POUDRE RIVER REMOVAL
SITE ASSESSMENT

FIELD SAMPLING PLAN
Fort Collins, Larimer County, Colorado

Prepared for:

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1.0 INTRODUCTION

This Field Sampling Plan (FSP) was developed by Tetra Tech EM Inc. (Tetra Tech) in support of a Site Assessment (SA) being conducted by the U.S. Environmental Protection Agency (EPA) Region VIII. EPA requested the SA due to finding a non-aqueous phase liquid (NAPL) release in the Cache La Poudre River adjacent to the Fort Collins, Northside Aztlan Center, Fort Collins, Larimer County, Colorado (Figure 1). The project is being performed in cooperation with the Xcel Energy Non-Aqueous Phase Source Investigation.

A Phase I Environmental Site Assessment (Phase I) was conducted for the Fort Collins Downtown River Corridor by WALSH Environmental Scientists and Engineers, LLC (Walsh) in 2001 (WALSH 2001a). The Fort Collins Northside Aztlan Center is located in the corridor studied by Walsh. The Phase I identified the potential for environmental concerns associated with the former Poudre Valley Gas Plant located south of the Northside Aztlan Center. The City of Fort Collins is interested in developing a larger recreation facility on and adjacent to the former landfill located on the Site.

In October 2003, EPA issued Technical Directive Document (TDD) S05-0310-016 to Tetra Tech to prepare a FSP for the SA at the Aztlan Center Site. This FSP has been prepared in accordance with the task elements specified in the EPA's *Guidance for Performing Site Inspections Under CERCLA* (EPA 1992) and *Region VIII Supplement to Guidance for Performing Site Inspections Under CERCLA* (EPA 1993).

The project objectives and related activities described in this FSP are designed to:

1) Identify potential pathways and source area(s) for free product/NAPL identified in the Cache La Poudre River adjacent to the Site.
2) Obtain data to refine the conceptual site model (CSM), (i.e. bedrock surface, alluvial thickness, landfill thickness, bedrock lithology, etc).
3) Investigate whether tetrachloroethene (PCE) previously identified in the vicinity of the landfill is affecting the water quality of the Cache La Poudre River.
4) Facilitate the identification of the extent and the source area(s) for gasoline/Methyl tertiary-butyl ether (MTBE) contamination in groundwater at the Site.
5) Generate data to support the design and implementation of remedy at the Site

The sampling program will include use of passive soil gas sampling to: Identify sources of contaminants, delineate groundwater contaminant plumes, provide information on likely contaminant pathways and, provide data on the lateral distribution and the types of contaminants present in the vadose zone.

A geophysical survey will be conducted using ground-penetrating radar (GPR) to better define the extent of the landfill and the configuration of the bedrock surface (Pierre shale). Following analysis of the soil gas and geophysical data, strategic soil boring and/or monitoring well locations will be identified. Hollow stem auger (HSA) borings will be advanced to the depth of the bedrock (Pierre shale) surface and into the bedrock to collect soil samples, identify the depth to bedrock, place and sample monitoring wells, and evaluate contaminant migration within the subsurface. Additionally, passive diffusion bag samplers will be placed in the riverbank along the border of the site to evaluate any potential contaminant discharges to the Cache la Poudre River from the Site. Data obtained from these sampling techniques may be used to focus other intrusive sampling and characterization efforts as needed (e.g. trenching). The field investigation approach will be used in conjunction with the CSM to limit uncertainty relative to potential pathways for contaminant migration and the extent of contamination across the Site.

2.0 CONCEPTUAL SITE MODEL

A CSM (Figure 12) is an important tool used to identify key features of a site relative to the site-specific environmental decisions being that may impact remedial and reuse alternatives. A preliminary CSM is developed before an investigation is planned and implemented. Existing data, such as geologic, hydrogeologic, contaminant types, source area characteristics, and other pertinent information are carefully reexamined to assure that the data proposed to be collected will be of sufficient quality and quantity to meet the project objectives.

A CSM includes the identification of suspected contaminant sources and types of contaminants present, potential receptors and exposure points, potential migration pathways, and other project constraints. The CSM uses existing information on the types of contaminants, pathways, receptors, and future land uses to help define areas where further study is needed. The CSM will be continually refined as information is gathered. Modifications to the project approach may be made as more is learned about the site and the data needs are refined.

2.1 SITE DESCRIPTION

The Fort Collins Northside Aztlan Center is located at 200 Willow Street in Fort Collins, Colorado. The Site is located in a commercial area and comprises approximately 20 acres, which includes the Northside Aztlan Center, the United Way Building, a park, soccer fields, playground, bike path, and parking areas. The Site is bounded on the northeast by the Cache La Poudre River, on the northwest by a branch line of the Union Pacific Railroad, on the southwest by Willow Street, and on the southeast by Linden Street and Pine Street (Figure 2).

The site includes a former municipal landfill of approximately 12 acres. Previous investigations document landfill debris to be between nine and fourteen feet in thickness with a one- to three-foot-thick silty clay cover (Walsh 2001b, Tetra Tech 2004).

Under the Fort Collins Downtown River Corridor Implementation Program, redevelopment plans for the Site include building of a new 50,000 square-foot multi-generational recreation center.

2.2 SITE HISTORY

A municipal landfill owned and operated by the City of Fort Collins covers much of the site (Figure 2). Little information is available about the contents of the landfill, and the exact date the landfill opened is not known. However, aerial photographs reviewed in the Phase 1 ESA (Walsh 2001a) indicate the landfill was in operation during 1941. The landfill was not gated and the waste was not monitored for content prior to disposal. Open burning of wastes was conducted at the landfill until the early 1960s, when the landfill was closed and reportedly covered with one to three feet of silty clay (WALSH 2001b; City of Fort Collins 2002).

The Poudre Valley Gas (PVG) Company produced manufactured gas south of the Site on Willow Street from approximately 1900 until 1930. The PVG plant manufactured gas from coal and possibly oil using a carbureted water gasification method. Two gas holders (49.5 feet and 52 feet in diameter) were present at the site in the 1930s. One tar pit of unknown size was located north of the smaller, western gas holder. The aboveground portion of the western gas holder was removed before 1941. The second gas holder is thought to have been removed in 1966 (WALSH 2001a).

Two buildings have been constructed on the former landfill. The Fort Collins Aztlan Center was built in 1973 and the United Way Building was built in 1985.

2.3 SUMMARY OF PREVIOUS INVESTIGATIONS

Previous investigations summarized analytical results for samples collected at the site. Methane gas surveys were conducted at the landfill for the City of Fort Collins in 1977, and in 1979 by GeoTek, Inc. and Raymond Vail Associates. The 1977 survey reported methane concentrations ranging from 0.1 to 4.1 percent gas in twenty-one boring locations. The 1979 survey reported methane detections in four out of twenty-seven boreholes. These detections ranged from five to sixty-two percent of the lower explosive level (LEL) for methane, which is five to fifteen percent methane gas by volume. The highest levels were found in the western portion of the landfill. Perimeter locations near residential, commercial, and industrial areas did not appear to be accumulating methane gas (WALSH 2001b).

The Colorado Department of Health and the Environment (CDPHE) reported that limited sampling of soil and groundwater occurred in 1985 during construction of the United Way Building. Samples were analyzed for metals and semivolatile organic compounds (SVOC) and volatile organic compounds (VOC) (WALSH 2001b). In 1999 groundwater samples were collected from monitoring wells MW-1, MW-2, and MW-3. The sample from MW-1 contained approximately 3,600 μg/L of naphthalene, 27 μg/L of benzene, and 1,400 μg/L of xylene and other hydrocarbons. MW-1 is located on the southern boundary of the former PVG plant site. In addition, chromium was also detected in groundwater in monitoring wells MW-1, MW-2, and MW-3 at concentrations ranging from 1,130 μg/L to 1,250 μg/L (WALSH 2001b).

In the late 1990s, an underground portion of the western gas holder used by the PVG Company was encountered during planning phase of the Downtown River Corridor Project (Stewart Environmental Consultants, Inc. [Stewart] 1996). The underground portion of the gas holder was 10.5 feet deep and filled with coal tar and coal tar contaminated soil. The contents of this gas holder were removed in 1996 by the City of Fort Collins under the CDPHE Voluntary Cleanup Program. The intact underground portion of the gas holder was filled with clean soil and left in place. Rail lines now pass over the former location of the gas holder (WALSH 2001b; Stewart 1996). During the 1996 gas holder tank removal, contaminated soil to the west, south, and east of the gas holder were removed to depths of three to four feet below ground surface (bgs). In addition, three test pits were excavated at locations immediately south and east of the gas holder. Soil containing coal tar and creosote, and green and blue-green stained soil layers, were observed in these test pits. Coal tar and other organic compounds were also visible in groundwater encountered in the test pits. Contaminated soil below four feet bgs and groundwater were not remediated as part of the gas holder remediation (WALSH 2001b; Stewart 1996).

The City of Fort Collins installed two monitoring wells (MW-9 and MW-12) on the City's property on the north side of Willow Street (Figure 3). MW-12 is located downgradient of the location of the former gas holder and MW-9 is located 200 feet from MW-12, but not directly downgradient of the former gas holder. Groundwater samples collected from MW-12 contained levels of benzene in excess of Colorado State Standards for groundwater as well as detectable concentrations of toluene, xylenes, and naphthalene. Groundwater samples collected from MW-9 contained naphthalene but no detectable benzene (WALSH 2001b).

In 1998, the Larimer County Health Department collected a water sample at a depth of nine feet below ground surface (bgs) from a sanitary sewer excavation located on the south side of Willow Street, adjacent to the property owned by Schrader Oil Company. The PVG Company was previously located on a portion of this property. Tentatively identified compounds detected in this sample included acenaphthylene, fluorene, phenanthrene, and substituted naphthalene (WALSH 2001b).

In 2001, WALSH drilled 11 boreholes (BTH-1 through BTH-11) and completed them as monitoring wells to evaluate the extent of contamination at the Site (WALSH 2001b). Soil and groundwater samples were collected from these boreholes and analyzed for the presence of VOCs, SVOCs and Polynuclear Aromatic Hydrocarbons (PAHs), total metals in soil, and dissolved metals in groundwater. PAHs were detected in groundwater samples from at least five of the wells, and VOCs were detected in soil samples from 3 locations (WALSH 2001b).

During the 2001 Phase I investigation, contamination from the former gas plant site was found downgradient of the PVG plant on the Fort Collins Northside Aztlan Center property (WALSH 2001a). The nature and extent of soil and groundwater contamination located on the site are described in several reports completed by WALSH in 2001 and 2002 under the Fort Collins Downtown River Corridor Brownfields Pilot Assessment Program (Walsh 2001a, 2001b, 2002a, 2002b). Coal tar-related compounds, including benzene and naphthalene, were documented as being present at or above method reporting limits in soil and groundwater on the City of Fort Collin's property. Detected contaminants were found primarily between the locations of the Fort Collins Northside Aztlan Center, the United Way Building, and the previous location of the eastern most former gas holder location south of Willow Street and are discussed in more detail in Section 2.7. A groundwater plume of potentially coal tar related compounds was identified, extending north from Willow Street at least 500 feet onto city property (WALSH 2001a; WALSH 2001b; WALSH 2001c; WALSH 2001d; WALSH 2001e; WALSH 2002a; WALSH 2002b).

Schrader Oil, the company that owns property and some of the structures associated with the former PVG plant (Figure 2), is conducting ongoing monitoring and remediation as part of a Colorado Department of Labor and Employment (CDLE) Division of Oil and Public Safety (OPS) Corrective Action Plan (CAP). The CAP resulted from a 1994 leaking underground storage tank (UST) and a gasoline groundwater plume documented on the southern portion of the Fort Collins Northside Aztlan Center site and north of the Schrader facility (Paragon Consulting Group [Paragon] 2002).

In September 2002, a sheen was noticed near the south bank of the Poudre River. The apparent origin of the sheen was located in line with the axis of the plume of potentially coal tar related compounds identified by previous investigations. Several PAHs were detected at low levels in samples of water and sheen that were collected on September 24, 2002 (Walsh 2003). URS Operating Services (UOS) collected a sample of the product from the bottom of the Cache la Poudre River on February 5, 2003. The product was black/dark brown, viscous, and appeared to have a high surface tension while under water. Analytical results document that the product collected by UOS is chemically consistent with products associated with the former PVG plant (WALSH 2002b; UOS 2003a). A discussion of product correlation is presented in Section 2.7 and in Attachment 1. Sample results preliminarily indicated the presence of both chlorinated solvents and pesticides.

In May 2003, EPA directed Tetra Tech to prepare a revised FSP for the Targeted Brownfields Assessment (TBA) at the Northside Aztlan Center Site. The FSP was finalized in July 2003 and described field activities conducted to; identify chemical characteristics of the oily material identified in the Cache La Poudre River adjacent to the Site, evaluate the nature and extent of contamination at the Site, and identify pathways for the oily material or other contaminant sources to the river. Results of the TBA indicated the presence of benzene, toluene, ethylbenzene, xylene (BTEX), MTBE, and naphthalene contamination in the southern part of the site. Tetrachloroethene (PCE) was detected in samples collected predominantly from monitoring wells along the western banks of the Cache la Poudre River and in the southeastern part of the site. Additionally, a product sample was collected from the river and sent for offsite analysis. Analytical results document that the product is chemically consistent with products associated with a manufactured gas plant (Tetra Tech 2004).

2.4 SITE GEOLOGY

The Site lies in the northern front range of Colorado. Previous investigations have identified the Site as overlying Post-Piney Creek Alluvium from the upper Holocene underlain by older alluvial gravel consisting of Broadway Alluvium from the Pinedale Glaciation, Pleistocene. The total thickness of the alluvium ranges from 5-15 feet. Pierre Shale bedrock is present at a depth of between 16 to 21.5 feet bgs (Figure 12).

Post-Piney Creek Alluvium is described as dark-gray humic, sandy to gravelly alluvium that contains scattered plant remains. The alluvium underlies flood plains of major streams and terraces less than 10 feet above the stream level and is underlain by older alluvium gravel in valley areas. The thickness ranges from 5-15 feet with flood events occasionally covering this unit.

Broadway Alluvium is described as gravel and sand deposited by the South Platte River and it's tributaries. The alluvium is well sorted and well stratified. Terrace surfaces are found at about 40 feet above major streams near the Front Range. The Broadway Alluvium along tributaries ranges from 10-15 feet thick, but can be as much as 125 feet thick along the South Platte River.

Soil at the Site consists of Loveland clay loam, Table Mountain loam, Paoli fine sandy loam, Riverwash, and Santanta loam (UOS 2003b).

2.5 SITE HYDROGEOLOGY

The Cache La Poudre River flows in a southeastern direction along the eastern boundary of the site. Depth to groundwater at the site ranges from 10 to 15 feet bgs with the saturated zone underlain by a confining layer of Pierre Shale bedrock. Groundwater generally flows in an east-northeast direction across the site (Tetra Tech 2004). Sanborn maps indicate that the adjacent river channel has meandered significantly throughout the history of the site (Walsh 2001a). A review of Sanborn maps from various times after the PVG was in place indicate that the river continued to migrate over time and likely deposited differing configurations of river sand bars and islands prior to the initiation of landfill operations in the 1930's. Figure 4 shows the approximate location of the river channels at a time shortly after the PVG plant was constructed in 1906. These perturbations in the river's path create ox-bows or riverbank and channel deposits that could represent preferred pathways beneath the landfill for the migration of contaminants from upgradient source areas to the river. Low areas created by these features may also have provided points of discharge for materials leaving the site of the former PVG plant.

2.6 MEDIA OF CONCERN

The media of concern at the Site include soil, sediment, surface water, groundwater, and air. Upgradient sources have resulted in the contamination of subsurface soil and groundwater beneath the Site. Walsh

(2001b) documented the potential threat to indoor air from the volatilization of groundwater plume constituents to indoor air.

Physically impacted sediment in the Cache La Poudre riverbed was observed by the presence of free product. It is currently unknown how this material has reached the river. The apparent discontinuous nature of the plume may or may not reflect the presence of a preferred pathway to the river. Small-scale heterogeneities or preferred pathways could have gone unnoticed as a result of monitoring well completions and fine scale heterogeneities within the alluvium and/or bedrock configuration.

Direct contact with surface soil is not a potential pathway of concern because of the reported presence of a soil cover. Direct contact with surface soil and sediment could be a potential pathway of concern along the berm between the landfill surface and the river to recreational users, but evaluation of this pathway is beyond the scope of this SA.

The presence of NAPL, contaminated groundwater, and subsurface soil are considered to be potential sources of contamination to surface water based on the preliminary CSM (Figure 12).

2.7 CONTAMINANTS OF POTENTIAL CONCERN

Previous investigations at the Site identified a number of VOCs and SVOCs in groundwater and soil (Walsh 2001b, 2002a, 2002b). Semi-volatile contaminants found at elevated levels in the Site soil and groundwater include: naphthalene, benzo(a)pyrene and other PAHs. Volatile contaminants found at elevated levels in site soil and groundwater include: BTEX, MTBE, and chlorinated solvents such as PCE.

In addition to the contamination found within the groundwater plume boundaries identified so far at the Site (Figures 5, 6, 7 and 8), product sample FC-PR-01 was collected by UOS personnel on February 3, 2003 from the Cache La Poudre riverbed (Figure 3). The sample was analyzed for oil and grease, VOCs, SVOCs, pesticides, PCBs, and metals. Detectable levels of VOCs, SVOCs, and some chlorinated pesticides were detected in the product sample; however, it does not appear that substantial impacts to the river for the detected substances have occurred (Walsh 2003). More information concerning the nature and extent of any release is needed before any potential for risk associated with direct or indirect contact with the river or associated sediments can be evaluated.

In an attempt to “fingerprint” PAH contamination found in the riverbed to potential sources at the Site, Walsh developed correlations between PAH concentrations found in the riverbed sample and those in two upgradient samples. The details of the correlation are provided in a letter from Walsh to Margit Hentschel, a representative of the Natural Resources Department, City of Fort Collins dated June 27, 2003 (Attachment 1a).

An upgradient soil sample, collected from test pit 2 at the former PVG gas plant site (Figure 3) had a high correlation coefficient of 0.97 when compared to the riverbed product samples. A second upgradient sample selected for comparison was used to evaluate PAHs found in landfill material against the riverbed project sample. This sample was collected at soil boring BTH-10 (5-15') (Figure 3) from within the landfill where PAH compounds had been detected. This sample had a very poor correlation coefficient of minus 0.21 when compared to the riverbed product sample.

The high correlation (0.97) between the concentrations of PAH compounds detected in the riverbed sample and the PVG gas plant sample suggests that the PAHs found in the both samples have a common origin and/or were generated by a common process. Similarly, the very poor correlation (-0.21) between the concentration of PAH compounds in the riverbed sample and the landfill borehole sample indicate that these materials have a very different composition and do not have a common origin. Field activities and sampling and analysis conducted under this SA will provide additional information necessary to evaluate any preferential pathways or spatial connections between the product detected in the riverbed and upgradient sources.

Two additional product samples (FC-PS-01) and (H1250) collected by Tetra Tech during the TBA confirmed the findings of Walsh’s correlation analysis (Appendix 1b). Product sample FC-PS-01 was collected from the top of the sediment in the Poudre River on September 23, 2003 (Figure 3). Again the PAH concentrations in the sample (FC-PS-01) had a high correlation coefficient (0.97) with the PVG gas plant sample (TP-2, 11.5’). Additional product was encountered within the landfill material during the direct push sampling phase of the TBA at location FC-GW-15 (Figure 3). The product sample (H1250) was collected between 17 and 18 feet bgs at location FC-GW-15. The sample had a low correlation coefficient (0.30) when compared with the product collected in the river (FC-PS-01). Similarly the product sample (H1250) had a low correlation coefficient (0.03) when compared with the product sample collected in the Cache La Poudre River in February 2003 (FC-PR-01).

The high correlations between the concentrations of PAH compounds detected in the riverbed samples (FC-PR-01 and FC-PS-01) and the former PVG gas plant sample (TP-2, 11.5') suggest that the PAHs found in all three samples have a common origin and/or were generated by a common process. Given the extremely poor correlations between the concentrations of PAH compounds in the riverbed samples (FC-PR-01 and FC-PS-01) and the landfill borehole samples (BTH-10 5-15' and H1250) it appears that the landfill materials have a very different composition from the former PVG gas plant sample. The correlation plots and a data table completed by Tetra Tech as part of the TBA are also included in Attachment 1.

3.0 FIELD SAMPLING PLAN STRATEGY

This section describes the sampling strategy and field activities intended to accomplish the objectives outlined in Section 1.0 of this FSP. Activities will adhere to procedures outlined in the Tetra Tech Standard Operating Procedures (SOPs) for conducting field operations at hazardous waste sites (Appendix A). Fieldwork is scheduled for February-April 2004. It is estimated that sampling activities will be completed in 4 mobilizations:

1) Passive soil gas samplers will be deployed in approximately 5 to 7 days;
2) The soil gas samplers will be retrieved approximately 2 weeks later and a geophysical survey will be conducted and passive diffusion bag samplers will be installed in the riverbank
3) The passive diffusion bag samplers will be retrieved approximately 2 weeks after they are placed and sent to a laboratory for chemical analysis
4) After the soil gas, passive diffusion bag sampler data, and geophysical survey results have been obtained and reviewed drilling activities and installation of groundwater monitoring wells will commence in a mobilization of approximately 10 to 14 days, depending on field conditions and the level of investigation required.

3.1 APPROACH

For planning purposes, the groundwater flow direction across the landfill is assumed to be east-northeast, based on the potentiometric surface developed using the most recent groundwater elevation data (Figure 9). Groundwater is approximately 10 to 15 feet bgs and depth to bedrock is approximately 18 feet bgs (Tetra Tech 2004). Groundwater elevations will be collected from existing wells on site and on the Schrader property as possible before sampling begins. Existing monitoring wells will also be inspected for the presence of NAPL.

Initially the project team plans to complete a geophysical survey and collect soil gas samples from across the site. Results from the geophysical survey, soil gas survey, and passive diffusion bag samples will be used to refine the CSM and used to target initial invasive drilling and sampling activities. Soil, water, and product samples will be sent to an off-site fixed laboratory for chemical analyses as defined in Section 5.0 of this FSP.

Field activities will be conducted using a dynamic decision-making approach whenever possible. The dynamic approach will provide the project team the flexibility to use field observations to optimize well locations and to select soil sampling locations as the CSM is further refined. Field methods including flame ionization detection (FID) and photo ionization detection (PID) systems will be used to determine when and where samples will be collected for chemical analysis.

Product samples will be collected when source areas are encountered across the site to facilitate fingerprinting and source identification.

Proposed sample locations and rationale are presented in Table 1. Soil borings will be advanced at up to 20 locations and 10 groundwater monitoring well pairs (20 monitoring wells) will be installed across the site in order to better define the bedrock surface, determine the locations of source areas, collect groundwater samples, and facilitate potential future remedial and/or removal actions at the Site. The actual locations of boring and monitoring well placements will be selected based on the CSM, previously located areas of contamination, the results of the geophysical survey, the results of the soil gas survey, the results of the passive diffusion bag samples, and field observations. The field-based observations include: VOC data from continuous FID/PID readings of each soil core, visually observed product, field-based tests, and the competency of the bedrock encountered. See Attachment 2 for the decision-making logic diagram.

Based on the results obtained from the geophysical survey, soil gas samples, and field observations, invasive field activities may also include advancing one or more trenches to the depth of bedrock (Pierre shale) to evaluate the presence of potential sources, preferential pathways, and to further characterize subsurface conditions at the Site. If activities associated with the Non-Aqueous Phase Source Investigation indicate that the product source is in or beneath the landfill, additional invasive investigation activities may be conducted to evaluate the extent of the product source. The additional invasive activities may include additional HSA drilling and trenching to the base of the landfill and into bedrock.

Currently, the Xcel Energy Non-Aqueous Phase Source Investigation is being conducted in and along the Cache La Poudre River at the Site. As soon as Site conditions allow, passive diffusion bag samplers will be installed below the depth of saturation in the riverbank, along the Aztlan landfill border to identify persistent contaminant discharge locations to the river.

3.2 FIELD ACTIVITIES

The following section describes field activities designed to meet the project objectives.

3.2.1 Underground Utilities Clearance

Prior to initiating field activities, Tetra Tech will procure a licensed subcontractor to identify and mark underground utilities at all locations where intrusive activities will be conducted.

3.2.2 Soil Gas Survey

Initial field sampling activities will include a soil gas survey, using the EMFLUX® passive soil-gas sampling system, in order to identify potential contaminant source areas, facilitate the delineation of groundwater contaminant plumes, provide information on discrete contaminant pathways, and provide data on the lateral distribution and types of contaminants present in the vadose zone. This soil gas survey method will readily detect the presence of VOC contamination and some light end SVOCs in soil and groundwater. Previously detected volatile compounds associated with presence of product at the site include: BTEX, substituted benzenes (1,3,5 trimethylbenzene, 1,2,4 trimethylbenzene, and n-butylbenzene), and total aliphatic hydrocarbons. These compounds may be used to identify locations where the presence of NAPL in the subsurface is likely. Up to 350 of the passive soil-gas sampling devices will be installed in a 50-foot grid across the entire site. Samplers will also be placed every 25 feet along transects placed strategically to intersect known and likely areas of contamination across portions of the Site (Figure 10). Soil gas samplers will also be placed at approximately 20-foot intervals along transects adjacent to the upgradient boundary of the Site and along the river (Figure 11) to locate contaminants entering the site from upgradient sources and to locate areas where contaminants may be leaving the Site and discharging into the river. The soil gas samplers will be installed and retrieved following procedures described in Section 4.1.

3.2.3 Geophysical Survey

Field activities will include GPR methods to better define the bedrock surface and to identify the presence of preferential pathways such as bedrock fractures, subsurface channels in alluvium, or underground pipelines. The survey will be conducted prior to the drilling mobilization to allow time for data evaluation, CSM refinement, and subsequent sampling strategy refinement. Where the data indicate the presence of a subsurface preferential pathway or pipeline(s), sampling locations may be modified accordingly to focus on site features that require further characterization. Based on known site conditions, GPR is the preferred geophysical method. Geophysical survey procedures are discussed in Section 5.2. However, preliminary data obtained on the first day of geophysical fieldwork may indicate the need for an alternate method of geophysical investigation. Other geophysical survey methods that may be considered feasible, based on site-specific conditions include seismic refraction (SR) and electrical resistivity.

3.2.4 Soil/Product Sampling

Up to 20 soil samples will be collected from soil borings to characterize the soil profile. Sample locations and depths will be determined in the field, based on visual inspection, PID/FID readings, and other field-based screening techniques described in Section 4.3. Soil samples may not be collected if field-based screening results are negative (i.e., PID/FID readings are very low and field based screening techniques indicate that there is no product). Product samples will be collected wherever possible across the site to facilitate fingerprinting and source identification/delineation. Soil samples will also be collected and analyzed for geotechnical properties to support potential future remedial and/or removal actions. Soil/Product sampling procedures are discussed in Section 4.3.

Observations of soil contamination will be used in conjunction with the CSM and soil gas survey results to focus source delineation and identification efforts. Soil and product samples will be analyzed at an off-site laboratory as described in Section 5.0.

3.2.5 Grab Groundwater Sampling

Grab groundwater samples will only be collected where soil borings are advanced without the installation of a monitoring well and visual observations of product and the sheen test are negative. Groundwater grab samples will be analyzed for VOCs, SVOCs, TPH-p, and TPH-e as defined in Section 5.0 of this FSP. Attachment 2 describes criteria for well placement. Sampling locations will be staked and labeled while awaiting location verification using survey techniques (Section 3.2.12).

3.2.6 Monitoring Well Installation

Up to 20 monitoring wells will be installed as part of this SA field effort. The actual locations of boring and monitoring well installations will be determined using information from the CSM, previously located areas of contamination, results of the Non-Aqueous Phase Source Investigation, geophysical investigation, and the soil gas survey. Monitoring wells will be installed as well pairs or 'nested' wells. One well would be set within the overburden at the bedrock interface and one well would be set into bedrock to evaluate potential variations in contaminant movement within the separate lithologic units. Monitoring well installation procedures are discussed in Section 4.5. After installation, the monitoring wells will be sampled as described in Section 4.6.

After installation, the monitoring wells will be properly developed according to Tetra Tech SOP 021 (Appendix A).

3.2.7 Monitoring Well Sampling

Groundwater samples will be collected from newly installed monitoring wells following procedures outlined in Tetra Tech SOP 015 (Appendix A). Following well development, groundwater samples will be collected from the new monitoring wells and analyzed at an off-site laboratory for VOCs, SVOCs, TPH-e, TPH-p, cations, and anions, as described in Section 5.0. The monitoring wells will be sampled as described in Section 4.6.

3.2.8 Groundwater Flow Measurements

Tetra Tech will measure current water levels in existing monitoring wells at the Site and upgradient of the Site as possible and generate a contour map of the potentiometric surface for further refinement of the groundwater flow direction. The groundwater flow direction will be used to support placement of new monitoring wells and locating groundwater grab sample locations. After the conclusion of field activities, a new contour map of the potentiometric surface will be generated using location and elevation data from all new and existing monitoring wells, which will be presented in the field activities report.

3.2.9 Site Access

Should sample locations be identified outside the City of Fort Collins property boundaries, permission to access that property will be obtained prior to sampling those locations.

3.2.10 Health and Safety

A site Health and Safety Plan has been developed for field activities. Field personnel will conduct all field activities in strict accordance with the approved site Health and Safety Plan. It is anticipated that all field activities will be conducted in modified Level D personal protective equipment (PPE).

3.2.11 Passive Diffusion Bag Sampler Installation

As soon as Site conditions allow, up to 80 passive diffusion bag samplers will be installed below the depth of saturation in the riverbank, along the Aztlan landfill border, and along the south bank to identify persistent contaminant discharge locations to the river. The bag samplers will be placed at 20-foot intervals along the riverbank and left in place for approximately 2 weeks to allow the sampler to equilibrate with the surrounding ground/surface water (Figure 10). After the bag samplers are retrieved they will be sent to an off-site laboratory for VOC analysis (target analytes include naphthalene and MTBE) as described in Section 6.0.

3.2.12 Surveying

A licensed surveyor will establish vertical and horizontal coordinates for all new soil and groundwater sample locations and monitoring wells after fieldwork is completed. Surveying will be conducted the day following conclusion of fieldwork, depending on licensed surveyor availability.

Soil gas and passive diffusion bag sample locations will be surveyed using a Global Positioning System (GPS) unit as they are placed.

4.2.13 Optional Trenching

Based on results obtained from the geophysical survey, soil gas samples, and field observations; field activities may also include advancing one or more trenches to the depth of bedrock (Pierre shale) to evaluate the presence of potential sources, preferential pathways, and to further characterize subsurface conditions at the Site.

4.0 FIELD PROCEDURES

4.1 SOIL GAS SAMPLING PROCEDURES

Soil gas samplers will be installed by following operating procedures recommended by the manufacturer of the soil gas samplers. Surface debris or vegetation will be removed exposing the ground surface. An electric rotary-hammer fitted with a 0.5 inch by three-foot drill bit will be used to drill an approximately three foot deep hole. The hole will act as a conduit for soil gas, increasing the sampler's sensitivity and allow penetration of the reported one to three foot landfill cap. Using a hammer and a 0.75-inch metal stake, the upper three to four inches of the hole will be widened to permit insertion of the soil gas sampler. If the sampler is to be installed in an area covered with asphalt or concrete, the rotary-hammer will first be used with a one-inch masonry bit to drill a hole to the soils beneath.

The sampling cartridge will be covered with local soils after it has been inserted into the hole. Where the samplers are installed through asphalt or concrete the hole will be covered with mortar. The sampler's location, time and date of emplacement, and other relevant information will be recorded. A GPS unit will be used to record the soil gas sample locations.

And the end of the exposure period (approximately two weeks) the samplers will be retrieved and sent to the laboratory for VOC analysis (target analytes include naphthalene and MTBE). Any holes in concrete or asphalt will be repaired with like material. During installation and retrieval, periodic ambient air control samples will be collected as a quality control measure as described in Section 5.0.

4.2 GEOPHYSICAL SURVEY PROCEDURES

The exact field procedures for the geophysical survey will be determined by the SOP developed by the geophysical subcontractor performing the work. The planned extent of the geophysical survey is presented in Figure 11. GPR is the preferred geophysical method for conditions at the Site; however, preliminary data obtained on the first day of geophysical fieldwork may indicate the need for an alternate method of geophysical investigation. Other methods considered feasible include seismic refraction (SR) and electrical resistivity.

4.3 SOIL CORE LOGGING AND SOIL SAMPLING PROCEDURES

Soil borings will be advanced using an HSA drill rig and 4.25-inch diameter auger flights equipped with a split-spoon sampling barrel. All boreholes will be continuously cored to the total depth of the boring (up to 25 feet into bedrock). The entire core will be logged for lithologic description and screened with a PID/FID for VOCs. Lithologic information will include depth, color, soil type, estimated density based on qualitative thumb penetration test, and qualitative moisture content. Original field logs will be recorded for each boring (Appendix B). Soil types will be classified in accordance with American Society for Testing and Materials (ASTM) D2488-90, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). In addition to lithology, any contaminant-related features such as odor, staining, and/or unusual solid constituents such as manmade debris, will be noted on the logs. The visual observation of NAPL will be documented using the following standardized descriptions:

- No Visible Evidence – No visible evidence of oil on soil sample
- Sheen – Any visible sheen in the water on soil particles as described by the sheen testing method presented later in this section
- Staining – Visible brown or black staining in soil. Can be visible as mottling or in bands. Typically associated with fine-grained soils
- Coating – Visible brown or black oil coating soil particles. Typically associated with coarse-grained soils such as coarse sand, gravels, and cobbles
- Oil Wetted – Visible brown or black oil wetting the soil sample. Oil appears as a liquid and is not held by soil grains (Soils oozing petroleum typically contain 2 to 3 percent petroleum)

An ultra violet (UV) light box will also be used to aid in the visual observation of NAPL and the description of core samples.

In addition to PID/FID and visual inspection, the presence of NAPL in soil cores will be periodically evaluated using a qualitative water sheen test. This water sheen test will be conducted for portions of the core where visual inspection does not indicate the presence of NAPL.

The water sheen test will be performed by placing soil in a small plastic bag filled with distilled water, shaking the bag and observing the water's surface for signs of sheen. Sheen will be classified as follows:

- No Sheen (NS) – No visible sheen on water surface
- Slight Sheen (SS) – Light colorless film; spotty to globular; spread is irregular, not rapid; areas of no sheen on water surface remain; film dissipates rapidly
- Moderate Sheen (MS) – Light to heavy film; may have some color or iridescence; globular to stringy; spread is irregular to flowing; few remaining areas of no sheen on water surface.
- Heavy Sheen (HS) – Heavy colorful film with iridescence; stringy in appearance; spread is rapid; sheen flows of the sample; most of water surface may be covered with sheen

To characterize the vertical extent of contamination where pooled NAPL is encountered at the bedrock surface, the 4.25-inch auger flights will be pulled from the boring and larger diameter auger flights (e.g. 8.25-inches in diameter) will be advanced to approximately 1 foot into bedrock using the same borehole. Approximately 2 feet of granular bentonite will then be poured through the auger flight and hydrated to create a plug to prevent possible down-hole migration of contaminated fluids. The larger diameter flights will be left in place, acting as a temporary surface casing, and the 4.25-inch auger will be advanced though them to the total depth of the boring (approximately 25 feet into bedrock).

Up to 20 soil samples will be collected from soil cores where PID/FID readings are greatest and/or where other field screening techniques indicate the presence of contamination. Soil samples will be collected following Tetra Tech SOP 005 (see Attachment 2 for the soil sampling decision logic diagram) and sent to an off-site laboratory for VOC, SVOC, TPH-p, and TPH-e analysis. At 3 locations chosen at the discretion of the field team leader, geotechnical samples will be collected. The 3 samples will be collected from the overburden directly above bedrock following Tetra Tech SOP 005. The 3 samples collected from the overburden directly above bedrock will be analyzed for bulk density, effective porosity, grain size distribution, and Atterburg limits. The geotechnical data will provide a preliminary indication of subsurface properties in the 3 locations chosen and will provide the basis for further geotechnical sampling that may be conducted during remedial design activities.

Table 3 presents soil sample volume, preservation, and container requirements. A list of methods and target analytes for each sampling media is provided in Table 4. Soil cleanup standards are provided for reference only in these tables.

4.4 GRAB GROUNDWATER SAMPLING PROCEDURES

Grab groundwater samples will be collected where soil borings are advanced without the installation of a monitoring well and visual inspection and sheen tests indicate the absence of NAPL. After the HSA has been advanced and the determination not to install a monitoring well has been made, a groundwater sample will be collected using a drop-down screen advanced through the HSA flights.

An electronic water level indicator will be inserted into the opening in the auger flights to measure the depth to groundwater. The drop down screen tool will then be inserted into the hole and driven to the desired sample depth. The desired depth will generally be two to three feet below the bottom of the borehole. When the desired depth has been reached, the drive pipe will be lifted slightly to open the inlet ports and allow groundwater to enter the sample chamber. A ¼-inch inert-material tube will be inserted into the push rod to the depth of the water-filled screen. A peristaltic pump will be attached to the end of the inert tubing at the surface and water will be extracted through the screen and sampling probe. Sample bottles will be filled with groundwater and sent to an off-site laboratory for analysis. A list of analyses proposed, preservation procedures and sample volumes, target analytes, expected levels of quantitation for each sampling media and analysis, and total numbers of samples proposed are provided in Table 4 and Appendix D.

4.5 MONITORING WELL INSTALLATION PROCEDURES

A licensed subcontractor will install monitoring wells using HSA methods. Monitoring wells will be constructed of 2-inch, polyvinyl chloride (PVC) casing with 0.010-inch factory-slotted screens. The anticipated screen length will be 10 feet or less. However, final well screen lengths will depend on the thickness of the water bearing zone and total depth of the borehole. Planned borehole depth is approximately 20-40 feet, depending on the depth of bedrock at that location and field observations.

The bottom of each well will be sealed with flush-threaded end cap. Screen materials shall be installed to ensure that the wells are plumb and correctly aligned. The monitoring well will be installed directly through the auger flights to prevent borehole collapse. Once the well is in place, the drive casing will be removed while simultaneously placing the filter pack around the screened interval. The filter pack will consist of 10-20-mesh sand. Depth to the top of the filter pack will be two feet above the screened interval. An annular seal of bentonite-slurry grout or granular bentonite will be placed from the top of the filter pack sand to the ground surface. If granular bentonite is used, it will be hydrated with potable water after emplacement. The monitoring wells will be completed at the surface with flush-mounted well vaults secured with concrete. Locking 'J'-plugs with locks will be inserted into the top of the monitoring well casing to prevent tampering.

4.6 MONITORING WELL SAMPLING PROCEDURES

Groundwater samples will be collected from the 20 new monitoring wells using an adjustable flow-rate pump following Tetra Tech SOP 015. The intent of this procedure is to minimize turbidity of the water in the well and in the formation by maintaining laminar (non-turbulent) flow. The purpose of minimizing turbidity is to limit mobilization of colloids and volume of total suspended solids. Introduction of increased amounts of these naturally suspended particles in the water sample has been proven to artificially bias natural concentrations of target compounds and analytes that are sorbed to these particles. As pumping commences the field team will collect any product that might be encountered for chemical analysis.

An adjustable flow-rate pump will be used to purge water from the well (micropurging). The water level in the well will be monitored during purging to ensure drawdown of less than 0.3 foot. Temperature, turbidity, dissolved oxygen (DO), and pH will be monitored during purging. Purging will continue until these parameters stabilize to within ±1.0 degrees Fahrenheit, ± 10 % for DO and turbidity, and ± 0.1 units for pH over three consecutive readings or until three casing volumes have been removed. Measurement data will be recorded on a groundwater sampling data sheet (Appendix B)

Sample collection for groundwater will begin immediately after parameters stabilize. Samples for VOC and TPH-p analyses will be collected first, followed by samples for SVOCs, TPH-e, anions, and cations. Sample fractions for SVOCs and TPH-e may be combined or split for use should sample volume be an issue. Such changes in the sampling protocols will require prior approval by the project chemist. Table 3 presents groundwater sample volume, preservation, and container requirements. A list of analyses proposed, preservation procedures and sample volumes, target analytes, expected levels of quantitation for each sampling media and analysis, and total numbers of samples proposed are provided in Table 4 and Appendix D.

4.7 PASSIVE DIFFUSION BAG SAMPLER INSTALLATION PROCEDURES

Passive diffusion bag samplers will be placed within the saturated portion of the south bank of the Cache La Poudre River. The bag samplers will be installed by digging a hole with a motorized posthole digger, digging shovel, and/or Maddox near the water's edge to approximately 1-foot below the saturated soil interval. The sample unit will then be placed in the hole and buried with native fill previously excavated from the hole. The locations will be clearly marked at the ground surface with a wooden stake noting the sample location ID and date of placement.

After an equilibration period of approximately 2 weeks, the bag samplers will be carefully removed from the bank sediment and sent to a laboratory for VOC analysis (target analytes include naphthalene and MTBE).

4.8 OPTIONAL TRENCHING PROCEDURES

If trenching is required, a backhoe will be used to advance one or more trenches to the depth of bedrock (Pierre shale). Barricades and caution tape will be used to create a boundary surrounding trenching operations. Emissions from the trench will be monitored using a PID/FID for the period that the trench is open. If visual inspection and/or PID/FID screening indicates the presence of contamination, one or more soil samples may be collected and sent to an off-site laboratory for chemical analysis as determined by the project chemist. The trench lithology will also be described and photographed from the ground surface (the trench will not be entered). After the trench inspection is complete the excavated soils will be returned to the trench and compacted at multiple levels using the backhoe bucket to reduce settling. Topsoil will be replaced and grass cover reseeded if applicable.

4.9 INVESTIGATION DERIVED WASTE

Investigation derived waste (IDW) generated during this field effort will be handled in accordance with the Office of Emergency and Remedial Response (OERR) Directive 9345.3-02, "Management of Investigation Derived Waste During Site Inspections," May 1991 (EPA 1991).

5.0 SAMPLING HANDLING AND ANALYSIS

5.1 SAMPLE DESIGNATION

Each sample will be given a unique identification designation. The unique designation will be associated with a specific sampling location. The designation will be an alphanumeric combination signifying the location, sample matrix, and sequential number. Table 2 lists sample designations and associated analyses to be performed on the sample.

5.2 SAMPLE ANALYSIS

All groundwater samples collected from monitoring wells will be analyzed for VOCs by EPA SW-846 method 8260 (target compounds include naphthalene and MTBE), semi-volatile organic compounds (SVOCs) by EPA SW-846 method 8270, TPH-p and TPH-e by EPA SW-846 method 8015M, anions by EPA Method for chemical analysis of water and wastes (MCAWW) method 300.0. Grab groundwater samples not collected from monitoring wells will be analyzed for VOCs (including naphthalene and MTBE), SVOCs, TPH-p, and TPH-e (Tables 4 and Appendix D).

Quality Assurance/Quality Control (QA/QC) samples will be collected in addition to the field groundwater samples listed in Tables 1 and 2. Additional volume for laboratory matrix spike/matrix spike duplicates (MS/MSDs) will be collected at a frequency of 1 per 20 field samples (5%). Field duplicate samples will be collected at a frequency of 1 per 10 field samples (10%), trip blanks for VOC analysis will be collected daily with groundwater, soil, or product samples and 1 set shipped per cooler carrying samples for VOC analysis. Equipment rinsate samples collected to assess the effectiveness of decontamination procedures will be collected at a frequency of 1 per sampling event (mobilization) for the entire suite of analyses. Rinsate samples will be collected for each piece of drilling or sampling equipment used at multiple locations and requiring decontamination. The actual number of field samples and associated QC samples collected will be determined dynamically as work progresses. The frequency requirements for collection of QC samples is shown on Table 2.

Soil samples collected during the drilling phase will be analyzed for VOCs by EPA SW-846 method 8260 (target compounds include naphthalene and MTBE), SVOCs by EPA SW-846 method 8270, TPH-p, and TPH-e by EPA SW-846 method 8015M (Tables 1, 2 4). Soil samples will also be subject to the QC sample frequency requirements provided in Table 2.

If free product is encountered during the drilling or sampling phases of the SA, product samples may be collected and analyzed for VOCs by EPA SW-846 method 8260 (target compounds include naphthalene and MTBE), SVOCs by EPA SW-846 method 8270, TPH-p and TPH-e by EPA SW-846 method 8015M (Tables 1, 2, 4). Due to the complexity of the matrix, associated analytical difficulties, and the likelihood that sample volume may be limited, QC samples for product will be collected and analyzed at the discretion of the field team leader and the project chemist. If sufficient volume is available, a duplicate sample will be collected, however product samples will not be subject to the QC sample frequency requirements provided in Table 2.

5.3 FIELD QUALITY CONTROL PROCEDURES

The following QC samples will be collected to assist in the evaluation of data quality at the Site in accordance with the Quality Assurance Project Plan (QAPP) for the Region 5 Superfund Technical Assessment and Response Team (START) (EPA 2003).

- As many as ten trip blanks for VOC analyses will be collected for the site (one for each laboratory shipment);
- As many as 3 rinsate blanks (1 per event per piece of equipment) will be collected;
- One duplicate sample per set of 10 field samples collected for water and soil.
- A maximum of seven triple volume samples (five water samples and two soil samples) are expected for MS/MSDs (the triple volume samples will not be labeled as separate samples and do not add to analytical costs).

All samples will be handled and preserved as described in Tetra Tech SOP 016 (Appendix A) and as summarized in Table 3.

Field logbooks will be maintained as described in Tetra Tech SOP 0024 (Appendix A).

All equipment that may come into contact with or pose a threat of cross-contamination will be decontaminated between sampling locations according to (Tetra Tech SOP 002, Appendix A). Sampling equipment will be rinsed with available tap water on-site and an alconox solution and then double-rinsed with deionized water. Dedicated or disposable equipment will be used for groundwater sampling to minimize potential for cross contamination. Calibration of the pH, temperature, and conductivity meter will follow the manufacturer's procedures and specifications.

5.4 CHAIN OF CUSTODY

Chain-of-custody recording procedures will be used to provide an accurate written record that traces the possession of individual samples from the time of collection in the field to the time of acceptance at the off-site laboratory. The chain-of-custody record will also be used to document the samples collected and the analyses requested.

6.0 DATA QUALITY, REDUCTION, VALIDATION, AND DELIVERABLES

All laboratory data and electronic data deliverables (EDDs) will be reviewed by the Tetra Tech project chemist for consistency and accuracy. Off-site laboratories procured as part of this SA are required to meet the EDD format and content described in Appendix C. Selected data packages may be validated by a third party validation firm at the discretion of the project team and will be determined at a later date by the EPA Region VIII On Scene Coordinator. If required, data validation procedures will follow the "National Functional Guidelines for Organic Data Review" (EPA 1999) and the "National Functional Guidelines for Inorganic Data Review" (EPA 2002).

6.1 DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) are used to identify the quantity and quality of data to be collected to support the objectives of the SA at the Fort Collins Aztlan Center site. Table 5 summarizes the DQOs for the project.

Guidance for the preparation of DQOs is provided in "Guidance for the Data Quality Objectives Process" (EPA 2000). The seven steps of the DQO process are:

Step 1: State the Problem

During this portion of the process, the overall problem to be addressed during the project is stated. For this SA the EPA seeks to identify source areas and potential pathways for mobile NAPL reaching the Cache La Poudre River and to further refine the CSM for the site. Secondary considerations include estimating the extent of PCE contamination up gradient and in the vicinity of the landfill, identifying extent and source areas for gasoline/MTBE, and collecting data that will aid in a remedial investigation/ feasibility study (RI/FS) if required. Table 5 provides a summary of the DQO process and project specific inputs for this SA.

Step 2: Identify the Decision

During this portion of the process detailed decisions are identified, which need to be answered in order to meet project objectives (Table 5). For example, is there an ongoing source of mobile NAPL extending from the site to the impacted areas in the Cache La Poudre River? If there is an ongoing source of mobile NAPL, what preferential pathways may the contamination be following? Are there source areas and what is the extent of PCE, gasoline, and MTBE upgradient and within the landfill? These types of decisions form the basis for sampling design and data collection efforts.

Step 3: Identify the Inputs to the Decision.

Based on the decisions identified in Step 2, necessary inputs are identified. For example, a geophysical survey using GPR or potentially seismic refraction (SR) and electrical resistivity will be conducted to better define the bedrock surface and to identify potential source areas or the presence of preferential pathways such as bedrock fractures, subsurface channels in alluvium, or underground pipelines. In addition to the geophysical survey, a passive soil gas survey will be conducted to identify potential contaminant source areas, facilitate the delineation of groundwater contaminant plumes, provide information on discrete contaminant pathways, and provide data on the lateral distribution and types of contaminants present in the vadose zone. Limited groundwater grab sampling and soil sampling will be conducted during the drilling and monitoring well installation phase to further refine the CSM and evaluate potential source areas and contaminant transport pathways. Monitoring wells will be installed and groundwater samples and flow measurements collected to further refine the CSM, further delineate existing dissolved contaminants in site groundwater, evaluate potential contamination leaving the site, and provide future sampling points for RI/FS activities. Finally, the passive diffusion bag samplers will be installed and optional trenching may be employed to evaluate potential persistent contaminant discharge locations to the river, evaluate the presence of preferential pathways, and to further characterize subsurface conditions and refine the CSM for the Site.

Step 4: Define the Study Boundaries.

Based on the decisions identified in Step 2 of the DQO process study, boundaries are identified to further focus sampling and analysis efforts. The lateral extent of the study area encompasses the Aztlan Center property along the River from the railroad truss to the north to Linden Street to the south and east to Willow Street. The study boundaries may extend beyond the property boundaries during the geophysical survey to delineate the extent of the historical landfill on site. The vertical boundary of the study is from ground surface to a depth of 25 feet below the bedrock interface (Table 5). Temporal study boundaries include expectations that scheduled SA activities will be completed in February through April of 2004.

Step 5: Develop a Decision Rule

Decision rules or if, then statements are developed that correspond with each major decision identified in Step 2 of the DQO process. Decision rules generally apply when making statements associated with risk estimation. Because this investigation targets primary pathway and plume delineation, decision rules are more basic. For example, if a preferential pathway, or product is evident in the soil gas and geophysical survey, then a boring will be installed to confirm the presence or absence of a preferred pathway and/or product. Decision logic planned for the dynamic field activities associated with this SA is presented in Attachment 2.

Step 6: Specify Limits on Decision Errors

In Step 6 of the DQO process the tolerable limits on decision error are established. For this project, tolerable levels of decision error will be established once decision rules based on the presence or absence of mobile NAPL are developed. This project is currently in the SA phase where the project team will attempt to identify source areas and preferential pathways for contaminant migration at the site and decision errors are not necessary to meet project objectives. Development of tolerable decision errors will be based on data collected during the TBA and the SA and will continue to be refined as more data is collected.

Step 7: Optimizing the Design

During Step 7 of the DQO process, methods for optimization of the sampling and analysis design are identified. Optimization of the sampling and analysis design for this SA will be done through the use of a geophysical survey and passive soil gas analyses to assist in locating drilling and sampling locations with the greatest likelihood of identifying source materials and preferential pathways for contaminant transport. Additionally, data obtained from the passive diffusion bag samplers may be used to identify areas where exploratory trenching would provide additional contaminant delineation or assist in identifying preferential contaminant transport pathways to further refine the CSM.

For certain portions of the project real-time data is needed to optimize the sampling and analytical program design while in the field. Sampling decision logic is presented in Attachment 2.

6.2 DATA QUALITY ASSESSMENT

Data Quality Assessments (DQA) are prepared to document the overall quality of data collected in terms of the established DQOs. The data assessment parameters calculated from results of the field measurements and laboratory analyses are reviewed to ensure that all data used in subsequent evaluations are scientifically valid, of known and documented quality, and where appropriate, legally defensible. The goal of the DQA is to present the findings in terms of data usability.

The major components of a DQA are presented below and show the progression of the assessment leading to determination of data usability:

- Data validation or data review, as appropriate, for all sample delivery groups by a chemist
- Description of the procedures used to further qualify data from laboratory issues related to dilution, reanalysis, duplicate analysis of samples, etc.
- Evaluation of QC samples such as field blanks, trip blanks, equipment rinsates, field replicates, and laboratory control samples to assess the quality of the field activities and laboratory procedures
- Assessment of the quality of data measured and generated in terms of precision, accuracy, representativeness, completeness, and comparability throughout the examination of laboratory and field control samples in relation to objectives established
- Summary of the usability of the data, based upon the assessment of data conducted during the previous steps. Sample results for each analytical method are unqualified or qualified as estimated or rejected. Estimated data are useable for all purposes, while rejected data are not useable for any purpose

6.3 DATA ASSESSMENT ACCEPTANCE CRITERIA

Data acceptance criteria for each of the five data assessment parameters (accuracy, precision, completeness, representativeness, and comparability) are expressed as quantitative and qualitative statements and are detailed below.

6.3.1 Precision

Precision is a measure of mutual agreement among replicate (or between duplicate) or collocated sample measurements for the same analyte. The closer the numerical values of the measurements are to each other, the more precise the measurement. Precision for a single analyte will be expressed as the relative percent difference for results of field replicate samples, matrix spike duplicate samples for organic analyses, and duplicate samples for inorganic analyses. In addition, precision will be maintained by conducting routine instrument checks to demonstrate that operating characteristics are within predetermined QC limits. The exact limits required for decision making purposes for precision will be established based on a review of analytical results and there relationship to decision criteria which may or may not be related to an action level or the result of a statistical test. In general the data obtained will be qualified in accordance with the requirements of the Contract Laboratory Program (CLP) and the need for corrective action based on poor precision in the field will be made by the project chemist.

6.3.2 Accuracy

Accuracy is a measure of precision and the bias in a measurement system. The closer the value of the measurement agrees with the true value, the more accurate the measurement. Accuracy will be expressed as the percent recovery of the analyte from a surrogate or matrix spike sample and occasionally from the analysis of a standard reference sample compared to actual analyte concentration. Bias of the field measurement will be evaluated during the demonstration of methods applicability and any bias accounted for as the data is obtained and evaluated by the project chemist.

6.3.3 Representativeness

Representativeness is a qualitative parameter that expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. The design of and rationale for the sampling program (in terms of the purpose for sampling, selection of sampling locations, the number of samples to be collected, the ambient conditions for sample collection, the frequencies and timing for sampling, and the sampling techniques) ensure that environmental conditions have been sufficiently represented. Real-time measurements will evaluated using standard methods for data analysis to assess the variance in the reported result relative to the project decisions being made. If it is determined that additional data is needed to assure the representativeness of project decisions, recommendations will be provided as part of the preparation of the final results report.

6.3.4 Completeness

Completeness is a measure of the number of valid measurements obtained in relation to the total number of measurements planned. The closer the numbers are, the more complete the measurement process will be. Completeness will be expressed as the percentage of valid-to-planned measurements. An objective of the field sampling program is to establish the quantity of data needed to support the investigation. This will be achieved by obtaining environmental samples for all types of analyses required at each individual location. A sufficient volume of sample material will be collected to complete the analyses so that samples represent all contaminant situations under investigation. Samples may also be collected to obtain other critical data, such as background and quality control. Completeness will take into consideration environmental conditions and the potential for change with respect to time and location. The general goal for completeness for this project is 90 percent.

6.3.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Data sets will be compared only when precision and accuracy meet the specified acceptance criteria to be established through the methods applicability study. Samples will be collected and analytical sample results will be reported according to standard procedures and methods in order to be comparable with other similar measurement data and sample results. The comparability goal will be achieved through the use of SOPs to collect and analyze representative samples, and by reporting analytical results in appropriate and consistent units. Each analytical procedure selected from among the acceptable options will be used throughout the project unless a rationale is provided for an alteration. In essence, comparability will be maintained by consistency in sampling conditions, selection of sampling procedures, sample preservation methods, analytical methods, and data reporting units.

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APPENDICES

APPENDIX A

SOP APPROVAL FORM

TETRA TECH EM INC.

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

GENERAL EQUIPMENT DECONTAMINATION

SOP NO. 002

REVISION NO. 2

Last Reviewed: December 1999

KRiesing

Quality Assurance Approved

February 2, 1993

Date

1.0 BACKGROUND

All nondisposable field equipment must be decontaminated before and after each use at each sampling location to obtain representative samples and to reduce the possibility of cross-contamination.

1.1 PURPOSE

This standard operating procedure (SOP) establishes the requirements and procedures for decontaminating equipment in the field.

1.2 SCOPE

This SOP applies to decontaminating general nondisposable field equipment. To prevent contamination of samples, all sampling equipment must be thoroughly cleaned prior to each use.

1.3 DEFINITIONS

Alconox: Nonphosphate soap

1.4 REFERENCES

U.S. Environmental Protection Agency (EPA). 1992. “RCRA Ground-Water Monitoring: Draft Technical Guidance. Office of Solid Waste. Washington, DC. EPA/530-R-93-001. November.

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1.5 REQUIREMENTS AND RESOURCES

The equipment required to conduct decontamination is as follows:

- Scrub brushes
- Large wash tubs or buckets
- Squirt bottles

- Alconox
- Tap water
- Distilled water
- Plastic sheeting
- Aluminum foil
- Methanol or hexane
- Dilute (0.1 N) nitric acid

2.0 PROCEDURE

The procedures below discuss decontamination of personal protective equipment (PPE), drilling and monitoring well installation equipment, borehole soil sampling equipment, water level measurement equipment, and general sampling equipment.

2.1 PERSONAL PROTECTIVE EQUIPMENT DECONTAMINATION

Personnel working in the field are required to follow specific procedures for decontamination prior to leaving the work area so that contamination is not spread off-site or to clean areas. All used disposable protective clothing, such as Tyvek coveralls, gloves, and booties, will be containerized for later disposal. Decontamination water will be containerized in 55-gallon drums.

Personnel decontamination procedures will be as follows:

1. Wash neoprene boots (or neoprene boots with disposable booties) with Liquinox or Alconox solution and rinse with clean water. Remove booties and retain boots for subsequent reuse.

2. Wash outer gloves in Liquinox or Alconox solution and rinse in clean water. Remove outer gloves and place into plastic bag for disposal.

3. Remove Tyvek or coveralls. Containerize Tyvek for disposal and place coveralls in plastic bag for reuse.

4. Remove air purifying respirator (APR), if used, and place the spent filters into a plastic bag for disposal. Filters should be changed daily or sooner depending on use and application. Place respirator into a separate plastic bag after cleaning and disinfecting.

5. Remove disposable gloves and place them in plastic bag for disposal.

6. Thoroughly wash hands and face in clean water and soap.

2.2 DRILLING AND MONITORING WELL INSTALLATION EQUIPMENT DECONTAMINATION

All drilling equipment should be decontaminated at a designated location on-site before drilling operations begin, between borings, and at completion of the project.

Monitoring well casing, screens, and fittings are assumed to be delivered to the site in a clean condition. However, they should be steam cleaned on-site prior to placement downhole. The drilling subcontractor will typically furnish the steam cleaner and water.

After cleaning the drilling equipment, field personnel should place the drilling equipment, well casing and screens, and any other equipment that will go into the hole on clean polyethylene sheeting.

The drilling auger, bits, drill pipe, temporary casing, surface casing, and other equipment should be decontaminated by the drilling subcontractor by hosing down with a steam cleaner until thoroughly clean. Drill bits and tools that still exhibit particles of soil after the first washing should be scrubbed with a wire brush and then rinsed again with a high-pressure steam rinse.

All wastewater from decontamination procedures should be containerized.

2.3 BOREHOLE SOIL SAMPLING EQUIPMENT DECONTAMINATION

The soil sampling equipment should be decontaminated after each sample as follows:

1. Prior to sampling, scrub the split-barrel sampler and sampling tools in a bucket using a stiff, long bristle brush and Liquinox or Alconox solution.
2. Steam clean the sampling equipment over the rinsate tub and allow to air dry.
3. Place cleaned equipment in a clean area on plastic sheeting and wrap with aluminum foil.
4. Containerize all water and rinsate.

5. Decontaminate all pipe placed down the hole as described for drilling equipment.

2.4 WATER LEVEL MEASUREMENT EQUIPMENT DECONTAMINATION

Field personnel should decontaminate the well sounder and interface probe before inserting and after removing them from each well. The following decontamination procedures should be used:

1. Wipe the sounding cable with a disposable soap-impregnated cloth or paper towel.
2. Rinse with deionized organic-free water.

2.5 GENERAL SAMPLING EQUIPMENT DECONTAMINATION

All nondisposable sampling equipment should be decontaminated using the following procedures:

1. Select an area removed from sampling locations that is both downwind and downgradient. Decontamination must not cause cross-contamination between sampling points.
2. Maintain the same level of protection as was used for sampling.
3. To decontaminate a piece of equipment, use an Alconox wash; a tap water wash; a solvent (methanol or hexane) rinse, if applicable or dilute (0.1 N) nitric acid rinse, if applicable; a distilled water rinse; and air drying. Use a solvent (methanol or hexane) rinse for grossly contaminated equipment (for example, equipment that is not readily cleaned by the Alconox wash). The dilute nitric acid rinse may be used if metals are the analyte of concern.
4. Place cleaned equipment in a clean area on plastic sheeting and wrap with aluminum foil.
5. Containerize all water and rinsate.

SOP APPROVAL FORM

TETRA TECH EM INC.

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

SOIL SAMPLING

SOP NO. 005

REVISION NO. 1

Last Reviewed: December 1999

R Riesing	*March 23, 1992*
Quality Assurance Approved	Date

1.0 BACKGROUND

Soil sampling is conducted for three main reasons. First, samples can be obtained for laboratory chemical analysis. Second, samples can be obtained for laboratory physical analysis. Third, samples can be obtained for visual classification and field screening. These three sampling objectives can be achieved separately or in combination with each other. Sampling locations are typically chosen to provide chemical, physical, or visual information in both the horizontal and vertical directions. A sampling and analysis plan is used to outline sampling methods and provide preliminary rationale for sampling locations. Sampling locations may be adjusted in the field based on the screening methods being used and the physical features of the area.

1.1 PURPOSE

Soil sampling is conducted to determine the chemical, physical, and visual characteristics of surface and subsurface soils.

1.2 SCOPE

This standard operating procedure (SOP) describes procedures for soil sampling in different areas using various implements. It includes procedures for test pit, surface soil, and subsurface soil sampling, and describes eight devices.

1.3 DEFINITIONS

Hand auger: Instrument attached to the bottom of a length of pipe that has a crossarm or “T” handle at the top. The auger can be closed-spiral or open-spiral.

Bucket auger: A type of auger that consists of a cylindrical bucket 10 to 72 inches in diameter with teeth arranged at the bottom.

Core sampler: Thin-wall cylindrical metal tube with diameter of 0.5 to 3 inches, a tapered nosepiece, a "T" handle to facilitate sampler deployment and retrieval, and a check valve (flutter valve) in the headpiece.

Spatulas or Spoons: Stainless steel instruments for collecting loose unconsolidated material.

Trier: Tube cut in half lengthwise with a sharpened tip that allows for collection of sticky solids or loosening of cohesive soils.

Trowel: Tool with a scooped blade 4 to 8 inches long and 2 to 3 inches wide with a handle.

Split-Spoon (or Split-Barrel) Sampler: Thick-walled steel tube that is split lengthwise. A cutting shoe is attached to the lower end; the upper end contains a check valve and is connected to drill rods.

Thin-Wall Tube Sampler: Steel tube (1 to 3 millimeters thick) with tapered bottom edge for cutting. The upper end is fastened to a check valve that is attached to drill rods.

1.4 REFERENCES

Barth, D.S., and B.J. Mason. 1984. "Soil Sampling Quality Assurance Users Guide." EPA 600/4-84-043.

DeVara, E.R., B.P. Simmons, R.D. Stephens, and D.L. Storm. 1980. "Samplers and Sampling Procedures for Hazardous Waste Streams." EPA 600/2-80-018. January.

Mason, B.J. 1983. "Preparation of Soil Sampling Protocol: Techniques and Strategies." EPA 600/4-83-020.

U.S. Environmental Protection Agency (EPA). 1987. "A Compendium of Superfund Field Operations Methods." OSWER Directive 9355.0-14 (EPA/540/P-87/001).

EPA. 1991. "Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells." March. EPA/600/4-89/034.

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1.5 REQUIREMENTS AND RESOURCES

Soil sampling requires that one or more of the following types of equipment be used:

Sampling Equipment	Other Required Equipment
Spoons and spatulas	Sample containers, labels, and chain-of-custody forms
Trowel	Logbook
Shovel or spade	Tape for measuring recovery
Trier	Soil classification information
Core sampler	Wax for sealing ends of thin-wall tube
Hand auger	Plastic sheeting
Bucket auger	Decontamination equipment
Split-spoon	Drilling equipment
Thin-wall tube	Backhoe
	Health and safety equipment

2.0 PROCEDURES

This SOP presents procedures for conducting test pit, surface soil, and subsurface soil sampling. The site sampling plan will specify which of the following procedures will be used.

Soil samples for chemical analysis should be collected in the following order: (1) volatile organics, (2) semivolatile organics, and (3) metals. Once the chemical samples have been containerized, samples for physical analyses can be containerized. Typical physical analyses conducted include (1) grain size distribution, (2) moisture content, (3) saturated permeability, (4) unsaturated permeability, and (5) Atterberg limits. Additionally, visual descriptions of samples, using the Unified Soil Classification System (USCS), should be recorded. Field tests such as head space analyses can also be conducted.

Soil samples for chemical analyses can be collected either as grab samples or composite samples. A grab sample is collected from a discrete location or depth. A composite sample consists of soil combined from more than one discrete location. Typically, composite samples consist of soil obtained from several locations and homogenized in a stainless steel or Teflon® pan or tray. Samples for volatile organic analysis (VOA) should not be composited.

2.1 TEST PIT SOIL SAMPLING

Test pit soil sampling is conducted when a complete soil profile is required or as a means of locating visually detectable contamination. This type of sampling provides a detailed description of the soil profile and allows for multiple samples to be collected from specific soil horizons. Prior to conducting any test pit or trench excavation with a backhoe, the sampling team should ensure that the sampling area is clear of utility lines, subsurface pipes, and poles.

A test pit or trench is excavated by incrementally removing soil material with a backhoe bucket. The excavated soil is placed on plastic sheeting well away from the edge of the test pit. A test pit should not be excavated to depths greater than 4 feet unless its walls are properly stabilized.

Personnel entering the test pit may be exposed to toxic or explosive gases and oxygen deficient environments. Air monitoring is required before entering the test pit and the use of appropriate respiratory gear and protective clothing is mandatory. At least two persons must be present at the test pit before sampling personnel enter the excavation and begin soil sampling.

Test pits are not practical for depths greater than 15 feet. If soil samples are required from depths greater than 15 feet, samples should be obtained using test borings instead of test pits. Test pits are also usually limited to a few feet below the water table. In some cases, a pumping system may be required to control the water level within the pits.

Access to open test pits should be restricted by use of flagging, tape, or fencing. If a fence is used, it should be erected at least 6 feet from the perimeter of the test pit. The test pit should be backfilled as soon as possible after sampling is completed.

Soil samples can be collected from the walls or bottom of a test pit using various equipment. A hand auger, bucket auger, or core sampler can be used to obtain samples from various depths. A trier, trowel, or spoons can be used to obtain samples from the walls or pit bottom surface.

2.2 SURFACE SOIL SAMPLING

The surface soil sampling equipment presented in this SOP is best suited for sampling to depths of 0 to 6 feet below ground surface (bgs). The sample depth, sample analyses, soil type, and soil moisture will also dictate the best suited sampling equipment. Prior to sample collection, the sampling locations should be cleared of any surface debris such as twigs, rocks, and litter. The following table presents various surface soil sampling equipment and their effective depth ranges, operating means (manual or power), and sample types collected (disturbed or undisturbed).

Sampling Equipment	Effective Depth Range (feet bgs)	Operating Means	Sample Type
Hand Auger	0 to 6	Manual	Disturbed
Bucket Auger	0 to 4	Power	Disturbed
Core Sampler	0 to 4	Manual or Power	Undisturbed
Shovel	0 to 6	Manual	Disturbed
Trier	0 to 1	Manual	Disturbed
Trowel	0 to 1	Manual	Disturbed
Spoon/Spatula	0 to 0.5	Manual	Disturbed

The procedures for using these various types of sampling equipment are discussed below.

2.2.1 Hand Auger

A hand auger equipped with extensions and a “T” handle is used to obtain samples from a depth of up to 6 feet. If necessary, a shovel may be used to excavate the topsoil to reach the desired subsoil level. If topsoil is removed, its thickness should be recorded. Samples obtained using a hand auger are disturbed in their collection; determining the exact depth at which samples are obtained is difficult.

The hand auger is screwed into the soil at an angle of 45 to 90 degrees from horizontal. When the entire auger blade has penetrated soil, the auger is removed from the soil by lifting it straight up without turning it, if possible. If the desired sampling depth has not been reached, the soil is removed from the auger and deposited onto plastic sheeting. This procedure is repeated until the desired depth is reached and the soil sample is obtained. The auger is then removed from the boring and the soil sample is collected directly from the auger into an appropriate sample container.

2.2.2 Bucket Auger

A bucket auger, equipped similarly as the hand auger, is used to obtain disturbed samples from a depth of up to 4 feet. A bucket auger should be used when sampling stony or dense soil that prohibits the use of a hand-operated core or screw auger. A bucket auger with closed blades is used in soil that cannot generally be penetrated or retrieved by a core sampler.

The bucket auger is rotated while downward pressure is exerted until the bucket is full. The bucket is then removed from the boring, the collected soil is placed on plastic sheeting, and this procedure is repeated until the appropriate depth is reached and a sample is obtained. The bucket is then removed from the boring and the soil sample is transferred from the bucket to an appropriate sample container.

2.2.3 Core Sampler

A hand-operated core sampler (Figure 1), similarly equipped as the hand auger, is used to obtain samples from a depth of up to 4 feet in uncompacted soil. The core sampler is capable of retrieving undisturbed soil samples and is appropriate when low concentrations of metals or organics are of concern. The core sampler should be constructed of stainless steel. A polypropylene core sampler is generally not suitable for sampling dense soils or sampling at an appreciable depth.

The core sampler is pressed into the soil at an angle of 45 to 90 degrees from horizontal and is rotated when the desired depth is reached. The core is then removed, and the sample is placed into an appropriate sample container.

2.2.4 Shovel

A shovel may be used to obtain large quantities of soil that are not readily obtained with a trowel. A shovel is used when soil samples from a depth of up to 6 feet are to be collected by hand excavation; a tiling spade (sharpshooter) is recommended for excavation and sampling. A standard steel shovel may be used for excavation; either a stainless steel or polypropylene shovel may be used for sampling. Soil excavated from above the desired sampling depth should be stockpiled on plastic sheeting. Soil samples should be collected from the shovel and placed into the sample container using a stainless-steel scoop, plastic spoon, or other appropriate tool.

2.2.5 Trier

A trier (Figure 2) is used to sample soil from a depth of up to 1 foot. A trier should be made of stainless steel or polypropylene. A chrome-plated steel trier may be suitable when samples are to be analyzed for organics and heavy metal content is not a concern.

Samples are obtained by inserting the trier into soil at an angle of up to 45 degrees from horizontal. The trier is rotated to cut a core and is then pulled from the soil being sampled. The sample is then transferred to an appropriate sample container.

2.2.6 Trowel

A trowel is used to obtain surface soil samples that do not require excavation beyond a depth of 1 foot. A trowel may also be used to collect soil subsamples from profiles exposed in test pits. Use of a trowel is practical when sample volumes of approximately 1 pint (0.5 liter) or less are to be obtained. Excess soil should be placed on plastic sheeting until sampling is completed. A trowel should be made of stainless steel or galvanized steel. It can be purchased from a hardware or garden store. Soil samples to be analyzed for organics should be collected using a stainless steel trowel. Samples may be placed directly from the trowel into sample containers.

2.3 SUBSURFACE SOIL SAMPLING

Subsurface soil sampling, in conjunction with borehole drilling, is required for soil sampling from depths greater than approximately 6 feet. Subsurface soil sampling is frequently coupled with exploratory boreholes or monitoring well installation. Refer to SOP Nos. 045, 046, and 047 (borehole drilling SOPs) and SOP No. 020 (Monitoring Well Installation).

Subsurface soil sampling may be conducted using a drilling rig or power auger. Selection of sampling equipment depends upon geologic conditions and the scope of the sampling program. Two types of samplers used with machine-driven augers—the split-spoon sampler and the thin-wall tube sampler—are discussed below. All sampling tools should be cleaned before and after each use in accordance with SOP No. 002 (General Equipment Decontamination). Both the split-spoon sampler and the thin-wall tube sampler can be used to collect undisturbed samples from unconsolidated soils. The procedures for using the split-spoon and thin-wall tube samplers are presented below.

2.3.1 Split-Spoon Sampler

Split-spoon samplers are available in a variety of types and sizes. Site conditions and project needs such as large sample volume for multiple analyses determine the specific type of split-spoon sampler to be used. Figure 3 shows a generic split-spoon sampler.

The split-spoon sampler is advanced into the undisturbed soil beneath the bottom of the casing or borehole using a weighted hammer and a drill rod. The relationship between hammer weight, hammer drop, and number of blows required to advance the split-spoon sampler in 6-inch increments indicates the density or consistency of the subsurface soil. After the split-spoon sampler has been driven to its intended depth, it should be removed carefully to avoid loss of sample material. In noncohesive or saturated soil, a catcher or basket should be used to help retain the sample.

After the split-spoon sampler is removed from the casing, it is detached from the drill rod and opened. If VOA samples are to be collected, VOA vials should be filled with soil taken directly from the split-spoon sampler. Samples for other specific chemical analyses should be taken as soon as the VOA sample has been collected. The remainder of the recovered soil can then be used for visual classification of the sample and containerized for physical analysis. The entire sample (except for the top several inches of possibly disturbed material) is retained for analysis or disposal.

2.3.2 Thin-Wall Tube Sampler

A thin-wall tube sampler, sometimes called the Shelby tube (Figure 4), may be pressed or driven into soil inside a hollow-stem auger flight, wash bore casing, or uncased borehole. The tube sampler is pressed into the soil without rotation to the desired depth or until refusal. If the tube cannot be advanced by pushing, it may be necessary to drive it into the soil without rotation using a hammer and drill rod. The tube sampler is then rotated to collect the sample from the soil and removed from the borehole.

After removal of the tube sampler from the drilling equipment, the tube sampler should be inspected for adequate sample recovery. The sampling procedure should be repeated until an adequate soil core is obtained (if sample material can be retained by the tube sampler). The soil core obtained should be documented in the logbook. Any disturbed soil is removed from each end of the tube sampler. If chemical analysis is required, VOA samples must be collected immediately after the tube sampler is withdrawn. Before use, and during storage and transport, the tube sampler should be capped with a nonreactive material. For physical sampling parameters, the tube sampler should be sealed by pouring three 0.25-inch layers of sealing liquid (such as wax) in each end, allowing each layer to solidify before applying the next. The remaining space at each end of the tube is filled with Ottawa sand or other, similar sand, which is allowed to settle and compact. Plastic caps are then taped over the ends of the tube. The top and bottom of the tube sampler should be labeled and the tube sampler should be stored accordingly.

FIGURE 1

HAND-OPERATED CORE SAMPLER

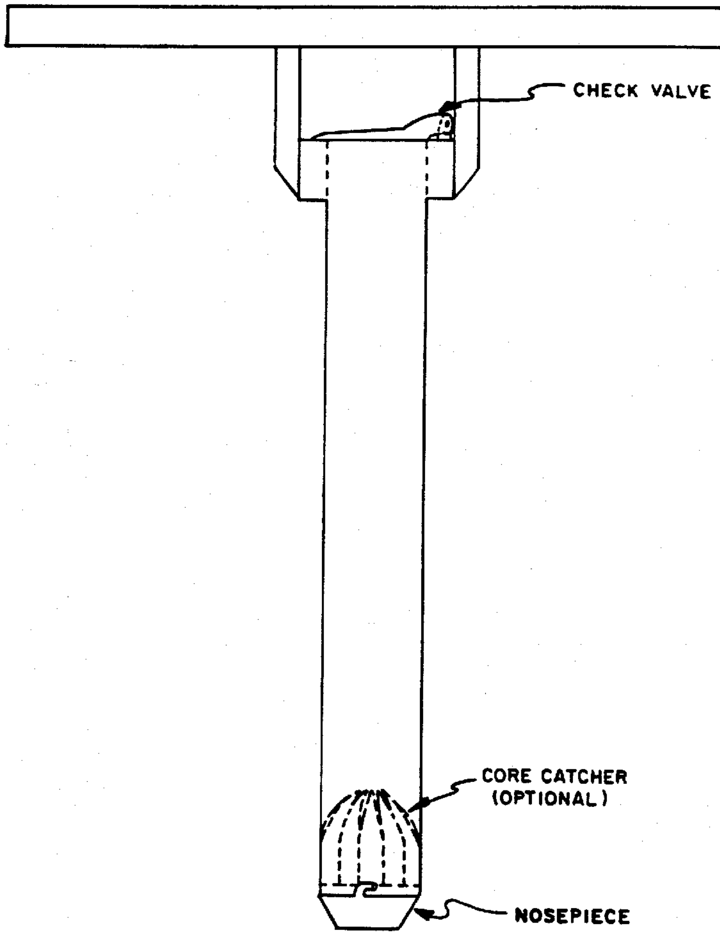


FIGURE 2

TRIER

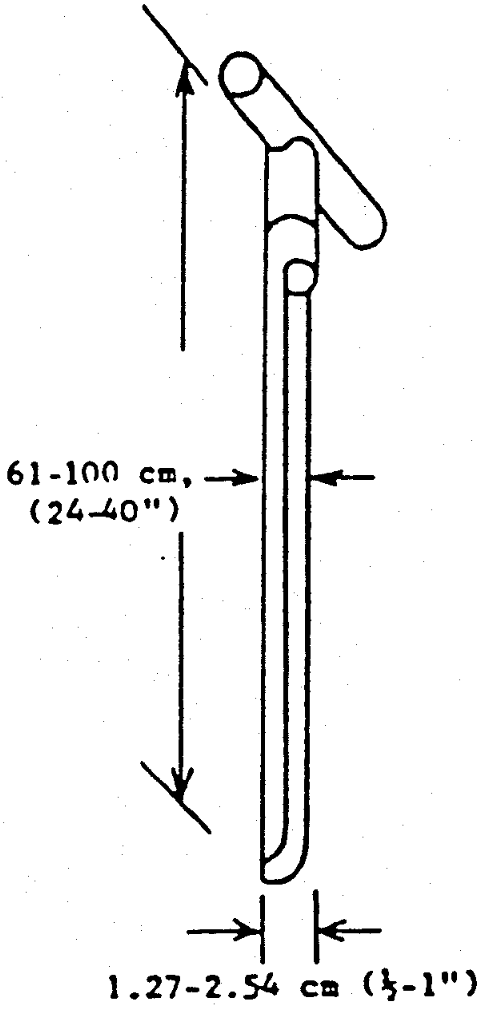


FIGURE 3

GENERIC SPLIT-SPOON SAMPLER

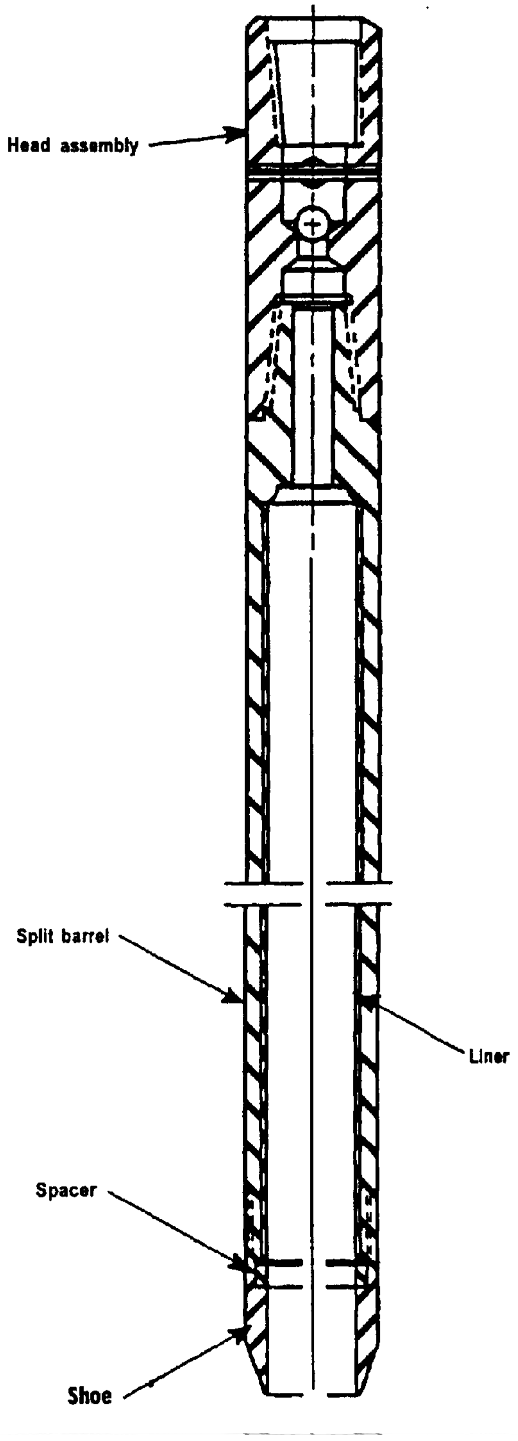
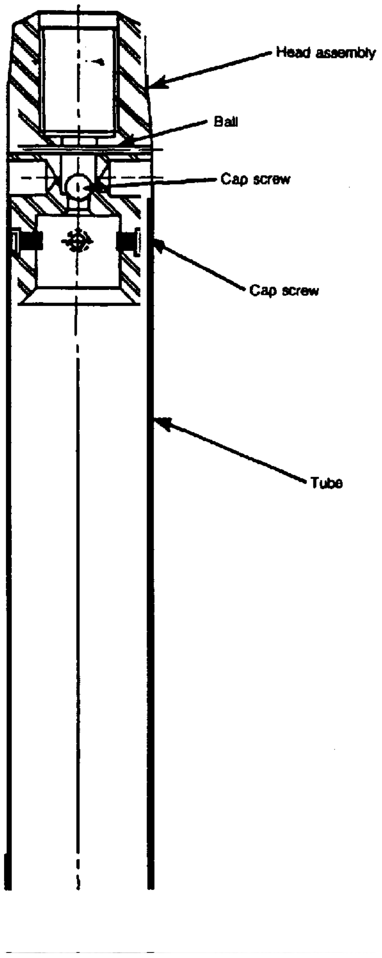


FIGURE 4

THIN-WALL TUBE SAMPLER



SOP APPROVAL FORM

TETRA TECH EM INC.

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

GROUNDWATER SAMPLE COLLECTION USING MICROPURGE TECHNOLOGY

SOP NO. 015

REVISION NO. 0

Last Reviewed: January 2000

RRiesing

Quality Assurance Approved

April 7, 1998

Date

1.0 BACKGROUND

Groundwater sample collection is an integral part of site characterization at many contaminant release investigation sites. Often, a requirement of groundwater contaminant investigation is to evaluate contaminant concentrations in the aquifer. Since data quality objectives of most investigations require a laboratory setting for chemical analysis, samples must be collected from the aquifer and submitted to a laboratory for analysis. Therefore, sample collection and handling must be conducted in a manner that minimizes alteration of chemical characteristics of the groundwater.

In the past, most sample collection techniques followed federal and state guidance. Acceptable protocol included removal of water in the casing of a monitoring well (purging), followed by sample collection. The water in the casing was removed so groundwater from the formation could flow into the casing and be available for sample collection. Sample collection was commonly completed with a bailer, bladder pump, controlled flow impeller pump, or peristaltic pump. Samples were preserved during collection. Often, samples to be analyzed for metals contamination were filtered through a 0.45-micron filter prior to preservation and placement into the sample container.

Research conducted by several investigators has demonstrated that a significant component of contaminant transport occurs while the contaminant is sorbed onto colloid particles. Colloid mobility in an aquifer is a complex, aquifer-specific transport issue, and its description is beyond the scope of this Standard Operating Procedure (SOP). However, concentrations of suspended colloids have been measured during steady state conditions and during purging activities. Investigation results indicate standard purging procedures can cause a significant increase in colloid concentrations, which in turn may bias analytical results.

Micropurge sample collection provides a method of minimizing increased colloid mobilization by removing water from the well at the screened interval at a rate that preserves or minimally disrupts steady-state flow conditions in the aquifer. During micropurge sampling, groundwater is discharged from the aquifer at a rate that the aquifer will yield without creating a cone of depression around the sampled well. Research indicates that colloid mobilization will not increase above steady-state conditions during low-flow discharge. Therefore, the collected sample is more likely to represent steady-state groundwater chemistry.

1.1 PURPOSE

The purpose of this SOP is to describe the procedures to be used to collect a groundwater sample from a well using the micropurge technology. The following sections describe the equipment to be used and the methods to be followed to promote uniform sample collection techniques by field personnel that are experienced in sample collection and handling for environmental investigations.

1.2 SCOPE

This SOP applies to groundwater sampling using the micropurge technology. It is intended to be used as an alternate SOP to the general "Groundwater Sampling" SOP (SOP No. 10) that provides guidance for the general aspects of groundwater sampling.

1.3 DEFINITIONS

Colloid: Suspended particles that range in diameter from 5 nanometers to 0.2 micrometers.

Dissolved oxygen: The ratio of the concentration or mass of oxygen in water relative to the partial pressure of gaseous oxygen above the liquid which is a function of temperature, pressure, and concentration of other solutes.

Flow-through cell: A device connected to the discharge line of a groundwater purge pump that allows regular or continuous measurement of selected parameters of the water and minimizes contact between the water and air.

pH: The negative base-10 log of the hydrogen-ion activity in moles per liter.

Reduction and oxidation potential: A numerical index of the intensity of oxidizing or reducing conditions within a system, with the hydrogen-electrode potential serving as a reference point of zero volts.

Specific conductance: The reciprocal of the resistance in ohms measured between opposite faces of a centimeter cube of aqueous solution at a specified temperature.

Turbidity: A measurement of the suspended particles in a liquid that have the ability to reflect or refract part of the visible portion of the light spectrum.

1.4 REFERENCES

Puls, R. W. and M. J. Barcelona. 1996. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. U.S. Environmental Protection Agency. Office of Research and Development. EPA/540/S-95/504. April.

1.5 REQUIREMENTS AND RESOURCES

The following equipment is required to complete micropurge sample collection :

- Water level indicator
- Adjustable flow rate pump (bladder, piston, peristaltic, or impeller)
- Discharge flow controller
- Flow-through cell
- pH probe
- Dissolved oxygen (DO) probe
- Turbidity meter
- Oxidation and reduction (Redox or Eh) probe
- Specific conductance (SC) probe (optional)
- Temperature probe (optional)
- Meter to display data for the probes
- Calibration solutions for pH, SC, turbidity, and DO probes, as necessary
- Container of known volume for flow measurement or calibrated flow meter
- Data recording and management system

2.0 PROCEDURE

The following procedures and criteria were modified from the U. S. Environmental Protection Agency guidance titled “Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures” (Puls and Barcelona 1996). This reference may be consulted for a more detailed description of micropurge sampling theory.

Micropurging is most commonly accomplished with low-discharge rate pumps, such as bladder pumps, piston pumps, controlled velocity impeller pumps, or peristaltic pumps. Bailers and high capacity submersible pumps are not considered acceptable micropurge sample collection devices. The purged water is monitored (in a flow-through cell or other constituent monitoring device) for chemical and optical parameters that indicate steady state flow conditions between the sample extraction point and the aquifer. Samples are collected when steady state conditions are indicated.

Groundwater discharge equipment may be permanently installed in the monitoring well as a dedicated system, or it can be installed in each well as needed. Most investigators agree that dedicated systems will provide the best opportunity for collecting samples most representative of steady state aquifer conditions, but the scope of a particular investigation and available investigation funds will dictate equipment selection.

2.1 EQUIPMENT CALIBRATION

Prior to sample collection, the monitoring equipment used to measure pH, Eh, DO, turbidity, and SC should be calibrated or checked according to manufacturer’s directions. Typically, calibration activities are completed at the field office at the beginning of sampling activities each day. The pH meter calibration should bracket the pH range of the wells to be sampled (acidic to neutral pH range [4.00 to 7.00] or neutral to basic pH range [7.00 to 10.00]). The DO meter should be calibrated to one point (air-saturated water) or two points (air-saturated water and water devoid of all oxygen). The SC meter cannot be calibrated in the field. It is checked against a known standard (typical standards are 1, 10, and 50 millimhos per centimeter at 25 EC). The offset of the measured value of the calibration standard can be used as a correction value. Similarly, the Eh probe cannot be calibrated in the field, but is checked against a known standard, such as Zobell solution. The instrument should display a millivolt (mv) value that falls within the range set by the manufacturer. Because Eh is temperature dependent, the measured value should be corrected for site-specific variance from standard temperature (25 EC). The Eh probe should be replaced if the reading is not within the manufacturer's specified range. All calibration data should be recorded on the Micropurging Groundwater Sampling Data Sheet attached to this SOP or in a logbook.

2.2 WELL PURGING

The well to be sampled should be opened and groundwater in the well allowed to equilibrate to atmospheric pressure. Equilibration should be determined by measuring depth to water below the marked reference on the wellhead (typically the top of the well casing) over two or more 5-minute intervals. Equilibrium conditions exist when the measured depth to water varies by less than 0.01 foot over two consecutive readings. Total depth of well measurement should be made following sample collection, unless the datum is required to place nondedicated sample collection equipment. Depth to water and total well depth measurements should be made in accordance with procedures outlined in SOP No. 014 (Static Water Level, Total Well Depth, and Immiscible Layer Measurement).

If the well does not have a dedicated sample collection device, a new or previously decontaminated portable sample collection device should be placed within the well. The intake of the device should be positioned at the midpoint of the well screen interval. The device should be installed slowly to minimize turbulence within the water in the casing and mixing of stagnant water above the screened interval with water in the screened interval. Following installation, the flow controller should be connected to the sample collection device and the flow-through cell connected to the outlet of the sample collection device. The calibrated groundwater chemistry monitoring probes should be installed in the flow-through cell. If a flow meter is used, it should be installed ahead of the flow-through cell.

If the well has a dedicated sample collection device, the controller for the sample collection device should be connected to the sample collection device. The flow meter and flow-through cell should be connected in line to the discharge tube, and the probes installed in the flow-through cell.

The controller should be activated and groundwater extracted (purged) from the well. The purge rate should be monitored, and should not exceed the capacity of the well. The well capacity is defined as the maximum discharge rate that can be obtained with less than 0.1 meter (0.3 foot) drawdown. Typically, the discharge rate will be less than 0.5 liters per minute (L/min) (0.13 gallons per minute). The maximum purge rate should not exceed 1 L/min (0.25 gallons per minute), and should be adjusted to achieve minimal drawdown.

Water levels, effluent chemistry, and effluent flow rate should be continuously monitored while purging the well. Purging should continue until the measured chemical and optical parameters are stable. Stable parameters are defined as monitored chemistry values that do not fluctuate by more than the following ranges over three successive readings at 3-minute intervals: ±0.1 pH unit; ±3 percent for SC; ±10 mv for Eh; and ±10 percent for turbidity and DO. Purging will continue until these stabilization criteria have been met or three well casing volumes have been purged. If three casing volumes of water have been purged and the stabilization criteria have not been met, a comment should be made on the data sheet that sample collection began after three well casing volumes were purged. The final pH, SC, Eh, turbidity, and DO values will be recorded. All data should be recorded on the Micropurging Groundwater Sampling Data Sheet attached to this SOP or in a logbook.

2.3 SAMPLE COLLECTION

Following purging, the flow through cell shall be disconnected, and groundwater samples collected directly from the discharge line. Discharge rates should be adjusted so that groundwater is dispensed into the sample container with minimal aeration of the sample. Samples collected for volatile organic compound analysis should be dispensed into the sample container at a flow rate equal to or less than 100 milliliters per minute. Samples should be preserved and handled as described in the investigation field sampling plan or quality assurance project plan.

Tetra Tech EM Inc.

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page ____ of ____
Date __________

Well Name ____________________
Project ____________________
Project No. ____________________
Well Location ____________________
Sample Date ____________________
Sampling Personnel ____________________
____
____
Sample ID ____________________
Duplicate ID ____________________

Screen Interval ____________________
Station Elevation ________ GND ____ TOC ______
Static Water Level (from TOC) ____________
Well Stick Up ____________________
Static Elevation ____________________
Well Depth __________ MEAS ____ RPTD _____
Feet of Water ____________________
Gallons/Foot ____________________
Casing Volume ____________________

Immiscible Phases Present ☐ Yes ☐ No
Type ____________________
Measured with ____________________
PID Readings (background) ____________
PID Reading (TOC) ____________________
Wells Installed by ____________________
Installation Date ____________________
Development Date(s) ____________________

FIELD CHEMISTRY CALIBRATIONS

Date/Time ____________________ Spec. Conductance: Standard ________ µmhos/cm at 25EC Reading ________ µmhos/cm at _____EC
pH: pH 4.00 - _______ at ________ EC pH 7.00 - _______ at ________ EC pH 10.00 - ______ at _______ EC Slope ______________
Dissolved Oxygen: D.O. Meter _______ mg/L at _______EC PID: Calibration Gas __________ PPM ______ Span ______ Reading __________

PURGING

Time	Discharge Rate (mL/min)	Dissolved Oxygen (mg/L)	pH	Eh/ORP (mV)	Temp. (EC)	Specific Conduct. (µmhos/cm at EC)	Turbidity (NTU)	Cumulative Volume of Water Removed (Purged)		PID/OVA Reading		Depth to Water (ft)	Comments
								Gallons	Casing Vol.	Location	Value		

SAMPLE PARAMETERS

Condition of well: ____
Remarks: ____

FIELD EQUIPMENT

pH Meter ____________________ Serial Number ____________________
Spec. Cond. Meter ____________________ Serial Number ____________________
Pump ____________________ Serial Number ____________________
Water Level Meter ____________________ Serial Number ____________________
D.O. Meter ____________________ Serial Number ____________________
Filter Apparatus ____________________ Filters ____________________
Temperature Measure ____
Interface Probe ____________________ Serial Number ____________________
PID/OVA ____________________ Serial Number ____________________

Field Chemistry Calibrations

Fractions ____________________
____
____
Number of Bottles ____________________
Sample Depth ____________________
Field Notebook ____________________
Sample Method ____________________
____
Discharge Water Containerized ☐ Yes ☐ No

SOP APPROVAL FORM

TETRA TECH EM INC.

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

RECORDING OF NOTES IN FIELD LOGBOOK

SOP NO. 024

REVISION NO. 1

Last Reviewed: November 1999

RRiesing

Quality Assurance Approved

May 18, 1993

Date

1.0 BACKGROUND

The field logbook should contain detailed records of all the field activities, interviews of people, and observations of conditions at a site. Entries should be described in as much detail as possible, so that personnel can accurately reconstruct the activities and events which have taken place during field assignments. Field logbooks are considered accountable documents in enforcement proceedings and may be subject to review. Therefore, the entries in the logbook must be accurate, detailed, and reflect the importance of the field events.

1.1 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide guidance to ensure that logbook documentation for any field activity is correct, complete, and adequate. Logbooks are used for identifying, locating, labeling, and tracking samples. A logbook should document any deviations from the project approach, work plans, quality assurance project plans, health and safety plans, sampling plans, and any changes in project personnel. They also serve as documentation of any photographs taken during the course of the project. In addition, the data recorded in the logbook may assist in the interpretation of analytical results. A complete and accurate logbook also aids in maintaining good quality control. Quality control is enhanced by the proper documentation of all observations, activities, and decisions.

1.2 SCOPE

This SOP establishes the general requirements and procedures for recording notes in the field logbook.

1.3 DEFINITIONS

None

1.4 REFERENCES

Compton, R.R. 1985. *Geology in the Field*. John Wiley and Sons. New York, N.Y.

1.5 REQUIREMENTS AND RESOURCES

The following items are required for field notation:

- Field logbooks
- Ballpoint pens with permanent ink
- 6-inch ruler (optional)

Field logbooks should be bound (sewn) with water resistant and acid-proof covers; they should have preprinted lines and wide columns. They should be approximately 7 1/2 by 4 1/2 inches or 8 1/2 by 11 inches in size. Loose-leaf sheets are not acceptable for field notes. If notes are taken on loose paper, they must be transcribed as soon as possible into a regular field logbook by the same person who took the notes.

Logbooks can be obtained through the Document Control Administrator (DCA) for each office. The DCA will have assigned each logbook an identification number. The DCA will make sure the pages in the logbooks are preprinted with consecutive numbers or are consecutively numbered by hand. If the numbers are written by hand, then numbers should be circled so that they are not confused with data.

2.0 PROCEDURES

The following subsections provide general guidelines and formatting requirements for field logbooks and detailed procedures for completing field logbooks.

2.1 GENERAL GUIDELINES

- A separate field logbook must be maintained for each project. If a site consists of multiple subsites, designate a separate logbook for each subsite. For special tasks, such as periodic well water-level measurements, data from multiple subsites may be entered into one logbook which contains only one type of information.

- All logbooks must be bound and contain consecutively numbered pages.

- No pages can be removed from the logbook for any purpose.

- All field activities, meetings, photographs, and names of personnel must be recorded in the site logbook.

- All logbooks pertaining to a site or subsite should be assigned a serial number based on the date the logbook is issued to the project manager. The first logbook should be assigned number 1, the next logbook issued assigned number 2, and so on. The project manager is to maintain a record of all logbooks issued under the project.

- All information must be entered with a ballpoint pen with waterproof ink. Do not use pens with "wet ink," because the ink may wash out if the paper gets wet. Pencils are not permissible for field notes because information can be erased. The entries should be written dark enough so that the logbook can be easily photocopied.

- Do not enter information in the logbook that is not related to the project. The language used in the logbook should be factual and objective.

- Begin a new page for each day's notes.

- Write notes on every line of the logbook. If a subject changes and an additional blank space is necessary to make the new subject title standout, skip one line before beginning the new subject. Do not skip any pages or parts of pages unless a day's activity ends in the middle of a page.

- Draw a diagonal line on any blank spaces of four lines or more to prevent unauthorized entries.

2.2 LOGBOOK FORMAT

The layout and organization of each field logbook should be consistent with other field logbooks. Guidelines for the cover, spine, and internal pagination are discussed below.

2.2.1 FORMAT OF FIELD LOGBOOK COVER AND SPINE

Write the following information in clear capital letters on the front cover of each logbook.

- Logbook identification number (assigned by the DCA)

- The serial number of the logbook (assigned by the project manager)

- Name of the site, city, and state

- Name of subsite if applicable
- Type of activity
- Beginning and ending dates of activities entered into the logbook
- "Tetra Tech EM Inc." City and State
- "REWARD IF FOUND"

Some of the information listed above, such as the list of activities and ending dates, should be entered after the entire logbook has been filled or after it has been decided that the remaining blank pages in the logbook will not be filled.

The spine of the logbook should contain an abbreviated version of the information on the cover. For example: "1, Col. Ave., Hastings, 5/88 - 8/88."

2.2.2 First Page of the Field Logbook

Spaces are usually provided on the inside front cover (or the opening page in some logbooks), for the company name ("Tetra Tech EM Inc."), address, and telephone number. If preprinted spaces for this information are not provided in the logbook, write the information on the first available page.

2.3 ENTERING INFORMATION IN THE LOGBOOK

Enter the following information at the beginning of each day or whenever warranted during the course of a day:

- Date
- Starting time
- Specific location
- General weather conditions and approximate temperature

- Names of personnel present at the site. Note the affiliation(s) and designation(s) of all personnel.
- Equipment calibration and equipment models used.
- Changes in instructions or activities at the site.
- Levels of personal protective clothing and equipment.
- A general title of the first task undertaken (for example, well installation at MW-11, decon at borehole BH-11, groundwater sampling at MW-11).
- Provide an approximate scale for all diagrams. If this can't be done, write "not to scale" on the diagram. Indicate the north direction on all maps and cross-sections. Label features on each diagram.
- Corrections should be made by drawing a single line through the entry being corrected. Initial and date any corrections made in the logbook.
- The person recording notes is to initial each page after the last entry. No information will be entered in the area following these initials.
- At the end of the day, the person recording notes is to sign and date the bottom of the last page. Indicate the end of the work day by writing "Left site at (time)." A diagonal line will be drawn across any blank space to the bottom of the page.

The following information should be recorded in the logbook after taking a photograph:

- Time, date, location, direction, and if appropriate, weather conditions
- Description of the subject photographed and the reason for taking the picture
- Sequential number of the photograph and the film roll number (if applicable)
- Name of the photographer

The following information should be entered into the logbook when taking samples:

- Location description
- Names of samplers
- Collection time
- Designation of samples as a grab or composite sample
- Type of sample (water, sediment, soil gas, etc.)

- On-site measurement data (pH, temperature, specific conductivity)
- Field observations (odors, colors, weather, etc.)
- Preliminary sample description
- Type of preservative used
- Instrument readings

2.4 PRECAUTIONS

Custody of field logbooks must be maintained at all times. Field personnel must keep the logbooks in a secure place (locked car, trailer, or field office) when the logbook is not in personal possession. Logbooks are official project documents and must be treated as such.

SOP APPROVAL FORM
Tetra Tech EM, Inc.

STANDARD OPERATING PROCEDURE

SAMPLE PRESERVATION AND MAXIMUM HOLDING TIMES

SOP NO. 016

AVAILABLE UPON REQUEST

SOP APPROVAL FORM

Tetra Tech EM, Inc.

STANDARD OPERATING PROCEDURE

MONITORING WELL DEVELOPMENT

SOP NO. 021

<u>AVAILABLE UPON REQUEST</u>

APPENDIX B

Tetra Tech EM Inc.

BOREHOLE LOG

SHEET _____ OF _______

LOCATION OF BOREHOLE	**JOB NO.:**	**BOREHOLE ID:**
	CLIENT:	**DEPTH TO WATER:**
	SITE:	**LOGGED BY:**
	SUBSITE:	**DRILLING DATE(S):**
	DRILLING CO.:	**DRILLING METHOD:**
	PERSONNEL:	**SAMPLING METHOD:**

SAMPLE INTERVAL			BLOWS/ 6 IN. SAMPLE	TIME	PID READING	LABORATORY ANALYSIS	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
TOP	BOTTOM	RECOVERED							
							1		
							2		
							3		
							4		
							5		
							6		
							7		
							8		
							9		
							0		
							1		
							2		
							3		
							4		
							5		
							6		
							7		
							8		
							9		
							0		

S:\Geosciences Discipline\Field Forms\CAD Files\ BOREHOLE LOG FORM.dwg 02/23/2000 FORDD DN

MONITORING WELL INSTALLATION RECORD

SURFACE COMPLETION

ABOVE GROUND ☐

FLUSH MOUNT ☐

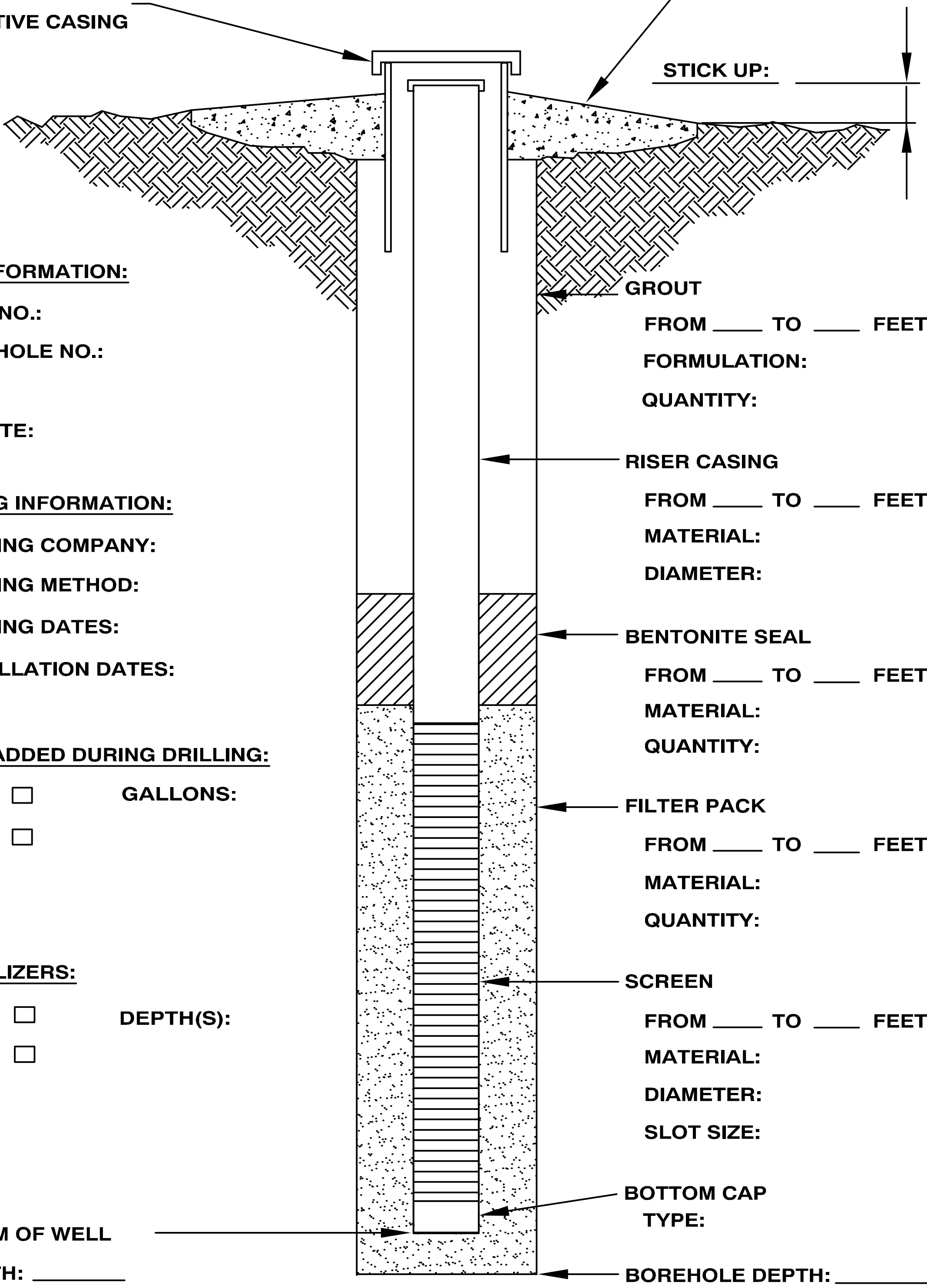
PROTECTIVE CASING

TYPE:

SURFACE SEAL

TYPE:

STICK UP: ________



WELL INFORMATION:

WELL NO.:

BOREHOLE NO.:

SITE:

SUBSITE:

DRILLING INFORMATION:

DRILLING COMPANY:

DRILLING METHOD:

DRILLING DATES:

INSTALLATION DATES:

WATER ADDED DURING DRILLING:

YES ☐ GALLONS:

NO ☐

CENTRALIZERS:

YES ☐ DEPTH(S):

NO ☐

BOTTOM OF WELL

DEPTH: ________

GROUT

FROM ____ TO ____ FEET (BGS)

FORMULATION:

QUANTITY:

RISER CASING

FROM ____ TO ____ FEET (BGS)

MATERIAL:

DIAMETER:

BENTONITE SEAL

FROM ____ TO ____ FEET (BGS)

MATERIAL:

QUANTITY:

FILTER PACK

FROM ____ TO ____ FEET (BGS)

MATERIAL:

QUANTITY:

SCREEN

FROM ____ TO ____ FEET (BGS)

MATERIAL:

DIAMETER:

SLOT SIZE:

BOTTOM CAP

TYPE:

BOREHOLE DEPTH: ____________

BOREHOLE DIAMETER: ________ BACKFILL MATERIAL:

DEPTHS MEASURED IN
FEET BELOW GROUND SURFACE (BGS)

Tetra Tech EM Inc.

S:\Geosciences Discipline\Field Forms\CAD Files\ WELL CONSTRUCTION FORM.dwg 02/23/2000 FORDD DN

Tetra Tech EM Inc.

GROUND WATER SAMPLING DATA SHEET

WELL NAME ______________

PAGE ____ OF ____
DATE ____________

PROJECT ____________________
PROJECT NO. ____________________
WELL LOCATION ____________________
SAMPLE DATE ____________________
SAMPLING PERSONNEL ______________
____
____
SAMPLE ID ____________________
DUPLICATE ID ____________________

STATION ELEVATION ______________ GND ___ TOC ___
STATIC WATER LEVEL (from TOC) ____________________
WELL STICK UP ____________________
STATIC ELEVATION ____________________
WELL DEPTH ______________ MEAS __ RPTD __
FEET OF WATER ______________
GALLONS/FOOT ______________
CASING VOLUME ______________

IMMISCIBLE PHASES PRESENT YES ____ NO ____
TYPE ____________________
MEASURED WITH ____________________
PID READINGS (backgrnd) ______________
PID READINGS (TOC) ______________

FIELD CHEMISTRY CALIBRATIONS

DATE/TIME ____________________
SPEC. CONDUCTANCE: STANDARD ___________ UMHOS/CM^2 AT 25°C READING _____ UMHOS/CM^2 AT _____°C
pH: pH 4.00 = ____________ AT _________°C pH 7.00 = _______ AT ______°C pH 10.00 = _______ AT _____°C SLOPE ________
DISSOLVED OXYGEN: D.O. METER ______ MG/L AT ____°C PID/FID: CALIBRATION GAS ________ PPM _______ SPAN ________ READING _
ORP: ORP PROBE STANDARD_________mV READING_____mV AT____°C TURBIDITY: TURBIDITY METER STANDARD_______NTUs READING________NTUs

TIME	DISCHARGE RATE (GPM)	DISSOLVED OXYGEN (MG/L)	pH	Eh/ORP	TEMP (C)	SPECIFIC CONDUCT. (UMHOS/CM AT C)	TURBID. (NTU)	CUMULATIVE VOL. OF WATER REMOVED (PURGED) Gallons Vols.	Casing	PID/OVA READING Location	Value	COMMENTS

FINAL PARAMETERS

PUMPED PARAMETERS STABLE (Y/N) ___
PUMPED = BAILED PARAMETERS (Y/N) ___

CONDITION OF WELL: ____________________
____

REMARKS ____

FIELD EQUIPMENT

pH meter ____________________ SERIAL NUMBER ____________________
SPEC. COND. METER ______________ SERIAL NUMBER ____________________
PUMP ____________________ SERIAL NUMBER ____________________
BAILER ____________________ SIZE ____________________
WATER LEVEL METER ______________ SERIAL NUMBER ____________________
D.O. METER ____________________ SERIAL NUMBER ____________________
FILTER APPARATUS ______________ SERIAL NUMBER ____________________
ORD METER ____________________ SERIAL NUMBER ____________________
TEMPERATURE MEASURE ____
INTERFACE PROBE ______________ SERIAL NUMBER ____________________
PID/OVA ____________________ SERIAL NUMBER ____________________

FIELD CHEMISTRY CALIBRATIONS

FRACTIONS ____________________
____
____
NUMBER OF BOTTLES ______________
SAMPLE DEPTH ______________
FIELD NOTEBOOK ______________
SAMPLE METHOD ______________
____
____
DISCHARGE WATER CONTAINERIZED
YES _____ NO ______

Tetra Tech EM Inc.

Sheet ___ of ___

WELL DEVELOPMENT DATA SHEET

BORING NO. ____________ **WELL NO.** ____________

Project ____________
Project No. ____________
Date(s) of Installation ____________
Date(s) of Development ____________
Personnel/Company ____________
____
Type of Rig Used ____________

Casing Diameter/Type ____________
Borehole Diameter ____________
Screened Interval(s) ____________
Total Length of Well Casing ____________
Measured Total Depth (TOC) Initial ____________
Final ____________
Initial Depth to Water
(TOC) ____________ Date ____________ Time ____________
Stabilized Depth to Water
(TOC) ____________ Date ____________ Time ____________

TECHNIQUE(S)	DEVELOPMENT EQUIPMENT TYPE/CAPACITY
____ Jetting (Airlift)	____________
____ Surge Block	____________
____ Bailing	____________
____ Pumping	____________
____ Other	____________

FLUIDS ADDED

Lost Drilling Fluid: ____________ Gallons
Lost Purge Water: ____________ Gallons
Water During Installation: ____________ Gallons
Total Fluids Added: ____________ Gallons
Source of Added Water: ____________
Ground Water Quality Parameters of
Added Water Measured: Y N
Sample Collected of Added Water: Y N
Sample Designation of Added Water: ____________

PURGE VOLUME CALCULATION

Casing Volume: ____________ Ft. of water
x ____________ Gallons/Foot
= ____________ Gallons per Single Casing Volume
Sand Pack Volume: ____________ Ft. of Saturated Sand Pack
x ____________ Gallons/Foot (borehole diameter)
= ____________ Gallons (in borehole)
- ____________ Gallons of Casing Volume
= ____________ x 0.3 (Assuming porosity = 30%)
= ____________ Gallons Within Sand Pack
Single Purge Volume: ____________ Gallons (Casing Vol. + Sand Pack Vol. + Fluids Added)
Minimum Purge Volume: ____________ Gallons
Actual Purge Volume: ____________ Gallons
Volume Measured by: ____________
Rate of Development ________ Gallons/Minute (Hour,Day)
Pumping Rate/Depth ____________ @ ______ Ft. (Below Grd.)
Immiscible Phases Present: Y N Thickness ____________

INSTRUMENT CALIBRATION

pH Meter: ____________
pH 4.0 = __________ @ _____ °C
pH 7.0 = __________ @ _____ °C
pH 10.0 = __________ @ _____ °C
Dissolved Oxygen Meter: ____________

Spec. Conductance Meter: ____________
Standard _________ µmhos/cm@ 25°C
Reading ____________ µmhos/cm @ ______ °C
Turbidity Meter: ____________
Other: ____________

Total Volume Discharged	Rate of Discharge	Time	Temp	pH	Specific* Conductance	Turbidity or D.O.	Clarity, Odor, PID Readings, Other:

Development Completed at ____________ Gallons Discharged. Date: ____________ Time: ____________
Criteria: ____________ Personnel: ____________

* Specific Conductance readings temperature compensated to 25°C, if not, report temperatures at which reading obtained.

APPENDIX C

APPENDIX C

TtEMI
ELECTRONIC DATA DELIVERABLE FORMAT

RESULTS THAT SHALL BE INCLUDED IN ALL ELECTRONIC DATA DELIVERABLES:

1) **TARGET ANALYTE** results for each sample and associated analytical methods requested on the TtEMI chain-of-custody (COC) form.

2) **TENTATIVELY IDENTIFIED COMPOUND** (TIC) results reported for the Contract Laboratory Program (CLP) volatile organics analyses (VOA) and CLP semivolatile organics analyses (SVOA).

3) The **METHOD AND INSTRUMENT BLANKS** (typically, organic analyses) and **PREPARATION AND CALIBRATION BLANKS** (typically, inorganic analyses) results reported for the sample delivery group (SDG).

4) Percent recoveries for the spike compounds in the **MATRIX SPIKES** (MS), **MATRIX SPIKE DUPLICATES** (MSD) (organics analyses only), **BLANK SPIKES** (typically, organics analyses), and/or **LABORATORY CONTROL SAMPLES** (LCS) (typically, inorganics analyses) (see "Matrix Spikes and Matrix Spike Duplicates" below).

5) **MATRIX DUPLICATE** results (inorganics analyses) reported for the SDG form (do not report the relative percent differences [RPD] [see "Matrix Duplicates" below]).

6) The **PERCENT MOISTURE** and/or the **PERCENT SOLIDS** results for each solid sample; this determination shall be made once for each solid sample listed on the TtEMI COC. The results for these determinations shall be reported in the same manner as all other target analyte results (see "Percent Moisture/Solids Determinations" below).

7) All **REANALYSES, REEXTRACTIONS,** or **DILUTIONS** reported for the SDG, including those associated with samples and the specified laboratory quality control (QC) samples.

RESULTS THAT SHALL *NOT* NORMALLY BE INCLUDED IN ALL EDD:

ORGANICS	***NO*** results from surrogate spikes or calibration standards shall be reported electronically.
INORGANICS	***NO*** results from serial dilutions, analytical/postdigestion/distillation spikes, or calibration standards shall be reported electronically.

SUPPLEMENTAL EDD: *When the project order is initially placed with the laboratory, at no additional cost to TtEMI, a supplemental file--containing surrogate spikes recoveries, serial dilutions (% difference), analytical spike recoveries, and post digestion/distillation spike recoveries-may be requested at the discretion of the TtEMI technical contact (project chemist).*

GENERAL REPORTING REQUIREMENTS

subcontractor shall report all results in a **fixed length record file** format in the exact structure specified in the following "Fixed Length Record File Specification". All data entered into the fixed length record file format shall be left justified within its respective column block. All data containing alphabetical characters shall be reported only in **UPPER** case.

For **ORGANICS ANALYSES**, results of less than 10 shall be reported to **ONE** significant figure, and results of greater than or equal to 10 shall be reported to **TWO** significant figures. For **INORGANICS ANALYSES**, results of less than 10 shall be reported to **TWO** significant figures, and results of greater than or equal to 10 shall be reported to **THREE** significant figures. Refer to Table A -I-1 for units.

FIXED LENGTH RECORD FILE SPECIFICATION

TtEMI Electronic Deliverable File Specification

Field Name	Width	Columns	Format
LABSID	12	1-12	
SDGNUM	8	13-20	
SMPTYPE	5	21-25	
CLIENTSID	30	26-55	
MATRIX	6	56-61	
ANALYTE	30	62-91	
REPLIM	11	92-102	999999.9999
RESULT	15	103-117	999999999.9999
QUAL	7	118-124	
CLPMQUAL	4	125-128	
UNITS	10	129-138	
SAMPDATE	10	139-148	MM/DD/YYYY
EXTDATE	10	149-158	MM/DD/YYYY
ANLYDATE	10	159-168	MM/DD/YYYY
ANLYGRP	10	169-178	
ANLYMETH	35	179-213	
TIC	1	214-214	
RETENTIME	7	215-221	9999.99
CASNO	11	222-232	
RCVDDATE	10	233-242	MM/DD/YYYY
LABCODE	5	243-247	
DILFACT	9	248-256	999999.99
SMPWTVOL	10	257-266	999999.999
SURROGATE	1	267-267	
QCBATCH	12	268-279	

DEFINITION OF FIELD NAMES

FIELD NAME	REQUIRED	DEFINITION
LABSID	Yes	subcontractor’s internal sample identification (ID)
SDGNUM	Yes	SDG to which the subcontractor assigned the sample. The SDG number shall be unique number that is not an actual sample ID or a part of an actual sample ID.
SMPTYPE	Yes	Indicates whether the reported result is from a laboratory QC sample (such as MS, MSD, blank spike, LCS, matrix duplicate, method blank, preparation blank, instrument blank, or calibration blank), a repeated sample (such as reextraction, reanalysis, or dilution), or the original sample (undiluted); this field shall be completed with only the data codes specified below (see “Required Data Codes and Calculations”).

SUPPLEMENTAL EDD: This field shall also identify results from serial dilutions, analytical spikes, and postdigestion/distillation spikes if a supplemental EDD is requested (see “Required Data Codes and Calculations” below).

CLIENTSID	Yes	Sample ID, exactly as specified on the TtEMI COC form; if the sample ID was truncated because of reporting software limitations, the original sample ID shall be presented in the EDD. For laboratory QC or repeated samples (such as MS, MSDs, blank spikes, LCSs, matrix duplicates, method blanks, preparation blanks, instrument blanks, calibration blanks, reextractions, reanalyses, and dilutions), follow the nomenclature detailed below when constructing the CLIENTSID (see “Nomenclature for Laboratory Quality Control Samples”). For laboratory QC samples associated with TCLP or WET extractions, follow the instructions in the section entitled, “TCLP and WET Extractions”.

SUPPLEMENTAL EDD: This field shall also contain the sample IDs of the serial dilutions, analytical spikes and postdigestion/distillation spikes if a supplemental EDD is requested. The IDs will be constructed as described in the section entitled “Nomenclature for Laboratory Quality Control Samples”.

MATRIX	Yes	Analyzed matrix, as identified by the subcontractor; the most common entries in this field shall be SOIL or WATER, but other entries are acceptable if they are more appropriate. The TtEMI technical contact (project chemist) shall be notified if the matrix, as identified by the subcontractor, is different from that on the TtEMI COC forms except **IF A TCLP OR WET EXTRACTION IS REQUESTED, THE MATRIX SHALL BE REPORTED AS TCLP OR WET, RESPECTIVELY** (see “TCLP and WET Extractions” below).

FIELD NAME	REQUIRED	DEFINITION
ANALYTE	Yes	Name of each target analyte or parameter for which the analytical method was run. Inorganic complexes results shall be reported so as to specify the analyte or complex the results are reported as. For example, total alkalinity as $CACO_3$, sulfate as S, nitrate as N, hardness as $CACO_3$, etc.
REPLIM	Cond	Adjusted required quantitation/detection limit as listed in Table A-I-1 of the Statement Of Work (SOW). This field shall be calculated as defined in "Required Data Codes and Calculations". The calculation corrects for changes in the dilution factor, sample weight or volume, percent moisture or percent solid, and extract volume (when applicable). REPLIM is considered an essential piece of information and shall always be reported. For the volatiles analysis, TICs shall have a quantitation limit of the target analytes in that analytical run. For the semivolatiles analysis, TICs shall have a quantitation limit of the nonphenolic target analytes in that analytical run.
RESULT	Yes	Concentration of the target analyte or the recorded measurement of the physical parameter
QUAL	Cond	Laboratory qualifiers (if any) associated with each result; for CLP methods, the qualifiers shall be only those allowed by the EPA SOWs. In the special case of CLP inorganic analyses, this field shall contain the concatenation of any applicable CLP concentration qualifier (that is "B" or "U") plus any applicable CLP result qualifier(s) (that is, "E", "M", "N", "S", "W", "*", or "+"). For some-non CLP analytical methods, such as pH, this field is not applicable.
CLPMQUAL	Cond	CLP inorganic method qualifier only; this field shall be completed with only the codes allowed by the EPA SOW (that is, "P", "A", "F", "PM", "AM", "FM", "CV", "AV", "CA", "AS", "C", "T", or "NR").
UNITS	Cond	Unit of measure in which the result is reported. The most common entries in this field shall be "MG/KG", "UG/KG", "MG/L", and "UG/L". This field shall NOT contain "PPM" or "PPB". For laboratory QC samples, the UNITS may also be "%REC", for percent recovery, or "%DIF", for percent difference (only for serial dilutions and only reported in a supplemental EDD). Percent moisture analyses shall be expressed in UNITS of "%MST", for percent moisture, or "%SLD", for percent solid. Units for salinity shall be expressed as SALIN. Unless otherwise stated in the project order issued by TtEMI, the units shall be the same as listed in Table A-I-1 of the SOW. This field must be completed, except for pH and salinity analyses. Refer to Table A-I-1 for units.

FIELD NAME	REQUIRED	DEFINITION
SAMPDATE	Cond	Sample date reported on the TtEMI COC form. The date shall be expressed in MM/DD/YYYY format. This field shall be blank for laboratory QC samples.
EXTDATE	Cond	Date on which the sample was extracted. This field applies only to analytical methods that require extraction, for example, SVOA, pesticides/PCBs, TPH-extractables, and chlorinated herbicides. This field shall NOT contain the date of a TCLP or WET extraction. The date shall be expressed in MM/DD/YYYY format.
ANLYDATE	Yes	Date on which the sample was analyzed; the date shall be expressed in MM/DD/YYYY format.
ANLYGRP	Yes	Analytical group to which the target analyte belongs. This field shall be completed with only the codes listed below; the codes are tied to the "Analysis" column of Table A-I-1 of the SOW (see "Required Data Codes and Calculations"). If TCLP or WET extraction is requested, the ANLYGRP code shall be preceded by a "T" or "W", respectively, and separated by a dash (for example, T-VOA) (see "TCLP and WET Extractions" below).
ANLYMETH	Yes	Specific analytical method used to determine the reported concentration. This field shall be completed with only the appropriate method name from the "Method Reference" column of Table A-I-1 of the SOW and the associated date of the method reference. This field shall contain the modifier "LOW LEVEL" or "ROUTINE" for CLP VOA, SVOA, and METALS. For example, if a CLP Metals analysis is conducted at the routine detection limits, this field shall contain the character string "CLP INORGANICS SOW - ROUTINE (1995)".
TIC	Yes	A "Y" indicates that the reported analyte is a TIC. An "N" indicates that the reported analyte is a target analyte of the analytical method. This field shall not be left blank.
RETENTIME	Cond	Retention time of the reported TIC in minutes. Fractions of a minute shall be reported in decimals. For example, six minutes and 30 seconds shall be reported as 6.50 minutes. This field shall only be reported for TICs.
CASNO	Cond	Chemical Abstract Service (CAS) Registry number of the target analyte or TIC. If there is a CAS number for the reported analyte, it must be reported. The CAS number shall be supplied without the hyphens. Unofficial CAS numbers developed by the laboratories shall not be used.
RCVDDATE	Cond	Date on which the sample was received by the subcontractor. The date shall be expressed in MM/DD/YYYY format. This field shall be blank for laboratory QC samples.
LABCODE	Yes	Laboratory ID code which shall be completed only from the list of laboratory codes below (see "Required Data Codes and Calculations").
DILFACT	Yes	Dilution factor for the result. The value placed in this field shall most commonly be 1, indicating that the sample was not diluted. No value of less than 1 is permitted. If a "1/5" dilution is conducted, the DILFACT shall be reported as 5 (***not*** 0.2).
SMPWTVOL	Cond	INITIAL weight or volume of the sample used in the analysis. This field shall be reported only as **g** or **mL**, as consistent with the EPA CLP SOW. The units are implied by the MATRIX and do not need to be reported electronically.

SURROGATE	Yes	For all standard EDDs this field shall contain an “N”, indicating that the result is not from a surrogate spike.

SUPPLEMENTAL EDD: If a supplemental EDD has been requested, and the RESULT being reported is an analyte of a surrogate spike, this field shall contai a “Y”, indicating a surrogate spike recovery.

QCBATCH	Cond	Laboratory QC batch ID, which some laboratories use to associate blanks and other laboratory QC samples with their respective “real” samples. If the laboratory uses this type of QC batch ID, it shall be reported electronically in this field.

REQUIRED DATA CODES AND CALCULATIONS

SMPTYPE	Code		Sample
	ORIG	–	Original analysis of the sample
	DL	–	Diluted analysis of the sample
	RE	–	Reextracted or reanalyzed sample
	REDL	–	Diluted analysis of a re-extracted or reanalyzed sample
	MBLK	–	Method blank or preparation blank
	MS	–	Matrix spike recovery (both organic and inorganic analyses)
	MSD	–	Matrix spike duplicate recovery (organic analyses only)
	MD	–	Matrix duplicate (inorganic analyses only)
	LCS	–	Blank spike or LCS recovery
	IBLK	–	Instrumental blank (organic analyses)
	CBLK	–	Calibration blanks (initial and continuing for inorganic analyses)

SUPPLEMENTAL EDD: If a supplemental EDD is requested, the following additional codes shall be used to identify results from serial dilutions, analytical spikes, and postdigestion/distillation spikes.

SMPTYPE	Code		Sample
	SDIL	–	Serial dilution percent difference
	ASPK	–	Analytical spike recovery
	PDIG	–	Postdigestion/distillation spike recovery

REPLIM *if applicable*

$$REPLIM = RQDL \text{ X } DILFACT \text{ X } \frac{SPECWTVOL}{SMPWTVOL} \text{ X } \frac{100}{100 - MOISTURE} \text{ X } \frac{SPECEXTRCT}{EXTRCTVOL}$$

RQDL – Required quantitation/detection limit specified in Table A-I-1 of this SOW
DILFACT – Dilution factor of the sample (as a whole number)
SPECWTVOL – Sample weight or volume specified for the analytical method
SMPWTVOL – Actual sample weight or volume used in the analysis (use the same units as in SPECWTVOL)
MOISTURE – Percent moisture in the sample (expressed as a percent)
SPECEXTRCT – Extract volume specified for the analytical method
EXTRCTVOL – Actual extract volume used in the analysis (use the same units as in EXTRCTVOL)

ANLYGRP

Code		Analysis
VOA	–	CLP VOA – routine
LVOA	–	CLP VOA – low-level
VOA8260	–	VOA – 8260A target analytes
LVOA8260	-	VOA – 8260A – low level
SVOA	–	CLP SVOA – routine
LSVOA	–	CLP SVOA – low-level
SVOA8270	-	SVOA –8270C target analytes
LSVOA8270	-	SVOA – 8270C – low level
PEST	–	CLP pesticides/PCBs – routine
LPEST	–	CLP pesticides/PCBs – low-level
TMETAL	–	CLP metals **(TOTAL)** – routine
DMETAL	–	CLP metals **(DISSOLVED)** – routine
LTMETAL	–	CLP metals **(TOTAL)** – low-level
LDMETAL	–	CLP metals **(DISSOLVED)** – low-level
CYAN	–	CLP cyanide
HALGV	–	Halogenated volatiles
AROMV	–	Aromatic volatiles
TPHPRG	–	TPH-purgeables
TPHEXT	–	TPH-extractables
PCB	–	PCBs (other than by CLP pesticides/PCBs method)
LPCB	-	PCBs – low level
CPCB	–	PCBs – congeners/isomers
PESTO	–	Organophosphorus pesticides
HERB	–	Chlorinated herbicides
ORGAN	–	Organotins
DIOXIN	–	Dioxins and Furans
EXP	–	Explosives
PAH	–	Polycyclic aromatic hydrocarbons
LPAH	-	Polycyclic aromatic hydrocarbons - low level

O&G	–	Oil and grease
TRPH	–	TRPH
ORGPB	–	Organic lead
CHROM	–	Hexavalent chromium
TOX	-	Total organic halides
ANION	–	Major anions, nitrite-N/nitrate-N, ortho-phosphate-P
SOLIDS	–	TDS and TSS
TKN	–	TKN
MBAS	–	MBAS
TOC	–	TOC
REACT	–	Reactivity
ASULFIDE	–	Acid sulfides
CATION	–	Cation exchange capacity
AMMON	–	Ammonia as nitrogen
TPHOS	–	Total phosphorus
SULFIDE	–	Sulfide
HYDRAZINE	–	Hydrazine
FLSHPT	–	Flash point
PH	–	pH
ALKALN	–	Alkalinity
COND	–	Conductivity
SALIN	–	Salinity
TURBIDITY	–	Turbidity
OXYD	–	BOD, COD
PCTMST	–	Percent moisture
HARD	–	Hardness
ACID	–	Acidity
LABCODE	–	*To be determined based on the selected laboratories.*

NOMENCLATURE FOR LABORATORY QUALITY CONTROL SAMPLES

The CLIENTSID for laboratory QC samples shall be constructed by using the following nomenclature. This nomenclature is similar to the nomenclature in the EPA CLP SOW for organics and inorganics analyses. In the nomenclature presented below, "X...X" represents the complete client sample ID, as indicated on the TtEMI COC form. The letter "Z" represents any single alphabetical character chosen by the subcontractor, and the letter "A" represents any single alphabetical character **or** digit chosen by the subcontractor. All other characters or digits are literal strings that must be included in the CLIENTSID exactly as shown below.

	Sample Type	**Nomenclature**
ORGANICS	Matrix spike	X...XMS
	Matrix spike duplicate	X...XMSD
	Blank spike	BSPKAA
	Method blank	ZBLKAA
	Instrument blank	ZIBLKAA
	Reextraction/reanalysis	X...XRE
	Dilution	X...XDL

	Sample Type	Nomenclature
INORGANICS	Matrix spike	X...XS
	Matrix duplicate	X...XD
	LCS (water)	LCSWAA
	LCS (soil)	LCSSAA
	Preparation blank (water)	PBWAAA
	Preparation blank (soil)	PBSAAA
	Initial calibration blank	ICBAAA
	Continuing calibration blank	CCBAAA

SUPPLEMENTAL EDD: If a supplemental EDD is requested, the following additional nomenclature shall be used to construct the CLIENTSID for serial dilutions, analytical spikes, and postdigestion/distillation spikes.

Serial dilutions	X...XL
Analytical spike	X...XA
Postdigestion/distillation spike	X...XP

MATRIX SPIKE AND MATRIX SPIKE DUPLICATES

For MS and MSD samples, the percent recovery shall be indicated in the RESULT field. A percent sign plus the character string "REC" (%REC) shall be placed in the associated UNITS field. To complete the SMPTYPE field, refer to the SMPTYPE subsection of the "Required Data Codes and Calculations" section. To complete the CLIENTSID, refer to the "Nomenclature for Laboratory Quality Control Samples" section. All other fields shall be completed as they would normally be for any field sample.

MATRIX DUPLICATES

Electronically report all matrix duplicate results associated with the SDG. More than one matrix duplicate might be analyzed in an SDG, because the SDG contains mixed matrices (such as, water and soil), mixed concentrations (that is, low and high), or filtered and unfiltered samples; however, in most cases, there will be only one matrix duplicate for each SDG. Report the actual results --not the RPD. Refer to the section entitled "Required Data Codes and Calculations" for information on how to complete the SMPTYPE field for matrix duplicates. The CLIENTSID shall be constructed as explained in the section entitled "Nomenclature for Laboratory Quality Control Samples". All other fields shall be completed as they would normally be for any field sample.

TCLP AND WET EXTRACTIONS

For TCLP or WET extractions, the MATRIX field shall contain "TCLP" or "WET", respectively. The EXTDATE shall contain the date of the extraction, if any, for the principal analytical method used and **NOT** the TCLP or WET extraction date. For example, if a TCLP SVOA analysis is requested, the EXTDATE shall contain the date of the SVOA extraction —not the TCLP extraction date. The ANLYGRP shall be chosen from the list presented above but shall be preceded with a "T" (for TCLP extraction) or "W" (for WET extraction) and separated by a dash. The ANLYMETH shall contain only the principal method used to conduct the analysis. The SMPTYPE shall contain the applicable code from the list presented above but shall be preceded by an "L" (indicating a TCLP or WET [L]eachate). The CLIENTSID shall be constructed as described in the section entitled "Nomenclature for Laboratory Quality Control Samples".

As an example of how to electronically report TCLP data, if sample X...X is submitted for SVOA and TCLP SVOA analyses, the following fields shall be completed as shown:

Regular sample:

Sample Description	CLIENTSID	ANLYGRP	SMPTYPE	MATRIX	ANLYMETH
Original sample	X...X	SVOA	ORIG	SOIL	EPA ORGANICS SOW - ROUTINE (1994)
MS on X...X	X...XMS	SVOA	MS	SOIL	EPA ORGANICS SOW - ROUTINE (1994)
MSD on X...X	X...XMSD	SVOA	MSD	SOIL	EPA ORGANICS SOW - ROUTINE (1994)
SVOA method blank	SBLK01	SVOA	BLK	SOIL	EPA ORGANICS SOW - ROUTINE (1994)

TCLP sample:

Sample Description	CLIENTSID	ANLYGRP	SMPTYPE	MATRIX	ANLYMETH
TCLP of	X...X X...XT	T-SVOA	LORIG	TCLP	EPA ORGANICS SOW - ROUTINE (1994)
MS on TCLP	X...XTMS	T-SVOA	LMS	TCLP	EPA ORGANICS SOW - ROUTINE (1994)
MSD on TCLP	X...XTMSD	T-SVOA	LMSD	TCLP	EPA ORGANICS SOW - ROUTINE (1994)
TCLP blank	TBLK01	T-SVOA	LMBLK	TCLP	EPA ORGANICS SOW - ROUTINE (1994)

Description	CLIENTSID	ANLYGRP	SMPTYPE	MATRIX	ANLYMETH
TCLP dup. of X...X	X...XTD	T-SVOA	LMD	TCLP	EPA ORGANICS SOW - ROUTINE (1994)

PERCENT MOISTURE/SOLIDS DETERMINATIONS

The results of the percent moisture or percent solids determination shall be reported just like the results of any analytical method. The following fields shall be completed as specified. The ANALYTE field shall contain the character string "PERCENT MOISTURE" or "PERCENT SOLIDS" (whichever is applicable). The SMPTYPE field shall contain the character string "ORIG" (see "Required Data Codes and Calculations"). The ANLYGRP field shall contain the character string "PCTMST", and the UNITS field shall contain the percent sign (%) plus the character string

"MST" (%MST), for percent moisture determinations, or the percent sign (%) plus the character string "SLD" (%SLD), for percent solids determinations. All other fields shall be completed as they would normally be for any field sample.

SUPPLEMENTAL EDD

If the TtEMI technical contact (project chemist) requests a supplemental EDD, the subcontractor shall electronically report the following additional laboratory QC results, if applicable:

- Surrogate spike recoveries
- Serial dilutions
- Analytical spike recoveries
- Postdigestion/distillation recoveries

Serial dilutions shall be reported as the percent difference with units "%DIF." All other recoveries shall be reported as a percent recovery with units "%REC."

These additional samples and their results shall be delivered as a separate file; however, they shall be in the same fixed length record file format, and contain the same fields, as described in the standard EDD. Refer to specific instructions throughout this EDD Specification. These instructions can be found in text boxes labeled "Supplemental EDD".

APPENDIX D

QUALITY MANUAL ADDENDUM

Prepared by Pace Analytical Services, Inc.
Kansas Laboratory
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APPROVAL

5-20-02

David Neal
General Manager

Date

Charles E Girgin

5/16/02

Charles E. Girgin
Quality Assurance Officer

Date

Copy 1 issued to: QA office
Name

Pace Analytical Services, Inc.
Affiliation

5/20/02
Date

This [✓ is] / is not a controlled document (control status must be circled before release).

This addendum has been accepted as the Kansas Laboratory Addendum to the PASI Quality Manual.

General Manager
Date

Quality Assurance Officer
5/16/02
Date

Table of Contents

Introduction

The Kansas Laboratory of Pace Analytical Services, Inc. (PASI Kansas) is a full service environmental testing laboratory committed to providing our clients with the highest quality data and unequaled customer service. Centrally located, the Kansas laboratory holds several state certifications. A copy of our NELAP certification and a list of state certifications can be found in Appendix D. The information in Appendix D is subject to change without notice. This document is designed as an addendum to the Pace Analytical Quality Manual and outlines information specific to the Kansas laboratory. Any deviations from the Corporate Quality Manual are outlined below or in the individual Laboratory Standard Operating Procedures.

Facilities and Services used by Pace Kansas

Pace Analytical is a network of testing laboratories offering a wide variety of overlapping services. Each Pace location holds NELAP certification, which allows Pace to ensure that each laboratory has a backup for every state certification it holds. In this way we can maintain a consistent level of QA/QC for our clients samples. If a sample needs to be sent to a laboratory outside of the PACE network, we ensure that the sub-contract laboratory has all of the required certifications and their data will be reported as received by Pace Kansas. No data is transcribed to a Pace report. This ensures that our clients know how there samples were analyzed.

Procedure for Protecting Client Confidentiality and Proprietary Rights

Pace makes every effort to insure the confidentiality of all of the data produced in the laboratory. The laboratory building has restricted access with only two doors with open access. These doors are continuously monitored during normal business hours.
No information regarding any of our clients or their sample analysis are released to anyone other than the client and/or their designated representative. Release of the information to any other individual and/or company requires written authorization from the client. The following confidentiality statement will accompany all electronic data transmissions.

"The documents accompanying this telecopy transmission contain confidential information belonging to the sender who is legally privileged. The information is intended only for the use of the individual(s) or entity(ies) named herein. If you are not the intended recipient, you are hereby notified that any disclosure, copying distribution or the taking of any action in reliance on the contents of this telcopied information is strictly prohibited. If you have received this telecopy in error, please immediately notify us by telephone to arrange for return of the original documents. If you have any question with this transaction, please call 913-599-5665."

Procedure for use of Data Qualifiers

Data on final reports are qualified to inform our clients to any problems or irregularities that may have occurred during analysis of their samples. Pace Analytical, by use of these qualifiers, makes no judgement regarding the usefulness or validity of the data. The data qualifiers provide our clients with the best information to make that determination.

Official Correspondence and Authorized Signatures

Pace Kansas maintains a copy of each employee's signature and initials on file in the QA office.

The personnel authorized to sign client reports and official Pace correspondence are the following positions: General Manager, Client Services Manager, Project Manager and Quality Assurance Officer (QAO). Currently, these positions are being held by:

General Manager	David Neal
Client Services Manager	Mary Jane Walls
Project Manager	Angie Brown
	Connie Gardener
	Chris Scharff
	Brad Godwin
	Adam Taylor
Quality Assurance Officer	Charles Girgin

Reporting Options offered by Pace Kansas

Pace Kansas offers a variety of reporting options to our clients. Due to the time and effort required, Pace Kansas does not offer customized report formats. Electronic Data Deliverables (EDD) are also available in a variety of formats.

EPIC Report:

This is the standard report provide by Pace. An EPIC report includes all the results for the samples including Quality Control samples, units, Pace Reporting Limit (PRL), date analyzed, analyst, CAS # and footnotes. Also included with the report are the invoice, cooler receipt form and chain of custody.

Projects that require supplemental information for data validation are available in the following formats

Level A: EPIC report, Narrative
Level B: EPIC report, Narrative, Raw Data
Level C: EPIC report, Narrative, Quality Control Forms
Level D: EPIC report, Narrative, Raw Data, Quality Control Forms

Training

One of the core goals for Pace Kansas is to have the best-trained and most professional staff in the country. To this end the training for all employees is a top priority for the management at Pace Analytical. This begins with the initial entry training conducted for all new employees. This training includes human resources, safety, health, ethics, hazardous communications, quality assurance, information services, and any specific departmental task orientated training that is required. Pace also holds a series of "brown bag" lectures on individual analytical topics. Members of the staff present these to their peers on a monthly basis.

Training for each test method follows a series of steps that are documented in their training records. Training records for all employees are kept in an electronic database and in hardcopy file. These records are maintained in the QA office.
For each method the following steps are completed in order:

1. Each analyst must read the appropriate method(s)
2. Each analyst must read the relevant SOP(s)
3. An initial demonstration of competency must be performed for each method
4. Continued proficiency demonstrated by acceptable performance testing, laboratory control sample analyses, or double blind QA analyses.

At the conclusion of these steps the analyst may analyze samples. During the training period the analyst must be under the direct supervision of a qualified analyst.

Procedure for Initial demonstration of proficiency

Each department must insure that all analysts demonstrate initial proficiency with each combination of sample preparation and determinative methods that are utilized, by generating data of acceptable accuracy and precision for a reference sample containing the target analytes in a clean matrix. The laboratory must also repeat this demonstration whenever new employees are trained or significant changes are made in instrumentation. The reference samples are prepared from a spiking solution containing each analyte of interest. Four replicate aliquots of the reference samples are analyzed by the same procedures used to analyze actual samples. The average recovery in ug/L, and the standard deviation of the recoveries in ug/L are calculated for each analyte of interest using the four results. Each result is compared to its corresponding control limits. If the results are within control limits, then the system and/or employee performance is acceptable and analysis of actual samples can begin.

Procedure for Documenting Specific Program Requirements:

Employees are introduced to specific program requirements as defined by customer technical documents by documenting the initial reading and completing a performance test.

Corrective Action

When a quality assurance problem occurs, the analyst determines the nature of the discrepancy and alerts their supervisor. The appropriate corrective action is determined and implemented. This may include but is not restricted to re-analysis and/or re-extraction, instrument maintenance, preparation of new calibration standards, and preparation of a new calibration curve. If all attempts at corrective action fail the Quality Assurance Officer and Laboratory Manager are contacted. The samples are flagged on the final report. Regardless of the outcome of the corrective action, the event is documented in the discrepancy report database. The following sections address individual circumstances that require corrective action and the possible steps to be taken.

Corrective action for Initial/Continuing Calibration

1. Check calculation and/or integration for possible errors
2. Re-analyze the calibration standard or calibration curve
3. Prepare fresh standard solutions
4. Instrument maintenance

Corrective action for unacceptable PE (performance evaluation) samples

Upon receipt of a unacceptable PE the QAO notifies the department supervisor by e-mail. The e-mail includes the information on the failed PE and a corrective action form (attachment E). The supervisor then institutes a thorough investigation and initiates any corrective action required. The completed corrective action form is e-mailed to the QA department for review.

Corrective action for surrogate failures

Monitoring of surrogate recoveries is done by the analyst in real time to insure consistency and data quality on a sample by sample basis.. If a recovery of any surrogate falls outside of the laboratory accepted criteria the sample is initially re-analyzed. If the recovery for the re-analysis is still outside the control limits, the sample is re-prepared/extracted and re-analyzed. If the sample falls within the control limits the in-control sample is reported. If the sample is still outside the control limits the data is reported and the final report is footnoted to inform the client of the discrepancies.

Management Review of the Quality System

The general manager will review the quality system and its testing and calibration activities to ensure its continuing suitability and effectiveness and to introduce any necessary changes or improvements in the quality system and laboratory operation on an annual basis. The review will take into account the quarterly quality reports, outcome of recent internal and external audits, the results of proficiency test, any changes in the volume and type of work undertaken, feedback from clients, corrective actions, and ongoing interaction with laboratory staff. Once the review is completed, a report will be generated and distributed to the senior staff. Records will be maintained in the Quality Assurance Office as feedback to the Quarterly Quality Report.

Review and Pre-approval of Prospective Projects

All prospective projects submitted by Pace clients are reviewed by the management staff which may include but is not limited to the general manager, project manager, laboratory manager, and QAO. The review will include verification and acceptance of required QC parameters including project specific method detection limits and minimum reporting requirements, frequency and acceptance criteria for QC samples (blanks, MS/MSD, and LCS), turn around time, reporting requirements, and contract specific penalties. After each of these has been reviewed and approved, a copy of the contract is initialed and placed in the client file.

Procedure for Dealing with Client Questions.

Inquires regarding analytical services will be initiated through the project manager. The project manager then informs the department group leader/supervisor and quality assurance officer by electronic mail and initiated a record using the Client Request database. Pace Kansas makes every attempt to have an answer for the client within 24 hours. If the investigation requires more time, the client is notified of the time that their question will be answered.

Procedure for notifying clients or state when validity of data has been compromised

When a circumstance arises that may have compromised data by any of the following: spilled sample, exceeded hold time, suspected data manipulation or anything that the lab feels may have compromised data integrity. The matter is investigated, if warranted, and corrective action taken. If validity of data has been compromised, the client or state is notified.

Method Detection Limit and Pace Reporting Limit

Method detection limits (MDL) are that level at which the instrument can produces a result that the laboratory is 99% confident that the result is greater than zero. Results reported at or near the MDL are not necessarily an accurate result. To ensure that the results reported to the client are accurate and defensible Pace uses a Pace reporting limit (PRL). This number is between 2 to 5 times the method detection limit. This allows for any instrument variation over time. Due to certain regulatory requirements, client needs or specific project data quality objectives, some methods and/or analytes may not fall into this 2 to 5 times window. In those instances, the PRL will_be greater than the MDL. The current Method and PRL information is located in Attachment F.

Microbiology and Aquatic Toxicity Testing

The Southeast Kansas Service Center of Pace Analytical Services, Inc. Kansas Laboratory is an environmental testing facility committed to providing our clients with the highest quality data and unequaled customer service in the area of microbiology and aquatic toxicity. Located in Frontenac, Kansas, the laboratory holds the State of Kansas NELAP certification. The following tasks are required for microbiology and Wet toxicity testing. All other procedural tasks are listed in the specific SOP for the species of interest. The species tested are listed on the wastewater NELAP certification parameter list in Attachment D.

Required Tasks

Listed in this section are the tasks that must be performed at the specific interval in order to ensure accurate bacteriological testing.

Record temperatures. Record temperatures of the fecal coliform water bath, the total coliform incubator, and the bacteria refrigerator in the morning and afternoon of each working day.

pH Meter calibration. At the beginning of each working day, calibrate pH meter using pH 7.0, and 10.0 buffers according to the meter manufacturer's instructions. Record details of the calibration in the calibration logbook.

Water check for pH and conductivity. Check the laboratory deionized water (the water used for bacteria analyses) at the beginning of each working day for pH and specific conductance. Specific conductance of the water should be < 2 *u*mho/cm; pH of the water should be between 5.5 and 7.5. If these criteria are not met, notify the laboratory/quality assurance manager immediately.

Balance calibration. The calibration of the analytical balances should be checked at The beginning of each working day to insure that they are operating properly. The data is recorded in the Balance Calibration Logbook.

Balance calibration. The weekly balance calibration procedure is the same as the daily procedure, except <u>all</u> of the working Class S weights are checked, rather than just two.

Laboratory Water Quality

Water check for residual chlorine and heterotrophic plate count. Check the laboratory deionized water (the water used for bacteria analyses) each month for residual chlorine and standard plate count. The analysis for residual chlorine and standard plate count are performed by Pace Analytical. Residual chlorine should be "not detected" (below detection limit); the heterotrophic plate count result should be < 500 CFU/ml. If these criteria are not met, notify the laboratory/quality assurance manager immediately.

ANNUALLY

1. **Water check for trace metals.** Check the laboratory deionized water (the water used for bacteria analyses) each year for the following elements: lead, cadmium, chromium, copper, nickel, and zinc. The concentration of each element should be < 0.05 mg/l; the total concentration should be < 0.1 mg/l. If these criteria are not met, notify the laboratory/quality assurance manager immediately.

2. **Water quality test for microbial suitability (Suitability Test).** The laboratory deionized water should be analyzed each year for microbial suitability as outlined in *Standard Methods,* section 9020. This analysis is performed by an outside laboratory and results are reported on a "Pass/Fail" basis.

3. **Thermometer calibration.** Thermometers used in the laboratory are calibrated on an annual basis. This includes all thermometers used to determine daily temperatures of the water baths, ovens, incubators, and refrigerators. Thermometers are calibrated against a NIST-certified thermometer.

4. **Annual calibration of working set of Class S weights.** Calibration of the working set of Class S weights is done on an annual basis against the laboratory's primary Class S weights, which has NIST-traceable calibration. The primary set of Class S weights is kept in the office of the Laboratory/Quality Assurance Manager.

5. **Inhibitory Residue Toxicity Test.** Certain wetting agents or detergents used in washing glassware may contain bacteriostatic or inhibiting substances. This test should be performed according to *Standard Methods,* Section 9020 prior to initiating use of a laboratory detergent. If the laboratory changes the type or brand of detergent, the test should be repeated.

6. **Calibration of filter funnels.** Calibrate the 100 ml volume mark on the filter funnels used for fecal coliform membrane filter analysis prior to use. Calibration is valid as long as calibration mark remains legible

AS NEEDED

1. **Check fecal media.** Each time fecal media is made, check the pH. pH should be in the range of 7.4 ± 0.2. Record pH in the Bacteria Preparation and Sterilization Logbook. With each new batch of fecal media, run a media check blank as described in fecal coliform procedure.

2. **Clean fecal water bath, incubator, refrigerator and sterilizer.**

3. **Sterilize items needed for fecal coliform analysis.** Record pertinent information in the Autoclave Logbook.

4. **Prepare buffer dilution water for bacterial analysis.** Sterilize and record in the Sterility Check Logbook.

5. **Prepare plate count agar.** Sterilize and record in the Sterility Check Logbook.

SAMPLE COLLECTION, PRESERVATION AND HANDLING FOR MICROBIOLOGY

A. The sample should be collected in a sterile Whirl pack, plastic or glass bottle and stored at 4°C ± 2°C until analysis is initiated.

B. Chlorinated samples must be preserved with 0.1 ml of 10% sodium thiosulfate per 100 ml sample or equivalent. PACE sample containers for fecal coliform analysis have this preservative added prior to distribution to samplers.

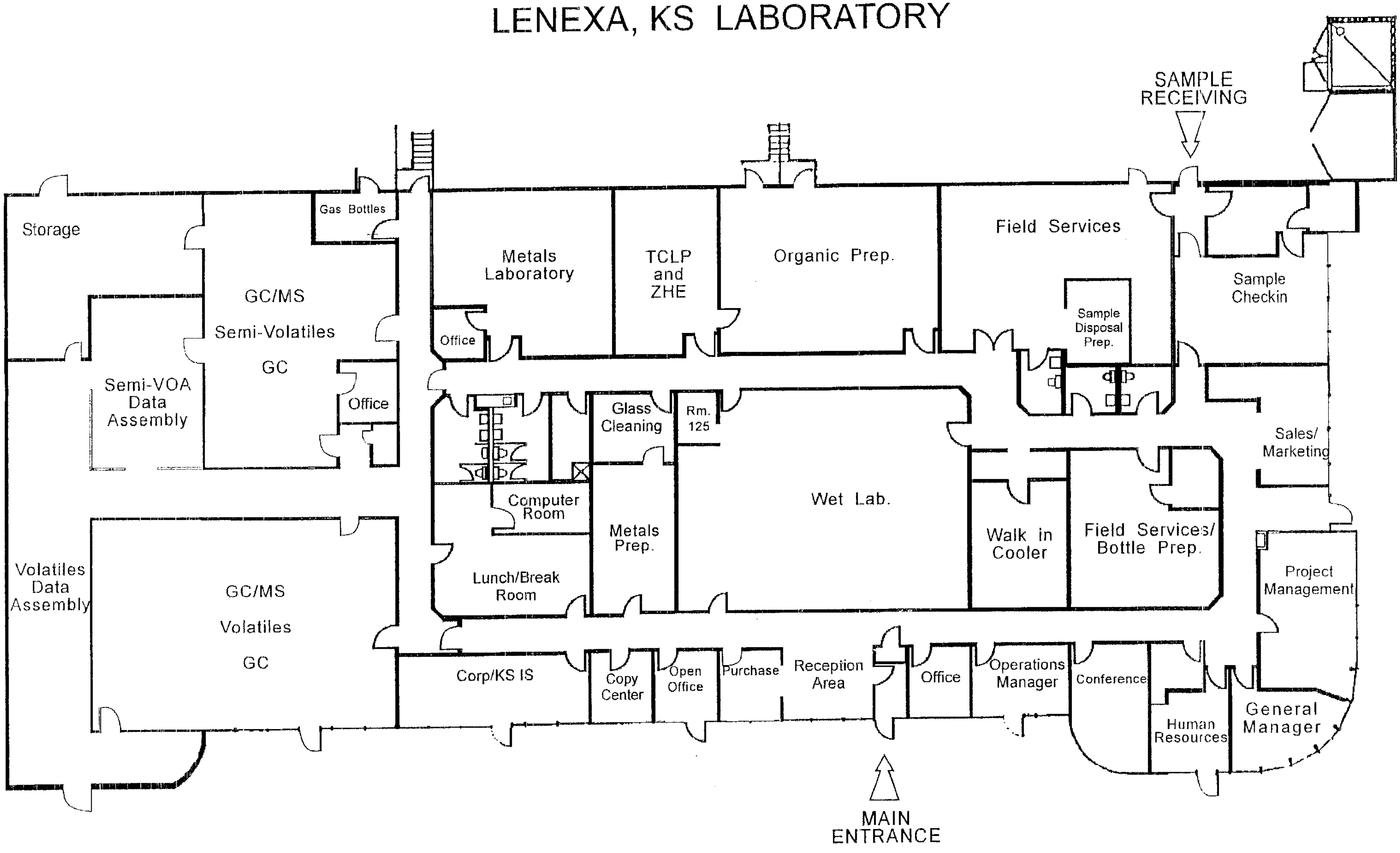
C. Ideally, analysis should begin within six hours of sampling whenever possible. Because of geographical and shipping constraints, that it is not possible for some samples. For these samples, analysis should begin within 30 hours of sampling. Results for these samples must be flagged with the statement "Fecal coliform analysis initiated more than 6 hours but less than 30 hours following sample collection." Results from sample analyses initiated more than 30 hours following sample collection are not considered valid.

SAMPLE COLLECTION, PRESERVATION AND HANDLING FOR AQUATIC TOXICITY

A. Samples must be collected in a plastic cubing container and stored on ice until use. The test should be initiated no later than 36 hours from the date and time of collection.

Attachment A
Kansas Laboratory Floor plan

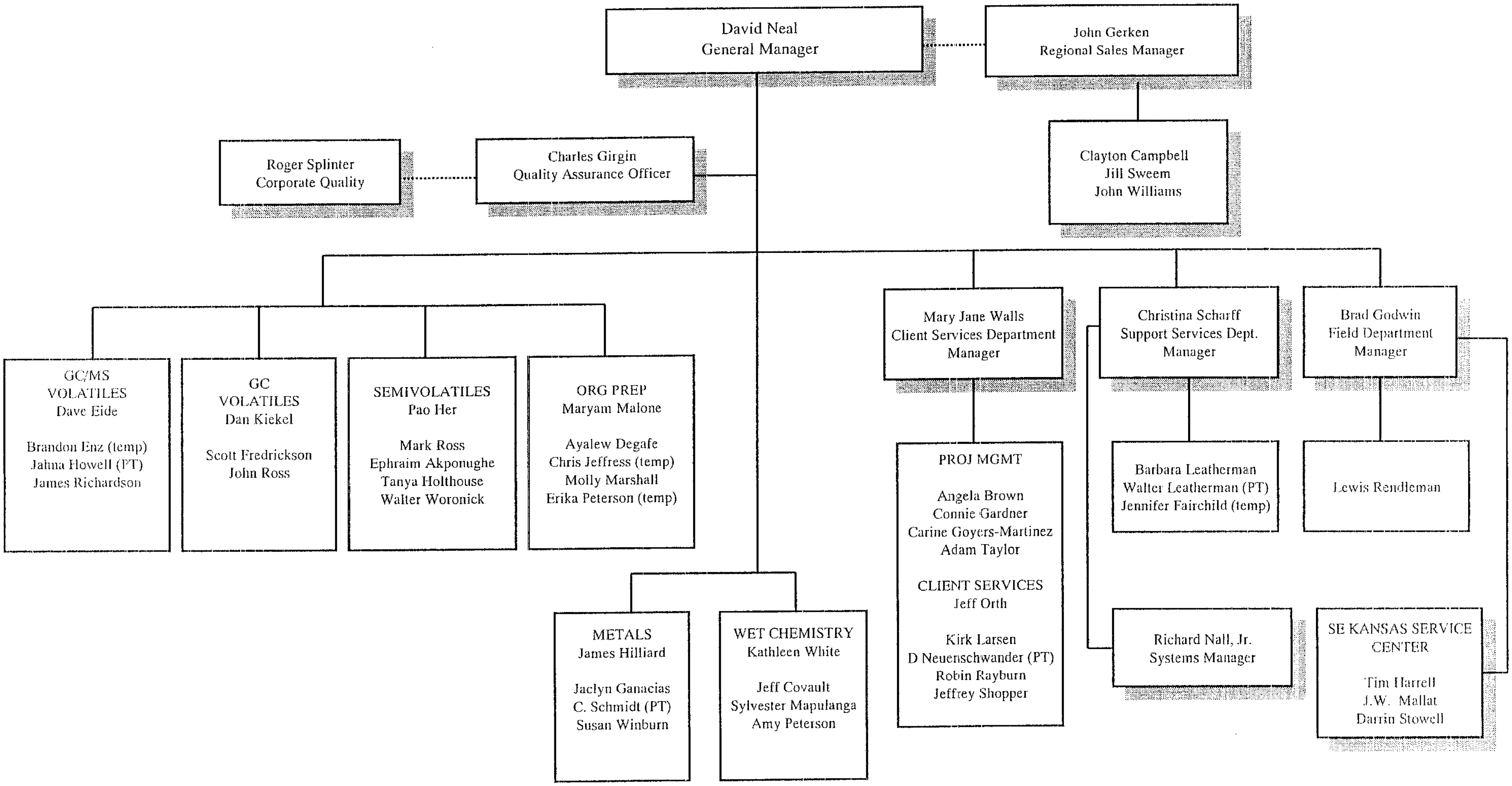
PACE ANALYTICAL SERVICES, INC.
LENEXA, KS LABORATORY



FLR_N=WSIZ(04 26-01)

Attachment B
Kansas Laboratory Organization Chart

KANSAS



MAY 2002

Attachment C
Kansas Laboratory Instrumentation List

PACE ANALYTICAL KANSAS CITY LABORATORY EQUIPMENT LIST - 1/2002

INSTRUMENT	MANUFACTURER	MODEL NUMBER	DETECTOR	ANALYSIS	DATE PURCH.
GS/MS	Finnigan	INCOS 50	MS	625/8270	Jan-87
GS/MS	Hewlett-Packard	5972	MSD	524/624/8260	Sep-93
GS/MS	Hewlett-Packard	5972	MSD	524/624/8260	Sep-93
GS/MS	Finnigan	INCOS 50	MS	625/8270	Jan-87
GC/MS	Hewlett-Packard	5972	MSD	625/8270	Jan-99
GC/MS	Hewlett-Packard	5972	MSD	8260	Dec-98
GC/MS	Hewlett-Packard	5972	MSD	8260	Jan-99
Gas Chromatographs	Hewlett-Packard	5890	ECD/ECD	8082	May-93
Gas Chromatographs	Hewlett-Packard	5890	ECD/ECD	8082	Jun-93
Gas Chromatographs	Hewlett-Packard	5890	ECD/ECD	8081/8151/8011	Dec-90
Gas Chromatographs	Hewlett-Packard	5890	PID//Hall	8021 UST	Aug-92
Gas Chromatographs	Hewlett-Packard	5890	PID//Hall	8021 UST	Jun-90
Gas Chromatographs	Hewlett-Packard	5890	PID/FID	8021/8015 UST	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	ECD/ECD	8151	Jun-87
Gas Chromatographs	Hewlett-Packard	5890	PID/FID	8021/8015 UST	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	PID/FID	8021/8015 UST	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	PID//Hall	8021 UST	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	NPD/NPD	8141	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	FID	8015 Mod/OA2	Mar-93
Gas Chromatographs	Hewlett-Packard	5890	FID	8015 Mod/TX 1005	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	FID	8015 Mod/OA2	Mar-91
Gas Chromatographs	Hewlett-Packard	5890	FID	8016 Mod/OA2	Mar-91
HPLC	Waters	Waters 600E	UV/Fluoresence	610/8310	1998
HPLC	Hewlett-Packard	1050	UV/Fluoresence	610/8310	2000
ICP	Perkin-Elmer	OPTIMA 4300 DV			2000
ICP	TJA 61E SEQ	13193300			1991
Graphite Furnace(GFAA)	Perkin-Elmer	5100 ZEE			1991
Mercury Analyzer	Perkin Elmer	FIMS 400		N/A	1995
Auto Analyzer	Lachat QuikChem	8000 FIA+	2000-0042	N/A	2000
TOC	Astrowater	2001	UV		1993
Ion Chromatograph	Dionex	DX-100	Conductivity detector		1992
Ion Chromatograph	Dionex	DX-100	Conductivity detector		1992

Attachment D
State Certification Summary and Kansas Laboratory NELAP Parameter List

Pace Analytical™

CERTIFICATION SUMMARY

Laboratory: Lenexa, Kansas

Accrediting Authority	Accrediting Agency	Program Category	Certification #	Status	Expiration Date	Contact
Kansas	KDHE	DW, WW, HW	E-10116	Current	4/30/03	Aurora Shields
Arkansas	DEQ	WW,S/HW	02-05532	Current	1/10/03	Jeff Ruehr
Oklahoma	DEQ	WW, S/HW	9205	Current	8/31/02	Tony Bright
Iowa	IDNR	DW, WW, HW UST	118	Current	07/01/02	Stacy Freiburg
Missouri	NA	Reciprocal of Kansas				
Louisiana	DEQ	WW, S/HW	AI# 55333	Current	6/30/02	Louis R.C.Johnson

DW = Drinking water
S/HW = Solid and Hazardous waste
WW = Waste water
Air = Air

STATE OF KANSAS
DEPARTMENT OF HEALTH AND ENVIRONMENT
CERTIFICATE

This is to certify that Certificate No. **E-10116**

for:

PACE ANALYTICAL SERVICES, INC.
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

has been accredited in accordance with K.S.A. 65-1,109a for performing environmental analyses for the parameters listed on the attached form. Continuous accreditation depends on successful, ongoing participation in the program. Clients are urged to verify with this agency the laboratory's accreditation status for particular methods and analytes.

EFFECTIVE DATE: **05/01/2002**

EXPIRATION DATE: **04/30/2003**

Secretary
Department of Health and Environment

Aurora Shields
Jack R. McKenzie
Environmental Laboratory Certification Officers

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
DRINKING WATER CERTIFICATION
PARAMETER LIST

This certificate supersedes parameter list dated:02/28/2002

PACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER:E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE:04/30/2003

The laboratory listed above is hereby approved for environmental laboratory certification in accordance with K.S.A. 65-1,109a for performing drinking water analysis for the following parameters:

**METALS

(A) Aluminum--(EPA 200.7)
(A) Antimony--(SM 3113 B)
(A) Arsenic---(EPA 200.7)
(A) Barium--(EPA 200.7)
(A) Beryllium---------------------------------------(EPA 200.7)
(A) Cadmium---(EPA 200.7)
(A) Calcium---(EPA 200.7)
(A) Chromium--(EPA 200.7)
(A) Copper--(EPA 200.7)
(A) Iron--(EPA 200.7)
(A) Lead--(EPA 200.9)
(A) Lead--(SM 3113 B)
(A) Manganese---------------------------------------(EPA 200.7)
(A) Mercury---(EPA 245.2)
(A) Nickel--(EPA 200.7)
(A) Selenium--(EPA 200.9)
(A) Selenium--(SM 3113 B)
(A) Silica--(EPA 200.7)
(A) Silica--(SM 4500-Si D)
(A) Silver--(EPA 200.7)
(A) Sodium--(EPA 200.7)
(A) Zinc--(EPA 200.7)

**MINERALS

(A) Chloride--(EPA 300.0)
(A) Hardness--(EPA 200.7)

**MISCELLANEOUS

(A) Bromide---(EPA 300.0)
(A) Hydrogen Ion (pH)-------------------------------(EPA 150.1)
(A) Surfactants (MBAS)------------------------------(SM 5540 C)
(A) Temperature-------------------------------------(SM 2550 B)
(A) Total Organic Halides---------------------------(SM 5320 B)
(A) Turbidity---------------------------------------(EPA 180.1)

**NUTRIENTS

(A) Nitrate---(EPA 300.0)
(A) Nitrate---(EPA 353.2)
(A) Nitrite---(EPA 300.0)

A-Approved P-Provisional I-Interim C-Conditional

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
DRINKING WATER CERTIFICATION
PARAMETER LIST
This certificate supersedes parameter list dated:02/28/2002

PACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER:E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE:04/30/2003

(A) Nitrite---------------------------------------(EPA 353.2)

**ORGANIC CHEMISTRY DBCP/EDB
(A) Dibromochloropropane--------------------------------(EPA 504.1)
(A) Ethylene Dibromide----------------------------------(EPA 504.1)

**ORGANIC CHEMISTRY VOLATILES
(A) cis-1,2-Dichloroethylene----------------------------(EPA 524.2)
(A) trans-1,2-Dichloroethylene--------------------------(EPA 524.2)
(A) Benzene---(EPA 524.2)
(A) Carbon Tetrachloride--------------------------------(EPA 524.2)
(A) Chlorobenzene---------------------------------------(EPA 524.2)
(A) Dichloromethane-------------------------------------(EPA 524.2)
(A) Ethylbenzene--(EPA 524.2)
(A) Styrene---(EPA 524.2)
(A) Tetrachloroethylene---------------------------------(EPA 524.2)
(A) Toluene---(EPA 524.2)
(A) Trichloroethylene-----------------------------------(EPA 524.2)
(A) Vinyl Chloride--------------------------------------(EPA 524.2)
(A) Xylene--(EPA 524.2)
(1,1-Dichloroethylene----------------------------------(EPA 524.2)
(A) 1,1,1-Trichloroethane-------------------------------(EPA 524.2)
(A) 1,1,2-Trichloroethane-------------------------------(EPA 524.2)
(A) 1,2-Dichlorobenzene---------------------------------(EPA 524.2)
(A) 1,2-Dichloroethane----------------------------------(EPA 524.2)
(A) 1,2-Dichloropropane---------------------------------(EPA 524.2)
(A) 1,2,4-Trichlorobenzene------------------------------(EPA 524.2)
(A) 1,4-Dichlorobenzene---------------------------------(EPA 524.2)

**RESIDUES
(A) Residue, Filterable (TDS)---------------------------(SM 2540 C)

**TRIHALOMETHANES
(A) Bromodichloromethane (THM)--------------------------(EPA 524.2)
(A) Chloroform (THM)------------------------------------(EPA 524.2)

**UNREGULATED ORGANIC COMPOUNDS
(A) cis-1,3-Dichloropropene-----------------------------(EPA 524.2)
(A) n-Butylbenzene--------------------------------------(EPA 524.2)
(A) n-Propylbenzene-------------------------------------(EPA 524.2)
(A) sec-Butylbenzene------------------------------------(EPA 524.2)
(A) tert-Butylbenzene-----------------------------------(EPA 524.2)
(A) trans-1,3-Dichloropropene---------------------------(EPA 524.2)
(A) Bromobenzene--(EPA 524.2)

A-Approved P-Provisional I-Interim C-Conditional

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
DRINKING WATER CERTIFICATION
PARAMETER LIST
This certificate supersedes parameter list dated:02/28/2002

PACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER:E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE:04/30/2003

(A) Bromochloromethane-----------------------------------(EPA 524.2)
(A) Chloroethane---(EPA 524.2)
(A) Chloromethane--(EPA 524.2)
(A) Dibromomethane---------------------------------------(EPA 524.2)
(A) Dichlorodifluoromethane------------------------------(EPA 524.2)
(A) Hexachlorobutadiene----------------------------------(EPA 524.2)
(A) Isopropylbenzene-------------------------------------(EPA 524.2)
(A) Methyl-t-butyl ether---------------------------------(EPA 524.2)
(A) Naphthalene--(EPA 524.2)
(A) Nitrobenzene---(EPA 524.2)
(A) Trichlorofluoromethane-------------------------------(EPA 524.2)
(A) 1,1-Dichloroethane-----------------------------------(EPA 524.2)
(A) 1,1-Dichloropropene----------------------------------(EPA 524.2)
(A) 1,1,1,2-Tetrachloroethane----------------------------(EPA 524.2)
(A) 1,1,2,2-Tetrachloroethane----------------------------(EPA 524.2)
(A) 1,2,3-Trichlorobenzene-------------------------------(EPA 524.2)
(A) 1,2,3-Trichloropropane-------------------------------(EPA 524.2)
(A) 1,2,4-Trimethylbenzene-------------------------------(EPA 524.2)
(A) 1,3-Dichlorobenzene----------------------------------(EPA 524.2)
(A) 1,3-Dichloropropane----------------------------------(EPA 524.2)
) 1,3,5-Trimethylbenzene---------------------------------(EPA 524.2)
(A) 2-Chlorotoluene--------------------------------------(EPA 524.2)
(A) 2,2-Dichloropropane----------------------------------(EPA 524.2)
(A) 4-Chlorotoluene--------------------------------------(EPA 524.2)
(A) 4-Isopropyltoluene-----------------------------------(EPA 524.2)

A-Approved P-Provisional I-Interim C-Conditional

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
WASTEWATER CERTIFICATION
PARAMETER LIST

This certificate supersedes all previous certificates

PACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER:E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE:04/30/2003

The laboratory listed above is hereby approved for environmental laboratory certification in accordance with K.S.A. 65-1, 109a for performing wastewater analysis for the following parameters:

**BIOMONITORING
(A) Cheriodaphnia dubia, acute----------------------------(EPA/600/4-90/027F)
(A) Cheriodaphnia dubia, chronic--------------------------(EPA 1002)
(A) Daphnia pulex, acute----------------------------------(EPA/600/4-90/027F)
(A) Pimephales promelas, acute----------------------------(EPA/600/4-90/027F)
(A) Pimephales promelas, chronic--------------------------(EPA 1000)
(A) Pimephales promelas, chronic--------------------------(EPA 1001)

**DEMANDS
(A) cBOD--(SM 5210 B)
(A) BOD---(EPA 405.1)
(A) BOD---(SM 5210 B)
(A) COD---(EPA 410.4)
(A) Oxygen, Dissolved-------------------------------------(EPA 360.1)
(A) Oxygen, Dissolved-------------------------------------(SM 4500-O G)
(A) Total Organic Carbon----------------------------------(EPA 415.1)

**INORGANIC
(A) Chlorine - total--------------------------------------(EPA 330.5)
(A) Chlorine - total--------------------------------------(SM 4500-Cl G)
(A) Cyanide, Amenable to CL-------------------------------(EPA 335.1)
(A) Cyanide, Amenable to CL-------------------------------(SM 4500-CN G)
(A) Cyanide, Total--(EPA 335.3)
(A) Cyanide, Total--(SM 4500-CN E)

**METALS
(A) Aluminum--(EPA 200.7)
(A) Antimony--(EPA 200.7)
(A) Antimony--(EPA 204.2)
(A) Arsenic---(EPA 200.7)
(A) Arsenic---(EPA 206.2)
(A) Barium--(EPA 200.7)
(A) Beryllium---(EPA 200.7)
(A) Boron---(EPA 200.7)
(A) Cadmium---(EPA 200.7)
(A) Calcium---(EPA 200.7)
(A) Chromium--(EPA 200.7)
(A) Chromium, VI--(SM 3500-Cr D)
(A) Cobalt--(EPA 200.7)
(A) Copper--(EPA 200.7)

A-Approved P-Provisional I-Interim C-Conditional

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
WASTEWATER CERTIFICATION
PARAMETER LIST

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PACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER:E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE:04/30/2003

(A)	Iron	(EPA 200.7)
(A)	Lead	(EPA 200.7)
(A)	Lead	(EPA 239.2)
(A)	Magnesium	(EPA 200.7)
(A)	Manganese	(EPA 200.7)
(A)	Mercury	(EPA 245.1)
(A)	Molybdenum	(EPA 200.7)
(A)	Nickel	(EPA 200.7)
(A)	Potassium	(EPA 200.7)
(A)	Selenium	(EPA 200.7)
(A)	Selenium	(EPA 270.2)
(A)	Silica	(EPA 370.1)
(A)	Silica	(SM 4500-Si D)
(A)	Silver	(EPA 200.7)
(A)	Sodium	(EPA 200.7)
(A)	Thallium	(EPA 200.7)
(A)	Thallium	(EPA 279.1)
(A)	Tin	(EPA 200.7)
(A)	Titanium	(EPA 200.7-ATP)
(A)	Vanadium	(EPA 200.7)
)	Zinc	(EPA 200.7)

**METALS - 503 Regs

(A)	Arsenic	(EPA 6010B)
(A)	Cadmium	(EPA 6010B)
(A)	Chromium, Total	(EPA 6010B)
(A)	Copper	(EPA 6010B)
(A)	Lead	(EPA 6010B)
(A)	Mercury	(EPA 7470)
(A)	Mercury	(EPA 7471)
(A)	Molybdenum	(EPA 6010B)
(A)	Nickel	(EPA 6010B)

**MICROBIOLOGY

(A)	Fecal Coliforms	(SM 9222 D)
(A)	Fecal Coliforms in Wastewater Sludges	(SM 9222 D)
(A)	Total Coliforms	(SM 9222 B)

**MINERALS

(A)	Acidity	(EPA 305.1)
(A)	Acidity	(SM 2310 B)
(A)	Alkalinity	(EPA 310.2)
(A)	Alkalinity	(SM 2320 B)
(A)	Chloride	(EPA 300.0)

A-Approved P-Provisional I-Interim C-Conditional

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
WASTEWATER CERTIFICATION
PARAMETER LIST
This certificate supersedes all previous certificates

PACE ANALYTICAL SERVICES INC	CERTIFICATE NUMBER:E-10116
9608 LOIRET BOULEVARD	EFFECTIVE DATE: 05/01/2002
LENEXA, KS 66219-2406	EXPIRATION DATE:04/30/2003

(A)	Chloride	(EPA 325.2)
(A)	Fluoride	(EPA 300.0)
(A)	Hardness	(EPA 130.2)
(A)	Sulfate	(EPA 300.0)
(A)	Sulfide	(EPA 376.1)
(A)	Sulfite	(EPA 377.1)

**MISCELLANEOUS

(A)	Bromide	(EPA 300.0)
(A)	Hydrogen Ion (pH)	(EPA 150.1)
(A)	Oil & Grease	(EPA 1664)
(A)	Oil & Grease	(SM 5520 B)
(A)	Phenolics	(EPA 420.1)
(A)	Phenolics	(EPA 420.2)
(A)	Surfactants (MBAS)	(EPA 425.1)
(A)	Temperature	(EPA 170.1)
(A)	Turbidity	(EPA 180.1)

**NUTRIENTS

(A)	Ammonia	(EPA 350.1)
(A)	Ammonia	(EPA 350.2)
(A)	K Nitrogen	(EPA 351.3)
(A)	Nitrate	(EPA 300.0)
(A)	Nitrate	(EPA 353.2)
(A)	Nitrate-Nitrite	(EPA 300.0)
(A)	Nitrate-Nitrite	(EPA 353.2)
(A)	Organic Nitrogen	(TKN-NH3-CAL)
(A)	Phosphorus	(EPA 365.4)

**RESIDUES

(A)	Fixed & Volatile Solids in Solids & Semi-solid sample	(SM 2540 G)
(A)	Residue, Filterable (TDS)	(EPA 160.1)
(A)	Residue, Non Filterable (TSS)	(EPA 160.2)
(A)	Residue, Settleable	(EPA 160.5)
(A)	Residue, Total	(EPA 160.3)
(A)	Residue, Volatile	(EPA 160.4)

**ORGANIC CHEMISTRY (MEASUREMENT BY GC)

(A)	PHTHALATE ESTERS	(EPA 606)
(A)	ORGANOCHLORINE PESTICIDES/PCB'S	(EPA 608)
(A)	POLYNUCLEAR AROMATIC HYDROCARBONS	(EPA 610)
(A)	GC	(EPA 615)
(A)	GC	(EPA 619)

A-Approved P-Provisional I-Interim C-Conditional

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
WASTEWATER CERTIFICATION
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PACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER:E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE:04/30/2003

**ORGANIC CHEMISTRY (MEASUREMENT BY GC/MS)
(A) BASE/NEUTRALS & ACIDS--------------------------------(EPA 625)

**ORGANIC CHEMISTRY VOLATILES (MEASUREMENT BY GC)
(A) PURGEABLE AROMATICS----------------------------------(EPA 602)

**ORGANIC CHEMISTRY VOLATILES (MEASUREMENT BY GC/MS)
(A) PURGEABLE ORGANICS-----------------------------------(EPA 624)

A-Approved P-Provisional I-Interim C-Conditional

Pace Analytical Services, Inc.
Lenexa, KS

E-10116
Effective Date: 05/01/2002
Expiration Date: 04/30/2003

Clean Water Act - Organic Analytes Attachment

BIS(2-ETHYLHEXYL) PHTHALATE	EPA 606
ALDRIN	EPA 608
a-BHC	EPA 608
b-BHC	EPA 608
d-BHC	EPA 608
g-BHC (LINDANE)	EPA 608
CHLORDANE	EPA 608
4,4'-DDD	EPA 608
4,4'-DDE	EPA 608
4,4'-DDT	EPA 608
DIELDRIN	EPA 608
ENDOSULFAN I	EPA 608
ENDOSULFAN II	EPA 608
ENDOSULFAN SULFATE	EPA 608
ENDRIN	EPA 608
ENDRIN ALDEHYDE	EPA 608
HEPTACHLOR	EPA 608
HEPTACHLOR EPOXIDE	EPA 608
TOXAPHENE	EPA 608
PCB-1016	EPA 608
PCB-1221	EPA 608
PCB-1232	EPA 608
PCB-1242	EPA 608
PCB-1248	EPA 608
PCB-1254	EPA 608
PCB-1260	EPA 608
ACENAPHTHENE	EPA 610
ACENAPHTHYLENE	EPA 610
ANTHRACENE	EPA 610
BENZ(a)ANTHRACENE	EPA 610
BENZO(a)PYRENE	EPA 610
BENZO(b)FLUORANTHENE	EPA 610
BENZO(k)FLUORANTHENE	EPA 610
BENZO(g,h,i)PERYLENE	EPA 610
CHRYSENE	EPA 610
DIBENZ(a,h)ANTHRACENE	EPA 610
FLUORANTHENE	EPA 610
FLUORENE	EPA 610
INDENO(1,2,3-c,d)PYRENE	EPA 610
NAPHTHALENE	EPA 610
PHENANTHRENE	EPA 610
PYRENE	EPA 610
2,4-D	EPA 615
2,4-DB	EPA 615
DICAMBA	EPA 615
DICHLORPROP	EPA 615
DINOSEB	EPA 615
MCPA	EPA 615
MCPP	EPA 615
2,4,5-T	EPA 615
2,4,5-TP	EPA 615
ATRAZINE	EPA 619
PROMETON	EPA 619
PROPAZINE	EPA 619
SIMAZINE	EPA 619
1,2-DICHLOROBENZENE	EPA 625
1,3-DICHLOROBENZENE	EPA 625
1,4-DICHLOROBENZENE	EPA 625
2,4,6-TRICHLOROPHENOL	EPA 625
2,4-DICHLOROPHENOL	EPA 625
2,4-DIMETHYLPHENOL	EPA 625
2,4-DINITROPHENOL	EPA 625
2,4-DINITROTOLUENE	EPA 625
2,6-DINITROTOLUENE	EPA 625
2-CHLORONAPHTHALENE	EPA 625
2-CHLOROPHENOL	EPA 625
2-METHYL-4,6-DINITROPHENOL	EPA 625
2-NITROPHENOL	EPA 625
3,3'-DICHLOROBENZIDINE	EPA 625
4-BROMOPHENYL PHENYL ETHER	EPA 625
4-CHLORO-3-METHYLPHENOL	EPA 625
4-CHLOROPHENYL PHENYL ETHER	EPA 625
4-NITROPHENOL	EPA 625
ACENAPHTHENE	EPA 625
ACENAPHTHYLENE	EPA 625
ANTHRACENE	EPA 625
BENZ(a)ANTHRACENE	EPA 625
BENZIDINE	EPA 625
BENZO(a)PYRENE	EPA 625
BENZO(b)FLUORANTHENE	EPA 625
BENZO(g,h,i)PERYLENE	EPA 625
BENZO(k)FLUORANTHENE	EPA 625
BENZYL BUTYL PHTHALATE	EPA 625
BIS(2-CHLOROETHOXY)METHANE	EPA 625
BIS(2-CHLOROETHYL) ETHER	EPA 625
BIS(2-CHLOROISOPROPYL) ETHER	EPA 625
BIS(2-ETHYLHEXYL) PHTHALATE	EPA 625
CHRYSENE	EPA 625
DIBENZ(a,h)ANTHRACENE	EPA 625
DIETHYL PHTHALATE	EPA 625
DIMETHYL PHTHALATE	EPA 625
DI-n-BUTYL PHTHALATE	EPA 625
DI-n-OCTYL PHTHALATE	EPA 625
FLUORANTHENE	EPA 625
FLUORENE	EPA 625
g-BHC (LINDANE)	EPA 625
HEXACHLOROBENZENE	EPA 625
HEXACHLOROBUTADIENE	EPA 625
HEXACHLOROCYCLOPENTADIENE	EPA 625
HEXACHLOROETHANE	EPA 625
INDENO(1,2,3-c,d)PYRENE	EPA 625
ISOPHORONE	EPA 625
NAPHTHALENE	EPA 625
NITROBENZENE	EPA 625
N-NITROSODIMETHYLAMINE	EPA 625
N-NITROSODI-n-PROPYLAMINE	EPA 625
N-NITROSODIPHENYLAMINE	EPA 625
PENTACHLOROPHENOL	EPA 625

Pace Analytical Services, Inc.
Lenexa, KS

E-10116
Effective Date: 05/01/2002
Expiration Date: 04/30/2003

Clean Water Act - Organic Analytes Attachment

PHENANTHRENE	EPA 625
PHENOL	EPA 625
PYRENE	EPA 625

BENZENE	EPA 602
ETHYLBENZENE	EPA 602
TOLUENE	EPA 602

ACROLEIN	EPA 624
ACRYLONITRILE	EPA 624
BENZENE	EPA 624
BROMODICHLOROMETHANE	EPA 624
BROMOFORM	EPA 624
BROMOMETHANE	EPA 624
CARBON TETRACHLORIDE	EPA 624
CHLOROBENZENE	EPA 624
CHLOROETHANE	EPA 624
2-CHLOROETHYL VINYL ETHER	EPA 624
CHLOROFORM	EPA 624
CHLOROMETHANE	EPA 624
DIBROMOCHLOROMETHANE	EPA 624
1,2-DICHLOROBENZENE	EPA 624
1,3-DICHLOROBENZENE	EPA 624
1,4-DICHLOROBENZENE	EPA 624
1,1-DICHLOROETHANE	EPA 624
1,2-DICHLOROETHANE	EPA 624
1,1-DICHLOROETHENE	EPA 624
trans-1,2-DICHLOROETHENE	EPA 624
1,2-DICHLOROPROPANE	EPA 624
cis-1,3-DICHLOROPROPENE	EPA 624
trans-1,3-DICHLOROPROPENE	EPA 624
ETHYLBENZENE	EPA 624
METHYLENE CHLORIDE	EPA 624
1,1,2,2-TETRACHLOROETHANE	EPA 624
TETRACHLOROETHENE	EPA 624
TOLUENE	EPA 624
1,1,1-TRICHLOROETHANE	EPA 624
1,1,2-TRICHLOROETHANE	EPA 624
TRICHLOROETHENE	EPA 624
TRICHLOROFLUOROMETHANE	EPA 624
VINYL CHLORIDE	EPA 624

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
SOLID/HAZARDOUS WASTE CERTIFICATION
PARAMETER LIST

This certificate supersedes all previous certificates

PACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER:E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE:04/30/2003

The laboratory listed above is hereby approved for environmental laboratory certification in accordance with K.S.A. 65-1,109a for performing solids and/or hazardous waste analysis for the following parameters:

**CHARACTERISTICS
(A) Corrosivity--(EPA 1110)
(A) Ignitability---(EPA 1010)
(A) Reactive Cyanide-------------------------------------(CHAP 7, SEC. 7.3)
(A) Reactive Sulfide-------------------------------------(CHAP 7, SEC. 7.3)
(A) Synthetic Precipitation Leaching Procedure-----------(EPA 1312)
(A) Toxic Characteristic Leaching Procedure--------------(EPA 1311)

**DEMANDS
(A) Total Organic Carbon---------------------------------(EPA 9060)

**INORGANIC
(A) Cyanide, Amenable to CL------------------------------(EPA 9010B)
(A) Cyanide, Amenable to CL------------------------------(EPA 9012A)
(A) Cyanide, Total---------------------------------------(EPA 9010B)
(A) Cyanide, Total---------------------------------------(EPA 9012A)
(A) Phosphate, Ortho-------------------------------------(EPA 9056)

**METALS
(A) Aluminum---(EPA 6010B)
(A) Antimony---(EPA 6010B)
(A) Antimony---(EPA 7041)
(A) Arsenic--(EPA 6010B)
(A) Arsenic--(EPA 7060A)
(A) Barium---(EPA 6010B)
(A) Beryllium--(EPA 6010B)
(A) Boron--(EPA 6010B)
(A) Cadmium--(EPA 6010B)
(A) Calcium--(EPA 6010B)
(A) Chromium---(EPA 6010B)
(A) Cobalt---(EPA 6010B)
(A) Copper---(EPA 6010B)
(A) Iron---(EPA 6010B)
(A) Lead---(EPA 6010B)
(A) Lead---(EPA 7421)
(A) Lithium--(EPA 6010B)
(A) Magnesium--(EPA 6010B)
(A) Manganese--(EPA 6010B)
(A) Mercury--(EPA 7470A)
(A) Mercury--(EPA 7471A)

A-Approved P-Provisional I-Interim C-Conditional

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
SOLID/HAZARDOUS WASTE CERTIFICATION
PARAMETER LIST
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PACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER:E-10116
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EXPIRATION DATE:04/30/2003

(A) Molybdenum--(EPA 6010B)
(A) Nickel--(EPA 6010B)
(A) Potassium---(EPA 6010B)
(A) Selenium--(EPA 6010B)
(A) Selenium--(EPA 7740)
(A) Silica--(EPA 6010B)
(A) Silver--(EPA 6010B)
(A) Sodium--(EPA 6010B)
(A) Strontium---(EPA 6010B)
(A) Thallium--(EPA 6010B)
(A) Thallium--(EPA 7841)
(A) Tin---(EPA 6010B)
(A) Titanium--(EPA 6010B)
(A) Vanadium--(EPA 6010B)
(A) Zinc--(EPA 6010B)

**MINERALS
(A) Bromide---(EPA 9056)
(A) Chloride--(EPA 9056)
(A) Chloride--(EPA 9251)
(A) Fluoride--(EPA 9056)
(A) Sulfate---(EPA 9056)
(A) Sulfide---(EPA 9034)

**MISCELLANEOUS
(A) Cation-Exchange Capacity of Soils-------------------(EPA 9081)
(A) Hydrogen Ion (pH)-----------------------------------(EPA 9040B)
(A) Hydrogen Ion (pH)-----------------------------------(EPA 9045C)
(A) Oil & Grease--(EPA 9070A)
(A) Oil & Grease--(EPA 9071B)
(A) Paint Filter Liquids Test---------------------------(EPA 9095A)
(A) Phenolics---(EPA 9065)
(A) Phenolics---(EPA 9066)
(A) Specific Conductance--------------------------------(EPA 9050A)

**NUTRIENTS
(A) Nitrate---(EPA 9056)
(A) Nitrite---(EPA 9056)

**ORGANIC CHEMISTRY (MEASUREMENT BY GC)
(A) EDB AND DBCP--(EPA 8011)
(A) ORGANOCHLORINE PESTICIDES---------------------------(EPA 8081A)
(A) POLYCHLORINATED BIPHENYLS---------------------------(EPA 8082)

A-Approved P-Provisional I-Interim C-Conditional

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Environmental Laboratory Certification
SOLID/HAZARDOUS WASTE CERTIFICATION
PARAMETER LIST

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PACE ANALYTICAL SERVICES INC
9608 LOIRET BOULEVARD
LENEXA, KS 66219-2406

CERTIFICATE NUMBER:E-10116
EFFECTIVE DATE: 05/01/2002
EXPIRATION DATE:04/30/2003

(A) ORGANOPHOSPHORUS PESTICIDES--------------------------(EPA 8141A)
(A) CHLORINATED HERBICIDES------------------------------(EPA 8151A)

**ORGANIC CHEMISTRY (MEASUREMENT BY GC/MS)
(A) SEMIVOLATILES BY GC/MS CAPILLARY COLUMN--------------(EPA 8270C)

**ORGANIC CHEMISTRY (MEASUREMENT BY HPLC)
(A) POLYNUCLEAR AROMATIC HYDROCARBONS BY HPLC------------(EPA 8310)

**ORGANIC CHEMISTRY VOLATILES (MEASUREMENT BY GC)
(A) VOLATILE ORGANIC COMPOUNDS---------------------------(EPA 8021B)

**ORGANIC CHEMISTRY VOLATILES (MEASUREMENT BY GC/MS)
(A) VOLATILES BY GC/MS CAPILLARY COLUMN------------------(EPA 8260B)

A-Approved P-Provisional I-Interim C-Conditional

Pace analytical Services, Inc.
Lenexa, KS

E-10116
Effective Date: 05/01/2002
Expiration Date: 04/30/2003

Solids & Hazardous Waste - Organic Analytes Attachment

1,2-DIBROMOETHANE	EPA 8011
DIBROMOCHLOROPROPANE	EPA 8011
4,4'-DDD	EPA 8081A
4,4'-DDE	EPA 8081A
4,4'-DDT	EPA 8081A
a-BHC	EPA 8081A
a-CHLORDANE	EPA 8081A
ALDRIN	EPA 8081A
b-BHC	EPA 8081A
CHLORDANE (tech.)	EPA 8081A
d-BHC	EPA 8081A
DIELDRIN	EPA 8081A
ENDOSULFAN I	EPA 8081A
ENDOSULFAN II	EPA 8081A
ENDOSULFAN SULFATE	EPA 8081A
ENDRIN	EPA 8081A
ENDRIN ALDEHYDE	EPA 8081A
ENDRIN KETONE	EPA 8081A
g-BHC (LINDANE)	EPA 8081A
g-CHLORDANE	EPA 8081A
HEPTACHLOR	EPA 8081A
HEPTACHLOR EPOXIDE	EPA 8081A
METHOXYCHLOR	EPA 8081A
TOXAPHENE	EPA 8081A
PCB-1016	EPA 8082
PCB-1221	EPA 8082
PCB-1232	EPA 8082
PCB-1242	EPA 8082
PCB-1248	EPA 8082
PCB-1254	EPA 8082
PCB-1260	EPA 8082
ATRAZINE	EPA 8141A
AZINPHOS METHYL	EPA 8141A
BOLSTAR	EPA 8141A
CHLORFENVINPHOS	EPA 8141A
CHLORPYRIFOS	EPA 8141A
COUMAPHOS	EPA 8141A
DEMETON-O	EPA 8141A
DEMETON-S	EPA 8141A
DIAZINON	EPA 8141A
DICHLORVOS	EPA 8141A
DIMETHOATE	EPA 8141A
EPN	EPA 8141A
ETHION	EPA 8141A
ETHOPROP	EPA 8141A
FAMPHUR	EPA 8141A
FENSULFOTHION	EPA 8141A
FENTHION	EPA 8141A
MALATHION	EPA 8141A
MERPHOS	EPA 8141A
MEVINPHOS	EPA 8141A
NALED	EPA 8141A
PARATHION (ETHYL)	EPA 8141A

PARATHION METHYL	EPA 8141A
PHORATE	EPA 8141A
RONNEL	EPA 8141A
SIMAZINE	EPA 8141A
STIROPHOS	EPA 8141A
SULFOTEPP	EPA 8141A
TEPP	EPA 8141A
TERBUFOS	EPA 8141A
THIONAZIN	EPA 8141A
TOKUTHION	EPA 8141A
TRICHLORONATE	EPA 8141A
2,4,5-T	EPA 8151A
2,4,5-TP (SILVEX)	EPA 8151A
2,4-D	EPA 8151A
2,4-DB	EPA 8151A
DALAPON	EPA 8151A
DICAMBA	EPA 8151A
DICHLORPROP	EPA 8151A
DINOSEB	EPA 8151A
MCPA	EPA 8151A
MCPP	EPA 8151A
1,2,4-TRICHLOROBENZENE	EPA 8270C
1,2-DICHLOROBENZENE	EPA 8270C
1,2-DIPHENYLHYDRAZINE	EPA 8270C
1,3-DICHLOROBENZENE	EPA 8270C
1,4-DICHLOROBENZENE	EPA 8270C
1-CHLORONAPHTHALENE	EPA 8270C
2,4,5-TRICHLOROPHENOL	EPA 8270C
2,4,6-TRICHLOROPHENOL	EPA 8270C
2,4-DICHLOROPHENOL	EPA 8270C
2,4-DIMETHYLPHENOL	EPA 8270C
2,4-DINITROPHENOL	EPA 8270C
2,4-DINITROTOLUENE	EPA 8270C
2,6-DICHLOROPHENOL	EPA 8270C
2,6-DINITROTOLUENE	EPA 8270C
2-CHLORONAPHTHALENE	EPA 8270C
2-CHLOROPHENOL	EPA 8270C
2-METHYL-4,6-DINITROPHENOL	EPA 8270C
2-METHYLNAPHTHALENE	EPA 8270C
2-METHYLPHENOL	EPA 8270C
2-NITROANILINE	EPA 8270C
2-NITROPHENOL	EPA 8270C
3,3'-DICHLOROBENZIDINE	EPA 8270C
3-METHYLPHENOL	EPA 8270C
3-NITROANILINE	EPA 8270C
4-BROMOPHENYL PHENYL ETHER	EPA 8270C
4-CHLORO-3-METHYLPHENOL	EPA 8270C
4-CHLOROANILINE	EPA 8270C
4-CHLOROPHENYL PHENYL ETHER	EPA 8270C
4-METHYLPHENOL	EPA 8270C
4-NITROANILINE	EPA 8270C
4-NITROPHENOL	EPA 8270C
7,12-DIMETHYLBENZ(a)ANTHRACENE	EPA 8270C
ACENAPHTHENE	EPA 8270C

Pace analytical Services, Inc.
Lenexa, KS

E-10116
Effective Date: 05/01/2002
Expiration Date: 04/30/2003

Solids & Hazardous Waste - Organic Analytes Attachment

ACENAPHTHYLENE	EPA 8270C
ACETOPHENONE	EPA 8270C
ANILINE	EPA 8270C
ANTHRACENE	EPA 8270C
BENZ(a)ANTHRACENE	EPA 8270C
BENZIDINE	EPA 8270C
BENZO(a)PYRENE	EPA 8270C
BENZO(b)FLUORANTHENE	EPA 8270C
BENZO(g,h,i)PERYLENE	EPA 8270C
BENZO(k)FLUORANTHENE	EPA 8270C
BENZOIC ACID	EPA 8270C
BENZYL ALCOHOL	EPA 8270C
BENZYL BUTYL PHTHALATE	EPA 8270C
BIS(2-CHLOROETHOXY)METHANE	EPA 8270C
BIS(2-CHLOROETHYL) ETHER	EPA 8270C
BIS(2-CHLOROISOPROPYL) ETHER	EPA 8270C
BIS(2-ETHYLHEXYL) PHTHALATE	EPA 8270C
CHRYSENE	EPA 8270C
DIBENZ(a,h)ANTHRACENE	EPA 8270C
DIBENZOFURAN	EPA 8270C
DIETHYL PHTHALATE	EPA 8270C
DIMETHYL PHTHALATE	EPA 8270C
DI-n-BUTYL PHTHALATE	EPA 8270C
DI-n-OCTYL PHTHALATE	EPA 8270C
DIPHENYLAMINE	EPA 8270C
FLUORANTHENE	EPA 8270C
FLUORENE	EPA 8270C
HEXACHLOROBENZENE	EPA 8270C
HEXACHLOROBUTADIENE	EPA 8270C
HEXACHLOROCYCLOPENTADIENE	EPA 8270C
HEXACHLOROETHANE	EPA 8270C
INDENO(1,2,3-c,d)PYRENE	EPA 8270C
ISOPHORONE	EPA 8270C
NAPHTHALENE	EPA 8270C
NITROBENZENE	EPA 8270C
N-NITROSODIETHYLAMINE	EPA 8270C
N-NITROSODIMETHYLAMINE	EPA 8270C
N-NITROSODI-n-BUTYLAMINE	EPA 8270C
N-NITROSODI-n-PROPYLAMINE	EPA 8270C
N-NITROSODIPHENYLAMINE	EPA 8270C
N-NITROSOMETHYLETHYLAMINE	EPA 8270C
PENTACHLOROBENZENE	EPA 8270C
PENTACHLOROPHENOL	EPA 8270C
PHENANTHRENE	EPA 8270C
PHENOL	EPA 8270C
PYRENE	EPA 8270C
PYRIDINE	EPA 8270C

ACENAPHTHENE	EPA 8310
ACENAPHTHYLENE	EPA 8310
ANTHRACENE	EPA 8310
BENZ(a)ANTHRACENE	EPA 8310
BENZO(a)PYRENE	EPA 8310
BENZO(b)FLUORANTHENE	EPA 8310
BENZO(g,h,i)PERYLENE	EPA 8310
BENZO(k)FLUORANTHENE	EPA 8310
CHRYSENE	EPA 8310
DIBENZ(a,h)ANTHRACENE	EPA 8310
FLUORANTHENE	EPA 8310
FLUORENE	EPA 8310
INDENO(1,2,3-c,d)PYRENE	EPA 8310
NAPHTHALENE	EPA 8310
PHENANTHRENE	EPA 8310
PYRENE	EPA 8310

1,2-DIBROMOETHANE (EDB)	EPA 8021B
1,2-DICHLOROETHANE	EPA 8021B
BENZENE	EPA 8021B
ETHYLBENZENE	EPA 8021B
m-Xylene	EPA 8021B
NAPHTHALENE	EPA 8021B
o-Xylene	EPA 8021B
p-Xylene	EPA 8021B
TOLUENE	EPA 8021B

1,1,1,2-TETRACHLOROETHANE	EPA 8260B
1,1,1-TRICHLOROETHANE	EPA 8260B
1,1,2,2-TETRACHLOROETHANE	EPA 8260B
1,1,2-TRICHLOROETHANE	EPA 8260B
1,1-DICHLOROETHANE	EPA 8260B
1,1-DICHLOROETHENE	EPA 8260B
1,1-DICHLOROPROPENE	EPA 8260B
1,2,3-TRICHLOROBENZENE	EPA 8260B
1,2,3-TRICHLOROPROPANE	EPA 8260B
1,2,4-TRICHLOROBENZENE	EPA 8260B
1,2,4-TRIMETHYLBENZENE	EPA 8260B
1,2-DIBROMOETHANE (EDB)	EPA 8260B
1,2-DICHLOROBENZENE	EPA 8260B
1,2-DICHLOROETHANE	EPA 8260B
1,2-DICHLOROPROPANE	EPA 8260B
1,3,5-TRIMETHYLBENZENE	EPA 8260B
1,3-DICHLOROBENZENE	EPA 8260B
1,3-DICHLOROPROPANE	EPA 8260B
1,4-DICHLOROBENZENE	EPA 8260B
1,4-DIOXANE	EPA 8260B
1-CHLOROHEXANE	EPA 8260B
2,2-DICHLOROPROPANE	EPA 8260B
2-CHLOROETHYL VINYL ETHER	EPA 8260B
2-CHLOROTOLUENE	EPA 8260B
2-HEXANONE (MBK)	EPA 8260B
4-CHLOROTOLUENE	EPA 8260B
4-METHYL-2-PENTANONE (MIBK)	EPA 8260B
ACETONE	EPA 8260B
ACETONITRILE	EPA 8260B
ACROLEIN	EPA 8260B
ACRYLONITRILE	EPA 8260B
BENZENE	EPA 8260B
BROMOBENZENE	EPA 8260B
BROMOCHLOROMETHANE	EPA 8260B
BROMODICHLOROMETHANE	EPA 8260B
BROMOFORM	EPA 8260B
BROMOMETHANE	EPA 8260B

Solids & Hazardous Waste - Organic Analytes Attachment

CARBON DISULFIDE	EPA 8260B
CARBON TETRACHLORIDE	EPA 8260B
CHLOROBENZENE	EPA 8260B
CHLOROETHANE	EPA 8260B
CHLOROFORM	EPA 8260B
CHLOROMETHANE	EPA 8260B
cis-1,2-DICHLOROETHENE	EPA 8260B
cis-1,3-DICHLOROPROPENE	EPA 8260B
cis-1,4-DICHLORO-2-BUTENE	EPA 8260B
DIBROMOCHLOROMETHANE	EPA 8260B
DIBROMOCHLOROPROPANE	EPA 8260B
DIBROMOMETHANE	EPA 8260B
DICHLORODIFLUOROMETHANE	EPA 8260B
ETHYLBENZENE	EPA 8260B
HEXACHLOROBUTADIENE	EPA 8260B
HEXACHLOROETHANE	EPA 8260B
IODOMETHANE	EPA 8260B
ISOPROPYLBENZENE	EPA 8260B
METHYL ETHYL KETONE (MEK)	EPA 8260B
METHYL METHACRYLATE	EPA 8260B
METHYLENE CHLORIDE	EPA 8260B
METHYL-T-BUTYL ETHER	EPA 8260B
m-Xylene	EPA 8260B
NAPHTHALENE	EPA 8260B
n-BUTYLBENZENE	EPA 8260B
n-PROPYLBENZENE	EPA 8260B
o-Xylene	EPA 8260B
p-ISOPROPYLTOLUENE	EPA 8260B
p-Xylene	EPA 8260B
sec-BUTYLBENZENE	EPA 8260B
STYRENE	EPA 8260B
tert-BUTYLBENZENE	EPA 8260B
TETRACHLOROETHENE	EPA 8260B
TOLUENE	EPA 8260B
trans-1,2-DICHLOROETHENE	EPA 8260B
trans-1,3-DICHLOROPROPENE	EPA 8260B
trans-1,4-DICHLORO-2-BUTENE	EPA 8260B
TRICHLOROETHENE	EPA 8260B
TRICHLOROFLUOROMETHANE	EPA 8260B
VINYL ACETATE	EPA 8260B
VINYL CHLORIDE	EPA 8260B

Attachment E
Corrective action report

Pace Analytical Services, Inc.
Kansas laboratory

PE Sample Investigation Report for Unacceptable Results
Study ID:

Parameter:

Analysis Preparation

Were correct volumes used?
Were any problems noted during extract blow-down? (organics)
Was the final volume accurately measured and recorded?
Were the directions for preparation of ampulated samples followed correctly?
Were any special instructions for preparation included with the samples? (i.e. use entire volume)
Were duplicate/spikes performed on the QC sample?
Any additional comments?

Calibration and Analysis

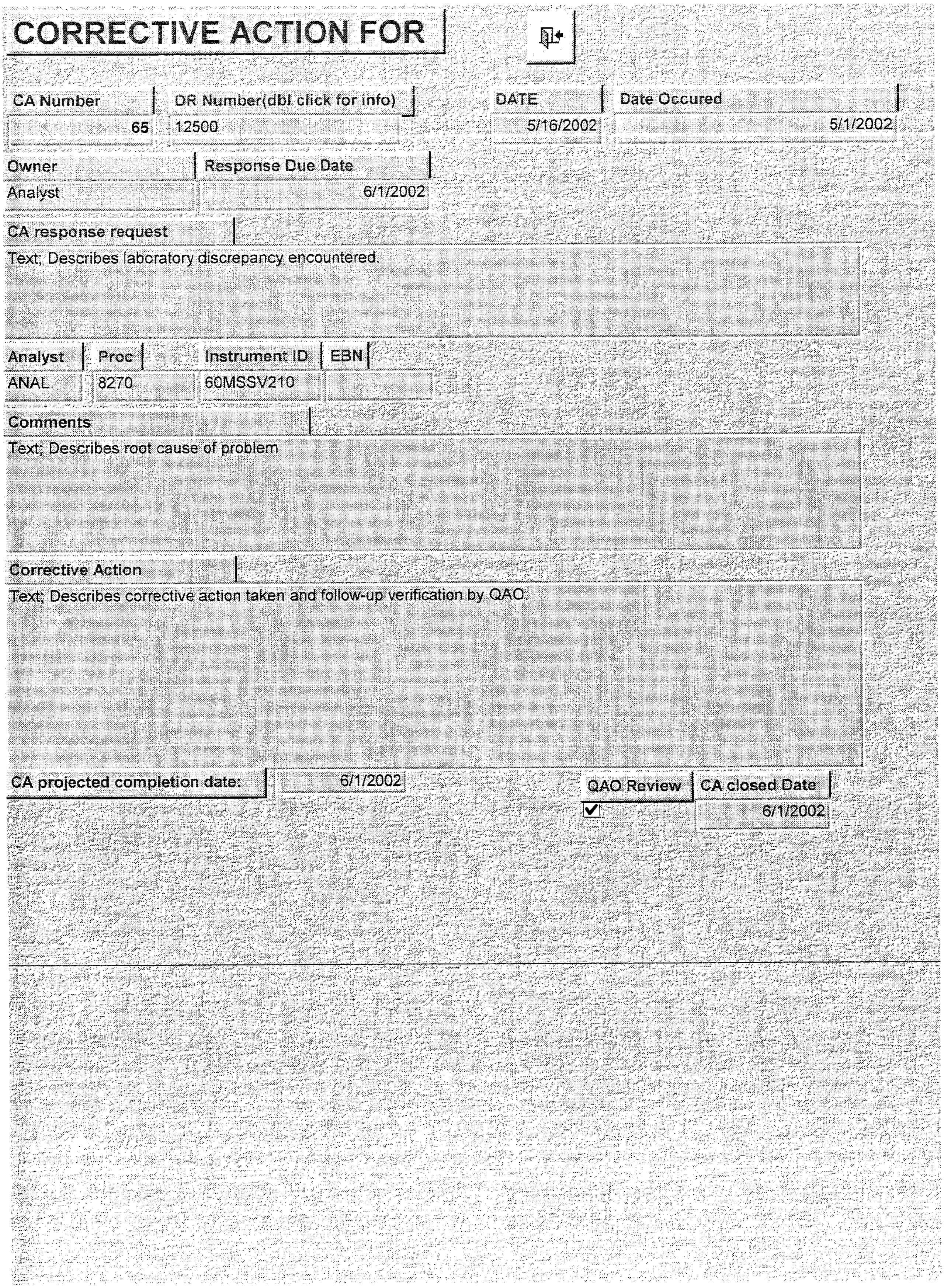
What was the RSD/corr. coef. for this analyte in initial calibration?
What was the %D for this analyte in continuing calibration?
Is there any associated MS data for this analyte?
If so, what were the percent recovery/RPD values?
What was the result (% rec) of the LCS or any other reference standard for this analyte?
Were any dilutions necessary?
If so, were dilutions accurately used in the calculation of the result?
Were any blank contamination problems found which could affect this result?
Any additional comments?

Corrective Actions

Result of follow-up performance sample (re-analyze the same PE if practical)

Concentration:
Result:
% Recovery:

QAO Comments:



CORRECTIVE ACTION FOR

CA Number	DR Number(dbl click for info)	DATE	Date Occured
65	12500	5/16/2002	5/1/2002

Owner	Response Due Date
Analyst	6/1/2002

CA response request

Text; Describes laboratory discrepancy encountered.

Analyst	Proc	Instrument ID	EBN
ANAL	8270	60MSSV210	

Comments

Text; Describes root cause of problem

Corrective Action

Text; Describes corrective action taken and follow-up verification by QAO.

CA projected completion date:	6/1/2002

QAO Review	CA closed Date
☑	6/1/2002

Attachment F
Methods and Minimum Reporting Limits

Pace Analytical Services, Inc.
Lenexa, Kansas Laboratory

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 130.2	Water	Hardness, Calcium	1	mg/L
EPA 130.2	Water	Hardness, Magnesium	1	mg/L
EPA 130.2	Water	Total Hardness	1	mg/L
EPA 160.1	Water	Total Dissolved Solids	5	mg/L
EPA 160.2	Water	Total Suspended Solids	5	mg/L
EPA 160.2	Water	Fixed Suspended Solids	5	mg/L
EPA 160.2	Water	Volatile Suspended Solids	5	mg/L
EPA 160.3	Water	Percent Solids	0.01	%
EPA 160.3	Water	Total Solids	5	mg/L
EPA 160.4	Water	Total Volatile Solids	5	mg/L
EPA 160.5	Water	Total Settleable Solids	0.2	mL/L/hr
EPA 1664	Water	Oil and Grease	5	mg/L
EPA 1664	Water	Oil and Grease Animal/Veg	5	mg/L
EPA 1664	Water	Total Petroleum Hydrocarbons	5	mg/L
EPA 200.7	Water	Silver	7	ug/L
EPA 200.7	Water	Aluminum	75	ug/L
EPA 200.7	Water	Arsenic	85	ug/L
EPA 200.7	Water	Gold	100	ug/L
EPA 200.7	Water	Boron	30	ug/L
EPA 200.7	Water	Barium	4	ug/L
EPA 200.7	Water	Beryllium	1	ug/L
EPA 200.7	Water	Calcium	100	ug/L
EPA 200.7	Water	Cadmium	5	ug/L
EPA 200.7	Water	Cobalt	7	ug/L
EPA 200.7	Water	Chromium	7	ug/L
EPA 200.7	Water	Copper	10	ug/L
EPA 200.7	Water	Iron	40	ug/L
EPA 200.7	Water	Potassium	1000	ug/L
EPA 200.7	Water	Lithium	50	ug/L
EPA 200.7	Water	Magnesium	50	ug/L
EPA 200.7	Water	Manganese	7	ug/L
EPA 200.7	Water	Molybdenum	20	ug/L
EPA 200.7	Water	Sodium	150	ug/L
EPA 200.7	Water	Nickel	30	ug/L
EPA 200.7	Water	Phosphorus	100	ug/L
EPA 200.7	Water	Lead	50	ug/L
EPA 200.7	Water	Antimony	50	ug/L
EPA 200.7	Water	Selenium	100	ug/L
EPA 200.7	Water	Silicon	500	ug/L
EPA 200.7	Water	Tin	250	ug/L
EPA 200.7	Water	Strontium	15	ug/L
EPA 200.7	Water	Titanium	10	ug/L
EPA 200.7	Water	Thallium	100	ug/L
EPA 200.7	Water	Vanadium	12	ug/L
EPA 200.7	Water	Zinc	100	ug/L
EPA 200.7 Trace	Water	Silver	7	ug/L
EPA 200.7 Trace	Water	Aluminum	75	ug/L
EPA 200.7 Trace	Water	Arsenic	5	ug/L
EPA 200.7 Trace	Water	Gold	100	ug/L
EPA 200.7 Trace	Water	Boron	30	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 200.7 Trace	Water	Barium	4	ug/L
EPA 200.7 Trace	Water	Beryllium	1	ug/L
EPA 200.7 Trace	Water	Calcium	100	ug/L
EPA 200.7 Trace	Water	Cadmium	5	ug/L
EPA 200.7 Trace	Water	Cobalt	7	ug/L
EPA 200.7 Trace	Water	Chromium	7	ug/L
EPA 200.7 Trace	Water	Copper	10	ug/L
EPA 200.7 Trace	Water	Iron	40	ug/L
EPA 200.7 Trace	Water	Potassium	1000	ug/L
EPA 200.7 Trace	Water	Lithium	50	ug/L
EPA 200.7 Trace	Water	Magnesium	50	ug/L
EPA 200.7 Trace	Water	Manganese	7	ug/L
EPA 200.7 Trace	Water	Molybdenum	20	ug/L
EPA 200.7 Trace	Water	Sodium	150	ug/L
EPA 200.7 Trace	Water	Nickel	30	ug/L
EPA 200.7 Trace	Water	Phosphorus	100	ug/L
EPA 200.7 Trace	Water	Lead	5	ug/L
EPA 200.7 Trace	Water	Antimony	10	ug/L
EPA 200.7 Trace	Water	Selenium	5	ug/L
EPA 200.7 Trace	Water	Silicon	500	ug/L
EPA 200.7 Trace	Water	Tin	250	ug/L
EPA 200.7 Trace	Water	Strontium	15	ug/L
EPA 200.7 Trace	Water	Titanium	10	ug/L
EPA 200.7 Trace	Water	Thallium	5	ug/L
EPA 200.7 Trace	Water	Vanadium	12	ug/L
EPA 200.7 Trace	Water	Zinc	20	ug/L
EPA 204.2	Water	Antimony	10	ug/L
EPA 206.2	Water	Arsenic	5	ug/L
EPA 239.2	Water	Lead	5	ug/L
EPA 245.1	Water	Mercury	0.2	ug/L
EPA 245.2	Solid	Mercury	0.154	mg/kg
EPA 270.2	Water	Selenium	5	ug/L
EPA 279.1	Water	Thallium	5	ug/L
EPA 300.0	Solid	Chloride	5	mg/kg
EPA 300.0	Solid	Fluoride	5	mg/kg
EPA 300.0	Solid	Sulfate	5	mg/kg
EPA 300.0	Solid	Bromide	5	mg/kg
EPA 300.0	Solid	Iodide	5	mg/kg
EPA 300.0	Solid	Nitrite as N	5	mg/kg
EPA 300.0	Solid	Nitrate as N	1	mg/kg
EPA 300.0	Solid	Orthophosphate as P	5	mg/kg
EPA 300.0	Water	Chloride	1	mg/L
EPA 300.0	Water	Fluoride	0.2	mg/L
EPA 300.0	Water	Sulfate	1	mg/L
EPA 300.0	Water	Bromide	1	mg/L
EPA 300.0	Water	Iodide	1	mg/L
EPA 300.0	Water	Nitrite as N	1	mg/L
EPA 300.0	Water	Nitrate as N	1	mg/L
EPA 300.0	Water	Orthophosphate as P	1	mg/L
EPA 305.1	Solid	Acidity, Total	10	mg/kg
EPA 305.1	Water	Acidity, Total	1	mg/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 310.2	Water	Alkalinity,Bicarbonate (CaCO3)	1	mg/L
EPA 310.2	Water	Alkalinity, Carbonate (CaCO)	1	mg/L
EPA 310.2	Water	Alkalinity, Hydroxide (CaCO)	1	mg/L
EPA 310.2	Water	Alkalinity, Total	1	mg/L
EPA 310.2	Solid	Alkalinity, Total	10	mg/kg
EPA 325.2	Solid	Chloride	100	mg/kg
EPA 325.2	Water	Chloride	1	mg/L
EPA 330.5	Water	Chlorine, Total Residual	0.05	mg/L
EPA 335.3	Solid	Cyanide, Dissociable	0.05	mg/kg
EPA 335.3	Water	Cyanide	0.005	mg/L
EPA 335.3	Solid	Cyanide	0.05	mg/kg
EPA 335.3	Water	Cyanide	0.01	mg/L
EPA 335.1	Water	Amenable Cyanide	0.01	mg/L
EPA 335.3	Water	Residual Cyanide	0.01	mg/L
SM 3500-Fe D	Water	Iron, Ferrous	0.2	mg/L
SM 3500-Fe D	Water	Iron, Ferrous, Dissolved	0.2	mg/L
EPA 350.2	Water	Nitrogen, Ammonia	0.2	mg/L
EPA 351.3	Water	Nitrogen, Kjeldahl, Total	0.2	mg/L
EPA 353.2	Solid	Nitrogen, NO2 plus NO3	5	mg/kg
EPA 353.2	Water	Nitrogen, NO2 plus NO3	0.5	mg/L
EPA 353.2	Water	Nitrogen, Nitrite	0.5	mg/L
EPA 353.2	Water	Nitrogen, Nitrate	0.5	mg/L
EPA 360.1	Water	Oxygen, Dissolved	0.1	mg/L
EPA 365.4	Solid	Phosphorus	5	mg/kg
EPA 365.4	Water	Phosphorus	0.5	mg/L
SM 4500 Si D	Water	Silica	1	mg/L
SM 4500 Si D	Water	Silica, Dissolved	1	mg/L
EPA 376.1	Water	Sulfide	0.5	mg/L
EPA 377.1	Water	Sulfite	2	mg/L
EPA 405.1	Water	BOD, 5 day	2	mg/L
EPA 410.4	Water	Chemical Oxygen Demand	4	mg/L
EPA 415.1	Water	Total Organic Carbon	1	mg/L
EPA 420.1	Water	Phenolics, Total Recoverable	0.05	mg/L
EPA 420.2	Water	Phenolics, Total Recoverable	0.05	mg/L
EPA 425.1	Water	Surfactants	0.2	mg/L
EPA 504.1	Water	1,2-Dibromo-3-chloropropane	0.03	ug/L
EPA 504.1	Water	1,2-Dibromoethane (EDB)	0.03	ug/L
EPA 524.2	Water	1,1-Dichloroethane	0.5	ug/L
EPA 524.2	Water	1,1-Dichloroethene	0.5	ug/L
EPA 524.2	Water	1,1-Dichloropropene	0.5	ug/L
EPA 524.2	Water	1,1,1-Trichloroethane	0.5	ug/L
EPA 524.2	Water	1,1,2-Trichloroethane	0.5	ug/L
EPA 524.2	Water	1,1,1,2-Tetrachloroethane	0.5	ug/L
EPA 524.2	Water	1,1,2,2-Tetrachloroethane	0.5	ug/L
EPA 524.2	Water	1,2,4-Trichlorobenzene	0.5	ug/L
EPA 524.2	Water	1,2-Dichlorobenzene	0.5	ug/L
EPA 524.2	Water	1,2-Dibromo-3-chloropropane	5	ug/L
EPA 524.2	Water	1,2-Dichloroethane	0.5	ug/L
EPA 524.2	Water	1,2-Dibromoethane (EDB)	0.5	ug/L
EPA 524.2	Water	1,2-Dichloropropane	0.5	ug/L
EPA 524.2	Water	1,2,4-Trimethylbenzene	0.5	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 524.2	Water	1,2,3-Trichlorobenzene	1	ug/L
EPA 524.2	Water	1,2,3-Trichloropropane	1	ug/L
EPA 524.2	Water	1,3-Dichlorobenzene	0.5	ug/L
EPA 524.2	Water	1,3-Dichloropropane	0.5	ug/L
EPA 524.2	Water	1,3,5-Trimethylbenzene	0.5	ug/L
EPA 524.2	Water	1,4-Dichlorobenzene	0.5	ug/L
EPA 524.2	Water	1,2-Dichlorobenzene-d4 (S)		ug/L
EPA 524.2	Water	2,2-Dichloropropane	0.5	ug/L
EPA 524.2	Water	2-Chlorotoluene	0.5	ug/L
EPA 524.2	Water	4-Chlorotoluene	0.5	ug/L
EPA 524.2	Water	4-Bromofluorobenzene (S)		ug/L
EPA 524.2	Water	Bromochloromethane	0.5	ug/L
EPA 524.2	Water	Benzene	0.5	ug/L
EPA 524.2	Water	Bromobenzene	0.5	ug/L
EPA 524.2	Water	Bromodichloromethane	0.5	ug/L
EPA 524.2	Water	Bromomethane	0.5	ug/L
EPA 524.2	Water	Bromoform	0.5	ug/L
EPA 524.2	Water	cis-1,2-Dichloroethene	0.5	ug/L
EPA 524.2	Water	cis-1,3-Dichloropropene	0.5	ug/L
EPA 524.2	Water	Carbon tetrachloride	0.5	ug/L
EPA 524.2	Water	Chlorobenzene	0.5	ug/L
EPA 524.2	Water	Chloroethane	0.5	ug/L
EPA 524.2	Water	Chloroform	0.5	ug/L
EPA 524.2	Water	Chloromethane	0.5	ug/L
EPA 524.2	Water	Dibromochloromethane	0.5	ug/L
EPA 524.2	Water	Dichlorodifluoromethane	0.5	ug/L
EPA 524.2	Water	Dibromomethane	0.5	ug/L
EPA 524.2	Water	Ethylbenzene	0.5	ug/L
EPA 524.2	Water	Hexachloro-1,3-butadiene	0.5	ug/L
EPA 524.2	Water	Isopropylbenzene (Cumene)	0.5	ug/L
EPA 524.2	Water	Methylene chloride	1	ug/L
EPA 524.2	Water	Methyl-tert-butyl ether	1	ug/L
EPA 524.2	Water	m&p-Xylene	1	ug/L
EPA 524.2	Water	Naphthalene	1	ug/L
EPA 524.2	Water	n-Butylbenzene	0.5	ug/L
EPA 524.2	Water	n-Propylbenzene	0.5	ug/L
EPA 524.2	Water	o-Xylene	0.5	ug/L
EPA 524.2	Water	p-Isopropyltoluene	0.5	ug/L
EPA 524.2	Water	sec-Butylbenzene	0.5	ug/L
EPA 524.2	Water	Styrene	0.5	ug/L
EPA 524.2	Water	trans-1,2-Dichloroethene	0.5	ug/L
EPA 524.2	Water	trans-1,3-Dichloropropene	0.5	ug/L
EPA 524.2	Water	Tetrachloroethene	0.5	ug/L
EPA 524.2	Water	Toluene	0.5	ug/L
EPA 524.2	Water	Trichloroethene	0.5	ug/L
EPA 524.2	Water	Trichlorofluoromethane	0.5	ug/L
EPA 524.2	Water	tert-Butylbenzene	0.5	ug/L
EPA 524.2	Water	Vinyl chloride	0.5	ug/L
SM 5520 B	Solid	Oil and Grease	50	mg/kg
SM 5520 B	Water	Oil and Grease	5	mg/L
SM 5520 B	Solid	Total Petroleum Hydrocarbons	50	mg/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
SM 5520 B	Water	Oil and Grease	5	mg/L
EPA 6010B	Solid	Silver	0.7	mg/kg
EPA 6010B	Solid	Aluminum	7.5	mg/kg
EPA 6010B	Solid	Arsenic	8.5	mg/kg
EPA 6010B	Solid	Gold	10	mg/kg
EPA 6010B	Solid	Boron	3	mg/kg
EPA 6010B	Solid	Barium	0.4	mg/kg
EPA 6010B	Solid	Beryllium	0.1	mg/kg
EPA 6010B	Solid	Calcium	10	mg/kg
EPA 6010B	Solid	Cadmium	0.5	mg/kg
EPA 6010B	Solid	Cobalt	0.7	mg/kg
EPA 6010B	Solid	Chromium	0.7	mg/kg
EPA 6010B	Solid	Copper	1	mg/kg
EPA 6010B	Solid	Iron	4	mg/kg
EPA 6010B	Solid	Potassium	100	mg/kg
EPA 6010B	Solid	Lithium	5	mg/kg
EPA 6010B	Solid	Magnesium	5	mg/kg
EPA 6010B	Solid	Manganese	0.7	mg/kg
EPA 6010B	Solid	Molybdenum	2	mg/kg
EPA 6010B	Solid	Sodium	15	mg/kg
EPA 6010B	Solid	Nickel	3	mg/kg
EPA 6010B	Solid	Phosphorus	10	mg/kg
EPA 6010B	Solid	Lead	5	mg/kg
EPA 6010B	Solid	Antimony	5	mg/kg
EPA 6010B	Solid	Selenium	10	mg/kg
EPA 6010B	Solid	Silicon	50	mg/kg
EPA 6010B	Solid	Tin	25	mg/kg
EPA 6010B	Solid	Strontium	1.5	mg/kg
EPA 6010B	Solid	Tellurium	1000	mg/kg
EPA 6010B	Solid	Titanium	1	mg/kg
EPA 6010B	Solid	Thallium	10	mg/kg
EPA 6010B	Solid	Vanadium	1.2	mg/kg
EPA 6010B	Solid	Zinc	10	mg/kg
EPA 6010B	Water	Silver	5	ug/L
EPA 6010B	Water	Arsenic	10	ug/L
EPA 6010B	Water	Boron	5	ug/L
EPA 6010B	Water	Barium	0.4	ug/L
EPA 6010B	Water	Beryllium	0.1	ug/L
EPA 6010B	Water	Cadmium	0.5	ug/L
EPA 6010B	Water	Cobalt	1	ug/L
EPA 6010B	Water	Chromium	1	ug/L
EPA 6010B	Water	Copper	1	ug/L
EPA 6010B	Water	Iron	5	ug/L
EPA 6010B	Water	Nickel	5	ug/L
EPA 6010B	Water	Lead	5	ug/L
EPA 6010B	Water	Selenium	10	ug/L
EPA 6010B	Water	Titanium	5	ug/L
EPA 6010B	Water	Zinc	5	ug/L
EPA 6010B	Water	Silver	7	ug/L
EPA 6010B	Water	Aluminum	75	ug/L
EPA 6010B	Water	Arsenic	85	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 6010B	Water	Gold	100	ug/L
EPA 6010B	Water	Boron	30	ug/L
EPA 6010B	Water	Barium	4	ug/L
EPA 6010B	Water	Beryllium	1	ug/L
EPA 6010B	Water	Calcium	100	ug/L
EPA 6010B	Water	Cadmium	5	ug/L
EPA 6010B	Water	Cobalt	7	ug/L
EPA 6010B	Water	Chromium	7	ug/L
EPA 6010B	Water	Copper	10	ug/L
EPA 6010B	Water	Iron	40	ug/L
EPA 6010B	Water	Potassium	1000	ug/L
EPA 6010B	Water	Lithium	50	ug/L
EPA 6010B	Water	Magnesium	50	ug/L
EPA 6010B	Water	Manganese	7	ug/L
EPA 6010B	Water	Molybdenum	20	ug/L
EPA 6010B	Water	Sodium	150	ug/L
EPA 6010B	Water	Nickel	30	ug/L
EPA 6010B	Water	Phosphorus	100	ug/L
EPA 6010B	Water	Lead	50	ug/L
EPA 6010B	Water	Antimony	50	ug/L
EPA 6010B	Water	Selenium	100	ug/L
EPA 6010B	Water	Silicon	500	ug/L
EPA 6010B	Water	Tin	250	ug/L
EPA 6010B	Water	Strontium	15	ug/L
EPA 6010B	Water	Titanium	10	ug/L
EPA 6010B	Water	Thallium	100	ug/L
EPA 6010B	Water	Vanadium	12	ug/L
EPA 6010B	Water	Zinc	100	ug/L
EPA 6010B TCLP	Leachate	Silver	70	ug/L
EPA 6010B TCLP	Leachate	Aluminum	750	ug/L
EPA 6010B TCLP	Leachate	Arsenic	850	ug/L
EPA 6010B TCLP	Leachate	Gold	1000	ug/L
EPA 6010B TCLP	Leachate	Boron	300	ug/L
EPA 6010B TCLP	Leachate	Barium	40	ug/L
EPA 6010B TCLP	Leachate	Beryllium	10	ug/L
EPA 6010B TCLP	Leachate	Calcium	1000	ug/L
EPA 6010B TCLP	Leachate	Cadmium	50	ug/L
EPA 6010B TCLP	Leachate	Cobalt	70	ug/L
EPA 6010B TCLP	Leachate	Chromium	70	ug/L
EPA 6010B TCLP	Leachate	Copper	100	ug/L
EPA 6010B TCLP	Leachate	Iron	400	ug/L
EPA 6010B TCLP	Leachate	Potassium	10000	ug/L
EPA 6010B TCLP	Leachate	Lithium	500	ug/L
EPA 6010B TCLP	Leachate	Magnesium	500	ug/L
EPA 6010B TCLP	Leachate	Manganese	70	ug/L
EPA 6010B TCLP	Leachate	Molybdenum	200	ug/L
EPA 6010B TCLP	Leachate	Sodium	1500	ug/L
EPA 6010B TCLP	Leachate	Nickel	300	ug/L
EPA 6010B TCLP	Leachate	Phosphorus	1000	ug/L
EPA 6010B TCLP	Leachate	Lead	500	ug/L
EPA 6010B TCLP	Leachate	Antimony	500	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 6010B TCLP	Leachate	Selenium	1000	ug/L
EPA 6010B TCLP	Leachate	Silicon	500	ug/L
EPA 6010B TCLP	Leachate	Tin	2500	ug/L
EPA 6010B TCLP	Leachate	Strontium	150	ug/L
EPA 6010B TCLP	Leachate	Titanium	100	ug/L
EPA 6010B TCLP	Leachate	Thallium	1000	ug/L
EPA 6010B TCLP	Leachate	Vanadium	120	ug/L
EPA 6010B TCLP	Leachate	Zinc	1000	ug/L
EPA 6010B SPLP	Leachate	Silver	7	ug/L
EPA 6010B SPLP	Leachate	Aluminum	75	ug/L
EPA 6010B SPLP	Leachate	Arsenic	5	ug/L
EPA 6010B SPLP	Leachate	Gold	100	ug/L
EPA 6010B SPLP	Leachate	Boron	30	ug/L
EPA 6010B SPLP	Leachate	Barium	4	ug/L
EPA 6010B SPLP	Leachate	Beryllium	1	ug/L
EPA 6010B SPLP	Leachate	Calcium	100	ug/L
EPA 6010B SPLP	Leachate	Cadmium	5	ug/L
EPA 6010B SPLP	Leachate	Cobalt	7	ug/L
EPA 6010B SPLP	Leachate	Chromium	7	ug/L
EPA 6010B SPLP	Leachate	Copper	10	ug/L
EPA 6010B SPLP	Leachate	Iron	40	ug/L
EPA 6010B SPLP	Leachate	Potassium	1000	ug/L
EPA 6010B SPLP	Leachate	Lithium	50	ug/L
EPA 6010B SPLP	Leachate	Magnesium	50	ug/L
EPA 6010B SPLP	Leachate	Manganese	7	ug/L
EPA 6010B SPLP	Leachate	Molybdenum	20	ug/L
EPA 6010B SPLP	Leachate	Sodium	150	ug/L
EPA 6010B SPLP	Leachate	Nickel	30	ug/L
EPA 6010B SPLP	Leachate	Phosphorus	100	ug/L
EPA 6010B SPLP	Leachate	Lead	5	ug/L
EPA 6010B SPLP	Leachate	Antimony	10	ug/L
EPA 6010B SPLP	Leachate	Selenium	10	ug/L
EPA 6010B SPLP	Leachate	Silicon	500	ug/L
EPA 6010B SPLP	Leachate	Tin	250	ug/L
EPA 6010B SPLP	Leachate	Strontium	15	ug/L
EPA 6010B SPLP	Leachate	Titanium	10	ug/L
EPA 6010B SPLP	Leachate	Thallium	5	ug/L
EPA 6010B SPLP	Leachate	Vanadium	12	ug/L
EPA 6010B SPLP	Leachate	Zinc	100	ug/L
EPA 6010B Trace	Solid	Silver	0.7	mg/kg
EPA 6010B Trace	Solid	Aluminum	7.5	mg/kg
EPA 6010B Trace	Solid	Arsenic	0.5	mg/kg
EPA 6010B Trace	Solid	Gold	10	mg/kg
EPA 6010B Trace	Solid	Boron	3	mg/kg
EPA 6010B Trace	Solid	Barium	0.4	mg/kg
EPA 6010B Trace	Solid	Beryllium	0.1	mg/kg
EPA 6010B Trace	Solid	Calcium	10	mg/kg
EPA 6010B Trace	Solid	Cadmium	0.5	mg/kg
EPA 6010B Trace	Solid	Cobalt	0.7	mg/kg
EPA 6010B Trace	Solid	Chromium	0.7	mg/kg
EPA 6010B Trace	Solid	Copper	1	mg/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 6010B Trace	Solid	Iron	10	mg/kg
EPA 6010B Trace	Solid	Potassium	100	mg/kg
EPA 6010B Trace	Solid	Lithium	5	mg/kg
EPA 6010B Trace	Solid	Magnesium	5	mg/kg
EPA 6010B Trace	Solid	Manganese	0.7	mg/kg
EPA 6010B Trace	Solid	Molybdenum	2	mg/kg
EPA 6010B Trace	Solid	Sodium	15	mg/kg
EPA 6010B Trace	Solid	Nickel	3	mg/kg
EPA 6010B Trace	Solid	Phosphorus	10	mg/kg
EPA 6010B Trace	Solid	Lead	0.5	mg/kg
EPA 6010B Trace	Solid	Antimony	1	mg/kg
EPA 6010B Trace	Solid	Selenium	1	mg/kg
EPA 6010B Trace	Solid	Silicon	50	mg/kg
EPA 6010B Trace	Solid	Tin	25	mg/kg
EPA 6010B Trace	Solid	Strontium	1.5	mg/kg
EPA 6010B Trace	Solid	Tellurium	1000	mg/kg
EPA 6010B Trace	Solid	Titanium	1	mg/kg
EPA 6010B Trace	Solid	Thallium	1.6	mg/kg
EPA 6010B Trace	Solid	Vanadium	1.2	mg/kg
EPA 6010B Trace	Solid	Zinc	5	mg/kg
EPA 6010B Trace	Water	Silver	7	ug/L
EPA 6010B Trace	Water	Aluminum	75	ug/L
EPA 6010B Trace	Water	Arsenic	5	ug/L
EPA 6010B Trace	Water	Gold	100	ug/L
EPA 6010B Trace	Water	Boron	30	ug/L
EPA 6010B Trace	Water	Barium	4	ug/L
EPA 6010B Trace	Water	Beryllium	1	ug/L
EPA 6010B Trace	Water	Calcium	100	ug/L
EPA 6010B Trace	Water	Cadmium	5	ug/L
EPA 6010B Trace	Water	Cobalt	7	ug/L
EPA 6010B Trace	Water	Chromium	7	ug/L
EPA 6010B Trace	Water	Copper	10	ug/L
EPA 6010B Trace	Water	Iron	40	ug/L
EPA 6010B Trace	Water	Potassium	1000	ug/L
EPA 6010B Trace	Water	Lithium	50	ug/L
EPA 6010B Trace	Water	Magnesium	50	ug/L
EPA 6010B Trace	Water	Manganese	7	ug/L
EPA 6010B Trace	Water	Molybdenum	20	ug/L
EPA 6010B Trace	Water	Sodium	150	ug/L
EPA 6010B Trace	Water	Nickel	30	ug/L
EPA 6010B Trace	Water	Phosphorus	100	ug/L
EPA 6010B Trace	Water	Lead	5	ug/L
EPA 6010B Trace	Water	Antimony	10	ug/L
EPA 6010B Trace	Water	Selenium	10	ug/L
EPA 6010B Trace	Water	Silicon	500	ug/L
EPA 6010B Trace	Water	Tin	250	ug/L
EPA 6010B Trace	Water	Strontium	15	ug/L
EPA 6010B Trace	Water	Titanium	10	ug/L
EPA 6010B Trace	Water	Thallium	5	ug/L
EPA 6010B Trace	Water	Vanadium	12	ug/L
EPA 6010B Trace	Water	Zinc	100	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 602	Water	BTEX (Total)	3	ug/L
EPA 602	Water	Benzene	0.6	ug/L
EPA 602	Water	Ethylbenzene	0.6	ug/L
EPA 602	Water	Toluene	0.6	ug/L
EPA 602	Water	Xylene (Total)	1.2	ug/L
EPA 606	Water	bis(2-Ethylhexyl)phthalate	10	ug/L
EPA 608	Water	4,4'-DDD	0.1	ug/L
EPA 608	Water	4,4'-DDE	0.1	ug/L
EPA 608	Water	4,4'-DDT	0.1	ug/L
EPA 608	Water	Aldrin	0.05	ug/L
EPA 608	Water	alpha-BHC	0.05	ug/L
EPA 608	Water	beta-BHC	0.05	ug/L
EPA 608	Water	delta-BHC	0.05	ug/L
EPA 608	Water	gamma-BHC (Lindane)	0.05	ug/L
EPA 608	Water	alpha-Chlordane	0.05	ug/L
EPA 608	Water	gamma-Chlordane	0.05	ug/L
EPA 608	Water	Chlordane (Technical)	0.2	ug/L
EPA 608	Water	Toxaphene	2.5	ug/L
EPA 608	Water	Dieldrin	0.1	ug/L
EPA 608	Water	Endosulfan I	0.1	ug/L
EPA 608	Water	Endosulfan II	0.1	ug/L
EPA 608	Water	Endrin aldehyde	0.1	ug/L
EPA 608	Water	Endrin	0.1	ug/L
EPA 608	Water	Endosulfan sulfate	0.5	ug/L
EPA 608	Water	Heptachlor	0.05	ug/L
EPA 608	Water	Heptachlor epoxide	0.05	ug/L
EPA 608	Water	PCB-1016 (Aroclor 1016)	1	ug/L
EPA 608	Water	PCB-1221 (Aroclor 1221)	1	ug/L
EPA 608	Water	PCB-1232 (Aroclor 1232)	1	ug/L
EPA 608	Water	PCB-1242 (Aroclor 1242)	1	ug/L
EPA 608	Water	PCB-1248 (Aroclor 1248)	1	ug/L
EPA 608	Water	PCB-1254 (Aroclor 1254)	1	ug/L
EPA 608	Water	PCB-1260 (Aroclor 1260)	1	ug/L
EPA 610	Water	Acenaphthene	0.5	ug/L
EPA 610	Water	Acenaphthylene	1	ug/L
EPA 610	Water	Anthracene	0.05	ug/L
EPA 610	Water	Benzo(k)fluoranthene	0.1	ug/L
EPA 610	Water	Benzo(g,h,i)perylene	0.1	ug/L
EPA 610	Water	Benzo(a)anthracene	0.1	ug/L
EPA 610	Water	Benzo(b)fluoranthene	0.1	ug/L
EPA 610	Water	Benzo(a)pyrene	0.1	ug/L
EPA 610	Water	Chrysene	0.1	ug/L
EPA 610	Water	Dibenz(a,h)anthracene	0.1	ug/L
EPA 610	Water	Fluorene	0.1	ug/L
EPA 610	Water	Fluoranthene	0.1	ug/L
EPA 610	Water	Indeno(1,2,3-cd)pyrene	0.1	ug/L
EPA 610	Water	Naphthalene	0.5	ug/L
EPA 610	Water	Phenanthrene	0.1	ug/L
EPA 610	Water	Pyrene	0.1	ug/L
EPA 619	Water	Atrazine	0.4	ug/L
EPA 619	Water	Cyanazine	0.3	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 619	Water	Prometon	0.4	ug/L
EPA 619	Water	Simazine	0.4	ug/L
EPA 624	Water	1,1-Dichloroethane	5	ug/L
EPA 624	Water	1,1-Dichloroethene	5	ug/L
EPA 624	Water	1,1,1-Trichloroethane	5	ug/L
EPA 624	Water	1,1,2-Trichloroethane	5	ug/L
EPA 624	Water	1,1,2,2-Tetrachloroethane	6.9	ug/L
EPA 624	Water	1,2-Dichlorobenzene	5	ug/L
EPA 624	Water	1,2-Dichloroethane	5	ug/L
EPA 624	Water	1,2-Dichloropropane	6	ug/L
EPA 624	Water	1,2-Dichloroethene (Total)	10	ug/L
EPA 624	Water	1,3-Dichloropropene	5	ug/L
EPA 624	Water	1,3-Dichlorobenzene	5	ug/L
EPA 624	Water	1,4-Dichlorobenzene	5	ug/L
EPA 624	Water	2-Chloroethylvinyl ether	5	ug/L
EPA 624	Water	2-Propanol	500	ug/L
EPA 624	Water	Acetone	100	ug/L
EPA 624	Water	Acrolein	100	ug/L
EPA 624	Water	Acrylonitrile	100	ug/L
EPA 624	Water	Benzene	5	ug/L
EPA 624	Water	Bromodichloromethane	5	ug/L
EPA 624	Water	Bromomethane	5	ug/L
EPA 624	Water	Bromoform	5	ug/L
EPA 624	Water	cis-1,2-Dichloroethene	5	ug/L
EPA 624	Water	cis-1,3-Dichloropropene	5	ug/L
EPA 624	Water	Carbon tetrachloride	5	ug/L
EPA 624	Water	Chlorobenzene	6	ug/L
EPA 624	Water	Chloroethane	5	ug/L
EPA 624	Water	Chloroform	5	ug/L
EPA 624	Water	Chloromethane	5	ug/L
EPA 624	Water	Dibromochloromethane	5	ug/L
EPA 624	Water	Dichlorodifluoromethane	5	ug/L
EPA 624	Water	Ethylbenzene	7.2	ug/L
EPA 624	Water	Ethyl amyl ketone	100	ug/L
EPA 624	Water	Methylene chloride	5	ug/L
EPA 624	Water	4-Methyl-2-pentanone (MIBK)	100	ug/L
EPA 624	Water	n-Hexane	10	ug/L
EPA 624	Water	Styrene	5	ug/L
EPA 624	Water	trans-1,2-Dichloroethene	5	ug/L
EPA 624	Water	trans-1,3-Dichloropropene	5	ug/L
EPA 624	Water	Tetrachloroethene	5	ug/L
EPA 624	Water	1,1,2-Trichlorotrifluoroethane	5	ug/L
EPA 624	Water	Toluene	6	ug/L
EPA 624	Water	Trichloroethene	5	ug/L
EPA 624	Water	Trichlorofluoromethane	5	ug/L
EPA 624	Water	Xylene (Total)	5	ug/L
EPA 624	Water	Vinyl chloride	5	ug/L
EPA 624 Low Level	Water	1,1-Dichloroethane	0.5	ug/L
EPA 624 Low Level	Water	1,1-Dichloroethene	1	ug/L
EPA 624 Low Level	Water	1,1,1-Trichloroethane	0.6	ug/L
EPA 624 Low Level	Water	1,1,2-Trichloroethane	0.5	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 624 Low Level	Water	1,1,2,2-Tetrachloroethane	0.5	ug/L
EPA 624 Low Level	Water	1,2-Dichlorobenzene	1	ug/L
EPA 624 Low Level	Water	1,2-Dichloroethane	0.5	ug/L
EPA 624 Low Level	Water	1,2-Dichloropropane	0.5	ug/L
EPA 624 Low Level	Water	1,2-Dichloroethene (Total)	0.5	ug/L
EPA 624 Low Level	Water	1,3-Dichlorobenzene	1	ug/L
EPA 624 Low Level	Water	1,4-Dichlorobenzene	1	ug/L
EPA 624 Low Level	Water	2-Butanone (MEK)	10	ug/L
EPA 624 Low Level	Water	2-Chloroethylvinyl ether	5	ug/L
EPA 624 Low Level	Water	2-Hexanone	10	ug/L
EPA 624 Low Level	Water	Carbon disulfide	10	ug/L
EPA 624 Low Level	Water	Acetone	10	ug/L
EPA 624 Low Level	Water	Acrolein	20	ug/L
EPA 624 Low Level	Water	Acrylonitrile	20	ug/L
EPA 624 Low Level	Water	Benzene	0.6	ug/L
EPA 624 Low Level	Water	Bromodichloromethane	0.5	ug/L
EPA 624 Low Level	Water	Bromomethane	3.54	ug/L
EPA 624 Low Level	Water	Bromoform	0.6	ug/L
EPA 624 Low Level	Water	cis-1,2-Dichloroethene	0.5	ug/L
EPA 624 Low Level	Water	cis-1,3-Dichloropropene	1.02	ug/L
EPA 624 Low Level	Water	Carbon tetrachloride	0.5	ug/L
EPA 624 Low Level	Water	Chlorobenzene	0.7	ug/L
EPA 624 Low Level	Water	Chloroethane	1.56	ug/L
EPA 624 Low Level	Water	Chloroform	0.5	ug/L
EPA 624 Low Level	Water	Chloromethane	0.5	ug/L
EPA 624 Low Level	Water	Dibromochloromethane	0.5	ug/L
EPA 624 Low Level	Water	Ethylbenzene	0.6	ug/L
EPA 624 Low Level	Water	Methylene chloride	2	ug/L
EPA 624 Low Level	Water	Methyl-tert-butyl ether	1	ug/L
EPA 624 Low Level	Water	4-Methyl-2-pentanone (MIBK)	10	ug/L
EPA 624 Low Level	Water	n-Hexane	50	ug/L
EPA 624 Low Level	Water	Styrene	1	ug/L
EPA 624 Low Level	Water	trans-1,2-Dichloroethene	0.5	ug/L
EPA 624 Low Level	Water	trans-1,3-Dichloropropene	0.6	ug/L
EPA 624 Low Level	Water	Tetrachloroethene	0.5	ug/L
EPA 624 Low Level	Water	1,1,2-Trichlorotrifluoroethane	5	ug/L
EPA 624 Low Level	Water	Toluene	0.6	ug/L
EPA 624 Low Level	Water	Trichloroethene	0.5	ug/L
EPA 624 Low Level	Water	Trichlorofluoromethane	5	ug/L
EPA 624 Low Level	Water	Xylene (Total)	1.2	ug/L
EPA 624 Low Level	Water	Vinyl chloride	0.54	ug/L
EPA 625	Water	1,2,4-Trichlorobenzene	5	ug/L
EPA 625	Water	1,2-Dichlorobenzene	5	ug/L
EPA 625	Water	1,2-Diphenylhydrazine	8	ug/L
EPA 625	Water	1,3-Dichlorobenzene	5	ug/L
EPA 625	Water	1,4-Dichlorobenzene	5	ug/L
EPA 625	Water	2,4,6-Trichlorophenol	5	ug/L
EPA 625	Water	2,4-Dichlorophenol	5	ug/L
EPA 625	Water	2,4-Dimethylphenol	5	ug/L
EPA 625	Water	2,4-Dinitrophenol	42	ug/L
EPA 625	Water	2,4-Dinitrotoluene	6	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 625	Water	2,6-Dinitrotoluene	5	ug/L
EPA 625	Water	2-Chloronaphthalene	5	ug/L
EPA 625	Water	2-Chlorophenol	5	ug/L
EPA 625	Water	2-Methylphenol (o-Cresol)	10	ug/L
EPA 625	Water	2-Nitrophenol	5	ug/L
EPA 625	Water	3,3'-Dichlorobenzidine	17	ug/L
EPA 625	Water	3-Methylphenol (m-Cresol)	10	ug/L
EPA 625	Water	4,6-Dinitro-2-methylphenol	24	ug/L
EPA 625	Water	4-Bromophenylphenyl ether	5	ug/L
EPA 625	Water	4-Chloro-3-methylphenol	5	ug/L
EPA 625	Water	4-Chlorophenylphenyl ether	5	ug/L
EPA 625	Water	4-Methylphenol (p-Cresol)	10	ug/L
EPA 625	Water	4-Nitrophenol	5	ug/L
EPA 625	Water	Acenaphthene	5	ug/L
EPA 625	Water	Acenaphthylene	5	ug/L
EPA 625	Water	Anthracene	5	ug/L
EPA 625	Water	Butylbenzylphthalate	5	ug/L
EPA 625	Water	Benzo(k)fluoranthene	5	ug/L
EPA 625	Water	Benzo(g,h,i)perylene	5	ug/L
EPA 625	Water	Benzo(a)anthracene	5	ug/L
EPA 625	Water	Benzidine	44	ug/L
EPA 625	Water	Benzo(b)fluoranthene	5	ug/L
EPA 625	Water	Benzo(a)pyrene	5	ug/L
EPA 625	Water	bis(2-Chloroethoxy)methane	5	ug/L
EPA 625	Water	bis(2-Chloroethyl) ether	6	ug/L
EPA 625	Water	bis(2-Chloroisopropyl) ether	6	ug/L
EPA 625	Water	bis(2-Ethylhexyl)phthalate	5	ug/L
EPA 625	Water	Chrysene	5	ug/L
EPA 625	Water	Dibenz(a,h)anthracene	5	ug/L
EPA 625	Water	Dimethylphthalate	5	ug/L
EPA 625	Water	Di-n-butylphthalate	5	ug/L
EPA 625	Water	Di-n-octylphthalate	5	ug/L
EPA 625	Water	Diethylphthalate	5	ug/L
EPA 625	Water	Fluorene	5	ug/L
EPA 625	Water	Fluoranthene	5	ug/L
EPA 625	Water	Hexachloro-1,3-butadiene	5	ug/L
EPA 625	Water	Hexachlorobenzene	5	ug/L
EPA 625	Water	Hexachlorocyclopentadiene	5	ug/L
EPA 625	Water	Hexachloroethane	5	ug/L
EPA 625	Water	Indeno(1,2,3-cd)pyrene	5	ug/L
EPA 625	Water	Isophorone	5	ug/L
EPA 625	Water	Naphthalene	5	ug/L
EPA 625	Water	N-Nitroso-di-n-propylamine	5	ug/L
EPA 625	Water	Nitrobenzene	5	ug/L
EPA 625	Water	N-Nitrosodimethylamine	5	ug/L
EPA 625	Water	N-Nitrosodiphenylamine	5	ug/L
EPA 625	Water	Phenol	5	ug/L
EPA 625	Water	Phenanthrene	5	ug/L
EPA 625	Water	Pentachlorophenol	5	ug/L
EPA 625	Water	Pyrene	5	ug/L
EPA 680	Water	Dichlorobiphenyl	0.5	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 680	Water	Decachlorobiphenyl	0.5	ug/L
EPA 680	Water	Hexachlorobiphenyl	0.5	ug/L
EPA 680	Water	Heptachlorobiphenyl	0.5	ug/L
EPA 680	Water	Monochlorobiphenyl	0.5	ug/L
EPA 680	Water	Nonochlorobiphenyl	0.5	ug/L
EPA 680	Water	Octachlorobiphenyl	0.5	ug/L
EPA 680	Water	PCB, Total	0.5	ug/L
EPA 680	Water	Pentachlorobiphenyl	0.5	ug/L
EPA 680	Water	Trichlorobiphenyl	0.5	ug/L
EPA 680	Water	Tetrachlorobiphenyl	0.5	ug/L
EPA 7041	Solid	Antimony	1	mg/kg
EPA 7041	Water	Antimony	10	ug/L
EPA 7060A	Solid	Arsenic	0.5	mg/kg
EPA 7060A	Water	Arsenic	5	ug/L
EPA 7060A	Water	Arsenic, Dissolved	5	ug/L
EPA 7196A	Solid	Chromium, Hexavalent	1	mg/kg
EPA 7196A	Water	Chromium, Hexavalent	0.01	mg/L
Chap 7, Sec 7.3	Solid	Cyanide, Reactive	0.5	mg/kg
Chap 7, Sec 7.3	Water	Cyanide, Reactive	0.1	mg/L
Chap 7, Sec 7.3	Solid	Sulfide, Reactive	10	mg/kg
Chap 7, Sec 7.3	Water	Sulfide, Reactive	0.5	mg/L
EPA 7421	Solid	Lead	0.5	mg/kg
EPA 7421	Water	Lead	5	ug/L
EPA 7470A	Water	Mercury	0.2	ug/L
EPA 7470A	Water	Mercury, Dissolved	0.2	ug/L
EPA 7470A TCLP	Leachate	Mercury	2	ug/L
EPA 7470A SPLP	Leachate	Mercury	0.2	ug/L
EPA 7471A	Solid	Mercury	0.154	mg/kg
EPA 7740	Solid	Selenium	0.5	mg/kg
EPA 7740	Water	Selenium	5	ug/L
EPA 7740	Water	Selenium, Dissolved	5	ug/L
EPA 7841	Solid	Thallium	0.5	mg/kg
EPA 7841	Water	Thallium	5	ug/L
EPA 7841	Water	Thallium, Dissolved	5	ug/L
EPA 8011	Solid	1,2-Dibromo-3-chloropropane	10	ug/kg
EPA 8011	Solid	1,2-Dibromoethane (EDB)	10	ug/kg
EPA 8011	Water	1,2-Dibromo-3-chloropropane	0.03	ug/L
EPA 8011	Water	1,2-Dibromoethane (EDB)	0.03	ug/L
EPA 8015 Ohio	Solid	EPH (C10-C20)	10	mg/kg
EPA 8015 Ohio	Solid	EPH (C10-C34)	10	mg/kg
EPA 8015 Ohio	Solid	EPH (C20-C34)	10	mg/kg
EPA 8015 Ohio	Water	EPH (C10-C20)	0.4	mg/L
EPA 8015 Ohio	Water	EPH (C10-C34)	0.4	mg/L
EPA 8015 Ohio	Water	EPH (C20-C34)	0.4	mg/L
EPA 8021B	Solid	1,2-Dichloroethane	13	ug/kg
EPA 8021B	Solid	1,2-Dibromoethane (EDB)	13	ug/kg
EPA 8021B	Solid	Benzene	50	ug/kg
EPA 8021B	Solid	Ethylbenzene	50	ug/kg
EPA 8021B	Solid	Methyl-tert-butyl ether	250	ug/kg
EPA 8021B	Solid	Naphthalene	250	ug/kg
EPA 8021B	Solid	Toluene	50	ug/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8021B	Solid	Xylene (Total)	175	ug/kg
EPA 8021B	Water	1,2-Dichloroethane	0.5	ug/L
EPA 8021B	Water	1,2-Dibromoethane (EDB)	10	ug/L
EPA 8021B	Water	Benzene	2	ug/L
EPA 8021B	Water	Ethylbenzene	2	ug/L
EPA 8021B	Water	Methyl-tert-butyl ether	10	ug/L
EPA 8021B	Water	Naphthalene	10	ug/L
EPA 8021B	Water	Toluene	2	ug/L
EPA 8021B	Water	Xylene (Total)	7	ug/L
EPA 8021B	Leachate	Benzene	50	ug/L
EPA 8082	Oil	PCB-1016 (Aroclor 1016)	1	mg/kg
EPA 8082	Oil	PCB-1221 (Aroclor 1221)	1	mg/kg
EPA 8082	Oil	PCB-1232 (Aroclor 1232)	1	mg/kg
EPA 8082	Oil	PCB-1242 (Aroclor 1242)	1	mg/kg
EPA 8082	Oil	PCB-1248 (Aroclor 1248)	1	mg/kg
EPA 8082	Oil	PCB-1254 (Aroclor 1254)	1	mg/kg
EPA 8082	Oil	PCB-1260 (Aroclor 1260)	1	mg/kg
EPA 8082	Oil	PCB-1262 (Aroclor 1262)	1	mg/kg
EPA 8082	Oil	PCB-1268 (Aroclor 1268)	1	mg/kg
EPA 8082	Wipe	PCB-1016 (Aroclor 1016)	2	ug
EPA 8082	Wipe	PCB-1221 (Aroclor 1221)	2	ug
EPA 8082	Wipe	PCB-1232 (Aroclor 1232)	2	ug
EPA 8082	Wipe	PCB-1242 (Aroclor 1242)	2	ug
EPA 8082	Wipe	PCB-1248 (Aroclor 1248)	2	ug
EPA 8082	Wipe	PCB-1254 (Aroclor 1254)	2	ug
EPA 8082	Wipe	PCB-1260 (Aroclor 1260)	2	ug
EPA 8082	Wipe	PCB-1262 (Aroclor 1262)	2	ug
EPA 8082	Wipe	PCB-1268 (Aroclor 1268)	2	ug
EPA 8081A TCLP	Leachate	4,4'-DDT	0.03	mg/L
EPA 8081A TCLP	Leachate	gamma-BHC (Lindane)	0.4	mg/L
EPA 8081A TCLP	Leachate	Chlordane (Technical)	0.03	mg/L
EPA 8081A TCLP	Leachate	Dieldrin	0.03	mg/L
EPA 8081A TCLP	Leachate	Endrin	0.02	mg/L
EPA 8081A TCLP	Leachate	Heptachlor	0.008	mg/L
EPA 8081A TCLP	Leachate	Heptachlor epoxide	0.008	mg/L
EPA 8081A TCLP	Leachate	Methoxychlor	10	mg/L
EPA 8081A TCLP	Leachate	PCB-1016 (Aroclor 1016)	0.0075	mg/L
EPA 8081A TCLP	Leachate	PCB-1221 (Aroclor 1221)	0.0075	mg/L
EPA 8081A TCLP	Leachate	PCB-1232 (Aroclor 1232)	0.0075	mg/L
EPA 8081A TCLP	Leachate	PCB-1242 (Aroclor 1242)	0.0075	mg/L
EPA 8081A TCLP	Leachate	PCB-1248 (Aroclor 1248)	0.0075	mg/L
EPA 8081A TCLP	Leachate	PCB-1254 (Aroclor 1254)	0.0075	mg/L
EPA 8081A TCLP	Leachate	PCB-1260 (Aroclor 1260)	0.0075	mg/L
EPA 8081A TCLP	Leachate	Toxaphene	0.5	mg/L
EPA 8081A	Solid	4,4'-DDD	3.3	ug/kg
EPA 8081A	Solid	4,4'-DDE	3.3	ug/kg
EPA 8081A	Solid	4,4'-DDT	3.3	ug/kg
EPA 8081A	Solid	Aldrin	1.7	ug/kg
EPA 8081A	Solid	alpha-BHC	1.7	ug/kg
EPA 8081A	Solid	beta-BHC	1.7	ug/kg
EPA 8081A	Solid	delta-BHC	1.7	ug/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8081A	Solid	gamma-BHC (Lindane)	1.7	ug/kg
EPA 8081A	Solid	Captan	5	ug/kg
EPA 8081A	Solid	Chlorobenzilate	10	ug/kg
EPA 8081A	Solid	alpha-Chlordane	1.7	ug/kg
EPA 8081A	Solid	gamma-Chlordane	1.7	ug/kg
EPA 8081A	Solid	Chlordane (Technical)	6.7	ug/kg
EPA 8081A	Solid	Diallate	10	ug/kg
EPA 8081A	Solid	Dieldrin	3.3	ug/kg
EPA 8081A	Solid	Endosulfan I	1.7	ug/kg
EPA 8081A	Solid	Endosulfan II	3.3	ug/kg
EPA 8081A	Solid	Endrin aldehyde	3.3	ug/kg
EPA 8081A	Solid	Endrin ketone	3.3	ug/kg
EPA 8081A	Solid	Endrin	3.3	ug/kg
EPA 8081A	Solid	Endosulfan sulfate	17	ug/kg
EPA 8081A	Solid	Heptachlor	1.7	ug/kg
EPA 8081A	Solid	Heptachlor epoxide	1.7	ug/kg
EPA 8081A	Solid	Isodrin	10	ug/kg
EPA 8081A	Solid	Methoxychlor	17	ug/kg
EPA 8081A	Solid	Toxaphene	83.3	ug/kg
EPA 8081A	Water	4,4'-DDD	0.1	ug/L
EPA 8081A	Water	4,4'-DDE	0.1	ug/L
EPA 8081A	Water	4,4'-DDT	0.1	ug/L
EPA 8081A	Water	Aldrin	0.05	ug/L
EPA 8081A	Water	alpha-BHC	0.05	ug/L
EPA 8081A	Water	beta-BHC	0.05	ug/L
EPA 8081A	Water	delta-BHC	0.05	ug/L
EPA 8081A	Water	gamma-BHC (Lindane)	0.05	ug/L
EPA 8081A	Water	Captan	0.1	ug/L
EPA 8081A	Water	Chlorobenzilate	0.1	ug/L
EPA 8081A	Water	alpha-Chlordane	0.05	ug/L
EPA 8081A	Water	gamma-Chlordane	0.05	ug/L
EPA 8081A	Water	Chlordane (Technical)	0.2	ug/L
EPA 8081A	Water	Diallate	0.1	ug/L
EPA 8081A	Water	Dieldrin	0.1	ug/L
EPA 8081A	Water	Endosulfan I	0.05	ug/L
EPA 8081A	Water	Endosulfan II	0.1	ug/L
EPA 8081A	Water	Endrin aldehyde	0.1	ug/L
EPA 8081A	Water	Endrin ketone	0.1	ug/L
EPA 8081A	Water	Endrin	0.1	ug/L
EPA 8081A	Water	Endosulfan sulfate	0.5	ug/L
EPA 8081A	Water	Heptachlor	0.05	ug/L
EPA 8081A	Water	Heptachlor epoxide	0.05	ug/L
EPA 8081A	Water	Isodrin	0.1	ug/L
EPA 8081A	Water	Methoxychlor	0.5	ug/L
EPA 8081A	Water	Toxaphene	2.5	ug/L
EPA 8082	Solid	PCB-1016 (Aroclor 1016)	33	ug/kg
EPA 8082	Solid	PCB-1221 (Aroclor 1221)	33	ug/kg
EPA 8082	Solid	PCB-1232 (Aroclor 1232)	33	ug/kg
EPA 8082	Solid	PCB-1242 (Aroclor 1242)	33	ug/kg
EPA 8082	Solid	PCB-1248 (Aroclor 1248)	33	ug/kg
EPA 8082	Solid	PCB-1254 (Aroclor 1254)	33	ug/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8082	Solid	PCB-1260 (Aroclor 1260)	33	ug/kg
EPA 8082	Water	PCB-1016 (Aroclor 1016)	1	ug/L
EPA 8082	Water	PCB-1221 (Aroclor 1221)	1	ug/L
EPA 8082	Water	PCB-1232 (Aroclor 1232)	1	ug/L
EPA 8082	Water	PCB-1242 (Aroclor 1242)	1	ug/L
EPA 8082	Water	PCB-1248 (Aroclor 1248)	1	ug/L
EPA 8082	Water	PCB-1254 (Aroclor 1254)	1	ug/L
EPA 8082	Water	PCB-1260 (Aroclor 1260)	1	ug/L
EPA 8141	Solid	TEPP	100	ug/kg
EPA 8141	Solid	Atrazine	100	ug/kg
EPA 8141	Solid	Azinphos, methyl (Guthion)	33	ug/kg
EPA 8141	Solid	Bolstar	33	ug/kg
EPA 8141	Solid	Chlorpyrifos	33	ug/kg
EPA 8141	Solid	Coumaphos	33	ug/kg
EPA 8141	Solid	Demeton-O	33	ug/kg
EPA 8141	Solid	Demeton-S	33	ug/kg
EPA 8141	Solid	Diazinon	33	ug/kg
EPA 8141	Solid	Dimethoate	33	ug/kg
EPA 8141	Solid	Disulfoton	33	ug/kg
EPA 8141	Solid	Dichlorvos	33	ug/kg
EPA 8141	Solid	EPN (ENT)	33	ug/kg
EPA 8141	Solid	Ethoprop	33	ug/kg
EPA 8141	Solid	Famphur	33	ug/kg
EPA 8141	Solid	Fensulfothion	33	ug/kg
EPA 8141	Solid	Fenthion	33	ug/kg
EPA 8141	Solid	Malathion	67	ug/kg
EPA 8141	Solid	Methyl parathion	33	ug/kg
EPA 8141	Solid	Merphos	33	ug/kg
EPA 8141	Solid	Mevinphos	33	ug/kg
EPA 8141	Solid	Naled	100	ug/kg
EPA 8141	Solid	O,O,O-Triethylphosphorothioate	33	ug/kg
EPA 8141	Solid	Phorate	33	ug/kg
EPA 8141	Solid	Parathion (Ethyl parathion)	33	ug/kg
EPA 8141	Solid	Ronnel	33	ug/kg
EPA 8141	Solid	Sulfotepp (Thiodiphosphoric Ac	33	ug/kg
EPA 8141	Solid	Thionazin	33	ug/kg
EPA 8141	Solid	Tokuthion (Prothiofos)	33	ug/kg
EPA 8141	Solid	Trichloronate	33	ug/kg
EPA 8141	Solid	Tetrachlorovinphos	33	ug/kg
EPA 8141	Water	TEPP	8	ug/L
EPA 8141	Water	Atrazine	1	ug/L
EPA 8141	Water	Azinphos, methyl (Guthion)	1	ug/L
EPA 8141	Water	Bolstar	0.7	ug/L
EPA 8141	Water	Chlorpyrifos	0.7	ug/L
EPA 8141	Water	Coumaphos	1	ug/L
EPA 8141	Water	Demeton-O	1	ug/L
EPA 8141	Water	Demeton-S	1	ug/L
EPA 8141	Water	Diazinon	1	ug/L
EPA 8141	Water	Dimethoate	1	ug/L
EPA 8141	Water	Disulfoton	0.7	ug/L
EPA 8141	Water	Dichlorvos	2	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8141	Water	EPN (ENT)	0.4	ug/L
EPA 8141	Water	Ethoprop	1	ug/L
EPA 8141	Water	Famphur	1	ug/L
EPA 8141	Water	Fensulfothion	0.8	ug/L
EPA 8141	Water	Fenthion	0.8	ug/L
EPA 8141	Water	Malathion	1	ug/L
EPA 8141	Water	Methyl parathion	0.6	ug/L
EPA 8141	Water	Merphos	1	ug/L
EPA 8141	Water	Mevinphos	1	ug/L
EPA 8141	Water	Naled	2	ug/L
EPA 8141	Water	O,O,O-Triethylphosphorothioate	1	ug/L
EPA 8141	Water	Phorate	0.4	ug/L
EPA 8141	Water	Parathion (Ethyl parathion)	1	ug/L
EPA 8141	Water	Ronnel	0.7	ug/L
EPA 8141	Water	Sulfotepp (Thiodiphosphoric Ac	0.7	ug/L
EPA 8141	Water	Thionazin	1	ug/L
EPA 8141	Water	Tokuthion (Prothiofos)	0.7	ug/L
EPA 8141	Water	Trichloronate	0.8	ug/L
EPA 8141	Water	Tetrachlorovinphos	2	ug/L
EPA 8141	Solid	Acetochlor	50	ug/kg
EPA 8141	Solid	Alachlor	50	ug/kg
EPA 8141	Solid	Atrazine	50	ug/kg
EPA 8141	Solid	Azinphos, methyl (Guthion)	50	ug/kg
EPA 8141	Solid	Butylate	50	ug/kg
EPA 8141	Solid	Chlorpyrifos	50	ug/kg
EPA 8141	Solid	Cyanazine	50	ug/kg
EPA 8141	Solid	Desethylatrazine	50	ug/kg
EPA 8141	Solid	Demeton-S	50	ug/kg
EPA 8141	Solid	Desisopropylatrazine	50	ug/kg
EPA 8141	Solid	EPTC	50	ug/kg
EPA 8141	Solid	Ethalfluralin	50	ug/kg
EPA 8141	Solid	Fonofos	50	ug/kg
EPA 8141	Solid	Linuron	50	ug/kg
EPA 8141	Solid	Methyl parathion	50	ug/kg
EPA 8141	Solid	Metolachlor	50	ug/kg
EPA 8141	Solid	Metribuzin	50	ug/kg
EPA 8141	Solid	Propachlor	50	ug/kg
EPA 8141	Solid	Pendimethalin	50	ug/kg
EPA 8141	Solid	Phorate	50	ug/kg
EPA 8141	Solid	Prometon	50	ug/kg
EPA 8141	Solid	Propazine	50	ug/kg
EPA 8141	Solid	Parathion (Ethyl parathion)	50	ug/kg
EPA 8141	Solid	Simazine	50	ug/kg
EPA 8141	Solid	Terbufos	50	ug/kg
EPA 8141	Solid	Trifluralin	50	ug/kg
EPA 8141	Solid	Triallate	50	ug/kg
EPA 8141	Water	Acetochlor	0.7	ug/L
EPA 8141	Water	Alachlor	0.7	ug/L
EPA 8141	Water	Atrazine	0.4	ug/L
EPA 8141	Water	Butachlor	0.7	ug/L
EPA 8141	Water	Butylate	0.3	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8141	Water	Chlorpyrifos	0.3	ug/L
EPA 8141	Water	Cyanazine	0.3	ug/L
EPA 8141	Water	Desethylatrazine	0.3	ug/L
EPA 8141	Water	Desisopropylatrazine	0.3	ug/L
EPA 8141	Water	EPTC	0.3	ug/L
EPA 8141	Water	Ethalfluralin	0.4	ug/L
EPA 8141	Water	Fonofos	0.6	ug/L
EPA 8141	Water	Malathion	0.4	ug/L
EPA 8141	Water	Methyl parathion	0.3	ug/L
EPA 8141	Water	Metolachlor	0.6	ug/L
EPA 8141	Water	Metribuzin	0.6	ug/L
EPA 8141	Water	Propachlor	1.5	ug/L
EPA 8141	Water	Pendimethalin	0.7	ug/L
EPA 8141	Water	Phorate	0.3	ug/L
EPA 8141	Water	Prometon	0.4	ug/L
EPA 8141	Water	Propazine	0.3	ug/L
EPA 8141	Water	Parathion (Ethyl parathion)	0.3	ug/L
EPA 8141	Water	Simazine	0.4	ug/L
EPA 8141	Water	Terbufos	0.3	ug/L
EPA 8141	Water	Trifluralin	0.4	ug/L
EPA 8141	Water	Triallate	0.6	ug/L
EPA 8151A TCLP	Leachate	2,4,5-T	7.5	ug/L
EPA 8151A TCLP	Leachate	2,4-D	20	ug/L
EPA 8151A TCLP	Leachate	2,4,5-TP (Silvex)	7.5	ug/L
EPA 8151A	Water	2,4,5-T	0.1	ug/L
EPA 8151A	Water	2,4-D	0.5	ug/L
EPA 8151A	Water	2,4-DB	1	ug/L
EPA 8151A	Water	MCPA	100	ug/L
EPA 8151A	Water	MCPP	100	ug/L
EPA 8151A	Water	Dalapon	2.5	ug/L
EPA 8151A	Water	Dicamba	0.1	ug/L
EPA 8151A	Water	Dinoseb	0.5	ug/L
EPA 8151A	Water	Dichloroprop	1	ug/L
EPA 8151A	Water	2,4,5-TP (Silvex)	0.1	ug/L
EPA 8151A	Solid	2,4,5-T	16	ug/kg
EPA 8151A	Solid	2,4-D	40	ug/kg
EPA 8151A	Solid	2,4-DB	160	ug/kg
EPA 8151A	Solid	MCPA	20000	ug/kg
EPA 8151A	Solid	MCPP	20000	ug/kg
EPA 8151A	Solid	Dalapon	150	ug/kg
EPA 8151A	Solid	Dicamba	16.2	ug/kg
EPA 8151A	Solid	Dinoseb	38	ug/kg
EPA 8151A	Solid	Dichloroprop	52	ug/kg
EPA 8151A	Solid	2,4,5-TP (Silvex)	15	ug/kg
EPA 8260B TCLP	Leachate	1,1-Dichloroethane	50	ug/L
EPA 8260B TCLP	Leachate	1,1-Dichloroethene	50	ug/L
EPA 8260B TCLP	Leachate	1,1,1-Trichloroethane	50	ug/L
EPA 8260B TCLP	Leachate	1,1,2,2-Tetrachloroethane	50	ug/L
EPA 8260B TCLP	Leachate	1,2-Dichloroethane	50	ug/L
EPA 8260B TCLP	Leachate	1,2-Dichloroethene (Total)	50	ug/L
EPA 8260B TCLP	Leachate	2-Butanone (MEK)	1000	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8260B TCLP	Leachate	Carbon disulfide	50	ug/L
EPA 8260B TCLP	Leachate	Acetone	1000	ug/L
EPA 8260B TCLP	Leachate	Benzene	50	ug/L
EPA 8260B TCLP	Leachate	Carbon tetrachloride	50	ug/L
EPA 8260B TCLP	Leachate	Chlorobenzene	50	ug/L
EPA 8260B TCLP	Leachate	Chloroform	200	ug/L
EPA 8260B TCLP	Leachate	Cyclohexanone	750	ug/L
EPA 8260B TCLP	Leachate	Ethylbenzene	50	ug/L
EPA 8260B TCLP	Leachate	Methylene chloride	50	ug/L
EPA 8260B TCLP	Leachate	Methanol	750	ug/L
EPA 8260B TCLP	Leachate	Styrene	50	ug/L
EPA 8260B TCLP	Leachate	Tetrachloroethene	50	ug/L
EPA 8260B TCLP	Leachate	Toluene	50	ug/L
EPA 8260B TCLP	Leachate	Trichloroethene	50	ug/L
EPA 8260B TCLP	Leachate	Trichlorofluoromethane	50	ug/L
EPA 8260B TCLP	Leachate	Xylene (Total)	50	ug/L
EPA 8260B TCLP	Leachate	Vinyl chloride	100	ug/L
EPA 5035/8260B	Solid	1,1-Dichloroethane	5	ug/kg
EPA 5035/8260B	Solid	1,1-Dichloroethene	5	ug/kg
EPA 5035/8260B	Solid	1,1-Dichloropropene	5	ug/kg
EPA 5035/8260B	Solid	1,1,1-Trichloroethane	5	ug/kg
EPA 5035/8260B	Solid	1,1,2-Trichloroethane	5	ug/kg
EPA 5035/8260B	Solid	1,1,1,2-Tetrachloroethane	5	ug/kg
EPA 5035/8260B	Solid	1,1,2,2-Tetrachloroethane	5	ug/kg
EPA 5035/8260B	Solid	1,2,4-Trichlorobenzene	5	ug/kg
EPA 5035/8260B	Solid	1,2-Dichlorobenzene	5	ug/kg
EPA 5035/8260B	Solid	1,2-Dibromo-3-chloropropane	5	ug/kg
EPA 5035/8260B	Solid	1,2-Dichloroethane	5	ug/kg
EPA 5035/8260B	Solid	1,2-Dibromoethane (EDB)	5	ug/kg
EPA 5035/8260B	Solid	1,2-Dichloropropane	5	ug/kg
EPA 5035/8260B	Solid	1,2-Dichloroethene (Total)	5	ug/kg
EPA 5035/8260B	Solid	1,2,4-Trimethylbenzene	5	ug/kg
EPA 5035/8260B	Solid	1,2,3-Trichlorobenzene	5	ug/kg
EPA 5035/8260B	Solid	1,2,3-Trichloropropane	5	ug/kg
EPA 5035/8260B	Solid	1,3-Dichloropropene	100	ug/kg
EPA 5035/8260B	Solid	1,3-Dichlorobenzene	5	ug/kg
EPA 5035/8260B	Solid	1,3-Dichloropropane	5	ug/kg
EPA 5035/8260B	Solid	1,3,5-Trimethylbenzene	5	ug/kg
EPA 5035/8260B	Solid	1,4-Dichlorobenzene	5	ug/kg
EPA 5035/8260B	Solid	1,4-Dioxane (p-Dioxane)	50	ug/kg
EPA 5035/8260B	Solid	1-Chlorohexane	5	ug/kg
EPA 5035/8260B	Solid	2,2-Dichloropropane	5	ug/kg
EPA 5035/8260B	Solid	2-Butanone (MEK)	10	ug/kg
EPA 5035/8260B	Solid	2-Chlorotoluene	5	ug/kg
EPA 5035/8260B	Solid	2-Chloroethylvinyl ether	5	ug/kg
EPA 5035/8260B	Solid	2-Hexanone	100	ug/kg
EPA 5035/8260B	Solid	2-Methyl-2-propanol	100	ug/kg
EPA 5035/8260B	Solid	Allyl chloride	10	ug/kg
EPA 5035/8260B	Solid	4-Chlorotoluene	5	ug/kg
EPA 5035/8260B	Solid	Carbon disulfide	10	ug/kg
EPA 5035/8260B	Solid	Ethanol	500	ug/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 5035/8260B	Solid	Acetone	20	ug/kg
EPA 5035/8260B	Solid	Acrolein	100	ug/kg
EPA 5035/8260B	Solid	Acetonitrile	100	ug/kg
EPA 5035/8260B	Solid	Acrylonitrile	100	ug/kg
EPA 5035/8260B	Solid	Bromochloromethane	5	ug/kg
EPA 5035/8260B	Solid	Benzene	5	ug/kg
EPA 5035/8260B	Solid	Bromobenzene	5	ug/kg
EPA 5035/8260B	Solid	Bromodichloromethane	5	ug/kg
EPA 5035/8260B	Solid	Bromomethane	5	ug/kg
EPA 5035/8260B	Solid	Bromoform	5	ug/kg
EPA 5035/8260B	Solid	cis-1,2-Dichloroethene	5	ug/kg
EPA 5035/8260B	Solid	cis-1,3-Dichloropropene	5	ug/kg
EPA 5035/8260B	Solid	Carbon tetrachloride	5	ug/kg
EPA 5035/8260B	Solid	Chlorobenzene	5	ug/kg
EPA 5035/8260B	Solid	Chloroprene	10	ug/kg
EPA 5035/8260B	Solid	Chloroethane	5	ug/kg
EPA 5035/8260B	Solid	Chloroform	5	ug/kg
EPA 5035/8260B	Solid	Chloromethane	5	ug/kg
EPA 5035/8260B	Solid	Dibromochloromethane	5	ug/kg
EPA 5035/8260B	Solid	Dichlorodifluoromethane	5	ug/kg
EPA 5035/8260B	Solid	Diisopropyl ether	5	ug/kg
EPA 5035/8260B	Solid	Dibromomethane	5	ug/kg
EPA 5035/8260B	Solid	Ethylbenzene	5	ug/kg
EPA 5035/8260B	Solid	Ethyl-tert-butyl ether	5	ug/kg
EPA 5035/8260B	Solid	Gasoline	200	ug/kg
EPA 5035/8260B	Solid	Hexachloro-1,3-butadiene	5	ug/kg
EPA 5035/8260B	Solid	Iodomethane	100	ug/kg
EPA 5035/8260B	Solid	Isopropylbenzene (Cumene)	5	ug/kg
EPA 5035/8260B	Solid	Methylene chloride	5	ug/kg
EPA 5035/8260B	Solid	Methyl-tert-butyl ether	5	ug/kg
EPA 5035/8260B	Solid	Methacrylonitrile	20	ug/kg
EPA 5035/8260B	Solid	4-Methyl-2-pentanone (MIBK)	10	ug/kg
EPA 5035/8260B	Solid	m&p-Xylene	5	ug/kg
EPA 5035/8260B	Solid	Naphthalene	5	ug/kg
EPA 5035/8260B	Solid	n-Butylbenzene	5	ug/kg
EPA 5035/8260B	Solid	n-Hexane	10	ug/kg
EPA 5035/8260B	Solid	n-Propylbenzene	5	ug/kg
EPA 5035/8260B	Solid	o-Xylene	5	ug/kg
EPA 5035/8260B	Solid	p-Isopropyltoluene	5	ug/kg
EPA 5035/8260B	Solid	Propionitrile	20	ug/kg
EPA 5035/8260B	Solid	sec-Butylbenzene	5	ug/kg
EPA 5035/8260B	Solid	Styrene	5	ug/kg
EPA 5035/8260B	Solid	trans-1,2-Dichloroethene	5	ug/kg
EPA 5035/8260B	Solid	trans-1,3-Dichloropropene	5	ug/kg
EPA 5035/8260B	Solid	trans-1,4-Dichloro-2-butene	10	ug/kg
EPA 5035/8260B	Solid	tert-Amylmethyl ether	5	ug/kg
EPA 5035/8260B	Solid	Tetrachloroethene	5	ug/kg
EPA 5035/8260B	Solid	1,1,2-Trichlorotrifluoroethane	5	ug/kg
EPA 5035/8260B	Solid	Toluene	5	ug/kg
EPA 5035/8260B	Solid	Trichloroethene	5	ug/kg
EPA 5035/8260B	Solid	Trichlorofluoromethane	5	ug/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 5035/8260B	Solid	tert-Butylbenzene	5	ug/kg
EPA 5035/8260B	Solid	Xylene (Total)	5	ug/kg
EPA 5035/8260B	Solid	Vinyl acetate	100	ug/kg
EPA 5035/8260B	Solid	Vinyl chloride	5	ug/kg
EPA 5030/8260B	Solid	1,1-Dichloroethane	5	ug/kg
EPA 5030/8260B	Solid	1,1-Dichloroethene	5	ug/kg
EPA 5030/8260B	Solid	1,1-Dichloropropene	5	ug/kg
EPA 5030/8260B	Solid	1,1,1-Trichloroethane	5	ug/kg
EPA 5030/8260B	Solid	1,1,2-Trichloroethane	5	ug/kg
EPA 5030/8260B	Solid	1,1,1,2-Tetrachloroethane	5	ug/kg
EPA 5030/8260B	Solid	1,1,2,2-Tetrachloroethane	5	ug/kg
EPA 5030/8260B	Solid	1,2,4-Trichlorobenzene	5	ug/kg
EPA 5030/8260B	Solid	1,2-Dichlorobenzene	5	ug/kg
EPA 5030/8260B	Solid	1,2-Dibromo-3-chloropropane	5	ug/kg
EPA 5030/8260B	Solid	1,2-Dichloroethane	5	ug/kg
EPA 5030/8260B	Solid	1,2-Dibromoethane (EDB)	5	ug/kg
EPA 5030/8260B	Solid	1,2-Dichloropropane	5	ug/kg
EPA 5030/8260B	Solid	1,2-Dichloroethene (Total)	5	ug/kg
EPA 5030/8260B	Solid	1,2,4-Trimethylbenzene	5	ug/kg
EPA 5030/8260B	Solid	1,2,3-Trichlorobenzene	5	ug/kg
EPA 5030/8260B	Solid	1,2,3-Trichloropropane	5	ug/kg
EPA 5030/8260B	Solid	1,3-Dichloropropene	100	ug/kg
EPA 5030/8260B	Solid	1,3-Dichlorobenzene	5	ug/kg
EPA 5030/8260B	Solid	1,3-Dichloropropane	5	ug/kg
EPA 5030/8260B	Solid	1,3,5-Trimethylbenzene	5	ug/kg
EPA 5030/8260B	Solid	1,4-Dichlorobenzene	5	ug/kg
EPA 5030/8260B	Solid	1,4-Dioxane (p-Dioxane)	50	ug/kg
EPA 5030/8260B	Solid	1-Chlorohexane	5	ug/kg
EPA 5030/8260B	Solid	2,2-Dichloropropane	5	ug/kg
EPA 5030/8260B	Solid	2-Butanone (MEK)	10	ug/kg
EPA 5030/8260B	Solid	2-Chlorotoluene	5	ug/kg
EPA 5030/8260B	Solid	2-Chloroethylvinyl ether	5	ug/kg
EPA 5030/8260B	Solid	2-Hexanone	100	ug/kg
EPA 5030/8260B	Solid	2-Methyl-2-propanol	100	ug/kg
EPA 5030/8260B	Solid	Allyl chloride	10	ug/kg
EPA 5030/8260B	Solid	4-Chlorotoluene	5	ug/kg
EPA 5030/8260B	Solid	Carbon disulfide	10	ug/kg
EPA 5030/8260B	Solid	Acetone	20	ug/kg
EPA 5030/8260B	Solid	Acrolein	100	ug/kg
EPA 5030/8260B	Solid	Acetonitrile	100	ug/kg
EPA 5030/8260B	Solid	Acrylonitrile	100	ug/kg
EPA 5030/8260B	Solid	Bromochloromethane	5	ug/kg
EPA 5030/8260B	Solid	Benzene	5	ug/kg
EPA 5030/8260B	Solid	Bromobenzene	5	ug/kg
EPA 5030/8260B	Solid	Bromodichloromethane	5	ug/kg
EPA 5030/8260B	Solid	Bromomethane	5	ug/kg
EPA 5030/8260B	Solid	Bromoform	5	ug/kg
EPA 5030/8260B	Solid	cis-1,2-Dichloroethene	5	ug/kg
EPA 5030/8260B	Solid	cis-1,3-Dichloropropene	5	ug/kg
EPA 5030/8260B	Solid	Carbon tetrachloride	5	ug/kg
EPA 5030/8260B	Solid	Chlorobenzene	5	ug/kg

Minimum Reporting Limits

Method	**Matrix**	**Parameter Name**	**RL**	**Units**
EPA 5030/8260B	Solid	Chloroprene	10	ug/kg
EPA 5030/8260B	Solid	Chloroethane	5	ug/kg
EPA 5030/8260B	Solid	Chloroform	5	ug/kg
EPA 5030/8260B	Solid	Chloromethane	5	ug/kg
EPA 5030/8260B	Solid	Dibromochloromethane	5	ug/kg
EPA 5030/8260B	Solid	Dichlorodifluoromethane	5	ug/kg
EPA 5030/8260B	Solid	Diisopropyl ether	5	ug/kg
EPA 5030/8260B	Solid	Dibromomethane	5	ug/kg
EPA 5030/8260B	Solid	Ethylbenzene	5	ug/kg
EPA 5030/8260B	Solid	Ethyl-tert-butyl ether	5	ug/kg
EPA 5030/8260B	Solid	Gasoline	200	ug/kg
EPA 5030/8260B	Solid	Hexachloro-1,3-butadiene	5	ug/kg
EPA 5030/8260B	Solid	Iodomethane	100	ug/kg
EPA 5030/8260B	Solid	Isopropylbenzene (Cumene)	5	ug/kg
EPA 5030/8260B	Solid	Methylene chloride	5	ug/kg
EPA 5030/8260B	Solid	Methyl-tert-butyl ether	5	ug/kg
EPA 5030/8260B	Solid	Methacrylonitrile	20	ug/kg
EPA 5030/8260B	Solid	4-Methyl-2-pentanone (MIBK)	10	ug/kg
EPA 5030/8260B	Solid	m&p-Xylene	5	ug/kg
EPA 5030/8260B	Solid	Naphthalene	5	ug/kg
EPA 5030/8260B	Solid	n-Butylbenzene	5	ug/kg
EPA 5030/8260B	Solid	n-Hexane	10	ug/kg
EPA 5030/8260B	Solid	n-Propylbenzene	5	ug/kg
EPA 5030/8260B	Solid	o-Xylene	5	ug/kg
EPA 5030/8260B	Solid	p-Isopropyltoluene	5	ug/kg
EPA 5030/8260B	Solid	Propionitrile	20	ug/kg
EPA 5030/8260B	Solid	sec-Butylbenzene	5	ug/kg
EPA 5030/8260B	Solid	Styrene	5	ug/kg
EPA 5030/8260B	Solid	trans-1,2-Dichloroethene	5	ug/kg
EPA 5030/8260B	Solid	trans-1,3-Dichloropropene	5	ug/kg
EPA 5030/8260B	Solid	trans-1,4-Dichloro-2-butene	10	ug/kg
EPA 5030/8260B	Solid	tert-Amylmethyl ether	5	ug/kg
EPA 5030/8260B	Solid	Tetrachloroethene	5	ug/kg
EPA 5030/8260B	Solid	1,1,2-Trichlorotrifluoroethane	5	ug/kg
EPA 5030/8260B	Solid	Toluene	5	ug/kg
EPA 5030/8260B	Solid	Trichloroethene	5	ug/kg
EPA 5030/8260B	Solid	Trichlorofluoromethane	5	ug/kg
EPA 5030/8260B	Solid	tert-Butylbenzene	5	ug/kg
EPA 5030/8260B	Solid	Xylene (Total)	5	ug/kg
EPA 5030/8260B	Solid	Vinyl acetate	100	ug/kg
EPA 5030/8260B	Solid	Vinyl chloride	5	ug/kg
EPA 5030/8260B	Solid	1,2-Dichloroethane	13	ug/kg
EPA 5030/8260B	Solid	Benzene	50	ug/kg
EPA 5030/8260B	Solid	Ethylbenzene	50	ug/kg
EPA 5030/8260B	Solid	Methyl-tert-butyl ether	250	ug/kg
EPA 5030/8260B	Solid	Naphthalene	250	ug/kg
EPA 5030/8260B	Solid	Toluene	50	ug/kg
EPA 5030/8260B	Solid	Xylene (Total)	175	ug/kg
EPA 8260B-UST	Water	1,2-Dichloroethane	3	ug/L
EPA 8260B-UST	Water	Benzene	2	ug/L
EPA 8260B-UST	Water	Ethylbenzene	2	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8260B-UST	Water	Methyl-tert-butyl ether	10	ug/L
EPA 8260B-UST	Water	Naphthalene	10	ug/L
EPA 8260B-UST	Water	Toluene	2	ug/L
EPA 8260B-UST	Water	Xylene (Total)	7	ug/L
EPA 8260B	Water	1,1-Dichloroethane	5	ug/L
EPA 8260B	Water	1,1-Dichloroethene	5	ug/L
EPA 8260B	Water	1,1-Dichloropropene	5	ug/L
EPA 8260B	Water	1,1,1-Trichloroethane	5	ug/L
EPA 8260B	Water	1,1,2-Trichloroethane	5	ug/L
EPA 8260B	Water	1,1,1,2-Tetrachloroethane	5	ug/L
EPA 8260B	Water	1,1,2,2-Tetrachloroethane	5	ug/L
EPA 8260B	Water	1,2,4-Trichlorobenzene	5	ug/L
EPA 8260B	Water	1,2-Dichlorobenzene	5	ug/L
EPA 8260B	Water	1,2-Dibromo-3-chloropropane	5	ug/L
EPA 8260B	Water	1,2-Dichloroethane	5	ug/L
EPA 8260B	Water	1,2-Dibromoethane (EDB)	5	ug/L
EPA 8260B	Water	1,2-Dichloropropane	5	ug/L
EPA 8260B	Water	1,2-Dichloroethene (Total)	5	ug/L
EPA 8260B	Water	1,2,4-Trimethylbenzene	5	ug/L
EPA 8260B	Water	1,2,3-Trichlorobenzene	5	ug/L
EPA 8260B	Water	1,2,3-Trichloropropane	5	ug/L
EPA 8260B	Water	1,3-Dichloropropene	5	ug/L
EPA 8260B	Water	1,3-Dichlorobenzene	5	ug/L
EPA 8260B	Water	1,3-Dichloropropane	5	ug/L
EPA 8260B	Water	1,3,5-Trimethylbenzene	5	ug/L
EPA 8260B	Water	1,4-Dichlorobenzene	5	ug/L
EPA 8260B	Water	1,4-Dioxane (p-Dioxane)	100	ug/L
EPA 8260B	Water	1-Chlorohexane	5	ug/L
EPA 8260B	Water	2,2-Dichloropropane	5	ug/L
EPA 8260B	Water	2-Butanone (MEK)	10	ug/L
EPA 8260B	Water	2-Chlorotoluene	5	ug/L
EPA 8260B	Water	2-Chloroethylvinyl ether	5	ug/L
EPA 8260B	Water	2-Hexanone	10	ug/L
EPA 8260B	Water	2-Methyl-2-propanol	100	ug/L
EPA 8260B	Water	2-Propanol	10	ug/L
EPA 8260B	Water	Allyl chloride	100	ug/L
EPA 8260B	Water	4-Chlorotoluene	5	ug/L
EPA 8260B	Water	Carbon disulfide	5	ug/L
EPA 8260B	Water	Ethanol	500	ug/L
EPA 8260B	Water	Acetone	20	ug/L
EPA 8260B	Water	Acrolein	100	ug/L
EPA 8260B	Water	Acetonitrile	100	ug/L
EPA 8260B	Water	Acrylonitrile	100	ug/L
EPA 8260B	Water	Bromochloromethane	5	ug/L
EPA 8260B	Water	Benzene	5	ug/L
EPA 8260B	Water	bis-Chloromethyl ether	10	ug/L
EPA 8260B	Water	Bromobenzene	5	ug/L
EPA 8260B	Water	Bromodichloromethane	5	ug/L
EPA 8260B	Water	Bromomethane	5	ug/L
EPA 8260B	Water	Bromoform	5	ug/L
EPA 8260B	Water	cis-1,2-Dichloroethene	5	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8260B	Water	cis-1,3-Dichloropropene	5	ug/L
EPA 8260B	Water	Carbon tetrachloride	5	ug/L
EPA 8260B	Water	Chlorobenzene	5	ug/L
EPA 8260B	Water	Chloroprene	10	ug/L
EPA 8260B	Water	Chloroethane	5	ug/L
EPA 8260B	Water	Chloroform	5	ug/L
EPA 8260B	Water	Chloromethane	5	ug/L
EPA 8260B	Water	Dibromochloromethane	5	ug/L
EPA 8260B	Water	Dichlorodifluoromethane	5	ug/L
EPA 8260B	Water	Diisopropyl ether	5	ug/L
EPA 8260B	Water	Dibromomethane	5	ug/L
EPA 8260B	Water	Ethyl acrylate	100	ug/L
EPA 8260B	Water	Ethylbenzene	5	ug/L
EPA 8260B	Water	Ethyl-tert-butyl ether	5	ug/L
EPA 8260B	Water	Gasoline	50	ug/L
EPA 8260B	Water	Hexachloro-1,3-butadiene	5	ug/L
EPA 8260B	Water	Iodomethane	10	ug/L
EPA 8260B	Water	Isopropylbenzene (Cumene)	5	ug/L
EPA 8260B	Water	Methylene chloride	5	ug/L
EPA 8260B	Water	Methyl methacrylate	100	ug/L
EPA 8260B	Water	Methyl-tert-butyl ether	5	ug/L
EPA 8260B	Water	Methacrylonitrile	10	ug/L
EPA 8260B	Water	4-Methyl-2-pentanone (MIBK)	10	ug/L
EPA 8260B	Water	m&p-Xylene	5	ug/L
EPA 8260B	Water	m-Xylene	5	ug/L
EPA 8260B	Water	Naphthalene	5	ug/L
EPA 8260B	Water	n-Butylbenzene	5	ug/L
EPA 8260B	Water	n-Hexane	10	ug/L
EPA 8260B	Water	n-Propylbenzene	5	ug/L
EPA 8260B	Water	o-Xylene	5	ug/L
EPA 8260B	Water	p-Isopropyltoluene	5	ug/L
EPA 8260B	Water	Propionitrile	10	ug/L
EPA 8260B	Water	p-Xylene	5	ug/L
EPA 8260B	Water	sec-Butylbenzene	5	ug/L
EPA 8260B	Water	Styrene	5	ug/L
EPA 8260B	Water	trans-1,2-Dichloroethene	5	ug/L
EPA 8260B	Water	trans-1,3-Dichloropropene	5	ug/L
EPA 8260B	Water	trans-1,4-Dichloro-2-butene	100	ug/L
EPA 8260B	Water	tert-Amylmethyl ether	5	ug/L
EPA 8260B	Water	Tetrachloroethene	5	ug/L
EPA 8260B	Water	Tetrahydrofuran	100	ug/L
EPA 8260B	Water	1,1,2-Trichlorotrifluoroethane	5	ug/L
EPA 8260B	Water	Toluene	5	ug/L
EPA 8260B	Water	Trichloroethene	5	ug/L
EPA 8260B	Water	Trichlorofluoromethane	5	ug/L
EPA 8260B	Water	tert-Butylbenzene	5	ug/L
EPA 8260B	Water	Xylene (Total)	5	ug/L
EPA 8260B	Water	Vinyl acetate	10	ug/L
EPA 8260B	Water	Vinyl chloride	5	ug/L
EPA 8260B SPLP	Leachate	1,1-Dichloroethane	5	ug/L
EPA 8260B SPLP	Leachate	1,1-Dichloroethene	5	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8260B SPLP	Leachate	1,1-Dichloropropene	5	ug/L
EPA 8260B SPLP	Leachate	1,1,1-Trichloroethane	5	ug/L
EPA 8260B SPLP	Leachate	1,1,2-Trichloroethane	5	ug/L
EPA 8260B SPLP	Leachate	1,1,1,2-Tetrachloroethane	5	ug/L
EPA 8260B SPLP	Leachate	1,1,2,2-Tetrachloroethane	5	ug/L
EPA 8260B SPLP	Leachate	1,2,4-Trichlorobenzene	5	ug/L
EPA 8260B SPLP	Leachate	1,2-Dichlorobenzene	5	ug/L
EPA 8260B SPLP	Leachate	1,2-Dibromo-3-chloropropane	5	ug/L
EPA 8260B SPLP	Leachate	1,2-Dichloroethane	5	ug/L
EPA 8260B SPLP	Leachate	1,2-Dibromoethane (EDB)	5	ug/L
EPA 8260B SPLP	Leachate	1,2-Dichloropropane	5	ug/L
EPA 8260B SPLP	Leachate	1,2,4-Trimethylbenzene	5	ug/L
EPA 8260B SPLP	Leachate	1,2,3-Trichlorobenzene	5	ug/L
EPA 8260B SPLP	Leachate	1,2,3-Trichloropropane	5	ug/L
EPA 8260B SPLP	Leachate	1,3-Dichlorobenzene	5	ug/L
EPA 8260B SPLP	Leachate	1,3-Dichloropropane	5	ug/L
EPA 8260B SPLP	Leachate	1,3,5-Trimethylbenzene	5	ug/L
EPA 8260B SPLP	Leachate	1,4-Dichlorobenzene	5	ug/L
EPA 8260B SPLP	Leachate	2,2-Dichloropropane	5	ug/L
EPA 8260B SPLP	Leachate	2-Chlorotoluene	5	ug/L
EPA 8260B SPLP	Leachate	2-Chloroethylvinyl ether	5	ug/L
EPA 8260B SPLP	Leachate	4-Chlorotoluene	5	ug/L
EPA 8260B SPLP	Leachate	Bromochloromethane	5	ug/L
EPA 8260B SPLP	Leachate	Benzene	5	ug/L
EPA 8260B SPLP	Leachate	Bromobenzene	5	ug/L
EPA 8260B SPLP	Leachate	Bromodichloromethane	5	ug/L
EPA 8260B SPLP	Leachate	Bromomethane	5	ug/L
EPA 8260B SPLP	Leachate	Bromoform	5	ug/L
EPA 8260B SPLP	Leachate	cis-1,2-Dichloroethene	5	ug/L
EPA 8260B SPLP	Leachate	cis-1,3-Dichloropropene	5	ug/L
EPA 8260B SPLP	Leachate	Carbon tetrachloride	5	ug/L
EPA 8260B SPLP	Leachate	Chlorobenzene	5	ug/L
EPA 8260B SPLP	Leachate	Chloroethane	5	ug/L
EPA 8260B SPLP	Leachate	Chloroform	5	ug/L
EPA 8260B SPLP	Leachate	Chloromethane	5	ug/L
EPA 8260B SPLP	Leachate	Dibromochloromethane	5	ug/L
EPA 8260B SPLP	Leachate	Dichlorodifluoromethane	5	ug/L
EPA 8260B SPLP	Leachate	Dibromomethane	5	ug/L
EPA 8260B SPLP	Leachate	Ethylbenzene	5	ug/L
EPA 8260B SPLP	Leachate	Hexachloro-1,3-butadiene	5	ug/L
EPA 8260B SPLP	Leachate	Isopropylbenzene (Cumene)	5	ug/L
EPA 8260B SPLP	Leachate	Methylene chloride	5	ug/L
EPA 8260B SPLP	Leachate	m&p-Xylene	5	ug/L
EPA 8260B SPLP	Leachate	Naphthalene	5	ug/L
EPA 8260B SPLP	Leachate	n-Butylbenzene	5	ug/L
EPA 8260B SPLP	Leachate	n-Propylbenzene	5	ug/L
EPA 8260B SPLP	Leachate	o-Xylene	5	ug/L
EPA 8260B SPLP	Leachate	p-Isopropyltoluene	5	ug/L
EPA 8260B SPLP	Leachate	sec-Butylbenzene	5	ug/L
EPA 8260B SPLP	Leachate	Styrene	5	ug/L
EPA 8260B SPLP	Leachate	trans-1,2-Dichloroethene	5	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8260B SPLP	Leachate	trans-1,3-Dichloropropene	5	ug/L
EPA 8260B SPLP	Leachate	Tetrachloroethene	5	ug/L
EPA 8260B SPLP	Leachate	Toluene	5	ug/L
EPA 8260B SPLP	Leachate	Trichloroethene	5	ug/L
EPA 8260B SPLP	Leachate	Trichlorofluoromethane	5	ug/L
EPA 8260B SPLP	Leachate	tert-Butylbenzene	5	ug/L
EPA 8260B SPLP	Leachate	Vinyl chloride	5	ug/L
EPA 8260B-Low Level	Water	1,1-Dichloroethane	1	ug/L
EPA 8260B-Low Level	Water	1,1-Dichloroethene	1	ug/L
EPA 8260B-Low Level	Water	1,1-Dichloropropene	1	ug/L
EPA 8260B-Low Level	Water	1,1,1-Trichloroethane	1	ug/L
EPA 8260B-Low Level	Water	1,1,2-Trichloroethane	1	ug/L
EPA 8260B-Low Level	Water	1,1,1,2-Tetrachloroethane	1	ug/L
EPA 8260B-Low Level	Water	1,1,2,2-Tetrachloroethane	1	ug/L
EPA 8260B-Low Level	Water	1,2,4-Trichlorobenzene	1	ug/L
EPA 8260B-Low Level	Water	1,2-Dichlorobenzene	1	ug/L
EPA 8260B-Low Level	Water	1,2-Dibromo-3-chloropropane	2.5	ug/L
EPA 8260B-Low Level	Water	1,2-Dichloroethane	1	ug/L
EPA 8260B-Low Level	Water	1,2-Dibromoethane (EDB)	1	ug/L
EPA 8260B-Low Level	Water	1,2-Dichloropropane	1	ug/L
EPA 8260B-Low Level	Water	1,2-Dichloroethene (Total)	1	ug/L
EPA 8260B-Low Level	Water	1,2,4-Trimethylbenzene	1	ug/L
EPA 8260B-Low Level	Water	1,2,3-Trichlorobenzene	1	ug/L
EPA 8260B-Low Level	Water	1,2,3-Trichloropropane	2.5	ug/L
EPA 8260B-Low Level	Water	1,3-Dichlorobenzene	1	ug/L
EPA 8260B-Low Level	Water	1,3-Dichloropropane	1	ug/L
EPA 8260B-Low Level	Water	1,3,5-Trimethylbenzene	1	ug/L
EPA 8260B-Low Level	Water	1,4-Dichlorobenzene	1	ug/L
EPA 8260B-Low Level	Water	1,4-Dioxane (p-Dioxane)	100	ug/L
EPA 8260B-Low Level	Water	1-Chlorohexane	1	ug/L
EPA 8260B-Low Level	Water	2,2-Dichloropropane	1	ug/L
EPA 8260B-Low Level	Water	2-Butanone (MEK)	10	ug/L
EPA 8260B-Low Level	Water	2-Chlorotoluene	1	ug/L
EPA 8260B-Low Level	Water	2-Chloroethylvinyl ether	10	ug/L
EPA 8260B-Low Level	Water	2-Hexanone	10	ug/L
EPA 8260B-Low Level	Water	2-Methylnaphthalene	5	ug/L
EPA 8260B-Low Level	Water	2-Propanol	500	ug/L
EPA 8260B-Low Level	Water	Allyl chloride	10	ug/L
EPA 8260B-Low Level	Water	4-Chlorotoluene	1	ug/L
EPA 8260B-Low Level	Water	Carbon disulfide	10	ug/L
EPA 8260B-Low Level	Water	Acetone	10	ug/L
EPA 8260B-Low Level	Water	Acrolein	20	ug/L
EPA 8260B-Low Level	Water	Acetonitrile	100	ug/L
EPA 8260B-Low Level	Water	Acrylonitrile	20	ug/L
EPA 8260B-Low Level	Water	Bromochloromethane	1	ug/L
EPA 8260B-Low Level	Water	Benzene	1	ug/L
EPA 8260B-Low Level	Water	bis-Chloromethyl ether	50	ug/L
EPA 8260B-Low Level	Water	Bromoethane	10	ug/L
EPA 8260B-Low Level	Water	Bromobenzene	1	ug/L
EPA 8260B-Low Level	Water	Bromodichloromethane	1	ug/L
EPA 8260B-Low Level	Water	Bromomethane	1	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8260B-Low Level	Water	Bromoform	1	ug/L
EPA 8260B-Low Level	Water	cis-1,2-Dichloroethene	1	ug/L
EPA 8260B-Low Level	Water	cis-1,3-Dichloropropene	1	ug/L
EPA 8260B-Low Level	Water	Carbon tetrachloride	1	ug/L
EPA 8260B-Low Level	Water	Chlorobenzene	1	ug/L
EPA 8260B-Low Level	Water	Chloroethane	1	ug/L
EPA 8260B-Low Level	Water	Chloroform	1	ug/L
EPA 8260B-Low Level	Water	Chloromethane	1	ug/L
EPA 8260B-Low Level	Water	Dibromochloromethane	1	ug/L
EPA 8260B-Low Level	Water	Dichlorodifluoromethane	1	ug/L
EPA 8260B-Low Level	Water	Diisopropyl ether	1	ug/L
EPA 8260B-Low Level	Water	Dibromomethane	1	ug/L
EPA 8260B-Low Level	Water	Ethylbenzene	1	ug/L
EPA 8260B-Low Level	Water	Gasoline	50	ug/L
EPA 8260B-Low Level	Water	Hexachloro-1,3-butadiene	1	ug/L
EPA 8260B-Low Level	Water	Iodomethane	10	ug/L
EPA 8260B-Low Level	Water	Isopropylbenzene (Cumene)	1	ug/L
EPA 8260B-Low Level	Water	Isobutanol	500	ug/L
EPA 8260B-Low Level	Water	Methylene chloride	1	ug/L
EPA 8260B-Low Level	Water	Methyl methacrylate	5	ug/L
EPA 8260B-Low Level	Water	Methyl-tert-butyl ether	1	ug/L
EPA 8260B-Low Level	Water	Methacrylonitrile	10	ug/L
EPA 8260B-Low Level	Water	4-Methyl-2-pentanone (MIBK)	10	ug/L
EPA 8260B-Low Level	Water	m&p-Xylene	1.3	ug/L
EPA 8260B-Low Level	Water	m-Xylene	0.5	ug/L
EPA 8260B-Low Level	Water	Naphthalene	1	ug/L
EPA 8260B-Low Level	Water	n-Butylbenzene	1	ug/L
EPA 8260B-Low Level	Water	n-Hexane	2	ug/L
EPA 8260B-Low Level	Water	n-Propylbenzene	1	ug/L
EPA 8260B-Low Level	Water	o-Xylene	1.1	ug/L
EPA 8260B-Low Level	Water	p-Isopropyltoluene	1	ug/L
EPA 8260B-Low Level	Water	Propionitrile	100	ug/L
EPA 8260B-Low Level	Water	sec-Butylbenzene	1	ug/L
EPA 8260B-Low Level	Water	Styrene	1	ug/L
EPA 8260B-Low Level	Water	trans-1,2-Dichloroethene	1	ug/L
EPA 8260B-Low Level	Water	trans-1,3-Dichloropropene	1	ug/L
EPA 8260B-Low Level	Water	trans-1,4-Dichloro-2-butene	20	ug/L
EPA 8260B-Low Level	Water	Tetrachloroethene	1	ug/L
EPA 8260B-Low Level	Water	1,1,2-Trichlorotrifluoroethane	1	ug/L
EPA 8260B-Low Level	Water	Toluene	1	ug/L
EPA 8260B-Low Level	Water	Trichloroethene	1	ug/L
EPA 8260B-Low Level	Water	Trichlorofluoromethane	1	ug/L
EPA 8260B-Low Level	Water	tert-Butylbenzene	1	ug/L
EPA 8260B-Low Level	Water	Xylene (Total)	3	ug/L
EPA 8260B-Low Level	Water	Vinyl acetate	20	ug/L
EPA 8260B-Low Level	Water	Vinyl chloride	1	ug/L
EPA 8270C	Solid	1,2,4-Trichlorobenzene	330	ug/kg
EPA 8270C	Solid	1,2-Dichlorobenzene	330	ug/kg
EPA 8270C	Solid	1,2-Diphenylhydrazine	330	ug/kg
EPA 8270C	Solid	1,3-Dichlorobenzene	330	ug/kg
EPA 8270C	Solid	1,3,5-Trinitrobenzene	330	ug/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8270C	Solid	1,4-Dichlorobenzene	330	ug/kg
EPA 8270C	Solid	1-Methylnaphthalene	330	ug/kg
EPA 8270C	Solid	1-Naphthaleneamine	330	ug/kg
EPA 8270C	Solid	2,4,6-Trichlorophenol	330	ug/kg
EPA 8270C	Solid	2,4-Dichlorophenol	330	ug/kg
EPA 8270C	Solid	2,4-Dimethylphenol	330	ug/kg
EPA 8270C	Solid	2,4-Dinitrophenol	1600	ug/kg
EPA 8270C	Solid	2,4-Dinitrotoluene	330	ug/kg
EPA 8270C	Solid	2,4,5-Trichlorophenol	330	ug/kg
EPA 8270C	Solid	2,6-Dichlorophenol	330	ug/kg
EPA 8270C	Solid	2,6-Dinitrotoluene	330	ug/kg
EPA 8270C	Solid	2-Acetylaminofluorene	330	ug/kg
EPA 8270C	Solid	2-Amino-2-methylpropanol	330	ug/kg
EPA 8270C	Solid	2-Chloronaphthalene	330	ug/kg
EPA 8270C	Solid	2-Chlorophenol	330	ug/kg
EPA 8270C	Solid	2-Methyl-5-nitroaniline	330	ug/kg
EPA 8270C	Solid	2-Methylphenol (o-Cresol)	330	ug/kg
EPA 8270C	Solid	2-Methylnaphthalene	330	ug/kg
EPA 8270C	Solid	2-Nitroaniline	1600	ug/kg
EPA 8270C	Solid	2-Nitrophenol	330	ug/kg
EPA 8270C	Solid	2-Picoline	330	ug/kg
EPA 8270C	Solid	3,3'-Dichlorobenzidine	660	ug/kg
EPA 8270C	Solid	3-Methylphenol (m-Cresol)	330	ug/kg
EPA 8270C	Solid	3-Nitroaniline	1600	ug/kg
EPA 8270C	Solid	4,6-Dinitro-2-methylphenol	1600	ug/kg
EPA 8270C	Solid	4-Bromophenylphenyl ether	330	ug/kg
EPA 8270C	Solid	4-Chloro-3-methylphenol	660	ug/kg
EPA 8270C	Solid	4-Chloroaniline	660	ug/kg
EPA 8270C	Solid	4-Chlorophenylphenyl ether	330	ug/kg
EPA 8270C	Solid	4-Methylphenol (p-Cresol)	330	ug/kg
EPA 8270C	Solid	4-Nitroaniline	1600	ug/kg
EPA 8270C	Solid	4-Nitrophenol	1600	ug/kg
EPA 8270C	Solid	7,12-Dimethylbenz(a)anthracene	1600	ug/kg
EPA 8270C	Solid	N,N-Dimethylformamide	330	ug/kg
EPA 8270C	Solid	Acenaphthene	330	ug/kg
EPA 8270C	Solid	Acenaphthylene	330	ug/kg
EPA 8270C	Solid	Acetophenone	330	ug/kg
EPA 8270C	Solid	Aniline	330	ug/kg
EPA 8270C	Solid	Anthracene	330	ug/kg
EPA 8270C	Solid	Aramite	330	ug/kg
EPA 8270C	Solid	Butylbenzylphthalate	330	ug/kg
EPA 8270C	Solid	Benzoic acid	1600	ug/kg
EPA 8270C	Solid	Benzyl alcohol	660	ug/kg
EPA 8270C	Solid	Benzo(k)fluoranthene	330	ug/kg
EPA 8270C	Solid	Benzo(g,h,i)perylene	330	ug/kg
EPA 8270C	Solid	Benzo(a)anthracene	330	ug/kg
EPA 8270C	Solid	Benzidine	1600	ug/kg
EPA 8270C	Solid	Benzo(b)fluoranthene	330	ug/kg
EPA 8270C	Solid	Benzo(a)pyrene	330	ug/kg
EPA 8270C	Solid	Biphenyl (Diphenyl)	330	ug/kg
EPA 8270C	Solid	bis(2-Chloroethoxy)methane	330	ug/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8270C	Solid	bis(2-Chloroethyl) ether	330	ug/kg
EPA 8270C	Solid	bis(2-Chloroisopropyl) ether	330	ug/kg
EPA 8270C	Solid	bis(2-Ethylhexyl)phthalate	330	ug/kg
EPA 8270C	Solid	Benzenethiol (Thiophenol)	1670	ug/kg
EPA 8270C	Solid	Carbazole	330	ug/kg
EPA 8270C	Solid	Chrysene	330	ug/kg
EPA 8270C	Solid	Cyclohexamine	330	ug/kg
EPA 8270C	Solid	Dibenz(a,h)acridine	1670	ug/kg
EPA 8270C	Solid	Dibenz(a,h)anthracene	330	ug/kg
EPA 8270C	Solid	Dibenzofuran	330	ug/kg
EPA 8270C	Solid	Diphenylamine	330	ug/kg
EPA 8270C	Solid	Dimethylphthalate	330	ug/kg
EPA 8270C	Solid	Di-n-butylphthalate	330	ug/kg
EPA 8270C	Solid	Di-n-octylphthalate	330	ug/kg
EPA 8270C	Solid	Diethylphthalate	330	ug/kg
EPA 8270C	Solid	Ethyl methanesulfonate	330	ug/kg
EPA 8270C	Solid	Fluorene	330	ug/kg
EPA 8270C	Solid	Fluoranthene	330	ug/kg
EPA 8270C	Solid	Hexachloro-1,3-butadiene	330	ug/kg
EPA 8270C	Solid	Hexachlorobenzene	330	ug/kg
EPA 8270C	Solid	Hexachlorocyclopentadiene	330	ug/kg
EPA 8270C	Solid	Hexachloroethane	330	ug/kg
EPA 8270C	Solid	Hexachlorophene	1500	ug/kg
EPA 8270C	Solid	Hexachloropropene	1500	ug/kg
EPA 8270C	Solid	Indeno(1,2,3-cd)pyrene	330	ug/kg
EPA 8270C	Solid	Indene	330	ug/kg
EPA 8270C	Solid	Isophorone	330	ug/kg
EPA 8270C	Solid	Isosafrole	330	ug/kg
EPA 8270C	Solid	Naphthalene	330	ug/kg
EPA 8270C	Solid	N-Nitroso-di-n-butylamine	330	ug/kg
EPA 8270C	Solid	N-Nitroso-di-n-propylamine	330	ug/kg
EPA 8270C	Solid	Nitrobenzene	330	ug/kg
EPA 8270C	Solid	N-methyl-2-pyrrolidone	330	ug/kg
EPA 8270C	Solid	N-Nitrosodiethylamine	330	ug/kg
EPA 8270C	Solid	N-Nitrosodimethylamine	330	ug/kg
EPA 8270C	Solid	N-Nitrosodiphenylamine	330	ug/kg
EPA 8270C	Solid	N-Nitrosopiperidine	330	ug/kg
EPA 8270C	Solid	N-Nitrosomethylethylamine	330	ug/kg
EPA 8270C	Solid	N-Nitrosomorpholine	330	ug/kg
EPA 8270C	Solid	N-Nitrosopyrrolidine	330	ug/kg
EPA 8270C	Solid	P-Dimethylaminoazobenzene	330	ug/kg
EPA 8270C	Solid	Phenacetin	330	ug/kg
EPA 8270C	Solid	Phenol	330	ug/kg
EPA 8270C	Solid	Phenanthrene	330	ug/kg
EPA 8270C	Solid	p-Phenylenediamine	330	ug/kg
EPA 8270C	Solid	Pentachlorobenzene	330	ug/kg
EPA 8270C	Solid	Pentachloroethane	330	ug/kg
EPA 8270C	Solid	Pentachlorophenol	1600	ug/kg
EPA 8270C	Solid	Pentachloronitrobenzene	330	ug/kg
EPA 8270C	Solid	Pyrene	330	ug/kg
EPA 8270C	Solid	Pyridine	330	ug/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8270C	Solid	Quinoline	330	ug/kg
EPA 8270C	Solid	Safrole	330	ug/kg
EPA 8270C	Water	1,2,4-Trichlorobenzene	10	ug/L
EPA 8270C	Water	1,2-Dichlorobenzene	10	ug/L
EPA 8270C	Water	1,2-Diphenylhydrazine	20	ug/L
EPA 8270C	Water	1,3-Dichlorobenzene	10	ug/L
EPA 8270C	Water	1,3-Dinitrobenzene	10	ug/L
EPA 8270C	Water	1,3,5-Trinitrobenzene	10	ug/L
EPA 8270C	Water	1,4-Dichlorobenzene	10	ug/L
EPA 8270C	Water	1,4-Naphthoquinone	50	ug/L
EPA 8270C	Water	1,2,4,5-Tetrachlorobenzene	10	ug/L
EPA 8270C	Water	1-Methylnaphthalene	10	ug/L
EPA 8270C	Water	1-Naphthaleneamine	10	ug/L
EPA 8270C	Water	2,3,4,6-Tetrachlorophenol	10	ug/L
EPA 8270C	Water	2,4,6-Trichlorophenol	10	ug/L
EPA 8270C	Water	2,4-Dichlorophenol	10	ug/L
EPA 8270C	Water	2,4-Dimethylphenol	10	ug/L
EPA 8270C	Water	2,4-Dinitrophenol	50	ug/L
EPA 8270C	Water	2,4-Dinitrotoluene	10	ug/L
EPA 8270C	Water	2,4,5-Trichlorophenol	50	ug/L
EPA 8270C	Water	2,6-Dichlorophenol	10	ug/L
EPA 8270C	Water	2,6-Dinitrotoluene	10	ug/L
EPA 8270C	Water	2-Acetylaminofluorene	10	ug/L
EPA 8270C	Water	2-Amino-2-methylpropanol	10	ug/L
EPA 8270C	Water	2-Chloronaphthalene	10	ug/L
EPA 8270C	Water	2-Chlorophenol	10	ug/L
EPA 8270C	Water	2-Methyl-5-nitroaniline	10	ug/L
EPA 8270C	Water	2-Methylphenol (o-Cresol)	10	ug/L
EPA 8270C	Water	2-Methylnaphthalene	10	ug/L
EPA 8270C	Water	2-Nitroaniline	50	ug/L
EPA 8270C	Water	2-Naphthaleneamine	10	ug/L
EPA 8270C	Water	2-Nitrophenol	10	ug/L
EPA 8270C	Water	2-Picoline	10	ug/L
EPA 8270C	Water	3,3'-Dichlorobenzidine	20	ug/L
EPA 8270C	Water	3,3'-Dimethylbenzidine	10	ug/L
EPA 8270C	Water	3-Methylcholanthrene	10	ug/L
EPA 8270C	Water	3-Methylphenol (m-Cresol)	20	ug/L
EPA 8270C	Water	3-Nitroaniline	50	ug/L
EPA 8270C	Water	4,6-Dinitro-2-methylphenol	50	ug/L
EPA 8270C	Water	4-Aminobiphenyl	10	ug/L
EPA 8270C	Water	4-Bromophenylphenyl ether	10	ug/L
EPA 8270C	Water	4-Chloro-3-methylphenol	20	ug/L
EPA 8270C	Water	4-Chloroaniline	20	ug/L
EPA 8270C	Water	4-Chlorophenylphenyl ether	10	ug/L
EPA 8270C	Water	4-Methylphenol (p-Cresol)	10	ug/L
EPA 8270C	Water	4-Nitroaniline	50	ug/L
EPA 8270C	Water	4-Nitrophenol	50	ug/L
EPA 8270C	Water	4-Nitroquinoline-n-oxide	10	ug/L
EPA 8270C	Water	7,12-Dimethylbenz(a)anthracene	50	ug/L
EPA 8270C	Water	N,N-Dimethylformamide	10	ug/L
EPA 8270C	Water	a,a-Dimethylphenylethylamine	10	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8270C	Water	Acenaphthene	10	ug/L
EPA 8270C	Water	Acenaphthylene	10	ug/L
EPA 8270C	Water	Acetophenone	10	ug/L
EPA 8270C	Water	Aniline	10	ug/L
EPA 8270C	Water	Anthracene	10	ug/L
EPA 8270C	Water	Aramite	10	ug/L
EPA 8270C	Water	Butylbenzylphthalate	10	ug/L
EPA 8270C	Water	Benzoic acid	50	ug/L
EPA 8270C	Water	Benzyl alcohol	20	ug/L
EPA 8270C	Water	Benzo(k)fluoranthene	10	ug/L
EPA 8270C	Water	Benzo(g,h,i)perylene	10	ug/L
EPA 8270C	Water	Benzo(a)anthracene	10	ug/L
EPA 8270C	Water	Benzidine	50	ug/L
EPA 8270C	Water	Benzo(b)fluoranthene	10	ug/L
EPA 8270C	Water	Benzo(a)pyrene	10	ug/L
EPA 8270C	Water	bis(2-Chloroethoxy)methane	10	ug/L
EPA 8270C	Water	bis(2-Chloroethyl) ether	10	ug/L
EPA 8270C	Water	bis(2-Chloroisopropyl) ether	10	ug/L
EPA 8270C	Water	bis(2-Ethylhexyl)phthalate	10	ug/L
EPA 8270C	Water	Benzilic acid	20	ug/L
EPA 8270C	Water	Benzophenone	50	ug/L
EPA 8270C	Water	Benzenethiol (Thiophenol)	50	ug/L
EPA 8270C	Water	Carbazole	10	ug/L
EPA 8270C	Water	Chrysene	10	ug/L
EPA 8270C	Water	Cyclohexamine	10	ug/L
EPA 8270C	Water	Dibenz(a,h)acridine	10	ug/L
EPA 8270C	Water	Dibenz(a,j)acridine	10	ug/L
EPA 8270C	Water	Dibenz(a,h)anthracene	10	ug/L
EPA 8270C	Water	Dibenzofuran	10	ug/L
EPA 8270C	Water	Dinoseb	10	ug/L
EPA 8270C	Water	Diphenylamine	10	ug/L
EPA 8270C	Water	Dimethylphthalate	10	ug/L
EPA 8270C	Water	Di-n-butylphthalate	10	ug/L
EPA 8270C	Water	Di-n-octylphthalate	10	ug/L
EPA 8270C	Water	Diethylphthalate	10	ug/L
EPA 8270C	Water	Ethyl methacrylate	10	ug/L
EPA 8270C	Water	Ethyl methanesulfonate	10	ug/L
EPA 8270C	Water	Fluorene	10	ug/L
EPA 8270C	Water	Fluoranthene	10	ug/L
EPA 8270C	Water	Hexachloro-1,3-butadiene	10	ug/L
EPA 8270C	Water	Hexachlorobenzene	10	ug/L
EPA 8270C	Water	Hexachlorocyclopentadiene	10	ug/L
EPA 8270C	Water	Hexachloroethane	10	ug/L
EPA 8270C	Water	Hexachlorophene	10	ug/L
EPA 8270C	Water	Hexachloropropene	10	ug/L
EPA 8270C	Water	Indeno(1,2,3-cd)pyrene	10	ug/L
EPA 8270C	Water	Indene	10	ug/L
EPA 8270C	Water	Isophorone	10	ug/L
EPA 8270C	Water	Isosafrole	10	ug/L
EPA 8270C	Water	Kepone	10	ug/L
EPA 8270C	Water	Methyl methacrylate	10	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8270C	Water	Methapyrilene	10	ug/L
EPA 8270C	Water	Methyl methanesulfonate	10	ug/L
EPA 8270C	Water	6-Methylchrysene	50	ug/L
EPA 8270C	Water	Naphthalene	10	ug/L
EPA 8270C	Water	N-Nitroso-di-n-butylamine	10	ug/L
EPA 8270C	Water	N-Nitroso-di-n-propylamine	10	ug/L
EPA 8270C	Water	Nitrobenzene	10	ug/L
EPA 8270C	Water	N-methyl-2-pyrrolidone	10	ug/L
EPA 8270C	Water	N-Nitrosodiethylamine	10	ug/L
EPA 8270C	Water	N-Nitrosodimethylamine	20	ug/L
EPA 8270C	Water	N-Nitrosodiphenylamine	10	ug/L
EPA 8270C	Water	N-Nitrosopiperidine	10	ug/L
EPA 8270C	Water	N-Nitrosomethylethylamine	10	ug/L
EPA 8270C	Water	N-Nitrosomorpholine	10	ug/L
EPA 8270C	Water	N-Nitrosopyrrolidine	10	ug/L
EPA 8270C	Water	O-Toluidine	10	ug/L
EPA 8270C	Water	P-Dimethylaminoazobenzene	10	ug/L
EPA 8270C	Water	Phenacetin	10	ug/L
EPA 8270C	Water	Phenol	10	ug/L
EPA 8270C	Water	Phenanthrene	10	ug/L
EPA 8270C	Water	p-Phenylenediamine	10	ug/L
EPA 8270C	Water	Pronamide	10	ug/L
EPA 8270C	Water	Pentachlorobenzene	10	ug/L
EPA 8270C	Water	Pentachloroethane	10	ug/L
EPA 8270C	Water	Pentachlorophenol	50	ug/L
EPA 8270C	Water	Pentachloronitrobenzene	10	ug/L
EPA 8270C	Water	Pyrene	10	ug/L
EPA 8270C	Water	Pyridine	10	ug/L
EPA 8270C	Water	Quinoline	10	ug/L
EPA 8270C	Water	Safrole	10	ug/L
EPA 8270C TCLP	Leachate	1,4-Dichlorobenzene	100	ug/L
EPA 8270C TCLP	Leachate	1-Methylnaphthalene	100	ug/L
EPA 8270C TCLP	Leachate	2,4,6-Trichlorophenol	100	ug/L
EPA 8270C TCLP	Leachate	2,4-Dichlorophenol	100	ug/L
EPA 8270C TCLP	Leachate	2,4-Dimethylphenol	100	ug/L
EPA 8270C TCLP	Leachate	2,4-Dinitrotoluene	100	ug/L
EPA 8270C TCLP	Leachate	2,4,5-Trichlorophenol	500	ug/L
EPA 8270C TCLP	Leachate	2-Methylphenol (o-Cresol)	100	ug/L
EPA 8270C TCLP	Leachate	2-Methylnaphthalene	100	ug/L
EPA 8270C TCLP	Leachate	3-Methylphenol (m-Cresol)	200	ug/L
EPA 8270C TCLP	Leachate	4-Methylphenol (p-Cresol)	100	ug/L
EPA 8270C TCLP	Leachate	Acenaphthene	50	ug/L
EPA 8270C TCLP	Leachate	Acenaphthylene	100	ug/L
EPA 8270C TCLP	Leachate	Aniline	100	ug/L
EPA 8270C TCLP	Leachate	Anthracene	50	ug/L
EPA 8270C TCLP	Leachate	Benzo(k)fluoranthene	100	ug/L
EPA 8270C TCLP	Leachate	Benzo(g,h,i)perylene	100	ug/L
EPA 8270C TCLP	Leachate	Benzo(a)anthracene	50	ug/L
EPA 8270C TCLP	Leachate	Benzidine	500	ug/L
EPA 8270C TCLP	Leachate	Benzo(a)pyrene	50	ug/L
EPA 8270C TCLP	Leachate	bis(2-Ethylhexyl)phthalate	50	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8270C TCLP	Leachate	Chrysene	50	ug/L
EPA 8270C TCLP	Leachate	Diesel Fuel	100	ug/L
EPA 8270C TCLP	Leachate	Di-n-butylphthalate	50	ug/L
EPA 8270C TCLP	Leachate	Diethylphthalate	100	ug/L
EPA 8270C TCLP	Leachate	Fluorene	50	ug/L
EPA 8270C TCLP	Leachate	Fluoranthene	100	ug/L
EPA 8270C TCLP	Leachate	Hexachloro-1,3-butadiene	100	ug/L
EPA 8270C TCLP	Leachate	Hexachlorobenzene	100	ug/L
EPA 8270C TCLP	Leachate	Hexachloroethane	100	ug/L
EPA 8270C TCLP	Leachate	Indeno(1,2,3-cd)pyrene	100	ug/L
EPA 8270C TCLP	Leachate	Indene	100	ug/L
EPA 8270C TCLP	Leachate	Isophorone	100	ug/L
EPA 8270C TCLP	Leachate	Naphthalene	50	ug/L
EPA 8270C TCLP	Leachate	Nitrobenzene	100	ug/L
EPA 8270C TCLP	Leachate	Phenol	50	ug/L
EPA 8270C TCLP	Leachate	Phenanthrene	50	ug/L
EPA 8270C TCLP	Leachate	Pentachlorophenol	500	ug/L
EPA 8270C TCLP	Leachate	Pyrene	50	ug/L
EPA 8270C TCLP	Leachate	Pyridine	100	ug/L
EPA 8270C SPLP	Leachate	1,4-Dichlorobenzene	100	ug/L
EPA 8270C SPLP	Leachate	1-Methylnaphthalene	100	ug/L
EPA 8270C SPLP	Leachate	2,4,6-Trichlorophenol	100	ug/L
EPA 8270C SPLP	Leachate	2,4-Dichlorophenol	100	ug/L
EPA 8270C SPLP	Leachate	2,4-Dimethylphenol	100	ug/L
EPA 8270C SPLP	Leachate	2,4-Dinitrotoluene	100	ug/L
EPA 8270C SPLP	Leachate	2,4,5-Trichlorophenol	500	ug/L
EPA 8270C SPLP	Leachate	2-Methylphenol (o-Cresol)	100	ug/L
EPA 8270C SPLP	Leachate	2-Methylnaphthalene	100	ug/L
EPA 8270C SPLP	Leachate	3-Methylphenol (m-Cresol)	200	ug/L
EPA 8270C SPLP	Leachate	4-Methylphenol (p-Cresol)	100	ug/L
EPA 8270C SPLP	Leachate	Acenaphthene	50	ug/L
EPA 8270C SPLP	Leachate	Acenaphthylene	100	ug/L
EPA 8270C SPLP	Leachate	Aniline	100	ug/L
EPA 8270C SPLP	Leachate	Anthracene	50	ug/L
EPA 8270C SPLP	Leachate	Benzo(k)fluoranthene	100	ug/L
EPA 8270C SPLP	Leachate	Benzo(g,h,i)perylene	100	ug/L
EPA 8270C SPLP	Leachate	Benzo(a)anthracene	50	ug/L
EPA 8270C SPLP	Leachate	Benzidine	500	ug/L
EPA 8270C SPLP	Leachate	Benzo(a)pyrene	50	ug/L
EPA 8270C SPLP	Leachate	bis(2-Ethylhexyl)phthalate	50	ug/L
EPA 8270C SPLP	Leachate	Chrysene	50	ug/L
EPA 8270C SPLP	Leachate	Di-n-butylphthalate	50	ug/L
EPA 8270C SPLP	Leachate	Diethylphthalate	100	ug/L
EPA 8270C SPLP	Leachate	Fluorene	50	ug/L
EPA 8270C SPLP	Leachate	Fluoranthene	100	ug/L
EPA 8270C SPLP	Leachate	Hexachloro-1,3-butadiene	100	ug/L
EPA 8270C SPLP	Leachate	Hexachlorobenzene	100	ug/L
EPA 8270C SPLP	Leachate	Hexachloroethane	100	ug/L
EPA 8270C SPLP	Leachate	Indeno(1,2,3-cd)pyrene	100	ug/L
EPA 8270C SPLP	Leachate	Indene	100	ug/L
EPA 8270C SPLP	Leachate	Isophorone	100	ug/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8270C SPLP	Leachate	Naphthalene	50	ug/L
EPA 8270C SPLP	Leachate	Nitrobenzene	100	ug/L
EPA 8270C SPLP	Leachate	Phenol	50	ug/L
EPA 8270C SPLP	Leachate	Phenanthrene	50	ug/L
EPA 8270C SPLP	Leachate	Pentachlorophenol	500	ug/L
EPA 8270C SPLP	Leachate	Pyrene	50	ug/L
EPA 8270C SPLP	Leachate	Pyridine	100	ug/L
EPA 8310	Solid	Acenaphthene	16.7	ug/kg
EPA 8310	Solid	Acenaphthylene	33.3	ug/kg
EPA 8310	Solid	Anthracene	3.4	ug/kg
EPA 8310	Solid	Benzo(k)fluoranthene	3.4	ug/kg
EPA 8310	Solid	Benzo(g,h,i)perylene	10	ug/kg
EPA 8310	Solid	Benzo(a)anthracene	5	ug/kg
EPA 8310	Solid	Benzo(b)fluoranthene	3.3	ug/kg
EPA 8310	Solid	Benzo(a)pyrene	5	ug/kg
EPA 8310	Solid	Chrysene	3.4	ug/kg
EPA 8310	Solid	Dibenz(a,h)anthracene	10	ug/kg
EPA 8310	Solid	Fluorene	15	ug/kg
EPA 8310	Solid	Fluoranthene	10	ug/kg
EPA 8310	Solid	Indeno(1,2,3-cd)pyrene	3.4	ug/kg
EPA 8310	Solid	Naphthalene	50	ug/kg
EPA 8310	Solid	Phenanthrene	5	ug/kg
EPA 8310	Solid	Pyrene	5	ug/kg
EPA 8310	Water	Acenaphthene	0.5	ug/L
EPA 8310	Water	Acenaphthylene	1	ug/L
EPA 8310	Water	Anthracene	0.05	ug/L
EPA 8310	Water	Benzo(k)fluoranthene	0.1	ug/L
EPA 8310	Water	Benzo(g,h,i)perylene	0.1	ug/L
EPA 8310	Water	Benzo(a)anthracene	0.1	ug/L
EPA 8310	Water	Benzo(b)fluoranthene	0.1	ug/L
EPA 8310	Water	Benzo(a)pyrene	0.1	ug/L
EPA 8310	Water	Chrysene	0.1	ug/L
EPA 8310	Water	Dibenz(a,h)anthracene	0.1	ug/L
EPA 8310	Water	Fluorene	0.1	ug/L
EPA 8310	Water	Fluoranthene	0.1	ug/L
EPA 8310	Water	Indeno(1,2,3-cd)pyrene	0.1	ug/L
EPA 8310	Water	Naphthalene	0.5	ug/L
EPA 8310	Water	Phenanthrene	0.1	ug/L
EPA 8310	Water	Pyrene	0.1	ug/L
EPA 9010B	Solid	Cyanide	0.05	mg/kg
EPA 9010B	Water	Cyanide	0.005	mg/L
EPA 9034	Solid	Sulfide	5	mg/kg
EPA 9034	Water	Sulfide	0.2	mg/L
EPA 9050A	Solid	Specific Conductance	1	umohs/cm
EPA 9071B	Solid	Oil and Grease	5	mg/kg
EPA 9081	Solid	Cation Exchange Capacity	0.1	S..
EPA 9095A	Solid	Free Liquids		
SM5540 C	Water	Surfactants	0.2	mg/L
Oklahoma DRO	Solid	Diesel Range Organics	10	mg/kg
Oklahoma DRO	Water	Diesel Range Organics	0.1	mg/L
F001-F005	Solid	1,1,1-Trichloroethane	100	mg/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
F001-F005	Solid	1,1,2-Trichloroethane	100	mg/kg
F001-F005	Solid	1,2-Dichlorobenzene	100	mg/kg
F001-F005	Solid	2-Butanone (MEK)	100	mg/kg
F001-F005	Solid	2-Chloroethanol	100	mg/kg
F001-F005	Solid	2-Ethoxyethanol	100	mg/kg
F001-F005	Solid	2-Methyl-2-propanol	100	mg/kg
F001-F005	Solid	2-Methoxyethanol	100	mg/kg
F001-F005	Solid	2-Methylphenol (o-Cresol)	100	mg/kg
F001-F005	Solid	2-Nitropropane	100	mg/kg
F001-F005	Solid	2-Propanol	100	mg/kg
F001-F005	Solid	3-Methylphenol (m-Cresol)	100	mg/kg
F001-F005	Solid	4-Methylphenol (p-Cresol)	100	mg/kg
F001-F005	Solid	Carbon disulfide	100	mg/kg
F001-F005	Solid	Ethanol	100	mg/kg
F001-F005	Solid	Acetone	100	mg/kg
F001-F005	Solid	Benzene	100	mg/kg
F001-F005	Solid	Carbon tetrachloride	100	mg/kg
F001-F005	Solid	Chlorobenzene	100	mg/kg
F001-F005	Solid	Cyclohexanone	100	mg/kg
F001-F005	Solid	Diethyl ether (Ethyl ether)	100	mg/kg
F001-F005	Solid	d-Limonene	100	mg/kg
F001-F005	Solid	Ethyl acetate	100	mg/kg
F001-F005	Solid	Ethylbenzene	100	mg/kg
F001-F005	Solid	Isobutanol	100	mg/kg
F001-F005	Solid	Methylene chloride	100	mg/kg
F001-F005	Solid	4-Methyl-2-pentanone (MIBK)	100	mg/kg
F001-F005	Solid	Methanol	100	mg/kg
F001-F005	Solid	n-Butanol	100	mg/kg
F001-F005	Solid	Nitrobenzene	100	mg/kg
F001-F005	Solid	Pyridine	100	mg/kg
F001-F005	Solid	Tetrachloroethene	100	mg/kg
F001-F005	Solid	1,1,2-Trichlorotrifluoroethane	100	mg/kg
F001-F005	Solid	Toluene	100	mg/kg
F001-F005	Solid	Trichloroethene	100	mg/kg
F001-F005	Solid	Trichlorofluoromethane	100	mg/kg
F001-F005	Solid	Xylene (Total)	100	mg/kg
F001-F005	Water	1,1,1-Trichloroethane	10	mg/L
F001-F005	Water	1,1,2-Trichloroethane	10	mg/L
F001-F005	Water	1,2-Dichlorobenzene	10	mg/L
F001-F005	Water	2-Butanone (MEK)	10	mg/L
F001-F005	Water	2-Chloroethanol	10	mg/L
F001-F005	Water	2-Ethoxyethanol	10	mg/L
F001-F005	Water	2-Methyl-2-propanol	10	mg/L
F001-F005	Water	2-Methoxyethanol	10	mg/L
F001-F005	Water	2-Methylphenol (o-Cresol)	10	mg/L
F001-F005	Water	2-Nitropropane	10	mg/L
F001-F005	Water	2-Propanol	10	mg/L
F001-F005	Water	3-Methylphenol (m-Cresol)	10	mg/L
F001-F005	Water	4-Methylphenol (p-Cresol)	10	mg/L
F001-F005	Water	Carbon disulfide	10	mg/L
F001-F005	Water	Ethanol	10	mg/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
F001-F005	Water	Acetone	10	mg/L
F001-F005	Water	Benzene	10	mg/L
F001-F005	Water	Carbon tetrachloride	10	mg/L
F001-F005	Water	Chlorobenzene	10	mg/L
F001-F005	Water	Cyclohexanone	10	mg/L
F001-F005	Water	Diethyl ether (Ethyl ether)	10	mg/L
F001-F005	Water	d-Limonene	10	mg/L
F001-F005	Water	Ethyl acetate	10	mg/L
F001-F005	Water	Ethylbenzene	10	mg/L
F001-F005	Water	Ethylene glycol	10	mg/L
F001-F005	Water	Isobutanol	10	mg/L
F001-F005	Water	Methylene chloride	10	mg/L
F001-F005	Water	4-Methyl-2-pentanone (MIBK)	10	mg/L
F001-F005	Water	Methanol	10	mg/L
F001-F005	Water	n-Butanol	10	mg/L
F001-F005	Water	Nitrobenzene	10	mg/L
F001-F005	Water	Propylene glycol	10	mg/L
F001-F005	Water	Pyridine	10	mg/L
F001-F005	Water	Tetrachloroethene	10	mg/L
F001-F005	Water	1,1,2-Trichlorotrifluoroethane	10	mg/L
F001-F005	Water	Toluene	10	mg/L
F001-F005	Water	Trichloroethene	10	mg/L
F001-F005	Water	Trichlorofluoromethane	10	mg/L
F001-F005	Water	Xylene (Total)	10	mg/L
EPA 8015	Solid	Gasoline Range Hydrocarbons	5	mg/kg
EPA 8015	Water	Gasoline Range Hydrocarbons	0.5	mg/L
Oklahoma GRO	Solid	1,2,4-Trimethylbenzene	10	ug/kg
Oklahoma GRO	Solid	1,3,5-Trimethylbenzene	10	ug/kg
Oklahoma GRO	Solid	Benzene	10	ug/kg
Oklahoma GRO	Solid	Ethylbenzene	10	ug/kg
Oklahoma GRO	Solid	Gasoline Range Organics	100	ug/kg
Oklahoma GRO	Solid	Methyl-tert-butyl ether	10	ug/kg
Oklahoma GRO	Solid	Naphthalene	10	ug/kg
Oklahoma GRO	Solid	Toluene	10	ug/kg
Oklahoma GRO	Solid	Xylene (Total)	25	ug/kg
Oklahoma GRO	Water	1,2,4-Trimethylbenzene	2	ug/L
Oklahoma GRO	Water	1,3,5-Trimethylbenzene	2	ug/L
Oklahoma GRO	Water	Benzene	2	ug/L
Oklahoma GRO	Water	Ethylbenzene	2	ug/L
Oklahoma GRO	Water	Gasoline Range Organics	50	ug/L
Oklahoma GRO	Water	Methyl-tert-butyl ether	10	ug/L
Oklahoma GRO	Water	Naphthalene	10	ug/L
Oklahoma GRO	Water	Toluene	2	ug/L
Oklahoma GRO	Water	Xylene (Total)	5	ug/L
OA1	Solid	BTEX (Total)	280	ug/kg
OA1	Solid	Benzene	50	ug/kg
OA1	Solid	Ethylbenzene	50	ug/kg
OA1	Solid	Gasoline Range Hydrocarbons	5000	ug/kg
OA1	Solid	Methyl-tert-butyl ether	260	ug/kg
OA1	Solid	Naphtha	5000	ug/kg
OA1	Solid	Naphthalene	260	ug/kg

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
OA1	Solid	Toluene	50	ug/kg
OA1	Solid	Total Petroleum Hydrocarbons	5	ug/kg
OA1	Solid	Xylene (Total)	130	ug/kg
OA1	Water	1,2-Dichlorobenzene	1	ug/L
OA1	Water	1,3-Dichlorobenzene	1	ug/L
OA1	Water	1,4-Dichlorobenzene	1	ug/L
OA1	Water	2-Butanone (MEK)	10	ug/L
OA1	Water	BTEX (Total)	11	ug/L
OA1	Water	Benzene	2	ug/L
OA1	Water	Chlorobenzene	0.7	ug/L
OA1	Water	Ethylbenzene	2	ug/L
OA1	Water	Gasoline Range Hydrocarbons	500	ug/L
OA1	Water	Methyl-tert-butyl ether	10	ug/L
OA1	Water	Naphthalene	10	ug/L
OA1	Water	Toluene	2	ug/L
OA1	Water	Total Petroleum Hydrocarbons	1	ug/L
OA1	Water	Xylene (Total)	5	ug/L
OA2	Solid	Diesel Fuel	10	mg/kg
OA2	Solid	Fuel Oil	10	mg/kg
OA2	Solid	Gasoline	10	mg/kg
OA2	Solid	Hydraulic Fluid	10	mg/kg
OA2	Solid	Jet Fuel	10	mg/kg
OA2	Solid	Kerosene	10	mg/kg
OA2	Solid	Mineral Spirits	10	mg/kg
OA2	Solid	Motor Oil	10	mg/kg
OA2	Solid	Transformer Oil	10	mg/kg
OA2	Solid	Total Petroleum Hydrocarbons	10	mg/kg
OA2	Wipe	Diesel Fuel	10	ug
OA2	Wipe	Fuel Oil	10	ug
OA2	Wipe	Gasoline	10	ug
OA2	Wipe	Hydraulic Fluid	10	ug
OA2	Wipe	Jet Fuel	10	ug
OA2	Wipe	Kerosene	10	ug
OA2	Wipe	Mineral Spirits	10	ug
OA2	Wipe	Motor Oil	10	ug
OA2	Wipe	Transformer Oil	10	ug
OA2	Wipe	Total Petroleum Hydrocarbons	10	ug
OA2	Water	Diesel Fuel	0.4	mg/L
OA2	Water	Fuel Oil	0.4	mg/L
OA2	Water	Gasoline	0.4	mg/L
OA2	Water	Hydraulic Fluid	0.4	mg/L
OA2	Water	Jet Fuel	0.4	mg/L
OA2	Water	Kerosene	0.4	mg/L
OA2	Water	Mineral Spirits	0.4	mg/L
OA2	Water	Motor Oil	0.4	mg/L
OA2	Water	Transformer Oil	0.4	mg/L
OA2	Water	Total Petroleum Hydrocarbons	0.4	mg/L
EPA 8015 Modified	Water	Diesel Fuel	0.4	mg/L
EPA 8015 Modified	Water	Fuel Oil	0.4	mg/L
EPA 8015 Modified	Water	Gasoline	0.4	mg/L
EPA 8015 Modified	Water	Hydraulic Fluid	0.4	mg/L

Minimum Reporting Limits

Method	Matrix	Parameter Name	RL	Units
EPA 8015 Modified	Water	Jet Fuel	0.4	mg/L
EPA 8015 Modified	Water	Kerosene	0.4	mg/L
EPA 8015 Modified	Water	Mineral Spirits	0.4	mg/L
EPA 8015 Modified	Water	Motor Oil	0.4	mg/L
EPA 8015 Modified	Water	Transformer Oil	0.4	mg/L
EPA 8015 Modified	Water	Total Petroleum Hydrocarbons	0.4	mg/L
EPA 8015 Modified	Solid	Diesel Fuel	10	mg/kg
EPA 8015 Modified	Solid	Fuel Oil	10	mg/kg
EPA 8015 Modified	Solid	Gasoline	10	mg/kg
EPA 8015 Modified	Solid	Hydraulic Fluid	10	mg/kg
EPA 8015 Modified	Solid	Jet Fuel	10	mg/kg
EPA 8015 Modified	Solid	Kerosene	10	mg/kg
EPA 8015 Modified	Solid	Mineral Spirits	10	mg/kg
EPA 8015 Modified	Solid	Motor Oil	10	mg/kg
EPA 8015 Modified	Solid	Transformer Oil	10	mg/kg
EPA 8015 Modified	Solid	Total Petroleum Hydrocarbons	10	mg/kg

Attachment G
Kansas Laboratory SOP Directory

SOP DIRECTORY

PASI KANSAS CITY LABORATORY

16-May-02

SOP #	Title	LAST REVISION
ALL-P-001-C	PREPARATION OF SOPS	12/14/01
ALL-P-104-A	METHOD DETECTION LIMIT STUDIES	4/15/02
KS-I-2300-D	ACIDITY (TITRIMETRIC ASSAY)	6/27/01
KS-I-2301-E	ALKALINITY,AUTOMATED IN WATER AND SOIL	4/30/01
KS-I-2302-E	AMMONIA, NITROGEN	5/9/01
KS-I-2305-D	BOD AND CBOD	6/25/01
KS-I-2308-E	COD WATERS-COLORMETRIC METHOD	5/31/01
KS-I-2310-D	RESIDUAL CHLORINE, TOTAL AND FREE	5/16/01
KS-I-2311-G	HEX CHROME WATER	5/21/01
KS-I-2312-B	HEX CHROME SOIL	5/25/01
KS-I-2316-E	DISSOLVED OXYGEN-ELECTRODE METHOD	6/27/01
KS-I-2317-A	FERROUS IRON, DISSOLVED AND TOTAL	8/1/01
KS-I-2320-E	TOTAL KJELDAHL NITROGEN	5/7/01
KS-I-2326-C	OIL & GREASE BY METHOD 1664	4/26/02
KS-I-2329-D	TOTAL ORGANIC CARBON	6/4/01
KS-I-2330-A	TURBIDITY	6/14/01
KS-I-2331-E	pH IN WATER AND SOIL	6/4/01
KS-I-2332-D	PHENOLICS, TOTAL RECOVERABLE	5/15/01
KS-I-2334-E	TOTAL SOLIDS	6/1/01
KS-I-2335-E	TOTAL DISSOLVED SOLIDS	6/4/01
KS-I-2336-F	SOLIDS, TOTAL SUSPENDED	4/29/02
KS-I-2337-E	TOTAL SETTLEABLE SOLIDS	6/4/01
KS-I-2338-E	VOLATILE SOLIDS	6/14/01
KS-I-2340-E	CONDUCTANCE	6/4/01
KS-I-2341-C	DISSOLVED SILICA	6/27/01
KS-I-2342-C	SULFIDE	5/25/01

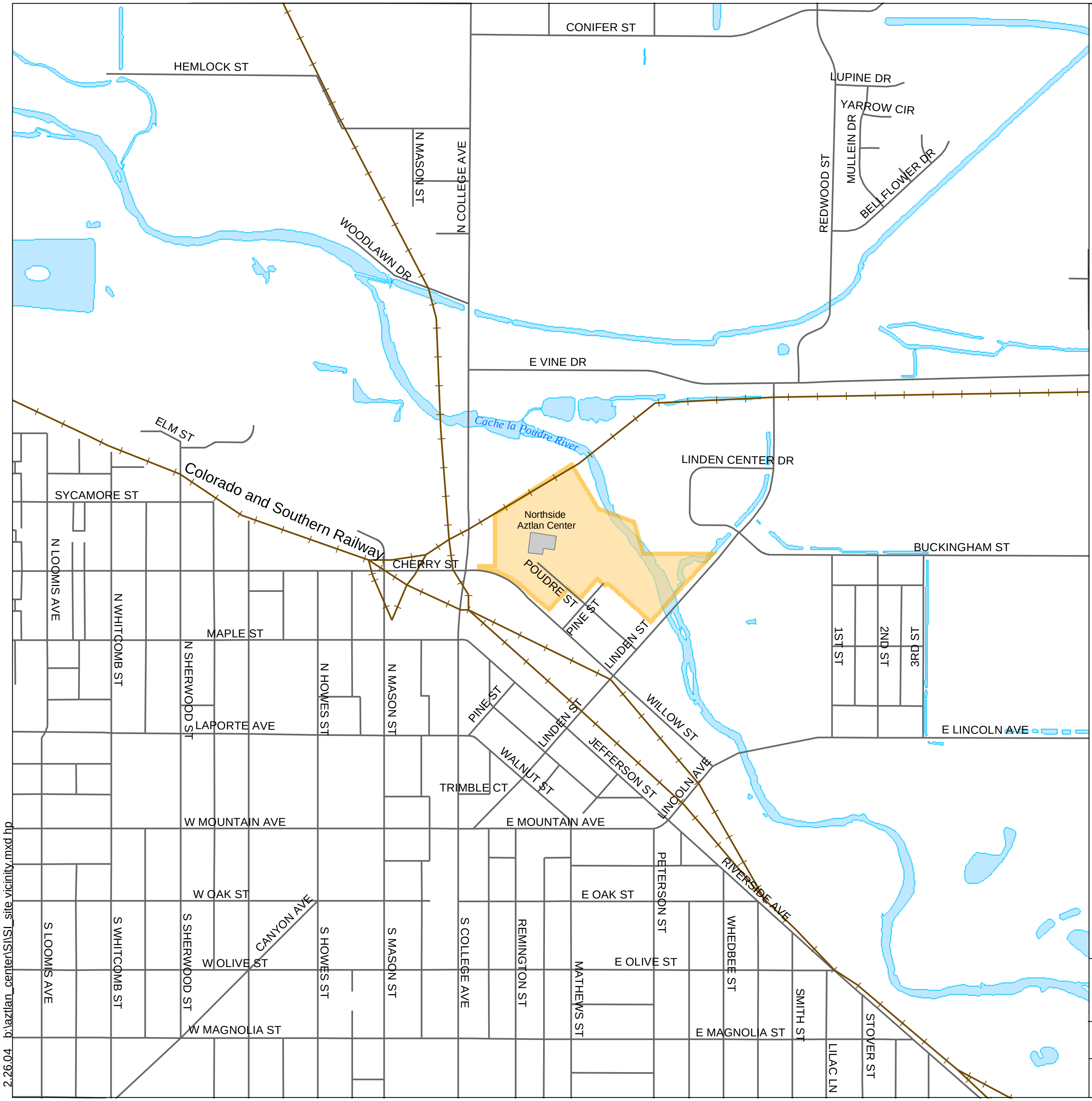
SOP #	Title	LAST REVISION
KS-I-2343-D	SULFITE	6/27/01
KS-I-2344-E	METHYLENE BLUE ACTIVE SUBSTANCES	6/27/01
KS-I-2348-D	IGNITABILITY	6/27/01
KS-I-2351-B	REACTIVE SULFIDE	5/18/01
KS-I-2352-B	REACTIVE CYANIDE	5/18/01
KS-I-2354-C	PAINT FILTER (LIQUID RELEASE TEST)	6/27/01
KS-I-2355-C	HARDNESS(TITRIMETRIC)	6/27/01
KS-I-2356-C	TEMPERATURE	6/27/01
KS-I-2362-E	AUTOMATED - TOTAL & AMENABLE CYANIDE	5/31/01
KS-I-2363-F	AUTOMATED -CHLORIDE	7/10/01
KS-I-2365-E	AUTOMATED -NITRATE/NITRITE	6/14/01
KS-I-2368-A	AUTOMATED-PHOSPHORUS	6/7/01
KS-I-2370-B	FECAL COLIFORM BACTERIA BY SM9222D	2/15/02
KS-I-2371-B	TOTAL COLIFORM BACTERIA BY SM9222B	2/15/02
KS-I-2372-B	HETEROTROPHIC PLATE COUNT BY SM9215A	2/15/02
KS-I-2380-A	ACUTE CERIO DUBIA	2/1/02
KS-I-2381-A	ACUTE FLATHEAD MINNOW	2/1/02
KS-I-2382-A	CHRONIC CERIO DUBIA	2/1/02
KS-I-2383-A	CHRONIC FLATHEAD	2/1/02
KS-I-2384-A	YTC	2/1/02
KS-I-2385-A	BRINE SHRIMP	2/1/02
KS-I-2386-A	ACUTE REF TOX CERIO DUBIA	2/1/02
KS-I-2387-A	ACUTE REF TOX FLATHEAD	2/1/02
KS-I-2388-A	CHRONIC REF TOX FLATHEAD	2/1/02
KS-I-2389-A	CHRONIC REF TOX CERIO DUBIA	2/1/02
KS-I-2390-A	LIGHT INTENSITY AND PHOTOPERIOD	2/18/02
KS-I-2400-C	ANIONS BY ION CHROMATOGRAPHY	6/27/01
KS-I-4312-C	DIGESTION OF METALS FOR ICP BY METHOD 3050	3/19/01

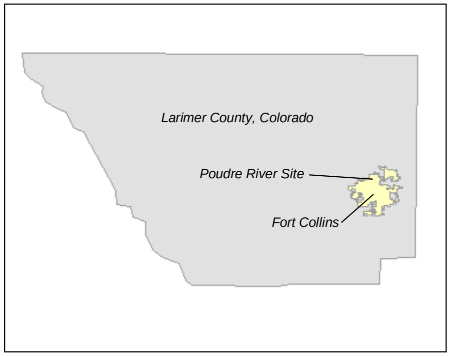
SOP #	Title	LAST REVISION
KS-I-4313-C	METALS PREP 3010A	4/2/01
KS-I-4314-C	METALS PREP 3020A	4/26/01
KS-I-4315-C	METALS PREP 3050A	4/26/01
KS-I-4316-A	METALS IN WIPE PREPARATION	5/1/02
KS-I-4317-A	METALS IN PAINT CHIPS PREPARATION	3/11/02
KS-I-4320-F	METALS BY ICP 6010 AND 200.7	4/3/02
KS-I-4321-A	FURNACE METALS(Sb,Pb,As,Th,Se) BY METHOD 200.9	4/2/01
KS-I-4329-B	MERCURY BY 7470a, 7471a, 245.1, 245.5	4/26/01
KS-I-4330-A	MERCURY PREPARATION & ANALYSIS (HOT BLOCK)	7/2/01
KS-I-4331-C	A.A. GRAPHITE FURNACE- Sb, As, Pb, Se, & Tl 7000	5/1/01
KS-I-4340-A	CATION EXCHANGE CAPACITY	7/11/01
KS-I-4341-A	POTASSIUM EXCHANGE	3/11/02
KS-O-5340-C	TCLP & ZHE EXTRACTION	6/27/01
KS-O-5350-B	EXTRACTION SPIKE FORTIFICATION VERIFICATION	2/1/01
KS-O-6310-B	PAHs IN SOIL & WATER BY EPA 8310	3/14/02
KS-O-6311-H	HERBICIDES IN SOIL & WATER BY 8151A	3/15/01
KS-O-6314-E	PCBS IN OILS, WIPES AND SWABS BY 8082	3/23/01
KS-O-6317-F	PCBS IN WATER & SOIL BY EPA 8082	3/23/01
KS-O-6319-H	PESTICIDES IN SOIL & WATER BY 8081A	3/20/01
KS-O-6320-D	EXTRACTABLE PETROLEUM HYDROCARBONS BY OA2	3/23/01
KS-O-6323-G	EXTRACTABLE PETROLEUM HYDROCARBONS BY 8015M	3/23/01
KS-O-6326-E	ORGANOPHOSPHOROUS PESTICIDES BY 8141A	4/2/01
KS-O-6328-E	EDB AND DBCP IN WATER AND SOIL BY METHOD 8011	3/14/01
KS-O-6330-F	BIS(2ETHYL HEXYL)PHTHALATE BY EPA 606	7/2/01
KS-O-6331-E	VOCS IN WATER, GC 601/602	3/15/01
KS-O-6332-E	VOCS IN WATER BY EPA 8021B	4/2/01
KS-O-6333-D	GAS/BTEX IN SOIL AND WATER 8015M/8021B	4/2/01
KS-O-6343-C	ORGANOCHLORINE PEST\PCB IN W 608	3/15/01

SOP #	Title	LAST REVISION
KS-O-6344-C	EDB & DBCP IN WATER BY EPA 504.1 METHOD	1/31/01
KS-O-6345-C	%MOISTURE IN SOIL AND SEDIMENT	3/23/01
KS-O-6352-B	EXTRACTABLE HYDROCARBONS BY OKLAHOMA DRO	4/2/01
KS-O-6355-B	PURGEABLE HYDROCARBONS BY OKLAHOMA GRO	7/2/01
KS-O-6356-B	CHLORINATED HERBICIDES BY 615	6/25/01
KS-O-6357-B	TRIAZINE PESTICIDES BY 619	7/2/01
KS-O-6358-D	PAH's BY METHOD 610	3/23/01
KS-O-7400-B	GC/MS VOCS IN DRINKING WATER BY 524.2	4/2/01
KS-O-7405-B	VOLATILE ORGANIC COMPOUNDS BY METHOD 624	4/2/01
KS-O-7415-B	SEMIVOLATILE ORGANIC BY METHOD 625	4/26/01
KS-O-7416-G	VOCS IN SOIL BY EPA 8260B	6/27/01
KS-O-7417-I	BNAs IN SOIL & WATER BY 8270C	3/14/02
KS-O-7419-F	VOCS IN WATER BY EPA 8260B	4/2/01
KS-Q-1009-B	LABORATORY GLASSWARE CLEANING	1/18/02
KS-Q-1010-B	STANDARD MATERIALS PREP. & TRACEABILITY	3/18/99
KS-Q-1011-C	DOCUMENTATION IN THE LABORATORY	1/29/02
KS-Q-1012-D	CONTROL CHART GENERATION AND EVALUATION	1/30/02
KS-Q-1013-A	MANUAL INTEGRATION POLICY	9/4/01
KS-Q-1014-C	PERFORMANCE AND SYSTEM AUDITS	1/29/02
KS-Q-1016-A	DISCREPANCY AND CORRECTIVE ACTION REPORTING	3/27/99
KS-Q-1017-A	LABORATORY DATA REVIEW	3/29/02
KS-Q-1101-B	LAB SECURITY PROCEDURES	3/25/99
KS-Q-1102-A	LABORATORY WASTE AND EXCESS SAMPLE DISPOSAL	2/20/02
KS-Q-1103-D	INTERNAL SAMPLE TRACKING	3/29/99
KS-Q-1104-A	THRUPUT SYSTEMS TARGET DATA BACKUP	3/7/02
KS-Q-1201-E	SAMPLE RECEIPT AND CHECK-IN	2/19/02
KS-Q-1202-E	SAMPLE LOG-IN	1/29/02
KS-Q-1203-D	SAMPLE STORAGE	3/29/99

SOP #	Title	LAST REVISION
KS-Q-1204-A	REAGENT WATER QUALITY	1/15/02
KS-Q-1205-A	SIGNIFICANT FIGURES AND ROUNDING RULES	1/16/02
KS-Q-1206-A	VOLATILE STORAGE BLANKS	1/18/02
KS-Q-1207-A	CALIBRATION OF THERMOMETERS	1/16/02
KS-Q-1208-A	CALIBRATION OF BALANCES AND WEIGHTS	1/18/02
KS-Q-1209-A	CALIBRATION OF PIPETS	1/30/02
KS-Q-1211-A	EMPLOYEE TRAINING PROCEDURES	2/27/02
KS-Q-1212-A	MONITORING OF TEMPERATURES IN THE LABORATORY	2/26/02
KS-Q-1213-A	TRIP BLANK PREPARATION AND MONITORING	4/3/02
KS-Q-1214-A	RESERVED	5/1/02
KS-Q-1215-A	RESERVED	5/1/02
KS-Q-1216-A	RESERVED	5/1/02
KS-Q-1217-A	RESERVED	5/1/02
KS-Q-1218-A	RESERVED	5/1/02

FIGURES





Location Map

Legend

⟋⟍	Railroad
⟋⟍	Street
🟦	Water
🟧	Site Outline

N

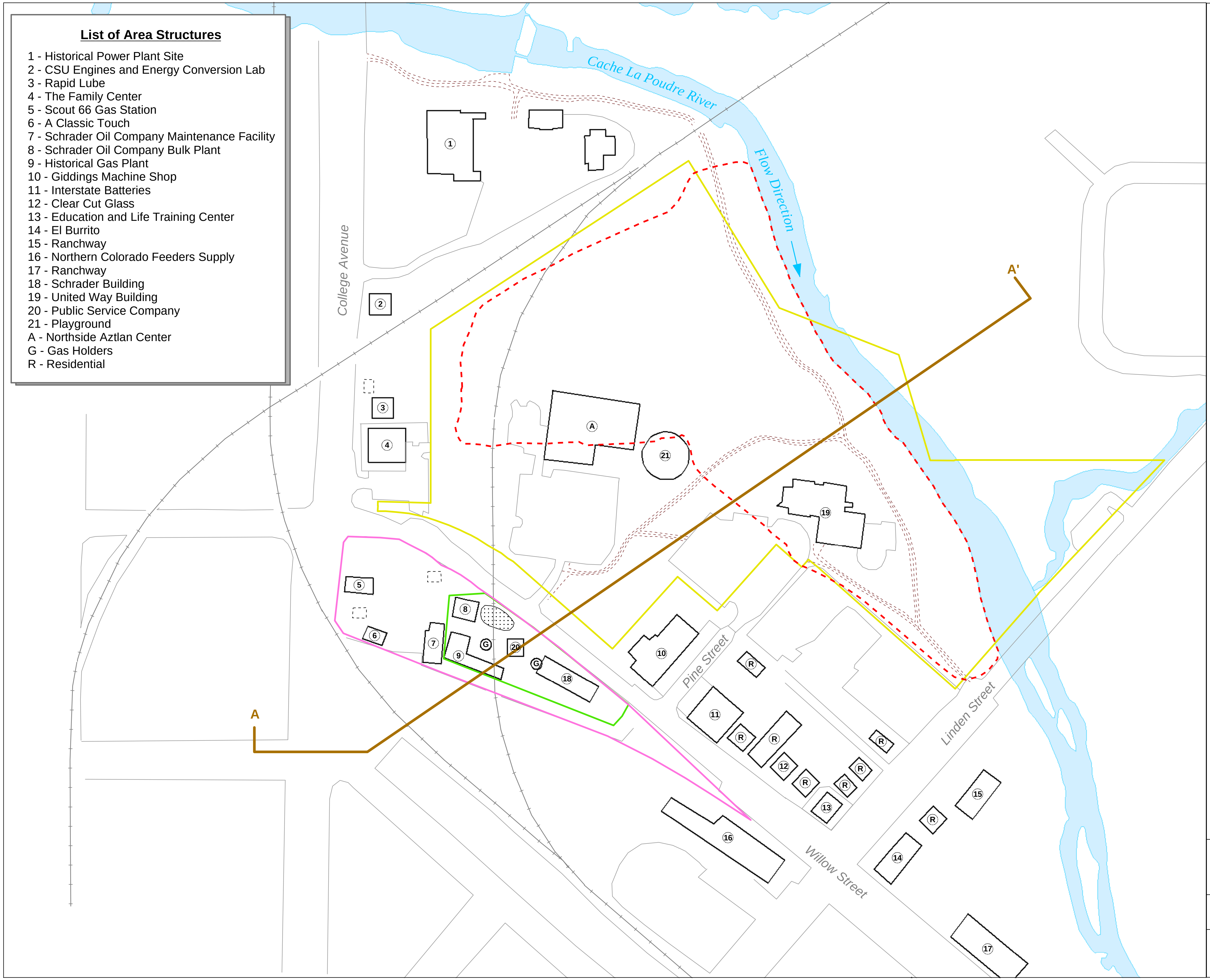
0 0.125 0.25
Miles

POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO

Figure 1
Site Location

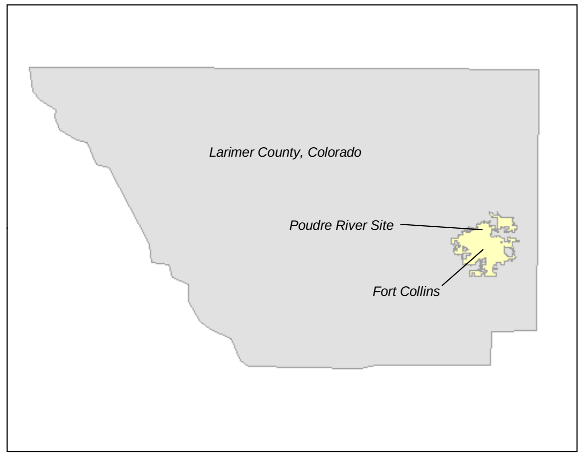
Tetra Tech EMI - START 2
TDD No. S05-0310-016

2.26.04 b:\aztlan_center\SI\SI_site vicinity.mxd hp



List of Area Structures

1 - Historical Power Plant Site
2 - CSU Engines and Energy Conversion Lab
3 - Rapid Lube
4 - The Family Center
5 - Scout 66 Gas Station
6 - A Classic Touch
7 - Schrader Oil Company Maintenance Facility
8 - Schrader Oil Company Bulk Plant
9 - Historical Gas Plant
10 - Giddings Machine Shop
11 - Interstate Batteries
12 - Clear Cut Glass
13 - Education and Life Training Center
14 - El Burrito
15 - Ranchway
16 - Northern Colorado Feeders Supply
17 - Ranchway
18 - Schrader Building
19 - United Way Building
20 - Public Service Company
21 - Playground
A - Northside Aztlan Center
G - Gas Holders
R - Residential



Location Map

Legend

⋀	A-A' Cross Section Location
⋀	Paved Area
⋀	Recreation Path
⋀	Railroad
☐	Building
🟥	Approximate Extent of Old Landfill
🟨	Site Outline
🟩	Former Location of Poudre Valley Gas Company
🟪	Schrader Oil or Public Service Company Property
▨	Former Tar Pit
☐	Former Underground Storage Tank

N

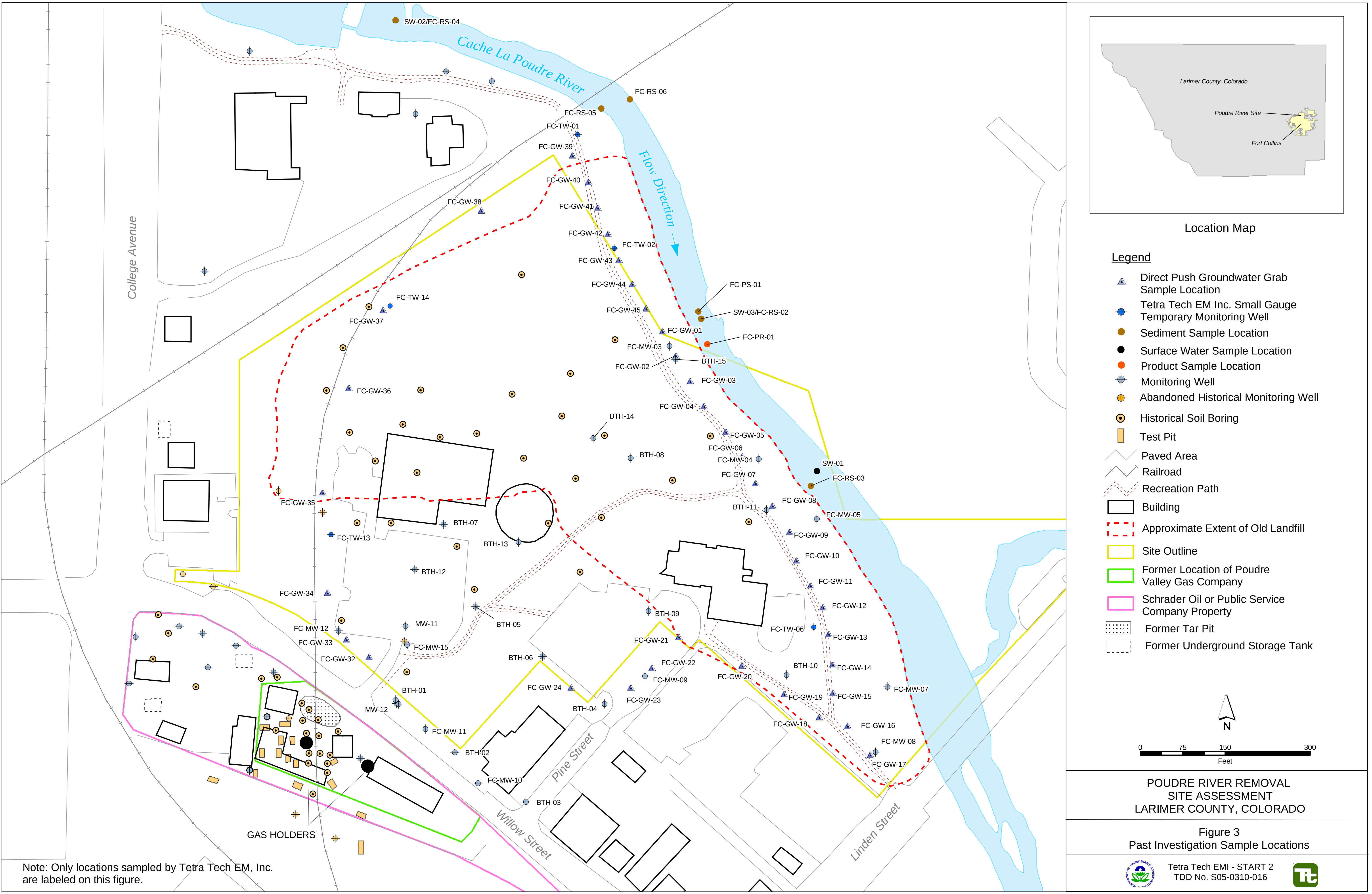
0 100 200 400
Feet

POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO

Figure 2
Site Layout

Tetra Tech EMI - START 2
TDD No. S05-0310-016

2.26.04 b:\aztlan_center\SI\SI_site layout.mxd hp

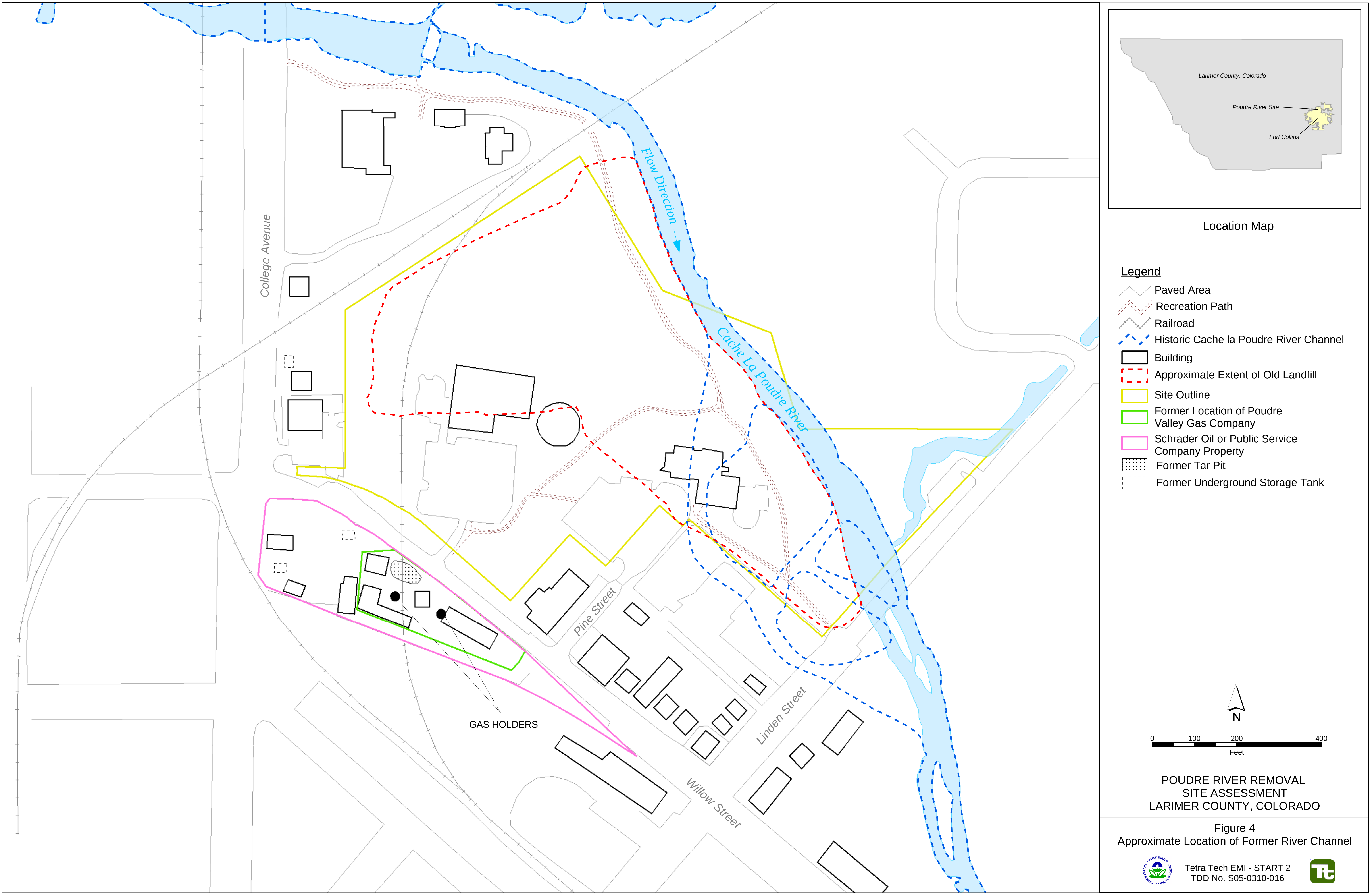


Note: Only locations sampled by Tetra Tech EM, Inc.
are labeled on this figure.

POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO

Figure 3
Past Investigation Sample Locations

Tetra Tech EMI - START 2
TDD No. S05-0310-016

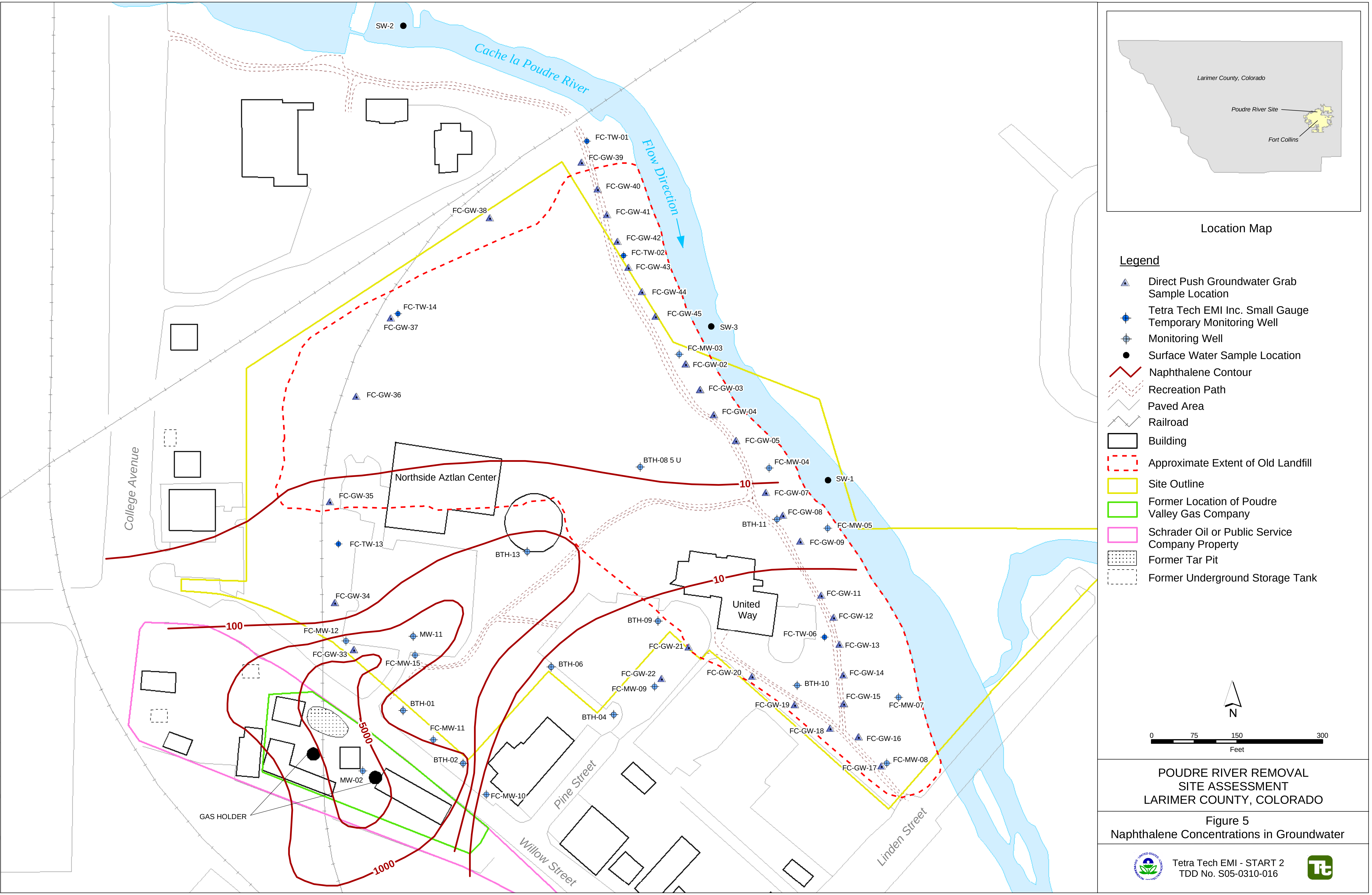


POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO

Figure 4
Approximate Location of Former River Channel

Tetra Tech EMI - START 2
TDD No. S05-0310-016

3.4.04 b:\aztlan_center\SI\SI_former river.mxd hp

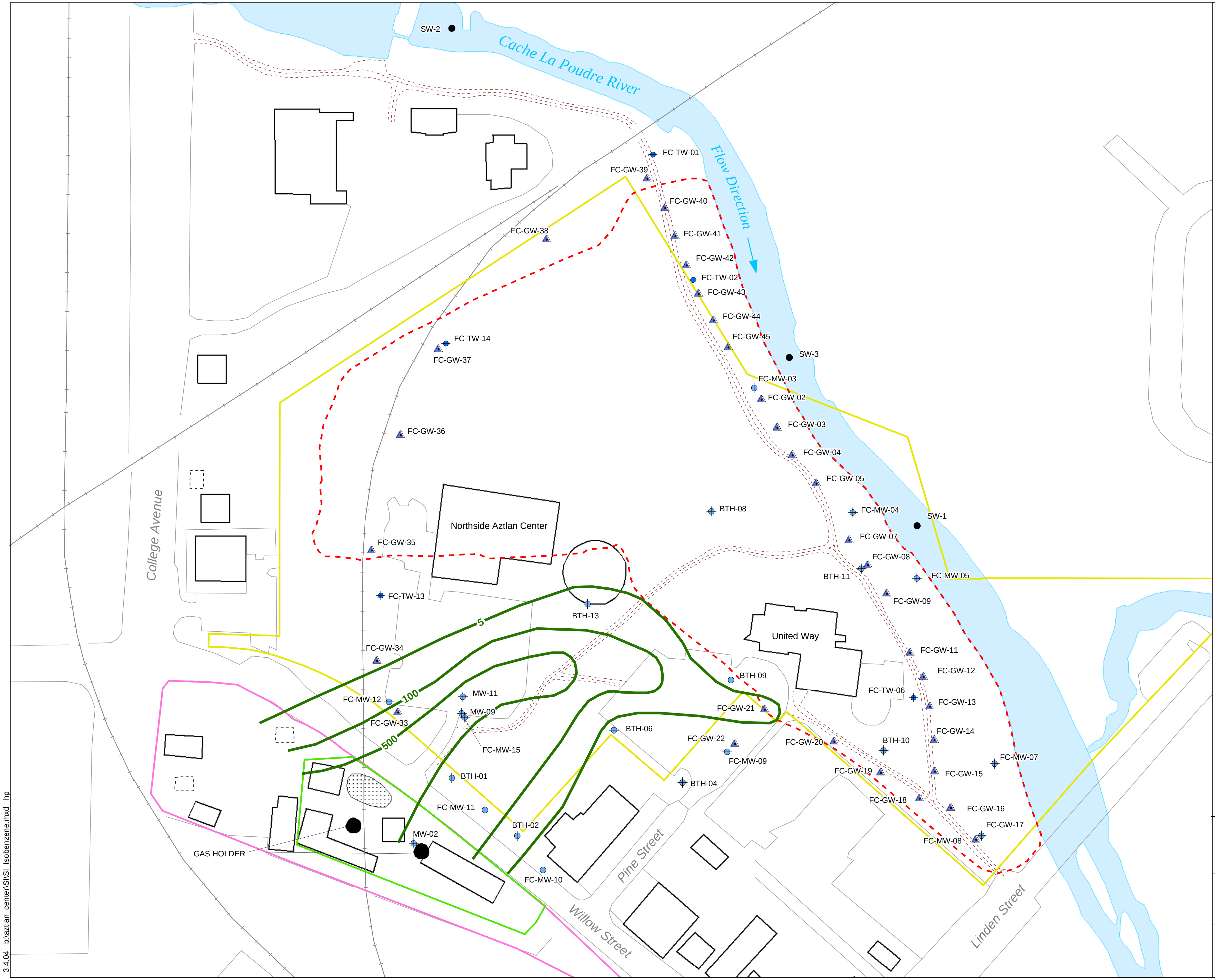


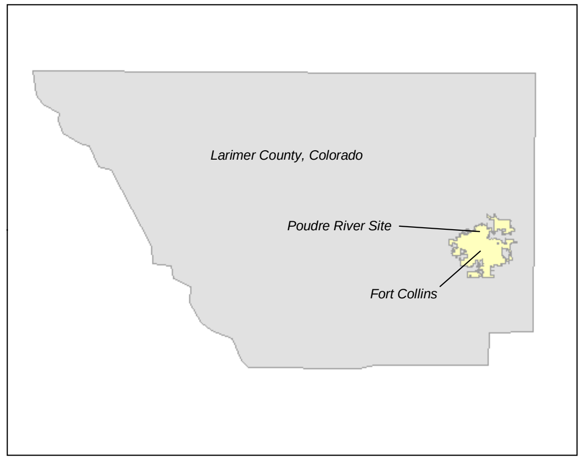
POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO

Figure 5
Naphthalene Concentrations in Groundwater

Tetra Tech EMI - START 2
TDD No. S05-0310-016

3.4.04 b:\aztlan_center\SI\SI_isonaph.mxd hp

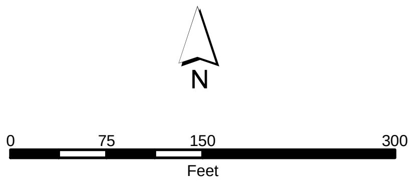




Location Map

Legend

- ▲ Direct Push Groundwater Grab Sample Location
- ⊕ Tetra Tech EM Inc. Small Gauge Temporary Monitoring Well
- ⊕ Monitoring Well
- ● Surface Water Sample Location
- Benzene Contour
- Recreation Path
- Paved Area
- Railroad
- ☐ Building
- Approximate Extent of Old Landfill
- 🟨 Site Outline
- 🟩 Former Location of Poudre Valley Gas Company
- Schrader Oil or Public Service Company Property
- ▨ Former Tar Pit
- Former Underground Storage Tank

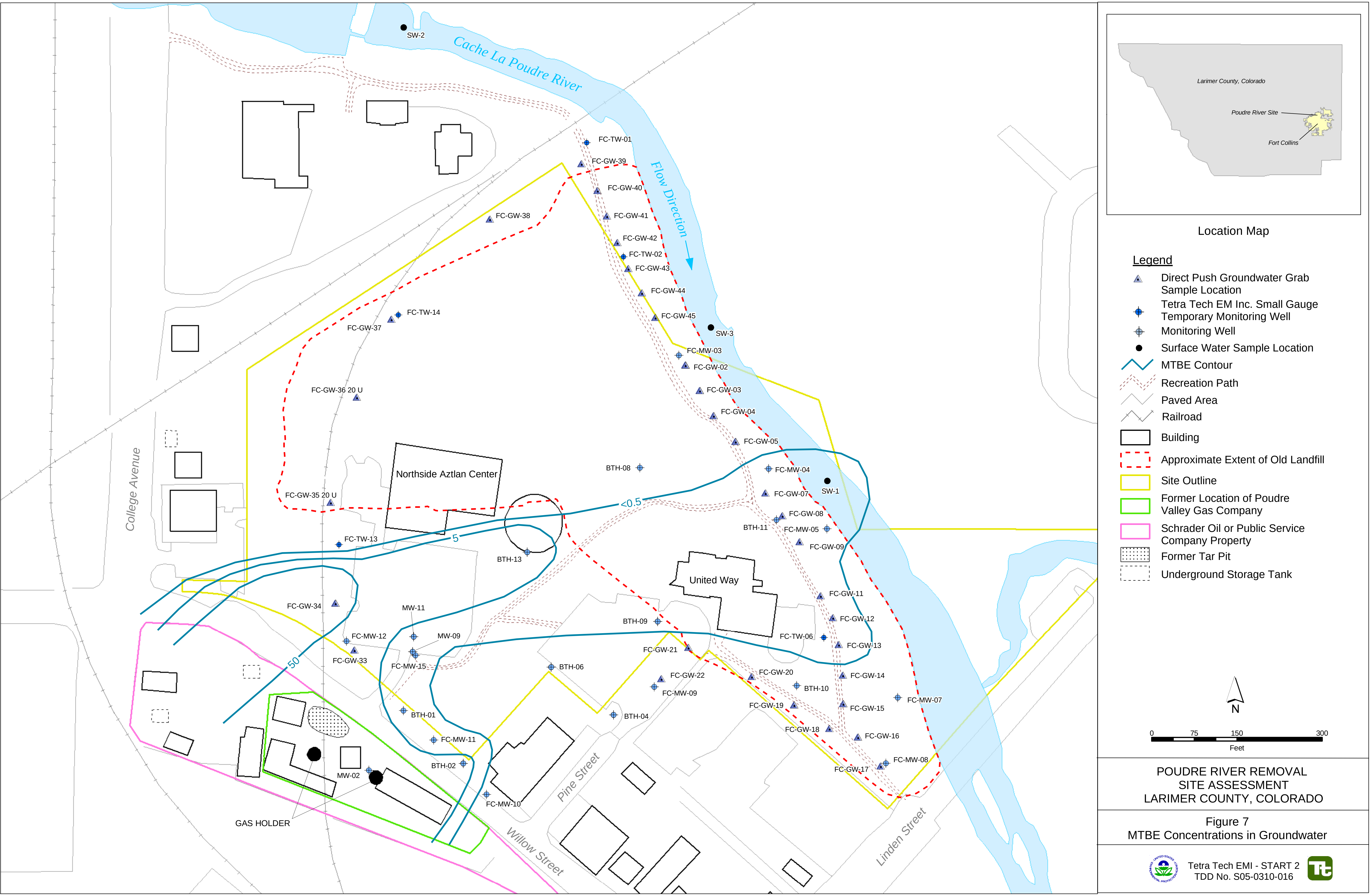


POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO

Figure 6
Benzene Concentrations
in Groundwater

Tetra Tech EMI - START 2
TDD No. S05-0310-016

3.4.04 b:\aztlan_center\SI\SI_Isobenzene.mxd hp

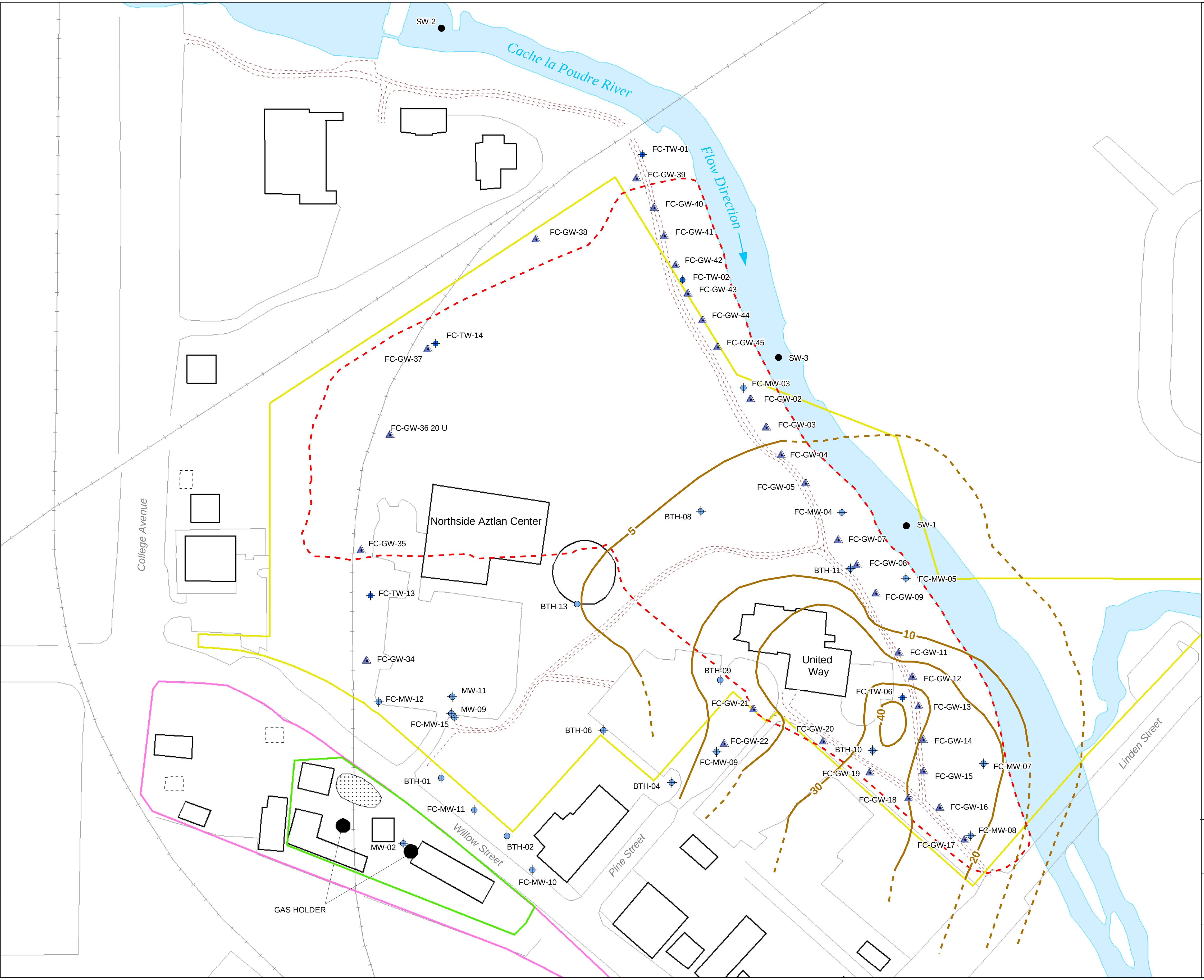


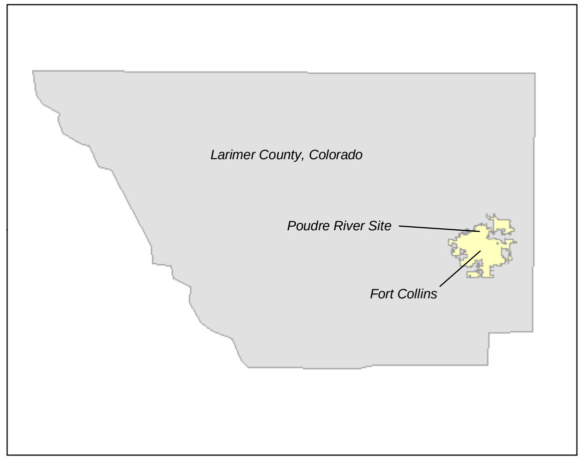
POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO

Figure 7
MTBE Concentrations in Groundwater

Tetra Tech EMI - START 2
TDD No. S05-0310-016

3.4.04 b:\aztlan_center\SI\SI_isoMTBE.mxd hp

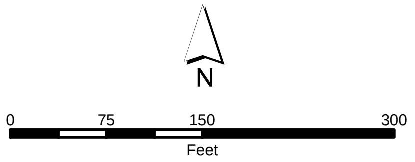




Location Map

Legend

- ▲ Direct Push Groundwater Grab Sample Location
- ⊕ Tetra Tech EM Inc. Small Gauge Temporary Monitoring Well
- ⊕ Monitoring Well
- ● Surface Water Sample Location
- PCE Contour (dashed where approximate) 5 feet contour interval
- Recreation Path
- Paved Area
- Railroad
- ☐ Building
- Approximate Extent of Old Landfill
- 🟨 Site Outline
- 🟩 Former Location of Poudre Valley Gas Company
- Schrader Oil or Public Service Company Property
- ▨ Former Tar Pit
- Former Underground Storage Tank

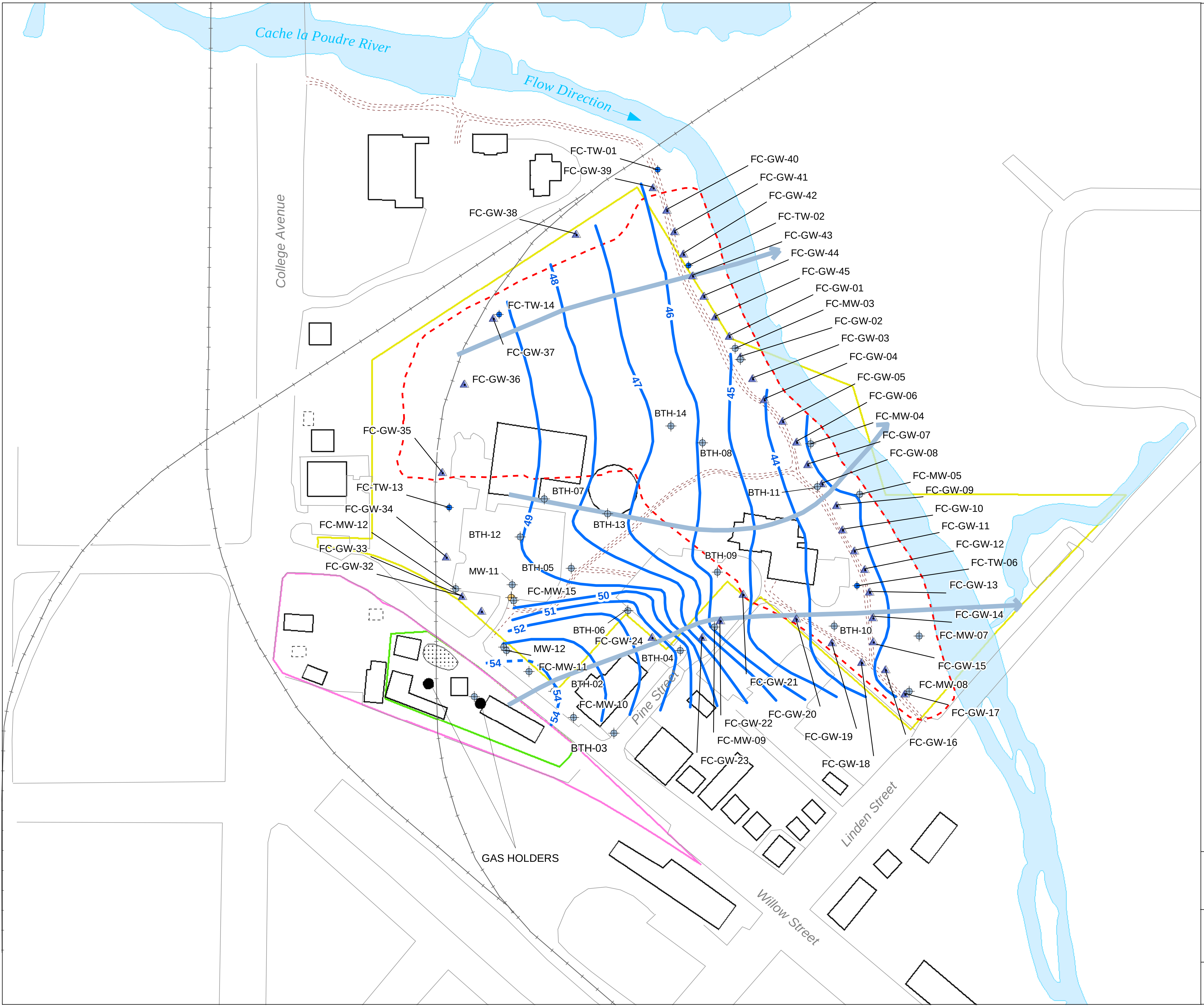


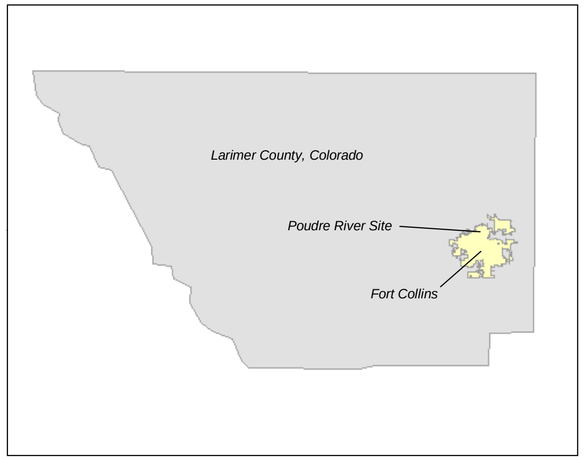
POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO

Figure 8
Tetrachloroethene (PCE)
Concentrations in Groundwater

Tetra Tech EMI - START 2
TDD No. S05-0310-016

3.4.04 b:\aztlan_center\SI\SI_isoPCE.mxd hp





Location Map

Legend

- Potentiometric Surface Contour - October 2003 (dashed where inferred)
- Approximate Direction of Groundwater Flow
- Direct Push Groundwater Grab Sample Location
- Tetra Tech EM Inc. Small Gauge Temporary Monitoring Well
- Monitoring Well
- Paved Area
- Railroad
- Recreation Path
- Building
- Approximate Extent of Old Landfill
- Site Outline
- Former Location of Poudre Valley Gas Company
- Schrader Oil or Public Service Company Property
- Former Tar Pit
- Former Underground Storage Tank

N

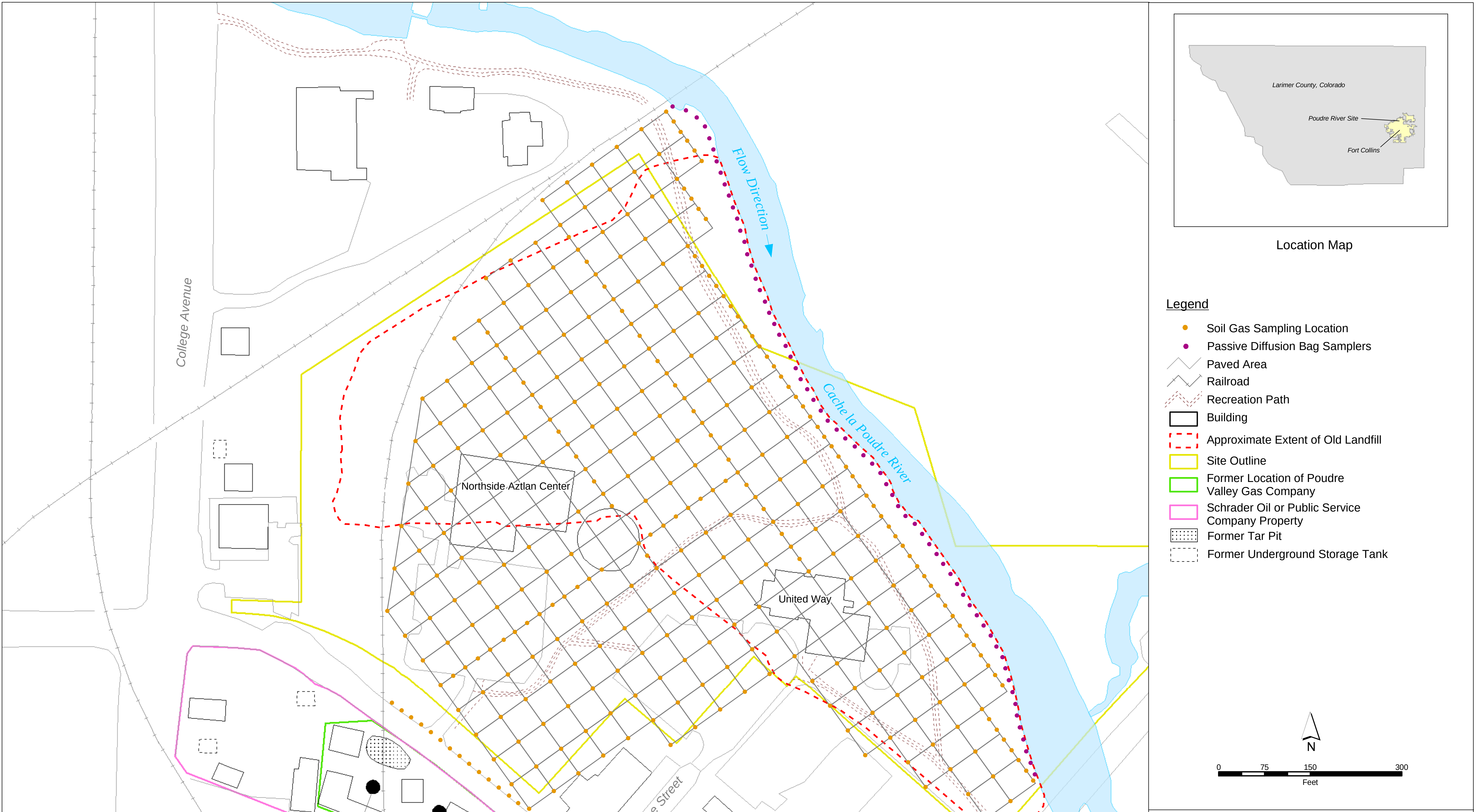
0 125 250 500
Feet

POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO

Figure 9
Potentiometric Surface Map and
Groundwater Flow Direction - October 2003

Tetra Tech EMI - START 2
TDD No. S05-0310-016

3.4.04 b:\aztlan_center\SI\SI_Pezio1003.mxd hp

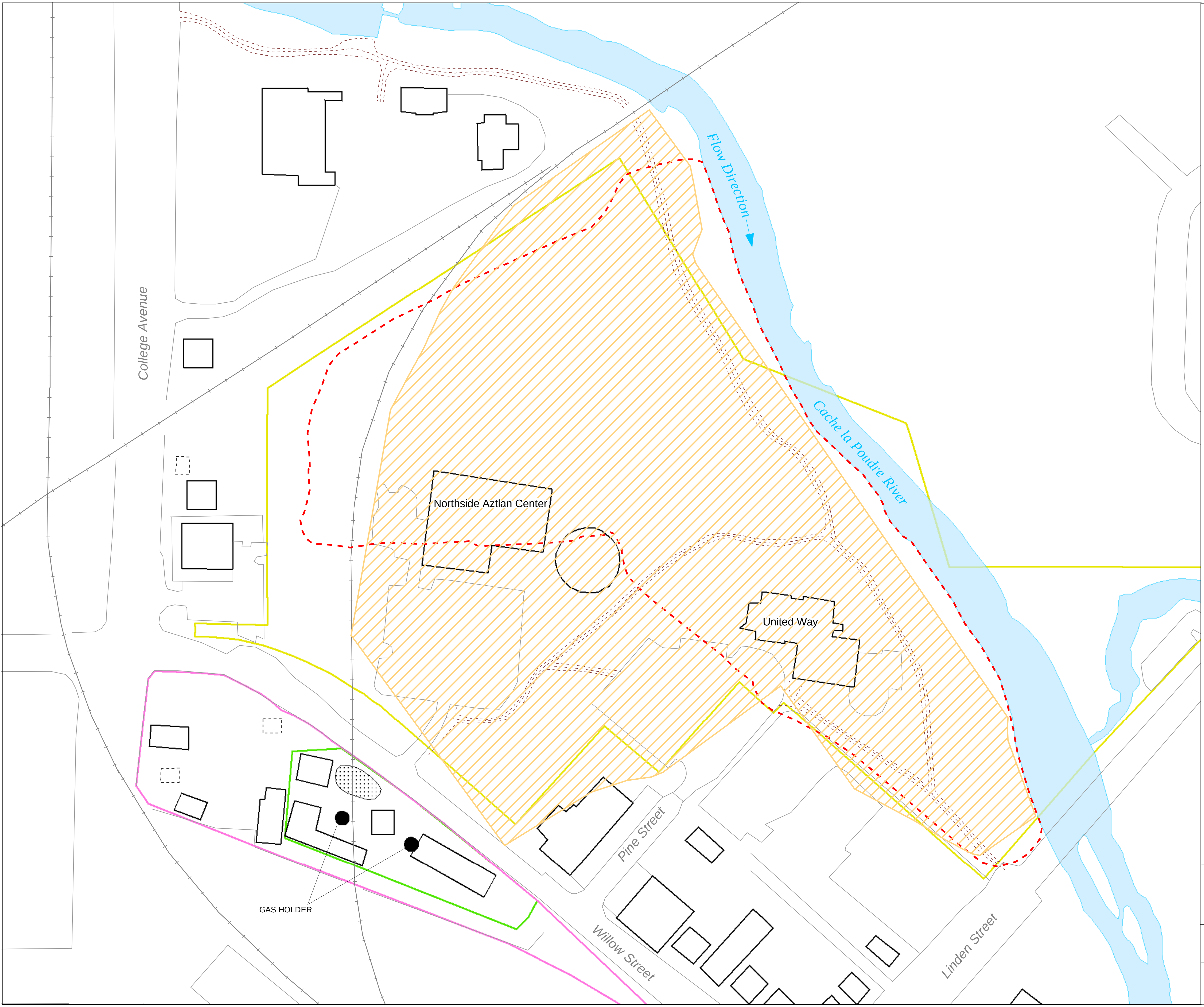


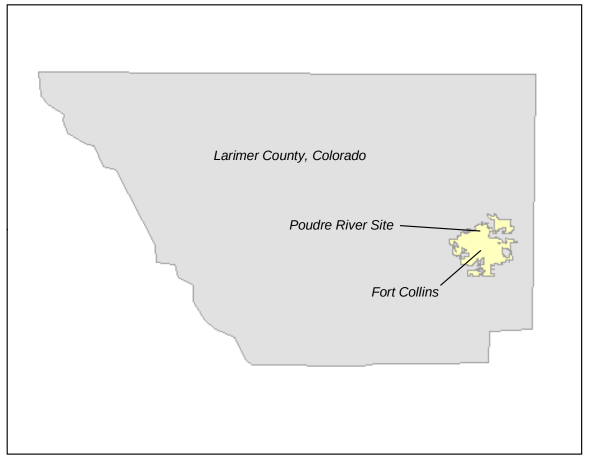
POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO

Figure 10
Soil Gas Survey Locations and
Passive Bag Diffusion Sampling Locations

Tetra Tech EMI - START 2
TDD No. S05-0310-016

3.4.04 b:\aztlan_center\SI\SI_SoilGas.mxd hp





Location Map

Legend

▨	Approximate Geophysical Survey Area
⁄\	Paved Area
⁄\	Railroad
⁄\	Recreation Path
☐	Building
⬚	Approximate Extent of Old Landfill
🟨	Site Outline
🟩	Previous Location of Poudre Valley Gas Company
🟪	Schrader Oil or Public Service Company Property
▦	Former Tar Pit
⬚	Former Underground Storage Tank

N

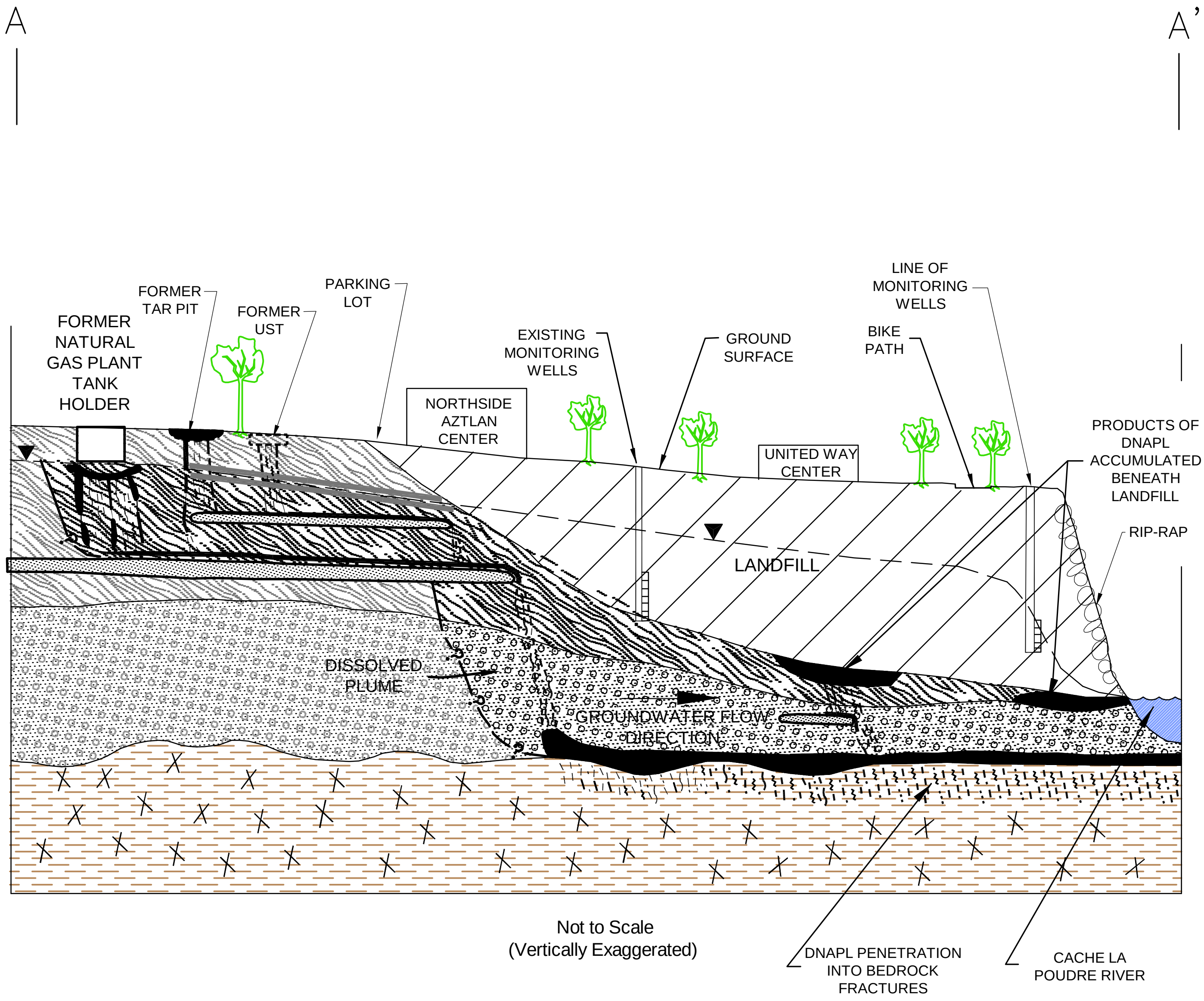
0 75 150 300
Feet

POUDRE RIVER REMOVAL
SITE ASSESSMENT
LARIMER COUNTY, COLORADO

Figure 11
Approximate Geophysical Survey Area

Tetra Tech EMI - START 2
TDD No. S05-0310-016

2.26.04 b:\aztlan_center\SI\SI_GeophysicalSurvey.mxd hp



Not to Scale
(Vertically Exaggerated)

Legend

- ▨ Post-Piney Creek Alluvium (Upper Holocene)
- ▩ Broadway Alluvium (Pleistocene)
- ▤ Weathered and Fractured Pierre Shale
- ▧ Landfill
- ░ Interbedded Caliche/Cemented Sandstone Layers
- —?— Petroleum Hydrocarbons and Napthalene Plume Boundary
- ■ Dense Non-Aqueous Phase Liquids (DNAPL)
- ▒ Light Non-Aqueous Phase Liquids (LNAPL)
- ▼ Water Table (Approximate)
- ┆ Well Screen Interval

POUDRE RIVER REMOVAL SITE ASSESSMENT LARIMER COUNTY, COLORADO

Figure 12
Conceptual Site Model and Geologic Cross Section

Tetra Tech EMI - START 2
TDD No. S05-0310-016

Note: Line of Cross-Section shown on Figure 2.

TABLES

TABLE 1
SAMPLE LOCATIONS AND RATIONALE

Sample Media	Proposed Sample Identification Numbers	Proposed Sampling Locations	Sample Collection Method	Rationale
Groundwater	SI-GW-01 through SI-GW-10	Collected from locations that will be determined by soil gas and geophysical survey results as well as existing data	Drop-down screen groundwater sampling device	To be used as an indicator of the presence of dissolved and free product phase contamination. Will facilitate contaminate plume delineation. Will also limit the uncertainty associated with potential upgradient and downgradient source identification.
	TTMW-01 through TTMW-20	Collected from monitoring well locations that will be determined by soil gas and geophysical survey results as well as existing data	Small gauge monitoring wells	To evaluate the quality of groundwater and facilitate contaminant plume delineation
	SI-BS-01 through SI-BS-80	Collected from locations along the Cache La Poudre River adjacent to the Aztlan Center property	Passive diffusion bag samplers	To confirm that there are no persistent contaminant discharge locations to the river and to identify potential unknown discharge locations
Subsurface Soil	SI-SB-01 through SI-SB-20	Collected from locations that will be determined by field based screening techniques	Split-spoon soil sampler	To characterize potential contaminant sources
Product	SI-PS-01 through SI-PS-10	Collected from locations where product is encountered		To facilitate fingerprinting and source identification and delineation.
Soil Gas	Will be determined based on alpha-numeric grid node location and alpha-alpha-numeric at transect location (e.g. A2, AA1)	Collected at predetermined grid node locations at 50 foot spacing across the Site and every 20 feet along transects at the upgradient and downgradient boarders and every 25 feet along transects within the Site	Passive soil gas sampler	To identify potential contaminant source areas, facilitate the delineation of groundwater contaminant plumes, provide information on discrete contaminant pathways and, provide data on the lateral distribution and types of contaminants present in the vadose zone

Notes:

GW	Groundwater Grab Sample	PS	Product Sample
MW	Monitoring Well Sample		
SB	Soil Boring Sample		
BS	Passive Diffusion Bag Sampler		

TABLE 2
SAMPLE PLAN CHECKLIST

Sample Location	Sample Type	Field Parameters					Chemical Analysis					Quality Control Samples[a] (frequency of collection)		
		PID/FID	Temp	pH	ORP	Cond	VOC	SVOC	TPH-e	TPH-p	Anions	MS/MSD 5%	Dup 10%	Field Blank
SA-GW-01	Groundwater Grab	X					X	X	X	X				
SA-GW-02	Groundwater Grab	X					X	X	X	X				
SA-GW-03	Groundwater Grab	X					X	X	X	X		X		
SA-GW-04	Groundwater Grab	X					X	X	X	X				X
SA-GW-05	Groundwater Grab	X					X	X	X	X				
SA-GW-06	Groundwater Grab	X					X	X	X	X				
SA-GW-07	Groundwater Grab	X					X	X	X	X			X	
SA-GW-08	Groundwater Grab	X					X	X	X	X				
SA-GW-09	Groundwater Grab	X					X	X	X	X				
SA-GW-10	Groundwater Grab	X					X	X	X	X				
TTMW-01	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-02	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-03	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-04	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-05	Monitoring well	X	X	X	X	X	X	X	X	X	X		X	
TTMW-06	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-07	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-08	Monitoring well	X	X	X	X	X	X	X	X	X	X			X
TTMW-09	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-10	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-11	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-12	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-13	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-14	Monitoring well	X	X	X	X	X	X	X	X	X	X		X	
TTMW-15	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-16	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-17	Monitoring well	X	X	X	X	X	X	X	X	X	X	X		
TTMW-18	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-19	Monitoring well	X	X	X	X	X	X	X	X	X	X			
TTMW-20	Monitoring well	X	X	X	X	X	X	X	X	X	X			
Passive Diffusion Bag Sampler	SA-BS-01 through SA BS-70						X					X	X	X
SI-SB-01	Subsurface Soil						X	X	X	X				
SI-SB-02	Subsurface Soil	X					X	X	X	X				
SI-SB-03	Subsurface Soil	X					X	X	X	X				

TABLE 2
SAMPLE PLAN CHECKLIST

Sample Location	Sample Type	Field Parameters					Chemical Analysis					Quality Control Samples[a] (frequency of collection)		
		PID/FID	Temp	pH	ORP	Cond	VOC	SVOC	TPH-e	TPH-p	Anions	MS/MSD 5%	Dup 10%	Field Blank
SI-SB-04	Subsurface Soil	X					X	X	X	X				
SI-SB-05	Subsurface Soil	X					X	X	X	X			X	
SI-SB-06	Subsurface Soil	X					X	X	X	X				
SI-SB-07	Subsurface Soil	X					X	X	X	X				
SI-SB-08	Subsurface Soil	X					X	X	X	X		X		
SI-SB-09	Subsurface Soil	X					X	X	X	X				
SI-SB-10	Subsurface Soil	X					X	X	X	X				
SI-SB-11	Subsurface Soil	X					X	X	X	X				
SI-SB-12	Subsurface Soil	X					X	X	X	X			X	
SI-SB-13	Subsurface Soil	X					X	X	X	X				
SI-SB-14	Subsurface Soil	X					X	X	X	X				
SI-SB-15	Subsurface Soil	X					X	X	X	X				X
SI-SB-16	Subsurface Soil	X					X	X	X	X				
SI-SB-17	Subsurface Soil	X					X	X	X	X				
SI-SB-18	Subsurface Soil	X					X	X	X	X				
SI-SB-19	Subsurface Soil	X					X	X	X	X				
SI-SB-20	Subsurface Soil	X					X	X	X	X				
SA-PS-01	Product	X					X	X	X	X				
SA-PS-02	Product	X					X	X	X	X				
SA-PS-03	Product	X					X	X	X	X				
SA-PS-04	Product	X					X	X	X	X				
SA-PS-05	Product	X					X	X	X	X			X[b]	
SA-PS-06	Product	X					X	X	X	X				
SA-PS-07	Product	X					X	X	X	X				
SA-PS-08	Product	X					X	X	X	X				
SA-PS-09	Product	X					X	X	X	X				
SA-PS-10	Product	X					X	X	X	X				
To be determined	Soil Gas						X							

Notes:

[a] Actual locations for QC sample collection may vary according to field conditions, available sample volume, and well recharge rates

[b] A duplicate for product samples may be collected if sufficient volume is available

TABLE 3

SAMPLE CONTAINER TYPES, VOLUMES, AND PRESERVATION

Sample Matrix	Analysis	Analytical Method Number	Container Number and Type	Required Volume	Preservation	Technical Holding Time
Water	VOC	SW-846 Method 8260 (Target analytes include naphthalene and MTBE)	3 - AGV	40 milliliter	Cool to 4_C HCl to pH < 2	14 Days
Water	SVOC	SW-846 Method 8270	2-AGB	1 liter	Cool to 4_C	7days/40 days
Water	TPH- extractable	SW-846 Method 8015M	2 AGB	1-liter	Cool to 4_C	7days/40 days
Water	TPH- purgeable	SW-846 Method 8015M	3 AGV	40 milliliter	Cool to 4_C HCl to pH < 2	14 days
Water	Anions	EPA 300.0	1 HDPE	1 liter	Cool to 4_C	48 hours
Soil/Product	VOC	SW-846 Method 8260 (Target analytes include naphthalene and MTBE)	1 Glass	4 ounce	Cool to 4_C	14 Days
Soil/Product	SVOC	SW-846 Method 8270	1 Glass	8 ounce	Cool to 4_C	14 Days
Soil/Product	TPH- extractable	SW-846 Method 8015M	1 Glass	8 ounce	Cool to 4_C	14 Days
Soil/Product	TPH- purgeable	SW-846 Method 8015M	1 Glass	4 ounce	Cool to 4_C	14 Days

Notes:

AGB	Amber glass bottle
AGV	Amber glass vial
HDPE	High density polyethylene
MTBE	Methyl tert butyl ether
SVOC	Semivolatile organic compounds
SW846	SW-846 (EPA1996b)
TPH	Total Petroleum Hydrocarbons
VOC	Volatile Organic Compound

TABLE 4
ANALYTICAL METHODS

Matrix	Analysis	Method
Water	VOC	SW-846 Method 8260 (Target analytes include naphthalene and MTBE)
Water	SVOC	SW-846 Method 8270
Water	TPH- purgable	SW-846 Method 8015M
Water	TPH- extractable	SW-846 Method 8015M
Water	Anions	EPA 300.0
Soil/Product	VOC	SW-846 Method 8260 (Target analytes include naphthalene and MTBE)
Soil/Product	SVOC	SW-846 Method 8270
Soil/Product	TPH- purgable	SW-846 Method 8015M
Soil/Product	TPH- extractable	SW-846 Method 8015M

Notes:

MTBE	Methyl tert Butyl Ether
SOW	Statement of Work
SW-486	SW-486 (EPA 1996b)
SVOC	Semivolatile Oganic Compounds
TPH	Total Petroleum Hydrocarbons
VOC	Volatile Organic Compounds

TABLE 5

POUDRE RIVER REMOVAL
SITE ASSESSMENT
DATA QUALITY OBJECTIVE STEPS

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
State the Problem	**Identify the Decisions**	**Identify the Inputs to the Decisions**	**Define Study Boundaries**	**Develop Decision Rules**	**Specify Tolerable Limits on Errors**	**Optimize Sampling Design**
Free product has been found in the Cache La Poudre River adjacent to the Aztlan Center in Fort Collins, Larimer County, Colorado. A targeted Brownfields assessment (TBA) conducted in 2003 also identified dissolved contaminants in groundwater and additional free product adjacent to the Cache La Poudre River at the site. Prior to designing or implementing remedial strategies at the site, EPA seeks to identify source areas and potential pathways for mobile NAPL reaching the Cache La Poudre River as well as refining the existing conceptual site model (CSM). Secondary considerations include: evaluating the extent of contamination in the vicinity of the landfill.	(1) Is there an ongoing source of mobile NAPL extending from the site to the impacted area in the Cache La Poudre River? (2) If mobile NAPL is extending from the site to the Cache La Poudre River, what potential pathways is the contaminant following. (3) Are source areas present at the site and what is their approximate extent?	Geophysical surveys, visual observations, passive soil gas results, passive diffusion bag samplers, UV fluorescence tests, and fixed laboratory data for total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs), Physical and chemical data used to refine the conceptual site model (CSM).	The lateral extent of the study area encompasses the Aztlan Center property along the River north to the railroad truss, south to Linden Street, and east to Willow Street. The study boundaries may be extended beyond property boundaries during the geophysical survey to delineate the extent of the historical landfill on site. The vertical boundary of the study area extends from the ground surface to approximately 25 feet below the bedrock interface. The site Assessment (SA) schedule is planned for February and March 2004.	(1A) If Collaborative data[1] suggest the presence of a preferred pathway and/or contamination/NAPL, then additional invasive activity may be considered. (1B) If collaborative data does not suggest the presence of contamination/NAPL, then no further invasive activities will be considered.	Tolerable levels of decision error cannot be defined until concentrations of site contaminants can be correlated with the likelihood of encountering contamination.	Data obtained from the passive soil gas survey, geophysical survey, and passive diffusion bag samplers will be used to optimize invasive activities.

---

[1] Collaborative data might include soil gas, trenching, geophysics, passive diffusion bag sample results

ATTACHMENTS

ATTACHMENT 1

ATTACHMENT 1a

Walsh
Environmental Scientists and Engineers, LLC
an ecology and environment company

June 27, 2003

Margit Hentschel
Natural Resources Department
City of Fort Collins
PO Box 580
Fort Collins, CO 80522

Subject: **Correlation of PAH Concentrations in "Product" Found in the Poudre River and in Samples from the former Landfill and Poudre Valley Gas Plant Site**

Dear Margit:

WALSH evaluated the distribution polycyclic aromatic hydrocarbons (PAHs) found in the "product" sample, collected on February 3, 2003 by URS Operating Services (UOS) from the Cache la Poudre River. We compared the "fingerprint" of PAHs in the sample from the river bed to that found in subsurface materials at the former Poudre Valley Gas (PVG) plant site and the former City-owned landfill. The data and sources used are attached.

Correlations of PAH Concentrations

The concentrations of PAHs in the "product" sample from the Poudre River have a correlation with those found in the sample from the former PVG Plant Site of 0.97.

There is a high correlation of the concentrations of the PAHs in the "product" collected from the Poudre River with those found at the former PVG plant site, (also represented in the attached Figure 1). The "fingerprints" of the PAHs strongly suggest that the PAHs in the "product" from the Poudre River and those found at the former PVG plant site have a common origin, and/or were generated by a common process.

The concentrations of PAHs in the "product" sample from the Poudre River have a correlation with those found in the sample from the former landfill of -0.21.

The negative correlation of PAH concentrations in the sample of landfill material (WALSH 2001) indicate that this material is very different in composition from the "product" found in the Poudre River (also represented in the attached Figures 1 and 2), and strongly suggests these materials do not have a common origin.

Discussion

The mere presence of PAHs in a soil, sediment, or other material is not demonstrative of a connection to any particular release containing PAHs, or to any possible source, and should not be interpreted to indicate such connections. PAHs are frequently found in soils and sediments. They are generated by natural (wild) fires, and in the combustion of many carbon containing materials, including oil, wood, paper, plastic, petroleum, coal, etc. However, a high correlation of the "fingerprint" or pattern of the concentrations of the numerous PAHs in two materials is unlikely unless the materials have a common origin.

The Field Sampling Plan (FSP) prepared by Tetra Tech, EMI, Inc., (Tetra Tech, June 2003) includes geophysics and sampling at many locations upgradient of the observed release to the Poudre River. The sampling will help to determine if the "product" found in the Poudre River is physically (spatially) connected to any identifiable source or sources. However, the material found in the Poudre River may not have migrated to its present location through subsurface soil and/or ground water, or through any pipe, channel or other preferential pathway. Perhaps no physical connection (past or present) to any source location will be identified.

The evidence, from the "fingerprints" of PAH concentrations, of a connection between the "product" in the Poudre River and material found at the former PVG plant site should be considered in ongoing work evaluating potential sources of the observed release. Perhaps additional characterization of materials at the former PVG plant site would also be useful in the evaluation of possible sources.

The composition of the "product" found in the Poudre River and should be carefully compared to the composition of any possible source materials, including soils, fill material, or other product samples. The FSP Tetra Tech has prepared appears to allow for appropriate consideration of the ubiquitous nature, and numerous sources of PAHs in the environment, and for appropriate interpretation of the composition of any sampled materials.

Sincerely,

Hal Stuber, Ph.D.,
Environmental Chemist

Data, Figures, and Sources

(Attachment to June 26, 2003 Letter to City of Fort Collins: PAHs in "product" found in Poudre River and two possible sources.)

Table 1

Concentrations of PAHs found in the "product" sample from the Poudre River (designated FC-PR-01, UOS, March 3, 2003), and subsurface soils collected at the PVG site (TP-2, 11.5', Western Technologies, 1996), and at the former municipal landfill (BTH-10, WALSH, 2001)

Compound	Concentration of PAHs, ug/kg Product Sample from Poudre River FC-PR-01	Soil from Test Pit 2 Former Poudre Valley Gas Plant Site TP-2, 11.5'	Landfill Material BTH-10 (5-15')
naphthalene	270,000	1,055,000	500
acenaphthylene	110,000	350,000	1,100
2-methylnaphthalene	290,000	825,000	490
acenaphthene	32,000	<660	360
fluorene	72,000	184,950	660
phenanthrene	150,000	335,500	880
anthracene	49,000	120,000	420
fluoranthene	55,000	124,000	970
pyrene	49,000	139,000	2,400
benzo(a)anthracene	19,000	46,300	740
chrysene	20,000	<660	770
benzo(b)fluoranthene	6,700	<660	1,400
benzo(k)fluoranthene	12,000	<660	<400
benzo(a)pyrene	14,000	<660	1,300
dibenzo(a,h)anthracene	1,500	<660	<400
benzo(g,h,i)perylene	6,500	<660	480
indeno(1,2,3-cd)pyrene	7,500	<660	450

Figure 1

PAHs in River Product Sample and MGP Site Test Pit

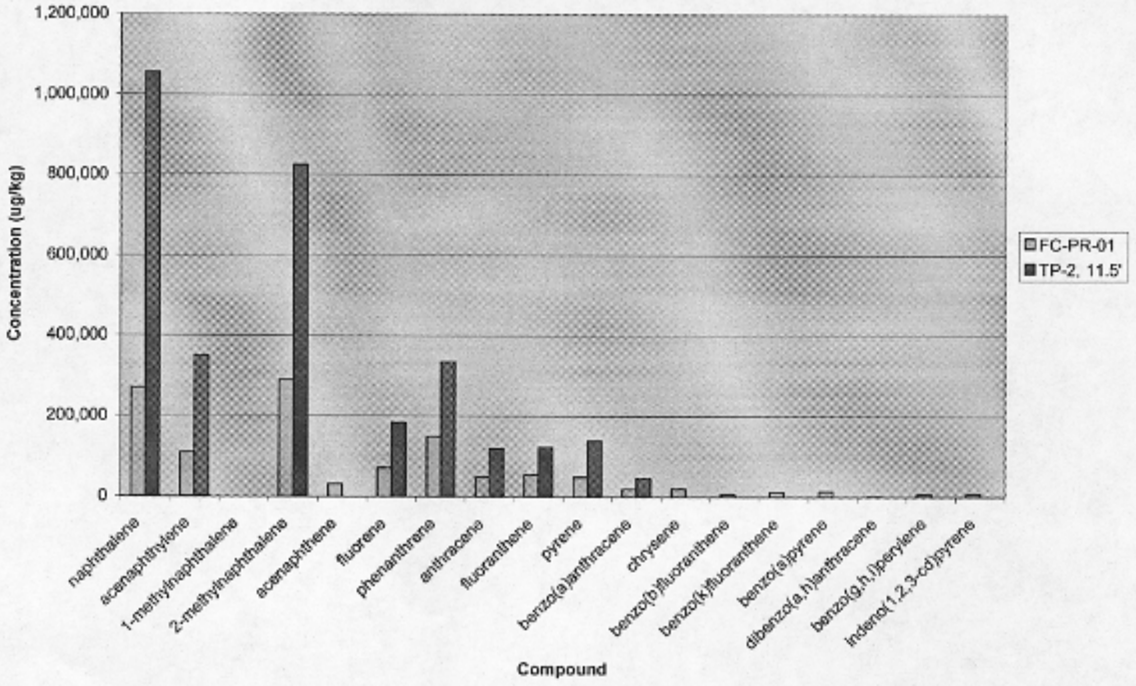
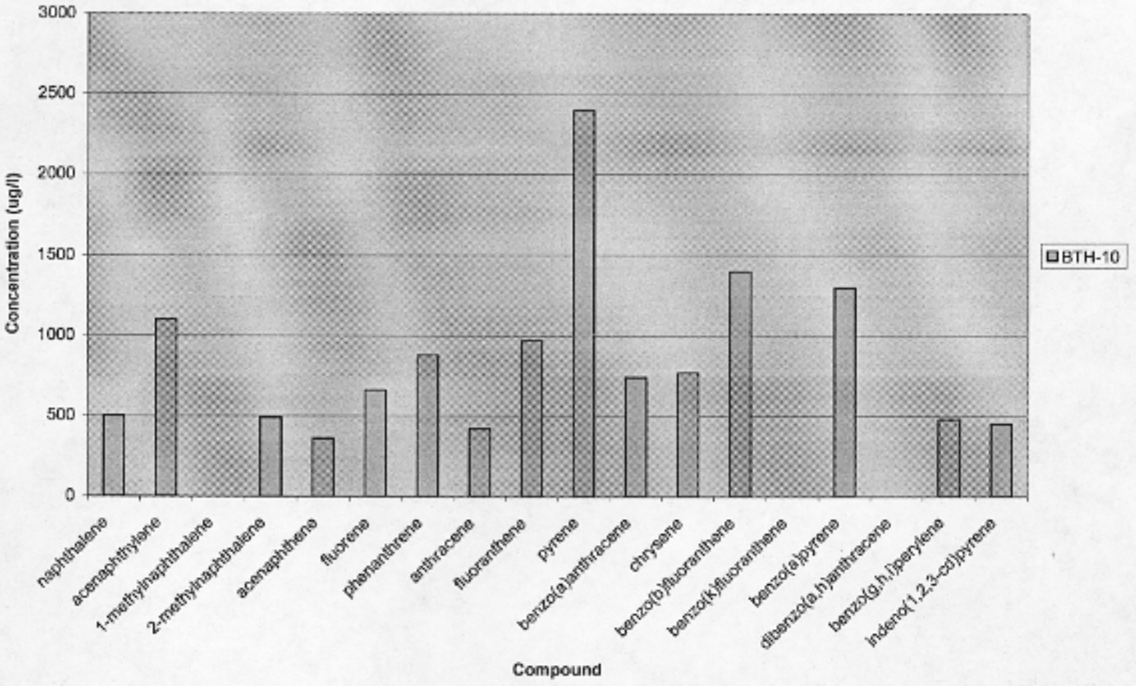


Figure 2

PAHs in BTH-10 soil



References

UOS, March 4, 2003. Product Sample Results for Targeted Brownfields Assessment, Fort Collins Aztlan Center, Fort Collins, Larimer County, Colorado. Letter Report To EPA Region VIII, Contract No. 68-W-00-118, TDD No. 0212-008

WALSH, July 15, 2001. Investigation of Soil and Ground Water Contamination Down Gradient of the Former Poudre Valley Gas Plant, Fort Collins, Colorado. Prepared for the City of Fort Collins, Downtown River Corridor Brownfields Pilot Assessment, U.S. EPA Cooperative Agreement, Assistance ID No. BP-988300001-0.

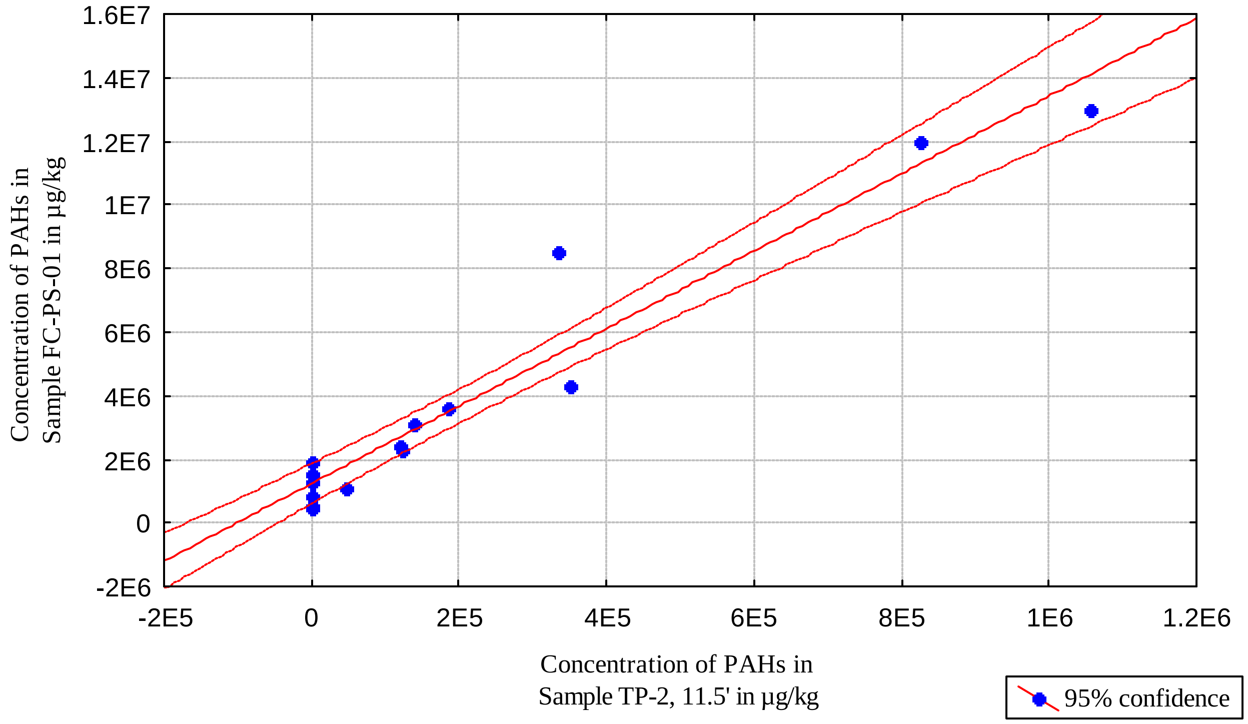
Western Environmental Technologies, Inc., August 19, 1996. Manufactured Gas Plant Site Gas Holder and Soil Remediation Report, Willow Street and College Avenue, Fort Collins, Colorado. Prepared for the City of Fort Collins.

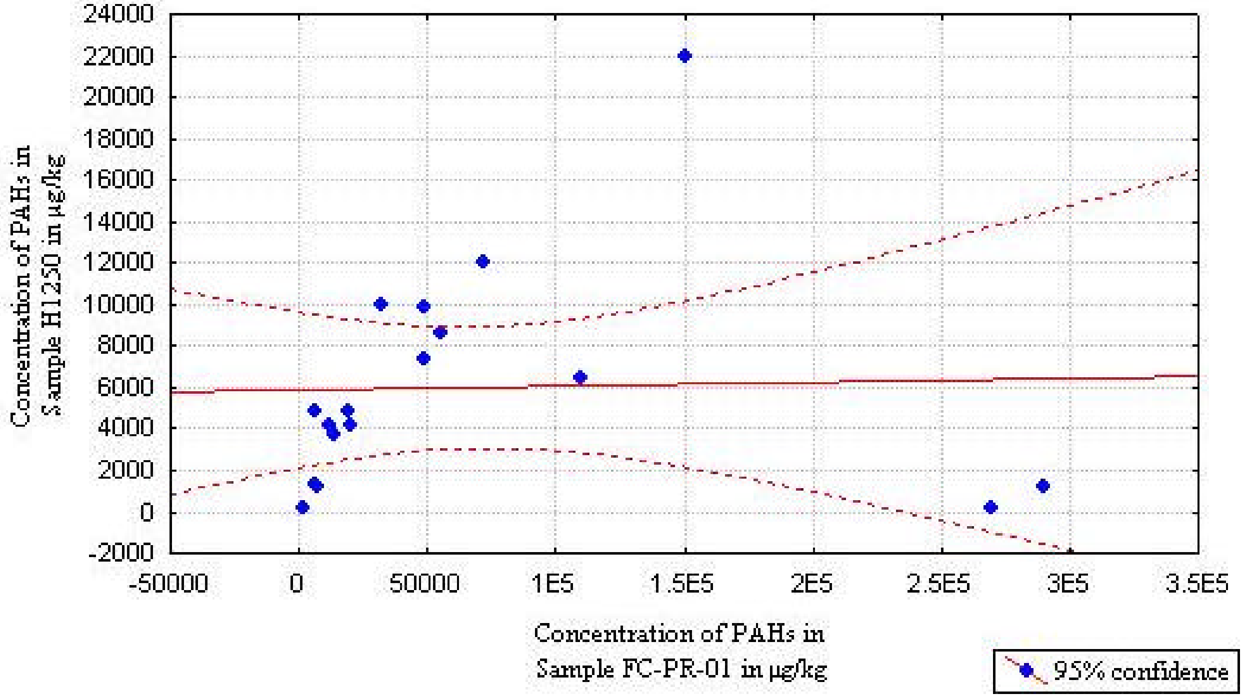
ATTACHMENT 1b

PAH Compound	**FC-PR-01** **µg/kg**	**TP-2, 11.5'** **µg/kg**	**FC-PS-01** **µg/kg**	**H1250** **µg/kg**	**BTH-10 (5-15')** **µg/kg**
NAPHTHALENE	270,000	1,055,000	13,000,000	125	500
2-METHYLNAPHTHALENE	290,000	825,000	12,000,000	1200.0	490
ACENAPHTHYLENE	110,000	350,000	4,300,000	6500.0	1,100
ACENAPHTHENE	32,000	**330**	1,900,000	10000.0	360
FLUORENE	72,000	184,950	3,600,000	12000.0	660
PHENANTHRENE	150,000	335,500	8,500,000	22000.0	880
ANTHRACENE	49,000	120,000	2,400,000	7400.0	420
FLUORANTHENE	55,000	124,000	2,300,000	8600.0	970
PYRENE	49,000	139,000	3,100,000	9900.0	2,400
BENZO(A)ANTHRACENE	19,000	46,300	1,100,000	4800.0	740
CHRYSENE	20,000	**330**	1,300,000	4200.0	770
BENZO(B)FLUORANTHENE	6,700	**330**	440,000	4800.0	1,400
BENZO(K)FLUORANTHENE	12,000	**330**	530,000	4200.0	**200**
BENZO(A)PYRENE	14,000	**330**	820,000	3700.0	1,300
INDENO(1,2,3-CD)-PYRENE	7,500	**330**	1,500,000	1200.0	450
DIBENZO(A,H)-ANTHRACENE	1,500	**330**	1,500,000	150	**200**
BENZO(G,H,I)PERYLENE	6,500	**330**	1,500,000	1300.0	480

Notes: Bold values indicate the use of a proxy value (½ the reporting limit) for non-detected compounds.

Correlation Scatterplot for Polynuclear
Aromatic Hydrocarbons (PAHs)
Poudre Valley Gas Plant Sample (TP-2, 11.5') vs.
Poudre River Product Sample (FC-PS-01)
FC-PS-01 = 1236E3 + 12.186 * TP-2, 11.5'
Correlation: r = .96629





Correlation Scatterplot for Polynuclear
Aromatic Hydrocarbons (PAHs)
Poudre River Product Sample (FC-PR-01) vs.
Landfill Product Sample (H1250)

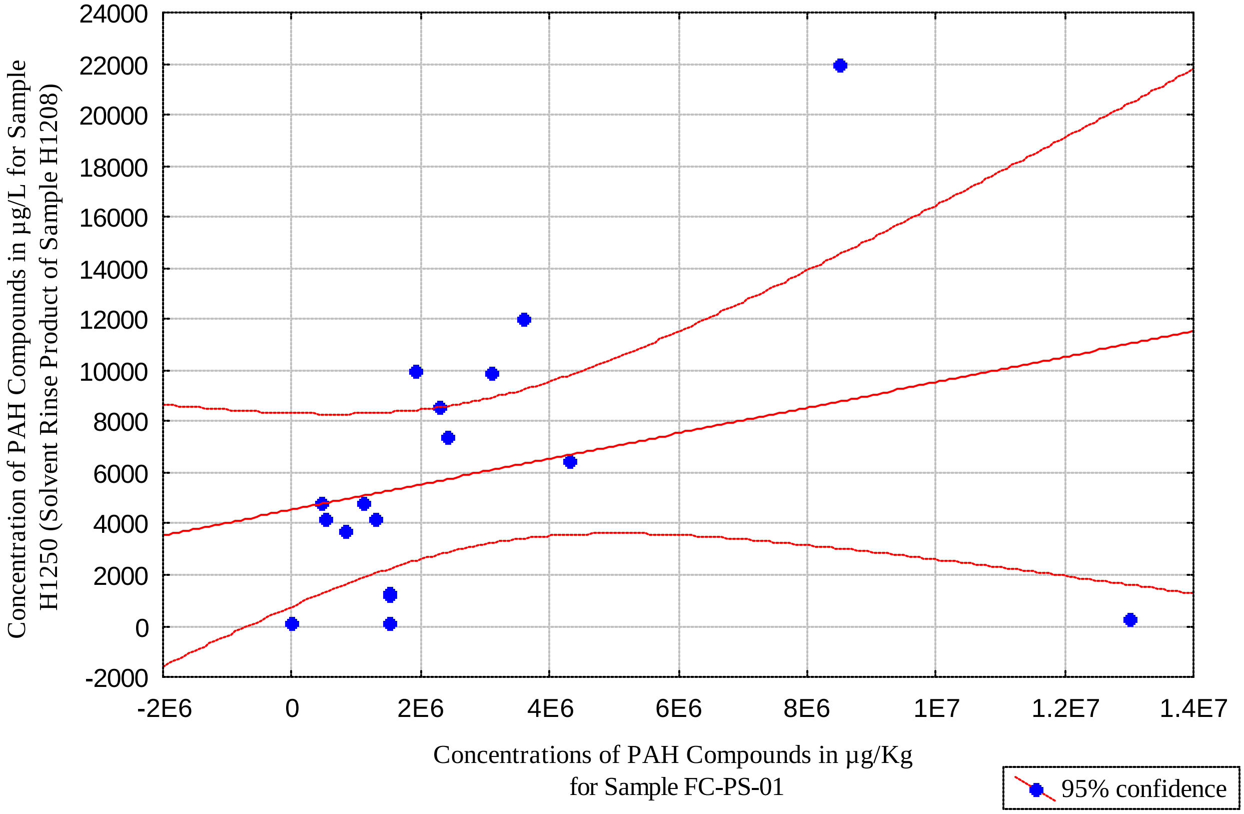
H1250 = 5876.0 + .00187 * FC-PR-01

Correlation: r = .03039

PAH Concentrations Scatterplot

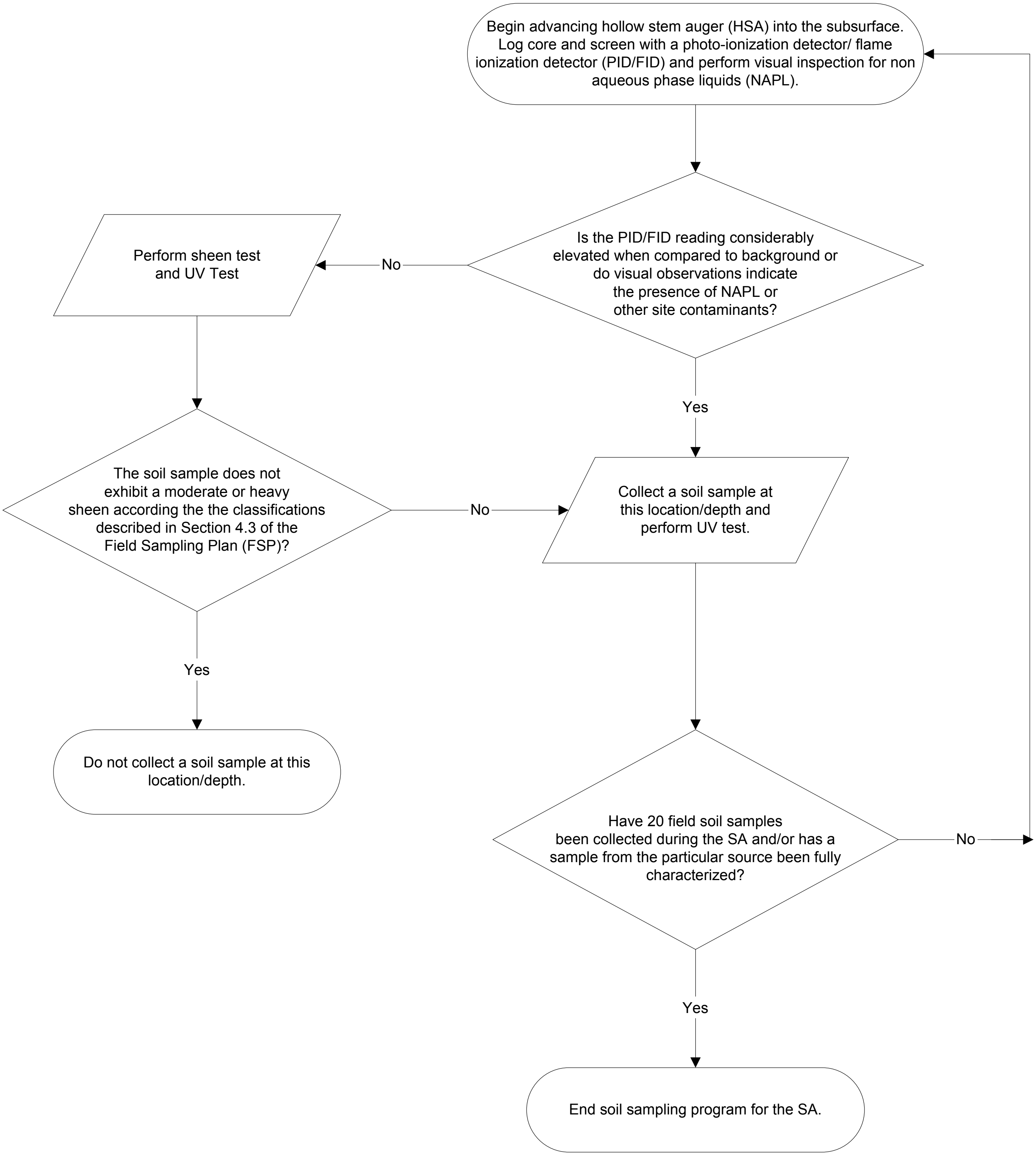
H1250 = 4544.9 + .50E-3 * FC-PS-01

Correlation: r = .29554



ATTACHMENT 2

Poudre River Removal Site Assessment
Soil Sampling Decision Logic



Poudre River Removal Site Assessment
Monitoring Well Placement Decision Logic