SAMPLING AND ANALYSIS PLAN
Remedial Investigation/Feasibility Study

Penta Wood Products
Town of Daniels, Wisconsin
Prepared by: CH2M HILL
WA No. 001-RICO-05WE/Contract No. 68-W6-0025
November 1997
Revision 1

The Penta Wood Products Sampling and Analysis Plan consists of three plans; the Quality Assurance Project Plan, the Field Sampling Plan, and the Data Management Plan. Collectively these three plans are called the Sampling and Analysis Plan.

These plans are supporting plans and have been prepared in conjunction with the following documents that have been prepared under separate cover:

- Penta Wood Products Remedial Investigation/Feasibility (RI/FS) Study Work Plan
- Penta Wood Products Site Management Plan (SMP), which contains the Pollution Control and Mitigation Plan and Transportation and Disposal Plan
- Penta Wood Products Site Treatability Study Work Plan

The RI/FS Work Plan describes the site background, physical characteristics, project approach, and details of the tasks to be completed for the RI/FS. The Treatability Study Work Plan presents the treatability studies that will be performed to support the Feasibility Study. The SMP describes the procedures and safeguards that will be used to control site access, prevent contaminants from being released offsite due to RI/FS activities, and manage and dispose of wastes generated during the RI/FS.

List of Acronyms/Abbreviations

ACZA	Ammonia, Copper II oxide, Zinc, Arsenate
ARARs	Applicable or Relevant and Appropriate Requirements
ASTM	American Society of Testing Materials
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CLP	Contract Laboratory Program
COC	Contaminants of Concern
CPT/IF	Cone Penetrometer Testing/Induced Fluorescence
DMP	Data Management Plan
DQO	Data Quality Objective
ERB	Emergency Response Branch
ERT	Emergency Response Team
FS	Feasibility Study
FSP	Field Sampling Plan
Ft	Feet
GFAA	Graphite Furnace Atomic Absorption
GC/MS	Gas Chromatography/Mass Spectrometry
HPLC	High Performance Liquid Chromatography
kg	Kilogram
L	Liter
LNAPL	Light Non-Aqueous Phase Layer
MDL	Method Detection Limit
MeOH	Methanol
µg	Microgram
mg	Milligram
ND	Nondetect
NPL	National Priority List
OSC	On-Scene Coordinator
PCP	Pentachlorophenol
PWP	Penta Wood Products
QA	Quality Assurance
QAO	Quality Assurance Officer
QAP	Quality Assurance Plan
QAPjP	Quality Assurance Project Plan
QAU	Quality Assurance Unit
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SACM	Superfund Accelerated Cleanup Model
SAP	Sampling and Analysis Plan
SAS	Special Analytical Services

SM	Site Manager
SOP	Standard Operating Procedure
SOW	Statement of Work
SVOC	Semivolatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WAM	Work Assignment Manager
WDNR	Wisconsin Department of Natural Resources
WDOT	Wisconsin Department of Transportation
XRF	X-Ray Fluorescence

QUALITY ASSURANCE PROJECT PLAN (QAPjP)
Remedial Investigation/Feasibility Study

Penta Wood Products
Town of Daniels, Wisconsin
Prepared by: CH2M HILL
WA No. 001-RICO-05WE/Contract No. 68-W6-0025
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Revision 1

QUALITY ASSURANCE PROJECT PLAN (QAPjP)
Remedial Investigation/Feasibility Study
Penta Wood Products
Town of Daniels, Wisconsin
WA No. 001-RICO-05WE/ Contract 68-W6-0025
Revision 1

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1.0 Introduction

The United States Environmental Protection Agency (USEPA) requires that all environmental monitoring and measurement efforts mandated or supported by the USEPA participate in a centrally managed quality assurance (QA) program.

Any party generating data under this program has the responsibility to implement minimum procedures to assure that the precision, accuracy, completeness, and representativeness of its data are known and documented. To ensure that the responsibility is uniformly met, each party must prepare a written QA Project Plan (QAPjP) covering each respective project it is to perform.

This QAPjP presents the organization, objectives, functional activities, and specific QA and quality control (QC) activities associated with the Remedial Investigation/Feasibility Study (RI/FS) for the Penta Wood Products (PWP) site, located in the Town of Daniels, Wisconsin.

This QAPjP and associated Field Sampling Plan (FSP) and Data Management Plan (DMP) present the sampling and analysis QA/QC procedures for the sampling which will be conducted by the USEPA during the PWP RI/FS. The USEPA will conduct groundwater, subsurface soil, surficial soil, sediment, and surface water sampling to supplement past data collection activities where data gaps exist.

This QAPjP also describes the specific protocols that will be followed for sampling, sample handling and storage, chain-of-custody, and laboratory and field analyses.

All QA/QC procedures will be in accordance with applicable professional technical standards, USEPA requirements, government regulations and guidelines, and specific project goals and requirements. CH2M HILL prepared this QAPjP for USEPA Region 5 under Work Assignment No. 001-RICO-05WE in accordance with all USEPA QAPjP guidance documents, in particular, the Contract Laboratory Program (CLP) guidelines, *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans (QAMS-005/80),* and the *Region 5 Model QAPjP (Revision No. 1, 1996).*

2.0 Project Description

2.1 Site Description and History

2.1.1 Project Background

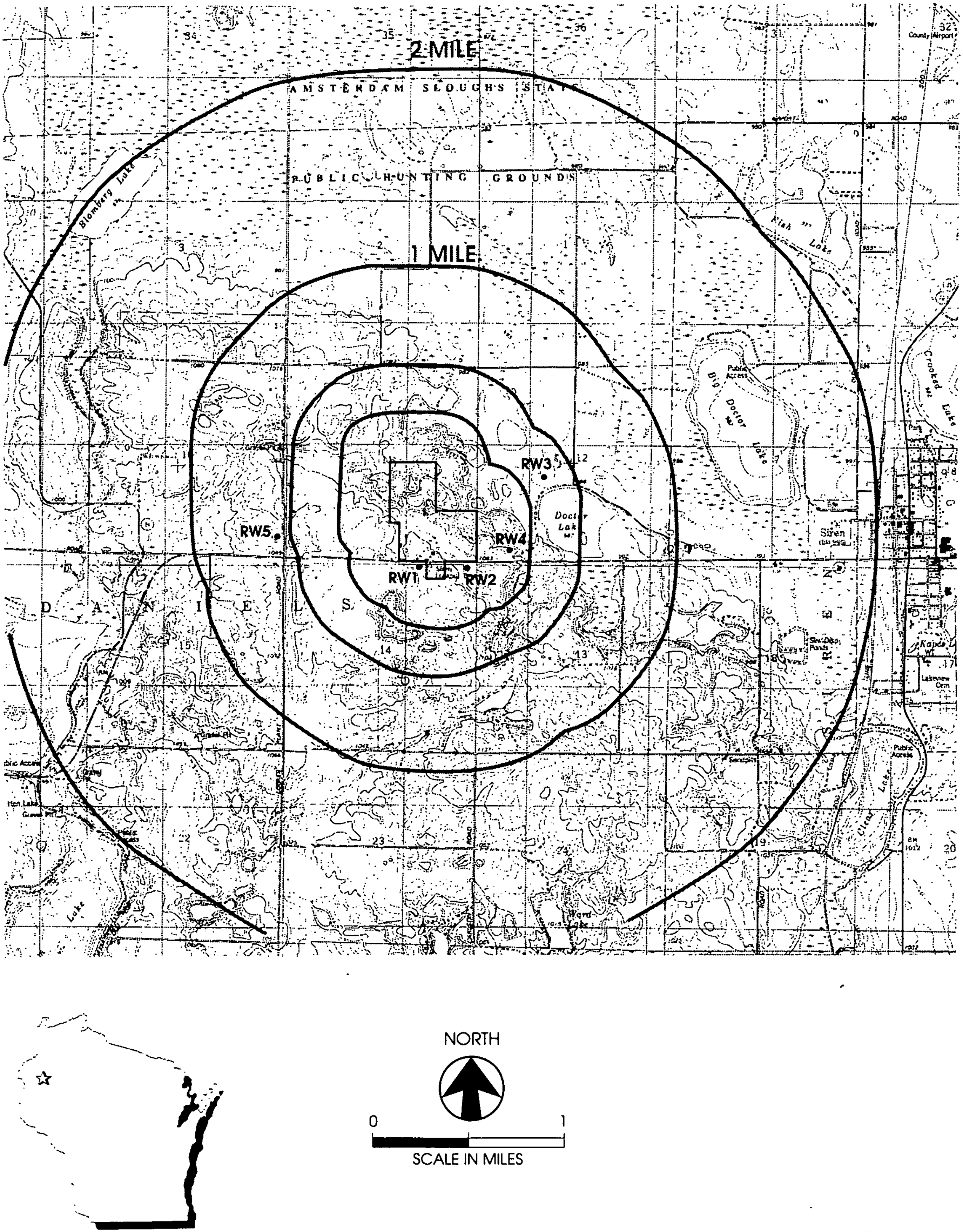
From 1953 to 1992, PWP operated on 80 acres of a 120-acre parcel located 2 miles west of Siren, Wisconsin (Figure 2-1). Raw timber was cut into posts and telephone poles and treated with either a 5 to 7 percent pentachlorophenol (PCP) solution in a No. 2 fuel oil carrier, or with chemonite, a water-borne salt treatment consisting of ammonia, copper II oxide, arsenate, and zinc (ACZA). During PWP's 39 years of operation, PWP discharged wastewater from an oil/water separator down a gully to a lagoon on the northeast corner of the property (Figure 2-2). Process wastes were also discharged onto the wood chip pile in the northwestern portion of the property. Wisconsin Department of Natural Resources (WDNR) investigators noted several large spills, stained soils, and poor operating practices in 1986. A 6-acre portion of the site, located south of old Highway 70, was used to transfer bulk PCP/oil mix to buyers.

In 1988, the onsite production well was closed for potable use when it was found to contain 2,700 parts per billion (ppb) of PCP. From 1989 to 1992, PWP funded an investigation to characterize soil and groundwater contamination with 58 soil borings, test pits, and 10 monitoring wells. In 1989, the Wisconsin Department of Transportation (WDOT) detected 2,800 parts per million (ppm) of PCP in a surficial soil sample within the right-of-way on the south side of old Highway 70.

The PWP facility was closed in May 1992 because of its inability to comply with RCRA regulations. In 1993, the WDNR conducted a Screening Site Inspection which detected 13 ppm PCP, 190 ppm copper, and 74 ppm of arsenic in a sediment sample collected from a wetland located downhill from the lagoon. Five residential wells (shown in Figure 2-1) were sampled and did not contain site contaminants.

Surficial soils and ash from the boiler where PCP sludges were burned were sampled at various times for dioxin. Sample results detected dioxin at less than 1 ug/kg toxicity equivalent using the 1987 USEPA toxicity equivalency factors.

The State of Wisconsin selected PWP as a Superfund Accelerated Cleanup Model (SACM) site in 1994. A federally funded removal action was conducted between April 1994 and June 1996 by USEPA Region V Emergency Response Branch (ERB). About 28 storage tanks containing liquids and sludges were emptied, and 43,000 gallons of PCP oil and sludge were disposed of offsite for incineration. The ACZA treatment building was demolished, and the grossly contaminated soils from that area were excavated. About 1,600 cubic yards of contaminated soils (PCP and arsenic) were excavated from the site and hauled offsite. About 4,000 cubic yards of ACZA-contaminated soil was excavated and mixed with



SOURCE: USGS 7.5 min. Quadrangle for Siren West, WI, 1982.

FIGURE 2-1
Site Location Map and Residential Wells Sampled in 1993
Penta Wood Products RI/FS QAPP
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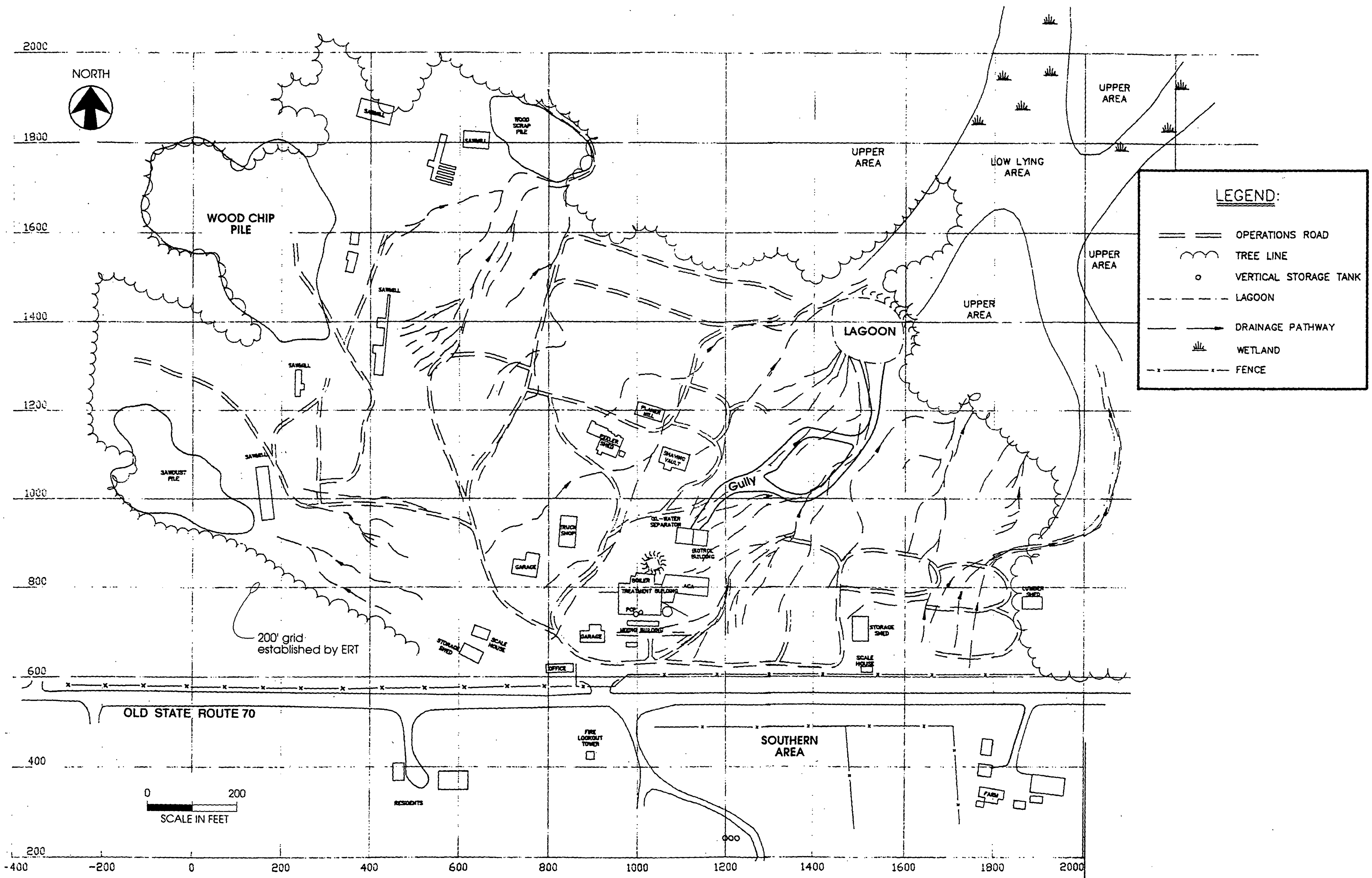

BASEMAP SOURCE: US EPA Analytical Contract #68-C4-0022,
W.O.#03347-040-001-0026-01 Figure 4, May 1994

FIGURE 2-2
Site Features Map
Penta Wood Products RI/FS QAPP

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concrete onsite to form a 580- by 260-foot, 1-foot-thick concrete pad. The pad was intended to be used for ex situ bioremediation of PCP-contaminated soils.

In June 1995, a heavy rain released water from the lagoon into the wetlands northeast of the site. The removal team responded by building a retention pond adjacent to the lagoon and stockpiling excavated soil across gullies to reduce soil erosion.

During the removal action, ERB requested removal assistance and site characterization support by the USEPA Emergency Response Team (ERT). In 1994, ERT conducted a hydrogeological and an on- and offsite surficial soil investigation. The hydrogeological investigation included installation of 12 additional wells, three lysimeter nests, infiltration tests, and seismic studies (ERT, 1994). About 300 soil samples were collected during soil boring installation and analyzed for PCP, total petroleum hydrocarbons (TPH), arsenic, copper, and zinc.

The soil investigation consisted of establishing a 200-foot interval grid system over the entire site and northeast of the property boundary. Soils were collected at 1-foot intervals down to 5 feet and analyzed with immunoassay kits for PCP and field portable X-ray fluorescence (XRF) for arsenic. ERT also conducted laboratory treatability studies, including soil washing and stabilization/solidification; and pilot-sized bioremediation treatability studies including land farming, ex situ biopiles, anaerobic dechlorination, and white rot fungus. Contaminated groundwater and wash water were treated with a Biotrol fixed-film biological reactor. ERT did not complete all its intended activities as federal funding was cut back in 1995. The site was placed in the remedial program in 1996.

2.1.2 Site Physical Characteristics

Topography

The PWP site is situated on a plateau that ranges from 20 to 50 feet above the adjacent land to the east, west, and north. The treatment area is located on the highest elevation of the site. Well defined drainage pathways, and areas of erosion and deposits have been created in the sandy overburden soils. A large gully extends northeast from the treatment area to the lagoon.

Geology

ERT characterized site geology as consisting of three distinct stratigraphic layers: the upper sands, a glacial till, and the lower sands. The glacial till consists of sand and silt and forms a discontinuous boundary between the upper and lower sands. The upper sands extend from the surface to 90 to 120 feet below ground surface (bgs). The lower and upper sands may be indistinguishable when the glacial till layer is missing. The deepest soil boring of 300 feet bgs did not encounter bedrock. Regional maps indicate the Pleistocene deposits overlay Cambrian sandstones and Precambrian basalt flows.

Geotechnical analysis of the upper sands indicates the material to have neutral to alkaline pH, low cation exchange capacity, and little organic carbon in noncontaminated areas. The permeability of the material is quite high with a median value of 19.3 ft/day.

Hydrogeology

Groundwater at the PWP site occurs both in a thin, unconfined, water-bearing unit about 100 feet bgs and within a multilayered system of semiconfined water-bearing units. In most areas of the site, the upper sands form a deep unsaturated zone. Semiconfined conditions are a result of the discontinuous, dipping till deposit of varying thickness. The sandy outwash deposits function as a single, water-bearing unit beneath the lagoon area, the gully, the eastern portion of the site, and the PCP treatment area where the glacial till is absent.

The site is situated in a groundwater recharge zone. Because of the high permeability of surficial soils, precipitation rapidly infiltrates the soil.

Regional groundwater flow is to the north. An analysis of the onsite well water levels indicates that the water table is relatively flat with a north-northeast flow direction. Potentiometric surface maps of the unconfined water-bearing unit created in 1994 indicate that the lagoon area can create a mounding effect. The calculated horizontal hydraulic gradients range from 0.31 to 1.20×10^{-3} ft/ft.

Groundwater Use

Three residences served by private wells screened in the semiconfined aquifer are within 200 feet of the site. There are 38 private wells within 1 mile of the site. The Town of Siren's wells are located 2 miles east of the site.

Surface Water Hydrology

Surface water that does not infiltrate the sandy soils primarily drains northeast of the site. A 1979 aerial photo of the site shows at that time, the lagoon consisted of a number of overflow impoundments down the steep hill towards the wetland. Materials used to construct the impoundments (e.g., wood chips and log ends) have been found in a depositional path from the lagoon to the wetland. Migration of contaminants to the wetland is suspected through overland flow and possibly through groundwater discharge to surface water.

Surrounding Land Use

The site is located in a residential/agricultural/recreational area. A dairy farm is located across from the site on old Highway 70. A 94-acre bog lake, 2,137 acres of lakes, and 7,500 acres of wetlands are located within a 4-mile radius of the site. The 7,233-acre Amsterdam Slough Public Hunting Area is located within 1 mile of the site and provides nesting areas for bald eagles, osprey, red-shouldered hawks, trumpeter swans, and other waterfowl.

2.1.3 Conceptual Site Model

The conceptual site model is a framework within which source areas, contaminant release mechanisms, and environmental pathways of potential concern at a site are identified. Media that should be sampled to determine whether a release has occurred can be identified using the model. The model also serves as the framework for conceptualizing general response actions.

The site history and previous site investigations indicate that the soil beneath the PCP treatment areas, and the entire gully corridor from the oil/water separator to the lagoon are contaminated with a PCP oil residual. The contamination was caused by spills around the treatment area, and the practice of discharging wastewater through the gully to the lagoon. Along the gully corridor, PCP and TPH contamination has been detected throughout the vadose zone soil down to the water table. The average PCP/TPH ratios found in the soil are similar to that of the initial PCP oil formulation, indicating that the mixture was traveling through the soils as a single pseudo-component. Upon reaching the water table, the PCP oil mixture formed a light non-aqueous phase layer (LNAPL). It is postulated that dissolved PCP travels in the groundwater as pentachlorophenate. The contaminated soils and LNAPL layer serve as a continuing source of PCP contaminant to the groundwater.

The wood chip pile in the northwest corner of the site is also a significant area of contamination. Wood chips from the pole peeling operation were deposited in a 30- to 50-foot ravine. Wastewater from the processing tanks were discharged in the wood chip pile, in volumes of approximately 300 gallons, five to six times per week for 6 to 7 years (at least 450,000 gallons). The wood chip pile covers an area of 136,000 square feet, with an average depth of 15 feet (75,000 cubic yards). Analysis of the wood chips detected PCP up to 1,300 mg/kg and TPH at 24,000 mg/kg.

Arsenic, copper, and zinc contamination is largely limited to the upper 5 feet of soil on the eastern third of the site, where the ACZA-treated wood was stored. ERT/ERB reportedly excavated most of the ACZA-contaminated soil and stabilized the soil in the "biopile" cement pad. Grid and biased soil sampling for PCP and arsenic show a few other hot spots on the south side of old Highway 70, along the tree line on the northern boundary of the site (where wastewater was discharged with a portable tank), and west of the treatment buildings. The USEPA On-Scene Coordinator (OSC) Reports indicate the hot spot soils south of old Highway 70 may have been excavated.

2.1.4 Preliminary Identification of Remedial Action Technologies

The USEPA has developed presumptive remedies for contaminated soil and groundwater at wood treatment facilities by studying the FS/Record of Decision (ROD) from over 25 National Priority List (NPL) wood treatment facilities and evaluating the available existing treatment technologies. Bioremediation is the primary presumptive remedy for treating soils contaminated with organic contamination; thermal desorption and incineration complete the remedy options. The presumptive remedy for inorganic soil contamination is immobilization. For contaminated groundwater, the guidance suggests that site characterization and response actions be implemented in a phased approach. The site investigation should delineate both LNAPL zones and aqueous plumes. Source removal/treatment is suggested to the extent practicable.

ERT has conducted numerous treatability tests at the PWP site including soil washing, solidification/stabilization, and biodegradation tests including landfarming, biopiles, anaerobic dechlorination, and white rot fungus. Contaminated water was treated with an existing onsite Biotrol fixed-film biological reactor unit.

Based on review of this data, and discussion with the WAM, potential treatment actions have been identified to guide further data collection. The vadose-zone soils between the treatment area and the lagoon are contaminated with a PCP/oil residual from the ground surface to about 100 feet bgs. Ex situ bioremediation studies with the PCP/oil contaminated soils have shown positive results without the need for added nutrients. Due to the extended depth (about 100 feet of vadose soils) and sheer volume of the contaminated soil, in situ bioremediation of the vadose zone soils has been identified as a potential treatment option. ERT proposed to excavate the upper 20 feet of contaminated soils, leaving the majority of the contaminant mass onsite. In situ bioventing will potentially treat all the vadose soils by injecting air to enhance aerobic biodegradation of the residual fuel oil and PCP. CH2M HILL proposes to field test this process. Ex situ bioremediation will be considered for treatment of some of the more highly contaminated soils.

Potential remediation options for groundwater that have been identified at this time include collection and treatment, removal of LNAPL layer, in situ bioremediation, and natural attenuation. Subsequent to a literature study and laboratory studies, field tests may be proposed for ultraviolet treatment of extracted groundwater, carbon polishing, and possibly a Biotrol unit.

2.2 Contaminants of Concern

Contaminants of Concern (COC) are defined as those most likely to contribute to risk as a result of exposure. The USEPA and WDNR have established through prior investigations that the COCs at the PWP site are PCP, arsenic, copper, and zinc.

2.3 Project Objectives

The overall objective of this field investigation is to supplement the existing information with the minimum amount of additional data necessary to support a ROD for site remediation.

The Final PWP RI/FS Work Plan, prepared by CH2M HILL in July 1997, contains a data needs evaluation based on existing data, a conceptual site model, and an identification of preliminary RA objectives and technologies. Data that will be collected during the RI/FS to fill the identified data gaps include the following:

- Surface soil investigations to establish post-removal action concentrations in areas excavated by ERB and further define hot spot areas
- Subsurface soil investigations to delineate the existing contaminant distribution in the vadose zone using cone penetrometer testing/induced fluorescence (CPT/IF) as a screening tool
- Groundwater data to further delineate the contaminant plume with respect to cleanup goals and determine if natural attenuation is occurring

TABLE 2-1
Summary of Sampling and Analysis Activities—RI
(Page 1 of 2)

Sample Matrix	Locations	Analytical Parameters	No. of Field Samples	QC Samples			Total No. of Samples
				FB	Dup	MS/D	
Groundwater—Existing Monitoring Wells	MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-6S, MW-7, MW-8, MW-9, MW-10, MW-10S, MW-11, MW-12, MW-13, MW-14, MW-15, MW-16, MW-17, MW-18, MW-19, MW-20, PW-01	PCP, arsenic, copper, zinc	23	2	2	2	29
		Natural attenuation-laboratory analysis: nitrate, sulfate, manganese, chloride methane, BTEX, carbon dioxide, TOC, ferrous iron, alkalinity, ammonia	23	2	2	0	27
		Natural attenuation-field analyses: DO, pH, Redox potential, conductivity, temperature	23	0	2	0	25
Drinking Water—Residential Wells	RW1, RW2, RW3, RW4, RW5	PCP	4	1	1	2	8
Groundwater—CPT/Groundwater Grab	See Figure 3 and Table 3 of FSP	Immunoassay PCP	Maximum 30	3	3	0	36
		Offsite PCP confirmation	3	0	0	0	3
Surface Water—Wetlands	1 from each of 2 fingers of the wetland and 1 background location	PCP, arsenic, copper, zinc, hardness, ammonia	3	1	1	0	5
Subsurface Soil—CPT	CPT borings—see Figure 5 and Table 2 of FSP	This is a field screening method to detect the presence of TPH	Maximum 24	0	0	0	24
Subsurface Soil—Wood Chip Area	CPT borings—see Figure 2 and Table 2 of FSP	Immunoassay PCP	Maximum 12	0	1	0	13
		Offsite PCP confirmation	2	0	0	0	2
Surface Soil	To be determined during field activities	Immunoassay, PCP	10	0	1	0	11
		Arsenic	6	0	1	1	8
		Offsite PCP confirmation	1	0	0	0	1
Sediment—Wetlands	See Figure 2 of FSP	PCP, arsenic, copper, zinc, pH, TOC	7	0	1	2	10
Soil/Concrete—Concrete Pad	Concrete pad area	TCLP arsenic	3	0	0	0	3

TABLE 2-1
Summary of Sampling and Analysis Activities—RI
(Page 2 of 2)

Sample Matrix	Locations	Analytical Parameters	No. of Field Samples	QC Samples			Total No. of Samples
				FB	Dup	MS/D	
Subsurface Soil—Column Study and Wood Debris	Soil to be collected from area near LY-02 or near IT-01	PCP, DRO, TPH, TOC, chloride, moisture content, pH	3 initial	0	1	0	13
			4 at 3 months	0	1	0	
		Field: initial temperature, in situ bulk density. Lab: weekly soil gas monitoring with meter for temperature, O_2, CO_2, and methane.	4 at 6 months	0	0	0	
Subsurface Soil—Field bioventing Study	From 5 feet and 40 feet below ground surface in each of three piezometer nests (six total locations)	PCP, DRO, TPH, TOC, chloride, moisture content	6 initial	0	1	0	21
			6 at 3 months	0	1	0	
		Field: Soil pH gas monitoring with meter for temperature, O_2, CO_2, and methane	6 at 6 months	0	1	0	
Groundwater—Photolysis Study	Groundwater will be extracted and placed in three cells in varying depths. An initial composite sample will be collected, followed by ten sampling events for each cell over a 3-day period.	PCP, total metals (CLP)	31 PCP	3	3	0	37
			4 Metals	1	1	0	6
		Field: pH, temperature, O_2 and oxidation reduction potential.					

PCP = Pentachlorophenol
CPT = Cone Penetrometer Testing
TPH = Total Petroleum Hydrocarbons
TOC = Total Organic Carbon
DRO = Diesel Range Organics

- Surface water and sediment data to determine the extent of contamination in the wetlands
- Residential well data to determine if potential receptors are being affected
- Wetlands evaluation to identify potentially affected communities

CH2M HILL's RI/FS scope of work, as requested by USEPA, includes the following:

- Sampling and analysis of groundwater for the primary COCs—PCP, arsenic, copper, and zinc. Additionally, groundwater samples will be analyzed for natural attenuation parameters.
- Sampling and analysis of residential wells for PCP.
- Sampling and analysis of surficial soil for PCP and arsenic.
- Sampling and analysis of subsurface soil for PCP.
- Sampling and analysis of surface water in the wetlands for the primary COCs, hardness, and ammonia.
- Sampling and analysis of sediments in the wetlands for the primary COCs, pH and total organic carbon (TOC).
- Sampling and analysis of concrete pad chips for toxicity characteristic leaching procedure (TCLP) arsenic.

The Treatability Study Work Plan, September 10, 1997, and Treatability Study Revision Memorandum, October 30, 1997, describe the objectives and sampling requirements for three treatability studies; a soil and wood debris bioventing laboratory column study, a field bioventing study, and a field groundwater photolysis study.

A detailed summary of the RI and Treatability Study sampling and analysis of soil, air, and water samples is presented in the Field Sampling Plan (FSP). A summary of sampling and analysis activities is presented in Table 2-1.

Analytical methods and the Project Required Detection Limits for sample analysis are presented in Table 2-2. Specific parameters to be analyzed for each matrix are listed in Table 2-1.

2.4 Sample Network Design and Rationale

The groundwater, subsurface soil, surficial soil, and sediment sample location rationale are described in detail in the FSP.

TABLE 2-2
Parameter List and Project Required Detection Limits

		Detection Limits	
Parameter	**Method**	**Soil (mg/kg)**	**Water (µg/L)**
Pentachlorophenol	Field Procedure	0.1	0.06
	SW846-8270	0.5	0.1
Arsenic	SW846-7060	0.5	2.0
Copper	SW846-6010	2.0	50
Zinc	SW846-6010	2.0	2.0
Aluminum	SW846-6010	--	100
Antimony	SW846-7041	--	1.2
Barium	SW846-6010	--	200
Beryllium	SW846-1010	--	0.4
Cadmium	SW846-7131	--	0.5
Calcium	SW846-6010	--	200
Chromium	SW846-6010	--	5.0
Cobalt	SW846-6010	--	10
Iron	SW846-6010	--	100
Lead	SW846-7421	--	1.5
Magnesium	SW846-6010	--	200
Mercury	SW846-7470	--	0.2
Nickel	SW846-6010	--	20
Potassium	SW846-6010	--	750
Selenium	SW846-7740	--	5.0
Silver	SW846-6010	--	5.0
Sodium	SW846-6010	--	1,000
Thallium	SW846-7841	--	0.4
Vanadium	SW846-6010	--	10
Zinc	SW846-6010	--	2.0
Nitrate	EPA-300	NA	130
Sulfate	EPA-300	NA	10,000
Methane	SW846-8020	NA	1.0

TABLE 2-2 (CONTINUED)
Parameter List and Project Required Detection Limits

		Detection Limits	
Parameter	Method	Soil (mg/kg)	Water (µg/L)
Manganese	SW846-6010	NA	10
Chloride	EPA-300	NA	10,000
Carbon Dioxide	SM4500-C02D	NA	NA[a]
TOC	SW846-9060	100	1,000
BTEX	SW846-8260/8020	NA	0.1 for benzene, 1.0 for others
DRO	SW-846-8015A	1.0	NA
TPH	EPA-418.1	10	NA
Ammonia-N	EPA-350.2	NA	100
Hardness	EPA-130.2	NA	500
Alkalinity	EPA-310.1	NA	5,000
Soluble Iron	SW846-6010	NA	100
TCLP Arsenic	SW846-1311/7060	1 mg/L	NA
pH	SW846-9045	0.1 pH unit	NA

[a] = Method SM4500-CO2D for carbon dioxide is a calculation method.
TOC = Total Organic Carbon.
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes.
TCLP = Toxicity Characteristic Leachate Procedure.
DRO = Diesel Range Organics.
TPH = total Petroleum Hydrocarbons.

2.5 Parameters to be Tested

Sample matrices and estimated numbers of samples can be found in Table 2-1. Analytical parameters, and analytical methods can be found in Table 2-2. Table 2-3 provides a summary of requirements for sample quantity, container, preservative, and packaging.

TABLE 2-3
Sample Containers, Preservatives, and Holding Times

Analysis	Container	Preservation/Storage	Maximum Hold Time
Soil—PCP	4-oz. amber glass jar[a]	4°C protect from light	7 days to extraction and 40 days from extraction to analysis
Soil—DRO	4-oz. amber glass jar[a]	4°C	14 days to extraction and 40 days from extraction to analysis
Soil—Arsenic, Copper, Zinc	4-oz. amber glass jar[a]	4°C	6 months
Soil—pH	4-oz. amber glass jar[a]	4°C	Analyze immediately
Soil—TOC	4-oz. amber glass jar[a]	4°C	28 days
Soil—TPH	4-oz. amber glass jar[a]	4°C	14 days
Concrete—TCLP Arsenic	4-oz. amber glass jar[a]	4°C	28 days to extraction and 6 months from extraction to analysis
Water—PCP	1-liter amber glass bottle[a]	4°C	7 days to extraction and 40 days from extraction to analysis
Water—Arsenic, Copper, Zinc	500-mL polyethylene bottle	HNO_3, pH < 2, 4°C	6 months
Water—TAL Metals	1,000-mL polyethylene bottle	HNO_3, pH < 2, 4°C	6 months (28 days for mercury)
Water—Nitrate, Sulfate, Chloride	1-liter polyethylene bottle	4°C	NO_3—48 hours SO_4—28 days Cl—28 days
Water—Methane	3 x 40-mL vials[a]	HCl, pH < 2, 4°C, protect from light	14 days
Water—Manganese	100-mL polyethylene bottle	HNO_3, pH < 2, 4°C	6 months
Water—TOC	100-mL polyethylene bottle	H_2SO_4, pH < 2, 4°C	28 days
Water—BTEX	3 x 40-mL vials[a]	HCl, pH < 2, 4°C, protect from light	14 days
Water—Ammonia-N	500-mL polyethylene bottle	H_2SO_4, pH < 2, 4°C	28 days
Water—Alkalinity	250-mL polyethylene bottle	4°C	14 days

TABLE 2-3 (CONTINUED)
Sample Containers, Preservatives, and Holding Times

Analysis	Container	Preservation/Storage	Maximum Hold Time
Water—Iron (soluble)	100-mL polyethylene bottle	HNO_3, pH < 2, 4°C	6 months
Water—Hardness	100-mL polyethylene bottle	HNO_3, pH < 2, 4°C	6 months

[a] Teflon-lined cap or septa.
PCP = Pentachlorophenol.
TOC = Total Organic Carbon.
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes.
TCLP = Toxicity Characteristic Leachate Procedure.
TAL = Target Analyte List.
DRO = Diesel Range Organics.
TPH = Total Petroleum Hydrocarbons.

2.6 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements which specify the data quality required to support decisions made during RI/FS activities and are based on the end uses of the data to be collected. As such, different data uses may require different data quality levels. There are three levels of analytical data to be collected in support of this RI/FS.

Screening Data. Screening data provides rapid results but low data quality. The screening data for this project will consist of organic vapor monitoring for health and safety, and the groundwater real-time monitoring of the field constituents listed in Table 2-1. The QA/QC associated this screening data will consist of following the field SOPs and performing field duplicate analyses at a frequency of one per 10 field sample measurements. The results and data from these measurements will be recorded in the field log book.

Engineering Data. Engineering data is supported by an intermediate level of data quality. Engineering data will consist of the soil and groundwater field immunoassay test kits and cone penetrometer testing. The QA/QC generated in support of this level of data will consist of following the field SOPs, instructions, and analyzing field duplicates and field blanks at a frequency of one per 10 field sample measurements. These analyses will be performed by trained personnel. All measurements shall be recorded in a field analytical notebook.

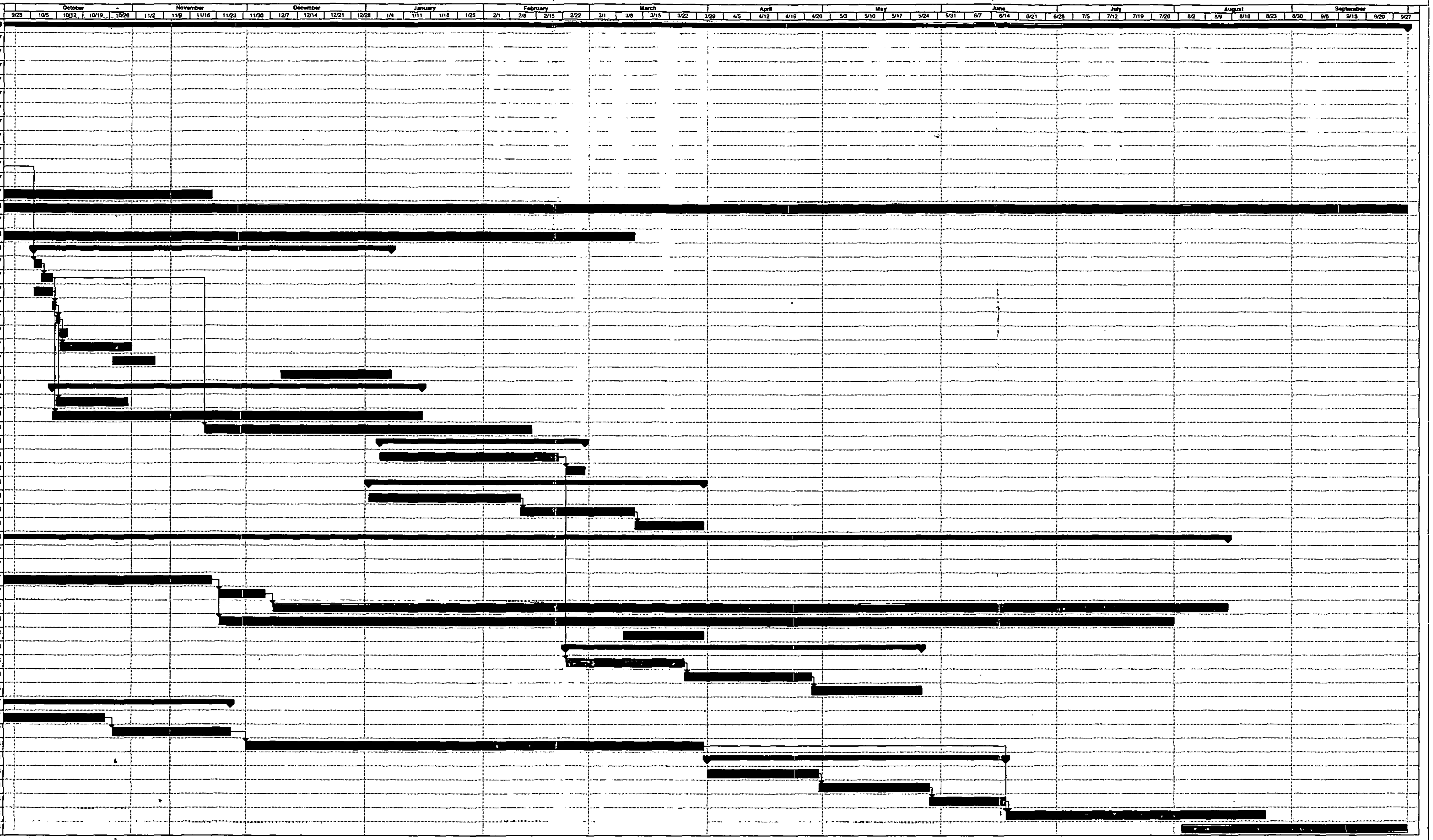
Confirmational Data. This provides the highest level of data quality and will be used to support the purposes of risk assessment and evaluation of remedial alternatives. These analyses are conducted using promulgated EPA procedures. The analytical data is validated in accordance with the USEPA-recognized protocols. The sampling of all offsite analyses of soil and water samples will be performed at the confirmational level. The QA/QC generated in support of this level will be as provided in the SASs (Appendix A).

2.7 Project Schedule

A current project schedule is attached (Figure 2-3). The schedule will be updated as required.

Figure 2-3
Project Schedule

ID	Task Name	Duration	Start	Finish
1	**Task 1 Project Planning**	394d	4/16/97	9/30/98
2	1.1.1 Kickoff Meeting	0d	4/24/97	4/24/97
3	1.1.2 Conduct Site Visit	0d	5/1/97	5/1/97
4	1.1.3 Evaluate Information	16d	4/18/97	5/9/97
5	1.1.4 RI/FS Work Plan	21d	4/24/97	5/23/97
6	EPA review work plan	23d	5/27/97	6/26/97
7	1.1.4.2.1 Negotiation Meeting	0d	6/18/97	6/18/97
8	1.1.4.2.2 Prepare Revised Work Plan	7d	7/1/97	7/9/97
[illegible]	EPA review revised Work Plan	34d	7/10/97	8/22/97
10	1.2 Prepare Site Plans	7d	8/25/97	9/2/97
11	EPA review site plans	24d	9/3/97	9/26/97
[illegible]	1.1.4.2.2 Prepare WPRR #1 (TSWP)	15d	9/8/97	9/22/97
[illegible]	EPA review WPRR #1	50d	9/23/97	11/21/97
14	1.3 Project Management	394d	4/16/97	9/30/98
15	1.4 Procure Subcontractors	31d	8/25/97	9/26/97
[illegible]	**Task 2 Comm. Relations Technical Support**	254d	4/10/97	3/12/98
[illegible]	**Task 3 Fieldwork**	70d	10/6/97	1/7/98
[illegible]	3.1.1 Set up Support Facilities	2d	10/6/97	10/7/97
19	3.2.4.2 Collect existing mw samples & water leve	3d	10/8/97	10/10/97
[illegible]	3.2.1.3 Survey prior coordinate system	5d	10/6/97	10/10/97
[illegible]	3.2.1.2 & 3.2.2.1 Collect res. wells and surficial sc	1d	10/11/97	10/11/97
[illegible]	3.2.2.4 & 3.2.5 Collect surface water and sedime	1d	10/12/97	10/12/97
23	3.2.8 Conduct ecological visit	2d	10/13/97	10/14/97
24	3.2.4.3 Cone Penetrometry Testing and gw grabs	15d	10/13/97	10/31/97
[illegible]	3.2.1 Survey new sample locations	9d	10/27/97	11/6/97
[illegible]	3.2.4.1(2) Install MWs and collect samples	21d	12/10/97	1/7/98
27	**Task 4 Sample Analysis**	71d	10/11/97	1/15/98
28	4.1.2 & 4.1.4 Conduct PCP kit testing	15d	10/12/97	10/30/97
[illegible]	4.2 Off-site lab analysis	71d	10/11/97	1/15/98
[illegible]	**Task 5 Analytical Support and Data Validation**	62d	11/20/97	2/13/98
31	**Task 6 Data Evaluation**	40d	1/5/98	2/27/98
32	6.2 Data Reduction, Tabulation, & Evaluation	35d	1/5/98	2/20/98
[illegible]	6.3 Modeling	5d	2/23/98	2/27/98
[illegible]	**Task 7 Ecological Risk Assessment**	62d	1/2/98	3/30/98
35	7.2.1 Draft Ecological Risk Assessment Report	28d	1/2/98	2/10/98
36	EPA Review of Draft Eco Report	22d	2/11/98	3/12/98
[illegible]	7.2.2 Final Ecological Risk Assessment Report	12d	3/13/98	3/30/98
[illegible]	**Task 8 Treatability Study and Pilot Testing**	313d	6/24/97	8/14/98
[illegible]	8.1 Literature Search	51d	6/24/97	8/29/97
40	8.2 Treatability Study Work Plan	19d	8/19/97	9/10/97
[illegible]	EPA Review Treat. Work Plan & WPRR No. 1	62d	9/11/97	11/21/97
[illegible]	8.5.2 Procure diller and lab	10d	11/24/97	12/5/97
[illegible]	8.5.3 Perform Field Tests	180d	12/8/97	8/14/98
44	8.3.3 Perform Column Study	180d	11/24/97	7/31/98
45	8.6 Draft Treatability Study Report	15d	3/10/98	3/30/98
[illegible]	**Task 9 RI Report**	67d	2/23/98	5/26/98
[illegible]	9.1 Draft RI Report	23d	2/23/98	3/25/98
48	EPA Review of Draft RI Report	23d	3/26/98	4/27/98
49	9.2 Final RI Report	21d	4/28/98	5/26/98
[illegible]	**Task 10 Remedial Altenatives Screening**	66d	9/10/97	11/26/97
[illegible]	10.1 Draft Remedial Alternatives Memorandum	43d	9/10/97	10/24/97
52	EPA Review Remedial Alternatives Memorandum	23d	10/27/97	11/26/97
53	**Task 11 Remedial Alternatives Evaluation**	86d	12/1/97	3/30/98
[illegible]	**Task 12 FS Report and RI/FS Report**	56d	4/1/98	6/17/98
[illegible]	12.1 Draft FS Report	21d	4/1/98	4/29/98
[illegible]	EPA Review Draft FS Report	21d	4/30/98	5/28/98
57	12.2 Final FS Report	14d	5/29/98	6/17/98
[illegible]	**Task 13 Post RI/FS Support**	48d	6/18/98	8/24/98
[illegible]	**Task 16 Work Assignment Closeout**	43d	8/3/98	9/30/98



P[illegible] Penta Wood Products RI/FS Schedule
D[illegible] 1/11/97

Task	▬	Progress	▬	Milestone	◆	Summary	▬	Rolled Up Task	▬	Rolled Up Milestone	◇	Rolled Up Progress	▬

3.0 Project Organization and Responsibility

At the direction of the USEPA Region 5, CH2M HILL is responsible for all phases of the RI/FS activities at the PWP site in the Town of Daniels, Wisconsin. CH2M HILL will perform the remedial investigation, prepare the RI report, and perform the subsequent FS. CH2M HILL will also provide project management. The various QA and management responsibilities of key project personnel are defined below and shown in Figure 3-1.

3.1 USEPA Region 5 Work Assignment Manager (WAM)

The WAM has the overall responsibility for all phases of the RI/FS. The WAM is also responsible for the review and approval of this QAPjP. Ken Glatz will be the WAM for the PWP site.

3.2 WDNR Remedial Project Manager (RPM)

The WDNR RPM will be responsible for overseeing the project and for conducting all WDNR reviews. Tom Kendzierski is the RPM for the PWP site.

3.3 CH2M HILL Program Manager

The CH2M HILL Program Manager is Ike Johnson. He has overall responsibility for meeting USEPA objectives and CH2M HILL quality standards. In addition, the Program Manager is responsible for technical QC and project oversight.

3.4 CH2M HILL QA Manager

CH2M HILL's QA Manager is John Fleissner. The QA Manager will remain independent of direct job involvement and day-to-day operations and has direct access to management staff to resolve QA disputes, as necessary. Specific functions and duties include the following:

- Directing the QA review of the various phases of the project, as necessary
- Directing the review of QA plans and procedures
- Provide QA technical assistance to project staff, as necessary

3.5 CH2M HILL Site Manager

The CH2M HILL Site Manager (SM) is Regina Bayer. The SM is responsible for implementing the project and is authorized to commit resources to meet project objectives and requirements. The SM's primary function is to achieve technical, financial, and

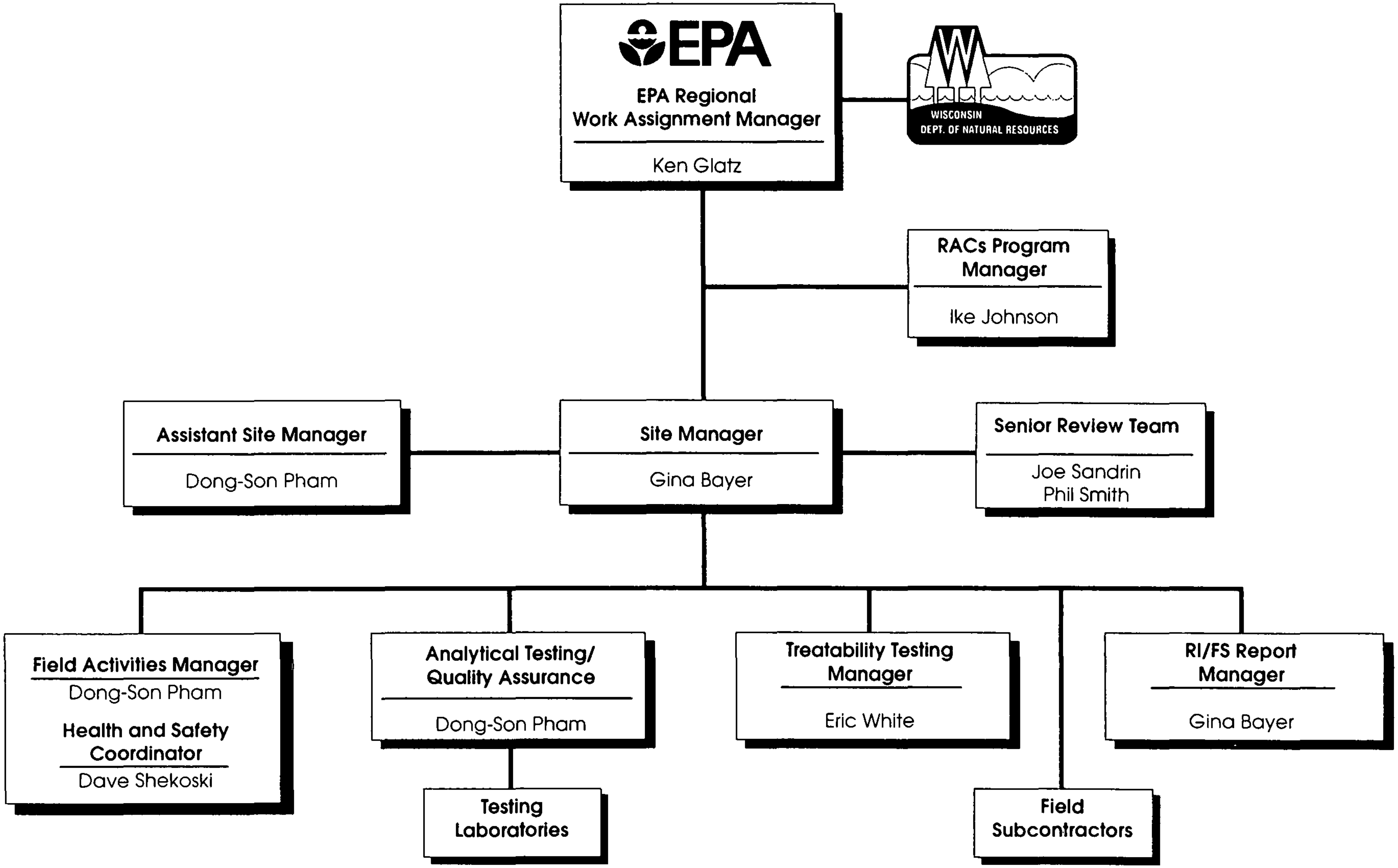


FIGURE 3-1
CH2M HILL Project Organization
Penta Wood Products RI/FS QAPP

CH2MHILL

scheduling objectives. The SM will report directly to the USEPA Region 5 WAM and will be the major point of contact for matters concerning the project. More specifically, the SM will:

- Define project objectives and develop a detailed work plan and schedule
- Establish project policy and procedures to address the specific needs of the project as a whole, as well as the objectives of each task
- Acquire and apply technical and corporate resources to meet budget and schedule constraints
- Orient field leaders and support staff with regard to the project's special considerations
- Monitor and direct other team members
- Develop and meet ongoing project or task staffing requirements, including mechanisms to review and evaluate each task product
- Review the work performed on each task to ensure quality, responsiveness, and timeliness
- Review and analyze overall task performance with regard to planned schedule and budget
- Review external reports (deliverables) before submission to USEPA Region 5
- Represent the project team at meetings and public hearings

3.6 CH2M HILL Review Team Leader

The Review Team Leader is Phil Smith. The role of the Review Team Leader is to support the SM in site management activities and to coordinate CH2M HILL internal reviews. The Review Team Leader will also be involved in the planning activities conducted at the beginning and during the project.

3.7 CH2M HILL Project Chemist

The CH2M HILL Project Chemist is Dong-Son Pham. He will be responsible for tracking data and overseeing the data evaluation. Specific responsibilities include the following:

- Schedule the analytical laboratories
- Oversee the tracking of samples and data from the time of field collection until results are entered into a database
- Coordinate activities with laboratories and data validators
- Oversee data validation and production of result tables
- Evaluate data usability

3.8 CH2M HILL Contract Specialist

Dawn Adams is CH2M HILL's RAC Program APM-ADMIN. She will be responsible for the contract documents created in support of RA activities. Specific responsibilities include the following:

- Contracting the analytical laboratories
- Contracting the subcontractors
- Resolving any contract disputes

3.9 CH2M HILL Technical Resources

The technical resources for this project will be drawn from CH2M HILL's corporate resources. The technical resources will be used to gather and analyze data and to prepare various task reports and support materials.

3.10 Subcontract Laboratories' Project Managers

The analyses to be performed by laboratory subcontractors are listed in Table 2-2. CH2M HILL will select the laboratories, with approval by the USEPA. The laboratories' Project Managers will be responsible for coordinating and scheduling the laboratory analyses; supervising the in-house chain-of-custody; accepting requirements outlined within this QAPjP; and overseeing the data review and preparation of the analytical reports.

3.11 Subcontract Laboratories' QA Officers

The laboratories' QAOs will be responsible for overseeing the laboratory QA and the analytical results QA/QC documentation; conducting the data review; selecting any necessary laboratory corrective actions; adherence to applicable in-house Standard Operating Procedures (SOPs); adherence to the QAPjP; and approving the final analytical reports. Each laboratory may have more than one QAO if, for example, any of these various activities take place in different departments within the laboratory.

4.0 Quality Assurance Objectives for Measurement Data

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting that will provide results that are legally defensible in a court of law. Specific procedures for sampling, chain-of-custody, laboratory instrument calibration, laboratory analysis, data reporting, internal QC audits, field equipment preventive maintenance, and corrective action are described in other sections of this QAPjP. The purpose of this section is to address the specific objectives for accuracy, precision, completeness, representativeness, and comparability.

4.1 Level of Quality Control Effort

Field blanks, trip blanks, duplicates, and MS/MSD samples will be analyzed to assess the data quality resulting from the field sampling and analytical programs.

Field and trip blanks consisting of HPLC-grade water will be submitted to the analytical laboratories. Field blank samples are analyzed to check for procedural contamination at the site. One water field blank will be collected and analyzed for every 10 or fewer investigative samples, whichever is greater. Trip blanks are used to assess the potential for contamination of samples during shipment and storage. One VOC trip blank will be included along with each shipping container of aqueous VOC samples. Duplicate soil and water samples will be collected every 10 field samples to check for sampling and analytical reproducibility.

MS/MSD sample provide information about the effect of the sample matrix on the measurement methodology. One MS/MSD sample will be collected for every 20 or fewer investigative samples.

The RI/FS soil and water samples will be sent to a qualified laboratory for analysis. Table 2-2 contains the analytical parameters and associated reporting limits for the organic and inorganic compounds.

The level of QC effort provided by the laboratory will be as specified in Section 2 of this QAPjP, and in the Special Analytical Services (SASs) contained in Appendix A.

4.2 Accuracy, Precision, and Sensitivity of Analysis

The fundamental QA objective with respect to accuracy, precision, and sensitivity of laboratory analytical data is to achieve the QC acceptance criteria of the analytical SASs.

The procedures for the use of field equipment are found the SOPs.

4.3 Completeness, Representativeness and Comparability

4.3.1 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. It is expected that the selected analytical laboratory will provide data meeting QC acceptance criteria for 90 percent or more for all samples analyzed.

Following completion of the analytical testing, the percent completeness will be calculated by the following equation:

$$\text{completeness (\%)} = \frac{\text{(number of valid data)}}{\begin{array}{l}\text{(number of samples collected} \\ \text{for each parameter analyzed)}\end{array}} \times 100$$

All data generated of acceptable quality will be used. The 90-percent QC acceptance criteria is a goal. The success in meeting this goal will have no negative affect on the analytical program.

4.3.2 Representativeness

Representativeness expresses the degree to which data precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Representativeness is a qualitative parameter that is dependent upon the proper design of the sampling program and proper laboratory protocol. The rationale of the sampling network is discussed in detail in the FSP. Representativeness will be satisfied by following the FSP, such that proper sampling technique(s) are used, proper analytical procedures are followed, and holding times for the samples are not exceeded in the laboratory. Representativeness will also be assessed by field-duplicated sample analysis.

4.3.3 Comparability

Comparability expresses the confidence with which one data set can be compared with another. The extent to which planned analytical data will be comparable to future analytical data depends on the similarity of sampling and analytical methods. The procedures used to obtain the planned analytical data, as documented in the QAPjP, are expected to provide comparable data.

5.0 Sampling Procedures

A FSP has been prepared as part of the Sampling and Analysis Plan (SAP). The FSP contains sampling procedures and includes the following:

- Detailed procedures for the collection of samples for the required parameters
- Detailed procedures for sample packaging and handling
- Detailed procedures for collection of QC samples
- Documentation requirements of sampling activities (use of field log books, field measurement forms, etc.)

Refer to Table 2-1 for a summary of the sampling and analysis program and Table 2-3 for summaries of sample quantity, container, and packaging requirements. Appendix B contains detailed procedures for chain-of-custody procedures and sample shipment.

6.0 Sample Custody

It is USEPA and Region 5 policy to follow the USEPA Region 5 sample custody, or chain-of-custody protocols as described in "NEIC Policies and Procedures," EPA-330/9-78DDI-R, revised June 1985. Chain-of-custody involves three parts: sample collection, laboratory analysis and final evidence files. Final evidence files, including all originals of laboratory reports and purge files, are maintained under document control in a secure area.

A sample or evidence file is under your custody if it:

- Is in your possession
- Is in your view, after being in your possession
- Is in your possession and you place them in a secured location, or is in a designated secure area

6.1 Field Chain-of-Custody Procedures

The sample packaging and shipment procedures summarized below will be followed so that the samples will arrive at the laboratory with the chain-of-custody intact. The protocol for specific sample numbering and other sample designations are included in Section 3 of the FSP, and in Appendix B, Sample Shipment Documentation.

6.1.1 Field Procedures

The field sampler is personally responsible for the care and custody of the samples until they are transferred or properly dispatched. As few people as possible should handle the samples.

- All sample containers are to be labeled and tagged with sample numbers and locations.

- Sample labels and tags are to be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample tag because the ballpoint pen would not function in freezing weather.

- The SM is to review all field activities to determine whether proper custody procedures were followed during the fieldwork and decide if additional samples are required. The SM will notify the USEPA RPM if a breach or irregularity in chain-of-custody procedures occurs.

6.1.2 Field Logbooks/Documentation

Data collection activities performed are to be recorded in a field logbook. Activities will be described in as much detail as possible so that persons going to the site could reconstruct a particular situation without reliance on memory.

Field logbooks will be bound field survey books or notebooks. Logbooks will be assigned to field personnel, but will be stored in the document control center when not in use. Each logbook will be identified by the project-specific document number.

The title page of each logbook will contain the following:

- Person to whom the logbook is assigned
- Logbook number
- Project name
- Project start date
- End date

Logbook entries will contain a variety of information. At the beginning of each entry, the date, start time, weather, names of all sampling team members present, level of personal protection being used, and the signature of the person making the entry will be entered. The names of site visitors, field sampling or investigation team personnel, and the purpose of their visit will also be recorded in the field logbook.

Measurements made and samples collected will be recorded. Entries will be made in ink and no erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark, initialed, and dated. Whenever a sample is collected or a measurement is made, a detailed description of the location of the station shall be recorded. The number of the photographs taken of the station, if any, will also be noted. All equipment used to make measurements will be identified, along with the date of calibration.

Samples will be collected following the sampling procedures documented in the FSP and subsequent appendices. The equipment used to collect samples will be noted, along with the time of sampling, sample description, sample location, and volume and number of containers. A sample identification number will be assigned before sample collection. Collocated and field blank samples, which will receive an entirely separate sample identification number, will be noted under the sample description.

6.1.3 Transfer of Custody and Shipment Procedures

- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of sample custody from the sampler to another person, to the permanent laboratory, or to/from a secure storage area.

- Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in each sample box or cooler. Shipping containers will be closed and secured with strapping tape and EPA custody seals for shipment to the laboratory. The preferred procedure includes use of a custody seal attached to the front right and back left of the cooler. The custody seals are to be covered with clear plastic tape. The cooler is to be strapped shut with strapping tape in at least two locations.

- Whenever samples are collocated with a source or government agency, a separate sample receipt is prepared for those samples and marked to indicate with whom the samples are being collocated. The person relinquishing the samples to the facility or agency should request the representative's signature acknowledging sample receipt. If the representative is unavailable or refuses, this is noted in the "Received By" space of the custody form.
- All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and the pink and yellow copies will be retained by the sampler for returning to the sampling office.
- If the samples are sent by common carrier, a bill of lading should be used. Bills of lading receipts will be retained as part of the permanent documentation. If sent by mail, the package will be registered with return receipt requested. Commercial carriers are not required to sign off on the custody form as long as the custody forms are sealed inside the sample cooler and the custody seals remain intact.

6.2 Laboratory Chain-of-custody Procedures

The chain-of-custody procedures for the analytical laboratory(ies) are discussed in the laboratory's Quality Assurance Plan (QAP).

6.3 Final Data Files Custody Procedures

CH2M HILL is the custodian of the data files and will maintain the data files. Included in the data files are all relevant records, reports, logs, field notebooks, pictures, subcontractor reports, correspondence, laboratory logbooks, chain-of-custody forms, analytical data, and any other pertinent records stored in a secured, limited access area and under custody of the SM. Upon closure of the work assignment, all data files will be transferred to the USEPA.

7.0 Calibration Procedures and Frequency

This section describes procedures for maintaining the accuracy of all the instruments and measuring equipment that are used for conducting field tests and laboratory analyses. These instruments and equipment should be calibrated prior to each use or on a scheduled, periodic basis.

7.1 Field Instruments/Equipment

Equipment to be used during the field sampling will be examined to check that it is operating properly. This includes checking the manufacturer's operating manual and the instructions for each instrument to check that the maintenance requirements are being observed.

Calibration of field instruments, as specified by the SOPs, will be performed at the intervals specified by the manufacturer or more frequently as conditions dictate. Field instruments will include an organic vapor photoionization detector (PID), pH meter, conductivity/temperature meter, redox potential meter, a dissolved oxygen meter, a field spectrophotometer, and a gas meter that reads oxygen, carbon dioxide, methane, and temperature.

In the event that an internally calibrated field instrument fails to meet calibration/checkout procedures, it will be replaced by the vendor and returned to the manufacturer for service.

7.2 Laboratory Instruments

Calibration procedures for the laboratory equipment will be as specified in SASs. Records of calibration, repairs, or replacement will be filed and maintained by the designated laboratory personnel performing QC activities. These records will be filed at the location where the work is performed and will be subject to QA audit.

Calibration of laboratory equipment will be based on approved written procedures. Calibration, repairs, or replacement records will be filed and maintained by the designated laboratory personnel performing quality control activities. These records will be filed at the location where the work is performed and will be subject to QA audit. For all instruments, the laboratory will maintain a factory-trained repair staff with in-house spare parts or will maintain service contracts with vendors.

The records of calibration will be kept in accordance with the laboratory QAP.

8.0 Analytical Procedures

All water and soil samples collected during field sampling activities for the PWP site will be analyzed through non-CLP analytical services at Katalyst Analytical Technologies, Incorporated, at Peoria, Illinois.

8.1 Laboratory Analysis

The analytical procedures to be used for performing the SAS analyses are described in the requests for special analytical services in Appendix A of this QAPjP. Also specified in the SASs are calibration procedures, calibration frequency, and the internal quality control checks required for each analysis.

Table 2-2 provides the analytical parameter and the method for analysis.

8.2 Field Screening Analytical Protocols

The procedures for field measurement of total organic vapors, pH, conductivity, temperature, redox potential, dissolved oxygen, pentachlorophenol, and soil gases (oxygen, carbon dioxide, methane) are described in the FSP and the SOPs.

9.0 Internal QC Checks

9.1 Field Quality Control Checks

QC procedures for field measurements will include calibrating the instruments as described in the instruments operating manual, measuring duplicate samples and checking the reproducibility of the measurements by taking multiple readings on a single sample or reference standard. Assessment of field sampling precision and bias will be made by collecting field duplicates and field blanks for laboratory analysis.

9.2 Laboratory Analysis

A QA program and QC checks will be employed by the analytical laboratory to ensure the production of analytical data of known and documented usable quality.

9.2.1 QA Program

The laboratory selected to perform these analyses has a written Quality Assurance Plan (QAP). The QAP provides guidelines to ensure the reliability and validity of work conducted at the laboratory. Compliance with the QAP is coordinated and monitored by the laboratory's QA unit (QAU). The QAU acts independently of the operating departments and reports directly to the laboratory manager.

The objectives of the laboratory QAP are to:

- Ensure that all procedures are documented, including any changes in administrative and/or technical procedures.
- Ensure that all analytical procedures are conducted according to sound scientific principles and have been validated.
- Monitor the laboratory performance by a systematic inspection program and provide for a corrective action as necessary.
- Ensure that all data are properly recorded and archived.

9.2.2 QC Checks

The selected laboratory will perform the analyses according to the SOPs and requirements specified in the SAS requests.

The laboratory will document, in each data package provided, that both initial and ongoing instrument and analytical QC functions have been met. Any samples analyzed in nonconformance with the QC criteria shall be reanalyzed by the laboratory. Continued nonconformance will be duly noted as to the quality of the analytical result in the analytical report case narrative.

10.0 Data Reduction, Validation, and Reporting

All data generated by field activities, or by the laboratory, will be reduced and validated prior to reporting.

10.1 Data Reduction

10.1.1 Field Measurements and Sample Collection

Raw data from field measurements and sample collection activities will be appropriately recorded in the field logbook. If the data are to be used in the project reports, they will be reduced and summarized, and the method of reduction will be documented in the report.

10.1.2 Laboratory Services

The samples collected at the PWP Site will be sent to a qualified offsite laboratory. Data review, reduction and result reporting will be performed by this laboratory in accordance with the requirements of their QAP. The data will then be sent to CH2M HILL.

10.2 Data Validation

10.2.1 Field Measurement Data Validation

Field result data validation will simply consist of the field team leader double-checking at least 10 percent of the field calculations and ensuring that instrument calibration occurred at the frequency described in the SOPs.

10.2.2 Laboratory Data Validation

The analytical laboratory data validation will be performed by USEPA following the USEPA *National Functional Guidelines for Organic and Inorganic Data Review*, February 1994. Validation will be accomplished by comparing the contents of the data packages and QA/QC results to the requirements specified in the analytical methods, the non-CLP SAS request forms, and the QAPjP. Raw data such as gas chromatography/mass spectrometry (GC/MS) total ion current (TIC) chromatograms or GC chromatograms, flame atomic absorption (FAA) data reports, and data station printouts will be examined to ensure that reported results are accurate and complete.

The data review will identify any out-of-control data points and data omissions and interact CH2M HILL, who will interact with the laboratory to correct data deficiencies. Decisions to repeat sample collection and analyses may be made by the WAM and SM based on the extent of the deficiencies and their importance in the overall context of the project.

10.3 Data Reporting

10.3.1 Field Data Reporting

Raw data from field measurements and sample collection activities will be appropriately recorded in the field logbook. If the data are to be used in the project reports, they will be reduced and summarized and the method of reduction will be documented in the report.

10.3.2 Laboratory Data Reporting

The analytical laboratory will prepare and submit full analytical reports to CH2M HILL in compliance with requirements SASs. The laboratory will report the data in the same chronological order in which it was analyzed. The types of information provided by the laboratory will include, at a minimum, the following:

- Cover sheets listing the samples included in the report and comments describing problems encountered in analysis.
- Tabulated results of inorganic and organic compounds identified and quantified.
- Analytical results for QC sample spikes, sample duplicates, initial and continuous calibration verifications, blank results, and laboratory control sample results.
- Tabulation of instrument detection limits.
- Raw data system printouts (or legible photocopies) identifying date of analyses, analyst, parameters determined, calibration curve used, associated method blanks, and any dilutions.

The data for the RI/FS sampling will be available for use by the site manager and project staff.

11.0 Performance and System Audits

Performance and system audits of both field and laboratory activities may be conducted to verify that sampling and analysis are performed in accordance with the procedures established in the FSP and QAPjP. The field and laboratory audits include two separate independent parts: internal and external audits.

11.1 Field Audits

An internal audit of field activities may be conducted by CH2M HILL's SM or their representative. The audit would include an examination of field sampling records, field instrument operating records, sample collection, handling, and packaging in compliance with the established procedures, maintenance of QA procedures, chain-of-custody, etc.

An additional external audit of the field procedures may be conducted by the USEPA Region 5.

11.2 Laboratory Audits

The laboratory may be audited by reviewing its QAP and/or SOPs. Areas that may be reviewed include, but will not be limited to: documentation on sample receiving and sample log-in, sample storage procedures, chain-of-custody procedures, sample preparation and analysis, instrument operating records, data reduction, and data reporting procedures.

At the discretion of CH2M HILL with the approval of USEPA, onsite audits of the laboratory may be conducted.

External audits of the laboratory may also be conducted by the USEPA Region 5.

12.0 Preventive Maintenance Procedures

12.1 Field Equipment/Instruments

The field equipment for this project includes pH, conductivity, temperature, redox, dissolved oxygen, volatile organic monitors and gas meters. Also included is a field spectrophotometer for immunoassay measurement of pentachlorophenol. Specific preventive maintenance procedures to be followed for field equipment are those recommended by the manufacturer.

Field instruments will be checked and calibrated by the vendor before they are shipped or carried to the field. These instruments will be checked and calibrated daily before use. Calibration checks will be documented with the sample results in a field log book.

Critical spare parts such as tape, papers, and batteries will be kept onsite to minimize instrument downtime. Backup instruments and equipment should be available onsite or within 1-day shipment to avoid delays in the field schedule.

12.2 Laboratory Instruments

As part of their QA/QC program, a routine preventive maintenance program will be required by the selected analytical laboratory(ies). The objective of the preventive maintenance program is to minimize instrument failure and other system malfunctions. The laboratory(ies) will have an internal group to perform routine schedule maintenance and to repair or to coordinate with the vendor for the repair of all instruments. All laboratory instruments will be maintained in accordance with manufacturer's specifications and within the requirements of the laboratory QAP.

13.0 Specific Routine Procedures to Assess Data Precision, Accuracy, and Completeness

13.1 Field Measurements

The Project Chemist will assess the field data and review the field results for compliance with the established QC criteria that are specified in the QAPjP and FSP. Accuracy of the field measurements will be assessed using daily instrument calibration and blanks analysis. Precision will be assessed on the basis of reproducibility by analyzing duplicate samples. Data completeness will be calculated using Equation 13-1.

$$\%\ \text{Completeness} = \frac{\text{Valid Data Obtained}}{\text{Total Data Planned}} \times 100 \qquad \text{Equation 13-1}$$

13.2 Laboratory Data

Laboratory results will be assessed for compliance with required precision, accuracy, completeness, and sensitivity as follows:

13.2.1 Precision

The laboratory analysis precision will be assessed by reviewing field duplicate sample results. The relative percent difference (%RPD) will be calculated for the duplicate samples using Equation 13-2.

$$\%\text{RPD} = \frac{S - D}{(S + D) / 2} \times 100 \qquad \text{Equation 13-2}$$

Where: S = First sample value (original value)
D = Second sample value (duplicate value)

13.2.2 Accuracy

Laboratory results accuracy will be assessed for compliance with the established QC criteria described in the SASs using the analytical results of laboratory control samples and method, and field blanks. The percent recovery (%R) of laboratory control samples will be calculated using Equation 13-3.

$$\%\text{R} = \frac{A}{B} \times 100 \qquad \text{Equation 13-3}$$

Where:

A = The analyte concentration determined experimentally from the laboratory control sample

B = The known amount of the concentration in the sample

13.2.3 Completeness

The data completeness of laboratory analyses results will be assessed for compliance with the amount of data required for decisionmaking. The completeness is calculated using Equation 13-1.

14.0 Corrective Actions

Corrective actions may be required for two classes of problems: analytical and/or equipment problems and noncompliance problems. Analytical and equipment problems may occur during sampling, sample handling, sample preparation, laboratory instrumental analysis, and data review. If the problem is analytical in nature, information on these problems will be promptly communicated to CH2M HILL's SM and the Project Chemist. Implementation of corrective action will be confirmed in writing through the same channels.

For noncompliance problems, a formal corrective action program will be determined and implemented at the time the problem is identified. The person who identifies the problem is responsible for notifying the SM, who in turn shall notify the WAM. Any nonconformance with the established quality control procedures in the QAPjP will be identified and corrected in accordance with the QAPjP. The USEPA WAM or their designee will issue a nonconformance report for each nonconformance condition.

14.1 Sample Collection/Field Measurements

Technical staff and project personnel will be responsible for reporting all suspected technical or QA nonconformances or suspected deficiencies of any activity or issued document by reporting the situation to the SM. The SM will be responsible for assessing the suspected problems in consultation with the Project Chemist and for making a decision based on the potential for the situation to affect the quality of the data. If it is determined that the situation warrants a reportable nonconformance requiring corrective action, then a nonconformance report will be initiated by the SM.

Field corrective actions will be implemented and documented in the field log book. No staff member will initiate a corrective action without prior communication of findings through the proper channels. If corrective actions are insufficient, work may be stopped by a stop-work order by the WAM.

The SM will be responsible for ensuring that corrective action for nonconformances is initiated by:

- Evaluating all reported nonconformances
- Controlling additional work on nonconforming items
- Determining disposition or action to be taken
- Maintaining a nonconformance log
- Reviewing nonconformance reports and corrective actions taken
- Ensuring nonconformance reports are included in the project files

Corrective action for field measurements may include:

- Repeating the measurement to check the error
- Checking for all proper adjustments for ambient conditions such as temperature
- Checking the batteries
- Recalibrating
- Checking the calibration
- Replacing the instrument or measurement devices
- Stopping work (if necessary)

The SM is responsible for site activities. In this role, the SM may be required to adjust the site programs to accommodate site-specific needs. When it becomes necessary to modify a program, the SM notifies the WAM of the anticipated change and implements the necessary changes after obtaining the approval of the WAM. The SM is responsible for controlling, tracking, and implementing the identified changes. Reports on all changes will be distributed to all affected parties, including the USEPA WAM.

14.2 Laboratory Analyses

Corrective actions are required whenever an out-of-control event or potential out-of-control event is noted. The investigative action taken is somewhat dependent on the analysis and the event.

Laboratory personnel are alerted that corrective actions may be necessary if:

- QC data are outside the warning or acceptable windows for precision and accuracy
- Blanks contain target analytes above acceptable levels
- Undesirable trends are detected in the RPD between collocated samples
- There are unusual changes in detection limits
- Deficiencies are detected by the QA department during internal or external audits or from the results of performance evaluation samples
- Inquiries concerning data quality are received

Corrective action procedures are often handled at the bench level by the analyst who reviews the preparation or extraction procedure for possible errors and checks the instrument calibration, calibration mixes, instrument sensitivity, and so on. If the problem persists or cannot be identified, the matter if referred to the laboratory supervisor, manager and/or QA department for further investigation. Once resolved, full documentation of the corrective action procedure is filed with the QA department, and included in the case narrative portion of the analytical report.

15.0 Quality Assurance Reports to Management

In addition to the audit reports that may be submitted to the SM in accordance with QAPjP Section 11, a monthly progress report that addresses all QA issues and corrective actions proposed or already taken is submitted to the USEPA WAM. The RI/FS Summary Report will contain QA sections that summarizes data quality information collected during the project.

QAPP

Appendix A

Special Analytical Services (SASs)

5/016-6/96

U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
TAL Metals-Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: November 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of Target Analyte List (TAL) metals in water samples. Sample results will be reported in µg/L

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 5 unfiltered water samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   Spring 1998.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 6010/7000 Series with special instructions as noted in Section 8.

   Samples will be preserved in the field with HNO_3 to pH<2, and stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for metals shall be as listed below (Section I- Data Requirements). The contract laboratories most recent MDL study shall be enclosed with the response to the request for proposal.

Follow protocol according to the SW846 Method 6010/7000 Series. Dilute samples with sample concentrations greater than the highest standard.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits (µg/L)	Precision Desired
Aluminum	100	+/-20%
Antimony	1.2	+/-20%
Arsenic	2.0	+/-20%
Barium	200	+/-20%

Beryllium	0.4	+/-20%
Cadmium	0.5	+/-20%
Calcium	200	+/-20%
Chromium	5.0	+/-20%
Cobalt	10	+/-20%
Copper	50	+/-20%
Iron	100	+/-20%
Lead	1.5	+/-20%
Magnesium	200	+/-20%
Manganese	10	+/-20%
Mercury	0.2	+/-20%
Nickel	20	+/-20%
Potassium	750	+/-20%
Selenium	5.0	+/-20%
Silver	5.0	+/-20%
Sodium	1000	+/-20%
Thallium	0.4	+/-20%
Vanadium	10	+/-20%
Zinc	2.0	+/-20%

II. QC REQUIREMENTS

As required by the SW846 Method 6010/7000 Series.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	+/- 20% recovery
Matrix Spike	at least one per group of 20 or fewer samples	80-120% recovery
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	80-120% recovery; <20% RPD

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
TPH- Soil

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

Analysis of total petroleum hydrocarbons (TPH) in soil samples using infrared (IR) spectrometry. Sample results will be reported as mg/kg.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

Analyze 34 soil samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

Superfund-Remedial

4. **Estimated date(s) of collection:**

December 1997 through June 1998.

5. **Estimated date(s) and method of shipment:**

Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

The holding time is not to exceed 14 days from sample collection.

The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

Analytical protocol taken from USEPA Method 418.1 with special instructions as noted in Section 8.

Samples stored at 4 C until analysis and validation of results.

Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for TPH shall be less than or equal to 10 mg/kg. The contract laboratories most recent MDL study shall be enclosed with the response to the request for proposal.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in mg/kg.

10. **Other (use additional sheets or attach supplementary information, as needed):**

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
TPH	10 mg/kg	+/- 20 percent

II. QC REQUIREMENTS

As required by the USEPA Method 418.1.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit

Laboratory control sample	at least one per group of 20 or fewer samples	within laboratory historical acceptance limits
Matrix Spike	at least one per group of 20 or fewer samples	within laboratory historical acceptance limits
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	within laboratory historical acceptance limits

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
DRO- Soil

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of diesel range organics (DRO) in soil samples using gas chromatography. Sample results will be reported as mg/kg.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 34 soil samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   December 1997 through June 1998.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The holding time is not to exceed 14 days from sample collection to extraction and 40 days from extraction to analysis.

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 8015A with special instructions as noted in Section 8.

   Samples stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for DRO shall be less than or equal to 1.0 mg/kg. The contract laboratories most recent MDL study shall be enclosed with the response to the request for proposal.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in mg/kg.

10. **Other (use additional sheets or attach supplementary information, as needed):**

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
DRO	1.0 mg/kg	+/- 20 percent

II. QC REQUIREMENTS

As required by the USEPA Method 418.1.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of	concentration < detection limit

	20 or fewer samples	
Laboratory control sample	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	within historical acceptance limits

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
PCP- Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore   Acting Technical Project Manager (TPO): C. Moore (312) 886-1488
C. Telephone Number: (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of pentachlorophenol in groundwater samples using gas chromatography/mass spectrometry (GC/MS). Sample results will be reported as µg/L. Low detection limits are required.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 8 low concentration water samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The holding time is not to exceed 7 days from sample collection to extraction and 40 days from extraction to analysis.

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 8270 with special instructions as noted in Section 8.

   Samples stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for Pentachlorophenol shall be less than or equal to 0.1 µg/L. The most recent MDL study shall be enclosed.

The method recommended surrogate and internal standards shall be used and prepared at the recommended concentrations.

Use five calibration standards. The lowest standards should represent analyze concentrations near, but above, the respective method detection limit.

All QA/QC requirements (surrogates, matrix spike/matrix spike duplicates, lab blanks, GC/MS tuning) shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	**Required Detection Limits**	**Precision Desired**
Pentachlorophenol	0.1 µg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 8270.

Audit	**Frequency of Audits**	**Limits**
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	within historical acceptance limits

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
PCP- Water
7-day TAT

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of pentachlorophenol in groundwater samples using gas chromatography/mass spectrometry (GC/MS). Sample results will be reported as µg/L. Low detection limits are required.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 37 groundwater and surface water samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 7 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 8270 with special instructions as noted in Section 8.

   Samples stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for Pentachlorophenol shall be less than or equal to 0.1 µg/L. The most recent MDL study shall be enclosed.

The method recommended surrogate and internal standards shall be used and prepared at the recommended concentrations.

Use five calibration standards. The lowest standards should represent analyze concentrations near, but above, the respective method detection limit.

All QA/QC requirements (surrogates, matrix spike/matrix spike duplicates, lab blanks, GC/MS tuning) shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Pentachlorophenol	0.1 µg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 8270.

Audit	**Frequency of Audits**	**Limits**
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	within historical acceptance limits

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
PCP- Soil

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore
C. Telephone Number: (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Acting Technical Project Manager (TPO): C. Moore
(312) 886-1488

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of pentachlorophenol in soil samples using gas chromatography/mass spectrometry (GC/MS). Sample results will be reported as mg/kg. Low detection limits are required.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 2 soil samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The holding time is not to exceed 7 days from sample collection to extraction and 40 days from extraction to analysis.

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 8270 with special instructions as noted in Section 8.

   Samples stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for Pentachlorophenol shall be less than or equal to 0.5 mg/kg. The most recent MDL study shall be enclosed.

The method recommended surrogate and internal standards shall be used and prepared at the recommended concentrations.

Use five calibration standards. The lowest standards should represent analyze concentrations near, but above, the respective method detection limit.

All QA/QC requirements (surrogates, matrix spike/matrix spike duplicates, lab blanks, GC/MS tuning) shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in mg/kg.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Pentachlorophenol	0.5 mg/kg	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 8270.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	within historical acceptance limits

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
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SAS Number
PCP- Soil
7-day TAT

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of pentachlorophenol in soil and sediment samples using gas chromatography/mass spectrometry (GC/MS). Sample results will be reported as mg/kg. Low detection limits are required.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 11 soil/sediment samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 7 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 8270 with special instructions as noted in Section 8.

   Samples stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for Pentachlorophenol shall be less than or equal to 0.5 mg/kg. The most recent MDL study shall be enclosed.

The method recommended surrogate and internal standards shall be used and prepared at the recommended concentrations.

Use five calibration standards. The lowest standards should represent analyze concentrations near, but above, the respective method detection limit.

All QA/QC requirements (surrogates, matrix spike/matrix spike duplicates, lab blanks, GC/MS tuning) shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in mg/kg.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Pentachlorophenol	0.5 mg/kg	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 8270.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	within historical acceptance limits

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96

U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Arsenic-Water
7-day TAT

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of arsenic in water samples. Sample results will be reported in µg/L

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 34 water samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 7 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 7060 with special instructions as noted in Section 8.

   Samples will be preserved in the field with HNO_3 to pH<2, and stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for arsenic shall be less than or equal to 2.0 µg/L. The most recent MDL study shall be enclosed.

Follow protocol according to the SW846 Method 7060. Dilute samples with sample concentrations greater than the highest standard.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Arsenic	2.0 µg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 7060.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	+/- 20% recovery
Matrix Spike	at least one per group of 20 or fewer samples	80-120% recovery
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	80-120% recovery; <20% RPD

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
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Chicago, Illinois 60604
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SAS Number
Arsenic-Soil

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of arsenic in soil samples. Sample results will be reported in mg/kg.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 8 soil samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 7060 with special instructions as noted in Section 8.

   Samples will be stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

   The detection limit for arsenic shall be less than or equal to 0.5 mg/kg. The most recent MDL study shall be enclosed.

Follow protocol according to the SW846 Method 7060. Dilute samples with sample concentrations greater than the highest standard.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in mg/kg.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Arsenic	0.5 mg/kg	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 7060.

Audit	Frequency of Audits	Limits

Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	+/- 20% recovery
Matrix Spike	at least one per group of 20 or fewer samples	80-120% recovery
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	80-120% recovery; <20% RPD

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
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SAS Number
Arsenic-Soil
7-day TAT

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore   Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488   (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of arsenic in soil/sediment samples. Sample results will be reported in mg/kg.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 10 soil/sediment samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 7 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 7060 with special instructions as noted in Section 8.

   Samples will be stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for arsenic shall be less than or equal to 0.5 mg/kg. The most recent MDL study shall be enclosed.

Follow protocol according to the SW846 Method 7060. Dilute samples with sample concentrations greater than the highest standard.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in mg/kg.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Arsenic	0.5 mg/kg	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 7060.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	+/- 20% recovery
Matrix Spike	at least one per group of 20 or fewer samples	80-120% recovery
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	80-120% recovery; <20% RPD

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Copper-Water
7-day TAT

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore
C. Telephone Number: (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Acting Technical Project Manager (TPO): C. Moore
(312) 886-1488

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of copper in water samples. Sample results will be reported in µg/L.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 34 groundwater and surface water samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 7 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 6010 with special instructions as noted in Section 8.

   Samples will be preserved in the field with HNO_3 to pH<2, and stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for copper shall be less than or equal to 50 µg/L. The most recent MDL study shall be enclosed.

Follow protocol according to the SW846 Method 6010. Dilute samples with sample concentrations greater than the highest standard.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Copper	50 µg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 6010.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	+/- 20% recovery
Matrix Spike	at least one per group of 20 or fewer samples	80-120% recovery
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	80-120% recovery; <20% RPD
Serial Dilution	at least one per group of 20 or fewer samples	10 % Difference

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Copper-Soil
7-day TAT

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of copper in soil samples. Sample results will be reported in mg/kg.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 10 soil/sediment samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 7 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 6010 with special instructions as noted in Section 8.

   Samples will be stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for copper shall be less than or equal to 2.0 mg/kg. The most recent MDL study shall be enclosed.

Follow protocol according to the SW846 Method 6010. Dilute samples with sample concentrations greater than the highest standard.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in mg/kg.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Copper	2.0 mg/kg	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 6010.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	+/- 20% recovery
Matrix Spike	at least one per group of 20 or fewer samples	80-120% recovery
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	80-120% recovery; <20% RPD
Serial Dilution	at least one per group of 20 or fewer samples	10 % Difference

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96

U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Zinc-Water
7-day TAT

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of zinc in water samples. Sample results will be reported in µg/L.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 34 groundwater and surface water samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 7 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 6010 with special instructions as noted in Section 8.

   Samples will be preserved in the field with HNO_3 to pH<2, and stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for copper shall be less than or equal to 2.0 µg/L. The most recent MDL study shall be enclosed.

Follow protocol according to the SW846 Method 6010. Dilute samples with sample concentrations greater than the highest standard.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Zinc	2.0 µg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 6010.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	+/- 20% recovery
Matrix Spike	at least one per group of 20 or fewer samples	80-120% recovery
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	80-120% recovery; <20% RPD
Serial Dilution	at least one per group of 20 or fewer samples	10 % Difference

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Zinc-Soil
7-day TAT

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of zinc in soil samples. Sample results will be reported in mg/kg.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 10 soil/sediment samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 7 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 6010 with special instructions as noted in Section 8.

   Samples will be stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for zinc shall be less than or equal to 2.0 mg/kg. The most recent MDL study shall be enclosed.

Follow protocol according to the SW846 Method 6010. Dilute samples with sample concentrations greater than the highest standard.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in mg/kg.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Zinc	2.0 mg/kg	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 6010.

Audit	**Frequency of Audits**	**Limits**
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	+/- 20% recovery
Matrix Spike	at least one per group of 20 or fewer samples	80-120% recovery
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	80-120% recovery; <20% RPD
Serial Dilution	at least one per group of 20 or fewer samples	10 % Difference

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
TCLP Arsenic

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of concrete and soil samples for arsenic by Toxicity Characteristic Leaching Procedure (TCLP). Sample results will be reported in mg/L.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 3 concrete and soil samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 1311/7060 with special instructions as noted in Section 8.

   Samples will be stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for arsenic shall be less than or equal to 1 mg/L. The most recent MDL study shall be enclosed.

Use a minimum sample aliquot of TCLP extract to determine compliance with TCLP regulatory levels.

Follow protocol according to the SW846 Method 1311/7060. Dilute samples with sample concentrations greater than the highest standard.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in mg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**

David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
TCLP Arsenic	1.0 mg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 1311/7060.

Audit	Frequency of Audits	Limits
TCLP Extraction		
Prep Blank for Extract Fluid #1 (see Method 1311)	Each set of solid samples prepared	< 5% of regulatory levels
Prep Blank for Extract Fluid #2 (if necessary)	Each set of solid samples prepared	< 5% of regulatory levels
Analysis of TCLP Extracts		
Prep Blank for TCLP Extract Determinations	Per appropriate SOW and set up with each TCLP batch	CRDL of Appropriate SOW
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	+/- 20% recovery
Matrix Spike	at least one per group of 20 or fewer samples	80-120% recovery
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	80-120% recovery; <20% RPD

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96

U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
TOC-Soil
7-day TAT

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of total organic carbon (TOC) in soil/sediment samples. Sample results will be reported in mg/kg.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 10 soil/sediment samples. This number is inclusive of QA/QC samples (duplicates, blanks).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 7 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 9060 with special instructions as noted in Section 8.

   Samples will be stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

   The detection limit for TOC shall be less than or equal to 100 mg/kg.

Follow protocol according to the SW846 Method 9060.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples shall be identified as to source, lot number and sample number.

Results will be reported in mg/kg.

10. **Other (use additional sheets or attach supplementary information, as needed):**

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
TOC	100 mg/kg	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 9045.

Audit	Frequency of Audits	Limits
Prep Blank	At least one per group of 20 or fewer samples	concentration < detection limit
Matrix Spike	At least one per group of 20 or fewer samples	75-125% recovery

Laboratory control sample	At least one per group of 10 or fewer samples	80-120% recovery
Duplicate	At least one per group of 20 or fewer samples	+/- 20% RPD

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Nitrate- Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of nitrate in groundwater samples. Sample results will be reported as µg/L. Samples will be unfiltered.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 27 groundwater samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 28 days of receipt of samples. Samples shall be analyzed within 48 hours of sample collection.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from EPA Method 300 with special instructions as noted in Section 8.

   Samples stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for nitrate shall be less than or equal to 130 µg/L.

Follow protocol according to the EPA Method 300.

All QA/QC requirementsshall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Nitrate	130 µg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the EPA Method 300.

Audit	Frequency of Audits	Limits

Method Blank	At least one per group of 10 or at least twice	concentration < detection limit
Matrix Spike	At least one per group of 10 or fewer samples	80-120% recovery
Laboratory control sample	At least one per group of 10 or fewer samples	80-120% recovery
Lab Duplicate	At least one per group of 10 or fewer samples	+/- 20% RPD

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
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77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Sulfate- Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of sulfate in groundwater samples. Sample results will be reported as mg/L. Samples will be unfiltered.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 27 groundwater samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from EPA Method 300 with special instructions as noted in Section 8.

   Samples stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for sulfate shall be less than or equal to 10 mg/L.

Sulfate standards shall be prepared daily from stock solutions.

Samples with sulfate exceeding that of the highest calibration standard shall be diluted and re-analyzed.

Follow protocol according to the EPA Method 300.

All QA/QC requirementsshall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in mg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Sulfate	10 mg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the EPA Method 300.

Audit	Frequency of Audits	Limits

Method Blank	At least one per group of 20 or at least twice	concentration < detection limit
Matrix Spike	At least one per group of 10 or fewer samples	80-120% recovery
Laboratory control sample	At least one per group of 20 or fewer samples	80-120% recovery
Lab Duplicate	At least one per group of 10 or fewer samples	+/- 20% RPD
Analytical Spike	At least one per group of 10 or fewer samples	85-115% recovery
Initial and continuing calibration blank	At start of analysis run followed by at least 1 per 10	concentration < detection limit
CRDL Standard	At least one per group of 10 or fewer samples	80-120% recovery

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Methane- Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of methane in groundwater samples using gas chromatography. Sample results will be reported as µg/L. Low detection limits are required.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 27 water samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The holding time is not to exceed 14 days from sample collection.

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 8015 with special instructions as noted in Section 8.

   Samples will be preserved in the field with HCl to pH<2 and stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):

The detection limit for methane shall be less than or equal to 10 µg/L. The most recent MDL study shall be enclosed.

The method recommended surrogate and internal standards shall be used and prepared at the recommended concentrations.

Use five calibration standards. The lowest standards should represent analyze concentrations near, but above, the respective method detection limit.

All QA/QC requirements (surrogates, matrix spike/matrix spike duplicates, lab blanks) shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. Other (use additional sheets or attach supplementary information, as needed):

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. Name of sampling/shipping contact and phone number:
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Methane	10 µg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 8015.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	within historical acceptance limits

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Manganese-Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of manganese in groundwater samples. Sample results will be reported in µg/L.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 27 groundwater samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 6010 with special instructions as noted in Section 8.

   Samples will be preserved in the field with HNO_3 to pH<2, and stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for manganese shall be less than or equal to 10 µg/L. The most recent MDL study shall be enclosed.

Follow protocol according to the SW846 Method 6010. Dilute samples with sample concentrations greater than the highest standard.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Manganese	10 µg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 6010.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	+/- 20% recovery
Matrix Spike	at least one per group of 20 or fewer samples	80-120% recovery
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	80-120% recovery; <20% RPD
Serial Dilution	at least one per group of 20 or fewer samples	10 % Difference

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96

U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
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Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Chloride- Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of chloride in groundwater samples. Sample results will be reported as mg/L. Samples will be unfiltered.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 27 groundwater samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from EPA Method 300 with special instructions as noted in Section 8.

   Samples stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for chloride shall be less than or equal to 10 mg/L.

Follow protocol according to the EPA Method 300.

All QA/QC requirementsshall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in mg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Chloride	10 mg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the EPA Method 300.

Audit	Frequency of Audits	Limits
Method Blank	At least one per group of 20 or at least twice	concentration < detection limit

Matrix Spike	At least one per group of 10 or fewer samples	90-110% recovery
Laboratory control sample	At least one per group of 20 or fewer samples	90-110% recovery
Lab Duplicate	At least one per group of 10 or fewer samples	+/- 20% RPD
Analytical Spike	At least one per group of 10 or fewer samples	85-115% recovery
Initial and continuing calibration blank	At start of analysis run followed by at least 1 per 10	concentration < detection limit
CRDL Standard	At least one per group of 10 or fewer samples	80-120% recovery

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
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Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
TOC-Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of total organic carbon (TOC) in groundwater samples. Sample results will be reported in mg/L.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 27 groundwater samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 9060 with special instructions as noted in Section 8.

   Samples will be preserved in the field with H_2SO_4 to pH<2 and stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for TOC shall be less than or equal to 1 mg/L.

Follow protocol according to the SW846 Method 9060.

The calibration curve shall have at least five different levels, including a zero concentration standard.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples shall be identified as to source, lot number and sample number.

Results will be reported in mg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
TOC	1.0 mg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 9060.

Audit	Frequency of Audits	Limits
Prep Blank	At least one per group of	concentration < detection limit

	20 or fewer samples	
Matrix Spike	At least one per group of 20 or fewer samples	75-125% recovery
Laboratory control sample	At least one per group of 10 or fewer samples	80-120% recovery
Duplicate	At least one per group of 20 or fewer samples	+/- 20% RPD

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
BTEX- Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) in groundwater samples using gas chromatography/mass spectrometry (GC/MS). Sample results will be reported as µg/L.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 27 groundwater samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The holding time is not to exceed 14 days from sample collection.

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 8260 with special instructions as noted in Section 8.

   Samples will be preserved in the field with HCl to pH<2 and stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for benzene shall be less than or equal to 0.1 µg/L. The detection limits for toluene, ethylbenzene, and xylenes shall be less than or equal to 1.0 µg/L. The most recent MDL study shall be enclosed.

The method recommended surrogate and internal standards shall be used and prepared at the recommended concentrations.

Use five calibration standards. The lowest standards should represent analyze concentrations near, but above, the respective method detection limit.

All QA/QC requirements (surrogates, matrix spike/matrix spike duplicates, lab blanks, GC/MS tuning) shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Benzene	0.1 µg/L	+/- 20 percent
Toluene	1.0 µg/L	
Ethylbenzene	1.0 µg/L	
Xylenes (total)	1.0 µg/L	

II. QC REQUIREMENTS

As required by the SW846 Method 8260.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike	at least one per group of 20 or fewer samples	within historical acceptance limits
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	within historical acceptance limits

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Alkalinity- Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of alkalinity in groundwater samples. Sample results will be reported as mg/L. Samples will be unfiltered.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 27 groundwater samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The holding time is not to exceed 14 days from sample collection.

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from EPA Method 310.1 with special instructions as noted in Section 8.

   Samples stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for alkalinity shall be less than or equal to 5 mg/L.

Follow protocol according to the EPA Method 310.1.

Standardize the pH meter and titrant daily. Standardize the pH meter using at least 2 buffers which bracket the pH end point.

Analyze a check standard after every 10 samples to demonstrate pH meter stability.

All QA/QC requirementsshall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in mg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Alkalinity	5 mg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the EPA Method 310.1.

Audit	**Frequency of Audits**	**Limits**
Method Blank	At least one per group of 20 or at least twice	concentration < detection limit
Laboratory control sample	At least one per group of 20 or fewer samples	within laboratory control limits
Lab Duplicate	At least one per group of 10 or fewer samples	+/- 20% RPD
Analytical Spike Sample	At least one per group of 10 or fewer samples	75-125% recovery
CRDL Standard	At least one per group of 10 or fewer samples	80-120% recovery

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Iron-Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of soluble iron in groundwater samples. Sample results will be reported in µg/L. Samples will be field filtered.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 27 groundwater samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 6010 with special instructions as noted in Section 8.

   Samples will be preserved in the field with HNO_3 to pH<2, and stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for iron shall be less than or equal to 100 µg/L. The most recent MDL study shall be enclosed.

Follow protocol according to the SW846 Method 6010. Dilute samples with sample concentrations greater than the highest standard.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

The laboratory is to conduct matrix spike and matrix spike duplicate (MS/MSD) analyses and report the results on the appropriate form.

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	**Required Detection Limits**	**Precision Desired**
Iron	100 µg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 6010.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit
Laboratory control sample	at least one per group of 20 or fewer samples	+/- 20% recovery
Matrix Spike	at least one per group of 20 or fewer samples	80-120% recovery
Matrix Spike Duplicate	at least one per group of 20 or fewer samples	80-120% recovery; <20% RPD
Serial Dilution	at least one per group of 20 or fewer samples	10 % Difference

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Ammonia-Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore   Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488   (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of ammonia in groundwater samples. Sample results will be reported in µg/L.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 27 groundwater samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 28 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from EPA Method 350.2 with special instructions as noted in Section 8.

   Samples will be preserved in the field with H_2SO_4 to pH<2 and stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for ammonia (as nitrogen) shall be less than or equal to 100 µg/L.

Follow protocol according to the EPA Method 350.2.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	**Required Detection Limits**	**Precision Desired**
Ammonia-N	100 µg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the EPA Method 350.2.

Audit	**Frequency of Audits**	**Limits**
Method Blank	At least one per group of 20 or fewer samples	concentration < detection limit

Matrix Spike	At least one per group of 20 or fewer samples	90-110% recovery
Laboratory control sample	At least one per group of 10 or fewer samples	90-110% recovery

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Ammonia-Water
7-day TAT

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore   Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488   (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of ammonia in surface water samples. Sample results will be reported in µg/L.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 5 water samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 7 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from EPA Method 350.2 with special instructions as noted in Section 8.

   Samples will be preserved in the field with H_2SO_4 to pH<2 and stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for ammonia (as nitrogen) shall be less than or equal to 100 µg/L.

Follow protocol according to the EPA Method 350.2.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples shall be identified as to source, lot number and sample number.

Results will be reported in µg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Ammonia-N	100 µg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the EPA Method 350.2.

Audit	Frequency of Audits	Limits
Method Blank	At least one per group of 20 or fewer samples	concentration < detection limit

Matrix Spike	At least one per group of 20 or fewer samples	90-110% recovery
Laboratory control sample	At least one per group of 10 or fewer samples	90-110% recovery

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Hardness-Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of hardness in surface water samples. Sample results will be reported in µg/L as $CaCO_3$.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 5 water samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   The laboratory will be required to provide results within 7 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from EPA Method 130.2 with special instructions as noted in Section 8.

   Samples will be preserved in the field with HNO_3 to pH<2, and stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for hardness shall be less than or equal to 500 μg/L.

Follow protocol according to the EPA Method 130.2.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples or initial calibration standards shall be identified as to source, lot number and sample number.

Results will be reported in μg/L.

10. **Other (use additional sheets or attach supplementary information, as needed):**

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
Hardness	500 μg/L	+/- 20 percent

II. QC REQUIREMENTS

As required by the EPA Method 130.2.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 20 or fewer samples	concentration < detection limit

Laboratory control sample	at least one per group of 20 or fewer samples	recovery within laboratory control limits
Matrix Spike	at least one per group of 10 or fewer samples	90-110% recovery

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

5/016-6/96
U.S. Environmental Protection Agency Region V
SFD/Contracts Mgmt. Section
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
pH-Soil

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Moore Acting Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: September 1997
E. Site Name: Penta Wood Products

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delays in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. **General description of analytical service requested:**

   Analysis of pH in soil/sediment samples. Sample results will be reported in pH units.

2. **Definition and number of work units involved (specify whether whole samples or fractions; whether aqueous or soil and sediments; and whether low, medium, or high concentration):**

   Analyze 10 soil/sediment samples. This number is inclusive of QA/QC samples (duplicates, blanks).

3. **Purposes of analysis (specify whether Superfund [Remedial or Enforcement], RCRA, NPDES, etc.):**

   Superfund-Remedial

4. **Estimated date(s) of collection:**

   October 1997.

5. **Estimated date(s) and method of shipment:**

   Method of shipment will be by overnight carrier.

6. **Number of days analysis and data required after laboratory receipt of samples:**

   Analyze sample pH immediately upon receipt at the laboratory.

   The laboratory will be required to provide results within 7 days of receipt of samples.

7. **Analytical protocol required (attach copy if other than a protocol currently used in this program):**

   Analytical protocol taken from SW846 Method 9045 with special instructions as noted in Section 8.

   Samples will be stored at 4 C until analysis and validation of results.

   Note: Laboratory data rejection and non-payment will be recommended if methods other than those specified in this document are used.

8. **Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for pH shall be less than or equal to 0.1 pH units.

Follow protocol according to the SW846 Method 9045.

All QA/QC requirements shall be performed and reported as recommended in the method. The procedures, frequencies and acceptance criteria used shall be the same as those recommended in the method or referenced in the method.

9. **Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain of Custody documentation, etc.). If not completed, format of results will be left to program discretion.**

The laboratory shall perform data reduction and shall report sample analysis data and quality control information similar to that designated in the CLP SOW, Rev. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data similar to those specified in CLP SOW, Rev. 10/92.

All procedures used shall be clearly identified. All original raw data, forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or extract chain of custody forms, strip charts and copies of pages from preparation and analysis logbooks shall be submitted. If originals were submitted in another data package, photocopies may be submitted with a record of the location of the originals.

All records of analysis and calculations shall be legible and be sufficient to recalculate all sample concentrations and QA audit results. QC reference samples shall be identified as to source, lot number and sample number.

Results will be reported in pH units.

10. **Other (use additional sheets or attach supplementary information, as needed):**

All original sample tags, chain of custody forms, SAS packing lists, airbills and any other original receiving or transmittal forms or copies of receiving logbook pages pertaining to this SAS shall be submitted to the Region within the time frame listed in section 6 above. Photocopies may be submitted with a record of the location of the originals.

Payment to laboratories for this SAS analysis may be reduced if all procedures noted above are not followed and all required deliverables noted above are not supplied. The Region or its contractors shall not be charged further for the provision of required deliverables within this agreement.

11. **Name of sampling/shipping contact and phone number:**
David Shekoski (414)272-2426

I. DATA REQUIREMENTS

Parameter	Required Detection Limits	Precision Desired
pH	0.1 pH units	+/- 20 percent

II. QC REQUIREMENTS

As required by the SW846 Method 9045.

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact the Region for problems that might result in the delay of reporting sample results.

QAPP
Appendix B
Sample Shipment Documentation

APPENDIX B

Sample Shipment Documentation

Sample Documentation

Sample Identification System

A sample numbering system devised by CH2M HILL will be used to identify each sample, including duplicates and blanks. The sample designation system can be found in Section 3 of the FSP. A list of sample identification numbers will be maintained in the field logbook by the field activity manager.

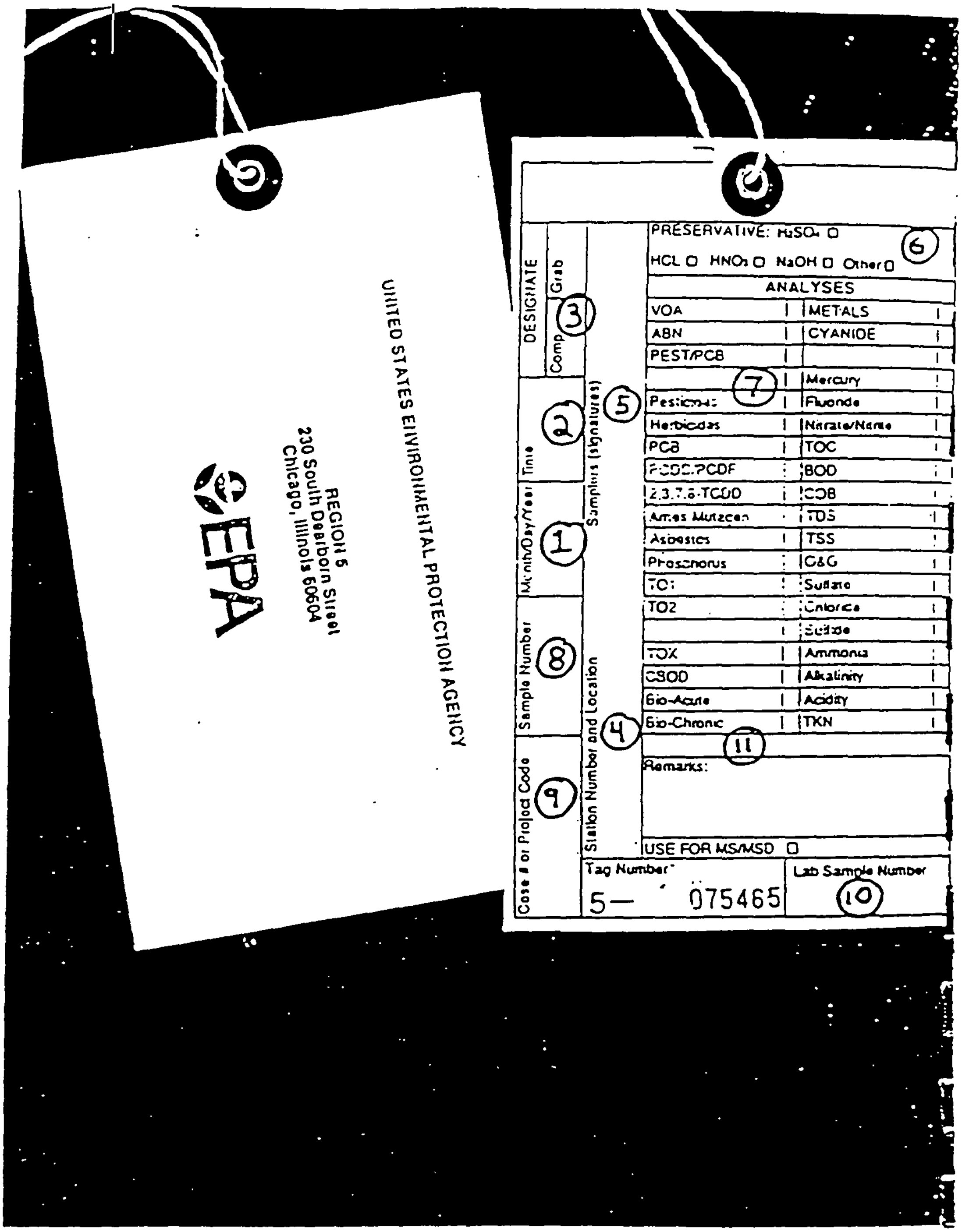
Sample Documentation Instructions

Sample Tag (Figure 1)

1. Enter date of sampling.
2. Enter time of sampling (military time only).
3. Specify "grab" or "composite" sample with an "X."
4. Enter CH2M HILL sample identification code.
5. Obtain signature of sample team leader.
6. Indicate preservative used (if any) with an "X."
7. Specify all parameters for analysis by placing an "X" to the right of each one.
8. Indicate the sample number. For analysis through the CLP, record the number from the stick-on labels. For SAS analyses through a contractor-procured laboratory, record the unique CH2M HILL sample number.
9. Indicate case number (e.g., Case No. 1234).
10. Leave BLANK (for laboratory use only).
11. Enter any desired analyses not listed on menu (e.g., PCBs, ammonia, sulfide, etc.) and mark box with an "X."

Combined Chain-of-Custody and Traffic Report Forms for SAS (Figure 2)

1. Project Code: Leave Blank.
2. Account Code: Leave Blank.


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5
230 South Dearborn Street
Chicago, Illinois 60604

EPA

DESIGNATE: Grab / Comp. ③

Month/Day/Year ①

Time ②

Sample Number ⑧

Case # or Project Code ⑨

Samplers (Signatures) ⑤

Station Number and Location ④

PRESERVATIVE: H_2SO_4 ☐
HCL ☐ HNO_3 ☐ NaOH ☐ Other ☐ ⑥

ANALYSES

VOA		METALS	
ABN		CYANIDE	
PEST/PCB			
⑦		Mercury	
Pesticides		Fluoride	
Herbicides		Nitrate/Nitrite	
PCB		TOC	
PCDD/PCDF		BOD	
2,3,7,8-TCDD		COD	
Ames Mutagen		TDS	
Asbestos		TSS	
Phosphorus		O&G	
TO1		Sulfate	
TO2		Chloride	
		Sulfide	
TOX		Ammonia	
CBOD		Alkalinity	
Bio-Acute		Acidity	
Bio-Chronic		TKN	

⑪

Remarks:

USE FOR MS/MSD ☐

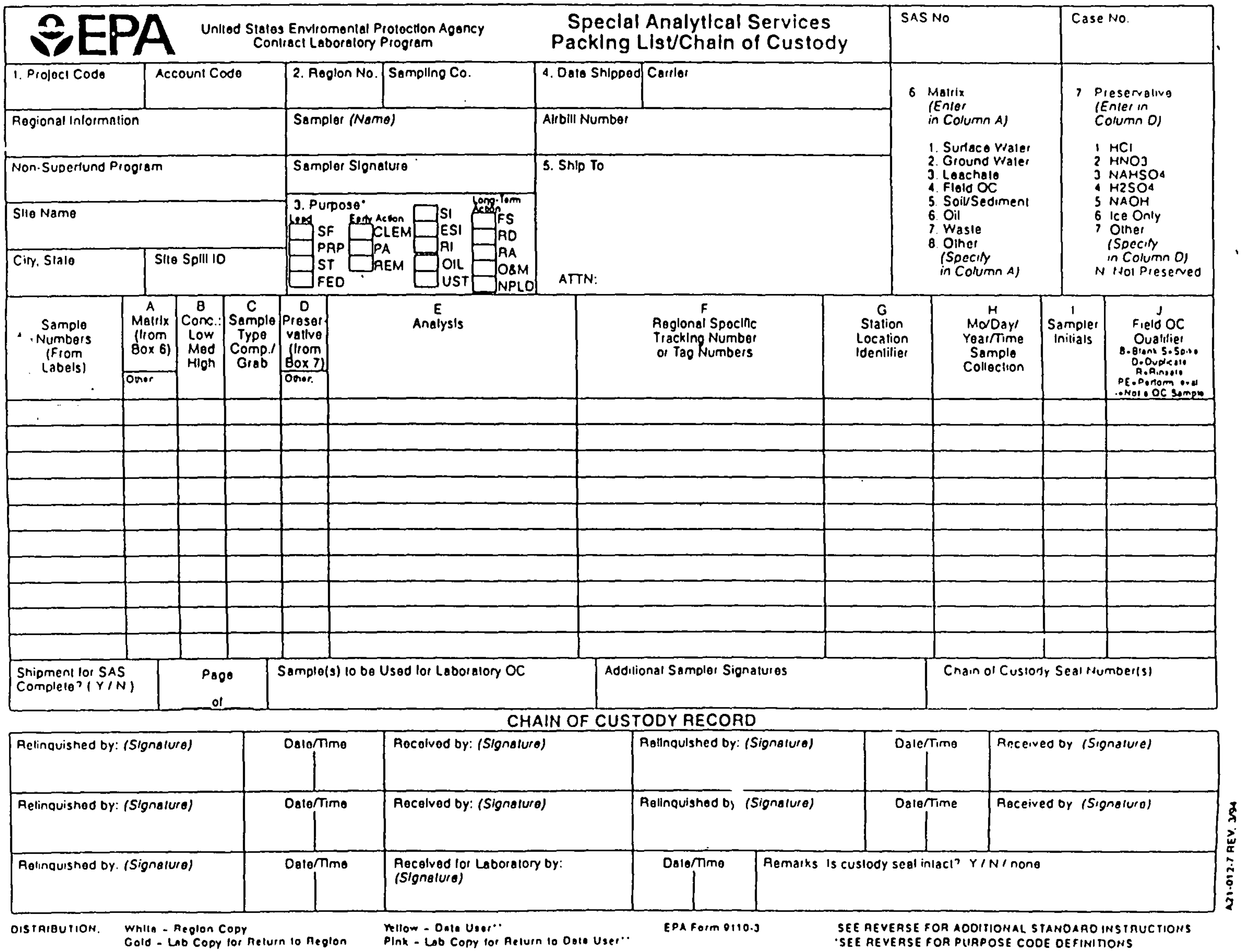
Tag Number: 5— 075465

Lab Sample Number ⑩

NOTE: For purposes of illustration forms are reproduced at 70% of original size.

Figure 1

SAS Combined Chain-of-Custody and Traffic Report Forms



EPA United States Enviromental Protection Agency
Contract Laboratory Program

Special Analytical Services
Packing List/Chain of Custody

SAS No

Case No.

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
Regional Information		Sampler *(Name)*		Airbill Number	
Non-Superfund Program		Sampler Signature		5. Ship To	
Site Name		3. Purpose*			
City, State	Site Spill ID			ATTN:	

3. Purpose*

Lead
- ☐ SF
- ☐ PRP
- ☐ ST
- ☐ FED

Early Action
- ☐ CLEM
- ☐ PA
- ☐ REM
- ☐ SI
- ☐ ESI
- ☐ RI
- ☐ OIL
- ☐ UST

Long-Term Action
- ☐ FS
- ☐ RD
- ☐ RA
- ☐ O&M
- ☐ NPLD

6 Matrix *(Enter in Column A)*
1. Surface Water
2. Ground Water
3. Leachate
4. Field OC
5. Soil/Sediment
6. Oil
7. Waste
8. Other *(Specify in Column A)*

7 Preservative *(Enter in Column D)*
1 HCl
2 HNO3
3 NAHSO4
4 H2SO4
5 NAOH
6 Ice Only
7 Other *(Specify in Column D)*
N Not Preserved

Sample Numbers (From Labels)	A Matrix (from Box 6) Other	B Conc.: Low Med High	C Sample Type Comp./Grab	D Preservative (from Box 7) Other	E Analysis	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Field OC Qualifier B=Blank S=Spike D=Duplicate R=Rinsate PE=Perform. eval -=Not a OC Sample

Shipment for SAS Complete? (Y / N)	Page of	Sample(s) to be Used for Laboratory OC	Additional Sampler Signatures	Chain of Custody Seal Number(s)

CHAIN OF CUSTODY RECORD

Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by *(Signature)*
Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by *(Signature)*	Date/Time	Received by *(Signature)*
Relinquished by. *(Signature)*	Date/Time	Received for Laboratory by: *(Signature)*	Date/Time	Remarks Is custody seal intact? Y / N / none	

DISTRIBUTION. White - Region Copy
Gold - Lab Copy for Return to Region
Yellow - Data User**
Pink - Lab Copy for Return to Data User**

EPA Form 9110-3

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

A21-012.7 REV. 3/94

3. Regional Information: If sampling is in support of oversight activities, indicate here. If this is an enforcement site, record "TGB102." If not, record "TFA102."

4. Non-Superfund Program: If sampling is not done under the Superfund program, enter the name of the program (e.g., RCRA).

5. Site Name, City, State: Complete as instructed.

6. Site Spill ID: Enter ID code provided by the office.

7. Region No.: Enter "Region 5."

8. Sampling Company: Enter "CH2M HILL."

9. Sampler Information: Complete as instructed.

10. Type of Activity:

    - SF—Superfund lead
    - PRP—PRP lead
    - ST—State lead
    - FED—Federal lead
    - PA—Preliminary assessment
    - SSI—Screening site investigation
    - LSI—Listing site investigation
    - RIFS—Remedial Investigation/Feasibility Study
    - RD—Remedial design
    - O&M—Operation & Maintenance
    - NPLD—National Priorities List delete
    - CLEM—Classic emergency
    - REMA—Removal assessment
    - REM—Removal
    - OIL—Oil response
    - UST—Underground storage tank response

11. Shipping Information: Complete as instructed.

12. Ship To: Enter laboratory name, address, and sample recipient/custodian.

13. Case No.: Complete as instructed.

14. Sample Numbers: For routine organic/inorganic samples, enter the CLP numbers from the "stick-on" labels. For SAS samples shipped to a CH2M HILL-procured laboratory, enter the unique CH2M HILL-generated sample number.

15. Sample Information: Complete as instructed.

16. Regional Specific Tracking Number or Tag Number: Enter sample tag number(s).

17. Station Location Number: Enter sample identifier (as defined in the QAPjP).

18. Time/Date: Complete as instructed. Use military time.
19. Sampler Initials: OPTIONAL.
20. Corresponding CLP Organic/Inorganic Sample Number: Enter CLP sample number (from "stick-on" labels) of corresponding sample from same location. Not applicable to SAS forms.
21. Designated Field QC: Indicate QC status when applicable (field blanks, trip blanks, duplicates, MS/MSD, etc.)
22. Sampling Status: Is the sampling for this Case/SAS complete? Circle one.
23. Page 1 of ____: Record number of documents enclosed in cooler.
24. MS/MSD and/or Duplicate: List samples.
25. Additional Samplers Signatures: OPTIONAL.
26. Chain-of-Custody Seal No.: Enter the numbers that appear on the custody seals to be used to seal the cooler (there should be two).
27. "Relinquished by" and "time/Date": Complete as instructed. Use military time.

Distribution: For RAS, the Laboratory Copy and laboratory Copy for Return to SMO are included with the shipment. The Region Copy and SMO Copy are returned to the office. For SAS, the Laboratory Copy for Return to Region and Laboratory Copy for Return to Data User are included with the shipment. The Region Copy and Data User Copy are returned to the CH2M HILL office.

Notice of Transmittal (Figure 3)

1. Enter the name of team leader.
2. Enter team leader's firm name.
3. Enter CH2M HILL project number.
4. Enter case number.
5. Enter date.
6. Enter number of samples shipped.
7. Enter matrix of samples.
8. Enter the site name in words.
9. Enter the location of the site (city, state).

Packaging and Shipping Procedures

Low-Concentration Samples

1. Prepare coolers for shipment.
   - Tape drains shut.

Figure 3
Notice of Transmittal

Date: ______________________

To:

CH2M HILL
411 E. Wisconsin Ave., Suite 1600
P.O. Box 2090
Milwaukee, WI 53201-2090

Attn: Cherie Wilson

From: ____________________ ______________________
(name) (firm)

CH2M HILL Project No.: ______________________________________

Enclosed are appropriate copies of the sample documentation forms completed under Case No. _________ for the _______________, 19_____ shipment of _______ (qty) __________ (matrix) samples from the _______________________________________ site located in _______________________, _________________________.

- Affix "This Side Up" labels on all four sides and "Fragile" labels on at least two sides of each cooler.
- Place mailing label with laboratory address on top of coolers.
- Fill bottom of coolers with about 3 inches of vermiculite or use preformed poly-foam liner.
- Place appropriate traffic reports, SAS packing lists, or regional field sheets and chain-of-custody records with corresponding custody seals on top of each cooler.

2. Arrange decontaminated sample containers in groups by sample number.
3. Mark volume levels on bottles with a grease pencil.
4. Secure appropriate sample tags around lids of containers with string or wire.
5. Secure container lids with strapping tape.
6. Arrange containers in front of assigned coolers.
7. Affix appropriate adhesive labels from assigned traffic report to each container. Protect with clear label protection tape.
8. Seal each container within a separate plastic bag.
9. Arrange containers in coolers so that they do not touch.
10. If ice is required to preserve the samples, cubes should be repackaged in double zip-loc bags and placed on and around the containers (especially on VOA vials).
11. Fill remaining spaces with vermiculite (or place poly-foam liner cover on top of samples).
12. Sign chain-of-custody form (or obtain signature) and indicate the time and date it was relinquished to Federal Express.
13. Separate copies of forms. Seal proper copies within a large zip-loc bag and tape to inside lid of cooler. Distribute remaining copies as indicated in the following sections.
14. Close lid and latch.
15. Carefully peel custody seals from backings and place intact over lid openings (right front and left back). Cover seals with clear protection tape.
16. Tape cooler shut on both ends, making several complete revolutions with strapping tape. **Do not** cover custody seals.
17. Relinquish to Federal Express. Place airbill receipt inside the mailing envelope and send to the sample documentation coordinator along with the other documentation.

FIELD SAMPLING PLAN
Remedial Investigation/Feasibility Study

Penta Wood Products
Town of Daniels, Wisconsin
Prepared by: CH2M HILL
WA No. 001-RICO-05WE/Contract No. 68-W6-0025
November 1997

Contents

Section Page

Contents, Continued

Tables **On or Follows Page**

Figures

1.0 Summary of Sampling Activities

This Field Sampling Plan defines procedures to be used to perform the field investigation at the Penta Wood Products (PWP) site in accordance with Work Assignment No. 001-RICO-05WE Statement of Work (SOW). Soil and groundwater at this inactive wood treatment facility are contaminated with pentachlorophenol, arsenic, copper, zinc, and fuel oil. Failure of a wastewater lagoon retaining wall has allowed the transport of contaminants into an offsite wetland.

Site investigation activities, removal actions, and remedial treatability studies have been conducted by PWP, the Wisconsin Department of Natural Resources (WDNR), the USEPA Region V Emergency Response Branch (ERB), and the USEPA Emergency Response Team (ERT). The objective of this field investigation is to supplement the existing information with the minimum amount of additional data necessary to support a Record of Decision (ROD) for site remediation. The field investigation will consist of the following:

- Obtain water levels from all existing monitoring wells to assess hydraulic gradients
- Sample existing monitoring wells to develop historical trends in contaminant concentration
- Sample residential wells to verify that contamination has not reached downgradient receptors
- Collect groundwater grab samples from push technology borings to further delineate the contaminant plume
- Collect and analyze shallow groundwater samples in the wetland from hand installed shallow well points to determine if groundwater is the source of contamination to the wetlands
- Collect surface water samples from the wetland area to determine if surface water is contaminated
- Collect sediment samples from the wetland area to determine if sediments are contaminated, and to what extent
- Perform cone penetrometer testing to delineate pentachlorophenol/TPH contamination in the subsurface soils
- Sample surficial soils to determine contaminant concentrations remaining after soil removal efforts and in hot spot areas where no soil removal has taken place
- Conduct treatability studies

2.0 Sampling Network and Rational

2.1 Project Objective

The overall objective of this field investigation is to supplement the existing information with the minimum amount of additional data necessary to support a ROD for site remediation. The Final PWP RI/FS Work Plan, prepared by CH2M HILL in July 1997, contains a data needs evaluation based on existing data, a conceptual site model, and an identification of preliminary RA objectives and technologies. Data that will be collected during the RI/FS to fill the identified data gaps include:

- Surface soil investigations to establish post removal action contaminant concentrations and further define hot spot areas
- Subsurface soil investigations to delineate the existing contaminant distribution in the vadose zone using CPT/IF as a screening tool
- Groundwater data to further delineate the contaminant plume with respect to cleanup goals and determine if natural attenuation is occurring
- Surface water and sediment data to determine the presence and extent of contamination in the wetlands
- Residential well data to determine if potential receptors are being affected
- Wetlands evaluation to identify potentially affected communities

2.2 Project Approach

Extensive investigation and treatability testing has been conducted at the site. This data has been reviewed and used to build a conceptual model, identify potential response actions, and develop the work plan, and this FSP. Technical direction from the USEPA Work Assignment Manager (WAM), and use of the presumptive remedies for wood treatment sites were also used to identify potential response actions. The identification of potential response actions is used to aid in defining further investigative needs and is not intended as a substitute for the more detailed process of technology screening during the FS. Evaluating the potential response actions with preliminary applicable relevant and appropriate requirements (ARARs) shows where data gaps exist in the current conceptual site model, and focuses the risk assessment and engineering data collection to support the FS.

2.3 Contaminants of Concern

Contaminants of concern (COC) are defined as those most likely to contribute to risk as a result of exposure. The USEPA and WDNR have established through prior investigations that the COCs at the PWP site are PCP, arsenic, copper and zinc.

2.4 Sampling Locations

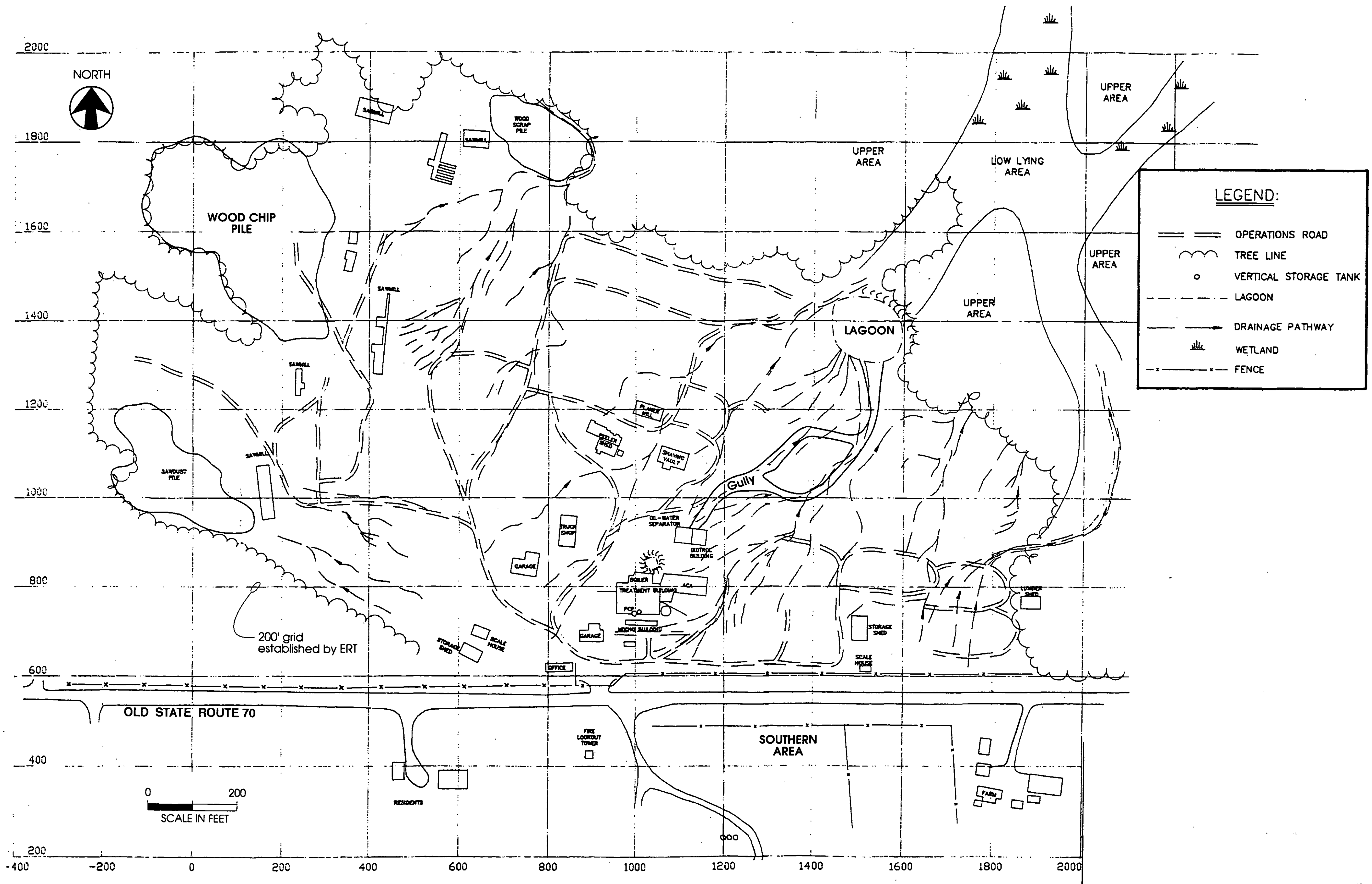
The extent of PCP/oil contamination in subsurface soils has not been fully defined. The boundaries of the PCP/oil residual in the vadose zone is important if in situ bioventing is chosen as the remediation alternative for soils. Areas with PCP/oil contamination are located in the gully area between the oil/water separator and the lagoon, and in the wood chip pile (Figure 2-1). There are a few hot spot areas near the PCP treatment building where spills occurred. Table 2-1 is a summary of the sampling and analysis activities proposed for the PWP site.

2.4.1 Surficial Soils

Approximately 10 surficial soil samples are proposed to (1) determine remaining surficial soil concentrations in the areas where it is believed ERB excavated soils; (2) define in greater detail the extent of surficial soil contamination in a few hot spot areas found during the ERT 200-foot grid sampling; (3) determine if the ACZA soil/cement pad is leaching arsenic; and (4) investigate the overland flow pathway from the lagoon to the wetland. The soil samples will be analyzed for PCP (with the immunoassay kit) or arsenic, as appropriate. The locations of the samples to be collected in the gully are shown in Figure 2-2 The locations of previous soil removal activities were not mapped. As a result, the remaining surface soil sampling locations will be determine in the field.

2.4.2 Subsurface Soils

To delineate the PCP/oil contamination, cone penetrometer testing (CPT) is proposed. TPH concentrations will be determined in situ using an induced fluorescence (IF) system connected to the cone penetrometer probe. Eight to 12 subsurface soil samples will be collected for PCP immunoassay analysis from below the wood chip pile at the interface with the sand if the real-time data collected with the CPT/IF indicate contamination. Table 2-2 presents proposed boring numbers, locations, and rationale. Sample locations are also shown in Figure 2-2.



BASEMAP SOURCE: US EPA Analytical Contract #68-C4-0022, W.O.#03347-040-001-0026-01 Figure 4, May 1994

FIGURE 2-1
Site Features Map
Penta Wood Products RI/FS FSP

I:/141158/DRAWINGS/4115803.DGN

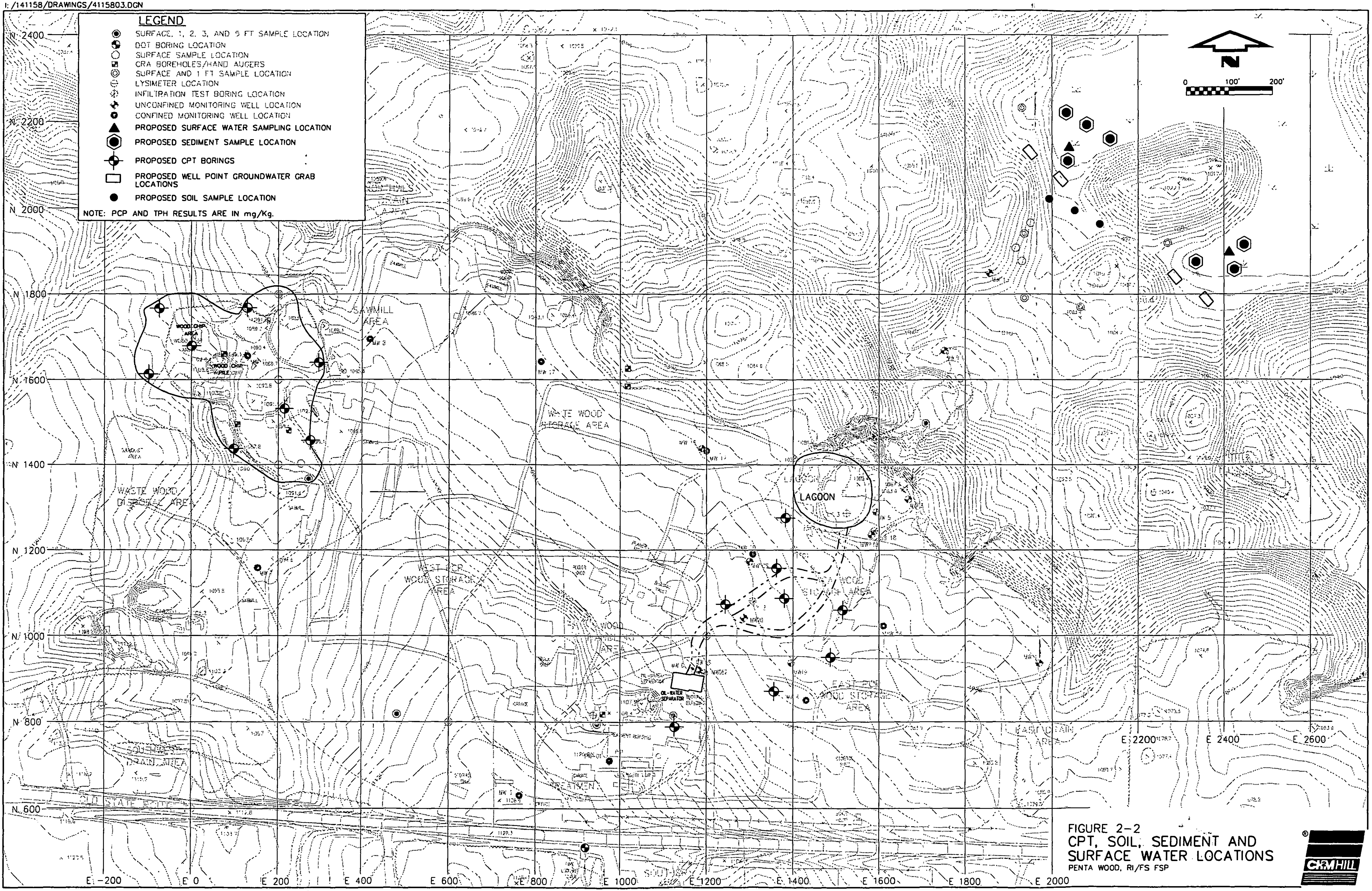


FIGURE 2-2
CPT, SOIL, SEDIMENT AND
SURFACE WATER LOCATIONS
PENTA WOOD, RI/FS FSP

CH2M HILL

TABLE 2-1
Summary of Sampling and Analysis Activities—RI
(Page 1 of 2)

Sample Matrix	Locations	Analytical Parameters	No. of Field Samples	QC Samples			Total No. of Samples
				FB	Dup	MS/D	
Groundwater—Existing Monitoring Wells	MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-6S, MW-7, MW-8, MW-9, MW-10, MW-10S, MW-11, MW-12, MW-13, MW-14, MW-15, MW-16, MW-17, MW-18, MW-19, MW-20, PW-01	PCP, arsenic, copper, zinc	23	2	2	2	29
		Natural attenuation-laboratory analysis: nitrate, sulfate, manganese, chloride methane, BTEX, carbon dioxide, TOC, ferrous iron, alkalinity, ammonia	23	2	2	0	27
		Natural attenuation-field analyses: DO, pH, Redox potential, conductivity, temperature	23	0	2	0	25
Drinking Water—Residential Wells	RW1, RW2, RW3, RW4, RW5	PCP	4	1	1	2	8
Groundwater—CPT/Groundwater Grab	See Figure 3 and Table 3 of FSP	Immunoassay PCP	Maximum 30	3	3	0	36
		Offsite PCP confirmation	3	0	0	0	3
Surface Water—Wetlands	1 from each of 2 fingers of the wetland and 1 background location	PCP, arsenic, copper, zinc, hardness, ammonia	3	1	1	0	5
Subsurface Soil—CPT	CPT borings—see Figure 5 and Table 2 of FSP	This is a field screening method to detect the presence of TPH	Maximum 24	0	0	0	24
Subsurface Soil—Wood Chip Area	CPT borings—see Figure 2 and Table 2 of FSP	Immunoassay PCP	Maximum 12	0	1	0	13
		Offsite PCP confirmation	2	0	0	0	2
Surface Soil	To be determined during field activities	Immunoassay, PCP	10	0	1	0	11
		Arsenic	6	0	1	1	8
		Offsite PCP confirmation	1	0	0	0	1
Sediment—Wetlands	See Figure 2 of FSP	PCP, arsenic, copper, zinc, pH, TOC	7	0	1	2	10
Soil/Concrete—Concrete Pad	Concrete pad area	TCLP arsenic	3	0	0	0	3

TABLE 2-1
Summary of Sampling and Analysis Activities—RI
(Page 2 of 2)

Sample Matrix	Locations	Analytical Parameters	No. of Field Samples	QC Samples			Total No. of Samples
				FB	Dup	MS/D	
Subsurface Soil—Column Study and Wood Debris	Soil to be collected from area near LY-02 or near IT-01	PCP, DRO, TPH, TOC, chloride, moisture content, pH	3 initial	0	1	0	
			4 at 3 months	0	1	0	13
		Field: initial temperature, in situ bulk density. Lab: weekly soil gas monitoring with meter for temperature, O_2, CO_2, and methane.	4 at 6 months	0	0	0	
Subsurface Soil—Field bioventing Study	From 5 feet and 40 feet below ground surface in each of three piezometer nests (six total locations)	PCP, DRO, TPH, TOC, chloride, moisture content	6 initial	0	1	0	21
			6 at 3 months	0	1	0	
		Field: Soil pH gas monitoring with meter for temperature, O_2, CO_2, and methane	6 at 6 months	0	1	0	
Groundwater—Photolysis Study	Groundwater will be extracted and placed in three cells in varying depths. An initial composite sample will be collected, followed by ten sampling events for each cell over a 3-day period.	PCP, total metals (CLP)	31 PCP	3	3	0	37
		Field: pH, temperature, O_2 and oxidation reduction potential.	4 Metals	1	1	0	6

PCP = Pentachlorophenol
CPT = Cone Penetrometer Testing
TPH = Total Petroleum Hydrocarbons
TOC = Total Organic Carbon
DRO = Diesel Range Organics

TABLE 2-2
Subsurface Soil Investigation

Number of Borings	Location	Sample Collection Method/Analysis	Rationale
3 to 5[b]	East of the gully extending from oil/water separator to lagoon	CPT/TPH[a]	Determine horizontal and vertical extent of contamination from the gully to the water table
3 to 5[b]	West of the gully extending from oil/water separator to lagoon	CPT/TPH[a]	Determine horizontal and vertical extent of contamination from the gully to the water table
1	Between the two arms of the gullies extending from the oil/water separator to the lagoon	CPT/TPH[a]	Determine horizontal and vertical extent contamination from the gullies to the water table
1	In former ACA Building	CPT/TPH[a]	Define vertical extent of shallow soil contamination previously identified in the former ACA Building area
8 to 12	In Wood Chip Pile Area	CPT/TPH[a], immunoassay for PCP from the top of the sand layer	Define vertical and horizontal extent of contamination in the Wood Chip Pile Area

[a] CPT = Cone penetrometer testing. TPH concentrations will be determined in situ using a laser-induced fluorescence system connected to the cone penetrometer probe. No actual soil samples will be collected or analyzed for TPH.

[b] Two optional borings included if initial three borings are contaminated and additional borings are needed to delineate the lateral extent of contamination from the gully

2.4.3 Sediment

Soil and sediment samples from a series of short transects will be collected in progression down the pathway from the lagoon to the wetland, ending with several sediment samples in each finger of the wetland. Figure 2-2 presents these sampling locations. Three soil samples will be analyzed onsite for PCP with immunoassay kits. The seven sediment samples will be analyzed at an offsite laboratory for PCP, arsenic, copper, zinc, pH, and TOC, as these samples will be important for the ecological screening risk assessment. The sediment samples will be analyzed in seven days so that if contamination is detected, further sampling can be conducted to determine the extent of contamination.

2.4.4 Surface Water

To determine whether contaminated groundwater is discharging into the wetland or if the surface water is contaminated by overland flow from the gully, one surface water sample will be collected from each of two fingers of the wetland, in addition to a background surface water sample (Figure 2-2). Surface water samples will be analyzed for PCP, arsenic, copper, zinc, hardness and ammonia.

2.4.5 Groundwater

The first field task CH2M HILL will perform is to measure water levels, and sample all the existing monitoring wells and the four residential wells. These samples will be analyzed with a 7-day turnaround time so the results can be used to guide the investigation. The samples collected from the monitoring well will be analyzed for PCP, arsenic, copper, and zinc. The samples for dissolved metals analysis will be field filtered. Total metals will also be analyzed. In addition the monitoring wells will be analyzed for the following natural attenuation indicators: nitrate, sulfate, manganese, chloride, methane, BTEX, carbon dioxide, TOC, ferrous iron, ammonia, and alkalinity. Dissolved oxygen, pH, redox potential, conductivity, and temperature will be measured in the field. ERT also analyzed for the following parameters during three sampling rounds: PCP, arsenic, copper, zinc, nitrate, sulfate, manganese, chloride, BTEX, iron, ammonia, and alkalinity. A data trend comparison will be performed with the 1994 data and the 1997 data.

The northeast extent of the groundwater plume may be an ecological concern as contaminated groundwater could potentially be discharging into the wetlands. These wetlands are considered to be a sensitive environment and are potential habitat for several endangered species. It is also unknown whether the groundwater is contaminated at depth and migrating under the wetlands towards Little Doctor Lake.

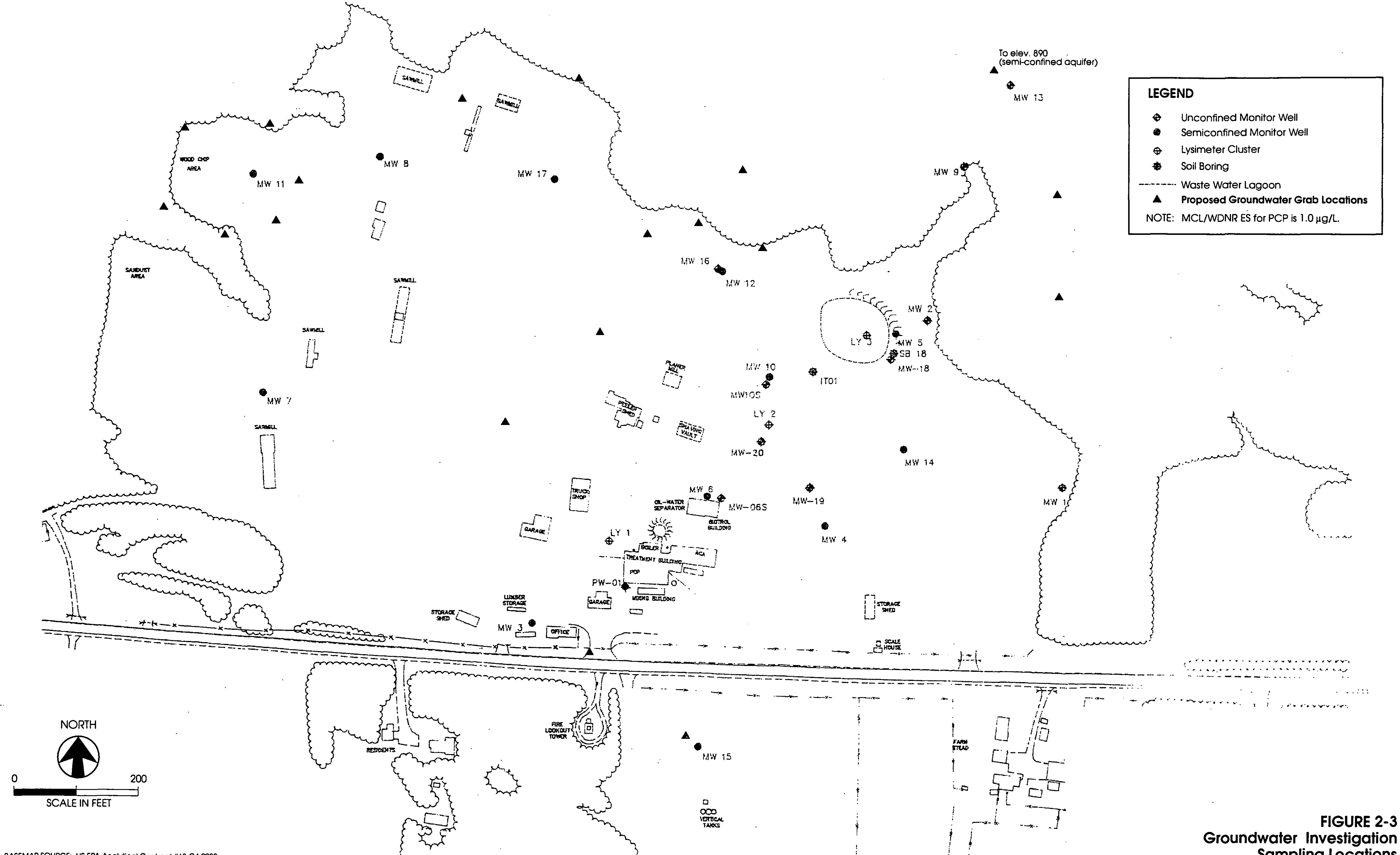
To fill the groundwater perimeter data gap, groundwater grab samples will be collected from push-technology (CPT) borings and analyzed with a field PCP immunoassay kit. Table 2-3 presents the proposed number of borings, locations, sample collection method and analysis, and rationale for each boring location. Proposed groundwater grab locations are shown on Figure 2-3. Based on the groundwater grab results, a limited number of piezometers (up to five) may be installed for the purpose of measuring water levels.

Four groundwater grab samples will also be collected adjacent to the wetland fingers using hand-driven shallow well points. The shallow well point sample locations are also shown on Figure 2-2.

2.4.6 Ecological Investigation

An aquatic ecologist will conduct a site visit. The following activities will be performed to support the ecological investigation:

- Describe existing aquatic, terrestrial, and wetland ecological habitat types (e.g., forest, cattail marsh), and the area covered by these habitats will be estimated. Potentially sensitive environments (e.g., migratory pathway, habitat known to be used by endangered or threatened species) will be noted.
- Record casual observations of animal species or signs of a species while walking through the area. Studied observations will be made along a transect line in the early morning and evening hours by sitting in one location for a period of time.
- Describe and, if possible, map soil and water types, land uses, and the dominant vegetation species present.



BASEMAP SOURCE: US EPA Analytical Contract #68-C4-0022,
W.O.#03347-040-001-0026-01 Figure 2.1-1, September 1994

FIGURE 2-3
Groundwater Investigation Sampling Locations
Penta Wood Products RI/FS FSP

- Request identification of threatened and endangered species in the site environs from the WDNR and US Fish and Wildlife Service.

TABLE 2-3
Groundwater Grab Sampling

Number of Borings	Location	Sample Collection Method/Analysis	Rationale
3 to 5[b]	In wetland area northeast of the facility	CPT/TPH[a], immunoassay for PCP	Determine lateral extent of groundwater contamination to the northeast and if the contaminated groundwater is discharging to the wetland. One grab sample will be collected from the semiconfined layer (elevation 890) to determine if PCP may be migrating below the wetland.
5	Northwest, northeast, west, southeast and south of MW 17	CPT/TPH[a], immunoassay for PCP	Determine potential source of PCP (2,000 µg/L) detected in MW 17
2 to 3[c]	Northwest and northeast of MW 12	CPT/TPH[a] immunoassay for PCP	Determine if PCP contamination (10,000 µg/L) identified in MW 12 is migrating to the north.
6 to 9[d]	In Wood Chip Pile Area	CPT/TPH[a], immunoassay for PCP in unconfined aquifer	Determine if contamination from the Wood Chip Pile is impacting the underlying groundwater.
2	In south-central portion of the site, south of former production well	CPT/TPH[a], immunoassay for PCP	Determine PCP concentration in unconfined zone south of the treatment area.

[a] CPT = Cone penetrometer testing. TPH concentrations will be determined in situ using a laser-induced fluorescence system connected to the cone penetrometer probe. No actual groundwater samples will be collected or analyzed for TPH.
[b] Two optional borings included if initial three borings are contaminated and additional borings are needed to define the lateral extent of contamination to the wetland
[c] One optional boring included if initial two borings are contaminated and additional borings are needed to define lateral extent of contamination.
[d] Borings will be located based on soil results, GW grabs collected downgradient from locations with potential soil contamination.

2.5 Treatability Study

A Treatability Study will be performed as part of the RI/FS. The Treatability Study Work Plan, September 10, 1997, describes the scope of work for the treatability study.

3.0 Sampling Custody Procedures

3.1 Sample Identification System

A sample numbering system devised by CH2M HILL will be used to identify each sample, including duplicates and blanks. A Sample Management Office (SMO) number and a Central Regional Laboratory (CRL) number will be assigned to each sample to be analyzed by an offsite laboratory. (Refer to the *User's Guide to the Contract Laboratory Program* for an explanation of the SMO numbers. Refer to the CRL *Sample Handling Manual* for an explanation of the CRL number.) The field activity manager will maintain a listing of sample identification numbers in the sampling logbook. Each CH2M HILL sample number will consist of three components, which are described below.

Each sample will have a three-digit, project identification code (identifying PWP as Penta Wood Products), followed by a two-digit code corresponding to the media, and a three-digit, sequential sample number. Sample numbers will be reserved for the different media to be sampled. They will not be repeated within a sample station, media, or among differing media. Duplicate samples will not be distinguished within the sample numbers, but will be distinguished through the subsample identification within the sample tracking and data management systems. This is done so that no bias is given to the samples during analysis. The media codes and reserved sample numbers are as follows:

- SS—Surface (0 to 2 feet) Soil Sample
- SB—Subsurface Soil (>2 Feet) Soil Sample
- SD—Sediment Sample
- SW—Surface Water Sample
- GW—Groundwater Grab Sample
- RW—Residential Well Sample
- MW—Monitoring Well Groundwater Sample
- TS—Treatability Study Samples

Examples of sample numbers are as follows:

- PWPGW0101—Groundwater sample collected from PWP sample location GW01, sample number 01
- PWPSB1011 - 5.0—Subsurface soil sample collected from PWP sample location SB01, sample number 11, collection starting at 5 feet bgs
- PWPSD0402—Sediment sample collected from PWP sample location SD04, sample number 02

3.2 Initiation of Field Custody Procedures

For samples collected for analysis, the USEPA Region 5 chain-of-custody protocols will be followed, as described in the *National Enforcement Investigations Center (NEIC) Policies and Procedures*, USEPA-330/9-78-DDI-R, Rev. June 1985. Custody procedures are described in Section 6 of the QAPjP.

3.3 Field Activity Documentation and Logbook

A field logbook, as discussed in Section 6 of the QAPjP, will be initiated at the start of the first onsite activity and maintained to record onsite activities during the RA. The field logbook is a controlled document that becomes part of the permanent site file. Because information contained in the field logbook may be admitted as evidence in cost recovery or other legal proceedings, it is important that this document be maintained. The following activities and events will be recorded in the field logbook:

- Arrival and departure of site visitors
- Arrival and departure of equipment
- Sample pickup including chain-of-custody form number, carrier, date, and time
- Start or completion of borehole and monitoring well installation; sampling activities
- Health and safety issues

The field logbook will consist of a bound notebook with consecutively numbered pages that cannot be removed. The logbook cover will indicate the following:

- Project name and USEPA Work Assignment Number
- Project number
- Site Manager's name
- Sequential log book number
- Project start date
- Project end date

Daily entries will be made during periods of site activity. Entries will be recorded in ink, and no erasures are permitted. Each page will be initialed. Incorrect entries will be stricken with a single line and initialed. At the beginning of each entry, the date, start time, weather conditions, and names of site personnel and visitors present will be recorded. Entries will include the following:

- Summaries of daily site activities and levels of personal protection

- References to other project notebooks kept onsite such as the geologist's field book and health and safety officer's notebook

- Photographic records including a description of each record and points of interest. Videotapes, slides, or photographs taken onsite or at monitoring stations will be numbered to correspond to logbook entries. Photographic records will also include the photographer's name, date, time, site location, site description, and weather conditions.

3.4 Sample Shipment and Transfer of Custody

Sample handling, shipping, and custody procedures are provided in Section 6 of the QAPP.

4.0 Sample Containers, and Maximum Holding Times

4.1 Sample Containers

The contaminant-free sample containers (bottles) used for this sampling effort will be prepared by the subcontract laboratory according to the procedures specified in USEPA's *Specifications and Guidance for Obtaining Contaminant-Free Sample Containers*, April 1990. Bottles used for the sampling activity will not contain target organic and inorganic contaminants exceeding the level specified in the above mentioned document. Specifications for the bottles will be verified by checking the supplier's certified statement and analytical results for each bottle lot.

In addition, field blanks, trip blanks, etc., will be used to monitor for contamination. Corrective actions will be taken as soon as a problem is identified and may include discontinuing the use of a specific bottle lot, contacting the bottle supplier(s) for retesting the representative bottle from a suspect lot, resampling the suspected samples, and validating the data, taking into account that the contaminants could be introduced by the laboratory (i.e., common lab solvents, sample handling artifacts, etc.); as a bottle QC problem, an educated determination of whether the bottles and data are still usable must be made.

For the Fund-lead projects, the corrective actions will be conducted in a comprehensive manner in order to avoid the use of identified contaminated lot(s) for other projects, and to ensure that if the bottle supplier(s) is deemed unresponsive or unable to provide cleaned bottles as specified, other USEPA projects are not negatively affected by the use of noncompliant bottles.

4.2 Sample Preservation and Holding Time

Table 4-1 summarizes the requirements for sample containers, preservatives, and sample holding times. Sample containers will be certified by the laboratories as precleaned. Preservatives will be prepared using reagent-grade chemicals and added to the sample bottles by the laboratory prior to shipment to the field site. Samples will be stored on ice to 4°C for preservation.

Filtered groundwater samples will be submitted for inorganic analyses. Filtering will occur in the field during sample collection. Samples will be filtered through a 0.45 micron filter following procedures located in the SOPs.

TABLE 4-1
Sample Containers, Preservatives, and Holding Times

Analysis	Container	Preservation/Storage	Maximum Hold Time
Soil—PCP	4-oz. amber glass jar[a]	4°C protect from light	7 days to extraction and 40 days from extraction to analysis
Soil—DRO	4-oz. amber glass jar[a]	4°C	14 days to extraction and 40 days from extraction to analysis
Soil—Arsenic, Copper, Zinc	4-oz. amber glass jar[a]	4°C	6 months
Soil—pH	4-oz. amber glass jar[a]	4°C	Analyze immediately
Soil—TOC	4-oz. amber glass jar[a]	4°C	28 days
Soil—TPH	4-oz. amber glass jar[a]	4°C	14 days
Concrete—TCLP Arsenic	4-oz. amber glass jar[a]	4°C	28 days to extraction and 6 months from extraction to analysis
Water—PCP	1-liter amber glass bottle[a]	4°C	7 days to extraction and 40 days from extraction to analysis
Water—Arsenic, Copper, Zinc	500-mL polyethylene bottle	HNO_3, pH < 2, 4°C	6 months
Water—TAL Metals	1,000-mL polyethylene bottle	HNO_3, pH < 2, 4°C	6 months (28 days for mercury)
Water—Nitrate, Sulfate, Chloride	1-liter polyethylene bottle	4°C	NO_3—48 hours SO_4—28 days Cl—28 days
Water—Methane	3 x 40-mL vials[a]	HCl, pH < 2, 4°C, protect from light	14 days
Water—Manganese	100-mL polyethylene bottle	HNO_3, pH < 2, 4°C	6 months
Water—TOC	100-mL polyethylene bottle	H_2SO_4, pH < 2, 4°C	28 days
Water—BTEX	3 x 40-mL vials[a]	HCl, pH < 2, 4°C, protect from light	14 days
Water—Ammonia-N	500-mL polyethylene bottle	H_2SO_4, pH < 2, 4°C	28 days

TABLE 4-1 (CONTINUED)
Sample Containers, Preservatives, and Holding Times

Analysis	Container	Preservation/Storage	Maximum Hold Time
Water—Alkalinity	250-mL polyethylene bottle	4°C	14 days
Water—Iron (soluble)	100-mL polyethylene bottle	HNO_3, pH < 2, 4°C	6 months
Water—Hardness	100-mL polyethylene bottle	HNO_3, pH < 2, 4°C	6 months

[a] Teflon-lined cap or septa.
PCP = Pentachlorophenol.
TOC = Total Organic Carbon.
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes.
TCLP = Toxicity Characteristic Leachate Procedure.
TAL = Target Analyte List.
DRO = Diesel Range Organics.
TPH = Total Petroleum Hydrocarbons.

5.0 Sample Handling, Packaging and Shipment

Sample handling, packaging, and shipping procedures are described in Section 6 of the QAPP.

6.0 Decontamination Procedures

This section provides the general guidelines for the decontamination of personnel, sampling and monitoring equipment, and sample bottles.

The following equipment will be onsite:

- High-pressure liquid chromatography (HPLC)-grade or American Society for Testing Materials (ASTM) Type 2-grade water
- 2.5 percent by weight trisodium phosphate (TSP) and water solution
- 10 percent by volume methanol (MeOH) and water solution (only reagent-grade MeOH is to be used)
- Large plastic pails or tubs for TSP and water; scrub brushes; squirt bottles for TSP, methanol, and water; plastic bags and sheets
- Department of Transportation (DOT)-approved 55-gallon drum for disposal of waste
- Holding tanks for storage of purge water prior to testing and disposal

Note: Solutions of TSP and HPLC or ASTM Type 2-grade water will be used for decontamination.

6.1 Personnel Decontamination

The following decontamination procedures will be performed by site personnel after completion of tasks whenever the potential for contamination exists and when leaving the contaminated area.

1. Wash boots in TSP solution, then rinse with water. If disposable latex booties are worn over boots in the work area, rinse with TSP solution, remove, and discard.
2. Wash outer gloves in TSP solution, rinse, remove, and discard.
3. Remove respirator if worn.
4. Remove disposable coveralls (e.g., Tyveks®) and discard.
5. Remove inner gloves and discard.
6. At the end of the work day, shower entire body, including hair, either at the work site or at home.
7. Sanitize respirator if worn.

6.2 Sampling Equipment Decontamination

The soil/sediment sampling equipment will be decontaminated between each sample collection using the following procedures:

1. Scrape soils from sampler.
2. Wash sampler in a 2.5 percent by weight solution of nonphosphate detergent, such as Liquinox or an equivalent, in tap water.
3. Rinse with tap water.
4. Spray rinse with 10 percent MeOH solution
5. Spray rinse with HPLC or ASTM Type 2-grade water.
6. Place on plastic and allow to air dry.

All other sampling equipment will be decontaminated between sampling locations by the following procedures:

1. Wash contaminated equipment contact surfaces with 7.5 percent nonphosphate detergent solution.
2. Rinse with potable water.
3. Spray rinse with 10 percent MeOH solution.
4. Rinse with HPLC or ASTM Type 2-grade water and air dry.

6.3 Monitoring Equipment Decontamination

Monitoring equipment will be decontaminated between sampling locations (borings, wells, etc.) by the following procedures:

1. Wipe all contaminated surfaces that had possible contact with contaminated materials with a paper towel dampened with TSP solution.
2. Wipe all surfaces that may have had contact with contaminated materials with a paper towel dampened with potable water.
3. Wipe with a towel dampened with HPLC-grade or ASTM Type 2-grade water.
4. Dispose of all used paper towels as specified in Section 11 of the FSP.

6.4 Cone Penetrometer and Equipment Decontamination

The down hole cone penetrometer equipment will be decontaminated between boring locations by a built-in washer under the rig that decontaminates the rods as they come out of the probe hole.

7.0 Sampling Equipment and Field Procedures

7.1 Land Survey

At the initiation of the field effort, a surveying subcontractor will reestablish the site coordinate system that ERT used to identify sample locations. A number of permanent markers will be installed that are intended to remain in place through the RA. The system will allow CH2M HILL to locate the contaminated areas defined by ERT and others. Existing wells will be surveyed for vertical control.

At the end of the field effort all new sampling locations (borings, wells, soil, sediment, and surface water) will be surveyed.

During the initial land survey effort, the subcontractor will survey spot elevations to verify the topographic map produced by ERT and map changes caused by removal activities. Surface water elevations in the wetland will be measured at the same time initial water level measurements in the monitoring wells are being collected.

Horizontal and vertical survey control information will be acquired from the nearest control points.

7.2 Soil Sampling Procedures

7.2.1 Surface Soil/Sediment Sampling

Surface soils may be collected using a wide variety of equipment. Spoons, shovels, hand augers, push tubes, and posthole diggers made of the appropriate material may be used to collect surface soil samples.

Surface samples are removed from the ground and placed in pans, where they may be mixed thoroughly before sample containers are filled. If a thick, matted root zone is encountered at the surface, it should be removed before the sample is collected.

7.2.2 Sample Mixing

It is extremely important that soil samples for non-VOC analysis be mixed as thoroughly as possible to ensure that the sample is homogeneous and representative of the interval sampled. After collection, all sample handling should be minimized. Personnel should use extreme care to ensure that samples are not contaminated. If samples are placed in an ice chest, personnel should ensure that melted ice cannot cause sample containers to become submerged, as this may result in sample cross-contamination. Plastic bags, such as Zip-Lock® bags, should be used when small sample containers are placed in ice chests to prevent cross-contamination.

7.3 Subsurface Soil Sampling

A maximum of 12 eight subsurface soil samples are proposed at the wood chip/sand interface in the wood chip pile if the real time CPT/IF data indicate there is TPH contamination (Figure 2-2). Samples will be collected for onsite PCP analysis.
Samples will be collected using the CPT direct push rig. The probe hole is first advanced to the proper depth using the CPT . At the required depth the core sampler is lowered through the push rods and advanced ahead of the rods to collect the sample. The core sampler is opened and the sample tested with a PID. The sample is then transferred to a clean bowl and mix. The required volume is then placed in the appropriate sample jar and analyzed onsite for PCP.

7.4 Piezometer Installation

Upon completion of installation, piezometers will be surveyed for horizontal location and elevations. Elevations will be referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation measurements will be taken from a designated point on the riser pipe (chisel mark). Vertical elevations will be made to the nearest 0.01 foot and surveyed horizontally to within ± 0.1 feet.

7.4.1 Piezometer Construction and Groundwater Grab Sampling

The Push-in Plastic Piezometer (PIPP) groundwater sampling probe is hydraulically pushed into the ground using a 23-ton CPT rig. The PIPP consists of a PVC screen inside a hardened-steel cylindrical probe (approximately 1-7/8-inch O.D.) with a disposable cone-shaped stainless steel drive tip. The PIPP is used to sample water bearing zones and skim floating product by lowering a small diameter bailer (PVC, stainless steel or Teflon) through the drive rods into the PVC screen (see PIPP figure in CPT SOP). The PIPP can also be installed as a temporary small diameter piezometer, monitoring well, or air sparge point.

To collect water samples with the PIPP system, a 5-foot-long, cylindrical PVC screen is attached to the top end of the disposable stainless steel drive tip and the assembly is inserted into the bottom end of the hardened steel barrel, sealing the screen inside the barrel with an O-ring. The PIPP is then pushed into the ground to the desired sampling depth where the drive tip is detached from the steel sample barrel by retracting the push pipes approximately 4 feet, thus exposing most of the PVC screen which remains attached to the drive tip. Liquids then flow into the screen and are sampled by lowering a small-diameter (0.66- or 0.76-inch) bailer (PVC, stainless steel, or Teflon) down the push pipes from the surface. There is no need to develop or purge the system since the only liquid present in the test depth is undisturbed in situ fluid. When sampling is complete, flexible plastic grout tubing is inserted through the PIPP system to the bottom of the hole. The push pipes and sampler barrel are then removed with the PVC screen still attached, leaving the flexible plastic grout tubing and the stainless steel drive tip in place. A slurry of bentonite and/or cement is pumped through the plastic tubing as it is slowly withdrawn from the hole, sealing the probe hole from the bottom up.

After the PIPP is removed from the ground, it is disassembled and subjected to a three-stage decontamination procedure before reassembly. The first stage consists of washing and scrubbing using a laboratory-grade detergent solution and water. The components of the probe are then rinsed twice in deionized water. The PVC screen and stainless steel tip are replaced after each use (new screens and tips are brought to the site sealed in plastic following the manufacturing and decontamination process).

7.5 Groundwater Sample Collection

Groundwater samples will be collected once as part of the RI investigation. Dedicated bladder pumps will be installed in each of the existing monitoring wells. The pumps will be installed according to manufacturer's instructions.

Sample fractions for dissolved metal analyses will be field-filtered. Groundwater samples will also be field analyzed for pH, temperature, specific conductivity, DO, and Eh.

Before sampling, groundwater elevations will be measured at each well to verify local groundwater gradients and flow directions. Wells will be purged of stagnant water following level measurements and before collecting groundwater samples using low flow techniques.

Sampling equipment and procedures for water level measurements, field parameter measurements, groundwater sampling, and other related activities are presented below, and in the SOPs.

7.5.1 Groundwater/LNAPL Thickness Measurements

Groundwater elevations will be measured during the RA to monitor changes in gradients over time. Water level measurements will be conducted before the wells are purged. All measurements will be made within a 1-day period. Elevations will be measured with a conductivity-based electronic water level measuring device. The electronic device emits an audible signal when the probe touches the water. The depth measurement is read from the top of the inner casing at the tick mark. The procedures used to measure static water levels follow:

1. Lower the decontaminated probe into the well by unrolling cable from the hand-held reel.
2. Continue lowering until a signal is emitted indicating that the water table has been reached.
3. Read measurements directly to the nearest 0.01 foot. The length of cable in the well from the top of casing or other reference point to the probe (depth to the water table) will be subtracted from the measuring point elevation to determine the groundwater level elevation.
4. Decontaminate water level indicator equipment between wells. Detergent and solvent rinses will only be performed if visible contamination remains on the probe.

Several monitoring wells in the gully area between the oil/water separator and lagoon have light, non-aqueous phase liquids (LNAPL) present. The thickness of the LNAPL will be measured in the same manner as groundwater levels using an oil-water interface probe. The electronic device give off a beeping tone when it comes in contact with the LNAPL. At the LNAPL water interface the instrument gives of a continuous tone. These measurements are taken to the top of the protective casing.

7.5.2 Well Purging

Before groundwater sampling begins, wells will be purged of stagnant water.

Wells screened in low permeability formations (i.e., wells that can be purged dry) will be purged as follows:

1. Pump or bail the well dry.
2. Measure the field parameters for every well volume purged. The measurements indicate stable groundwater conditions when there is less than a 10 percent variability of parameters among three well volumes.
3. Wait 15 minutes, allowing the well to recover after purging. When the well recovers to 80 percent of its original level or when a sufficient volume of water exists for the intended analysis, the sampling may begin.

Wells screened in permeable formations will be purged as follows:

1. Begin pumping the well at a low flow rate of less than 300 mL per minute.
2. Measure field parameters every minute or half well volume.
3. When the field parameters agree within 10% or the previous two readings the well is ready to be sampled.
4. Limit the amount of air and turbulence into the formation during purging to prevent potential alteration of the samples.

7.5.3 Groundwater Field Parameter Measurements

Field parameters of pH, temperature, specific conductance, DO, and Eh will be measured while conducting groundwater sampling. The procedures to perform those field analyses are described in the SOPs.

7.5.4 Groundwater Monitoring Well Sampling Procedures

Low-flow groundwater sampling techniques will be used to collect the monitoring well samples. VOA vials will be filled first; containers for filtered metals will be filled last. In all cases, the samples are collected directly from the discharge line. To collect VOA samples reduce the volume of discharge from the sample line to approximately 100 mL/min. by adjusting the control box. Place the mouth of the VOA vial at the end of the discharge tube and allow bottle to fill slowly. Pour sample into a vial in a steady, gentle stream with a minimum of agitation. Fill until a meniscus forms on the mouth of the VOA vial.

Increase discharge rate back to 300 mL/min. and fill remaining sample containers by splitting successive pumped volumes between sampling containers and filling all containers to the shoulder. Before collecting filtered metals samples, attach an inline sample field filter directly to the discharge tube per manufacturer's instructions. Fill containers for metals analyses.

Cover well cap and lock steel access lid on concrete vault. After filling and preserving sample containers, place all in an iced container and bring to sample preparation area. Be sure to collect the requisite number of QA samples.

7.5.5 Groundwater Grab Sampling Procedures

The following sampling procedures will be used to collect groundwater grab samples from the borehole:

1. Disconnect push rods from the rig and install PVC screen to the end of the disposable stainless steel drip tube inserted into the bottom end of the steel push rods.
2. Push the push rods to the desired sampling depth.
3. Pull the push rods up approximately 4 feet to detach the drive tip and expose the PVC screen.
4. Determine the depth to water in the hole to the nearest 0.01 foot using an electronic water level indicator. The electronic meter consists of a tape with a contact electrode or probe suspended from an insulated cable, a reel, and an ammeter or small light or beeper. When the electrode or probe comes into contact with the water, an electrical circuit is completed, activating the meter light or beeper. The light, beeper, or ammeter may be located on the cable reel. Determine the depth of water using the following steps:
   - Lower the electrode or probe into the hole by pulling the cable from the hand-held reel.
   - Continue lowering until completion of the circuit is indicated by illumination of the small light, a beep, or deflection of the ammeter needle.
   - Measure the length of cable in the well from the top of the push rod casing to the probe (depth to the water table) to the nearest 0.01 foot measure the top of casing elevation to the ground surface to the nearest 0.01 foot.
   - Record depth in the field logbook.
5. Collect sample by lowering a small-diameter (0.66- or 0.75-inch) stainless steel bailer down the push rods from the surface.

6. Collect the samples in pre-preserved sample containers. VOA vials will be filled first; containers for filtered metals will be filled last.

7. After filling and preserving sample containers, place all in an iced container and bring to sample preparation area.

8. Be sure to collect the requisite number of QA samples.

7.6 Surface Water Sample Collection Procedures

The physical location of the investigator when collecting a sample may dictate the equipment to be used. Direct dipping of the sample container into the surface water is desirable. The following procedures will be used to collect surface water samples:

- Immerse the sample container to about mid-depth at arms length. Take precautions to avoid disturbing the bottom deposits while wading to the sample location.
- If water depths are greater than 3 feet, a boat will be used for the collection of surface water samples. Otherwise, waders will be used for the collection of samples.

7.6.1 Surface Water Field Parameter Measurements

Field parameters of pH, temperature, specific conductance, turbidity, and DO will be measured while conducting surface water sampling. The procedures to perform those field analyses are described in the SOPs.

7.7 Residential Well Sampling

See the Residential Well SOP.

8.0 Quality Control Sample Procedures

The offsite laboratories identified in the QAPjP each has a QC program to ensure the reliability and validity of the analyses being performed. QC procedures for pH, Eh, DO, specific conductance, and temperature measurements include calibrating the instruments as described in Section 7.0 of the QAPjP, measuring duplicate samples and checking the reproducibility of the measurements by taking multiple readings from a single sample. Field sampling precision and bias will be evaluated by collecting field duplicate and field blanks for laboratory analysis. The number and frequency of QC sample collection is summarized in Table 2-1.

8.1 Field Blank

Field blanks will be collected for both ground water and surface water samples. Since dedicated sample pumps will be used in the monitoring wells groundwater field blanks will be collected by pouring HPLC or ASTM type II water directly into the sample container. The sample bottles will be labeled as described in Section 3.1.1 of this plan. The samples will be preserved and stored in the same manner as the groundwater samples. The frequency of collection is listed in Table 2-1.

Surface water field blanks will be in the same manor as those for groundwater except the blank water will first be poured into a glass or steel beaker and then poured into the sample container.

8.2 Field Duplicates

Field duplicate samples will be collected and analyzed to determine the precision of field sampling. Groundwater and surface water field duplicate samples will be collected by alternately filling first the sample bottle for one analysis and then the duplicate bottle for one analysis. This procedure will be followed until the bottles for all analyses are filled. A separate inline filter will be used to fill the sample and duplicate containers for dissolved metals.

Soil/sediment field duplicate samples will be collected by placing the soil in a stainless steel bowl, mixing the sample by stirring, and then filling the individual sample and duplicate containers from the bowl.

8.3 Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicate (MS/MSD) samples will be collected for the parameters listed in Table 2-1. Two extra volumes of sample are required. Sample containers will be in the same manor as field duplicate samples. The frequency for collection of MS/MSD samples is listed in Table 2-1.

9.0 Field Measurements/Screening

Field measurement and screening techniques for pH, conductivity and temperature, DO, redox, PID monitoring, field filtering, CPT, pentachlorophenol immunoassay field procedure, residential well sampling, water level measurement and well purging, and soil gas sampling are provided in the SOPs.

10.0 Preventive Maintenance Procedures/ Schedule

Field team members will refer to the field procedure SOP or the manufacturers' instrument manuals for the appropriate preventive maintenance procedures and frequency for the field equipment used at the site.

11.0 Storage and Disposal of Investigation Derived Wastes, Decontamination Fluids, and Purge Water

The waste materials generated during a field investigation are known as Investigation Derived Wastes (IDW). Some of the waste materials may be hazardous wastes which must be properly disposed in accordance with USEPA regulations.

11.1 Types of Investigation-Derived Waste

Materials which may become IDW requiring proper treatment, storage and disposal are:

- Personnel protective equipment (PPE). This includes disposable coveralls, gloves, booties, respirator canisters, etc.
- Disposable equipment (DE). This includes plastic ground and equipment covers, aluminum foil, Teflon® tubing, broken or unused sample containers, sample container boxes, tape, etc.
- Soil cuttings from drilling or hand auguring.
- Groundwater obtained through well development or well purging.
- Cleaning fluids such as spent solvent and washwater.

11.2 Management of Non-Hazardous Investigation-Derived Waste

See the Site Management Plan.

11.3 Management of Hazardous Investigation-Derived Waste

See the Site Management Plan.

DATA MANAGEMENT PLAN
Remedial Investigation/Feasibility Study

Penta Wood Products
Town of Daniels, Wisconsin
Prepared by: CH2M HILL
WA No. 001-RICO-05WE/Contract No. 68-W6-0025
November 1997

1.0 Introduction

This Data Management Plan (DMP) outlines the procedures for storing, handling, accessing, and securing data collected during the Penta Wood Products (PWP) RI/FS. In addition to compiling data gathered during the RI/FS field investigation, data gathered during previous site investigations will be consolidated and compiled into a project environmental database system which can be used to evaluate site conditions and data trends. This DMP will serve as a guide for all database users. The DMP is subject to future revision to allow for modifications as implementation of the database management system proceeds.

- Data management for the PWP project has the following objectives:
- Establish a controlled, functional, and efficiently operated data management system and accompanying procedures to manage, analyze, document, and transfer the environmental data that are collected and generated in support of the RI/FS
- Maintain a usable and accurate database throughout the life of the PWP project
- Process specific data requests in support of the RI/FS
- Transfer the database or specific data components to other parties, as appropriate
- Archive the database and related documentation upon project closeout

2.0 Data Types

RI/FS activities performed at the PWP site will involve accessing a number of different types of data collected or retained for a variety of uses. The following generally describes the overall contents of the project database, based on the available data and data to be collected as part of the RI/FS.

2.1 Historical Data

Sources of historical data for the site compiled to date include information collected by other parties to characterize conditions at the site. This information includes both chemical and physical data for the site and surrounding area.

2.2 RI/FS Data

The FSP identifies additional data to be collected for further characterization of the site. These data will be added to the project database as they become available. The data will include screening and engineering data collected in the field and validated by CH2M HILL, and confirmational (laboratory) data which will be validated by USEPA. The source of the data will be noted in the database. Procedures for incorporating the data into the database are presented in subsequent sections of this DMP.

3.0 Data Tracking and Management

3.1 Hard Copy

Measurements made during field data collection activities will be recorded in field logbooks. Field data will be reduced and summarized, and will be stored along with the field logbooks.

All raw analytical laboratory data is stored as the original hard copy. Hard copy information includes chain-of-custody forms, analytical bench sheets, instrument printouts and chromatograms, certificates of analyses, and QA/QC report summaries.

3.2 Data Input Procedures

Sampling information, analytical results, applicable QA/QC data, and data validation qualifiers will be entered into an environmental database for storage and retrieval during data evaluation and report development. The data will be electronically entered into the database from files received from the analytical laboratory. The data entry will be checked by printing out data reports and manually comparing them to the validated summary analytical forms received from the USEPA validators. CH2M HILL will evaluate the validation summary forms.

Manual data entry of the historical site data will be 100 percent validated by comparing the hard copy printout of the data entered to the hard copy used to perform the data entry. All data entry validation procedures and results will be documented.

3.3 Computer Database

The computer database system uses Structured Query Language (SQL) combined with a macro-programming language and software tools to build menus, on-line forms, and report formats. The database will be based on a relational model, in which independent tables containing fields of data can be linked through selected fields that are common to two or more tables. This database design allows inclusion of the historical data, and allows users to effectively conduct trend analysis, and generate a variety of data reports to aid in data interpretation and report generation.

3.4 Access and Security

The database must be protected from unauthorized access, tampering, accidental deletions or additions, and data or program loss that can result from power outages or hardware failure. The following procedures will be adopted to ensure this protection:

- A copy of the master database will be stored on the local area network (LAN) file server computer and will be protected with file passwords known only to the Data Administrator. The Data Administrator is the only person who will be authorized to modify the master database.
- The master database will be archived onto 3.5-inch diskettes and stored at a secure location. The disks will be backed up whenever changes are made to the master

database. Before archiving, the data will be compressed to reduce storage using the PKZIP utility from PKWARE, Inc.

- A copy of the master database will be placed on the LAN under a directory with limited "read only" access rights to users, which will permit readers to only copy or view the data. Whenever the master database is modified, it will be recopied to the LAN to ensure that the current copy is available to users.

The LAN copy of the master database will be backed up through the standard LAN backup procedures that are administered by the Regional Computer Center support staff. These backups occur each day.

3.5 Documentation

Documentation of data management activities is critical because it provides:

- A hard copy record of project data management activities
- Reference information critical for database users
- Evidence that the activities have been properly planned, executed, and verified
- Continuity of data management operations when personnel changes occur

This DMP will serve as the initial general documentation of the project data management efforts. Additional documentation will also be maintained to document specific issues such as database structure definitions, database inventories, database maintenance, user requests, database issues and problems, and client contact.

3.6 Evidence File

The final evidence file will be the central repository for all documents which constitute evidence relevant to sampling and analysis activities. CH2M HILL is the custodian of the evidence file and maintains the contents of the evidence files for the RI/FS, including all relevant records, reports, logs, field notebooks, pictures, subcontractor reports, and data reviews in a secured, limited access area under the custody of CH2M HILL.

All records will be kept by CH2M HILL until project completion and project closeout. As necessary, records may be transferred to an offsite records storage facility. The records storage facility must provide secure, access controlled storage of records. Records of raw analytical laboratory data, quality assurance data and reports will be kept by the subcontract laboratory for a minimum of five years.

4.0 Presentation of Site Characterization Data

Depending on the data user needs, data presentation may consist of, but not be limited to, any of the following formats:

- Spreadsheet presentations of data summaries or raw data
- Figures showing concentration isopleths, location-specific concentrations, or risk-based concentration isopleths
- Tables providing statistical evaluation results or calculation results
- Presentation tools such as ARCINFO or other similar analysis/presentation aids

STANDARD OPERATING PROCEDURES
Remedial Investigation/Feasibility Study

Penta Wood Products
Town of Daniels, Wisconsin
Prepared by: CH2M HILL
WA No. 001-RICO-05WE/Contract No. 68-W6-0025
November 1997

Standard Operating Procedures

pH
Conductivity and Temperature
Redox
PID Monitoring
Field Filtering
Dissolved Oxygen
Cone Penetrometer Testing
Pentachlorophenol Immunoassay Field Procedure
Residential Well Sampling
Water Level Measurement and Well Purging
Soil Gas Meter Sampling

pH

FIELD MEASUREMENT OF pH

I. Purpose

To provide a general guideline for field measurement of pH

II. Scope

Standard field pH determination techniques for use on groundwater samples.

III. Equipment/Materials

- pH buffer solutions for pH 4, 7, and 10
- Deionized water in squirt bottle
- pH meter
- Combination electrodes
- Beakers
- Glassware that has been washed with soap and water, rinsed twice with hot water, and rinsed twice with deionized water
- solution of KCl

IV. Procedures/Guidelines

A. CALIBRATION

Note: Calibrate unit prior to initial daily use and at least once every 4 hours or every 5 samples, whichever is less. Calibrate with at least 2 solutions. Clean probe according to manufacturers recommendations. Duplicate samples should be run once every 10 samples or every 4 hours.

1. Place electrode in pH 7 buffer solution.
2. Allow meter to stabilize and then turn calibration dial until a reading of 7.0 is obtained.
3. Rinse electrode with deionized water and place it in a pH 4 or pH 10 buffer

solution.

4. Allow meter to stabilize again and then turn slope adjustment dial until a reading of 4.0 is obtained for the pH 4 buffer solution or 10.0 for the pH 10 buffer solution.

5. Rinse electrode with deionized water and place in pH 7 buffer. If meter reading is not 7.0, repeat sequence.

B. PROCEDURE

1. Before going out into the field:

   - Check batteries.
   - Do a quick calibration at pH 7 and 4 to check electrode.
   - Obtain fresh solutions.

2. Calibrate meter using calibration procedure.

3. Pour the sample into a clean beaker.

4. Rinse electrode with deionized water between samples.

5. Immerse electrode in solution. Make sure the white KCl junction on the side of the electrode is in the solution. The level of electrode solution should be one inch above sample to be measured.

6. Recheck calibration with pH 7 buffer solution after every five samples.

C. GENERAL

1. When calibrating the meter, use pH buffers 4 and 7 for samples with pH <8, and buffers 7 and 10 for samples with pH >8. If meter will not read pH 4 or 10, something may be wrong with the electrode.

2. Measurement of pH is temperature dependent. Therefore, temperatures of buffers and samples should be within about 2 degrees C. For refrigerated or cool samples, use refrigerated buffers to calibrate the pH meter.

3. Weak organic and inorganic salts and oil and grease interfere with pH measurements. If oil and grease are visible, note it on the data sheet. Clean electrode with soap and water and rinse with a 10% solution of HCl. Then

recalibrate meter.

4. Following field measurements:

   - Report any problems
   - Compare with previous data
   - Clean all dirt off meter and inside case
   - Store electrode in pH 4 buffer

Accuracy and precision are dependent on the instrument used; refer to manufacturer's manual. Expected accuracy and precision are +/- 0.1 pH unit.

V. Attachments

None

VI. Key Checks/Items

- Check batteries
- Calibrate
- Clean probe with deionized water when done

VII. Preventative Maintenance

- Refer to operation manual for recommended maintenance.
- Check batteries, Have a replacement set on hand.

Conductivity and Temperature

FIELD MEASUREMENT OF SPECIFIC CONDUCTIVITY AND TEMPERATURE

I. Purpose

To provide a general guideline for field measurement of specific conductivity and temperature.

II. Scope

Standard field conductivity and temperature techniques for use on groundwater samples.

III. Equipment/Materials

- Conductivity meter and electrode
- Distilled water in squirt bottle
- Beaker or other container to hold sample
- Standard Potassium Chloride (KCl) Solution (0.01 N)

IV. Procedures/Guidelines

A.TECHNICAL: Detection limit = 1 umho/cm @ 25 C; range = 0.1 to 100,000 umho/cm

B. CALIBRATION

Note: Calibrate prior to initial daily use and at least once every 4 hours or every 5 samples, whichever is less. Calibrate with standard solution. The standards should have different orders of conductance. Clean prove according to manufacturers recommendations. Duplicates should be run once every 10 samples or every 4 hours.

1. With mode switch in OFF position, check meter zero. If not zeroed, set with zero adjust.
2. Plug probe into jack on side of meter.
3. Turn mode switch to red line and turn red line knob until needle aligns with

red line on dial. If They cannot be aligned, change the batteries.

4. Immerse probe in 0.01 N standard KCl solution. Do not allow the probe to touch the sample container.
5. Set the mode control to TEMPERATURE. Record the temperature on the bottom scale of the meter in degrees C.
6. Turn the mode switch to appropriate conductivity scale (i.e. x100, x10, or x1). Use a scale that will give a mid-range output on the meter.
7. Wait for the needle to stabilize. Multiply reading by scale setting and record the conductivity. The conductivity must then be corrected for temperature.
8. Calculate conductivity using the formula:

$$G_{25} = G_T / [1 + 0.02 (T - 25)]$$

Where:

G_{25} = conductivity at 25 C, umho/cm
T = temperature of sample, degrees C
G_T = conductivity of sample at temperature T, umho/cm

The table below lists the values of conductivity the calibration solution would have if the distilled water were totally non-conductive, however even water of very high purity will still possess a small amount of conductivity.

Temperature (C)	Conductivity (umho/cm)
15	1,141.5
16	1,167.5
17	1,193.6
18	1,219.9
19	1,246.4
20	1,273.0
21	1,299.7
22	1,326.6
23	1,353.6
24	1,380.8
25	1,408.1
26	1,436.5
27	1,463.2
28	1,490.9
29	1,518.7
30	1,546.7

9. Rinse the probe with deionized water

10. Run sample and rinse with deionized water when done

V. Attachments

Note

VI. Key Checks/Items

- Check battery
- Calibrate
- Clean probe with deionized water when done
- When reading results, note sensitivity settings

VII. Preventative Maintenance

- Refer to operations manual for recommended maintenance.
- Check batteries. Have a replacement set on hand.

Redox

FIELD REDOX (OXIDATION/REDUCTION) MEASUREMENT

I. Purpose

To provide a general guideline for field measurement of oxidation/reduction potential in water

II. Scope

Standard method of field REDOX measuring techniques.

III. Equipment/Materials

- pH meter with millivolt mode setting (1 mV sensitivity)
- Platinum combination electrodes
- Beaker or other container to hold sample
- Distilled water
- Operation manual

IV. Procedures/Guidelines

1. Calibrate the meter using the calibration procedure outlined in the operation manual
2. Pour the sample into a clean beaker
3. Immerse the electrode in the sample allowing several minutes for the electrode to equilibrate. Make sure the electrode is completely submerged. The level of electrode solution must be about one inch above the sample being measured.
4. Record the mV reading, temperature and pH.
5. Rinse the electrode with deionized water between samples. If electrode appears oily, clean with mild soap and water, and rinse with distilled water. Recalibrate.

Note: oils and grease can interfere with measurement. If visible, note it in the field logbook.

V. Attachments

None.

VI. Key Checks/Items

- pH meter with millivolt scale
- Follow manufacturer's instructions for setup and use.
- Keep electrodes clean
- Clean probe with deionized water when done

VII. Preventative Maintenance

- Refer to operation manual for recommended maintenance.
- Check batteries, Have a replacement set on hand.

PID Monitoring

PHOTOIONIZATION DETECTOR (PID) MONITORING: OVM

I. Purpose

To provide general guidelines for the calibration and use of the OVM photoionization detector.

II. Scope

This is a general guideline for the field use of an OVM. For specific instructions, refer to the operations manual.

III. Equipment/Materials

- OVM 158
- Operation manual
- Charging unit
- Probe
- Span gas for calibration, typically 100 PPM isobutylene
- "Zero" calibration gas
- Calibration gas regulator
- "T" tubing assembly to supply calibration gas to the instrument at ambient pressure
- A bottle of aluminum oxide for lamp cleaning (a screw driver will be needed to open the unit)

IV. Procedures/Guidelines

ONLY PROPERLY TRAINED PERSONNEL SHOULD USED THIS INSTRUMENT. FOR SPECIFIC INSTRUCTIONS, SEE OPERATION MANUAL.

A. Turn instrument on

1. Power up the instrument by plugging in the power plug attached to the back, or connecting the charger cable to the recharge port.

2. Press “ON/OFF” key to light lamp and start pump. “LAMP OUT” will be displayed if lamp is not functioning.

B. Zero and Calibrate

Note: It is assumed that RF and lamp are set to the proper settings, and span gas programmed in the instrument is correct. If not, refer to the operation manual.

1. Press “MODE/STORE” key.
2. Using “-/CRSR” key, scroll through menu until display reads “RESET TO CALIBRATE”.
3. Press “RESET” key.
4. Press “-/CRSR” key in response to “RESTORE BACKUP” prompt.
5. Using the “T” connector, connect the “zero” calibration gas cylinder to the instrument probe and open the valve (or zero with ambient air).
6. Press “RESET” key to begin zeroing the instrument. When done, display should read “SPAN PPM= ___ + TO CONTINUE”.
7. Close valve and disconnect zero gas cylinder.
8. Press “+/INC” key.
9. Connect span gas cylinder to the instrument probe using the “T” connector and open the valve.
10. Press “RESET” key.
11. When calibration is complete, display will read “RESET TO CALIBRATE”. Press “MODE/STORE” key. Display should read close the concentration of the span gas.
12. Close valve and disconnect span gas cylinder.
13. OVM will be operating in the survey mode.

C. Sampling with the OVM

1. When calibration is complete and the “MODE/STORE” key is pressed (step

11 above), the OVM will be operating in the normal survey mode.

2. When monitoring is done, press "ON/OFF" key.
3. Disconnect the power plug in back of the unit, plug in the cord from the battery charger and recharge the battery overnight.

V. Attachments

None

VI. Key Checks/Items

- Zero and calibrate
- Recharge unit after use
- Clean lamp as needed

VII. Preventative Maintenance

A complete preventative maintenance program is beyond the scope of this document. For specific instructions, refer to the operations manual.

A complete spare OVM should be available on site whenever field operations require this instrument.

Occasional cleaning of the lamp with aluminum oxide powder should be performed as needed.

Charge batteries daily.

Occasionally allow the batteries to totally discharge before recharging to prevent battery memory from occurring.

Field Filtering

FIELD FILTERING of AQUEOUS SAMPLES

I. Purpose

To provide a general guideline for the field filtering of water samples for dissolved metals analysis.

II. Scope

Standard method of field filtering techniques.

III. Equipment/Materials

- nitric acid (HNO_3) solution.
- DI water
- ml Disposable filter systems with 0.45 cellulose acetate filters
- Glass fiber prefilters
- Vacuum source

IV. Procedures/Guidelines

A. FILTER STAND METHOD

1. Prepare HNO_3 solution: Add about 900 ml of DI water to a 1 liter Erlenmeyer flask. Using a graduated cylinder, add 100 ml concentrated HNO_3 to the DI water while stirring.
2. Attach a vacuum source (pump, syringe, etc.) to the funnel/receiver assembly.
3. Flush the entire filter system with 10% HNO_3 solution. Open assembly, discard rinsate and reassemble unit.
4. Flush the entire filter system with demonstrated analyte free deionized water. Open assembly, discard rinsate and reassemble unit.
5. Filter sample and transfer to polyethylene bottle (with preservative) for shipment.

6. Discard filter assembly and prefilter.

B. IN-LINE DISPOSABLE FILTER METHOD

1. With the peristaltic pump running, purge the inlet and outlet tubing with distilled water. Make sure all of the distilled water is out of the tubing before filtering the sample .
2. Submerge the inlet tube from the peristaltic pump into the sample to be filtered.
3. Attach a new in-line filter to the outlet tube of the peristaltic pump making sure the sample flow is in the same direction as the arrow on the filter housing.
4. Turn on the peristaltic pump and discard a small amount of the initial sample that flows out of the filter. Pump the remainder of the filtered sample into a clean bottle.
5. Add the required preservative to the filtered sample.
6. Discard the filter.
7. Repeat Step 1 or remove the peristaltic pump tubing and replace with new.

V. Attachments

None.

VI. Key Checks/Items

- HNO_3 solution for cleaning
- All purge water must be distilled or deionized
- Preserve samples when done

Dissolved Oxygen

FIELD DO (dissolved oxygen) MEASUREMENT

I. Purpose

To provide a general guideline for field measurement of dissolved oxygen in water

II. Scope

Standard method of field DO measuring techniques.

III. Equipment/Materials

- Dissolved oxygen meter
- Thermometer
- Deionized water
- Sample bottle with cap
- Operation manual

IV. Procedures/Guidelines

1. Set up and calibrate the DO meter by following the instructions in the operation manual.
2. When collecting the sample, carefully fill the bottle to prevent aeration. If DO cannot be measured immediately, completely fill and cap the bottle. There can be no bubbles present.
3. To measure the DO in a sample, insert the probe into the sample, making sure there are no bubbles in the bottle.
4. Gently stir the sample with the probe until the instrument stabilizes. Allow sufficient time.
5. Read the DO level directly from the instrument's meter.
6. Rinse probe with deionized water between samples

V. Attachments

None.

VI. Key Checks/Items

- Do not aerate sample; eliminate all bubbles
- Cap bottle if measurement is delayed
- Follow manufacturer's instructions for setup and use.
- Clean probe with deionized water when done

VII. Preventative Maintenance

- Refer to operation manual for recommended maintenance.
- Check batteries, Have a replacement set on hand.

Cone Penetrometer Testing

3. Project: City of Blythe/Comingled Plume Delineation and Remediation

HFA has been working with the City of Blythe since 1994 to assess the extent of contamination from past industrial activities in the City of Blythe, California. HFA has conducted over 20,000 linear feet of CPT testing, and direct-push soil and groundwater sampling throughout the City. At present, HFA is engaged in a citywide program of CPT-IF testing (approximately 30 days of CPT-IF testing and ground water & soil sampling). The work requires full decontamination of all downhole equipment, and full-depth grouting at completion of each probe hole.

Period of Performance	1994 to date (CPT-IF work: September/October 1997)
Cost:	$120,000 (estimated cost of current CPT-IF work)
Client:	City of Blythe Department of Public Works
Contact:	Mr. Charles Hull, Public Works Director (760/922-6611)

In addition to the projects outlined above, HFA has conducted several small CPT-IF projects for a number of our other clients.

Project Approach

HFA proposes to use a 23-ton, 3-drive-axle CPT rig for the subject project. In order to operate without difficulty at all locations, our CPT rig can be converted to a tracked vehicle in less than an hour (using removable tracks). The CPT rig will be accompanied by a support vehicle that carries all supplies. Our rigs are equipped with portable generators so that we can avoid cumbersome electrical extension cords.

Prior to start of any work, HFA's CPT crew will examine the site with CH2M HILL's site representative in order to finalize the sequence in which sounding/sampling activities are to be conducted. The HFA senior operator will also coordinate utility clearance and local supply sources for expendables during the first two-days on site. We expect the CPT-IF soundings to begin on the second or third day on site.

The soundings will be conducted using a cone with a 15 cm cone (projected tip area of 1500 mm^2), equipped with an electrical conductivity module (in addition to the standard tip and sleeve resistance measurement elements), and followed by UV-induced fluorescence module. After setting up on each location as directed by CH2M HILL, each CPT-IF sounding will be advanced to a depth of approximately 130 feet below ground surface (bgs) or refusal, unless otherwise directed by CH2M HILL's field representative.

As the hydraulic rams in the 23-ton CPT rig push a CPT probe into the ground, the resistance measured at the cone tip and along the friction sleeve will be monitored continuously. Tip, sleeve, electrical conductivity, and UV-induced fluorescence measurements will be recorded at approximately 25-mm (1-inch) intervals by the rig-based data acquisition system for real-time display on a monitor and on-site paper plotting. A copy of the draft field printout will be provided to CH2M HILL at the end of each sounding.

All field data will be transmitted to HFA's CPT headquarters in Irvine, California. Final peer reviewed copies of CPT logs will be provided to CH2M HILL within 10 working days of the end of field work. The Peer Review will be provided by Mr. Dick Carlton and Dr. Girish Agrawal.

At the end of each CPT-IF sounding, the downhole equipment will be withdrawn and water sampling equipment (please see the attached PIPP information sheets) will be inserted to the bottom of the hole. After collection of a water sample, the sampler screen (and blank riser pipes) will be withdrawn and grout tubing inserted into through the metal pipes to the bottom of the hole. The pipe string will then be withdrawn and the CPT rig will move on to the next location. The 2nd crew member will pump grout through the flexible tubing left in the hole and ensure site clean up. Additional water samples will be collected next to a CPT-IF hole if we are so instructed by CH2M HILL's field representative. Multiple depth water sampling can be done in one probe hole by exiting at the end of one sampling event, and then renetering the same hole with a fresh, decontaminated set of sampler screens and a disposable wooden tip. The tip from the previous sampling event will be pushed aside once the sampler reaches the previous depth and the sampler is then advanced to the next desired depth. The down hole equipment is decontaminated by a buil-in washer under the rig as it comes out of the probe hole. This minimizes any chance of contamination being carried from one depth down to another.

Soil sampling will be conducted using a direct-push sampler with a retractable tip. Soil samples will be collected in pairs of brass or stainless steel liners (1.25-inch ID and 3.81-inch in length).

We estimate that a total of approximately thirty-five (35), 10-hour work days will be required to complete the subject project, including all equipment and personnel decontamination and final site clean-up and waste disposal. We expect that an average of two (2) CPT-IF soundings will be conducted each work day. This includes collection of a ground water grab sample at the bottom of each CPT sounding, eqyuipment and personnel decontamination, and full-depth grouting of each probe hole. The soil sampling is expected to take the equivalent of 5 work days, with small-diameter piezometer installation expected to take two work days. In addition to the two (2) days allowed at project start for site familiarization and set up, we have allowed an additional two (2) days at the end of the project for site clean up and waste disposal.

HOLGUIN, FAHAN & ASSOCIATES, INC'S, PIPP GROUNDWATER SAMPLER

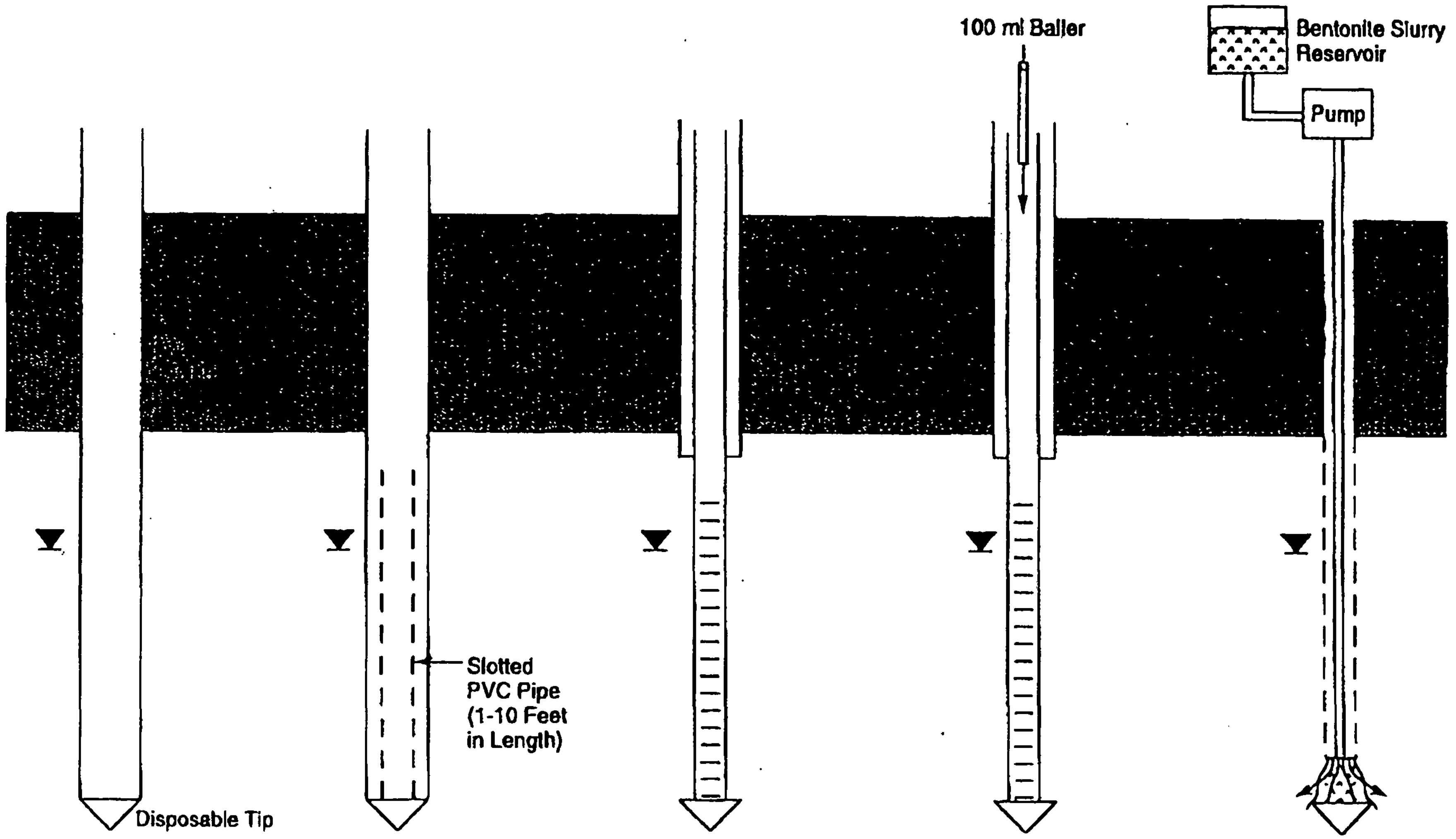
The Push-In Plastic Piezometer (PIPP) groundwater sampling probe is hydraulically pushed into the ground using a 23-ton CPT rig. The PIPP consists of a PVC screen inside a hardened-steel cylindrical probe (approximately 1 7/8-inch O.D.) with a disposable cone shaped stainless steel drive tip. The PIPP is used to sample water bearing zones and skim floating product by lowering a small diameter bailer (PVC, stainless steel or Teflon) through the drive rods into the PVC screen. The PIPP can also be installed as a temporary small diameter piezometer, monitoring well or air sparge point.

To collect water samples with the PIPP system, a 5-foot long, cylindrical PVC screen is attached to the top end of the disposable stainless steel drive tip and the assembly is inserted into the bottom end of the hardened steel barrel, sealing the screen inside the barrel with an O-ring. The PIPP is then pushed into the ground to the desired sampling depth where the drive tip is detached from the steel sample barrel by retracting the push pipes approximately 4 feet, thus exposing most of the PVC screen which remains attached to the drive tip. Liquids then flow into the screen and are sampled by lowering a small diameter (0.66 or 0.75 inch) bailer (PVC, stainless steel or Teflon) down the push pipes from the surface. There is no need to develop or purge the system since the only liquid present at the test depth is undisturbed in-situ fluid. When sampling is complete, flexible plastic grout tubing is inserted through the PIPP system to the bottom of the hole. The push pipes and sampler barrel are then removed with the PVC screen still attached, leaving the flexible plastic grout tubing and the stainless steel drive tip in place. A slurry of bentonite and/or cement is pumped through the plastic tubing as it is slowly withdrawn from the hole, sealing the probe hole from the bottom up.

After the PIPP is removed from the ground, it is disassembled and subjected to a three-stage decontamination procedure before reassembly. The first stage consists of washing and scrubbing using a laboratory grade detergent solution and water. The components of the probe are then rinsed twice in deionized water. The PVC screen and stainless steel tip are replaced after each use (New screens and tips are brought to the site sealed in plastic following the manufacturing and decontamination process).

HOLGUIN, FAHAN & ASSOCIATES, INC.
ENVIRONMENTAL MANAGEMENT CONSULTANTS
143 South Figueroa Street • Ventura, California 93001 • (805) 652-0219 • FAX (805) 652-0793
2820 Pegasus Drive, Suite 1 • Bakersfield, California 93308 • (805) 391-0517 • FAX (805) 391-0826
16570 Aston Street • Irvine, California 92714 • (714) 442-6665 • FAX (714) 724-0446

"Push in" PVC Piezometer (PIPP's)



(1)
Steel Casing Pushed to
Desired Depth Below
Groundwater Level

(2)
PVC Pipe Installed
Inside Steel Casing

(3)
Steel Casing Retracted
to Expose Slotted PVC

(4)
Short Term Sampling
Bailer Lowered Inside PVC
to Collect Sample

(5)
Hole Sealed with
Bentonite Slurry
After Casing and
Screen Removal

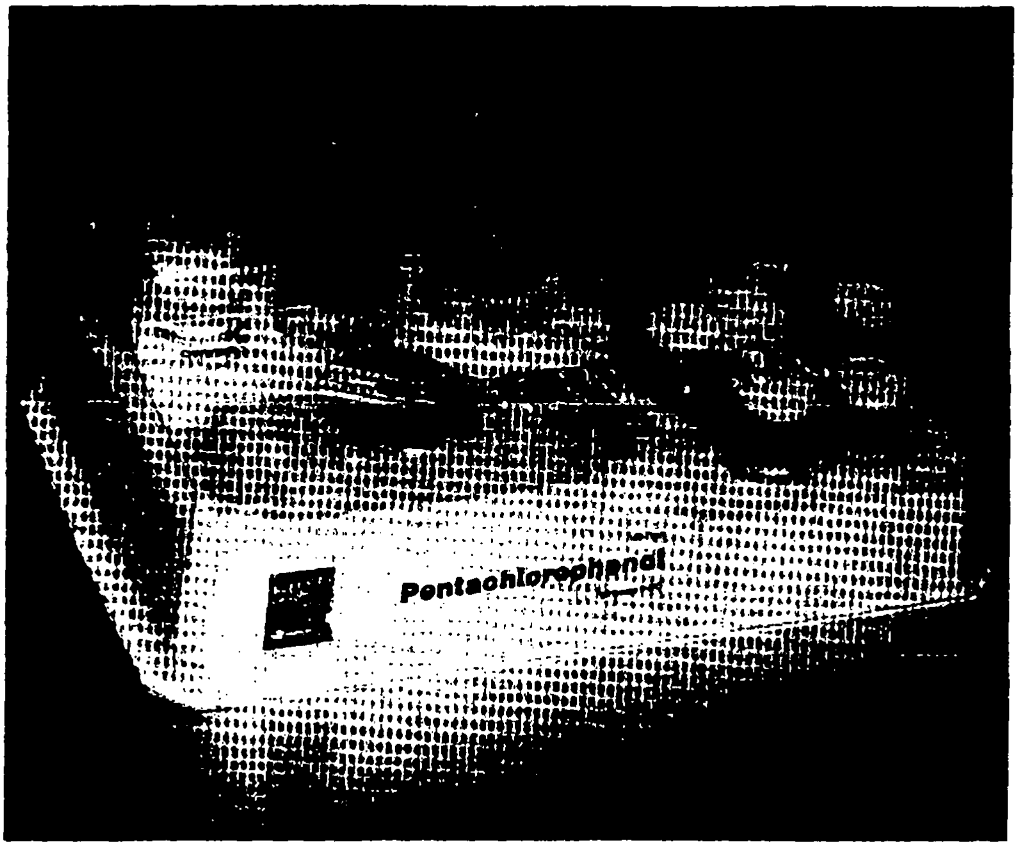
HOLGUIN, FAHAN & ASSOCIATES, INC.

Pentachlorophenol Immunoassay
Field Procedure

OHMICRON
... The Quality Difference

Product Profile

Pentachlorophenol RaPID Assay®



General Description

Pentachlorophenol (PCP) is a broad spectrum pesticide used in the wood and paper industry as a fungicide to protect against rot, and as an insecticide for the control of termites and other wood boring insects. Primary applications include preservation treatment of utility poles, marine pilings and fence posts, and as a slime reducer in paper and pulp milling. PCP is also used as a pre-harvest defoliant in cotton. PCP residues may contaminate soil, wells, surface and groundwaters due to runoff, spills, normal-use spraying and industrial waste effluents.

PCP is classified by the EPA as a Group B2 contaminant, a probable human carcinogen based on sufficient evidence in animals and inadequate data in human studies (US EPA, 1991). PCP is highly toxic and may be fatal if inhaled, swallowed or ingested through the skin. The US EPA has set a Maximum Contaminant Level for PCP in drinking water of 1 ppb.

The current EPA-approved method for the detection of PCP in drinking water (Method 515.5) is costly and requires a lengthy sample preparation including the esterification of PCP. The Pentachlorophenol RaPID Assay® eliminates the need for clean-up steps and GC/ECD instrumentation.

The Pentachlorophenol RaPID Assay applies the principles of enzyme linked immunosorbent assay (ELISA) to the determination of the pesticide. ELISAs use selective antibodies which are attached to solid supports, in combination with sensitive enzyme reactions. The immunochemical reaction provides high selectivity due to the extraordinary discriminatory capabilities of antibodies. The powerful catalytic ability of the enzyme provides highly sensitive detection. These features produce an analytical system capable of detecting very low levels of chemicals.

The Pentachlorophenol RaPID Assay is based on the use of magnetic particles as the solid support and means of separation. The magnetic particles allow rapid reaction kinetics, provide precise addition of antibody, and facilitate ease-of-use.

Features

Rapid - results in less than 60 minutes.

Precise - no well-to-well or tube-to-tube variation due to antibody coating.
- within assay %CV <8%, and between assay %CV <2% at 3 ppb.

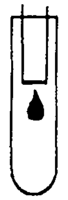
Accurate - use of a highly selective immunochemical method.

Efficient - reduced time and cost of materials compared to traditional methods.

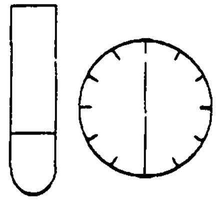
Sensitive - least detectable dose of 0.06 ppb pentachlorophenol (90% B/Bo).

Test Range - water: 0.06 to 10.0 ppb as pentachlorophenol.
soil: 0.10 to 10.0 ppm as pentachlorophenol.

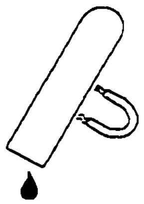
Assay Protocol — Pentachlorophenol RaPID Assay®



1. Add 200 µL sample, 250 µL enzyme conjugate, and 500 µL antibody coupled magnetic particles.

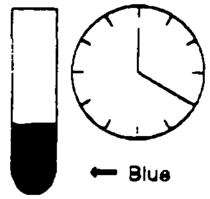


2. Incubate for 30 minutes.

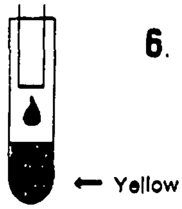


3. Using the RaPID magnetic separator, decant and wash (2x)

4. Add 500 µL color reagent.



5. Incubate 20 minutes. Blue color develops.



6. Stop the reaction and read color at 450 nm. Solution turns yellow.

Performance

Precision

Water samples were fortified with PCP at different levels and assayed in singlicate five times over five days. The following results were obtained (n=25):

Sample #	1	2	3	4
Mean	0.51	1.87	3.16	8.63
% CV [a]	12.5	8.8	7.7	6.7
% CV [b]	11.4	8.6	1.8	3.2

[a] within assay [b] between assay

Specificity

The proprietary antibody used in this assay was developed to detect PCP. The cross-reactivity with various organochlorine pesticides and other compounds can be expressed as the least detectable dose (LDD) which is estimated at 90% B/B0.

Compound	LDD Water (ppb)	LDD Soil (ppm)	50%B/Bo Water (ppb)	50%B/Bo Soil (ppm)
Pentachlorophenol	0.08	0.10	2.20	2.20
2,3,5,6-Tetrachlorophenol	0.21	0.39	4.08	4.08
2,3,4,6-Tetrachlorophenol	0.81	1.21	14.60	14.60
2,3,5-Trichlorophenol	1.52	3.71	62.90	62.90
2,3,6-Trichlorophenol	2.44	4.39	119	119
Tetrachlorohydroquinone	8.70	13.50	148	148
2,4,6-Trichlorophenol	15.10	22.30	463	463
2,4,5-Trichlorophenol	21.60	37.80	574	574
2,3,4-Trichlorophenol	53.20	122	>1000	>1000
2,5-Dichlorophenol	62.9	207	>1000	>1000
2,6-Dichlorophenol	266	424	>1000	>1000
2,3-Dichlorophenol	611	>1000	>1000	>1000
2,4-Dichlorophenol	887	>1000	>1000	>1000
Hexachlorobenzene	1560	>1000	>1000	>1000
3,5-Dichlorophenol	1670	>1000	>1000	>1000
Hexachlorocyclohexane	5790	>1000	>1000	>1000

Solvent Tolerances

The following solvents do not interfere with this assay when their concentration in the sample is at, or lower, than those listed.

Solvent	Maximum Concentration Tolerated
Acetone	5%
Acetonitrile	2%
Methanol	10%

Recovery

Four water samples, taken from a small creek, local pond, well and municipal water source were fortified with various levels of pentachlorophenol and assayed with this system. The following results were obtained (n=12):

Amount of PCP Added (ppb)	Recovery	
	Mean ± S.D.	%
0.50	0.49 ± 0.09	98
1.50	1.63 ± 0.17	108
3.00	3.34 ± 0.29	111
8.00	8.43 ± 0.71	105
Average		105

Non-Interferences

The magnetic particle wash during early test steps efficiently eliminates potential interfering substances, e.g., ions, particulate material and chromogenic substances. The following compounds and ions had no effect on the pentachlorophenol assay at or below the indicated concentration.

Compound	Concentration	
Calcium	250	ppm
Copper	250	ppm
Iron	50	ppm
Manganese	250	ppm
Magnesium	250	ppm
Mercury II	250	ppm
Nickel	250	ppm
Nitrate	250	ppm
Phosphate	250	ppm
Sodium Chloride	650	mM
Sulfate	10,000	ppm
Sulfite	250	ppm
Thiosulfate	250	ppm
Zinc	250	ppm

Results

When using the RPA-I RaPID Analyzer™, results are directly reported in ppb pentachlorophenol. If read in a standard spectrophotometer, results from the calibrators are plotted on graph paper and used to determine final results. It is recommended that a control be included in each run. A positive control (1.0 ppb) is supplied with the Pentachlorophenol RaPID Assay kit.

The Pentachlorophenol RaPID Assay® kit provides screening results. Positive results should be confirmed by an independent, non-immunological method.

Ordering Information

Pentachlorophenol Products

RaPID Assay kit, 30 and 100 tests
Sample Diluent, 100 mL
Proficiency Samples
Sample Extraction kit, 20 tests

For ordering or technical assistance contact:

Sales Department
Ohmicron Environmental Diagnostics, Inc.
1-800-544-8881
(215) 860-5115
Fax (215) 860-5213

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7-95
L00044

RaPID Assays®

Pentachlorophenol

• Intended Use

For detection of pentachlorophenol in water (groundwater, surface water, well water). For soil, crop, and food use refer to specific application bulletins.

For use as SW-846 Method 4010 "Screening for Pentachlorophenol by Immunoassay" see Ohmicron Technical Bulletin #T00084.

• Principle

The Pentachlorophenol RaPID Assay® applies the principles of enzyme linked immunosorbent assay (ELISA) to the determination of pentachlorophenol. The sample to be tested is added, along with an enzyme conjugate, to a disposable test tube, followed by paramagnetic particles with antibodies specific to pentachlorophenol attached. Both the pentachlorophenol (which may be in the sample) and the enzyme labeled pentachlorophenol (the enzyme conjugate) compete for antibody binding sites on the magnetic particles. At the end of an incubation period, a magnetic field is applied to hold the paramagnetic particles (with pentachlorophenol and labeled pentachlorophenol analog bound to the antibodies on the particles, in proportion to their original concentration) in the tube and allow the unbound reagents to be decanted. After decanting, the particles are washed with Washing Buffer.

The presence of pentachlorophenol is detected by adding the enzyme substrate (hydrogen peroxide) and the chromogen (3,3',5,5'-tetramethylbenzidine). The enzyme-labeled pentachlorophenol analog bound to the pentachlorophenol antibody catalyzes the conversion of the substrate/chromogen mixture to a colored product. After an incubation period, the reaction is stopped and stabilized by the addition of acid. Since the labeled pentachlorophenol (conjugate) was in competition with the unlabeled pentachlorophenol (sample) for the antibody sites, the color developed is inversely proportional to the concentration of pentachlorophenol in the sample.

• Reagents

1. Pentachlorophenol Antibody Coupled Paramagnetic Particles
The pentachlorophenol antibody (rabbit anti-pentachlorophenol) is covalently bound to paramagnetic particles, which are suspended in buffered saline with preservative and stabilizers.
30 test kit: one 20 mL vial
100 test kit: one 65 mL vial

2. Pentachlorophenol Enzyme Conjugate
The horseradish peroxidase (HRP) labeled pentachlorophenol analog is diluted in buffered saline with preservative and stabilizers.
30 test kit: one 10 mL vial
100 test kit: one 35 mL vial

3. Pentachlorophenol Standards
Three concentrations (0.1, 2.0, 10.0 ppb) of pentachlorophenol standards in buffered saline with preservative and stabilizers are supplied. Each vial contains 2.0 mL.

4. Control
A concentration (approximately 1 ppb) of pentachlorophenol in buffered saline with preservative and stabilizers. A 2.0 mL volume is supplied in one vial.

5. Diluent/Zero Standard
Buffered saline containing preservative and stabilizers without any detectable pentachlorophenol.
30 test kit: one 10 mL vial
100 test kit: one 35 mL vial

6. Color Solution
A solution of hydrogen peroxide and 3,3',5,5'-tetramethylbenzidine in an organic base.
30 test kit: one 20 mL vial
100 test kit: one 65 mL vial

7. Stopping Solution
A solution of sulfuric acid (0.5%).
30 test kit: one 20 mL vial
100 test kit: one 60 mL vial

8. Washing Buffer
Buffered saline containing preservatives and stabilizers.
30 test kit: one 70 mL vial
100 test kit: one 250 mL vial

9. Test Tubes
Polystyrene tubes (36) are packaged in a box.
30 test kit: one 36 tube box
100 test kit: three 36 tube boxes

• Reagent Storage and Stability

Store all reagents at 2-8°C. Do not freeze. Reagents may be used until the expiration date on the box. *The test tubes require no special storage condition and may be stored separately from the reagents to conserve refrigerator space.*

Consult state, local and federal regulations for proper disposal of all reagents.

• Materials Required but Not Provided

In addition to the reagents provided, the following items are essential for the performance of the test:

Pipets*	Precision pipets capable of delivering 200, 250 and 500 uL and a 1.0 mL repeating pipet.
Vortex Mixer*	Thermolyne Maxi Mix, Scientific Industries Vortex Genie, or equivalent
Magnetic Separation Rack*	
RPA-I™ RaPID Analyzer* or equivalent	photometer capable of readings at 450 nm

* These items are available from Ohmicron.

• Sample Information

This procedure is recommended for use with water samples. Other samples may require modifications to the procedure and should be thoroughly validated.

Samples containing gross particulate matter should be filtered (e.g. 0.2 um Anotop™ 25 Plus, Whatman, Inc.) to remove particles.

Samples which have been preserved with monochloroacetic acid or other acids, should be neutralized with strong base e.g. 6N NaOH, prior to assay.

If the pentachlorophenol concentration of a sample exceeds 10 ppb, the sample is subject to repeat testing using a diluted sample. A ten-fold or greater dilution of the sample is recommended with an appropriate amount of Diluent/Zero Standard or Sampel Diluent. For example, in a separate test tube make a ten-fold dilution by adding 100 uL of the sample to 900 uL of Diluent/Zero Standard. Mix thoroughly before assaying. Perform the assay according to the Assay Procedure and obtain final results by multiplying the value obtain by the dilution factor e.g. 10.

The presence of the following substances up to 250 ppm were found to have no significant effect on Pentachlorophenol RaPID Assay results: calcium, copper, manganese, magnesium, mercury, nickel, nitrate, phosphate, sulfite, thiosulfate and zinc. In addition, sodium chloride up to 0.85 M, sulfate to 10,000 ppm, iron to 60 ppm and humic acid to 10 ppm, showed no significant effect on results.

• Reagent Preparation

All reagents must be allowed to come to room temperature and the antibody coupled paramagnetic particles should be mixed thoroughly before use.

• Procedural Notes and Precautions

As with all immunoassays, a consistent technique is the key to optimal performance. To obtain the greatest precision, be sure to treat each tube in an identical manner.

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Add reagents directly to the bottom of the tube while avoiding contact between the reagents and the pipet tip. This will help assure consistent quantities of reagent in the test mixture.

Avoid cross-contaminations and carryover of reagents by using clean pipets for each sample addition and by avoiding contact between reagent droplets on the tubes and pipet tips.

Avoid foam formation during vortexing.

The magnetic separation rack consists of two parts: an upper rack which will securely hold the test tubes and a lower seperator which contains the magnets used to attract the antibody coupled paramagnetic particles. During incubations the upper rack is removed from the lower seperator so that the paramagnetic particles remain suspended during the incubation. For separation steps, the rack and the seperator are combined to pull the paramagnetic particles to the sides of the tubes.

To obtain optimum assay precision, it is important to perform the separation steps carefully and consistently. Decant the rack by slowly inverting away from the operator using a smooth turning action so the liquid flows consistently along only one side of the test tube. While still inverted, place the rack on an absorbent pad and allow to drain. Lifting the rack and replacing gently onto the pad several times will ensure complete removal of the liquid from the rim of the tube (technique is demonstrated on training video, available from Ohmicron).

Mix the antibody coupled paramagnetic particles just prior to pipetting.

Do not use any reagents beyond their stated shelf life.

Avoid contact of Stopping Solution (sulfuric acid) with skin and mucous membranes. If this reagent comes in contact with skin, wash with water.

• Limitations

The Pentachlorophenol RaPID Assay will detect pentachlorophenol and related compounds to different degrees. Refer to specificity table for data on several of the organochlorines. The Pentachlorophenol RaPID Assay kit provides screening results. As with any analytical technique (GC, HPLC, etc...) positive results requiring some action should be confirmed by an alternative method.

The total time required for pipetting the magnetic particles should be kept to two (2) minutes or less, therefore the total number of tubes that can be assayed in a run should be adjusted accordingly.

• Quality Control

A control solution at approximately 1 ppb of pentachlorophenol is provided with the Pentachlorophenol RaPID Assay kit. It is recommended that it be included in every run and treated in the same manner as unknown samples. Acceptable limits should be established by each laboratory.

• Assay Procedure

Read Reagent Preparation, Procedural Notes and Precautions before proceeding.

1. Label test tubes for standards, control, and samples.

Tube Number	Contents of Tube
1,2	Diluent/Zero Standard, 0 ppb
3,4	Standard 1, 0.1 ppb
5,6	Standard 2, 2.0 ppb
7,8	Standard 3, 10.0 ppb
9	Control
10	Sample 1
11	Sample 2
12	Sample 3

2. Add 200 uL of the appropriate standard, control, or sample.
3. Add 250 uL of Pentachlorophenol Enzyme Conjugate to each tube.
4. Mix the Pentachlorophenol Antibody Coupled Paramagnetic Particles thoroughly and add 500 uL to each tube.
5. Vortex for 1 to 2 seconds minimizing foaming.
6. Incubate for 30 minutes at room temperature.
7. Seperate in the Magnetic Separation Rack for two (2) minutes.
8. Decant and gently blot all tubes briefly in a consistent manner.
9. Add 1 mL of Washing Buffer to each tube and allow them to remain in the magnetic separation unit for two (2) minutes.
10. Decant and gently blot all tubes briefly in a consistent manner.
11. Repeat Steps 9 and 10 an additional time.
12. Remove the rack from the seperator and add 500 uL of Color Solution to each tube.
13. Vortex for 1 to 2 seconds minimizing foaming.
14. Incubate for 20 minutes at room temperature.
15. Add 500 uL of Stopping Solution to each tube.
16. Add 1 mL Washing Buffer to a clean test tube. Use as blank in Step 17.
17. Read results at 450 nm within 15 minutes after adding the Stopping Solution.

• Results

Manual Calculations

1. Calculate the mean absorbance value for each of the standards.
2. Calculate the %B/Bo for each standard by dividing the mean absorbance value for the standard by the mean absorbance value for the Diluent/Zero Standard.
3. Construct a standard curve by plotting the %B/Bo for each standard on vertical logit (Y) axis versus the corresponding pentachlorophenol concentration on horizontal logarithmic (X) axis on the graph paper provided.
4. %B/Bo for controls and samples will then yield levels in ppb of pentachlorophenol by interpolation using the standard curve.

(Contact Ohmicron for detailed application information on specific photometers.)

RPA-I RaPID Analyzer

Using the RPA-I RaPID Analyzer, calibration curves can be automatically calculated and stored. Refer to the RPA-I operating manual for detailed instructions. To obtain results from the Pentachlorophenol RaPID Assay on the RPA-I the following parameter settings are recommended:

Data Reduct : Lin. Regression
Xformation : Ln/LogitB
Read Mode : Absorbance
Wavelength : 450 nm
Units : PPB

Rgt Blk : 0
Calibrators:
# of Cals : 4
# of Reps : 2

Concentrations:
#1: 0.00 PPB
#2: 0.10 PPB
#3: 2.00 PPB
#4: 10.00 PPB

Range : 0.06 - 10.00
Correlation : 0.990
Rep. %CV : 10%

• Expected Results

No interferences were observed in a study conducted on approximately 400 water samples from locations across the U.S. using the Pentachlorophenol RaPID Assay. The Pentachlorophenol RaPID Assay was shown to correlate well against EPA Method 526 (GC/MS) in a study with 20 water samples (r = 0.980).

• Performance Data

Precision

The following results were obtained:

Control	1	2	3	4
Replicates	5	5	5	5
Days	5	5	5	5
n	25	25	25	25
Mean (ppb)	0.51	1.67	3.18	8.63
% CV (within assay)	12.5	8.8	7.7	6.7
% CV (between assay)	11.4	8.6	1.8	3.2

Sensitivity

The Pentachlorophenol RaPID Assay has an estimated minimum detectable concentration, based on a 90% B/Bo of 60 ppt

Recovery

Four (4) samples, including a municipal water source, drinking water from a local well, and samples from a local pond and a small creek were spiked with various levels of pentachlorophenol and then assayed using the Pentachlorophenol RaPID Assay. The following results were obtained:

Amount of Pentachlorophenol Added (ppb)	Recovery Mean (ppb)	S.D. (ppb)	%
0.50	0.49	0.08	98
1.50	1.63	0.17	109
3.00	3.34	0.28	111
8.00	8.43	0.71	105
Average			105

Specificity

The cross-reactivity of the Pentachlorophenol RaPID Assay for various organochlorine compounds can be expressed as the least detectable dose (LDD) which is estimated at 90% B/Bo, or as the dose required to displace 50% (50% B/Bo).

Compound	LDD (ppb)	50% B/Bo (ppb)
Pentachlorophenol	0.06	2.20
2,3,5,6-Tetrachlorophenol	0.21	4.06
2,3,4,6-Tetrachlorophenol	0.91	14.8
2,3,5-Trichlorophenol	1.52	119
2,3,6-Trichlorophenol	2.44	62.9
Tetrachlorohydroquinone	6.70	146
2,4,6-Trichlorophenol	16.1	463
2,4,5-Trichlorophenol	21.5	574
2,3,4-Trichlorophenol	63.2	1730
2,5-Dichlorophenol	62.8	7830
2,6-Dichlorophenol	266	5890
2,3-Dichlorophenol	611	>10,000
2,4-Dichlorophenol	987	>10,000
3,5-Dichlorophenol	1870	>10,000
Hexachlorobenzene	1580	>10,000
Hexachlorocyclohexane	5790	>10,000

The following compounds demonstrated no reactivity in the Pentachlorophenol RaPID Assay at concentrations up to 10 ppm: alachlor, aldicarb, benomyl, butachlor, butylate, captan, carbaryl, carbendazim, carbofuran, 4-chlorophenol, 3,4-dichlorophenol, chlorothalonil, 2,4-D, 1,3-dichloropropene, dinoseb, MCPA, metalaxyl, metolachlor, metribuzin, pentachlorobenzene, pentachloronitrobenzene, picloram, propachlor, terbufos, thiabendazole, and thiophanate-methyl.

• Assistance

For ordering or technical assistance contact:

Ohmicron Environmental Diagnostics
Sales Department
Newtown, Pennsylvania 18940
(800)544-8881 • Fax(215)860-5213

• Availability

Ohmicron
- Pentachlorophenol RaPID Assay
  - 30 Test Kit
  - 100 Test Kit
- Pentachlorophenol Proficiency Samples
- Pentachlorophenol Sample Diluent
- Soil Collection Kit
- PCP Sample Extraction Kit

[illegible] [illegible]

CERTIFIED TECHNOLOGY

RaPID Prep™

Pentachlorophenol Sample Extraction Kit

• Intended Use

For use in conjunction with RaPID Prep™ Soil Collection Kit and the Pentachlorophenol RaPID Assay® Kit for determination of pentachlorophenol in soil.

For use as SW-846 Method 4010 "Screening for Pentachlorophenol by Immunoassay" see Ohmicron Bulletin #T00084.

• Principle

Pentachlorophenol is a broad spectrum pesticide used in the wood and paper industry as a fungicide to protect against fungal rot and as an insecticide for the control of termites and wood boring insects. Primary applications in this industry include preservation of utility poles, railway ties, marine pilings, and fence posts and as a slime reducer in paper and pulp milling. Pentachlorophenol is also used as a general herbicide, especially as a pre-harvest defoliant in cotton farming. It is the most widely used chlorophenol pesticide and it has been detected at hazardous waste sites in the United States. Pentachlorophenol residues may contaminate soil, wells, groundwater and surface water due to spills, drift and runoff.

The degradation of pentachlorophenol under atmospheric conditions occurs by photolysis. In aquatic systems, photolysis and biodegradation are believed to be the dominant processes. In soil, pentachlorophenol biodegrades by becoming rapidly metabolized by acclimated microorganisms. Pentachlorophenol degradation occurs most rapidly in soils of high organic and moisture content with temperatures favorable to microbial activity.

The reagents contained in the RaPID Prep Pentachlorophenol Sample Extraction Kit have been optimized for fast, efficient removal of pentachlorophenol from soil and convenient preparation of the sample for immunoassay at levels of interest to the investigator. The system allows for reliable, convenient and cost effective determinations at the field testing or remediation site.

• Description of Contents

1. Pentachlorophenol Extraction Solution
   Sodium Hydroxide in 75% methanol.
   per kit: 20 bottles containing 20 mL each
2. Pentachlorophenol Extract Diluent
   Buffered saline containing preservatives and stabilizers without any detectable pentachlorophenol.
   per kit: 20 vials containing 25 mL each
3. Fifty microliter precision pipet.
4. Pipet tips
   per kit: 20 disposable plastic tips
5. Chain of custody container labels.
   per kit: 30 labels for diluent vials

• Reagent Storage and Stability

Store all reagents and components in a dry well ventilated area at 2-30°C. Reagents may be used until the expiration date shown on the vials.

Consult local, state and federal regulations for proper disposal of all reagents.

• Materials Not Provided

In addition to the materials provided, the following items will be necessary for the performance of the procedure:

- RaPID Prep Soil Collection Kit
- stopwatch or clock with second hand
- permanent marking pen
- protective gloves
- digital balance (optional, available from Ohmicron)

• Sample Information

This kit was validated for use with soil samples. Other types of samples matrices and solid wastes may require different procedures to extract pentachlorophenol.

• Procedural Notes and Precautions

Do not use any reagent beyond its stated shelf life.

Avoid contact of extraction solution (methanol/sodium hydroxide) with skin and mucous membranes. If this reagent comes in contact with skin wash with water.

The fifty microliter pipet is considered disposable and should be discarded after the kit reagents are depleted.

• Limitations

The Pentachlorophenol Sample Extraction Kit when used in conjunction with RaPID Prep Soil Collection Kit and the Pentachlorophenol RaPID Assay will provide screening results. Positive results should be confirmed by a non-immunological method.

• Extraction/Filtration Procedure

Read the *Procedural Notes and Precautions* and the RaPID Prep Soil Collection kit package insert before proceeding. Various soil sampling options are presented in the Soil Collection Kit package insert.

1. Write sample information on the labels provided for soil collection device, extract collection vials and Pentachlorophenol Extract Diluent vials. Apply labels to appropriate vessels.

2. *Sampling*. Remove the screw cap from the soil collector and collect soil by volume or weight as follows:
• By volume: With the plunger fully depressed (pushed to the top of the tube), pack soil into the open end of the collection tube. Unscrew the plunger rod from its plunger by turning the handle counter clockwise. Level the soil flush with the top of the collector tube using the plunger rod. Using the base portion of the handle, push the soil sample and the plunger to the bottom.
• By weight using digital balance:
Option 1. Remove screw cap. Tare the soil collector with its plunger rod. Collect the soil "By volume", level it off and push the soil and plunger to the bottom of the tube. Reattach plunger rod and weigh the tube containing the soil. Subtract original weight from final weight to determine soil weight. Record the weight of the soil.
Option 2. Remove the screw cap and plunger rod from an empty collection tube. Position the plunger at the bottom of the collection tube. Attach the red base piece provided and place the tube in an upright position on the balance and tare weight. Weigh 10 ± 0.1 gram of soil into the tube. Record the soil weight.

3. *Extraction*. Position the soil collection tube containing a soil sample upright in the styrofoam rack and add 20 mL of the appropriate extraction solution. Screw the cap (without filter) on tightly and make sure that the luer cap is secured. Shake vigorously and continuously for at least 60 seconds. Additional shaking may be required to break up large or dry soil aggregates. Position the collection tube upright in the rack and allow the mixture to sit at least five minutes. Longer extraction times may be desirable for some situations.

If batch processing is desired, up to 21 soil samples with added extraction solution can be loaded into the rack inside the Soil Collection Kit box base, the box lid is put in place and the box is shaken vigorously for at least 60 seconds.

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4. *Filtration.* Remove the screw cap and attach the filter cap. Hand tighten until resistance is felt. *Do not overtighten.* Attach the plunger rod to the plunger of the soil collector. Remove the luer cap and invert the soil collector so that the luer cone is positioned over a collection vial. Keep inverted for a few seconds to wet the filter and to allow the filtrate to drip through the filter into the luer cone. Apply slight pressure to the plunger handle. The filtrate will begin to flow more quickly as gentle pressure is continuously applied. Fill the vial with approximately 10 to 20 drops (0.5 to 1 mL). Cap the vial. This amount is sufficient to perform multiple replicate analyses with RaPID Assays kits. The vial will hold up to 5 mL of filtrate if additional extract volume is desired. The filtrate containing Pentachlorophenol is stable when stored in the extract collection vial for one (1) week at room temperature (15 to 30 °C).

• Dilution Procedure

Using the pipet provided, transfer 50 µL of the extract directly into a vial of Pentachlorophenol Extract Diluent (25 mL). Mix by inverting several times.

This mixture can now be measured as "sample" according to the package insert of the Pentachlorophenol RaPID Assay.

• Calculation of Results

Calculate the pentachlorophenol concentration in soil by multiplying the RaPID Assay result by the factors introduced by the procedure.

$$\underset{\text{(ppb)}}{\text{RaPID Assay result}} \times \frac{\text{vol. Extractant (mL)}}{\text{wt. of soil (g)}} \times \text{dilution factor}^{*}$$

$$\text{RaPID Assay result (ppb)} \times \frac{20}{\text{wt of soil (g)}} \times 500^{*} =$$

concentration of pentachlorophenol in soil (ppb)

EXAMPLE: For a soil sample weighing 10.0 grams giving an assay result of 2.5 ppb:

$$2.5 \text{ ppb} \times \frac{20}{10} \times 500^{*} =$$

2,500 ppb = 2.5 ppm = concentration of pentachlorophenol in soil

* NOTE:

$$\text{dilution factor} = \frac{\text{vol. extract (mL)} + \text{vol. diluent (mL)}}{\text{vol. extract (mL)}}$$

$$= \frac{0.05 + 25}{0.05} = 500$$

• Range of Detection

When this extraction/dilution procedure is used in conjunction with RaPID Prep Soil Collection Kit and the Pentachlorophenol RaPID Assay kit, the range of detection in soil is 100 ppb to 10 ppm.

For samples with pentachlorophenol concentrations greater than 10 ppm on initial screen, the diluted extract can be further diluted with Pentachlorophenol RaPID Assay kit reagents and retested. An additional 1:10 dilution (50 µL of diluted extract plus 0.5 mL of Diluent/Zero Standard) is recommended. The dilution factor for this solution would be 5000 instead of 500 shown in the example above. The range of detection for pentachlorophenol is thereby extended to 100 ppm.

• Expected Results

Due to the large dilution factor used, the accuracy of the final result will depend in part on the care taken in pipeting the extract into the diluent.

Pentachlorophenol recoveries of will vary depending on soil type, retention mechanism, solvent and extraction apparatus used, length of extraction period and levels of potentially interfering substances in the soil.

Three soils of the clay and loam type were fortified with pentachlorophenol to final soil concentrations of 1.0, 1.5 and 5.0 extraction/dilution procedure. Average recovery of added pentachlorophenol was 70%. Results ranged from 63 to 83%.

Pentachlorophenol recoveries were not affected when the following levels of contaminants were added to the soil prior to the extraction procedure: 100 ppm creosote, 1000 ppm CCA and 10% diesel fuel.

• Extraction Time Course

Greater analyte recovery will be achieved if extraction time is extended. Approximately 85% of added pentachlorophenol can be recovered if the soil sample is shaken for 30 minutes.

• Performance Data

Precision

The overall coefficient of variation (%CV) for pentachlorophenol measurement in soil spiked at 2 ppm using the RaPID Prep components and Pentachlorophenol RaPID Assay is approximately 20%. This represents the amount of variability expected when a homogeneous soil sample undergoes ten replicate collections, extractions and dilutions generating ten immunoassay results from a single run.

	Sample Collection Method	
	by weight	by volume
no. of replicates	10	10
mean assay result (ppm)	1.43	1.47
%CV	28.1	20.3

• Correlation

Extracts of Wisconsin loam soil samples fortified with 5, 10 and 50 ppm pentachlorophenol were prepared per the procedure shown above. The extracts were split and measured with the RaPID assay and with an HPLC pentachlorophenol method. The following results were obtained:

Pentachlorophenol spiked into soil (ppm)	RaPID Assay (ppm)	HPLC (ppm)
5	5.6	4.3
10	8.8	8.9
50	47.2	47.4

• References

Ohmicron Technical Publications:

#T00027 - *Pesticides in Soil and Analysis by Immunoassay*

#T00034 - *Detection of Pentachlorophenol in Soil*

• Availability

From Ohmicron

Description	*Part Number*
Pentachlorophenol Sample Extraction Kit (20 units)	A00128
RaPID Prep Soil Collection Kit (21 units)	A00127
Pentachlorophenol RaPID Assay	
100 tube kit	A00111
30 tube kit	A00110
Extraction Kits: TYPE I: for extraction of: Carbendazim or pentachlorophenol (20 tests per kit)	A00128

Description	*Part Number*
TYPE II: for extraction of: Atrazine, cyanazine, alachlor, metolachlor or 2,4-D (20 tests per kit)	A00130
[illegible]	[illegible]

• Assistance

For ordering or technical assistance contact:

Ohmicron Environmental Diagnostics
Sales Department
Newtown, Pennsylvania 18940
(800)544-8881 * Fax(215)880-5213

200210

R101696

CERTIFIED TECHNOLOGY

METHOD 4010

SCREENING FOR PENTACHLOROPHENOL BY IMMUNOASSAY

1.0 SCOPE AND APPLICATION

1.1 Method 4010 is a procedure for screening solids such as soils, sludges, and aqueous media such as waste water and leachates for pentachlorophenol (PCP) (CAS Registry 87-86-5).

1.2 Method 4010 is recommended for screening samples to determine whether PCP is likely to be present at concentrations above 0.5 mg/kg for solids or 0.005 mg/L for aqueous samples. Method 4010 provides an estimate for the concentration of PCP by comparison with a standard.

1.3 Using the test kits from which this method was developed, 95 % of aqueous samples containing 2 ppb or less of PCBs will produce a negative result in the 5 ppb test configuration. Also, 95 % of soil samples containing [illegible] ppb or less of PCBs will produce a negative result in the 500 ppb test configuration.

1.4 In cases where the exact concentration of PCP is required, additional techniques (i.e., gas chromatography (Method 80[illegible]) or gas chromatography/mass spectrometry (Method 8270)) should be used.

2.0 SUMMARY OF METHOD

2.1 Test kits are commercially available for this method. The manufacturer's directions should be followed. [illegible] general, the method is performed using a water sample or an extract of a soil sample. Sample and an enzyme conjugate reagent are added to immobilized antibody. The enzyme conjugate "competes" with PCP present in the sample for binding to immobilized anti-PCP antibody. The test [illegible] interpreted by comparing the response produced by testing a sample to the response produced by testing standard(s) simultaneously.

3.0 INTERFERENCES

3.1 Compounds [illegible] are chemically similar may cause a positive test (false positive [illegible] PCP. The [illegible] kit used in preparation of this method was evaluated for interferences. Table [illegible] provides the concentration of compounds found to give a false positive test at the indicated concentration.

3.2 Other compounds have been tested for cross reactivity with PCP, and have been demonstrated to not interfere with the specific kit tested. Consult the information provided by the manufacturer of the kit used for additional information regarding cross reactivity with other compounds.

3.3 Storage and use temperatures may modify the method performance. Follow the manufacturer's directions for storage and use.

4.0 APPARATUS AND MATERIALS

4.1 PENTA RISc Test Kits (EnSys, Inc.), or equivalent. Each commercially available test kit will supply or specify the apparatus and materials necessary for successful completion of the test.

5.0 REAGENTS

5.1 Each commercially available test kit will supply or specify the reagents necessary for successful completion of the test.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 See the introductory material to this chapter, Organic Analytes, Section 4.1.

7.0 PROCEDURE

7.1 Follow the manufacturer's instructions for the test kit being used. Those test kits used must meet or exceed the performance indicated in Tables 2-3.

8.0 QUALITY CONTROL

8.1 Follow the manufacturer's instructions for the test kit being used for quality control procedures specific to the test kit used. Additionally, guidance provided in Chapter One should be followed.

8.2 Use of replicate analyses, particularly when results indicate concentrations near the action level is recommended to refine information gathered with the kit.

8.3 Do not use test kits past their expiration date.

8.4 Do not use tubes or reagents designated for use with other kits.

8.5 Use the test kits within their specified storage temperature and operating temperature limits.

8.6 Method 4010 is intended for field or laboratory use. The appropriate level of quality assurance should accompany the application of this method to document data quality.

9.0 METHOD PERFORMANCE

9.1 This method has been applied to a series of groundwater, process water, and wastewater samples from industries which use PCP, and the results compared with GC/MS determination of PCP (Method 8270). These results are provided in Table 2. These results represent determinations by two laboratories.

9.2 This method has been applied to a series of soils from industries which use PCP and the results compared with GC/MS determination of PCP via Method 8270. These results are provided in Table 3. These results represent determinations by two laboratories.

10.0 REFERENCES

1. J.P. Mapes, K.D. McKenzie, L.R. McClelland, S. Movassaghi, R.A. Reddy, R.L. Allen, and S.B. Friedman, "Rapid, On-Site Screening Test for Pentachlorophenol in Soil and Water - PENTA-RISc™", Ensys Inc., Research Triangle Park, NC 27709

2. J.P. Mapes, K.D. McKenzie, L.R. McClelland, S. Movassaghi, R.A. Reddy, R.L. Allen, and S.B. Friedman, "PENTA-RISc™ - An On-Site Immunoassay for Pentachlorophenol in Soil", Bull. Environ. Contam. Toxicol. 49:334-341, 1992.

3. PENTA-RISc™ Instructions for Use, Ensys Inc.

Table 1
Cross Reactivity for PCP[a]

Compound	Concentration (mg/Kg) in Soil to Cause a False Positive for PCP at 0.5 mg/Kg	Concentration (μg/L) in Water to Cause a False Positive for PCP at 5 μg/L
2,6-Dichlorophenol	700	600
2,4,6-Trichlorophenol	16	10[illegible]
2,4,5-Trichlorophenol	100	500
2,3,4-Trichlorophenol	400	[illegible]00
2,3,5,6-Tetrachlorophenol	1.2	[illegible]
Tetrachlorohydroquinone	500	>150[illegible]

[a] for PENTA RIS<u>c</u> Test Kit (EnSys, Inc.)

Residential Wells

RESIDENTIAL WELLS

I. Purpose

General reference information for sampling residential groundwater wells is provided.

II. Scope

Standard techniques for collecting representative samples from residential wells are summarized. Site-specific sampling details are discussed in related sections of the FSAP.

III. Equipment/Materials

Sample jars, clean latex, or surgical gloves

IV. Procedures/Guidelines

1. The wells should be allowed to run continuously for at least 10 minutes (if possible) before the sample is collected.
2. Samples will be collected from a source (tap or faucet) that is located upstream of any water treatment such as softeners or filters.
3. An aerator on the tap or faucet must be removed before sampling.
4. Sample containers should be filled directly from the tap or faucet.

V. Attachments

None.

VI. Key Checks/Items

- System purge
- Water softener/filter
- Sample tap aerator
- Sources of contamination

Water Level Measurement and Well Purging

Water Level Measurement and Well Purging

Before sampling begins, wells will be purged a minimum of 5 well volumes or until purged dry to remove stagnant water using the dedicated sampling system. The following sampling procedures will be used to collect groundwater samples from the monitoring wells:

1. Unlock lock on steel access lid on concrete vault surrounding monitoring well casing. If lock is rusted or corroded, replace it with a new lock.
2. Open protective casing, scan airspace for volatile organic vapors. Lubricate lock and hinges on vault cover with graphite lubricant.
3. Remove cover and open well cap.
4. Obtain and record PID readings at the well head and in the breathing zone. Upgrade to next level of protection if reading is above action level (see Health and Safety Plan).
5. Determine the depth to water in the well to the nearest 0.01 foot using an electronic water level indicator. The electronic meter consists of a tape with a contact electrode or probe suspended from an insulated cable, a reel, and an ammeter or small light or beeper. When the electrode or probe comes into contact with the water, an electrical circuit is completed, activating the meter light or beeper. The light, beeper, or ammeter may be located on the cable reel. Determine the depth of water using the following steps:
    - Lower the electrode or probe into the well by pulling the cable from the hand-held reel.
    - Continue lowering until completion of the circuit is indicated by illumination of the small light, a beep, or deflection of the ammeter needle.
    - Measure the length of cable in the well from the marked edge on the top of casing to the probe (depth to the water table) to the nearest 0.01 foot and subtract this length from the top of casing elevation to determine the water table elevation.
    - Record depth in the field logbook
6. Calculate the volume of water in the well.
7. Close monitoring well cap.
8. Hook up the pump in the monitoring well to the controller/compressor unit.
9. Purge the well using low flow techniques by removing water at a rate of approximately 300 ml/min. Keep track of the amount of water purged by filling and counting 5-gallon buckets. Disposal of purge water will follow procedures in the waste disposal plan.
10. Record field parameter readings every minute or half purge volume in the field log book. Purging will continue until three consecutive field parameter readings agree within 10 percent.
11. After the requisite volume has been purged, the samples can be collected.

Soil Gas Meter Sampling

Field Measurement of Gases (O_2, CO_2, Methane) in Vapor

1.1 Method

Infrared Gas Analyzer

1.2 References

GA 90 Meter Instruction Manual, 1997, GeoGroup Inc, or equivalent.

1.3 Sensitivity

0 percent

1.4 Range

CO_2 : 0 to 50 percent; accuracy to ±3%
O_2 : 0 to 21 percent; accuracy to ±1%
Methane: 0 to 100 percent
Temperature: 32 to 104 degrees Fahrenheit
Static Pressure: 0 to 100 inches water

1.5 Sample Holding Time

Continuous read

1.6 Reagents

- 15% CH_4, 15% CO_2, 70% N_2 calibration gas

1.7 Apparatus

- Hand-held Infrared Gas Analyzer
- Inlet Port Filter
- In-Line Water Trap Element
- Spare Battery
- Internal pump (can collect sample up to 70 inches)

1.8 Calibration

The instrument is factory calibrated. Calibration verification shall occur daily prior to instrument use.

1.9 Calibration Verification Frequency

At the beginning and end of each day recheck and record the calibration reading.

1.10 Operating Procedure (most models)

The instrument shall be operated as instructed by the operations manual. The operating time of this instrument is approximately 4 to 5 hours.

1.11 Quality Control Requirements

Accuracy will be assessed by measuring the calibration gas at a frequency of one per ten samples. The accuracy readings must be within a ± 25%. Precision will be assessed by multiple measurements of the calibration gas or a sample at a frequency of one per ten samples. Precision readings must be less than or equal to 50%.

1.13 Preventive Maintenance (Frequency)

1. Field equipment is inspected in the warehouse before delivery to the field.

2. Check batteries daily.

3. Verify calibration daily. If calibration results are outside the acceptance window. The instrument shall be shipped back to the manufacture for recalibration.