RAC V

RESPONSE ACTION CONTRACT FOR

Remedial, Enforcement Oversight, and
Non-Time Critical Removal Activities at Sites of Release
or Threatened Release of Hazardous Substances in Region V

Quality Assurance Project Plan

FID 632 013 360 RR COR

Onalaska Municipal Landfill
Onalaska, Wisconsin

Long-Term Response Action

WA No. 003-RARA-05L5/Contract No. 68-W6-0025

July 1997

PREPARED FOR

U.S. Environmental Protection Agency

PREPARED BY

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Acronyms/Abbreviations

ARARs	applicable or relevant and appropriate requirements
ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CRL	Central Regional Laboratory
DI	deionized
DMZ	Design Management Zone
DNR	Wisconsin Department of Natural Resources
DOT	Department of Transportation
DQO	data quality objective
EM	electromagnetic
ES	Enforcement Standard
EPA	U. S. Environmental Protection Agency
FAA	furnace atomic adsorption
FS	Feasibility Study
FSP	Field Sampling Plan
GC/MS	gas chromatograph/mass spectrometer
HPLC	high-pressure liquid chromatography
ICP	inductively coupled plasma
I.D.	inner diameter
LSSS	Laboratory Scientific Support Section
LEL	lower explosive limit
LTRA	Long-Term Response Action
MCL	maximum contaminant level
MS/MSD	matrix spike/matrix spike duplicate
NEIC	National Enforcement Investigations Center
NGVD	National Geodetic Vertical Datum of 1929
NIST	National Institute of Standards and Technology
NPL	National Priorities List
O.D.	outer diameter
OVA	organic vapor analyzer
PAH	polycyclic aromatic hydrocarbon
PAL	Preventive Action Limits
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PE	performance evaluation
PIC	pressurized ion chamber
%R	percent recovery
PRP	potentially responsible party
PVC	polyvinyl chloride
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference

QA	quality assurance
QAPjP	Quality Assurance Project Plan
QAS	Quality Assurance Section
QC	quality control
RAS	Routine Analytical Services
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPD	relative percent difference
SAS	Special Analytical Services
SOP	Standard Operating Procedure
SOW	statement of work
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCA	trichloroethane
TCE	trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
USGS	U.S. Geological Survey
VOC	volatile organic compound
WA	work assignment

MKE1001732C.WP5

Section 1
Title Page

Remedial Planning Activities
(RAC V)
Contract No. 68-W6-0025
Quality Assurance Project Plan (QAPP)

Project Title:	Long-Term Response Action Onalaska Municipal Landfill Onalaska, Wisconsin

EPA No: WA 003-RARA-05L5

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3.1 Introduction

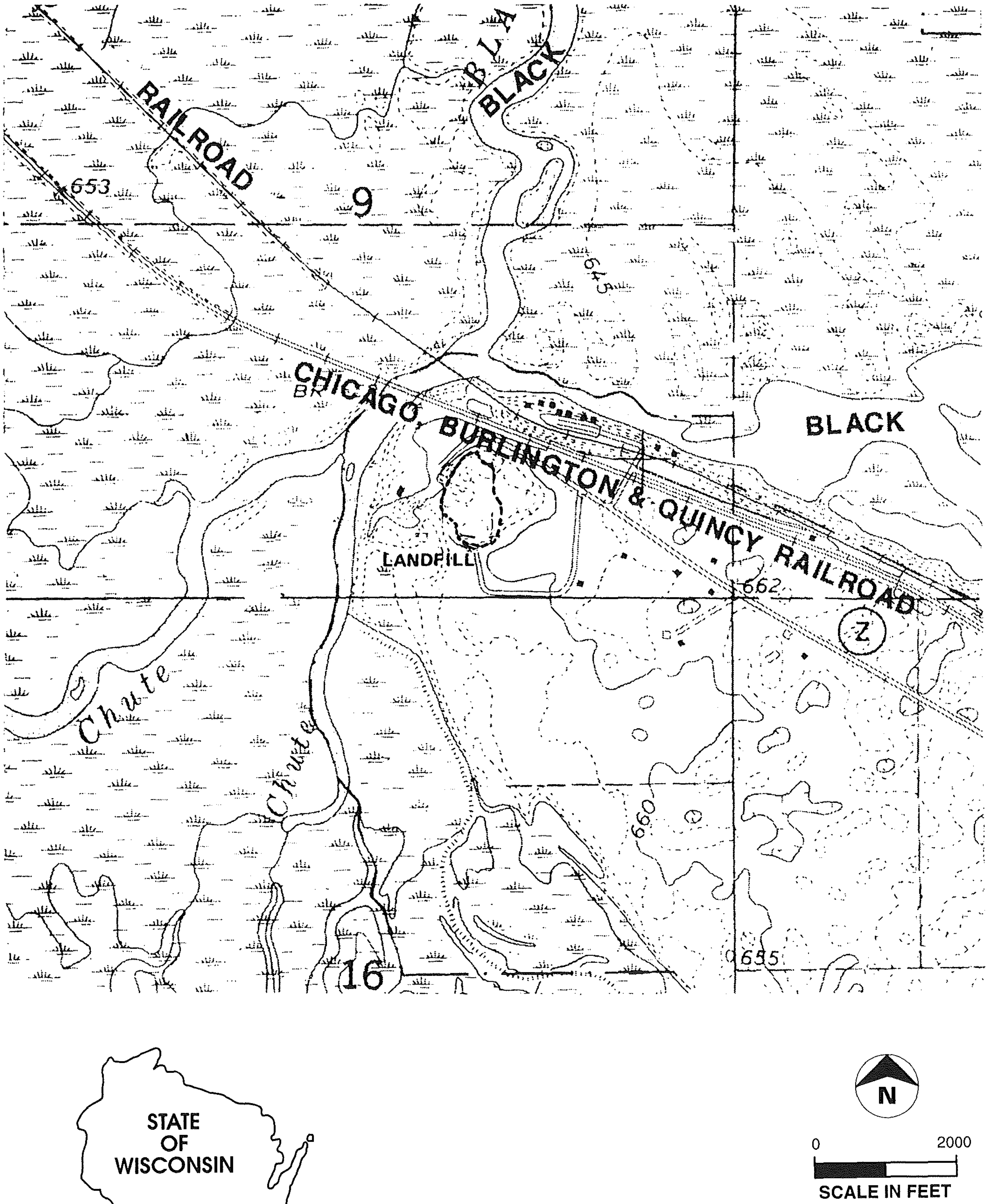
The United States Environmental Protection Agency (EPA) requires that all EPA contractors participate in a centrally managed quality assurance (QA) program. That requirement applies to all environmental monitoring and measurement efforts mandated or supported by the EPA. Each contractor generating data has the responsibility to implement minimum procedures to see that the precision, accuracy, completeness, and representativeness of its data are known and documented. To see that this responsibility is met uniformly, each EPA contractor must prepare a written Quality Assurance Project Plan (QAPjP) addressing each project it is contracted to perform.

This QAPjP is prepared as part of Work Assignment No. 003-RARA-05L5 under RAC V (Contract No. 68-W6-0025) which authorizes CH2M HILL to complete the Long-Term Response Action (LTRA) for the Onalaska Municipal Landfill in Onalaska, Wisconsin. This QAPjP presents the organization, objectives, functional activities, and specific QA and quality control (QC) activities associated with groundwater sampling as part of the Field Sampling Plan (FSP) to implement the selected remedial action for groundwater extraction and treatment at the Onalaska Municipal Landfill site.

3.2 Site Description

The Onalaska Municipal Landfill is in La Crosse County, Wisconsin, about 10 miles north of the City of La Crosse near the confluence of the Mississippi and Black Rivers and within 400 feet of the Black River (Figure 1). Several homes are located within 500 feet of the site, and a subdivision of about 50 homes is located 1.25 miles southeast of the site. The area is generally rural. The sand and gravel aquifer is used as the water supply.

The 11-acre site was mined as a sand and gravel quarry in the early 1960s. In the mid-1960s the quarry operation ceased, and the Town of Onalaska began using the quarry as a municipal landfill. Between 1969 and 1980, municipal trash and chemical wastes were disposed of in the landfill. The landfill was capped between 1980 and 1982 (see Figure 2).



SOURCE: U.S. Geological Survey, Trempealeau, 15' Quadrangle.

FIGURE 1
SITE LOCATION MAP
ONALASKA LANDFILL
QAPP

E140811.DV.05 Site Loc Map-QAPP 7-22-97ll

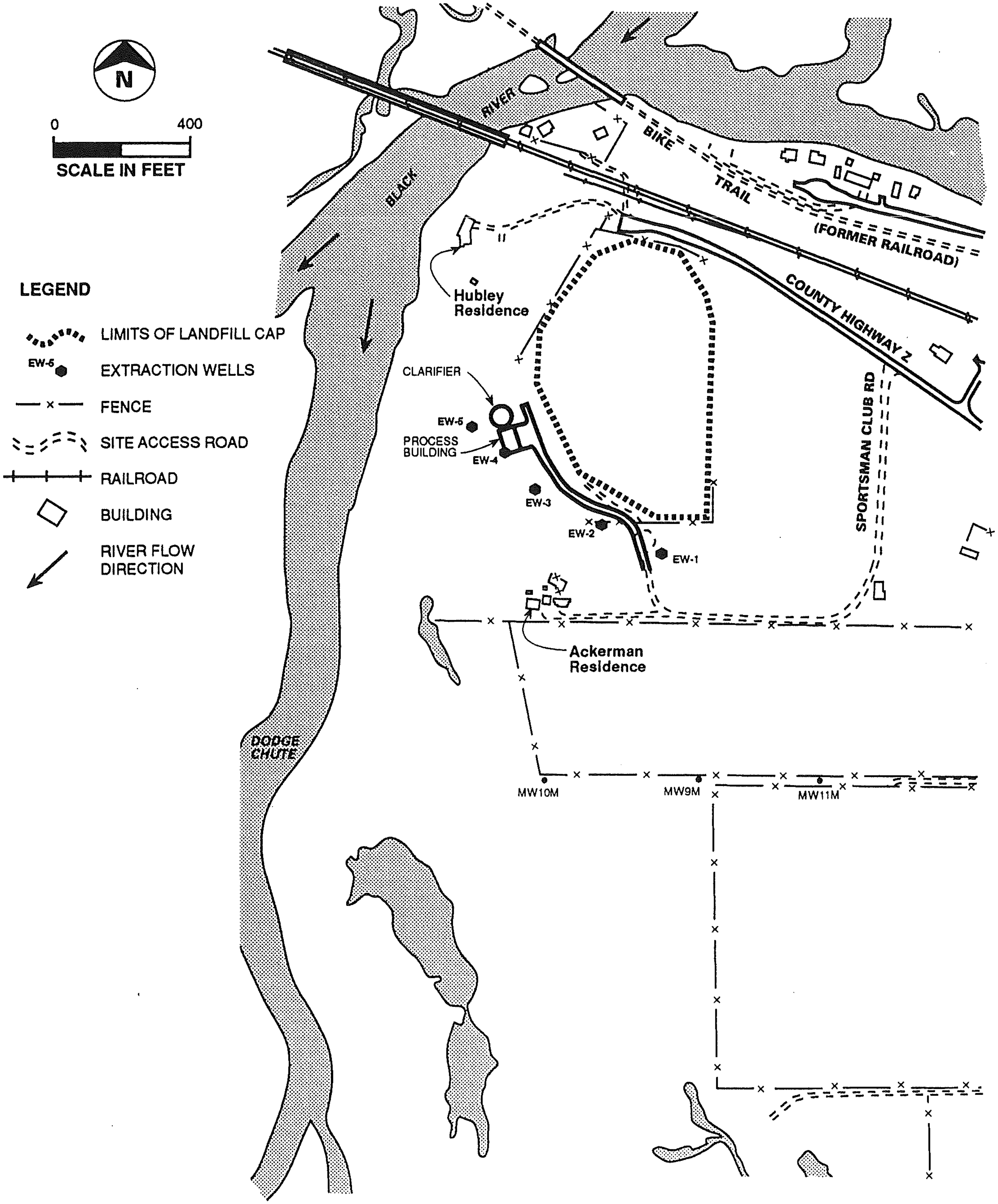


FIGURE 2
SITE MAP
ONALASKA LANDFILL
QAPP

GLE65672.RA.QS Site Map 5/15/95kmw

3.3 Site History and Background

3.3.1 Site History

The Town of Onalaska owned and was licensed to operate the Onalaska Municipal Landfill from 1969 to 1980. The Wisconsin Department of Natural Resources (DNR) ordered its closure in 1980. During 11 years of operation, the Onalaska Landfill provided waste disposal for residential, commercial, and industrial generators located within the township and nonresidents with written permits. The landfill also accepted refuse from other townships.

Landfill operations were informal. During the first 3 years of operation, there was no attendant at the landfill. Later, operating hours were posted and an operator was present to cover incoming waste and measure the nonresidential waste for billing purposes. The landfill boundaries were defined by a cable or fence partially enclosing the site. A gate was installed at the site in early 1971 to restrict site access. However, keys were readily provided to clients who wished to use the landfill outside the posted operating hours.

Seven acres of the Onalaska Landfill were reportedly reserved for using the compaction and cover method of waste disposal. The landfill was regularly inspected by the DNR. Early DNR records indicate that open burning was practiced at the site in late 1970. The DNR prohibited all open burning in January 1971 after receiving several complaints about noxious odors and sooty, black smoke from the burning of naphtha, an oily industrial solvent waste. Consequently, the DNR required that an area be designated for the disposal of industrial solvents and wastes delivered to the site. Several industrial firms are known to have used the landfill for waste disposal.

Outers Laboratories and Metallics, Inc. (two companies owned by one person), contributed significant quantities of industrial wastes to the site. Daily landfill operation reports indicate that these two companies were disposing of industrial waste oils and solvents as early as July 7, 1970. Early DNR records report that Outers delivered liquid solvent residues to the site for burning. The waste solvents consisted primarily of naphtha, toluene, and paint residues. Initially, both Outers and Metallics hauled solvent wastes in 55-gallon barrels. Once a week, 20 to 25 barrels of industrial wastes from the companies were hauled to the landfill. The barrels were emptied and the waste was burned. After burning was banned, the liquid waste was dumped in the designated area and poured into excavated holes for immediate burial. Occasionally, full barrels were left at the site if they could not be easily emptied or if they were damaged or leaking. In later years, the liquid waste was hauled in a 500-gallon truck instead of barrels. At that time, about 300 barrels were additionally mass buried at the landfill.

Reportedly, on one occasion, when a tank truck hauling the waste could not be drained because the discharge outlet was plugged with hardened paint resin and solvent, the truck was buried in the south section of the landfill. In August 1975, the DNR recommended that Outers find alternative methods to dispose of its naphtha waste. Outers investigated and eventually implemented a reclamation process to recover some of the raw materials from the waste. In April 1976, Outers informed the DNR that it was no longer disposing of liquid wastes in the landfill.

On February 9, 1978, the DNR issued an order to the township to submit an infield conditions report for the landfill because the site did not meet Wisconsin solid waste codes. Warzyn Engineering investigated the site for the township and submitted a report to the DNR on April 17, 1978. Warzyn recommended phased abandonment of the site. In June 1978, the DNR reported that the average distance between the groundwater table and the base of the refuse pile was 1 foot. Studies showed that the seasonal fluctuations in water levels sometimes allowed the groundwater to be in direct contact with a portion of the waste for extended periods of time.

On October 19, 1978, Warzyn Engineering submitted a plan of operation for phased abandonment of the landfill. On May 4, 1979, the DNR issued a plan approval and ordered the landfill closed by September 30, 1979. On May 30, 1980, the DNR modified the order to close the landfill by September 30, 1980. Closure proceeded in phases, and the final cap was placed in July 1982.

In September 1982, the DNR sampled and analyzed water from monitoring wells and private wells for compliance with drinking water standards for organic and inorganic constituents. The investigations indicated that groundwater contamination had occurred. The barium concentrations in the water from Cecil Miller's residential well south of the site exceeded the drinking water standard, and five organic compounds were detected above background levels. In January 1983, the Town of Onalaska replaced Mr. Miller's well with a deep well.

On May 2, 1983, an EPA Potential Hazardous Waste Site inspection report was submitted. In September 1984 the Onalaska Landfill was placed on the National Priorities List with a hazard ranking of 42.97.

3.3.2 Background

Except for the industrial waste solvents from Outers Laboratories and Metallics, Inc. There is little indication that the wastes within the 7 acres used for open pit disposal were segregated. Industrial, commercial, and municipal wastes are considered to be mixed throughout the fill area. Outers and Metallics used a specific area designated for liquid industrial waste disposal according to DNR correspondence and license applications. However, the designated disposal area was not strictly limited to the industrial wastes from Outers and Metallics. Records indicate that other commercial wastes were deposited simultaneously in the area designated for liquid industrial waste disposal in October 1981 and October 1982.

For a time, open burning occurred at the site. Until early 1971 when open burning was banned, the industrial solvents from Outers and Metallics were burned regularly at apparently random locations throughout the landfill. Some refuse was also burned bimonthly. Open burning reportedly continued, even though banned, until as late as 1979.

Liquid industrial wastes consisted primarily of naphtha-based solvents used in a metal cleaning process and solvent wastes from paint spray gun cleaning and machine shop cleaning fluids. At least two kinds of naphtha were disposed of at the site—high-flash naphtha and VM&P or Stoddard naphtha. High-flash naphtha is a coal-tar derivative consisting primarily of a mixture of aromatic hydrocarbons. It was probably used as a degreasing agent or a general solvent. The VM&P or Stoddard naphthas, derived from petroleum, are slightly more volatile. They consist of a mixture of aliphatic hydrocarbons, naphthenes, and alkyl benzenes. They are used as universal solvents for general cleaning and as paint thinners. These naphthas were probably used in a paint cleaning process at one of the plants and as general solvents. Both the petroleum and coal-tar derived naphthas are less dense than water and would float on the surface of the water table if they reached the aquifer.

Some of the organic compounds detected in the groundwater during past analyses may have been derived from naphtha wastes floating on the water table. The liquid naphtha waste could generate a complex mixture of dissolved organic compounds in the groundwater over a period of time. Both types of naphtha would each produce a different suite of degradation products of varying composition. It is impossible to predict the exact composition of each mixture, but generally naphtha degradation products consist of aliphatic and aromatic carboxylic acids, toluene, and other complex mixtures of aromatic and aliphatic hydrocarbons.

3.4 Target Compounds

Contaminant concentrations in the groundwater at individual monitoring well locations within the landfill or at the landfill boundary contained contaminant concentrations that exceed one or more standards or criteria. The Safe Drinking Water Act maximum contaminant levels (MCLs) for arsenic, barium, benzene, 1,1-dichloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, and xylene were exceeded at one or more monitoring well locations.

A series of shallow groundwater samples were collected during the RI and were analyzed using a close support laboratory. The primary objectives of the shallow groundwater analysis were to locate the extent of the floating non-aqueous phase and to help select groundwater monitoring well locations. The close support laboratory analyzed a total of 81 samples for the following organic compounds:

- Toluene
- Total xylenes
- 1,1,1-TCA
- TCE
- PCE

These compounds were selected on the basis of historical groundwater analysis, site history, and their chemical properties (e.g., mobility). Concentrations of toluene were observed as high as 43,000 μg/L. Of the three chlorinated compounds analyzed for, 1,1,1-TCA was the most prevalent, and was found at concentrations as high as 730 μg/L.

Two rounds of groundwater sampling for Contract Laboratory analysis were conducted. These samples were analyzed for the complete Target Compound List (TCL) and 13 Special Analytical Services (SAS) parameters.

Volatile Organic Compounds (VOCs) were generally observed to be present at concentrations much greater than semivolatile organics (sometimes more than an order of magnitude greater). The majority of the VOCs detected during the Remedial Investigation were found in shallow monitoring wells (MW-5S and MW-3S and B4S) and were BTEX compounds. The vertical extent of BTEX and chlorinated compounds contamination is mostly confined to the upper 10 to 20 feet of the aquifer. Ethylbenzene, 1,1-DCA and chloroethane were detected, however, at depths up to 50 to 60 feet below the water table. The vertical extent of semivolatile organic compounds (SVOCs) contamination is also mostly confined to the upper 10 to 20 feet of the aquifer. There were no SVOCs detected in any of the deep monitoring wells.

Monitoring wells along the southwestern edge of the landfill and southwest of the landfill have the most occurrence of inorganic chemicals above background. These are primarily shallow and medium wells that included MW-2S, MW-2M, MW-3S, MW-4S, MW-B4S, MW-5S, and MW-8S. Four chemicals: barium, iron, manganese, and sodium, were detected above background with greater frequency than the other inorganic chemicals.

The higher concentrations of these four chemical tends to occur in wells along the southwestern edge of the landfill or southwest of the landfill.

Under the remedy selected in the ROD, the following cleanup standards were adopted:

- Groundwater contaminant plume located at any point beyond the property boundary or DMZ:
    - Preventive Action Limits (PALs) from Wisconsin Administrative Code Chapter NR 140
- Groundwater contaminant plume located at landfill waste boundary:
    - Maximum Contaminant Levels (MCLs) from the Safe Drinking Water Act, 40 CFR 141.61 and 40 CFR 143
    - Maximum Contaminant Level Goals (MCLGs) above zero Safe Drinking Water Act, 40 CFR 141.50

The ROD requires that the more stringent Wisconsin standards promulgated in NR 140, WAC, be achieved ''at any point beyond the property boundary or beyond the three-dimensional design management zone, whichever is closer to the waste boundary.'' The DMZ as defined in NR 140 is a three-dimensional boundary surrounding a regulated facility. The boundary extends from the ground surface through all saturated geological strata. The DMZ defined for the Onalaska site extends 250 feet horizontally from the waste boundary. Because the property boundary is generally closer than the DMZ to the waste boundary, the PALs apply at the property boundary with the exception of southwest corner of the property where the PALs apply to the DMZ (Figure 3).

Tables 1 and 2 present a summary of contaminant concentrations, by monitoring well, that exceeded either the U.S. EPA drinking water standards, criteria and guidelines, or Wisconsin groundwater protection standards.

Groundwater samples from the monitoring, extraction, and residential wells will be analyzed for the parameters stated in the Field Sampling Plan.

The Field Sampling Plan includes sampling of monitoring and extraction wells, and collection of groundwater elevation data from the monitoring wells and piezometers. The Field Sampling Plan also provides the SOPs describing the field sampling procedures, decontamination procedures, as well as other information necessary to complete the sampling event. In addition, surface water and sediment samples will be collected by WDNR.

E140811.DV.05 MW & Piez Net-QAPP 7-22-97 TLL

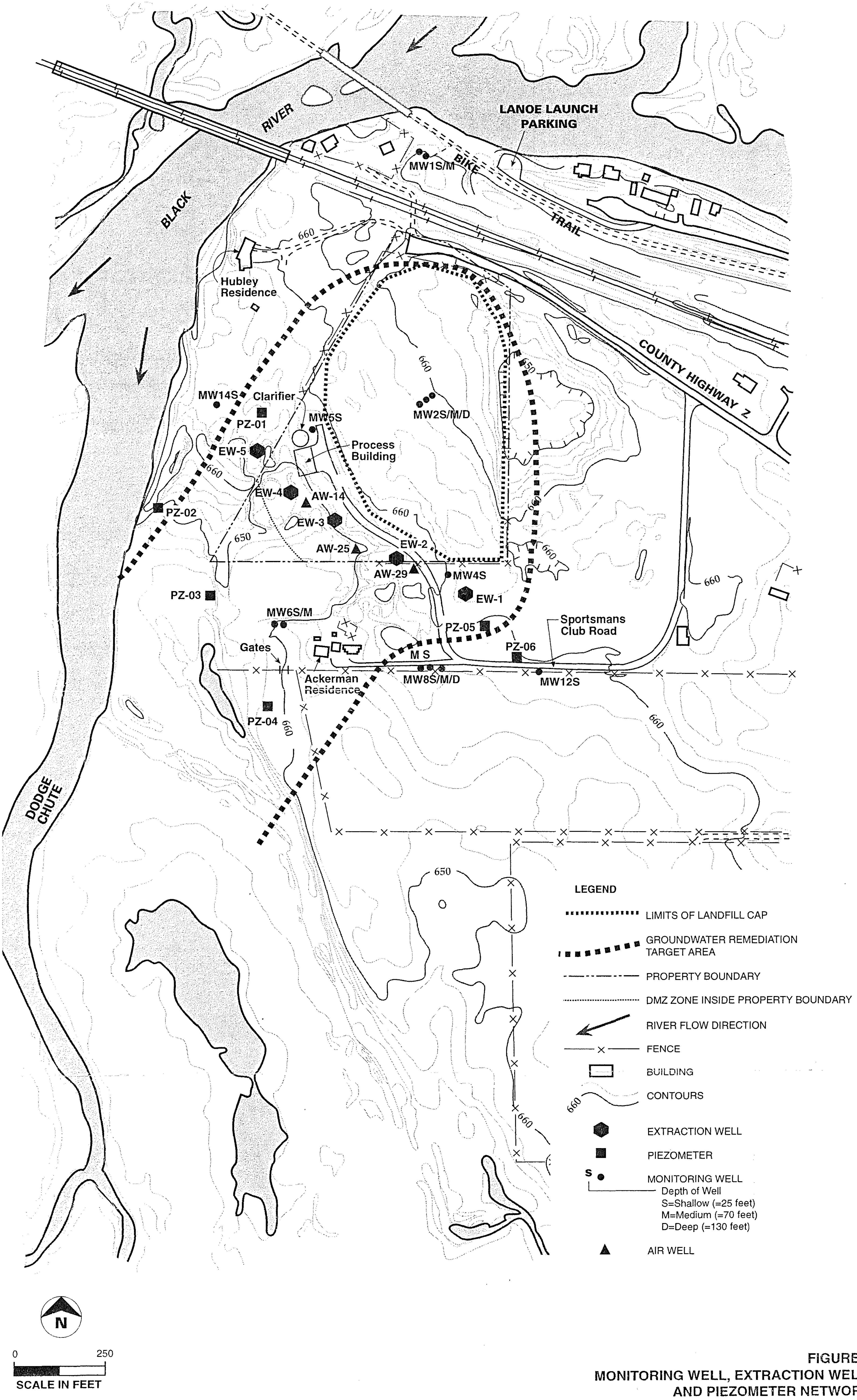


FIGURE 3
MONITORING WELL, EXTRACTION WELL, AND PIEZOMETER NETWORK
ONALASKA LANDFIL

Table 1
Summary of Monitoring Well Concentrations Exceeding Wisconsin Groundwater Protection Standards Onalaska Landfill Site

Well	Chemical	Detected Concentration ($\mu g/L$)[a]	Criteria Exceeded[b]	Criteria Level ($\mu g/L$)
MW02S-01	Benzene	5	ES	5.0
			PAL	0.5
	Arsenic	9.5	PAL	5
	Chromium	24.8	PAL	10
MW02M-01	Arsenic	19.4	PAL	5
	Barium	1390	ES	2000
			PAL	400
MW03S-01	1,1-Dichloroethene	15	ES	7.0
			PAL	0.7
	Benzene	13	ES	5
			PAL	0.5
	1,1,1-Trichloroethane	240	ES	200
			PAL	40
	Trichloroethene	11	ES	5
			PAL	0.5
	Toluene	8300	ES	343
			PAL	68.6
	Xylene	2300	ES	620
			PAL	124
	Arsenic	19.4	PAL	5
	Barium	593	ES	2000
MW03M-01	Arsenic	68.4	ES	50
			PAL	5
	Barium	2760	ES	2000
			PAL	400
MW04S-01	Toluene	530	ES	343
			PAL	68.6
	Arsenic	6.9	PAL	5
	Barium	1140	ES	2000
MW05S-01	Benzene	7	ES	5
			PAL	0.5
	Toluene	8300	ES	343
			PAL	68.6
	Xylene	1400	ES	620
			PAL	124
	Arsenic	8	PAL	5
	Barium	347	ES	2000
MW06M-01	Barium	1370	ES	2000
			PAL	400
MW08M-01	Barium	600	PAL	400
W21S-01	Barium	201	PAL	400

Note: The public welfare PAL and ES for iron was exceeded for all wells except MW06M, MW08D, MW08M, MW08S, MW10M, MW12S, and MW13S. The public welfare PAL and ES for manganese exceed in all wells.

[a] Per Remedial Investigation.

[b] Criteria abbreviation:

ES Enforcement Standard
PAL Protective Action Limit

Table 2
Summary of Monitoring Well Concentrations Exceeding U.S. EPA Drinking Water Standards, Criteria, and Guidelines
Onalaska Site

Well	Chemical	Detected Concentration (μg/L)	Criteria[a] Exceeded	Criteria Level (μg/L)
MW02S-01	Benzene	5	MCL	5
			MCLG	0
			WQC-Risk	0.67
	Ethylbenzene	210	MCL2°	5
MWO2M-01	Barium	1,390	MCL	1,000
MW03S-01	Benzene	13	MCL	5
			MCLG	0
			WQC-Risk	0.67
	1,1-Dichloroethene	15	MCL	7
			MCLG	7
			WQC-Risk	0.7
	1,1,1-Trichloroethane	240	MCL	200
			MCLG	200
			DWLHA	200
	Trichloroethene	11	MCL	5
			MCLG	0
			WQC-Risk	2.8
	Toluene	8,300	MCL	1,000
			MCL2°	--
			MCLG	1,000
			DWLHA	1,000
	Xylene	2,300	DWLHA	--
			MCL2°	20
MW03M-01	Arsenic	68.4	MCL	50
			DWLHA	--
			WQC-Risk	0.0025
	Barium	2,760	MCL	2,000
			DWLHA	--
MW04S-01	Ethylbenzene	42	MCL2°	--
	Toluene	530	MCL2°	--
MW05S-01	Benzene	7	MCL	5
			MCLG	0
			WQC-Risk	5
	Ethylbenzene	160	MCL2°	--
	Toluene	8,300	MCL	1,000
			MCL2°	--
			MCLG	1,000
			DWLHA	1,000
	Xylene	1,400	DWLHA	--
			MCL2°	--
MW06M-01	Barium	1,370	MCL	2,000

Note: The secondary MCL for manganese exceeded in all wells except MW125 and MW135. The secondary MCL for iron exceeded in all wells except MW06M, MW08D, MW08M, MW08S, MW10M, MW12S, MW13S, MW21S

[a] Criteria abbreviations:

MCL - Maximum Contaminant Level
MCL2° - Secondary Maximum Contaminant Level
MCLG - Maximum Contaminant Level Goal
WQC-RISK - Water Quality Criteria at 10^{-6} risk level
DWLHA - Drinking Water Lifetime Healthy Advisory
Prop - Proposed

3.5 Project Objectives

The objectives of the groundwater monitoring program are to:

- Provide data to determine if groundwater contaminant concentrations in the aquifer have been reduced to below the cleanup criteria

- Provide data to verify that a hydraulic gradient is being maintained by the extraction system in order to contain and collect contaminated groundwater

- Provide data to determine if groundwater contaminant concentrations in the aquifer between the landfill and the Black River are being reduced by the extraction system

- Monitor water levels in the wetlands adjacent to the site to make sure that the extraction system is not lowering water levels to such a level as to adversely affect the wetlands

The groundwater monitoring will also identify any seasonal fluctuations in groundwater quality and provide information on background water quality.

3.5.1 Intended Data Usage

These data shall be used to evaluate the effectiveness of the remedial action design and determine when groundwater extraction may cease. The data will be used to:

- Determine the change in extent or movement of the groundwater contaminant plume

- Support decisions related to operation of the groundwater extraction system (such as extraction rate per well)

- The field screening VOC concentrations measured by HNu or organic vapor analyzer (OVA) will be used to monitor the safety of field sampling personnel and to select proper personal protective equipment

3.5.2 Data Quality Objectives

Data quality objectives (DQOs) define and specify the quality of data required for the intended use of the data.

There will be two levels of Analytical Data collected in support of this response action:

The lower of the two levels will be Field Screening Data. This level of analysis is to generate real time monitoring data for health and safety. The QC associated with this data is minimal. This data will be field reviewed but not validated.

The other level of data will be certified analytical laboratory data. This level of analysis requires the highest level of data quality. The analytical, QC, and validation requirements used in support of this level of data is consistent with EPA protocols. This data is used for site conditions assessment.

The field screening data includes field measurements of groundwater pH, temperature, and specific conductance and HNu/OVA readings. The analytical laboratory data will include the chemical analysis of select VOCs, metals and conventional groundwater parameters. The laboratory data will be used to track and monitor the groundwater contaminant plume, and to determine if the remedial action is being implemented as planned.

Sample matrices, parameters, and analytical methods for each media are presented in Table 3. The number of samples in this table include QC samples.

3.6 Groundwater Monitoring Network

The groundwater monitoring network was designed to provide groundwater quality data for the site and adjacent area and is comprised of wells constructed during the RI and during the RA. The groundwater monitoring network consists of 6 piezometers, 12 monitoring wells, 5 extraction wells, 2 residential wells, and 3 air wells. The selected monitoring wells are primarily located hydraulically downgradient to the south, southeast, and west of the landfill site. One monitoring well is located upgradient of the landfill to provide background groundwater quality. These wells will permit evaluation of the hydraulic gradient control and groundwater quality in the aquifer. Well and piezometer locations are shown in Figure 3.

3.6.1 Piezometers

Six piezometers were installed for the purposes of determining the impact of groundwater pumping on the wetlands area to the south of the site, and to ensure that the plume of contaminated groundwater is being captured by the system of extraction wells. Potential adverse impacts on the wetlands will be evaluated using pre- and post-pumping groundwater elevation data collected at the three piezometers (PZ-02, PZ-03, and PZ-04)

Table 3
Sampling and Analysis Summary

Parameter	Method	Matrix	Field Samples				Lab QC		Matrix	Field Samples				Lab QC		No. of Samples per Event
			FS	TB	FB	FR	MS	MSD		FS	TB	FB	FR	MS	MSD	
Benzene	SW846-8260/ EPA 524.2	Groundwater	17	2	2	2	2	2	Drinking Water	2	1	0	0	1	1	32
Toluene	SW846-8260/ EPA 524.2	Groundwater	17	2	2	2	2	2	Drinking Water	2	1	0	0	1	1	32
Xylene(s), Total	SW846-8260/ EPA 524.2	Groundwater	17	2	2	2	2	2	Drinking Water	2	1	0	0	1	1	32
Ethylbenzene	SW846-8260/ EPA 524.2	Groundwater	17	2	2	2	2	2	Drinking Water	2	1	0	0	1	1	32
Trichloroethene	SW846-8260/ EPA 524.2	Groundwater	17	2	2	2	2	2	Drinking Water	2	1	0	0	1	1	32
1,1-Dichloroethane	SW846-8260/ EPA 524.2	Groundwater	17	2	2	2	2	2	Drinking Water	2	1	0	0	1	1	32
1,1,1-Trichloroethane	SW846-8260/ EPA 524.2	Groundwater	17	2	2	2	2	2	Drinking Water	2	1	0	0	1	1	32
1,1-Dichloroethene	SW846-8260/ EPA 524.2	Groundwater	17	2	2	2	2	2	Drinking Water	2	1	0	0	1	1	32
Tetrachloroethylene	SW846-8260/ EPA 524.2	Groundwater	17	2	2	2	2	2	Drinking Water	2	1	0	0	1	1	32
Arsenic	SOWILM03.0	Groundwater	17	0	2	2	1	1	Drinking Water	2	0	0	0	0	0	25
Barium	SOWILM03.0	Groundwater	17	0	2	2	1	1	Drinking Water	2	0	0	0	0	0	25
Lead	SOWILM03.0	Groundwater	17	0	2	2	1	1	Drinking Water	2	0	0	0	0	0	25
Iron	SOWILM03.0	Groundwater	17	0	2	2	1	1	Drinking Water	2	0	0	0	0	0	25
Manganese	SOWILM03.0	Groundwater	17	0	2	2	1	1	Drinking Water	2	0	0	0	0	0	25
Total Dissolved Solids (TDS)	EPA160.1	Groundwater	12	0	2	2	0	0	Drinking Water	2	0	0	0	0	0	18
Oil and Grease	EPA413.2	Groundwater	12	0	2	2	1	1	Drinking Water	2	0	0	0	0	0	20
Color	EPA110.2	Groundwater	12	0	2	2	0	0	Drinking Water	2	0	0	0	0	0	18
Turbidity	EPA180.1	Groundwater	12	0	2	2	0	0	Drinking Water	2	0	0	0	0	0	18
Odor	EPA140.1	Groundwater	12	0	2	2	0	0	Drinking Water	2	0	0	0	0	0	18

located in the wetlands area. Plume capture will be determined by the horizontal hydraulic gradients, as defined by the water table elevations in the piezometers and in the monitoring wells, such as MW-14S, which is located near the edge of the plume. Piezometer PZ-01 has been installed to measure the inward gradient along the western boundary of the plume. Piezometers PZ-05 and PZ-06 will be used to measure the inward gradient along the eastern boundary of the plume. The rate of groundwater pumpage can be varied to provide the groundwater gradients necessary to capture the plume, yet not draw down the wetlands.

3.6.2 Monitoring Wells

The monitoring wells (MW-1S, MW-2S, MW-2M, MW-2D, MW-4S, MW-5S, MW-6S, MW-6M, MW-8S, MW-8M, MW-12S and MW-14S) shall be used to monitor:

- If contaminated groundwater has been captured successfully (contaminants of concern are below action levels at point of compliance)
- Groundwater quality changes downgradient of the collection system capture zone (i.e., how quickly concentrations of contaminants of concern decrease after the extraction system is functioning)
- Hydraulic gradient control (contaminated groundwater plume is moving toward the extraction wells)

Groundwater quality downgradient of the landfill and extraction well network will be monitored in shallow wells MW-6S and MW-8S and in intermediate wells MW-6M and MW-8M. These well locations were selected to place wells outside of the capture zone. MW-12S and MW-14S are located on the periphery of the capture zone and will be used to monitor groundwater quality and hydraulic gradient control east and west of the extraction well network. Wells along the landfill waste (MW-4S and MW-5S) are sampled because these wells represent the compliance point defined in the ROD (the landfill waste boundary) for MCLs and non-zero MCLGs. MW-2S, MW-2M, and MW-2D will be used to monitor groundwater quality beneath the landfill to determine if groundwater contaminants are migrating vertically. MW-1S will be used to monitor background groundwater quality upgradient of the landfill.

Monitoring using only shallow and intermediate wells is performed because the majority of the VOCs detected during the Remedial Investigation were found in shallow monitoring wells (MW-5S and former wells MW-3S and B4S). The vertical extent of BTEX and chlorinated compounds contamination is mostly confined to the upper 10 to 20 feet of the aquifer.

3.6.3 Extraction Wells

A series of five extraction wells have been installed in locations that capture the contaminant plume prior to offsite groundwater discharge. The extraction well network has been designed to extract approximately 775 gallons per minute (gpm) of contaminated groundwater for treatment. The rate of pumpage for each well can be varied during operation, based on results of monitoring wells and piezometers. Groundwater from the extraction wells will be monitored to assess the degree that contaminant cleanup is occurring.

3.6.4 Residential Wells

Two residential wells, one located northwest of the facility, and one located directly downgradient of the landfill, will be monitored to assure that contamination is not impacting these wells. Both wells are deep and will be monitored semiannually.

3.6.5 Surface Water and Sediments

The groundwater beneath the site generally flows in a south-southwesterly direction toward the wetlands bordering the Black River. Although no site-derived contamination was detected in the surface water and sediment samples collected during the remedial investigation, surface water and sediments will be sampled during the response action to monitor for potential offsite contaminant migration. Surface water and sediment grab samples will be collected by Wisconsin DNR from the wetland area and Dodge Chute.

3.6.6 Background / Baseline Monitoring

The monitoring program began with the collection and analysis of four discrete samples from all 17 wells in the monitoring program to develop baseline concentrations. The samples were analyzed for the parameters listed in Table 3. The analytical results from each semiannual sampling event will be compared to the background concentrations.

3.6.7 Sampling

The Field Sampling Plan includes semiannual sampling events from monitoring wells, extraction wells and residential wells, and collection of semiannual groundwater elevation data from piezometers, monitoring wells, and air wells. In addition, surface water and sediment samples will be collected by the WDNR from two or more locations.

The sampling schedule will be evaluated annually and adjusted as needed depending on the analytical results and the operation of the extraction and treatment system. The frequency of sampling will be re-evaluated annually. The sampling plan is described in detail in the Field Sampling Plan.

The primary purpose of the semiannual sampling and elevation measurements is to continue to evaluate the groundwater extraction and treatment system for reliable operation and monitor the reduction of contaminant concentrations in the aquifer. Groundwater samples from the 12 monitoring wells, five extraction wells, and two residential wells will be collected during April/May and September/ October. The residential wells are at the Hubley and Ackerman homes.

After 5 years of operation of the groundwater extraction and treatment system (year 1999), the groundwater quality will be further evaluated to assess if the groundwater standards have been met.

3.7 Project Schedule

Groundwater monitoring samples and groundwater elevation measurements will be taken semiannually, unless unanticipated problems indicate that additional sampling is warranted.

The groundwater quality will be evaluated at the end of the fifth year to determine if the groundwater standards have been met. The ROD estimates that 95 percent of the contaminants will be removed from the groundwater plume within the 5-year time frame. In addition to the evaluation of results of quarterly and semiannual samples collected over the 5-year period, a full priority pollutant scan will be performed to determine if additional parameters should be added to the compounds listed in Table 2. If the groundwater goals (or WACLs, if established) have not been met, sampling and remediation will continue until the cleanup goals are achieved. The frequency of sampling will be evaluated based on the trends observed in the first 5 years. If an applicable and appropriate requirement (ARAR) waiver is established, the groundwater goals and the need or frequency of further sampling will be addressed as part of the waiver process.

Section 4
Project Organization and Responsibility

At the direction of the Region 5 Remedial Project Manager (RPM), with final authority by the Region 5 Regional Project Officer (RPO), CH2M HILL has overall responsibility for all phases of the Long Term Response Action, including overall management and QA/QC for all activities within their control. CH2M HILL will perform the field sample collection and field screening measurements, and will prepare monitoring reports. The project organization chart is included as Figure 4.

4.1 Management Responsibilities

Project management will be conducted through CH2M HILL's regional office in Milwaukee. Contact will be maintained with the EPA's RPM during all phases of the project.

Monthly reports will be submitted to keep the EPA apprised of the technical, financial, and schedule status of the project. Other CH2M HILL responsibilities include controlling budgets and schedules; selecting, coordinating, and scheduling staff and subcontractors for task assignments; and maintaining project QA/QC programs.

Operational responsibilities involving execution and direct management of the technical and administrative aspects of this project have been assigned as follows:

- Remedial Project Manager (RPM)
  Kevin Adler (U.S. EPA Region 5)

- Quality Assurance Manager (QAM)
  Willie Harris (U.S. Region 5)

- State Project Manager (SPM)
  Larry Lester (WDNR)

- Site Manager (SM)
  Jim Fisher (CH2M HILL)

- Program Manager (PM)
  Alpheus Sloan (CH2M HILL)

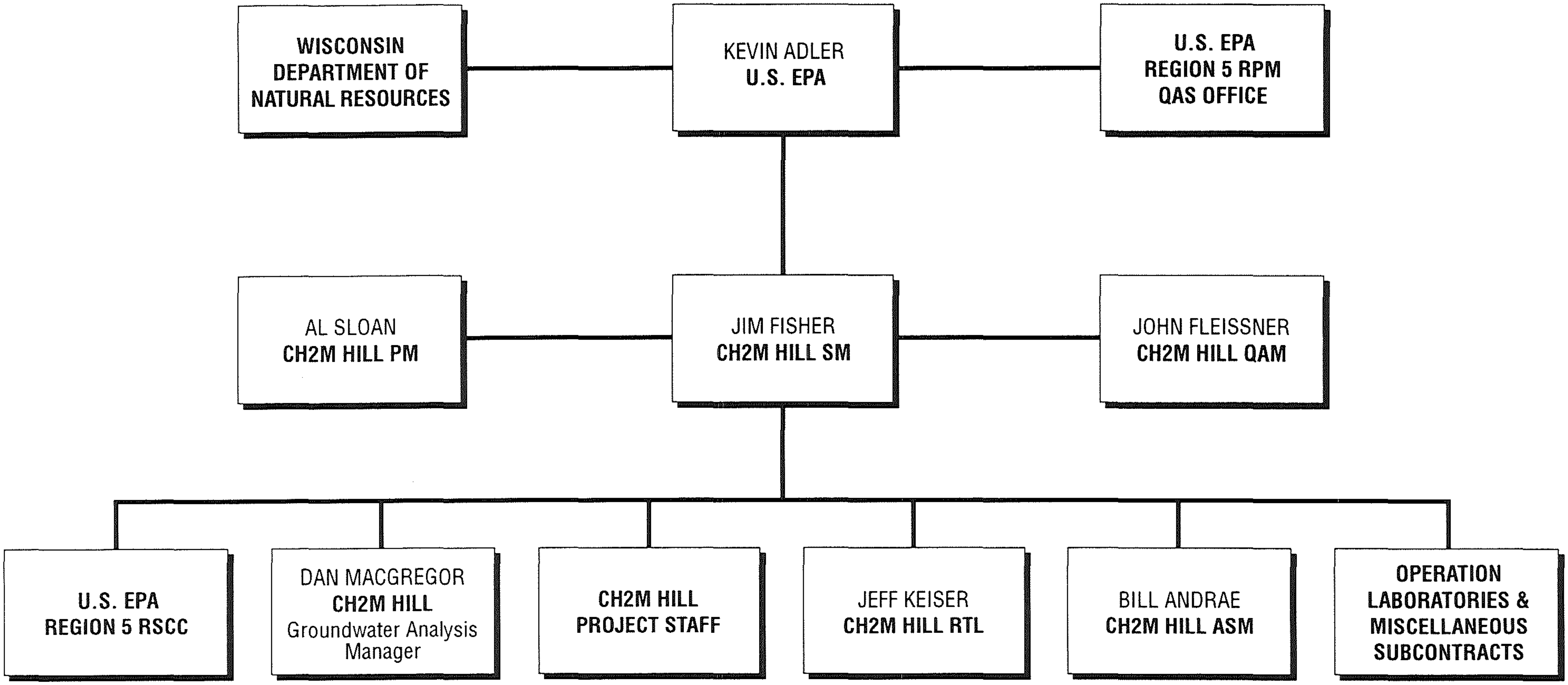


FIGURE 4
PROJECT ORGANIZATION
ONALASKA LANDFILL
QAPP

The responsibilities of the aforementioned personnel are described below.

4.1.1 U.S. EPA Region 5 Remedial Project Manager

The RPM has the responsibility for the implementation of the Remediation Plan.

4.1.2 State Project Manager

The SPM has responsibility for ensuring that the Remedial implementation meets WDNR regulations and guidelines.

4.1.3 CH2M HILL Program Manager

The PM has overall responsibility for seeing that the project meets EPA and state objectives and CH2M HILL's quality standards. In addition, he is responsible for technical quality control and project oversight, and will provide the site manager with access to corporate management.

4.1.4 CH2M HILL Site Manager

The SM is responsible for implementing the project, and has the authority to commit the resources necessary to meet project objectives and requirements. The SM's primary function is to see that technical, financial, and scheduling objectives are achieved. The SM will report directly to the RPM and SPM and will provide the major point of contact and control for matters concerning the project. The SM will:

- Define project objectives and develop a detailed work plan 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 as needed to maintain performance within budget and schedule constraints
- Orient all field leaders and support staff concerning the project's special considerations
- Monitor and direct the field leaders
- Develop and meet ongoing project and/or task staffing requirements, and develop mechanisms to review and evaluate each task product

- Review the work performed on each task to ensure its quality, responsiveness, and timeliness
- Review and analyze overall task performance with respect to planned requirements and authorizations
- Approve all external reports (deliverables) before their submission to EPA Region 5 and WDNR
- Be responsible for preparation and quality of interim and final reports
- Represent the project team at meetings and public hearings

4.1.5. EPA Region 5 Quality Assurance Manager

EPA Region 5 Quality Assurance officer has the responsibility to review and approve all QAPPs, and to validate data of the SAS Data and Results.

4.2 Quality Assurance Organization

Responsibilities for management and execution of QA aspects of this project are assigned as follows:

Tasks	Responsible Organization/Personnel
• Final review and approval of QAPjP	Kevin Adler, U.S. EPA Region 5 RPM Willie Harris, U.S. EPA Region 5 QA Manager (QAM)
• QA program for analytical laboratory performance and systems audits for laboratory SAS	Dan MacGregor, CH2M HILL
• QA review and approval of reports, plans and procedures, and field activities; and identifying and controlling nonconformance for corrective action while providing technical assistance to project staff. The QAD will remain independent of direct job involvement and day-to-day operations, and will have direct access to corporate executive staff as necessary to resolve any QA dispute.	John Fleissner, CH2M HILL, Quality Assurance Director (QAD)
• Evidence audits of field records	John Fleissner, CH2M HILL, QAD NEIC Evidence Audit Team (Techlaw, Inc.)

• Approval of QA programs and laboratory SAS procedures	U.S. EPA Region 5 QAM U.S. EPA Region 5 CRL

4.3 Field Operations

Responsibilities for field operations tasks including both management and execution of the field work, are assigned as follows:

Tasks	Responsible Organization/Personnel
• Sample Collections	Jim Fisher, CH2M HILL, SM Kevin Adler, U.S. EPA Region 5 RPM
• Field Measurements	Jim Fisher, CH2M HILL, SM Kevin Adler, U.S. EPA Region 5 RPM
• External Field Audits	U.S. EPA Region 5 CRL
• Internal Field Audits	Jim Fisher, CH2M HILL, SM

The responsibilities of the field team leader and field team members are described below.

4.3.1 Field Team Leaders

The field team leader is responsible for leading and coordinating the day-to-day activities of the various resource specialists under his supervision. The field team leader is a professional with extensive environmental experience who will report directly to the SM. Specific field team leader responsibilities include:

- Day-to-day coordination with the SM on field activities
- Coordination and management of field staff including sampling and drilling
- Coordination and oversight of technical efforts of subcontractors assisting the field team
- Review all field activities to ensure proper custody procedures are followed
- Implementation of QC for technical data provided by the field staff including field measurement data

- Identification of problems at the field team level, discussion of resolutions with the site manager, and communication between field team and upper management
- Adherence to work schedules provided by the SM
- Participation in the preparation of the final report

4.3.2 Field Team Members

The field team members for this project will be drawn from CH2M HILL's pool of resources. The technical team staff will gather and analyze data and prepare various task reports and support materials. All of the designated technical team members are experienced professionals who possess the degree of specialization and technical competence required to effectively and efficiently perform the required work.

4.4 Laboratories

Organizations and personnel responsible for requesting services, administration of SAS laboratories, and QA/QC tasks associated with the laboratories are assigned as follows:

Laboratory Deliverables	**Responsible Organization/Personnel**
• Initiation of request	Dave Shekoski, CH2M HILL*
• Preparation of SAS	Daniel MacGregor, CH2M HILL*
• Contact for laboratory deliverables	Daniel MacGregor, CH2M HILL*
• Review and approval of SAS	U.S. EPA Region 5 CRL LSSS U.S. EPA Region 5 QAM Kevin Adler, U.S. EPA, Region 5 RPM
• Data validation of laboratory deliverables	U.S. EPA Region 5 CRL LSSS
• Data assessment of laboratory deliverables	Daniel MacGregor, CH2M HILL*

* Contractor's personnel for these tasks may change, subject to staff availability. If a change is made, the EPA RPM will be notified.

Section 5

Quality Assurance Objectives for Measurement Data

The overall QA objectives are to develop and implement procedures for field sampling, chain of custody, laboratory analysis, and reporting that will provide the quality of data required for monitoring and tracking the groundwater contaminants. Specific procedures to be used for sampling, chain-of-custody, calibration of field instruments, laboratory analysis, reporting, internal quality control, audits, preventive maintenance, and corrective actions are described in other sections of this QAPjP and the Field Sampling Plan. This section addresses the objectives of data precision, accuracy, completeness, representativeness, and comparability.

Precision measures the reproducibility of measurements under a given set of conditions. It is a measure of the variability of a group of measurements compared to an average value. Accuracy measures the bias in a measurement system. Possible sources of error are the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques. Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or environmental conditions. Completeness is defined as the percentage of measurements made that are judged to be valid measurements. Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another.

5.1 Level of Quality Control Effort

Field blank, trip blank, duplicate, and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling program. Field and trip blanks, consisting of distilled water, will be submitted to the analytical laboratories to provide the means to assess the quality of the data resulting from the field sampling program. Field blank samples are analyzed to check for procedural contamination at the site which may cause sample contamination. Trip blanks are used to assess the potential for contamination of samples due to contaminant migration during sample shipment and storage. Duplicate samples are analyzed to check for sampling and analytical reproducibility. Matrix spikes (MSs) provide information about the effect of the sample matrix on the extraction/digestion and measurement methodology. Whereas, inorganic analyses require one MS sample, volatile organic matrix spikes are performed in duplicate and are hereinafter referred to as MS/MSD samples.

The general level of the QC effort will be collecting one field duplicate and one field blank for every 10 or fewer investigative samples. One volatile organic analysis (VOA) trip blank consisting of certified organic free pure water will be included along with each shipment of aqueous VOA samples.

Aqueous MS/MSD samples must be collected at triple the volume for VOCs and aqueous MS samples must be collected at double the volume for metals, oil and grease, and TOC analyses. One MS and MS/MSD sample, as appropriate, will be collected/designated for every 20 or fewer investigative samples per sample matrix (i.e., groundwater, residential water). Sampling procedures are specified in the Field Sampling Plan.

The aqueous samples will be sent to a subcontracted analytical laboratory. The level of laboratory QC effort for SAS analyses is outlined individually in each SAS request form contained in Appendix A.

The QC effort for the field measurement of pH consists of pre-measurement calibration and a post-measurement verification using two standard reference solutions. This procedure will be performed daily. The QC effort for field conductivity measurements will include daily calibration of the instrument using standard solutions of known conductivity. The QC effort for temperature will consist of checking the thermometer on the conductivity meter against a certified thermometer. These procedures are described in more detail in the field equipment measurement SOPs (Appendix B).

5.1.1 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 protocols.

The accuracy, precision, and sensitivity requirements for SAS for the laboratory are specified in each individual SAS request form contained in Appendix A. The standard operating procedures (SOPs) for the field equipment to measure pH, conductivity, and temperature are outlined in Appendix B. QA requirements for field screening analyses are also included in SOPs found in Appendix B.

5.1.2 Completeness, Representativeness, and Comparability

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. It is expected that the field measurement and laboratories will provide data meeting QC acceptance criteria.

Representativeness expresses the degree to which data accurately and 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 which is dependent upon the proper design of the sampling program and proper laboratory protocol. The sampling network was designed to provide data representative of site conditions. During design and development of the sampling network, consideration was given to past waste disposal practices, existing analytical data, physical setting and processes, and constraints inherent to the Superfund program. Representativeness will be satisfied by seeing that the Field Sampling Plan is followed, proper sampling techniques are used, proper analytical procedures are followed, and holding times of the samples are not exceeded in the laboratory. Representativeness will be assessed by analyzing of field duplicated samples.

Comparability expresses the confidence with which one data set can be compared with another. The extent to which existing and planned analytical data will be comparable 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. These new analytical data, however, may not be directly comparable to existing data because of differences in procedures and QA objectives.

5.2 Method Detection Limits

Contract-required detection limits for the Target Parameters are provided as part of the SASs in Appendix A.

Section 6

Sampling Procedures

Detailed sampling procedures are provided in the Field Sampling Plan. Table 4 of Section 3 provides a summary of sample matrices and the parameters to be sampled for.

Section 7
Sample Custody Procedures

7.1 Introduction

It is EPA and Region 5's policy to follow the EPA Region 5 sample custody or chain-of-custody protocols as described in *NEIC Policies and Procedures*, EPA-330/9-78-001-R, revised June 1985. This custody is in three parts: field custody procedures, laboratory custody procedures, and final evidence files.

A sample or evidence file is under your custody if the documents:

- Are in your possession
- Are in your view after being in your possession
- Were in your possession and you placed them in a secured location
- Are in a designated secure area

7.2 Field Custody Procedures

The sample packaging and shipment procedures summarized below will insure that the samples will arrive at the laboratory with the chain-of-custody intact. The protocol for sample numbering is included in the Field Sampling Plan.

7.2.1 Field Procedures

(a) 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.

(b) Each sample bottle will have an EPA Region 5 sample tag attached which will contain the sample number, the case or SAS number, and station location.

(c) Sample tags are to be completed for each sample using waterproof ink.

7.2.2 Sample Documentation Procedures

Sample packaging and shipping procedures are based on U.S. EPA Specifications and Department of Transportation (DOT) regulations (40 CFR). The procedures vary according to sample concentration and matrix and are designed to provide optimum protection of samples and the public.

Shipping containers must be insulated, durable, and watertight. Sample bottles are to be cushioned in the shipping container with packing material such as vermiculite or bubble pack. To prevent contamination of samples, all containers regardless of size and type must be placed inside sealed plastic bags before being packed. Preformed poly-foam cooler liners may be used for shipment of low-concentration samples only. Following shipment, chain-of-custody records and air bills must be given to the CH2M HILL sample documentation coordinator. Field packing and shipping procedures are as follows:

1. Assemble a list of the samples to be packaged and shipped on the same day by their respective analytes and the names of the assigned laboratories.

2. Enter the SAS number, tag number, matrix, sample numbers, laboratory, date sampled, and date shipped for each sample on the sample I.D. matrix.

   Note: If portions of a given sample are to be shipped to different laboratories (e.g., for organic and inorganic analysis), two entry lines will be required for that sample number to accommodate the chain-of-custody record, airbill, and traffic report numbers corresponding to each portion of the sample.

3. Obtain the QC lot numbers of the prelabeled containers for each sample and enter them on the sample I.D. matrix.

4. Determine the number of shipping containers (coolers) required for the day's shipment. This will depend on the number of samples to be shipped, the number of containers per sample, the number of sample containers that will fit in each cooler, and the number of laboratories to be used.

   Note: A group of containers for a single sample should not be split between coolers unless the portions of the sample are to be sent to more than one laboratory for different types of analysis.

5. Complete an airbill for each laboratory address.

   Note: Several coolers may be shipped to the same address under one airbill.

   Shipment of medium and high concentration samples requires the use of a special airbill, including a shipper's certification for restricted articles.

6. Enter the airbill numbers on the sample I.D. matrix.

7. Assign a chain-of-custody record to each cooler and determine which sample containers will be shipped in each.

   Note: More than one chain-of-custody record may be needed to accommodate the number of samples to be shipped in one cooler.

8. Assign sample and tag numbers to each sample by entering these numbers on the matrix.

   Reminder: Portions of samples for organic and inorganic analysis will usually be sent to separate laboratories. Use one line on the sample I.D. matrix for the organic portion and another line for the inorganic portion.

9. Determine the number of traffic labels that will be needed for organics and inorganics.

10. Assign traffic report numbers from the labels to each sample and enter the numbers on the sample I.D. matrix.

11. Record the tag numbers on each sample container and enter the numbers on the sample I.D. matrix.

12. Complete separate traffic reports for each laboratory each day (or SAS packing lists) based on the information provided on the matrix.

13. Complete sample tags according to the information provided on the sample I.D. matrix and the parameters of analysis. Place tags in groups by sample number.

14. Complete the chain-of-custody records based on the information provided on the sample I.D. matrix.

15. Assign two EPA custody seals to each cooler. Enter the serial numbers of the seals in the ''REMARKS'' section of each chain-of-custody form (if the new combined chain-of-custody/traffic report forms are used, enter the serial numbers in the appropriate box) and temporarily clip seals to the form.

16. Group all the paperwork associated with each cooler in a separate clip.

17. Obtain full signatures of the Sample Team Leader (STL) and initials of significant field team members (including yourself) on the sample tags and at the top of the chain-of-custody forms.

18. Prepare samples for shipment.

All original data recorded on traffic report forms, sample identification tags, chain-of-custody records, and receipt for sample forms will be written with waterproof ink.

Step-by-step instructions for completing each form are found in the Field Sampling Plan.

7.2.3 Transfer of Custody Procedures

Transfer of custody procedures are as follows:

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

2. 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 locked and secured with strapping tape and EPA custody seals for shipment to the laboratory. The preferred procedure includes use of a custody seal attached to the front right and back left of the cooler. The custody seals

are covered with clear plastic tape. The cooler is strapped shut with strapping tape in at least two locations.

3. Whenever samples are split 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 split. 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.

4. 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 return to the sampling office.

5. If the samples are sent by common carrier, a bill of lading should be used. Receipts of bills of lading 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 the custody form as long as the custody forms are sealed inside the sample cooler and the custody seals remain intact.

7.2.4 Field Logbook

All information pertinent to a field survey or sampling effort will be recorded in a bound logbook or equivalent standard form. Each page or form will be consecutively numbered and will be at least 4-1/2 inches by 7 inches in size. All entries will be made in indelible ink or, if weather conditions dictate, in hard lead pencil, and all corrections will consist of line-out deletions that are initialed and dated. 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

As an example, the logbook could contain the following:

- Purpose of sampling
- Location, description, and log of photographs of the sampling point
- Weather conditions
- Identification of sampling crew members
- Type of sample (e.g., groundwater, soil, sludge, wastewater)
- Number of samples taken
- Sampling methodology, including distinction between grab and composite samples
- Modifications from Field Sampling Plan
- Sample preservation
- Date and time of collection
- Sample identification designation and tag numbers
- Signature and date by the personnel responsible for observations
- Decontamination procedures

Sampling situations vary widely. No general rules can specify the extent of information that must be entered in a logbook or standardized form. However, records will contain sufficient information so that someone can reconstruct the sampling activity without relying on the sample collector's memory. The logbook and standardized forms will be kept under strict chain of custody.

7.2.5 Corrections to Documentation

No accountable serialized documents are to be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement document. If an error is made on an accountable document assigned to one individual, that individual shall make corrections by making a single line through the error and entering the correct information. The erroneous information should not be obliterated. Any subsequent error discovered on an accountable document should be corrected by the person who made the entry. All subsequent corrections must be initialed and dated.

7.2.6 Distribution of Completed Documents

Final disposition of the completed documents is as follows:

- Shipped with samples:

    - Chain-of-custody form, original (if new combined chain-of-custody traffic reports are used, two copies will be required)

    - Sample tags

- Retained by project manager:

    - Field logbooks (at completion of project)
    - Field records (at completion of project)

- Sent to CH2M HILL documentation coordinator:

    - Chain-of-custody form, two copies
    - Raw analytical data and results

7.2.7 Site Manager's Responsibility

The site manager will review all field activities to determine whether proper custody procedures were followed during the fieldwork and decide if additional samples are required. He or she should notify the U.S. EPA Remedial Project Manager of a breach or irregularity in chain-of-custody procedures.

7.3 Laboratory Custody Procedures for The Contract Laboratory

The laboratory chain-of-custody procedures for organic and inorganic compound SAS analyses are described in the Contracted Laboratories Quality Assurance Plan.

Minimum laboratory custody procedures shall consist of the following:

- Designation of a sample custodian
- Correct completion by the custodian of the chain-of-custody record, sample tag, and laboratory request sheet (including documentation of sample condition upon receipt)
- Laboratory sample tracking and documentation procedures
- Secure sample storage (of the appropriate environment—refrigerated, dry, etc.)
- Proper data logging and documentation procedures including custody of all original laboratory records

7.4 Final Evidence Files Custody Procedures

The final evidence files are maintained by CH2M HILL. This includes all analytical deliverables, data validation reports, laboratory telephone conversation records, and purge file records including laboratory chain-of-custody and sample tags. These files are maintained under document control in a secure area.

Section 8
Calibration Procedures and Frequency

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

8.1 Special Analytical Services

For laboratory SAS analysis, the calibration procedures and frequency are presented in the SAS request forms in Appendix A.

8.2 Field Instruments

Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications.

Equipment to be used doing the field sampling will be examined to certify that it is operating condition. This includes checking the manufacturing's operating manual and the instruction for each instrument to ensure that all maintenance requirements are being observed. Field notes from previous sampling trips will be reviewed so that the notation on any prior equipment problem are not overlooked, and all necessary repairs to equipment have been carried out.

Calibration procedures and frequency for field instruments including the OVA and HNu; the pH, specific conductivity, and temperature meters are found in Appendix B.

Section 9

Analytical Procedures

All samples collected during field sampling will be analyzed by a subcontract analytical laboratory.

9.1 Special Analytical Services

For laboratory SAS analyses, the analytical procedures are presented in the SAS request forms in Appendix A. Also specified in the SAS requests are calibration procedures, frequency of calibration, and the internal quality control checks required for each analysis.

9.2 Field Instruments

Analytical procedures for field instruments including the OVA and HNu, pH, specific conductivity, and temperature meters are found in Appendix B.

Section 10

Internal Quality Control Checks

10.1 Special Analytical Services

For laboratory SAS analyses, the analytical QC procedures are presented in the SAS request forms in Appendix A. Section 5 of this QAPjP provides examples of QC checks used for laboratory measurement and analysis.

10.2 Field Instruments

Field analyses will be performed onsite and will not involve samples that are collected and retained. The primary QA/QC objective is to obtain reproducible measurements to a degree of accuracy that is consistent with that capable of the analytical methodologies and sufficient to meet the intended use of the data. Field QC procedures will be limited to checking the reproducibility of measurements, by taking multiple readings and by verifying accuracy and precision through instrument calibration and calibration checks. The field measurement SOPs in Appendix B describe the QC checks for the field measurements.

Section 11
Data Reduction, Validation, and Reporting

11.1 Data Reduction

11.1.1 Laboratory Analysis

All samples collected at the Onalaska Landfill will be sent to a subcontract analytical laboratory. Data reduction, evaluation, and reporting for samples analyzed by this laboratory will be performed according to specifications outlined in the SASs.

11.1.2 Field Measurements

Raw data from field measurements and sample collection activities will be recorded in the field laboratory notebook. The method of reduction will also be documented in the laboratory notebook.

11.2 Data Validation

11.2.1 Laboratory Analysis

Validation will be accomplished by comparing the contents of the data packages and QA/QC results to the requirements described in the SAS methods. Raw data such as: GC/MS Total Ion Current (TIC) chromatograms, GC/MS mass spectra, FAA data reports, and conventional analyses data station printouts will be examined to ensure that reported results are accurate. The U.S. EPA Region 5 will be responsible for data validation. The Laboratory Data Validation Functional Guidelines (referenced below) will be used as guidelines to validate the SAS data:

- *Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses*—U.S. EPA, February 1994.
- *Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses*—U.S. EPA, July 1994.

Data validated by the U.S. EPA will be assessed by CH2M HILL to determine if project objectives and intended data usage requirements were met. If project objectives or data usage requirements are not being met, the program will be modified in such a manner that project requirements are fulfilled.

11.2.2 Field Measurements

Data validation of field measurements will be the responsibility of the Field Team Leader. The field measurement data validation will consist of: the field notebooks being checked to verify that the QC procedures specified in the field measurement SOP in Appendix B were performed, and that the QC procedures were performed correctly and that all calculations are correct. The computer spreadsheet data and results will be proofed against the field notebooks to ensure no transcription errors occurred.

11.3 Data Reporting

11.3.1 Laboratory Analysis

The analytical laboratory will prepare and submit analytical reports to CH2M HILL in a format as described in the SAS.

11.3.2 Field Measurements

The data will be transferred from field notebooks to a computer database and output in a spreadsheet format for use in the project reports.

11.4 Annual Evaluation

The results of the sampling and analysis program will be evaluated annually. At the end of each year, all sampling results will be compiled. These analytical results will be evaluated for trends and compared with groundwater standards. Groundwater elevation readings will also be evaluated to determine if capture is occurring due to a hydraulic gradient toward the extraction wells. The evaluation will include tabulated results for all sampling that year at each well, plots of concentration versus time for each parameter analyzed for the individual wells, discussion of trends, and comparisons to groundwater standards.

The entire monitoring program also will be reevaluated annually. Specific adjustments to the program that may be necessary include:

- Analyte List—Do analytes need to be added or deleted?

- Sampling Frequencies—Is semiannual sampling and groundwater elevation readings adequate or excessive?

- Monitoring Well Network—Is the monitoring well network adequate? Does any well need to be replaced? Should additional wells be installed? Can some of the monitoring wells be deleted from the sampling program?

- Sampling Program—Do the analytical data indicate that the overall concentrations are decreasing? Should the monitoring program continue?

Section 12

Performance and System Audits

Performance and system audits of both field and laboratory activities will be conducted to verify that sampling and analysis are performed in accordance with the procedures established in the Field Sampling Plan and QAPjP. The audits of field and laboratory activities include two separate independent parts: Internal and External audits.

12.1 External Audits

12.1.1 Laboratories

The system audits, when necessary will include examination of laboratory SOPs on sample receiving, sample log-in, sample storage chain of custody procedure, sample preparation and analysis, instrument operating records, etc.

12.1.2 Field Audits

All field activities conducted by CH2M HILL may be subject to onsite audit by the U.S. EPA Region 5 Central District office and/or CRL. Audits will be arranged with the U.S. EPA Remedial Project Manager.

12.2 Internal Audits

12.2.1 Field Audits

Field performance audits may be conducted to evaluate the execution of sample identification and control, chain of custody procedures, field documentation, training, and sampling operation. Audits evaluate compliance with the procedures outlined in the QAPjP and Field Sampling Plan. Field audits will be initiated by the site manager.

The site manager will perform the audit during a sampling event and will keep a written record of the evaluation.

The site manager will evaluate the following items:

- Responsibilities and Organization—To determine if the planned organization is operational and if necessary details of site activities are being communicated to project participants.
- Sample Collection—To ensure that written procedures outlined in the FSP are being implemented.
- Documentation—To ensure that all forms, identification tags, and field notebooks are being prepared and maintained.
- Quality Assurance Checks—To determine that quality control and assurance checks are being performed as specified in the QAPjP and Groundwater Monitoring Plan.
- Field Equipment—To ensure that calibration and maintenance are being done and recorded.
- Training—To ensure that the sampling team members are adequately trained in field sampling and documentation procedures.
- Chain-of-Custody Procedures—To determine if custody documentation is being completed and maintained and samples are kept in custody at all times.

Following the audit, the auditor will review the preliminary results of his evaluation with the field team leader. The auditor will prepare an audit report containing the results of the evaluation and recommendations for any corrective action. The audit report will be reviewed by the project manager. The site manager shall implement any agreed upon corrective action. The site manager will also be responsible for verifying the implementation of the corrective action. Any noncompliance with standard procedures shall be identified and corrected.

Section 13
Preventive Maintenance

13.1 Laboratory Instruments

The laboratories participating in the SAS program will follow SOPs for preventive maintenance for each measurement system and required support activity. If the CRL is used, laboratory instruments will be maintained according to CRL SOP.

13.2 Field Instruments

Preventative maintenance for field instruments is found with the field testing procedures in Appendix B.

Section 14

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

14.1 Field Measurements

Field data will be assessed by the field leader. The field leader will review the field results for compliance with the established QC criteria that are specified in the QAPjP and Field Sampling Plan. Accuracy of the field measurements will be assessed using daily instrument calibration, calibration check, and analysis of blanks. Precision will be assessed on the basis of reproducibility by multiple reading of a single sample.

14.2 Laboratory Data

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

14.2.1 Precision

Precision of laboratory analysis will be assessed by comparing the analytical results between matrix spike/matrix spike duplicate (MS/MSD) and field and laboratory duplicate analyses. The relative percent difference (%RPD) will be calculated for each pair of duplicate analysis using the Equation 14-1.

$$\%\ RPD = \frac{S - D}{(S + D)/2} \times 100 \qquad \text{Eq. 14-1}$$

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

14.2.2 Accuracy

Accuracy of laboratory results will be assessed for compliance with the established QC criteria using the analytical results of method blanks, reagent/preparation blanks, MS and MS/MSD samples, field blanks, and trip blanks. The percent recovery (%R) of spike samples will be calculated using Equation 14-2.

$$\% R = \frac{A - B}{C} \times 100 \qquad \text{Eq. 14-2}$$

Where:

A = The analyte concentration determined experimentally from the spiked sample

B = The background level determined by a separate analysis of the unspiked sample

C = The amount of the spike added

14.2.3 Completeness

The data completeness of laboratory analyses results will be assessed for compliance with the amount of data required for decision making. The Site Manager will assess completeness. If it is felt that insufficient data has been obtained, the RPM will be notified and consulted to assess the proper corrective action.

14.3 Project Assessment

Overall data assessment and data completeness assessment will be determined by CH2M HILL.

Section 15
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 and sample handling, sample preparation, laboratory instrumental analysis, and data review.

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 appropriate personnel. If the problem is field related, the field team leader is promptly notified. If the problem is analytical in nature, information on the problem will be promptly communicated to CH2M HILL. The field team leader or their designee will then determine the corrective action. Implementation of corrective action will be confirmed in writing.

15.1 Sample Collection / Field Measurements

Field 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 or his designee. The SM will be responsible for assessing the suspected problems in consultation with the Project QAD. A decision will be made based on the potential for the situation to impact 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 manager.

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

- Evaluating all reported nonconformances.
- Controlling additional work on nonconforming items.
- Determining disposition or action to be taken.
- Maintaining a written log of nonconformances in a field record book.
- Reviewing nonconformance reports and corrective actions taken.

- Ensuring nonconformance reports are included in the final site documentation in project files.

If appropriate, the SM will see that no additional work that is dependent on the nonconforming activity is performed until the corrective actions are completed.

Corrective action for field measurements may include:

- Repeat the measurement to check the error
- Check for all proper adjustments for ambient conditions such as temperature
- Check the batteries
- Re-Calibration
- Check the calibration
- Replace the instrument or measurement devices
- Stop work (if necessary)

The SM or his designee is responsible for all site activities. In this role, the SM, at times, is required to adjust the site programs to accommodate site specific needs. When it becomes necessary to modify a program, the responsible person notifies the RPM of the anticipated change and implements the necessary changes after obtaining their approval. The change in the program will be documented on the field record book. The entry will be signed by the initiators and the SM.

The SM for the Onalaska Landfill site is responsible for the controlling, tracking, and implementation of the identified changes. Reports on all changes will be distributed to all affected parties which include the U.S. EPA RPM.

15.2 Laboratory Analyses—Laboratory Corrective Actions

For the laboratory's Special Analytical Services (SASs), corrective action is implemented at several different levels. The laboratories are required to have a written SOP specifying corrective action to be taken when an analytical error is discovered or the analytical system is determined to be out of control. The SOP requires documentation of the corrective action and notification by the analyst about the errors and corrective procedures. Corrective actions by a laboratory will be implemented according to their Standard Operating Procedures (SOPs).

CH2M HILL may request corrective action for any contractual nonconformance identified by audits or data validation. Corrective action may include:

- Re-analyzing the samples, if holding time criteria permits.
- Resampling and analyzing.
- Evaluating and amending sampling procedures and/or evaluating and amending analytical procedures.
- Accepting the data and acknowledging the level of uncertainty.

If resampling is deemed necessary due to laboratory problems, RPM and the SM must identify the necessary approach including cost recovery from the laboratory for the additional sampling effort.

Section 16

Quality Assurance Reports to Management

The preparation of a separate QA report for this project is not anticipated. The annual reports for the Long-Term Response Action will contain separate QA sections that summarize data quality information collected during the previous year. Changes in the Field Sampling Plan or QAPjP will be documented in the annual report. The semiannual reports will contain qualified data (if available) summarized in tables.

The contents of the QA section of the annual report will include but not be limited to the following elements:

- Project status
- Indication of whether the QA objectives are being met
- Performance and system audits conducted during the previous monitoring period
- Data validation narrative summary and data quality assessment
- QA problems and corrective actions
- Changes to the QAPjP or Field Sampling Plan
- Qualified data summarized in tables

APPENDIX A
SAS REQUEST FORMS

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
VOCs (8260) SAS

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Luckett Acting Technical Project Manager (TPO): C. Luckett
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: July 1997
E. Site Name: Onalaska Municipal Landfill

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) at part per billion (ppb) levels in groundwater samples using purge and trap capillary column gas chromatography/mass spectrometry (GC/MS). Sample results will be reported as µg/L. Attachment 1 lists target compounds and detection limits.

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):**

   For each sampling round, analyze 27 low concentration water samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

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

   Superfund-Remedial

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

   Semiannually in April/May and September/October.

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 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.):**

See Attachment 2.

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. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data 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
See attachment 1	See attachment 1	+/- 20 percent of target detection limits listed in attachment 1

II. QC REQUIREMENTS

As required by the SW846 Method 8260 and Attachment 2.

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.

ATTACHMENT 1

Organic Target Analytes	Aqueous Detection Limits (µg/L)
Benzene	1.0
Toluene	1.0
Xylene(s)	1.0
Ethylbenzene	1.0
Trichloroethene	1.0
1,1-Dichloroethane	1.0
1,1,1-Trichloroethane	1.0
1,1-Dichloroethene	1.0
Tetrachloroethene	0.5

8260A1.DOC

ATTACHMENT 2
SPECIAL TECHNICAL INSTRUCTIONS

1. Method Detection Limit (MDL) Study

The MDL study shall be performed prior award of contract. The MDL study shall consist of a statistically determined MDL using the procedure described in the Federal Register (V.49 #209, Appendix B to Part 136, 10-26) and verified through a spike at the computed MDL.

2. Sample Analysis

Analysis of all samples shall follow EPA SW-846 Method 8260 with modifications/specifications outlined below. **Corrective actions and QC limits shall follow the CLP RAS Organic SOW OLM01.8 unless otherwise noted below.**

A. A 25 mL purge will be necessary to achieve required detection limits.

B. Internal Standards

The internal standard compounds shall be pentafluorobenzene, 1,4-difluorobenzene, chlorobenzene-d_5, and 1,4-dichlorobenzene-d_4. Spiked at a concentration level of 1.0 µg/L.

C. Surrogate Standards

Surrogate standards shall additionally be spiked into all samples, blanks, calibration standards, matrix spike/matrix spike duplicate samples, etc. The surrogate standard compound shall be toluene-d_5, 4-bromofluoro-benzene, and dibromofluoromethane. The concentration of each surrogate shall be equivalent to the internal standards (1.0 µg/L) in each investigative and QC sample. Prepare according to EPA SW-846 Method 8260, Section 5.7 and 5.9 and spike when internal standards are introduced (Section 7.5.1). Recovery limits are: toluene-d_5 (88 to 110 percent), 4-bromofluorobenzene (86 to 115 percent), and dibromofluoromethane (86-118 percent).

D. Tuning Criteria

Bromofluorobenzene (BFB) tuning criteria (EPA SW-846 Method 8260) Table 4 and Section 7.4.1 must be every 12 hours and prior to analysis of any calibration standard, sample blank, etc.

E. Calibration

(1) Initial Calibration

Initial Calibration shall consist of five points as discussed in EPA SW-846 Method 8260, Section 5.12. These calibration points shall be prepared as described in Section 5.12 of the method. RFs of all other compounds must be ≥ 0.05. The percent relative standard deviation (percent RSD) for the RFs of all compounds must be $\leq$ 30 percent.

(2) Continuing Calibration

A continuing calibration standard shall be analyzed every 12 hours containing all compounds at a concentration near the mid point concentration for the working range of GC/MS. The continuing calibration response factors shall be used to quantitate all samples analyzed. Spiked at concentrations as described in the method. The RFs of the compounds must be $\geq$ 0.05. The percent difference (percent D) for the RFs of all compounds must be $\leq$ 25 percent.

F. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate sample shall be selected by field samplers and shall be additionally analyzed as 1 set per group of 20 samples. The spike compounds will consist of all target compounds (benzene, toluene, xylenes, ethylbenzene, trichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, 1,1-dichlorothene, and 1,1,2,1-tetrachloroethylene) at concentrations representative of what is expected to be found in the samples. Calculate spike recovery (percent R) and relative percent difference (RFD) as per the CLP RAS organic SOW OLM01.8.

G. Qualitative/Quantitative Analysis

EPA SW-846 Method 8260, Table 5, defines the primary and secondary characteristic masses used for the SAS target compounds (Attachment 5).

H. Method blanks

Method blanks shall be analyzed every 12 hours after initial and continuing calibration standards. An acceptable method blank must contain less than five times the verified MDL for methylene chloride, acetone, toluene, and 2-butanone and less than the MDL for the other target compounds.

I. Dilutions

If samples require dilutions in order to bring some compounds within the calibration range, the lab shall report both the undiluted and diluted result (including all CLP SOW deliverables) where compounds are quantitated. Results from samples requiring dilution will be qualified as diluted and flagged with a "D".

J. Preservation/Container Requirements

Samples will arrive preserved with HCl to a pH <2. Three VOA vials (40 mL each) will be sent per sample.

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
VOCs (524.2) SAS

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Luckett Acting Technical Project Manager (TPO): C. Luckett (312) 886-1488
C. Telephone Number: (312) 886-1488
D. Date of Request: July 1997
E. Site Name: Onalaska Municipal Landfill

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) at part per billion (ppb) levels in residential wells using purge and trap capillary column gas chromatography/mass spectrometry (GC/MS). Sample results will be reported as µg/L. Attachment 1 lists target compounds and detection limits.

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):**

   For each sampling round, analyze 5 low concentration residential well samples. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

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

   Superfund-Remedial

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

   Semiannually in April/May and September/October.

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 EPA SDWA 500 Method 524.2 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.):**

See Attachment 2.

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. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data 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**
See attachment 1	See attachment 1	+/- 20 percent of target detection limits listed in attachment 1

II. QC REQUIREMENTS

As required by EPA SDWA 500 Method 524.2 and Attachment 2.

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.

ATTACHMENT 1

Organic Target Analytes	Aqueous Detection Limits (µg/L)
Benzene	1.0
Toluene	1.0
Xylene(s)	1.0
Ethylbenzene	1.0
Trichloroethene	1.0
1,1-Dichloroethane	1.0
1,1,1-Trichloroethane	1.0
1,1-Dichloroethene	1.0
Tetrachloroethene	0.5

524A1.DOC

ATTACHMENT 2
SPECIAL TECHNICAL INSTRUCTIONS

1. Method Detection Limit (MDL) Study

The MDL study shall be performed prior to award of contract. The MDL study shall consist of a statistically determined MDL using the procedure described in the Federal Register (V.49 #209, Appendix B to Part 136, 10-26) and verified through a spike at the computed MDL.

2. Sample Analysis

Analysis of all samples shall follow EPA SDWA 500 Method 524.2 with modifications/specifications outlined below. **Corrective actions and QC limits shall follow the CLP RAS Organic SOW OLM01.8 unless otherwise noted below.**

A. Internal Standards

The internal standard compounds shall be pentafluorobenzene, 1,4-difluorobenzene, chlorobenzene-d_5, and 1,4-dichlorobenzene-d_4. Spiked at a concentration level of 1.0 µg/L.

B. Surrogate Standards

Surrogate standards shall additionally be spiked into all samples, blanks, calibration standards, matrix spike/matrix spike duplicate samples, etc. The surrogate standard compound shall be toluene-d_5, 4-bromofluoro-benzene, and dibromofluoromethane. The concentration of each surrogate shall be equivalent to the internal standards (1.0 µg/L) in each investigative and QC sample. Prepare according to EPA SDWA 500 Method 524.2 and spike when internal standards are introduced (Section 7.5.1). Recovery limits are: toluene-d_5 (88 to 110 percent), 4-bromofluorobenzene (86 to 115 percent), and dibromofluoromethane (86-118 percent).

C. Tuning Criteria

Bromofluorobenzene (BFB) tuning criteria (EPA SDWA 500 Method 524.2) Table 3 and Section 9.2.2 must be every 12 hours and prior to analysis of any calibration standard, sample blank, etc.

D. Calibration

(1) Initial Calibration

Initial Calibration shall consist of five points as discussed in EPA SDWA 500 Method 524.2, Section 7.8.1. These calibration points shall be prepared as described in Section 7.8.2 of the method. RFs of all other compounds must be $\geq$ 0.05. The percent relative standard deviation (percent RSD) for the RFs of all compounds must be $\leq$ 30 percent.

(2) Continuing Calibration

A continuing calibration standard shall be analyzed every 12 hours containing all compounds at a concentration near the mid point concentration for the working range of GC/MS. The continuing calibration response factors shall be used to quantitate all samples analyzed. Spiked at concentrations as described in the method. The RFs of the compounds must be $\geq$ 0.05. The percent difference (percent D) for the RFs of all compounds must be $\leq$ 25 percent.

E. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate sample shall be selected by field samplers and shall be additionally analyzed as 1 set per group of 20 samples. The spike compounds will consist of all target compounds (benzene, toluene, xylenes, ethylbenzene, trichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, 1,1-dichlorothene, and 1,1,2,1-tetrachloroethylene) at concentrations representative of what is expected to be found in the samples. Calculate spike recovery (percent R) and relative percent difference (RFD) as per the CLP RAS organic SOW OLM01.8.

F. Qualitative/Quantitative Analysis

EPA SDWA 500 Method 524.2, Table 1, defines the primary and secondary characteristic masses used for the SAS target compounds (Attachment 5).

G. Method blanks

Method blanks shall be analyzed every 12 hours after initial and continuing calibration standards. An acceptable method blank must contain less than five times the verified MDL for methylene chloride, acetone, toluene, and 2-butanone and less than the MDL for the other target compounds.

H. Dilutions

If samples require dilutions in order to bring some compounds within the calibration range, the lab shall report both the undiluted and diluted result (including all CLP SOW deliverables) where compounds are quantitated. Results from samples requiring dilution will be qualified as diluted and flagged with a "D".

I. Preservation/Container Requirements

Samples will arrive preserved with HCl to a pH <2. Three VOA vials (40 mL each) will be sent per sample.

524A2.WP

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
Metals SAS

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Luckett Acting Technical Project Manager (TPO): C. Luckett
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: July 1997
E. Site Name: Onalaska Municipal Landfill

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 monitoring wells, extraction wells, and residential wells for select metals with detection limits lower than those provided by the ILM03.0 SOW. 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):**

   Twenty-five monitoring, extraction, and residential well samples will be collected during each sampling event. The aqueous samples will be analyzed for medium to low concentrations of filterable metals. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

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

   Superfund-Remedial

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

   Semiannually in April/May and September/October.

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):**

   The following metals, with the listed detection limits, will be analyzed by trace inductively coupled plasma or graphite furnace atomic absorption (GFAA) (EPA SW-846 7000 series methods);

Analyte	Detection Limits (µg/L)
Arsenic	5
Barium	200
Lead	1.5
Iron	100

Manganese 10

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.):**

One liter of the aqueous sample will be collected and preserved with 5 ml of HNO_3 to a pH <2. Samples should be stored at 4°C until the time of analysis.

Any sample remaining after digestion should be stored at 4°C until the validation and the acceptance of the sample result.

Sample holding time is 6 months from date of receipt.

Zeeman, Smith/Hieftje background correction or equivalent (not D_2) is required if GFAA analysis of arsenic is used.

Matrix modifiers are required for the analysis of arsenic.

The IDL must be shown to have been met prior to the analysis of any samples. The lab can accomplish this by submitting their most recent form XI with each case.

Each calibration blank and QC audit solution must contain the same nitric acid concentration as the samples, or diluted samples.

The sample solutions analyzed must have their matrix concentration fully documented in the raw data.

Each analytical determination must have the resulting absorbance clearly recorded and documented in their order of determination.

The calibration range of the GFAA analyses can not be exceeded. Dilute any sample that does exceed the calibration range.

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. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data 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.

The deliverables included in the SOW ILMO3.0 are required.

Current quarterly form XI, XII, and XIII for each element.

Form VIII must be modified to include the slope of each addition as well as the correlation coefficient.

Correct forms V, VI, and VII to reflect the SAS contract limits and IDL where appropriate.

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. QC REQUIREMENTS

Audits Required	Frequency of Audits	Limits * (+/- or conc.)
Preparation Blank	At least 1 per group of 10 or fewer samples	≤ IDL
Lab Duplicates	At least 1 per group of 10 or fewer samples	+ 25% or RPD is < or + to SAS IDL
Calibration Blank	At least 1 per group of 10 or fewer samples	≤ IDL
ICVs and CCVs	as per SOW ILM03.0	as per SOW ILM03.0
Matrix Spike/ Matrix Spike Duplicates	At least 1 per group of 20 or fewer samples	85-115% for aqueous samples and 75-125% for sediment samples
Lab Control Spike	1 per group of 10 or fewer samples	90-110% for aqueous samples and 75-125% for sediment samples

*See Section III

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
TDS SAS

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Luckett Acting Technical Project Manager (TPO): C. Luckett
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: July 1997
E. Site Name: Onalaska Municipal Landfill

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 monitoring wells, extraction wells, and residential wells for total dissolved solids (TDS). Sample results will be reported as mg/L dissolved solids.

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):**

   Eighteen monitoring, extraction, and residential well samples will be collected during each sampling event. The aqueous samples will contain medium to high concentrations of TDS. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

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

   Superfund-Remedial

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

   Semiannually in April/May and September/October.

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):**

   EPA Method 160.1, Filterable Residue.

   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.):**

Samples will be stored at 4°C until sample analysis. Any remaining samples should be stored in the same manner until the validation and the acceptance of the sample result.

Sample holding time is 7 days from sample receipt.

Use standard aliquots of 100 mL; however, do not use aliquots yielding more than 200 mg residue. If residue is greater than 200 mg, repeat the analysis using a smaller aliquot.

Residue will be weighted to constant weight pursuant to Section 7.6 of Method 160.1 (weight loss is less than 0.5 mg or less than 4% weight loss from previous loss). Constant weights will also be obtainable on a single weight basis if the sample is dried for a minimum of 12 hours. The final weight is to be used for calculations.

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. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data 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.

Bench records of tare weights, final weights, additional weights to determine constant weights, volumes filtered, blanks, and duplicate samples will be provided with work sheets used to calculate results. Dates and times of when the following tasks are performed will be recorded as part of the bench record:

* determination of tare weights

* sample filtration

* determination of constant weights

* determination of residue weights

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	Detection Limit	Precision Desired (+/- % or conc.)
TDS	20 mg/L	Difference in duplicate results should not exceed 2 mg for residues. Duplicate differences shall not exceed 10% for sample values greater than 200 mg/L

II. QC REQUIREMENTS

Audits Required	Frequency of Audits	Limits * (+/- % or conc)
Lab Blank (100 mL of filtered reagent water)	At least 1 per group of 10 or fewer samples	- 20 mg/L to + 20 mg/L
Lab Duplicate	At least 1 per group of 10 or fewer samples	+/- 10% or 2 mg residue
Lab Control Sample (LCS)	At least 1 per group of 20 samples	90-110% recovery

*See Section III

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
O&G SAS

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Luckett Acting Technical Project Manager (TPO): C. Luckett (312) 886-1488
C. Telephone Number: (312) 886-1488
D. Date of Request: July 1997
E. Site Name: Onalaska Municipal Landfill

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 monitoring wells, extraction wells, and residential wells for Oil and Grease (O & G). Sample results will be reported as 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):**

   Twenty monitoring, extraction, and residential well samples will be collected during each sampling event. The aqueous samples will contain medium concentrations of O&G. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

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

   Superfund-Remedial

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

   Semiannually in April/May and September/October.

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):**

   EPA Method 413.2. This is a spectrophotometric method.

   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.):**

   Samples will be in 1 quart or 1 liter glass bottles and preserved with 2 mL H_2SO_4 to ph <2.

Sample holding time is 28 days from date of receipt.

Samples should be stored at 4°C until the time of analysis. Any remaining samples should be stored in the same manner until the validation and the acceptance of the sample result.

Sample volume is best calculated by weighing the sample bottle full and empty to nearest 5 grams.

A solvent blank is necessary for each solvent lot, and will be free of interferences.

Prepare a 5 point calibration curve containing a zero concentration standard for each cell between 0 and 0.8 absorbance.

Matrix spikes and laboratory blanks will be prepared from tapwater, H_2SO_4, and #2 fuel oil.

Dilute samples or select shorter cell path if samples absorbance exceeds that of the highest standard or exceeds 0.8 absorbance.

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. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data 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.

Bench records and IR spectra of solvent blanks, samples, lab blanks, matrix spikes, standards, etc., will be provided along with copies of work-sheets used to calculate results.

The order of instrumental measurements and cell path lengths must be identified.

In case narrative and on bench records identify any problem samples as to emulsions, interferences, etc.

All records of analysis must be legible and sufficient to recalculate all sample concentrations and QA audit results.

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	Detection Limit	Precision Desired (+/- % or conc.)
Oil & Grease	0.4 mg/L	Any designated field duplicate values should not exceed +/- 25% or 0.4 mg/L

II. QC REQUIREMENTS

Audits Required	Frequency of Audits	Limits * (+/- % or conc)
Solvent Blank (90 mL of Freon)	At least 1 per group of 10 or fewer samples	< 0.4 mg/L
Lab Blank (1 liter of tapwater at pH <2)	At least 1 per group of 10 or fewer samples	< 0.4 mg/L
Matrix Spike (1 liter of tapwater at pH <2 plus 15 to 20 mg/L or #2 fuel oil)	1 per group of 20 or fewer samples	80-120% Recovery
Lab Control Sample (LCS)	At least 1 per group of 20 samples	80-120% recovery

*See Section III

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
Color SAS

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Luckett Acting Technical Project Manager (TPO): C. Luckett
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: July 1997
E. Site Name: Onalaska Municipal Landfill

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 monitoring wells, extraction wells, and residential wells for color. Sample results will be reported as color units (CU).

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):**

   Eighteen monitoring, extraction, and residential well samples will be collected during each sampling event. The aqueous samples will contain low color. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

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

   Superfund-Remedial

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

   Semiannually in April/May and September/October.

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):**

   EPA Method 110.2. This is a platinum-cobalt colorimetric method.

   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.):**

Samples should be stored at 4°C until the time of analysis. Any remaining samples should be stored in the same manner until the validation and the acceptance of the sample result.

Sample holding time is 48 hours from date of receipt.

Turbid samples should be clarified by centrifugation.

If the sample color exceeds 70 units, dilute the sample with distilled water to a point where the color is less than 70 units.

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. 10/92. The sample analysis data package shall include all documentation, data reporting forms and raw data 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.

In order to be able to reproduce the calculated color results, bench records that clearly and legibly show the estimated color and sample dilutions will be provided.

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	Detection Limit	Precision Desired (+/- % or conc.)
Color	1 color unit	Difference in duplicate results should not exceed +/- 10% for concentrations > 10 color units or 1 color units for color readings less than 10 color units

II. QC REQUIREMENTS

Audits Required	Frequency of Audits	Limits * (+/- % or conc)
Lab Blank	At least 1 per group of 10 or fewer samples	0 color units
Lab Duplicate	At least 1 per group of 10 or fewer samples	+/- 10% or 1 color unit
Laboratory Control Sample (LCS)	1 per group of 20 or fewer samples	90-110 % Recovery

*See Section III

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
Odor SAS

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Luckett Acting Technical Project Manager (TPO): C. Luckett
C. Telephone Number: (312) 886-1488 (312) 886-1488
D. Date of Request: July 1997
E. Site Name: Onalaska Municipal Landfill

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 monitoring wells, extraction wells, and residential wells for odor. Sample results will be reported as threshold odor numbers (TON).

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):**

   Eighteen monitoring, extraction, and residential well samples will be collected during each sampling event. The aqueous samples will contain little odor. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

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

   Superfund-Remedial

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

   Semiannually in April/May and September/October.

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):**

   EPA Method 140.1, odor. This is a consistent series method.

   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.):**

In order to prevent the picking up of extraneous odors, samples must be collected in glass bottles, filled to the top and tightly capped.

Samples should be stored at 4°C until the time of analysis. Any remaining samples should be stored in the same manner until the validation and the acceptance of the sample result.

Glassware must be cleaned shortly before use, with non-odorous soap, an acid cleaning solution, followed with rinsing with odor free water.

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.**

In order to be able to reproduce the calculated odor results, bench records that clearly and legibly show the odor responses, the number of people used to make the determination, and sample volumes used will be provided.

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	Detection Limit	Precision Desired (+/- % or conc.)
Odor	1 TONs	Difference in duplicate results should not exceed 2 TONs.

II. QC REQUIREMENTS

Audits Required	Frequency of Audits	Limits * (+/- % or conc)
Lab Blank	At least 1 per group of 10 or fewer samples	1 TONs
Lab Duplicate	At least 1 per group of 10 or fewer samples	+/- 2 TONs

*See Section III

III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:

5/016-6/96

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
Turbidity SAS

SPECIAL ANALYTICAL SERVICES
Client Request

[X] Regional Transmittal

A. EPA Region/Client: Region V
B. RSCC Representative: C. Luckett Acting Technical Project Manager (TPO): C. Luckett (312) 886-1488
C. Telephone Number: (312) 886-1488
D. Date of Request: July 1997
E. Site Name: Onalaska Municipal Landfill

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 monitoring wells, extraction wells, and residential wells for turbidity. Sample results will be reported in nephelometric turbidity units (NTUs).

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):**

   Eighteen monitoring, extraction, and residential well samples will be collected during each sampling event. The aqueous samples will contain medium amounts of turbidity. This number is inclusive of QA/QC samples (duplicates, blanks and MS/MSD).

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

   Superfund-Remedial

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

   Semiannually in April/May and September/October.

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):**

   EPA Method 180.1, Turbidity. This is a nephelometric procedure.

   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.):**

Samples should be stored at 4°C until the time of analysis. Any remaining samples should be stored in the same manner until the validation and the acceptance of the sample result.

Sample holding time is 14 days from sample receipt.

Glassware used for this procedure must be kept scrupulously clean and be free of scratches and etching.

Samples with turbidities exceeding 40 units should be diluted with turbidity free water to a concentration less than 40 turbidity units.

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.**

Bench records that clearly and legibly show sample volumes, dilutions, and the calibration curve data will be provided in order to be able to reproduce the calculated turbidity results.

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	Detection Limit	Precision Desired (+/- % or conc.)
Turbidity	1 NTUs	Difference in duplicate results should not exceed +/-10% for concentrations > 10 NTUs or 0.02 NTUs for concentrations less than 10 NTUs

II. QC REQUIREMENTS

Audits Required	Frequency of Audits	Limits * (+/- % or conc)
Calibration Verification Std.	At least 1 per group of 10 or fewer samples	90-110% Recovery
Lab Blank	At least 1 per group of 10 or fewer samples	< 1 NTU
Lab Duplicate	At least 1 per group of 10 or fewer samples	+/- 10% or 0.02 NTUs

Laboratory Control Sample (LCS)	1 per group of 20 or fewer samples	90-110% Recovery

*See Section III

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
FIELD TESTING PROCEDURES

Appendix B

Field Measurements and Monitoring

pH

Purpose

To provide a general guideline for field measurement of pH

Scope

Standard field pH determination techniques for use on groundwater samples.

Equipment/Materials

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

Procedures/Guidelines

Calibration

Calibrate unit prior to initial daily use and at least once every 4 hours or every 5 samples, whichever is less. Calibrate with at least 2 solutions. Clean probe according to manufacturers recommendations. Duplicate samples should be run once every 10 samples or every 4 hours.

1. Place electrode in pH 7 buffer solution.

2. Allow meter to stabilize and then turn calibration dial until a reading of 7.0 is obtained.

3. Rinse electrode with deionized water and place it in a pH 4 or pH 10 buffer solution.

4. Allow meter to stabilize again and then turn slope adjustment dial until a reading of 4.0 is obtained for the pH 4 buffer solution or 10.0 for the pH 10 buffer solution.

5. Rinse electrode with deionized water and place in pH 7 buffer. If meter reading is not 7.0, repeat sequence.

Procedure

1. Before going out into the field:
    - a) Check batteries.
    - b) Do a quick calibration at pH 7 and 4 to check electrode.
    - c) Obtain fresh solutions.

2. Calibrate meter using calibration procedure.

3. Pour the sample into a clean beaker.

4. Rinse electrode with deionized water between samples.

5. Immerse electrode in solution. Make sure the white KCl junction on the side of the electrode is in the solution. The level of electrode solution should be one inch above sample to be measured.

6. Recheck calibration with pH 7 buffer solution after every five samples.

General

1. When calibrating the meter, use pH buffers 4 and 7 for samples with pH < 8, and buffers 7 and 10 for samples with pH > 8. If meter will not read pH 4 or 10, something may be wrong with the electrode.

2. Measurement of pH is temperature dependent. Therefore, temperatures of buffers and samples should be within about 2°C. For refrigerated or cool samples, use refrigerated buffers to calibrate the pH meter.

3. Weak organic and inorganic salts and oil and grease interfere with pH measurements. If oil and grease are visible, note it on the data sheet. Clean electrode with soap and water and rinse with a 10 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 meter and inside case
    d) Store electrode in pH 4 buffer

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

Preventative Maintenance

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

Specific 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

Technical

Detection limit = 1 umho/cm @ 25 C; range = 0.1 to 100,000 umho/cm

Calibration

Calibrate prior to initial daily use and at least once every 4 hours or every 5 samples, whichever is less. Calibrate with standard solution. The standards should have different orders of conductance. Clean prove according to manufacturers recommendations. Duplicates should be run once every 10 samples or every 4 hours.

1. With mode switch in OFF position, check meter zero. If not zeroed, set with zero adjust.

2. Plug probe into jack on side of meter.

3. Turn mode switch to red line and turn red line knob until needle aligns with red line on dial. If They cannot be aligned, change the batteries.

4. Immerse probe in 0.01 N standard KCl solution. Do not allow the probe to touch the sample container.

5. Set the mode control to TEMPERATURE. Record the temperature on the bottom scale of the meter in°C.

6. Turn the mode switch to appropriate conductivity scale (i.e., x100, x10, or x1). Use a scale that will give a mid-range output on the meter.

7. Wait for the needle to stabilize. Multiply reading by scale setting and record the conductivity. The conductivity must then be corrected for temperature.

8. Calculate conductivity using the formula:

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

Where:

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

The table below lists the values of conductivity the calibration solution would have if the distilled water were totally nonconductive, however even water of very high purity will still possess a small amount of conductivity.

Table 1
Conductivity Meter Calibration Table

Temperature (°C)	**Conductivity (μmho/cm)**
15	1,141.5
16	1,167.5
17	1,193.6
18	1,219.9
19	1,246.4
20	1,273.0
21	1,299.7
22	1,326.6
23	1,353.6
24	1,380.8

I. Rinse the probe with deionized water

J. Run sample and rinse with deionized water when done

Attachments

Conductivity meter calibration sheet

Key Checks/Items

- Check battery
- Calibrate
- Clean probe with deionized water when done
- When reading results, note sensitivity settings

Preventative Maintenance

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

Field Filtering

Purpose

To provide a general guideline for the field filtering of water samples for dissolved metals analysis.

Scope

Standard method of field filtering techniques.

Equipment/Materials

Option 1: Disposable In-line Filter Method

- Peristaltic pump
- Peristaltic pump head tubing
- 10 percent nitric acid (HNO_3) solution.
- Distilled or deionized water
- 0.45 micron disposable filters

Option 2: Filter Stand Method

- Filter stand assembly
- 10 percent nitric acid (HNO_3) solution.
- Distilled or deionized water
- Disposable 0.45 cellulose acetate filters with compatible diameter for the filter stand assembly
- Vacuum source

Procedures/Guidelines

Reagent Preparation

1. *10 percent 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.

Procedure

Option 1: Disposable In-line Filter Method

1. Set up the peristaltic pump and connect to a power source (car battery or A.C. power). If the integrity of the pump head tubing is unknown or in question, replace with fresh tubing.

2. With the pump running, flush the pump tubing with 10 percent HNO_3 solution.

3. With the pump, rinse the pump tubing with analyte free distilled or deionized water. Run pump until all rinse water is removed from the line.

4. Connect the in-line filter to the outlet of the peristaltic pump. **Make sure the flow direction indicated on the filter is consistent with the flow direction indicated on the filter.**

5. Pump sample from collection vessel through the filter into a polyethylene bottle (with preservative) for shipment. If sufficient volume of the original sample exists, allow a small portion of the initial filtered sample to be discarded.

6. Remove and discard the used filter.

7. Repeat steps 1 through 3.

Option 2: Filter Stand Method

1. Attach a vacuum source (pump, syringe, etc.) to the funnel/receiver assembly.
2. Disassemble unit. Flush the entire filter system with 10 percent HNO_3 solution.
3. Rinse the entire filter system with analyte free distilled or deionized water.
4. Insert a 0.45 micron filter and reassemble unit.
5. Filter sample and transfer into a polyethylene bottle (with preservative) for shipment.
6. Disassemble unit and discard used filter.
7. Repeat steps 1 through 3.

Attachments

None.

Key Checks/Items

- 10 percent HNO_3 solution for cleaning
- All water for HNO_3 solution and rinsing must be distilled or deionized.

HNu Monitoring

Purpose

To provide general guidelines for the calibration and use of the HNu photoionization detector.

Scope

This is a broad guideline for the field use of an HNu. For specific instructions, refer to the operations manual.

Equipment/Materials

- Operations Manual
- An HNu readout/control unit and photoionization probe (either 10.2 or 11.7 eV depending on requirements) with fully charged battery pack.
- Charging unit
- A cylinder of calibration gas, typically 100 ppm isobutylene in air
- A regulator for the calibration gas cylinder
- A short length of 1/8th inch tube to transfer calibration gas from the cylinder to the HNu probe (as short as possible).

Procedures/Guidelines

ONLY PROPERLY TRAINED PERSONNEL SHOULD USE THIS INSTRUMENT. FOR SPECIFIC INSTRUCTIONS, SEE OPERATION MANUAL.

Calibrate the HNu

1. Identify the probe by lamp model
2. Connect the sensor/probe to the readout/control unit
3. Perform a battery check by turning the function switch to ''Batt.''

4. Turn function switch to ''Standby'' and set the readout to zero by turning the zero knob.

5. Hold the sensor/probe to your ear to verify that it is powered. A faint humming sound will be heard.

6. Set the range to the appropriate setting.

7. Connect the tube from the calibration gas cylinder to the end of the probe and open the valve on the calibration gas cylinder.

8. Sample the calibration gas and adjust to the proper reading with the span control knob.

9. If calibration cannot be achieved, disassemble the sensor/probe assembly and clean lamp. If the span knob setting is at the end of the span range, unit must be serviced by qualified personnel.

Sampling with the HNu

1. Once calibration is complete, unit is ready for sampling. When not in use, set function knob to ''Standby.''

2. When done for the day, turn unit off and disconnect the sensor/probe.

3. Charge the battery overnight (complete recharge takes 14 hours).

4. For preventative maintenance, refer to instruction manual.

Attachments

HNu calibration sheet

Key Checks/Items

- Check battery
- Zero and calibrate
- Verify sensor probe is working
- Recharge unit after use

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 HNu should be available on site whenever field operations require this instrument.
- A spare lamp should be on hand so a defective unit can be changed without returning the unit.
- Occasional cleaning of the lamp should be performed as needed.
- Charge batteries daily.
- Occasionally allow the batteries to totally discharge before recharging to prevent battery memory from occurring.

OVA Monitoring

Purpose

To provide general guidelines for the calibration and use of the OVA (Organic Vapor Analyzer) flame ionization detector.

Scope

This is a broad guideline for the use of an OVA. For specific instructions, refer to the operations manual.

Equipment/Materials

- Instruction manual
- OVA organic vapor analyzer
- Calibration span gas (100 ppm methane in air)
- Regulator for span gas cylinder
- For continued use, a source of 99.999 percent pure hydrogen for recharging internal tank is required

Procedures/Guidelines

ONLY PROPERLY TRAINED PERSONNEL SHOULD USED THIS INSTRUMENT. FOR SPECIFIC INSTRUCTIONS, SEE INSTRUCTION MANUAL.

Start Up

1. Attach meter/probe assembly

2. Turn pump switch on and check battery by moving the ''INSTR'' switch to ''BATT'' position

3. Turn ''INSTR'' switch on and wait 5 minutes

4. Zero instrument with ''Calibrate'' knob

5. Open hydrogen gas valve

6. Depress igniter button until burner flame ignites

7. Use ''Calibrate'' knob to zero out ambient background

8. Calibrate unit with methane span gas, adjusting the ''Gas Select'' (span control) pot

9. Unit is ready to use.

Shut Down

1. Close hydrogen valve
2. Move ''INSTR'' and pump switches to off.
3. Charge unit (it will take about 1 hour of charging for each hour of operation.)

Caution

1. Hydrogen is explosive. Use caution when filling tank.

Attachments

None

Key Checks/Items

- Open hydrogen gas valve
- Light flame
- Close hydrogen gas valve when done.
- Recharge battery

Preventative Maintenance

A complete preventative maintenance program is beyond the scope of this document. For specific instructions, refer to the operations manual.

- A spare OVA should be available whenever field use of this instrument is required.

- Use only 99.999 percent pure hydrogen

- A spare supply of valve seals should be on hand so hydrogen leaks can be repaired without returning the unit.

- Charge batteries daily.

- Occasionally allow the batteries to totally discharge before recharging to prevent battery ''memory'' from occurring.

VOC Sampling—Water

Purpose

General guidelines for sampling volatile organic compounds are provided.

Scope

Standard techniques for collecting representative samples are summarized. Site specific details are discussed in the FSAP.

Equipment/Materials

- Sample vials, clean latex or surgical gloves, pH meter
- Hydrochloric acid (HCl) for preservation
- pH meter or pH indicating paper
- surgical or latex gloves

Procedures/Guidelines

1. Sample VOCs before sampling other analyte groups.

2. When sampling for VOCs, especially residential wells, evaluate the area around the sampling point for possible sources of air contamination by VOCs. Products that may give off VOCs and possible contaminate a sample include perfumes and cosmetics, skin applied pharmaceuticals, automotive products (gasoline, starting fluid, windshield deicers, carburetor cleaners, etc.) and household paint products (paint strippers, thinners, turpentine, etc.).

3. To check the amount of hydrochloric acid (HCl) that needs to be added at each location, fill a test vial (40ml) with the water to be sampled, add one drop of hydrochloric acid (HCl), gently mix, and check the pH. Repeat this cycle (if necessary) until you reach a pH of 2, counting the number of drops of HCl was required. DISCARD THE TEST VIAL and add an equal number of drops of HCl to each of the sample vials. Proceed to sample.

4. Keep the caps off of the sample vials for as short a time as possible.

5. Wear clean latex or surgical gloves.

6. Fill the sample vial immediately, allowing the water stream to strike the inner wall of the vial to minimize formation of air bubbles. DO NOT RINSE THE SAMPLE VIALS BEFORE FILLING.

7. Fill the sample vial with a minimum of turbulence, until the water forms a positive meniscus at the brim.

8. Replace the cap by gently setting it on the water meniscus. Tighten firmly, but DO NOT OVER TIGHTEN.

9. Invert the vial and tap it lightly. If you see air bubbles in the sample, do not add more sample. Use another vial to collect another sample. Repeat if necessary until you obtain a proper sample.

Attachments

None.

Key Checks/Items

- Check for possible sources of contamination
- Check pH
- Fill slowly, with as little turbulence as possible
- Check for air bubbles

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July 24, 1997

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RR CORR

Mr. Kevin Adler
Work Assignment Manager (SR-6J)
U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Dear Mr. Adler:

Subject: QAPP/FSP/SAP Submittal for Long Term Response Action
Onalaska Municipal Landfill-Onalaska, WI
Contract No. 68-W6-0025, Work Assignment No. 003-RARA-05L5

Enclosed, please find the Quality Assurance Project Plan, the Field Sampling Plan, and the Sampling and Analysis Plan for the Onalaska Municipal Landfill site. If you have any questions or concerns, please feel free to call me.

Sincerely,

CH2M HILL

Jim Fisher
KDK

Jim Fisher, P.E.
Site Manager

MKE/1001734E.DOC
Enclosures
c: Lawrence Lester/WDNR
Stephen Nathan, PO/USEPA (w/o enclosure)
Peggy Hendrixson, CO/USEPA (w/o/ enclosure)
Alpheus Sloan III, PM/MKE
Ike Johnson, APM-OPNS/MKE
John Fleissner, QAM/MKE
Joe Sandrin/MKE
Cherie Wilson, AA/MKE
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