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Superfund Record of Decision:

Cardington Road Landfill (aka Sanitary Landfill), OH

50272-101

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First Remedial Action - Final

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16. Abstract (Limit: 200 words)

The 36-acre Cardington Road Landfill a.k.a. Sanitary Landfill site is part of the 53-acre Cardington Road Landfill located in Moraine, Montgomery County, Ohio. Land use in the area is mixed commercial, light industrial, and residential. The site borders residential properties to the northeast, with the closest residence within 200 yards of the landfill property. The landfill is located above a kame terrace in the Great Miami River valley buried aquifer system, which has been designated as a sole-source aquifer. All area residents are provided with municipal drinking water, and there are nine commercial production wells within the study area. Throughout the 1960s, the site was mined primarily for sand and gravel, although some landfill activities may have occurred. Beginning in 1971, the site was operated as a solid waste disposal facility, and the excavated sand and gravel pits were filled with commercial, industrial, and municipal waste. In 1980, after waste disposal activities terminated, the site was covered with soil ranging in thickness from two to eight feet. In 1987, EPA and the State conducted a RI, which revealed that adverse environmental impacts were the result of prior onsite solid waste and hazardous waste disposal practices. This ROD addresses a first and final action for the landfill source material and gas to prevent them from

(See Attached Page)

17. Document Analysis a. Descriptors
Record of Decision - Cardington Road Landfill a.k.a. Sanitary Landfill, OH
First Remedial Action - Final
Contaminated Media: soil, sediment, debris, sw, landfill gas
Key Contaminants: VOCs (benzene, TCE, toluene, xylenes), other organics, metals (arsenic, chromium, lead)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 108
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Abstract (Continued)

migrating offsite. The primary contaminants of concern affecting the soil, sediment, debris, surface water, and landfill gas are VOCs, including benzene, TCE, toluene, and xylenes; other organics; and metals, including arsenic, chromium, and lead.

The selected remedial action for this site includes capping the entire landfill area with a low permeability vegetated cap; actively collecting landfill gases and treating them using flaring, thermal destruction, or carbon adsorption, with subsequent release into the atmosphere or collection and sale of the gases to a local utility, if determined feasible; installing additional gas controls and gas collection trenches along the eastern/northeastern boundary, if necessary; conducting a Supplemental Site Investigation to further define ground-water flow directions and to determine whether the contamination found at the southern end of the landfill is coming from the landfill or another source; implementing surface water runoff and engineering controls, including site grading, diversion berms, storm water drainage channels, collection systems, and energy dissipation controls; monitoring ground water, surface water, landfill gas emissions, and air; and implementing institutional controls, including deed, ground water, and land use restrictions. The estimated present worth cost for this remedial action is $8,145,300, which includes an estimated total O&M cost of $2,125,900 for 30 years.

PERFORMANCE STANDARDS OR GOALS:

Collection, treatment, or flaring of landfill gas will be in compliance with chemical-specific ARARs of the Clean Air Act and the APEN Air Pollution Emission Notice.

ATTENTION

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Declaration for the Record of Decision

Site Name and Location

Sanitary Landfill Company (IWD)
(a.k.a. Cardington Road Landfill)
Moraine, Ohio

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Sanitary Landfill Company (IWD) site, in Moraine, Ohio, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and is consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to the extent practicable. This decision document explains the factual and legal basis for selecting the remedy for this site.

This decision is based upon the contents of the administrative record for the Sanitary Landfill Company (IWD) site.

The State of Ohio concurs on the selected remedy.

Assessment of the Site

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

Description of the Remedy

This is the first and only operable unit for the site. The selected remedial alternative for the Sanitary Landfill Company (IWD) site is to perform active landfill gas collection and treatment, cover the landfill with a low permeability cap and undertake other actions required by State sanitary landfill closure requirements. The major components of the selected remedial alternative are:

- Solid Waste Landfill Cap
- On-site Subsurface Gas Controls
- Surface Run-off Controls
- Long-term Monitoring
- Institutional Controls
- Supplemental Site Investigation

The following components will be further evaluated during the Remedial Design (RD) and Remedial Action (RA) and, if necessary, will be included as part of the remedy.

- Natural Attenuation of Contaminated Ground Water
- Ground Water Extraction and Treatment

Declaration of Statutory Determinations

Consistent with CERCLA and, to the extent practicable, the NCP, 40 C.F.R. Part 300, the selected remedial action is protective of human health and the environment. The selected remedy attains Federal and State requirements that are applicable or relevant and appropriate to this remedial action and is cost effective.

This remedy utilizes permanent solutions and alternative treatment technologies, to the maximum extent practicable.

Because this remedy will result in hazardous substances remaining on-site above health-based standards, 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.

David A. Ullrich

Valdas V. Adamkus
Regional Administrator

9/27/93
DATE

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RECORD OF DECISION
SANITARY LANDFILL COMPANY (IWD) SITE

Decision Summary for the Record of Decision

I. Site Name, Location, and Description

The Sanitary Landfill Company (IWD) site is located at 1855 Cardington Road, Moraine, Ohio, in Montgomery County, approximately one mile south of the City of Dayton (Figure 1). The property parcel on which the site is located encompasses approximately 53 acres and is bounded on the South by Cardington Road, on the east by Lance Drive, on the north by Calvary Cemetery, and on the west by active and reclaimed sand and gravel quarries. The actual site area used for waste disposal has been estimated to be about 36 acres. The site is approximately 2,200 feet in length on the west boundary and 1,000 feet wide at the northern boundary (Figure 2).

The property surrounding the site is zoned commercial, light industrial and residential. Residential properties border the site to the northeast with the closest resident within 200 yards of the landfill property. All residents in the study area as defined in the RI/FS Work Plan are provided with municipal drinking water. Nine commercial/production wells were identified within the defined study area.

The site is located at the top of a kame terrace in the Great Miami River valley buried aquifer system, which has been designated by the U.S. EPA as a sole-source aquifer. Glacial materials deposited in the valley system, which are the primary source of ground water, can range from 100 to 300 feet in thickness. The Great Miami River, which flows in a southerly direction, lies approximately 2,500 feet north and 4,000 feet west of the site. No surface water streams are present near the site. Topography of much of the site is gently sloping to relatively flat.

II. Site History and Enforcement Activities

The site is situated on property owned by two trusts controlled by the Snyder family. The property was leased to Moraine Materials Company, which mined the site for sand and gravel throughout the 1960's. Records indicate that some landfilling activities may have occurred at the site in the middle to late 1960's. In January 1971, the State of Ohio licensed operation of the site as a solid waste disposal facility. The site was leased for use as a landfill to the Sanitary Landfill Company (subsequently owned by Danis Industries Corporation), which operated the facility during the entire licensed period. During landfilling operations, the excavated sand and gravel pits were filled with commercial, industrial and municipal wastes. In January 1980, the Sanitary Landfill Company requested lease

termination and indicated to the State of Ohio that waste disposal activities were complete. Later in 1980, the site was covered with soil ranging in thickness from two to eight feet.

The Sanitary Landfill Company (IWD) Superfund Site (a.k.a. Cardington Road Landfill Site) was included on the National Priorities List (NPL) in the Federal Register on June 10, 1986. U.S. EPA, the State of Ohio, and a group of potentially responsible parties (PRPs) entered into a three-party Administrative Order by Consent (AOC) effective December 16, 1987. The PRPs which signed the AOC are Danis Industries Corporation, General Motors Corporation, Firestone Tire & Rubber Company, and NCR Corporation. Reynolds and Reynolds was subsequently added as a Respondent to the AOC on October 18, 1989. Under the terms of the AOC, the PRPs agreed to conduct the Remedial Investigation and Feasibility Study for the site with oversight by U.S. EPA and Ohio EPA.

III. Highlights of Community Participation

The Feasibility Study and the Proposed Plan for the Sanitary Landfill Company (IWD) site were released to the public for comment on March 31, 1993. These two documents were made available to the public in the administrative record and information repositories maintained at the EPA Docket Room in Region Five, Chicago, Illinois, and at the City of Moraine Library in the Moraine Municipal Building, Moraine, Ohio. The notice of availability for the documents was published in the Dayton Daily News, Dayton, Ohio on Monday, March 29, 1993. As required by CERCLA Sections 113 and 117, a public comment period on the documents was held from March 29, 1993 to April 30, 1993. A public meeting was held on April 14, 1993 at the Southdale School in Kettering, Ohio. At this meeting, representatives from U.S. EPA and Ohio EPA answered questions about problems at the site and the remedial alternatives under consideration. The proceedings were transcribed by a court reporter. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this Record of Decision (ROD).

IV. Scope and Role of Response Within Site Strategy

As with many Superfund sites, the problems at the Sanitary Landfill Company (IWD) site are complex. Adverse environmental impacts are derived from solid waste and hazardous waste disposal practices which have occurred at the site. The remediation at the Sanitary Landfill site is required to further control the infiltration of contaminants into area ground water, prevent direct human contact with landfill waste, and to control landfill gases from migrating off-site. Current and potential risks to human health and the environment are shown to be posed by the

contamination found on-site. This ROD selects a remedial action for the site which addresses risks posed by all identified pathways.

V. Summary of Site Characteristics

The Remedial Investigation (RI) was designed to determine the nature and extent of contamination at the site through a sampling program for ground water, soils, surface waters, sediments and air quality. Also included in the investigation was a cap integrity study and a waste characterization program consisting of geophysical surveys, vent gas surveys, soil gas surveys and intrusive borings into and leachate sampling from the landfill.

a. Soils (surface and subsurface)

Eight surface soil samples were collected from two off-site areas. Four samples represent upslope and background and four were located downslope in areas adjacent to the site. No volatile organic compounds (VOCs), pesticides, or PCBs were detected in the soil samples. Semi-volatile organic compounds (SVOCs) were detected in one upslope sample. Inorganic compounds were found in both upslope and downslope samples.

Seventeen borings were drilled at nine locations around the perimeter of the landfill. Subsurface soils were collected and submitted for chemical analysis and to determine subsurface geology. Organic and inorganic compounds were detected in these samples. No pesticides or PCBs were detected. In general the concentrations of organic contaminants were low and no pattern of detections was identified. Inorganic contaminants were generally within an acceptable range. The thickness of the unconsolidated glacial materials varies from 250 to 300 feet. An unsaturated zone of glacial materials ranging from 55 to 80 feet in thickness is present between the base of the landfill and the water table.

b. Ground Water

A network of 17 monitoring wells were installed around the perimeter of the landfill (Figure 4). Water bearing units sampled include the unconsolidated material above a continuous clay layer to the west of the buried waste which supports a perched zone of saturation (shallow wells or A-wells), unconsolidated saturated material at the top of the regional water table (intermediate wells or I-wells), unconsolidated saturated material at a mid-depth between the top of the regional water table and bedrock (mid-zone wells or M-wells), and unconsolidated material at or near the base of the glacial deposit/bedrock interface (deep wells or R-wells).

The flow direction from the shallow wells appears to be to the west and may be hydraulically connected to and/or discharge at

the seeps west of the landfill. The regional flow system, which the intermediate wells bisect, generally flows to the south/southwest. The deep wells generally follow the regional flow system toward the south/southwest but also show a tendency toward a more southerly directional flow. Since only two wells were installed in the mid-zone, insufficient data points are available to determine the potential flow direction at this depth.

Organic and inorganic compounds were detected in both upgradient and downgradient perimeter monitoring wells. Detected organic compounds ranged from 1 ug/l to 210 ug/l. Most of the organic compounds found were at low concentrations of less than 10 ug/l. Twenty-three metals (inorganics) and total cyanide were detected in monitoring wells. There is an even distribution of organic and inorganic compounds found between the different aquifer zones (depths) that were sampled; however, there is no pattern of consistent detections between individual monitoring wells. The available data is not sufficient to determine if there is a defined plume of chemical contamination in the ground water. No pesticides or PCBs were detected in the ground water samples.

One well cluster (MW-9I and MW-9M) located at the southern boundary of the site showed one volatile organic compound exceeding the Maximum Contaminant Levels (MCLs) over two consecutive sampling rounds. However, inspection of the ground water flow maps indicates uncertainty related to whether these wells have been impacted or not impacted by the landfill.

Four production wells in the vicinity of the landfill were also tested to determine if the site was impacting drinking water supplies. Eight organic compounds were detected in the samples at concentrations ranging from 0.5 ug/l to 30 ug/l. Eleven inorganic compounds were detected in the wells. Two of these wells are considered upgradient and two are downgradient. The two downgradient wells are located approximately one half mile south of the landfill, however, the flow direction at these locations were not conclusively established and other potential sources have been identified between these wells and the site.

c. Surface Water and Sediments

The investigation included the collection of liquid and sediment samples from ten sampling locations, both on-site and off-site, and three downgradient seep locations.

No VOCs, SVOCs, pesticides, or PCBs were identified in any of the surface water samples above the required detection limits. Numerous inorganic compounds were detected in the surface water samples collected. Numerous organic and inorganic compounds were detected in upgradient, on-site, and downgradient sediment samples.

Three VOCs and twenty-one inorganic compounds were detected in the seep liquids. These seeps are downgradient of the landfill, found at the same relative elevation as the landfill, and may be hydraulically connected with the shallow monitoring wells on the western perimeter of the site. No SVOCs, pesticides, or PCBs were detected in the seep liquids. No SVOCs, pesticides, or PCBs were detected in any seep sediment samples. Chloroform was detected below the required quantitation limit. Numerous inorganic compounds were detected in the seep sediments.

Selected Summary of the Seep Liquid Sample Results (Maximum)

CONTAMINANT	CONCENTRATION
Methylene chloride	.002 parts per million (ppm)
1,1-Dichloroethane	.02 ppm
1,2-Dichloroethene (total)	.005 ppm
Chromium	.0806 ppm
Cobalt	.111 ppm
Iron	244.00 ppm
Lead	.0546 ppm
Magnesium	496.00 ppm
Manganese	33.45 ppm
Mercury	.00035 ppm
Nickel	.117 ppm

d. Air Quality

The air investigation was conducted to determine the migration and dispersion of potential chemical constituents in the ambient air on-site and along the perimeter of the site (50-foot radius). This investigation included an ambient air survey conducted over the entire site and perimeter areas located within 50 feet of the site, and the collection and analysis of perimeter air samples at nine locations along the perimeter of the site (Figure 5).

Several VOCs were detected both on-site (Table 1) and along the perimeter (Table 2) during this portion of the investigation. Organic compounds detected include but are not limited to trichlorofluromethane, toluene, 1,1,1-TCA, acetone, 2-butanone, chloromethane, ethylbenzene, and methane. Many of the organics detected were found in both upwind and downwind locations. Some mechanism of movement such as dispersion or other physical process may be occurring. No SVOCs were detected in upwind or downwind samples.

As part of the air quality investigation, chemical analysis of indoor air for workers in the Snyder Concrete Products Company were performed. This company's operation occurs on and next to the landfill. The chemical concentrations recorded in the single grab sample were taken under worst case conditions. 1,1-dichloroethylene and methylene chloride were two organic

compounds that were detected. These two compounds were used to assess the risk posed by the site and helped establish in the risk assessment that the principal threat was landfill gas.

e. Cap (cover) Integrity Study

The cap (cover) integrity study was conducted to determine the nature and/or physical characteristics of the cover materials. The study also assessed the overall effectiveness of the landfill cover in preventing infiltration to the waste and the subsequent rate of leachate generation, and the net drainage from the base of the landfill.

It was found that the existing cover materials are comprised of varying contents of silt or clay, sand, and gravel size particles. Comparison of field density measurements to laboratory compaction test results indicates limited compaction of the cover soils was achieved upon placement. Through the application of the Hydrologic Evaluation of Landfill Performance (HELP) computer model it was determined that the average net drainage from the base of the landfill into the unsaturated zone is approximately 4.0 inches per acre per year. It was found that the existing cap allows for the infiltration of water into the landfill and allows for the production and escape of landfill gas in an uncontrolled fashion.

f. Waste Characterization

The waste characterization program was conducted to determine the lateral extent of the waste placement boundaries, the depth of the waste materials in the landfill, the composition and the extent of migration of gases emanating from the landfill, and the composition of the waste materials and leachate in the landfill. The waste characterization investigation consisted of geophysical and radiological surveys, on-site gas vent screening and sampling surveys, installation and screening/sampling of on-site and off-site soil gas probes, and intrusive drilling into the landfill. No landfill volume estimates were performed for this site.

It was found that the landfill area encompasses approximately 36 acres and varies in depth from 45 to 75 feet. Gases emitted from the on-site gas vents contain a high percentage of methane (5 to 61 percent). Several VOCs and SVOCs were detected both on-site and off-site in vent and soil gas sampling (Tables 1 and 3). The extent of gas migration off-site was found to be approximately 200 to 500 feet from the landfill boundaries. Visual inspection of the waste material revealed paper, wood, plastic, metal and foam rubber. In general, the waste has decomposed into a black sludge-like semi-solid mass that contained several VOCs, SVOCs, heavy metals and other inorganic compounds. The results did not indicate the presence of pesticides, PCBs or radiological materials in the landfill.

Selected Summary of the Leachate Sample Results (Maximum)

CONTAMINANT	CONCENTRATION
Volatile Organics	
1,2-Dichloroethene (total)	.001 parts per million (ppm)
2-Hexanone	1.5 ppm
4-methyl-2-pentanone	.076 ppm
Benzene	.018 ppm
Chlorobenzene	.014 ppm
Ethylbenzene	.36 ppm
Methylene chloride	.24 ppm
Toluene	.26 ppm
Xylene	4.1 ppm
Semi-Volatile Organics	
Benzo(a)pyrene	.012 ppm
Benzoic acid	.26 ppm
Fluoranthene	.037 ppm
Naphthalene	.062 ppm
Inorganics	
Arsenic	.62 ppm
Cadmium	.365 ppm
Chromium	2.22 ppm
Cobalt	.437 ppm
Iron	2110.00 ppm
Lead	7.28 ppm
Magnesium	1960.00 ppm
Manganese	20.6 ppm
Mercury	.0021 ppm
Nickel	1.56 ppm
Cyanide	.0513 ppm

VI. Summary of Site Risks

a. Human Health Risk

Based on the results of the RI, U.S. EPA and Ohio EPA directed the PRPs in calculating the risks that the site would pose to human health and the environment if no remedial actions were taken at the site. This process is called the Baseline Risk Assessment (Risk Assessment). Risk assessment involves assessing the toxicity, or degree of hazard, posed by the substances found at the site, and the routes by which humans and the environment could come into contact with these substances.

The NCP requires that the Risk Assessment consider exposure scenarios for both current land use and for a conservative

reasonable future use. Since the area surrounding the site is a combination of both light industrial and residential within the city of Moraine, and one mile from the city of Dayton, it is appropriate to assess potential risks which would occur if no action was taken at the site and the site was converted to residential use sometime in the future.

The Risk Assessment, included as a separate document of the RI report, examined the potential risks which the contaminants at the site pose to human health and the environment. Based on frequency of detection, concentration relative to background, and toxicity, the list of contaminants found at the site was screened to 81 chemicals of concern. These substances, which are listed on Table 4, include 14 inorganics and 67 organic compounds. 1,1-dichloroethylene (1.78×10^{-3} current use air pathway) contributed to elevated site risks. Some other contaminants which contributed to site wide risks for human health include: methylene chloride (1.16×10^{-4} current use air pathway), trichlorofluoromethane (670 ppbv air pathway), benzyl chloride (3.12×10^{-5} current use air pathway), vinyl chloride (8.84×10^{-6} current use air pathway), 1,1,2 trichloroethane(1.17×10^{-6} future use groundwater pathway), and arsenic (4.48×10^{-4} future use groundwater pathway). Table 5 summarizes the chemicals of concern by media.

Routes of exposure were identified through which the chemicals of concern could come in contact with the public. Both current-use pathways and future-use pathways were examined. Under current conditions at the site, the existing routes of exposure include:

1. inhalation of VOCs in indoor air and outdoor ambient air;
2. incidental ingestion of surface soils, surface sediments, and seep sediments;
3. dermal contact with surface soils, surface water, and seep water, and;
4. dermal contact with surface sediments and seep sediments.

Potential, or future-use, exposure routes may evolve if the land upon which the landfill is situated is used for different purposes. In the future-use scenario, the Agencies assumed that the site was developed for residential housing, as a means of assessing a worst case situation. The potential routes of exposure under these conditions may be:

1. inhalation of VOCs in ambient air;
2. ingestion of onsite groundwater;
3. inhalation of VOCs while showering;
4. dermal adsorption of contaminants while showering;
5. ingestion of contaminants in surface sediment, surface water, and seep sediment, and;
6. dermal adsorption of contaminants in surface sediment, surface water, and seep sediment.

There are two types of health risks that contamination from a site may pose to humans; carcinogenic (cancer-causing) and noncarcinogenic. All people are assumed to have an average risk of suffering from cancer in their lifetime. The Risk Assessment estimates the excess risk, posed by the site, of getting cancer, over and above the average risk. Cancer risks from various exposure pathways are assumed to be cumulative. Acceptable risks are those that may result in less than one additional cancer case in 10,000 (less than 1.00×10^{-4}) to 1,000,000 (less than 1.00×10^{-6}) people exposed over a lifetime (70 years). For the current-use scenario, potentially exposed populations are:

1. residents (both adults and children) living to the northeast of the site;
2. workers at the Snyder Concrete Products Building on Lance Drive;
3. workers at other commercial establishments along Lance Drive, and;
4. children who trespass on and in the vicinity of the site.

For the future-use scenario, the Risk Assessment assumed that the site would be developed for residential use including the installation and use of on-site ground water wells for drinking water. The potentially exposed populations for the future-use scenario include:

1. children and adult residents on the site;
2. residents drinking on-site ground water, and;
3. children who trespass on and in the vicinity of the site.

Risk calculations for current-use pathways and future-use pathways showed unacceptable excess cancer risks. Current use excess cancer risk estimates were identified for exposures to indoor air at the Snyder Concrete Products Company (1.89×10^{-3}). Other risk estimates were identified for outdoor workers at the Snyder Concrete Products Company (4.69×10^{-5}), adult and children residents off-site air (1.76×10^{-4} and 2.13×10^{-4}) children on-site air, trespassing (1.64×10^{-6}) and children dermal contact with seep water (1.55×10^{-6}). Future-use excess cancer risk estimates were identified and are shown on Table 6.

Noncarcinogenic risks, or hazards, are evaluated with respect to a hazard index, which represents the sum of all ratios of the level of exposure of the contaminants found at the site to that of contaminants' various reference doses. If this level exceeds 1.0, there may be a potential for the occurrence of noncarcinogenic health risks. Noncarcinogenic health risks were identified for current resident children and adults for off-site inhalation of volatiles at 6.0 and 2.9 respectively. For future use, resident children and adults exceeded the hazard index for

ingestion of ground water (6.1 and 4.2 respectively) and resident children for dermal contact with surface sediments at 1.5.

b. Ecological Risk

Ecological impacts from site-related contamination were also evaluated. Due to the site's proximity to industrial and residential development, the lack of suitable aquatic habitats, and the limited size and diversity of possible habitats on-site, the area does not support an abundance of terrestrial and aquatic life. No endangered species were identified to be associated with the site. The maximum detected concentrations are less than on site-specific values and are less than published guidelines or standards for ecological risk. The ecological assessment found that the site does not pose a significant ecological risk.

c. Conclusions of the Risk Assessment

One conclusion of the risk assessment is that the principal threat presented by the site is landfill gas. Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision, may present imminent and substantial endangerment to human health, welfare, and the environment.

VII. Description of Alternatives

Alternatives for the remediation of the Sanitary Landfill site have been evaluated in a Feasibility Study, which is available for review by the public at the City of Moraine Library in the Moraine Municipal Building, Moraine, Ohio. The Feasibility Study was conducted to identify and screen technologies and alternatives for addressing the contamination problems at the site.

The remedial alternatives were first evaluated based on their ability to meet the remedial action objectives and to be protective of human health and the environment as detailed in the Risk Assessment.

The remedial action objectives are the media-specific goals that must be achieved to protect human health and the environment. An environmental medium or physical area (e.g. air, soil, water), is identified as a principal threat when it is contaminated with unacceptable concentrations of toxic compounds, liquids, or highly mobile materials. Based on the detection of organic gases, one of the principal threats is in on-site gas vents, off-site soil gas samples, perimeter air samples, with VOC concentration exceeding acceptable risk levels. One remedial action objective is to control the subsurface migration of gases from the landfill to off-site locations and to control the emission of landfill gases on-site to the ambient air.

The remedial action objectives for ground water are to limit infiltration into the landfill to minimize the mobilization of contaminants in the waste and limit direct physical contact with the waste. If a defined plume is identified in the future, another remedial action objective is to restore the ground water to a useful, less threatening state by reducing the levels of the contaminants present and preventing exposure (ingestion, dermal contact, etc.) to those contaminants.

CERCLA provides a preference for remedial actions which achieve protection of human health and the environment through treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances, pollutants, or contaminants. The preamble to the NCP states that treatment is the preferred alternative for the remediation of hazardous substances. The preamble also states that solutions will most often involve a combination of methods of protection, including treatment, engineering controls, and institutional controls. U.S. EPA guidance specifies that containment is the most likely response action at CERCLA municipal landfills. The NCP also contains an expectation that treatment should be considered for identifiable areas of highly toxic and/or mobile materials that pose potential principal threats. Treatment of mobile materials (landfill gases) has been evaluated along with the containment part of each appropriate alternative.

Once the applicable technologies have been selected, remedial action alternatives were developed by combining two or more of the screened technologies into specific remedial action options. These alternatives address the media of concern and the remedial action objectives for the site and are compared to specified evaluation criteria.

All of the alternatives described in the following paragraphs, except for the No Action alternative, include the following five (5) common elements.

1. Institutional Controls

Institutional controls will be used to restrict access to and limit future use of the site, as well as to prevent use of ground water beneath the site as drinking water. Use of the site will be limited to prevent uncontrolled disposal of wastes, damage to the cap and exposure of contaminants to humans or the environment. The fencing network will be expanded. Institutional control options include deed restrictions, and enforceable access and land use restrictions.

2. Monitoring

Monitoring is the basis for determining whether the remedial actions conducted at the site are effective. Monitoring will

encompass landfill gas emissions and ground water. Monitoring will also consist of water level measurements of monitoring wells and the leachate head wells which are currently drilled into the landfill. As a base, the post-closure, long-term ground water monitoring program will incorporate thirteen (13) of the existing wells present at the site and two (2) new wells (figure 4). The number of monitoring wells may change depending on changing site conditions. Monitoring (which includes water level measurements of monitoring wells and the leachate head wells) would commence after the cover system has been in place and be conducted quarterly for the first two (2) years, semi-annually for an additional thirteen (13) years, and then annually for the remaining fifteen (15) years, for a total of thirty (30) years.

3. Surface Water Run-off Controls

Surface water run-off controls include site grading, diversion berms, stormwater drainage channels, collection systems, and energy dissipation controls. Erosion control systems can also protect the landfill slopes from damage due to erosion. The design of these types of controls will be consistent with and incorporated into the design of a cover system.

4. On-Site Subsurface Gas Controls

The gas management system would consist of the installation of approximately thirty (30) new active gas wells. The actual location of the gas wells will be determined during the design phase of the project. Higher gas concentrations and proximity to residential/commercial development will be design considerations.

If it is determined that additional gas controls are necessary to prevent migration of landfill gas off-site into residential/commercial developments, a series of collection trenches along the eastern/northeastern boundary of the site would be included as part of the gas control system.

The collection trenches can be passively vented or connected to a main header and blower system for active extraction. The collected gases would be flared, thermally destroyed or treated by carbon adsorption and released by emission, thus resulting in risk reduction.

5. Supplemental Site Investigation

The Supplemental Site Investigation (SSI) will involve the installation of two additional monitoring wells. These wells will be installed during the design of the cap and gas extraction system. The purpose of the SSI will be to further define the flow gradients at the southern end of the landfill and attempt to determine if the chemical contamination detected at the MW-9 cluster is coming from the landfill.

Alternatives 2 through 6, and Alternative 9 have been screened out in the FS. Please refer to the FS for more details concerning these alternatives.

Alternative 1: No Action

Months to Implement Action:	None
Estimated Capital Cost:	$ 0
Estimated 30 Year Operation and Maintenance (O&M) Costs:	$ 0
Estimated Present Net Worth Cost (30 years):	$ 0

CERCLA and the NCP require that a "No Action" alternative be considered as a basis upon which to compare other alternatives. Under this alternative, no additional cover system or landfill gas collection systems would be constructed, no additional ground water monitoring would take place, and the conditions at the site would remain as at present. No O&M activities are included to prevent further deterioration of present site conditions over the long-term. This alternative would not adequately protect human health or the environment. There is no cost for this alternative.

Alternative 7: Single Barrier Cover (Solid Waste Landfill Cap)

Months to Implement Action:	12 to 24 months
Estimated Capital Cost:	$6,019,400
Estimated 30 Year Operation and Maintenance (O&M) Costs:	$2,125,900
Estimated Present Net Worth Cost (30 years):	$8,145,300

Under this alternative a solid waste landfill cap would be constructed, consisting of a one or two foot bedding layer of compacted select native soil or sand sub-grade, two feet of impermeable clay, a one foot minimum drainage layer of sand, and a vegetated and protective top layer capable of supporting vegetation with a minimum thickness of two feet (Figure 3). At a minimum, a solid waste landfill cap will meet Ohio laws and regulations for design and operation of solid waste landfill caps (ORC 3734.041, OAC 3745-27-11 and 3745-27-14). Finally, as described above, necessary institutional controls, monitoring, surface run-off controls and subsurface gas controls will be implemented. The FS report provides a complete breakdown of cost estimates for this alternative.

Alternative 8: Composite Barrier Cover (Full RCRA Cap)

Months to Implement Action:	12 to 24 months
Estimated Capital Cost:	$7,328,600
Estimated 30 Year Operation and Maintenance (O&M) Costs:	$2,188,000
Estimated Present Net Worth Cost (30 years):	$9,516,600

Alternative 8 replaces the single barrier cover with a composite barrier cover. Under this alternative, a composite barrier cover would result in a greater reduction in the infiltration of precipitation into the landfill. A typical composite cover would consist of one foot of soil or sand sub-grade, a two-foot compacted low permeability clay layer and a synthetic geomembrane, one foot of sand, and a vegetative and protective topsoil layer. At a minimum, this landfill cap will be designed and constructed to meet Ohio regulations for design and operation of hazardous waste landfill caps (OAC 3745-68-10, OAC 3745-65-90 through 3745-65-94, OAC 3745-66-17 through 3745-66-20). Again, as described above, necessary institutional controls, monitoring, surface run-off controls and subsurface gas controls will be implemented. The FS report provides a complete breakdown of cost estimates for this alternative.

Alternative 10: Natural Attenuation

This alternative is concerned only with ground water and assumes that one of the capping alternatives has already been chosen. The following costs are in addition to the costs found in Alternatives 7 and 8.

Estimated Capital Cost:	$116,000
Estimated 30 Year Operation and Maintenance (O&M) Costs:	$328,000
Estimated Present Net Worth Cost (30 years):	$444,000

This alternative assumes that the Supplemental Site Investigation (SSI) is complete, a ground water plume is identified at the site, and that natural attenuation is the appropriate response action. There is a question as to whether the contamination found in the monitoring wells at the southern boundary of the site has been caused by the contamination at the site. At this time, no defined ground water plume has been identified migrating from the landfill. This alternative allows, through natural processes and without the imposition of additional remedial measures compounds which may leach from the landfill to either adsorb onto organic carbon particles in the soil or degrade by physical and chemical reactions into less concentrated forms. The net result of these processes, in conjunction with other technologies such as capping, are to reduce (attenuate) the concentrations of contaminants in ground water while capping prevents further leaching of contaminants into groundwater.

The base monitoring plan as described above and incorporated into all alternatives would be expanded under this alternative. If a defined plume is found migrating from the site, additional monitoring will be used to identify the extent of contamination. This would involve the installation of additional ground water monitoring wells and the evaluation of the effectiveness of natural attenuation as a continued remedial option. For the

purposes of this ROD, a ground water plume is defined as the presence of the same compound (or sister/daughter compounds) exceeding MCLs or risk based levels in the same downgradient monitoring well over a period of at least two consecutive sampling events. The completion of the SSI will be necessary to evaluate the need to address ground water at the site, and, if so, whether Alternative 10 or 11 is the appropriate ground water response action.

Finally, as described above, necessary institutional controls, monitoring, surface run-off controls, subsurface gas controls and installation of a cap will be implemented. The FS report provides a complete breakdown of cost estimates for this alternative.

Alternative 11: Ground Water Extraction and Treatment (On-site or Off-site)

This alternative is concerned only with ground water and assumes that one of the capping alternatives has already been chosen. The following costs are in addition to the costs found in Alternatives 7 and 8.

Estimated Capital Cost:	$1,139,000
Estimated 30 Year Operation and Maintenance (O&M) Costs:	$2,023,000
Estimated Present Net Worth Cost (30 years):	$3,162,000

This alternative assumes that the SSI is complete, a ground water plume is identified at the site, and that ground water extraction and treatment is the appropriate response action. As with alternative 10, a ground water plume will be defined based upon the presence of the same compound (or sister/daughter compounds) exceeding MCLs or risk based levels in the same downgradient monitoring well over a period of at least two consecutive sampling events. This alternative involves the installation and operation and maintenance of extraction wells, pumps and a piping system to allow for the collection of contaminated ground water. The exact size, configuration and type of extraction and treatment system would be determined during the design stage when additional data has been obtained.

Finally, as described above or in other alternatives, necessary institutional controls, monitoring, surface run-off controls, subsurface gas controls and installation of a cap system will be implemented. The FS report provides a complete breakdown of cost estimates for this alternative.

VIII. Summary of Comparative Analysis of Alternatives

Criteria for Evaluation of Alternatives

The NCP requires that the alternatives be evaluated on the basis of the nine evaluation criteria listed below. These criteria were used to compare the alternatives and select a preferred alternative:

Threshold Criteria:

1. Overall Protection of Human Health and the Environment
Addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. Compliance with ARARs
Addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental laws and regulations and/or provides grounds for invoking a waiver of such ARAR.

Primary Balancing Criteria:

3. Long-Term Effectiveness and Permanence
Refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met.

4. Reduction of Toxicity, Mobility, or Volume Through Treatment
Assesses the degree to which a remedy utilizes treatment to address the principle threats at the site.

5. Short-Term Effectiveness
Addresses the period of time needed to achieve protection and the potential adverse effects that implementation of a remedy may have on human health and the environment, i.e. during the construction and implementation period, until cleanup levels are achieved.

6. Implementability
Addresses the technical and administrative feasibility of a remedy, including the availability of services and materials.

7. Cost
Includes the estimated capital and operation and maintenance costs for a remedy, as well as net present worth costs.

Modifying Criteria:

8. State Acceptance
Indicates whether the State of Ohio supports the alternative.

9. Community Acceptance
Addresses the acceptability of the alternative to the local community based on comments received during the public comment period.

Evaluation of Alternatives

Threshold criteria must be met in order for an alternative to be eligible for selection. Primary balancing criteria are used to assess the technical and administrative trade-offs between alternatives. As a result of the assessment of primary balancing criteria, U.S. EPA determines which alternatives satisfy the statutory requirement for cost-effective and permanent solutions which utilized treatment to the maximum extent practicable. Comments received during the public comment period will form the basis for evaluating the alternatives relative to the modifying criteria described above.

The following discussion summarizes the compliance of Alternatives 1, 7 and 8 with the nine criteria. For a more detailed discussion of this evaluation, please refer to the Feasibility Study. Alternatives 10 and 11 are not evaluated at this time because a decision to implement either of these alternatives will be made after completion of the SSI.

Overall Protection of Human Health and the Environment

Based on the results of the RI and the Risk Assessment, the inhalation of contaminated air from the landfill presented a current-use pathway posing a risk to human health. Ground water presented a future use risk if one assumes the leachate in the landfill were to migrate into the regional water table and that ground water were to be consumed as part of a residential development of the site.

All alternatives under consideration except Alternative 1 (the No Action alternative) provide some degree of overall protection of human health and the environment in the long term. Each of the alternatives under consideration provides a base of protection due to the subsurface gas control/treatment portion of each alternative.

The two capping alternatives (alternatives 7 and 8) provide high degrees of protection through risk reduction. Both alternatives help to control migration of landfill gas, the potential inhalation of landfill gases, reduction or minimization of surface water infiltration to reduce leachate production and

subsequent migration into the regional aquifer, and the potential exposure and direct contact with the waste material.

Compliance with ARARs

Federal and State ARARs are listed in Appendix A (Tables A-3 and A-4) of the Feasibility Study Report and are provided as Attachments 2 and 3 of this ROD. ARARs are addressed in three categories: chemical-specific, action-specific, and location-specific. Alternative 1 (the No Action alternative) does not satisfy any of the federal and state ARARs identified for this site.

Chemical-Specific ARARs: Alternatives 7 and 8 will comply with applicable or relevant and appropriate requirements under state law and the Clean Air Act limiting emissions of landfill gases. Landfill gas that is vented to the air will be destroyed or treated with carbon adsorption to meet these limits.

Action-Specific ARARs: Alternative 7 satisfies federal Subtitle D and state closure requirements of a two foot soil cover with a maximum permeability of 1×10^{-7}. Alternative 8 requires a RCRA Subtitle C cap. Both capping alternatives will comply with OAC 3745-27-11, which requires, among other things, that a landfill cap have a minimum slope of five percent and a maximum slope of twenty-five percent or some alternate slope based on stability analyses. Because of the topography of the landfill, stability analyses will have to be conducted pursuant to OAC 3745-27-11(G)(1)(c) to establish alternate slope requirements for portions of the cap which do not allow for a slope between five and twenty-five percent.

Though this alternative does satisfy federal and state closure requirements, results of the RI indicate that Alternative 8's level of protection is not necessary, because the wastes in the landfill contain low levels of hazardous constituents. No hot spots of hazardous wastes or constituents were identified in the landfill.

Alternatives 7 and 8 will meet state ARARs for operation of a gas collection system.

Location-Specific ARARs: No location-specific ARARs were identified for the alternatives presented.

Long-Term Effectiveness and Permanence

Alternative 1 is not considered effective or permanent. The two capping alternatives (Alternatives 7 and 8) are considered effective in the long term and provide a permanent remedy for the site by containing the landfill contents and preventing the migration of landfill gases and infiltration of precipitation

through the landfill. Given the characteristics of the site, primarily the low levels of contamination and the absence of a defined ground water plume, no significant difference in the ability of the single barrier cover versus the composite barrier cover to protect public health and the environment over the long term was identified.

Reduction of Contaminant Mobility, Toxicity, and Volume (TMV) Through Treatment

Neither alternative 7 nor 8 reduces the toxicity or volume of the landfill contents since treatment of the waste material does not occur. The No Action alternative would not reduce the TMV of the chemicals of concern identified for the site. Both capping alternatives would reduce the TMV of the principal threat, the landfill gases, through installation of a gas extraction system and thermal destruction or carbon adsorption of the generated gases.

Short-Term Effectiveness

Alternatives 7 and 8 are expected to be effective in the short term, since the alternatives could be implemented in less than two years. These alternatives would begin to reduce or minimize landfill gas migration and infiltration through the waste material immediately upon implementation. Both alternatives will increase short-term exposure of human and environmental receptors to contaminants which may be released through vaporization, surface runoff, or fugitive dust emissions as a result of remediation activities. Measures necessary to minimize these impacts during remediation activities will be incorporated into these alternatives.

Implementability

Both capping alternatives can be implemented using established technology. The two capping alternatives are easy to implement using available equipment and technologies.

Cost

The No Action alternative would not entail any cost at the present time, but may result in the need for very costly remediation in the future. Capital and annual operation and maintenance costs increase from Alternatives 7 and 8 due to the increase in complexity of these alternatives. Total costs for the two capping alternatives range from $8,145,300 in Alternative 7 (single barrier/gas controls) to $9,516,600 in Alternative 8 (composite barrier/gas controls).

State Acceptance

The State of Ohio supports the preferred alternative as stated in this Record of Decision.

Community Acceptance

Community acceptance of the alternatives has been evaluated after the public comment period ended and is described in the Responsiveness Summary section of this Record of Decision. Responses to all public comments are also contained in the Responsiveness Summary. If evaluation of the ground water remedial alternatives is triggered by the results of the SSI, a public meeting and public comment period will be held.

IX. Selected Remedy

The selected alternative, detailed description

The selected alternative at the Sanitary Landfill Company (IWD) site is Alternative 7, which involves the following:

- Solid Waste Landfill Cap
- On-site Subsurface Gas Controls
- Surface Water Run-off Controls
- Long-term Monitoring
- Institutional Controls
- Supplemental Site Investigation concerning Ground Water

Also included with this remedy is:

- Possible Future Ground Water Remediation

Details on each component of the alternative are given below.

Solid Waste Cap

This alternative involves leaving the waste material in place and covering the entire landfill area with a solid waste landfill cap. The purpose of the cap is to minimize human and animal contact with the landfill material, minimize leachate generation by controlling infiltration of precipitation through the landfilled material and controlling erosion. Based on available site data, a solid waste cap is preferred over a cap with a geomembrane because, it is equally protective of human health and the environment, and less costly to construct, inspect and maintain.

A solid waste cap (Figure 3) consists of a vegetated top cover, a middle drainage layer, a low permeability layer, and subgrade bedding layer. The clay material constituting the low permeability layer must not exceed 10^{-7} cm/sec permeability.

This design for a solid waste landfill cap is specified by the Ohio Administrative Code (OAC) 3745-27-11. All solid waste landfills in Ohio closed after April, 1990 must be closed in accordance with this regulation. The vegetated layer will have a minimum thickness of two feet and consist of fertile topsoil that can support vegetation. A well-mixed cover of grasses and legumes such as Kentucky bluegrass, clover, and red top will provide a dense root system to anchor the soil and minimize wind and water erosion and protect the soil barrier from damage due to root penetration and frost. The granular drainage layer is located directly below the vegetated top layer and is at least 1 foot thick, with a minimum permeability of 10^{-3} cm/sec (sand). The low permeability layer will consist of a low permeability soil layer (clay) at least 2 feet thick. This low permeability clay layer minimizes the amount of infiltration to the capped material. The bedding or sand subgrade layer will consist of compacted select native soils, one to two foot thick.

Post closure care for the cap will continue for a minimum of 30 years after the closure date as outlined in OAC 3745-27-14. Post closure care involves surface water management, ground water monitoring, maintenance of the gas system, regular inspections of the cap for erosion, subsidence, and/or settlement, and periodic maintenance such as repair of any erosion damage to the cap or any of the drainage channels from surface water runoff. The maintenance program will be developed in a site Operations and Maintenance Plan as part of the remedial design/action.

Subsurface Gas Controls

The subsurface gas controls/management system are to be integrated with the solid waste cap outlined above. These controls will collect subsurface gases through an active pumping system from gas extraction wells. The property boundary and/or fence line will be the compliance point for ambient air related standards. The gas management system will consist of approximately thirty (30) new active gas wells. The actual location of the gas wells will be determined during the design phase of the project. Higher gas concentrations and proximity to residential/commercial development will be design considerations. During the design phase, it may be determined that additional subsurface gas controls are necessary to be protective of human health and the environment. These additional subsurface gas controls would consist of a series of collection trenches along the eastern/northeastern boundary of the site. The trenches will be passively vented or connected to a main header and blower system for active extraction.

The existing passive gas system will be removed during construction of the new solid waste cap and active gas well management system. The collected gases will be destroyed or treated through the use of thermal flares or carbon adsorption.

If determined to be economically and technically feasible, the collected gases can be sold to a local utility.

Surface Water Run-off Controls

Surface water run-off controls will include site grading, diversion berms, stormwater drainage channels, collection systems, and energy dissipation controls. The design of the surface water run-off controls will be consistent with and incorporated into the solid waste cap and active gas management system mentioned above.

Monitoring

Long-term monitoring will be conducted for landfill gas emissions and ground water. Monitoring will also consist of water level measurements at ground water monitoring wells and the leachate head wells which are currently drilled into the landfill. The monitoring system for gas emissions will be incorporated into the new gas management system and be designed in conjunction with the capping phase of the project. As a base, the post-closure, long-term ground water monitoring program will incorporate thirteen (13) of the existing wells present at the site and two (2) new wells (Figure 4). The number of monitoring wells may change depending on changing site conditions or other design considerations. Monitoring (which includes water level measurements of monitoring wells and the leachate head wells) would commence after the cover system has been in place and be conducted quarterly for the first two (2) years, semi-annually for an additional thirteen (13) years, and then annually for the remaining fifteen (15) years for a total of thirty (30) years. The monitoring portion of the preferred alternative will be carried out independent of the outcome of the SSI.

Extensive monitoring of all media will be required during the remedial design and remedial construction.

Institutional Controls

This remedy includes institutional controls to limit future use of the site. This includes all areas covered by the cap, surface run-off areas and the gas management system, etc. The restrictions must prevent the use of this site for any activity which will interfere with the performance of the remedy, or which will result in the exposure of contaminants to humans or the environment. Such activities include residential or recreational use, excavation, or construction of wells. U.S. EPA will seek to prevent all individuals from traversing the cap, once completed, so that the cap will not be damaged. Access restrictions, deed restrictions, and land use restrictions are all institutional controls to be used to control use of this site.

The site fence (and warning signs) will be completed, which will restrict access. In order to complete the site fence, at least one business will have to be scaled back and partially relocated. Deed restrictions from the site owner(s) will be obtained as a means to impose these limitations on the use of the property.

In the event that institutional controls cannot be implemented effectively, the U.S. EPA will consider additional actions as necessary to ensure that the remedy remains effective for a long-term basis.

Supplemental Site Investigation

The Supplemental Site Investigation (SSI) will involve the installation of two additional monitoring wells. These wells will be installed during the design of the cap and gas extraction system. The purpose of the SSI will be to further define the flow gradients at the southern end of the landfill and attempt to determine if the chemical contamination detected at the MW-9 cluster is coming from the landfill.

The scope of the initial SSI (phase I) will include the placement of a new intermediate well (MW-10I) and a new mid-zone well (MW-10M) to the southeast of the landfill near the intersection of Lance Drive and Cardington Road. The collection of monthly water level measurements and the collection of quarterly ground water samples for chemical analysis will be used to evaluate the subsurface conditions at the southern end of the landfill. This monitoring will continue for a period of up to one year. Ground water samples collected for analysis (full CLP scan) will be from the newly installed MW-10 wells and the existing MW-9 wells. The collection of monthly water level measurements will be from all existing monitoring wells and will commence when the new MW-10 wells are installed.

If the results of the SSI indicate that the presence of chemical contamination can be attributed to the landfill then a second phase of the SSI will be initiated to define the vertical and horizontal extent of the plume. Phase two of the SSI, if necessary, will involve the installation of additional ground water monitoring wells and/or other hydrogeologic investigative measures and will continue until the contaminated plume has been delineated. Documents will be created that present the results of both phases of the SSI.

Evaluation of SSI

The U.S. EPA and Ohio EPA will conduct an evaluation of the Phase I and Phase II SSI. As part of this evaluation Alternative 10, Natural Attenuation and Alternative 11, Ground Water Extraction and Treatment will be examined. This evaluation will be based on

the remedy selection criteria as defined in the NCP. This evaluation may involve modeling to illustrate the effects of natural attenuation versus active extraction on contaminant levels, time estimates demonstrating natural attenuation versus active extraction, and costs associated with each alternative.

Field work related to Phase I and II SSI must be completed prior to an evaluation of either Alternatives 10 or 11.

Ground Water Treatment

The implementation of a ground water remedial action assumes that Phase I and II of the SSI are complete, a ground water plume has originated from the site and that ground water remediation is an appropriate response action. Further evaluations will be required of Alternative 11 (Ground Water Extraction and Treatment) so that a comparison can be made to Alternative 10. This comparison will be conducted or directed by the Agencies as part of the Evaluation of SSI mentioned above. Discharge options for the treated ground water will also be a part of this evaluation. The treated ground water would be required to meet ARARs. The goal of any ground water action will be to restore the resource to its beneficial use, which, in the Great Miami River Buried Valley Aquifer System, is drinking water.

Summary

The U.S. EPA and Ohio EPA prefer Alternative 7 for the remediation of the Sanitary Landfill (IWD) site. Also included with this alternative is a Supplemental Site Investigation (SSI). The Agencies may at a later time, depending on the results of the SSI and/or the long term monitoring program re-evaluate the possibility of groundwater remediation. Alternative 7 involves the construction of a solid waste landfill cap, on-site subsurface gas controls, surface water run-off controls, long term monitoring and institutional controls.

The U.S. EPA, and Ohio EPA, believe that the chosen remedy, as described above, is the best balance of desirable characteristics with respect to the nine criteria. Based on information available at this time, the U.S. EPA and Ohio EPA also believe the chosen remedy offers the best protection of human health and the environment. This remedy also complies with ARARs (e.g. Ohio solid waste regulations), eliminates long-term risks, reduces toxicity, mobility or volume of principal site threats through treatment, is easily implemented and is cost effective.

Cost of the Selected Remedy (does not include SSI or ground water remediation)

Capital Costs: $6,019,400
30 Year O & M Costs: $2,125,900
Present Net Worth Costs: $8,145,300

X. Statutory Determinations

U.S. EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. The following is a brief description of how the selected remedy meets the statutory requirements of Section 121 of CERCLA.

Protection of Human Health and the Environment

The selected remedy provides for protection of human health and the environment by limiting the potential for migration of contaminants off site. This is achieved through capping and subsurface gas controls and, if necessary, ground water remedial action. The implementation of Alternative 7 will place site risk within acceptable risk range for carcinogens and the Hazard Index for non-carcinogens.

The potential for direct exposure of the waste to humans, or release into the environment, will be limited by the physical barrier of the cap, and through deed restrictions, which will limit inappropriate activities on the site.

The selected remedy should not cause any unacceptable short-term risks or cross-media impacts to the environment because only minimal movement of in-place wastes will be necessary.

Compliance with Applicable or Relevant and Appropriate Requirements

Applicable requirements are those cleanup standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal or State environmental or facility siting law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal or State environmental siting law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is

well suited to this particular site. ARARs are divided into chemical specific, action specific, and location specific groups. All ARARs will be met for the selected remedy.

CHEMICAL SPECIFIC ARARs

The selected remedy will achieve fence line compliance with chemical specific ARARs relating to the collection and treatment or flaring of collected landfill gas. Federal and State ARARs relating to air emissions and the quality of ambient air will be met during and after construction of the remedy.

Other ARARs (if deemed necessary) include Maximum Concentration Limits (MCLs) established pursuant to the Safe Drinking Water Act (SDWA), Ambient Water Quality Criteria, and State standards which give concentration limits for drinking water and surface waters. MCLs and State drinking water standards are relevant and appropriate based on the possibility that groundwater beneath the site might eventually be used as a source of drinking water. The other water quality standards and limits will be applicable in the event that treated groundwater will be discharged to infiltration ponds or used in ground water re-injection.

ACTION SPECIFIC ARARs

The cap shall be constructed in accordance with the requirements of Ohio Administrative Code (OAC) 3745-27-11, other Ohio Solid Waste Laws, and with RCRA Subtitle D specific requirements. Most RCRA requirements are administered under the State of Ohio's implementing regulations. Because of the topography of the landfill, stability analyses will have to be conducted pursuant to OAC 3745-27-11(G)(1)(c) to establish alternate slope requirements for portions of the cap which do not allow for a slope between five and twenty-five percent.

The RCRA Land Disposal Restrictions will apply to used carbon, if carbon adsorption is chosen as the means to treat contaminated landfill gas. If needed, discharges from the treatment system will meet Federal and State ARARs relating to discharges of contaminants.

LOCATION SPECIFIC ARARs

No location-specific ARARs have been identified for the selected remedy.

Cost Effectiveness

The U.S. EPA and the State of Ohio believe that the selected remedy is cost-effective in mitigating the risks posed by the site contaminants within a reasonable period of time. Section 300.430(f)(ii)(D) of the NCP requires U.S. EPA to evaluate cost-

effectiveness by comparing all the alternatives which meet the threshold criterion; protection of human health and the environment, against three additional balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility or volume through treatment; and short term effectiveness. The selected remedy provides the best overall balance of these criteria and provides for overall effectiveness in proportion to the cost. The additional costs of the SSI and

potential ground water remediation are not included in the figures list below. The estimated cost of the selected remedy (Alternative 7 only) is:

Capital Costs: $6,019,400
30 Year O & M Costs: $2,125,900
Present Net Worth Costs: $8,145,300

Utilization of Permanent Solutions and Alternative Treatment (or resource recovery) Technologies to the Maximum Extent Practicable

U.S. EPA and the State of Ohio believe that the selected remedy represents the maximum extent to which permanent solutions can be utilized in a cost effective manner to address the potential migration of contaminants away from the Sanitary Landfill site. The selected remedy provides the best balance of tradeoffs in terms of long-term effectiveness or permanence; reduction of toxicity, mobility or volume through treatment; short term effectiveness; implementability; cost; and State and community acceptance. The criterion of long-term effectiveness and permanence is addressed by the installation of a solid waste cap and a gas extraction system.

Based on the results of the RI/FS, it can not be determined if a pump and treat ground water extraction system is warranted at this time. If the results of the SSI and/or other future analytical results indicate the presence of a plume of contaminants emanating from the site, the groundwater portion of the remedy may be re-evaluated. Ground water remediation, if needed, will provide a permanent solution for contaminated ground water.

If feasible, the selected remedy may utilize resource recovery technologies by collecting and selling usable landfill gas.

Preference for Treatment as a Principal Element

The selected remedy satisfies, in part, the statutory preference for treatment as a principal element. On-site subsurface gas controls will be utilized to collect and treat contaminated landfill gases. However, selling the collected gas to a utility company is also an option. Not all of the waste materials on the site will be treated; the majority of wastes will be contained.

XI. Documentation of Significant Changes

The Proposed Plan for this remedial action was released for public comment on March 29, 1993. The Proposed Plan identified Alternative 7, combined with the Supplemental Site Investigation, as the preferred alternative. The Proposed Plan also included the possibility of future ground water remediation. No significant changes have been made since the release of the Proposed Plan.

Responsiveness Summary for the Record of Decision

This responsiveness summary has been developed to document community involvement and concerns which occurred during the Remedial Investigation/Feasibility Study and proposed plan phases of the Sanitary Landfill Company (IWD) Superfund Site process and to respond to comments received during the public comment period. Public comments for the Sanitary Landfill site were received by the United States Environmental Protection Agency (U.S. EPA) at a public meeting on April 14, 1993 and through the Region V Chicago office until April 30, 1993. All of the comments received are to be considered prior to U.S. EPA's final decision embodied in the Record of Decision (ROD) for a site.

I. Overview

Based on the findings of the remedial investigation and feasibility study, the U.S. EPA and Ohio Environmental Protection Agency (Ohio EPA) recommended in a Proposed Plan; institutional controls, long-term monitoring, surface water run-off controls, on-sight subsurface gas controls, solid waste landfill cap and a supplemental site investigation. This Proposed Plan generally received approval from those who commented during the public meeting and the 30-day comment period.

The responsiveness summary contains the following sections:

- Background on Community Involvement
- Summary of Public Comments and Lead Agency Response
- Remaining Concerns

II. Background on Community Involvement

The U.S. EPA and Ohio EPA conducted community relations activities throughout the Remedial Investigation and Feasibility Study (RI/FS) process to provide interested citizens and officials information about progress at the site.

The first public meeting occurred May 24, 1989. At this time the U.S. EPA and Ohio EPA discussed with the community the Sanitary Landfill site and the Superfund program. Corresponding with this public meeting, a summary fact sheet providing background information about the site was distributed. Discussions centered around the remedial investigation which began in the summer of 1989.

A Community Update (September 1990) fact sheet and two public meetings were held to discuss on-site investigation activities. Of particular interest to the community was the activity referred

to as intrusive drilling. These meetings were well attended by the community with health and safety concerns being the primary issue.

Summary fact sheets describing the results of the RI were distributed in April 1992. A fact sheet about the FS and Proposed Plan was released in March 1993. The RI and FS reports and Proposed Plan were released to the public in March 1993. These documents were made available to the public for review and copying in the administrative record maintained at the U.S. EPA offices in Region V and in the City of Moraine Library. Consistent with Section 113 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the administrative record includes all documents such as work plans, data analyses, public comments, transcripts, and other relevant information used in developing remedial alternatives for a site.

To encourage public participation in the remedy selection process consistent with Section 117 of CERCLA, the U.S. EPA set a 30-day public comment period from March 31, 1993 through April 30, 1993 for the Proposed Plan. A formal public hearing was held on April 14, 1993, to accept verbal public comments on the Proposed Plan. Interested parties were given the opportunity to make comments on the alternatives presented in the Proposed Plan and elaborated upon in the FS.

III. Summary of Public Comments Received and Lead Agency Response

Comments 1 through 6 were raised as either oral or written comments at the April 1993 public meeting or as written comments received in the Region V Chicago office:

1. Comment: Alternative 8, which includes a synthetic liner, is arguably superior to Alternative 7. The additional expense is not an issue. The Potentially Responsible Parties should bear these costs.

Incorporating a synthetic liner into a cap system is arguably superior to a cap system without the liner. However, after the U.S. EPA and Ohio EPA evaluated the data concerning the contents of the landfill, it was felt that cost is a very relevant issue. The addition of a synthetic liner will not give any more appreciable protection than just a clay liner. The added cost is not justified when comparing the difference in protection to human health and the environment between these two alternatives.

The Potentially Responsible Parties ultimately will bear the entire cost, regardless of the alternative.

2. Comment: Alternative 10 for the cleanup of groundwater should be rejected because it is as unacceptable as #1, No Action. The fact that it costs the least is, once again, not the point. Why wait for a plume of contamination? Act with foresight, not hindsight.

At this time, Alternative 10 is not being selected as a remedy for this site. The ground water alternatives will be evaluated for future considerations only. The U.S. EPA and Ohio EPA have determined that additional work related to ground water needs to occur at the site. Therefore, as part of the selected remedy, a supplemental site investigation (SSI) will be implemented to determine whether a site-related contaminated ground water plume does exist. If a plume of contamination is found to be emanating from the landfill then the ground water alternatives will be evaluated for appropriateness.

3. Comment: Are these materials (in the landfill) responsible for the death of my first wife, who died of cancer at the age of 29? We resided on W. Bowman Ave. at the time she died in 1954. A next-door woman also died of cancer at the age of 34 or 35 about the same time.

It is very difficult to determine what causes cancer, especially since so many lifestyle factors (such as smoking and occupational exposure to chemicals) have been implicated in cancer cases. Health risk assessments performed at Superfund sites, however, have commonly looked at how the chemical reaches the person (pathways), how much of the of the chemical the person is exposed to, how long the exposure has been, and how carcinogenic the chemical is.

An investigation into the Sanitary Landfill site history tells us that the property was mined for sand and gravel throughout the 1960's. Records indicate that some landfilling activities occurred at the site in the middle to late 1960's. The site was not licensed as a solid waste disposal facility until January 1971. Therefore, it is highly improbable that cancer deaths in 1954 can be correlated to the landfilling activities associated with this site.

4. Comment: Montgomery County Solid Waste Advisory Committee and the Moraine City Council passed a motion in support of Alternative 7 as the selected alternative.

The U.S. EPA acknowledges the Montgomery County Solid Waste Advisory Committee and the Moraine City Council for their support.

5. Comment: An unsolicited contract proposal was submitted as an offer to erase all landfills. The proposal is to use a steam retort to change trash back into its basic elements.

The U.S. EPA acknowledges the receipt of this unsolicited contract proposal. However, the scope of this proposal is outside the parameters that have been established for this site.

6. Comment: I'd like to say with respect to Alternative 7, I see nothing that (is) wrong with it. To me it really does the job well provided that the clay is properly selected and the design is proper. I don't see the worth of the plastic blanket in addition to it.

The U.S. EPA acknowledges this comment.

Comments 7 through 27 were submitted by the Cardington Road Coalition (the PRPs) over the signature of Steven M. Jawetz (letter dated April 30, 1993). Because most of these comments are lengthy and tend to overlap with regard to subject, they have been summarized in this responsiveness summary. The complete comments can be found in the administrative record for the Sanitary Landfill Company (IWD) site.

7. Comment: Alternative 7 Fully Addresses Potential Site Risks Over the Long Term and Meets ARARs

There still remains additional work which needs to be performed for ground water. Since Alternative 7, in and by itself, does not fully address <u>all</u> potential site risks over the long term (i.e. ground water), it is incorrect to state this. Future data collected during the supplemental site investigation is designed to answer questions related to ground water.

8. Comment: Alternative 7 Meets ARARs With A 1% Minimum Slope Cover

The U.S. EPA believes that Congress intended that cleanup activities conform to state laws which are implicated by remedial actions. For example, remedial actions occurring in wetlands must presumably comply with state wetland regulations. Similarly, remedial actions occurring on solid waste landfills must, at a minimum, comply with the state solid waste standards.

Both capping alternatives will comply with OAC 3745-27-11, which requires, among other things, that a landfill cap have a minimum slope of five percent and a maximum slope of twenty-five percent or some alternate slope based on stability analyses. Because of the topography of the landfill, stability analyses will have to be conducted pursuant to OAC 3745-27-11(G)(1)(c) to establish alternate slope requirements for portions of the cap which do not allow for a slope between five and twenty-five percent.

Since the Sanitary Landfill has been closed for over 10 years and the initial waste placement began over 20 years ago, most of the waste consolidation and settlement in the waste material has already occurred, thereby making a stability analysis relatively easy to accomplish.

9. Comment: The PRPs think that the Selected Remedy Should Not Include A Groundwater Element, Whether Or Not The Element Is Contingent

Additional work related to the ground water needs to be performed at this site. Until this work is performed and 30 years of ground water monitoring (without a defined plume) has occurred the Agencies are not willing to wholly abandon the ground water issue. Any decision to implement a ground water remedial alternative will be subject to public comment.

Nature and Extent of Contamination

10. Comment: The description in the Proposed Plan stating that the flow gradient of the regional flow system is to the "south/ southwest" is misleading and not consistent with the RI or FS.

The regional flow system was described by Norris and Spieker (1966) and was modeled by Fidler (1975). Those studies indicated that regional flow is to the south. The gradient and flow direction has changed slightly through time, but the general direction of the regional flow system remains toward the southwest. Three wells were completed just above the bedrock, deep in the regional flow system. The flow direction as indicated by water level measurements, in these three wells varies from southwest to south and southeast. On August 27, 1990, the flow direction was to the southeast. Water reaching the aquifer would therefore travel to the southwest at the water table and toward the south or southeast as the water travels deeper within the flow system.

11. Comment: The characterization of the "continuous clay layer to the west of the landfill" in the Proposed Plan is not entirely consistent with the RI.

There were four shallow wells installed on the west side of the landfill. All four of these wells are screened in a clay layer that is relatively at the same depth. The soil borings on the east side of the landfill did not show that same clay layer. The RI indicated that the clay layer is not continuous across the site. This is true for the east/west direction but not true for the north/south direction on the west side of the landfill.

12. Comment: The Proposed Plan refers to a variety of ground water sampling results, without indicating which results were from upgradient wells, and results from the four production wells may mislead the reader by oversimplifying the presentation.

The Proposed Plan is a document that, in part, summarizes the results of the RI and FS. The ROD can incorporate expanded discussions when it is deemed necessary to support the selected remedy. In this case, U.S. EPA directs the PRPs to Section 4.0 of the RI for more information.

13. Comment: The discussion in the Proposed Plan of the surface water and sediment investigation portion of the RI does not sufficiently and accurately present the findings as they relate to the site.

The Proposed Plan is a document that, in part, summarizes the results of the RI and FS. The ROD can incorporate expanded discussions when it is deemed necessary to support the selected remedy. Since surface water and sediments, at this site, are not considered a risk to human health and the environment and are not incorporated into the selected remedy, the U.S. EPA directs the PRPs to Section 4.0 of the RI for more information.

14. Comment: The discussion of the air sampling results does not accurately define the context or the conclusions of the air investigation.

The Proposed Plan is a document that, in part, summarizes the results of the RI and FS. The U.S. EPA, again, directs the PRPs to Section 4.0 of the RI for more information. However, due to the more serious implications of the air results and the significant part that these results play in the selected remedy, the U.S. EPA has expanded the discussion of air sampling results in the ROD.

Baseline Risk Assessment

15. Comment: The reasons for assessing site risks based on a future residential use scenario are contravened by the weight of the data in the record.

The residential exposure scenario results in the highest risk numbers. In this case, the baseline risk assessment assumed that no action was taken on the site, and that the site was used for residential purposes in the future. This evaluation is performed in order to determine what could happen in the future if the site were uncontrolled. This is a standard procedure which has been performed at many Superfund sites, and is considered proper methodology.

16. Comment: The Proposed Plan listed multiple contaminants without specifying the environmental medium in which they were found, and proceeded to make a number of general broad statements.

The U.S. EPA disagrees that many of the statements in the Risk Assessment are "general" or "broad". However, to satisfy this comment, specific media of contamination have been included in the Risk Assessment section. Nevertheless, these types of statements are standard EPA language that is appropriate for this site and have been used at many Superfund sites. The U.S. EPA directs the PRPs to the Baseline Risk Assessment for more information.

17. Comment: Note (1) in both Table 1 and Table 2 of the Proposed Plan incorrectly states that the cancer risks shown represent the number of "expected" lifetime cancer cases for particular exposure routes.

U.S. EPA presents data in a risk assessment as a worst case scenario. This allows for the most protection of human health and the environment and presents to the public the worst potential exposure from the site. By definition, expected, means "to consider likely or certain", "to consider reasonable or due", "to suppose". As the PRPs correctly stated, the numbers in these tables are the upper bound estimates. The tables are not intended to predict specific numbers but demonstrate a risk range for each exposed population. The upper bound is the worst case scenario in this case and is "reasonable" or "likely".

18. Comment: The U.S. EPA's conclusion that actual or threatened releases of hazardous substances from the site may present a current or potential treat to human health, welfare, or the environment is not well supported by the evidence.

U.S. EPA considered the potential threat of future releases as one of the major factors in the selection of the preferred remedy. The evidence of actual releases overwhelmingly favors the selected remedial action. This is demonstrated, in part, by the 10^{-3}, 10^{-4} and 10^{-5} risk numbers for inhalation of volatiles, and from the results of the HELP model that shows up to 4 inches per acre per year of potential leachate is exiting from the base of the landfill. Other major factors were the infiltration and runoff of surface water was uncontrolled, and site monitoring was not established.

Feasibility Study

19. Comment: The PRPs opposed the Proposed Plan Description of Alternative 10.

The Proposed Plan correctly states that: "Based on available information, ground water contamination currently found at the site will naturally attenuate or diminish over time posing no additional risk to the community." Benzene was found at 19 ug/l in the fourth quarter sample from the downgradient well number 4I. This contamination is clearly attributable to the site.

20. Comment: The PRPs opposed the Proposed Plan Definition of the Ground Water Plume.

The U.S. EPA and Ohio EPA believe that the definition of ground water plume, as described, is appropriate for this site. The last ground water samples collected were in November 1990. The sample results taken during the RI provide a base for comparison for all future evaluations of ground water. The detection of contamination over MCL's or risk based numbers on two consecutive scheduled sampling events would be an indication that a release has occurred from the landfill. The PRPs may immediately resample the well(s) in question to verify the results and validity of a particular round of sampling. However, two consecutive detections of contamination over MCL's or risk based numbers is the chosen method to document contamination.

If a release becomes verified, there are established procedures in both the SSI and long term monitoring to determine the extent of contamination. Part of the evaluation of natural attenuation or active restoration will include the magnitude of the release and whether the contamination is increasing or decreasing over time.

21. Comment: The PRPs opposed the Proposed Plan Description of Alternative 11.

The PRPs comments regarding Alternative 11 suggest that performance of a technical evaluation of existing ground water data should be a prerequisite for selection of Alternative 11.

The Agencies will in fact perform such an evaluation prior to selection of a ground water response action. In order to consider selection of Alternative 11 certain assumptions must be made. It must be assumed that the other investigations/options have already been exhausted. As the Proposed Plan (and ROD) states, "this alternative assumes that the SSI is complete, ground water plume is identified at the site, and that ground water extraction and treatment is the appropriate response action." This description clearly defines, up front, the conditions that must be met before this alternative is even

considered. Ground water remediation will not be evaluated if a ground water plume emanating from the landfill has not been identified for this site. And finally, in order to consider a ground water pump and treat scenario, the other ground water options will also have to be evaluated.

Evaluation of Alternatives

22. Comment: The Proposed Plan inappropriately concludes that Alternative 11 would provide the highest level of overall protection.

Each alternative, by design, builds upon the previous alternative. Alternative 7 (a solid waste landfill cap) is more protective than Alternative 1 (no action). This same type of reasoning is used for all alternatives that are considered. Again, it is important to remember that Alternative 11 is based upon the assumptions that are mentioned in comment 21. In the Proposed Plan, the evaluation of "protectiveness", states that Alternative 11 requires further data collection before it can be said to be completely protective of human health and the environment. The ROD does not include any evaluation of ground water remedies. This evaluation will take place if additional data collected confirms the existence of a ground water plume at the site.

23. Comment: The Proposed Plan incorrectly implies that only Alternatives 10 and 11 comply with ground water ARARs and that the description of the State slope requirement is inaccurate.

Before any ground water remedy can be chosen, further data collection, analysis and evaluation would have to occur, including an evaluation of compliance with ground water ARARs.

As a further response, U.S. EPA refers the reader to Comment 8 for more details about the State ARAR on slope requirements.

24. Comment: No evidence exists for the statement in the Proposed Plan that the No Action alternative "may result in the need for very costly remediation in the future."

The evidence used to support the selected remedy as outlined in the ROD can be used to justify the need for a remedy to prevent future, costly remediation.

Description of Preferred Alternative And SSI

25. Comment: The PRPs feel the consequences of the SSI should be clarified.

U.S. EPA agrees that the SSI should be expand upon, and has used the ROD as the means to accomplish this task.

26. Comment: The PRPs believed that no basis exists for a contingency remedy for ground water.

Additional work related to the ground water needs to be performed at this site. Until this work is performed and 30 years of ground water monitoring (without a defined plume) has occurred the Agencies are not willing to wholly abandon the ground water issue.

A well designed monitoring program would serve to verify the effectiveness of remedial actions and trigger additional actions as needed. This ROD allows the U.S. EPA to address future ground water problems, should they arise.

27. Comment: The PRPs think that trigger levels for ground water response action should not be established at this time.

The most appropriate time to establish trigger levels for ground water response action is during the ROD stage of any such ground water response action. U.S. EPA has used the ROD to incorporate expanded discussions in support of the selected remedy. However, the selected remedy does not include any ground water response action, therefore trigger levels have been removed from this ROD.

IV. Remaining Issues

At the public meeting, a resident expressed concern about the landfill gas being collected and treated or collected and burned versus collected and sold to a utility. U.S. EPA responded that the selling of landfill gas is a viable option. However, additional information needs to be obtained regarding the amount of gas available. This information will not be available until the design phase of the project. If selling the landfill gas is both economically and technically possible, the U.S. EPA is willing to support this activity.

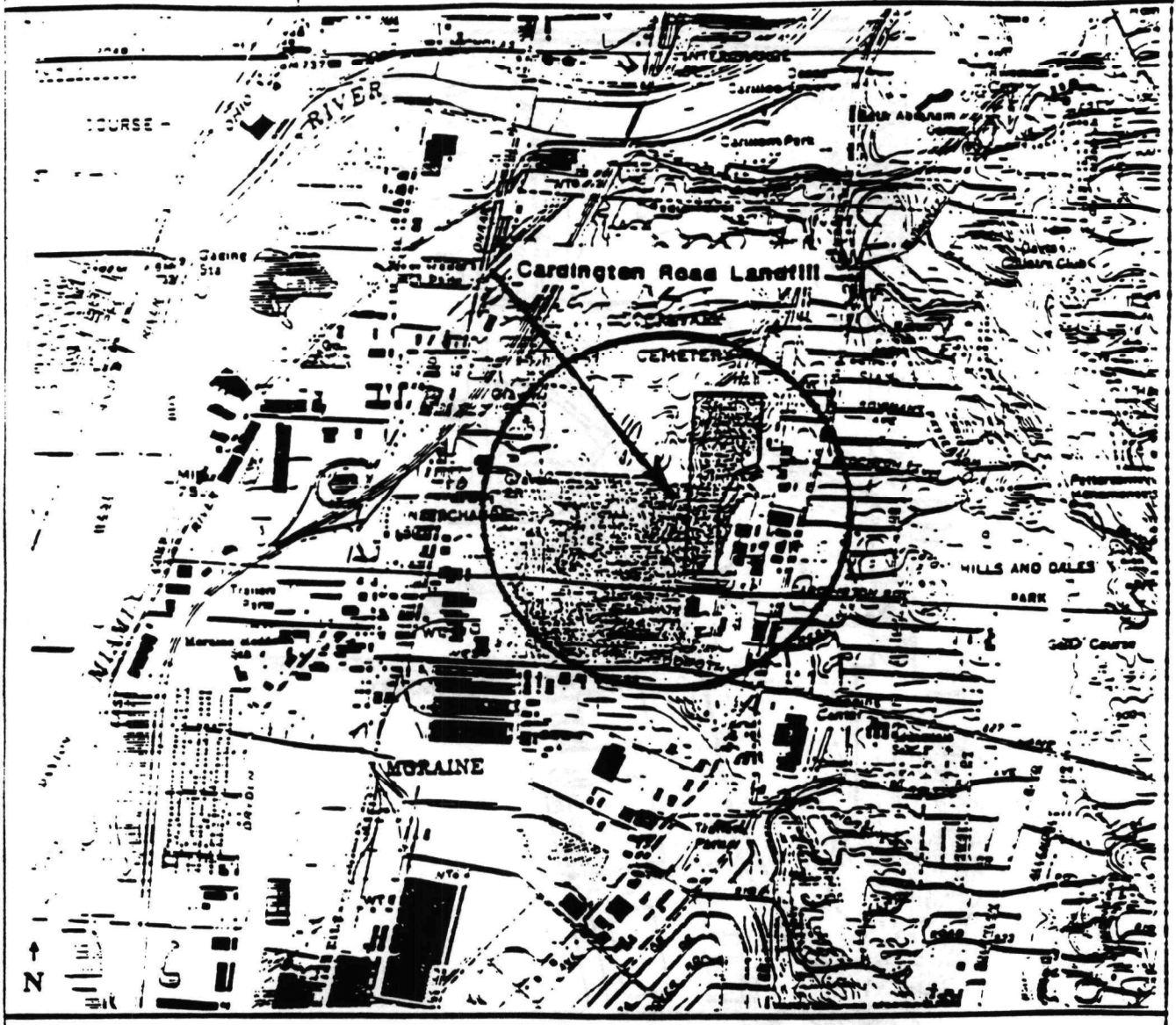
TABLE OF CONTENTS
FIGURES, TABLES AND ATTACHMENTS
SANITARY LANDFILL (IWD) SITE
RECORD OF DECISION

REFERENCED U.S.G.S. MAP

DAYTON SOUTH, OHIO
39084-F2-TF-024

1966
PHOTOREVISED 1981

QUADRANGLE LOCATION



SCALE 1:24000

1 1/2 0 1 MILE

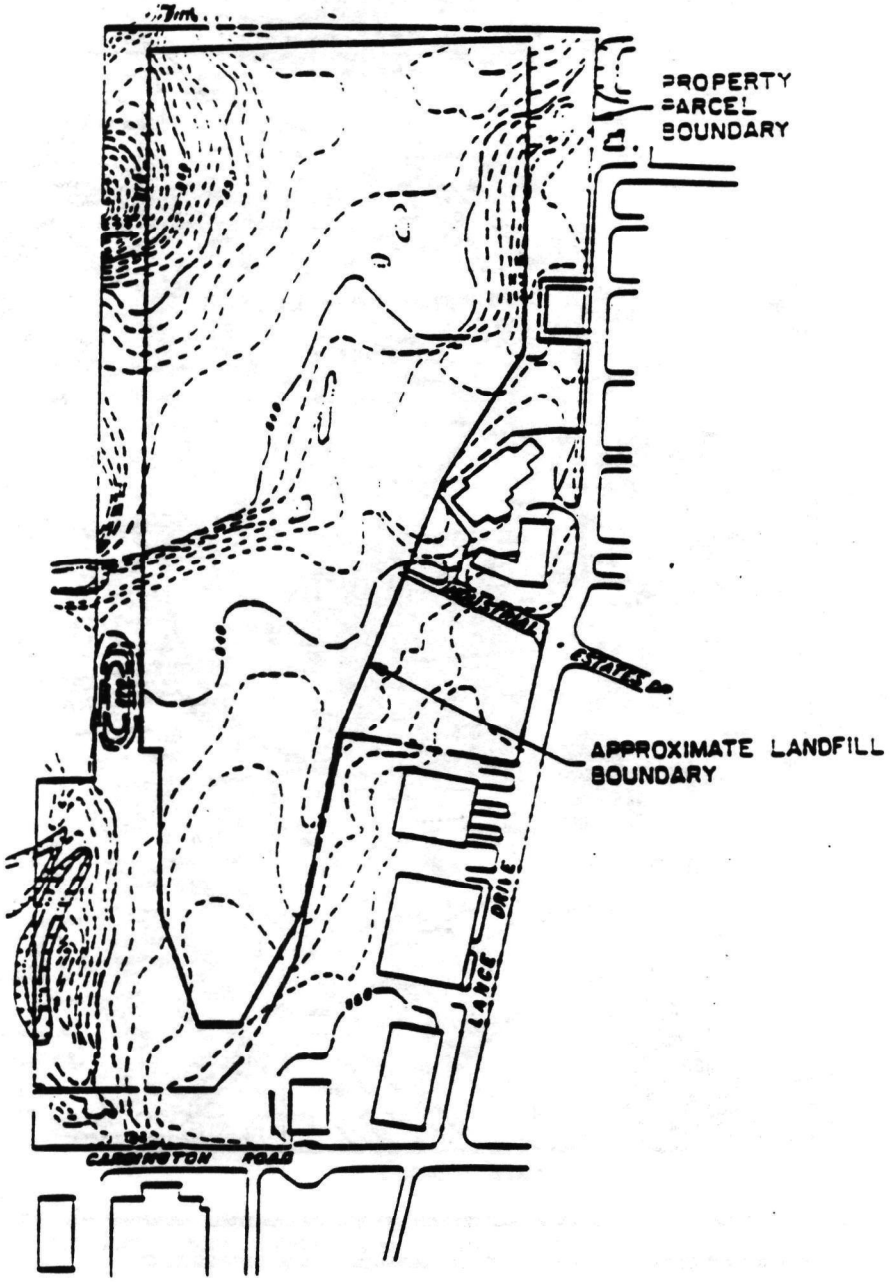
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
MORAINE, OHIO

DRWN	CHKD	APPD
SCALE	N.T.S.	DATE

LOCATION MAP | **FIGURE 1**



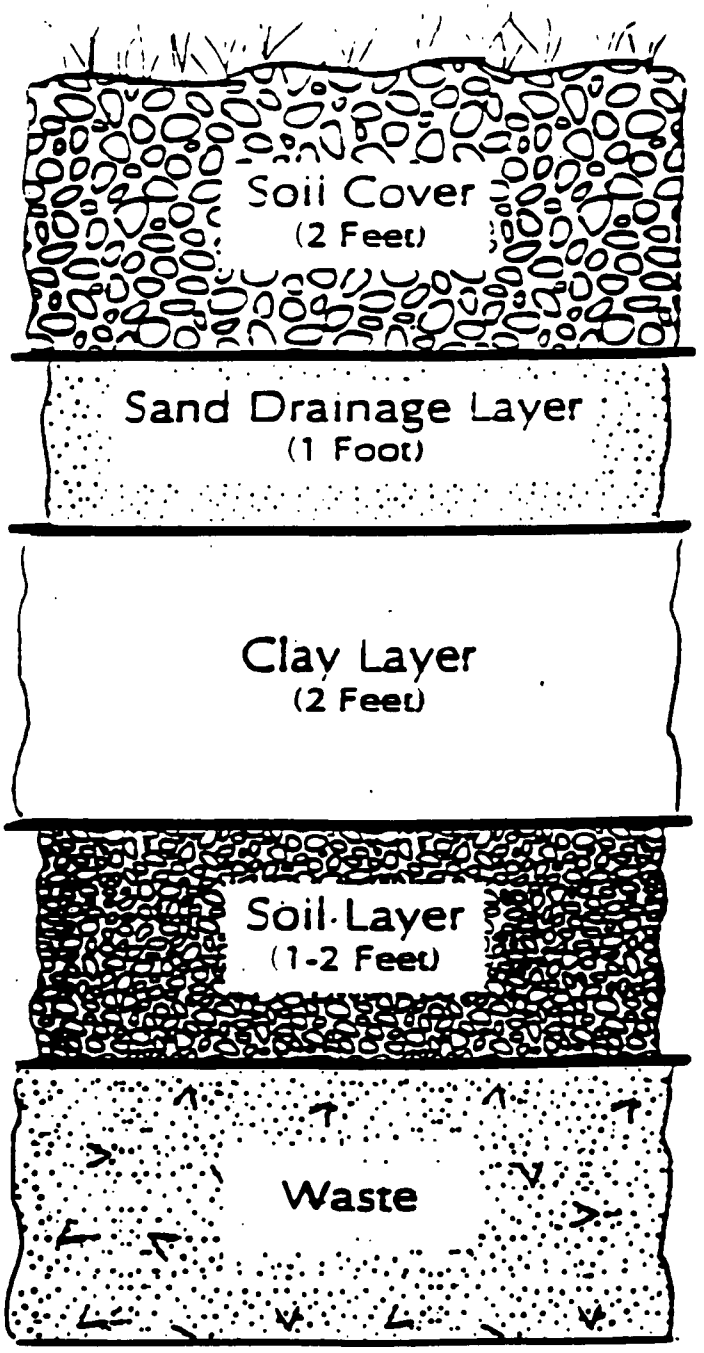
N

Scale: 1" approx. 400'

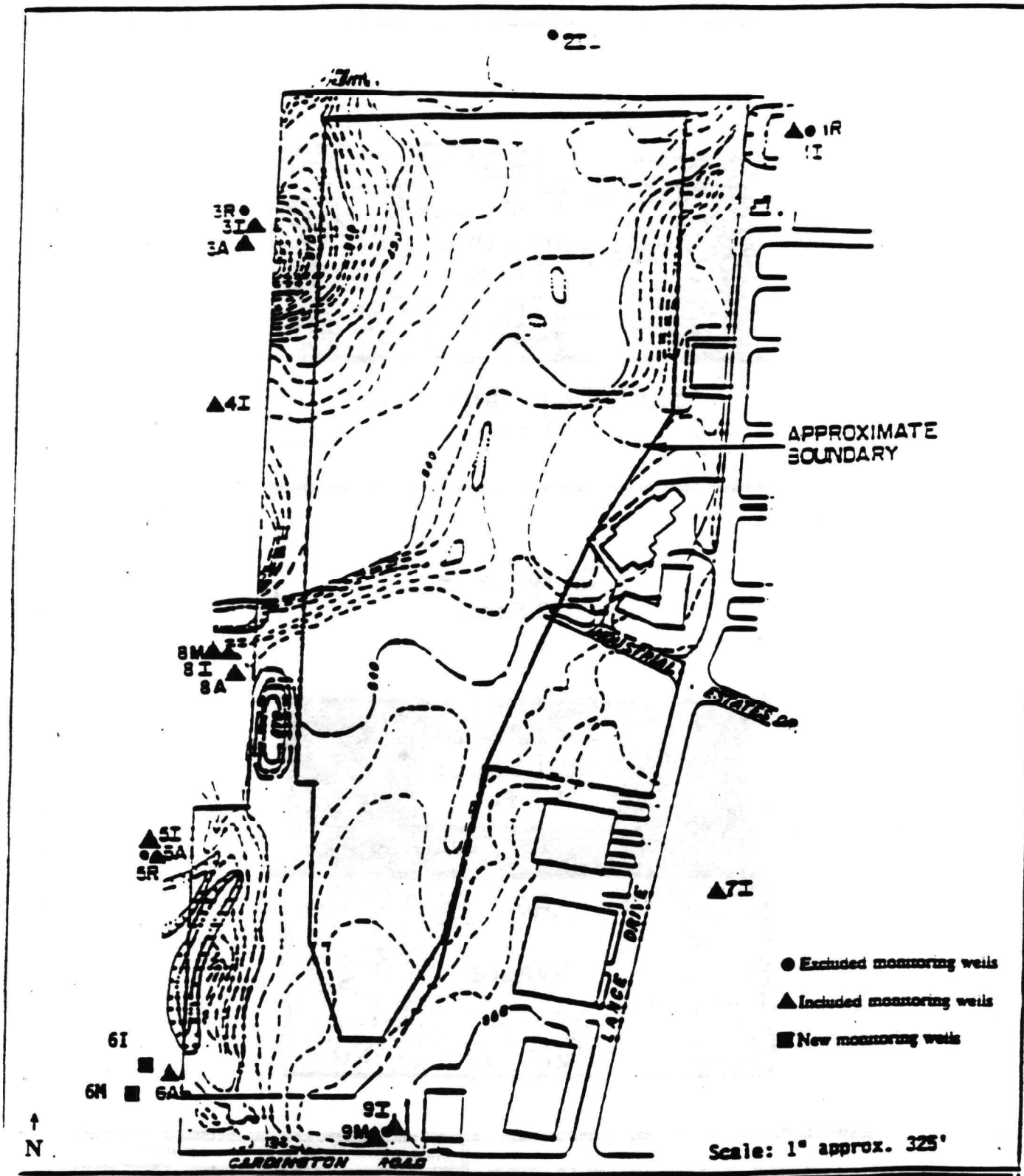
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
MORAINE, OHIO

DRWN	CHKD	APPD
SCALE		DATE

SITE MAP | **FIGURE 2**

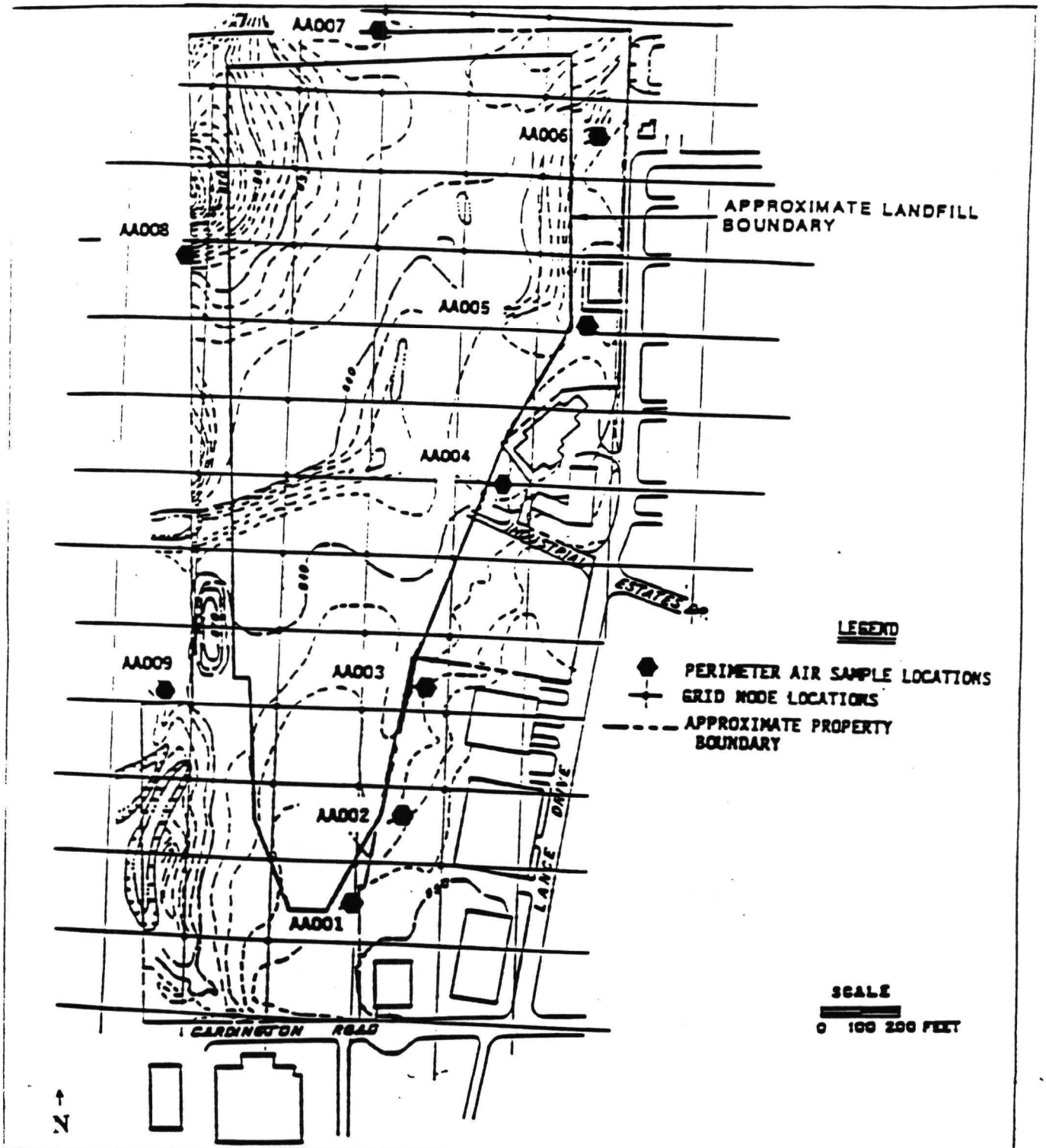


SANITARY LANDFILL COMPANY (IWD) SITE (a.k.a. CARDINGTON ROAD LANDFILL) MORAINE, OHIO	DRWN / CHKD / APPD	
	SCALE: N.T.S.	DATE
	CROSS-SECTION SOLID WASTE CAP	FIGURE 3



SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
MORAINE, OHIO

DRWN	CHKD	APPD
SCALE	-	DATE
LONG-TERM POST-CLOSURE MONITORING NETWORK		FIGURE 4



SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
MORAINE, OHIO

DRWN	CHKD	APPD
SCALE	N.T.S.	DATE

PERIMETER AIR SAMPLE AND GRID MODE LOCATIONS

FIGURE 5

TABLE 1
SUMMARY OF ANALYTICAL RESULTS FOR THE ON-SITE GAS VENT AIR SAMPLES SANITARY LANDFILL COMPANY (IWD) SITE (a.k.a. CARDINGTON ROAD LANDFILL) MORAINE, OHIO

			Field Samples			Blanks		
Compound	Units	SQL*	Max	Min	Frequency	Max	Min	Frequency
Volatile Organics								
Dichlorodifluoromethane	ppbv	80	1500	95	8/10	***	***	0/2
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ppbv	80	130	93	4/10	***	***	0/2
Vinyl Chloride	ppbv	100	6900	190	8/10	***	***	0/2
Bromomethane	ppbv	120	440	440	1/10	***	***	0/2
Chloroethane	ppbv	200	45000	190	9/10	***	***	0/2
Trichlorofluoromethane	ppbv	40	250	54	2/10	***	***	0/2
1,1,2-Trichloro-1,2,2-trifluoroethane	ppbv	80	420	420	1/10	***	***	0/2
Acetone	ppbv	400	510	510	1/10	***	***	0/2
Hexane	ppbv	320	16000	1100	10/10	***	***	0/2
1,1-Dichloroethane	ppbv	100	5100	150	5/10	***	***	0/2
Vinyl acetate	ppbv	100	440	440	1/10	***	***	0/2
1,1-Dichloroethene	ppbv	80	700	220	2/10	***	***	0/2
1,1,1-Trichloroethane	ppbv	80	1400	770	2/10	***	***	0/2
Benzene	ppbv	120	960	470	7/10	***	***	0/2
Trichloroethene	ppbv	100	290	290	1/10	***	***	0/2
4-Methyl-2-pentanone	ppbv	120	180	180	1/10	***	***	0/2
Toluene	ppbv	120	20000	110	9/10	***	***	0/2
Tetrachloroethene	ppbv	120	200	200	1/10	***	***	0/2
2-Hexanone	ppbv	200	4100	360	10/10	***	***	0/2
Chlorobenzene	ppbv	100	480	120	6/10	***	***	0/2
Ethylbenzene	ppbv	100	17000	120	9/10	3.7	3.7	1/2
1,4- and 1,3-(m,p) Xylene	ppbv	200	54000	210	10/10	11	11	1/2
1,2-(o) Xylene	ppbv	80	12000	120	10/10	4.4	4.4	1/2
Benzyl chloride	ppbv	80	21000	250	8/10	10	10	1/2
4-Ethyl toluene	ppbv	160	1400	200	8/10	***	***	0/2
1,3,5-Trimethylbenzene	ppbv	100	950	100	9/10	***	***	0/2
1,2,4-Trimethylbenzene	ppbv	120	1500	250	8/10	***	***	0/2
Methane	% (vol/vol)		61	5.3	10/10	2.4	2.4	1/2

ppbv = Parts per billion by volume

*** = No Max/Min due to no detections

* = Sample Quantitation Limits. The limits listed above are for the field samples only. The quantitation limits for the blanks are a factor of 40 smaller.

TABLE 2
SUMMARY OF RESULTS FROM PERIMETER AIR MONITORING STATIONS
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
MORAINE, OHIO

Compound	Units	SQL*	Field Samples			Snyder Building	Upwind Samples			Blanks		
			Max	Min	Freq.#		Max	Min	Freq.#	Max	Min	Freq.#
Volatile Organics												
Dichlorodifluoromethane	ppbv	2-100	2.2	2.2	3/12	ND	22	2.4	2/6	•••	•••	0/3
Chloromethane	ppbv	2.5-125	•••	•••	0/12	ND	4.3	4.3	1/6	•••	•••	0/3
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ppbv	2-100	•••	•••	0/12	ND	4.9	4.9	1/6	•••	•••	0/3
Trichlorofluoromethane	ppbv	1-50	320	2.1	12/12	22	2000	5.3	5/6	2800	270	2/3
1,1,2-Trichloro-1,2,2-trifluoroethane	ppbv	2-100	37	7.8	3/12	ND	46	3.2	3/6	•••	•••	0/3
Acetone	ppbv	10-500	13	10	4/12	21	15	12	3/6	•••	•••	0/3
Methylene chloride	ppbv	4-200	48	8.3	3/12	60	34	20	2/6	•••	•••	0/3
1,1-Dichloroethene	ppbv	2-100	•••	•••	0/12	9.4	•••	•••	0/6	•••	•••	0/3
2-Butanone	ppbv	3-150	23	3.7	5/12	ND	17	9.6	2/6	•••	•••	0/3
1,1,1-Trichloroethane	ppbv	2-100	3.8	2.8	4/12	7.5	6.6	2.3	4/6	•••	•••	0/3
4-Methyl-2-pentanone	ppbv	3-150	10	7.8	3/12	10	7.7	7.7	1/6	•••	•••	0/3
Toluene	ppbv	3-150	6300	4.8	4/12	6.9	1600	8.9	4/6	3800	3.6	2/3
2-Hexanone	ppbv	5-250	16	16	1/12	ND	12	12	1/6	•••	•••	0/3
Ethylbenzene	ppbv	2.5-125	•••	•••	0/12	ND	6.3	6.3	1/6	•••	•••	0/3
1,4-and 1,3-(p,m) Xylene	ppbv	5-250	7.2	5.4	3/12	7.2	•••	•••	0/6	•••	•••	0/3
Extractable Organics												
1,2-Dichlorobenzene	ppbv	5-250	•••	•••	0/12	6.3	•••	•••	0/6	•••	•••	0/3
Methane	ppbv	NR	28000	2800	11/12	14	97000	2700	6/6	4900	4900	1/3
Fibers	(f/cc)	NR	0.01	0.001B	7/12	NA	0.003A	0.002B	3/6	•••	•••	0/3

B = Below quantification limit (less than 5.5 fibers per 100 fields)
NA = Sample not submitted for analysis
ppbv = Parts per billion by volume
f/cc = Fibers per cubic centimeter
ND = Non-detect
NR = Not reported
* = Sample Quantitation Limits
••• = No Max/Min due to no detections

TABLE 3
SUMMARY OF RESULTS FOR OFF-SITE GAS PROBE SAMPLES**
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
MORAINE, OHIO

Compound	Units	SQL*	Field Samples			Blank		
			Max	Min	Freq.#	Max	Min	Freq.#
Volatile Organics								
Chloromethane	ppbv	2.5-225	250	15	3/11	•••	•••	0/1
Chloroform	ppbv	2-180	12	12	1/11	•••	•••	0/1
Dichlorodifluoromethane	ppbv	2-180	1500	4.2	4/11	•••	•••	0/1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ppbv	2-180	210	16	5/11	•••	•••	0/1
Vinyl Chloride	ppbv	2.5-225	2200	480	2/11	•••	•••	0/1
Chloroethane	ppbv	5-450	1200	620	2/11	•••	•••	0/1
Trichlrofluoromethane	ppbv	1-90	670	1.3	10/11	6.9	6.9	1/1
Acetone	ppbv	10-900	1400	1400	1/11	•••	•••	0/1
Hexane	ppbv	8-720	6700	48	3/11	•••	•••	0/1
1,1-Dichloroethane	ppbv	2.5-225	810	160	2/11	•••	•••	0/1
Vinyl acetate	ppbv	2.5-225	5600	1400	2/11	•••	•••	0/1
trans-1,2-Dichloroethene	ppbv	4-360	57	42	2/11	•••	•••	0/1
1,1-Dichloroethene	ppbv	2-180	480	200	3/11	•••	•••	0/1
1,1,1-Trichloroethane	ppbv	2-180	210	2.4	9/11	2.7	2.7	1/1
Benzene	ppbv	3-270	34	23	2/11	•••	•••	0/1
Trichloroethene	ppbv	2.5-225	58	23	2/11	•••	•••	0/1
Tetrachloroethene	ppbv	3-270	320	4	5/11	•••	•••	0/1
2-Hexanone	ppbv	5-450	2100	560	2/11	•••	•••	0/1
2-Butanone	ppbv	3-270	180	180	1/11	•••	•••	0/1
Methane	%(vol/vol)	NR	43	230@	11/11	9@	9@	1/1

@ = Results in ppm (vol/vol)
# = Frequency
* = Sample Quantitation Limits
** = Samples are adjacent to Lance Drive buildings
••• = No Max/Min due to no detections
NR = Not reported

TABLE 4
SUMMARY OF SELECTION OF CHEMICAL OF CONCERN
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
MORAINE, OHIO

Compound	Media Detected	Chemical of Concern	Reasons for Elimination
INORGANICS			
Aluminum	surface soil	No	A
	seep water	No	A
	surface water	No	A
	seep sediment	No	A
	surface sediment	No	A
	ground water (T)	No	A
	leachate	Yes	
Antimony	surface soil	No	A
	seep water	Yes	
	seep sediment	No	A
	surface sediment	Yes	
	ground water (T)	Yes	
	leachate	Yes	
Arsenic	surface soil	No	A
	seep water	No	A
	surface water	Yes	
	seep sediment	No	A
	surface sediment	No	A
	ground water (T)	Yes	
	leachate	Yes	
Barium	surface soil	No	A
	seep water	No	A
	surface water	No	A
	seep sediment	No	A
	surface sediment	Yes	
	ground water (T)	Yes	
	production wells	Yes	
	leachate	Yes	
Beryllium	seep water	Yes	
	ground water (T)	No	A
	leachate	Yes	
Cadmium	seep water	No	A
	seep sediment	No	A
	ground water (T)	No	A
	leachate	Yes	

A – Background; B – Frequency of detect; C – Essential human nutrient; D – Blanks

TABLE 4 (continued)
SUMMARY OF SELECTION OF CHEMICAL OF CONCERN

Compound	Media Detected	Chemical of Concern	Reasons for Elimination
Calcium	surface soil	No	A,C
	seep water	No	C
	surface water	No	A,C
	seep sediment	No	A,C
	surface sediment	No	A,C
	ground water (T)	No	C
	production wells	No	C
	leachate	No	C
Chromium	surface soil	No	A
	seep water	No	A
	seep sediment	No	A
	surface sediment	No	A
	ground water (T)	Yes	
	leachate	Yes	
Cobalt	surface soil	No	A
	seep water	Yes	
	seep sediment	No	A
	surface sediment	Yes	
	ground water (T)	No	A
	leachate	Yes	
Copper	surface soil	No	A,C
	seep water	No	C
	surface water	No	A,C
	seep sediment	No	A,C
	surface sediment	No	C
	ground water (T)	No	A,C
	production wells	No	A,C
	leachate	No	C
Cyanide	ground water (T)	Yes	
	leachate	No	D
Iron	surface soil	No	A,C
	seep water	No	A,C
	surface water	No	C
	seep sediment	No	A,C
	surface sediment	No	C
	ground water (T)	No	C
	production wells	No	A,C
	leachate	No	C

A - Background; B - Frequency of detection; C - [illegible]

TABLE 4 (continued)
SUMMARY OF SELECTION OF CHEMICAL OF CONCERN

Compound	Media Detected	Chemical of Concern	Reasons for Elimination
Lead	surface soil	No	A
	seep water	Yes	
	surface water	No	A
	seep sediment	No	A
	surface sediment	No	A
	ground water (T)	Yes	
	production wells	Yes	
	leachate	Yes	
Magnesium	surface soil	No	A,C
	seep water	No	C
	surface water	No	A,C
	seep sediment	No	A,C
	surface sediment	No	C
	ground water (T)	No	C
	production wells	No	C
	leachate	No	C
Manganese	surface soil	No	A,C
	seep water	No	A,C
	surface water	No	C
	seep sediment	No	A,C
	surface sediment	No	C
	ground water (T)	No	C
	production wells	No	A,C
	leachate	No	C
Mercury	seep water	No	A
	seep sediment	No	A
	surface sediment	Yes	
	ground water (T)	No	A
	leachate	Yes	
Nickel	surface soil	No	A
	seep water	No	A
	seep sediment	No	A
	surface sediment	Yes	
	ground water (T)	No	A
	leachate	Yes	

A – Background; B – Frequency of detect; C – Essential human nutrient; D – Blanks

TABLE 4 (continued)
SUMMARY OF SELECTION OF CHEMICAL OF CONCERN

Compound	Media Detected	Chemical of Concern	Reasons for Elimination
Potassium	surface soil	No	A,C
	seep water	No	C
	seep sediment	No	A,C
	surface sediment	No	C
	ground water (T)	No	C
	production wells	No	C
	leachate	No	C
Selenium	surface sediment	No	A,C
Silver	seep water	Yes	
	surface sediment	Yes	
Sodium	surface soil	No	A,C
	seep water	No	C
	surface water	No	A,C
	seep sediment	No	A,C
	surface sediment	No	C
	ground water (T)	No	A,C
	production wells	No	C
	leachate	No	C
Vanadium	surface soil	No	A
	seep water	Yes	
	surface water	Yes	
	seep sediment	No	A
	surface sediment	No	A
	ground water (T)	No	A
	leachate	Yes	
Zinc	surface soil	No	A,C
	seep water	No	A,C
	surface water	No	A,C
	seep sediment	No	A,C
	surface sediment	No	A,C
	ground water (T)	No	C,D
	production wells	No	A,C
	leachate	No	C
ORGANICS			
Acenaphthene	surface sediment	No	A,B
	leachate	Yes	
Acenaphthylene	surface sediment	No	B

A – Background; B – Frequency of detect; C – Essential human nutrient; D – Blanks

TABLE 4 (continued)
SUMMARY OF SELECTION OF CHEMICAL OF CONCERN

Compound	Media Detected	Chemical of Concern	Reasons for Elimination
Acetone	perimeter air	Yes	
	gas vent	Yes	
	off-site soil gas	Yes	
	ground water	No	B,D
	leachate	Yes	
	indoor air	Yes	
Anthracene	surface sediment	No	A,B
	leachate	Yes	
Benzene	gas vent	Yes	
	off-site soil gas	Yes	
	ground water	Yes	
	leachate	Yes	
Benzo(a)anthracene	surface soil	No	A,B
	surface sediment	No	A
	leachate	Yes	
Benzo(a)pyrene	surface soil	No	A,B
	surface sediment	No	A
	leachate	Yes	
Benzo(b)fluroanthene	surface soil	No	A,B
	surface sediment	No	A
	leachate	Yes	
Benzo(ghi)perylene	surface soil	No	A,B
	surface sediment	No	A
	leachate	Yes	
Benzo(k)fluroanthene	surface soil	No	A,B
	surface sediment	No	A
	leachate	Yes	
Benzoic acid	leachate	Yes	
	surface sediment	Yes	
Benzyl alcohol	leachate	Yes	
Benzyl chloride	gas vent	Yes	
bis(2-Ethylhexyl)phthalate	surface soil	Yes	
	surface sediment	Yes	
	ground water	No	D
	leachate	Yes	
Bromomethane	gas vent	Yes	

A – Background; B – Frequency of detect; C – Essential human nutrient; D – Blanks

TABLE 4 (continued)
SUMMARY OF SELECTION OF CHEMICAL OF CONCERN

Compound	Media Detected	Chemical of Concern	Reasons for Elimination
2-Butanone	perimeter air	Yes	
	surface sediment	Yes	
	off-site soil gas	Yes	
	leachate	Yes	
Butylbenzylphthalate	surface sediment	Yes	
	leachate	Yes	
Carbon disulfide	ground water	No	D
Chlorobenzene	gas vent	Yes	
	leachate	Yes	
Chloroethane	gas vent	Yes	
	off-site soil gas	Yes	
	ground water	No	B
	leachate	Yes	
Chloroform	seep sediment	Yes	
	surface sediment	Yes	
	off-site soil gas	Yes	
Chloromethane	off-site soil gas	Yes	
Chrysene	surface soil	No	A,B
	surface sediment	No	A
	leachate	Yes	
Dibenzo(ah)anthracene	surface soil	No	A,B
	surface sediment	No	A
Dibenzofuran	surface sediment	No	A,B
	leachate	Yes	
1,2-Dichlorobenzene	indoor air	Yes	
1,4-Dichlorobenzene	leachate	Yes	
Dichlorodifluoromethane	perimeter air	Yes	
	gas vent	Yes	
	off-site soil gas	Yes	
1,1-Dichloroethane	gas vent	Yes	
	seep water	Yes	
	off-site soil gas	Yes	
	ground water	Yes	
	production wells	Yes	

A – Background; B – Frequency of detect; C – Essential human nutrient; D – Blanks

TABLE 4 (continued)
SUMMARY OF SELECTION OF CHEMICAL OF CONCERN

Compound	Media Detected	Chemical of Concern	Reasons for Elimination
1,1-Dichloroethene	indoor air	Yes	
	gas vent	Yes	
	off-site soil gas	Yes	
1,2-Dichloroethene (total)	ground water	No	D
	seep water	Yes	
	leachate	Yes	
	production wells	Yes	
trans-1,2-Dichloroethene	off-site soil gas	Yes	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	gas vent	Yes	
	off-site soil gas	Yes	
Di-n-butylphthalate	surface sediment	Yes	
	ground water	No	B
	leachate	Yes	
Diethylphthalate	ground water	Yes	
	leachate	Yes	
2,4-Dimethylphenol	leachate	Yes	
Di-n-octyl-phthalate	leachate	Yes	
Ethylbenzene	gas vent	Yes	
	ground water	No	B,D
	leachate	Yes	
	production wells	Yes	
4-Ethyl toluene	gas vent	Yes	
Fluroanthene	surface soil	No	A,B
	surface sediment	No	A
	leachate	Yes	
Fluorene	surface sediment	No	A,B
	leachate	Yes	
Hexane	gas vent	Yes	
	off-site soil gas	Yes	
2-Hexanone	perimeter air	Yes	
	gas vent	Yes	
	off-site soil gas	Yes	
	leachate	Yes	
Indeno(123-cd)pyrene	surface soil	No	A,B
	surface sediment	No	A
	leachate	Yes	

A - Background; B - Frequency of detect; C - Essential human nutrient; D - Blanks

TABLE 4 (continued)
SUMMARY OF SELECTION OF CHEMICAL OF CONCERN

Compound	Media Detected	Chemical of Concern	Reasons for Elimination
Methane	perimeter air	Yes	
	gas vent	Yes	
	off-site soil gas	Yes	
	indoor air	Yes	
Methylene chloride	perimeter air	Yes	
	seep water	Yes	
	ground water	Yes	
	leachate	Yes	
	indoor air	Yes	
	production wells	Yes	
2-Methylnaphthalene	leachate	Yes	
4-Methyl-2-pentanone	perimeter air	Yes	
	gas vent	Yes	
	leachate	Yes	
	indoor air	Yes	
2-Methylphenol	leachate	Yes	
4-Methylphenol	surface sediment	Yes	
	leachate	Yes	
Naphthalene	leachate	Yes	
n-Nitrosodiphenylamine	surface soil	Yes	
	leachate	Yes	
Pentachlorophenol	leachate	Yes	
Phenanthrene	surface soil	No	A,B
	surface sediment	No	A,B
	leachate	Yes	
Phenol	leachate	Yes	
Pyrene	surface soil	No	A,B
	surface sediment	No	A
	leachate	Yes	
Tetrachloroethene	gas vent	Yes	
	off-site soil gas	Yes	
	ground water	No	D
	leachate	Yes	

A - Background; B - Frequency of detect; C - Essential human nutrient; D - Blanks

TABLE 4 (continued)
SUMMARY OF SELECTION OF CHEMICAL OF CONCERN

Compound	Media Detected	Chemical of Concern	Reasons for Elimination
Toluene	perimeter air	No	D
	gas vent	Yes	
	surface sediment	Yes	
	ground water	No	B,D
	leachate	Yes	
	indoor air	No	D
	production wells	Yes	
Trichlorofluoromethane	perimeter air	Yes	
	gas vent	Yes	
	off-site soil gas	Yes	
	indoor air	Yes	
1,1,1-Trichloroethane	perimeter air	Yes	
	gas vent	Yes	
	off-site soil gas	Yes	
	ground water	No	B
	indoor air	Yes	
1,1,2-Trichloroethane	leachate	Yes	
Trichloroethene	gas vent	Yes	
	off-site soil gas	Yes	
	ground water	Yes	
	leachate	Yes	
	production wells	Yes	
1,1,2-Trichloro-1,2,2-trifluoroethane	perimeter air	Yes	
	gas vent	Yes	
1,3,5-Trimethylbenzene	gas vent	Yes	
1,2,4-Trimethylbenzene	gas vent	Yes	
Vinyl acetate	gas vent	Yes	
	off-site soil gas	Yes	
Vinyl chloride	gas vent	Yes	
	off-site soil gas	Yes	
1,4 and 1,3(p,m)xylene	perimeter air	Yes+	
	gas vent	Yes+	
	indoor air	Yes+	
1,2-(o)xylene	gas vent	Yes+	
xylenes (total)	ground water	No	B,D
	leachate	Yes+	

A - Background; B - Frequency of detect; C - Essential human nutrient; D - Blanks

TABLE 4 (continued)
SUMMARY OF SELECTION OF CHEMICAL OF CONCERN

Notes:

* - see discussion in text
- - will be treated as total xylene
T - total

Reasons for Elimination or Selection as Chemical of Concern

A - All detects were below background concentrations. Appropiate background was defined as:
  - site-specific background were only used if the compound was detected in more than 50% of the background samples, or if the frequency of detects in background samples was at least as high as field samples.
  - for soils, the backgound values were either site-specific soil background or Ohio-specific soil background .
  - for surface and seep water, background values were either site-specific surface water background or based on comparisons of data from unimpacted streams in Ohio.
  - for surface and seep sediment, the background values were site-specific surface sediment background data.
  - for ground water and private wells, the background values were site-specific data from upgradient groundwater wells.

B - Frequency of detection defined as:
  - compound detected infrequently in 1 or 2 environmental media (<5% of the samples of that media).
  - compound was not detected in any other media or at high concentrations.

C - Essential human nutrient defined as:
  - compound found at low concentration i.e., slightly above naturally ocurring.
  - compound is toxic at only high doses i.e., much higher than those associated with site.

D - Detection in field blanks defined as:
  - if common laboratory contaminant is found <10 times the concentration found in blanks or found at low concentrations in field samples
  - for other compounds, if found <5 times the concentration found in blanks.

TABLE 5
SUMMARY OF CHEMICALS OF CONCERN BY MEDIA
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
MORAINE, OHIO

Chemical	Indoor Air	Surface Soil	Seep Sediment	Surface Water	Leachate	Surface Sediment	Gas Vent	Perimeter Air	Seep Water	Off Site Soil Gas	Ground water	Production Wells
1,1,1-Trichloroethane	X						X	X		X		
1,1,2-Trichloro-1,2,2-trifluoroethane							X	X				
1,1,2-Trichloroethane					X							
1,1-Dichloroethane							X		X	X	X	X
1,1-Dichloroethylene	X						X			X		
1,2,4-Trimethylbenzene							X					
1,2-Dichloro-1,1,2,2-tetrafluoroethane							X			X		
1,2-Dichlorobenzene	X											
1,2-Dichloroethane (total)					X				X			X
1,3,5-Trimethylbenzene							X					
1,4-Dichlorobenzene					X							
2,4-Dimethylphenol					X							
2-Butanone					X	X		X		X		
2-Hexanone					X		X	X		X		
2-Methylnaphthalene					X							
2-Methylphenol					X							
4-Ethyl toluene							X					
4-Methyl-2-pentanone	X				X		X	X				
4-Methylphenol					X	X						
Acenaphthene					X							
Acetone	X				X		X	X		X		
Aluminum					X							
Anthracene					X							
Antimony					X	X			X		X	
Arsenic				X	X						X	
Barium					X	X					X	X
Benzene					X		X			X	X	
Benzo(a)anthracene					X							
Benzo(a)pyrene					X							
Benzo(b)fluoranthene					X							
Benzo(ghi)perylene					X							
Benzo(k)fluoranthene					X							
Benzoic Acid					X	X						
Benzyl Alcohol					X							
Benzyl Chloride							X					
Beryllium					X				X			
bis(2-ethylhexyl)phthalate		X			X	X						
Bromomethane							X					
Butylbenzylphthalate					X	X						
Cadmium					X							
Chlorobenzene					X		X					
Chloroethane					X		X			X		

TABLE 5 (continued)
SUMMARY OF CHEMICALS OF CONCERN BY MEDIA
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
MORAINE, OHIO

Chemical	Indoor Air	Surface Soil	Seep Sediment	Surface Water	Leachate	Surface Sediment	Gas Vent	Perimeter Air	Seep Water	Off-Site Soil Gas	Ground water	Production Wells
Chloroform			X			X				X		
Chloromethane										X		
Chromium					X						X	
Chrysene					X							
Cobalt					X	X			X			
Cyanide											X	
Di-n-butylphthalate					X	X						
Di-n-octyl-phthalate					X							
Dibenzofuran					X							
Dichlorodifluoromethane							X	X		X		
Diethylphthalate					X						X	
Ethylbenzene					X		X					X
Fluoranthene					X							
Fluorene					X							
Hexane							X			X		
Indeno(1,2,3-cd)pyrene					X							
Lead					X				X		X	X
Mercury					X	X						
Methane	X						X	X		X		
Methylene Chloride	X				X			X	X		X	X
n-Nitrosodiphenylamine		X			X							\
Naphthalene					X							
Nickel					X	X						
Pentachlorophenol					X							
Phenanthrene					X							
Phenol					X							
Pyrene					X							
Silver						X			X			
Tetrachloroethylene					X		X			X		
Toluene					X	X	X					X
trans-1,2-Dichloroethene										X		
Trichloroethylene					X		X			X	X	X
Trichlorofluoromethane	X						X	X		X		
Vanadium				X	X				X			
Vinyl Acetate							X			X		
Vinyl Chloride							X			X		
Xylenes (total)	X				X		X	X				

TABLE 6
SUMMARY OF HEALTH RISKS - FUTURE USE
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
MORAINE, OHIO

EXPOSED POPULATION	EXPOSURE ROUTE		CANCER RISK(1)	HAZARD INDEX(2)
FUTURE USE				
Residential Children	Inhalation of on-site volatiles		9.85E-05	0.15
	Ingestion of ground water		4.52E-04	6.11
	Inhalation of volatiles while showering		5.60E-06	0.25
	dermal contact while showering		7.12E-06	0.33
	Incidental ingestion of surface sediment		4.76E-09	0.56
	dermal contact with surface sediment		1.77E-06	1.54
		TOTAL	5.6E-04	8.9
Adult Residents	Inhalation of on-site volatiles		7.86E-05	0.07
	Ingestion of ground water		5.15E-04	4.19
	Inhalation of volatiles while showering		4.46E-06	0.12
	dermal contact while showering		8.67E-06	0.24
	Incidental ingestion of surface sediment		1.86E-09	0.04
	dermal contact with surface sediment		1.64E-06	0.35
		TOTAL	6.1E-04	5.02
Residential Children trespassing on-site	Incidental ingestion of surface water		4.02E-07	0.001
	Inhalation of on-site volatiles		1.64E-06	0.003
	Incidental ingestion of surface sediment		5.76E-11	0.003
	Incidental ingestion of seep sediment		4.46E-14	3.96E-09
	dermal contact with surface sediment		1.41E-09	0.070
	dermal contact with seep sediment		1.57E-12	1.39E-07
	dermal contact with surface water		2.63E-07	0.006
	dermal contact with seep water		1.55E-06	0.029
		TOTAL	3.9E-06	0.11

(1) Number of expected lifetime cancer cases per number of exposed populace.
Examples - Residential Children - 5.6E-04 = 5.6/10,000 or 5.6 in ten thousand.
Adult Resident - 6.1E-04 = 6.1/10,000 or 6.1 in ten thousand.

(2) Numerical value showing hazardous index for indicated exposure. The total hazard index is cumulative for each exposed population and is expressed as a total number.

ATTACHMENT 1

ADMINISTRATIVE RECORD

(Index and Documents)

for the

SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)

REMEDIAL ACTION

MORAINE, OHIO

SEPTEMBER 1993

United States Environmental Protection Agency
Region V
77 West Jackson
Chicago, IL 60604

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

H-7J

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

REPLY TO THE ATTENTION OF

March 19, 1993

Head Librarian
City of Moraine Library
Moraine Municipal Building
4200 Dryden Road
Moraine, OH 45439

Subject: Cardington Road Landfill--Original

Dear Head Librarian:

Enclosed is a copy of the Administrative Record file which documents selection of remedy by the United States Environmental Protection Agency (U.S. EPA) for the above-captioned site. The U.S. EPA is required to establish administrative records at or near the facility at issue. It is U.S. EPA's intent to make the Administrative Record available so that the public may have the opportunity to comment constructively on site activities and to understand the issues relating to the selection of the response action at the site.

The enclosed record files, along with any future documents relating to technical activities at the site should be placed in the repository and be available as reference materials for public review and photocopying during your normal business hours. We ask you to maintain the Administrative Record indefinitely or until contacted by U.S. EPA. Periodically, we will be updating the Administrative Record by adding more documents as they become available to U.S. EPA, and ask you to include the updates with this Administrative Record at the time they are received.

We appreciate your cooperation in serving as an administrative record repository. Although we ask you to use all due care in handling the Administrative Record, we want you to know that U.S. EPA does maintain another copy of the Administrative Record at the regional office in Chicago, Il., and neither the repository nor any individuals associated with the repository shall bear any liability for serving as the repository for this Administrative Record.

Again, we thank you for your cooperation. If you have any questions or comments, please contact me at (312)353-5821.

Sincerely,

J. Pfundheller

Janet Pfundheller,
WMD Records Manager

U.S. EPA ADMINISTRATIVE RECORD
CARDINGTON ROAD LANDFILL
AKA SANITARY LANDFILL CO. (IWD) SITE
MORAINE, OHIO
ORIGINAL
03/24/93

AR

DOC #	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	00/00/00	U.S. EPA/OEPA		Attachment A to USEPA/OEPA Response to CRC Disputes re: Intrusive Drilling Investigation Work Plan, Health and Safety Plan, and Community Notification Plan	7
2	00/00/00	U.S. Department of the Interior		Geological Survey of Landfill Site Area	1
3	00/00/00			Handwritten: Calculations for Residential Exposure Drinking Water	1
4	00/00/00			Map: Proposed Intrusive Boring/Well Locations	1
5	00/00/00			Residential Exposure: Ingestion of Chemicals in Drinking Water	1
6	00/00/00	U.S. EPA		Sanitary Landfill Reference Documents: Documents Dated 1/27/70 - 11/30/84	215
7	00/00/00			Topographic Map of Landfill Site and Surrounding Area	1
8	11/15/71	OEPA		Computation Sheets: Groundwater Data	3
9	03/21/74	Johnson, N., IWD Co., Inc.	Paschidi, A., OEPA	Cover Letter and 3/01/74 Report of Components in Drums at North and South Landfills	3
10	05/21/74	Hosler, J., OEPA		Ground Water Evaluation for South Sanitary Landfill	3
11	05/30/74	Rashidi, A., OEPA	Johnson, N., IWD Co., Inc.	Letter re: Disposal of Liquid or Semi Liquid Wastes	2
12	10/07/74	Johnson, N., IWD Co., Inc.	Rashidi, A., OEPA	Cover Letter and 10/02/74 Analysis of Liquid Waste Sludge Samples	3
13	03/28/75	Reitz, R., Systems Technology Corp.	Hosler, J., OEPA	Lab Analysis of Soluble Chromium Waste Generated by Delco Products	1
14	05/02/75	Reitz, R., Systems Technology Corp.	Hosler, J., OEPA	Request for Permission to Dispose of Polymerized Phenolic Compound	1

DOC #	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
16	05/13/75	Kotowski, M., OEPA	Peltz, R., Systems Technology Corp.	Response to Inquiry re: Disposal of Polyberized Phenolic Compound	1
17	03/11/77	Pennino, J., OEPA	Salmons, J., Hauling Services	Telephone Memorandum re: Disposal of Waste Paint at S.S. Davis--IWD South Landfill	1
18	04/14/77	Singeman, J., Montgomery Co. Combined General Health Dist.	Davis, R., IWD Liquid Waste, Inc.	Letter re: Unauthorized Liquid Waste Disposal, South Sanitary Landfill	1
19	07/11/80	U.S. EPA		Preliminary Assessment	4
19	12/16/83	U.S. EPA		Site Inspection Report	14
20	07/04/84	U.S. EPA		HRS Scoring Package (signed off 3/19/86)	20
21	01/09/86	Bisseile, C., Mitre Corp.	Sagers, T., Montgomery Co. Sanitation Dept.	Record of Communication re: Public well Fields and Target Populations near Sanitary Landfill Site	1
22	02/02/86	U.S. EPA		HRS Scoring Package	13
23	03/18/86	Johnson, R., Mitre Corp.	Hunt, R., Carillon Cafeteria	Telephone Memorandum re: use of Well Water at Cafeteria	1
24	11/16/87	U.S. EPA		Administrative Order by Consent Re: RI/FS	61
25	05/13/88	Sarl, J., U.S. EPA	Addressees	Current Region V Sole Source Aquifers and Review Requirements Under the Safe Drinking Water Act	6
26	08/00/88	Jacobs Engineering Group Inc.	U.S. EPA	Community Relations Plan	28
27	05/00/89	U.S. EPA	Public	Fact Sheet: Environmental Investigation to Begin	6
28	08/00/89	U.S. EPA	Public	Fact Sheet: Superfund Activities: Dayton, Ohio	4
29	08/22/89	Heimbuch, J., TEC, Inc.	Van der Kloot, J., U.S. EPA	Letter re: Site Security w/ Drawings Indicating Location of Proposed New Fence	3
30	09/05/89	Heimbuch, J., TEC, Inc.	Van der Kloot, J., U.S. EPA and Ayeni, E., OEPA	Letter re: Site Security w/ Map Showing Proposed Locations of Fences	2
31	09/27/89	Heimbuch, J., TEC, Inc.	Snyder, L., Snyder Concrete Products	Laboratory Report of Ambient Air Sample	3

DOC #	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
39	...20/89	Lentzen, T., Metcalf & Eddy	Rosik, ..., U.S. EPA	Work Plan for Sanitary Landfill w/ Cover Letter	14
40	.. 27/89	Paul, ..., Hart Engineers	Van der Kloot, J., U.S. EPA and Buthker, B., OEPA	Letter re: On-Site waste Intrusions, RI/FS w/ Attachments	2
41	.288/89	Hart Engineers		RI/FS Work Plan - Volume 1	71
42	.288/89	Hart Engineers		RI/FS: Appendices - Project Operation Plans and Procedures - Volume 2	152
43	04/13/90	Buthker, B., OEPA	Turner, K., U.S. EPA	Intrusive Drilling Investigation Work Plan, OEPA Comments	5
44	04/13/90	Turner, K., U.S. EPA and Buthker, B., OEPA	Heisbuch, J., TEC, Inc.	Notice of Disapproval re: Intrusive Drilling Work Plan, Health and Safety Plan, and Community Notification Plan as Submitted 3/15/90	2
45	4/26/90	Paul, ..., Hart Engineers	McAuliffe, M., U.S. EPA	Attachment A to Letter from J. Hanson (4/26/90) re: CRC Response to USEPA/OEPA Comments on Intrusive Drilling Work Plan, Health and Safety Plan, and Community Notification Plan w/ FAX Cover Sheet	22
46	04/26/90	Paul, ..., Hart Engineers	McAuliffe, M., U.S. EPA; Kovac, F., OEPA; et. al.	Memo: Submittal of Attachment A to CRC Notification of Intent to Enter Dispute Resolution	22
47	04/26/90	Hanson, J., Beveridge & Diamond, P.C.	McAuliffe, M., U.S. EPA and Kovac, F., OEPA	Notice of Dispute and Response to USEPA/OEPA Comments on the Intrusive Drilling Investigation Work Plan with Support Documents	2
48	05/09/90	OEPA		OEPA Comments for Inclusion with "Attachment A," re: CRC Comments on Work Plan	3
49	05/10/90	McAuliffe, M., U.S. EPA and Kovac, F., OEPA	Hanson, J., Beveridge & Diamond, P.C.	USEPA/OEPA Response to CRC Request for Dispute Resolution re: Intrusive Drilling and CRC Comments on Intrusive Drilling Investigation Work Plan with Supporting Documents	4
50	05/21/90	Cardington Road Landfill Superfund Task Force		Questions/Comments for 5/21/90 Meeting with City of Kettering	3
51	05/23/90	Bartelt, R., Geraghty & Miller	Hanson, J., Beveridge & Diamond, P.C.	Response to Request to Review Information on Intrusive Drilling	3

DOC #	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
45	05/24/90	Horan, P., Asst. City Manager, Kettering, OH	Buthker, G., OEPA	Recommendations for Intrusive Drilling Investigation	3
46	5/30/90	Buthker, G., OEPA	Turner, K., U.S. EPA	CRC Dispute Resolution Meeting 5/23/90: Handwritten Transcript	19
47	5/30/90	Hanson, J., Beveridge & Diamond, P.C.	McAuliffe, M., U.S. EPA and Kovac, F., OEPA	Dispute Resolution re: Request to Reconsider EPA Position on Decision-Maker	3
48	06/25/90	Turner, K., U.S. EPA and Buthker, G., OEPA	Heimbuch, J., TEC, Inc.	Dispute Resolution re: U.S. EPA/OEPA Disapproval of Intrusive Drilling Work Plan and Health and Safety Plan	11
49	07/13/90	Heimbuch, J., TEC, Inc.	Turner, K., U.S. EPA and Buthker, G., OEPA	Dispute Resolution re: Revisions to Work Plan and Health and Safety Plan	3
50	8/09/90	Turner, K., U.S. EPA and Buthker, G., OEPA	Heimbuch, J., TEC, Inc.	Second Disapproval of Intrusive Drilling Work Plan and Health and Safety Plan	5
51	08/17/90	Paul, L., Hart Engineers	Turner, K., U.S. EPA and Buthker, G., OEPA	Cover Letter With Final Residential/Production Well Investigation Plan	116
52	08/17/90	Paul, L., McLaren / Hart	Turner, K., U.S. EPA and Buthker, G., OEPA	Second Revisions to Intrusive Drilling Investigation Work Plan and Health and Safety Plan	2
53	09/11/90	Paul, L., Hart Engineers	Turner, K., U.S. EPA and Buthker, G., OEPA	Subsittal of Revised Draft Community Notification Plan	62
54	09/30/90	U.S. EPA	Public	Fact Sheet: Community Update on Intrusive Drilling	2
55	10/05/90	Turner, K., U.S. EPA and Buthker, G., OEPA	Heimbuch, J., TEC, Inc.	Final Approval of Intrusive Drilling Work Plan, Health and Safety Plan and Community Notification Plan	2
56	10/11/90	Paul, L., Hart Engineers	Turner, K., U.S. EPA and Buthker, G., OEPA	Cover Letter With Final Intrusive Drilling Investigation Work Plan	179
57	01/14/91	Paul, L., McLaren / Hart	Turner, K., U.S. EPA and Buthker, G., OEPA	Letter re: Revised Project Schedule	2

DOC#	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
68	4/22/91	Kendall, S., U.S. Dept. of the Interior	Turner, K., U.S. EPA	U.S. Geological Administrative Report "Zones of Saturation and Conceptualized Ground-water Flow System, Cardington Road Landfill, Moraine, Ohio." w/ Cover Letter	24
69	5/19/91	Herold, T., City Manager's Office, Kettering, OH	Turner, K., U.S. EPA	Letter and Attachments sent to Citizens attending 5/8/91 Briefing	5
70	7/25/91	Paul, L., McLaren / Hart	Turner, K., U.S. EPA and Buthker, G., OEPA	Draft Preliminary Remedial Technologies Screening Technical Memorandum w/ Cover Letter	33
71	08/16/91	Buthker, G., OEPA	Turner, K., U.S. EPA	Letter re: Data Gaps in RI	3
72	08/21/91	Heimbuch, J., TEC, Inc.	Turner, K., U.S. EPA and Buthker, G., OEPA	Letter re: Revision of RI Report to be Submitted on 9/6/91	1
73	8/19/91	Paul, L., McLaren/Hart Env. Eng.	Turner, K., U.S. EPA and Buthker, G., OEPA	Cover Letter for 8/5/91 Letter re: Supplemental Information to Remedial Investigation and Risk Assessment	1
74	09/19/91	Paul, L., McLaren / Hart	Turner, K., U.S. EPA and Buthker, G., OEPA	Supplemental Information to RI and Risk Assessment	2
75	09/25/91	Turner, K., U.S. EPA	Heimbuch, J., TEC, Inc.	Notification of U.S. EPA's Extended Review Period for the Revised Draft Baseline Risk Assessment	1
76	10/07/91	Buthker, G., OEPA	Turner, K., U.S. EPA	Comments on Revised Draft RI Report	2
77	10/07/91	Turner, K., U.S. EPA	Buthker, G., OEPA	Letter re: Resolution of Issues raised in 9/16/91 Letter	2
78	11/00/91	McLaren/Hart Env. Eng.		Final RI Report--Volume I	271
79	11/00/91	McLaren/Hart Env. Eng.		Final RI Report--Volume II, 1 of 2	173
70	11/00/91	McLaren/Hart Env. Eng.		Final RI Report--Volume II, 2 of 2	303
71	11/08/91	Heimbuch, J., TEC, Inc.	Turner, K., U.S. EPA and Buthker, G., OEPA	McLaren/Hart's 11/6/91 Memorandum re: Revisions to be Incorporated into the Revised RI Report	4

DOC#	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
72	11/22/91	Gradient Corp.		Final Baseline Risk Assessment w/ U.S. EPA/OEPA Approval Letter	261
73	[illegible]/10/92	Turner, K., U.S. EPA and Buthker, S., OEPA	Heimbuch, J., TEC, Inc.	Approval of Final RI Report	1
74	[illegible]/03/92	Buthker, S., OEPA	Turner, K., U.S. EPA	OEPA's Comments on the Alternative Array	2
75	04/00/92	U.S. EPA	Public	Fact Sheet: Results of Remedial Investigation	4
76	04/09/92	Paul, L., McLaren / Hart	Turner, K., U.S. EPA and Buthker, S., OEPA	Cover Letter with the Final Alternatives Array Document	74
77	04/17/92	Buthker, S., OEPA	Turner, K., U.S. EPA	FAX Transmission re: ARAR'S w/ Cover Sheet	2
78	04/21/92	Turner, K., U.S. EPA and Buthker, S., OEPA	Heimbuch, J., TEC, Inc.	Approval of Final Alternative Array Document	1
79	04/22/92	Paul, L., McLaren / Hart	Turner, K., U.S. EPA and Buthker, S., OEPA	Submittal of Corrected Page 79 of the Final Alternatives Array Document	3
80	09/30/92	Ohio Dept. of Health		Public Health Assessment	46
81	11/10/92	Heimbuch, J., TEC, Inc.	Turner, K., U.S. EPA	Letter re: Resolution of USEPA/OEPA Comments to 9/29/92 Draft FS	1
82	11/12/92	McLaren/Hart Env. Eng.		Final Feasibility Study	250
83	02/03/93	Turner, K., U.S. EPA and Buthker, S., OEPA	Heimbuch, J., TEC, Inc.	Letter re: Approval of Final FS Report	1
84	03/23/93	Buthker, S., OEPA	Turner, K., U.S. EPA	Letter re: OhioEPA Approval of the Proposed Plan	1
85	03/31/93	U.S. EPA		Proposed Plan	25

ATTACHMENT 2

FEDERAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

for the

SANITARY LANDFILL COMPANY (IWD) SITE (a.k.a. CARDINGTON ROAD LANDFILL)

REMEDIAL ACTION

MORAINE, OHIO

SEPTEMBER 1993

United States Environmental Protection Agency
Region V
77 West Jackson
Chicago, IL 60604

APPLICABLE OR RELEVENT AND APPROPRIATE REQUIREMENTS (ARARs) - CHEMICAL SPECIFIC SANITARY LANDFILL COMPANY (IWD) SITE (a.k.a. CARDINGTON ROAD LANDFILL)

FEDERAL REQUIREMENTS (and to be considered)

PARAMETERS	REFERENCES	MCL	MCLG	PMCL	PMCLG	AAQS
INORGANICS (ug/l)						
Aluminum	a	--	--	--	--	--
Antimony	a	--	--	10/5	3	--
Arsenic	c	50	50	--	--	--
Barium	c	2,000	2,000	--	--	--
Beryllium	a	--	--	1	0	--
Cadmium	c	5	5	--	--	--
Calcium		--	--	--	--	--
Chromium	c	100	100	--	--	--
Cobalt		--	--	--	--	--
Copper	d	1,300	1,300	--	--	--
Iron		--	--	--	--	--
Lead	d	0.015	0	--	--	--
Magnesium		--	--	--	--	--
Manganese		--	--	--	--	--
Mercury	c	2	2	--	--	--
Nickel	a	100	100	--	--	--
Potassium		--	--	--	--	--
Selenium	c	50	50	--	--	--
Silver	b	--	--	50	50	--
Sodium		--	--	--	--	--
Thallium	c	--	--	2/1	.5	--
Vanadium		--	--	--	--	--
Zinc		--	--	--	--	--
Cyanide	a	--	--	200	200	--

REFERENCES:

AAQS – Ambient Air Quality Standards; (1) 24 hour average with no more than one exceedence per year; (2) Annual Arithmetic Mean.
a = USEPA (Office of Drinking Water), 1990. Drinking Water Regulations and Health Advisories, Washington, D.C.
b = USEPA (Office of Emergency and Remedial Response), 1986. Superfund Public Health Evaluation Manual, Washington, D.C. (to be considered).
c = Federal Register, 1991, Volume 56, No. 20, p. 3528.
d = Federal Register, June 7, 1991, Action Level (10% of total number of required samples).
e = National Air Quality Standard – 40 CFR Part 50
MCL = Maximum Contaminant Level.
MCLG = Maximum Contaminant Level Goal.
PMCL = Proposed Maximum Contaminant Level (to be considered).
PMCLG = Proposed Maximum Contaminant Level Goal (to be considered).

APPLICABLE OR RELEVENT AND APPROPRIATE REQUIREMENTS (ARARs) - CHEMICAL SPECIFIC
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
FEDERAL REQUIREMENTS (and to be considered)
(continued)

PARAMETERS	REFERENCES	MCL	MCLG	PMCL	PMCLG	AAQS
ORGANICS (ug/l)						
Benzene	c	5	0	--	--	--
Bis (2-ethylhexylphthalate)	a	--	--	4	0	--
Cis 1,2 Dichloroethene	a	70	70	--	--	--
Chlorobenzene		--	--	--	--	--
Dichloroethane (1,1)	c	--	--	--	--	--
Dichloroethane (1,2)	c	5	0	--	--	--
Dichloroethylene (1,1)	c	7	7	--	--	--
Di-n-butylphthalate	b	--	--	4	--	--
Diethylphthalate	b	--	--	4	--	--
Ethylbenzene	c	700	700	--	--	--
Tetrachloroethylene	c	5	0	--	--	--
Toluene	c	1,000	1,000	--	--	--
Trans 1,2 Dichloroethene	c	100	100	--	--	--
Trichloroethane (1,1,1)	c	200	200	--	--	--
Trichloroethylene	c	5	0	--	--	--
Vinyl Chloride	c	2	0	--	--	--
Xylenes	c	10,000	10,000	--	--	--
Particulate Matter	e	--	--	--	--	150 ug/m³ (1) 50 ug/m³ (2)

REFERENCES:

AAQS = Ambient Air Quality Standards; (1) 24 hour average with no more than one exceedence per year; (2) Annual Arithmetic Mean.
a = USEPA (Office of Drinking Water), 1990. Drinking Water Regulations and Health Advisories, Washington, D.C.
b = USEPA (Office of Emergency and Remedial Response), 1986. Superfund Public Health Evaluation Manual, Washington, D.C. (to be considered).
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APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) - ACTION SPECIFIC
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
FEDERAL REQUIREMENTS

Action	Requirement	Citation
Closure - Solid Waste Landfills	A final cover system for a solid waste landfill will be at a minimum comprised of an infiltration layer of 18 inches of earthen material covered by an erosion layer consisting of 6 inches of earthen material capable of sustaining native plant growth. The cover will be designed to promote drainage and minimize erosion.	40 CFR 258.60(a)
Closure of Waste in Place (Capping)	Placement of cap over hazardous waste (e.g., closing a landfill, or closing a surface impoundment or waste pile as a landfill, or similar action) requires a cover designed and constructed to:	40 CFR 264.228(a) (Surface Impoundments) 40 CFR 264.258(b) (Waste Piles) 40 CFR 264.310(a) Landfills)

APPLICABLE OR RELEVANT AND APPROPRIATE
REQUIREMENTS (ARARs) - ACTION SPECIFIC
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
FEDERAL REQUIREMENTS
(continued)

Action	Requirement	Citation
Closure of Waste in Place (Capping)	.provide long-term minimization of infiltration liquids through the capped area. . function with minimum maintenance. . promote drainage and minimize erosion or abrasion of the cover. . accommodate settling and subsidence so that the cover's integrity is maintained. . have permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.	40 CFR 264.228(a) (Surface Impoundments) 40 CFR 264.258(b) (Waste Piles) 40 CFR 264.310(a) (Landfills)
	Eliminate free liquids, stabilize wastes before capping (surface	40 CFR 264.228(a)

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) - ACTION SPECIFIC
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
FEDERAL REQUIREMENTS
(continued)

Action	Requirements	Citation
Closure of Waste in Place (Capping)	impoundments).	
	Restrict post-closure use of property as necessary to prevent damage to the cover.	40 CFR 264.117(c)
	Prevent run-on and runoff from damaging cover.	40 CFR 264.117(c) 40 CFR 264.310(b)
	Protect and maintain surveyed benchmarks used to locate waste cells (landfills, waste piles).	40 CFR 264.310(b)
	Dispose or decontaminate equipment, structures, and soils.	40 CFR 264.111
	Eliminate free liquids by removal or solidification.	40 CFR 264.228(a) (2)
	Stabilize remaining waste and waste residues to support cover.	40 CFR 264.228(a) (2) and 40 CFR 264.258(b)

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) - ACTION SPECIFIC
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
FEDERAL REQUIREMENTS
(continued)

Action	Requirement	Citation
Closure of Waste in Place (Capping)	Install final cover to provide long-term minimization of infiltration.	40 CFR 264.310
	Post-closure care and ground water monitoring.	40 CFR 264.310
Operation and Maintenance (O&M)	Post-closure care to ensure that site is maintained and monitored.	40 CFR 258.61 (RCRA Subtitle D. Subpart F) 40 CFR 264.118 (RCRA Subtitle C, Subpart G)
Discharge to POTW (d)	Pollutants that pass through the POTW without treatment, interfere with POTW operations, or contaminate POTW sludge are prohibited. Specific prohibitions preclude the discharge of pollutants to POTWs that:	40 CFR 403.5

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) - ACTION SPECIFIC
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
FEDERAL REQUIREMENTS
(continued)

Action	Requirement	Citation
Discharge to POTW (d)	.create a fire or explosion hazard in the POTW. .are corrosive (pH<5.0). .obstruct flow resulting in interference. .increase the temperature of wastewater entering the treatment plant that would result in interference, but in no case raise the POTW influent temperature above 104.F(40.C). Discharge must comply with local POTW pretreatment program, including POTW-specific pollutants spill prevention program requirements, and reporting monitoring requirements.	40 CFR 403.5 and local POTW regulations.

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) - ACTION SPECIFIC
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
FEDERAL REQUIREMENTS
(continued)

Action	Requirement	Citation
Discharge to POTW (d)	RCRA permit-by-rule requirements must be compiled with for discharges of RCRA hazardous wastes to POTWs by truck, rail, or dedicated pipe.	40 CFR 264.71 and 40 CFR 264.72
Discharge to Surface Water	Discharge must comply with conditions established under NPDES Program, including limitations, standards and other permit conditions.	40 CFR 122.44 40 CFR 131
	Establishes technology-based effluent limitations and standards.	40 CFR 122.44(a)
	Monitoring results must be reported at specified intervals on a Discharge Monitoring Report (DMR).	40 CFR 122.4(j) reporting requirements 40 CFR 136.1 - 136.4 (testing procedures)

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) - ACTION SPECIFIC
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
FEDERAL REQUIREMENTS
(continued)

Action	Requirement	Citation
Discharge to Surface Water	Requires a Best Management Program that: a) shall be developed in accordance with good engineering practices. b) shall establish specific objectives for control of toxic and hazardous pollutants. c) shall establish best managment practices (BMPs) to meet objectives. d) reflect requirements of Spill Prevention Control and Countermeasure (SPCC) Plan. e) examine for potential releases to surface waters. f) ensure proper management of solid and hazardous waste.	40 CFR 125.100 through 104

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) - ACTION SPECIFIC
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
FEDERAL REQUIREMENTS
(continued)

Action	Requirement	Citation
Gas Collection	Standards for control of emissions of volatile organics	November 15, 1990 Federal Register
	Design system to provide odor-free operation.	CAA Section 101(a) and 40 CFR 52 Subparts A and KK
	File an Air Pollution Emission Notice (APEN) with state to include estimation of emission rates for each pollutant expected.	40 CFR 52 Subparts A and KK
	Include with the filed APEN the following: .modelled impact analysis of source emissions. .a best available control technology (BACT) review for the source operation.	

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) - ACTION SPECIFIC
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
FEDERAL REQUIREMENTS
(continued)

Action	Requirements	Citation
Gas Collection	Predict total emissions of volatile organic compounds (VOCs) to demonstrate emissions do not exceed 450 lb/hr., 3,000 lb/day, 10 gal/day, or allowable emission levels from similar sources using Reasonably Available Control Technology (RACT) guidelines.	40 CFR 52 Subpart A and KK
	Verify through emission estimates and dispersion modeling that hydrogen sulfide emissions do not create an ambient concentration greater than or equal to 0.10 ppm.	40 CFR 61

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) - ACTION SPECIFIC
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
FEDERAL REQUIREMENTS
(continued)

Action	Requirement	Citation
Gas Collection	National Emission Standard for mercury, vinyl chloride, and benzene in order to not exceed levels expected from sources in compliance with hazardous air pollution regulations.	40 CFR 61 Subpart A, E, F, and FF
	If carbon adsorption is used to control the subsurface gases, and the spent carbon becomes a characteristic waste, the spent carbon must be disposed as a hazardous waste.	49 CFR 264 (Subpart x - miscellaneous units)
	If hazardous wastes-materials, which require disposal off-site, are generated during remedial response activities, then DOT transportation requirements must be followed.	40 CFR 100 thru 199 40 CFR 263

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) - ACTION SPECIFIC
SANITARY LANDFILL COMPANY (IWD) SITE
(a.k.a. CARDINGTON ROAD LANDFILL)
FEDERAL REQUIREMENTS
(continued)

Action	Requirement	Citation
Surface Water Controls	Prevent run-on, and control and collect runoff from a 24 -hour, 25-year storm (waste piles, land treatment facilities, landfills).	40 CFR 264.251(c)(d) 40 CFR 264.273(c)(d) 40 CFR 264.301(c)(d)
	Establishes NPDES stormwater permit requirements for discharges of stormwater associated with industrial activity. Discharge must comply with conditions established under NPDES Program including effluent imitations, monitoring requirements, reporting requirements and best management.	40 CFR 122.26
Occupational Safety and Health Administration	Regulates worker health and safety	40 CFR 300.38

NOTES:

a) All of the Clean Air Act ARARs that have been established by the federal government may be covered by matching state regulations. The state may have the authority to manage these programs through the approval of the implementation plans (40 CFR 52 Subpart G).
b) Action alternatives from ROD keywork index.
c) Bulk storage requires the preparation and implementation of a spill prevention, control, countermeasures (SPCC) plan (see 40 CFR 761.65(C) (7) (a) for specification of container sizes that are considered "bulk" storage containers. Substantive requirements may be ARARs if bulk storage is performed onsite.
d) These regulations apply regardless of whether the remedial action discharges into the sewer or trucks the waste to an inlet to the sewage coveyance system located "upstream" of the POTW.

ATTACHMENT 3

STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

for the

SANITARY LANDFILL COMPANY (IWD) SITE (a.k.a. CARDINGTON ROAD LANDFILL)

REMEDIAL ACTION

MORAINE, OHIO

SEPTEMBER 1993

United States Environmental Protection Agency
Region V
77 West Jackson
Chicago, IL 60604

STATE CHEMICAL-SPECIFIC ARARs AND GUIDANCES TO BE CONSIDERED (TBCs) CARDINGTON ROAD LANDFILL SITE MORAINE, OHIO

PARAMETERS	MCL	PMCL	AAQS
ORGANICS (ug/l)			
Benzene	5	--	
bis (2-ethylhexyl)phthalate)	--	--	--
cis 1,2 Dichloroethene	70	--	--
Dichloroethylene (1,1)	7	--	--
Dichloroethane (1,1)	5	--	--
Dichloroethane (1,2)	5	--	--
Di-n-butylphthalate	--	--	--
Diethylphthalate	--	--	--
Ethylbenzene	700	--	--
Tetrachloroethylene	--	5	--
Toluene	1,000	--	--
trans 1,2-Dichloroethene	100	--	--
Trichloroethane (1,1,1)	200	--	--
Trichloroethylene	5	--	--
Vinyl Chloride	2	--	--
Xylenes (total)	10,000	--	--
Particulate Matter			150 ug/m³ (1) 50 ug/m³ (2)
Ozone			240 ug/m³ (5)
Non-methane Hydrocarbons			160 ug/m³ (3)
Sulfur Dioxide			365 ug/m³ (1) 80 ug/m³ (2)
Nitrogen Dioxides			100 ug/m³ (2)
Carbon Monoxide			10 ug/m³ (4) 40 ug/m³ (5)

NOTES:

AAQS - Ambient Air Quality Standards; OAC 3745-17-02, OAC 3745-18-02, OAC 3745-21-02 and OAC 3745-23-01.
MCL - Maximum Contaminant Levels; Ohio Administrative Code 3745-81
PMCL - Proposed Maximum Contaminant Levels (to be considered)
(1) 24-hour average concentration.
(2) Annual arithmetic mean.
(3) 3-hour average concentration of 0.024 ppm volume measured as carbon.
(4) Maximum 8-hour arithmetic mean.
(5) Maximum 1-hour arithmetic mean.

(continued)

STATE CHEMICAL-SPECIFICARARs AND GUIDANCES TO BE CONSIDERED (TBCs) CARDINGTON ROAD LANDFILL SITE MORAINE, OHIO

PARAMETERS	MCL	PMCL	AAQS
INORGANICS (ug/l)			
Aluminum	--	--	--
Antimony	--	--	--
Arsenic	50	--	--
Barium	100	200	--
Beryllium	--	--	--
Cadmium	10	5	--
Calcium	--	--	--
Chromium	50	100	--
Cobolt	--	--	--
Copper	--	--	--
Iron	--	--	--
Lead	50	--	--
Magnesium	--	--	--
Manganese	--	--	--
Mercury	2	2	--
Nickel	--	--	--
Potassium	--	--	--
Selenium	10	50	--
Silver	50	--	--
Sodium	--	--	--
Thallium	--	--	--
Vanadium	--	--	--
Zinc	--	--	--
Cyanide	--	--	--

NOTES:

AAQS – Ambient Air Quality Standards; OAC 3745-17-02
MCL – Maximum Contaminant Levels; OAC 3745-81
PMCL – Proposed Maximum Contaminent Levels (to be considered); OAC 3745-81.

STATE ACTION-SPECIFIC ARARs FOR THE
CARDINGTON ROAD LANDFILL SITE
MORAINE, OHIO

ACTION	REQUIREMENT		CITATION
Sanitary Landfill Closure	Establishes final closure requirements for placement of a cap over the waste materials. These requirements include: • Cover shall consist of at least two feet of non-putrescible materials having low permeability to water, good compatibility, cohesiveness and relatively uniform texture. • All land surface shall be graded to slopes of no less than 1% and no greater than 25%. • All grading shall prevent ponding of water where solid waste has been placed. At final closure of a sanitary landfill, placement of a cap over the waste material requires, at a minimum, a cover designed and constructed to minimize infiltration and consists of: • A recompacted soil barrier layer, a minimum of two feet thick; having a maximum of permeability of 1x10-7cm/sec;3745-27-08(c)(1)(a) to (e); • A granular drainage layer, a minimum of one foot thick, constructed on top of the soil barrier layer; 3745-27-08 (c)(3)(a); and, • A vegetative layer consisting of soil and vegetation placed on top of the granular layer. The soil shall be sufficiently thick and fertile to support vegetation and to protect the soil barrier layer from damage due to root penetration and frost. A minimum slope of five percent and a maximum slope of twenty-five percent or some alternate slope based on stability analyses shall be maintained with a maximum projected erosion rate of five tons per acre per year. Grading of all land surface to prevent ponding of water where solid waste has been placed. Design, install and maintain a ground water monitoring system in accordance with 3745-27-10.		QAC 3745-27-09(f)(3)(b) QAC 3745-27-11 (final closure of sanitary landfill) 3745-27-08(c)(1)(a) to (e) and (c)(3)(a) (cap design requirements) 3745-27-10 (ground water monitoring) 3745-27-12 (explosive gas monitoring)

STATE ACTION SPECIFIC ARARs FOR THE
CARDINGTON ROAD LANDFILL SITE
MORAINE, OHIO

ACTION	REQUIREMENT		CITATION
Sanitary Landfill Closure (continued)	If a sanitary landfill is so situated that a residence or other occupied structure is located within one thousand feet horizontal distance from emplaced solid wastes, the responsible party shall design, install and maintain an explosive gas monitoring system. Based on the findings of the monitoring, measures to abate or minimize the formation or migration of explosive gas monitoring may be required. Establishes requirements for an explosive gas monitoring plan for sanitary landfill.		ORC 3745.041
Operations and Maintenance (O&M) of Sanitary Landfill	Post-closure care for a minimum to 30 years to ensure that site is maintained and monitored. Post-closure activities include: • Continuation of leachate management, surface water management, explosive gas extraction/control system and monitoring, and ground water monitoring programs. • Maintain effectiveness/integrity of cap. • Quarterly inspections and reporting. • Submittal of certificate after completion of post-closure care.		OAC 3745-27-14 (A)
Closure of Hazardous Waste in Place	At final closure of a landfill, placement of a cap or cover over hazardous waste requires a final cover designed and constructed to: • Provide long-term minimization of migration of liquids through the closed landfill; • Function with minimum maintenance; • Promote drainage and minimize erosion or abrasion of the cover; • Accommodate settling and subsidence so that the covers integrity is maintained; and, • Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.		OAC 3745-68-10 (A) (Closure of Landfills)

STATE ACTION SPECIFIC ARARs FOR THE
CARDINGTON ROAD LANDFILL SITE
MORAINE, OHIO

ACTION	REQUIREMENT		CITATION
Operation and Maintenance of Hazardous Waste Landfill	After final closure, post-closure care of the landfill, including monitoring and maintenance throughout the post-closure care period, is required to: • Maintain the integrity and effectiveness of the final cover by making repairs to the cover as necessary to correct the effects of settling, subsidence, erosion or other events; • Maintain and monitor the ground water monitoring system and comply with all other applicable requirements regarding ground water monitoring; • Prevent run-on and runoff from eroding or otherwise damaging the final cover; and, • Protect and maintain surveyed benchmarks used to identify the exact location of the landfill. Require additional post-closure care, if applicable, to: • Maintain and monitor the leachate collection, removal and treatment system, if there is such a system present in the landfill, to prevent excess accumulation of leachate in the system; • Maintain and monitor the gas collection and control system, if there is such a system present in the landfill, to control the vertical and horizontal escape of gases; and, • Restrict post-closure use of the property as necessary to prevent damage to the final cover and prevent increases of potential hazards to human health and environment.		OAC 3745-68-10 3745 65 90 through 3745 65 94 3745 66 17 through 3745-66 20
Construction/Excavation Activities	Prohibits excavation and construction activities without prior authorization from the Ohio Director of Environmental Protection.		ORC 3734.02 (H) OAC 3745-27-13 (A,B C,J)

STATE ACTION SPECIFIC ARARs FOR THE
CARDINGTON ROAD LANDFILL SITE
MORAINE, OHIO

ACTION	REQUIREMENT		CITATION
Gas Collection and Ground Water Treatment Systems	Establishes routine maintenance requirements for air pollution control equipment and corrective action procedures for malfunctioning air pollution control equipment.		OAC 3745-15-06 (A1, A2)
	Prohibits the emission or escape into the open air from any source or sources of smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, odors or other substances or combination of substances in such a manner which may endanger health, safety or welfare of the public or damage to property and to be considered a public nuisance.		OAC 3745-07 (A,D)
	All new and existing air contaminant sources shall follow good engineering stack height requirements.		OAC 3745-16-02
	Emission limitations imposed upon a source shall not be affected by so much of any stack height that exceeds good engineering practices nor by another dispersion techniques.		
	Significant and avoidable deterioration of air quality where existing air quality is equal to or better than that of ambient air quality standards shall be prohibited.		OAC 3745-21-05
	All new stationary sources of photochemically reactive materials shall minimize such emissions by use of the latest available control techniques and operating practices in accordance with best current technology.		OAC 3745-21-07 (A-J)
	No person shall emit organic materials into the atmosphere from a waste gas flare system unless such materials are burned by smokeless flares or equally effective control equipment.		
	Prohibits changes in operations whereby an industrial waste is produced or changed, or install works for the treatment or disposal of any such waste until plans have been submitted and approved by the director.		ORC 6111.45
	Any person who generates a waste must determine if such waste is a hazardous waste.		OAC 3745-52-11
	Establishes air/water permit criteria for PTI and BATs.		OAC 3745-31-05

STATE ACTION SPECIFIC ARARs FOR THE
CARDINGTON ROAD LANDFILL SITE
MORAINE, OHIO

ACTION	REQUIREMENT		CITATION
Discharge Directly to Surface Waters	Prohibits the discharge of pollutants to surface waters of the State without a permit		ORC 6111 04 ORC 6111 042 OAC 3745 33
	Discharge must comply with state NPDES Program including effluent limitations, monitoring requirements and reporting requirements.		
	Establishes minimum ambient water quality standards/criteria for surface waters of the State.		OAC 3745-01
	Prohibits further water quality degradation which would interfere with or become injurious to existing designated uses.		OAC 3745 01-05
	Establishes non thermal and thermal mixing zone requirements associated with discharges to surface water.		OAC 3745 01 06
	Establishes water use designations and criteria for surface waters for the State.		OAC 3745 01 07
	Establishes general water quality criteria. Surface waters shall be free of: • Suspended soils or other substances that settle to form sludge deposits or inversely impact aquatic life. • Floating debris, oil, scum, or other floating materials causing nuisance conditions. • Materials producing color, odor, or other nuisance causing degradation. • Substances in concentrations toxic or harmful to human, animal or aquatic life and/or are rapidly lethal in the mixing zone. • Nutrients in concentrations that create nuisance growth of aquatic weeds and algae.		OAC 3745 1 04 (A-B)

STATE ACTION SPECIFIC ARARs FOR THE:
CARDINGTON ROAD LANDFILL SITE
MORAINE, OHIO

ACTION	REQUIREMENT		CITATION
Discharge to POTW	Establishes permit program regulating non-domestic discharges to POTW to assure compliance with Ohio pretreatment standards.		OAC 3745-36
	Pollutants that pass throughout the POTW without treatment, interfere with POTW operations, or contaminate POTW sludge are prohibited.		OAC 3745-3 (01 through 07)
	Specific prohibitions preclude the discharge of pollutants to POTWs that: • Create a fire or explosion hazard in the POTW. • Are corrosive (ph < 5.0) unless specifically approved. • Obstruct flow resulting in interference. • Are discharged at a flow rate and/or concentration that will result in interference. • Increase the temperature of wastewater entering the treatment plant that would result in interference, but in no case raise the POTW influent temperature above 104°F (40°C).		
	Industrial users must immediately notify POTW of slug loading.		
	Discharge must comply with local POTW pretreatment program, including POTW specific pollutants, spill prevention program requirements, and reporting and monitoring requirements.		OAC 3745-3 and Local Regulations

STATE ACTION SPECIFIC ARARs FOR THE
CARDINGTON ROAD LANDFILL SITE
MORAINE, OHIO

ACTION	REQUIREMENT		CITATION
Hazardous Waste Generation	Generators of hazardous waste must comply with applicable treatment, storage or disposal standards.		OAC 3745-52
	Prohibits against unauthorized storage, treatment, or disposal of hazardous wastes.		ORC 3745 02(F)
	Generators of wastes must determine if wastes are hazardous using approved analytical methods.		OAC 3745-52-11 OAC 3745-52-13
	Hazardous waste facility must comply with minimum standards established for acceptable management of hazardous waste.		OAC 3745-54
	Prohibits land disposal of specified hazardous wastes or defines limited circumstances under which prohibited wastes may be land disposed.		OAC 3745-59
	Prohibits the emissions of particulate, dust, fumes, gas, mist, and smoke from a hazardous waste facility that interferes with the public health.		ORC 3734 02(I)
Closure of a Hazardous Waste Facility	Owner or operator of a hazardous waste facility shall close the facility to: • Minimize the need for further maintenance. • Control, minimize or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste decomposition products to ground water, or surface waters or to the atmosphere. • Comply with applicable closure requirements.		OAC 3745-66-11
	During partial or full closure, all contaminated equipment, structures and soil must be properly disposed of decontaminated.		OAC 3745-66-14
Injection into Existing Class V Ground Water Wells	Prohibits the injection of sewage, industrial wastes or other wastes into wells without obtaining a UIC permit to drill, or into existing wells not previously used for that purpose.		OAC 3745-34-13
	Establishes criteria for abandonment of test holes and ground water wells.		OAC 3745 9 10 (A,B,C)

STATE ACTION SPECIFIC ARARs FOR THE
CARDINGTON ROAD LANDFILL SITE
MORAINE, OHIO

ACTION	REQUIREMENT		CITATION
Air Emissions	Establishes requirements necessary to maintain levels of air quality which are consistent with the protection of public health and prevention of injury to plant, animal or property in the state		OAC 3745-15-02
	Prohibits air pollution nuisances such as smoke, ash, dust, dirt, grime, acids, fumes, gases, vapors, odors from any source or sources in such a manner or in such amounts as to endanger the health, safety or welfare of the public or cause unreasonable injury or damage to property.		OAC 3745-15-07
	Establishes criteria for measurement of emissions of air contaminants, including nitrogen dioxides.		OAC 3745-15-04 and OAC 3745-23-02
	Prohibits significant and avoidable deterioration of existing air quality where existing quality is equal to or better than ambient air quality standards.		OAC 3745-17-05 and OAC 3745-23-04
	Establishes requirements for fugitive dust sources contributing or causing a nuisance.		OAC 3745-17-08
	Establishes restrictions on particulate emissions from fuel burning equipment.		OAC 3745-17-10
	Establishes controls for visible particulate emissions from stationary sources.		OAC 3745-17-07 (A-B)
	Establishes controls for emissions of volatile organic compounds from stationary sources.		OAC 3745-21-09 (A,B,C)
	Prohibits open burning in an area where air alert, warning or emergency as specified in OAC 3745-25 are in effect.		OAC 3745-19-02 (A-B)
	Establishes requirements for open burning in restricted areas.		OAC 3745-19-03 (A-D)
	Establishes requirements for open burning in unrestricted areas.		OAC 3745-19-04 (A-D)
	Establishes criteria for decision making by the director concerning installation or modification and operation of an air contaminant source, solid waste disposal facility, water pollution source, land application of sludge or public water system.		OAC 3745-31-05 (A)
All Actions	Review of New Sources of Air Toxic Emissions		OEPA DAPC 2/91
All Actions	Ohio "How Clean is Clean Policy"		DERR-00-RR-009

STATE ACTION-SPECIFIC ARARs FOR THE
CARDINGTON ROAD LANDFILL SITE
MORAINE, OHIO

ACTION	REQUIREMENT		CITATION
All Actions	USEPA Groundwater Protection Strategy		
All Actions	Best Available Treatment Technologies (BATT) for Remedial Response Sites		DERR-00-RR-016
All Actions	Procedures for Evaluation of Remedial Response Alternatives and Remedy Selection for Remedial Response Program Sites		DERR-00-RR-019