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FIVE-YEAR REVIEW REPORT

SCHMALZ DUMP, HARRISON, WISCONSIN

Prepared by:

The United States Environmental Protection Agency (EPA)
Region V, Superfund Division

I. INTRODUCTION

This report presents the results of a Five-Year Review for the Schmalz Dump site located in Harrison, Calumet County, Wisconsin. The purpose of this review is to evaluate whether the remedial action at Schmalz Dump remains protective of public health and the environment, is functioning as designed, and is being operated and maintained properly. This review was conducted pursuant to Section 121(c) of the Comprehensive Environmental Response Compensation and Liability Act, 42 U.S.C. § 9621 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and Section 300.430(f)(4)(ii) of the National Contingency Plan, which require periodic review (at least once every five years) for sites where hazardous substances, pollutants or contaminants will remain above levels that would allow unlimited use and unrestricted exposure after completion of the remedial action.

The remedial action that EPA selected for the Schmalz Dump site will result in hazardous substances remaining in soils above concentrations that would allow unlimited use and unrestricted exposure. Therefore, a Five-Year Review is required. Since remedial actions other than long term monitoring and maintenance are completed at Schmalz Dump, a Type 1 review has been conducted in accordance with OSWER Directive 9355.7-02, May 23, 1993. A Type 1 review includes a site visit, document review, and review of the risk assessment, but does not include recalculation of risks, a new risk assessment, sampling, extensive interviews or meeting with community groups. This report will be placed in the site files located at EPA's office at 77 W. Jackson Boulevard, Chicago, Illinois, and in the local repository for Schmalz Dump at the following locations:

Fox Valley Library
West Building, University of Wisconsin
1478 Midway Road
Menasha, WI 54952-8002
(902) 832-2672

Town of Harrison
W5971 Manitowoc Road
Appleton, WI 54915
(902) 989-1062

II. SITE HISTORY AND CHARACTERISTICS

The Schmalz Dump site is located 500 feet north of the north shore of Lake Winnebago in the Town of Harrison, Calumet County, Wisconsin. Harrison is located approximately ten miles south of Appleton. The seven acre site includes approximately one-half acre of wetland. Properties to the north and west of the site are historically wetlands that have been filled for development, possibly with waste materials. A railroad right-of-way forms the southern border of the site. A wetland bounds the site to the east. South of the railroad tracks, between the site and Lake Winnebago, is a moderately populated residential area called Waverly Beach (see attached Figures from the Remedial Investigation). Waverly Beach was created by dredging sand from the lakebed to fill the wetlands. In 1984, all residences in the Waverly Beach area were connected to the City of Menasha water system. A number of residents still have their wells, but use them only for watering yards and other outdoor purposes, although incidental drinking water ingestion could continue to occur.

Filling on the site began in 1968. The long-range objective of the filling was to develop the property for residential usage. Available information indicates that wastes disposed on the site at that time included car bodies, stone, trees, waste wood chips, pulp and mash from paper manufacture. In 1972 and 1973, fly ash and bottom ash from Menasha Utility was disposed. In 1978 and 1979, demolition debris from an Allis-Chalmers Corporations facility was disposed.

On-site soil sampling in 1979 identified polychlorinated biphenyl (PCB) contamination within the area of the Allis-Chalmers debris disposal area at concentrations as high as 3100 milligrams per kilogram (mg/kg). The site was placed on the National Priorities List on September 21, 1984. A Remedial Investigation/Feasibility Study (RI/FS) was initiated in April 1985. To address the public health threat from PCBs, a Record of Decision (ROD) for the PCB operable unit was issued in 1985, which required a fence to be constructed around the PCB contaminated debris, and removal and off-site disposal of the PCB contaminated sediments and debris in an approved landfill. Camp, Dresser and McKee, Inc. conducted the operable unit action under an EPA contract. The fence was constructed in 1985 and the removal and disposal of the PCB contaminated debris and sediments was started in 1987 and completed in 1988.[1] Follow-up sampling confirmed that the remaining sediments were below the action level of 1 mg/kg of PCBs.

The RI was completed in August 1987. With the PCB contamination being removed, the RI identified exposure to lead and chromium in soils and ground water under a residential development scenario as the remaining public health threats. A second ROD was issued in 1987 to address the risks due to lead and chromium. The 1987 ROD primarily required construction of a low permeability soil cap over the contaminated soil, and ground water monitoring. The 1987 ROD also proposed a voluntary well abandonment program for residents between the site and Lake Winnebago, and evaluation of adjacent property under the pre-remedial program. However, these proposals were not to address risks caused by the site.

The Wisconsin Department of Natural Resources (WDNR), Region V of the EPA, and the United States Army Corps of Engineers (COE) developed the design documents during 1988 through 1992. The approved design provided for a cap consisting of enough clean soil (one to

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[1] The solids were sent to an EPA approved landfill. The water/solids mixture in sediments was separated. The water component along with contaminated pond water was treated by metals precipitation and activated carbon for removal of PCBs, chromium and lead prior to discharge to the on-site pond.

ten feet thick) to provide the proper grade, which would underlie a two foot thick layer of compacted clay, which would underlie six inches of top soil to establish vegetative growth. The contract for construction for the 1987 ROD, included the following components:

- abandonment of 12 existing monitoring wells;
- installation of six new monitoring wells;
- placement and compaction of 38,000 cubic yards of low permeability clay soil;
- placement of 4,300 cubic yards of topsoil;
- establishment of turf and landscaping;
- installation of a perimeter security fence;
- maintenance of the site for one year starting from the date of completion of seeding;
- four quarters of ground water monitoring.

Chemical Waste Management (CWM) was selected as the construction contractor. CWM prepared a Contractor Quality Control Plan, and the Site Health and Safety Plan, which included separate Dust Control, Spill Control, and Precipitation/Groundwater Control Plans. These plans were reviewed and approved by the COE after necessary revisions were made.

CWM initiated the contract work by clearing and grubbing for the construction in October 1992. Actual placement of the cap was completed between May and September 1993, and final grading and seeding was completed in May 1994. In addition to the planned work, the COE approved the removal and disposal of an underground tank and its contents. An interim final inspection was conducted in October 1993, and a final inspection in September 1994. These inspections included attendance by CWM, COE, EPA and WDNR representatives. CWM conducted the quarterly ground water sampling in August 1993, November 1993, February 1994, and June 1994. CWM's period for maintenance of the cap ended in May 1995, when a final mowing and inspection was conducted. The final contract price was approximately $600,000.

After CWM's contract expired, WNDR became responsible for maintenance and monitoring of the site cover. WDNR initiated inspection and ground water sampling at the site in April 1998. Inspection and sampling was repeated in July 1998.

III. REMEDIAL ACTION REQUIREMENTS

SOIL COVER REQUIREMENTS

The selected remedy in the ROD required the following:

- Placement of a soil cover over the contaminated soil. The soil cover must be low in permeability. Conceptually, the ROD anticipated that 2 feet of compacted earth would be required with six inches of top soil over it for vegetation, a 2 percent slope, and measures to divert surface water.

- Periodic inspections for signs of erosion, settlement or subsistence.

- Maintenance of the cap by applications of fertilizer, periodic mowing, and weed control to prevent invasion of deeply rooted vegetation.

In addition, the soil cover was required to meet the following ARARs:

- Resource Conservation and Recovery Act (RCRA) Subtitle C regulations regarding landfill closure in 40 CFR 264.111, 264.117, and 264.310; and Wisconsin Administrative Code (WAC) 181.13(12): These regulations, which relate to hazardous waste handling, treatment and disposal, were not applicable but were considered to be relevant and appropriate. The RCRA requirements considered to be relevant and appropriate included construction of a site cover that would: minimize infiltration; function with minimum maintenance; promote drainage and minimize erosion; accommodate settling; and have a permeability less than the underlying soils. In addition, generally a 30-year monitoring and post closure maintenance period is required. NR 181 was not more stringent than the RCRA ARARs.

- WAC NR 180.13(3): Under State of Wisconsin regulations, the site closure must comply solid waste regulations for closure of unlicensed landfills.

- WAC NR 115: Under State of Wisconsin regulations, the action must comply with Wisconsin's Shoreland Management Program Administrative Rule by requiring approval by the County Planning Commission. It was expected that this approval would be gained by implementing proper erosion controls.

GROUND WATER REQUIREMENTS

The selected remedy in the ROD required implementation of a ground water monitoring program, and evaluation of whether a corrective action is necessary in case of any increase in ground water concentrations of chromium and lead.

In addition, the ground water monitoring program was required to meet the following ARARs:

- RCRA, Subtitle C (40 CFR 264.95 and 264.97): These regulations were not applicable but were considered to be relevant and appropriate. These regulations are being complied with by placing monitoring wells at the boundary of the waste management unit and upgradient of the unit, and by following sampling and analytical procedures that will produce representative data.

- Safe Drinking Water Act National Primary Drinking Water Maximum Contaminant Levels (MCLs), and WAC NR 140: The MCLs for both chromium and lead were 50 micrograms per liter (ug/l). Since the date of the ROD the MCL for chromium has been relaxed to 100 ug/l, while the federal cleanup requirement for lead has been made more stringent to 15 ug/l. WAC NR 140 provides for: 1) a Preventive Action Level (PAL), which serves as an early warning concentration to indicate that actions should be taken to investigate ground water conditions; and 2) an Enforcement Standard (ES), which is an action level requiring initiation and maintenance of a cleanup response to restore ground water quality to the PAL. If it is not economically or technically feasible to restore ground water to the PAL, then the cleanup action must restore ground water to the ES. The ESs for both chromium and lead were 50 ug/l, while the PALs were 5 ug/l. Since the date of the ROD, the ES and PAL for chromium has been changed to 100 ug/l and 10 ug/l, respectively. The ES and PAL for lead has been changed to 15 ug/l and 1.5 ug/l, respectively.

IV. SCREENING OF RISK ASSESSMENT USED IN 1991 ROD

THREAT FROM DIRECT CONTACT WITH SOIL IN CASE OF FUTURE RESIDENTIAL DEVELOPMENT

The Phase I Remedial Investigation Report[2] identified two public health concerns at the site: one was PCB contaminated demolition debris and underlying sediments; the second was random disposal of bottom ash, paper mill wastes, and various other municipal and industrial wastes. Phase I included collection of 147 soil samples from the site. Sampling for Phase I included 108 samples from 54 borings where samples were collected from 0-1 foot and 1-2 foot depth, 18 composite surface soil samples, and 21 soil samples collected at 5 foot intervals from the monitoring well borings. Samples were selectively analyzed for volatile organic compounds, semivolatile organic compounds, pesticide/PCBs, metals, and EP metals.

The Phase I Report determined that the parameters of concern were PCBs, carcinogenic polyaromatic hydrocarbons (CPAHs), chromium and lead. PCBs were detected in the debris, in surface water at as high as 6.4 ug/l, in sediments at as high as 280 mg/kg, and in soils at as high as 6.2 mg/kg. The operable unit action resulted in removal of PCB contaminated debris and PCB contaminated sediments. Although PCBs were removed down to a 1 mg/kg action level in sediments, it is unclear how much PCB contaminated soil was removed. Most likely contaminated soils near the debris area were removed, but that soil farther from the debris area may have been left in place. Out of the 55 on-site soil samples analyzed for PCBs (excluding samples of soil that were probably removed), there were three detections (6.2, 1.6 and 1.5 mg/kg) exceeding 1 mg/kg.

CPAHs were primarily detected in the on-site soils near the debris pile. The operable unit action probably removed the soil sample with the highest CPAHs concentration of 39 mg/kg

[2] This report was dated April 1987 and was prepared for EPA by Camp, Dresser, and McKee, Inc.

benzo(a)pyrene equivalents (BaP) [3], since this sample was near the debris pile and consisted mostly of debris.

The RI concluded that the risks remaining following the removal action were due to chromium and lead in the soil and ground water. Elevated chromium concentrations were detected in surface water from the drainage ditch, in sediments, soils, and in on-site ground water. Elevated lead concentrations were detected in on-site ground water, surface water, sediments and soil. To further investigate the extent of chromium and lead concentrations in soils, additional samples were collected during Phase II at a 2-3 foot depth from 10 selected boring locations and were analyzed for only total chromium, total lead, EP[4] chromium, and EP lead.

Following is a summary of on-site, off-site and background[5] soil sampling results for chromium, lead, PCBs and CPAHs that likely remained in the on-site soils after the removal action (from Tables 4-3, 4-4 and 4-5 of the Phase I Remedial Investigation Report excluding and soil samples from locations SL-39, SL-40, SL-44 and SL-49, which were probably removed during the removal action, and Section 6.3 of Phase II Remedial Investigation Report[6]):

PARAMETER/PHASE	RANGE	AVERAGE
on-site total chromium (Phase I)	ND - 964 mg/kg	52.8 mg/kg
on-site total chromium (Phase II)	14 - 516 mg/kg	214 mg/kg
on-site EP chromium (Phase II)	< 8 - 63 ug/l	21 ug/l
off-site total chromium (Phase I)	3.7-24 mg/kg	14 mg/kg
background chromium (Phase I)	2.5 mg/kg	2.5 mg/kg

[3]BaP is short for benzo(a)pyrene equivalents. The relative potencies of the CPAHs are in accordance with the RBCs: benzo(a)pyrene =1.0; dibenz(a,h)anthracene = 1.0; benz(a)anthracene = 0.1; benzo(b)fluoranthene = 0.1; indeno(1,2,3-cd)pyrene = 0.1; benzo(k)fluoranthene =0.01; chrysene = 0.001.

[4] EP means Extraction Procedure Toxicity Test.

[5] In this Table, on-site means within the area that was capped, while off-site means outside of the capped area. Off-site samples included sample locations SL-52, SL-53, and SL-59 from the Phase I investigation. Background is represented by the sample from SL-BK in the Phase I investigation.

[6] This report was dated August 1987 and was prepared for EPA by Camp, Dresser, and Mckee, Inc.

on-site total lead (Phase I)	2 - 1940 mg/kg	143 mg/kg
on-site total lead (Phase II)	10 -695 mg/kg	276 mg/kg
on-site EP lead (Phase II)	< 70 - 146 ug/l	80 ug/l
off-site total lead (Phase I)	2.6-140 mg/kg	24 mg/kg
background lead (Phase I)	11 mg/kg	11 mg/kg
on-site PCBs (Phase I)	ND-6.2 mg/kg	0.18 mg/kg
off-site PCBs (Phase I)	ND	ND
background PCBs (Phase I)	ND	ND
on-site CPAHs (Phase I in BaP)	ND - 10 mg/kg	0.56 mg/kg
off-site CPAHs (Phase I in BaP)	ND- 0.4 mg/kg	0.14 mg/kg
background CPAHs (Phase I)	ND	ND

The Phase II Remedial Investigation Report states that the highest chromium concentrations were associated with a white sludge. This white sludge also had a fairly high lead concentration (409 mg/kg).

The risk assessment in the ROD screened out PCBs as a concern because the PCB contaminated soils were going to be removed. It was determined that, after the removal, the on-site soils would be within the 10^{-6} to 10^{-4} risk range for lifetime exposure to PCBs. CPAHs was also screened out as a concern. The ROD estimated that lead concentrations greater than 14 mg/kg and trivalent chromium concentrations greater than 100 mg/kg pose an unacceptable health risk from direct contact. These estimates were based on assuming a residential exposure scenario with hypothetical exposure to a child at an ingestion rate of one gram of soil per day. Based on the estimated risks from chromium and lead exposures, it was determined that the potential for direct contact with on-site soils needed to be addressed.

As a screening tool to evaluate concentrations that would be acceptable using current risk assessment methods, the EPA Region III Risk-Based Concentration Table (RBC) by Roy L. Smith, Ph.D. can be used (see http://www.epa.gov/reg3hwmd/risk/guide4.htm). The RBC were calculated using the most up to date carcinogenic potency factors and reference doses and assumes a soil ingestion rate of 100 mg/day for adults and 200 mg/day for children. A frequency of 350 days per year is used, and for carcinogens an exposure duration of 30 years. The RBC for residential soil exposures to PCBs is 0.32, which corresponds to the estimated 10^{-6} risk level. 3.2

mg/kg of PCBs corresponds to the 10^{-5} risk level, and 32 mg/kg corresponds to the 10^{-4} risk level.

Following the operable unit action, on-site PCB detections of 1.7 and 6 mg/kg may have remained near the former debris area (although it is possible that they were removed). In addition, an isolated detection of 1.5 mg/kg on the northern portion of the site would have remained. If these detections represented an individual's average exposure concentration to residential soils over a lifetime, then this may cause an incremental lifetime cancer risk of about 10^{-5}. However, all of the other on-site detections were approximately at or below the 10^{-6} risk level.

The RBC for residential soil ingestion of CPAHs is 0.088 mg/kg BaP, which corresponds to the estimated 10^{-6} risk level. The 10^{-5} risk level is 0.88 mg/kg, and the 10^{-4} risk level is 8.8 mg/kg. One of the 34 on-site samples (that were analyzed for CPAHs and probably not removed) in Table 4-5 of the Phase I Remedial Investigation Report exceeded 10^{-4} risk level (10 mg/kg BaP). Two additional samples exceeded the 10^{-5} risk level, and eight additional samples exceeded the 10^{-6} risk level.

Using new risk assessment procedures, trivalent chromium is unimportant as a direct contact threat at the site. The RBC for residential soil ingestion of trivalent chromium is 78,000 mg/kg, which is approximately 2 orders of magnitude greater than the maximum chromium detection in the on-site soil.

For lead, EPA uses 400 mg/kg as a screening level for residential exposures to lead (see OSWER Directive 9355.4-12 dated July 14, 1994). In Phase I, 12 out of the 112 on-site soil samples collected exceeded 400 mg/kg. The highest lead detection of 1940 mg/kg may have been removed, in which case the highest detection would be 1300 mg/kg. During Phase II, 3 out of the 10 soil samples exceeded 400 mg/kg. The average on-site lead concentration is less than 400 mg/kg, but the average significantly exceeds the average of the off-site samples and site-specific background lead concentration. Exceedance of background is a concern because there is still potential for adverse health effects due to exposure to lead at soil concentrations below 400 mg/kg (see p. 8 of OSWER Directive 9355.4-12).

All RI sampling and analyses were conducted in accordance with an EPA approved Quality Assurance Project Plan.

This review of the risk assessment based on the RBCs and OSWER Directive 9355.4-12, results in the following conclusions:

- In contrast to the ROD, the direct contact threat at this site from trivalent chromium is insignificant;
- Consistent with the ROD, there is still reason to prevent direct contact with the site soils due to lead contamination;
- The relatively low direct contact cancer risks from PCBs and CPAHs provide additional justification for preventing direct contact with the site soils.

Since this screening of the risk assessment confirms that a site cover is justified to prevent direct contact with the contaminated soils, it is not necessary to conduct a more detailed quantification of risks due to soil contamination.

THREAT FROM RESIDENTIAL GROUND WATER USAGE

Six nearby residential wells and five ground water monitoring wells were sampled during Phase I. See locations in the attached Figure 4-5 from the Phase I Remedial Investigation Report. These samples were analyzed for volatile organic compounds, semivolatile organic compounds, pesticide/PCBs, metals, cyanide, ammonia, and water quality parameters. However, hexavalent chromium was not analyzed. During Phase I there were no significant detections of organic compounds in either the residential or monitoring well samples (this includes screening against the current RBCs). Among the inorganic compounds, only total lead in GW-2 and total chromium in GW-2 and GW-3 exceeded the ROD specified Safe Drinking Water Act Primary Maximum Contaminant Levels (MCLs) of 50 ug/l for each parameter. However, the monitoring wells were sampled using bailers, which most likely indicates that the total chromium analysis included a non-mobile portion associated with solids in the formation (refer to Evaluation of Sampling and Field-Filtration Methods for Trace Metals in Ground Water, EPA/600/R-95/119, October 1994). All metals including lead and chromium were far below the Primary MCLs in the residential wells.

During Phase II, seven additional monitoring wells were installed and sampled for a total of twelve monitoring wells (see the attached Figure 7-1 from the Phase II Remedial Investigation Report). The additional monitoring wells were apparently installed in order to get a better indication of background and the downgradient impacts from the site. The Phase II samples were analyzed only for hexavalent chromium, total and filtered chromium and total and filtered lead (see attached Table 8-2). No hexavalent chromium was detected. This demonstrated that the chromium in both the ground water and soil was trivalent. Total lead exceeded 50 ug/l in GW-2 and GW-3, as well as the updated MCL of 15 ug/l. However, filtered lead was not detected in any of the samples. Total chromium exceeded the ROD MCL of 50 ug/l in GW-1, GW-2, GW-3, GW-5, GW-9, GW-9a, and GW-11. The current MCL of 100 ug/l was exceeded in GW-2, GW-3, GW-9, GW-9A, and GW-11. Filtered chromium was below both the current and ROD MCLs in all samples, except GW-9 and GW-9a. Background concentrations are probably represented by GW-6, GW-7, and GW-8, where total chromium varied from 22-40 ug/l and filtered chromium ranged from 2.1 to 6.5 ug.l.

Although GW-9 and GW-9a were by far the most seriously contaminated wells, they were neither within the source area of the site nor likely to have been affected by ground water migration from the site (see Figure 7-7 from the Phase II Remedial Investigation Report). It is believed that the contamination at GW-9 and GW-9a is from a localized contamination source. In addition, some of the chromium in the northern monitoring wells GW-3 and GW-11 may be from off site. Figure 7-7 indicates that the usual ground water flow direction is to south and west from the site and eventually discharges into Lake Winnebago. The estimated normal flow velocity of the ground water is 8 feet per year. There is concern that a number of the residential wells are within the pathway of the ground water flow from the site and from GW-9 and GW-9a. However, these wells are unlikely to be affected by contamination in the shallow aquifer below the site for two reasons: 1. the residential wells are screened in a deeper geological formation than the shallow on-site monitoring wells and are probably protected from contamination detected at the site by geological confining layer; 2. the rate of movement of lead and trivalent chromium in the aquifer is very slow. In the unlikely event that these wells were impacted by the contamination, there would still be no health threat because they are not being used for drinking water (except perhaps incidentally).

The RI and ROD concluded that it is more appropriate to compare filtered metals to MCLs than total metals. It was believed that a portion of the total metals was likely to be associated with solids in the aquifer and not to be mobile. It has been confirmed by a number of studies that sampling using bailers typically produces high turbidity samples that include non-mobile solids in the sample. By removing solids from the sample by filtering, it was believed that the metals sample would better represent the mobile metal concentration in the aquifer. However, since the time of the ROD, a number of studies have demonstrated that filtration has the potential for removing some of the mobile portion of metals from the sample; thus making the samples unrepresentative (refer to Evaluation of Sampling and Filed-Filtration Methods for the analysis of Trace Metals in Ground Water). The most reliable method for obtaining representative results of the mobile fraction of the metals in ground water, is to use low-flow sampling to produce a low-turbidity samples and analyzing for total metals (refer to "Low Flow (Minimal Drawdown) Ground-Water Sampling Procedures by Robert W. Puls and Michael J. Barcelona, Ground Water Issue , EPA/540/S-95/504, April 1996).

All RI sampling was conducted in accordance with an EPA approved Quality Assurance Project Plan.

Although the MCL for chromium has been relaxed to 100 ug/l since the time of the ROD and the extent of ground water contamination is limited, it is still necessary to monitor the ground water to assure that there is not an increase in contaminant migration from the site.

THREAT TO WILDLIFE

During Phase I, a survey was conducted to identify the wildlife in the vicinity. In addition, seventeen sediment samples and sixteen surface water samples were collected to determine the extent of PCB contamination in the pond, to determine whether PCBs were migrating off-site, and to detect the presence of other contaminants of concern. The threat to wildlife was addressed by removal of PCB contaminated debris and removed PCB contaminated sediments to less than 1 mg/kg.

V. IMPLEMENTATION OF CONSTRUCTION, GROUND WATER MONITORING RESULTS, MAINTENANCE, INSPECTIONS, AND FUTURE DEVELOPMENT

CONSTRUCTION

Actions taken during construction are summarized in the Remedial Action Report, Schmalz Dump Superfund Site, dated March 1994. Six new monitoring wells were installed, two approximately 200 feet north of the northern fence (MW-1 and MW-6), three approximately 25 feet south of the southern fence (MW-2, MW-3 and MW-4), and one (MW-5) at the southwest corner of the fill area within the fence.

The contract specifications required construction of at least a two foot thick low permeability layer having a hydraulic conductivity of less than 10^{-6} cm/sec. Testing conducted by the contractor and the COE indicated that this specification was met. Six inches of top soil was placed in the Fall of 1993, and seed and fertilizer applied in the Spring of 1994. A security fence was installed in the Fall of 1993.

Construction was in accordance with the Contractor Quality Control Plan, which was supplemented by testing by CWM. Construction was overseen by the COE. The contractor quality control activities complied with the contract requirements. The COE's overall assessment of the contractor's construction quality management system was satisfactory. In addition, a professional engineer registered in the State of Wisconsin certified that the construction documentation was in accordance with the construction specifications.

GROUND WATER MONITORING RESULTS

In accordance with their contract, CWM conducted four quarterly ground water monitoring events following construction of the cap in 1993 and 1994. WDNR conducted a round of ground water monitoring in April 1998 and July 1998. The sampling and analyses by CWM were in accordance with the contract documents and EPA Test Methods for Evaluating Solid Waste, SW-846. WDNR's sampling and analyses are in accordance with a Quality Assurance Plan for the Superfund Pre-remedial Program.

Bailers were used for the sampling, and the ground water samples were analyzed for filtered metals, PCBs and water quality parameters. The results are presented in the attached Table 1, from a September 4, 1998 letter report by WDNR. The results indicate that filtered lead and chromium were well below the MCLs in all monitoring wells except for MW-5, where concentrations of filtered chromium varied from 160 to 340 ug/l. This is a change from the conditions assumed in the ROD, where it was concluded that ground water at the site did not exceed the MCLs. This data indicates that ground water containing chromium exceeding the MCLs may be migrating from the site, although there are other possible explanations. It is possible that the chromium contamination at GW-5 is migrating from what was described as a localized contamination source at former monitoring well GW-9.[7] It is also possible that the contamination at MW-5 is from a localized contaminant source separate from GW-9 and from the main part of the site. Regardless of the cause of the high chromium concentration at MW-5, it is less than the concentration of filtered chromium detected at off-site location GW-9 during the RI and does not imply a significant health threat for the reasons previously noted in Section IV.

The June 3, 1998 report confirms that some of the samples produced by the bailing method were high in turbidity.

ADDRESSING CONTAMINATION ON ADJACENT PROPERTIES

Adjacent properties were evaluated under the Superfund Pre-remedial program to determine whether they would qualify for an emergency action or for adding to the National Priorities List. It was determined that the conditions on adjacent properties did not warrant an emergency action by EPA, nor inclusion on the National Priorities List. Even though localized contaminant sources exist within the fill in this area, there is no significant threat to residential well users for the reasons previously noted in Section IV.

MAINTENANCE AND PERIODIC INSPECTIONS

Periodic maintenance is needed to maintain the effectiveness of the site cap, the fence and the monitoring wells. After the one year of maintenance by CWM under oversight by COE, maintenance became the responsibility of WNDR. In April 1998 and July 1998, WDNR conducted inspections. No need for repairs to the site cap, fence or monitoring wells were noted during these inspections, except for replacement of padlocks on the monitoring wells, which was performed by WDNR.

After review of the site by specialists within the Agency, WDNR has developed a program for inspection and maintenance of the site cover. This program is consistent with requirements and procedures for maintaining capped landfills within the State of Wisconsin. WDNR will inspect the condition of the site cover annually, preferably in the spring, and will repair any damage to the cover. As needed, WDNR will mow or take other measures to control deep rooting plants, such as trees, to maintain the cover integrity. However, WDNR has determined that a regular schedule of mowing and application of fertilizers and pesticides is unnecessary.

During the inspections, the WDNR site manager has discussed the site with nearby residents. Some of the residents do not seem to be concerned about contamination from the site. Some

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[7] This can be demonstrated by review of Figures 7-1, and 7-7 of the Phase II Remedial Investigation Report. MW-5 is in approximately the location of WL-2 from the RI. The relative water level readings indicate that both WL-2 and even GW-1 from the RI, could be downgradient from GW-9 rather than downgradient from the site.

seemed to be upset that the government was wasting money at the site, while others appeared to be happy with the improved appearance of the site since the remedial actions have been completed.

SITE INSPECTION BY EPA

The EPA remedial project manager and the WDNR site manager met at the site on August 12, 1998 and conducted a walk through inspection. The condition of the site appeared to be consistent with WDNR's inspection reports. EPA did not observe any evidence of erosion of the site cover nor damage to the fence, and the grass generally seemed to be healthy. There were a number of thistle weeds growing in the site cover that were up to six feet tall.

FUTURE DEVELOPMENT

Regulation of future development of the site is necessary to prevent development that may cause direct contact with the contaminated soils below the site cover. EPA has some control over future development of the site through access agreements and a Court Order. WDNR and EPA have been working together to address future development issues.

In April 1998, a prospective purchaser conducted preliminary conversations with WDNR and EPA about development of the site. The planned development would have included construction of a large warehouse facility over much of the site, regrading portions of the capped area, filling the pond and some wetlands, relocating the pond elsewhere on the site, and digging through and relocating a portion of the wastes on-site. The prospective purchaser said that portions of the cap along the building would be repaired to maintain the cap's effectiveness. It was understood that the prospective purchaser would take over maintenance of the site. EPA and WDNR were concerned that relocating the pond on another portion of the site and the construction of the building and utility trenches would entail excavating into the contaminated soil and waste and compromising the integrity of the cap. Excavating into the contaminated soil/waste would trigger health and safety requirements and a WDNR requirement that any excavated contaminated soil/waste would have to be dewatered (if necessary), tested, characterized and disposed of appropriately off-site. Any contaminated water would also have to be characterized, treated and disposed of properly. WDNR and EPA were also concerned about how regrading of the site would affect the present surface water drainage pattern, which promotes proper drainage away from the site. Finally, the Agencies could require recovery of some past costs incurred to cleanup the site and would probably have to process a ROD amendment. The owner of property including the northern portion of the site has also contacted the agencies regarding development of his property.

VI. COMPLIANCE WITH ARARS

The site cover as constructed satisfies the requirements of the ROD including the following ARARs:

- RCRA Subtitle C, 40 CFR 264.111 and 264.310;
- WAC 181.13(12);
- WAC NR 180.13(3); and
- WAC NR 115.

The ground water monitoring well system complies with RCRA, Subtitle C, 40 CFR 264.95, 264.97, and WAC NR 141.

RCRA, Subtitle C, 40 CFR 264.117 generally requires a 30-year monitoring and post closure maintenance period. The ROD provides for annual ground water monitoring for four years, followed by reassessment of the monitoring program. In addition, the ROD states that any increase in existing levels of chromium or lead will be evaluated to determine whether a corrective action is necessary. CERCLA requires a review of this remedy every five years.

The ROD considered the ground water at the site to be in compliance with the Safe Drinking Water Act, National Primary Drinking Water Standards, and WAC NR 140 because on-site filtered chromium and lead samples were less than the MCLs, even though total chromium and lead exceeded the MCLs in some samples from the site. Filtered chromium detections at MW-5, have consistently exceeded the MCL for chromium of 100 ug/l. However, it is uncertain whether these detections indicate that ground water containing chromium exceeding the MCL, is migrating from the Schmalz Dump site or that it is migrating from an off-site or a localized source.

Instead of using filtered metals samples, it would be preferable to compare the MCLs to total metals results from low-turbidity samples generated using a low -flow sampling technique, since these are more likely to be representative of the concentration of mobile metals in the aquifer.

VII. RECOMMENDATIONS

The site cap is effectively preventing direct contact exposures to the contaminated soils. WNDR has established a program to provide annual inspections of the site cover, and, as needed, to make cap repairs, conduct mowing and take other actions to maintain the integrity of the site cover. If development of the site is being considered, WDNR and EPA intend to work together to evaluate how and whether the development can proceed while still assuring the protection of public health and the environment. In addition, WDNR and EPA will work together to modify the ROD if necessary. The Agencies should show flexibility in response to requests to develop the site, but development options that minimize excavating into the contaminated soil should be preferred.

The current plan to monitor the ground water annually for the next three years and then to reevaluate the monitoring program should be implemented. WDNR is in the process of conducting four quarterly ground water monitoring events in order to provide a baseline for the water quality at the site. Even though ground water exceeding MCLs is migrating in the direction of any remaining residential wells, it is unnecessary to expand the monitoring network to characterize the extent of this migration for the following reasons:

- The downgradient residential wells are screened deeper than the monitoring wells and are believed to be protected from contamination in the shallow aquifer at the site by a geologic confining layer;
- the rate of ground water movement is slow and the movement of trivalent chromium is also very retarded within the aquifer;
- the residential wells are not normally used for drinking purposes;
- the chromium concentration in MW-5 does not appear to be increasing versus time.

For the long-term monitoring, and comparison to MCLs, WDNR is considering replacement of the filtered metals analysis of samples collected using bailers, with total metals analyses of samples collected using a low-flow sampling technique. Their decision will be based on comparative testing to be conducted during future sampling events.

VII. STATEMENT ON PROTECTIVENESS AND FUTURE REVIEWS

I certify that the remedial actions taken at this site are providing protection to human health and the environment.

The next five-year review will be conducted by September 2003.

William E. Muno
Director, Superfund Division
Region V, EPA

ATTACHMENTS:

- Figure 4-5 from the Phase I Remedial Investigation Report, dated June 1987, prepared by Camp, Dresser & McKee, Inc. under contract with EPA.
- Figure 7-1, Figure 7-7, and Table 8-2 from Phase II Remedial Investigation Report, dated August 1987, prepared by Camp, Dresser & McKee under contract with EPA.
- Table 1 from a letter report dated September 4, 1998 prepared by Jennifer Huffman, P.G., WDNR.

APPROXIMATE GROUNDWATER SAMPLING LOCATIONS
SCHMALZ DUMP SITE
HARRISON, WISCONSIN

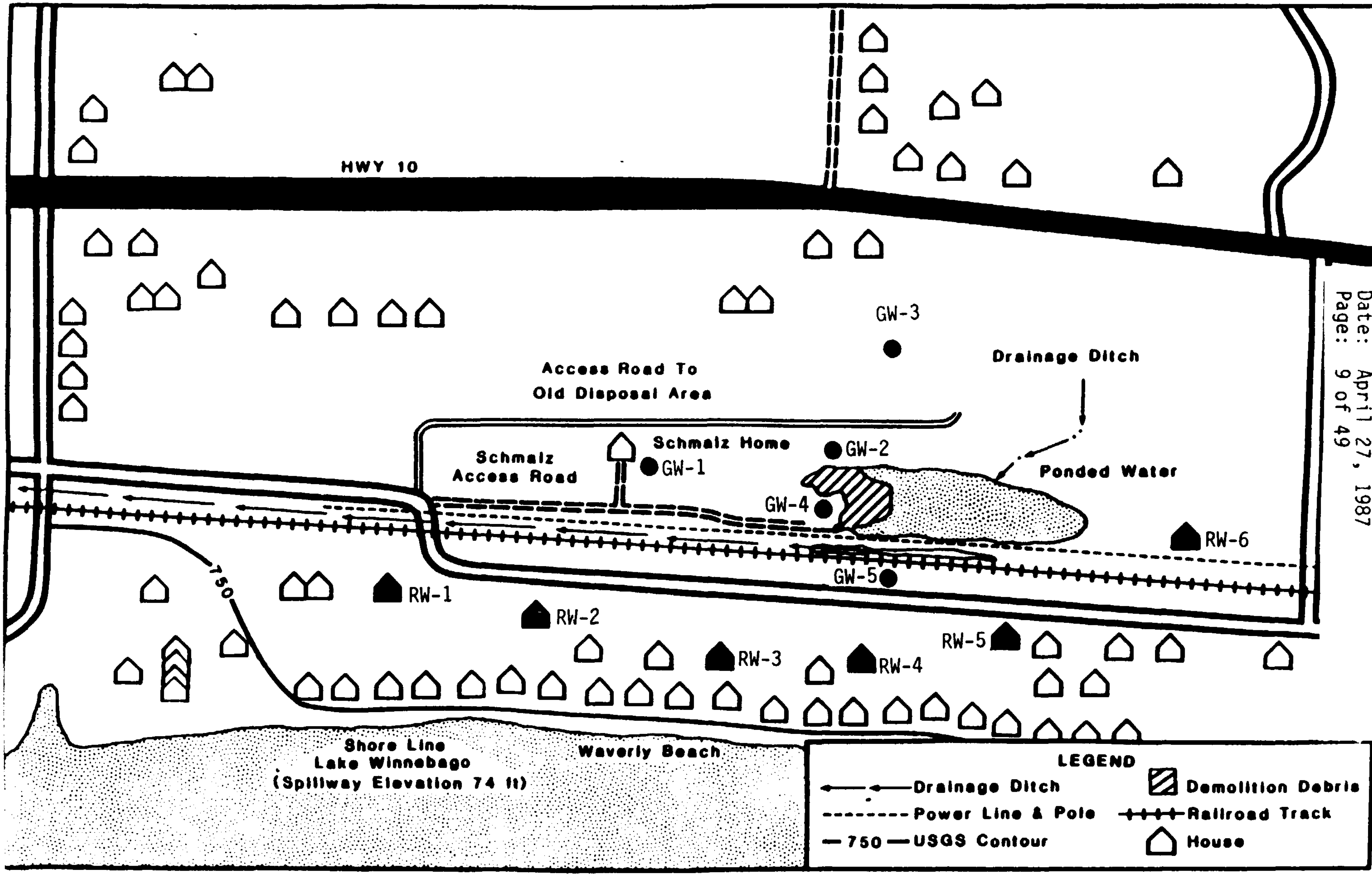

FIGURE 4-5

Figure 7-1 Well Locations and Surface Water Monitoring Stations

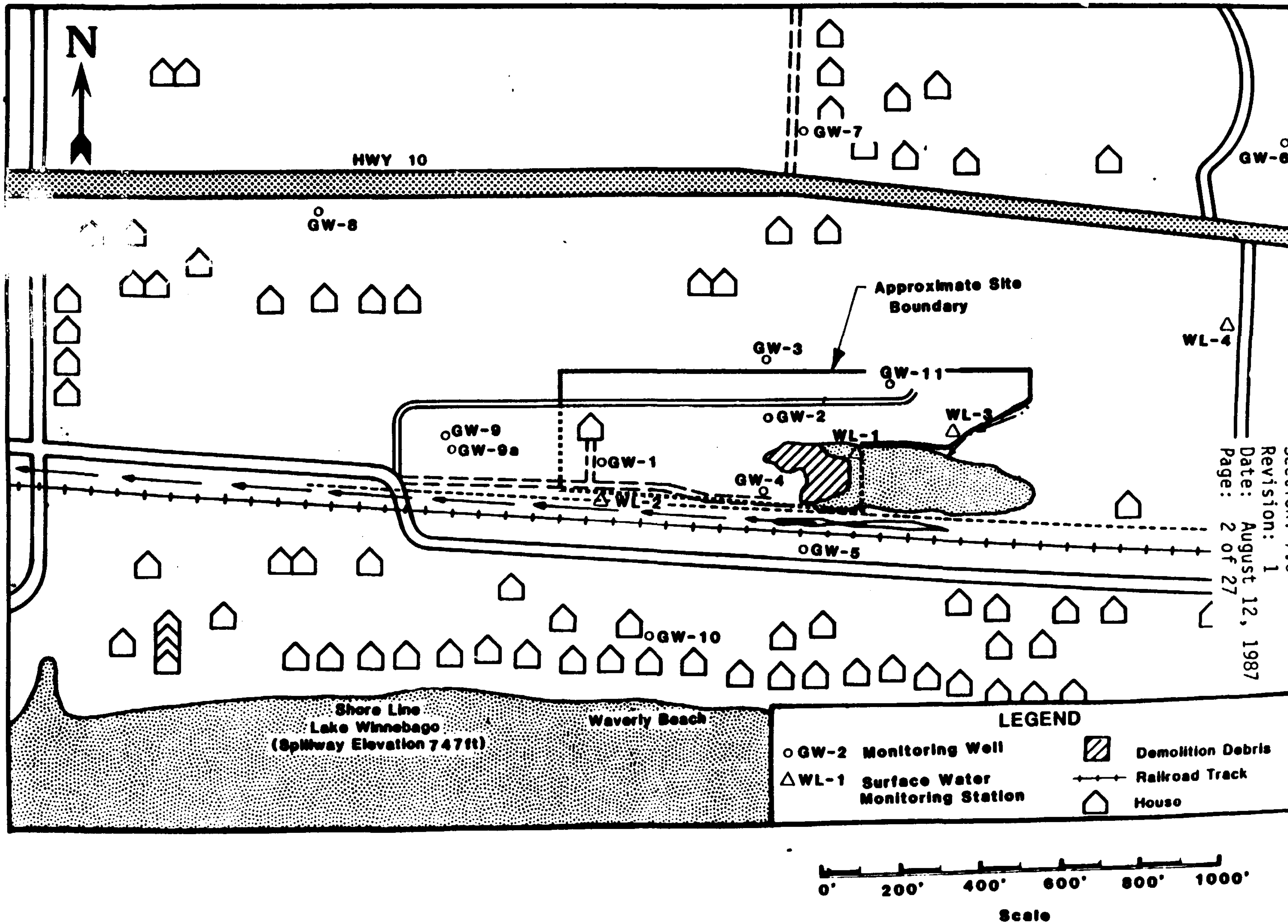

Figure 7-7 Dry Period Water Table June 8, 1987

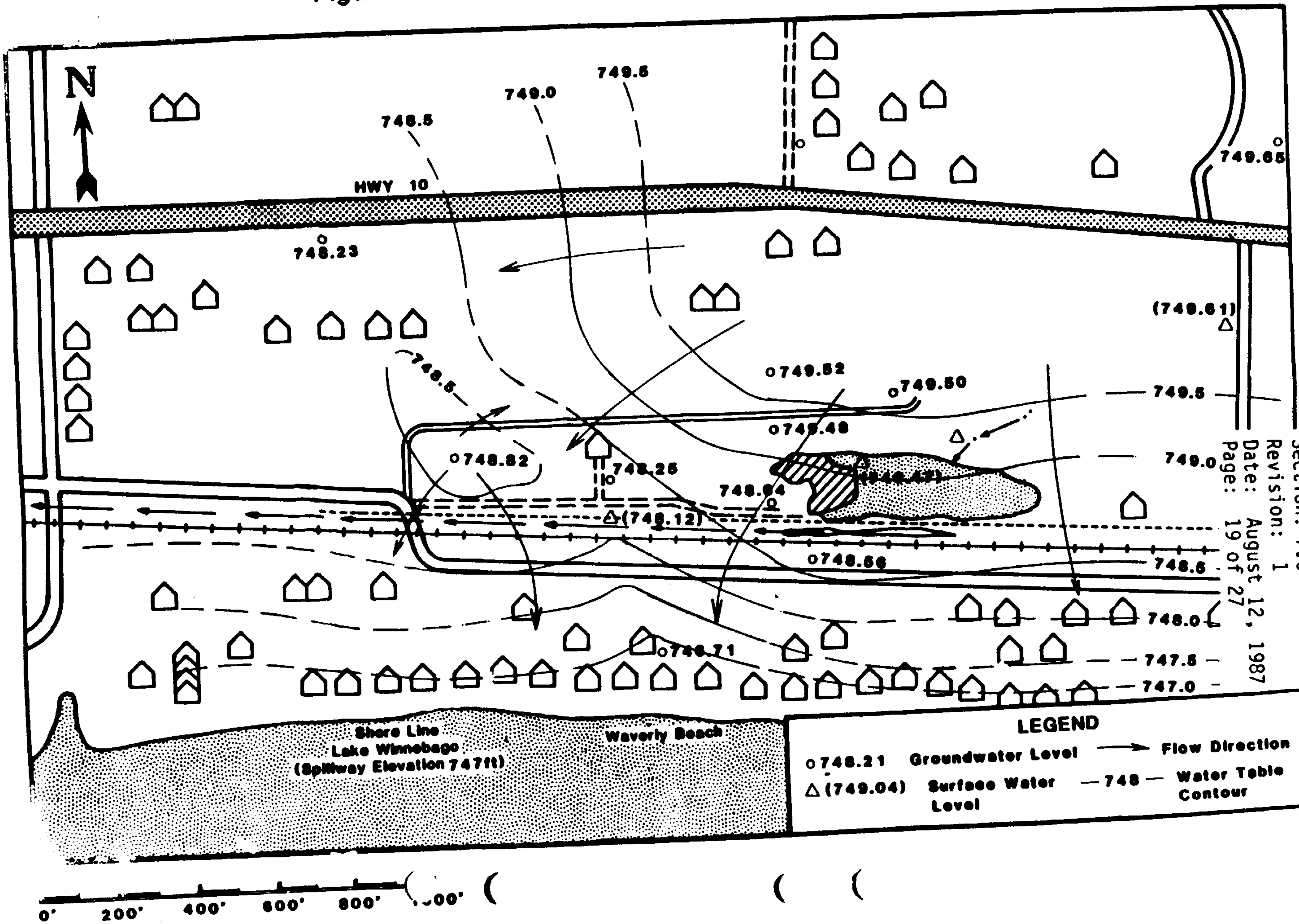

TABLE 8-2

PHASE II GROUNDWATER SAMPLE ANALYSES

Well Location	Total Pb ug/l		Dissolved Pb ug/l	Total Cr^{+3} ug/l		Dissolved Cr^{+3} ug/l	Ratio of Total to Dissolved Cr	Cr^{+6} ug/l	Total Suspended Solids mg/l
Detection Limit	2	(2)	2	0.5	(8)	0.5		10	5
GW-1	-	(-)	-	89	(47)	38	1.89	-	392
GW-2	149	(102)	-	390	(236)	48	8.13	-	603
GW-3	64	(-)	-	120	(73)	27	4.44	-	418
GW-4	-	(12)	-	45	(28)	14	3.21	-	102
GW-5	-	(-)	-	60	(21)	8.9	6.74	-	274
GW-6	-		-	22		6.5	3.38	-	77
GW-7	-		-	40		2.1	19.05	-	188
GW-8	-		-	25		2.4	10.42	-	274
GW-9[1]	-		-	1130		1140	0.99	-	429
GW-9a	-		-	286		185	1.55	-	210
GW-10	-		-	21		3.3	6.36	-	280
GW-11	-		-	102		29	3.52	-	382
DW-01	-		-	2.4		1.5	1.6	-	-

- = Below detection limit.

DW-01 is a sample of the water used during drilling.

(Numbers in parenthesis are contaminant levels measured in the Phase I RI).

1 Note: Relative percent difference between total and dissolved chromium in sample GW-9 = 0.88%, which is well within the precision limits of the analytical procedure.

7/29/18

Analytical Results for MW-1
Schmalz Dump Superfund Site

TABLE 1

PARAMETER	UNITS	8/93	11/93	2/94	6/94		4/21/98	7/21/98	NR 140 PAL	NR 140 ES
Metals, dissolved						Duplicate				
Arsenic	ug/l	< 3.0	< 100	< 100	< 100	< 100	< 0.6	0.8	5	50
Barium	ug/l	280	240	220	230	300	110	240	400	2000
Cadmium	ug/l	< 10	< 10	< 10	< 10	< 10	< 0.02	0.08	0.5	5
Chromium	ug/l	2	< 10	< 10	< 10	**10**	1.7	2	10	100
Lead	ug/l	< 50	< 50	< 50	< 50	< 50	< 0.4	< 0.8	1.5	15
Mercury	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	NA	NA	0.2	2
Selenium	ug/l	< 3	< 100	< 100	< 100	< 100	< 1	< 1	10	50
Silver	ug/l	< 10	< 10	< 10	< 10	< 10	0.28	< 0.2	10	50
Common Anions										
Fluoride	mg/l	< 3.2	< 3.2	< 3.2	< 3.2	< 3.2	NA	NA	NS	NS
Chloride	mg/l	13	12	12	10	10	NA	NA	125	250
Nitrite as N	mg/l	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	NA	NA	0.2	1
Bromide	mg/l	< 0.11	0.11	0.14	0.14	0.13	NA	NA	NS	NS
Nitrate as N	mg/l	< 0.028	< 0.025	< 0.025	0.043	0.043	NA	NA	2	10
Sulfate	mg/l	**210**	**170**	**180**	**170**	**170**	NA	NA	125	250
PCBs										
PCB 1016	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1221	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1232	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1242	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1248	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1254	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1260	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
Pesticides	ug/l	NA	NA	NA	ND	NA	NA	NA	*	*
Miscellaneous										
TOX	ug/l	29.6	50	390	113.2	22.3	NA	NA	NS	NS
TOC	mg/l	35.8	53.4	59	156	105	NA	NA	NS	NS
TSS	mg/l	27	23	10	110	130	NA	NA	NS	NS
Phenol	mg/l	< 0.020	< 0.020	< 0.020	0.0338	NA	NA	NA	1.2	6

NA = Not Analyzed
ND = Not Detected > PQL
PQL = Practical Quantitation Limit
NS = No Standard
Bold Type = NR 140 PAL Exceedance
Bold Italic Type = ES Exceedance
* = See NR 140 for Pesticide Standards

Analytical Results for MW-2
Schmalz Dump Superfund Site

TABLE 1 (continued)

PARAMETER	UNITS	8/93	11/93		2/94		6/94		4/21/98	7/21/98	NR 140	NR 140
Metals, dissolved				Duplicate		Duplicate		Duplicate			PAL	ES
Arsenic	ug/l	< 3.0	< 100	< 100	< 100	< 100	< 100	< 100	< 0.6	1.6	5	50
Barium	ug/l	240	280	280	240	270	300	280	270	310	400	2000
Cadmium	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 0.02	0.15	0.5	5
Chromium	ug/l	**19**	**13**	**10**	**10**	**14**	**14**	**15**	7.2	**10**	10	100
Lead	ug/l	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 0.4	< 0.8	1.5	15
Mercury	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	NA	NA	0.2	2
Selenium	ug/l	< 3	< 100	< 100	< 100	< 100	< 100	< 100	2	< 2	10	50
Silver	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	0.16	0.2	10	50
Common Anions												
Fluoride	mg/l	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	NA	NA	NS	NS
Chloride	mg/l	71	73	73	73	73	83	84	NA	NA	125	250
Nitrite as N	mg/l	<0.36	< 0.36	< 0.36	< 0.72	< 0.72	< 0.72	< 0.72	NA	NA	0.2	1
Bromide	mg/l	0.12	< 0.20	0.11	0.11	0.11	0.11	0.13	NA	NA	NS	NS
Nitrate as N	mg/l	< 0.028	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	NA	NA	2	10
Sulfate	mg/l	***920***	***1,100***	***1,100***	***1,200***	***1,200***	***1,200***	***1,200***	NA	NA	125	250
PCBs												
PCB 1016	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1221	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1232	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1242	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1248	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1254	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1260	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
Pesticides	ug/l	NA	NA	NA	NA	NA	ND	NA	NA	NA	*	*
Miscellaneous												
TOX	ug/l	49.4	37	27.4	450	1,400	25.8	30.5	NA	NA	NS	NS
TOC	mg/l	53	69	72.9	69	69	99.7	132	NA	NA	NS	NS
TSS	mg/l	4	46	49	57	100	66	70	NA	NA	NS	NS
Phenol	mg/l	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	0.0247	0.0306	NA	NA	1.2	6

NA = Not Analyzed
ND = Not Detected > PQL
PQL = Practical Quantitation Limit
NS = No Standard
Bold Type = NR 140 PAL Exceedance
Bold Italic Type = NR 140 ES Exceedance
* = See NR 140 for Pesticide Standards

Analytical Results for MW-3
Schmalz Dump Superfund Site

TABLE 1 (continued)

PARAMETER	UNITS	8/93		11/93	2/94	6/94	4/21/98	7/21/98	NR 140	NR 140
Metals, dissolved			Duplicate						PAL	ES
Arsenic	ug/l	< 3.0	< 3.0	< 100	< 100	< 100	< 0.6	< 0.8	5	50
Barium	ug/l	240	250	250	250	210	230	240	400	2000
Cadmium	ug/l	< 10	< 10	< 10	< 10	< 10	0.1	0.14	0.5	5
Chromium	ug/l	3.9	4.1	< 10	**13**	< 10	2.3	5	10	100
Lead	ug/l	< 50	< 50	< 50	< 50	< 50	< 0.4	< 0.8	1.5	15
Mercury	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	NA	NA	0.2	2
Selenium	ug/l	< 3	< 3	< 100	< 100	< 100	3	< 1	10	50
Silver	ug/l	< 10	< 10	< 10	< 10	< 10	< 0.4	< 0.2	10	50
Common Anions										
Fluoride	mg/l	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	NA	NA	NS	NS
Chloride	mg/l	22	22	23	22	21	NA	NA	125	250
Nitrite as N	mg/l	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	NA	NA	0.2	1
Bromide	mg/l	< 0.11	< 0.11	0.11	< 0.10	0.4	NA	NA	NS	NS
Nitrate as N	mg/l	0.3	0.27	0.075	0.056	0.044	NA	NA	2	10
Sulfate	mg/l	**230**	**220**	**230**	**220**	**240**	NA	NA	125	250
PCBs										
PCB 1016	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1221	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1232	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1242	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1248	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1254	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1260	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
Pesticides	ug/l	NA	NA	NA	NA	ND	NA	NA	*	*
Miscellaneous										
TOX	ug/l	15.9	18.3	58	350	23.7	NA	NA	NS	NS
TOC	mg/l	27.8	78	45.6	38	24.4	NA	NA	NS	NS
TSS	mg/l	30	32	140	170	68	NA	NA	NS	NS
Phenol	mg/l	< 0.020	< 0.020	< 0.020	< 0.020	0.0129	NA	NA	1.2	6

NA = Not Analyzed
ND = Not Detected > PQL
PQL = Practical Quantitation Limit
NS = No Standard
Bold Type = NR 140 PAL Exceedance
Bold Italic Type = NR 140 ES Exceedance
* = See NR 140 for Pesticide Standards

Analytical Results for MW-4
Schmalz Dump Superfund Site

TABLE 1 (continued)

PARAMETER	UNITS	8/93	11/93	2/94		6/94	4/21/98	7/21/98	NR 140 PAL	NR 140 ES
Metals, dissolved					Duplicate					
Arsenic	ug/l	< 3.0	< 100	< 100	< 100	< 100	0.7	< 0.8	5	50
Barium	ug/l	200	190	320	280	220	220	240	400	2000
Cadmium	ug/l	< 10	< 10	< 10	< 10	< 10	< 0.02	0.05	0.5	5
Chromium	ug/l	**18**	< 10	**19**	**23**	**15**	**29**	**31**	10	100
Lead	ug/l	< 50	< 50	< 50	< 50	< 50	< 0.4	< 0.8	1.5	15
Mercury	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	NA	NA	0.2	2
Selenium	ug/l	< 3	< 100	< 100	< 100	< 100	1	< 1	10	50
Silver	ug/l	< 10	< 10	< 10	< 10	< 10	0.1	< 0.2	10	50
Common Anions										
Fluoride	mg/l	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	NA	NA	NS	NS
Chloride	mg/l	48	49	45	39	47	NA	NA	125	250
Nitrite as N	mg/l	<0.36	< 0.36	< 0.36	< 0.36	< 0.36	NA	NA	0.2	1
Bromide	mg/l	0.2	0.23	0.18	0.13	0.48	NA	NA	NS	NS
Nitrate as N	mg/l	< 0.028	< 0.025	< 0.025	< 0.025	< 0.025	NA	NA	2	10
Sulfate	mg/l	***1,100***	***1000***	***780***	***680***	***1,100***	NA	NA	125	250
PCBs										
PCB 1016	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1221	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1232	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1242	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1248	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1254	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1260	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
Pesticides	ug/l	NA	NA	NA	NA	ND	NA	NA	*	*
Miscellaneous										
TOX	ug/l	36	37.5	720	550	36	NA	NA	NS	NS
TOC	mg/l	112.1	67.2	89	63	62.7	NA	NA	NS	NS
TSS	mg/l	72	280	780	1400	220	NA	NA	NS	NS
Phenol	mg/l	<0.020	< 0.020	< 0.020	< 0.020	0.0477	NA	NA	1.2	6

NA = Not Analyzed
ND = Not Detected > PQL
PQL - Practical Quantitation Limit
NS = No Standard
Bold Type = NR 140 PAL Exceedance
Bold Italic Type = NR 140 ES Exceedance
* = See NR 140 for Pesticide Standards

Analytical Results for MW-5
Schmalz Dump Superfund Site

TABLE 1 (continued)

PARAMETER	UNITS	8/93	11/93		2/94	6/94	4/21/98		7/21/98		NR 140	NR 140
Metals, dissolved				Duplicate				Duplicate		Duplicate	**PAL**	**ES**
Arsenic	ug/l	< 3.0	< 100	< 100	< 100	< 100	2	2.9	3.3	1.5	5	50
Barium	ug/l	350	370	370	310	320	**460**	**470**	**460**	**450**	400	2000
Cadmium	ug/l	< 10	< 10	< 10	< 10	< 10	0.02	0.04	0.2	0.08	0.5	5
Chromium	ug/l	***340***	***210***	***200***	***190***	***200***	***160***	***170***	***170***	***170***	10	100
Lead	ug/l	< 50	< 50	< 50	< 50	< 50	< 0.4	< 0.4	< 0.8	< 0.8	1.5	15
Mercury	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	NA	NA	NA	NA	0.2	2
Selenium	ug/l	< 3	< 100	< 100	< 100	< 100	6	2	3	< 1	10	50
Silver	ug/l	< 10	< 10	< 10	< 10	< 10	0.2	0.3	< 0.2	< 0.2		
Common Anions												
Fluoride	mg/l	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	NA	NA	NA	NA	NS	NS
Chloride	mg/l	60	65	65	59	56	NA	NA	NA	NA	125	250
Nitrite as N	mg/l	< 0.36	< 0.36	< 0.36	< 0.36	< 0.45	NA	NA	NA	NA	0.2	1
Bromide	mg/l	0.18	0.19	0.2	0.17	0.36	NA	NA	NA	NA	NS	NS
Nitrate as N	mg/l	< 0.028	< 0.025	< 0.025	< 0.025	< 0.025	NA	NA	NA	NA	2	10
Sulfate	mg/l	***430***	***400***	***400***	***350***	***360***	NA	NA	NA	NA	125	250
PCBs												
PCB 1016	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	0.003	0.03
PCB 1221	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	0.003	0.03
PCB 1232	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	0.003	0.03
PCB 1242	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	0.003	0.03
PCB 1248	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	0.003	0.03
PCB 1254	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	0.003	0.03
PCB 1260	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	0.003	0.03
Pesticides	ug/l	NA	NA	NA	NA	ND	NA	NA	NA	NA	*	*
Miscellaneous												
TOX	ug/l	109	206	73.2	99	42.8	NA	NA	NA	NA	NS	NS
TOC	mg/l	182	316	247	360	259	NA	NA	NA	NA	NS	NS
TSS	mg/l	34	140	24	7	23	NA	NA	NA	NA	NS	NS
Phenol	mg/l	< 0.020	< 0.020	< 0.020	< 0.020	0.0384	NA	NA	NA	NA	1.2	6

NA = Not Analyzed
ND = Not Detected > PQL
PQL = Practical Quantitation Limit
NS = No Standard
Bold Type = NR 140 PAL Exceedance
Bold Italic Type = NR 140 ES Exceedance
* = See NR 140 for Pesticide Standards

Analytical Results for MW-6
Schmalz Dump Superfund Site

TABLE 1 (continued)

PARAMETER	UNITS	8/93		11/93	2/94	6/94	4/21/98	7/21/98	NR 140 PAL	NR 140 ES
Metals, dissolved			Duplicate							
Arsenic	ug/l	< 3.0	< 3.0	< 100	< 100	< 100	< 0.6	< 0.8	5	50
Barium	ug/l	310	350	310	280	220	260	320	400	2000
Cadmium	ug/l	< 10	< 10	< 10	< 10	< 10	< 0.02	0.04	0.5	5
Chromium	ug/l	3	3	< 10	< 10	< 10	2.9	3	10	100
Lead	ug/l	< 50	< 50	< 50	< 50	< 50	< 0.4	< 0.8	1.5	15
Mercury	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	NA	NA	0.2	2
Selenium	ug/l	< 3	< 3	< 100	< 100	< 100	4	< 1	10	50
Silver	ug/l	< 10	< 10	< 10	< 10	< 10	0.23	< 0.2	10	50
Common Anions										
Fluoride	mg/l	< 5.2	< 5.2	< 5.2	< 5.2	< 3.2	NA	NA	NS	NS
Chloride	mg/l	49	49	48	48	45	NA	NA	125	250
Nitrite as N	mg/l	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	NA	NA	0.2	1
Bromide	mg/l	0.41	0.39	0.38	0.4	0.4	NA	NA	NS	NS
Nitrate as N	mg/l	0.031	< 0.025	< 0.025	< 0.025	< 0.025	NA	NA	2	10
Sulfate	mg/l	**240**	***280***	**240**	**220**	**240**	NA	NA	125	250
PCBs										
PCB 1016	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1221	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1232	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1242	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1248	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1254	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
PCB 1260	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	0.003	0.03
Pesticides	ug/l	NA	NA	NA	NA	ND	NA	NA	*	*
Miscellaneous										
TOX	ug/l	230	66	64.9	140	75.2	NA	NA	NS	NS
TOC	mg/l	61.6	45.9	72.1	82	47.8	NA	NA	NS	NS
TSS	mg/l	27	30	49	120	220	NA	NA	NS	NS
Phenol	mg/l	< 0.020	< 0.020	< 0.020	< 0.020	0.0738	NA	NA	1.2	6

NA = Not Analyzed
ND = Not Detected > PQL
PQL = Practical Quantitation Limit
NS = No Standard
Bold Type = NR 140 PAL Exceedance
Bold Italic Type = NR 140 ES Exceedance
* = See NR 140 for Pesticide Standards