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

FIR 632 013 360 RR CORR

Sampling and Analysis Plan

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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Sampling and Analysis Plan

Introduction

This plan describes the sampling and analysis program as part of the Long Term Response Action (LTRA) for the Onalaska Municipal Landfill site located in Onalaska Township, Wisconsin (Figures 1 and 2). The sampling program is outlined in the U.S. Environmental Protection Agency's (EPA) Record of Decision (ROD). The field sampling program is designed to monitor the effectiveness of the groundwater collection and monitoring systems in meeting the requirements of the ROD and potential adverse impacts on nearby wetlands.

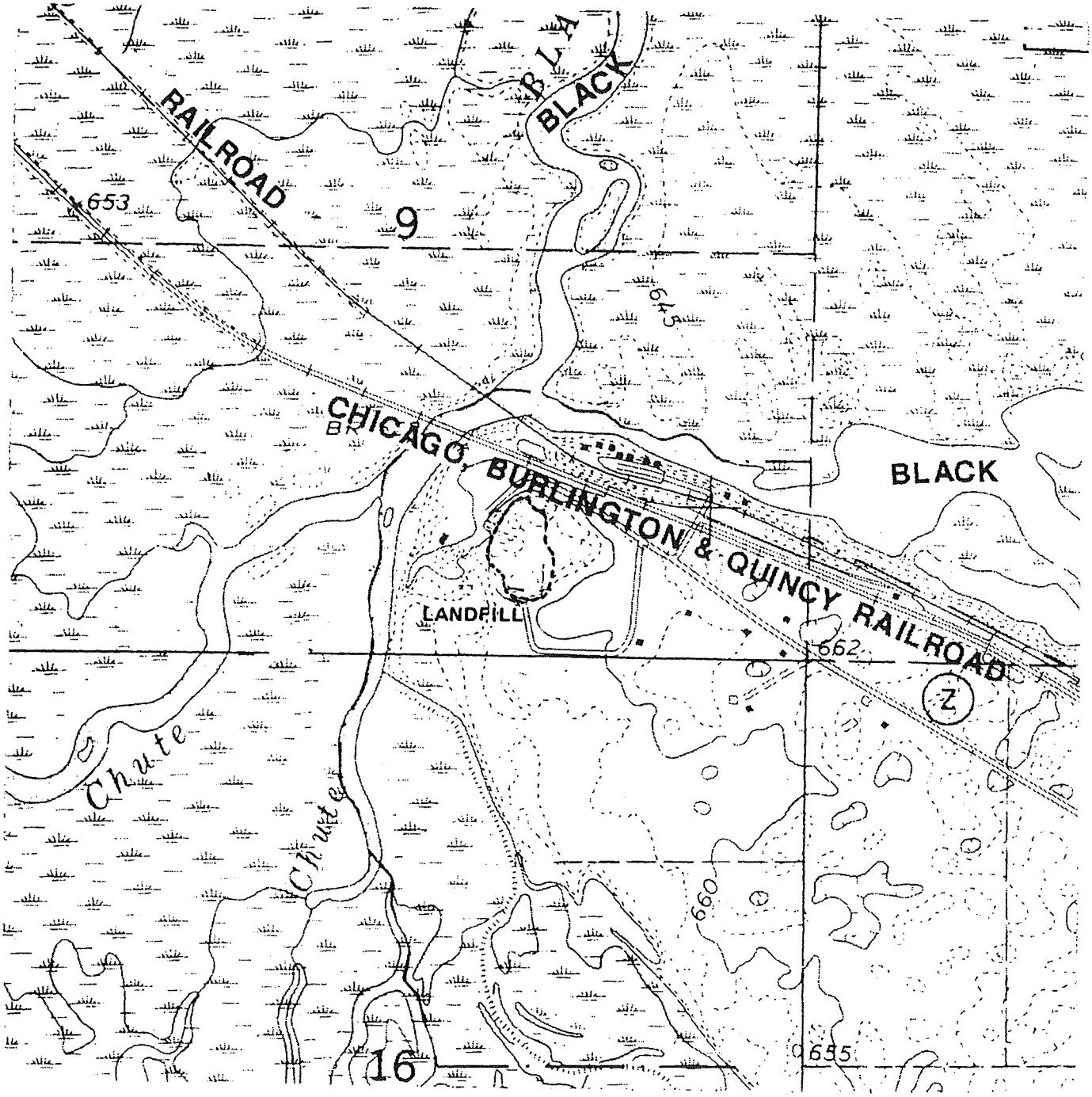
The ROD, signed August 14, 1990, defines the selected remedy and addresses the goals of the remedial action. The ROD goals and selected remedy are consistent with the RI/FS and Proposed Plan. The selected action for the remedy includes the following remedial actions for groundwater:

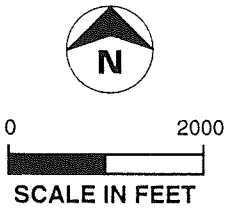
- Extraction and treatment of the groundwater contaminant plume to meet Federal Safe Drinking Water Act (SDWA) drinking water standards and State of Wisconsin groundwater quality standards
- Periodic monitoring of the groundwater contaminant plume
- Deed restrictions limiting surface and groundwater use at the Onalaska Municipal Landfill site
- Continued reliance on state institutional controls governing groundwater use within the proximity of landfills

The groundwater remedial action goals stated in the ROD are to achieve Federal drinking water standards under the SDWA (Maximum Contaminant Levels [MCLs] or nonzero Maximum Contaminant Level Goals [MCLGs]) and the more stringent State of Wisconsin groundwater quality standards under Ch. NR 140, Wisconsin Administrative Code (Preventive Action Limits [PALs]).

The MCLs and nonzero MCLGs must be met at the landfill waste boundary and the more stringent Wisconsin standards (PALs) must be met at any point beyond the property boundary or the design management zone (DMZ). The DMZ as defined in NR 140 is a 3-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 as shown in Figure 3. 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 the southwest corner of the property where the PALs apply to the DMZ.

The required elements of a Sampling and Analysis Plan are included in appropriate sections within the Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP) that

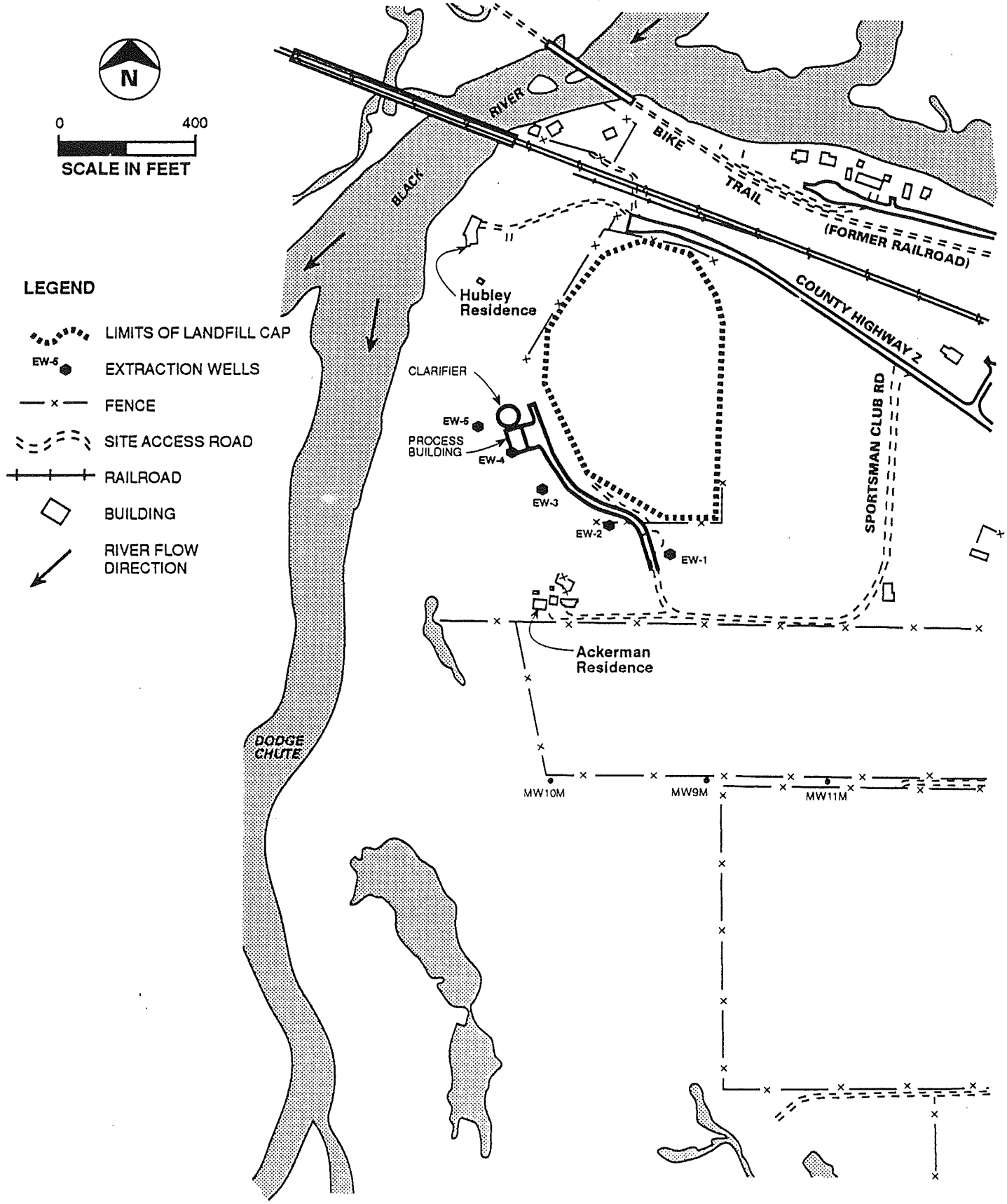




SOURCE: U.S. Geological Survey, Trempealeau, 15' Quadrangle.

FIGURE 1
SITE LOCATION MAP
ONALASKA LANDFILL
QAPP

E140811.DV05 Site Loc Map-QAPP 7-22-97ill



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

FIGURE 2
SITE MAP
ONALASKA LANDFILL
QAPP

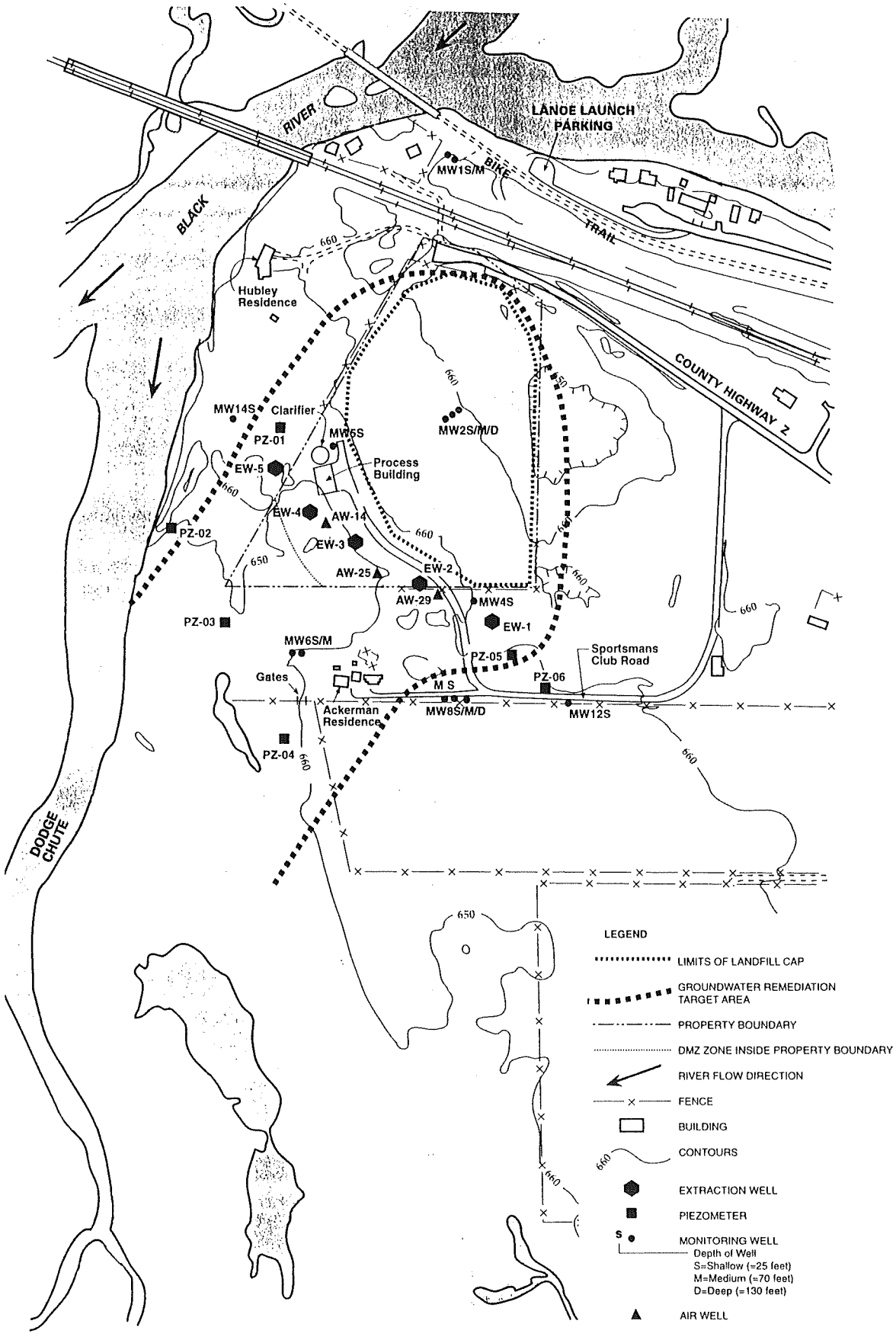


FIGURE 3
MONITORING WELL, EXTRACTION WELL, AND PIEZOMETER NETWORK
ONALASKA LANDFILL
QAPP

outline data acquisition objectives, data collection, and quality assurance requirements of sampling and analysis conducted by CH2M HILL during the LTRA.

Site Description and Project Background

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 (see Figure 2). In the mid-1960s the quarry operation ceased, and the Town of Onalaska began using the quarry as a municipal landfill. The Town of Onalaska owned and was licensed to operate the Onalaska Municipal Landfill from 1969 to 1980. Municipal trash and chemical wastes were disposed of in the landfill during the 11 years of operation. The Wisconsin Department of Natural Resources (DNR) ordered its closure in 1980. The landfill was capped between 1980 and 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 a residential well south of the site exceeded the drinking water standard, and five organic compounds were detected above background levels.

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.

Background

Industrial, commercial, and municipal wastes are considered to be mixed throughout the fill area. For a time, open burning occurred at the site. Until early 1971 when open burning was banned, industrial solvents 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. These naphthas were probably used in a paint cleaning process at one of the plants and as general solvents.

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.

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. 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.

Project Objectives

The objectives of the groundwater monitoring program are to:

- Provide data to evaluate the effects of hydraulic gradient control and collection of contaminated groundwater within the aquifer

- Provide data to evaluate reduction of groundwater contaminant concentrations in the aquifer onsite in relation to associated cleanup criteria
- Provide data to evaluate reduction of groundwater contaminant concentrations in the aquifer offsite between the landfill and the Black River
- Monitor water levels in the wetlands adjacent to the site to ensure water levels are not lowered so as to adversely affect the wetlands.

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

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 RA and during the RI. The groundwater monitoring network consists of six piezometers, twelve monitoring wells, five extraction wells, and three 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.

Piezometers

Six piezometers (PZ-1, PZ-2, PZ-3, PZ-4, PZ-5, PZ-6) 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 two piezometers (PZ-3 and PZ-4) 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-1 was installed to measure the inward gradient along the western boundary of the plume. Piezometers PZ-5 and PZ-6 are used to measure the inward gradient along the eastern boundary of the plume.

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)

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 can 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.

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 wells.

Compliance with Groundwater Standards

MW-4S and MW-5S represent the compliance point defined in the ROD (the landfill waste boundary) for MCLs and nonzero MCLGs. The compliance point for the PALs (any point beyond the property boundary or DMZ) are represented by monitoring wells MW-4S, MW-6S, MW-6M, MW-8S, MW-8M, MW-12S, and MW-14S and the extraction wells. The groundwater standards and compliance points are discussed in more detail later in this document.

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 (RI), surface water and sediments will be sampled annually to monitor for potential offsite contaminant migration during performance of the remedial action. Surface water and sediment grab samples will be collected from the wetland area and Dodge Chute by the Wisconsin DNR.

Parameters to be Tested and Frequency

Groundwater samples from the monitoring, extraction, and residential wells will be analyzed for the compounds listed in Table 1. Monitoring wells MW-2S, MW-2M, MW-2D, MW-4S, and MW-5S will be analyzed for VOCs and metals only.

- Table 1 consists of compounds identified in Table 3B of the ROD as the "Chemicals of Concern" and additional parameters that were added to the ROD list in order to better monitor the landfill or as a means to meet WDNR and the Town of Onalaska sampling and reporting requirements.

Groundwater samples will be analyzed for the listed compounds, VOCs and inorganic chemicals in accordance with the analytical procedures summarized in Table 1 and detailed

in the QAPP. Field temperature and pH will also be recorded for each well during sampling events. Field sampling procedures, methods of analyses, and QA/QC protocols for analyses will be conducted in accordance with the QAPP.

General procedures for measuring water levels, performing field tests, and collecting water quality samples are described in the Field Sampling Plan. Additional details related to specific sampling and decontamination procedures, sampling frequencies, and analytical requirements are discussed in the QAPP.

Project Schedule

The groundwater monitoring plan includes semi-annual sampling events from monitoring wells, extraction wells and residential wells; and collection of semi-annual 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 reevaluated annually.

- The results of the sampling and analysis program will be compiled annually. The analytical results will be averaged and the data evaluated to examine spatial and temporal trends. This analysis will also include groundwater elevation readings. The types of spatial and temporal trends conducted will be evaluated after each year of sampling.

The entire monitoring program also will be reevaluated annually. Specific adjustments to the program, such as recommended changes to the analyte list, monitoring well network, and sampling frequency will be made annually.

TABLE 1
Groundwater Monitoring Analyte List and Action Levels

Target Analytes	Method	Units	PAL[a,b]	MCL[b]	MCLG[b]	Detection Limit
ROD Compounds						
Benzene	SW846-8260/EPA 524.2	µg/L	0.5	5	0	1.0
Toluene	SW846-8260/EPA 524.2	µg/L	68.6	1,000	1,000	1.0
Xylenes	SW846-8260/EPA 524.2	µg/L	124	10,000	10,000	1.0
Ethylbenzene	SW846-8260/EPA 524.2	µg/L	140	700	700	1.0
Trichloroethene	SW846-8260/EPA 524.2	µg/L	0.5	5	0	1.0
1,1-Dichloroethane	SW846-8260/EPA 524.2	µg/L	85			1.0
1,1,1-Trichloroethane	SW846-8260/EPA 524.2	µg/L	40	200	200	1.0
1,1-Dichloroethene	SW846-8260/EPA 524.2	µg/L	0.7	7	7	1.0
Arsenic	ILM03.0 SOW	µg/L	5	50		5
Barium	ILM03.0 SOW	µg/L	400	2,000	2,000	200
Lead	ILM03.0 SOW	µg/L	1.5	15	0	1.5
Others						
Tetrachloroethylene	SW846-8260/EPA 524.2	µg/L	0.5	5	0	0.5
Total Dissolved Solids(TDS)	EPA 160.1	mg/L	[c]			20
Oil and Grease	EPA 413.2	mg/L				0.4
Iron	ILM03.0 SOW	mg/L	0.15			0.1
Manganese	ILM03.0 SOW	mg/L	0.025			0.01
Color	EPA 110.2	CU[f]	7.5			1
Turbidity	EPA 180.1	NTU[d]				1
Odor	EPA 140.1	TON[e]	1.5			1

[a]NR 140.
[b]October 1996
[c]To be established from 8 rounds of background data.
[d]Nephelometric turbidity units.
[e]Threshold odor number.
[f]Color Units
Note: Groundwater samples from the monitoring, extraction, and private wells will be analyzed for the compounds listed above except MW-2S, MW-2M, MW-2D, MW-4S, and MW-5S which will be analyzed for VOCs and metals only.