



Superfund Record of Decision:

**La Grande Sanitary Landfill,
MN**

NOTICE

The appendices listed in the index that are not found in this document have been removed at the request of the issuing agency. They contain material which supplement, but adds no further applicable information to the content of the document. All supplemental material is, however, contained in the administrative record for this site.

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/ROD/R05-92/211	2.	3. Recipient's Accession No.			
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12. Sponsoring Organization Name and Address U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460	14.					
	15. Supplementary Notes PB93-964110					
16. Abstract (Limit: 200 words) <p>The 80-acre La Grande Sanitary Landfill site is located in west-central Douglas County, Minnesota, 5 miles west of the town of Alexandria and 3 miles south of the town of Garfield. The main fill area occupies 6 acres of a small, north-trending gully, which is surrounded by forest, steep uncultivated hills, and low lying wetlands. A sand and gravel water table exists under a portion of the site, and residents downgradient are using the aquifer for drinking water. From 1974 to 1984, the landfill was in operation and accepted mixed municipal solid waste and nonhazardous industrial wastes. In 1982, a state ground water investigation revealed the presence of low level organic compounds. The landfill was closed in 1984, and a final cover was installed in accordance with state regulations. Sampling during the RI revealed that only one contaminant, manganese, was found in high levels in the Old Shop Well onsite, which required action to reduce the potential risk of exposure. This ROD addresses a final remedy for the site and addresses the onsite landfill and ground water. These primary contaminants affecting the soil, debris, and ground water are organics, including bis (2-ethylhexyl) phthalate; and metals, including manganese.</p> <p>(See Attached Page)</p>						
17. Document Analysis a. Descriptors Record of Decision - La Grande Sanitary Landfill, MN First Remedial Action - Final Contaminated Medium: soil, debris, gw Key Contaminants: organics (bis(2-ethylhexyl)phthalate), metals (manganese) b. Identifiers/Open-Ended Terms c. COSATI Field/Group						
18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 34				
	20. Security Class (This Page) None	22. Price				

EPA/ROD/R05-92/211
La Grande Sanitary Landfill, MN
First Remedial Action - Final

Abstract (Continued)

The selected remedial action for this site includes long-term monitoring of ground water and combustible gas; converting a gas monitoring well to a gas vent to control the accumulation of explosive gases; sealing off and abandoning the onsite Shop Well to ensure that it will not be used as a potable water source, stabilizing the west slope of the landfill, and covering the exposed landfill waste on the northwest corner with a soil cover; sloping and reconstructing the borrow pit area adjacent to the west slope to ensure long-term integrity of the existing cover system; restricting site access and implementing institutional controls, including deed and ground water use restrictions. The estimated present worth cost for this remedial action is \$501,000, which includes an annual O&M cost of \$22,000 for 30 years.

PERFORMANCE STANDARDS OR GOALS: Chemical-specific ground water clean-up goals were not specified. Because of the low level risks posed by the site, treatment of onsite media is not considered necessary.

**DECLARATION OF THE RECORD OF DECISION
LA GRANDE SANITARY LANDFILL
DOUGLAS COUNTY, MINNESOTA**

Site Name and Location:

La Grande Sanitary Landfill Superfund site, La Grande Township,
Douglas County, Minnesota

Statement of Basis and Purpose:

This decision document presents the final remedial action for the La Grande Sanitary Landfill Superfund Site (the Site) which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendment and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Contingency Plan. The selection of the remedial action is consistent with the Minnesota Environmental Response and Liability Act of 1983. The purpose of the final remedial action at the Site is to implement a remedy that will protect human health and the environment.

This decision is based upon the reports, information and public comments which constitute the Administrative Record for the Site.

Assessments of the Site:

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action in this Record of Decision, may present imminent and substantial endangerment to public health and welfare, or the environment.

Description of the Selected Remedy:

1. long-term monitoring of groundwater and combustible gas to verify that the low level of threat posed by the contaminants of concern remains low and that the landfill does not generate potentially explosive levels of combustible gas;
2. the conversion of a combustible gas monitoring well to a gas vent to assure that combustible gas does not accumulate at the single point where the soil gas level was measured at greater than 100% of the lower explosive limit (LEL);
3. the permanent sealing and abandonment of the on-site Shop Well in conformance with the Minnesota Water Well Code, Minn. Rules, Chapter 4725.2700, to assure that this well will not be used as a potable water source;
4. the stabilization of the west slope of the Landfill and

the covering of exposed waste on the northwest corner to assure that the existing landfill cover, which is providing an effective barrier to infiltration, remains effective;

5. the sloping and reconstruction of the borrow pit area adjacent to the west slope of the Landfill to assure the long-term integrity of the cover system;
6. institutional controls in the form of site access restrictions, and the possible use of deed restrictions;
7. maintenance of the existing final cover system so as to reduce the future potential for infiltration into the waste mass and the subsequent leaching of contaminants;
8. observance of Minnesota Environmental Response and Liability Act prohibitions against the disturbance of the Landfill final cover and monitoring systems; and
9. observance of the Minnesota Water Well Construction Code, Minn. Rules Chapter 4725.2000, which regulates the location of future potable wells near the Landfill.

Statutory Determinations:


The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the scope of this final remedial action, and is cost-effective and utilizes permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable. The preferred alternative will not satisfy the statutory preference for treatment as a principal element since treatment is not considered necessary due to the low level of risk posed by site contaminants.

Because this remedy includes monitoring components which would verify that the low level threats posed by the Site do not increase above health-based levels, a review of monitoring data will be conducted within five years after the commencement of remedial action to ensure continued protection of human health and the environment.

Federal and State Concurrence:

The United States Environmental Protection Agency and the Minnesota Pollution Control Agency believe that the selected remedy is the best choice balancing all of the nine evaluation criteria required by CERCLA.

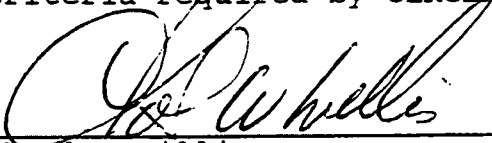
Charles Williams
Commissioner
Minnesota Pollution Control Agency

 9/30/92

Valdas V. Adamkus
Regional Administrator
U.S. Environmental Protection Agency
Region V

Federal and State Concurrence:

The United States Environmental Protection Agency and the Minnesota Pollution Control Agency believe that the selected remedy is the best choice balancing all of the nine evaluation criteria required by CERCLA.



Charles Williams
Commissioner
Minnesota Pollution Control Agency

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Regional Administrator
U.S. Environmental Protection Agency
Region V

**DECISION SUMMARY
LA GRANDE SANITARY LANDFILL
DOUGLAS COUNTY, MINNESOTA**

I. SITE NAME, LOCATION AND DESCRIPTION

The La Grande Sanitary Landfill (the Site or the Landfill) is located in a rural setting in west-central Douglas County, Minnesota (Attachment 1), approximately 5 miles west of the town of Alexandria and approximately 3 miles south of the town of Garfield (Attachment 2). The Site consists of 80 acres of forest, steep uncultivated hills and low lying wetlands. The main fill area occupies six acres of a small north-trending gully formed during earlier gravel mining operations (Attachment 3). It is marked to the north, west and east by groups of large trees.

The Site is located within an area of glacial deposits known as the Alexandria Moraine Complex. This moraine complex is 10 to 20 miles wide and extends northward in an area through west-central Minnesota. The upper 100 feet of sediments beneath the Site consist of glacial drift deposits of the moraine complex. A sand and gravel water table aquifer exists under a portion of the Site, and is overlain by a silty to sandy clay till layer which was found to range in thickness from approximately 15 to 40 feet. The sand and gravel aquifer extends beneath the Landfill waste mass. At other portions of the Site, the till layer extends to a depth of at least 100 feet. The water table was found at depths ranging from approximately 20 to 70 feet below the surface of the hilly terrain at the Site.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Site operated from March 1974, when it received a solid waste permit from the MPCA (SW-141), until April 1984, as a sanitary landfill accepting mixed municipal solid waste and nonhazardous industrial waste. In late 1982, and early 1983, groundwater sampling at the Site confirmed the presence of organic compounds. Subsequent investigations at the Site led the Minnesota Pollution Control Agency (MPCA) to evaluate whether the Site should be included on the National Priorities List (NPL) and Minnesota's Permanent List of Priorities (PLP) for Superfund sites potentially requiring clean up. The Site was added to the NPL and PLP in June 1987, with a Hazard Ranking System score of 34.

In July, 1987, the MPCA issued a Request for Response Action to Francis C. Cosgrove, Marlin F. Torguson and Valley Disposal Corp. as owners and operators to perform a Remedial Investigation/Feasibility Study (RI/FS) at the Site. In August, 1987, the MPCA issued a Determination That Actions Would Not Be Taken In The Time And Manner Requested to the same three parties. The issuance of a Determination That

Actions Will Not Be Taken In The Manner And Time Requested allows the MPCA to perform necessary investigatory and response action activities at the Site using either the State or Federal Superfund.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Superfund activities at the Site have been followed closely by the local community and press. To date, public meetings have been held and the MPCA has published fact sheets, update letters, and issued press releases regarding response activities associated with the Site. Local citizens interested in the activities occurring at the Site are informed of major events by the MPCA, in consultation with the U.S. EPA. A chronology of past community relations activities at the Site is listed in the Responsiveness Summary (Attachment 10).

A public information repository has been established in the Alexandria Public Library, 117 Seventh Avenue West, Alexandria, Minnesota. The public information repository contains the Administrative Record for the Site. The Administrative Record consists of all documents, including public comments, which U.S. EPA and MPCA reviewed in selecting the remedy for the Site (Attachment 11). The Administrative Record is also located at the MPCA's main office in St. Paul, Minnesota and at the U.S. EPA offices in Chicago, Illinois.

Notice of availability of the Proposed Plan for the Site for review by the public was published in the Lake Region Echo Newspaper in the form of a display ad on August 14 and August 16, 1992. This ad initiated a thirty (30) day public comment period beginning on August 17, 1992. The public comment period is consistent with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 117 (a). Notice of a public meeting was included. Additionally, a Fact Sheet providing notification of the proposed remedy and public meeting was sent to interested parties and the press.

A public meeting was held on September 2, 1992, where the MPCA and U.S. EPA presented the alternatives to a group of interested citizens. The Responsiveness Summary (Attachment 10) addresses specific comments raised at the September 2nd public meeting and during the public comment period. The public comment period officially ended on September 15, 1992. No formal request for an extension of the comment period was received by the MPCA or the U.S. EPA.

IV. SITE CHARACTERIZATION

The work at the Site involved determining the nature and extent of contamination during the RI and developing and evaluating remedial (cleanup) alternatives during the FS. The RI Report concluded that:

- Groundwater moves beneath the Site in a south-southeasterly direction.
- Although a number of organic contaminants were measured in soil and groundwater at the Site, no organic contaminant plume was identified and none of the measured compounds exceeded current health-based standards or U.S. EPA's acceptable risk range.
- Arsenic and manganese were found in the groundwater at concentrations exceeding Minnesota Recommended Allowable Limits (RALs) for private drinking water supplies, but not Maximum Contaminant Levels (MCLs) under the Federal Safe Drinking Water Act (SDWA). These naturally-occurring heavy metals were widespread throughout the Site and had the appearance of random background concentrations. The on-site Shop Well showed manganese levels elevated above background levels. However, these levels were not considered to be related to landfill waste disposal activities.
- Manganese was found in surface water at concentrations that exceeded RALS in nearly all water bodies, both upgradient and downgradient of the Landfill and regardless of whether surface water drains away from or toward the water bodies. The manganese appears to be derived from natural sources in the soils, with no evidence of a source from the Landfill.
- A chloride plume appears to be emanating from the southern end of the Landfill and migrating south-southeastward. Chloride is one of the most mobile contaminants associated with landfills. It is not a hazardous substance and occurred in concentrations well below the SDWA secondary MCL. This standard is not health-based, but determined on the basis of taste, odor, and aesthetic considerations.
- There does not appear to be any combustible gas migration from the Landfill, except for a single monitoring point at the southwest corner, where the combustible gas reading was greater than 100% of the Lower Explosive Limit (LEL).

- Portions of the western slope of the Landfill appear unstable and the northwest corner of the waste mass has been exposed by hillside erosion.
- Access to the Site by motorized vehicles via the main access road was not controlled.
- A pile of several hundred tires is located to the south of the Landfill, off the fill area. These tires will be addressed by the MPCA's tire control program.

The FS Report utilized the results of the RI to develop potential cleanup alternatives designed to address the low level threats posed by the Site.

V. SUMMARY OF SITE RISKS

Part of the RI for the Site involved conducting a baseline risk assessment, which is intended to measure the potential current and future risks posed by chemicals of concern at the Site. The risk assessment evaluates both human health and environmental risks.

Human Health Risks

The human health risk assessment evaluates potential carcinogenic, or cancer-causing risks, and noncarcinogenic risks to human health. Noncarcinogenic risks include such risks as the potential to cause liver damage and reproductive abnormalities. Furthermore, the risk assessment requires that all complete contaminant exposure pathways be evaluated. Such pathways include, but are not limited to: Direct skin contact with or ingestion of contaminated soil, surface water, and groundwater; inhalation or absorption of contaminants during washing, showering, or bathing; and inhalation of airborne contaminants from the Site.

Air sampling performed during the RI indicated that exposure to soil or air emanating from the Site does not pose any major health risks. The only pathways of concern identified in the human health risk assessment, which all relate to the use of groundwater downgradient from the Site, are:

- ingestion of contaminated groundwater by drinking or cooking;
- inhalation of chemicals that can volatilize into the air during showering; and
- dermal (skin) contact with water during showering, bathing and other related activities.

Finally, the human health risk assessment assumes a reasonable maximum exposure (RME) scenario. This means that it takes into account the highest concentration of each chemical to which adults and children are reasonably expected to be exposed during an average lifetime at the Site. At present, there is no one living on or using the groundwater at the Site nor do residential wells downgradient of the Site show any contamination from organic compounds. Thus, this scenario represents a conservative approach in calculating potential future risks.

The chemicals of concern evaluated in the human health risk assessment were chosen based upon how often they were detected and at what levels, upon their inherent toxicity, and upon how likely it is that adults or children would come into contact with them. Using these criteria, the chemicals that were chosen for the human health risk assessment were the metals arsenic and manganese and the semi-volatile compounds bis (2-ethylhexyl) phthalate, butyl benzyl phthalate and di-N-octyl phthalate.

The determination of carcinogenic risk is based upon calculating how much of an increased risk a chemical poses over the average or "background" level. For the general population, the background risk is about one in three, or 33 percent, of developing some form of cancer in one's lifetime. The range of increased cancer risk that U.S. EPA considers acceptable is a range of one in ten thousand to one in one million. Within this range U.S. EPA may consider taking action to reduce carcinogenic risk on a site-specific basis.

The results of the human health risk assessment indicate that the total potential increased cancer risk from the possible exposure of residents to groundwater at the Site is about nine in one hundred thousand for adults and four in one hundred thousand for children (Attachment 4). These risks are within U.S. EPA's acceptable risk range and are largely attributable to arsenic in the groundwater.

Arsenic is naturally occurring throughout the area and the RI indicated that the Landfill did not appear to be a source of arsenic. For this reason, and because the increased carcinogenic risk falls within U.S. EPA's acceptable range, groundwater remediation for arsenic at the Site is not warranted.

The determination of noncarcinogenic risk is based upon the calculation of a term called the Hazard Index. If the Hazard Index for a risk pathway is less than 1, noncarcinogenic risk is not expected at the Site. A Hazard Index greater than 1 represents a potential for the

occurrence of noncarcinogenic health risks.

Total pathway Hazard Indices for the possible exposure of residents to groundwater are 1.8 for adults and 4.2 for children, indicating that ingestion of groundwater on-site presents a potential concern for noncarcinogenic health effects (Attachment 5). This concern is largely due to the presence of manganese in the groundwater and is based largely on manganese levels measured in the old Shop Well. Thus, manganese is the only groundwater contaminant which warrants taking action to reduce potential health risks from exposure to groundwater.

The cause of the high manganese levels in the Shop Well is not known. Manganese, like arsenic, occurs naturally throughout the area and, based upon the results of the RI, the Landfill does not appear to be the source of elevated manganese levels. However, because the Shop Well is the primary location where manganese levels were measured significantly above background, and represents the bulk of the noncarcinogenic risk at the Site, it will be permanently sealed and abandoned in accordance with the requirements of the Minnesota Water Well Construction Code, Minn. Rules, Ch. 4725.

As previously indicated, air sampling performed during the RI indicated that exposure to air emanating from the Site does not pose any major health risks. In addition to the air sampling, the Landfill was also monitored for the generation of combustible gas (largely methane), which is a common occurrence at landfills over time.

The human health risk assessment was not intended to address the potential for the buildup of combustible gas at the Landfill. However, because combustible gas (largely methane) is expected to be generated at the Landfill over time, it will be monitored as part of the selected remedy. In addition, because a single combustible gas monitoring point indicated a combustible gas reading greater than 100% of the Lower Explosive Limit (LEL), it will be converted to a gas vent so as to eliminate the potential for the buildup of combustible gas at that point. This is in accordance with requirements at Minn. Rules Chapter 7035 for Mixed Municipal Solid Wastes.

Environmental Risks

The environmental assessment is based upon surface water and sediment samples collected at the Site and an ecological survey of the area. Because of the complexity involved in ecological analyses and the lack of species-specific toxicity data, it is not possible to perform a quantitative

risk assessment for the environmental effects of most chemicals. Therefore, this assessment is more qualitative in nature, and based upon general observations of the surface waters, sediments, plant, and animal life at the Site. As a guide, measured concentrations of chemicals in surface waters and sediments at the Site are compared to available standards, such as surface water criteria, when performing the evaluation.

The chemicals of concern evaluated for their environmental risk potential were the metals copper, lead, and zinc and the plasticizer bis (2-ethylhexyl) phthalate. Based upon exceedances of surface water quality criteria, copper and lead pose a moderate risk to wildlife and zinc poses a moderate to high risk.

Like arsenic and manganese, these metals are common throughout the area. Background samples for these metals taken upgradient of the Site exhibited concentrations in the same range, and sometimes higher than, on-site downgradient samples. Furthermore, there appears to be no direct interconnection between the groundwater at the Site and the sediments and surface waters. Therefore, no further consideration of surface water and sediment remediation is warranted.

The risk posed by bis (2-ethylhexyl) phthalate is considered negligible since it was detected at a very low level in one upgradient surface water sample. The risk assessment concluded that, overall, the quality of the environment around the Landfill appears to be good and the remediation of surface water and sediment is not warranted.

VI. DESCRIPTION OF ALTERNATIVES

The Feasibility Study for the Site was written in accordance with EPA's Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (OSWER Directive 9355.3-01). EPA guidance requires that different cleanup technologies be evaluated and combined into various remedial alternatives. The resulting alternatives must then be developed and screened, with the most promising alternatives retained for detailed analysis. Based upon this review process, the following three alternatives were retained:

Alternative 1: No Action

The No Action alternative consists of leaving the Site conditions as they currently exist. No long-term actions are included in this alternative and it provides no additional protection of human health or the environment.

Evaluation of the No Action alternative is required by the National Oil and Hazardous Substances Contingency Plan (NCP) as a "baseline" alternative for all Superfund sites.

Cost of Alternative 1: \$0

Alternative 2: Long-Term Monitoring of Groundwater and Combustible Gas, A Gas Vent Well, and the Permanent Sealing of the On-Site Shop Well

The intent of Alternative 2 is to monitor future potential public health and environmental risks at the Site. Continued monitoring will be necessary to verify that current low level risks do not increase in the future. Its purpose will be to detect changes in groundwater contaminant concentrations and combustible gas concentrations which may indicate increased health risks related to the Landfill, and may indicate that additional remedial activities are necessary. In addition, an existing combustible gas well will be modified to a gas vent in order to mitigate combustible gas that may accumulate. This will be accomplished by venting the gas well to the atmosphere. Finally, the on-site Shop Well will be permanently sealed in accordance with the Minnesota Water Well Construction Code, Minn. Rules Chapter 4725.2700.

Annual inspection and maintenance to assure the integrity of the existing cover vegetation, removing woody vegetation, such as trees, and repairing eroded and/or subsided areas will be conducted in conjunction with the monitoring program. Site access will be controlled by means of a locking gate at the only road entering the facility, as well as the posting of "No Trespassing" signs. Institutional controls, such as deed restrictions to notify potential buyers of the property of the situation at the Site, may be obtained. The Minnesota Water Well Construction Code, Minn. Rules Ch. 4725.2000, Subp. 2. regulations regarding the installation of potable wells near landfills will apply.

Cost of Alternative 2:	Capital Cost	\$ 73,000
	Annual O&M Cost	\$ 22,000
30 Year Present Worth at a 10% Discount Rate		\$279,000

Alternative 3: Long-Term Monitoring of Groundwater and Combustible Gas, A Gas Vent Well, the Permanent Sealing of the On-Site Shop Well and Slope Stabilization

Alternative 3 includes all of the elements of Alternative 2. Continued monitoring will be necessary to verify that current low level risks do not increase in the future. Its purpose will be to detect changes in groundwater contaminant

concentrations and combustible gas concentrations which may indicate increased health risks related to the Landfill, and may indicate that additional remedial activities are necessary. In addition, an existing combustible gas well will be modified to a gas vent in order to mitigate combustible gas that may accumulate. This will be accomplished by venting the gas well to the atmosphere. Finally, the on-site Shop Well will be permanently sealed in accordance with the Minnesota Water Well Code, Minn. Rules Chapter 4725.2700.

Annual inspection and maintenance to assure the integrity of the existing landfill final cover system will be conducted in conjunction with the monitoring program. This inspection and maintenance will consist of, but not be limited to, mowing the cover vegetation, removing woody vegetation, such as trees, and repairing eroded and/or subsided areas. Site access will be controlled by means of a locking gate at the only road entering the facility, as well as the posting of "No Trespassing" signs. Institutional controls, such as deed restrictions to notify potential buyers of the property of the conditions at the Site might be obtained.

The Minnesota Water Well Construction Code, Minn. Rules Ch. 4725.2000, Subp. 2, regulations regarding the installation of potable wells near landfills will apply.

In addition to all of the elements of Alternative 2, Alternative 3 incorporates the stabilization of the west and northwest slopes of the Landfill. Two versions of the slope stabilization activity are considered. Version 1 involves reshaping and recompacting the exposed northwest corner of the Landfill, covering exposed waste and backfilling the access ramps on the west side of the Landfill (Attachment 6). Version 2 involves a comprehensive restoration of the Landfill's western slope and the borrow pit area where fill material was removed and used to cover waste during landfill operation (Attachment 7).

Also, this Alternative will observe the requirements of the Minnesota Environmental Response and Liability Act (MERLA), which prohibits the disturbance of the Landfill final cover and monitoring systems.

Cost of Alternative 3: Capital Cost:	\$155,000 (Version 1)
	\$295,000 (Version 2)

Annual O&M Cost:	\$ 22,000
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30 Year Present Worth at a 10% Discount:	\$361,000 (Version 1)
	\$501,000 (Version 2)

VII. SUMMARY OF COMPARATIVE ANALYSIS

The NCP requires that the cleanup alternatives retained for detailed analysis be evaluated on the basis of nine specific evaluation criteria. This section discusses how the alternatives compare to one another against the nine criteria.

U.S. EPA's Nine Evaluation Criteria for addressing hazardous waste sites are:

1) Overall Protection of Human Health and the Environment

This criterion describes how the alternative, as a whole, achieves and maintains protection of human health and the environment.

2) Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

This criterion describes how the alternative complies with existing federal, state, and municipal laws, regulations and other established standards.

3) Long-term Effectiveness and Permanence

This criterion evaluates the long-term effectiveness of an alternative in maintaining protection of human health and the environment and the reliability of controls over time.

4) Reduction of Toxicity, Mobility, and Volume Through Treatment

This criterion evaluates the anticipated performance of the specific treatment technologies employed by an alternative in terms of their ability to reduce the toxicity, mobility and volume of contaminated materials.

5) Short-term Effectiveness

This criterion examines the effectiveness of the alternative in protecting the community and on-site workers during the construction and implementation of a cleanup alternative.

6) Implementability

This criterion evaluates the technical and administrative feasibility of alternatives and the availability of required goods and services.

7) Cost

This criterion evaluates capital and operation and maintenance (O&M) costs. It also evaluates the present worth cost of each alternative using standard assumptions for the life of a project (usually 30 years) and the discount rate (usually 5% or 10%).

8) State Acceptance

This criterion reflects the state's apparent preferences among or concerns about alternatives.

9) Community Acceptance

This criterion reflects the community's apparent preferences among or concerns about alternatives.

VIII. COMPARATIVE ANALYSIS OF ALTERNATIVES

A comparative analysis of the three alternatives against each of the nine criteria is presented below and summarized in Attachment 8.

1) Overall Protection of Human Health and the Environment

Alternative 1, No Action, is currently protective of human health since no VOC concentrations currently exceed health-based standards, nearby residential wells did not show detectable levels of VOCs, and the two metals of concern to human health, arsenic and manganese, appear to be present as naturally occurring background elements. Similarly, Alternative 1 is currently protective of the environment because the metals of concern for surface water and sediments, copper, lead and zinc, when compared to the surrounding area, also appear to be present as naturally occurring background elements, with no current negative impacts on the plants and animals at the Site. With Alternative 1, potential combustible gas migration and contaminant concentrations in groundwater would not be measured and future overall protection of human health and the environment would not be assured.

Long-term monitoring, which is part of Alternatives 2 and 3, provides a direct indication that contaminant levels remain within health-based groundwater quality standards. Alternatives 2 and 3 will provide combustible gas data in order to monitor combustible gas migration. Such migration may indicate changes in health risks related to the Landfill. Alternatives 2 and 3 provide a greater degree of overall protection than Alternative 1 as a result of the groundwater and combustible gas monitoring, the permanent

sealing of the old Shop Well and the access controls that these alternatives include.

Finally, Alternative 3 is more protective than Alternatives 1 and 2 because it offers protection from the potential exposure to uncovered fill material and protects against the future release of contaminants from the Landfill by minimizing infiltration. Both Version 1 and Version 2 of Alternative 3 are protective.

2) Compliance with ARARs

CERCLA requires that remedial actions must at least attain applicable or relevant and appropriate requirements (ARARs) of Federal, and more stringent state, environmental laws. The major ARARs at the LaGrande Site are discussed below.

a. Groundwater Contaminant Concentrations

The Federal Safe Drinking Water Act establishes Maximum Contaminant Levels (MCLs) for contaminants in drinking water. The MCLs are applicable to public water systems having at least 15 service connections or serving at least 25 residents. These standards would not be applicable to the groundwater under and downgradient of the Site since it is not used as a public water supply. However, U.S. EPA has determined that primary MCLs (set for contaminants determined to have an adverse effect on human health above certain levels) are relevant and appropriate as cleanup levels for ground or surface waters that are current or potential sources of drinking water. At present, no one is living on or using groundwater at the Site. However, there are residential wells downgradient from the Site using the aquifer for drinking water. The Safe Drinking Water Act also establishes Secondary MCLs for specific contaminants or water characteristics that may affect the aesthetic qualities of drinking water (i.e., color, odor and taste). Secondary MCLs are non-enforceable guides for public water systems and, as such, are not applicable or relevant and appropriate requirements. Secondary MCLs may, however, be considered in determining appropriate cleanup levels for groundwater if groundwater remediation were required at the Site.

Minnesota Department of Health Recommended Allowable Limits (RALs) are non-enforceable standards established for private water supplies. Although these recommended contaminant levels are not promulgated state standards, and therefore, are not ARARs, these advisory levels may be considered in determining the appropriate cleanup levels for groundwater contaminants if groundwater remediation were required at the Site.

Minnesota Intervention Limits (MILs) are pollutant concentrations (one quarter the concentration of the RAL for a particular contaminant) which must not be exceeded at the Compliance Boundary of a mixed municipal solid waste landfill. Minnesota Solid Waste Rules, Chapter 7035, require that MILs and RALs cannot be exceeded at this boundary. The Compliance Boundary is required to be established at a maximum distance of 200 feet from the permitted waste boundary. These rules are not applicable to the LaGrande landfill because the landfill was closed prior to their effective date; however, they are relevant and appropriate because the rules are intended to ensure that solid waste landfills, like LaGrande, do not become a source of groundwater contamination.

Currently, the groundwater under and downgradient of the Site attains the primary MCLs for all organic and non-organic compounds tested. Manganese and arsenic exceed RALs. Three semi-volatile compounds, phthalate esters, exceed proposed primary MCLs for phthalates. Since they are not final, promulgated standards, these proposed MCLs are not ARARs, but are to be considered; they would be applicable to groundwater upon final promulgation. The presence of these compounds at the current levels does not, however, present an unacceptable carcinogenic risk to adults and children who could be exposed to the groundwater through its use for drinking or showering. Manganese is present in amounts sufficient to present a potential risk of non-carcinogenic health effects (Attachment 5). This concern is derived primarily from elevated manganese levels (over background levels) measured in the old Shop Well. Based on RI sampling, the landfill itself does not add to the naturally-occurring elevated manganese levels.

Alternative 1 would not comply with the requirements of Minn. Rules, Chapter 7035, that MILs and RALs must not be exceeded at the Compliance Boundary, since it does not incorporate long-term monitoring, necessary to verify these requirements. Alternatives 2 and 3, which include long-term groundwater monitoring, would comply with these requirements.

Manganese is the only contaminant currently present at levels that may warrant taking response action to protect public health. Because the Shop Well is the major source of the high manganese levels and represents the bulk of the non-carcinogenic risk at the Site, it will be permanently sealed and abandoned in accordance with the requirements of the Minnesota Water Well Construction Code, Minn. Rules, Chapter 4725.2700, to assure that it will not be used as a potable water source.

b. Soils/Landfill Cover

The landfill was closed in 1984. The existing final cover system exceeds the State of Minnesota cover standards that were required at the time the landfill stopped accepting waste in April, 1984, except for the exposed area of waste at the northwest corner of the Landfill. Alternatives 2 and 3 include maintenance of this existing cover system. Alternative 3 also includes the stabilization and repair of the existing cover on the northwest corner of the Landfill.

The existing cover does not meet the state's present standards for a four foot final cover system under Minn. Rules Ch. 7035 for solid waste landfills. These cover standards are not applicable to the LaGrande Landfill, because they were promulgated after the Landfill terminated operations and received its final cover. The Chapter 7035 cover requirements would be relevant to closure of the LaGrande Landfill, however, because they are intended to regulate closure of solid waste landfills similar in nature to the Site.

It is the opinion of the MPCA and the U.S. EPA that, with the exception of the area of exposed waste at the northwest corner of the Landfill, the existing final cover system is performing adequately in minimizing the infiltration of water through the landfilled waste and in protecting against direct physical contact with the landfilled waste. This conclusion is based upon the findings of the RI and the public health and environmental risk assessments. Altering the existing cover system to comply with the new standards, or meeting the new standards for the small area to be stabilized and recovered, would not significantly add to the overall effectiveness of the existing cover system. Furthermore, it would not enhance protection of surface water and sediments since there is no hydraulic connection between them and the groundwater. Finally, the short-term risks and the additional costs associated with the major construction activity that would be required to upgrade the existing cover system are not justified, based on the low level threat posed by the Site. Therefore, the Agencies have determined that those sections of the current Chapter 7035 cover standards, requiring placement of additional earthen or synthetic materials on the entire existing cover system, are not appropriate for the LaGrande Landfill Site.

All three alternatives would adhere to the requirements of MERLA, which prohibits the disturbance of the landfill final cover system.

c. Landfill Gas Monitoring and Venting

Minn. Rules Chapter 7035 requires that decomposition gases from solid waste landfills must be vented into the atmosphere in order to prevent explosive concentrations from accumulating. It also requires landfill gas control monitoring. These requirements are both relevant and appropriate to the LaGrande Landfill, because the production of landfill gas within the waste mass was confirmed during the RI.

Alternative 1 does not comply with these requirements. Alternatives 2 and 3 incorporate landfill gas monitoring, and would, therefore, comply with the Minn. Rules Chapter 7035 requirements.

3) Long-Term Effectiveness

The No Action alternative is not effective over the long term. It does not include provisions for monitoring data to identify changes in groundwater contaminant concentration or potential combustible gas migration over a long period of time.

Alternatives 2 and 3 allow for additional future actions if warranted by the additional monitoring data that will be collected. Furthermore, both Alternatives 2 and 3 include the permanent sealing of the on-site Shop Well. Alternatives 2 and 3 are, therefore, more effective over the long-term than Alternative 1. Alternative 3, Version 2 provides the maximum long-term effectiveness because it includes stabilization of the western slope of the Landfill, the covering of exposed waste, and the comprehensive reconstruction of the borrow pit area. This is likely to reduce the amount of precipitation entering the Landfill waste and reduce the potential for failure of the existing final cover system and erosion of the borrow pit area.

4) Reduction of Toxicity, Mobility, and Volume (TMV)

Because Alternatives 1, 2 and 3 involve no groundwater or combustible gas treatment, the toxicity, mobility and volume of the low levels of contaminants measured at the Landfill will not be reduced. However, toxicity, mobility and volume of landfill contaminants in the future will be minimized by the slope stabilization and the covering of exposed waste proposed in Alternative 3. These actions will help to prevent the leaching of contaminants from the Landfill into the environment.

5) Short-Term Effectiveness

The monitoring elements of Alternatives 2 and 3 pose minimal risk to the local community and site workers. The slope stabilization activities of Alternative 3 are not expected to release hazardous compounds because no in-place waste will be excavated. The minimal impacts of fugitive dust emissions and drainage during construction will require some mitigation measures.

6) Implementability

Alternative 1, requiring no construction, is the easiest to implement. Alternative 2 requires minimal construction and is easily implemented using common construction methods. The slope stabilization component of Alternative 3 can be easily implemented in a short time. Services are readily available in the area and on-site materials would likely be used for slope stabilization and covering the exposed northwest corner of the Landfill and reconstruction of the borrow pit area. The other required elements of Alternatives 2 and 3, including the permanent sealing of the on-site Shop Well, site access controls, monitoring and analytical services, are also immediately implementable. The technologies for these actions are proven and readily available.

7) Cost

Alternative 1, No Action, is the least costly alternative, followed by Alternative 2, Long-Term Monitoring with a Gas Vent Well. Alternative 3, Version 2, Long-Term Monitoring with a Gas Vent Well and Slope Stabilization is the most costly alternative (Attachment 9). The specific 30 year, present worth costs of the various alternatives are as follows:

Alternative 1:	\$0
Alternative 2:	\$279,000
Alternative 3: (Version 1)	\$361,000
Alternative 3: (Version 2)	\$501,000

8) State Acceptance

The selected remedy, Alternative 3, Version 2, is acceptable to the State. Alternative 1, No Action, is not acceptable while Alternative 2, Long-Term Monitoring, is considered the minimally acceptable alternative.

9) Community Acceptance

The selected remedy is acceptable to the public. A public

meeting was held on September 2, 1992, where the MPCA and the U.S. EPA presented the alternatives to a group of interested citizens. The Responsiveness Summary (Attachment 10) addresses specific comments raised at the September 2nd public meeting and during the public comment period. The public comment period officially ended September 15, 1992. No formal request for an extension of the comment period was received by the MPCA or the U.S. EPA.

IX. THE SELECTED REMEDY

U.S. EPA and MPCA's selected remedy for remedial response at the LaGrande Sanitary Landfill is Alternative 3, Version 2. This alternative includes:

1. long-term monitoring of groundwater and combustible gas to verify that the low level of threat posed by the contaminants of concern remains low and that the landfill does not generate potentially explosive levels of combustible gas;
2. the conversion of a combustible gas monitoring well to a gas vent to assure that combustible gas does not accumulate at the single point where the soil gas level was measured at greater than 100% of the lower explosive limit (LEL);
3. the permanent sealing and abandonment of the on-site Shop Well in conformance with the Minnesota Water Well Code, Minn. Rules, Chapter 4725.2700, to assure that this well will not be used as a potable water source;
4. the stabilization of the west slope of the Landfill and the covering of exposed waste on the northwest corner to assure that the existing landfill cover, which is providing an effective barrier to infiltration, remains effective;
5. the sloping and reconstruction of the borrow pit area adjacent to the west slope of the Landfill to assure the long-term integrity of the cover system;
6. institutional controls in the form of site access restrictions, and the possible use of deed restrictions;
7. maintenance of the existing final cover system so as to reduce the future potential for infiltration into the waste mass and the subsequent leaching of landfill contaminants;

8. observance of Minnesota Environmental Response and Liability Act prohibitions against the disturbance of the Landfill final cover and monitoring systems; and
9. observance of the Minnesota Water Well Construction Code, Minn. Rules Chapter 4725.2000, which regulates the location of future potable wells near the Landfill.

X. STATUTORY DETERMINATIONS

The implementation of the selected remedy, Alternative 3, Version 2, at the Site satisfies the following requirements of CERCLA Section 121:

Overall Protection of Human Health and the Environment:

The long-term monitoring of groundwater at the Site will provide confirmation that the present low level (less than 10^{-4}) risks posed by the contaminants of concern remain low, and will provide a basis for action should these risks exceed U.S. EPA acceptable risk levels. The sealing of the old Shop Well will eliminate the potential noncarcinogenic risk posed by that well by eliminating it as a source of potable water.

The conversion of a combustible gas monitoring well to a gas vent will reduce the potential for combustible gas buildup since any combustible gas that accumulates will be dissipated through the vent.

The stabilization of the west slope of the landfill, covering of exposed waste at the northwest corner of the landfill, and the sloping and reconstruction of the borrow pit area will reduce the potential for infiltration into the landfill and future leaching of contaminants from the landfill.

Finally, institutional controls in the form of site access restrictions, the possible use of deed restrictions, the observance of the Minnesota Environmental Response and Liability Act (MERLA) prohibitions against the disturbance of the Landfill final cover and monitoring systems, and the observance of the Minnesota Water Well Construction Code regulating the location of future potable wells near the Landfill, will further ensure that the active controls described will remain effective.

Compliance with ARARs:

The selected remedy will comply with the relevant provisions

of the following Federal and State ARARs, which have been identified for the Site:

Federal ARARs

Safe Drinking Water Act, 40 CFR Parts 141-149 - Establishes final and proposed Maximum Contaminant Levels (MCLs) for contaminants in drinking water.

Final MCLs- Relevant and Appropriate.
Proposed MCLs- To be considered.

State ARARs

Minnesota Department of Health Recommended Allowable Limits (RALs) - Non-promulgated, non-enforceable, advisory standards established for private water supplies. To be considered.

Minnesota Rules Chapter 7035- Regulate mixed municipal solid waste landfills and establishes the following requirements:

Minnesota Intervention Limits (MILs). MILs are pollutant concentrations (one quarter the concentration of the RAL for a particular contaminant) which must not be exceeded at the Compliance Boundary of a mixed municipal solid waste landfill. Relevant and Appropriate.

Decomposition gases from solid waste landfills must be vented into the atmosphere in order to prevent explosive concentrations from accumulating. Relevant and Appropriate.

Minnesota Statutes, Chapter 115B (Minnesota Environmental Response and Liability Act), Minnesota State Superfund-Provision prohibiting the disturbance of the final cover system on a landfill. Applicable.

Minnesota Rules, Chapter 4725.2700, Minnesota Water Well Construction Code- Regulates well construction, sealing and abandonment. Relevant and Appropriate.

Cost-Effectiveness

The selected remedy provides an effective remedy proportionate to its cost. The degree of long-term effectiveness and permanence, reduction of toxicity, mobility and volume of contaminants, and ease of implementability afforded by this remedy for the cost make it a reasonable value.

Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

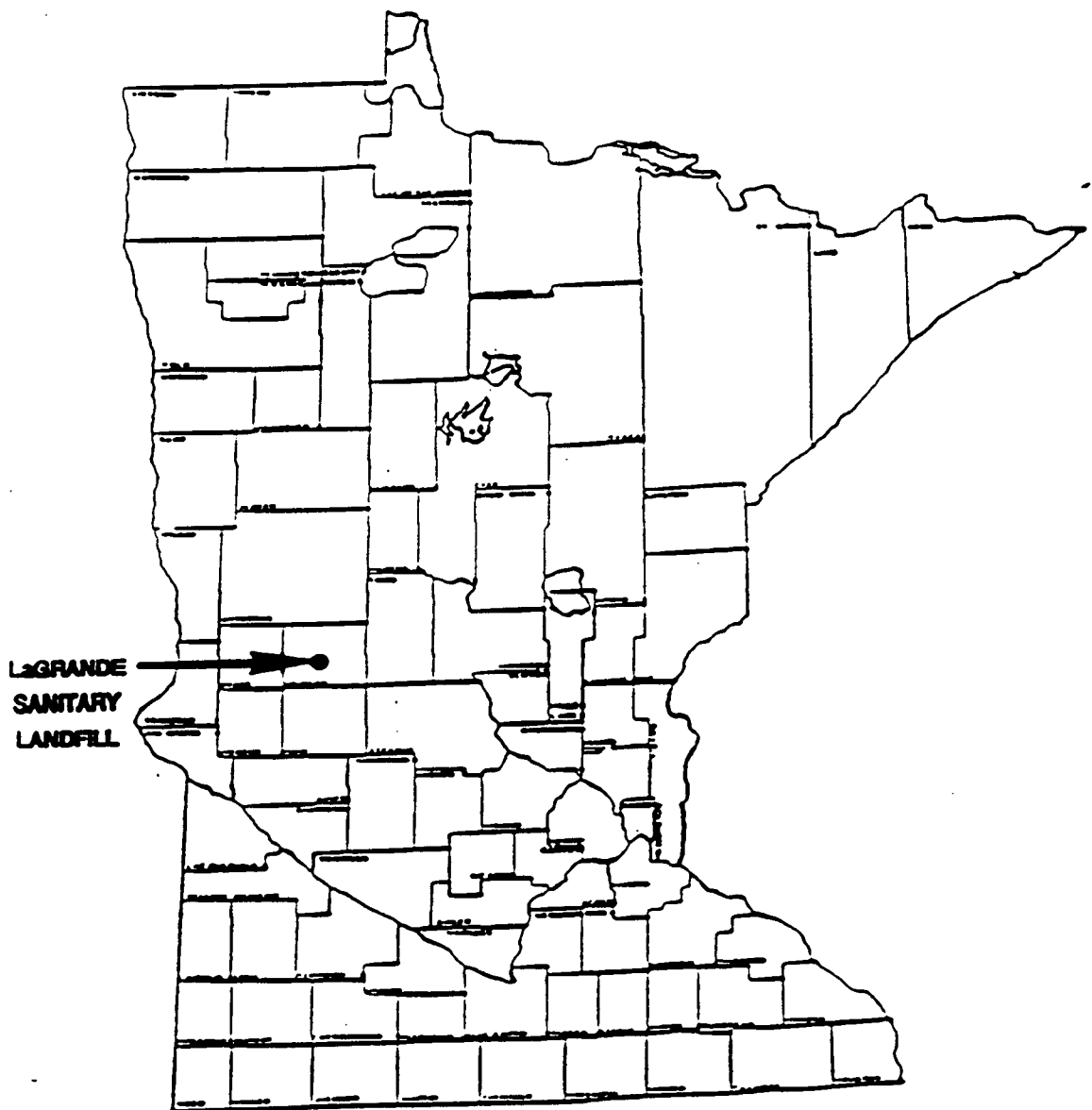
Because of the low level risks posed by the Site, treatment of on-site media is not considered necessary. The long-term monitoring of groundwater and combustible gas requirements of Alternative 3, Version 2, will provide continued verification that the low level risks remain low. In addition, the sealing of the old Shop Well will permanently eliminate it as a source of noncarcinogenic risk from excessively high manganese levels. Finally, the slope stabilization, covering of exposed waste, and reconstruction of the borrow pit area, will ensure the maintenance of Landfill cap integrity.

The criteria most critical in the selection of the remedy were long-term effectiveness, implementability and cost. Alternative 3, Version 2, ensures that the low level risks at the Site will continue to be monitored to verify the effectiveness of the minimal construction components of the remedy over the long-term. Because it requires minimal construction and restoration activities, it is easily implementable. Finally, the cost of the remedy, when compared against the other primary balancing criteria, makes it a reasonable value. The State of Minnesota and the community support Alternative 3, Version 2.

The selected remedy meets the statutory requirement to utilize permanent solutions and treatment technologies to the maximum extent practicable.

Preference for Treatment as a Principal Element

The preferred alternative will not satisfy the statutory preference for treatment as a principal element since treatment is not considered necessary due to the low level of risk posed by the Site.



NOT TO SCALE

**MALCOLM
PIRNIE**

GENERAL SITE LOCATION MAP
LaGRANDE SANITARY LANDFILL RI

FIGURE 1-1

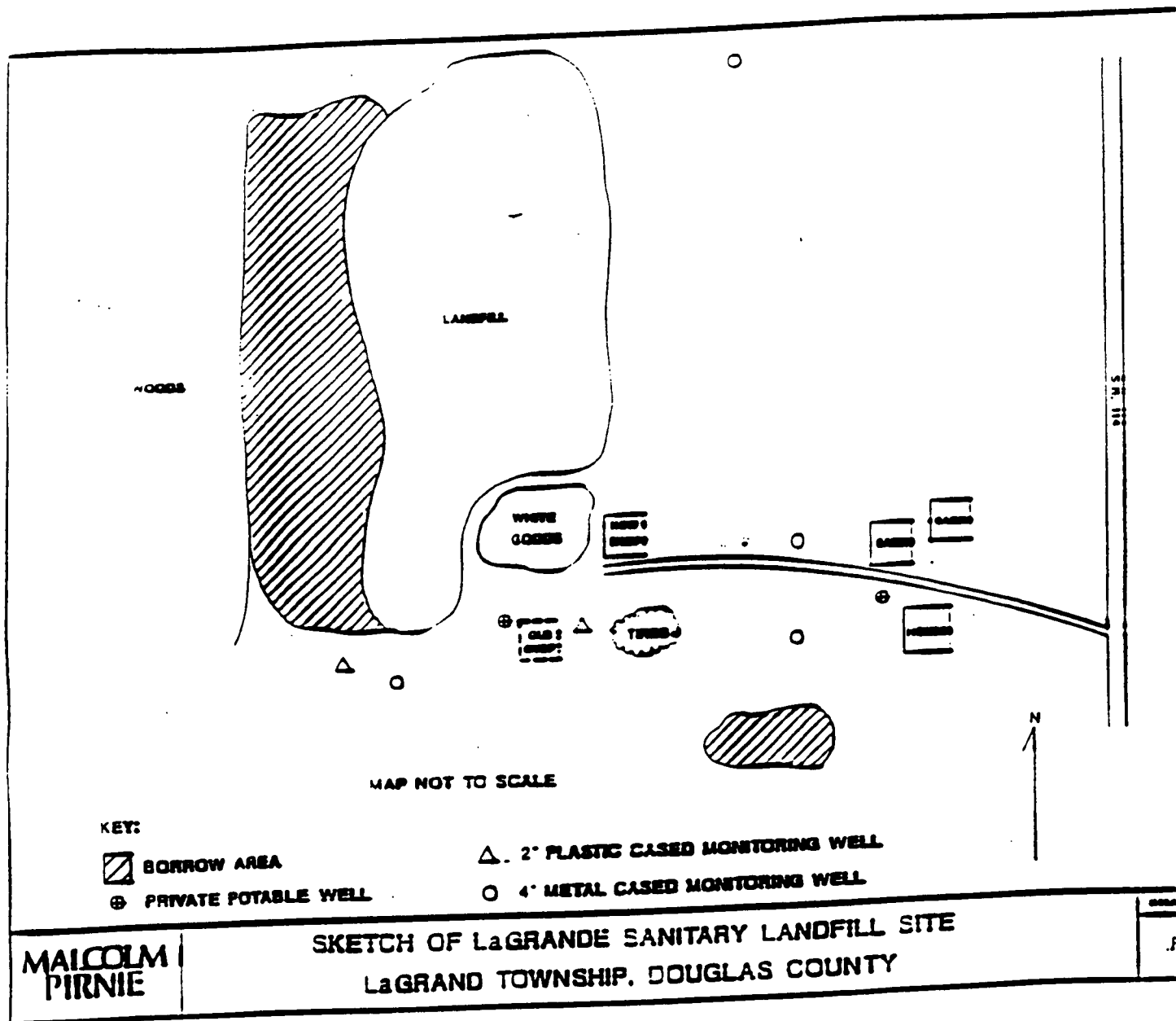


TABLE 6-14

SUMMARY OF CANCER RISK ESTIMATES

LAGRANDE SANITARY LANDFILL

Chemical		CDI (mg/kg-day)	CDI Adjusted for Absorption	SF (mg/kg-day)	Chemical- specific Risk	Total Pathway Risk
EXPOSURE PATHWAYS FOR RESIDENT ADULTS						
INGESTION	bis(2-ethylhexyl)phthalate	7.28E-05	No	1.42E-02	1.03E-06	
	butylbenzylphthalate	8.32E-05				
	arsenic	4.85E-05	No	1.75E+00	3.49E-05	3.59E-05
DERMAL CONTACT	bis(2-ethylhexyl)phthalate	6.69E-06	Yes	1.42E-02	9.50E-08	
	butylbenzylphthalate	7.66E-06				
	arsenic	7.06E-08	Yes	1.84E+00	1.30E-07	2.25E-07
TOTAL EXPOSURE RISK FOR RESIDENT ADULTS						8.61E-05
EXPOSURE PATHWAYS FOR RESIDENT CHILDREN						
INGESTION	bis(2-ethylhexyl)phthalate	3.40E-05	No	1.42E-02	4.83E-07	
	butylbenzylphthalate	3.88E-05				
	arsenic	2.26E-05	No	1.75E+00	3.95E-05	4.00E-05
DERMAL CONTACT	bis(2-ethylhexyl)phthalate	2.25E-06	Yes	1.42E-02	3.20E-08	
	butylbenzylphthalate	2.57E-06				
	arsenic	2.37E-08	Yes	1.84E+00	4.36E-08	7.56E-08
TOTAL EXPOSURE RISK FOR RESIDENT CHILDREN						4.01E-05

Slope factor for dermal exposure adjusted for absorption as follows:

$$SF/ABS = \text{Adj SF}$$

where ABS = 1.00 for organic chemicals (default)
0.95 for arsenic (ATSDR, 1989)

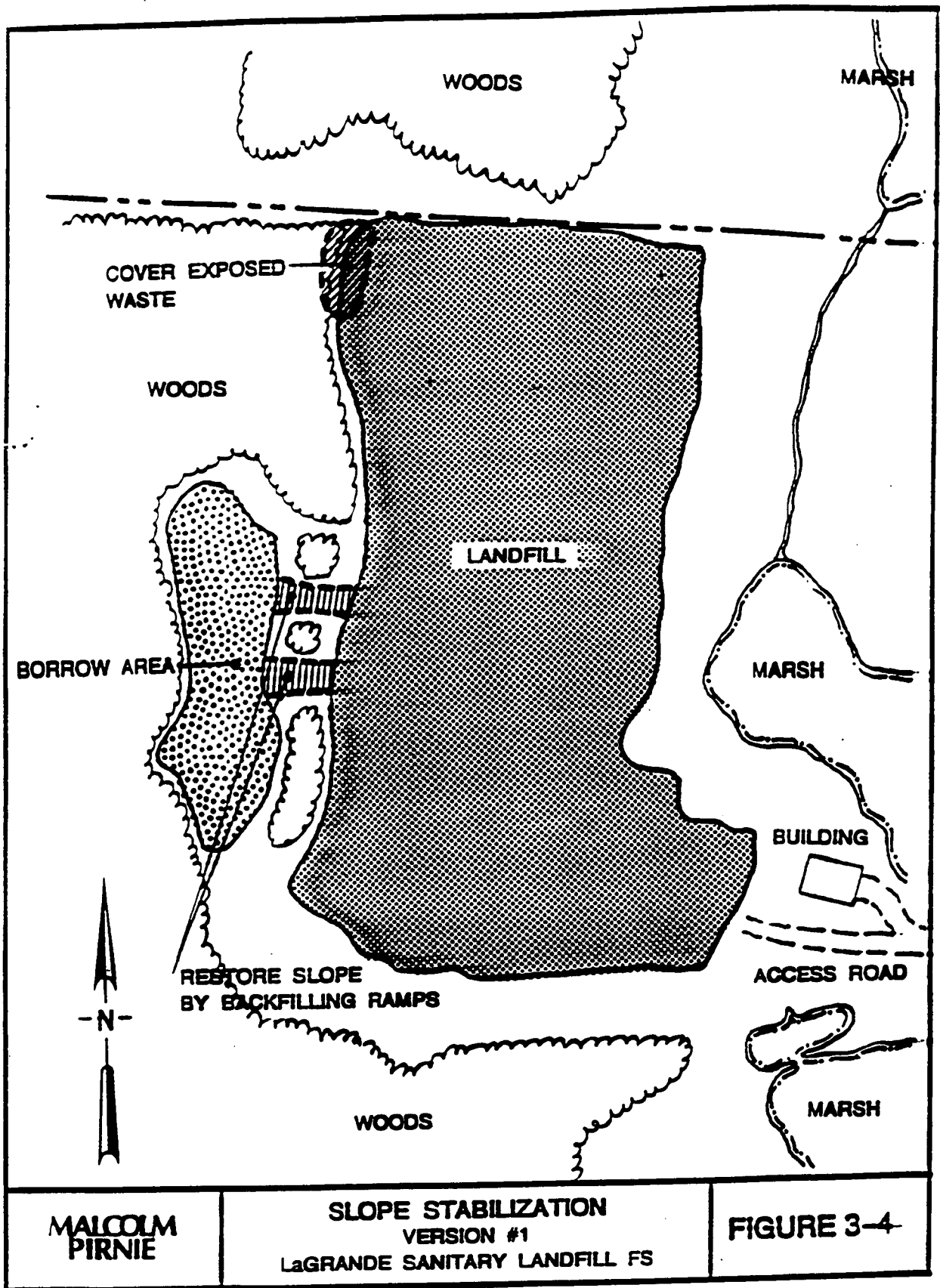
TABLE 6-13
SUMMARY OF CHRONIC NONCARCINOGENIC HAZARD INDEX ESTIMATES
LAGRANDE SANITARY LANDFILL

Chemical		CDI (mg/kg-day)	CDI Adjusted for Absorption	RfD (mg/kg-day)	Hazard Quotient	Pathway Hazard Index
EXPOSURE PATHWAYS FOR RESIDENT ADULTS						
INGESTION	bis(2-ethylhexyl)phthalate	1.70E-04	No	2.00E-02	8.50E-03	
	butylbenzylphthalate	1.94E-04	No	2.00E-01	9.70E-04	
	di-n-octylphthalate	1.49E-04	No	2.00E-02	7.45E-03	
	arsenic	1.13E-04	No	3.00E-04	3.77E-01	
	manganese	1.36E-01	No	1.00E-01	1.36E+00	1.75E+00
DERMAL CONTACT	bis(2-ethylhexyl)phthalate	1.56E-05	Yes	2.00E-02	7.80E-04	
	butylbenzylphthalate	1.79E-05	Yes	2.00E-01	8.95E-05	
	di-n-octylphthalate	1.37E-04	Yes	2.00E-02	6.85E-03	
	arsenic	1.65E-07	Yes	2.85E-04	5.79E-04	
	manganese	1.99E-04	Yes	5.00E-03	3.98E-02	4.81E-02
TOTAL EXPOSURE HAZARD INDEX FOR RESIDENT ADULTS						1.80E+00
EXPOSURE PATHWAYS FOR RESIDENT CHILDREN						
INGESTION	bis(2-ethylhexyl)phthalate	3.96E-04	No	2.00E-02	1.98E-02	
	butylbenzylphthalate	4.53E-04	No	2.00E-01	2.27E-03	
	di-n-octylphthalate	3.48E-04	No	2.00E-02	1.74E-02	
	arsenic	2.64E-04	No	3.00E-04	8.80E-01	
	manganese	3.18E-01	No	1.00E-01	3.18E+00	4.10E+00
DERMAL CONTACT	bis(2-ethylhexyl)phthalate	2.62E-05	Yes	2.00E-02	1.31E-03	
	butylbenzylphthalate	3.00E-05	Yes	2.00E-01	1.50E-04	
	di-n-octylphthalate	2.31E-04	Yes	2.00E-02	1.15E-02	
	arsenic	2.76E-07	Yes	2.85E-04	9.68E-04	
	manganese	3.33E-04	Yes	5.00E-03	6.66E-02	3.06E-02
TOTAL EXPOSURE HAZARD INDEX FOR RESIDENT CHILDREN						4.18E+00

RfDs for dermal exposure are adjusted for absorption as follows:

$$RfD \times ABS = Adj\ RfD$$

where ABS = 1.00 for organic chemicals (default)
= 0.95 for arsenic (ATSDR, 1989)
= 0.05 for manganese (ATSDR, 1991)



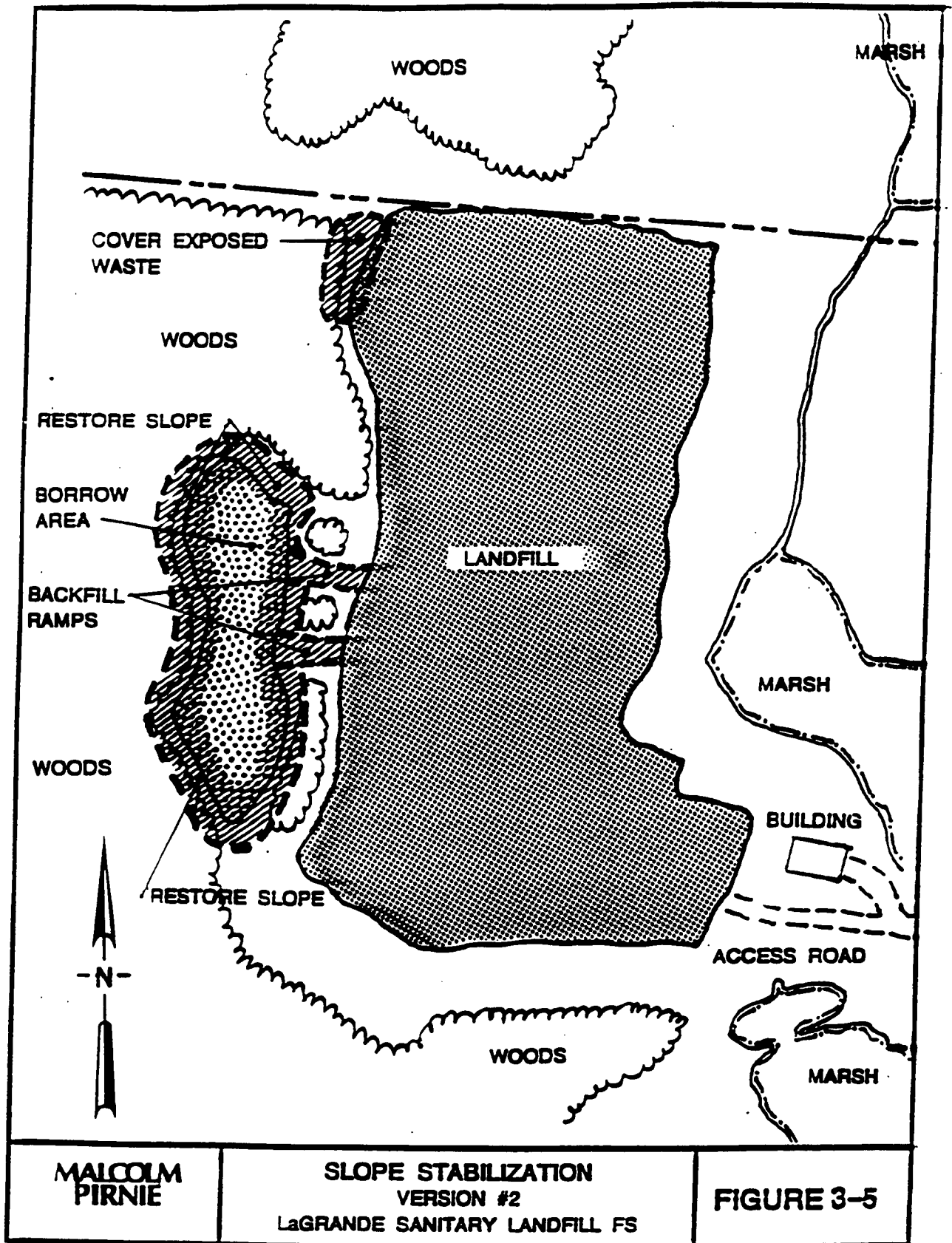


TABLE 4-3

**LAGRANDE SANITARY LANDFILLS FS
COMPARATIVE ANALYSIS AMONG ALTERNATIVES**

Evaluation Criteria	1-No Action	2-Long Term Monitoring(LTM)	3-LTM and Slope Stabilization
Overall Protection of Human Health & Environment	Lowest Protection	Intermediate Protection	Maximum Protection
Compliance with ARARs	Does not comply with MN Rules-Mixed Municipal Solid Waste for soil gas and ground water monitoring	Complies with MN Rules for soil gas and ground water monitoring	Complies with MN Rules for soil gas and ground water monitoring
Long-Term Effectiveness	May be effective. No long term soil gas/ground water monitoring data. No reduction in potential for landfill cap failure.	Effective for soil gas and ground water monitoring. No reduction in potential for landfill cap failure.	Effective for soil gas and ground water monitoring and reduction in the potential for landfill cap failure.
Reduction of Toxicity, Mobility, Volume	Not applicable, no treatment proposed.	Not applicable, no treatment proposed.	Not applicable, no treatment proposed.
Short-Term Effectiveness	Not applicable.	Minimal risk to public and sampling workers. Site access controls implemented.	Minimal risk to public and sampling workers. Site access controls implemented. Slope stabilization may require respiratory protection.

TABLE 4-3**LAGRANDE SANITARY LANDFILLS FS****COMPARATIVE ANALYSIS AMONG ALTERNATIVES**

Evaluation Criteria	1-No Action	2-Long Term Monitoring (LTM)	3-LTM and Slope Stabilization
Implementability	Not Administratively feasible.	Technically and administratively feasible.	Technically and Administratively feasible.
Cost-First Year	No Costs	\$73,000	\$155,000-\$295,000
Cost-Second Year	No Costs	\$22,000	\$22,000
30-Year Present Worth Cost			
5% Discount Rate	No Costs	\$406,000	\$488,000-\$628,000
10% Discount Rate	No Costs	\$279,000	\$361,000-\$501,000
State Acceptance	Not Acceptable	Not Acceptable	Acceptable
Community Acceptance	Not Acceptable	Not Acceptable	Acceptable

TABLE 4-2

LAGRANDE SANITARY LANDFILL FS
ESTIMATED COST FOR ALTERNATIVE 3

<u>TASK</u>	<u>COST</u>
INSTITUTIONAL CONTROLS:	\$13,000
(Includes site development, deed restrictions and well abandonment)	
GROUND WATER AND SOIL GAS MONITORING:	
(Includes eight on-site wells and four residential wells)	
First Year:	\$60,000
Annually, thereafter:	\$22,000
SLOPE STABILIZATION:	
Version #1:	\$80,000
Version #2:	\$220,000
TOTAL COST RANGE FOR FIRST YEAR:	<u>\$155,000-\$295,000</u>
TOTAL COST ANNUALLY, THEREAFTER:	<u>\$22,000</u>
30-Year Present Worth Cost Range:	
5% Discount Rate:	<u>\$488,000-\$628,000</u>
10% Discount Rate:	<u>\$361,000-\$501,000</u>
NOTE:	Additional capital costs may result from future replacement or refurbishment of monitoring wells.