using this initial calibration.

- For initial calibration performed on 04/11/06 on instrument MSVOA5, target compounds chloromethane (20.2%), vinyl chloride (15.2%), acetone (35.8%; grossly exceeding), carbon disulfide (22.9%), methylene chloride (16.7%), 2-butanone (17.9%), trichloroethene (15.3%), and 1,1,2,2-tetrachloroethane (21.5%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds vinyl chloride (r=0.9982), acetone (r=0.9997), carbon disulfide (r=0.9996), methylene chloride (r=0.9991), 2-butanone (r=0.9986), and trichloroethene (r=0.9996) were quantified using linear or second order regression with correlation coefficients >0.99, therefore, no qualifiers were applied based upon these outliers. Compounds chloromethane and 1,1,2,2-tetrachloroethane were non-detect for all samples, therefore no qualifiers were applied based upon the high %RSDs. Samples 51MW1 (F39990-1), 51MW2 (F39990-2), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) were analyzed using this initial calibration.

- For initial calibration performed on 04/25/06 on instrument MSVOA6, target compounds chloromethane (28.9%), vinyl chloride (28.7%), bromomethane (33.2%; grossly exceeding), chloroethane (31.8%; grossly exceeding), carbon disulfide (20.4%), methylene chloride (29.0%), acetone (39.2%; grossly exceeding), 1,1-dichloroethane (22.9%), cis-1,2-dichloroethene (20.1%), chloroform (24.1%), carbon tetrachloride (17.5%), 1,1,1-trichloroethane (20.9%), 2-butanone (27.6%), benzene (28.1%), 1,2-dichloroethane (21.7%), trichloroethene (21.7%), bromodichloromethane (17.8%), cis-1,3-dichloropropene (17.9%), 4-methyl-2-pentanone (18.9%), trans-1,3-dichloropropene (16.2%), tetrachloroethene (16.5%), 1,1,2-trichloroethane (21.6%), dibromochloromethane (15.7%), 2-hexanone (17.6%), chlorobenzene (21.1%), m,p-xylenes (18.2%), o-xylene (16.1%), bromoform (17.5%), and 1,1,2,2-tetrachloroethane (24.4%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds vinyl chloride (r=0.9968), bromomethane (r=0.9990), chloroethane (r=0.9982), carbon disulfide (r=0.9987), methylene chloride (r=0.9994), acetone (r=0.9987), cis-1,2-dichloroethene (r=0.9993), chloroform (r=0.9983), carbon tetrachloride (r=0.9978), 1,1,1-trichloroethane (r=0.9982), 2-butanone (r=0.9993), benzene (r=0.9991), 1,2-dichloroethane (r=0.9994), trichloroethene (r=0.9971), 1,2-dichloropropane (r=0.9994), bromodichloromethane (r=0.9995), cis-1,3-dichloropropene (r=0.9992), toluene (r=0.9986), 4-methyl-2-pentanone (r=9996), trans-1,3-dichloropropene (r=0.9982), tetrachloroethene (r=0.9973), 1,1,2-trichloroethane (r=0.9993), dibromochloromethane (r=0.9994), 2-hexanone (r=0.9994), ethylbenzene (r=0.9985), m,p-xylenes (r=0.9985), and o-xylene (r=0.9988) were quantified using linear or second order regression with correlation coefficients >0.99, therefore, no qualifiers were applied based upon these outliers. Compounds chloromethane, 1,1-dichloroethane, chlorobenzene, bromoform, and 1,1,2,2-tetrachloroethane were qualified estimated "J" for detects and no qualifier for non-detects based upon the high %RSDs. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) were analyzed using this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Continuing calibration establishes the 12-hour relative response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within 20% for all target compounds. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- For continuing calibration performed on 04/21/06 @10:25 on instrument MSVOA4, target compounds bromomethane (25.6%) and 2-hexanone (25.7%) were outside criteria. All other target compounds were within criteria (%D≤20%; RRF≥0.05). Compounds bromomethane (r=0.9999), acetone (r=0.9973), 2-hexanone (r=0.9965), and 4-methyl-2-pentanone (r=0.9996) were quantified using linear or second order regression with correlation coefficients >0.99, therefore, no qualifiers were applied based upon these outliers. Sample 16-4 (F39990-3) applies to this continuing calibration.

- For continuing calibration performed on 04/21/06 @09:28 on instrument MSVOA5, target compound acetone (41.8%; grossly exceeding) was outside criteria. All other target compounds were within criteria (%D≤20%; RRF≥0.05). Compounds vinyl chloride (r=0.9982), acetone (r=0.9997), carbon disulfide (r=0.9996), methylene chloride (r=0.9991), 2-butanone (r=0.9986), and trichloroethene (r=0.9996) were quantified using linear or second order regression with correlation coefficients >0.99, therefore, no qualifiers were applied based upon this outlier. Samples 51MW1 (F39990-1) and 51MW2 (F39990-2) apply to this continuing calibration.

- For continuing calibration performed on 04/24/06 @09:42 on instrument MSVOA5, all target compounds were within criteria (%D≤20%; RRF≥0.05). Compounds vinyl chloride (r=0.9982), acetone (r=0.9997), carbon disulfide (r=0.9996), methylene chloride (r=0.9991), 2-butanone (r=0.9986), and trichloroethene (r=0.9996) were quantified using linear or second order regression with correlation coefficients >0.99. No qualifiers were applied. Samples 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) apply to this continuing calibration.

- For continuing calibration performed on 04/24/06 @14:37 on instrument MSVOA6, all target compounds were within criteria (%D≤20%; RRF≥0.05). Compounds vinyl chloride (r=0.9968), bromomethane (r=0.9990), chloroethane (r=0.9982), carbon disulfide (r=0.9987), methylene chloride (r=0.9994), acetone (r=0.9987), 1,1-dichloroethane (22.9%), cis-1,2-dichloroethene (r=0.9993), chloroform (r=0.9983), carbon tetrachloride (r=0.9978), 1,1,1-trichloroethane (r=0.9982), 2-butanone (r=0.9993), benzene (r=0.9991), 1,2-dichloroethane (r=0.9994), trichloroethene (r=0.9971), 1,2-dichloropropane (r=0.9994), bromodichloromethane (r=0.9995), cis-1,3-dichloropropene (r=0.9992), toluene (r=0.9986), 4-methyl-2-pentanone (r=9996), trans-1,3-dichloropropene (r=0.9982), tetrachloroethene (r=0.9973), 1,1,2-trichloroethane (r=0.9993), dibromochloromethane (r=0.9994), 2-hexanone (r=0.9994), ethylbenzene (r=0.9985), m,p-xylenes (r=0.9985), and o-xylene (r=0.9988) were quantified using linear or second order regression with correlation coefficients >0.99. No qualifiers were applied. Tetrachloroethylene was analyzed for samples TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) on 04/25/06 using continuing calibration performed on 04/25/06 @11:05 on instrument MSVOA6. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this continuing calibration.

- For continuing calibration performed on 04/25/06 @11:05 on instrument MSVOA6, all target compounds were within criteria (%D≤20%; RRF≥0.05). Compounds vinyl chloride (r=0.9968), bromomethane (r=0.9990), chloroethane (r=0.9982), carbon disulfide (r=0.9987), methylene chloride (r=0.9994), acetone (r=0.9987), 1,1-dichloroethane (22.9%), cis-1,2-dichloroethene (r=0.9993), chloroform (r=0.9983), carbon tetrachloride (r=0.9978), 1,1,1-trichloroethane (r=0.9982), 2-butanone (r=0.9993), benzene (r=0.9991), 1,2-dichloroethane (r=0.9994), trichloroethene (r=0.9971), 1,2-dichloropropane (r=0.9994), bromodichloromethane (r=0.9995), cis-1,3-dichloropropene (r=0.9992), toluene (r=0.9986), 4-methyl-2-pentanone (r=9996), trans-1,3-dichloropropene (r=0.9982), tetrachloroethene (r=0.9973), 1,1,2-trichloroethane (r=0.9993), dibromochloromethane (r=0.9994), 2-hexanone (r=0.9994), ethylbenzene (r=0.9985), m,p-xylenes (r=0.9985), and o-xylene (r=0.9988) were quantified using linear or second order regression with correlation coefficients >0.99. No qualifiers were applied. Tetrachloroethylene for samples TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of BFB. No contaminants should be detected in any of the associated blanks > the MDL. USACE Shell criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants methylene chloride, acetone, and 2-butanone). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, and 2-butanone (MEK), or 5 times (5X) the maximum amount for other volatile target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. The rinse blank 041206R (F39990-8) (low-flow pump) applies to all groundwater samples in this SDG. The trip blank 041006T (F39990-13) applies for samples 51MW1 (F39990-1), 51MW2 (F39990-2), 16-4 (F39990-3), 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) in this SDG. The trip blank 041306T (F39990-19) applies for samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
04/21/06	VC1637-MB	All target <MRL	NA	NA	None
04/21/06	VB1608-MB	All target <MRL	NA	NA	None
04/24/06	VC1638-MB	All target <MRL	NA	NA	None
04/24/06	VJ916-MB	All target <MRL	NA	NA	None
04/25/06	VJ917-MB	All target <MRL	NA	NA	None
04/24/06	041206R	Acetone	21J	210	48MW2
04/24/06	041206R	Chloroform	8.0	40	48MW2, 48MW3
04/24/06	041206R	Methylene chloride	2.8J	28	C1
04/24/06	041206R	Methyl ethyl ketone	6.5	65	48MW2
04/24/06	041206R	Toluene	0.69J	3.5	None
04/24/06	041006T	Methylene Chloride	2.0J	20	C1
04/24/06	041306T	Methylene Chloride	1.7J	17	None

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".
NA = Not Applicable
MRL = Method Reporting Limit

VI-Laboratory Control Sample
Data for laboratory control samples (LCS) are evaluated to determine long-term accuracy of the analytical method on various matrices. Percent recoveries (%Rs) should be within the specified control limits. USACE Shell limits are 80-120% (60-140% for sporadic marginal failures (SMF)).

- Sample VC1637-BS was used as the LCS for the VOC analysis on 04/21/06. A total of 34 compounds were spiked, allowing for 3 SMF tolerances. All criteria were met. No qualifiers were applied. Samples 51MW1 (F39990-1) and 51MW2 (F39990-2) apply to this LCS.

- Sample VB1608-BS was used as the LCS for the VOC analysis on 04/21/06. A total of 34 compounds were spiked, allowing for 3 SMF tolerances. Compounds acetone (70%) and 2-hexanone (72%) were outside USACE criteria, but within SMF and laboratory criteria. No qualifiers were applied to acetone or 2-hexanone based upon these low recoveries. Sample 16-4 (F39990-3) applies to this LCS.

- Sample VC1638-BS was used as the LCS for the VOC analysis on 04/24/06. A total of 34 compounds were spiked, allowing for 3 SMF tolerances. Compounds acetone (79%), 2-hexanone (74%), and 1,1,2,2-tetrachloroethane (75%) were outside USACE criteria, but within SMF and laboratory criteria. No qualifiers were applied to acetone, 2-hexanone, or 1,1,2,2-tetrachloroethane based upon these low recoveries. Samples 28MW2 (F39990-4), 28MW1 (F39990-5), C4 (F39990-6), 48MW4 (F39990-7), 13MW1 (F39990-9), TM13MW1 (F39990-10), 13MW2 (F39990-11), and C1 (F39990-12) apply to this LCS.

- Sample VJ916-BS was used as the LCS for the VOC analysis on 04/24/06. A total of 34 compounds were spiked, allowing for 3 SMF tolerances. Compounds acetone (73%) and vinyl chloride (131%) were outside USACE criteria, but within SMF and laboratory criteria. No qualifiers were applied to acetone or vinyl chloride based upon these low/high recoveries. Tetrachloroethylene was analyzed for samples TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) on 04/25/06 using LCS VJ917-BS. Samples 48MW1 (F39990-14), TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this LCS.

- Sample VJ917-BS was used as the LCS for tetrachloroethylene analysis on 04/25/06. Tetrachloroethylene was within criteria. No qualifiers were applied. Samples TM48MW1 (F39990-15), 48MW2 (F39990-16), and 48MW3 (F39990-17) apply to this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. USACE Shell limits are 70-130%; RPD≤30% (60-140%; RPD≤40% for sporadic marginal failures (SMF)).

- Sample F39972-1 was used for the MS/MSD analysis for analysis on 04/21/06. A total of 68 compounds were spiked allowing for 5 SMFs. Since this sample is not a RFAAP site sample, it was not evaluated. No qualifiers were applied.

- Sample F39974-2 was used for the MS/MSD analysis for analysis on 04/21/06. A total of 68 compounds were spiked allowing for 5 SMFs. Since this sample is not a RFAAP site sample, it was not evaluated. No qualifiers were applied.

- Sample 28MW2 (F39990-4) was used for the MS/MSD analysis on 04/24/06. A total of 68 compounds were spiked allowing for 5 SMFs. All percent recoveries were within criteria for all target compounds. Compounds chloroethane (RPD=23%), methyl bromide (RPD=19%), and vinyl chloride (RPD=22%) were outside laboratory precision criteria, however within USACE and SMF criteria. No qualifiers were applied for compounds chloroethane, methyl bromide, or vinyl chloride based upon these outliers.

- Sample 48MW1 (F39990-14) was used for the MS/MSD analysis on 04/24/06. A total of 68 compounds were spiked allowing for 5 SMFs. All RPDs were within criteria for all target compounds. Compound trichloroethylene (119%; 118%) was outside laboratory accuracy criteria, however within USACE and SMF criteria. Compounds vinyl chloride (136%; 136%) and methyl chloride (132%) were outside USACE accuracy criteria, however within laboratory and SMF criteria. No qualifiers were applied for trichloroethylene, vinyl chloride, or methyl chloride based upon these outliers.

- Sample F40172-1 was used for the MS/MSD analysis for tetrachloroethylene analysis on 04/25/06. Since this sample is not a RFAAP site sample, it was not evaluated. No qualifiers were applied.

VIII-System Monitoring Compounds (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Recoveries for system monitoring compounds in volatile samples and blanks must be within the specified control limits.

Criteria: Dibromofluoromethane (86-115%) – SMC1 (USACE Shell Criteria: 70-130%)
1,2-Dichloroethane-d4 (73-126%) – SMC2 (USACE Shell Criteria: 70-130%)
Toluene-d8 (86-112%) – SMC3 (USACE Shell Criteria: 70-130%)
4-Bromofluorobenzene (83-119%) – SMC4 (USACE Shell Criteria: 70-130%)

- All criteria were met. No qualifiers were applied.

IX-Internal Standards (IS)
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: area counts (-50% to +100%) of the associated calibration standard, and retention time (± 30 seconds) from that of the associated calibration standard.

- All criteria were met. No qualifiers were applied.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field groundwater sample duplicate pair 13MW1 (F39990-9) and TM13MW1 (F39990-10) was collected for VOCs. All target compounds were non-detect. All criteria were met. No qualifiers were applied.

- Field groundwater sample duplicate pair 48MW1 (F39990-14) and TM48MW1 (F39990-15) was collected for VOCs. All detected compounds found in the sample and its duplicate pair and associated %RPD are noted in **Table 3**. All other target compounds were non-detect. All criteria were met. No qualifiers were applied.

Table 3 Field Precision Hits Analysis Summary for VOCs for Duplicate Pair 48MW1 (F39990-14) and TM48MW1 (F39990-15)

Compound	Original Sample (µg/L)	Duplicate Pair (µg/L)	%RPD
1,1-Dichloroethane	1.3	1.4	7.4
1,1-Dichloroethylene	0.55J	0.56J	1.8
cis-1,2-Dichloroethylene	0.71J	0.77J	8.1
1,1,1-Trichloroethane	1.3	1.2	8.0
Tetrachloroethylene	1.1	1.0	9.5
Trichloroethylene	5.5	5.5	0.0

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".

XI-Quantitation Verification

The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 51MW1 (F39990-1), Tetrachloroethylene

Conc. (µg/L) = (Ax)*(Is) *(DF)/(Ais)*(RRF)

where: Ax is the compound area
Ais is the corresponding internal standard area
Is is the corresponding internal standard concentration (µg/L)
DF is the dilution factor
RRF is the relative response factor.

Conc. µg/L = (14622 * 50 µg/L * 1) / (1980304 * 0.396) = 0.93 µg/L

Reported Conc. = 0.93 µg/L
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Form I COMP

Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW1		
Lab Sample ID:	F39990-1	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0040362.D	1	04/21/06	KW	n/a	n/a	VC1637
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result		RL	MDL	Units	Q
67-64-1	Acetone	ND		25	5.0	ug/l	
71-43-2	Benzene	ND		1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND		1.0	0.50	ug/l	
75-25-2	Bromoform	ND		1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND		1.0	0.50	ug/l	
75-00-3	Chloroethane	ND		2.0	1.0	ug/l	
67-66-3	Chloroform	ND		1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND		2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND		1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND		1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND		1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND		1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND		1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND		1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND		1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND		5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND		5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND		2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND		2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND		5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND		5.0	2.5	ug/l	
100-42-5	Styrene	ND		1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	0.93	J	1.0	0.50	ug/l	J
108-88-3	Toluene	ND		1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND		1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW1		
Lab Sample ID:	F39990-1	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		86-115%
17060-07-0	1,2-Dichloroethane-D4	97%		73-126%
2037-26-5	Toluene-D8	96%		86-112%
460-00-4	4-Bromofluorobenzene	97%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW2		
Lab Sample ID:	F39990-2	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0040363.D	1	04/21/06	KW	n/a	n/a	VC1637
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	51MW2		
Lab Sample ID:	F39990-2	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		86-115%
17060-07-0	1,2-Dichloroethane-D4	96%		73-126%
2037-26-5	Toluene-D8	96%		86-112%
460-00-4	4-Bromofluorobenzene	97%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	16-4		
Lab Sample ID:	F39990-3	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B037985.D	1	04/21/06	KW	n/a	n/a	VB1608
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	16-4		
Lab Sample ID:	F39990-3	Date Sampled:	04/10/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		86-115%
17060-07-0	1,2-Dichloroethane-D4	103%		73-126%
2037-26-5	Toluene-D8	99%		86-112%
460-00-4	4-Bromofluorobenzene	109%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	28MW2		
Lab Sample ID:	F39990-4	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0040372.D	1	04/24/06	KW	n/a	n/a	VC1638
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form 1 Copy

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Report of Analysis

Client Sample ID:	28MW2		
Lab Sample ID:	F39990-4	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		86-115%
17060-07-0	1,2-Dichloroethane-D4	96%		73-126%
2037-26-5	Toluene-D8	95%		86-112%
460-00-4	4-Bromofluorobenzene	101%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	28MW1		
Lab Sample ID:	F39990-5	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0040373.D	1	04/24/06	KW	n/a	n/a	VC1638
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	1.4 J	2.0	1.0	ug/l	J
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	2.9	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	0.88 J	1.0	0.50	ug/l	J
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	0.95 J	1.0	0.50	ug/l	J
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	28MW1		
Lab Sample ID:	F39990-5	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		86-115%
17060-07-0	1,2-Dichloroethane-D4	96%		73-126%
2037-26-5	Toluene-D8	95%		86-112%
460-00-4	4-Bromofluorobenzene	97%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C4		
Lab Sample ID:	F39990-6	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0040374.D	1	04/24/06	KW	n/a	n/a	VC1638
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	0.96 J	1.0	0.50	ug/l	J
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C4		
Lab Sample ID:	F39990-6	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		86-115%
17060-07-0	1,2-Dichloroethane-D4	98%		73-126%
2037-26-5	Toluene-D8	96%		86-112%
460-00-4	4-Bromofluorobenzene	97%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F39990-7	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0040375.D	1	04/24/06	KW	n/a	n/a	VC1638
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	0.66 J	1.0	0.50	ug/l	J
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F39990-7	Date Sampled:	04/11/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	111%		86-115%
17060-07-0	1,2-Dichloroethane-D4	101%		73-126%
2037-26-5	Toluene-D8	93%		86-112%
460-00-4	4-Bromofluorobenzene	94%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW1		
Lab Sample ID:	F39990-9	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0040379.D	1	04/24/06	KW	n/a	n/a	VC1638
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW1		
Lab Sample ID:	F39990-9	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	113%		86-115%
17060-07-0	1,2-Dichloroethane-D4	103%		73-126%
2037-26-5	Toluene-D8	91%		86-112%
460-00-4	4-Bromofluorobenzene	94%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM13MW1		
Lab Sample ID:	F39990-10	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0040380.D	1	04/24/06	KW	n/a	n/a	VC1638
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM13MW1		
Lab Sample ID:	F39990-10	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	112%		86-115%
17060-07-0	1,2-Dichloroethane-D4	103%		73-126%
2037-26-5	Toluene-D8	92%		86-112%
460-00-4	4-Bromofluorobenzene	94%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW2		
Lab Sample ID:	F39990-11	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0040381.D	1	04/24/06	KW	n/a	n/a	VC1638
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	13MW2		
Lab Sample ID:	F39990-11	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	112%		86-115%
17060-07-0	1,2-Dichloroethane-D4	104%		73-126%
2037-26-5	Toluene-D8	92%		86-112%
460-00-4	4-Bromofluorobenzene	94%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	C1		
Lab Sample ID:	F39990-12	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0040382.D	1	04/24/06	KW	n/a	n/a	VC1638
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result		RL	MDL	Units	Q
67-64-1	Acetone	ND		25	5.0	ug/l	
71-43-2	Benzene	ND		1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND		1.0	0.50	ug/l	
75-25-2	Bromoform	ND		1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND		1.0	0.50	ug/l	
75-00-3	Chloroethane	4.0		2.0	1.0	ug/l	
67-66-3	Chloroform	ND		1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND		2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND		1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	8.5		1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND		1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND		1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND		1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND		1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND		1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND		5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND		5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND		2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND		2.0	1.0	ug/l	
75-09-2	Methylene chloride	8.0	B	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND		5.0	2.5	ug/l	
100-42-5	Styrene	ND		1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	1.3	J	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND		1.0	0.50	ug/l	
108-88-3	Toluene	ND		1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND		1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	C1		
Lab Sample ID:	F39990-12	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	114%		86-115%
17060-07-0	1,2-Dichloroethane-D4	106%		73-126%
2037-26-5	Toluene-D8	91%		86-112%
460-00-4	4-Bromofluorobenzene	92%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F39990-14	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J022168.D	1	04/24/06	MM	n/a	n/a	VJ916
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result		RL	MDL	Units	Q
67-64-1	Acetone	ND		25	5.0	ug/l	
71-43-2	Benzene	ND		1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND		1.0	0.50	ug/l	
75-25-2	Bromoform	ND		1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND		1.0	0.50	ug/l	
75-00-3	Chloroethane	ND		2.0	1.0	ug/l	
67-66-3	Chloroform	ND		1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND		2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND		1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	1.3	J	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	0.55	J	1.0	0.50	ug/l	J
107-06-2	1,2-Dichloroethane	ND		1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND		1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND		1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	0.71	J	1.0	0.50	ug/l	J
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND		1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND		5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND		5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND		2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND		2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND		5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND		5.0	2.5	ug/l	
100-42-5	Styrene	ND		1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	1.3	J	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	1.1	J	1.0	0.50	ug/l	
108-88-3	Toluene	ND		1.0	0.50	ug/l	
79-01-6	Trichloroethylene	5.5		1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F39990-14	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		86-115%
17060-07-0	1,2-Dichloroethane-D4	108%		73-126%
2037-26-5	Toluene-D8	95%		86-112%
460-00-4	4-Bromofluorobenzene	99%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	TM48MW1		
Lab Sample ID:	F39990-15	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J022178.D	1	04/24/06	MM	n/a	n/a	VJ916
Run #2	J022200.D	1	04/25/06	MM	n/a	n/a	VJ917

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	1.4 J	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	0.56 J	1.0	0.50	ug/l	J
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	0.77 J	1.0	0.50	ug/l	J
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	1.2 J	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	1.0 [a] J	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	5.5	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	TM48MW1		
Lab Sample ID:	F39990-15	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%	107%	86-115%
17060-07-0	1,2-Dichloroethane-D4	114%	115%	73-126%
2037-26-5	Toluene-D8	95%	94%	86-112%
460-00-4	4-Bromofluorobenzene	104%	103%	83-119%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F39990-16	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J022179.D	1	04/24/06	MM	n/a	n/a	VJ916
Run #2 [a]	J022201.D	1	04/25/06	MM	n/a	n/a	VJ917

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

VOA TCL List

CAS No.	Compound	Result		RL	MDL	Units	Q
67-64-1	Acetone	61.5	B	25	5.0	ug/l	
71-43-2	Benzene	ND		1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND		1.0	0.50	ug/l	
75-25-2	Bromoform	ND		1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND		1.0	0.50	ug/l	
75-00-3	Chloroethane	ND		2.0	1.0	ug/l	
67-66-3	Chloroform	5.9	B	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND		2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	29.2		1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND		1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND		1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND		1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND		1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND		1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND		1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND		5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND		5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND		2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND		2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND		5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	4.5	B	5.0	2.5	ug/l	J
100-42-5	Styrene	ND		1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	1.1 [b]	J	1.0	0.50	ug/l	
108-88-3	Toluene	ND		1.0	0.50	ug/l	
79-01-6	Trichloroethylene	3.0		1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F39990-16	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%	109%	86-115%
17060-07-0	1,2-Dichloroethane-D4	115%	118%	73-126%
2037-26-5	Toluene-D8	94%	94%	86-112%
460-00-4	4-Bromofluorobenzene	103%	103%	83-119%

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F39990-17	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J022180.D	1	04/24/06	MM	n/a	n/a	VJ916
Run #2	J022202.D	1	04/25/06	MM	n/a	n/a	VJ917

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

VOA TCL List

CAS No.	Compound	Result		RL	MDL	Units	Q
67-64-1	Acetone	ND		25	5.0	ug/l	
71-43-2	Benzene	ND		1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND		1.0	0.50	ug/l	
75-25-2	Bromoform	ND		1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND		1.0	0.50	ug/l	
75-00-3	Chloroethane	ND		2.0	1.0	ug/l	
67-66-3	Chloroform	5.5	B	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND		2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	51.2		1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND		1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND		1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND		1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND		1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND		1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND		1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND		5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND		5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND		2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND		2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND		5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND		5.0	2.5	ug/l	
100-42-5	Styrene	ND		1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	0.54 [a]	J	1.0	0.50	ug/l	J
108-88-3	Toluene	ND		1.0	0.50	ug/l	
79-01-6	Trichloroethylene	7.4		1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F39990-17	Date Sampled:	04/13/06
Matrix:	AQ - Ground Water	Date Received:	04/15/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%	108%	86-115%
17060-07-0	1,2-Dichloroethane-D4	114%	118%	73-126%
2037-26-5	Toluene-D8	93%	93%	86-112%
460-00-4	4-Bromofluorobenzene	103%	102%	83-119%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	041206R		
Lab Sample ID:	F39990-8	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0040378.D	1	04/24/06	KW	n/a	n/a	VC1638
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result		RL	MDL	Units	Q
67-64-1	Acetone	21.0	J	25	5.0	ug/l	J
71-43-2	Benzene	ND		1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND		1.0	0.50	ug/l	
75-25-2	Bromoform	ND		1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND		1.0	0.50	ug/l	
75-00-3	Chloroethane	ND		2.0	1.0	ug/l	
67-66-3	Chloroform	8.0		1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND		2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND		1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND		1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND		1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND		1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND		1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND		1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND		1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND		5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND		5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND		2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND		2.0	1.0	ug/l	
75-09-2	Methylene chloride	2.8	J	5.0	1.0	ug/l	J
78-93-3	Methyl ethyl ketone	6.5		5.0	2.5	ug/l	
100-42-5	Styrene	ND		1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND		1.0	0.50	ug/l	
108-88-3	Toluene	0.69	J	1.0	0.50	ug/l	J
79-01-6	Trichloroethylene	ND		1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	041206R		
Lab Sample ID:	F39990-8	Date Sampled:	04/12/06
Matrix:	AQ - Ground Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	111%		86-115%
17060-07-0	1,2-Dichloroethane-D4	101%		73-126%
2037-26-5	Toluene-D8	92%		86-112%
460-00-4	4-Bromofluorobenzene	96%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	041006T		
Lab Sample ID:	F39990-13	Date Sampled:	04/11/06
Matrix:	AQ - Trip Blank Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0040383.D	1	04/24/06	KW	n/a	n/a	VC1638
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	2.0 J	5.0	1.0	ug/l	J
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
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N = Indicates presumptive evidence of a compound

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	041006T		
Lab Sample ID:	F39990-13	Date Sampled:	04/11/06
Matrix:	AQ - Trip Blank Water	Date Received:	04/13/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	113%		86-115%
17060-07-0	1,2-Dichloroethane-D4	106%		73-126%
2037-26-5	Toluene-D8	91%		86-112%
460-00-4	4-Bromofluorobenzene	94%		83-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	041306T		
Lab Sample ID:	F39990-19	Date Sampled:	04/13/06
Matrix:	AQ - Trip Blank Water	Date Received:	04/15/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J022181.D	1	04/24/06	MM	n/a	n/a	VJ916
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	1.7 J	5.0	1.0	ug/l	J
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

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Accutest LabLink@09:39 02-May-2006

Report of Analysis

Client Sample ID:	041306T		
Lab Sample ID:	F39990-19	Date Sampled:	04/13/06
Matrix:	AQ - Trip Blank Water	Date Received:	04/15/06
Method:	SW846 8260B	Percent Solids:	n/a
Project:	Radford AAP; SWMU 48, 49, 50, 51 & 59		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		86-115%
17060-07-0	1,2-Dichloroethane-D4	116%		73-126%
2037-26-5	Toluene-D8	94%		86-112%
460-00-4	4-Bromofluorobenzene	102%		83-119%

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N = Indicates presumptive evidence of a compound