FINAL QUALITY ASSURANCE PROJECT PLAN

FOR

HUNTS DISPOSAL LANDFILL
CALEDONIA, WISCONSIN

JULY 1988

Prepared for:

U.S. Environmental Protection Agency
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Region V
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PERFORMANCE OF REMEDIAL RESPONSE
ACTIVITIES AT UNCONTROLLED HAZARDOUS
WASTE SITES (REM V)

U.S. EPA CONTRACT NO.: 68-01-7403

DRAFT QUALITY ASSURANCE PROJECT PLAN

FOR

HUNTS DISPOSAL LANDFILL
CALEDONIA, WISCONSIN

DOCUMENT NO.: 002-CCJ-QA-1204

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CALEDONIA, WISCONSIN

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LIST OF ACRONYMS/ABBREVIATIONS

CCJM	C. C. Johnson & Malhotra, P.C.
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CES	Compliance Enforcement Section
C&NW	Chicago and Northwestern (Railway Line)
CLP	Contract Laboratory Program
CR	Community Relations
CRL	U.S. EPA Central Regional Laboratory
CRP	Community Relations Plan
ERRB	Emergency and Remedial Response Branch
FS	Feasibility Study
HNu	HNu Photoionization Monitoring Instrument, Model P101
HSM	REM V Health and Safety Manager
HSP	Health and Safety Plan
IFB	Invitation for Bid
ISER	Initial Site Evaluation Report
LEL	Lower Explosive Limit
MSL	Mean Sea Level (Ground elevation reference point)
NCP	National Contingency Plan
NDD	Negotiated Decision Document
NEIC	National Enforcement Investigations Center
NPL	National Priorities List
O&M	Operation and Maintenance
OVA	Organic Vapor Analyzer
PRP	Potential Responsible Party
QAC	Quality Assurance Coordinator
QAO	Quality Assurance Office
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RAS	Routine Analytical Service
REM	Remedial Engineering Management

LIST OF ACRONYMS/ABBREVIATIONS
(Continued)

REM V	REM Program and Contract (EPA No. 68-01-7403)
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RPM	Remedial Project Manager (EPA-Region V)
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SAS	Special Analytical Service
SHSC	Site Health and Safety Coordinator
SOP	Standard Operating Procedures
TM	Technical Memorandum
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
U.S. EPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WA	Work Assignment
WMI	Waste Management, Inc.
WRJ	Williams-Russell and Johnson, Inc.

DRAFT QUALITY ASSURANCE PROJECT PLAN
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HUNTS DISPOSAL LANDFILL, CALEDONIA, WISCONSIN

1.0 INTRODUCTION

The United States Environmental Protection Agency (U.S. EPA) requires participation of all U.S. EPA contractors in a centrally managed quality assurance (QA) program. This requirement applies to all environmental monitoring and measurement efforts mandated or supported by U.S. EPA.

Each contractor generating data has the responsibility to implement minimum procedures to assure that the precision, accuracy, completeness and representativeness of its data are known and documented. To insure the responsibility is met uniformly, each U.S. EPA contractor must prepare a written QA Project Plan (QAPP) covering each project the contractor is contracted to perform.

This QAPP presents the organization, objectives, functional activities and specific QA and quality control (QC) activities associated with the Field Sampling Investigation to be performed at the Hunts Disposal Landfill Site in Caledonia, Wisconsin. The QAPP is designed to achieve the specific data quality goals of the Remedial Investigation/Feasibility Study (RI/FS) at the Hunts Disposal Landfill site.

2.0 PROJECT DESCRIPTION

The field sampling investigation effort of the RI/FS is designed to gather specific information to characterize the nature and extent of contamination present at the site. The data gathered will be used to assess the hazard(s) posed by the site and to establish the data basis for developing methods to remediate the identified hazards.

2.1 SITE LOCATION

The Hunts Disposal Landfill (HDL) is an inactive 35 acre landfill which accepted municipal and industrial waste from 1951 to 1974. It is part of a 79 acre parcel located in a sparsely populated agricultural area of Caledonia Township, Racine County, Wisconsin (Figures 2-1, 2-2 and 2-3). The landfill (also known as Caledonia Landfill) is located south of the Racine-Milwaukee County Line Road, approximately 1.5 miles west of Highway 32 in the northeast quarter of Section 3, Township 4 North, Range 22 East, Town of Caledonia, Racine County, Wisconsin. The HDL is situated in the 50 year flood plain of the Root River which runs along the southwest side of the landfill. The local topography surrounding the mounded landfill is relatively flat with little change in grade. The base of the landfill is approximately 660 feet in elevation above mean sea level (MSL). The mounding of the landfill makes the overall structure 5 to 40 feet above the existing natural terrain.

The site may be reached via Interstate Route 94 by exiting onto Seven Mile Road, then going east for three miles to Nicholson Road. On Nicholson, go north one mile and turn east on Eight Mile Road. The landfill is on the south side of the road, 1/2 mile east and just past the C&NW Railroad tracks (Figures 2-1, 2-2 and 2-3). Access to the site has been provided by Racine County, the present owner of the landfill.

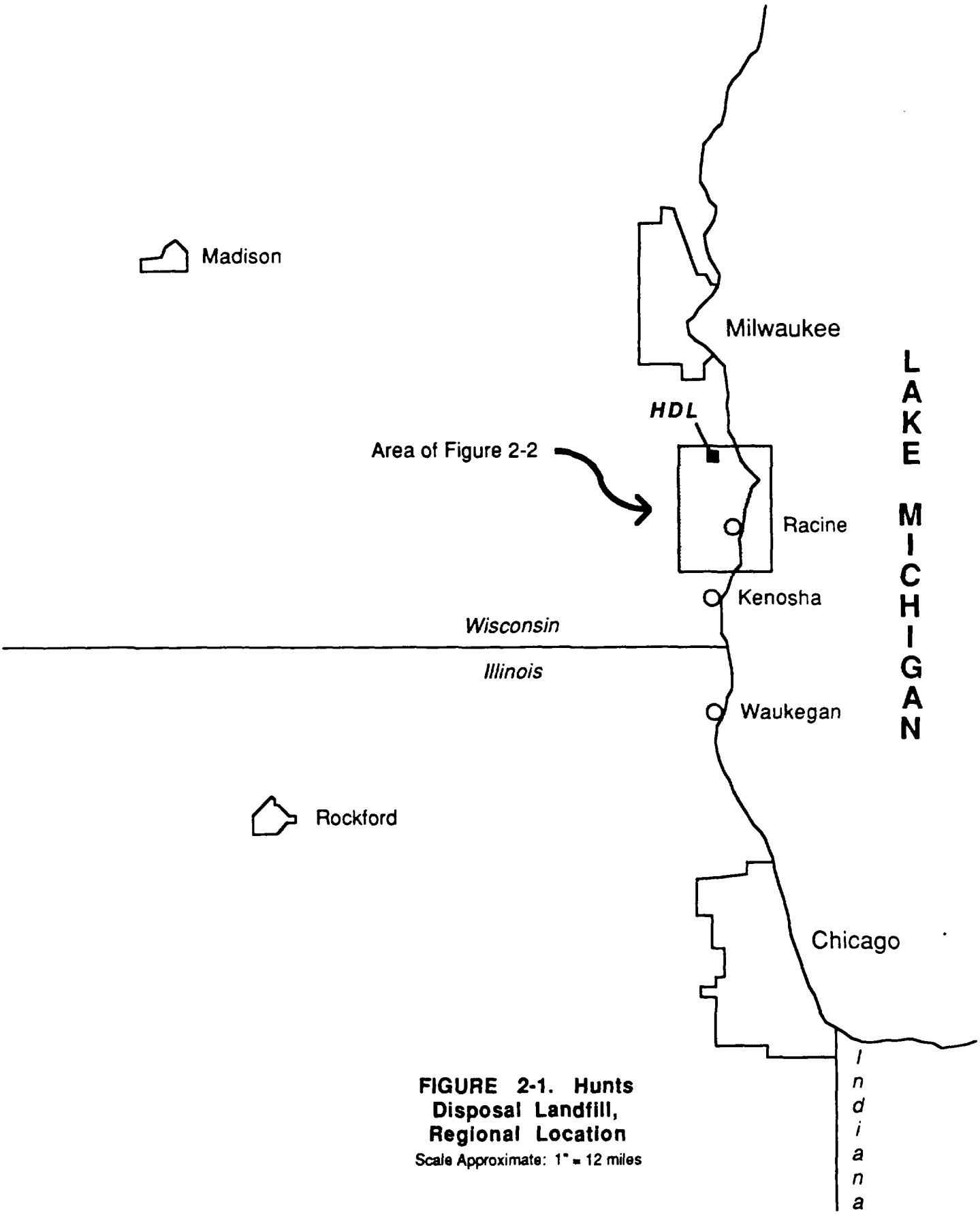

FIGURE 2-1. Hunts Disposal Landfill, Regional Location

Scale Approximate: 1" = 12 miles

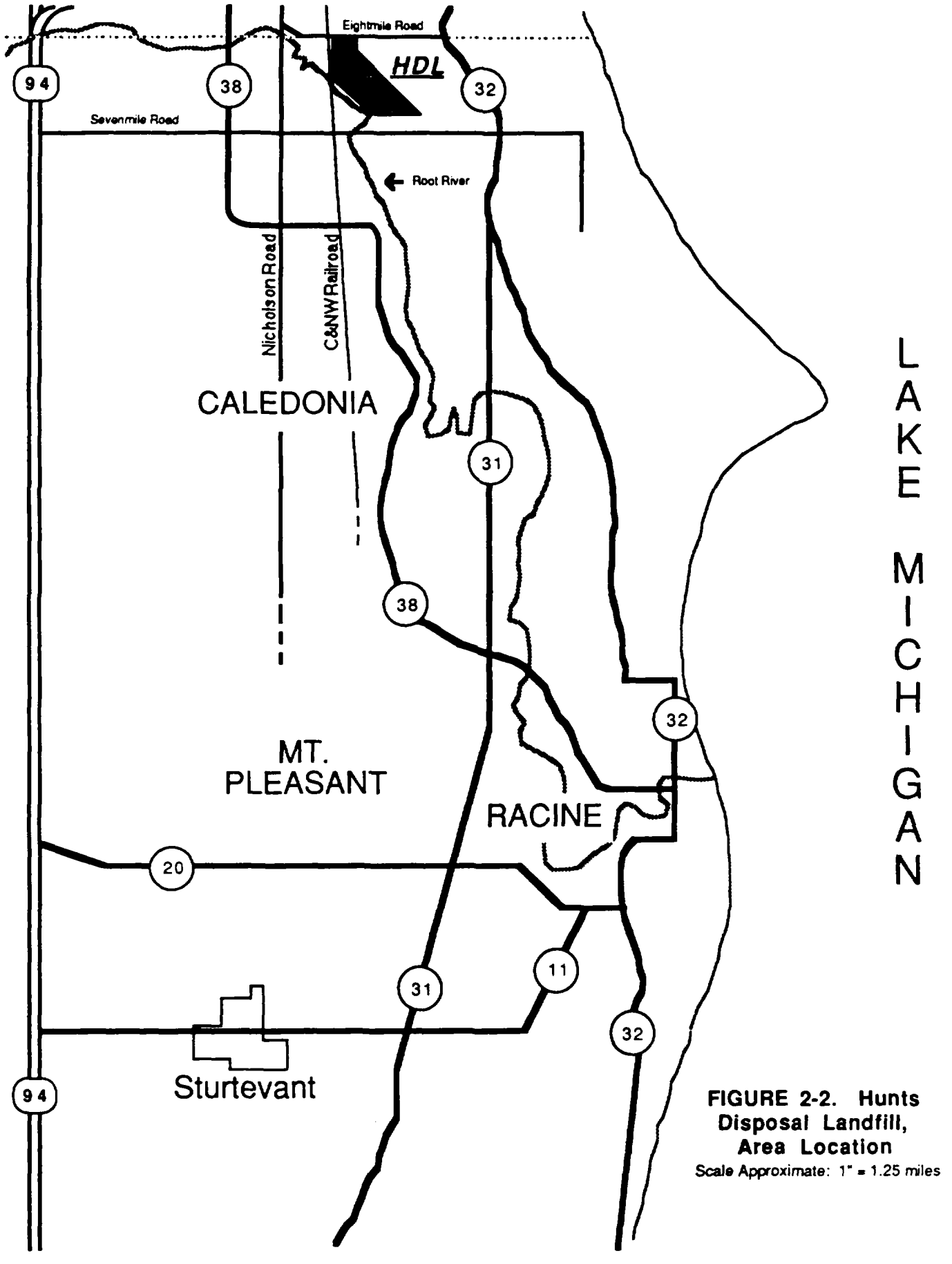

FIGURE 2-2. Hunts Disposal Landfill, Area Location

Scale Approximate: 1" = 1.25 miles

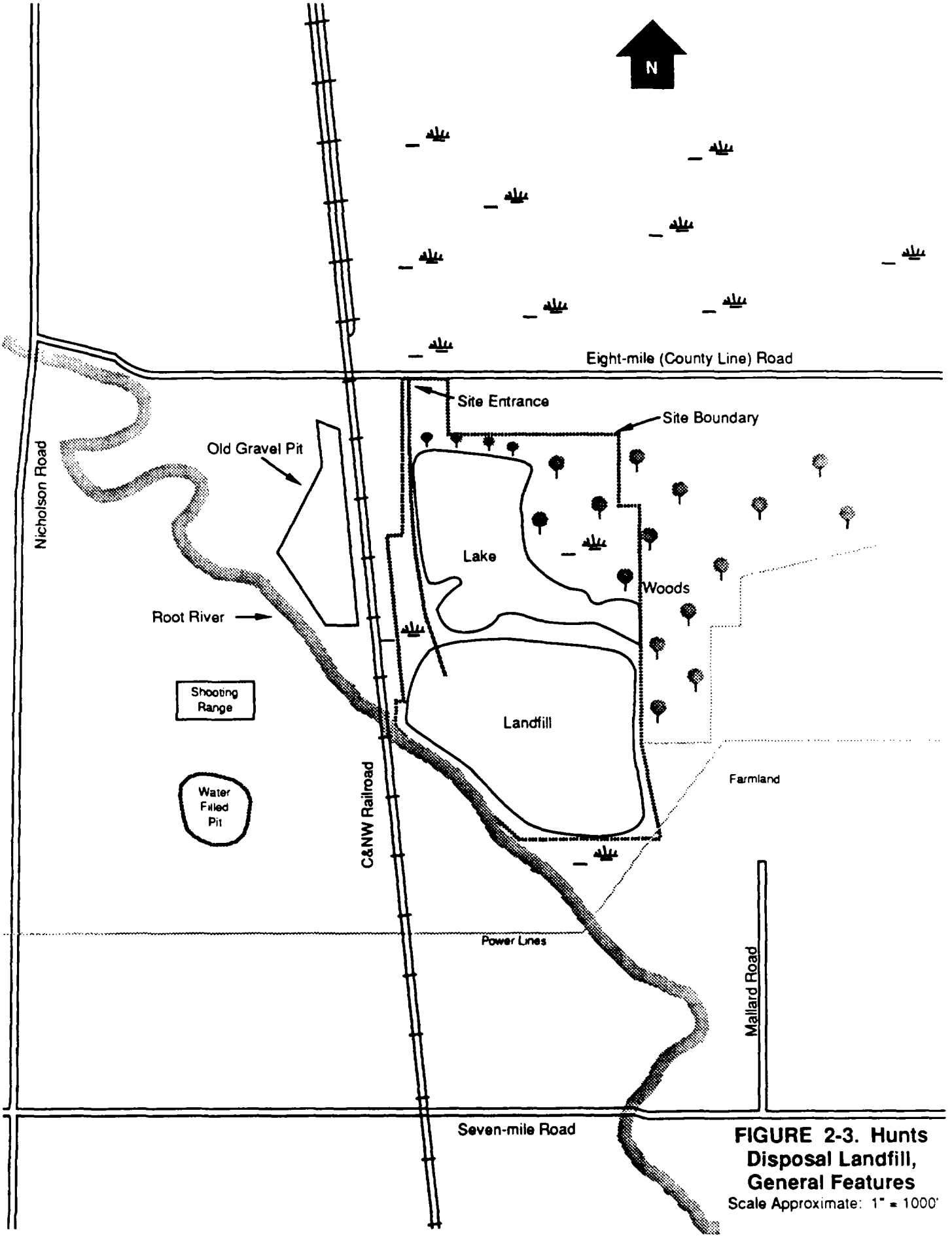

FIGURE 2-3. Hunts Disposal Landfill, General Features

Scale Approximate: 1" = 1000'

Physiography

The HDL site is located in the Eastern Ridges and Lowlands Physiographic Province. This province is characterized by bedrock-controlled alternating ridges and intervening valleys which typically produce a rolling to moderately hilly topography. However, in some localized areas (morainal or drumlin fields) the topography can be quite irregular (Paull, 1977).

The site is adjacent to the Root River and is located in the floodplain on the river's northeast bank.

Geology

Geologic structure in southeast Wisconsin is strongly influenced by the Wisconsin Arch, a Precambrian basement high located in the north-central portion of the state (Ryling, 1961). Paleozoic sedimentary rocks on the east flank of the arch dip eastward toward the Michigan basin (Ryling, 1961; Paull, 1977).

Regional geology in southeast Wisconsin is typified by deeply buried Precambrian basement rocks overlain by a wedge of Paleozoic sedimentary rocks. A mantle of glacial material covers the bedrock throughout the region. The Paleozoic rocks have been uplifted, tilted eastward, and differentially eroded to form a series of north-south trending cuestas and intervening valleys (Paull, 1977). The resistant Prairie du Chien Formation and Silurian dolomites stand out as ridges while the softer Upper Cambrian sandstones, Middle to Upper Ordovician, and Devonian units form the low-lying valleys. Pleistocene glaciation extensively modified the landscape, depositing glacial drift over widespread areas.

The geology in Racine County is with Silurian dolomites forming the near surface bedrock, and surficial deposits comprised of late Wisconsin glacial till and outwash (Lindbach et al., 1983; Wisconsin Geological Survey, 1970).

Well logs in the vicinity of the site (Sec. 3 T.4N. R.22E.) encountered "limestone" bedrock at an average depth of 83 feet (NUS, 1985). These logs along with the shallow soil borings (NUS, 1985) from the site show 55 to 151 feet of interbedded clays, fine to medium-grained sands, and some gravel overlying bedrock. Some wells encountered a layer of hardpan at depths varying from 66 to 108 feet.

Groundwater Patterns

Three principal water-bearing units and a major aquitard are found in southeastern Wisconsin. These include a lower sandstone aquifer, an intermediate dolomite aquifer, and a surficial glacial aquifer (USGS, 1956; USGS, 1970). A dolomitic shale aquitard impedes flow between the dolomite aquifer and the underlying sandstone aquifer (USGS, 1970).

The lower sandstone aquifer is an important regional source of groundwater. It includes Cambrian and Ordovician sandstones (the Mount Simon, Eau Claire, Dresbach, and Franciscan Formations) along with some Ordovician carbonates (the Prairie du Chien Group and Galena dolomites) (Wisconsin Geological Survey, 1956). The Mount Simon and Dresbach Formations are the most prolific. The Plattesville Limestone and Galena dolomites yield only small amounts of water (Wisconsin Geological Survey, 1956).

Recharge to the sandstone aquifer is accomplished by percolation through the overlying glacial and carbonate deposits. Groundwater is discharged to the Root and Fox Rivers and their tributaries. Some water is also discharged through the overlying rocks to Lake Michigan. Artificial discharge results from heavy pumpage (Wisconsin Geological Survey, 1956).

The Maquoketa shale is a major regional aquitard composed of dolomitic shale and thick dolomite units near the top of the formation. A comparison of a structural contour map and the site elevation suggests approximate depth to the top of the formation is 400 feet. Thickness varies between

180 and 250 feet. Except for the upper dolomite units, the Maquoketa yields relatively little water and forms a hydrologic barrier between the overlying Niagara and glacial aquifers and the sandstone aquifer below.

The intermediate dolomite or "Niagara Aquifer" is the main water-bearing unit overlying the Maquoketa shale (USGS, 1970). The aquifer includes the Silurian Niagara Dolomite, Devonian dolomites in portions of Milwaukee, Ozaukee and Sheboygan Counties, and dolomite units of the upper Maquoketa (USGS, 1956; USGS, 1970). Recharge of the dolomite aquifer occurs by direct precipitation on outcrops and by percolation through overlying glacial deposits. Discharge is to streams and Lake Michigan. Artificial discharge to wells is also important (Wisconsin Geological Survey, 1956).

The surficial glacial sand and gravel deposits form a water table aquifer that is locally hydraulically connected to the dolomite aquifer (Wisconsin Geological Survey, 1956). Permeability and percolation rates of the glacial deposits vary and the most permeable material occurs in western Racine County (Ryling, 1961).

Regionally, water moves laterally from west to east through the glacial material, with thin interbedded clay beds restricting vertical movement (Ryling, 1961). This glacial aquifer and the underlying dolomite aquifer provide the only source of groundwater in parts of the region where saline waters occur in the lower sandstone aquifer. However, in the area of the landfill, shallow groundwater is anticipated to be moving towards the Root River.

Surface Waters

Regionally, drainage systems are relatively youthful and poorly developed. For the most part, drainage is controlled by glacial deposition and erosion (Paull, 1977).

The site lies in the Root River watershed. The Root River is a shallow, meandering stream cut into terminal and ground morainal deposits (SWRPC, 1966). A fresh water wetland is located about 0.5 miles north of the site and local drainage apparently flows across the site before reaching the Root River (Wilharm, personal communication, 1987).

Soils

The Sebewa, Warsaw, Kane, Matherton, and Montgomery soil series are found in and around the site and typically occupy flats, depressions and high terraces along major drainages (SCS, 1970). All except the Montgomery series are underlain by sand and gravel glacial outwash.

The excavations and filling that have taken place at the site have destroyed the original soil distribution, but some areas of the site property have not been disturbed and the described soils are expected to be present at these locations. These soils are typically poorly drained, loamy soils with varying quantities of silt and clay.

Evidence of Contamination

The site is a worked-out sand and gravel pit that began operation as a dump in 1959 following the issuance of a permit to Harold Itzenhuiser by the Racine County Board of Adjustments. In 1959, the dump commenced operation under the ownership and supervision of Mr. H.P. Itzenhuiser. He operated the facility until 1962. During his tenure, Mr. Itzenhuiser primarily accepted household refuse, construction waste, and other debris. Paint-related materials and acids may also have been accepted. Investigations executed by both the Wisconsin Department of Natural Resources (WDNR) and the Public Engineer recommended that a sanitary landfill method of waste disposal be carried out at this site. These investigations further recommended that no decomposable material be placed in water areas and defined the types of materials to be transported to the site. By 1961 open burning of garbage and rubbish was observed at the site. The Town of Caledonia

made a request that this be discontinued and the site be closed. The Zoning Administrator indicated that the Board of Adjustment must have proof of violation of the contract agreement before any action could be taken.

A review of existing records indicates that from 1959 to 1962, about 50 to 70 drums a year each containing 40-50 gallons of waste newspaper ink were disposed at the site. The waste newspaper ink had a composition: hydrocarbon oil - 85 percent; carbon pigment - 10-12 percent; greases, hydrocarbon resins, wetting agents, and anti-wear compounds of 3 to 5 percent. Solvents consisting of kerosene, naphtha, and mineral spirits have also been dumped at the site. The solvent and newspaper ink wastes were generated by the Journal/Sentinel Company of Milwaukee.

The site was purchased from Mr. Itzenhuiser in 1962 by Mr. Clayton Hunt who operated the landfill until 1971. A letter in 1962 from Mr. Hunt, the new owner of the site, to the Zoning Administrator requesting permission to operate the dump, indicates that problems existed at the site and that Mr. Hunt was aware of the problems.

Mr. Hunt supposedly continued the non-acceptance of industrial wastes and liquids. But, logs maintained by Mr. Hunt, site operators, generators, and other landfill-associated personnel, indicate that three fifty-five gallon steel drums containing spent methyl ethyl ketone were dumped at the site. Miscellaneous industrial wastes such as tannery wastes and solids were also dumped at the site.

S.C. Johnson, in June 1981, filed a CERCLA 103 Notification in which they stated that between 1963 and 1972 they disposed organic and inorganic waste. These included solvents, pesticides, heavy metals, acids and bases. The source of these waste materials was the chemical industry. They also stated the drums were buried at the landfill.

In June of 1964, an agreement was made between Mr. Hunt and Pittsburgh Plate Glass Company for disposal of four arsenic acid tanks coated with sludge. The volume of sludge involved is estimated at 110 cubic feet. According to records, the tanks were washed, cut, and buried. Entries in Mr. Hunt's log indicated having accepted chromic acids with a composition of 50 percent acid and 50 percent water. Beryllium in barrels has also been indicated to have been disposed at the site. Further, from 1970 to 1974, about 300 to 500 drums a year of waste newspaper ink having the same composition as described earlier were dumped by the Journal/Sentinel, Inc. In this case, the ink and solvents were mixed together before being dumped.

In June of 1971, the Solid Waste Disposal Section of WDNR conducted a site inspection. Several violations were observed and recommendations were made. During 1971, the site was purchased by Messrs. Elmer J. Lauer and Joseph A. Magestro, Sr., and shortly thereafter, Caledonia Corporation assumed operation of the newly named Caledonia Corporation Landfill. By 1972, Caledonia Corporation drew a legal agreement with the Town of Caledonia detailing the conditions for operation of the southern portion of disposal site. In 1973 the Caledonia Town board adopted a resolution that Caledonia Corporation operate only the southern portion of the Hunt Disposal Site. Again, an inspection and report by WDNR directed the termination of leachate seepage, coverage of waste materials, and clean-up of windblown paper.

The site was closed in 1974, and in 1975 the deed was transferred from the Caledonia Corporation to the Boundary Corporation (Elmer Lauer and Joseph Magestro served as officers in both Caledonia and Boundary Corporations). In 1976, Racine County purchased approximately 79 acres, including the site, from Boundary Corporation and is the current owner of the site.

TABLE 2-1

ANALYTICAL RESULTS: GROUNDWATER SAMPLES FROM MONITORING WELLS[a]
INSTALLED AT THE HUNTS DISPOSAL LANDFILL SITE

Analysis Parameter[b]	3/30/84 Well[c] #1	3/30/84 Well[c] #2	3/30/84 Well[c] #3	4/9/84 Well[c] #1	4/9/84 Well[c] #2	4/9/84 Well[c] #3	4/20/84 Well[c] #1	4/20/84 Well[c] #2	4/20/84 Well[c] #3	4/23/84 Well[c] #1	4/23/84 Well[c] #2	4/23/84 Well[c] #3
Total Dissolved Solids	500	540	4,260	640	560	4,240	481	487	3,490	546	485	827
pH	7.91	7.90	6.92	7.78	7.58	6.93	7.65	7.54	6.70	7.59	7.57	6.63
COD	195	240	6,950	168	35	7,330	144	142	3,680	510	158	2,100
Dissolved Iron	0.02	<0.01	40.3	0.04	0.02	19.5	<0.01	0.01	1.15	0.14	0.01	0.95
Hardness (as $CaCO_3$)	409	413	1,030	426	435	1,069	360	361	921	364	328	980
Chloride	14	14	960	9	14	940	4	3	780	3	2	760
Alkalinity (as $CaCO_3$) to pH 4.8)	270	320	1,930	330	350	1,880	1,270	860	2,440	1,300	590	2,160

a) All samples taken by Giles Engineering Associates from wells that they installed. Wells #1 and #2 are completed in native strata; well #3 is in landfill wastes. Samples analyzed by Sommer-Frey Laboratories. Both Giles and Sommer-Frey were working for the City of Oak Creek.

b) All units in milligrams per liter except pH.

c) Well locations shown in Figure 2-2.

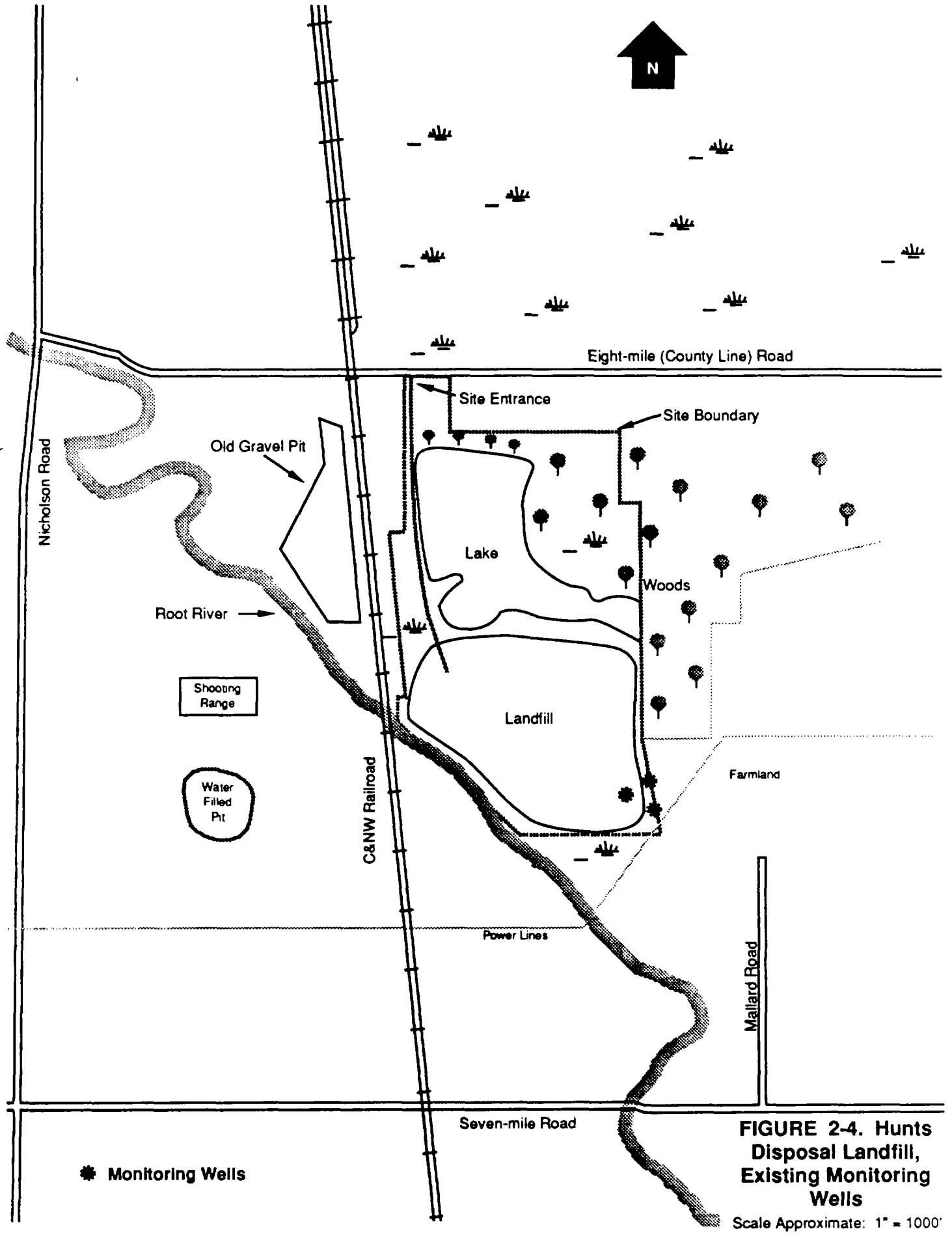

FIGURE 2-4. Hunts Disposal Landfill, Existing Monitoring Wells

Scale Approximate: 1" = 1000'

Two investigations were conducted prior to the initiation of this RI/FS. The first was performed in connection with activities by the City of Oak Creek. The second study was performed by the NUS Field Investigation Team (FIT) in 1985. The findings have been summarized below.

The first investigation at the site was performed under the direction of the City of Oak Creek. The Oak Creek city boundary is located immediately north of the HDL property on the opposite side of Eight Mile (County Line) Road. The investigation at the HDL site was prompted by Oak Creek's interest in constructing ditches designed to provide additional drainage for low-lying areas within the city's southern border. The Oak Creek investigation consisted of a number of soil borings, the installation of three groundwater monitoring wells, obtaining water samples from these wells, and the use of location probes to determine the limits of the abandoned landfill. Available data indicates that groundwater samples were analyzed for gross parameters only. The results for sampling which occurred between 3/30/84 and 4/23/84 are presented in Table 2-1. The relative locations of these wells are shown in Figure 2-2. A comparison of the results from wells #1 and #2 (which are completed in natural strata) are very different from (and less polluted) than well #3 which is completed in the landfill. The relationship of the location of the wells and their respective contamination levels suggest that contamination from the landfill has not moved (or is not moving) from the landfill toward the east. These results also suggest that the groundwater within the landfill is significantly more contaminated than that found in the wells adjacent to the site.

An investigation of soil, surface water and groundwater media associated with the site was performed by the NUS's FIT. Samples taken from different locations showed varying contaminants. One soil sample taken on the site contained low levels of the volatile organics 1,1-dichloroethane and 1,1,1-trichloroethane. A different soil sample from the landfill contained elevated levels of cadmium and tin. Two groundwater samples and a closely

associated surface water sample taken at the eastern edge of the landfill contained elevated levels of barium, calcium, chromium, cobalt, iron, lead, magnesium, manganese, nickel, potassium, sodium, and vanadium.

During the NUS sampling, the monitoring well located on the landfill (See Figure 2-4) was not sampled. However, as indicated previously, the Oak Creek sampling of that well and the two wells just off the landfill to the east showed "significant variation between wells 1 and 2 which are located along the proposed channel alignment and well 3 which is located within the landfill limits."

Air monitoring equipment showed background levels throughout the survey of the site. Objectionable odors were noticed only at the northeast corner of the landfill where the cover has been severely eroded. However, the HNu did not detect the presence of ambient organic gases in this area.

Solid waste, including wood, metal, glass, plastic, rubber, and other miscellaneous garbage was observed along the eroded eastern edge of the site. No discolored water or leachate was seen anywhere around the site. Appendix A includes data obtained from these previous investigations.

2.1.5 WASTE DISPOSED AT SITE

Information concerning the waste disposed at the HDL site has been obtained from:

- Documents which describe the wastes permitted at the site.
- Interviews with knowledgeable persons (e.g., employees, site operators, etc.).
- Information obtained from PRPs in response to U.S. EPA requests.
- Observations by local residents and reports of damage incidents.
- Information as documented by WDNR.

Table 2-2 provides a compilation of waste materials known to have been disposed at the site. It was the presence of cadmium and tin in soil samples; iron, manganese, and chromium in water samples; and other toxic, persistent, flammable, and volatile wastes which prompted WDNR to propose that HDL be considered as a Superfund site.

Other information on landfill contents include analyses of on-site soil samples collected in 1984 by the FIT Team, which detected 1,1-dichloroethane (57 ppb) and 1,1,1-trichloroethane (10 ppb).

Although detailed analytical data is generally not available for most waste materials sent for disposal, composition of the ink solvents and printing ink residue disposed at Hunts Disposal Landfill are provided in Tables 2-3 and 2-4. Table 2-5 lists some of the other miscellaneous, persistent pollutants disposed at the site.

2.2 PROJECT OBJECTIVES

The objectives of this RI/FS are to characterize the hazards or threat of hazards posed by the Hunts Disposal Landfill site and to identify a cost-effective, environmentally sound plan of action to remedy the existing/potential hazards. Before alternatives for remedial action can be considered in the FS phases of this project, there must be sufficient information available to verify the need for remedial action, and to develop, screen and evaluate potential alternatives.

The RI/FS will be performed to gather and assess the data needed to accomplish the following goals:

- Assess the nature and extent of groundwater, surface water, and soil contamination on and adjacent to the site.
- Assess the role that contaminants from the Hunts Disposal Landfill Site play on the overall quality of water in the Root River, the on-site lake, and the nearby groundwater supplies.

TABLE 2-2

List of Waste Materials Disposed at Hunts Disposal Landfill

Reported Waste Disposed at Site*

Printing Ink
Printing Ink Solvents
Waste Solvents
50% Concentrated Chromic Acid
Shoe Polish Residue
Waste Paper
Glue
Beryllium
Solid Waste (Domestic Type)
Acid Waste
After Burn-Ash from Refineries/Refractories
Arsenic Sludge

Characteristics of Waste**

Toxic
Persistent
Flammable
Volatile

* U.S. EPA Region V Emergency and Remedial Response Branch.
** *Source:* RTECS 1983-84

TABLE 2-3

COMPOSITION OF WASTE NEWSPAPER INK DUMPED AT THE SITE FROM

JOURNAL/SENTINEL INC. PRINTING COMPANY

CHEMICAL COMPOSITION OF NEWSPAPER INK

Hydrocarbon Oil	85%
Carbon Pigment	10 to 12%
Additives	Depending on batch of ink, additives comprised between 3 to 5% of the ink.

- o Greases
- o Hydrocarbon Resins
- o Wetting Agents
- o Anti-wear Compounds

COMPOSITION OF SOLVENTS DUMPED AT THE SITE FROM

JOURNAL/SENTINEL INC. PRINTING COMPANY

Kerosene

Naphtha

Mineral Spirits

Source: Journal/Sentinel Inc., 1987

TABLE 2-4

COMPOSITION OF SHOE POLISH FORMULAS DISPOSED AT THE SITE

BY

S.C. JOHNSON & SON INC.

NAME: SHOE POLISH FORMULA FROM 1966-1970

Components	Dyed	Pigmented
Water	82 - 83%	76 - 77%
Modified Acrylic Polymer	10 - 11%	12 - 13%
Alkali Soluble Resin	3%	4%
Polyethylene Wax	1.5%	2%
Surfactants	1.5%	2%
Tributoxyethyl Phosphate	0.3%	0.4%
Chloromethoxypropylmercuric Acetate	200 ppm	200 ppm
Pigments	-----	2.9 - 3.1%
Dyes	0 - 0.5%	-----

NAME: SHOE POLISH FORMULA FROM 1961 - 1966

Components	Composition
Modified Polystyrene resin	6.5 - 8%
Acrylic Styrene Copolymer	5.7 - 7.2%
Emulsifiable Polyethylene	0.2 - 2%
Refined Shellac	0.2 - 2%
Water	80 - 84%
Phenyl Mercuric Acetate	200 ppm
Pigment (scuffed)	0.37%
Dye (self-shining)	0.12%
Oleic Acid	<0.2%
Morpholine	<0.2%
Borax	<0.2%
Tributoxyethyl Phosphate	<0.2%

Source: Johnson Wax; S.C. Johnson & Son Inc., 1987

TABLE 2-5

OTHER MATERIALS DISPOSED AT THE SITE

CHEMICAL COMPOSITION OF ARSENIC SLUDGE FROM PITTSBURGH PLATE GLASS INDUSTRIAL, INC.

Arsenic Dioxide	110 cubic feet as sludge coated on walls of tankers

Source: PPG, Industrial Inc., 1984

COMPOSITION OF WASTE DISPOSED BY DELCO ELECTRONICS & AC SPARK PLUG UNIT OF GENERAL MOTORS

Chromic Acid	50% water - 50% acid
Beryllium	In Barrels

Source: Mr. Clayton Hunt, under oath, Feb. 1987

- Assess the extent of off-site migration of contaminants and their impact on potential receptors.
- Identify potential pathways for exposure.
- Ascertain whether the site poses a hazard to public health, welfare, or the environment.
- Recommend the most effective, most implementable and least costly remedial alternatives.
- Prepare a pre-design of the remedial alternative selected.

The technical approach for the completion of a typical RI/FS consists of the 15 major standarized tasks below:

Task 1 - Project Planning
Task 2 - Community Relations
Task 3 - Field Investigation
Task 4 - Sample Analysis/Validation
Task 5 - Data Evaluation
Task 6 - Assessment of Risks
Task 7 - Treatability Study/Pilot Testing
Task 8 - Remedial Investigation Reports
Task 9 - Remedial Alternatives Screening
Task 10 - Remedial Alternatives Evaluation
Task 11 - Feasibility Study/RI/FS Reports
Task 12 - Past RI/FS Support
Task 13 - Enforcement Support
Task 14 - Miscellaneous Support
Task 15 - Expedited Response Action (ERA) Planning

The environmental monitoring and measurement efforts covered by this QAPP are also described in Section 5.0 of the Work Plan.

2.3 Schedule

The HDL RI/FS was authorized September 17, 1987. The organization of the project and the preparation of planning documents have been proceeding during the winter months. The goal was to have the necessary documents in place in order to initiate field work during July 1988. The Draft Work Plan has been completed and submitted to the U.S. EPA for review. After incorporation of all comments, the Final Work Plan will be prepared and

submitted to U.S. EPA for final approval. The Field Investigation (Task 3) is expected to commence directly after final approval of the QAPP and an approval by the RPM of the major field activities included in the Work Plan. Figure 2-5 shows the anticipated schedules for the RI/FS at the HDL site.

The RI Phase of this project is expected to require approximately 12 months, including the time for preparation of the Draft Remedial Investigation Report. Review by state and Federal officials, incorporation of review comments and production of the Final Remedial Investigation Report should take about a month. Preparation for and participation in the public meeting associated with the RI should take about 3 weeks.

The FS will require approximately 8 months to complete. The total elapsed time from U.S. EPA approval of the work plan to submission of the final deliverables is estimated to be 24 months. The project schedule (Figure 2-5) will be updated, as appropriate, throughout the RI/FS project.

2.4 DATA USAGE

The data obtained during the RI will be used to achieve the objectives outlined above (Subsection 2.2) within the scope and authority of CERCLA as amended by SARA. In addition, the data obtained from sampling and analysis of residential water supply wells will be used to assess potential public health effects and compliance with the Safe Drinking Water Act (SDWA). Field screening and/or laboratory characterization of project-generated solid waste will be accomplished during the current field investigation in order to recommend final disposal options. An evaluation of the adequacy of the data for the uses described above will be performed as part of the RI Report.

FIGURE 2-5

ANTICIPATED SCHEDULE FOR RI/FS AT HDL SITE

October 1987 - July 1988	o Preparation of Work Plan Memo o Project Start up Activities o Project planning activities, including preparation of the Initial Site Evaluation Report, Project Plans, IFBs, RFPs, and Health and Safety Plans
August 1988 - November 1988	o Perform Property Survey o Preparation of Topographic Maps and Aerial Survey o Perform Geophysical Investigation o Collection of Environmental Samples o Monitoring Well Installation o Receive and Reduce Analytical Results o Initiate Preparation of RI Report o Initiate Preparation of Screening Aspects of FS Report
December 1988 - August 1989	o Finalize RI Report o Initiate Detailed Analysis for FS
March 1989 - December 1989	o Finalize FS Report o Public Comment Period o Preparation of ROD and Responsiveness Summary o Final Signing of ROD

2.5 SAMPLING NETWORK DESIGN

The objectives of the sampling program to be undertaken as part of the RI/FS at the HDL site are described in Section 2.2 of this document.

The details of the sampling (monitoring) network designed to achieve these objectives and the rationale for that design are presented in Section 2 of the Sampling and Analysis Plan, which is attached as Appendix B.

2.6 SAMPLE MATRICES/PARAMETERS/FREQUENCY

The objective of sampling at the HDL is not only to determine whether there is chemical contamination at the site but also to obtain a better understanding of the dynamics of landfill-derived materials which may be moving through the media in the vicinity of the site. The scope of sampling activities, as described in the following paragraphs is designed to accomplish these two major objectives.

The scope of the sampling activities at the HDL site includes the installation of 18 groundwater monitoring wells, and the collection and analysis of 158 investigative samples, 18 duplicates and 10 field blanks. The media/matrices to be sampled include surface water, sediment, soil, and groundwater. A total of 176 samples will be analyzed for TCL and TAL parameters and 10 samples will be analyzed for three geotechnical parameters: permeability, porosity and grain size. The number of sample containers actually sent to the laboratory will vary depending on the analyses being requested. However, each "sample" is designed to represent homogeneous material which reflects the environmental condition of the location sampled at the time the sample was taken.

The sampling and analysis program is summarized in Table 2-6. This table indicates the specific parameters to be measured, the number and frequency of sampling, and the level of QC effort for each environmental media/matrix.

TABLE 2-6

SUMMARY OF S _ING AND ANALYSIS PROGRAM - HUNTS DISPOSAL _ANDFILL

SAMPLE MATRIX	FIELD PARAMETERS	LABORATORY PARAMETERS	INVESTIGATIVE SAMPLES NO.	FREQ	TOTAL	QC SAMPLES DUPLICATE NO.	FREQ	TOTAL	BLANK NO.	FREQ	TOTAL	MATRIX TOTAL
Soils (Surficial)	Qualitative organic vapor screening with HNu or OVA and HNu -Geophysical investigation. -Radiological investigation	--RAS Organics Package From CLP Including 30 Tentatively Identified Parameters/a.	35	1	35	4	1	4	-	-	-	39
		--RAS Inorganics/Metals From CLP/b.	35	1	35	4	1	4	-	-	-	39
		--RAS Inorganics Package/ Cyanide From CLP/b.	35	1	35	4	1	4	-	-	-	39
Surface water Samples	Qualitative organic vapor screening with HNu or OVA and HNu -pH -Specific Conductance -Temperature	--RAS Organics Package From CLP Including 30 tentatively identified Parameters/a.	20	1	20	2	1	2	2	1	2	24
		--RAS Inorganics Package/ Metals from CLP Unfiltered Samples/b.	20	1	20	2	1	2	2	1	2	24
		--RAS Inorganics Package/ Metals from CLP Filtered Samples/b.	20	1	20	2	1	2	2	1	2	24
		--RAS Inorganics Package/ Cyanide from CLP Unfiltered/b.	20	1	20	2	1	2	2	1	2	24
Sediments	Qualitative organic vapor screening with HNu or OVA and HNu	--RAS Organics Package From CLP Including 30 Tentatively Identified Parameters/a.	20	1	20	2	1	2	-	-	-	22
		--RAS Inorganics Package/ Metals From CLP/b.	20	1	20	2	1	2	-	-	-	22
		--RAS Inorganics Package/ Cyanide From CLP/b.	20	1	20	2	1	2	-	-	-	22
Soil Borings (Split-Spoon Samples)	Qualitative organic vapor screening with HNu or OVA and HNu	(For selected samples on head space analysis) RAS Organics Package from CLP Including 30 tentatively identified Parameters/a.	18	1	18	2	1	2	-	-	-	20
		--RAS Inorganics Package/ Metals From CLP/b.	18	1	18	2	1	2	-	-	-	20
		--RAS Inorganics Package/ Cyanide From CLP/b.	18	1	18	2	1	2	-	-	-	20

TABLE 2-6 (Continued)

SUMMARY OF SAMPLING AND ANALYSIS PROGRAM - HUNTS DISPOSAL LANDFILL

SAMPLE MATRIX	FIELD PARAMETERS	LABORATORY PARAMETERS	INVESTIGATIVE SAMPLES NO.	FREQ	TOTAL	QC SAMPLES DUPLICATE NO.	FREQ	TOTAL	BLANK NO.	FREQ	TOTAL	MATRIX TOTAL
		--Physical Gentechnical Parameter from CLP SAS/c. Grain size Permeability Porosity	10	1	10	-	-	-	-	-	-	10
Groundwater Monitoring Well Samples (3 existing and 18 newly installed wells)	Qualitative organic vapor screening with HNu or OVA and HNu (new wells only) -pH -Specific Conductance -Temperature -Bail Down/Hydraulic conductivity (new wells only)	--SAS Organics Package From CLP Including 30 Tentatively Identified Parameters/ Drinking Water Detection Limits/c.	21	2	42	3	2	6	3	2	6	54
		--RAS Inorganics Package/ Metals From CLP Filtered Samples/h.	21	2	42	3	2	6	3	2	6	54
		--RAS Inorganics Package/ Cyanide From CLP Unfiltered Samples/h.	21	2	42	3	2	6	3	2	6	54
		--SAS Inorganic Package for Total Dissolved Solids/c. Filtered Samples	21	2	42	3	2	6	3	2	6	54
		---RAS Organics Package plus SAS Fast-turnaround/c. From CLP Including 30 tentatively Identified Parameters/a.	3	1	3	1	1	1	1	1	1	5
		---RAS Inorganics Package plus SAS Fast-turnaround/c. Metals from CLP Filtered Samples/h.	3	1	3	1	1	1	1	1	1	5

TABLE 2-6 (Continued)

SUMMARY OF SAMPLING AND ANALYSIS PROGRAM - HUNTS DISPOSAL LANDFILL

SAMPLE MATRIX	FIELD PARAMETERS	LABORATORY PARAMETERS	INVESTIGATIVE SAMPLES NO.	FREQ	TOTAL	QC SAMPLES DUPLICATE NO.	FREQ	TOTAL	BLANK NO.	FREQ	TOTAL	MATRIX TOTAL
		---RAS Inorganics Package plus SAS Fast-turnaround/c. Cyanide from CLP Unfiltered samples/b.	3	1	3	1	1	1	1	1	1	5
Residential Wells	-pH -Specific Conductance -Temperature	--SAS Organic Package From CLP Including 30 Tentatively Identified Parameters/Drinking Water Detection Limits/c.	10	1	10	1	1	1	1	1	1	12
		--SAS Inorganic Package/ Metals (including Mercury) From CLP/ Drinking Water Detection Limits/ Unfiltered Samples/c.	10	1	10	1	1	1	1	1	1	12
		--SAS Inorganic Package/ Cyanide From CLP/ Drinking Water Detection Limits/ Unfiltered Samples/c.	10	1	10	1	1	1	1	1	1	12

a. Parameters to be analyzed for are listed in Table 4-2 of the QAPP.
b. Parameters to be analyzed for are listed in Table 4-3 of the QAPP.
c. Parameters to be analyzed for are listed in Appendix 3 of the SAP.

NOTE: Matrix Spike/Matrix Spike Duplicate analyses will be performed on a 1 per 10 sample basis for every aqueous sampling event. Triple the normal sample volume for organics analyses will be collected for these samples. In addition, one trip blank will be included with each shipment container of volatile organic samples.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

3.1 PROGRAM ORGANIZATION

The REM V program and quality assurance organization and responsibilities are discussed in detail in Section A of the REM V Quality Assurance Program Plan. Quality Assurance (QA) is organized independently of technical operations, which are responsible for quality control (QC).

3.2 QUALITY ASSURANCE ORGANIZATION

The REM V Quality Assurance Director and his Deputy answer directly to Williams-Russell & Johnson (WRJ) corporate management for the quality assurance of all REM V projects.

Responsibilities for conducting audits, for identifying and controlling nonconformances, and for corrective actions are specified and discussed in Sections 5.15, 5.16, and 5.17 of the REM V Quality Assurance Program Plan and in the REM V QA Audit Procedures, October 23, 1987. Figure 3-1 is a graphical display of this organization.

WRJ, as prime contractor, has overall responsibility for all work assignments under the REM V Contract. C.C. Johnson & Malhotra, P.C. (CCJM), a REM V team member has been assigned responsibility for the RI/FS at the Hunts Disposal Site. CCJM will perform the RI field investigation and use the resulting information as an element in RI/FS preparation. CCJM will also develop, screen, and evaluate remedial action alternatives; and prepare the related reports. WRJ will provide administrative and financial oversight and QA/QC for all deliverables. All deliverables will be issued by WRJ.

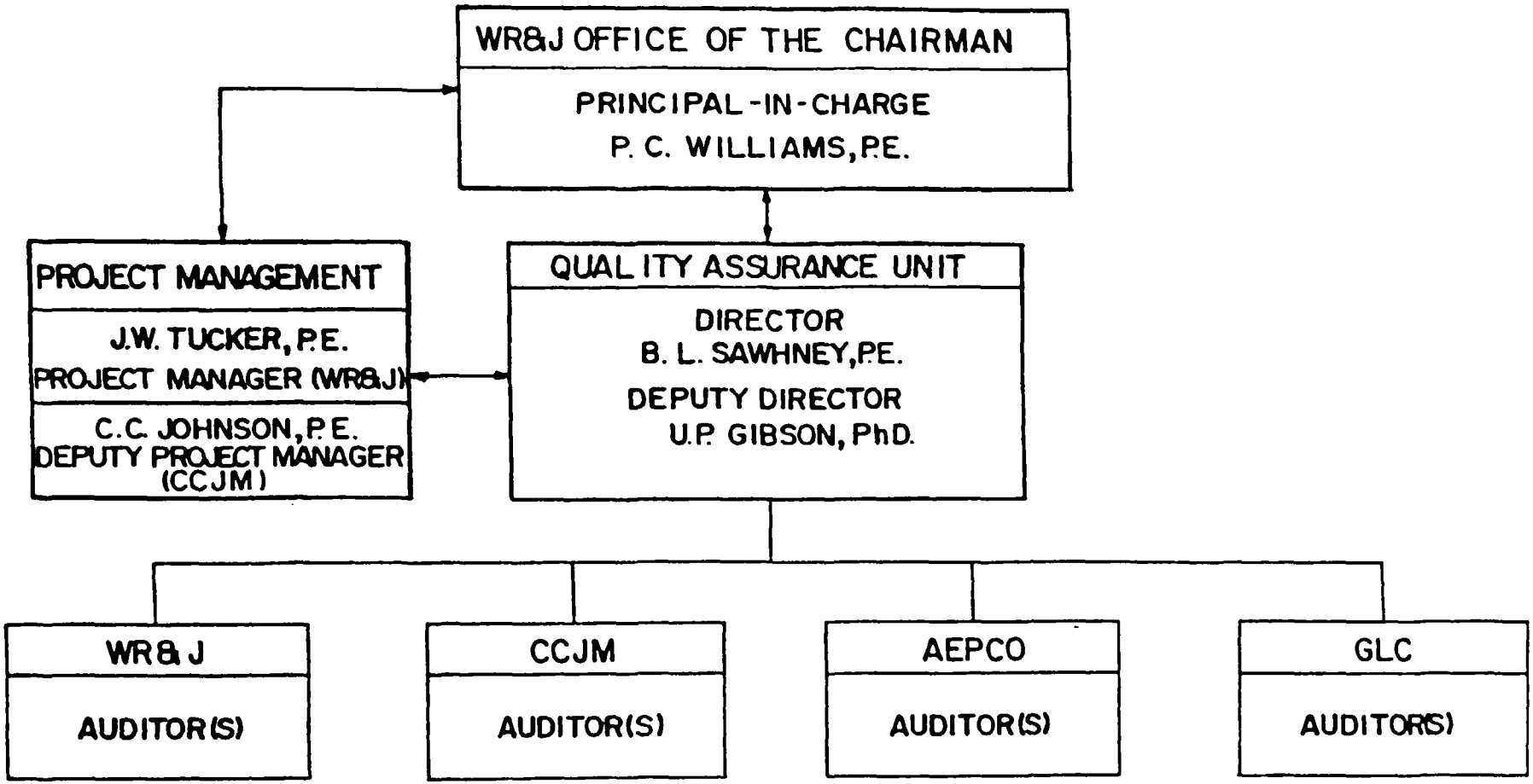

FIGURE 3-1

QUALITY ASSURANCE ORGANIZATION CHART

Quality Assurance (QA) responsibilities are those involved with ensuring that a quality control system is in place and functioning adequately. Primary responsibility for quality control rests with the Site Manager. Ultimate responsibility for project quality rests with WRJ. Specific QA responsibilities for the RI at HDL site have been assigned as follows:

- Quality Assurance Director for REM V Activities
  Bhushnan Sawhney
- Overall QA for CLP/CRL Activities
  Quality Assurance Office, U.S. EPA, Region V
- QA for RAS and SAS from CLP
  Support Services Branch, OERR, EPA HQ
  EMSL Las Vegas
  Contract Program Management Section, CRL
- Performance and Systems Audit of RAS from CLP
  U.S. EPA, EMSL-Las Vegas
- Systems Audit of Field Activities
  Bhushnan Sawhney REM V, Quality Assurance Director

3.3 OPERATIONAL RESPONSIBILITY

Operational responsibilities are those involving execution and direct management of the technical and administrative aspects of this project. The following responsibilities have been assigned for the RI/FS at HDL Site:

- Remedial Project Manager (RPM)
  Michael A. Gifford, U.S. EPA, Region V, ERRB, CES
- REM V Project Manager
  John W. Tucker, REM V, WRJ
- Site Manager
  Sidney F. Paige, REM V, CCJM
- Assistant Site and Field Manager
  Curtis Welty, REM V, CCJM

- Community Relations Support
  Charletta Jacks, REM V, WRJ

- Site Health & Safety Coordinator
  Mona Sutherland, REM V, CCJM

- Project Sample Management Coordinator
  Mona Sutherland, REM V, CCJM

- Principal Investigator RI
  Curtis Welty, REM V, CCJM

- Principal Investigator FS
  Sidney F. Paige, REM V, CCJM

- Principal Investigator Risk Assessment
  Sidney F. Paige, REM V, CCJM

- Field Sampling Team Member
  Sailesh Banaji, REM V, CCJM

- Analytical Data Review and Review of Tentatively Identified Compounds
  Richard Cheatham, CCJM, Denver

3.4 LABORATORY TESTING ASSIGNMENTS

The U.S. EPA Contract Laboratory Program (CLP) will analyze the soil, sediment, and water samples as part of the Routine Analytical Services (RAS) and/or Special Analytical Services (SAS) packages for fast turnaround or other prescribed SAS analyses.

The CLP QA/QC responsibilities are as follows:

- CLP Routine Analytical Services (RAS)
  - Request initiated by WRJ/CCJM sampling team.
  - Support Services Branch, Office of Emergency and Remedial Response, U.S. EPA Headquarters.
  - Final Data review by U.S. EPA Region V Contract Project Management Section, CRL.
  - Review of tentatively identified compounds and assessment of need for confirmation.

- CLP Special Analytical Services (SAS)
  - Requests initiated by CCJM/WRJ Project Organization.
  - Requests coordinated through U.S. EPA Region V Environmental Services Division or U.S. EPA Region V Remedial Response Branch or U.S. EPA RPM.
  - Review of SAS specifications - U.S. EPA Region V QA Office and CRL.
  - Final data review by U.S. EPA Region V Contract Project Management Section, CRL.

3.5 PERFORMANCE AND SYSTEM AUDITS

The performance of various elements and systems participating in these studies may be audited by the indicated audit agency.

- Internal and Field Operations - REM V QA Director (or his designee) or U.S. EPA Region V QA Office.
- CLP - U.S. EPA EMSL Las Vegas
- CRL - U.S. EPA Region V QA Office; QC Coordinator, CRL, U.S. EPA EMSL Cincinnati.

4.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall QA objective is to ensure the development and implementation procedures for field sampling, chain of custody, laboratory analysis and reporting that will provide legally defensible results in a court of law. Specific procedures to be used for sampling, chain of custody, calibration, laboratory analysis, reporting, internal quality control, audits, preventative maintenance and corrective actions are described in other sections of this Quality Assurance Project Plan. This section defines the goals for level of QA effort, accuracy, precision and sensitivity of analyses; and completeness, representativeness, and comparability of measurement data from all analytical laboratories. QA objectives for field measurements are also discussed.

4.1 REGULATORY AND LEGAL REQUIREMENTS

The data used to evaluate compliance with the Safe Drinking Water Act should have method detection limits that are less than 20 percent of the maximum allowable levels on a parameter-by-parameter basis. The standard method detection limits for analytical services from the CLP and the Central Regional Laboratory (CRL) meet this criterion for all inorganic and most organic parameters. Lower detection limits will be required for the volatile organics fraction. The required limits are presented below in Subsection 4.3.

4.2 LEVEL OF QA EFFORT

Field duplicates, field blanks and matrix spike samples will be taken and submitted to the analytical laboratories to provide the means to assess the quality of the data resulting from the field sampling program. All matrix spikes are performed in duplicate. Duplicate samples are analyzed to check for sampling and analytical reproducibility. Blank samples are analyzed to check for procedural contamination and/or ambient conditions at the site which are causing sample contamination. No field blanks will be taken

for soil and sediment samples but trip blanks will accompany each shipment container of volatile organic samples. Trip blanks will be prepared in the laboratory and shipped with the bottles used for aqueous VOA sampling. These blanks will remain capped throughout sampling and shipment; they are used to assess the contamination due to VOC migration during sample shipment and storage.

The general level of this QA effort will be one field duplicate, one MS/MSD, and one field blank sample per 10 or fewer investigative liquid samples. One VOA trip blank sample will be included along with each shipment container of aqueous VOA samples. For soil and sediment samples, one field duplicate sample will be collected for every 10 or fewer investigative samples. Field blanks are not required for soil/sediments. The specific level of field QA effort for the Hunts Disposal Landfill RI/FS itemized by sample matrix and parameter is shown in Table 2-6 of this QAPP. Section 2 of the Sampling and Analysis Plan also includes a detailed discussion of the QA effort associated with the field sampling portions of the RI/FS.

Th aste, surface water, soil, sediments, air and groundwater samples collected at the site will be analyzed using the Contract Laboratory Program (CLP). The level of laboratory QA effort for Routine Analytical Services (RAS) provided by the CLP is specified in the Invitations for Bid (IFB), WA87-K236/K237/K238 and J001/J002/J003 for organics, and WA87-K025/K026/K027 and K201 for inorganics. The level of laboratory QA effort for special analytical services (SAS) is provided in each SAS request listed in Appendix B, of this QAPP (the Sampling and Analysis Plan). Samples collected from residential water supply wells will also be analyzed by the CLP under provisions of a SAS. This SAS request is presented in Appendix B.

4.3 ACCURACY, PRECISION, AND SENSITIVITY OF ANALYSES

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 and precision requirements for RAS from the CLP are specified in IFB WA87-K236/K237/K238 and J001/J002/J003 for organics, and WA87-K025/K026/K027 and K201 for inorganics. The sensitivities required for CLP analyses for organic and inorganics will be the method detection limits, shown in Tables 4-1 and 4-2, from the same IFBs.

4.4 COMPLETENESS, REPRESENTATIVENESS AND COMPARABILITY

It is expected that the CLP will provide data meeting QC acceptance criteria for 95 percent or more of all samples tested.

Completely valid data are required for samples designated in the Sampling and Analysis Plan (Appendix B) as "background samples." The SAS laboratories should provide completely valid data, and the reasons for any variances from 100 percent completeness will be documented in writing.

4.5 BIBLIOGRAPHY/REFERENCES

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TABLE 4-1
Target Compound List (TCL) and
Contract Required Quantitation Limits (CROL)*

Volatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[a] ug/Kg
1. Chloromethane	74-87-3	10	10
2. Bromomethane	74-83-9	10	10
3. Vinyl Chloride	75-01-4	10	10
4. Chloroethane	75-00-3	10	10
5. Methylene Chloride	75-09-2	5	5
6. Acetone	67-64-1	10	10
7. Carbon Disulfide	75-15-0	5	5
8. 1,1-Dichloroethene	75-35-4	5	5
9. 1,1-Dichloroethane	75-34-3	5	5
10. 1,2-Dichloroethene (total)	540-59-0	5	5
11. Chloroform	67-66-3	5	5
12. 1,2-Dichloroethane	107-06-2	5	5
13. 2-Butanone	78-93-3	10	10
14. 1,1,1-Trichloroethane	71-55-6	5	5
15. Carbon Tetrachloride	56-23-5	5	5
16. Vinyl Acetate	108-05-4	10	10
17. Bromodichloromethane	75-27-4	5	5
18. 1,2-Dichloropropane	78-87-5	5	5
19. cis-1,3-Dichloropropene	10061-01-5	5	5
20. Trichloroethene	79-01-6	5	5
21. Dibromochloromethane	124-48-1	5	5
22. 1,1,2-Trichloroethane	79-00-5	5	5
23. Benzene	71-43-2	5	5
24. trans-1,3-Dichloropropene	10061-02-6	5	5
25. Bromoform	75-25-2	5	5
26. 4-Methyl-2-pentanone	108-10-1	10	10
27. 2-Hexanone	591-78-6	10	10
28. Tetrachloroethene	127-18-4	5	5
29. Toluene	108-88-3	5	5
30. 1,1,2,2-Tetrachloroethane	79-34-5	5	5

TABLE 4-1 (continued)

Volatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[a] ug/Kg
31. Chlorobenzene	108-90-7	5	5
32. Ethyl Benzene	100-41-4	5	5
33. Styrene	100-42-5	5	5
34. Xylenes (Total)	1330-20-7	5	5

[a]Medium Soil/Sediment Contract Required Quantitation Limits (CRQL) for Volatile TCL Compounds are 125 times the individual Low Soil/Sediment CRQL.

*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

**Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

TABLE 4-1 (continued)
Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)*

Semivolatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[3] ug/Kg
35. Phenol	108-95-2	10	330
36. bis(2-Chloroethyl) ether	111-44-4	10	330
37. 2-Chlorophenol	95-57-8	10	330
38. 1,3-Dichlorobenzene	541-73-1	10	330
39. 1,4-Dichlorobenzene	106-46-7	10	330
40. Benzyl alcohol	100-51-6	10	330
41. 1,2-Dichlorobenzene	95-50-1	10	330
42. 2-Methylphenol	95-48-7	10	330
43. bis(2-Chloroisopropyl) ether	108-60-1	10	330
44. 4-Methylphenol	106-44-5	10	330
45. N-Nitroso-di-n-dipropylamine	621-64-7	10	330
46. Hexachloroethane	67-72-1	10	330
47. Nitrobenzene	98-95-3	10	330
48. Isophorone	78-59-1	10	330
49. 2-Nitrophenol	88-75-5	10	330
50. 2,4-Dimethylphenol	105-67-9	10	330
51. Benzoic acid	65-85-0	50	1600
52. bis(2-Chloroethoxy) methane	111-91-1	10	330
53 2,4-Dichlorophenol	120-83-2	10	330
54. 1,2,4-Trichlorobenzene	120-82-1	10	330
55. Naphthalene	91-20-3	10	330
56. 4-Chloroaniline	106-47-8	10	330
57. Hexachlorobutadiene	87-68-3	10	330
58. 4-Chloro-3-methylphenol (para-chloro-meta-cresol)	59-50-7	10	330
59. 2-Methylnaphthalene	91-57-6	10	330
60. Hexachlorocyclopentadiene	77-47-4	10	330
61. 2,4,6-Trichlorophenol	88-06-2	10	330
62. 2,4,5-Trichlorophenol	95-95-4	50	1600
63. 2-Chloronaphthalene	91-58-7	10	330
64. 2-Nitroaniline	88-74-4	50	1600

TABLE 4-1 (continued)

Semivolatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[a] ug/Kg
65. Dimethylphthalate	131-11-3	10	330
66. Acenaphthylene	208-96-8	10	330
67. 2,6-Dinitrotoluene	606-20-2	10	330
68. 3-Nitroaniline	99-09-2	50	1600
69. Acenaphthene	83-32-9	10	330
70. 2,4-Dinitrophenol	51-28-5	50	1600
71. 4-Nitrophenol	100-02-7	50	1600
72. Dibenzofuran	132-64-9	10	330
73. 2,4-Dinitrotoluene	121-14-2	10	330
74. Diethylphthalate	84-66-2	10	330
75. 4-Chlorophenyl-phenyl ether	7005-72-3	10	330
76. Fluorene	86-73-7	10	330
77. 4-Nitroaniline	100-01-6	50	1600
78. 4,6-Dinitro-2-methylphenol	534-52-1	50	1600
79. N-nitrosodiphenylamine	86-30-6	10	330
80. 4-Bromophenyl-phenylether	101-55-3	10	330
81. Hexachlorobenzene	118-74-1	10	330
82. Pentachlorophenol	87-86-5	50	1600
83. Phenanthrene	85-01-8	10	330
84. Anthracene	120-12-7	10	330
85. Di-n-butylphthalate	84-74-2	10	330
86. Fluoranthene	206-44-0	10	330
87. Pyrene	129-00-0	10	330
88. Butylbenzylphthalate	85-68-7	10	330
89. 3,3'-Dichlorobenzidine	91-94-1	20	660
90. Benzo(a)anthracene	56-55-3	10	330
91. Chrysene	218-01-9	10	330
92. bis(2-Ethylhexyl)phthalate	117-81-7	10	330
93. Di-n-octylphthalate	117-84-0	10	330
94. Benzo(b)fluoranthene	205-99-2	10	330

TABLE 4-1 (continued)

Semivolatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[b] ug/Kg
95. Benzo(k)fluoranthene	207-08-9	10	330
96. Benzo(a)pyrene	50-32-8	10	330
97. Indeno(1,2,3-cd)pyrene	193-39-5	10	330
98. Dibenz(a,h)anthracene	53-70-3	10	330
99. Benzo(g,h,i)perylene	191-24-2	10	330

[b]Medium Soil/Sediment Contract Required Quantitation Limits (CRQL) for Semi-Volatile TCL Compounds are 60 times the individual Low Soil/Sediment CRQL.

*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

**Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

TABLE 4-1 (continued)

Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)*

Pesticides/PCBs	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[C] ug/Kg
100. alpha-BHC	319-84-6	0.05	8.0
101. beta-BHC	319-85-7	0.05	8.0
102. delta-BHC	319-86-8	0.05	8.0
103. gamma-BHC (Lindane)	58-89-9	0.05	8.0
104. Heptachlor	76-44-8	0.05	8.0
105. Aldrin	309-00-2	0.05	8.0
106. Heptachlor epoxide	1024-57-3	0.05	8.0
107. Endosulfan I	959-98-8	0.05	8.0
108. Dieldrin	60-57-1	0.10	16.0
109. 4,4'-DDE	72-55-9	0.10	16.0
110. Endrin	72-20-8	0.10	16.0
111. Endosulfan II	33213-65-9	0.10	16.0
112. 4,4'-DDD	72-54-8	0.10	16.0
113. Endosulfan sulfate	1031-07-8	0.10	16.0
114. 4,4'-DDT	50-29-3	0.10	16.0
115. Methoxychlor	72-43-5	0.5	80.0
116. Endrin ketone	53494-70-5	0.10	16.0
117. alpha-Chlordane	5103-71-9	0.5	80.0
118. gamma-Chlordane	5103-74-2	0.5	80.0
119. Toxaphene	8001-35-2	1.0	160.0
120. Aroclor-1016	12674-11-2	0.5	80.0
121. Aroclor-1221	11104-28-2	0.5	80.0
122. Aroclor-1232	11141-16-5	0.5	80.0
123. Aroclor-1242	53469-21-9	0.5	80.0
124. Aroclor-1248	12672-29-6	0.5	80.0
125. Aroclor-1254	11097-69-1	1.0	160.0
126. Aroclor-1260	11096-82-5	1.0	160.0

[C]Medium Soil/Sediment Contract Required Quantitation Limits (CRQL) for Pesticide/PC TCL compounds are 15 times the individual Low Soil/Sediment CRQL.

*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

**Quantitation limits listed for soil/sediment are based on wet weight. The quantitation Limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

TABLE 4-2

INORGANIC TARGET ANALYTE LIST (TAL)

Analyte	Contract Required Detection Limit (1,2) (ug/L)
Aluminum	200
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadmium	5
Calcium	5000
Chromium	10
Cobalt	50
Copper	25
Iron	100
Lead	5
Magnesium	5000
Manganese	15
Mercury	0.2
Nickel	40
Potassium	5000
Selenium	5
Silver	10
Sodium	5000
Thallium	10
Vanadium	50
Zinc	20
Cyanide	10

(1) Subject to the restrictions specified in the first page of Part C, Section IV of Exhibit D (Alternate Methods - Catastrophic Failure) any analytical method specified in SOW Exhibit D may be utilized as long as the documented instrument or method detection limits meet the Contract Required Detection Limit (CRDL) requirements. Higher detection limits may only be used in the following circumstance:

If the sample concentration exceeds five times the detection limit of the instrument or method in use, the value may be reported even though the instrument or method detection limit may not equal the Contract Required Detection Limit. This is illustrated in the example below:

For lead:

Method in use = ICP
Instrument Detection Limit (IDL) = 40
Sample concentration = 220
Contract Required Detection Limit (CRDL) = 5

The value of 220 may be reported even though instrument detection limit is greater than CRDL. The instrument or method detection limit must be documented as described in Exhibit E.

(2) The CRDL are the instrument detection limits obtained in pure water that must be met using the procedure in Exhibit E. The detection limits for samples may be considerably higher depending on the sample matrix.

The sampling network was designed to provide data representative of site conditions. During development of this network consideration was given to past waste storage and disposal practices, existing analytical data, remedial activities to date, physical setting and processes, and constraints inherent to the Superfund program. 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 are documented in this QAPP. It may be necessary to verify similar documentation for existing analytical data.

4.6 FIELD MEASUREMENTS

Measurement data will be generated in many field activities that are incidental to collecting samples for analytical testing or unrelated to sampling. These activities include, but are not limited to, the following:

- Documenting time and weather conditions.
- Locating and determining the elevation of sampling stations.
- Calculating flow rates and cross sections for surface water.
- Determining pH, specific conductance and temperature of water samples.
- Qualitative organic vapor screening of soil samples using an OVA and/or HNu.
- Determining depths in a borehole or well.
- Calculating pumping rates.

- o Performing bail-down recovery tests.
- o Calculating pre-sampling purge volume.
- o Verifying well development and pre-sampling purge volumes.

The general QA objective for such measurement data is to obtain reproducible and comparable measurements to a degree of accuracy consistent with the intended use of the data through the documented use of standardized procedures. The procedures for performing these activities and the standardized formats for documenting them are presented in the Sampling and Analysis Plan (Appendix B).

5.0 SAMPLING PROCEDURES

General programmatic sampling requirements are provided in Section 5.5 and 5.7 of the REM V Quality Assurance Program Plan (Revision 0). All site activities which affect data quality will be conducted based on the formally documented guidelines specified in Section 7 and Section 8 of the Draft Field Technical Guidance Manual (FTGM) - Volume II, April 1988. Sections 5.12 of the QA Program Plan provide guidance relating to the handling, storage and shipping of samples. Site specific sampling procedures are described in the Sampling and Analysis Plan, Appendix B. The sections of the Draft FTGM applicable to sampling at the HDL are listed in Table 5-1.

TABLE 5-1

STANDARD SAMPLING PROCEDURES

FTGM Procedure Title	FTGM Section Number
Surface Water and Sediment Sampling	FT-7.08
Soil and Rock Sample Acquisition	FT-7.03
Groundwater Samples Acquisition	FT-7.02
Groundwater Monitoring Well Installation	FT-7.01
Management of Sampling and Preparation of Required Forms	FT-7.04
Sample Identification and Chain-of-Custody	FT-7.05
Sample Preservation	FT-7.06
Sample Packing and Shipping	FT-7.07
Decontamination of Chemical Sampling and Field Analytical Equipment	FT-12.01
Site Log Book	FT-13.03

6.0 SAMPLE AND DOCUMENT CUSTODY PROCEDURES

It is U.S. EPA and Region V policy to follow the U.S. EPA Region V sample custody of 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: sample collection, laboratory, and final evidence files. Final evidence files, including all originals of laboratory reports and purge files, are maintained under document control in a secure area.

A sample or evidence file is under your custody if 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; or
- are in a designated area.

6.1 FIELD SPECIFIC 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.

Field procedures are as follows:

(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) All bottles should be tagged with sample numbers and locations. The Sample Management Office (SMO) number and stickers will be affixed.

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

(d) The contractor's site manager must review all field activities to determine whether proper custody procedures were followed during the field work 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.

Transfer of custody and shipment are as follows:

(a) Samples are accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possessions 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/from a secure storage area.

(b) 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.

(c) 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.

(d) 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.

(e) 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 off on the custody form as long as the custody forms are sealed inside the sample cooler and the custody seals remain intact.

6.2 LABORATORY CUSTODY PROCEDURES

CONTRACT LABORATORY

The chain-of-custody procedures for the Contract Laboratory Program (CLP) are described in the SOWs for RASs. The same custody procedures apply to SASs. These custody procedures, along with the holding time requirements for CLP samples, are described in the appropriate SOW documents.

6.3 FINAL EVIDENCE FILES CUSTODY PROCEDURES

The final evidence files from the CRL and Contract Laboratory Program (CLP) are maintained by Region V CRL Laboratory Support Team, Data Coordinator.

The contractor maintains the RI files along with all relevant records, reports, logs, field notebooks, pictures, subcontractor reports and CPMS data reviews in a secured, limited access area and under custody of the contractor's site manager.

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

FIGURE 6-1

REGION 5
230 South Dearborn Street
Chicago, Illinois 60604

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME					NO. OF CONTAINERS								REMARKS
SAMPLERS: *(Signature)*														
STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION									

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks	

Distribution: White — Accompanies Shipment; Pink — Coordinator Field Files; Yellow — Laboratory File

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5
230 South Dearborn Street
Chicago, Illinois 60604

EPA

Project Code	Station No.	Month/Day/Year	Time	Designate Comp.	Designate Grab

Station Location

Samplers (Signatures)

Tag No. 5- 096953

Lab Sample No.

Remarks.	ANALYSES	Preservative: Yes ☐ No ☐
	BOD Anions	
	Solids (TSS) (TDS) (SS)	
	COD, TOC, Nutrients	
	Phenolics	
	Mercury	
	Metals	
	Cyanide	
	Oil and Grease	
	Organics GC/MS	
	Priority Pollutants	
	Volatile Organics	
	Pesticides	
	Mutagenicity	
	Bacteriology	

FIGURE 6-2
U.S. EPA FIELD SAMPLE TAG

7.0 CALIBRATION PROCEDURES AND FREQUENCY

The necessary instructions and procedures to be prepared for all REM V activities that affect data quality are identified in Section 5.5 of the REM V Quality Assurance Program Plan (REM V, Revision 0). The procedures for the operation, calibration, and maintenance of equipment are described in Section 5.11 of the Plan.

The CLP will be used for performing the analysis of the samples collected in connection with this project. The calibration procedures and frequency of calibration for RAS to be provided by the CLP are specified in the Invitation for Bids (IFBs), WA87-K236/K237/K238 and J001/J002/J003 for organics, and WA87-K025/K026/K027 and K201 for inorganics.

Calibration of equipment used in the field laboratory will be as follows:

- pH meter - calibrated using two reference solutions before and after each set of replicate measurements; solutions of pH 4.0 and 7.0 will be used for acidic samples and solutions of pH 7.0 and 10.0 will be used for basic samples.
- Thermometer - calibrated using a beaker of ice water and a beaker of boiling water at beginning of laboratory work; temperatures must be within $+2^{o}C$ of $0^{o}C$ and $100^{o}C$ respectively.

Calibration of the OVA, Gastech, and HNu organic vapor detection devices will be performed prior to field use. Calibration will be performed using reference gases in accordance with manufacturer's specifications. Calibration of the Ludlum Radiological Detection meter will also be performed by qualified REM V personnel at the regional equipment warehouse prior to field use. Procedures prescribed by the manufacturer will be used for this calibration.

Calibration of the field pH meter and the YSI specific conductance and temperature meter will be done prior to the collection of each water sample.

The field pH meter will be calibrated using two reference solutions appropriate to the pH of the sample. The YSI meter has an internal standard for specific conductance. The thermometer will be calibrated against the field laboratory thermometer. Additional information regarding the calibration of these meters can be found in Appendix 4 of the Sampling and Analysis Plan (Appendix B of QAPP).

Tape measures used to locate sampling stations and to determine depths in boreholes or wells will be examined prior to each period of sustained use to verify their calibration.

8.0 ANALYTICAL PROCEDURES

General programmatic requirements are established in Section 5.7 of the REM V Quality Assurance Program Plan (REM V, Revision 0) for the preparation of instructions and procedures required for all activities affecting the quality of data, and in Section 5.14 for selecting laboratories for analytical support. Sections LS-1 and LS-2 of the Draft REM V Technical Support Guidelines, April 1988, also provide guidance relating to Analytical Protocols and Analytical Procedures.

All surface water, sediment, soil, and groundwater samples collected for chemical analysis will be tested for the complete RAS organics and RAS inorganics (metals and cyanide) packages through the CLP. The methods for performing these analyses are specified in the IFBs, WA87-K236/K237/K238 and J001/J002/J003 for organics, and WA87-K025/K026/K027 and K201 for inorganics. The testing will also conform to the guidelines in the "User's Guide to the U.S. EPA Contract Laboratory Program, Revised December 1986." The analytical results for metals in soil and sediment will be reported on a dry weight basis. Soil samples will be shipped assuming low level contamination.

As part of the organics analysis by the CLP attempts will be made to identify unknown compounds. Computer assisted library searches will be made to tentatively identify as many as 30 organic compounds (10 volatiles and 20 extractables) in addition to those listed in Tables 4-2 and 4-6. However, no more than 4 hours per sample will be spent in the search for the identity of unknowns. The three most matched compounds will be reported via a computer mass spectral library search. Positive peak identification requires at least a five-major-peak match (including the base peak and molecular ion peak), and the relative intensities of these peaks should not vary by $\pm$20 percent compared to the suspected compound. Compounds still unidentified after 4 hours are labeled as UNKNOWN #XXX; where XXX is the scan number where the unknown appears. Purity will also be included.

The general procedures for qualitative organic vapor screening of soil samples by field monitoring equipment are summarized in Table 8-1 and are included in the Sampling and Analysis Plan (Appendix B). The SAP also contains the procedures for field measurement of pH, specific conductance and temperature of water samples.

TABLE 8-1

QUALITATIVE FIELD SCREENING FOR VOLATILE ORGANICS

1. Scope and Application

This method is applicable for qualitative screening at the sampling location for volatile organics.

2. Summary of Method

The vapor in the head space above the samples is measured with an OVA or HNu for a meter deflection, which indicates the presence of organics.

3. Apparatus

a) Organic Vapor Analyzer (OVA) or Photoionization Detector (HNu)
b) Sealed Jar
c) Aluminum Foil

4. Sample Handling and Preparation

Collect samples as specified in the QAPP and SAP and place in an 8-oz. jar until half full. Place aluminum foil over the jar mouth to achieve as tight a seal as possible. Screw the jar lid in place and allow the sample to warm to ambient temperature (approximately 75^{0}F), by setting it out in the sun or by placing it in a heated room.

5. Procedure

After the sample has warmed, which allows any volatile organics to enter the head space, poke the OVA/HNu probe through the foil. A deflection upscale indicates the presence of volatile organics. Adjust the scale if necessary.

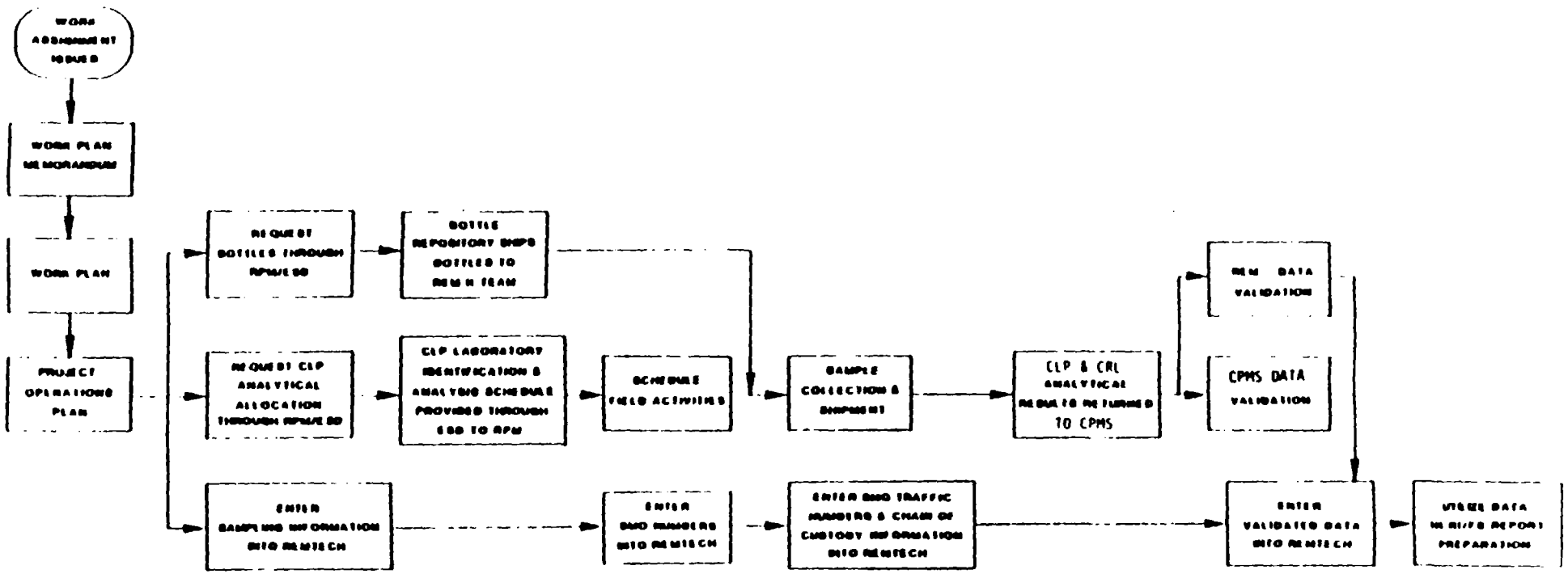
9.0 DATA REDUCTION, VALIDATION AND REPORTING

General programmatic requirements are established in Section 5.7 of the REM V Quality Assurance Program Plan (REM V, Revision 0) for the control of the collection, documentation, and reduction of data. Additional guidance is provided in Section LS-3 of the Draft REM V Technical Support Guidelines, April 1988.

Data reduction, evaluation and reporting of those samples analyzed by CLP laboratories will be performed in accordance with the specifications of the Contract Laboratory Program. The data management approach for CLP-analyzed samples is illustrated by the logic diagram shown on Figure 9-1. Following the analyses and data evaluation and reduction by the CLP Laboratory, the data will be sent to the U.S. EPA Region V Contract Project Management (CPM) Section of the CRL for data validation. The CPM Section then reviews the data for precision, accuracy and completeness in accordance with the procedures described in Laboratory Data Validation Functional Guidelines for Evaluating Organic and Inorganic Analyses prepared by U.S. EPA Data Validation Work Group, February, 1988.

Analytical data from SAS requests is assessed for contractural compliance and completeness by the Sample Management Office based on the requirements of the SAS request. The CPM Section of the CRL then assesses the data for completeness, accuracy and precision based on the requirements given in the SAS request. The general procedure used for data assessment is described in Laboratory Data Validation Functional Guidelines for Evaluating Organic and Inorganic Analyses.

In addition to the summarized forms for precision and accuracy of the analyses (EPA Form 1320-6), the CRL is requested to provide the complete CLP deliverables package to the Site Manager. Transmittal of the CLP deliverables package is requested upon receipt by the CRL.



CRL-CENTRAL REGION LABORATORY

CPMS-CONTRACT PROGRAM MANAGEMENT SECTOR,CRL

FIGURE 9-1

CLP Analytical Data Management Flow Chart

The reduction, validation, and reporting of data generated by the CRL will be performed according to the process shown in Figure 9-2. The SOPs for data reduction and reporting are specified in the Quality Assurance Program Plan for the CRL. Data validation is performed by the Quality Control Section of the CRL in accordance with the specific method of analysis.

Raw data from field measurements and sample collection activities will be appropriately recorded in the field log book. If the data is to be used in the project reports, it will be reduced or summarized and the method of reduction documented in the report.

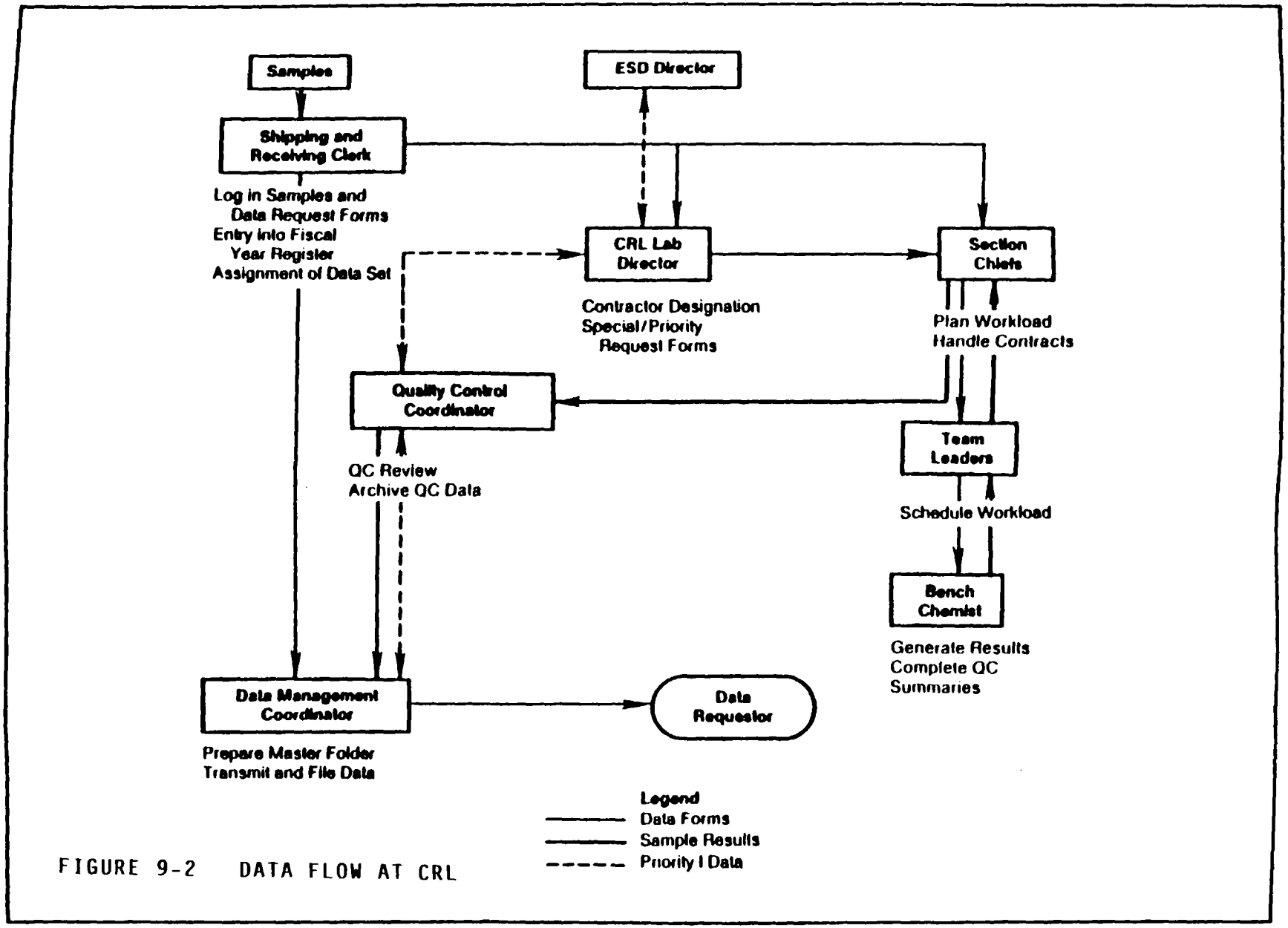


FIGURE 9-2 DATA FLOW AT CRL

10.0 INTERNAL QUALITY CONTROL PROCEDURES

General programmatic requirements for internal quality control procedures are discussed in Section 5.1 of the REM V Draft Quality Assurance Program Plan (REM V, Revision 0) for the preparation of instructions and procedures for all activities affecting the quality of data, in Section 5.16 for identification and control of nonconformances and Section 5.4 for the preparation and use of work plans. Sections LS-1 and LS-2 of the Draft REM V Technical Support Guidelines, April 1988 also describes QA/QC as it relates to the analyses and screening of field samples.

Internal quality control procedures for RAS from the CLP are specified in IFBs, WA87-K236/K237/K238 and J001/J002/J003 for organics and WA87-K025/K026/K027 and K201 for inorganics. These specifications include the types of audits required (sample spikes, surrogate spikes, reference samples, controls, blanks), the frequency of each audit, the compounds to be used for sample spikes and surrogate spikes, and the quality control acceptance criteria for these audits.

For SAS requests, the internal quality control procedures are specified for each individually. SAS request for the Hunts Disposal Landfill RI are contained in the SAP (Appendix B).

Quality control procedures for field measurement are limited to checking the reproducibility of the measurement in the field by obtaining multiple readings and/or by calibrating the instruments (where appropriate).

Quality control of field sampling will involve collecting field duplicates and blanks in accordance with the applicable procedures described in the Sampling and Analysis Plan (Appendix B). The level of effort is indicated in Table 2-6 of this QAPP and the identical Table 1-2 of the Sampling and Analysis Plan.

11.0 PERFORMANCE AND SYSTEM AUDITS

The considerations and procedures for conducting quality assurance audits are described in Section 5.12 of the REM V Quality Assurance Program Plan (REM V, Revision 0).

The Site Manager will monitor the procedures used during the RI/FS to ensure that the project is executed in accordance with this QAPP.

Performance and system audits of the CLP will be scheduled and executed by EMSL-Las Vegas. Performance audits, which are based on the laboratory's ability to properly analyze an unknown reference sample, are done on a quarterly basis. System audits, which are based on on-site inspection of the laboratory, are performed on an annual basis.

Audits of the CRL will be scheduled and executed by the Quality Assurance Office of Region V, U.S. EPA. Performance audits are done on a quarterly basis, and system audits are done on a quarterly basis. System audits of the field laboratory, when these facilities are available, will be scheduled by the REM V Quality Assurance Director (QAD) or Deputy Quality Assurance Director (DQAD) and executed by auditors identified by the QAD or DQAD at the time of scheduling. Performance audits of field laboratories are not required.

The QAD or DQAD will also schedule system audits of Work Assignment (WA) activities which affect data quality. These audits will be scheduled to allow oversight of as many different field activities as possible, and will be performed by auditors identified by the QAD or DQAD. A minimum of one system audit will be scheduled in each project phase (Work Plan, Remedial Investigation, Feasibility Study, etc.). Performance audits will be scheduled on limited number of WAs identified by the QAD and/or the DQAD.

As this is a enforcement site it is expected to be chosen for a performance audit to be scheduled by the QAD or the DQAD. Such audits will generally be announced in advance to the Site Manager. The objectives of the performance audits are:

- To observe project activities in process in order to verify that the established Quality Control measures, procedures and documentation are being implemented as specified.
- To identify nonconformances with the established quality control measures, procedures and documentation.
- To recommend corrective actions for identified nonconformances.
- To verify implementation of corrective actions.
- To provide written reports of audits.

12.0 PREVENTIVE MAINTENANCE

General programmatic requirements are established in Section 5.11 of the REM V Quality Assurance Program Plan (REM V, Revision 0) for procedures for obtaining, using, and maintaining equipment.

All laboratories participating in the CLP are required under respective IFBs for organics and inorganics to have Standard Operating Procedures (SOPs) for preventive maintenance for each measurement system and required support activity. All maintenance activities must be documented in log books to provide a history of maintenance records for the U.S. EPA Region V Central Regional Lab's. Preventive maintenance SOPs are described in the Quality Assurance Program Plan for the CRL.

The field equipment to be used for this project includes a field pH meter, a YSI specific conductance and temperature meter, a Foxboro Century 128 OVA, a Gastech Combustible Gas/Oxygen Meter, Ludlum Radiological Survey Meter, and an HNu photoionization detector. Specific preventive maintenance procedures are performed by the REM V Equipment Manager and spare parts are located in the equipment warehouse. The Field Manager will be responsible for calibrating the pH meter and the YSI specific conductance and temperature meter, and verifying that the other instruments were calibrated by the Equipment Manager prior to field use. Specific calibration procedures and frequency requirements are outlined in Section 7.0 of this QAPP.

13.0 DATA ASSESSMENT

General programmatic requirements are established in Section 5.6 of the REM V Quality Assurance Program Plan (REM V, Revision 0) for the preparation of instructions and procedures for all activities affecting the quality of data. Procedures to be used in tracking and processing analytical data are provided in Section LS-2 of the Draft REM V Technical Support Guidelines, April 1988.

Analytical data from the CLP is assessed for accuracy, precision, and completeness by the Sample Management Office of the CLP with overview by the Contract Program Management Section of the CRL in accordance with respective standard procedures.

The bench chemist directly responsible for the test knows the current operating acceptance limits. This person can directly accept or reject the data generated and consult with the Team Leader for any corrective action. Once the bench chemist has reported the data deemed acceptable, the chemist initials the report sheet. Any out-of-control results that occurred are flagged and a note is made as to why the result was reported.

The Team Leader receives the data sheets, reviews the quality control data that accompanied the sample run, initials the report sheet, and forwards it to the Section Chief. The Section Chief, after checking the reported data for completeness and quality control results, either initials the report sheet or sends it back to the Team Leader for rerunning samples. The QC Coordinator reviews data considered acceptable by the Section Chief. Any remaining out-of-control results that, in the opinion of the QC Coordinator, do not necessitate rerunning of the sample are flagged and a memo

written to the data user regarding the utility of the data. Data generated from all high priority studies are given a final review by the CRL Director.

All data will be reviewed for completeness by the principal investigators as appropriate to their operational responsibilities.

14.0 CORRECTIVE ACTION PROCEDURES

General programmatic requirements are established in Section 5.16 of the REM V Quality Assurance Program Plan (REM V, Revision 0) for the reporting, evaluation, and disposition of nonconformances, and in Section 17 for recording and correcting nonconformances. Additional guidance for corrective action procedures is provided by REM V Quality Assurance Audit Procedures (REM V, Revision 0). Conditions requiring immediate corrective action shall be reported immediately to the QAD or the DQAD. The QAD or DQAD shall notify the audited entity in writing of the results of the audit. Should these results include nonconformances, the QA Auditor shall initiate a nonconformance report(s) on the appropriate forms. The QAD or DQAD shall certify the need for corrective action and forward the nonconformance report to the audited entity. The audited entity shall initiate the implementation of corrective actions. Such actions must be completed to the satisfaction of the audit team. The iterative process for arriving at an adequate corrective action is shown on Figure 14-1.

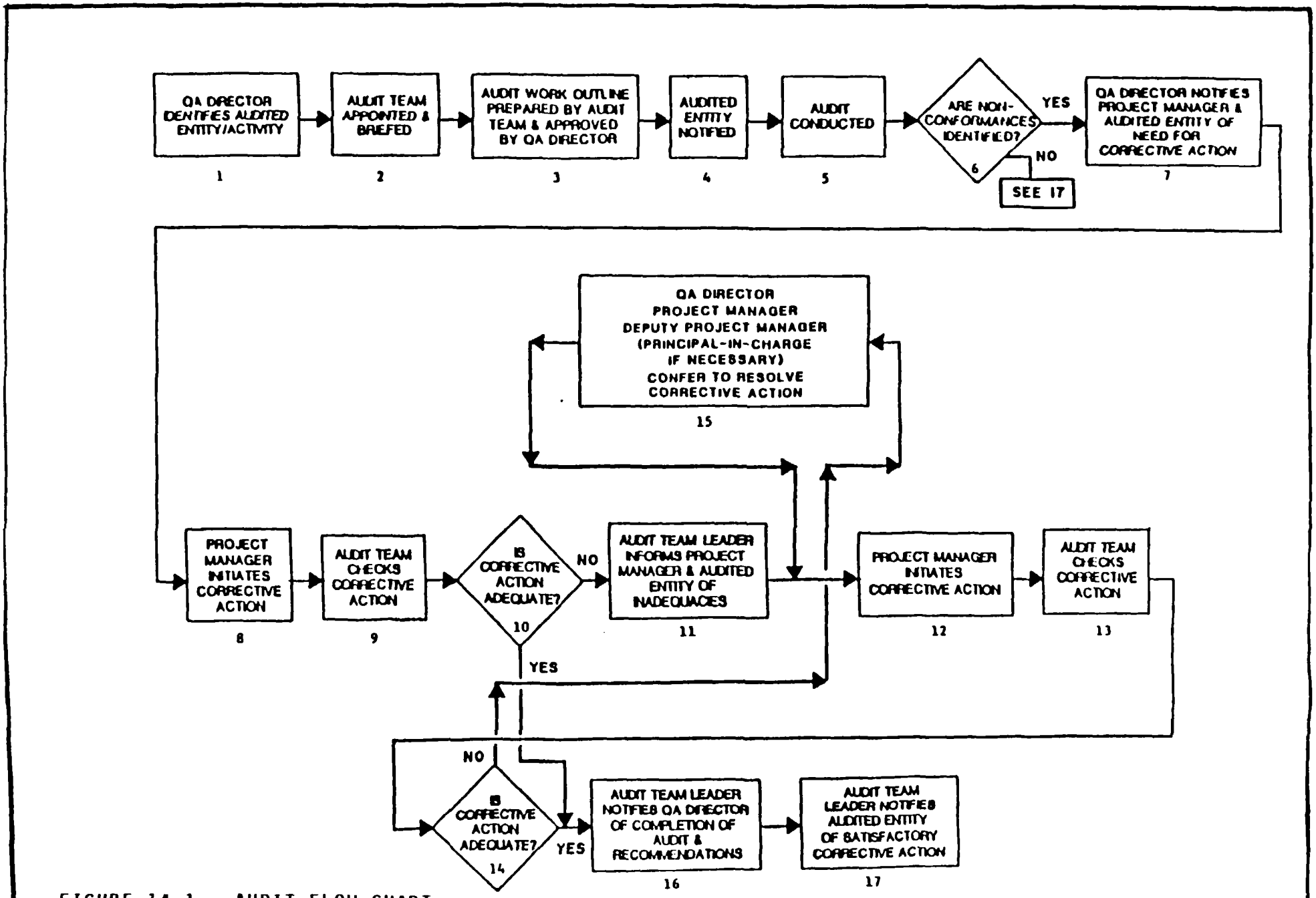


FIGURE 14-1 AUDIT FLOW CHART

15.0 QA REPORTS

The Quality Assurance Director or his designee will review all aspects of the implementation of this Quality Assurance Project Plan on a monthly basis and submit a summary report to the Principal-in-Charge and the Project Manager of WR&J in accordance with Section 5.1.5.3 of the REM V Quality Assurance Program Plan. These reviews will include an assessment of data quality, and the results of systems and/or performance audits as appropriate.

In the event of a disagreement between the Quality Assurance Director and the Project Manager on the adequacy of corrective actions implemented by the latter, the WR&J Principal-in-Charge may be informed and requested to confer on a resolution of the dispute in accordance with Section 5.15 of the Quality Assurance Program Plan (see Figure 14-1 herein).

16.0 GLOSSARY OF TERMS

ACCURACY - The degree of agreement of a measurement (or an average of measurements of the same thing), X, with an accepted referenced or true value, T, usually expressed as the difference between the two values, X-T, or the difference as a percentage of the reference or true value, 100 (X-T)/T, and sometimes expressed as a ratio, X/T. Accuracy is a measure of the bias in a system.

AUDIT - A systematic check to determine the quality of operation of some function or activity. Audits may be of two basic types: (1) system audits that consist of a review of the quality control system to ensure that a comprehensive set of quality control methods, procedures, reviews, and signoff approvals is established or in place, and (2) performance audits in which project activities are observed in process for their compliance with the established quality control procedures and requirements.

COMPARABILITY - Expresses the confidence with which one data set can be compared to another.

COMPLETENESS - 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.

DATA VALIDATION - A systematic process for reviewing a body of data against a set of criteria to provide assurance that data are adequate for their intended use. Data validation consists of data editing, screening, checking, auditing, verification, certification, and review.

ENVIRONMENTALLY RELATED MEASUREMENTS - A term used to describe essentially all field and laboratory investigations that generate data involving (1) the measurement of chemical, physical, or biological parameters in the environment; (2) the determination of the presence or absence of criteria or hazardous substance list compound in waste streams; (3) assessment of health and ecological effect studies; (4) conduct of clinical and epidemiological investigations; (5) study of laboratory stimulation of environmental events; and (7) study of measurement on pollutant transport and fate, including diffusion models.

PRECISION - A measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. Precision is best expressed in terms of the standard deviation. Various measures of precision exist depending upon the "prescribed similar conditions".

QUALITY ASSURANCE - The total integrated program for assuring the reliability of monitoring and measurement data. A system for integrating the quality planning, quality assessment, and quality improvement effort to meet user requirements.

QUALITY ASSURANCE PROGRAM PLAN - An orderly assemblage of management policies, objectives, principles, and general procedures by which an agency or laboratory outlines how it intends to produce data of known and accepted quality.

QUALITY ASSURANCE PROJECT PLAN - An orderly assemblage of detailed and specific procedures which delineates how data of known and accepted quality are produced for a specific project. (A given agency or laboratory would have only one quality assurance program plan, but would have a quality assurance project plan for each of its projects).

QUALITY CONTROL - The routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process.

REPRESENTATIVENESS - Expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process conditions, or an environmental condition.

STANDARD OPERATING PROCEDURE (SOP) - A written document which details an operation, analysis, or action whose mechanisms are thoroughly prescribed and which is commonly accepted as the method for performing certain routine or repetitive tasks.

APPENDIX A

EXISTING ANALYTICAL DATA

A-1 General Channel Borings:

A-2 Well Installation Borings: Oak Creek Study

A-3 Limit of Landfill Location Borings: Oak Creek Study

A-4 Analytical Data for Water Samples for Existing Monitoring Wells: Oak Creek Study

A-5 Investigation Summary and Potential Hazardous Waste Site Inspection Report (EPA Form 2070-13): NUS Investigation

QAPP

HUNTS DISPOSAL LANDFILL SITE

APPENDIX A-1

GENERAL CHANNEL BORINGS

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 1

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 2/13/84

(Channel Borings) Racine County, Wisconsin GEA Project No.: 840104

DESCRIPTION	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	w	REMARKS
SEE NOTE A		1-AU	--					
Black Organic Clayey Silt - moist		2-SS	5		0.50	0.30	47	▼
Brown very fine Sand - Moist	5'	3-SS	3					
		4-SS	4				15	
Gray Silt, trace fine Sand - Moist	10'	5-SS	10		0.5	0.17	23	see Figure 4
Gray fine Sand, some thin Silty to Clayey Silt lenses - Moist		6-SS	14		0.5	0.35	21	
Gray varved Clayey Silt, and Silt	15'	7-SS	10	2.48	2.25		25	
Gray fine Sand, some thin Silt lenses - Moist		8-SS	6					
	20'	9-SS	9					
Boring Terminated @ 21'								
NOTE A	25'							
20" ± Black Organic Clayey Silt, trace root (Topsoil) - Moist	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 3

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 2/13/84

(Channel Borings) Racine County, Wisconsin GEA Project No.: 840104

DESCRIPTION	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
SEE NOTE A		1-AU	--					
Black Organic Silt - Moist		2-SS	4				153	▼
Gray very fine Sand - Moist	5'	3-SS	6				23	
Gray Silt, trace fine Sand-Moist		4-SS	11		0.5	0.11	20	see Figure 5
Gray fine to coarse Sand, little Silt - Moist	10'	5-SS	20					
Gray laminated Silt to Clayey Silt Moist		6-SS	16		1.5	0.65	21	
Gray fine to coarse Sand and Gravel Wet	15'	7-SS	25					
Gray Silt - Moist to Wet		8-SS	19				15	
Gray fine to coarse Sand and Gravel Wet	20'	9-SS	10					
Boring Terminated @ 21'								
NOTE A	25'							
12" ± Black Organic Silt, trace roots (Topsoil) - Wet	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and ma vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 4

CONSULTING SOIL AND FOUNDATION ENGINEER

Project: Proposed Root River Channel Improvements (Channel Borings) Racine County, Wisconsin

Date: 2/13/84

GEA Project No.: 840104

DESCRIPTION	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	w	REMARKS
Black fibrous-Organic Silt (Peat) Moist		1-AU	--					▼
		2-SS	3				98	
Gray-Brown very fine Sand, little Silt - Moist	5'	3-SS	15					
		4-SS	11		1.0	0.36	19	see Figure 6
Gray-Brown very fine Sand, some Silt lenses - Moist	10'	5-SS	3				18	
Gray fine to medium Sand, some thin Silt seams - Moist		6-SS	12					
	15'	7-SS	20					
Gray-Brown Silt, little fine Sand Moist		8-SS	7				20	
	20'	9-SS	7		0.25	0.15	19	
Boring Terminated @ 21'	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and m vary considerably between boring locations.

Giles Engineering Associates, Inc.

Boring No. 5

Consulting Soil and Foundation Engineers

Project: Proposed Root River Channel Improvements Date: 2/16/84

(Channel Borings) Racine County, Wisconsin GEA Project No.: 840104

DESCRIPTION	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
Brown fine Sandy Silt, trace roots, some Organic Staining - Moist		1-AU	--					
		2-SS	12		0.25	0.05	27	
Brown Silty Clay, little fine Sand- Moist	5'	3-SS	21	11.33	7.0		18	▼
Gray-Brown very fine Sand-Wet		4-SS	17					
Gray Silt, trace fine Sand - Moist	10'	5-SS	15	1.55	1.5	0.48	17	
		6-SS	29	3.46	2.75		15	
Gray fine Sand, little Silt - Wet	15'	7-SS	14					see Figure 7
Gray Silt, little fine Sand - Moist		8-SS	13	1.47	1.25	0.46	20	
	20'	9-SS	12	1.55	1.25	0.45	21	
Boring Terminated @ 21'	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

GILES ENGINEERING ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No. 6

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 2/18/84

(Channel Borings) Racine County, Wisconsin GEA Project No.: 840104

DESCRIPTION	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
SEE NOTE A		1-AU	--					
Brown fine Sand, little Silt - Moist		2-SS	15		1.25	0.05	21	▼
Brown very fine Sand - Moist	5'	3-SS	15					
		4-SS	17				16	
	10'	5-SS	11					
Gray fine to coarse Sand, some fine Gravel - Wet		6-SS	15					
	15'	7-SS	15					see Figure 8
		8-SS	20					
	20'	9-SS	17					
Boring Terminated @ 21'								
	25'							
NOTE A								
7" ± Dark Brown Silty Clay, little fine to coarse Sand - Moist	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

GILES ENGINEERING ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No. 6

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 2/18/84

(Channel Borings) Racine County, Wisconsin GEA Project No.: 840104

DESCRIPTION	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
SEE NOTE A		1-AU	--					
Brown fine Sand, little Silt - Moist		2-SS	15		1.25	0.05	21	▼
Brown very fine Sand - Moist	5'	3-SS	15			--		
		4-SS	17				16	
	10'	5-SS	11					
Gray fine to coarse Sand, some fine Gravel - Wet		6-SS	15					
	15'	7-SS	15					see Figure 8
		8-SS	20					
	20'	9-SS	17					
Boring Terminated @ 21'								
	25'							
NOTE A								
7" ± Dark Brown Silty Clay, little fine to coarse Sand - Moist	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 7

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements (Channel Borings) Racine County, Wisconsin

Date: 2/13/84

GEA Project No.: 840104

DESCRIPTION	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
SEE NOTE A		1-AU	--					
Brown and Dark Brown mixed fine Silty Sand - Moist (Possible Fill)		2-SS	6		0.75	0.12	41	▼
Gray Silt, some thin fine Sand lenses - Moist	5'	3-SS	14			--	19	
Gray-Brown fine Sandy Silt - Moist		4-SS	17		0.25	0.13	21	see Figure 9
	10'	5-SS	13					
Gray-Brown fine Sand, some Silt - Moist		6-SS	12					
Gray-Brown fine to coarse Sand - Wet	15'	7-SS	18					
Gray very fine Silty Sand - Moist		8-SS	17					
Gray fine to medium Sand - Wet	20'	9-SS	16					
Boring Terminated @ 21'								
	25'							
NOTE A								
Black fibrous Organic Silt (Fill) Moist	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

CONSULTING SOIL AND FOUNDATION ENGINEERS

Boring No. 8

Project: Proposed Root River Channel Improvements

Date: 2/13/84

(Channel Borings) Racine County, Wisconsin

GEA Project No.: 840104

DESCRIPTION	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	w	REMARKS
SEE NOTE A		1-AU	--					
Dark Brown Silt, little fine Sand- Moist		2-SS	5				26	▼
Brown very fine Sand - Moist	5'	3-SS	8		1.0		18	
Gray-Brown fine Sand, little Silt- Moist		4-SS	15				19	see Figure 10
	10'	5-SS	14					
Gray fine Sand, little Silt - Moist		6-SS	17					
	15'	7-SS	19					
Gray fine to medium Sand, some Silt Moist		8-SS	23					
Gray fine to coarse Sand - Moist	20'	9-SS	17					
Boring Terminated @ 21'	25'							
NOTE A Dark Brown fine Sandy Silt - Moist	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

GILES ENGINEERING ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

CONSULTING SOIL AND FOUNDATION ENGINEERS

Boring No. 9

Project: Proposed Root River Channel Improvements (Channel Borings) Racine County, Wisconsin

Date: 2/13/84

GEA Project No.: 840104

DESCRIPTION	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	w	REMARKS
SEE NOTE A		1-AU	--					
Brown very fine Sand - Moist		2-SS	21	0.22	0.25		20	▼
Gray very fine Sand, some thin Silt seams - Moist	5'	3-SS	22		1.25	0.36	19	
Gray-Brown very fine Sand, little Silt - Moist		4-SS	25					
	10'	5-SS	14					
Gray-Brown very fine Sandy Silt - Moist		6-SS	14	1.40	1.0	0.41	21	see Figure 11
Gray laminated Silt and fine Sand - Moist	15'	7-SS	11	0.66	0.75	0.27	20	
Gray fine to coarse Sand and Gravel, little Silt - Moist		8-SS	15					
Gray-Brown fine to medium Sand, little Silt - Moist	20'	9-SS	11				25	
Boring Terminated @ 21'								
NOTE A	25'							
11" ± Black fibrous Silt - Moist								
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 10

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements

Date: 2/13/84

(Channel Borings) Racine County, Wisconsin

GEA Project No.: 840104

DESCRIPTION	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_t	W	REMARKS
SEE NOTE A		1-AU	--					
Brown Clayey Silt, little fine Sand - Moist		2-SS	8	1.03	1.25	0.28	13	
Brown fine Sand - Damp to Moist	5'	3-SS	21				5	
Gray-Brown fine Sand, trace Silt - Moist		4-SS	20		2.75		15	▼
	10'	5-SS	17					see Figure 1
		6-SS	17					
Gray fine Sand - Moist	15'	7-SS	17					
Gray laminated Silt, some thin fine Sand and Silty Clay lenses - Moist		8-SS	13		0.5	0.14	24	
Gray fine to medium Sand - Moist to Wet	20'	9-SS	22				18	
Boring Terminated @ 21'	25'							
NOTE A								
Brown Sandy Silt, trace roots (Topsoil) - Moist	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and r vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 11

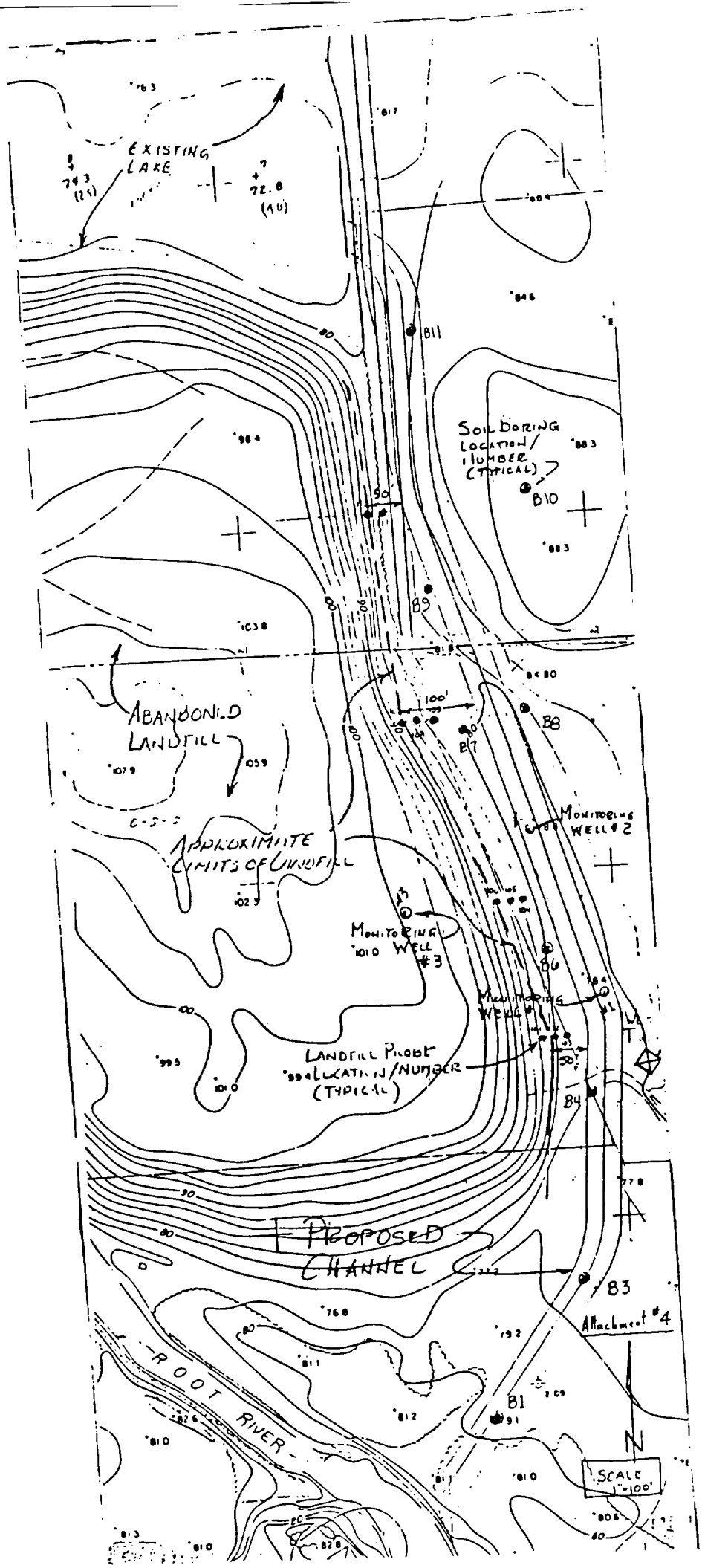
CONSULTING SOIL AND FOUNDATION ENGINEER

Project: Proposed Root River Channel Improvements Date: 2/13/84

(Channel Borings) Racine County, Wisconsin GEA Project No.: 840104

DESCRIPTION	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
SEE NOTE A		1-AU	--					
Dark Brown fine Sandy Silt, little medium to coarse Sand and Gravel-Moist		2-SS	4	0.89	1.25	0.51	24	▽
Gray-Brown fine Sand - Moist	5'	3-SS	9					
		4-SS	11					see Figure 13
	10'	5-SS	11					
		6-SS	14					
Gray Silt, some very thin fine Sand lenses - Moist	15'	7-SS	9		0.25	0.12	21	
Gray very fine Sand, little Silt - Moist		8-SS	18				22	
Gray Silt, some thin fine to coarse Sand and Gravel seams - Damp	20'	9-SS	19		0.75	0.25	20	
Boring Terminated @ 21'								
NOTE A 20" ± Black Organic fibrous Silt - Moist	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and n vary considerably between boring locations.


EXISTING LAKE
743 (25)
728 (10)
SOIL BORING LOCATION/ NUMBER (TYPICAL)
B10
B11
B9
B8
B7
B6
B5
B4
B3
ABANDONED LANDFILL
APPROXIMATE LIMITS OF LANDFILL
MONITORING WELL #2
MONITORING WELL #3
LANDFILL PROBE LOCATION/NUMBER (TYPICAL)
PROPOSED CHANNEL
ROOT RIVER
SCALE 1"=100'
Attachment #4

QAPP

HUNTS DISPOSAL LANDFILL SITE

APPENDIX A-2

WELL INSTALLATION BORINGS: OAK CREEK STUDY

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Well No. 1

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 3-22-84

(Well Installations) Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
Black Organic Fibrous Silt (Peat)-Moist		1-AU	--					▼
		2-SS	4					
Note A	5'							
		3-SS	13					
Gray Brown fine Sand, some Silt-Wet		4-SS	11					
Gray Brown fine to medium Sand-Moist	10'	5-SS	10					
Gray Brown Silt-Moist		6-SS	16					
Gray Brown fine to medium Sand little medium to coarse Gravel -Moist	15'	7-SS	19					
Gray very fine Sand, some Silt -Moist		8-SS	13					
Gray Silt - Moist	20'	9-SS	11					
Boring Terminated at 21'								Water at 3' at comple-tion
Note A: Black Organic Silt, some fine Sand Seams and partially decomposed Wood fragments-Moist	25'							
Note: A well was set in the borehole at a depth of 20 feet.	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Well No. 2

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 3-22-84

(Well Installations) Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
Black Organic Silt, some Organic Matter		1-AU	--					
Dark Gray to Brown fine to medium Sand, some Organic staining		2-SS	6					▼
Gray very fine Sand, some Silt-Moist	5'	3-SS	18					
Gray fine Sand-Moist		4-SS	23					
	10'	5-SS	15					
		6-SS	15					
Gray fine to coarse Sand, little meduim to coarse Gravel-Moist	15'	7-SS	15					
		8-SS	18					
	20'	9-SS	15					
Boring Terminated at 21'								water a 3½' whil drillin
Note: A well was set at a depth of 20 feet.	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and r vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Well No. 3

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 3-22-84

(Well Installation$) Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
Dark Gray Brown fine Sandy Silt trace Roots (FILL)		1-AU	--					
Gray Brown fine Sand, trace plastic (FILL)-Moist		2-SS	15					
Gray Brown and Black mixed fine Sandy Silt (FILL)-Moist	5'	3-SS	32					
		4-SS	19					
Note A								
Gray and Black mixed fine Sand some Plastic and Organic Matter (FILL)-Moist	10'	5-SS	7					
Dark Gray Brown fine Sandy Silt some Styrofoam, Plastic, Wood Fragments and Organic Matter (FILL)-Moist		6-SS	71					
	15'	7-SS	54/4"					
		8-SS	23					
	20'	9-SS	5					
Boring Terminated at 21'								
	25'							
Note A: Gray Brown fine Sand, some Glass and Paper- (FILL)-Moist	30'							
	35'							
A well was installed in the borehole at a depth of 20 feet	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and m vary considerably between boring locations.

10

QAPP

HUNTS DISPOSAL LANDFILL SITE

APPENDIX A-3

LIMIT OF LANDFILL LOCATION BORINGS: OAK CREEK STUDY

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 101

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 4-17-84

Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
Dark Brown fine Sandy Silt, trace Roots(FILL)-Moist		1-AU	--					
Gray Brown fine Sandy Silt-(FILL)		2-SS	14					▼
Gray Brown fine Sandy Silt, some Plastic and Paper (FILL)-Moist	5'	3-SS	13					
		4-SS	11					
Boring Terminated at 8½'	10'							Water at 2'-11" and Cave at 3' at completio
	15'							
	20'							
	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 102

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 4-17-84

Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	w	REMARKS
Note A		1-AU	--					
Gray and Brown mix fine Sandy Silt, some Paper (FILL)-Moist		2-SS	12					
	5'	3-SS	23					
Boring Terminated at 6.0'								
	10'							
Note A: Black Organic fine Sandy Silt (FILL)-Moist								
	15'							
	20'							
	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

GILES ENGINEERING ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No. 103

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 4-17-84

Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
Note A		1-AU	--					
Gray Brown Silty very fine Sand-Wet		2-SS	13					
	5'	3-SS	10					
Boring Terminated at 6.0'								
	10'							
Note A: Black Organic fine Sandy Silt, trace Roots and Organic Matter-Moist	15'							
	20'							
	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

EPA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
WI	D980511919

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
Hunts Disposal Landfill	County Line Road & Foley Road				
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 COUNTY**	**07 COUNTY CODE**	**08 CONG DIST**
Caledonia	WI	53108	Racine	101	01

09 COORDINATES — LATITUDE: 42° 50' 10.0" | LONGITUDE: 087° 52' 50.0"

10 TYPE OF OWNERSHIP (Check one)
☐ A. PRIVATE ☐ B. FEDERAL _____ ☐ C. STATE ☒ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER _____ ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
11 / 15 / 84 (MONTH DAY YEAR)	☐ ACTIVE ☒ INACTIVE	1951 (BEGINNING YEAR) 1974 (ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)
☐ A. EPA ☒ B. EPA CONTRACTOR NUS Corporation (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR _____ (Name of firm)
☐ E. STATE ☐ F. STATE CONTRACTOR _____ (Name of firm) ☐ G. OTHER _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO
Richard Cawley	Geologist	NUS Corp.	(201) 225-6160
09 OTHER INSPECTORS	**10 TITLE**	**11 ORGANIZATION**	**12 TELEPHONE NO**
Joseph Cattafe	Geologist	NUS Corp.	(201) 225-6160
Paul McNally	Biologist	NUS Corp.	(201) 225-6160
Barry Dambach	Chemical Engineer	NUS Corp.	(201) 225-6160
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
Bye Zickus	Representitive	Racine Co. Parks Dept.	(414) 886-3366
Pixie Newman	Env. Sci.	CH2MHILL	(414) 272-2426
Mike Schuetz	Env. Sci.	CH2MHILL	(414) 272-2426
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☒ PERMISSION ☐ WARRANT	0945	Overcast, Windy 20° - 30°F

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO
Mike Strimbu	Environmental Protection Agency, Region V	(312) 353-6417

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
William G. Russell		NUS Corp.	(201) 225-6160	7 / 24 / 85 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

EPA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
WI	D980511919

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- [X] A SOLID
- [ ] B POWDER, FINES
- [ ] C SLUDGE
- [ ] D OTHER _____ (Specify)
- [ ] E SLURRY
- [X] F LIQUID
- [ ] G GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____

CUBIC YARDS _____

NO OF DRUMS 300,000

03 WASTE CHARACTERISTICS (Check all that apply)

- [X] A TOXIC
- [ ] B CORROSIVE
- [ ] C RADIOACTIVE
- [ ] D PERSISTENT
- [ ] E SOLUBLE
- [ ] F INFECTIOUS
- [ ] G FLAMMABLE
- [X] H IGNITABLE
- [ ] I HIGHLY VOLATILE
- [ ] J EXPLOSIVE
- [ ] K REACTIVE
- [ ] L INCOMPATIBLE
- [ ] M NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			No records of individual waste
OLW	OILY WASTE			quantities were available. Waste
SOL	SOLVENTS	Unknown		type information was taken from
PSD	PESTICIDES	Unknown		Section E of EPA form 8900-1,
OCC	OTHER ORGANIC CHEMICALS	Unknown		notification of Hazardous Waste Site.
IOC	INORGANIC CHEMICALS	Unknown		The waste was landfilled in drums.
ACD	ACIDS	Unknown		
BAS	BASES	Unknown		
MES	HEAVY METALS	Unknown		

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
OCC	Dichloroethane	75-34-3	Landfill	57	ppb
OCC	Trichlorethane	71-55-6	Landfill	10	ppb
MES	Iron	14596-12-4	Landfill	66.6	ppm
MES	Cadmium	7440-43-9	Landfill	14	ppm
MES	Chromium	7440-47-3	Landfill	64	ppb
MES	Manganese	7439-96-5	Landfill	3,330	ppb

V. FEEDSTOCKS (See Appendix for CAS numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references e.g. state files, sampling results, reports)

Notification of Hazardous Waste Site, EPA from 8900-1. submitted by: S. C. Johnson & Sons, Inc., dated 6/8/81 and Waste Management of Wisconsin, Inc., dated 6/9/81

Sample results from FIT Site Inspection 11/15/84.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
WI	D980511919

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 3040
02 ☐ OBSERVED (DATE _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

The landfill was closed in 1974 and has no leachate collection system. The potential exists for contaminant migration into the grounwater.

01 ☒ B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 100
02 ☐ OBSERVED (DATE _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

A potential for surface water contamination exists. Observed leachate seeps may have an impact on surface water.

01 ☐ C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: 0
02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No potential for air contamination exists. The landfill was closed in 1974 and additional abandonment work is being completed.

01 ☐ D. FIRE EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: 0
02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No potential fire/explosive conditions exist.

01 ☒ E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED: 50
02 ☐ OBSERVED (DATE _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

A potential for direct contact exposure exists. When snow covered, areas of the landfill are used by the Racine County Parks Department for snowmobile trails.

01 ☒ F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: 82 (Acres)
02 ☐ OBSERVED (DATE _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

A potential for soil contamination exists due to the types of material disposed on-site.

01 ☒ G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 3040
02 ☐ OBSERVED (DATE _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

The potential does exist for groundwater to become contaminated.

01 ☐ H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: 0
02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No potential for worker exposure exists, the site was closed in 1974.

01 ☒ I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: 3040
02 ☐ OBSERVED (DATE _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Potential exists for population exposure/injury if groundwater and/or surface water become contaminated.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: WI | 02 SITE NUMBER: D980511919

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☒ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) — ☒ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

The potential exists for contamination of flora if groundwater and surface water become contaminated.

01 ☒ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE _____) — ☒ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include names of species)

The potential exists for contamination of fauna if groundwater and surface water become contaminated.

01 ☒ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE _____) — ☒ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

The potential exists for contamination of the food chain if groundwater and surface water become contaminated.

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES (Spills, Runoff, Standing liquids, Leaking drums) — 02 ☒ OBSERVED (DATE 11/15/85) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ — 04 NARRATIVE DESCRIPTION

Leachate was observed during the NUS Corporation, Site Inspection 11/15/85 and has been observed during past inspections.

01 ☒ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE _____) — ☒ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

A potential for damage to offsite property exists due to the spead of leachate from the site.

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE _____) — ☐ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No potential for contamination of sewers, storm drains or WWTPs exists.

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE _____) — ☒ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

A potential exists for illegal/unauthorized dumping because the site is not secured by fence or guard.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

No other known or potential hazards exist.

III. TOTAL POPULATION POTENTIALLY AFFECTED: 3040

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sampling results)

Background information obtained from Ecology and Environment, Region V, FIT, Ecology and Environment background information was received by NUS Corporation 10/15/84.
NUS Corporation, site inspection conducted 11/5/84

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
WI	D980511919

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES				The site has been closed
☐ B. UIC				since 1974
☐ C. AIR				
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☒ F. LANDFILL	15,000,000	gal
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

06 TREATMENT (Check all that apply)

☐ A. INCINERATION
☐ B. UNDERGROUND INJECTION
☐ C. CHEMICAL/PHYSICAL
☐ D. BIOLOGICAL
☐ E. WASTE OIL PROCESSING
☐ F. SOLVENT RECOVERY
☐ G. OTHER RECYCLING/RECOVERY
☐ H. OTHER (Specify)

None

09 OTHER

☐ A. BUILDINGS ON SITE

No buildings on site

08 AREA OF SITE

80 (Acres)

07 COMMENTS

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☒ B. MODERATE ☐ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

Leachate seeps have been observed, however additional abandonment work is being completed.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE ☐ YES ☒ NO

02 COMMENTS

The waste has been graded, and covered with two feet of sandy earth.

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

Background information obtained from Ecology and Environment, Region V, FIT
NUS Corporation, site inspection conducted 11/15/84

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
WI	D980511919

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as appropriate)

	SURFACE	WELL
COMMUNITY	A. ☐	B. ☒
NON-COMMUNITY	C. ☐	D. ☒

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A. ☐	B. ☐	C. ☒
D. ☐	E. ☐	F. ☒

03 DISTANCE TO SITE

A. 0.25 (mi)
B. 0.25 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A. ONLY SOURCE FOR DRINKING ☒ B. DRINKING (Other source available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water source available) ☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other source available) ☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER 3040

03 DISTANCE TO NEAREST DRINKING WATER WELL 0.25 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
3 (ft)	Southeast	3 (ft)	Unknown (gpd)	☐ YES ☒ NO

09 DESCRIPTION OF WELLS (Including useage, depth, and location relative to population and buildings)

Three, twenty foot, monitoring wells were installed at the landfill on 3/22/84. The local drinking water supply is groundwater and three tap water samples were collected 11/15/84 during the NUS Corporation site inspection.

10 RECHARGE AREA		11 DISCHARGE AREA	
☐ YES ☒ NO	COMMENTS: None	☒ YES ☐ NO	COMMENTS: Local groundwater would tend to discharge into the Root River.

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☒ A. RESERVOIR, RECREATION, DRINKING WATER SOURCE ☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C. COMMERCIAL, INDUSTRIAL ☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME	AFFECTED	DISTANCE TO SITE
Root River	☐	Adjacent (mi)
	☐	(mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 1,500 (NO. OF PERSONS)	B. 2,300 (NO. OF PERSONS)	C. 3,040 (NO. OF PERSONS)

02 DISTANCE TO NEAREST POPULATION: 0.25 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE	04 DISTANCE TO NEAREST OFF-SITE BUILDING
600	0.25 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site (e.g., rural, village, density, population, urban area))

This area of Racine County, Wisconsin is sparecely populated and mainly an agricultural community.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
WI	0980511919

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A $10^{-6} - 10^{-8}$ cm/sec ☒ B $10^{-4} - 10^{-6}$ cm/sec ☐ C $10^{-4} - 10^{-3}$ cm/sec ☐ D GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A IMPERMEABLE (Less than 10^{-6} cm/sec) ☐ B RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☒ C RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH	
96 (ft)	Unknown (ft)	Unknown	

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE		
		SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
7.68 (in)	2.0 - 2.5 (in)	4 %	Southeast	1-3 %

09 FLOOD POTENTIAL	10
SITE IS IN 50 YEAR FLOODPLAIN	☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE	OTHER
A N/A (mi)	B 0.50 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

_____ (mi)

ENDANGERED SPECIES Unknown

13 LAND USE IN VICINITY

DISTANCE TO

COMMERCIAL INDUSTRIAL	RESIDENTIAL AREAS NATIONAL/STATE PARKS, FORESTS OR WILDLIFE RESERVES	AGRICULTURAL LANDS PRIME AG LAND	AGRICULTURAL LANDS AG LAND
A _____ (mi)	B 0.25 (mi)	C _____ (mi)	D 0.25 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

There are some low lieing areas adjacent to the landfill which are subjected to seasonal flooding. A large marshy area is north of the site and appears to be up gradient. The Root River runs northwest to southeast in this area and is adjacent to the site property. The local topography is relatively flat with little change in grade, the base of the landfill is at approximately 700 feet in elevation.

VII. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sampling results)

Background information obtained from Ecology and Environment, Region V, FIT
USGS, Topographic Map for Franksville Quadrangle, Wisconsin, 1958
NUS Corporation site inspection conducted 11/15/84

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION
01 STATE: WI | 02 SITE NUMBER: D980511919

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED | 02 DATE | 03 AGENCY
04 DESCRIPTION
Not applicable.

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED | 02 DATE | 03 AGENCY
04 DESCRIPTION
Not applicable.

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED | 02 DATE | 03 AGENCY
04 DESCRIPTION
Not applicable.

01 ☐ D. SPILLED MATERIAL REMOVED | 02 DATE | 03 AGENCY
04 DESCRIPTION
None recorded in background material.

01 ☐ E. CONTAMINATED SOIL REMOVED | 02 DATE | 03 AGENCY
04 DESCRIPTION
None recorded in background material.

01 ☐ F. WASTE REPACKAGED | 02 DATE | 03 AGENCY
04 DESCRIPTION
None recorded in background material.

01 ☐ G. WASTE DISPOSED ELSEWHERE | 02 DATE | 03 AGENCY
04 DESCRIPTION
None recorded in background material.

01 ☐ H. ON SITE BURIAL | 02 DATE | 03 AGENCY
04 DESCRIPTION
The site is a landfill.

01 ☐ I. IN SITU CHEMICAL TREATMENT | 02 DATE | 03 AGENCY
04 DESCRIPTION
Not applicable.

01 ☐ J. IN SITU BIOLOGICAL TREATMENT | 02 DATE | 03 AGENCY
04 DESCRIPTION
Not applicable.

01 ☐ K. IN SITU PHYSICAL TREATMENT | 02 DATE | 03 AGENCY
04 DESCRIPTION
Not applicable.

01 ☐ L. ENCAPSULATION | 02 DATE | 03 AGENCY
04 DESCRIPTION
Not applicable.

01 ☐ M. EMERGENCY WASTE TREATMENT | 02 DATE | 03 AGENCY
04 DESCRIPTION
Not applicable.

01 ☐ N. CUTOFF WALLS | 02 DATE | 03 AGENCY
04 DESCRIPTION
Not applicable.

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION | 02 DATE | 03 AGENCY
04 DESCRIPTION
None, however a plan was proposed for Root River Channel improvements.

01 ☐ P. CUTOFF TRENCHES/SUMP | 02 DATE | 03 AGENCY
04 DESCRIPTION
Not applicable.

01 ☐ Q. SUBSURFACE CUTOFF WALL | 02 DATE | 03 AGENCY
04 DESCRIPTION
Not applicable.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION
01 STATE: WI | 02 SITE NUMBER: D980511919

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

Not applicable.

01 ☒ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

The landfill was abondoned, graded, covered with two feet of sandy earth and seeded. No topsoil was placed on the site.

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

Not applicable.

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

Not applicable.

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

Not applicable.

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

Not applicable.

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

Not applicable.

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

Not applicable.

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

Not applicable.

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

Not applicable.

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

Not applicable.

01 ☒ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE 1982-Present — 03 AGENCY _____
04 DESCRIPTION

Additional abandonment work is being completed. Work includes repairing erosion damage, sealing leachate seeps and revegetation. The work is being done by the Racine County Parks Department and Waste Management of Wisconsin.

III. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

Background information obtained from Ecology and Environment, Region V, FIT

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
WI	D980511919

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER
Racine County Parks Dept.	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
14200 Washington Avenue	

05 CITY	06 STATE	07 ZIP CODE
Sturtevant	WI	53177

PARENT COMPANY (if applicable)

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME	02 D+B NUMBER
Waste Management of WI., Inc.	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
3333 N. Mayfair Road, Suite 306	

05 CITY	06 STATE	07 ZIP CODE
Milwaukee	WI	53222

01 NAME	02 D+B NUMBER
Caledonia Corp. Landfill	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
County Line Road & Foley Road	

05 CITY	06 STATE	07 ZIP CODE
Caledonia	WI	53108

01 NAME	02 D+B NUMBER
Hunts Disposal Landfill	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
County Line Road & Foley Road	

05 CITY	06 STATE	07 ZIP CODE
Caledonia	WI	53108

IV. REALTY OWNER(S) (if applicable, list most recent first)

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sampling results)

Background information obtained from Ecology & Environment, Region V, FIT

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
WI	D980511919

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	5	Organic (aqueous) to GCA Technology	6/8/85
SURFACE WATER	4	Division, Bedford, MA	6/8/85
WASTE		Organic (Soil/Sediment) to Compu/Chem Labs,	
AIR		Research Triangle Park, NC	
RUNOFF		Inorganics to Versar, Inc.,	
SPILL		Springfield, VA	
SOIL/SEDIMENT	8		6/8/85
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Organic Vapor Analysis	(OVA) No readings were recorded above background
Photo Ionization	Background = 0.0 ppm
Detection	(PID) No readings were recorded above background
	Background = 0.0 ppm

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF NUS Corporation, Edison, New Jersey
(Name of organization or individual)

03 MAPS ☒ YES ☐ NO

04 LOCATION OF MAPS NUS Corporation, Edison, New Jersey

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

Samples were split with representatives of CH2MHill
Field log book, NUS Corporation, Edison, New Jersey
Analytical results for the samples

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

NUS Corporation site inspection conducted 11/15/85

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
WI	D980511919

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
The site is presently closed			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	14 CITY	15 STATE / 16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER		

OPERATOR'S PARENT COMPANY (If applicable)

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
Same as previous owners			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	14 CITY	15 STATE / 16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD		
01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	14 CITY	15 STATE / 16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD		
01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	14 CITY	15 STATE / 16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD		

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Background information obtained from Ecology and Environment, Region V, FIT

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
WI	980511919

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
Not Applicable	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
S. C. Johnson & Son, Inc.			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
1525 Howe Street			

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
Racine	WI	53403			

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
S. C. Johnson & Son, Inc.			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
1525 Howe Street			

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
Racine	WI	53403			

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sampling results)

Background information obtained from Ecology and Environment, Region V, FIT
Notification of hazardous Waste Site, EPA Form 8900-1 submitted by S. C. Johnson & Son, Inc., dated 6/8/81

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 104

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 4-17-84

Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	w	REMARKS
Note A Gray Brown fine Silty Sand- Moist to Wet		1-AU	--					▼
		2-SS	17					
	5'	3-SS	15					
Boring Terminated at 6.0' Note A: 6" Dark Gray Brown fine Sandy Silt, trace Roots-Moist	10'							Water at 2' and Cave at 2½' at Comple-tion
	15'							
	20'							
	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 105

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 4-17-84

Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
Note A		1-AU	--					
Brown fine to medium Sandy Silt-Moist		2-SS	20					
Brown Silt, some fine Sand-Moist	5'	3-SS	19					
Boring Terminated at 6.0'								Dry and Open to 3'-1" at Completion
Note A: 5" Dark Gray fine Sandy Silt, trace Roots-Moist	10'							
	15'							
	20'							
	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

Giles Engineering Associates, Inc.

Boring No. 106

Consulting Soil and Foundation Engineers

Project: Proposed Root River Channel Improvements Date: 4-17-84

Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	w	REMARKS
4" Dark Brown fine Sandy Silt, trace Roots (FILL) Moist		1-AU	--					
Brown and Gray mixed fine Sandy Silt (FILL) Moist		2-SS	5					
Note A	5'	3-SS	20					
Boring Terminated at 6.0'	10'							Dry and Open to 2' at completio
Note A: Brown fine Sandy Silt, some Newspaper (Date on newspaper of approx. 1972)-Moist	15'							
	20'							
	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and ma vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

CONSULTING SOIL AND FOUNDATION ENGINEERS

Boring No. 107

Project: Proposed Root River Channel Improvements Date: 4-17-84

Racine, Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
Note A Gray and Dark Brown mixed fine Sandy Silt, some Clay(FILL)- Moist Some Organic Matter at 5 feet	5'	1-AU 2-SS 3-SS	-- 13 7					
Boring Terminated at 9'	10'							Dry and Open to 4'-3" at Completion
Note A: Black fine Sandy Silt, trace Roots (FILL)- Moist	15'							
	20'							
	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 108

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Root River Channel Improvements Date: 4-17-84

Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
Note A Dark Gray Brown mixed Silty Clay with some fine Sand- Moist		1-AII	--					▼
		2-SS	22					
	5'	3-SS	11					
Boring Terminated at 6.0'								Wet and Caved at 2' at completion
	10'							
Note A: 6" Dark Gray fine Sandy Silt (FILL)								
	15'							
	20'							
	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 109

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 4-17-84

Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
Note A		1-AU	--					
Gray Brown fine to coarse Silty Sand-Moist		2-SS	23					▼
Gray fine Sandy Silt-Moist	5'	3-SS	22					
Boring Terminated at 6.0'								Water at 3' and Caved at 3½' at completion
Note A: 6"± Dark Gray Brown fine Sandy Silt (TRACE ROOTS) -Moist	10'							
	15'							
	20'							
	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

RECORD OF SUBSURFACE EXPLORATION

GILES ENGINEERING ASSOCIATES, INC.

Boring No. 110

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 4-17-84

Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
Brown Silt-(FILL)-Moist		1-AU	--					
Dark Gray Brown mixed Clayey Silt, some fine to coarse Sand (FILL)-Moist		2-SS	22					▼
	5'	3-SS	5					
Boring Terminated at 6.0'								
	10'							
	15'							
	20'							
	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and ma vary considerably between boring locations.

GILES ENGINEERING ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No. 111

CONSULTING SOIL AND FOUNDATION ENGINEERS

Project: Proposed Root River Channel Improvements Date: 4-17-84

_____, Racine Co., Wisconsin GEA Project No.: 840104

Crew Chief: Pat Reuteman

DESCRIPTION Ground Surface Elevation	Depth Below Surface	Sample No. & Type	N	q_u	q_p	q_s	W	REMARKS
Note A		1-AU	--					
Gray Brown fine Sandy Silt-Moist		2-SS	9					▼
	5'	3-SS	11					
Boring Terminated at 6.0'								Water at 4' and Cave at completio
Note A: 4"± Dark Brown Clayey Silt, trace Roots-Moist	10'							
	15'							
	20'							
	25'							
	30'							
	35'							
	40'							
	45'							

Changes of strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between boring locations.

QAPP

HUNTS DISPOSAL LANDFILL SITE

APPENDIX A-4

ANALYTICAL DATA FOR WATER SAMPLES FOR EXISTING MONITORING WELLS

OAK CREEK STUDY

Sommer - Frey Laboratories, Inc.

Serving Industry, Business & Agriculture

6125 WEST NATIONAL AVENUE • P.O. BOX 14513 • MILWAUKEE, WISCONSIN 53214 • (414) 475-6700

Giles Engineering
W228 N683 West Mound Drive
Waukesha, WI 53186

April 12, 1984
Project #889

Attn: Mr. Bill Krolj

Water Samples Received 3-30-84

	Sample #1	Sample #2	Sample #3
Total Dissolved Solids (mg/l)	500	540	4260
pH	7.91	7.90	6.92
COD (mg/l)	195	240	6950
Dissolved Iron (mg/l)	0.02	<0.01	40.3
Hardness (mg/l as $CaCO_3$)	409	413	1030
Chloride (mg/l)	14	14	960
Alkalinity (mg/l as $CaCO_3$ to pH 4.8)	270	320	1930

Carol Koroghlanian
Carol Koroghlanian
Analytical Chemist

Reference:
Standard Methods for the Examination of Water and Wastewater, 15th Ed.

ko

Sommer - Frey Laboratories, Inc.

Serving Industry, Business & Agriculture

6125 WEST NATIONAL AVENUE • P.O. BOX 14513 • MILWAUKEE, WISCONSIN 53214 • (414) 475-6700

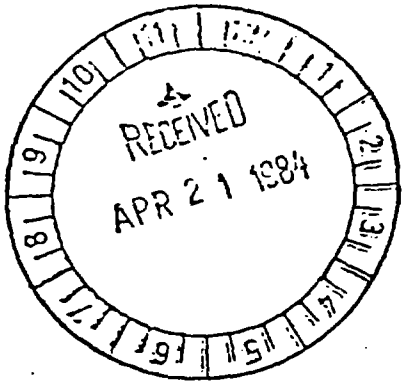
Giles Engineering
W228 N683 West Mound Drive
Waukesha, WI 53186

April 18, 1984
Project #959

Attn: Mr. Bill Krolj

Water Samples Received 4-9-84

	Sample #1	Sample #2	Sample #3
Total Dissolved Solids (mg/l)	640	560	4240
pH	7.78	7.58	6.93
COD (mg/l)	168	35	7330
Dissolved Iron (mg/l)	0.04	0.02	19.5
Hardness (mg/l as $CaCO_3$)	426	435	1069
Chloride (mg/l)	9	14	940
Alkalinity (mg/l as $CaCO_3$)	330	350	1880



Carol Koroghlanian
Carol Koroghlanian
Analytical Chemist

Reference:
Standard Methods for the Examination of Water and Wastewater, 15th Ed.

ko

Sommer - Frey Laboratories, Inc.

Serving Industry, Business & Agriculture

6125 WEST NATIONAL AVENUE • P.O. BOX 14513 • MILWAUKEE, WISCONSIN 53214 • (414) 475-6700

Giles Engineering
W228 N683 West Mound Drive
Waukesha, WI 53186

May 5, 1984
Project #1051

Attn: Mr. Bill Krolj

Water Samples Received 4-20-84

	Sample #1	Sample #2	Sample #3
Total Dissolved Solids (mg/l)	481	487	3490
pH	7.65	7.54	6.70
COD (mg/l)	144	142	3680
Dissolved Iron (mg/l)	<0.01	0.01	1.15
Hardness (mg/l as $CaCO_3$)	360	361	921
Chloride (mg/l)	4	3	780
Alkalinity (mg/l as $CaCO_3$)	1270	860	2440

Carol Koroghlanian
Carol Koroghlanian
Analytical Chemist

Reference:

Standard Methods for the Examination of Water and Wastewater, 15th Ed.

Sommer - Frey Laboratories, Inc.

Serving Industry, Business & Agriculture

6125 WEST NATIONAL AVENUE • P.O. BOX 14513 • MILWAUKEE, WISCONSIN 53214 • (414) 475-6700

Giles Engineering
W228 N683 West Mound Drive
Waukesha, WI 53186

May 5, 1984
Project #1073

Attn: Mr. Bill Krolj

Water Samples Dated 4-23-84

	Sample #1	Sample #2	Sample #3
Total Dissolved Solids (mg/l)	546	485	827
pH	7.59	7.57	6.63
COD (mg/l)	510	158	2100
Dissolved Iron (mg/l)	0.14	0.01	0.95
Hardness (mg/l as $CaCO_3$)	364	328	980
Chloride (mg/l)	3	2	760
Alkalinity (mg/l as $CaCO_3$)	1300	590	2160

Carol Koroghlanian

Carol Koroghlanian
Analytical Chemist

Reference:

Standard Methods for the Examination of Water and Wastewater, 15th Ed.

QAPP

HUNTS DISPOSAL LANDFILL SITE

APPENDIX A-5

INVESTIGATION SUMMARY AND POTENTIAL HAZARDOUS WASTE SITE INSPECTION REPORT (EPA FORM 2070-13): NUS INVESTIGATION

NUS CORPORATION
A Halliburton Company

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
EXECUTIVE SUMMARY

Hunts Disposal Landfill Site Name	WI D980511919 EPA Site ID Number
Caledonia, Wisconsin Address Lakewood, New Jersey	02-8410-24 TDD Number

SITE DESCRIPTION

Hunts disposal is an inactive 82 acre landfill which accepted municipal and industrial waste from 1951 to 1974. It is located in a sparcely populated agricultural area of Racine County, Wisconsin. The Root River runs adjacent to the site's property line. Three groundwater monitoring wells were installed on-site and have been sampled along with surface water, soil and sediment. Cadmium and Tin were detected in one of four soil samples. Iron, Manganese and Chromium were detected in various water samples collected.

HAZARD RANKING SCORE: $S_M = 44.15$, $S_{FE} = 0$, $S_{DC} = 37.5$

Prepared by: William G. Russell
of NUS Corporation

Date: 7/24/85

12.0 PREVENTIVE MAINTENANCE

General programmatic requirements are established in Section 5.11 of the REM V Quality Assurance Program Plan (REM V, Revision 0) for procedures for obtaining, using, and maintaining equipment.

All laboratories participating in the CLP are required under respective IFBs for organics and inorganics to have Standard Operating Procedures (SOPs) for preventive maintenance for each measurement system and required support activity. All maintenance activities must be documented in log books to provide a history of maintenance records for the U.S. EPA Region V Central Regional Lab's. Preventive maintenance SOPs are described in the Quality Assurance Program Plan for the CRL.

The field equipment to be used for this project includes a field pH meter, a YSI specific conductance and temperature meter, a Foxboro Century 128 OVA, a Gastech Combustible Gas/Oxygen Meter, Ludlum Radiological Survey Meter, and an HNu photoionization detector. Specific preventive maintenance procedures are performed by the REM V Equipment Manager and spare parts are located in the equipment warehouse. The Field Manager will be responsible for calibrating the pH meter and the YSI specific conductance and temperature meter, and verifying that the other instruments were calibrated by the Equipment Manager prior to field use. Specific calibration procedures and frequency requirements are outlined in Section 7.0 of this QAPP.

13.0 DATA ASSESSMENT

General programmatic requirements are established in Section 5.6 of the REM V Quality Assurance Program Plan (REM V, Revision 0) for the preparation of instructions and procedures for all activities affecting the quality of data. Procedures to be used in tracking and processing analytical data are provided in Section LS-2 of the Draft REM V Technical Support Guidelines, April 1988.

Analytical data from the CLP is assessed for accuracy, precision, and completeness by the Sample Management Office of the CLP with overview by the Contract Program Management Section of the CRL in accordance with respective standard procedures.

The bench chemist directly responsible for the test knows the current operating acceptance limits. This person can directly accept or reject the data generated and consult with the Team Leader for any corrective action. Once the bench chemist has reported the data deemed acceptable, the chemist initials the report sheet. Any out-of-control results that occurred are flagged and a note is made as to why the result was reported.

The Team Leader receives the data sheets, reviews the quality control data that accompanied the sample run, initials the report sheet, and forwards it to the Section Chief. The Section Chief, after checking the reported data for completeness and quality control results, either initials the report sheet or sends it back to the Team Leader for rerunning samples. The QC Coordinator reviews data considered acceptable by the Section Chief. Any remaining out-of-control results that, in the opinion of the QC Coordinator, do not necessitate rerunning of the sample are flagged and a memo

written to the data user regarding the utility of the data. Data generated from all high priority studies are given a final review by the CRL Director.

All data will be reviewed for completeness by the principal investigators as appropriate to their operational responsibilities.

14.0 CORRECTIVE ACTION PROCEDURES

General programmatic requirements are established in Section 5.16 of the REM V Quality Assurance Program Plan (REM V, Revision 0) for the reporting, evaluation, and disposition of nonconformances, and in Section 17 for recording and correcting nonconformances. Additional guidance for corrective action procedures is provided by REM V Quality Assurance Audit Procedures (REM V, Revision 0). Conditions requiring immediate corrective action shall be reported immediately to the QAD or the DQAD. The QAD or DQAD shall notify the audited entity in writing of the results of the audit. Should these results include nonconformances, the QA Auditor shall initiate a nonconformance report(s) on the appropriate forms. The QAD or DQAD shall certify the need for corrective action and forward the nonconformance report to the audited entity. The audited entity shall initiate the implementation of corrective actions. Such actions must be completed to the satisfaction of the audit team. The iterative process for arriving at an adequate corrective action is shown on Figure 14-1.

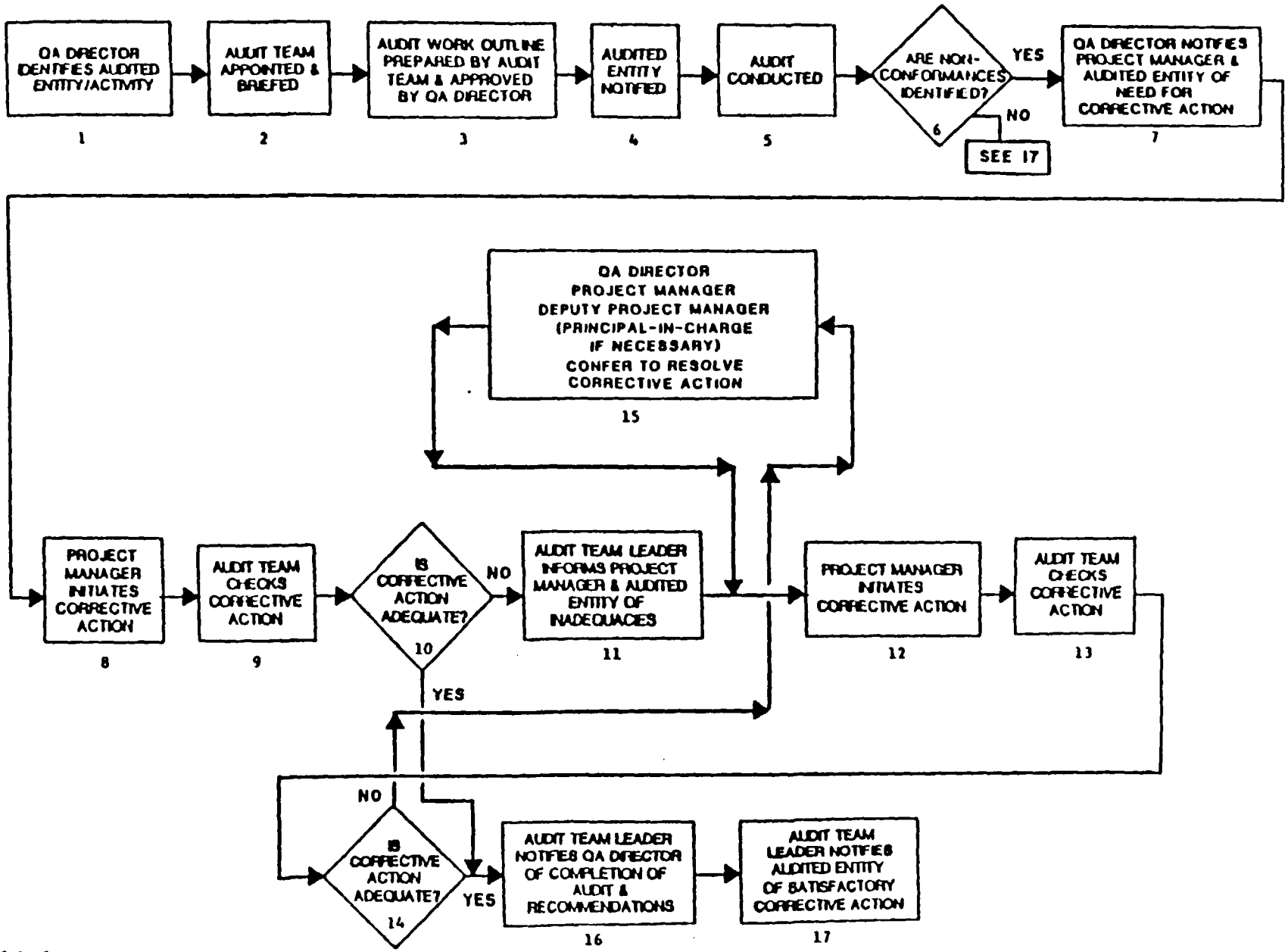


FIGURE 14-1 AUDIT FLOW CHART

15.0 QA REPORTS

The Quality Assurance Director or his designee will review all aspects of the implementation of this Quality Assurance Project Plan on a monthly basis and submit a summary report to the Principal-in-Charge and the Project Manager of WR&J in accordance with Section 5.1.5.3 of the REM V Quality Assurance Program Plan. These reviews will include an assessment of data quality, and the results of systems and/or performance audits as appropriate.

In the event of a disagreement between the Quality Assurance Director and the Project Manager on the adequacy of corrective actions implemented by the latter, the WR&J Principal-in-Charge may be informed and requested to confer on a resolution of the dispute in accordance with Section 5.15 of the Quality Assurance Program Plan (see Figure 14-1 herein).

16.0 GLOSSARY OF TERMS

ACCURACY - The degree of agreement of a measurement (or an average of measurements of the same thing), X, with an accepted referenced or true value, T, usually expressed as the difference between the two values, X-T, or the difference as a percentage of the reference or true value, 100 (X-T)/T, and sometimes expressed as a ratio, X/T. Accuracy is a measure of the bias in a system.

AUDIT - A systematic check to determine the quality of operation of some function or activity. Audits may be of two basic types: (1) system audits that consist of a review of the quality control system to ensure that a comprehensive set of quality control methods, procedures, reviews, and signoff approvals is established or in place, and (2) performance audits in which project activities are observed in process for their compliance with the established quality control procedures and requirements.

COMPARABILITY - Expresses the confidence with which one data set can be compared to another.

COMPLETENESS - 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.

DATA VALIDATION - A systematic process for reviewing a body of data against a set of criteria to provide assurance that data are adequate for their intended use. Data validation consists of data editing, screening, checking, auditing, verification, certification, and review.

ENVIRONMENTALLY RELATED MEASUREMENTS - A term used to describe essentially all field and laboratory investigations that generate data involving (1) the measurement of chemical, physical, or biological parameters in the environment; (2) the determination of the presence or absence of criteria or hazardous substance list compound in waste streams; (3) assessment of health and ecological effect studies; (4) conduct of clinical and epidemiological investigations; (5) study of laboratory stimulation of environmental events; and (7) study of measurement on pollutant transport and fate, including diffusion models.

PRECISION - A measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. Precision is best expressed in terms of the standard deviation. Various measures of precision exist depending upon the "prescribed similar conditions".

As this is a enforcement site it is expected to be chosen for a performance audit to be scheduled by the QAD or the DQAD. Such audits will generally be announced in advance to the Site Manager. The objectives of the performance audits are:

- To observe project activities in process in order to verify that the established Quality Control measures, procedures and documentation are being implemented as specified.
- To identify nonconformances with the established quality control measures, procedures and documentation.
- To recommend corrective actions for identified nonconformances.
- To verify implementation of corrective actions.
- To provide written reports of audits.