CH2M HILL
135 South 84th Street
Milwaukee, WI
53214
Tel 414.272.2426
Fax 414.272.4408

CH2MHILL

November 2, 2000

Mr. Tony Rutter
Remedial Project Manager
U.S. Environmental Protection Agency
Remedial Response Branch (SR-6J)
77 West Jackson Boulevard
Chicago, IL 60604-3590

Dear Tony:

Subject: Sampling and Analysis Plan
Penta Wood Products Site
Siren, Wisconsin
WA No. 101-RALR-05WE /Contract No. 68-W6-0025

Enclosed please find one copy of the Sampling and Analysis Plan for the Penta Wood Products Site. Please feel free to call me if you have any questions or concerns.

Sincerely,

CH2M HILL

Regina Bayer
Site Manager

c: Stephen Nathan/PO/U.S. EPA, Region 5 (w/o enclosure)
Dave Alberts (Marshall McReynolds)/CO/U.S. EPA, Region 5 (w/o enclosure)
Tom Kendzierski/PM/WDNR (2 copies)
Ike Johnson/PM/CH2M HILL, Milwaukee
Dan Plomb/DPM/CH2M HILL, Milwaukee
Lauri Gorton, (Acting) QAM/CH2M HILL, Milwaukee
Phil Smith/RTL/CH2M HILL, Milwaukee
Cherie Wilson/AA/CH2M HILL, Milwaukee

SAMPLING AND ANALYSIS PLAN
Long-Term Response Action

Penta Wood Products
Town of Daniels, Wisconsin
WA No. 101-RALR-05WE /Contract No. 68-W6-0025

November 2, 2000

The Penta Wood Remedial Action Sampling and Analysis Plan consists of three plans: the Quality Assurance Project Plan (QAPP), the Field Sampling Plan (FSP), and the Data Management Plan (DMP). Collectively these three plans are called the Sampling and Analysis Plan (SAP).

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

- Penta Wood Long Term Response Action (LTRA) Work Plan and O&M Manual
- Penta Wood Site Management Plan (SMP), which contains the Pollution Control and mitigation Plan and Transportation and Disposal Plan

The LTRA Work Plan describes the site background, physical characteristics, project approach, and derails of the tasks to be completed for the LTRA. The SMP describes the procedures and safeguards that will be used to control site access, prevent contaminants from being released offsite due to LTRA activities, and manage and dispose of wastes generated during the LTRA.

QUALITY ASSURANCE PROJECT PLAN
Long-Term Response Action

Penta Wood Products
Town of Daniels, Wisconsin
WA No. 101-RALR-05WE / Contract No. 68-W6-0025

November 1, 2000

QUALITY ASSURANCE PROJECT PLAN (QAPjP)
Remedial Action
Penta Wood Products
Town of Daniels, Wisconsin
WA No. 101-RALR-05WE / Contract 68-W6-0025

Prepared by: CH2M HILL

Date: October 2000

Approved by:

_____

USEPA, Region 5, Work Assignment Manager
Tony Rutter

_____

USEPA, Region 5, Quality Assurance Manager

_____

CH2M HILL Site Manager
Regina Bayer

_____

CH2M HILL Quality Assurance Manager
Lauri Gorton

Contents

SECTION 1

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 Long-Term Response Action (LTRA) 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 that will be conducted by the USEPA during the LTRA. The USEPA will conduct groundwater, soil, soil gas, and treatment system influent, effluent, and byproduct sampling to verify the adequacy of the remedial construction and the effectiveness of treatment.

This QAPjP 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. WA No. 101-RALR-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)*.

SECTION 2

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 its 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 it could not comply with Resource Conservation and Recovery Act regulations. In 1993, the WDNR conducted a Screening Site Inspection that 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 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 $\mu g/kg$ 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 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.

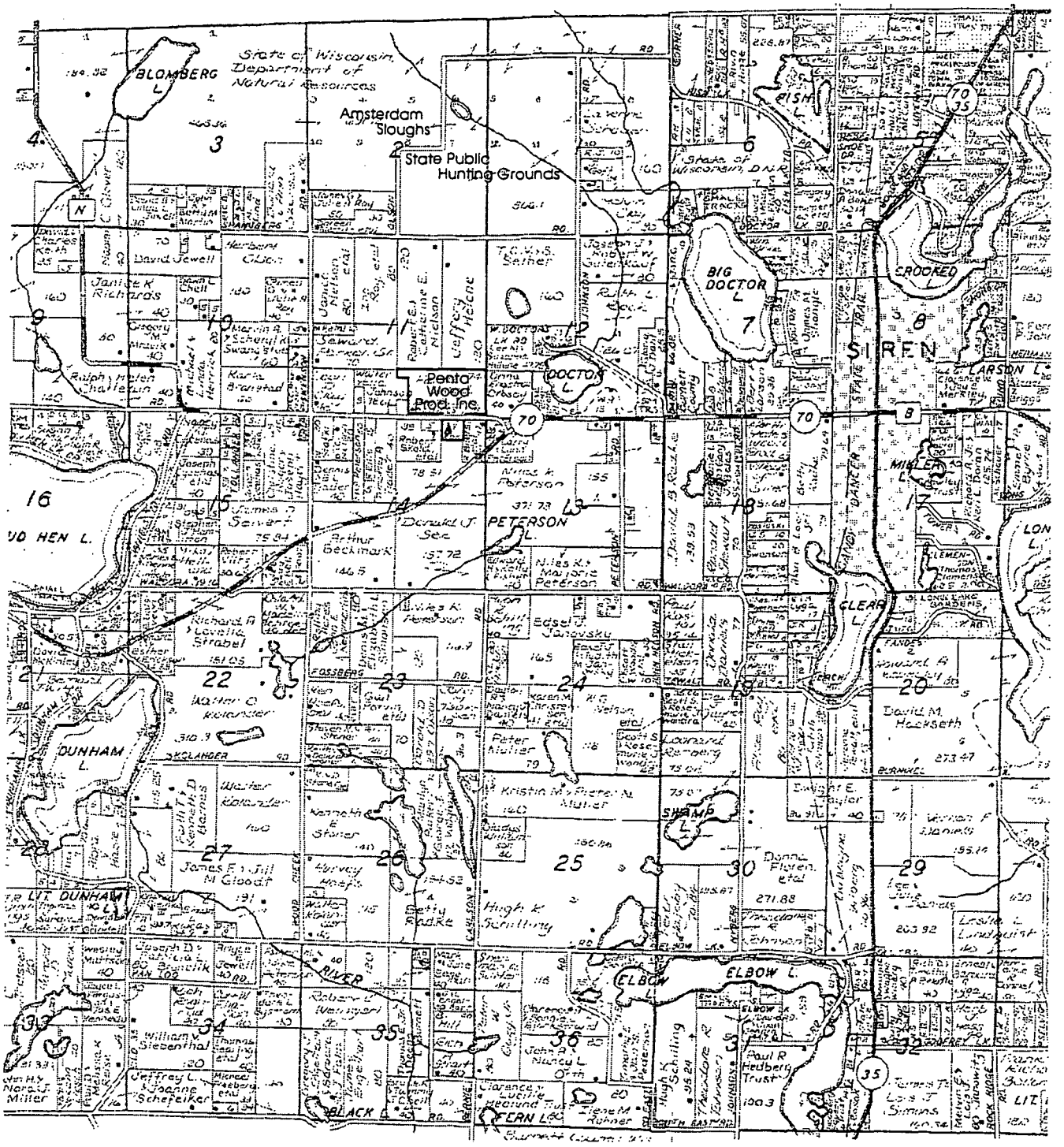
During the removal action, ERB requested removal assistance and site characterization support by the USEPA Emergency Response Team (ERT). In 1994, an ERT conducted a hydrogeological and an on- and offsite surficial soil investigation. The hydrogeological investigation included installation of 12 additional 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. The ERT 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. The ERT did not complete all of its intended activities because of cut-backs in federal funding in 1995. The site was placed in the remedial program in 1996.

CH2M HILL conducted RI field activities for the USEPA in October 1997 to fill data gaps remaining after a site characterization investigation performed by ERT in 1994 and a removal action conducted by ERB in 1994 and 1996. RI activities included groundwater and residential well sampling, surface water and sediment sampling, surficial soil sampling, a subsurface soil investigation consisting of cone penetrometer testing/induced fluorescence (CPT/IF) and test pit excavation, and a screening level ecological investigation. In January through February of 1998 five new monitoring wells were installed and sampled, along with an extraction/bioventing well and nine soil gas wells for a bioventing treatability study.

Additional site studies were conducted during pre-design from May 10 to May 26, 1999, including soil sampling for total and leachable arsenic, conducting groundwater pump tests, sampling influent and effluent water from a granular activated carbon (GAC) treatment system for the pump test water, and other miscellaneous sampling for specific predesign evaluations.

Remedial construction activities in support of the remedial action began in January 2000 and included the demolition of 17 buildings and foundations, and the offsite disposal of demolition material, debris piles, and laboratory chemicals. Soils were stabilized and consolidated, pipes were laid, manholes and an infiltration basin were installed. Drilling operations included abandonment of existing wells and the installation of the multi-purpose biovent and groundwater extraction wells, soil gas wells, a monitoring well, and the groundwater and LNAPL recovery pumps. A pre-fabricated treatment building, the groundwater treatment system, and the biovent blower system were installed. The remedial construction was completed in September 2000.



NORTH

0 1

SCALE IN MILES

FIGURE 2-1
Site Location Map
Penta Wood Products RA Construction QAPP

CHARLENE 608-267-0543

CORRESPONDENCE/MEMORANDUM — **State of Wisconsin**

DATE: January 31, 2001 FILE REF: FID 807050310

TO: Tom Kendzierski - NR

FROM: Charlene Khazae – RR/3

SUBJECT: Penta Wood Products Sampling and Analysis Plan

I have reviewed the Penta Wood Products Sampling and Analysis Plan (SAP), November 2, 2000 that includes the following components: 1.) Quality Assurance Project Plan (QAPP), and 2.) Field Sampling Plan (FSP). The third component, the Data Management Plan, received only a cursory review.

Please forward these comments to the contractor, CH2M HILL, and to the USEPA Region 5 Work Assignment Manager, Tony Rutter.

There are essential areas that make the SAP severely deficient and which greatly hinder a thorough review of the document's components. First, according to EPA's own guidance, a QAPP should NOT be submitted unless a laboratory (ies) is/are named and project-specific/laboratory-specific analytical standard operating procedures (SOPs) are included. Without this critical information, there is no QAPP. The only exception to this is if the project is an EPA fund lead and ALL analyses are performed at laboratories that participate in and have current contracts with the USEPA's Contract Laboratory Program (CLP). In such circumstances, the CLP Statements of Work (SOW) are cited rather than laboratory SOPs. Penta Wood Products remedial actions as described in this document clearly do not fit these criteria.

Along with the above-mentioned document, several Special Analytical Services Request Forms were also submitted. The contractor, CH2M HILL, needs to understand that EPA removed these services and the SAS Request Forms more than six years ago. That program ended in June 1994. The SAS forms could possibly be used as a checklist for including critical analytical and quality control (QC) information and other data deliverables when establishing contracts with laboratories, but they CANNOT take the place of laboratory SOPs required for the QAPP. Once the SOPs are submitted, they should be reviewed by a qualified chemist to make sure they adequately fulfill project-specific objectives. TRANSITION PLAN - UPDATE FOR PHASES

I confirmed the validity of the statements made in the above paragraphs with knowledgeable EPA personnel. With these major deficiencies and all the ones cited in my comments below, I am confused why EPA approved this document.] OUT

In a September 18, 2000 electronic message to you, I indicated that there are specific situations in which a Wisconsin certified laboratory is required. Wastewater permits, groundwater monitoring, and soil analyses require a certified lab for all parameters for which a test category exists, even if the site is on the NPL. After reviewing the PWP SAP, waste disposal parameters

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are added to the list of situations that require a state-certified laboratory. Analytical requirements are cited in a number of Wisconsin Administrative Codes and are therefore Applicable or Relevant and Appropriate Requirements (ARARs). It was also stated in the e-mail message that it is not possible for laboratories to generate data using CLP methodology/requirements AND laboratory certification's methodology/requirements (NR 149, Wis. Admin. Code). If it is your intention to use a non-certified laboratory but have the data generated and reviewed according to standards that closely match the requirements of the various programs of the Department of Natural Resources, including the Laboratory Certification Program, the text and tables of the document indicate that this goal will not be reached.

Another difficulty in reviewing this document is that the text of the QAPP and the FSP lack sufficient detail for me to adequately review the document and offer substantive suggestions for its improvement. Text and accompanying tables do not always agree, further hampering the review. The most extreme case is in Section 8 of the QAPP where I read for the first time that the sampling rationale had changed; on-site lab analyses are being performed on soil and water. Nowhere in the QAPP up to this point and nowhere in the FSP, neither tables nor text, is this scheme mentioned. Section 8 text contains the only mention of a Wisconsin certified laboratory (still nameless). There is no indication that this requirement has made its way into all the appropriate sections of the QAPP and FSP. Quality requires planning and it hurts this project greatly to have mobile lab analyses and certified labs stuck in as after-thoughts.

Comments on the Quality Assurance Project Plan

Sign-off Page

There should be a place for the DNR Site Manager and for each laboratory's Quality Assurance Manager to sign.

Section 1 – Introduction

As previously emphasized, the USEPA's Contract Laboratory Program should not and is not being used for this project.

Section 2 – Project Description

General comment - A list of abbreviations and acronyms would be helpful.

Table 2-1

- This table needs to be revised for clarity, especially since the text of the QAPP lacks sufficient detail to determine which matrices are being analyzed for which parameters. Nowhere in the text of the QAPP or the FSP is there a mention of the frequency of sampling (semiannually, quarterly?). In the groundwater section, there are 19 monitoring wells that will be sampled for 4 rounds (19x4=76); 8 rounds of sampling will include 5 monitoring wells (8x5=40); and the 4 residential wells will be sampled 6 times (4x6=24). Is it reasonable to guess that the 116 wells that are being analyzed for BTEX, Naphthalene, etc.,

and natural attenuation field parameters are the 4+8 rounds of monitoring well sampling? Which 132 wells are being sampled for PCP? The numbers don't add up. The project objectives in subsection 2.3 states, "Confirm that contaminants do not extend to drinking water wells." The private wells are being analyzed for which parameters? Somewhere in the text or table it should state which "total" and "dissolved" metals are included in the analyses. What is the rationale for doing both total and dissolved? (The contractor may want to consider eliminating the field blanks for the residential wells if containers are being filled directly.)

- In the Treatment System section, it is not evident from the text or table how the number of field samples has been determined. Does "Combined Influent" mean that all eight of the influent sampling ports will be composited for 36 rounds? Frequency? Does this table mean to indicate that the influent will only be tested for PCP and the effluent will be tested for PCP and all the other analytes listed here? The text indicates that influent and effluent sampling will be done via ports and it is understood that field blanks are not required. There are, however, 14 samples collected for BTEX analysis, so why no trip blanks? Would it not be advantageous to collect some duplicate samples? It is not stated in the text why dioxins and furans are analytes. This should be clarified. Does "Phenol" mean total phenols or the "acid extractable" phenolics and which ones? This needs clarification.
- How was the number of soil gas samples determined?
- For the soils – The text states that a contaminant of concern is DRO. Wisconsin requires DRO and not TPH. These are not interchangeable and the table should be changed accordingly. It isn't necessary to prepare field blanks for soil samples. There is no practical way of determining how the contamination in an aqueous sample has affected a soil sample.

Table 2-2

- This table would be more accurate and probably be an easier read if the matrices were broken down further and regrouped according to sampling matrix. For example, the detection limits required for this project are not the same for groundwater (monitoring wells and private wells) as they are for treatment system effluent. I do not have the benefit of having the discharge permit requirements, but Dave Hantz can compare the requirements of his program and the detection limits given here and see if the detection limits are sufficient. It would also serve well to group the natural attenuation parameters together, as there are no established required analyses and are they being performed only on monitoring wells.
- The contractor has made an error by claiming the detection limits presented here are, "the project's required detection limits." Many of the detection limits listed on this table are the "Contract Required Detection Limits" for inorganic analyses and the "Contract Required Quantitation Limits" for organic analyses required by the Contract Laboratory Program (CLP). What this table should list instead are the NR 140 groundwater PAL standards, NR 720 soil standards or established RCLs, limits given on the wastewater permit, or other "benchmark" concentrations that will fulfill this project's objectives.
- Why have PAHs suddenly appeared? They are not on Table 2-1. They are not linked to any remedial goal. If it is the intent to have subsequent PAH analysis because of DRO concentrations found in soil, these are NOT the PAHs required by our program for either soil or groundwater. SW846 method 8270 for PAH analysis for soils is appropriate, but the

SW846 method 8310 (HPLC) is required because the lower detection limits are needed for the NR 140 groundwater standards.

- A word of caution on the Methane analysis: Our program does not have an analytical requirement for testing methane in groundwater to monitor natural attenuation. We suggest that whatever works to give usable data is acceptable. It should be noted that method SW-846-8020 has been pulled from that reference and is no longer maintained. Methods for determining methane in groundwater for NA monitoring are not plentiful, but do exist and should be sought. The biggest problem with this parameter is that methane is very easily released from water and getting a representative sample result is extremely difficult. If this parameter is critical (and usually is not), then sample collection/handling procedures need to be very rigorous. At the very least, it should be acknowledged up front that methane data alone would not give an accurate representation of the NA process.
- DRO method – Wisconsin DNR still requires the "Modified DRO, Method for Determining Diesel Range Organics, July, 1993" and does not accept SW8015A or any other method for soil or groundwater.
- I really think the TPH should be removed from the table.
- BTEX – As previously stated, method 8020 is no longer used. Either method 8021 or 8260 may be used; as long as the selected laboratory can demonstrate the detection limits (NR 140 groundwater standards) are low enough for these parameters.
- SPLP arsenic – This parameter is not specifically linked to any remedial goal in the text and does not appear on Table 2-1. If it is necessary to perform this analysis for disposal purposes, than the matrix might be soil or waste, not water. Also, it should be noted that SW846 method 1312 is a sample preparation method only, not an analytical method. The revised Table 2-2 should include the analytical method and required detection limit (for disposal).

Table 2-3

- This table should be revised according to comments given on the other two tables-substitute DRO for TPH for soils and group according to sample matrix, etc.. It will be more evident that the same sample container can be used for multiple parameters. The consultant needs to check with the lab(s) performing the analyses to see how much extra volume is required for laboratory QC and a footnote should be added accordingly.

2.6 Data Quality Objectives - This is admittedly a challenging component to any QAPP. I strongly suggest the consultant review the EPA document, EPA QA/G-4, September 1994, to have a better understanding of what is required in the DQO process. Here are some suggestions for improvement:

2.6.2 – Step 2: Identify the Decision
Comparing this subsection to 2.3, two other decisions to be made are 1.) Determine existing groundwater contaminants and natural attenuation parameters, and 2.) Determine baseline unsaturated zone pore water contaminant concentrations.

2.6.3 – Step 3: Identify Inputs to the Decision

This is the appropriate place to state what your information is based on to make the decisions. For example, if the question is asked, "Is the treatment effluent meeting discharge requirements?" then here is where you would list the discharge requirements or reference where in the document they can be found. To answer the question, "Is the groundwater treatment system operating properly?" list the "benchmark" concentrations that would give you the answer. As stated previously, the NR 140 groundwater standards and the NR 720 soil standards or established RCLs are also "inputs to the decisions." How will the natural attenuation data be used to determine if the natural attenuation process is adequately taking place (which parameter concentrations will increase and which will decrease)? What are the "remedial goals specified in the ROD?"

2.6.4 – Step 4: Define the Boundaries of the Study
According to EPA's guidance on DQOs, boundaries of a study are spatial and temporal. Referring to the site map, Figure 2-2, what specifically are the boundaries of the study? It should be stated that the 4 residential wells are off-site. The temporal boundaries of the study: September2000-September 2003 or a 5 year duration (?), frequency of groundwater monitoring, 18 vadose zone soils will be collected in one endeavor…The revisions should not be limited to the examples given.

2.6.5 Step 5: Develop a Decision Rule
(DNR recognizes that health and safety monitoring is an important issue, however this information does not belong in a QAPP.) The rest of this subsection needs to be reworded so that it contains useful information. ("Engineering level" and "confirmational level" data are not defined terms and should not be used. The rest of the verbiage is inaccurate, as will be discussed in the next subsection and in Section 10.) There should be at least one "logical 'If...then…' statement that defines the conditions that would cause the decision maker to choose among alternative actions" for every decision that needs to be made. (Quoting EPA DQO guidance.) Some examples: "If contaminants are detected in the private wells, then…(what)" "If the groundwater treatment plant waste products contain (cite criteria), then they will be disposed of as hazardous waste."

2.6.6 Step 6: Specify Limits on Decision Errors
I have seen very elaborate computations that give a numerical value on the limits on decision errors for all data. Rather than quantifying these limits, qualitative statements are acceptable. I'm looking for language that will answer the question, "How much uncertainty about the data (the accuracy, precision, completeness, comparability, and representativeness) can we accept and still make meaningful decisions?" Conversely, "How much certainty do you need in order to make a meaningful decision?" I am seeing a few categories of data and the level of certainty/uncertainty can be discussed for each. First I see the groundwater monitoring (monitoring wells and residential well) and the effluent analyses for site contaminants. There is also the data being generated for disposal of treatment plant waste and the vadose zone soils. All four data sets should be generated at a state-certified laboratory and the certainty of its quality should be high. (I question the need for validating this data at all, but certainly not for every round. For

other Superfund sites that are in the remedial or O&M stages, I have suggested that data be validated initially, yearly thereafter (for quarterly monitoring), and for any sampling round the regulatory agencies deem it necessary. This is a **HUGE** cost savings. When I have discussed this strategy with knowledgeable EPA staff, they tell me it's a reasonable approach. The lab can pull the data packages together with all supporting QC documentation and have it readily available in the event that data will need validation at another time. I suggest language regarding data review/validation be eliminated from the DQO subsection and Section 10 of the QAPP referenced here instead.) What level of certainty regarding the treatment plant influent and the bioventing soil gas data is needed to tweak the systems to make things work? The soil gas data will be generated in the field and not in a lab. None of these data sets needs independent "validation." Certainly legally defensible data quality is overboard for these decisions. There are several lab and field parameters for natural attenuation. There are no analytical methods required by either regulatory agency-Wisconsin accepts whatever works. There is a certain amount of uncertainty associated with each parameter (I have already mentioned the representative problem with methane). No single parameter for natural attenuation will drive the decision; data will be reviewed as a whole. Therefore, the level of certainty required for each parameter is less critical.

Step 7 of the DQO process has been left out. Here is what is needed in the revised QAPP:

Step 7 – Optimize the Design for Obtaining Data: Identify the most resource-effective sampling and analysis design for generating data that are expected to satisfy the DQOs. Language in this section of the text should answer the question: How will the number of samples, sample matrices, sample locations, and analytical parameters of each sample give the information needed to make the necessary decisions?

Section 3 – Project Organization and Responsibility

3.2 – WDNR Site Manager - What is Tom Kendzierski's role and what are the responsibilities associated with this role?

SPECIFIED ! SSC

3.10 – Subcontract Laboratories Project Managers – Once the laboratories are firmly established, the QAPP shall be revised according to guidelines in the Region 5 Model QAPP.

What is the role of the Region 5's Quality Assurance Section regarding the review and approval of this QAPP? During my last conversation with EPA's Steve Ostradka, he indicated that his work group did not receive or review the most recent version of this QAPP.

Section 4 – QA Objectives for Measurement Data

Introduction – The statement regarding legally defensible data is an exaggeration for most and maybe all of the data for this phase of the project. It is more appropriate to concentrate on the *usability* of the data.

COMPLIANCE WITH ARARS

4.1 – Level of Quality Control Effort – This subsection should contain detailed information regarding the level of QC effort for all the field measurements. This should include temperature, conductivity, pH, Redox potential, dissolved oxygen, water level, soil vapor parameters, and soil gas pressure measurements. It should be clear what quality control measures will be taken and what the performance criteria are for all measurements. (The criteria for field measurements should be a part of 4.2.)

4.2 – AP and S of Analysis - It would serve well to have a summarized table for the accuracy, precision, and sensitivity criteria similar to Table 3-10 in the Model QAPP.

4.3.1 – Completeness – It is a general goal for projects to have 90 % completeness for field measurements (not addressed) and 95 % completeness for laboratory analyses (not 90 %). Please change the text accordingly. What does, "The success in meeting this goal will have no negative affect on the analytical program," mean?

Section 5 – Sampling Procedures

(Please see comments for the Field Sampling Plan.) Somewhere in this section or in the FSP the text should include a statement similar to the following: "In the event that it becomes necessary to deviate from the Sampling and Analysis Plan in any way including, but not limited to, the number of samples, sample location, sampling technique, requested analysis, sample handling, preservation or packaging, etc., deviations and corrective actions taken will be noted in the Remedial Design field summary report to the regulatory agencies, particularly noting how these deviation affect the quality and usability of data for its intended purpose."

Section 6 – Sample Custody

6.2 – Laboratory Chain of Custody Procedures – The revised QAPP shall include a description of the laboratory's internal custody procedures in this subsection. An alternative would be to have the laboratory supply an SOP for their custody procedures and have the attachment referenced here. The laboratory's QA Plan should neither be referenced here nor supplied. According to EPA's guidance, "**DO NOT** submit the laboratory quality assurance program plan attached in an appendix in order to satisfy project-specific quality assurance project plan (QAPP) information."

(The custody paper work such as labels, tags, seals, multiple copy/color-coded chain of custody forms described in the text is appropriate for samples being sent through the Contract Laboratory Program. It is not necessary to use Region 5's paperwork, but I have no strong objection if EPA approves this.)

Section 7 – Calibration Procedures and Frequency

7.1 – Field Instruments/Equipment – I have mentioned elsewhere in my comments that the reason for using a PID is not clearly understood. If it is used for field screening of samples, text needs to be added for what, why, benchmarks, etc. If it is used for health and safety purposes,

only, it can be eliminated in the QAPP. I believe the reference to an X-ray fluorescence meter can be eliminated. If not, please explain. Not used

7.2 – Laboratory Instruments – For the record, calibration procedures and frequency are NOT included in the SAS request forms. More importantly, laboratory/instrument-specific calibration procedures and frequency WILL be a part of the required analytical SOPs.

If this laboratory does not have a contract with EPA (as in the Contract Laboratory Program) and is not certified by Wisconsin, who exactly would perform an on-site audit? Has Region 5's Quality Assurance Section agreed to this?

As stated above, a general statement regarding a laboratory QA Plan should not be referenced or attached. The necessary information should be in the text of the QAPP or the lab's SOPs should be provided and referenced.

Section 8 – Analytical Procedures

THIS IS NOT THE PLACE TO INFORM THE READER OF THIS DOCUMENT THAT ON-SITE OR "MOBILE" LABORATORY ANALYSES OF PCP AND ARSENIC WILL BE PERFORMED. This information should be introduced very early in the QAPP (throughout Section 2) and should also be in the FSP. These analyses should be a part of the DQO process. Why is on-site generated data needed? How many samples will be collected? What are the analytical procedures? Where are the SOPs for the analyses? The subcontracting mobile lab should be named BEFORE a QAPP is written, also. What are the laboratory's detection and quantitation limits for these parameters? Are they adequate for the project's objectives? What decisions will be made on mobile lab-generated data? What "benchmarks" are significant for these decisions? The 10 % concept mentioned here appears to contradict the sample numbers given on the tables of the QAPP and FSP. Which 10 % - how will that be determined? Does this field screening have anything to do with the XRF mystery? The field screening samples should be included on all pertinent tables and should be mentioned everywhere else in the QAPP and FSP. Arsenic is not even a parameter for soils according to Table 2-1 and is not listed as a parameter in the text. What comparability is needed between the mobile lab data and fixed lab data? What happens if the data sets don't compare within prescribed ranges?

OUT

*****Tom, I think this curve ball warrants a call to the contractor and EPA. If on-site field screening is actually necessary and planned, ALL sections of the QAPP and FSP need to be rewritten accordingly. I would have to rewrite my comments also, but will wait until this is resolved.**

OUT

8.1 – Laboratory Analysis – Please see all comments regarding the necessity of laboratory-specific/project-specific analytical SOPs.

8.2 – Field Screening Analytical Protocol – Please see all comments regarding ALL SOPs for field measurements. Field SOPs need to be referenced here. I still don't know why the PID is mentioned here. What was the contractor expecting to detect in the field samples with this

instrument? The ionization potential of most contaminants of concern will not permit them to be detected by a PID.

Section 9 – Internal QC Checks

9.1 – Field Quality Control Checks – As mentioned elsewhere in my comments, EPA's guidance indicates manufacturer's operating manuals cannot take the place of SOPs. At the very least, the contractor needs to submit the operating manuals for review.

9.2 – Laboratory Analysis – For what should be done for this phase of the project, language similar to what is in the Region 5 Model QAPP would be more appropriate in this subsection. Please review and rewrite accordingly.

Section 10 – Data Reduction, Validation, and Reporting

General Comment – As mentioned previously in my comments, I question the need to have any data validated. If EPA prefers to have some of the data validated (certainly the NA data, soil gas data, influent, etc., would not be "validated"), then it should be understood there is NO industry standard for validating data. The only "standard" validation processes available are the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" and the "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review." Here are reasons these processes cannot be used for this project:

- The processes described in these guidance documents can only be applied to data that has been generated using CLP parameters and CLP methods. Specifically they are for the analysis of volatile organic compounds, semivolatile organic compounds, PCB/pesticides, and twenty-three metals and cyanide analyzed according to CLP Statements of Work. Notice that the parameters listed above and the parameters of this project don't match. Also, note that CLP statements of work are not to be utilized for the PWP Remedial Actions.
- The performance criteria given in these EPA guidance documents are NOT the same criteria required by the laboratory certification program.

EPA and WDNR clearly must decide if validation is needed at all, what data would be validated, who would perform this validation/data assessment, and the process/criteria for validation. The entity validating the data would have to submit SOPs that contain all necessary information (process, criteria, etc.). I think this is another issue to discuss during a telephone conference with EPA and CH2M HILL Once we have this resolved, I will be able to give the contractor better direction regarding data reduction, *review*, and reporting.

Section 11 – Performance and Systems Audits

This section should include information on internal and external audits for both field and laboratory activities. Please review the Model and revise this section accordingly.

11.1 – Field Audits – Please add text to indicate that field audit may be performed by the USEPA or WDNR, at the discretion of either regulatory agency.

11.2 – Laboratory Audits – There is a syntax error in the first sentence. Please add text that states laboratory audits are performed periodically by WDNR as a part of the laboratory certification program. (Laboratories that are not currently certified or who have not applied for certification will not be audited. WDNR will not conduct audits on a project-specific basis.)

Section 12 – Preventive Maintenance Procedures

12.1 – Field Equipment/Instruments – The text here is insufficient. Please see comments regarding preventive maintenance of field equipment in the FSP. The revised QAPP should include information for ALL field instruments.

12.2 – The text of this subsection needs to be revised according to all other comments provided and according to the example given in the Model. Please provide a table similar to Table 11-1 in the Model.

Section 13 – Specific Routine Procedures to Assess Data Precision, Accuracy, and Completeness

(Please review the equations in the Model more closely.)

13.1 – Field Measurements – Information regarding field precision and accuracy have been omitted. Please include.

13.2.1 – (Laboratory Data) – Precision – This is incomplete. Please revise.

Section 14 – Corrective Actions

There is no text in this section for corrective actions during data evaluation and assessment. Please see Model. Include language that is appropriate for this project.

Section 15 – Quality Assurance Reports to Management

As previously stated, reports to the regulatory agencies should include any deviations to the QAPP or FSP, particularly noting how these deviations affect data quality/usability for this project.

Comments on the Field Sampling Plan

Section 2 – Sampling Network and Rationale

2.1 – Project Objectives – It should be noted that the 5 objectives listed here do not completely correspond to the 9 listed in the QAPP. Please include the following:

- Provide information to assist in the operation of the groundwater treatment facility and bioventing system and their monitor performance
- Ensure compliance with discharge requirements through the collection an analysis of influent and effluent samples
- Sample and analyze soil gas samples to monitor oxygen uptake and contaminant reduction in soils resulting from bioventing system operation
- Confirm that contaminants do not extend to drinking water wells

2.3 – Contaminants of Concern – What does "and address specific concerns in individual environmental media" mean? Details are needed here for clarity.

Table 2.1

Please see comments for QAPP Table 2.1

Section 3 – Sample Custody Procedures

3.1 – Sample Identification System

- The information in this first paragraph is inappropriate and out of data by more than 6 years. It should be completely eliminated. The Sample Management Office no longer exists.
- The alphanumeric system should be project specific. If there are no surface soils associated with this phase of the project, the SS media code should be eliminated.
- Include information on field QC samples (duplicates, field blanks, trip blanks, etc.). How will they be designated?
- Please clarify: In PWPMW0101, does the second 01 refer to sampling round or how will rounds be designated?

Section 4 – Sample Containers and Maximum Holding Times

4.1 Sample Containers – Please add text that the bottle supplier's certificates of analyses will be kept as part of this project's permanent file record.

Table 4.1

All comments for QAPP Table 2.3 apply here with the following addition: The holding times for "Water – Nitrate, Sulfate, Chlorides" are missing and should be included.

Section 6 – Decontamination Procedures

There is a contradiction: A trisodium phosphate and nonphosphate detergent are being used for the same purpose. A nonphosphate detergent is more environmentally friendly and is adequate with the other rigors in place.

6.1 – Personnel Decontamination – Decontamination in the field is used for two reasons; 1.) For health and safety purposes and, 2.) QC reasons, specifically to prevent cross contamination. The text here more resembles health and safety procedures. Please reword text so that it is clear what measures will be taken to prevent cross contamination of field samples. It may be as simple as changing outer gloves between sampling locations.

6.2 – Another contradiction: Solutions of TSP and HPLC or ASTM Type 2 grade water and solutions of nonphosphate detergent in tap water are being used for the same purpose. Usually tap water and detergent are fine when the final rinse is with high quality, DI water. The use of solvents in the field should be discouraged unless it is clearly justified. Is a 10 % methanol rinse really necessary?

Section 7 – Sampling Equipment and Field Procedures

7.1.1 – Surface soil sampling text should be eliminated.

7.4.1 – There is NO information on how the monitoring wells will be *sampled*. Will plastic sheeting be placed around the well to prevent contamination of sampling equipment? Will the wells be sampled using a bailer or will a low flow pump be used? Will in-line filtration be used for the metals or a Gelman-type apparatus? Complete details are needed.

Section 8 – Quality Control Sample Procedures

8.1 – Field Blanks – Details should be added to the text to make sure the field blanks are "prepared" in the same way as the field samples. For example, the reagent-free water must pass through the same sampling equipment (and filtration for metals analysis) as the field samples. Field blanks should be preserved the same way as the field sample. They are analyzed for all the parameters as the field samples. As mentioned previously, it isn't necessary to prepare field blanks for the soils.

8.2 – Field Duplicates – Field duplicates should be collected at a frequency of 1 per 10 field samples or fewer *per matrix*. Specifically, residential wells should have a separate duplicate as the monitoring wells. If there is justification for eliminating duplicates for a matrix, like the treatment plant effluent, it should be explained here.

Aqueous samples for BTEX are being collected. Information on how the trip blanks are prepared and who will prepare them (will they be supplied by the lab or prepared in the field?) should be included.

Section 9 – Field Measurements/Screening

(If the PID is being used to screen field samples, then all appropriate information needs to be added to the pertinent sections of the QAPP and FSP. If it is used for health and safety monitoring only, it can be eliminated.)

Text here should include ORP, soil vapor parameters, and soil gas pressure.

Section 10 – Preventive Maintenance Procedures/Schedules

According to EPA's QAPP guidance, "DO NOT submit copies of manufacturer's guides to operating certain instruments such as the field equipment commonly used to detect volatile organic analytes, or for the measurement of temperature, pH, Eh, and specific conductance." I would be perfectly willing to overlook this rule if the consultant had actually included the manufacturer's instructions. They are merely referenced. This is not helpful for the review of the document and it probably isn't helpful to the field crew performing field measurements. Procedures and frequency of preventive maintenance of field measurement instruments are missing for the following SOPs:

- pH
- Redox
- Field Filtering
- Water Level Measurement
- Soil Vapor
- Soil Gas Pressure

A simple solution for including this missing information is to provide a summary in tabular form, like Table 11-3 in the Region 5 Model QAPP.

Section 11 – IDW

If the IDW is being disposed of in Wisconsin, it must be properly disposed in accordance with *Wisconsin* regulations.

F029 issue

IDW in O&M plan

SAS Request Forms

I will not review the SAS request forms. They cannot take the place of laboratory SOPs.

CC: Donalea Dinsmore – ISS/6, submitted electronically
Dave Hantz – WT/2, submitted electronically

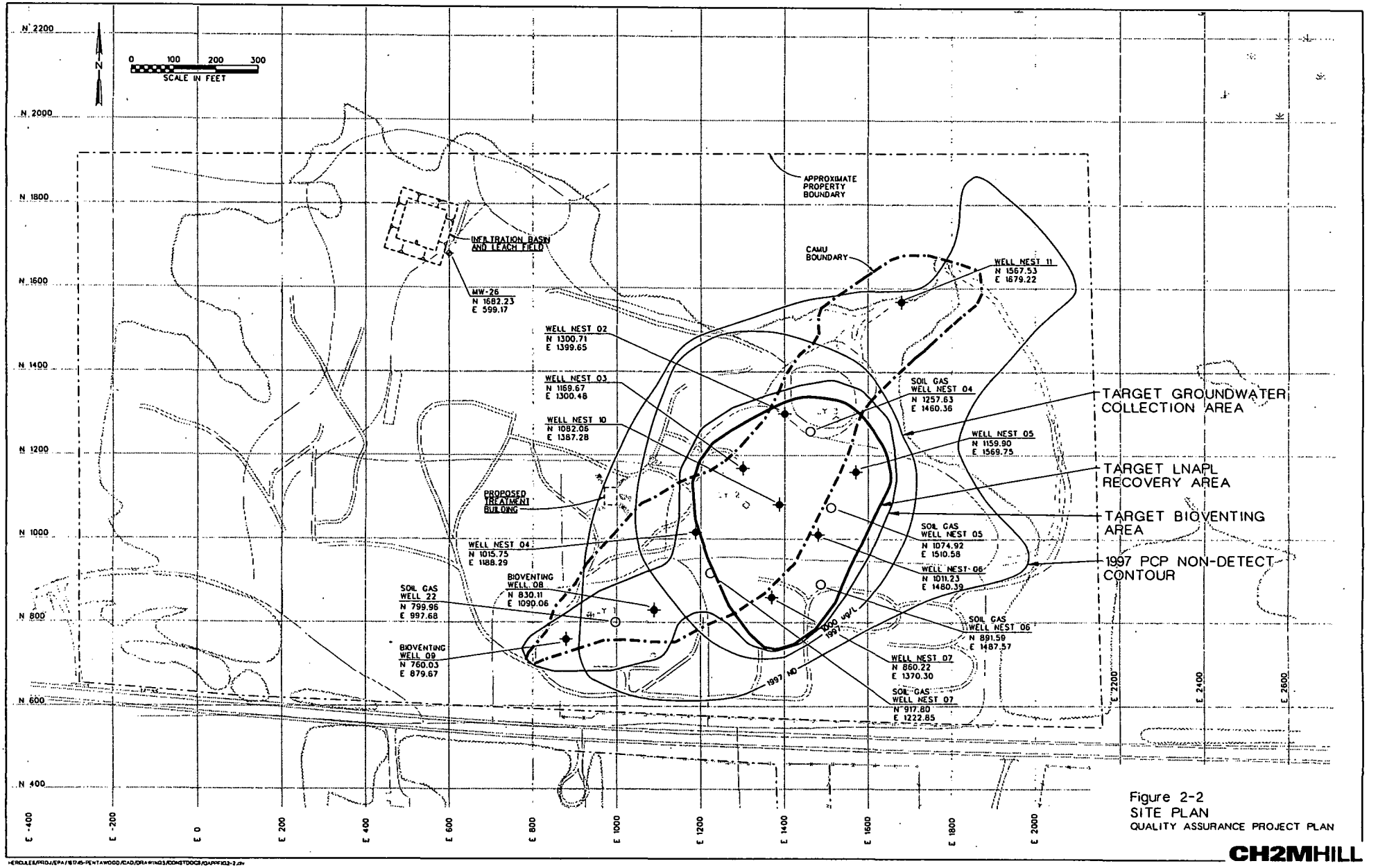


Figure 2-2
SITE PLAN
QUALITY ASSURANCE PROJECT PLAN

CH2MHILL

2.1.2 Site Physical Characteristics

2.1.2.1 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 were created in the sandy overburden soils. A large gully extends northeast from the treatment area to the lagoon.

2.1.2.2 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. The lower and upper sands may be indistinguishable when the glacial till layer is missing. The deepest soil boring of 300 feet below ground 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 has 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.

2.1.2.3 Hydrogeology

Groundwater at the PWP site occurs both in a thin, unconfined, water-bearing unit about 100 feet below ground 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.

2.1.2.4 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.

2.1.2.5 Surface Water Hydrology

Surface water that does not infiltrate the sandy soils is primarily managed by interceptor ditches and a diversion berm which directs surface water drainage towards the downchutes.

2.1.2.6 Surrounding Land Use

The site is located in a residential/agricultural/recreational area. A 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

As a result of spills and poor waste handling practices at the site, subsurface soils to a depth of over 100 feet are contaminated with the PCP/oil mixture beneath the gully where wastewater was discharged from an oil/water separator to a lagoon. Over the years, PWP filled erosional gullies with wood debris. This wood debris layer is semi-saturated with the PCP/oil mixture. The PCP/oil mixture, which has traveled to the groundwater and spread horizontally as a LNAPL layer, is in equilibrium with pore pressures and is not expected to continue spreading A LNAPL of PCP/oil is floating on the water table over an estimated 4-acre area.

A dissolved phase PCP plume exists in the groundwater. PCP concentrations in groundwater have been monitored at the site since 1988, and some of the wells have 11 rounds of sampling data. PCP groundwater concentrations have shown consistent declines at the majority of monitoring wells over time, although many of the wells have only been monitored for 3 years. There is a general decrease in the size of the PCP plume, and the total contaminant mass of PCP in the saturated zone has declined since 1994. PCP contamination detected at 2,000 μg/L at MW17 in 1994 has declined to non-detect levels in 1997. Contaminated groundwater is not discharging to the wetland, or migrating below the wetland to surface water bodies.

Additional evidence that PCP is biodegrading in groundwater is supported by the natural attenuation parameter data. The groundwater is under anaerobic conditions in both the unconfined and semiconfined aquifer in the LNAPL plume area. The anaerobic plume is not expanding, which is important because aerobic biodegradation has a faster decay rate than anaerobic biodegradation.

Prior to the remedial construction, the northern lagoon wall was collapsing and overland transport of oil saturated soil and wood debris has resulted in sediment and surface water contamination in an offsite wetland. Surficial soil samples collected from a minor gully that starts below a wood scrap pile on the northwestern property boundary and discharges to an offsite hollow did not contain PCP; however, arsenic levels were slightly elevated.

Wastewater was discharged into a ravine filled with wood chips. Despite elevated levels of PCP and TPH detected in the wood chips, the soil and groundwater below them appear to be minimally impacted. The wood chips have been removed during the remedial construction.

2.1.4 Selected Remedy

A record of decision (ROD) was finalized for the PWP site on September 29, 1998. The selected remedial action for the site consists of soil and sediment consolidation and bioventing, LNAPL collection and disposal, ground water collection and treatment in the LNAPL area, and monitored natural attenuation for the remainder of the groundwater plume. The selected remedy focused on removing free phase LNAPL and the grossly-contaminated groundwater while slowly drawing down the water table and enhancing natural biodegradation of the soils above the LNAPL by bioventing (adding air

to the soils above the water table). PCP/fuel oil contaminated soils and sediments were consolidated under a cover prior to bioventing. Arsenic/metals contaminated soil were segregated where possible; highly contaminated soils were solidified in cement and placed onsite. The overland transport of contaminated site materials through a collapsing lagoon wall to an adjacent wetland was eliminated through grading, covering and establishing vegetation. The natural degradation of contaminants that is occurring in the groundwater plume will be monitored. If monitoring detects that offsite receptors are threatened, or if the remedy fails to effectively reduce contaminant mass within a reasonable amount of time, contingency plans will be implemented. The major components of this remedy include:

- Building demolition
- Segregation, select solidification, and placement of all arsenic soils in an onsite CAMU
- Consolidation of PCP/fuel oil soils and wood chips under a soil cover
- Bioventing PCP/fuel oil contaminated material
- Biopad removal and disposal onsite in the CAMU
- Erosion control measures
- Revegetation
- LNAPL removal
- Monitored natural attenuation
- Institutional controls
- Environmental monitoring/maintenance
- Point-of-entry carbon treatment, if necessary
- 5-year site reviews
- Collection, treatment, and discharge of grossly contaminated groundwater (exceeding 1,000 μg/L PCP)

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 that the primary COCs at the PWP site are PCP, arsenic, benzene, naphthalene, and diesel range organics (DRO).

2.3 Project Objectives

The objectives of the LTRA sampling and analysis are:

- Determine existing groundwater contaminant and natural attenuation parameter concentrations
- Provide information to assist in the operation of the groundwater treatment facility and bioventing system and their monitor performance
- Ensure compliance with discharge requirements through the collection and analysis of influent and effluent samples
- Sample and analyze soil gas samples to monitor oxygen uptake and contaminant reductions in soils resulting from bioventing system operation

- Balance bioventing system air flow rates, determine baseline soil gas conditions, and determine bioventing blower operation on-and-off duration
- Confirm that contaminants do not extend to drinking water wells
- Evaluate treatment system contaminant removal effectiveness
- Evaluate treatment system residuals and LNAPL contaminant concentrations
- Determine baseline unsaturated zone pore water contaminant concentrations

2.4 Sample Network Design and Rationale

The soil, groundwater, soil gas, and treatment system sample location rationale are described in detail in the FSP.

2.5 Parameters to be Tested

A summary of sampling, sample matrices, specific parameters to be analyzed for each matrix, and estimated numbers of samples are presented in Table 2-1.

Analytical parameters, and analytical methods, and the project's required detection limits for sample analysis can be found in Table 2-2. Table 2-3 provides a summary of requirements for sample quantity, container, preservative, and packaging.

TABLE 2-1
Summary of the Long Term Response Action Sampling and Analysis Activities

Sample Matrix	Locations	Analytical Parameters	Field Samples	Field QC			Lab QC	Total No.
				FB[1]	Dup[2]	TB[3]	MS/D[4]	
Groundwater—Existing Monitoring Wells and Residential Wells	Monitoring wells: MW-1, MW-2, MW-3, MW-4, MW-5, 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-19	PCP	132	20	20		16	188
		BTEX	116	16	16	40	12	200
	Residential wells: RW01(8713 Daniels 70), RW02 (8627 Daniels 70), RW03 (cabin-8526 Daniels 70), RW04 (8526 Daniels 70)	Naphthalene, total metals, dissolved metals, alkalinity, nitrate, sulfate, sulfide, chloride, hardness, TOC, methane	116	16	16		12	160
	(Four sampling rounds will include all monitoring wells; eight sampling rounds will include five monitoring wells; six sampling rounds will include four residential wells)	Natural attenuation-field analyses: DO, pH, Redox potential, conductivity, temperature, CO_2	116					116
Treatment System Influent and Effluent Sampling	Combined Influent (EW-2, 3, 4, 5, 6, 7, 10, 11)	PCP	36					36
	Effluent (after activated carbon treatment, prior to discharge to the infiltration basin)	PCP	156					156
		DRO, TOC, Phenol, Naphthalene	36					36
		TSS, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, total-trimethylbenzene, dioxin (2,3,7,8-TCDD), BTEX, As, Cu, Zn	14					14
		Chloride, Fe, Mn	12					12
		Acid extractables, TCDDs, TCDFs (all congeners)	3					3
Spent activated charcoal, bag filters and activated clay	Groundwater Treatment System	PCP, TCDDs, TCDFs (all congeners)	TBD					TBD

TABLE 2-1
Summary of the Long Term Response Action Sampling and Analysis Activities

Sample Matrix	Locations	Analytical Parameters	Field Samples	Field QC			Lab QC	Total No.
				FB[1]	Dup[2]	TB[3]	MS/D[4]	
Waste-LNAPL	LNAPL Storage Tank	PCP, TCDDs, TCDFs,	TBD					TBD
Bioventing Soil Gas Analysis	Unsaturated Zone piezometer nests: (7 piezometer nests of 3 wells each)	O_2, CO_2, temperature, humidity, air pressure	63					63
Soil	18 Vadose zone soil samples	PCP, TPH	18	2	2		1	23

PCP = Pentachlorophenol
BTEX = Benzene, toluene, ethylbenzene, xylenes
TBD = To be determined
DRO = Diesel range organics
TOC = Total Organic Carbon
TPH = Total Petroleum Hydrocarbons
TSS = Total suspended solids
TCDDs, TCDFs (all congeners) =
HxCDD (Hexachlorodibenzo-p-dioxins)
PeCDD (Pentachlorodibenzo-p-dioxins)
TCDD (Tetrachlorodibenzo-p-dioxins)
HxCDF (Hexachlorodibenzofurans)
PeCDF (Pentachlorodibenzofurans)
TCDF (Tetrachlorodibenzofurans)

[1]Field blanks are collected at a frequency of 1 per group of 10 samples

[2] Duplicate samples are collected at a frequency of 1 per group of 10 samples

[3]Trip blanks are provided at a frequency of 1 per shipment

[4]MS/D samples are collected at a frequency of 1 per group of 20 samples

TABLE 2-2
Parameter List and Project Required Detection Limits

		Detection Limits	
Parameter	**Method**	**Soil (mg/kg)**	**Water (µg/L)**
Pentachlorophenol	SW846-8151	--	0.1
	SW846-8270	0.5	--
Phenol			
2,4-Dimethylphenol	SW846-8270	0.33	10
2,3,4,6-Tetrachlorophenol		0.33	10
2,4,6-Trichlorophenol		0.33	10
Acenaphthene		0.33	10
Anthracene		0.33	10
Benzo(a)anthracene		0.33	10
Benzo(b)fluoranthene		0.33	10
Benzo(k)fluoranthene		0.33	10
Benzo(a)pyrene		0.33	10
Chrysene		0.33	10
Dibenzo(a,h)anthracene		0.33	10
Fluoranthene		0.33	10
Indeno(1,2,3-c,d)pyrene		0.33	10
Naphthalene		0.33	10
Phenanthrene		0.33	10
Pyrene		0.33	10
Arsenic	SW846-7060A	0.5	2.0
Copper	SW846-6010B	NA	5.0
Iron	SW846-6010B	NA	100
Manganese	SW846-6010B	NA	10
Zinc	SW846-6010B	NA	2.0
Nitrate	EPA-300	NA	130
Sulfate	EPA-300	NA	2,000
Sulfide	SW846 9030	NA	500
Methane	SW846-8020	NA	1.0
Chloride	EPA-300	NA	3,000
Carbon Dioxide	SM4500-C02D	NA	NA[a]
DRO	SW846-8015A	1	NA
TOC	SW846-9060	NA	1,000
TPH	EPA-418.1	10	NA
BTEX	SW846-8260/8020	NA	0.1 for benzene, 1.0 for others

TABLE 2-2
Parameter List and Project Required Detection Limits

		Detection Limits	
Parameter	**Method**	**Soil (mg/kg)**	**Water (µg/L)**
Polychlorinated Bibenzo-p-Dioxins			
HxCDD	SW846-8290	0.0001	0.0063
PeCDD		0.0001	0.0063
TCDD		0.0001	0.0063
Polychlorinated Dibenzofurans	SW846-8290		
HxCDF		0.0001	0.0063
PeCDF		0.0001	0.0035
TCDF		0.0001	0.0063
Hardness	EPA-130.2	NA	500
Alkalinity	EPA-310.1	NA	5,000
SPLP Arsenic (Total)	SW846-1312	0.5 mg/L	2.0
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.

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 TPH	4-oz. amber glass jar [a]	4°C protect from light	14 days to extraction and 28 days from extraction to analysis
Water/Liquid Waste —PCP, 2,4-Dimethylphenol, Phenol, 2,3,4,6-Tetrachlorophenol, 2,4,6-Trichlorophenol	1-liter amber glass bottle [a]	4°C protect from light	7 days to extraction and 40 days from extraction to analysis
Water/Liquid Waste PAHs	1-liter amber glass bottle [a]	4°C protect from light	7 days to extraction and 40 days from extraction to analysis
Water/Liquid Waste-PCDDs and PCDFs	1-liter amber glass jar [a]	4°C protect from light	30 days to extraction and 45 days from extraction to analysis
Water—Arsenic, Copper, Iron, Manganese, Zinc	500-mL polyethylene bottle	HNO_3, pH<2, 4°C	6 months
SPLP Water/Liquid Waste — Arsenic (Total)	500-mL polyethylene bottle	HNO_3, pH<2, 4°C	180 days
Water—Nitrate, Sulfate, Chloride	1-liter poly	4°C	NO_3 - 48 hours SO_4 - 28 days Cl - 28 days
Water—Sulfide	1-liter amber glass jar [a]	4°C, NaOH, pH > 9, Zinc acetate	48 hours
Water—Methane	3 40-mL vials [a]	HCl, pH<2, 4°C, protect from light	14 days
Water—Manganese	100 mL poly	HNO_3, pH<2, 4°C	6 months
Water—TOC	100 mL poly	H_2SO_4, pH<2, 4°C	28 days
Water—BTEX	3x40 mL vials [a]	HCl, pH<2, 4°C, protect from light	14 days
Water—Alkalinity	250 mL poly	4°C	14 days
Water—Iron (soluble)	100 mL poly	HNO_3, pH<2, 4°C	6 months
Water—Hardness	100 mL poly	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.
SPLP = Synthetic Precipitation Leachate Procedure
PCDD = Polychlorinated Dibenzo-p-Dioxins
PCDF = Polychlorinated Dibenzo Furans

2.6 Data Quality Objectives

2.6.1 Step 1: State the Problem

A PCP solution in a No. 2 fuel oil carrier and chemonite, a water-borne salt treatment consisting of ACZA, were released to site soils and resulted in risks to human health and the environment from exposure to soils and contaminated groundwater. The USEPA selected remedy addresses the risks posed by the site. This QAPjP is directed at the sampling and analysis to be performed during the LTRA to verify the adequacy of the remediation, the operation of the groundwater collection and treatment system and bioventing system.

2.6.2 Step 2: Identify the Decision

The major decisions required are:

- Determine whether bioventing system is balance and operating effectively
- Determine disposal requirements for treatment system residuals and LNAPL
- Confirm that contaminants do not extend to drinking water wells
- Determine whether groundwater treatment system is operating effectively to meet discharge criteria

2.6.3 Step 3: Identify Inputs to the Decision

The key inputs to the decisions listed above will be groundwater treatment system sampling before and after treatment system unit processes, treatment system residual sampling and analysis, baseline groundwater sampling and analysis, and bioventing system operational parameter measurements.

2.6.4 Step 4: Define the Boundaries of the Study

The boundaries of the studies are the site boundaries previously established. Nearly all the study sampling and measurements will take place within the property boundaries of the former PWP facility. The groundwater treatment and bioventing treatment systems is located in a central area onsite. The target area of groundwater collection and soil bioventing is onsite in an area of about 4 acres in the central area of the CAMU.

2.6.5 Step 5: Develop a Decision Rule

Organic vapor monitors and other real-time monitoring instruments will be used in the field for health and safety monitoring. The instruments will be calibrated daily. The person calibrating the instrument will enter the calibration information in the field log book. No other QC measures are required for health and safety monitoring.

Engineering level data will be needed to verify the effectiveness of the treatment system. It will include the analysis of water, soil gas, and soil at periodic times during the LTRA. These analyses are conducted using promulgated USEPA procedures. The analytical data is validated in accordance with the USEPA-recognized protocols. All laboratory analyses will be performed at the confirmational level. It will require high quality data and complete

analytical data packages. The QA/QC generated in support of this level will be as provided in the SASs (Appendix A).

2.6.6 Step 6: Specify Limits on Decision Errors

The probability of sampling and measurement errors that exist at any site under investigation necessitates the development of sampling guidelines and the collection of quality control samples. Field errors are minimized by having each member of the field team follow the same standard operating procedures (SOPs) for sampling. Sampling techniques are discussed (or referenced) in detail in the Field Sampling Plan. QC samples are used to verify the accuracy and precision of the data. When a QC sample is outside of a laboratory's established control limits, the data user will be notified through the laboratory report's case narrative that the data are suspect. The QC samples will be used to assist in data validation. Data validation is an important step in determining how the data can be used by the risk assessors or for development of remedial alternatives.

2.7 Measurement Performance Criteria

The measurement performance criteria is checked on several levels:

- Built in quality control standards
- Senior review
- Management controls

The measurement data is given specific QC standards by which it must abide. If these standards are not met, the data is suitably qualified. The analytical data and QC results are checked by the bench chemist, the laboratory's QA manager, and an USEPA data validator.

All documents which pertain to the quality standards of the project are drafted by and reviewed internally by CH2M HILL staff with relevant technical experience. These documents must then be approved by the USEPA's Region 5.

While performing field sampling activities, the field team leaders will supervise activities to assess if SOPs are being followed.

2.8 Project Schedule

O&M of the groundwater treatment plant will continue through September 2003.

SECTION 3

Project Organization and Responsibility

At the direction of the USEPA Region 5, CH2M HILL is responsible for all phases of the LTRA activities at the PWP site in the Town of Daniels, Wisconsin. CH2M HILL will perform the operation and maintenance of the bioventing/groundwater treatment system installed at the PWP site. 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

The work assignment manager (WAM) has the overall responsibility for all phases of the RA. The WAM is also responsible for the review and approval of this QAPjP. Tony Rutter will be the WAM for the PWP site.

3.2 WDNR Site Manager

The WDNR site manager (SM) assigned to the PWP site is Tom Kendzierski.

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

The QA manager is Lauri Gorton. 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
- Providing 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

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 ongoing planning activities.

3.7 CH2M HILL Project Chemist

The CH2M HILL project chemist is Paul Arps. 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

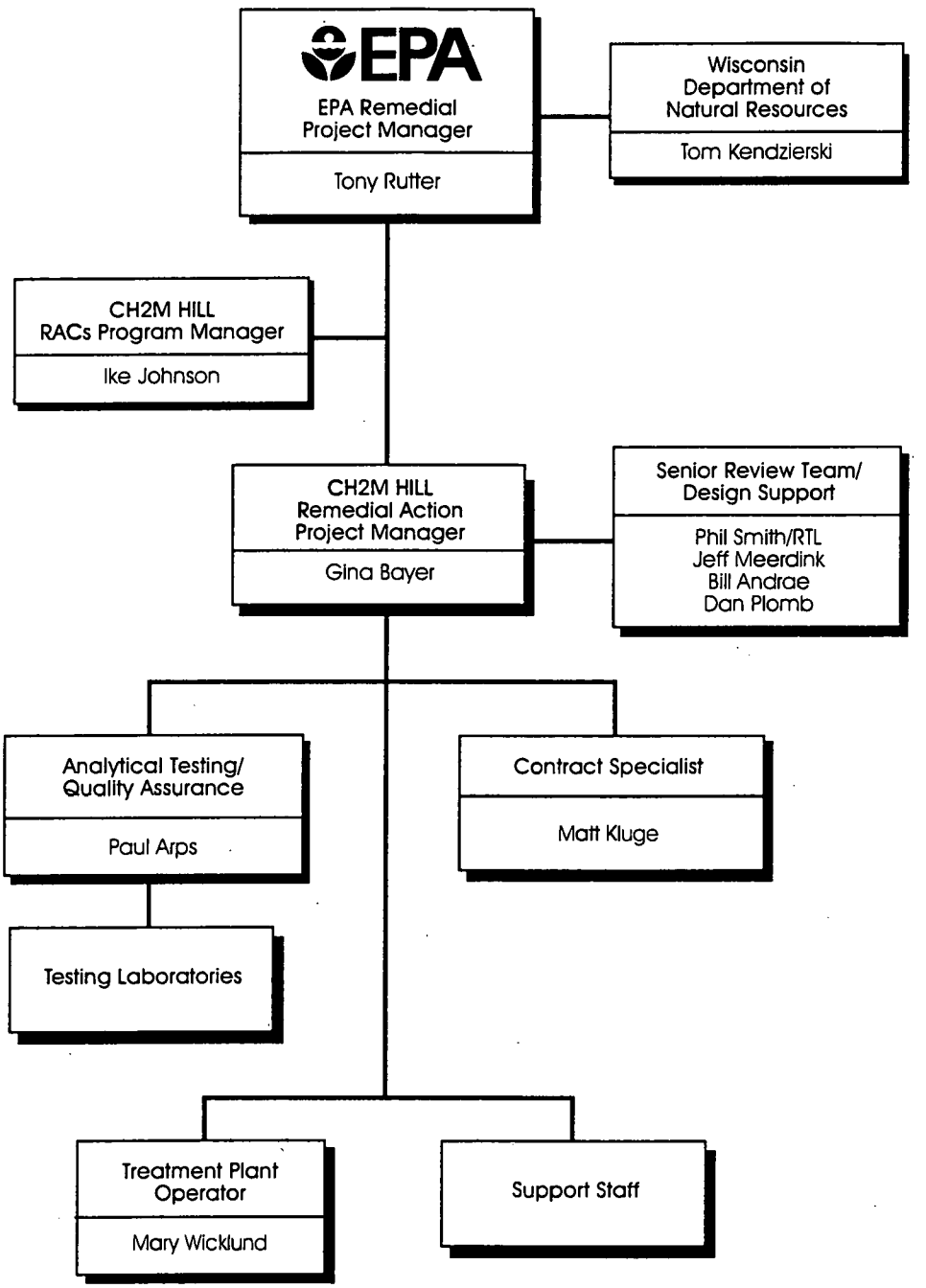


FIGURE 3-1
Team Organization
Penta Wood Products Site
Quality Assurance Project Plan

3.8 CH2M HILL Contract Specialist

Matt Kluge is CH2M HILL's RAC Program APM-ADMIN. Mr. Kluge 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

CH2M HILL will draw on its corporate resources to gather and analyze data and 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 analytical reports preparation.

3.11 Subcontract Laboratories' QA Officers

The laboratories' QA officers 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 SOPs
- Adherence to the QAPjP
- Approving the final analytical reports

Each laboratory may have more than one QA officer, if, for example, any of these various activities take place in different departments within the laboratory.

SECTION 4

QA 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. 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. This section addresses 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 ten or fewer investigative samples, whichever is greater. Trip blanks are used to assess the potential for contamination of samples during shipment and storage. One volatile organic compound (VOC) trip blank will be included with each shipping container of aqueous VOC samples. Duplicate soil and water samples will be collected for every ten field samples to check for sampling and analytical reproducibility.

MS/MSD samples 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 that are confirmational level data.

The LTRA groundwater, soil, treatment system influent, effluent and byproduct 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 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.

After the analytical testing is complete, the percent completeness will be calculated by the following equation:

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

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.

SECTION 5

Sampling Procedures

A FSP has been prepared as part of the 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.

SECTION 6

Sample Custody

It is USEPA's and Region 5's 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 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.

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 will be labeled and tagged with sample numbers and locations. Sample labels and tags will 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 will 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 will be recorded in a field logbook. Activities will be described in as much detail as possible so that persons going to the site will be able to reconstruct particular events 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 documents the transfer of 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 USEPA 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 analytical laboratory chain-of-custody procedures are discussed in each laboratory's QA 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.

SECTION 7

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 before each use or on a routine basis.

7.1 Field Instruments/Equipment

Equipment 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 ensure 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), an X-ray fluorescence meter, an oxygen, carbon dioxide, and temperature soil gas meter, a dissolved oxygen, temperature, pH, conductivity and ORP meter, and an oil/water interface probe.

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.

SECTION 8

Analytical Procedures

Water and soil samples from the PWP field sampling will be analyzed by an onsite laboratory (PCP and arsenic only), and by a Wisconsin-certified laboratory who will be contracted by CH2M HILL. The onsite laboratory will be required to provide results within 24 to 48 hours of sample receipt. A split sample will be collected at 10 percent of the onsite laboratory sample locations and analyzed at the offsite laboratory for verification purposes. Neither the onsite laboratory, nor the offsite laboratory have been determined at this time; bids will be solicited, evaluated, and an award given under the Remedial Action Work Assignment.

8.1 Laboratory Analysis

The analytical procedures for the SAS analyses are described in the requests for SASs in Appendix A. Also specified in the SASs are calibration procedures, calibration frequency, and internal quality control checks required for each analysis.

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

8.2 Field Screening Analytical Protocols

The procedures for the field measurement of total organic vapors are described in the FSP and the SOPs.

SECTION 9

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 will have a written 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.

SECTION 10

Data Reduction, Validation, and Reporting

All data generated by field activities or 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 will be used in the project reports, they will be reduced and summarized; 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 reviewer will identify any out-of-control data points and data omissions, and notify 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 will 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 RD sampling will be available for use by the site manager and project staff.

SECTION 11

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 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 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.

SECTION 12

Preventive Maintenance Procedures

12.1 Field Equipment/Instruments

The field equipment for this project includes volatile organic monitors. 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 logbook.

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. The objective of the preventive maintenance program is to minimize instrument failure and other system malfunctions. The laboratory will have an internal group perform routine scheduled maintenance and to make repairs, or coordinate with the vendor for the repair of instruments. All laboratory instruments will be maintained in accordance with manufacturer's specifications and within the requirements of the laboratory QAP.

SECTION 13

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.

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

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.

SECTION 14

Corrective Actions

Corrective actions may be required for two classes of problems: analytical and 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 situation's potential affect on 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 logbook. 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 with a stop-work order from 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 type of investigative action 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
- Inquiries concerning data quality are received
- Deficiencies are detected by the QA department during internal or external audits or from the results of performance evaluation samples

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, 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.

SECTION 15

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 RD field summary report will contain QA sections that summarizes data quality information collected during the project.

Appendix A
Special Analytical Services

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: H. Pham — Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 353-2310 — (312) 886-1488
D. Date of Request: September 2000
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 48 groundwater samples. This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD).

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

   Superfund-Remedial

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

   October 2000 through October 2001

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
Arsenic-Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: October 2000
E. Site Name: Penta Wood Products

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 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 101 groundwater samples. This number is not 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 2000 through October 2001

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 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
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: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: September 2000
E. Site Name: Penta Wood Products

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 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 48 groundwater samples This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD).

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

   Superfund-Remedial

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

   October 2000 through October 2001

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
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 53 groundwater samples. This number does not include 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 2000 through October 2001.

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
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Copper & Iron-Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: H. Pham — Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 353-2310 — (312) 886-1488
D. Date of Request: October 2000
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 and Iron 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 101 groundwater samples. This number is not 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 2000 through October 2001

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.):**

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	5.0 µg/L	+/- 20 percent
Iron	100 ug/L	

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
Dioxins (2,3,7,8-TCDD)

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: September 2000
E. Site Name: Penta Wood Products

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 2,3,7,8-TCDD in aqueous samples by SW-846 Method 8290

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 low concentration aqueous samples. This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD).

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

   Superfund-Remedial

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

   October 2000 through October 2001

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 21 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 8290 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.):**

Follow protocol according to SW-846 method 8290.

The initial calibration curve shall have 5 different levels of standards.

Dilute and reanalyze samples with analyte concentrations greater than in the highest calibration standard.

Holding time shall not exceed 30 days to extraction and 45 days to analysis from the date of sample extraction.

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 as designated in the CLP SOW, Rev. 8/94. The sample analysis data package shall include all documentation, data reporting forms and raw data as specified in CLP SOW, Rev. 8/94.

All procedures used shall be clearly identified. All original raw data (including, but not limited to 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, exact copies 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 CH2M HILL within the time frame listed in section 6 above. Exact copies 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

5/016-6/96

I. DATA REQUIREMENTS

Parameter	Required Reporting Limits (ug/L)
2,3,7,8-TCDD	0.00003

II. QC REQUIREMENTS

As required by the SW846 Method 8290

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 10 or fewer samples	concentration < reporting limit
Laboratory control sample	at least one per group of 20 or fewer samples	± 20%
Laboratory Duplicate Sample	at least one per group of 20 or fewer samples	± 20%
Surrogates	each sample	± 30%

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact CH2M HILL 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
Dioxins and Furans

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: September 2000
E. Site Name: Penta Wood Products

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 Dioxins and Furans in aqueous samples by SW-846 Method 8290

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 1 low concentration aqueous sample annually. This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD).

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

   Superfund-Remedial

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

   October 2000 through October 2001

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 21 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 8290 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.):**

Follow protocol according to SW-846 method 8290.

The initial calibration curve shall have 5 different levels of standards.

Dilute and reanalyze samples with analyte concentrations greater than in the highest calibration standard.

Holding time shall not exceed 30 days to extraction and 45 days to analysis from the date of sample extraction.

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 as designated in the CLP SOW, Rev. 8/94. The sample analysis data package shall include all documentation, data reporting forms and raw data as specified in CLP SOW, Rev. 8/94.

All procedures used shall be clearly identified. All original raw data (including, but not limited to 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, exact copies 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 CH2M HILL within the time frame listed in section 6 above. Exact copies 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

5/016-6/96

I. DATA REQUIREMENTS

Parameter	Required Reporting Limits (ug/L)
Total TCDD	0.0063
Total TCDF	0.0063
Total PeCDD	0.0063
Total PeCDF	0.0035
Total HeCCD	0.0063
Total HeCCF	0.0063

II. QC REQUIREMENTS

As required by the SW846 Method 8290

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 10 or fewer samples	concentration < reporting limit
Laboratory control sample	at least one per group of 20 or fewer samples	± 20%
Laboratory Duplicate Sample	at least one per group of 20 or fewer samples	± 20%
Surrogates	each sample	± 30%

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact CH2M HILL 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: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: October 2000
E. Site Name: Penta Wood Products

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 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 101 groundwater samples. This number is not 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 2000 through October 2001

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
Hardness-Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: September 2000
E. Site Name: Penta Wood Products

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 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 48 water samples. This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD).

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

   Superfund-Remedial

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

   October 2000 through October 2001

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
Methane- Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: September 2000
E. Site Name: Penta Wood Products

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 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 48 low concentration water samples. This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD).

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

   Superfund-Remedial

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

   October 2000 through October 2001

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: H. Pham — Technical Project Manager (TPO): C. Moore
C. Telephone Number: (312) 353-2310 — (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 101 groundwater samples. This number is not 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 2000 through October 2001

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
77 West Jackson, SM-5J
Chicago, Illinois 60604
PHONE: (312) 886-1488 FAX: (312) 886-0753

SAS Number
Naphthalene and
Phenol - Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: September 2000
E. Site Name: Penta Wood Products

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 naphthalene and phenol in aqueous 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 60 low concentration water samples for naphtyhalene and 12 low concentration water samples for phenol. This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD). Several additional samples will be collected during the start-up of the wastewater treatment facility..

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

   Superfund-Remedial

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

   October 2000 through October 2001

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 21 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 Methods 8270B 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.):**

Follow protocol according to SW-846 method 8270B.

The initial calibration curve shall have 5 different levels of standards.

Dilute and reanalyze samples with analyte concentrations greater than in the highest calibration standard.

Holding time shall not exceed 7 days to sample extraction and then an additional 40 days to sample analysis.

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 as designated in the CLP SOW, Rev. 8/94. The sample analysis data package shall include all documentation, data reporting forms and raw data as specified in CLP SOW, Rev. 8/94.

All procedures used shall be clearly identified. All original raw data (including, but not limited to 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, exact copies 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 CH2M HILL within the time frame listed in section 6 above. Exact copies 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

5/016-6/96

I. DATA REQUIREMENTS

Parameter	Required Reporting Limits (ug/L)
Naphthalene	5.0
Phenol (total)	5.0

II. QC REQUIREMENTS

As required by the SW846 Method 8260A.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 10 or fewer samples	concentration < reporting limit
Laboratory control sample	at least one per group of 20 or fewer samples	± 20%
Laboratory Duplicate Sample	at least one per group of 20 or fewer samples	± 20%
Surrogates	each sample	± 30%

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact CH2M HILL 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: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: September 2000
E. Site Name: Penta Wood Products

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 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 48 low concentration groundwater samples. This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD).

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

   Superfund-Remedial

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

   October 2000 through October 2001

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
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: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: February 1999
E. Site Name: Penta Wood Products

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 23 soil samples. This number is not 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 2000 through October 2001

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 8270C 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	within historical acceptance limits

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 (8151)

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: September 2000
E. Site Name: Penta Wood Products

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 (PCP) in aqueous samples by gas chromatography using methylation derivatization. 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 120 low concentration water samples (1 sample weekly). This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD). Several additional samples will be collected during the start-up of the wastewater treatment facility.

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

   Superfund-Remedial

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

   October 2000 through October 2001

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 21 days of receipt of samples, unless a quick turn-around-time is specified. Quick TAT samples require preliminary results in the designated time frame with a full data package to be supplied to CH2M HILL after 21 days from sample receipt.

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

   Analytical protocol taken from SW846 Methods 8151 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.):**

Follow protocol according to SW-846 method 8151.

The initial calibration curve shall have 5 different levels of standards.

Dilute and reanalyze samples with analyte concentrations greater than in the highest calibration standard.

Holding time shall not exceed 7 days to sample extraction and then an additional 40 days to sample analysis.

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 as designated in the CLP SOW, Rev. 8/94. The sample analysis data package shall include all documentation, data reporting forms and raw data as specified in CLP SOW, Rev. 8/94.

All procedures used shall be clearly identified. All original raw data (including, but not limited to 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, exact copies 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 CH2M HILL within the time frame listed in section 6 above. Exact copies 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

5/016-6/96

I. DATA REQUIREMENTS

Parameter	Required Reporting Limits (ug/L)
PCP	0.1

II. QC REQUIREMENTS

As required by the SW846 Method 8151.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 10 or fewer samples	concentration < reporting limit
Laboratory control sample	at least one per group of 20 or fewer samples	± 20%
Laboratory Duplicate Sample	at least one per group of 20 or fewer samples	± 20%
Surrogates	each sample	± 30%

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact CH2M HILL 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
Sulfate- Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: September 2000
E. Site Name: Penta Wood Products

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 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 48 low concentration groundwater samples. This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD).

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

   Superfund-Remedial

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

   October 2000 through October 2001

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.

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

SAS Number
Sulfide - Water

SPECIAL ANALYTICAL SERVICES
Client Request

Regional Transmittal

A. EPA Region/Client:	Region V		
B. RSCC Representative:	H. Pham	Technical Project Officer (TPO):	C. Moore
C. Telephone Number:	(312) 353-2310		(312) 886-1488
D. Date of Request:	February 2000		
E. Site Name:	Penta Wood Products – Danials, WI		

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 sulfide 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 organics or inorganics; whether aqueous or Soil and sediments; and whether low, medium, or high concentrations):**

Analyze 48 low concentration groundwater samples. This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD).

3. **Purpose of analysis (specify whether Superfund (Remedial or Enforcement), RCRA, NPDES, ETC.):**

Superfund remedial.

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

October 2000 through October 2001

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

Method of shipment will be daily shipment by overnight carrier.

6. **Approximate number of days results required after lab 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 376.1 with special instructions as noted in Section 8.

Samples stored at 4 C until analysis and validation 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 instructions (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):

The detection limit for sulfide should be less than or equal to 1.0 mg/L

Sulfide standards shall be prepared daily from stock solutions.

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

Follow protocol according to EPA Method 376.1.

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 must 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 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.

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

All original chain of custody forms, 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.

Payment to laboratories for thes 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:** Dave Shekoski
Phone: (414) 272-2426

I. QUALITY CONTROL REQUIREMENTS

Audits Required	Frequency of Audits	Limits* (±% or conc)
Preparation Blank	At least 1 per group of 20 or fewer samples	≤ IDL
Lab Duplicate	At least 1 per group of 20 or fewer samples	± 25% or RPD is ≤ MDL.
Calibration Blank	At least 1 per group of 10 or fewer samples	≤ IDL
ICVs and CCVs	As per method	as per method
Matrix Spike	At least 1 per group of 10 or fewer samples	85-115% for aqueous samples
Lab Control Spikes	1 per group of 20 or fewer samples	90-110% for aqueous samples

II. Data Requirements

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

III. Action Required if Limits are Exceeded:

Take corrective action and resample affected samples. Contact CH2M HILL 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 (Diesel Range Organics) in Water

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: September 2000
E. Site Name: Penta Wood Products

Technical Project Manager (TPM): 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 aqueous samples for Diesel Range Organics (DRO) ,C_{10} – C_{28}, using the Wisconsin Modified method for DRO. All samples will be reported in units of 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 12 aqueous samples (1 sample to be collected monthly), this number is not inclusive of field QA/QC samples (duplicates, blanks) or laboratory QA/QC samples (MS/MSD).

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

   Superfund-Remedial

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

   October 2000 through October 2001

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 sample extraction and 40 days from sample extraction to sample analysis.

   The laboratory will be required to provide results within 21 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 the attached Wisconsin Modified Method for DRO with special instructions as noted in Section 8.

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

   Samples must be preserved with 5 mls of 50% HCL at the time of collection.

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.):**
   a. The detection limit for DRO shall be less than or equal to 1 mg/L.. The laboratories Standard operating procedure must be supplied before the notice to proceed will be provided..
   b. Samples must be refrigerated at 4°C from the time of sample receipt until extraction, and from the time of extraction to analysis.
   c. All QA/AC requirements (Surrogates, Matrix Spike/ Matrix Spike Duplicates, Laboratory Blanks) shall be performed and reported as recommended in the method. The frequencies and acceptance criteria used shall be those specified by this SAS.
   d. Sample results that fall outside of the initial calibration concentrations must be diluted and reanalyzed.

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.**

   All original raw data (including, but not limited to forms, calculation worksheets, instrument read-outs, preparation forms, internal sample and/or external chain of custody forms, shipping documentation, strip charts and copies of pages from preparation and analysis logbooks) shall be submitted. If originals were submitted in another data package, exact copies 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.

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

    The laboratory shall provide their most recent MDL study using the specified protocol before being provided a notice to proceed.. The laboratory shall adhere to chain-of-custody and document control procedures as specified in the CLP SOW, Rev. 8/94.

    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

5/016-6/96

I. DATA REQUIREMENTS

Analyte	MDL (mg/L)
Total Diesel Range Organics (DRO)	1.0

II. QC REQUIREMENTS

As required by the attached Wisconsin Modified Method for DRO

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact CH2M HILL for problems that might result in the delay of reporting sample results.

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

SAS Number
TOC - Water

SPECIAL ANALYTICAL SERVICES
Client Request

Regional Transmittal

A. EPA Region/Client:	Region V		
B. RSCC Representative:	C. Moore	Technical Project Officer (TPO):	B.P. Freeman
C. Telephone Number:	(312) 886-1488		(312) 353-2720
D. Date of Request:	September 2000		
E. Site Name:	Penta Wood Products – Danials, WI		

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 aqueous samples. Sample results will be reported as mg/L.

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

Analyze 60 aqueous samples. This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD). Several additional samples will be collected during the start-up of the wastewater treatment facility.

3. **Purpose of analysis (specify whether Superfund (Remedial or Enforcement), RCRA, NPDES, ETC.):**

Superfund remedial.

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

October 2000 through October 2001

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

Method of shipment will be daily shipment by overnight carrier.

6. **Approximate number of days results required after lab receipt of samples:**

The laboratory will be required to provide results within 21 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 SW-846 9060 with special instructions as noted in Section 8.

Samples will be preserved in the field with H_2SO_4 to a pH<2 and stored at 4°C until analysis and validation of the 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 instructions (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for TOC should be less than or equal to 1.0 mg/L

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

Follow protocol according to SW-846 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 must 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 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.

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

All original chain of custody forms, 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.

Payment to laboratories for thes 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: Dave Shekoski
Phone: (414) 272-2426

I. QUALITY CONTROL REQUIREMENTS

Audits Required	Frequency of Audits	Limits* (±% or conc)
Preparation Blank	At least 1 per group of 20 or fewer samples	≤ IDL
Lab Duplicate	At least 1 per group of 20 or fewer samples	± 25% or RPD is ≤ MDL.
Calibration Blank	At least 1 per group of 10 or fewer samples	≤ IDL
ICVs and CCVs	As per method	as per method
Lab Control Spikes	1 per group of 20 or fewer samples	90-110% for aqueous samples

II. Data Requirements

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

III. Action Required if Limits are Exceeded:

Take corrective action and resample affected samples. Contact CH2M HILL 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
TPH- Soil

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: February 1999
E. Site Name: Penta Wood Products

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 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 23 soil samples. This number is not 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 2000 through October 2001

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	within historic acceptance limits

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 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.

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

SAS Number
TSS - Water

SPECIAL ANALYTICAL SERVICES
Client Request

Regional Transmittal

A. EPA Region/Client:	Region V		
B. RSCC Representative:	H. Pham	Technical Project Officer (TPO):	C. Moore
C. Telephone Number:	(312) 353-2310		(312) 886-1488
D. Date of Request:	September 2000		
E. Site Name:	Penta Wood Products – Danials, WI		

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 suspended solids (TSS) in aqueous samples. Sample results will be reported as mg/L.

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

Analyze 5 aqueous samples. This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD).

3. **Purpose of analysis (specify whether Superfund (Remedial or Enforcement), RCRA, NPDES, ETC.):**

Superfund remedial.

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

October 2000 through October 2001

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

Method of shipment will be daily shipment by overnight carrier.

6. **Approximate number of days results required after lab receipt of samples:**

The laboratory will be required to provide results within 21 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 160.2 with special instructions as noted in Section 8.

Samples stored at 4 C until analysis and validation 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 instructions (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):**

The detection limit for TSS should be less than or equal to 4.0 mg/L

Follow protocol according to EPA Method 160.2.

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 must 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 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.

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

All original chain of custody forms, 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.

Payment to laboratories for thes 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:** Dave Shekoski

Phone: (414) 272-2426

I. QUALITY CONTROL REQUIREMENTS

Audits Required	Frequency of Audits	Limits* (±% or conc)
Preparation Blank	At least 1 per group of 20 or fewer samples	≤ IDL
Lab Duplicate	At least 1 per group of 20 or fewer samples	± 25% or RPD is ≤ MDL.

II. Data Requirements

Parameter	Required Detection Limits	Precision Desired
TSS	4.0 mg/L	+/- 20 percent

III. Action Required if Limits are Exceeded:

Take corrective action and resample affected samples. Contact CH2M HILL 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
VOC-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): B.P. Freeman
C. Telephone Number: (312) 886-1488 — (312) 886-1488
D. Date of Request: September 2000
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 volatile organic compounds (VOCs) in aqueous 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 5 low concentration water samples. This number is not inclusive of field QA/QC samples (duplicates, blanks) and laboratory QC (MS/MSD).

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

   Superfund-Remedial

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

   October 2000 through October 2001

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 21 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 Methods 5035/8260A 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.):**

Follow protocol according to SW-846 method 8260A.

The initial calibration curve shall have 5 different levels of standards.

Dilute and reanalyze samples with analyte concentrations greater than in the highest calibration standard.

Holding time shall not exceed 14 days from sample collection

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 as designated in the CLP SOW, Rev. 8/94. The sample analysis data package shall include all documentation, data reporting forms and raw data as specified in CLP SOW, Rev. 8/94.

All procedures used shall be clearly identified. All original raw data (including, but not limited to 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, exact copies 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 CH2M HILL within the time frame listed in section 6 above. Exact copies 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

5/016-6/96

I. DATA REQUIREMENTS

Parameter	Required Reporting Limits (ug/L)
Benzene	0.5
Toluene	5.0
Xylene(s)	5.0
Ethylbenzene	5.0
1,3,5-trimethylbenzene	5.0
1,2,4-trimethylbenzene	5.0
Total trimethylbenzene	10.0

II. QC REQUIREMENTS

As required by the SW846 Method 8260A.

Audit	Frequency of Audits	Limits
Method Blank	at least one per group of 10 or fewer samples	concentration < reporting limit
Laboratory control sample	at least one per group of 20 or fewer samples	± 20%
Laboratory Duplicate Sample	at least one per group of 20 or fewer samples	± 20%
Surrogates	each sample	± 30%

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

Take corrective action. Contact CH2M HILL 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

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: H. Pham
C. Telephone Number: (312) 353-2310
D. Date of Request: October 2000
E. Site Name: Penta Wood Products

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 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 101 groundwater samples. This number is not 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 2000 through October 2001

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 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.

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.

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).

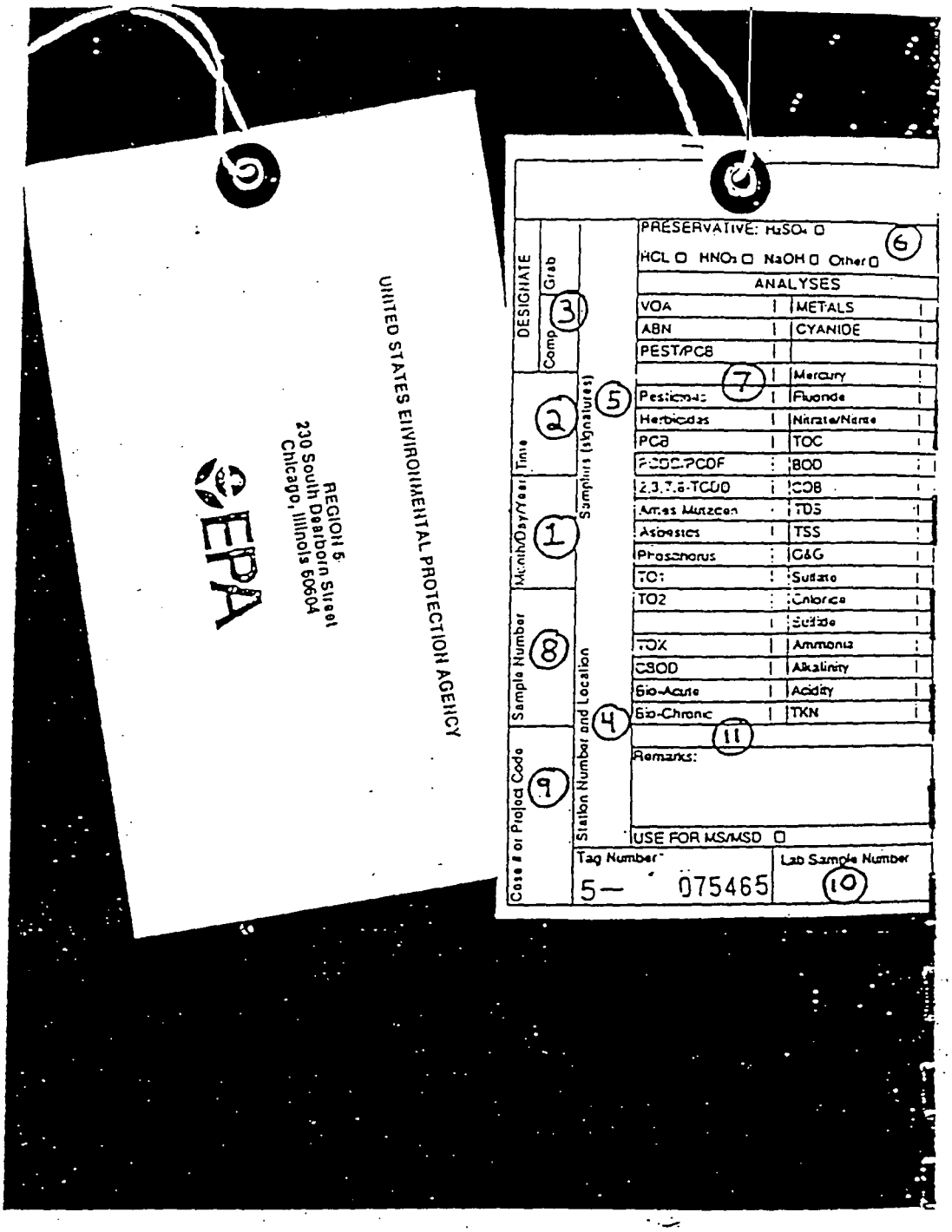
Packaging and Shipping Procedures

Low-Concentration Samples

1. Prepare coolers for shipment.
   - Tape drains shut.
   - 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 ziploc 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 ziploc 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.



NOTE: For purposes of illustration forms are reproduced at 70% of original size.

Figure 1

FIGURE 3
Notice of Transmittal

Date: _____

To: CH2M HILL
Honey Creek III
Suite 325
135 South 84th Street
Milwaukee, WI 53214

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 _____, _____.

FIELD SAMPLING PLAN

Penta Wood Products
Town of Daniels, Wisconsin

Long-Term Response Action

WA No. 101-RALR-05WE /Contract No. 68-W6-0025
November 2000

CH2M HILL
135 South 84th Street
Suite 325
Milwaukee, WI
53214
Tel 414.272.2426
Fax 414.272.4408

CH2MHILL

RECEIVED
DNR SPOONER
'01 JAN 16 AM 11 38

January 11, 2001

Mr. Tony Rutter
Remedial Project Manager
U.S. Environmental Protection Agency
Remedial Response Branch (SR-6J)
77 West Jackson Boulevard
Chicago, IL 60604-3590

Dear Tony:

Subject: Revision 1 Pages for Field Sampling Plan
PentaWood Products Site
Town of Daniels, Wisconsin
Work Assignment No. 101-RALR-05WE
Contract No. 68-W6-0025

Enclosed please find three sets of revision pages for the Field Sampling Plan, which is the second plan in the comb-bound document entitled Sampling and Analysis Plan, dated November 2000. The revision pages cover residential well sampling, and have been prepared such that they can be paper clipped to the original corresponding page. Please feel free to call me with any questions or concerns.

Sincerely,

CH2M HILL

Cherie Wilson

for Regina Bayer

Site Manager

c: Stephen Nathan/PO/USEPA (w/o enclosure)
Dave Alberts/CO/USEPA (w/o enclosure)
Tom Kendzierski/WDNR, Spooner
Charlene Khazae/WDNR, Madison
Ike Johnson/PM/CH2M HILL, Milwaukee
Dan Plomb/DPM/CH2M HILL, Milwaukee
Phil Smith/RTL/CH2M HILL, Milwaukee
Bill Andrae/ASM/CH2M HILL, Milwaukee
Cherie Wilson/AA/CH2M HILL, Milwaukee

Contents

SECTION 2

Sampling Network and Rationale

2.1 Project Objective

The primary objective of the LTRA is to operate and maintain the components of the constructed remedy to meet the remediation goals specified in the ROD. The specific objectives of the remedial construction and start-up sampling and analysis are:

- Determine existing groundwater contaminant and natural attenuation parameter concentrations
- Evaluate treatment system contaminant removal effectiveness
- Evaluate treatment system residuals and LNAPL contaminant concentrations
- Determine baseline unsaturated zone pore water contaminant concentrations
- Balance bioventing system air flow rates, determine baseline soil gas conditions and determine bioventing blower operation on-off duration

2.2 Project Approach

2.2.1 Groundwater Sampling

Groundwater sampling of 19 monitoring wells was conducted to establish a baseline of groundwater contaminants and natural attenuation parameters prior to start-up of the groundwater collection and treatment system. Future sampling of some or all of the monitoring wells will be conducted to verify the effectiveness of the treatment system over time. Residential wells will also be sampled periodically. A summary of the sampling activities is presented in Table 2-1.

2.2.2 Treatment System Sampling

The effectiveness of the treatment system will be evaluated through the collection of treatment system influent samples, samples of water within the treatment train, and samples of the treatment system effluent. Multiple samples from each location are planned during the start-up to allow on-going evaluation of system performance. In addition sampling of treatment system residuals, including filters, spent GAC and LNAPL will be performed to evaluate disposal options. A summary of the sampling activities is presented in Table 2-1.

2.2.3 Soil Gas Sampling

Sampling of soil gas in the unsaturated zone piezometers is planned to allow flow balancing of the bioventing system and to allow evaluation of oxygen uptake during start-up. A summary of the sampling activities is presented in Table 2-1.

2.2.4 Vadose Zone Soil Sampling

Samples will be collected from the vadose zone soils during the third year of the LTRA. A summary of the sampling activities is presented in Table 2-1.

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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 that the primary COCs at the PWP site are PCP, arsenic, benzene, naphthalene, and DRO. Other contaminants will be sampled in addition to these to allow evaluation of natural attenuation and address specific concerns in individual environmental media.

TABLE 2-1
Summary of Long Term Response Action Sampling and Analysis Activities

Sample Matrix	Locations	Analytical Parameters	Field Samples	Field QC			Lab QC	Total No.
				FB[1]	Dup[2]	TB[3]	MS/D[4]	
Groundwater—Existing Monitoring Wells, and Residential Wells	MW-1, MW-2, MW-3, MW-4, MW-5, 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-19 Residential wells: RW01(8713 Daniels 70), RW02 (8627 Daniels 70), RW03 (cabin-8526 Daniels 70), RW04 (8526 Daniels 70) (Four sampling rounds will include all monitoring wells; eight sampling rounds will include five monitoring wells; six sampling rounds will include four residential wells)	PCP	132	20	20		16	188
		BTEX	116	16	16	40	12	200
		Naphthalene, total metals, dissolved metals, alkalinity, nitrate, sulfate, sulfide, chloride, hardness, TOC, methane	116	16	16		12	160
		Natural attenuation-field analyses: DO, pH, Redox potential, conductivity, temperature, CO_2	116					116
Treatment System Influent and Effluent Sampling	Combined Influent (EW-2, 3, 4, 5, 6, 7, 10, 11)	PCP	36					36
	Effluent (after activated carbon treatment, prior to discharge to the infiltration basin)	PCP	156					156
		DRO, TOC, Phenol, Naphthalene	36					36
		TSS, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, total-trimethylbenzene, dioxin (2,3,7,8-TCDD), BTEX, As, Cu, Zn	14					14
		Chloride, Fe, Mn						
		Acid extractables, TCDDs, TCDFs (all congeners)	12					12
			3					3
Spent activated charcoal, bag filters and activated clay	Groundwater Treatment System	PAHs, TCDDs, TCDFs (all congeners)	TBD					TBD

TABLE 2-1
Summary of Long Term Response Action Sampling and Analysis Activities

Sample Matrix	Locations	Analytical Parameters	Field Samples	Field QC			Lab QC	Total No.
				FB[1]	Dup[2]	TB[3]	MS/D[4]	
Waste-LNAPL	LNAPL Storage Tank	PAHs, HxCDDs, HxCDFs, PeCDDs, PeCDFs, TCDDs, TCDFs, PCP, Phenol, 2,3,4,6-Tetrachlorophenol, 2,4,6-Trichlorophenol, 2,4-Dimethylphenol	TBD					TBD
Bioventing Soil Gas Analysis	Unsaturated Zone piezometer nests (7 piezometer nests of 3 wells each)	O_2, CO_2, temperature, humidity, air pressure	63					63
Soil	18 Vadose zone soil samples	PCP, TPH	18	2	2		1	23

PCP = Pentachlorophenol
BTEX = Benzene, toluene, ethylbenzene, xylenes
TBD = To be determined
DRO = Diesel range organics
TOC = Total Organic Carbon
TPH = Total Petroleum Hydrocarbons
TSS = Total suspended solids
TCDDs, TCDFs (all congeners) =

HxCDD (Hexachlorodibenzo-p-dioxins)
PeCDD (Pentachlorodibenzo-p-dioxins)
TCDD (Tetrachlorodibenzo-p-dioxins)
HxCDF (Hexachlorodibenzofurans)
PeCDF (Pentachlorodibenzofurans)
TCDF (Tetrachlorodibenzofurans)

[1]Field blanks are collected at a frequency of 1 per group of 10 samples
[2] Duplicate samples are collected at a frequency of 1 per group of 10 samples
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SECTION 3

Sampling Custody Procedures

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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
- MW—Monitoring Well Groundwater Sample
- RW—Residential Well
- IF—Influent to Treatment System Sample
- EF—Effluent from Treatment System Sample
- TR—Treatment Residuals Sample
- LN—LNAPL Sample
- SG—Soil Gas Sample

Examples of sample numbers are as follows:

- PWPMW0101—Groundwater sample collected from PWP sample location MW01, sample number 01
- PWPSB1011 - 5.0—Subsurface soil sample collected from PWP sample location SB10, sample number 11, collection starting at 5 feet bgs

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 will be initiated at the start of the first onsite activity and will record onsite activities during the LTRA. 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 well 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
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- Project end date

Daily entries will be made during periods of site activity. Entries will be recorded in ink; 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
- References to other project notebooks kept onsite such as the geologist's field book
- 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 condition

3.4 Sample Shipment and Transfer of Custody

Sample handling, shipping, and custody procedures are provided in Section 6 of the QAPP.

4. Limit the amount of air and turbulence into the formation during purging to prevent potential alteration of the samples.

7.4.2 Groundwater Field Parameter Measurements

Field parameters of pH, temperature, specific conductance, ORP and DO will be measured while redeveloping the existing wells. The procedures to perform those field analyses are described in the SOPs.

7.5 Residential Well Sampling

Contact the residents to obtain permission to sample their well. Locate a source (tap or faucet) that is upstream of any water treatment such as softeners or filters. An aerator on the tap or faucet must be removed before sampling. If sampling from an outside spigot, unscrew any garden hoses (after system purge). The well should be allowed to run continuously for at least 10 minutes (if possible) before the sample is collected, particularly is the water has not been used much that day. Sample containers should be filled directly from the faucet or spigot. Note any possible sources of soil or groundwater contamination at the home.

Contents

SECTION 1

Summary of Sampling Activities

This Field Sampling Plan defines procedures that will be used to perform the Long-Term Response Action (LTRA) sampling and analysis field activities at the Penta Wood Products (PWP) site in accordance with Work Assignment No. 040-RDRD-05WE Statement of Work (SOW). Soil and groundwater at this inactive wood treatment facility are contaminated with pentachlorophenol, arsenic, 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 for the USEPA Remedial Branch by PWP, the Wisconsin Department of Natural Resources (WDNR), the USEPA Region V Emergency Response Branch (ERB), the USEPA Emergency Response Team (ERT), and CH2M HILL. Remedial construction activities to implement the RA design were completed by CH2M HILL in September 2000, which will be followed by the LTRA which will track concentrations of groundwater contaminants, ensure compliance with discharge requirements, and evaluate treatment system operation.

Sampling activities include:

- Groundwater sampling for PCP, selected metals, and natural attenuation parameter concentrations
- Sampling of treatment system water
- Sampling of treatment system residuals and LNAPL contaminant concentrations
- Sampling of soil gas
- Vadose zone soil sampling

SECTION 2

Sampling Network and Rationale

2.1 Project Objective

The primary objective of the LTRA is to operate and maintain the components of the constructed remedy to meet the remediation goals specified in the ROD. The specific objectives of the remedial construction and start-up sampling and analysis are:

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- Sample pickup including chain-of-custody form number, carrier, date, and time
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- 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 condition

3.4 Sample Shipment and Transfer of Custody

Sample handling, shipping, and custody procedures are provided in Section 6 of the QAPP.

SECTION 4

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.

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 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. The laboratory will be prepared preservatives using reagent-grade chemicals and add them to the sample bottles prior to shipment to the field site. Samples will be stored on ice to 4°C for preservation.

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 TPH	4-oz. amber glass jar [a]	4°C protect from light	14 days to extraction and 28 days from extraction to analysis
Water/Liquid Waste — PCP, 2,4-Dimethylphenol, Phenol, 2,3,4,6-Tetrachlorophenol, 2,4,6-Trichlorophenol	1-liter amber glass bottle [a]	4°C protect from light	7 days to extraction and 40 days from extraction to analysis
Water/Liquid Waste PAHs	1-liter amber glass bottle [a]	4°C protect from light	7 days to extraction and 40 days from extraction to analysis
Water/Liquid Waste-PCDDs and PCDFs	1-liter amber glass jar [a]	4°C protect from light	30 days to extraction and 45 days from extraction to analysis
Water—Arsenic, Copper, Iron, Manganese, Zinc	500-mL polyethylene bottle	HNO_3, pH<2, 4°C	6 months
SPLP Water/Liquid Waste – Arsenic (Total)	500-mL polyethylene bottle	HNO_3, pH<2, 4°C	6 months
Water—Nitrate, Sulfate, Chloride	1-liter poly	4°C	
Water—Sulfide	1-liter amber glass jar [a]	4°C, NaOH, pH > 9, Zinc acetate	48 hours
Water—Methane	3x40 mL vials [a]	HCl, pH<2, 4°C, protect from light	14 days
Water—Manganese	100 mL poly	HNO_3, pH<2, 4°C	6 months
Water—TOC	100 mL poly	H_2SO_4, pH<2, 4°C	28 days
Water—BTEX	3x40 mL vials [a]	HCl, pH<2, 4°C, protect from light	14 days
Water—Alkalinity	250 mL poly	4°C	14 days
Water—Iron (soluble)	100 mL poly	HNO_3, pH<2, 4°C	6 months
Water—Hardness	100 mL poly	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.
SPLP = Synthetic Precipitation Leachate Procedure.
PCDD = Polychlorinated Dibenzo-p-Dioxines
PCDF = Polychlorinated DibenzoFurans

SECTION 5

Sample Handling, Packaging and Shipment

Sample handling, packaging, and shipping procedures are described in Section 6 of the QAPP.

SECTION 6

Decontamination Procedures

This section presents 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
- Large plastic pails or tubs for TSP and water; scrub brushes; squirt bottles for TSP, methanol, and water; plastic bags and sheets
- 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.
7. Sanitize respirator if worn.

6.2 Sampling Equipment Decontamination

The soil 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 HPLC or ASTM Type 2-grade water.
5. 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.

SECTION 7

Sampling Equipment and Field Procedures

7.1 Soil Sampling Procedures

7.1.1 Surface Soil

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.

7.1.2 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.

7.1.3 Subsurface Soil Sampling

Samples will be collected using a hand-held soil corer or posthole digger. The probe hole will be advanced up to 10 feet bgs. The sample at each interval is transferred to a clean bowl and mixed. The required volume is then placed in the appropriate sample jar.

7.2 Treatment System Water Sample Collection

Water samples will be collected from several sample ports within the treatment system. The sample will be collected by opening the sample port valve, letting water purge from the valve area for about 15 seconds and then filling the sample bottle.

7.3 Groundwater / LNAPL Thickness Measurements

Groundwater elevations will be measured during the LTRA 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 are as follows:

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 gives off a beeping tone when it comes in contact with the LNAPL. At the LNAPL water interface the instrument sounds a continuous tone. These measurements are taken to the top of the protective casing.

7.4 Monitoring Well Sampling

7.4.1 Well Development

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 3 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 percent 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.

7.4.2 Groundwater Field Parameter Measurements

Field parameters of pH, temperature, specific conductance, ORP and DO will be measured while redeveloping the existing wells. The procedures to perform those field analyses are described in the SOPs.

SECTION 8

Quality Control Sample Procedures

Each of the offsite laboratories identified in the QAPjP has a QC program to ensure the reliability and validity of the analyses being performed. QC procedures for pH, 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 groundwater samples. 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.

8.2 Field Duplicates

Field duplicate samples will be collected and analyzed to determine the precision of field sampling. Groundwater 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.

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 filled in the same manner as field duplicate samples. The frequency for collection of MS/MSD samples is listed in Table 2-1.

SECTION 9

Field Measurements/Screening

Field measurement and screening techniques for pH, conductivity and temperature, DO, PID monitoring, water level measurement, and well purging are provided in the SOPs.

SECTION 10

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.

SECTION 11

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.

Standard Operating Procedures

Standard Operating Procedures

pH

Temperature and Conductivity

Redox

PID Monitoring

Field Filtering

Dissolved Oxygen

Water Level Measurement and Well Purging

Soil Vapor Parameters

Soil Gas Pressure

pH

Field Measurement of pH

Purpose

To provide a general guideline for field measurement of pH in water samples.

Scope

Standard field pH determination techniques for use on surface water and groundwater samples.

Equipment / Materials

- pH buffer solution for pH 4, 7, and 10
- Deionized water in squirt bottle
- pH meter
- Combination electrodes
- Beakers
- Solution of HCl
- Glassware that has been washed with soap and water, rinsed twice with hot water, and rinsed twice with deionized water

Procedures / Guidelines

Calibration

Calibrate unit before initial daily use and at least once every 4 hours or every 5 samples, whichever is less. Calibrate with at least two solutions. Clean probe according to manufacturer's recommendations. Run duplicate samples once every 10 samples or every 4 hours.

1. Note source of pH buffers, date of preparation, expiration date, and prepared by whom.
2. Note pH instrument number, model number, and manufacturer.
3. Rinse electrode with deionized water.
4. Place electrode in pH 7 buffer solution.
5. Allow meter to stabilize and then press the "yes" key to accept reading.
6. Rinse electrode with deionized water and place it in a pH 4 or pH 10 buffer solution.
7. Allow meter to stabilize again and then press the "yes" key to accept reading. Record the slope reading (example: "SLP 98.5").
8. Rinse electrode with deionized water, and place in pH 7 buffer. If meter reading is not 7.0, repeat sequence.

Procedure

1. Before going into the field:
   a. Check batteries.
   b. Do a quick calibration at pH 7 and 4 to check electrode.
   c. Obtain fresh standard solutions.
2. Calibrate meter using calibration procedure.
3. Pour sample into a clean beaker.
4. Rinse electrode with deionized water between samples.
5. Immerse electrode in solution. Record pH reading.
6. Recheck calibration with pH 7 buffer solution after every 5 samples.

General

1. When calibrating 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 electrode.
2. Measurement of pH is temperature dependent. Therefore, temperatures of buffers and samples should be within about 2°C. For refrigerated or cool samples, use refrigerated buffers to calibrate pH meter.
3. Weak organic and inorganic salts, oil, and grease interfere with pH measurements. If oil or grease are visible, note it on the data sheet. Clean electrode with soap and water, and rinse with a 10 percent solution of HCl. Then recalibrate meter.
4. Following field measurements:
   a. Report any problems
   b. Compare with previous data
   c. Clean all dirt off of the meter and from inside the case
   d. Store electrode in pH 4 buffer solution
5. Accuracy and precision are dependent on the instrument used. Refer to manufacturer's manual. Expected accuracy and precision are ± 0.1 pH unit.

Attachments

- pH meter calibration sheet

Key Checks / Items

- Check batteries
- Calibrate

Preventive Maintenance

- Refer to operation manual for recommended maintenance.
- Check batteries. Have a replacement set on hand.

Conductivity and Temperature

Field Measurement of Conductivity and Temperature

Purpose

To provide a general guideline for field measurement of specific conductivity and temperature.

Scope

Standard field conductivity and temperature techniques for use on groundwater samples.

Equipment / Materials

- Conductivity meter and electrode
- Distilled water in squirt bottle
- Standard Potassium Chloride (KCl) Solution (0.01 N)

Procedures / Guidelines

References

Methods for Chemical Analysis of Water and Wastes, EPA Method 120.1, 1983

YSI Models 33 and 33M S-C-T Meters, Instructions, November 1987, Item 021470, Yellow Springs Instrument Company, Yellow Springs, Ohio, or equivalent.

Sensitivity

1 μmho/cm at 25°C

Range

0.1 to 100,000 μmho/cm

Reagents

Distilled water in squirt bottle and standard potassium chloride solution

Reagent Preparation

1. Stock potassium chloride (KCl) solution (1.00 N): Dissolve 74.555 g KCl in distilled water and dilute to 1,000 mL in a volumetric flask.

2. Standard potassium chloride solution (0.01 N): Dilute 10.0 mL of stock 1.00 N KCl solution to 1,000 mL with distilled water using a volumetric pipet and flask.

Apparatus

- Conductivity meter and electrodes
- Beakers or jars, plastic or glass
- Spare size D, alkaline batteries

Calibration Procedure (most models)

1. Switch mode to Off and unplug the probe; turn the adjustment screw to correct meter zero until the meter needle coincides with the zero on the conductivity scale.

2. Switch mode to Redline; turn the adjustment screw to correct meter redline until the meter needle coincides with the redline on the meter face. If this cannot be accomplished, replace the batteries.

3. Plug the probe into the probe jack.

4. Place the probe in the 0.01 N standard potassium chloride solution. Record temperature (°C) and conductance (μmho/cm).

5. Correct conductivity reading for temperature. This value must correspond (±10 percent) to the expected value in Table 1. If the calibration fails, then appropriate corrective action must be performed and the instrument recalibrated.

   Note: Before each sampling event, calibrate the temperature probe against an NIST, ASTM, or equivalent thermometer standard.

Operation Procedure (most models)

1. Perform calibration at beginning and end of the day.

2. Switch mode to Temperature. Allow time for the probe temperature to come to equilibrium with that of the water before reading. Read the temperature on the bottom scale of the meter in degrees Celsius.

3. Switch mode to X100. If the reading is below 50 on the 0 to 500 range (5.0 on the 0 to 50 mS/m range), switch to X10. If the reading is still below 50 (5.0 mS/m), switch to the X1 scale. Read the meter scale and multiply the reading by the mode factor. The answer is expressed in μohms/cm. Measurements are not temperature compensated.

4. When measuring on the X100 and X10 scales, depress the CELL TEST button. The meter reading should fall less than 2 percent; if greater, the probe is fouled and the measurement is in error. Clean the probe and remeasure.

Operating Suggestions

- Obstructions near the probe can disturb readings.
- When the calibration test indicates low readings, the probable cause is dirty electrodes. Hard water deposits, oil, and organic matter are the most likely contaminants.
- Caution: Do not touch the electrodes inside the probe. The plating material is soft and can be scraped off.
- If cleaning does not restore the probe performance, replatinizing may be required. Always rinse the probe thoroughly in tap water, then in distilled or DI water after cleaning and before storage. Note that it is best to store conductivity cells in DI water. Collect rinsate water for storage pursuant to the Waste Management Plan.
- Most problems in obtaining good records with monitoring equipment are related to electrode fouling and to inadequate sample circulation.

Calibration Frequency

At the beginning and end of the day or after maintenance, recharge battery after each use. Factory checkout and calibration shall be yearly or when malfunctioning.

Calculations

Calculate conductivity using the formula:

$$G_{25} = \frac{G_T}{[1 + 0.02\,(T - 25)]}$$

where,

G_{25} = conductivity at 25°C, μmho/cm
T = temperature of sample, °C
G_T = conductivity of sample at temperature T, μmho/cm

Quality Control Requirements

The accuracy of conductivity measurements will be assessed by measurement with a 0.01 N standard KCl solution before sample analysis and at the end of the day. Accuracy of measurements will be ±5 percent of the standard. Precision will be assessed by analysis of multiple measurements that will have a relative percent difference of ≤15 percent. The thermometer on the conductivity meter will be checked before each sampling event for accuracy against an NIST, ASTM, or equivalent thermometer standard. Accuracy of the measurement shall be ±1°C.

Preventive Maintenance

- Field equipment is inspected in the warehouse prior to delivery to the field.
- The only maintenance required is battery replacement every 200 h.
- Recalibration should be done at the factory.

Redox

Field REDOX (Oxidation/Reduction) Measurement SOP

Purpose

To provide a general guideline for field measurement of oxidation/reduction potential in water.

Scope

Standard method of field REDOX measuring techniques.

Equipment/Materials

- pH meter with millivolt mode setting (1mV sensitivity)
- Platinum combination electrodes
- Beaker or other container to hold sample
- Distilled water
- Operation manual

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 1-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.

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

Preventive 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

Dissolved Oxygen Measurements in Water

Purpose

To provide a general guideline for field measurement of dissolved oxygen in water.

Scope

Measurement of dissolved oxygen in groundwater samples.

Equipment / Materials

- DO meter and membrane probe
- YSI submersible stirrer, if available
- Spare size C, carbon zinc batteries
- Spare membranes and KCl

Procedures/Guidelines

References

Methods for Chemical Analysis of Water and Wastes, EPA Method 360.1, 1983

YSI Model 51B Dissolved Oxygen Meter, Instruction Manual, November 1989, Yellow Springs Instrument Company, Yellow Springs, Ohio, or equivalent.

Range

0 to 15 mg/L

Meter Setup (most models)

1. With switch in the Off position, adjust the meter pointer to zero with the screw in the center of the meter panel. Readjustment may be necessary if the instrument position is changed.

2. Switch to Zero and adjust to zero with the Zero control knob.

3. Switch to Full Scale and adjust the Full Scale knob until the meter needle aligns with the "15" mark on the mg/L scale.

4. Attach the prepared probe to the Probe connector of the instrument and adjust the retaining ring finger tight.

5. Before calibrating allow 15 minutes for optimum probe stabilization. Repolarize whenever the instrument has been Off or the probe has been disconnected.

Calibration (most models)

1. Switch to Calib O2 position.

2. Place the probe in moist air. This can be accomplished in two ways: (a) place the probe in the calibration bottle along with a few drops of water, or (b) the probe can also be wrapped loosely in a damp cloth taking care not to touch the membrane. Wait about 10 minutes for temperature stabilization. This may be done simultaneously while the probe is stabilizing.

3. With the Calib knob, set the meter pointer to the mark for the local altitude. Be sure the reading is steady. Recalibration is recommended when altitude is changed. A 1,000-foot altitude change can result in a 3 percent error (0.3 @ 10 mg/L).

The probe is now calibrated and should hold this calibration value for many measurements. Calibration can be disturbed by physical shock, touching the membrane, or drying out of the electrolyte.

Operation Procedure (most models)

With the meter prepared for use and the probe calibrated, place the probe in the sample to be measured and provide stirring.

1. Stirring for the 5739 probe can best be accomplished with a YSI submersible stirrer. If the stirrer is not used, provide manual stirring by raising and lowering the probe about 1 ft/sec.

2. Allow sufficient time for probe to stabilize to sample temperature and DO.

3. Turn the switch to Temp and read temperature from the lower meter scale. Set the O2 Solubility Factor dial to the observed temperature.

4. Turn the switch to Read O2 and read the DO value in mg/L directly from the meter.

Operating Suggestions

- Membranes will last indefinitely, depending on usage. Average replacement is 2 to 4 weeks. However, should the electrolyte be allowed to evaporate and an excessive amount of bubbles form under the membrane, or the membrane becomes damaged, thoroughly flush the reservoir with KCl and install a new membrane.

- Replace the membrane if erratic readings are observed or calibration is not stable.

- Detailed instructions regarding care and preparation of the probe are listed in the YSI instruction manual.

Calibration Frequency

At the beginning and end of the day or after maintenance, recharge battery after each use. Factory checkout and calibration shall be yearly or when malfunctioning.

Preventive Maintenance

- Field equipment is inspected in the warehouse prior to delivery in the field.
- Inspect the membrane for damage before use. Replace as necessary or at least every four weeks.
- Check batteries daily.

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 Vapor Parameters

Soil Vapor Parameter Measurement SOP

Purpose

The purpose of this procedure is to monitor oxygen, carbon dioxide, methane, lower explosive limit (LEL), and total organic hydrocarbon concentrations in soil vapor.

Scope

Standard field procedure for measuring oxygen, carbon dioxide, methane, lower explosive limit, total organic hydrocarbon concentrations in soil vapor.

Requirements

Measuring points are shallow (vadose zone only) and intermediate depth (deep vadose zone within the LNPL) piezometers

Sampling Equipment

- Landtec GA-90 gas analyzer (oxygen, carbon dioxide, LEL, and methane) and a MultiRAE organic vapor analyzer with photoionization detector PID
- 1 scfm vapor sampling vacuum pump
- Tygon and Teflon tubing, tubing connections
- 2-inch slip sleeve with gasket and labcock connections for measuring wells normally used for groundwater level measurements and/or sampling

Operating Procedures

1. Calibrate equipment according to manufacturer's instructions
2. Connect magnehelic gauge with Tygon tubing to the labcock valve on the top of the piezometer. If well, connect gauge to the labcock connection to the slip sleeve. Record pressure indication on gauge
3. Open labcock valve
4. Connect air sampling pump to well or piezometer and purge for 5 minutes
5. While air sampling pump is running, use Landtec GA-90 gas analyzer to measure oxygen, carbon dioxide, methane, and LEL
6. While air sampling pump is running, use the organic vapor analyzer to measure total vapor hydrocarbons
7. Repeat steps at other locations
8. Record readings

Soil Gas Pressure

Soil Gas Pressure Measurement SOP

Purpose

The purpose of this procedure is measure soil gas pressure at piezometers.

Scope

Standard field procedure for measuring soil gas pressures in piezometers.

Requirements

Soil gas pressure can be measured in piezometers screened in the vadose zone or monitoring wells open to the vadose zone. Screen depth of the well being used for measurement should be known beforehand. In addition, care should be exercised in making sure that an airtight seal between the gauge and the well exists.

Sampling Equipment

- 0 to 1 inch water Dwyer magnehelic gauge
- Miscellaneous Tygon and Teflon tubing, tubing connections
- 2-inch slip sleeve with gasket and labcock connections for measuring wells normally used for groundwater level measurements and/or sampling

Operating Procedures

1. Connect magnehelic gauge with Tygon tubing to the labcock valve on the top of the piezometer. If measuring pressure at a monitoring well, connect the gauge to the labcock connected to the slip sleeve.
2. Open labcock valve and measure soil pressure reading on gauge
3. Close the labcock valve and disconnect tubing from the labcock
4. Record pressure measurement
5. Plot readings on figure that shows monitoring point locations

DATA MANAGEMENT PLAN

Penta Wood Products
Town of Daniels, Wisconsin

Long-Term Response Action

WA No. 101-RALR-05WE /Contract No. 68-W6-0025
November 2000

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) Long-Term Response Action (LTRA). Data gathered during the LTRA will be compiled, and the 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 the database management system to be modified as it is developed and maintained.

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 LTRA.
- Maintain a usable and accurate database throughout the life of the PWP project.
- Process specific data requests in support of the LTRA.
- 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

LTRA 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 description of the project database's contents is based on the available data and data to be collected as part of the LTRA.

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 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.

3.3 Computer Database

The computer database system uses Structured Query Language (SQL) combined with a macro-programming language and software tools for building 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. It also allows users to effectively conduct trend analysis and generate a variety of data reports that aid 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 that 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 LTRA, 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 5 years.

4.0 Presentation of Site Characterization and Remediation Verification 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