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Superfund Record of Decision:

Oak Grove Landfill, MN

50272-101

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Oak Grove Landfill, MN
First Remedial Action

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The Oak Grove Sanitary Landfill covers 45 to 50 acres in Oak Grove Township, Anoka County, Minnesota, approximately 38 miles northwest of St. Paul. There are 249 people that live within 1 mile of the site and 6,786 reside within 4 miles. The majority of these residents depend on water from wells drawn primarily from the lower aquifer, or surface water sources. Surface runoff from the landfill empties into a wetland to the south. A creek flows through this wetland, discharging to Rum River two to three miles southwest of the site. The landfill received 200,000 to 300,000 cubic yards of waste per year from 1976 until it reached its permitted capacity in late 1983. Most of this waste consists of household trash and garbage. In addition, waste consisting of oil sludge from an oil recycling process, paint and solvent wastes, foundry wastes, metal sludges, organic compounds from pesticide manufacturing, cutting oils and lubricants, cleaning solvents, and inks are reported to have been buried near the center of the landfill but their exact location is unknown. Minnesota Pollution Control Agency (MPCA) and Anoka County records indicate a number of violations and operational problems throughout the active history of the site. MPCA discovered a ground water contamination problem from monitoring well samples obtained at the site in 1984. The primary contaminants of concern affecting ground water and surface water are VOCs including ethyl benzene, toluene and xylenes.
(See Attached Sheet)

17. Document Analysis a. Descriptors

Record of Decision
Oak Grove Landfill, MN
First Remedial Action
Contaminated Media: gw, sw
Key Contaminants: VOCs (ethyl benzene, toluene, xylenes)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 63
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16. ABSTRACT (continued)

The selected remedial action for this site includes: installation of a security fence; capping with a final cover system consisting of a gas control layer, a barrier layer of low permeable material or a flexible membrane and a drainage layer; topsoil cover and vegetation; deed restrictions; consideration of treatment options for air emissions from gas vents after construction of the final cover; consideration during design of the need for extra protection for frost damage without significantly increasing cost or likelihood of failure; and air and ground water monitoring. The second remedial action will address the ground water contamination and possible remediation of the downgradient plume. The estimated present worth cost for this remedial action is $6,300,000 to $11,100,000 if a clay barrier is installed, or $5,500,000 to $9,300,000 if a synthetic membrane barrier is installed, with annual O&M of $42,000 or $40,000.

9/30

RECORD OF DECISION

SITE NAME AND LOCATION

Oak Grove Sanitary Landfill Site
Oak Grove Township, Anoka County, Minnesota

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected source control operable unit remedial action for the Oak Grove Sanitary Landfill Site, in Oak Grove Township, Anoka County, Minnesota, developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300). This decision is based upon the contents of the administrative record for the Oak Grove Sanitary Landfill site. The attached index identifies the items which comprise the administrative record. The Minnesota Pollution Control Agency's decision is based in accordance with the Minnesota Environmental Response and Liability Act of 1983.

The State of Minnesota and the U.S. Environmental Protection Agency (USEPA), each and independently, concur and adopt the selected remedy.

DESCRIPTION OF THE SELECTED REMEDY

This operable unit is the first of two operable units for the site. The first operable unit addresses the source of the contamination by containing the on-site wastes and contaminated soil. The function of this operable unit is to provide a final cover for the Oak Grove Sanitary Landfill which will prevent or minimize ground water contamination and risks associated with exposure to the contaminated materials. The remedy does not fully address the principal threats at the site because it is not appropriate to address the ground water contamination at this time. The second operable unit will address the ground water contamination and possible remediation of the downgradient plume.

The major components of the selected remedy include:

* Installing a security fence around the landfill site;

* Capping with a final cover system consisting of a gas control layer, a barrier layer of low permeable material or a flexible membrane, and a drainage layer;

* Topsoil cover and vegetation;

* Site deed restrictions limiting further use of the site;

* Treatment options for air emissions from gas vents will be considered after construction of the final cover;

* Consideration during design, of the need for extra protection from frost damage without significantly increasing cost or the likelihood of failure; and

* Air and ground water monitoring to ensure the effectiveness of the remedial action will be implemented after construction of the final cover.

The barrier layer component of the final cover system will be evaluated during the remedial design to determine whether low permeability material (clay) or a flexible synthetic liner is best suited for use.

This action will require operation and maintenance activities to ensure continued effectiveness of the remedial alternative. The action being taken is consistent with Section 121 of CERCLA as amended by SARA, 42 U.S.C. § 9621.

DECLARATION

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site. The size of the landfill plus the fact that there are no on-site hot spots that represent the major sources of contamination preclude a remedy in which contaminants could effectively be excavated and treated.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

9/30/88
Date

Frank M. Covington for
Valdas V. Adamkus
Regional Administrator
U.S. EPA, Region V

September 29, 1988
Date

Barbara Lindsey Sims for
Gerald L. Willet
Commissioner
Minnesota Pollution Control Agency

EPA 3/90

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

Oak Grove Sanitary Landfill
Oak Grove Township, Anoka County, Minnesota

I. SITE NAME, LOCATION, AND DESCRIPTION

Location

The Oak Grove Sanitary Landfill (OGSLF)is located in Oak Grove Township, Anoka County, Minnesota (figure 1) near the intersection of Eidelweiss Street and County Road 22 (Viking Boulevard) as shown in Figure 2. The OGSLF is approximately 38 miles northwest of St. Paul, the state capital.

Site Description

The OGSLF is located in the eastern portion of the Small Lake Section of the Central Lowland Physiographic Province. The Small Lake Section is a plain of hummocky moraines of Wisconsin till with the eastern portion divided into a number of areas. The OGSLF is located in the Anoka Sandplain Area, which is characterized as a broad sandplain formed largely from glacial drainage. The topography of the area consists of low regions of uplands and sand dunes interspersed among numerous lakes and wetlands. Elevations vary from approximately 900 feet above mean sea level (MSL) to approximately 870 MSL. The site is located on an east-west trending upland.

The nearby developed land consists of agricultural and residential uses. The western and northern edges of the OGSLF border single family residences. An estimated 249 people reside within one mile of the landfill and 6,786 people reside within four miles of the landfill. These population estimates were taken from the 1980 population census. It is estimated that the majority of houses in the vicinity of the OGSLF Draw their water from wells or surface water sources.

A wetland is located adjacent to and south of the landfill and receives surface runoff from the landfill. Cedar Creek flows through the wetland and discharges to the Rum River which is about two to three miles southwest of the site.

The site hydrogeology consists of two shallow ground water units beneath the landfill. The upper unit is composed of surficial outwash sand while the lower unit is a confined aquifer composed of valley train deposits. A till deposit is present between the two aquifer units and may function as an aquitard. The till unit is composed of three facies, a gray till facies, a red fine-grained facies and a red coarse-grained facies. Ground water levels in monitoring wells indicate that flow from both of the units is predominately south from the landfill. Residential wells around the site generally do not use the surficial aquifer for drinking water. Most wells in the area draw from the lower aquifer.

II. SITE HISTORY

A solid waste landfill permit was issued to the owner of the site in 1971 by the Minnesota Pollution Control Agency (MPCA). In 1976, landfill operations were assumed by a consortium of refuse haulers. The landfill reached its permitted capacity in late 1983 and was not allowed to receive additional waste. The MPCA tried unsuccessfully to enforce the permit requirement that final cover be installed at the site. The MPCA allowed lime sludge to be applied as a base material for final cover in an attempt to obtain proper closure of the site under conditions of the permit. Initially, lime sludge was being spread over the landfill by the operator. However, subsequent inspections by the MPCA and Anoka County staff discovered that the lime sludge was being stockpiled on top of the landfill and near the borrow pit. Also, the lime sludge spread over the landfill was not properly applied and was causing ponding of water instead of allowing it to run off over the sides. Therefore, in order to halt the improper application and stockpiling of lime sludge at the OGSLF, the MPCA issued a Cease and Desist Order in 1985.

Ground water contamination was discovered in the monitoring wells at the OGSLF in 1984 and the MPCA issued a Request for Response Action (RFRA) to the owners and operators of the OGSLF on August 28, 1984. The RFRA was issued for the purpose of completing closure activities and initiating a Remedial Investigation/Feasibility Study (RI/FS) at the site to determine the extent and magnitude of ground water contamination. When the owners and operators of the OGSLF failed to respond to the RFRA, a Determination of Inadequate Response was issued and the MPCA entered into a Multi-Site Cooperative Agreement (MSCA) with U.S. Environmental Protection Agency (USEPA) for implementing a RI/FS at the site. The OGSLF was listed on the National Priorities List in October 1984, with a Hazard Ranking System score of 43. USEPA is the lead agency for the enforcement portion of the project.

The landfill received an estimated 200,000 to 300,000 cubic yards of waste per year. The fill area of the site covers approximately 45-50 acres. Most of the waste present in the landfill is municipal trash and garbage. However, a small documented quantity of industrial, chemical and hazardous wastes are believed to be buried in the landfill. These wastes are reported to have been placed near the center of the fill area but their exact location is unknown. The wastes included oil sludge from an oil recycling process, paint and solvent wastes, foundry wastes, metal sludges, chlorinated and other organic compounds from pesticide manufacturing, cutting oils and lubricants, cleaning solvents, and inks. Currently, there is an estimated 2.5 million cubic yards of waste in the landfill.

MPCA and Anoka County records show a number of violations and operational problems that occurred over the operational history of the site. The records indicate that the landfill was not operated properly and that filling took place in a random fashion instead of in phases as the permit specified.

III. ENFORCEMENT ACTIVITIES (CONFIDENTIAL)

IV. SUMMARY OF SITE CHARACTERISTICS

RI activities were initiated at the OGSLF in 1986 and are currently ongoing. The activities and results obtained to date will be briefly summarized in this section. However, it should be noted that the data and hydrogeological results presented here are preliminary and will be subjected to further refinement during the migration management operable unit RI/FS.

Throughout various phases of field work, 19 monitoring wells were installed at various depths at twelve locations (figure 3), and water samples were collected twice from each well for chemical analysis. analytical results are presented in Table 1a. Surface water and sediment samples were collected from seven locations as shown in Figure 4. Sample results are listed in Tables 1b and 1c. Figure 5 shows the location of the five leachate sample collection points and Table 1d presents the analytical result from these samples. In addition, slug tests were performed and 48 subsurface soil samples were taken for geotechnical analysis to help assist in the hydrogeological investigation.

Residential wells near the OGSLF were sampled by MPCA staff on seven separate occasions. The samples were analyzed for volatile organic compounds (VOCs) by the Minnesota Department of Health. None of the residential wells sampled are known to be contaminated.

Hydrogeology

The geology can be generally divided into three unconsolidated layers in descending order: a surficial outwash sand, a till layer, and a deeper sand and gravel layer. A peat layer exists in the wetland area south of the site (see Figure 2).

The surficial sand aquifer is thought to be continuous throughout the site and ranges in thickness from five to 60 feet. The minimum thickness occurs in the wetland area. Hydraulic conductivities range from 1×10^{-2} cm/sec to 4×10^{-2} cm/sec and ground water flows in a southerly direction (see Figure 6).

The till unit ranges in color and composition from gray fine-grained facies with traces of sand and gravel, to red fine-grained facies and red coarse-grained facies. The thickness of the till unit ranges from 40 to 70 feet. The gray facies is discontinuous and occurs mainly in the eastern and southern portions of the site. The red till facies (fine- and coarse-grained) exist throughout the site in varying thicknesses, relative positions, and lateral extent. Through the interfingering and wedging of these red till facies each could extend vertically from the overlying outwash to the underlying valley train deposits.

The till unit may act as an aquitard since hydraulic conductivities of the gray till facies are extremely low and range from 2×10^{-7} to 4×10^{-8} cm/sec. Hydraulic conductivities in the red till facies were unobtainable due to difficulties in acquiring an adequate sample. However, based on the grain size distribution curves of each facies, the red fine- and coarse-grained facies are assumed to have higher hydraulic conductivities than the gray till facies.

The deep sand and gravel layer is located within a bedrock valley that transects the site in a north to south direction (see Figure 7). The thickness of this layer is approximately 175 feet as shown in Figures 8 and 9 and hydraulic conductivities range from 4×10^{-2} cm/sec to 5×10^{-2} cm/sec. Ground water in this aquifer also flows in a southerly direction (Figure 6).

Depth to water table ranges from zero feet in the wetland to about 20-40 feet throughout the rest of the site. Vertical gradients indicate that the surficial and deeper aquifers tend to discharge into the wetland area at the southern portion of the site. Vertical gradients also indicate that a downward gradient may exist throughout a portion of the fill area from the surficial to the deeper aquifer.

Runoff generated from the southern one-half of the site drains directly to the wetland by overland flow and erosional gullies created on the side slopes. Runoff from the northern one-half of the OGSLF flows to low lying drainage ditches that partially discharge into the wetland or into a borrow fill area located off the northeast corner of the site. The rest of the site drains directly to the wetland which lies approximately twenty feet from the southern edge of the fill area. The wetland discharges into a small unnamed stream located approximately 1,000 feet from the landfill which then flows into Cedar Creek.

Extent of Contamination

Results from the analyses of samples collected during the RI document the presence of a variety of compounds. The most common of these compounds are acetone, methylene chloride, toluene, ethyl benzene, and total xylenes. Further investigation is ongoing and is required in order to characterize the extent and magnitude of the ground water contamination at the OGSLF site, especially in the deeper aquifer. As described in section VI, the migration management operable unit will address this portion of the project. A draft RI report has been prepared and will be put into final form upon completion of additional ground water sampling and hydrogeological studies.

Many organic and inorganic compounds were detected in ground water, surface water, soil and leachate samples collected during the RI conducted at the OGSLF. The breathing zone was monitored during drilling activities using a photoionization meter. This instrument was also used to detect possible hot spots at the landfill. Table 1 presents on-site contaminant information and the following paragraphs provide a brief summary of the results of sampling to date

Ground Water

Ground water contamination was detected in three monitoring well nests screened in the surficial outwash sand unit immediately south (downgradient) of the landfill. There were 63 occurrences of Hazardous Substance List (HSL) organic compounds in these wells compared to one occurrence in all other surficial aquifer wells and four occurrences in confined aquifer wells. Total xylenes were detected at 108 ug/l and arsenic was detected at 141 ug/l and was the highest level of ground water contamination found. Results from downgradient wells in the wetland area presently indicate that the extent of lateral movement of contamination in the shallow ground water is less than 1,000 feet.

Four organic compounds were reported in ground water samples from two downgradient wells screened within the lower confined aquifer. These results indicate possible vertical migration of the contaminants into the lower confined aquifer.

Surface Water

Surface water samples were collected from the wetland immediately south of the landfill and from Cedar Creek. Seven organic compounds were detected in samples of the standing water in the wetland adjacent to the landfill: chloroethane, methylene chloride, acetone, 1,1-dichloroethane, 4-methyl-2-pentanone, 4-methylphenol, and benzoic acid. Acetone was the compound with the highest level of contamination (3500 ug/l). Chromium, barium, vanadium, and cyanide (among others) were among the inorganic constituents detected in these samples. Of the constituents found in the wetland surface water samples, chloroethane, methylene chloride, and 1,1-dichloroethane were detected in downstream surface water samples. Trichloroethene and trans,1-2-dichloroethene were found in downstream samples but not in wetland samples. Inorganic constituents detected in downstream samples were comparable to levels detected in the upstream background sample.

Soil

Subsurface soil samples were collected from beneath landfill leachate seeps. The samples taken from south of the landfill contained methylene chloride, acetone, chloroform, and xylene. The highest level of contamination detected was 16,000 ug/l for the compound 2-butanone. Samples taken from north of the landfill were not measurably contaminated. Because of methylene chloride and acetone occurrence in most of the laboratory blanks for the soil samples, the RI, at this stage, has not been able to conclude whether these contaminants were site related.

Leachate

As would be expected, leachate samples collected from erosional gullies on the sides of the landfill exhibited the highest concentrations and number

of HSL organic compounds. The most prevalent compounds, in terms of distribution, were acetone, methylene chloride, and toluene. The highest level of contamination detected was acetone at 19,000 ug/l. Other organics found at high concentrations were 2-butanone (methyl ethyl ketone), 4-methyl-2-pentanone, 4-methylphenol, and benzoic acid. DDT was also reported at low concentration in one sample. One leachate sampling location exhibited inorganic contamination at levels significantly higher than the background surface water sample. The metals detected included aluminum, chromium, iron, mercury and zinc.

Residential Wells

Residential wells near the OGSLF were sampled for 53 VOCs on seven occasions as follows:

10 residential wells	May 1985
8 residential wells	June 1985
5 residential wells	July 1985
7 residential wells	February 1986
9 residential wells	September 1986
10 residential wells	June 1987
10 residential wells	June 1988

During the June 1985 sampling event, low levels of VOCs were detected in samples taken from three of the eight residential wells sampled. These wells were resampled during the July 1985 sampling event and showed no contamination. Subsequent sampling events have not confirmed the presence of contamination in these residential wells.

Air

Readings taken from the breathing zone during drilling activities at the site with a photoionization meter did not indicate the presence of organic vapors. A soil gas survey did, however, detect organic vapors beneath the existing lime sludge cover. Most of these readings also taken with a photoionization meter are apparently the result of methane accumulations, although three points beneath the lime sludge cover did indicate the presence of nonmethane organic compounds. Cover soil samples taken from these locations indicated the presence of methylene chloride, acetone, and toluene at concentrations less than 40 ug/kg. There was little indication of organic vapor accumulation beneath the vegetative cover on the western one-third of the landfill.

Source of Contamination

There is no discrete source of contamination other than mixed municipal waste at the OGSLF. Most of the waste present at the landfill is household trash and garbage. A small quantity of industrial, chemical, and hazardous waste, however, is believed to be buried near the center of the landfill. The wastes include oil sludge from an oil recycling

process, paint and solvent wastes, foundry wastes, metal sludges, chlorinated and other organic compounds from pesticide manufacturing, cutting oils and lubricants, cleaning solvents, and inks. As mentioned earlier, the former active landfill area covers about 45-50 acres. Most of the waste was placed above grade, to a maximum height of approximately 50 feet. The waste does not appear to be in contact with the water table.

V. SUMMARY OF RISKS

A preliminary endangerment assessment (EA) was prepared and was based on information presently available from the RI. Since the RI will be completed after further site characterization is performed, the EA will also be completed at that time. These activities will be performed during the second operable unit portion of the project.

The preliminary EA identified potential exposure pathways which will be mitigated by the source control operable unit. The potential exposure pathways are: exposure to air emissions from the landfill, exposure to contaminated soils, exposure to contaminated surface water, and exposure to contaminated ground water.

Current exposure to air emissions from the site appears to be minimal, and not significant from a public health viewpoint. However, a short-term increase in emissions would be expected during construction of any remedial action which disturbs the existing cover. There are approximately 35 single family residences located within 10,000 feet of the site. Based on meteorological data cited in the preliminary EA, these areas would be exposed to airborne contaminants approximately 17 percent of the time. The duration of exposure would depend on the duration and type of construction activities.

Contaminated soils are not expected to pose a public health concern. Contamination of cropland and ingestion of contaminated food is unlikely, since the identified volatile constituents are present at low concentration and do not tend to bioconcentrate in the food chain.

Contaminated surface water is a potential pathway for exposure. Surface water in the wetland area immediately south of the landfill receives surface runoff from the landfill. This runoff carries contaminated leachate from surface seeps and potentially contaminated particulate material from the surface of the landfill. This runoff could be responsible for plant damage which is evident in the wetland along the south edge of the landfill. The wetland provides a pathway for contaminants to enter Cedar Creek. The preliminary EA report indicated that there are no surface water withdrawal points on Cedar Creek for potable, agricultural, or industrial use downstream of the site.

Ground water represents another potential exposure pathway for contaminants. Ground water is an important source of water in the area, and there are a number of domestic wells in close proximity to the site.

However, these wells are all upgradient or crossgradient of the landfill and are completed to depths of 150 to 200 feet. The nearest downgradient well identified in the EA is approximately 5,000 feet from the landfill and is located on the south side of Cedar Creek. The RI data, to date, indicates there may be a potential for interconnections between the surficial aquifer and the deeper aquifer. This poses the greatest concern as a pathway of exposure. Further investigation will more clearly delineate the magnitude of the threat posed by contaminants reaching or presently existing in the deeper aquifer.

Implementation of the selected remedy as presented by this operable unit for source control, will eliminate exposure to contaminated soils, control air emissions, minimize rodent burrowing and prevent further contamination of surface water by controlling runoff from the landfill and minimize or prevent contamination to the deeper aquifer. Subsurface migration of gas has not been detected and appears to be an unlikely pathway for migration of contaminants.

VI. SCOPE AND ROLE OF OPERABLE UNIT

Since further work is needed to complete the RI/FS for the ground water contamination, which was started in October 1986, the USEPA and MPCA agreed to divide the project into two operable units in order to facilitate progress toward remedial action at this site. The two operable units are for source control and migration management. The first operable unit will address the source of the contamination by containing the on-site wastes and contaminated soils. The second operable unit will involve further study of the ground water contamination and will address remediation of the downgradient contaminant plume. The role of each operable unit will be further explained below.

Source Control Operable Unit

The MPCA in conjunction with the USEPA decided to proceed with a FS to determine what type of final cover would be suitable for the site. The OGSLF never received final cover when the landfill was closed. Therefore, an operable unit which will address the containment of wastes and contaminated soil at the site, can occur prior to the completion of the ground water remediation because construction of a suitable final cover will prevent further infiltration of precipitation which will reduce resulting leachate production.

Migration Management Operable Unit

This operable unit will be a continuation of the RI/FS which began in 1986. The preliminary results of the RI indicate the presence of contamination in the upper aquifer, but further work is necessary to determine the competency of the confining layer that lies between the upper and lower aquifer, and to determine if the lower aquifer is being

contaminated by the OGSLF. Some of the remaining tasks to be performed include installation of additional monitoring wells, performance of a series of slug tests, collection and analysis of additional water samples, and preparation of the final RI report. The FS will be initiated after completion of these RI activities.

VII. COMMUNITY RELATIONS

The source control alternatives evaluated in the FS were presented in the interested community in a manner consistent with the Superfund law and EPA guidelines on community relations at the conclusion of a FS.

A public comment period on the alternatives began on September 2, 1988, and ended on September 23, 1988. The MPCA published a notice in the September 2, 1988 edition of the Anoka County Union, the local newspaper, and also provided a news release to the paper. The notice included information on the availability of the FS and proposed plan at the Oak Grove Township Hall, the dates of the public comment period and public meeting, and a description of the alternatives and the proposed alternatives. In addition, on August 30, 1988, the MPCA mailed a copy of the notice and news release, which explained in more detail the proposed alternative, to the Oak Grove site mailing list. This mailing list includes interested residents, township and county officials, elected officials, and site owners and operators. The Oak Grove Township Hall served as the information repository for the Administrative Record, the FS and the proposed plan.

A public meeting was held on September 14, 1988, in the Oak Grove Township Hall. The attached Responsiveness Summary lists the comments received at the meeting and during the comment period, as well as the MPCA's response to those comments.

VIII. DOCUMENTATION OF SIGNIFICANT CHANGES

No significant changes have been made since the publication of the FS and proposed plan.

IX. DESCRIPTION OF ALTERNATIVES

The alternatives under consideration for source control were developed by examining a number of possible remedial technologies, and compliance of these alternatives with applicable or relevant and appropriate requirements (ARARs) of federal and state environmental statutes. excavation of the landfill (with destruction of the wastes by incineration, disposal off-site in a secure commercial landfill, or redisposal on-site in a lined landfill) was eliminated in the initial screening process. The criteria used for elimination of excavation were short-term impacts on human health due to air emissions and excessive

cost. In-place closure of the landfilled waste, consisting of alternative cover systems, consistent with the state and federal regulations, including the Resource Conservation and Recovery Act (RCRA) for landfill closure and Minnesota proposed rules pts. 7035.2525 and specifically pt. 7035.2815 were developed for detailed evaluation.

The source control alternatives are:

* Alternative 1: No Action

* Alternative 2a: Cover system satisfying interim minnesota rules for municipal landfill closure with clay barrier layer.

* Alternative 2b: Cover system satisfying interim minnesota rules for municipal landfill closure with synthetic membrane barrier layer.

* Alternative 3a: Cover system satisfying minnesota rules for municipal landfill closure with clay barrier layer.

* Alternative 3b: Cover system satisfying minnesota rules for municipal landfill closure with synthetic membrane barrier layer.

* Alternative 4a: RCRA equivalent cover system for hazardous waste facility closure.

* Alternative 4b: RCRA cover system for hazardous waste facility closure.

All alternatives except "no action" would include capping the former disposal area with varying layers and thicknesses of soil and/or synthetic materials which in combination would comprise a cover system for the landfill. Each alternative cover system described below includes a foundation layer overlying existing materials to support the cover system and a continuous coarse-grained soil layer in conjunction with gas vents which will be utilized to control gas migration. The differences in the alternative cover systems consist of varying thicknesses of cover soil, the presence and thickness of a lateral drainage layer and the type of barrier layer utilized to minimize percolation of surface water. The cover systems would provide varying degrees of control of contaminant migration into ground water and surface water by minimizing percolation of rainfall and snow melt through the landfill contents.

Alternative 1: No Action

Construction Cost: $90,000-$110,000
Annual Operation and Maintenance (O&M) Costs: None
Months to Implement: 1

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires that the "no action" alternative be considered at

every site. Under this alternative, MPCA would fence the site to prevent direct human contact with landfilled wastes, but take no further action to control the ability of contaminants to migrate.

Alternative 2A: Interim Minnesota rules for municipal landfill-clay barrier.

Construction Cost: $3,900,000-$7,300,000
Annual O&M Costs: $38,000
Months to Implement: 18-24

This remedy would include the installation of a minimum 42-inch cover system (Figure 10) over the landfill area. The barrier to downward percolation of infiltrating surface water is provided by a 24-inch compacted clay layer. Additional quantities of soil fill are required to construct a minimum two percent slope to facilitate surface water runoff. The Alternative 2A soil cap complies with state regulations for a landfill which will no longer receive waste and will be closed within 18 months of the effective date of Pts. 7035.2525 to 7035.2815 of the Minnesota proposed rules.

Alternative 2B: Interim Minnesota rules for municipal landfill-synthetic membrane barrier.

Construction Cost: $3,100,000-$5,400,000
Annual O&M Costs: $37,000
Months to Implement: 18-24

This alternative is similar to Alternative 2A, except a high density polyethylene (HDPE) membrane is substituted for the 24-inch clay barrier (Figure 10). The 30-mil thick HDPE membrane complies with state regulations for closure of a municipal landfill.

Alternative 3A: Minnesota rules for municipal landfill-clay barrier.

Construction Cost: $5,900,000-$10,700,000
Annual O&M Costs: $42,000
Months to Implement: 18-24

Under this alternative, the landfill area is capped by a minimum 60-inch cover system (Figure 10). A 24-inch compacted clay layer provides the barrier to downward migration to contaminants due to percolation of surface precipitation. In comparison to Alternatives 2A and 2B, Alternative 3A provides six inches of additional cover material for promotion of vegetation, drainage and protection of the barrier layer. The minimum percent slope is increased to three percent and a 12-inch thick lateral drainage layer is added to intercept surface water percolating into the cover system. This alternative complies with state regulations for a landfill which will receive wastes 18 months after the effective date of Pts. 7035.2525 to 7035.2815 of the Minnesota proposed rules.

Alternative 3B: Minnesota rules for municipal landfill-synthetic membrane barrier.

Construction Cost: $5,100,000-$8,900,000
Annual O&M Costs: $40,000
Months to Implement: 18-24

This alternative is similar to Alternative 3A, except an HDPE synthetic membrane is substituted for the 24-inch clay barrier layer (Figure 10). The 30-mil thick HDPE liner system also complies with state regulations for closure of a municipal landfill.

Alternative 4A: RCRA equivalent for hazardous waste facility.

Construction Cost: $7,400,000-$13,400,000
Annual O&M Costs: $45,000
Months to Implement: 18-24

A minimum 78-inch soil cap is included with this alternative (Figure 10). A composite barrier to downward percolation is provided by an HDPE liner overlying a 12-inch clay layer. The cover soil is 30 inches thicker than in Alternatives 3A and 3B. This alternative is in substantive compliance with RCRA regulations for closure of a hazardous waste facility, but varies from federal design guidance in the thickness of the clay layer.

Alternative 4B: RCRA closure for hazardous waste facility.

Construction Cost: $8,000,000-$14,600,000
Annual O&M Costs: $46,000
Months to Implement: 18-24

Alternative 4B differs from alternative 4A in that the thickness of the clay layer is increased from 12 inches to 24 inches (Figure 10). This alternative is in compliance with RCRA hazardous waste regulations and federal design guidance.

X. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The National Contingency Plan and Section 121 of Superfund Amendments and Reauthorization Act of 1986 (SARA) form the regulatory basis for the nine evaluation criteria to be utilized in determining the appropriate remedial action at a CERCLA site. Specifically, Section 121 of SARA requires that the selected remedy is to be protective of human health and the environment, cost-effective, and use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

Alternatives were evaluated using current USEPA guidance, including "Interim Guidance on Superfund Selection of Remedy" dated December 24,

1986, and "Additional Interim Guidance for FY 87 Records of Decision" dated July 24, 1987. In the July 24, 1987, guidance, the following nine evaluation criteria are referenced:

* Long-Term Effectiveness - This criterion evaluates the long-term protection of human health and the environment at the completion of remedial action. It is assessed in the magnitude of residual risks, adequacy of controls in achieving cleanup criteria, and reliability of controls against possible failure.

* Reduction of Toxicity, Mobility, and Volume - This criterion evaluates the anticipated performance of treatment alternatives. It is not applicable to the containment alternatives evaluated for the OGSLF site.

* Short-Term Effectiveness - The effectiveness of alternatives in protecting human health and the environment during implementation of remedial action is evaluated by this criterion. Short-term effectiveness is assessed by protection of the community, protection of workers, environmental impacts, and time until protection is achieved.

* Implementability - This assessment evaluates the technical and administrative feasibility of alternatives and the availability of services and materials.

* Cost - The estimated capital, annual maintenance and monitoring, and present worth value costs are evaluated by this criterion. Present worth costs are calculated using a ten percent discount rate over a 50-year period of operation. Cost estimate summaries of alternative cover systems are given in Appendix B.

* Overall Protection of Human Health and the Environment - This assessment draws on the results of the above evaluations to describe whether, and how, each alternative provides protection of human health and the environment.

* Compliance with ARARs - The assessment against this criterion describes how the alternative complies with ARARs, or if a waiver is required and how it is justified.

* Community Acceptance - Community acceptance to the alternatives is presented in the responsiveness summary, included in this Record of Decision (ROD) as an attachment.

* State Acceptance - The State of Minnesota (MPCA) is the lead agency for the site.

This section provides a summary of the relative performance of the alternatives with respect to each of the nine criteria. Tables 2 through 8 present a comparison of the nine criteria for each alternative.

Overall Protection of Human Health and the Environment. All of the alternatives, with the exception of the no action alternative, would provide, with varying degrees of efficiency, an increased protection of human health and the environment with respect to existing conditions. The increased protection is achieved by reducing percolation of surface precipitation through the landfilled wastes and thereby controlling leachate production and contaminant migration into ground water and surface water. The cover systems would also reduce the risk of direct contact with the contaminants remaining at the site.

Compliance with ARARs. Alternatives 4A and 4B meet or exceed all ARARs of federal and state municipal landfill and hazardous waste facility closure regulations. Alternatives 3A and 3B meet state and federal ARARs for municipal landfill closure. Alternatives 2A and 2B comply only with interim state ARARs for municipal landfill closure and the no action alternative does not comply with state or federal regulations for landfill closure.

Long-Term Effectiveness and Permanence. Long-term effectiveness for this operable unit is evaluated in terms of the reduction of leachate generation with respect to present conditions, and potential for failure of the cover system. A ground water monitoring system will be included in the migration management operable unit work phase for control of movement of contamination through ground water. The future ground water monitoring system will be used to verify the effectiveness of the containment unit.

Leachate generation was estimated using the HELP computer model developed by the U.S. Army Corps of Engineers and average weather data for nearby St. Cloud, Minnesota. The simulated percolation reaching the base of the landfill, expressed as a percentage of total precipitation falling on the landfill surface, is as follows:

Alternative	Percentage
1	39.0
2A	11.5
2B	12.0
3A	6.5
3B	5.7
4A	0.0
4B	0.0

The above values are estimates only and represent conditions assumed to exist immediately following construction of the cover system. It is important to note that although the actual percentage of precipitation which will percolate from the base of the landfill under Alternatives 4A and 4B can potentially be quite low, it will never achieve the zero percent indicated by the HELP model simulation. The simulation does not take into account the decrease in effectiveness due to poor installation,

material defects, and physical abrasion and degradation. Alternatives 2A, 2B and no action do not comply with the State of Minnesota requirement that a cover system be able to reject or contain at least 90 percent of the surface precipitation. Alternatives 3A, 3B, 4A and 4B do, however, exceed this requirement.

Possible failure modes for cover systems include differential settling of landfill contents and subsequent breaching of the barrier layer, penetration of the barrier layer by erosion, burrowing animals, vegetative growth, damage to the barrier layer by freezing/thawing, and improper construction and installation. Insufficient information concerning the potential for differential settlement at the landfill makes it difficult to adequately evaluate whether a clay or a synthetic membrane barrier is more appropriate for the site. Alternative 2A and 2B, which include only 12 inches of cover soil and no lateral drainage layer, have the greatest potential for failure due to penetration or freeze/thaw damage of the barrier layer. Alternatives 4A and 4B provide the greatest long-term protection against failure.

Reduction of Toxicity, Mobility, or Volume of the Contaminants. This evaluation criterion is not applicable to the OGSLF site because none of the alternatives includes treatment of the contaminants.

Short-Term Effectiveness. All cover system alternatives will have minimal potential impact on human health because construction activities will not disturb in-place wastes. The major impact on the nearby residents will be temporarily increased truck traffic required to transport the large quantities of soil comprising the cover system components. The cover system will require 18 to 24 months to design and construct, depending on seasonal weather conditions. Alternatives 4A and 4B will probably require a slightly longer construction period than Alternatives 2A, 2B, 3A and 3B.

Implementability. The equipment, materials, and skilled workers needed to construct the cover system alternatives are readily available in the Twin Cities area. The plans and specifications for the alternative cover system are likely to attract construction bids from local and regional contractors. The manufacturers and suppliers of the synthetic membrane are likely to be companies operating nationally.

Cost. Alternative 1 has minimal estimated construction costs. The estimated construction costs for each of the remaining alternatives are as follows:

* Alternative 2A - $3,900,000 - $7,300,000
* Alternative 2B - $3,100,000 - $5,400,000
* Alternative 3A - $5,900,000 - $10,700,000
* Alternative 3B - $5,100,000 - $8,900,000
* Alternative 4A - $7,400,000 - $13,400,000
* Alternative 4B - $8,000,000 - $14,600,000

The estimated construction costs are sensitive to the unit costs of the soils and/or synthetic membrane comprising the cover system alternatives. The availability of the various soil types comprising the cover systems cannot be determined with respect to quantity, quality or unit cost until further detailed engineering investigations are initiated.

The annual operation and maintenance costs for each cover system (Alternatives 2A through 4B) are estimated as follows:

* Alternative 2A - $38,000
* Alternative 2B - $37,000
* Alternative 3A - $42,000
* Alternative 3B - $40,000
* Alternative 4A - $45,000
* Alternative 4B - $46,000

State Acceptance. The State of Minnesota supports the preferred alternative.

Community Acceptance. Community acceptance of the preferred alternatives will be evaluated after the public comment period has ended and is described in the Responsiveness Summary.

X. SELECTED ALTERNATIVE

Based on current information, the USEPA and MPCA select Alternative 3 (Figure 11) as the most appropriate alternative for the final cover at the OGSLF site. This alternative provides the best balance among the nine criteria that USEPA uses to evaluate the remedial alternatives. Alternative 3 contains two variations of barrier layer materials. At the present time, there is insufficient information regarding the available quantity, quality and cost of the materials comprising the barrier layer. Therefore, the final selection will be made during the early stages of the remedial design. During the remedial design, an evaluation will be conducted to determine:

1. Whether low permeability soil (compacted clay) or a synthetic membrane will withstand settlement of the refuse and freeze/thaw damage; and

2. Cost and availability of both barrier layer materials.

Both variations of Alternative 3 use containment techniques and will minimize future contaminant migration by reducing the volume of precipitation which percolates through the landfilled wastes. Alternative 3 was also selected because it meets ARARs, consistent with the State of Minnesota proposed rules for closure of a municipal landfill and is cost effective. The effectiveness of the selected cover system in protecting ground water quality will be verified by a monitoring network installed as part of the migration management operable unit phase of work.

Consideration will be given to extra protection from frost damage during the design stages of the project. Air quality monitoring will also be considered.

XI. STATUTORY DETERMINATIONS

A. Protection of Human Health and the Environment

The selected remedy will reduce the generation of leachate by infiltration, thereby reducing the release and subsequent harm or potential harm to public health, welfare and the environment. A release of contaminants has been documented in the surficial aquifer at toxicologically significant concentrations. Although the surficial aquifer is unlikely to be used as a drinking water source, migration of contaminants from the surficial aquifer into the deeper aquifer is possible. The selected remedy will decrease the likelihood for degradation of the deeper aquifer which is currently used for individual potable water supplies in the vicinity of the site and is capable of yielding larger quantities of water for commercial and public uses where necessary.

Additional RI activities are necessary to determine if the deeper aquifer is contaminated or if it is vulnerable to contamination. The selected remedy will not address the release of contaminants via lateral movement of ground water through source material at the southwest corner of the fill area nor the continued production of leachate through infiltration subsequent to placement of the cover. This release as well as an appropriate remedy for the deeper aquifer will be addressed through another FS and ROD after the RI activities are completed.

B. Attainment of Applicable or Relevant and Appropriate Requirements (ARARs)

Compliance with ARARs

SARA requires that remedial actions meet legally applicable or relevant and appropriate requirements of other environmental laws. These laws may include: the Toxic Substances Control Act, the Safe Drinking Water Act, the Clean Air Act, the Clean Water Act, the Solid Waste Disposal Act (RCRA), and any state law which has stricter requirements than the corresponding federal law.

Applicable requirements are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a site. A requirement is "applicable" if the remedial action or circumstances at the site satisfy all of the jurisdictional prerequisites of the requirement.

Relevant and appropriate requirements are cleanup standards, standards of control, and other environmental protection requirements, criteria or limitations promulgated under federal or state law that, while not legally "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to that site.

"A requirement that is judged to be relevant and appropriate must be complied with to the same degree as if it were applicable. However, there is more discretion in this determination: it is possible for only part of a requirement to be considered relevant and appropriate, the rest being dismissed if judged not to be relevant and appropriate in a given case" (Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements, 52 FR 32496, August 27, 1987).

Landfill Closure Requirements

The RCRA regulations which govern Hazardous Waste Treatment, Storage and Disposal facilities (40 CFR Parts 264 and 265) apply to landfill facilities that received hazardous waste after November 19, 1980. The USEPA has not documented, at present, that any hazardous waste was disposed of at OGSLF following November 19, 1980. The RCRA, Subtitle C requirements for hazardous waste landfill closure are not known to be "applicable" at this site.

The USEPA has documented the disposal of a small quantity of hazardous waste at OGSLF; therefore, Subtitle C is a "relevant" requirement. The USEP arrived at its conclusion that a Subtitle C cap/cover was not appropriate at OGSLF based on the following analysis.

OGSLF was a sanitary landfill which received a small documented quantity of hazardous waste. The presently documented proportion of hazardous waste is based on records received from Anoka County files. The USEPA does not believe it appropriate to use a Subtitle C cap/cover to remediate a large sanitary landfill where we have such small documented quantities of hazardous waste known to have been disposed. Approximately point-one percent (0.1%) of the more than two million cubic yards of waste estimated to be in this landfill has been presently documented by the USEPA to be hazardous waste. Though the known quantity of hazardous waste is believed to be near the center of the landfill, no hot spot has been identified. The USEPA has consequently concluded that the hazardous waste, though perhaps near the center, may be dispersed over a much wide area. The dispersion believed to exist decreases the resemblance of the OGSLF site to the discrete RCRA units that ordinarily lend themselves to being closed with a RCRA Subtitle C cover/cap. In fact, to apply an effective RCRA Subtitle C cap or cover over the presumed area of concern would dictate covering a large sanitary landfill with the Subtitle C cover/cap.

RCRA Subtitle D regulations have been delegated to the State of Minnesota. The Minnesota regulations incorporating RCRA's Subtitle D requirements are applicable, relevant, and appropriate. While recognizing that Subtitle D is an "applicable, relevant and appropriate requirement" for OGSLF, it is not deemed protective. As discussed earlier, this alternative is highly susceptible to frost and structural damage. Moreover, some hazardous waste, albeit a small quantity, has been documented to exist in the landfill. Thus, the USEPA is compelled to increase the protectiveness afforded by a Subtitle D cover, and believes it is obtained by Alternative 3.

In view of the small documented quantity of hazardous waste and the potential wide dispersion of the waste in a 45-acre sanitary landfill, there does not seem to be sufficient similarity between the OGSLF site and the type of circumstances Subtitle C requirements are intended to address. Thus Subtitle C, though "relevant" is not "appropriate".

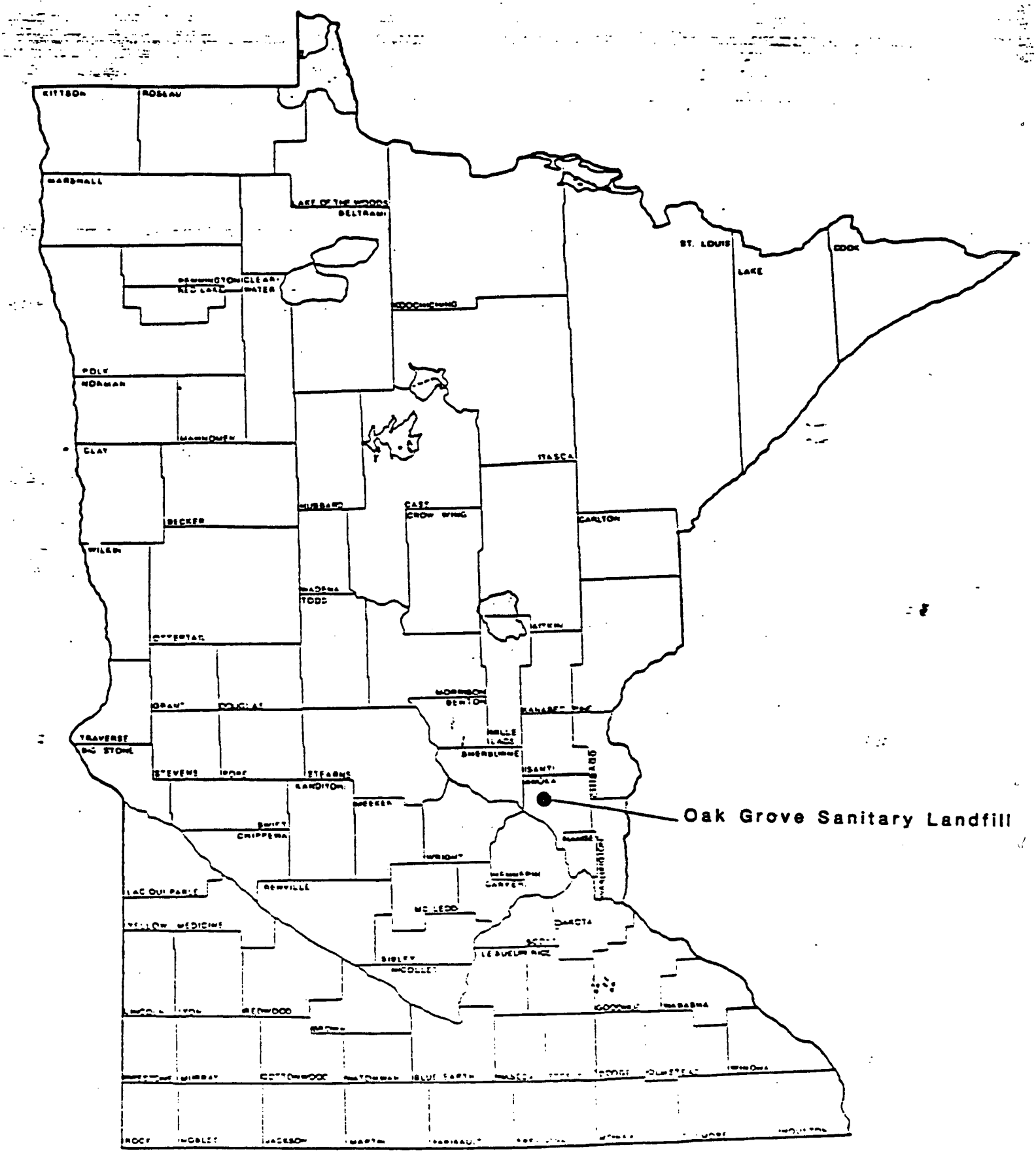
C. Cost Effectiveness

The selected remedy will be consistent with the overall site strategy for restoring the ground water and soils to acceptable cleanup levels. The selected remedy is the least expensive of the alternatives which meet site cleanup goals.

D. Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable/Preference for Treatment

Since the purpose of this source control operable unit was to provide a suitable final cover for the OGSLF which would satisfy all ARARs while minimizing the potential risk to human health, welfare and the environment, no treatment of any kind has been addressed as part of this operable unit. Another operable unit, for the migration management portion of this project, will address possible remediation of the ground water and will consider treatment as a principal element of the overall site strategy.

Figure 1. Location map.



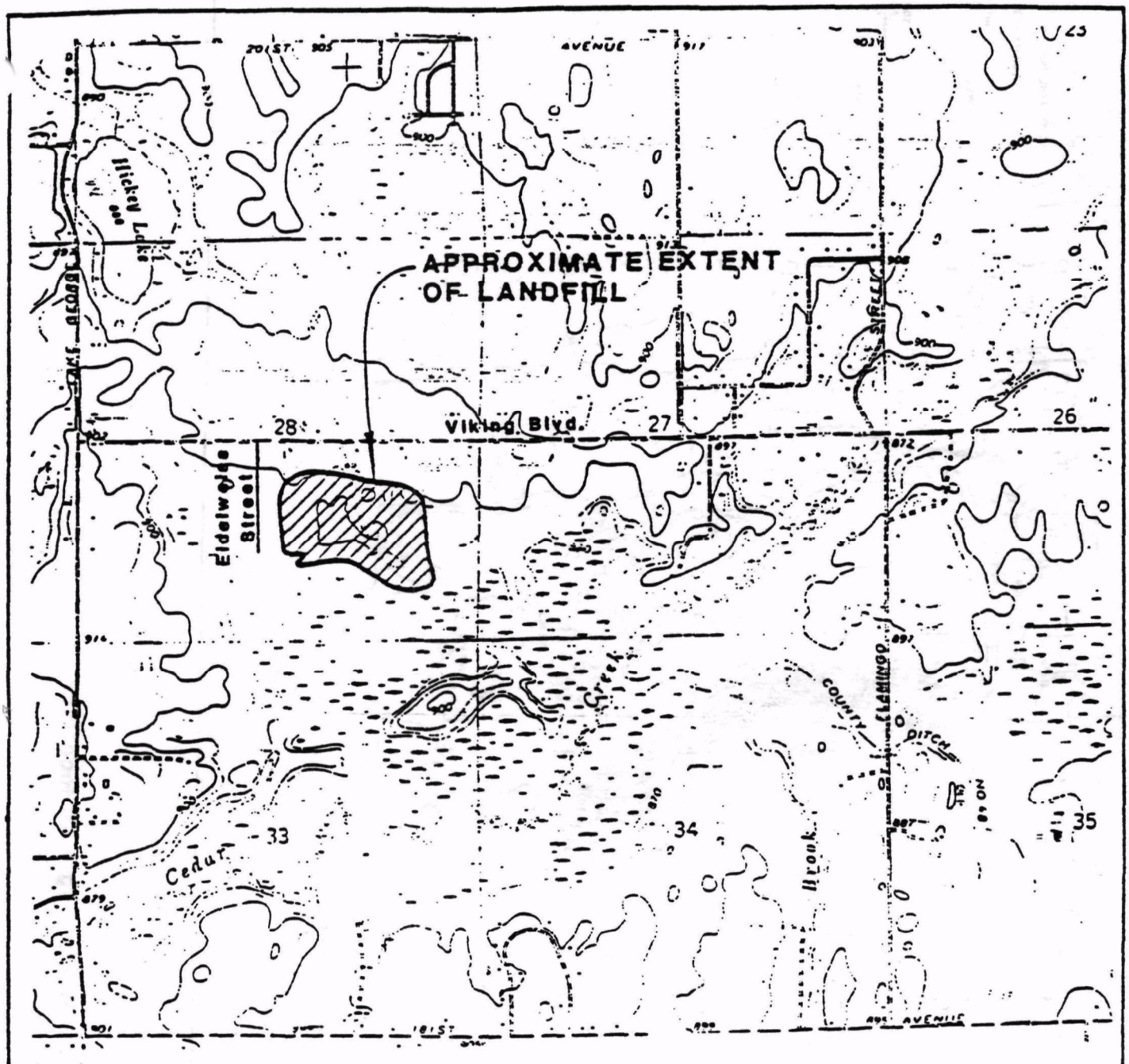


Figure 2.

Site location.

Oak Grove Sanitary Landfill

REF: CEDAR, MINNESOTA USGS 7.5 MINUTE (TOPOGRAPHIC) QUADRANGLE

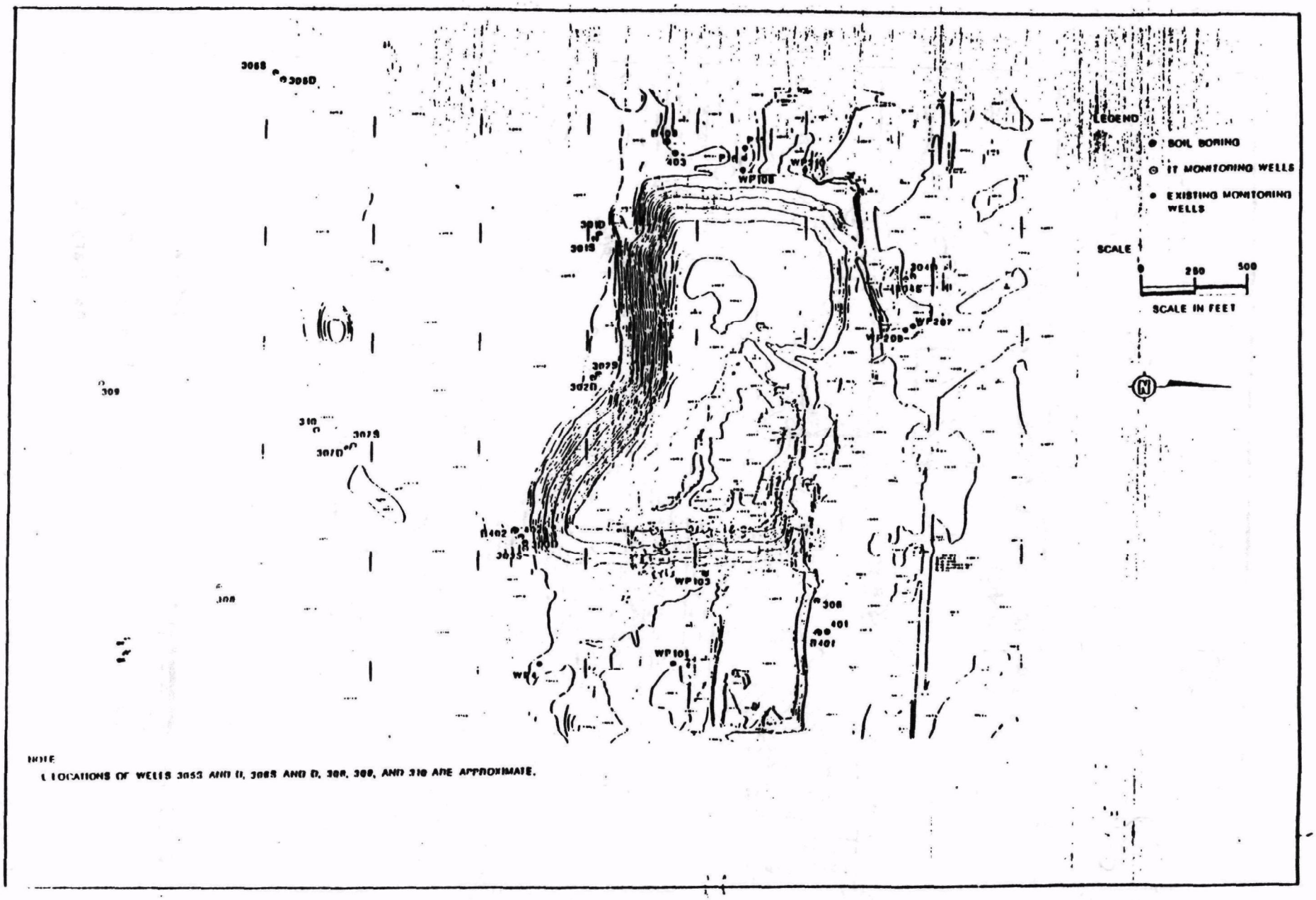
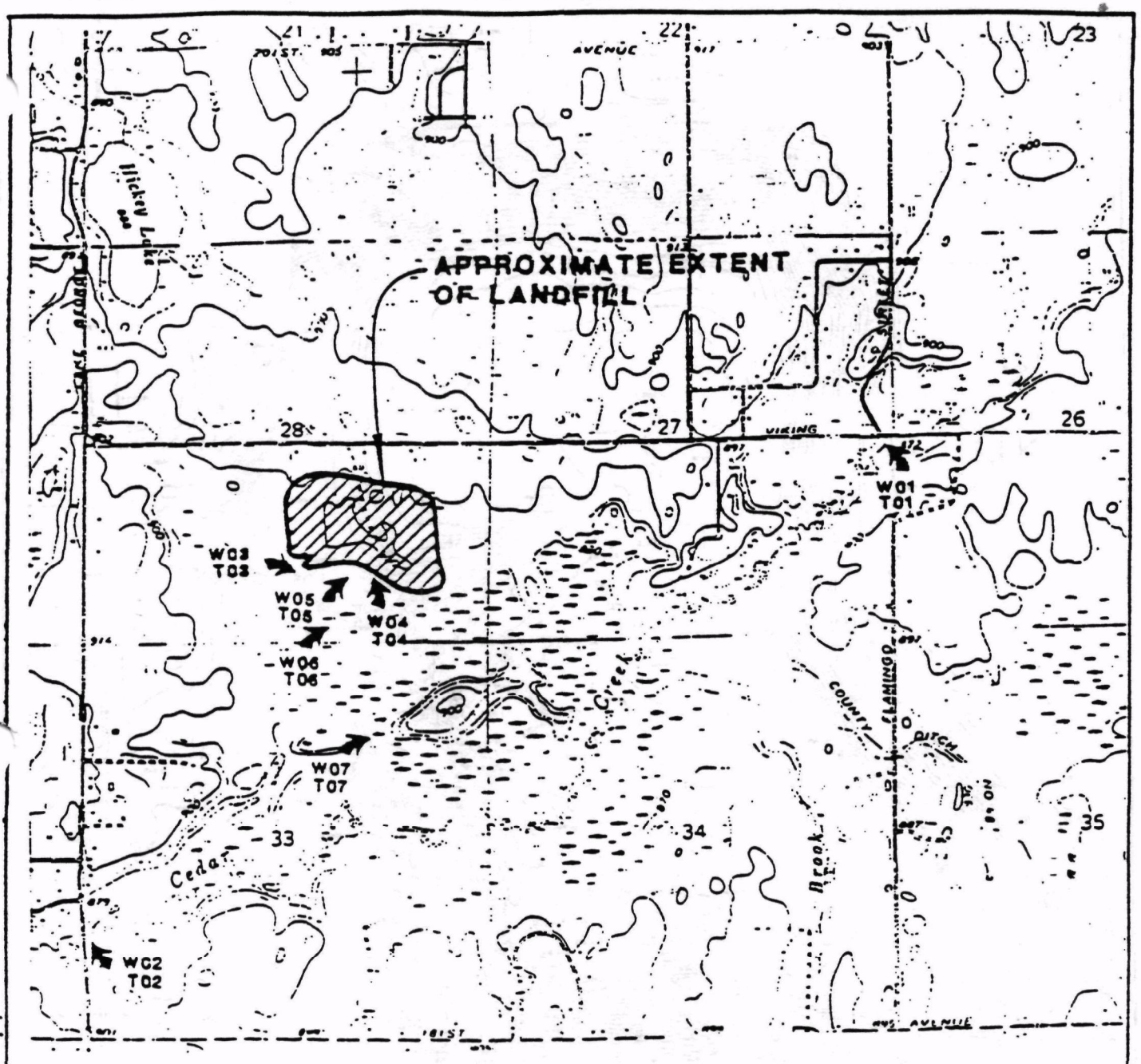


Figure 3. Monitoring well locations.



LEGEND

N

0 4000

2000

SCALE IN FEET

W = SURFACE WATER SAMPLES

T = SEDIMENT SAMPLES

REF: CEDAR, MINNESOTA USGS 7.5 MINUTE (TOPOGRAPHIC) QUADRANGLE

Figure 4.

SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS

OAK GROVE LANDFILL RI/FS

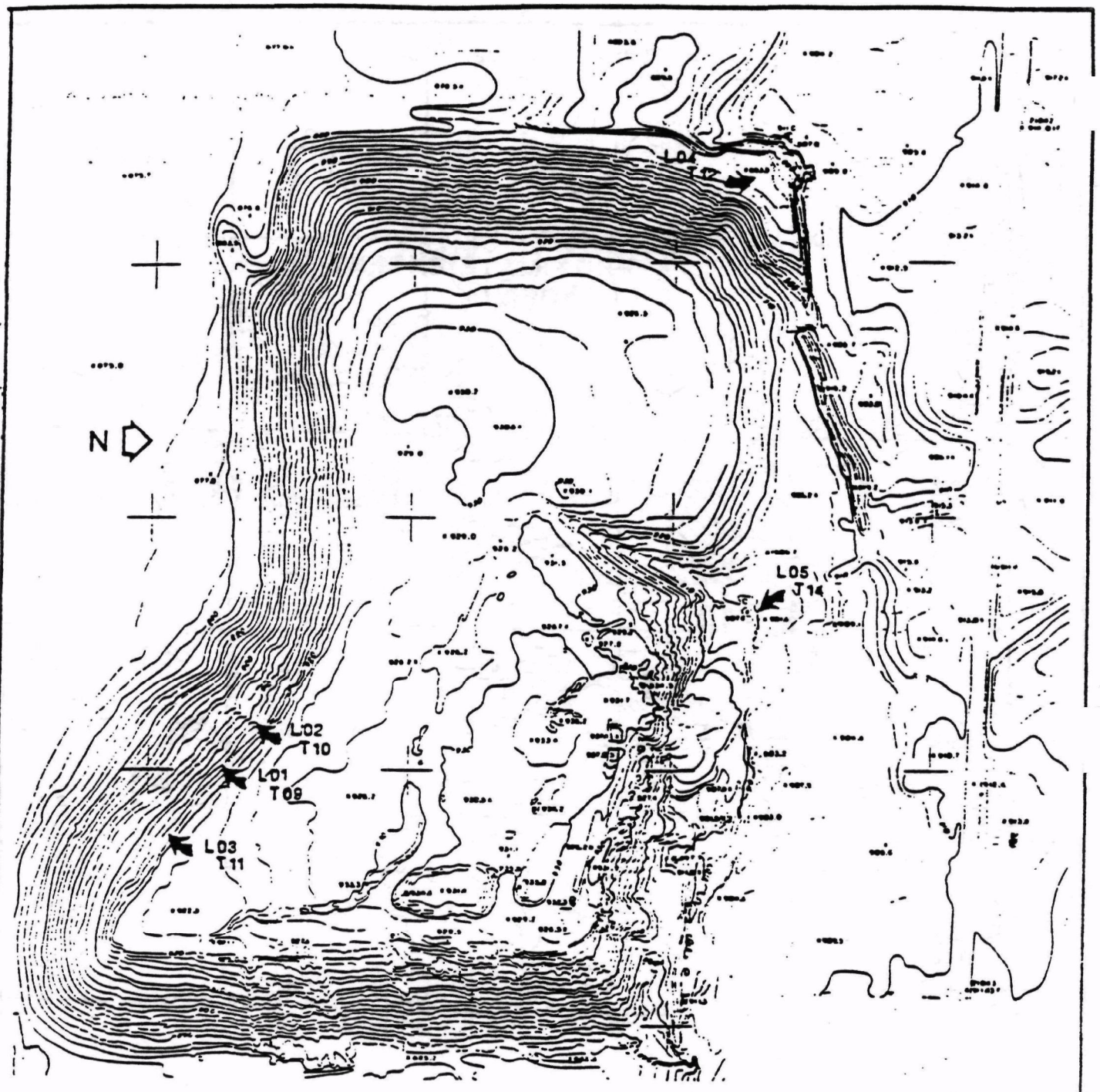


Figure 5.

LEACHATE SEEP AND
SEDIMENT SAMPLE LOCATIONS
OAK GROVE LANDFILL RI/RS

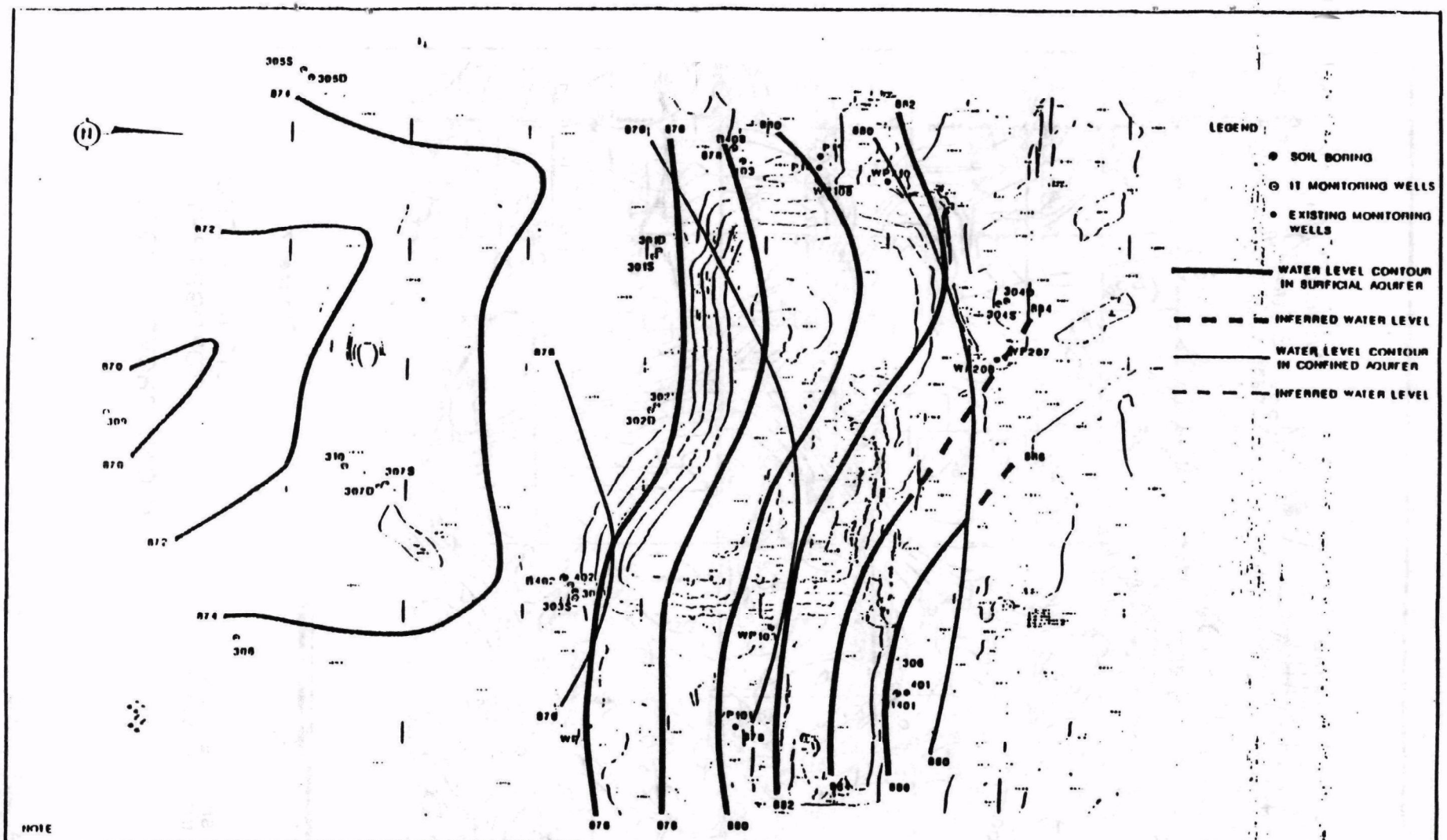
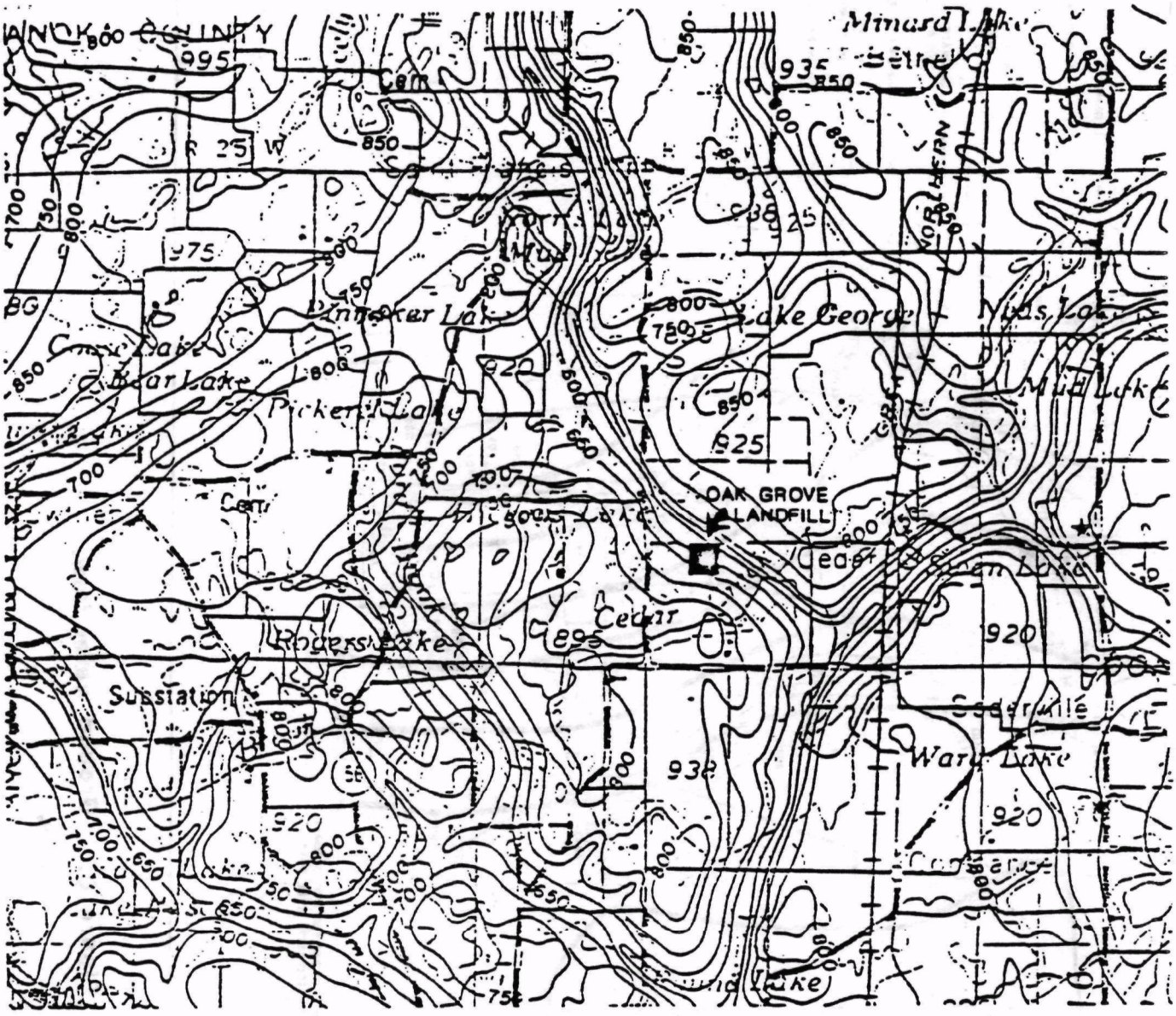


Figure 6. Ground water flow.



0 2 4

MILES

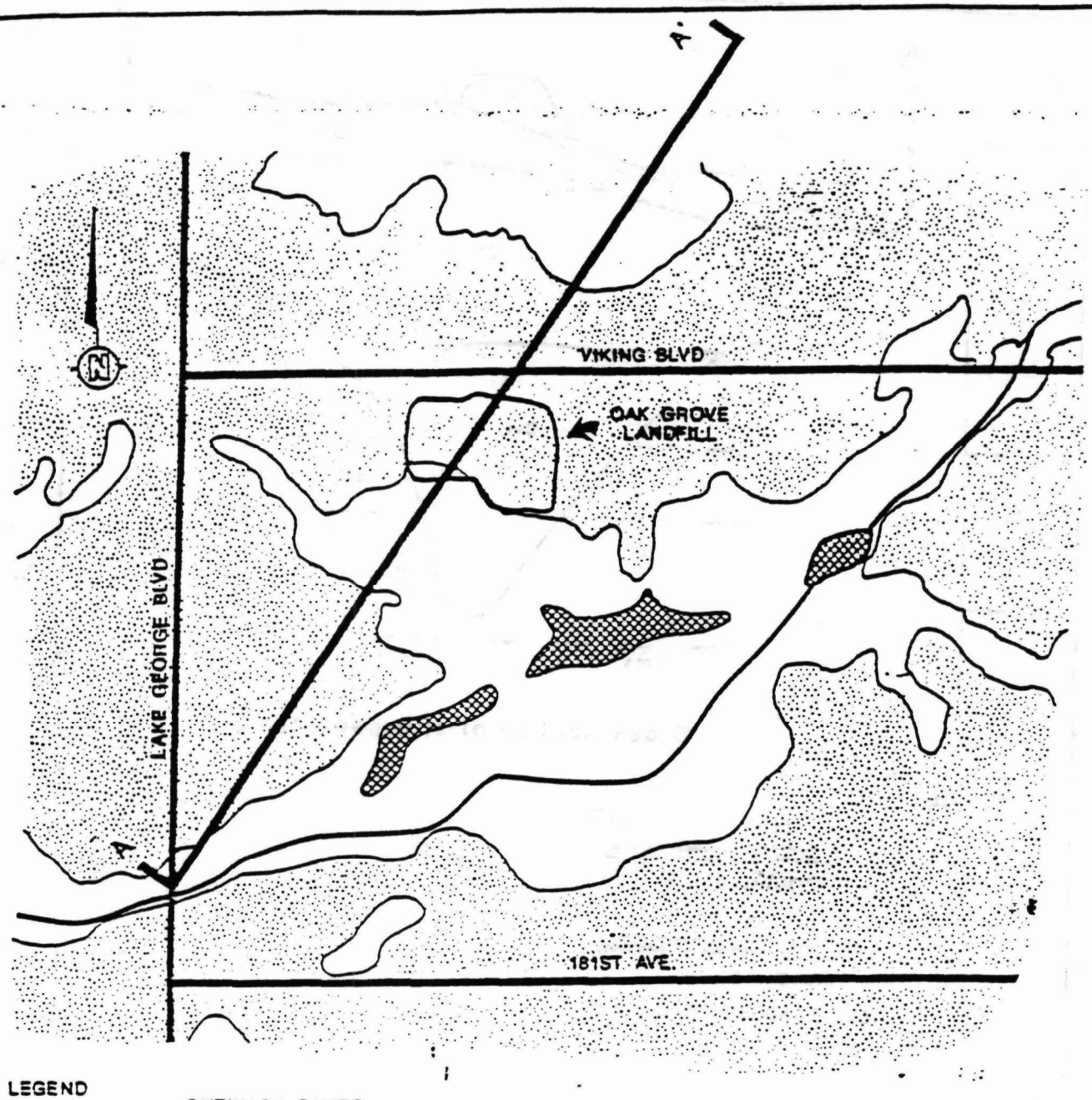
800 BEDROCK SURFACE CONTOURS
CONTOUR INTERVAL 50 FEET

Figure 7.

REGIONAL BEDROCK TOPOGRAPHY

OAK GROVE LANDFILL RI/FS

REF: MINNESOTA GEOLOGICAL SURVEY MISCELLANEOUS MAP SERIES M-55, PLATE 2 OF 2.



LEGEND

OUTWASH SANDS
FINE SAND DEPOSITED INTO A SHALLOW WATER ENVIRONMENT PROBABLY UNDERLAIN BY STAGNANT GLACIAL ICE

ESKER
A RIDGE OF SAND AND GRAVEL DEPOSITED IN THE CHANNEL OF FORMER GLACIAL STREAMS FLOWING WITHIN OR UNDER THE ICE

PEAT
PEAT DEPOSITS

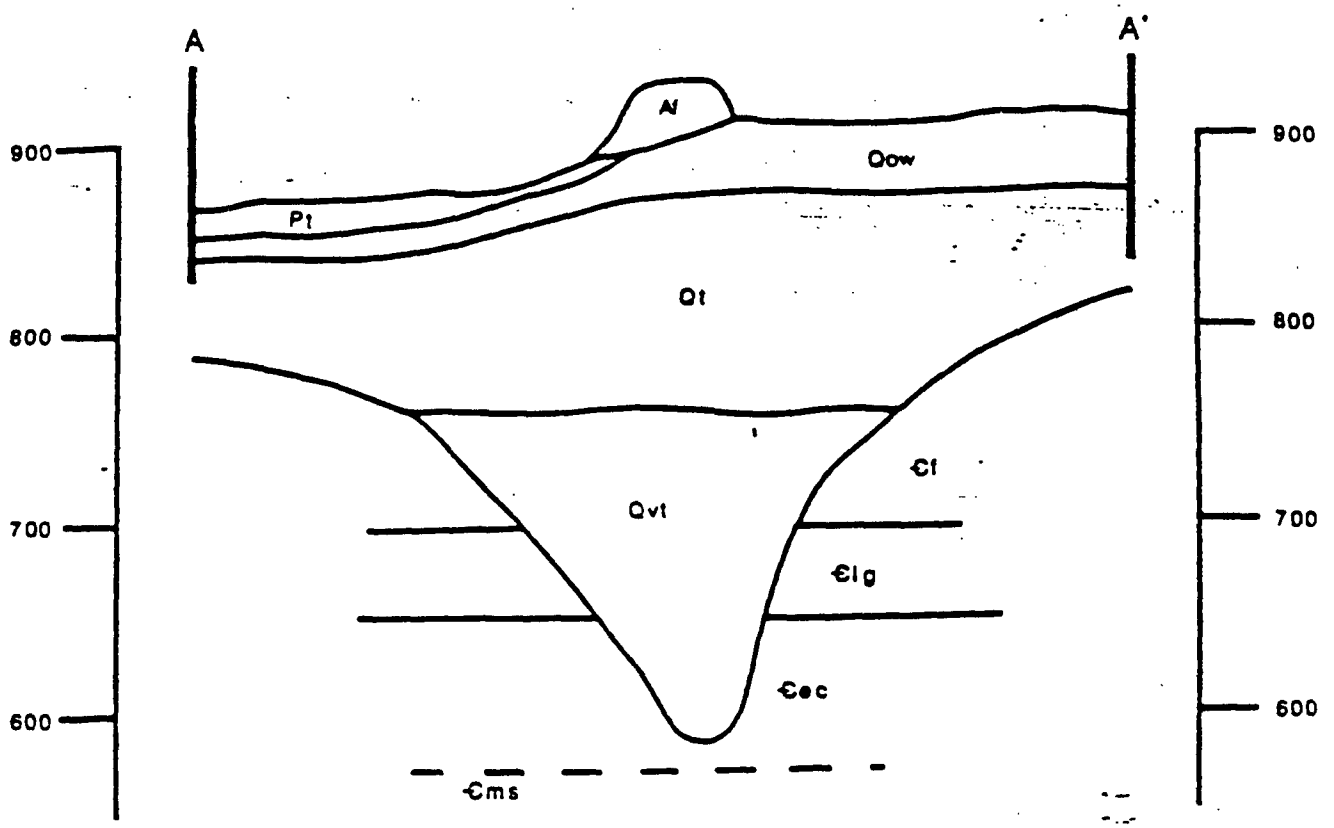
0 2000 4000

SCALE IN FEET

REF: AN EVALUATION OF SURFICIAL GEOLOGY AND PEAT BOGS IN ANOKA, ISANTI AND CHISAGO COUNTIES, MDNR, 1978.

Figure 8.

SURFICIAL GEOLOGY
OAK GROVE LANDFILL RI/FS



Cross section of site geology.

SCALE IN FEET

0 2500 5000

HORIZONTAL SCALE

0 100 200

VERTICAL SCALE

VERTICAL EXAGGERATION = 25x

LEGEND

Af = ARTIFICAL FILL
Qow = OUTWASH DEPOSITS
Qt = GLACIAL TILL
Qvt = VALLEY TRAIN DEPOSITS
Cf = FRANCONIA FORMATION
Clg = IRONTON AND GALESVILLE SANDSTONE
Cec = EAU CLAIRE FORMATION
Cms = MT. SIMON SANDSTONE

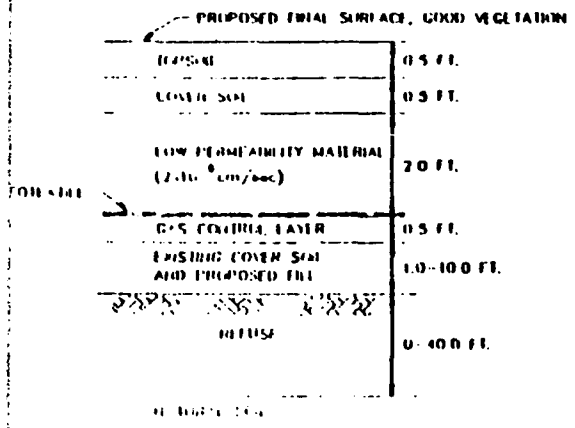
NOTE

RECENT AND QUATERNARY GEOLOGY ADAPTED AND GENERALIZED FROM SOIL BORINGS, MONITORING WELLS AND DOMESTIC WELL RECORDS. BEDROCK GEOLOGY AND TOPOGRAPHY ADAPTED FROM BEDROCK GEOLOGIC AND TOPOGRAPHIC MAPS OF THE SEVEN COUNTY-TWIN CITIES METROPOLITAN AREA, MINNESOTA GEOLOGICAL SURVEY MISCELLANEOUS MAP SERIES M-55, 1985

Figure 8.

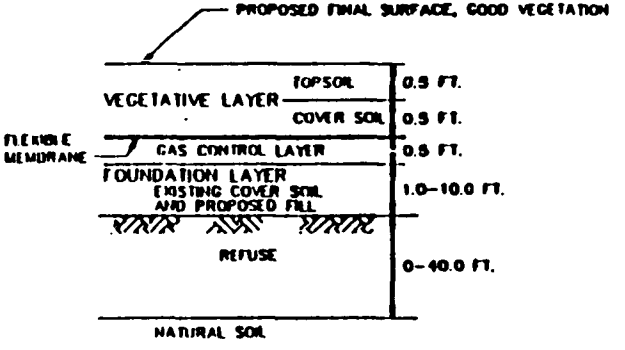
CROSS-SECTION A-A'
GENERAL NE - SW
CROSS-SECTION

OAK GROVE LANDFILL RI/FS



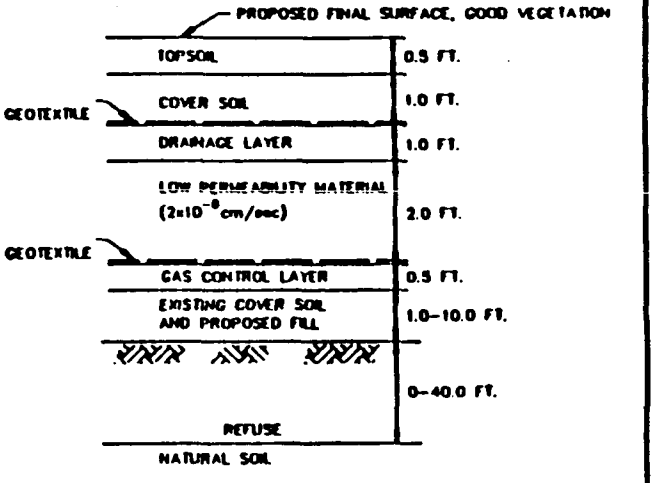
NOTE: THIS CROSS SECTION IS PER PROPOSED STATE SOLID WASTE RULES, MINNESOTA RULES PART 7035.2815, SUBPART 8, ITEM C.

ALTERNATIVE COVER SYSTEM 2A



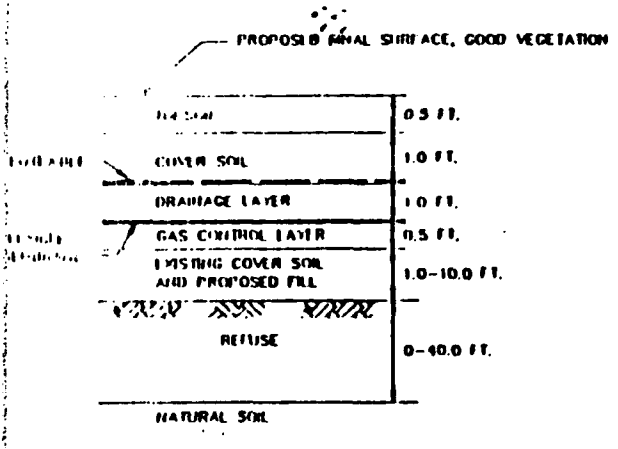
NOTE: THIS CROSS SECTION IS PER PROPOSED STATE SOLID WASTE RULES, MINNESOTA RULES PART 7035.2815, SUBPART 8, ITEM C.

ALTERNATIVE COVER SYSTEM 2B



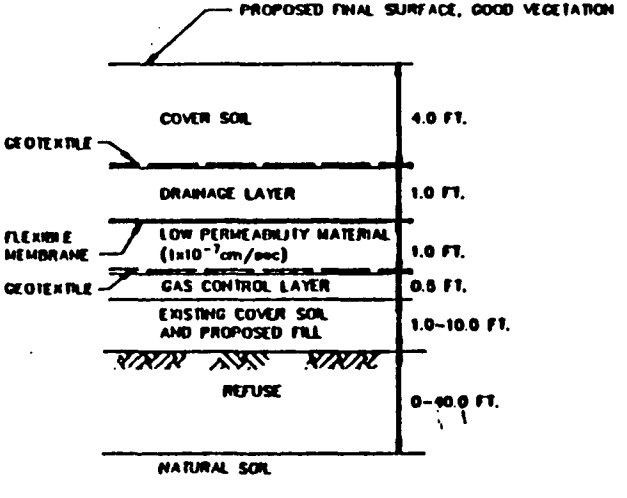
NOTE: THIS CROSS SECTION IS PER PROPOSED STATE SOLID WASTE RULES, MINNESOTA RULES PART 7035.2815, SUBPART 8, ITEM D.

ALTERNATIVE COVER SYSTEM 3A



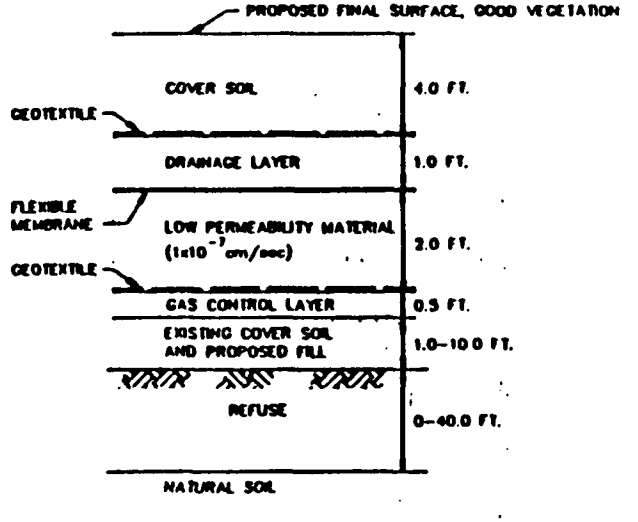
NOTE: THIS CROSS SECTION IS PER PROPOSED STATE SOLID WASTE RULES, MINNESOTA RULES PART 7035.2815, SUBPART 8, ITEM D.

ALTERNATIVE COVER SYSTEM 3B



NOTE: THIS CROSS SECTION IS PER GENERAL U.S.E.P.A. GUIDANCE

ALTERNATIVE COVER SYSTEM 4A



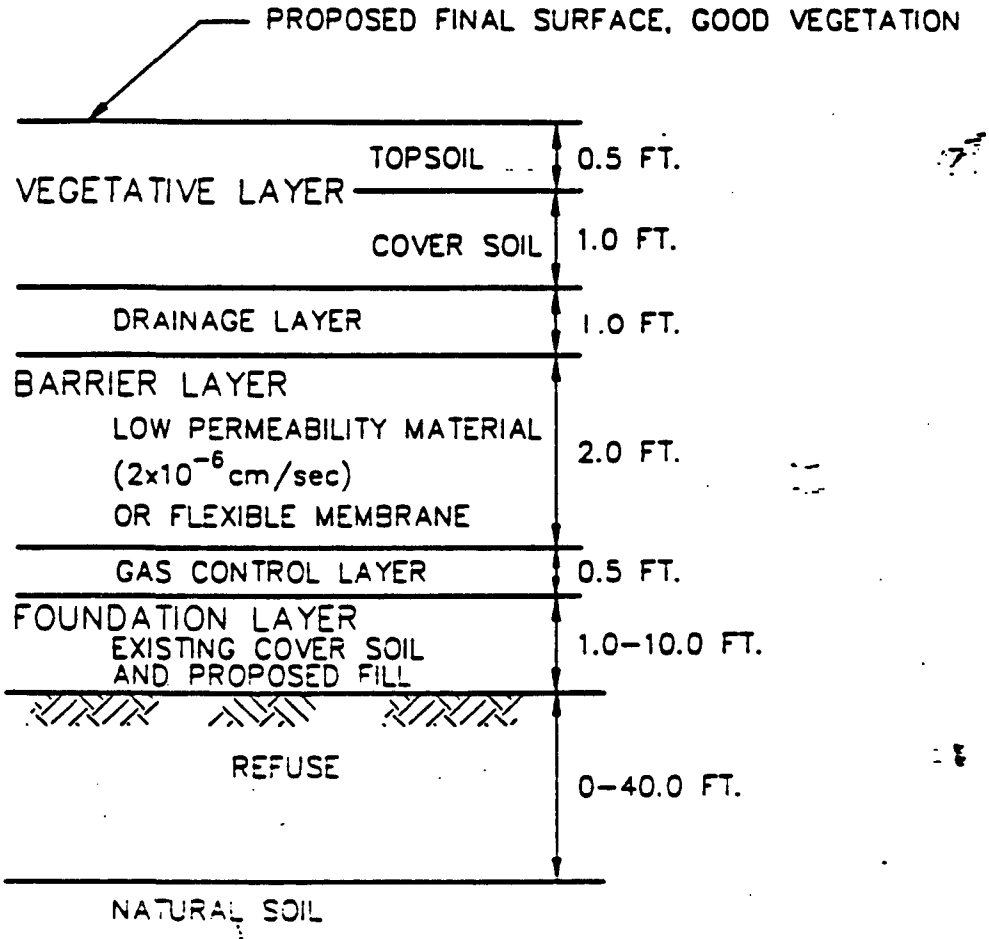
NOTE: THIS CROSS SECTION IS PER GENERAL U.S.E.P.A. GUIDANCE

ALTERNATIVE COVER SYSTEM 4B

OAK GROVE PROPOSED PLAN

MINNESOTA POLLUTION CONTROL AGENCY

Figure 10.
ALTERNATIVE COVER SYSTEMS



NOTE: THIS CROSS SECTION IS PER PROPOSED STATE SOLID WASTE RULES, MINNESOTA RULES PART 7035.2815, SUBPART 6, ITEM D.

ALTERNATIVE COVER SYSTEM 3

Figure 1. Selected alternative.

Table 1:

DRAFT

SUMMARY OF GROUNDWATER
OAK GROVE RI/FS
RESULTS IN ug/l
PAGE 1 OF 3

CONSTITUENT / SAMPLE NUMBER	OGV-M301D-01	OGV-M301D-11	OGV-M301S-01	OGV-M301S-11	OGV-M302D-01	OGV-M302D-11	OGV-M302S-01	OGV-M302S-11	OGV-M303D-01	OGV-M303D-11	OGV-M303S-01	OGV-M303S-11
	PHASE 1	PHASE 2	PHASE 1	PHASE 2	PHASE 1	PHASE 2	PHASE 1	PHASE 2	PHASE 1	PHASE 2	PHASE 1	PHASE 2
CHLOROFORM					490	260	540	300	21	17		
METHYLENE CHLORIDE						9		10	6.1	7		
ACETONE			11				17	14		25		
1,1-DICHLOROETHANE	2.7		2.1		4.3		1.8		3	6		
TRANS-1,2-DICHLOROETHENE			1.3		3.8		6.7	5				
1,2-DICHLOROETHANE					3.8		6.8	6				
2-BUTANONE												
TRICHLOROETHENE					.74							
BENZENE					1.6	10	20	20	8.2	9		
TOLUENE	0.3		4.3	11	4.8		54	39				
CHLOROBENZENE					1.6		6.1					
ETHYLBENZENE					7.4	10	41	34	63	71		
TOTAL XYLENES	2.05				17	22	108	81	49	73		
PHENOL				41								
4-METHYLPHENOL				30								
BENZOIC ACID									23.5			
DIETHYL PHTHALATE									24	19		
BIS(2-ETHYLHEXYL)PHTHALATE												
DI-N-BUTYL PHTHALATE												
ARSENIC	42	24	15	12	41	56	80	121	141	131		
BARIUM	204		213		632	753	209		2710	3230	223	220
BERYLLIUM	5.9		6.5		8.1		8.5					
CALCIUM	161000	180000	170000	121000	275000	276000	498000	415000	193000	193000	195000	231000
CHROMIUM	10		20		20		25		10			
COPPER												
IRON	10400	7860	3130		22700	21800	79700	72200	25600	30600		
MAGNESIUM	36400	50100	36100	20800	65500	80900	217000	244000	19200	213000	118000	151000
MANGANESE	424	428	665	331	853	788	3650	3680	1030	1160	490	467
NICKEL					67	80	59	57	189	223		
POTASSIUM		3040		10000		5100		2010	86000	69400		
SELENIUM												
SODIUM	40300	45500	52600	58100	130000	141000	195000	193000	253000	284000	25300	27600
ZINC						22			47		26	30

NOTE: WELL 304S AND WELL 318 NOT SAMPLED DURING PHASE ONE.

Table 1a (cont.)

SUMMARY OF GROUNDWATER
OAK GROVE RI/FS
RESULTS IN ug/L
PAGE 2 OF 3

DRAFT

	SAMPLE NUMBER											
	OGV-M304D-01	OGV-M304D-11	OGV-M304SR-11	OGV-M305D-01	OGV-M305D-11	OGV-M305S-01	OGV-M305S-11	OGV-M306S-01	OGV-M306S-11	OGV-M307D-01	OGV-M307D-11	OGV-M307S-01
	PHASE 1	PHASE 2	PHASE 2	PHASE 1	PHASE 2	PHASE 1	PHASE 2	PHASE 1	PHASE 2	PHASE 1	PHASE 2	PHASE 1
[illegible]												
[illegible] CHLORIDE												
[illegible]												
1, 1 DICHLOROETHENE												
TRANS 1, 2 DICHLOROETHENE												
1, 2 DICHLOROETHANE												
2 [illegible]												
TRICHLOROETHENE												
[illegible]												
[illegible]												
[illegible]												
[illegible]												
[illegible]												
[illegible]												
[illegible]												
[illegible]		10										
[illegible]												
[illegible]					3							
[illegible]												
[illegible]												
[illegible]	69100	67800	63000	37900	36900	12700	10200	124000	122000	51500	52600	52500
[illegible]								20				
[illegible]											26	
[illegible]												
[illegible]	14300	14500	14600	8740	8670			21700	24400	12700	13100	12800
[illegible]			63							230	227	260
[illegible]												
[illegible]			6410		688		856		5360			
[illegible]												
[illegible]	35200	27100	6340	15600	14200		1860	8720	15600			
ZINC		23									20	

F: WELL 304S AND WELL 310 NOT SAMPLED DURING PHASE ONE.

Table (cont.)

SUMMARY OF GROUNDWATER
OAK GROVE RI/FS
RESULTS IN ug/l

TYPE	CONSTITUENT	OGV-N3[illegible]S-11 PHASE 2	OGV-N388-01 PHASE 1	OGV-N388-11 PHASE 2	OGV-N389-01 PHASE 1	OGV-N389-11 PHASE 2	OGV-N310-11 PHASE 2	OGV-N401-01 PHASE 1	OGV-N401-11 PHASE 2	OGV-N402-01 PHASE 1	OGV-N402-11 PHASE 2	OGV-N403-01 PHASE 1	OGV-N403-11 PHASE 2
V	CHLOROETHANE												
V	METHYLENE CHLORIDE												
V	ACETONE												
V	1,1-DICHLOROETHANE												
V	TRANS-1,2-DICHLOROETHENE												
V	1,2-DICHLOROETHANE												
V	2-BUTANONE								2		4		
V	TRICHLOROETHENE												
V	BENZENE												
V	TOLUENE							1			3		
V	CHLOROBENZENE												
V	ETHYLBENZENE												
V	TOTAL XYLENES												
BN	PHENOL												
BN	4-METHYLPHENOL												
BN	BENZOIC ACID												
BN	DIETHYL PHTHALATE												
BN	BIS(2-ETHYLHEXYL)PHTHALATE								23				23
BN	DI-N-OCTYL PHTHALATE											13	
M	ARSENIC				17								
M	BARIUM				224			112					
M	BERYLLIUM												
M	CALCIUM	53000	46000	60000	495000	51100	48600	49000	54700	46800	47000	46500	52600
M	CHROMIUM							15					
M	COPPER			64		57	35				28		
M	IRON				1290	1460			1170	270	936		
M	MAGNESIUM	13100	11000	13000	10000	10200	12000	8710	10300	12400	11800	14200	13500
M	MANGANESE	284			590	616	178	436	538	290	302	250	287
M	NICKEL												
M	POTASSIUM												781
M	SELENIUM										5		
M	SODIUM				5650	5300		5470	2740	5160			2810
M	ZINC			41		30	33		27		25		

NOTE: WELL 3[illegible]S AND WELL 310 NOT SAMPLED DURING PHASE ONE.

Table 1b.

SUMMARY OF SURFACE WATERS
OAK GROVE MINES
RESULTS IN ug/l

DRAFT

TYPE	CONSTITUENT	SAMPLE NUMBER OGV-WA1-01	OGV-WA2-01	OGV-WA3-01	OGV-WA4-01	OGV-WA5-01	OGV-WA6-01	OGV-WA7-01
V	CHLOROETHANE		7.1		170			
V	METHYLENE CHLORIDE		110		44	61		
V	ACETONE	51			3500			
V	1, 1 DICHLOROETHANE				55			5.4
V	TRANS-1, 2-DICHLOROETHENE							12
V	TRICHLOROETHENE							3.2
V	4-METHYL-2 PENTANONE				160			
BE	4 METHYLPHENOL				48			
BE	BENZOIC ACID				56			
H	CHROMIUM				102			
H	BARIUM					207		
M	CALCIUM	45000	45000	113000	80000	90000	51000	38000
M	MAGNESIUM	18	19	36	72	68	18	23
M	SODIUM	124	120	500	706	422	174	185
M	IRON	11		6.4				
M	POTASSIUM	10700	10700	190000	273000	233000	182000	13800
M	MANGANESE	164	165	575	283	564	36	221
M	ANTIMONY	.2						
M	BERYLLIUM			52	45	96		
M	STRONTIUM			97000	12000	218000		
M	SULFATE	5800	4720	218000	94100	623000	11000	
M	MOLYBDENUM					43		
M	ZINC	9.1	75	43	24	32		
M	CYANIDE					40		

Table 1c.

SUMMARY OF SEDIMENTS
OAK GROVE RI/FS
ORGANIC RESULTS IN ug/kg, INORGANIC RESULTS IN ug/kg

DRAFT

TYPE	CONSTITUENT	SAMPLE NUMBER	OGV-101-01	OGV-102-01	OGV-103-01	OGV-104-01	OGV-105-01	OGV-106-01	OGV-107-01	OGV-109-01	OGV-110-01	OGV-111-01	OGV-112-01	OGV-114-01
V	[illegible]					140								
V	METHYLENE CHLORIDE		16	13	49	20		39		6.5	330	860		310
V	[illegible]		34	30	310	630	370	260	300	32	3900	9700	87	9200
V	2-[illegible]					190					6100	12000		16000
V	4-[illegible]-2-PENTANONE					110						660		840
V	TOLUENE				21	48				51		640		350
V	ETHYLBENZENE					110				17				
V	TOTAL XYLENES									32	1000			
SV	PHENOL											580		2000
SV	BIS(2-CHLOROETHYL)ETHER											850		
SV	2-METHYLPHENOL					780								
SV	4-METHYLPHENOL										2000	8200	360	13000
SV	BENZOIC ACID										7200	3300		5200
SV	[illegible]											550		
SV	[illegible]				810							650		
SV	[illegible]											1300		
M	[illegible]		503	500	191	1200	1750	35	19	1300	1820	1810	2540	1660
M	[illegible]		1.1	1.7		.95	2.4	2.4	1.1		1.4	3.1	3.6	
M	[illegible]					.32	37		12			40	33	63
M	[illegible]		779	983	787	13000	5540	426	385	8870	10300	24600	23700	26600
M	[illegible]		4	1.6	.34	2.3	3.4	.5		3.6	3.9	3.1	3.8	3.9
M	[illegible]				.73	4.3	3.4			5	6.3	12	4.2	19
M	IRON		2640	2860	543	4870	3820	991	950	2810	3920	4950	2840	3880
M	LEAD		1.2	.76	.34	.79	6	.74	.3	3.4	1.3	2.8	4.9	6.8
M	MAGNESIUM					1790	927			1380	1710	3210	2220	4620
M	MANGANESE		75	203	18	215	207	18	42	115	139	210	287	275
M	[illegible]					.01	.01	.003		.01				.02
M	[illegible]				.7	1.8	2.5							
M	[illegible]		41				453							
M	[illegible]							1.1				6.6		
M	ZINC		5.4	4.5	3.1	8.9	10	1.4	.78	72	69	9.4	17	10

Table 1d."

SUMMARY OF LEACHATE
OVC GROVE BUTTS
RESULTS IN ug/l

DRAFT

TYPE	CONSTITUENT	SAMPLE NUMBER OGV-101-01	OGV-102-01	OGV-103-01	OGV-104-01	OGV-105-01
V	METHYLENE CHLORIDE		500	600		1900
V	ACETONE		13000	19000		5400
V	trans, 1, 2 DICHLOROETHENE			510		
V	2 BUTANONE			10000		18000
V	4 METHYL 2 PENTANONE			830		
V	TOLUENE	160		660		
V	ETHYLBENZENE	21				
V	TOTAL XYLENES	50				
A	2 NITROPHENOL	40				
A	4 METHYLPHENOL	60				6900
A	2, 4 DIMETHYLPHENOL	35				
A	BENZOIC ACID					18000
A	4 CHLORO 3 METHYLPHENOL	23				
A	PHENOL	76		190		
A	BIS(2-ETHYLHEXYL)PHTHALATE	35				
A	N, N' DPH					.17
B	ACENAPHTHENE	13500		28		
B	FLUORENE	17				
B	PHENANTHRENE	35000		1000	13000	1440
B	ANTHRACENE	102		3	12	
B	FLUORANTHENE	122				
B	PYRENE	52000		633		724
M	LEAD	5.7				
M	MAGNESIUM	837000			51200	984
M	MANGANESE	139		14	14	22
M	MERCURY	.08		.37		.2
M	NICKEL	170				
M	POTASSIUM	511000				459000
M	SODIUM	1010000				870
M	VANADIUM	124				
M	ZINC	2570		1.97		

TABLE 2
OAK GROVE SANITARY LANDFILL

ALTERNATIVE 1 ANALYSIS

ALTERNATIVE 1 - NO ACTION

Description: The No Action alternative consists of leaving the present cover in place and fencing the site to minimize future access.

Assessment:

Overall Protection of Human Health and the Environment
- o Not protective of the environment. Contaminants will continue to leach into ground water and surface water.
- o Unknown impact on human health. Future contaminant concentrations in ground water and surface water may or may not exceed drinking water and other health-based standards.

Compliance with ARARs:
- o Does not comply with State or Federal landfill closure regulations.

Long-Term Effectiveness:
- o Wastes remain on-site.
- o Present landfill cover is inadequate to prevent contaminant transport to ground water.
- o Future impacts on ground water quality are likely.

Reduction of Toxicity, Mobility, or Volume:
- o Not applicable because no treatment is involved.

Short-Term Effectiveness:
- o Not applicable because no remedial construction is included.

Implementability:
- o Technical feasibility not applicable because no remedial construction is included.
- o Not administratively feasible. No action inconsistent with State and federal landfill closure guidelines.
- o Availability of services and materials not applicable because no remedial construction is included.

Cost:
- o Capital Cost: $80,000 - $110,000
- o Annual Maintenance and Monitoring Cost: $0
- o Estimated Present Worth: $80,000 - $110,000

State Acceptance:
- o Not applicable because this is a State-lead site.

Community Acceptance:
- o No action is likely to be opposed.

TABLE 3

OAK GROVE SANITARY LANDFILL

ALTERNATIVE 2A ANALYSIS

ALTERNATIVE 2A - MINNESOTA RULES FOR INTERIM MUNICIPAL LANDFILL WITH CLAY BARRIER LAYER

Description: The Alternative 2A cover system consists of grading and soil fill to construct a foundation layer with minimum 2 percent slope, a gas control layer of 6 inches of sand, a barrier layer of 24 inches of clay, and a 12 inch vegetated cover layer.

Assessment:

Overall Protection of Human Health and the Environment

- Lowest protection of alternatives. Allows about 11.5 percent of surface precipitation to infiltrate the landfill. Some leaching of contaminants into ground water and surface water.

Compliance with ARARs:

- Complies with State closure regulations for an existing municipal solid waste facility which will not receive additional wastes within 18 months of the enactment of the Minnesota proposed rules.
- Does not comply with ARAR of at least 90% rejection or containment of surface precipitation.

Long-Term Effectiveness:

- Wastes remain on-site.
- Cover system allows percolation of 11.5 percent of surface precipitation.
- The long-term adequacy of land disposal is unknown.
- Minimal potential for barrier layer failure due to differential settling of landfill contents.
- The minimal thickness (12") of the cover soil makes the clay barrier susceptible to damage by burrowing animals, shallow to deep rooted vegetation and erosion, with a subsequent decrease in effectiveness.
- Very susceptible to frost damage and significant decrease in effectiveness.
- Future increases in the water table elevation may bring ground water into contact with landfill contents.
- Lack of drainage can destroy vegetation increasing percolation and leachate production (lower effectiveness).
- Lack of drainage can increase slope instability of the cover soil.

Reduction of Toxicity, Mobility, Or Volume:

- Not applicable because no treatment is involved.

Short-Term Effectiveness:

- Minimal risk to the community during cover system construction.

- Potential risk to workers during construction due to emissions of volatile organic compounds or methane. Requires air monitoring and possible respiratory protection.
- Possible environmental impacts due to particulate emissions. Requires dust control during remedial construction.
- Engineering and construction will require 1 to 2 years. Protection against infiltration will be achieved immediately, although the effect on ground water quality will not be observed until a later time when percolation of previous infiltration is complete.

Implementability:

- Technically feasible. Minimal technical problems during design and construction.
- Administratively feasible. Requires agency coordination to assess the appropriateness of a municipal waste closure action.
- Services and materials are available.

Cost:

- Capital Cost: $3,900,000 - $7,300,000
- Annual Maintenance and Monitoring Cost: $38,000
- Estimated Present Worth: $4,300,000 - $7,700,000

State Acceptance:

- Not applicable because this is a State-lead site.

Community Acceptance:

- All containment alternatives may be opposed.

TABLE 4
OAK GROVE SANITARY LANDFILL

ALTERNATIVE 2B ANALYSIS

ALTERNATIVE 2B - MINNESOTA RULES FOR INTERIM MUNICIPAL LANDFILL WITH SYNTHETIC MEMBRANE BARRIER

Description: The Alternative 2B cover system consists of grading and soil fill to construct a foundation layer with minimum 2 percent slope, a gas control layer of 6 inches of sand, a synthetic flexible membrane, and a 12 inch vegetated cover layer.

Assessment:

Overall Protection of Human Health and the Environment

- Lowest protection of the alternatives. Allows about 12.0 percent of surface precipitation to infiltrate landfill. Some leaching of contaminants into ground water and surface water.

Compliance with ARARs:

- Complies with State closure regulations for an existing municipal solid waste facility which will not receive additional wastes within 18 months of the enactment of the Minnesota proposed rules.
- Does not comply with ARAR of at least 90% containment or rejection of surface precipitation.

Long-Term Effectiveness:

- Wastes remain on-site.
- Cover system allows percolation of 12.0 percent of surface precipitation.
- The long-term adequacy of land disposal is unknown.
- Minimal potential for barrier layer failure due to differential settling of landfill contents.
- The thickness of cover soil (12") provides the synthetic membrane with only minimal protection from physical damage from burrowing animals, vegetation, erosion and surface traffic, thereby resulting in a decreased effectiveness.
- Damage to single synthetic membrane could result in significant decrease in effectiveness.
- Future increases in the water table elevation may bring ground water into contact with landfill contents.
- Lack of drainage can destroy vegetation, increasing percolation and leachate production.
- Lack of drainage may increase slope failure of the cover soil.

Reduction of Toxicity, Mobility, Or Volume:

- Not applicable because no treatment is involved.

Short-Term Effectiveness:

- Minimal risk to the community during cover system construction.

- Potential risk to workers during construction due to emissions of volatile organic compounds or methane. Requires air monitoring and possible respiratory protection.
- Possible environmental impacts due to particulate emissions. Requires dust control during remedial construction.
- Engineering and construction will require 1 to 2 years. Protection against infiltration will be achieved immediately, although the effect on ground water quality will not be observed until a later time when percolation of previous infiltration is complete.

Implementability:

- Technically feasible. Minimal technical problems during design and construction.
- Administratively feasible. Requires agency coordination to assess the appropriateness of a municipal waste closure action.
- Services and materials are available.

Cost:

- Capital Cost: $3,100,000 - $5,400,000
- Annual Maintenance and Monitoring Cost: $37,000
- Estimated Present Worth: $3,500,000 - $5,800,000

State Acceptance:

- Not applicable because this is a State-lead site.

Community Acceptance:

- All containment alternatives may be opposed.

TABLE 5
OAK GROVE SANITARY LANDFILL

ALTERNATIVE 3A ANALYSIS

ALTERNATIVE 3A - MINNESOTA RULES FOR ACTIVE MUNICIPAL LANDFILL, CLAY BARRIER LAYER

Description: The Alternative 3A cover system consists of grading and soil fill to construct a foundation layer with minimum 3 percent slope, a gas control layer of 6 inches of sand, a barrier layer of 24 inches of clay, a 12 inch sand lateral drainage layer, and an 18 inch vegetated cover layer.

Assessment:

Overall Protection of Human Health and the Environment

- o Intermediate protection. Allows about 6.5 percent of surface precipitation to infiltrate landfill. Some leaching of contaminants into ground water and surface water.

Compliance with ARARs:

- o Complies with State closure regulations for an active municipal solid waste facility which will not close within 18 months of the enactment of the Minnesota proposed rules.

Long-Term Effectiveness:

- o Wastes remain on-site.
- o Cover system allows percolation of 6.5 percent of surface precipitation.
- o The long-term adequacy of land disposal is unknown.
- o Minimal potential for barrier layer failure due to differential settling of landfill contents.
- o Burrowing animals and vegetation can disturb upper thickness of barrier without significant reduction in effectiveness.
- o Lateral drainage layer minimizes potential frost damage.
- o Future increases in the water table elevation may bring ground water into contact with landfill contents.

Reduction of Toxicity, Mobility, or Volume:

- o Not applicable because no treatment is involved.

Short-Term Effectiveness:

- o Minimal risk to the community during cover system construction.
- o Potential risk to workers during construction due to emissions of volatile organic compounds or methane. Requires air monitoring and possible respiratory protection.
- o Possible environmental impacts due to particulate emissions. Requires dust control during remedial construction.
- o Engineering and construction will require 1 to 2 years. Protection against infiltration will be achieved immediately, although the effect on ground water quality will not be observed until a later time when percolation of previous infiltration is complete.

Implementability:

- Technically feasible. Minimal technical problems during design and construction.
- Administratively feasible. Requires agency coordination to assess the appropriateness of a municipal waste closure action.
- Services and materials are available.

Cost:

- Capital Cost: $5,900,000 - $10,700,000
- Annual Maintenance and Monitoring Cost: $42,000
- Estimated Present Worth: $6,300,000 - $11,100,000

State Acceptance:

- Not applicable because this is a State-lead site.

Community Acceptance:

- All containment alternatives may be opposed.

TABLE 6
OAK GROVE SANITARY LANDFILL

ALTERNATIVE 3B ANALYSIS

ALTERNATIVE 3B - MINNESOTA RULES FOR ACTIVE MUNICIPAL LANDFILL, MEMBRANE LINER BARRIER LAYER

Description: The Alternative 3B cover system consists of grading and soil fill to construct a foundation layer with minimum 3 percent slope, a gas control layer of 6 inches of sand, a barrier layer of 30 mil thickness high density polyethylene liner, a 12 inch sand lateral drainage layer, and an 18 inch vegetated cover layer.

Assessment:

Overall Protection of Human Health and the Environment

- Intermediate protection. Adequate short-term barrier to leachate generation with about 5.7 percent of precipitation infiltrating landfill. However, failure may occur due to differential settling or penetration by burrowing animals and/or vegetation.

Compliance with ARARs:

- Complies with State closure regulations for an existing municipal solid waste facility which will not close within 18 months of the enactment of the Minnesota proposed rules.

Long-Term Effectiveness:

- Wastes remain on-site.
- Cover system allows percolation of 5.7 percent of surface precipitation.
- The long-term adequacy of land disposal is unknown.
- Increased potential for membrane failure due to differential settling of landfill contents.
- Potential for membrane failure due to abrasion or other disturbances if cover thickness is decreased by erosion.
- Potential for membrane failure due to inadequate quality control during installation.
- If penetrated, the effectiveness of the synthetic membrane may be significantly reduced.
- Burrowing animals or vegetation may penetrate entire thickness of barrier thus reducing the effectiveness of the barrier.
- Future increases in the water table elevation may bring ground water into contact with landfill contents.

Reduction of Toxicity, Mobility, or Volume:

- Not applicable because no treatment is involved.

Short-Term Effectiveness:

- Minimal risk to the community during cover system construction.

- Potential risk to workers during construction due to emissions of volatile organic compounds or methane. Requires air monitoring and possible respiratory protection.
- Possible environmental impacts due to particulate emissions. Requires dust control during remedial construction.
- Engineering and construction will require 1 to 2 years. Protection against infiltration will be achieved immediately, although the effect on ground water quality will not be observed until a later time when percolation of previous infiltration is complete.

Implementability:

- Technically feasible. Minimal technical problems during design and construction.
- Administratively feasible. Requires agency coordination to assess the appropriateness of a municipal waste closure action.
- Services and materials are available.

Cost:

- Capital Cost: $5,100,000 - $8,900,000
- Annual Maintenance and Monitoring Cost: $40,000
- Estimated Present Worth: $5,500,000 - $9,300,000

State Acceptance:

- Not applicable because this is a State-lead site.

Community Acceptance:

- All containment alternatives may be opposed.

TABLE 7
OAK GROVE SANITARY LANDFILL

ALTERNATIVE 4A ANALYSIS

ALTERNATIVE 4A - RCRA EQUIVALENT COVER SYSTEM FOR HAZARDOUS WASTE CLOSURE

Description: The Alternative 4A cover system consists of grading and soil fill to construct a foundation layer with minimum 3 percent slope, a gas control layer of 6 inches of sand, a barrier layer of 30 mil thickness high density polyethylene liner and 12 inches of clay, a 12 inch sand lateral drainage layer, and a 48 inch vegetated cover layer.

Assessment:

Overall Protection of Human Health and the Environment

- Protective. Virtually eliminates leachate generation due to infiltration of precipitation.

Compliance with ARARs:

- May achieve compliance with RCRA closure regulations for a hazardous waste cover system. Achieves desired barrier performance criteria with 12 inches of clay rather than the 24 inches recommended in guidance documents.

Long-Term Effectiveness:

- Wastes remain on-site.
- Cover system essentially eliminates percolation of surface precipitation, initial efficiency of 100 percent.
- The long-term adequacy of land disposal is unknown.
- Synthetic membrane and lateral drainage layer minimizes frost damage to the clay barrier.
- Minimal potential for cover system failure.
- Future increases in the water table elevation may bring ground water into contact with landfill contents.

Reduction of Toxicity, Mobility, or Volume:

- Not applicable because no treatment is involved.

Short-Term Effectiveness:

- Minimal risk to the community during cover system construction.
- Potential risk to workers during construction due to emissions of volatile organic compounds or methane. Requires air monitoring and possible respiratory protection.
- Possible environmental impacts due to particulate emissions. Requires dust control during remedial construction.
- Engineering and construction will require 1 to 2 years. Protection against infiltration will be achieved immediately, although the effect on ground water quality will not be observed until a later time when percolation of previous infiltration to the ground water table is complete.

Implementability:

- Technically feasible. Minimal technical problems during design and construction.
- Administratively feasible. Requires agency approval of interpretation of RCRA performance criteria.
- Services and materials are available. High costs for clay transport may cause bentonite/soil mixture to be a cost-effective alternative.

Cost:

- Capital Cost: $7,400,000 - $13,400,000
- Annual Maintenance and Monitoring Cost: $45,000
- Estimated Present Worth: $7,900,000 - $13,900,000

State Acceptance:

- Not applicable because this is a State-lead site.

Community Acceptance:

- All containment alternatives may be opposed, but possible lesser opposition due to the second barrier layer provided.

TABLE 8
OAK GROVE SANITARY LANDFILL

ALTERNATIVE 4B ANALYSIS

ALTERNATIVE 4B - RCRA COVER SYSTEM FOR HAZARDOUS WASTE CLOSURE

Description: The Alternative 4B cover system consists of grading and soil fill to construct a foundation layer with minimum 3 percent slope, a gas control layer of 6 inches of sand, a barrier layer of 30 mil thickness high density polyethylene liner and 24 inches of clay, a 12 inch sand lateral drainage layer, and a 48 inch vegetated cover layer.

Assessment:

Overall Protection of Human Health and the Environment
- o Protective. Virtually eliminates leachate generation due to infiltration of precipitation.

Compliance with ARARs:
- o Compliance with RCRA closure regulations and design guidance documents for a hazardous waste cover system.

Long-Term Effectiveness:
- o Wastes remain on-site.
- o Cover system virtually eliminates percolation of surface precipitation, initial efficiency of 100 percent.
- o The long-term adequacy of land disposal is unknown.
- o Synthetic membrane and lateral drainage layer minimizes frost damage to the clay barrier.
- o Minimal potential for cover system failure.
- o Future increases in the water table elevation may bring ground water into contact with landfill contents.

Reduction of Toxicity, Mobility, or Volume:
- o Not applicable because no treatment is involved.

Short-Term Effectiveness:
- o Minimal risk to the community during cover system construction.
- o Potential risk to workers during construction due to emissions of volatile organic compounds or methane. Requires air monitoring and possible respiratory protection.
- o Possible environmental impacts due to particulate emissions. Requires dust control during remedial construction.
- o Engineering and construction will require 1 to 2 years. Protection against infiltration will be achieved immediately, although the effect on ground water quality will not be observed until a later time when percolation of previous infiltration is complete.

Implementability:

- Technically feasible. Minimal technical problems during design and construction.
- Administratively feasible. Requires agency coordination to assess the appropriateness of a hazardous waste closure action.
- Services and materials are available. High costs for clay transport may cause bentonite/soil mixture to be a cost-effective alternative.

Cost:

- Capital Cost: $8,000,000 - $14,600,000
- Annual Maintenance and Monitoring Cost: $46,000
- Estimated Present Worth: $8,500,000 - $15,100,000

State Acceptance:

- Not applicable because this is a State-lead site.

Community Acceptance:

- All containment alternatives may be opposed, but possible lesser opposition due to the second barrier layer provided.

ENFORCEMENT

Prior to implementation of the RI/FS, U.S. EPA issued notice letters to the owners and operators of the Oak Grove Sanitary Landfill.

During the RI/FS, numerous information request letters pursuant to CERCLA 104(e) were sent in an effort to identify additional PRPs. Consequently, five generators and one transporter were identified as PRPs.

Section 122(a) of SARA give the President the authority to enter into agreements with PRPs to perform response actions if he determines the actions will be done properly. If the President determines that it is inappropriate to enter into an agreement or to initiate negotiations, the responsible parties will be notified of this decision and the reasons behind it. Nine PRPs were sent a letter in September 1988 notifying them of the decision not to enter into negotiation with them consistent with this requirement of Section 122(a).

PRPs identified to date were generally not considered viable candidates to implement remedial action. U.S. EPA is also planning to issue approximately 50 additional information requests. Should U.S. EPA identify viable PRPs as a result, U.S. EPA will initiate the special notice moratorium under SARA 122(e).

OAK GROVE LANDFILL, OAK GROVE TOWNSHIP, MINNESOTA

SOURCE CONTROL FEASIBILITY STUDY

RESPONSIVENESS SUMMARY

This community responsiveness summary has been developed to document community involvement and concerns during the source control operable unit phase of the project, and to respond to public comments received during the public comment period. Also included, as Attachment A, is a summary of the community relations activities conducted by the Minnesota Pollution Control Agency (MPCA) since the Remedial Investigation and Feasibility Study was funded, under a cooperative agreement with the U.S. Environmental Protection Agency (EPA). EPA hereby adopts the MPCA responses for the purpose of Section 117 of CERCLA.

A. OVERVIEW

The recommended alternative for a landfill cover at the Oak Grove site was announced to the community through an advertisement in the local newspaper and a news release. These items were also mailed to names on the Oak Grove site mailing list. The recommended alternative is a landfill cover which includes a 3 to 20 percent slope, a gas control layer, a barrier layer of either two feet of clay or a 30-mil high density polyethylene membrane, a drainage layer, cover soil and vegetated topsoil.

Anoka County and several residents living near the site supported the MPCA's recommendation for a landfill cover. Comments were also received from a few residents and the landfill owners and operators (the potentially responsible parties) adamantly opposing the MPCA's alternative and supporting the no-action alternative.

This responsiveness summary contains the following sections:

- Background on Community Involvement
- Summary of Comments Received and Agency Responses
- Remaining Issues
- Attachment: Community Relations Activities at Oak Grove Landfill

B. BACKGROUND ON COMMUNITY INVOLVEMENT

A high level of community interest in the Oak Grove Landfill site had existed during the time that the landfill was operating and has continued at relatively the same level following closure of the landfill and throughout the Superfund project to this point. The primary focus of residents' concerns since the landfill closed has been the ground water contamination from the site and its potential effect on nearby residential wells.

The MPCA conducted the community relations activities for the Superfund project. In November 1985, residents were provided with information on plans for the project through a news release, fact sheet and public meeting. A second public meeting was held and fact sheet provided in December 1986, following approval of the work plan and start of the field work. Letters to update interested persons on the progress of the ground water investigations were mailed to names on the Oak Grove site mailing list in February and June 1988. These letters also included information on the MPCA's decision to conduct a source control feasibility study and the purpose of the study.

The MPCA announced a 21-day public comment period (September 2 - September 23, 1988) on the alternatives for the landfill cover through an advertisement in the Anoka County paper and a news release. Copies of the advertisement and news release were also mailed to persons on the mailing list. A public meeting was held midway in the public comment period, on September 14, and fact sheets were distributed at the meeting and made available at the township hall.

C. SUMMARY OF PUBLIC COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND MPCA RESPONSES

Comments received during the public comment period on the Source Control Feasibility Study and Proposed Plan are summarized below:

Comment: Residents living near the site expressed support for the MPCA's recommendation for a landfill cover.

MPCA Response: The MPCA agrees that a landfill cover is needed and is the best source control alternative for the site. The MPCA proposed alternative 3 because it is appropriate for a solid waste landfill and is the most cost-effective alternative.

Comment: Anoka County supported the proposed alternative, noted it was long-overdue and recommended it be undertaken quickly. The County also:

- requested that the existing lime sludge be graded before the fill is placed
- questioned whether gas venting would be provided
- questioned how surface runoff will be controlled
- requested that the quality of the upper 18 inches of soil meet county requirements
- questioned whether the use of the synthetic barrier is realistic because of the difficulty of repair after cover soils are placed
- requested that consideration be given to additional cover soils for frost protection

MPCA Response: Gas venting will be provided as part of the landfill cover. The existing lime sludge will be graded before the fill is placed.

During the remedial design phase, specific plans for surface water runoff control will be developed and specifications for the topsoil and cover soils determined. Throughout the design phase, the MPCA will periodically meet with and update county staff to keep them informed of the plans for the landfill cover. County concerns about runoff control and topsoil and cover soil quality will be considered as design specifications are developed.

The MPCA considers either barrier layer material -- clay or synthetic membrane -- equivalent and appropriate for the cover. The MPCA also recognizes, however, the difficulties in repairing the synthetic membrane after placement of cover soils. The choice of barrier material will be made early in the design stage, after the MPCA receives more site-specific information on the availability and cost of the materials.

Frost control is not required for cover under Minnesota's proposed solid waste rules. The MPCA believes that the drainage layer in the cover system will remove a sufficient amount of moisture from the cover to prevent frost damage.

Comment: One resident objected to "big government spending" and indicated interest in bidding on the project. The resident also objected to the landfill owner's loss of development rights for the landfill property.

MPCA Comment: The proposed alternative was evaluated on how well it met the nine criteria developed by EPA for evaluation of remedial action alternatives under the federal Superfund program. The nine criteria are: protection of human health and the environment; compliance with health and environmental regulations; reduction of toxicity, mobility or volume of the contaminants; short-term effectiveness; long-term effectiveness; implementability; public acceptability; state acceptability; and cost. The proposed alternative represents the best balance among the nine criteria.

While the estimated cost is higher than the MPCA expected, the agency believes that through the competitive bidding process, the cover will be constructed at the lowest cost possible.

Under state competitive bidding procedures, any qualified contractor has an opportunity to bid on state contracts.

Relative to the property development issue, the reason that the property cannot be developed in the future is the need to keep the cover intact, and added weight placed on the cover could result in additional settling of the landfill. In addition, future use of the property in some manner could restrict operation of the gas venting system. Although the construction of the cover will prevent future use of the property, the property owners should realize that, even without the use restrictions of the cover, it is unlikely that the landfill property would be of interest to potential developers.

Comment: Another resident supported the no-action alternative, citing the high cost to taxpayers as the primary objection. The resident also noted that two nearby landfills, Anoka Municipal and Waste Disposal Engineering, are not being covered and that, given the information available on the ground water contamination at the Oak Grove site, the existing lime sludge cover would be adequate.

MPCA Response: The MPCA's response to the cost issue is contained in the response to the previous commenter. In addition, the MPCA notes that little if any Superfund monies would probably have been required for the cover had the owners and operators agreed to participate in timely design and construction of an appropriate final cover for the landfill, as was requested by the MPCA.

Both the Anoka County Landfill in Ramsey and the Waste Disposal Engineering Landfill in Andover will have covers that are equal to or more stringent than the proposed cover for Oak Grove.

Landfill covers are designed not only to reduce the generation and movement of leachate into the ground water. They are also designed to: control the release of methane and other gases forming in the buried wastes, prevent erosion and control runoff from the surface of the landfill, provide adequate drainage, prevent rodents from burrowing into the landfill and prevent direct contact with the wastes. The existing lime sludge on the landfill is not designed to accomplish this, and is, therefore, not an adequate cover.

The attorney for the owners and operators of the landfill, who are responsible parties, and several of the landfill owners objected to the proposed alternative, supported the no-action alternative, and provided the specific comments (1 - 5) listed below.

For clarity, the MPCA's response follows each comment.

Comment: 1. The landfill should be left uncovered -- the no-action alternative -- because of the lack of demonstrated harm. The MPCA's draft report on the extent of contamination, has not shown the landfill poses a problem, a potential threat to the public or an effect on drinking water. Ground water contamination detected in the study is not severe and is being treated as it is discharged to the wetland.

MPCA Response: The MPCA's study of the contamination at the landfill is not complete and it is too early to characterize the severity of contamination at the landfill.

Under Minnesota Proposed Rules 7035.2815, Subpart 6, every sanitary landfill in Minnesota will be required to have a final cover that meets new specifications, whether or not there is ground water contamination present. All covers are required to control and prevent a variety of potential problems, besides reducing production of leachate and movement of leachate into the ground water. Landfill covers are also required to control erosion, runoff from the surface, and access to the site, control the release of methane and other gases from the buried waste, provide adequate drainage, and prevent rodents from burrowing into the landfill, and prevent direct contact with the waste.

Comment: 2. The landfill has been uncovered for many years without causing a problem. The MPCA is moving too quickly in making this decision ahead of completing its investigation.

MPCA Response: The MPCA is continuing its remedial investigation at the landfill. Since the cover will be required for the landfill no matter what the investigation finds and it will not interfere with any ground water remedies that may be needed, the MPCA has chosen to proceed with the cover alternative prior to the completion of the investigation.

Comment: 3. The cost of the alternative is excessive compared to the seriousness of the threat from the landfill and responsible parties will face legal action and potential economic ruin. EPA has indicated they have suspended negotiations with the responsible parties and the responsible parties do not understand this and need more facts.

MPCA Response: The MPCA's response to the cost issue is contained in the response to a commenter above. The federal and state Superfund laws, enacted by Congress and the Minnesota Legislature, give the EPA and MPCA the authority to recover costs for remedial actions from responsible parties, in this case the owners and operators of the landfill.

At this site, EPA is the lead agency for enforcement actions and will negotiate with responsible parties for cost recovery. Under EPA procedures, a moratorium is placed on these negotiations until after the Record of Decision is signed. Following this action, EPA re-opens the negotiation process for a specified period of time.

Comment: 4. Public officials and area residents were not in attendance at the meeting and should have been.

MPCA Response: The MPCA sent a notice of the meeting to all persons on the Oak Grove mailing list, which includes residents and government and elected officials. The MPCA also published the meeting announcement in the Anoka County Union.

Comment: 5. Some of the background information in the Feasibility Study relating to the estimated amount of hazardous waste in the landfill is inaccurate.

MPCA Response: The estimated amount of hazardous waste disposed of in the landfill was provided primarily for background purposes and was an amount included in the draft report on the ground water investigation prepared by the MPCA's previous consultant. The amount listed is the documented amount of hazardous waste disposed of at the landfill. The MPCA and EPA believe that additional amounts of hazardous waste may have been disposed of at the site.

Relative to the questioned percentage of hazardous waste to total waste volume, the MPCA's consultant agrees that the figure should have been .12 percent, and the MPCA has noted this .08 percent error.

D. REMAINING ISSUES

The MPCA was unable to specify which barrier layer for the cover -- clay or a high density polyethylene membrane -- would be the final choice. This decision will be made during the early stages of remedial design, after the MPCA receives more site-specific information on the availability and cost of both barrier materials. The MPCA considers either barrier layer material equivalent and appropriate for the cover as both have been designed to divert water from entering the fill material and infiltrating through the buried wastes.

In addition, some of the comments received from Anoka County will be addressed during the remedial design. County concerns relating to the quality of the top-soil and cover soils and questions about surface water runoff will be considered during this phase of the project. Through periodic meetings and updates, the MPCA will work with the county on these issues and keep them informed on the progress of the design.

ATTACHMENT A

COMMUNITY RELATIONS ACTIVITIES CONDUCTED AT THE OAK GROVE LANDFILL SITE

The MPCA has conducted the following community relations activities for the Oak Grove Landfill to date:

November 6, 1985 - Public meeting held to discuss future federal Superfund project at the landfill. Fact sheet provided to meeting attendees and township.

December 1985 - Community relations interviews conducted and information repository established at the Oak Grove Township Hall.

Spring 1985 - Community relations plan written and approved by EPA.

November 17, 1986 - News release announcing meeting in Oak Grove Township on beginning of Superfund project field work.

December 3, 1986 - Meeting held in Oak Grove Township; fact sheet provided to residents and township; project work plan placed in information repository.

February and June 1988 - Letters sent to persons on mailing list to provide updated information on the status of the ground water investigation and indicating that the MPCA was proceeding with a source control feasibility study while continuing investigation at the landfill.

August 30, 1988 - News release announcing completion of feasibility study for cover; announcing public comment period and date of public meeting.

September 2, 1988 - Ad published in Anoka County Union announcing same information as news release. Feasibility Study and Proposed Plan placed in information repository.

September 14, 1988 - Public meeting held, fact sheet provided and comments accepted from public.

September 23, 1988 - Public comment period ended; responsiveness summary written and attached to Record of Decision.

COUNTY OF ANOKA

COMMUNITY HEALTH & SOCIAL SERVICES DEPARTMENT
FOURTH FLOOR
COURTHOUSE ANOKA, MINNESOTA 55303 612-422-7000

Public Health Nursing Services
Environmental Health Services
Mental Health, Mental Retardation, Chemical Dependency Services

Family & Children's Services
Volunteer Services
Developmental Achievement Centers

September 19, 1988

Minnesota Pollution Control Agency
c/o Wayne Sarappo
520 North Lafayette Road
St. Paul, MN

Dear Mr. Sarappo:

Reference is made to the Source Control Operable Unit Proposed Plan for the Oak Grove Sanitary Landfill which was submitted to us on September 2, 1988. The work proposed in this plan is long overdue and needs to be undertaken as soon as possible.

Our review of the proposed plan has identified several items needing clarification which we'd like to bring to your attention. These items are as follows:

1. The quality of the upper 18 inches of soil has not been specified. We would request that the quality of the upper 18 inches of final cover soil meet the criteria specified in the County's Solid Waste Ordinance for such soils. I have enclosed a copy of the definition of final cover which indicates the soil quality requirements for the upper 18 inches of soils.

2. It was not clear in the plan whether or not the existing lime sludge on the top Phase II area would be graded before fill placement. Care should be taken to grade the existing lime sludge so that there are no pockets to pond water after placement of the fill soils necessary for establishing the final grade.

3. Both cover plans, 3A and 3B, provide for 2½ feet of cover over the impervious material (low permeable soils or flexible membrane). Two and a half feet of cover may not provide sufficient protection of these materials from damage caused by freeze/thaw cycles. Consideration should be given to additional protective cover soils.

4. Is the use of a membrane cap a realistic alternative? Membrane caps are, at best, extremely difficult to repair if damaged after cover soil placement.

5. Will gas venting be provided?

5. Will gas venting be provided?

6. How will surface run off water be controlled and managed to get it off of the fill without damaging the cover?

I look forward to your favorable consideration of the foregoing comments. If you have any questions concerning this matter, please feel free to call me.

Yours very truly,

Robert M. Hutchison
Director, Environmental Services

RMH:kk

Subsection 13. "Transfer Station" is defined as an intermediate solid waste disposal facility in which solid waste collected from any source is temporarily deposited to await transportation to the final disposal site or facility.

Subsection 14. "Incineration" is defined as the process by which solid wastes are burned for the purpose of volume and weight reduction in facilities designed for such use.

Subsection 15. "Site" and "Facility" are defined as all real and personal property which is or may be used for the intermediate disposal or final disposal of solid waste and which requires a license under the provisions of this ordinance.

Subsection 16. "Shoreland" is defined as land located within the following distances from the ordinary high water elevation of public waters: (a) land within 1,000 feet from the normal high watermark of a lake, pond, reservoir, impoundment, or flowage; and (b) land within 300 feet of a river or stream or the landward side of flood plain delineated by ordinance on such a river or stream, whichever is greater.

Subsection 17. "Waste Tire" is defined as solid waste which consists of the rubber or other resilient material product which is used on a vehicle or other equipment wheel to provide tread which is discarded or which cannot be used for its original intended purpose because it is used, damaged or defective.

Subsection 18. "Intermediate Disposal" is defined as the preliminary or incomplete disposal of solid waste including, but not limited to, transfer station operations, open burning, incomplete land disposal, incineration, composting, reduction, shredding, compression, recycling, processing, resource recovery, and any other management or handling of waste short of final disposal.

Subsection 19. "Final Disposal" is defined as the complete and ultimate disposal of solid waste by placement in or on the land.

Subsection 20. "Termination" is defined as all of those activities and duties relating to the closing of a waste site or facility whether performed prior to or after operation of the site or facility has ceased, and the maintenance, monitoring and long-term care of the site or facility after the site or facility has ceased to accept wastes.

Subsection 21. "Closure" is defined as that phase of site or facility termination in which the site or facility is prepared for post-closure care.

Subsection 22. "Post-closure" is defined as that phase of site or facility termination during which the long-term care, maintenance and monitoring of the site or facility takes place.

Subsection 23. "Gate Yard of Waste" is defined as a cubic yard of waste measured in the hauling vehicle as received at the site or facility before it is processed or prepared for disposal.

Subsection 24. "Adequate Turf" is defined as a live ground cover mat of native perennial grasses or other suitable vegetation free of noxious weeds which provides sufficient ground cover to effectively prevent loss of final cover by wind or water erosion. The adequacy of the turf may not be determined until at least one year after seeding.

Subsection 25. "Final Cover" is defined as the cover placed on a finished area of a site or facility after the area has reached the approved development elevation or operations in the area have ceased, and shall consist of three horizons: a lower impervious cap, a middle earthen cover material, and an upper topsoil. The lower impervious cap shall consist of at least twelve (12) inches of a soil or other approved material having a permeability no greater than 10^{-6} cm/sec. The middle earthern cover material shall consist of at least twelve (12) inches of soil classified as sandy clay loam, sandy loam, clay loam, loam, silty clay loam, loamy sand, or silt loam. The upper top soil shall consist of at least six (6) inches of soil classified as loam, sandy loam, silt loam, silty clay loam, clay loam, or sandy clay loam. For sites or facilities initially licensed prior to October 1, 1983, the middle and upper soil horizons may consist of a soil manufactured on site which is uniformly mixed, contains between five (5%) and ten (10%) per cent organic material, less than eighty (80%) per cent silt, less than fifty (50%) per cent clay, less than seventy (70%) per cent sand, and has a moisture retention capacity of at least 0.2 inches moisture per inch of soil.

Subsection 26. "Mixed municipal solid waste" is defined as garbage, refuse, and other solid waste from residential, commercial, industrial, and community activities which is generated and collected in aggregate, but does not include auto hulks, street sweepings, ash,