FINAL CLEANUP ACTION PLAN

Mica Landfill Site
Spokane, WA

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Washington Department of Ecology
Toxics Cleanup Program
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1.0 INTRODUCTION

This report presents the Washington State Department of Ecology's proposed cleanup action for the Mica Landfill (Site), located approximately one mile north of the town of Mica, Spokane County, Washington (Figure 1). This Cleanup Action Plan (CAP) is required as part of the site cleanup process under the Model Toxics Control Act (MTCA), Ch. 70.105D RCW, implemented by the Washington State Department of Ecology (Ecology). The cleanup action decision is based on the Remedial Investigation/Feasibility Study (RI/FS), the subsequent Interim Action completed by Spokane County, the potentially liable person (PLP), and other relevant documents in the administrative record.

This CAP outlines the following:

- The history of operations, ownership, and disposal activities at the Site;
- The nature and extent of contamination as presented in the RI;
- The Interim Action measures and associated compliance monitoring;
- Cleanup levels for the Site that are protective of human health and the environment; and
- Determination of the need for additional remedial actions.

1.1 DECLARATION

Ecology has selected this remedy because it will be protective of human health and the environment. Furthermore, the selected remedy is consistent with the preference of the State of Washington as stated in RCW 70.105D.030(1)(b) for permanent solutions.

1.2 APPLICABILITY

Cleanup levels specified in this cleanup action plan are applicable only to the Mica Landfill Site. They were developed as a part of an overall remediation process under Ecology oversight using the authority of MTCA, and should not be considered as setting precedents for other sites.

1.3 ADMINISTRATIVE RECORD

The documents used to make the decisions discussed in this cleanup action plan are on file in the administrative record for the Site. Major documents are listed in the reference section. The entire administrative record for the Site is available for public review by appointment at Ecology's Eastern Regional Office, located at N. 4601 Monroe Street, Spokane, WA 99205-1295.

1.4 PREVIOUS WORK

The CAP presents a brief description and history of Mica Landfill. Results from applicable studies and reports are summarized to provide background information pertinent to the CAP. These studies and reports include:

Figure 1. Location of Mica Landfill

- Year 1 Annual Monitoring Report, Mica Landfill Interim Action Compliance Monitoring Program (CH2MHill, 1996)
- Work Plan for Interim Action Compliance Monitoring, Mica Landfill, Spokane County WA (CH2MHill, 1994)
- Interim Action Cover System Preliminary Design Report, Mica Landfill, Spokane County WA (CH2MHill, 1993)
- Remedial Investigation Report Volume 1, Mica Landfill, Spokane County WA (CH2MHill, 1992)

2.0 SITE BACKGROUND

2.1 SITE HISTORY

Mica Landfill is a municipal solid waste landfill located approximately 11 miles southeast of Spokane, WA and 1.5 miles north of the Town of Mica (Figure 1). The landfill was operated by Spokane County from 1972 until 1990, and jointly by Spokane County and the City of Spokane from 1990 through 1991. Mica Landfill stopped receiving waste in late 1991. The landfill received approximately 65,000 tons of waste per year in the form of residential and municipal solid waste, dewatered sewage treatment plant sludge, demolition debris and industrial wastes. Demolition debris was generally mixed with municipal waste, or used as base material for landfill roads. Industrial wastes included pesticides, fungicides, herbicides, fertilizers, electronics industry chemicals, petroleum products, degreaser solvents, dyes and paints, industrial sludges, baghouse dust wastes, and other miscellaneous chemicals. Also, approximately 24,000 tons of black dross, which is a byproduct of the aluminum production industry, was disposed of in a designated area of the landfill. Dross was disposed between 1974 and 1987. (CH2MHill, 1992)

In 1974, the “Mica” monitoring well was installed at the south end of the site to assess the impacts to groundwater from the south-central leachate pond. In 1975, leachate samples were collected from a drain line and analyzed to evaluate potential leachate impacts to groundwater.

In 1986, Spokane County purchased 24 acres of land immediately adjacent to the southwest corner of the landfill. This land was used to build an additional lined leachate pond for the southwest landfill drainage system. In conjunction, an additional monitoring well was installed to measure any potential groundwater impacts downgradient of the new leachate pond and existing leachate collection system.

2.2 SITE INVESTIGATIONS

Formal investigations were initiated by Spokane County in 1981 when volatile organic compounds were detected in the Mica well and in an off-site domestic well. An assessment of potential groundwater contamination from the landfill was conducted by Spokane County. The assessment was completed in three phases. Phase one, completed in November of 1981, involved a review of available data and a limited field investigation. Phase two was completed in 1982 and entailed a more involved field investigation, including the installation of seven monitoring wells and groundwater sampling. Phase three consisted of four additional groundwater sampling events of the original seven monitoring wells. These wells continued to be sampled quarterly from 1984 through 1988.

In 1984, the U.S. Environmental Protection Agency (EPA) completed a Potential Hazardous Waste Site Preliminary Assessment of the site. A Preliminary Site Inspection Report was completed in 1985, and the landfill was added to the National Priorities List (NPL) established under CERCLA in 1985. (CH2MHill, 1992) Under an agreement between EPA and the State of Washington, Ecology became the lead agency at the site.

In 1987, Ecology completed a Forward Plan which summarized the available data and provided a statement of work for implementing a Remedial Investigation (RI). On January 4, 1988, Ecology entered into Consent Decree 88200005-5 with Spokane County to develop and complete a Remedial Investigation at the landfill.

In 1988, Spokane County began the RI which was conducted in two phases. Phase 1 involved an investigation of historical site activities, an initial review of existing site data, and the collection of initial groundwater and leachate samples. Phase 2, conducted in 1990 and 1991 as a supplement to Phase 1, evaluated off-site groundwater quality, collected additional data on landfill groundwater and leachate composition, and analyzed landfill gas and sediment. As a part of the investigation, geophysical surveys were completed using ground penetrating radar, seismic refraction, electromagnetic induction, and electrical resistivity. Borehole logging was completed using electromagnetic induction. The purpose of these various geophysical techniques was to delineate various lithological features of the subsurface. The Phase 2 RI was completed in September 1992. Work on a Feasibility Study (FS) was initiated, but postponed in late 1991. Following the completion of sampling for the RI, groundwater was sampled on a periodic basis from July 1991 through May 1993. Details on the schedule and frequency of sampling events are in Appendix A.

2.3 INTERIM ACTION

In 1992, Ecology proposed that a major component of the remedial work be completed at the site by implementing an Interim Action (IA). By performing an IA, Ecology thought that human health and the environment would be best protected. The IA included covering the landfill and installing engineering controls such as leachate, stormwater, and gas collection and treatment systems. As a part of IAs, many elements of the FS are included, such as an analysis of applicable requirements, a screening of alternative technologies, and a SEPA analysis. The cover system and associated engineering controls are considered a containment remedy.

The IA contained the following design elements (CH2MHill, 1993):

- A landfill cover system composed of layers of subgrade/leachate collection material, a geosynthetic clay layer, 60 mil HDPE geomembrane, strip drains, and topsoil. In areas of steeper slopes, a double geomembrane replaced the geosynthetic clay layer portion of the composite barrier.

- A leachate collection system consisting of drainage blankets and collection trenches discharging leachate to existing lined collection ponds. Collected leachate is currently transported to and treated at the City of Spokane Advanced Wastewater Treatment Plant.
- A landfill gas collection and treatment system comprised of collection well and trench system, and gas condensate collection. A network of passive flares treats landfill gas as it leaves the system.
- A stormwater control system consisting of a network of berms, ditches, slopes, drains, and culverts designed to divert and collect surface water. Since the cover system prevents infiltration, stormwater is collected to prevent erosion of the surface material and is discharged to existing drainage channels including culverts and ditches.

The IA began in 1994, following public notice and opportunity to comment. Since the completion of the IA, several modifications have been made to the system to correct or enhance operation. These modifications are as follows (Steve Anderson, personal communication):

- 1995 – The number of burning passive gas flares was reduced from 15 to 2 to maintain adequate gas pressure.
- 1995 – Water traps were installed in the leachate pipes that discharged to the ponds to prevent landfill gas from escaping to the atmosphere.
- 1997 – Several modifications to the leachate collection system were made:
    - A 4” gravity sewer line was installed to convey leachate directly from the northwest storage pond to the sanitary sewer at 32nd Street and Hwy 27. This replaced hauling leachate by truck.
    - Modifications to divert all leachate to the ponds instead of the storage tank.
- 1998 – Due to observations of leachate in a perimeter surface water drainage ditch, it was connected to the leachate collection system.
- 1999 – A small leachate breakout was observed on the north side of the landfill, and was connected to the leachate collection system.
- 2000 – Valves were added to the 1998 connection so that water in the perimeter strip drain could be directed to the leachate collection system or the drainage ditch.
- 2000 – A Landtec 1½” wellhead assembly was added to gas well 17 to reduce the risk of a technician’s exposure to landfill gas and provide more precise flow measurements. Spokane County intends to install these assemblies at the remaining landfill gas well vaults in the next few years.

After completion of the construction components of the IA, compliance monitoring began. The compliance monitoring program for the IA had the following objectives (CH2MHill 1996):

- Monitor groundwater quality;
- Provide technical data to evaluate the performance of the cover system;
- Evaluate impacts to groundwater for compliance purposes;
- Monitor leachate to be disposed of by discharge into the County sewer system; and
- Evaluate any surface water impacts attributable to contaminated groundwater and/or off-site leachate seeps.

Beginning in February 1994 for a period of five years, groundwater and leachate samples were collected quarterly. Surface water samples were taken in the fall of 1995 and 1996. Gas samples were collected quarterly unless evidence of landfill gas migration was detected, at which point samples were collected weekly and then monthly for one year. If anomalous detections continued at a location, then action would be taken to correct the problem. The five year compliance monitoring period ended in 2000, though quarterly sampling continues. At the end of the five year monitoring period, the data collected during the IA was reviewed to determine if the remedy was performing as planned. The performance review is in Section 5.0.

2.4 PHYSICAL SITE CHARACTERISTICS

2.4.1 Topography and Climate

The site occupies the south flanks of a north-south trending ridge. The east and west flanks of the ridge are fairly steep, up to a 10% grade, and are cut by ravines. Elevation change at the site is around 430 feet. The addition of waste in the ravines and excavation of soil to cover waste has changed the actual surface topography over the years. Figure 2 shows the pre-waste site topography and property boundaries.

Surface water drains off the surface to gullies and ravines on the east, south, and west boundaries of the landfill. Water flows through these intermittent tributaries into Chester Creek located south of the landfill. Chester Creek is a perennial stream that flows towards the Spokane Valley and ultimately recharges the Spokane Valley/Rathdrum Prairie aquifer. Surface water flow is highly dependent on the presence of rain or snow; highest flows occur from December through May when a combination of rain, snow, and snowmelt is present.

The Mica Landfill vicinity is semiarid, receiving approximately 16 inches of precipitation per year. The bulk of the precipitation occurs in late fall through early spring; winter precipitation is usually in the form of snow. Summers are warm and dry.

2.4.2 Regional Geology

The regional geology consists of bedrock overlain by partially weathered bedrock and loess. Bedrock is highly metamorphosed Precambrian Chester Creek Gneiss. The surface of this bedrock has been weathered and decomposed to varying degrees, forming a layer that varies from several feet to tens of feet in thickness. The weathered bedrock varies in composition both horizontally and vertically across the site depending on the parent rock and the degree of weathering. Texturally, it is a mixture of sand, silt, and clay. Finally, brown to tan loess of the Pleistocene Palouse Formation covers the weathered bedrock (Weis, 1968). The combined thickness of the loess and weathered bedrock ranges from several feet to several tens of feet, typically thinnest along ridge tops and thickest in ravines and depressions. Figure 3 shows a generalized cross section.

2.4.3 Hydrogeology

Groundwater occurs in two main hydrogeologic units: the competent bedrock and the weathered

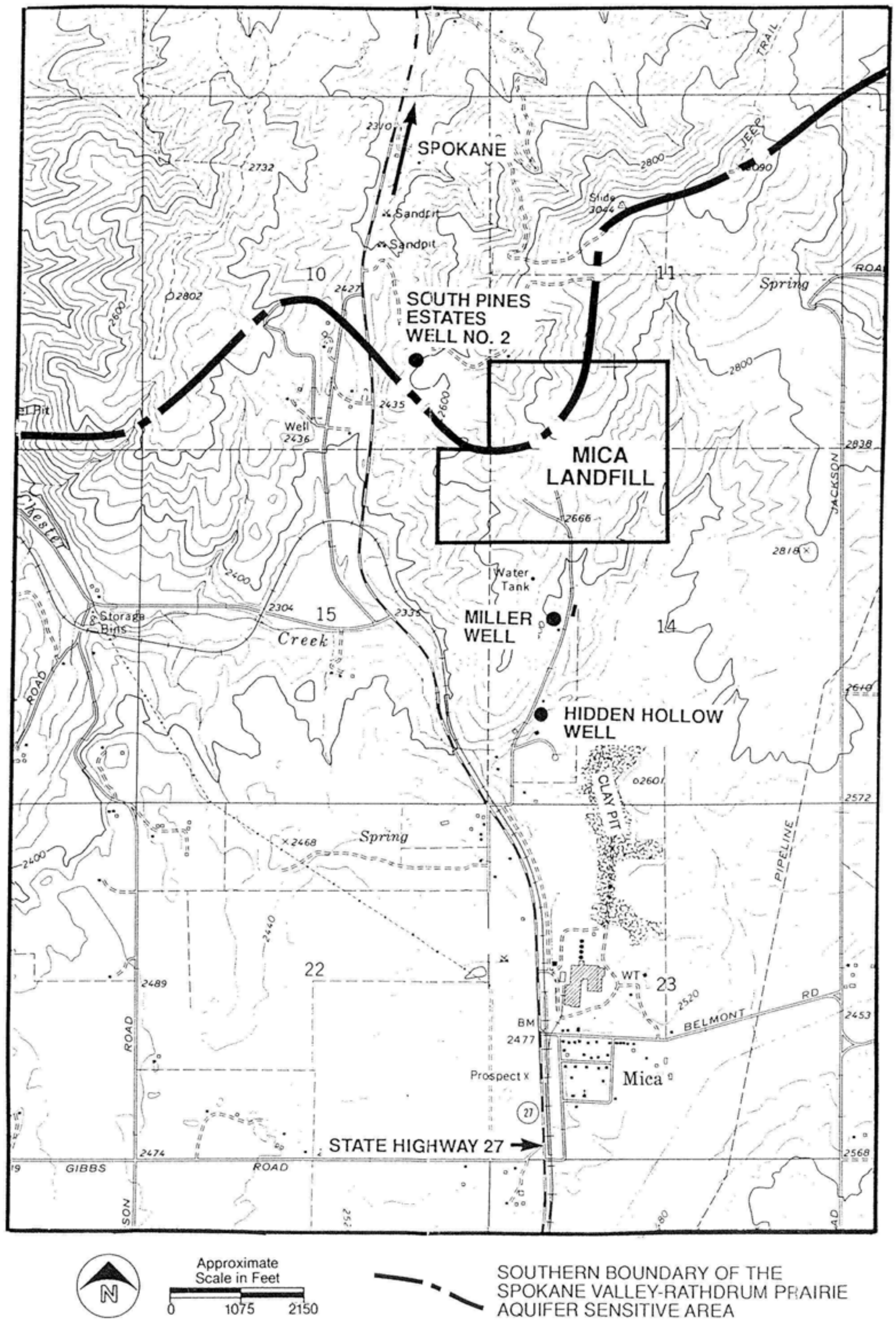

Figure 2. Site Topography and Boundaries

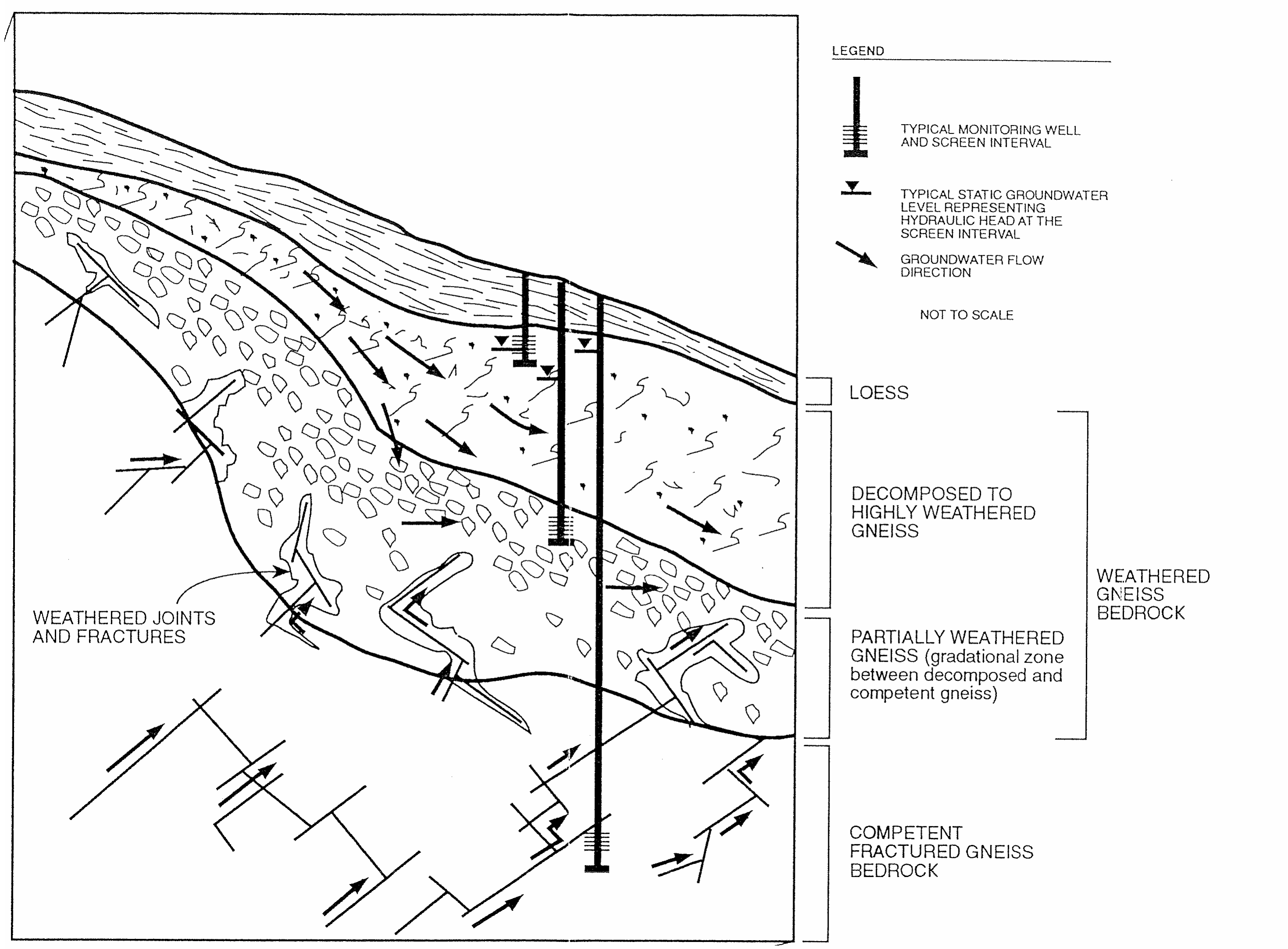

Figure 3. Cross Section of Geology and Hydrogeology

bedrock/loess. In the bedrock, groundwater flows primarily through fractures, while flow in the weathered bedrock/loess is through pore spaces, as shown in Figure 3. In the transition zone between competent bedrock and weathered bedrock, a mix of flow through pore spaces and fractures occurs. No horizontal barriers to flow are present, so groundwater moves freely between both hydrogeologic units. Slug and pumping tests were conducted to estimate the rate of groundwater flow in each unit. Horizontal hydraulic conductivities for the weathered bedrock range from $5x10^{-2}$ ft/day to $8x10^{-1}$ft/day, and the fractured bedrock ranges from $2x10^{-3}$ ft/day to 1 ft/day. Vertical hydraulic conductivities were estimated through lab tests to be $3x10^{-4}$ ft/day to $9x10^{-4}$ ft/day for sediments and $3x10^{-1}$ ft/day for the single test conducted on the weathered bedrock.

3.0 NATURE AND EXTENT OF CONTAMINATION

3.1 LEACHATE

Leachate is produced by the infiltration of precipitation, surface runoff, or seasonal movement of groundwater through landfilled waste materials. Water coming into contact with various liquid and solid wastes becomes chemically altered. Leachate is characterized by a high ionic and organic strength and is composed of various synthetic and naturally occurring compounds. Naturally occurring compounds in leachate are considered contaminants when present at high concentrations; synthetic compounds are contaminants at any concentration.

Leachate at Mica was sampled at two monitoring wells and three leachate impoundments. Typical Mica Landfill leachate contains volatile and semi-volatile compounds, metals, and other inorganic constituents. No polychlorinated biphenyls (PCBs) or herbicides have been detected; pesticides are detected infrequently. The most frequently detected compounds are metals including arsenic, iron, and manganese, and chlorinated volatile organic compounds such as 1,1-dichloroethane, 1,2-dichloropropane, toluene and vinyl chloride.

With the installation of the cap and leachate collection system as part of the IA, leachate is no longer generated via the infiltration of precipitation, and no longer leaves the property either as surface seeps or seepage to surface water. However, leachate still is generated by the movement of groundwater through wastes. Therefore, leachate at Mica Landfill is essentially contaminated groundwater and is addressed through the groundwater monitoring program.

3.2 GROUNDWATER

Groundwater quality is monitored at a series of 31 monitoring wells and 3 off-site water supply wells distributed across the site (Figure 4). Wells are screened in either the competent bedrock, the weathered bedrock, or the loess.

Groundwater in the vicinity of the landfill flows in a generally radial pattern out from the center (Figure 5). Groundwater flows on to the site from the north and contaminants enter groundwater by the movement of leachate into groundwater or by the direct movement of groundwater through waste. Contaminants present in groundwater include inorganic compounds and volatile and semi- volatile organic compounds. These contaminants are discussed in Section 5.0.

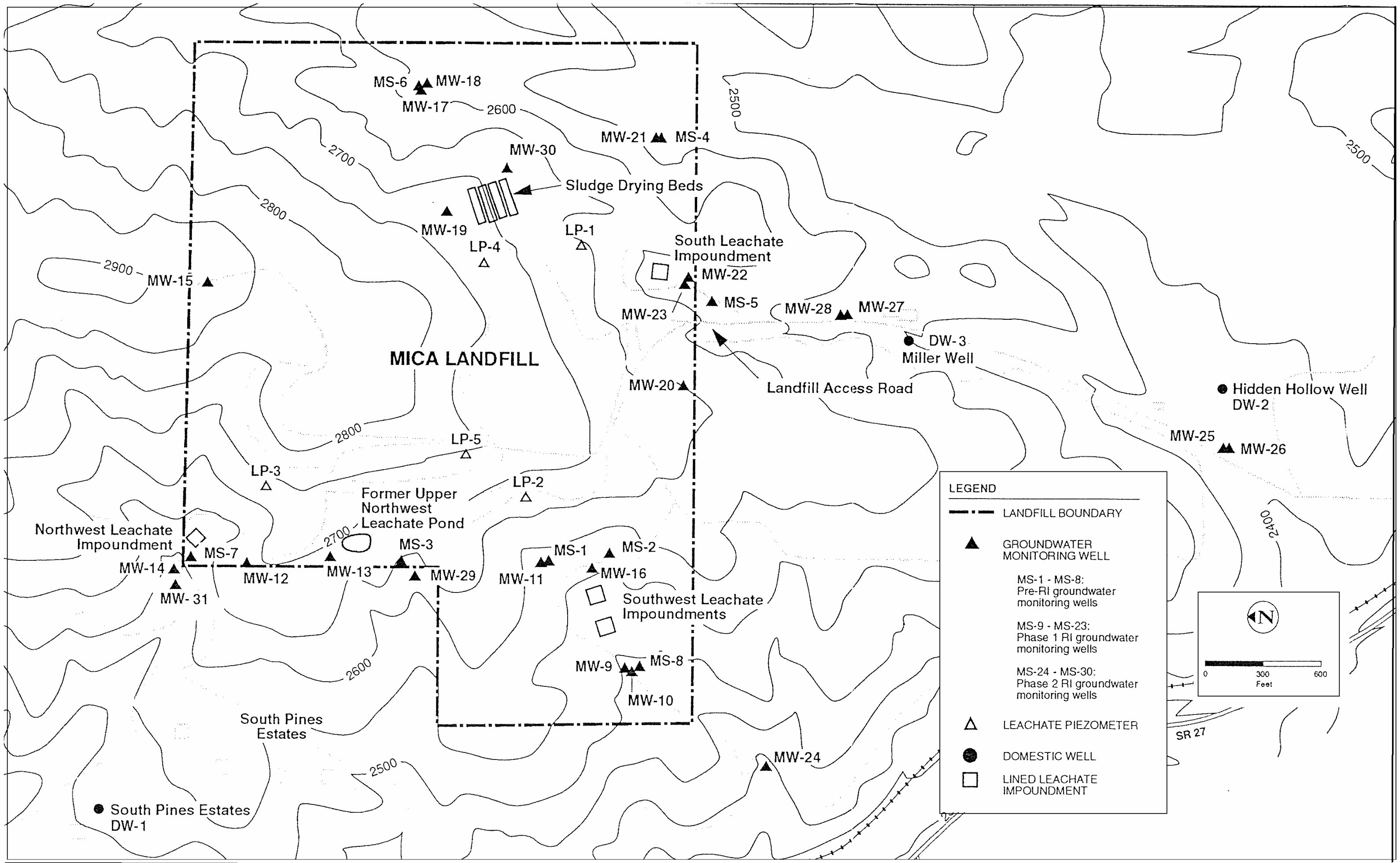

Figure 4. Well Locations

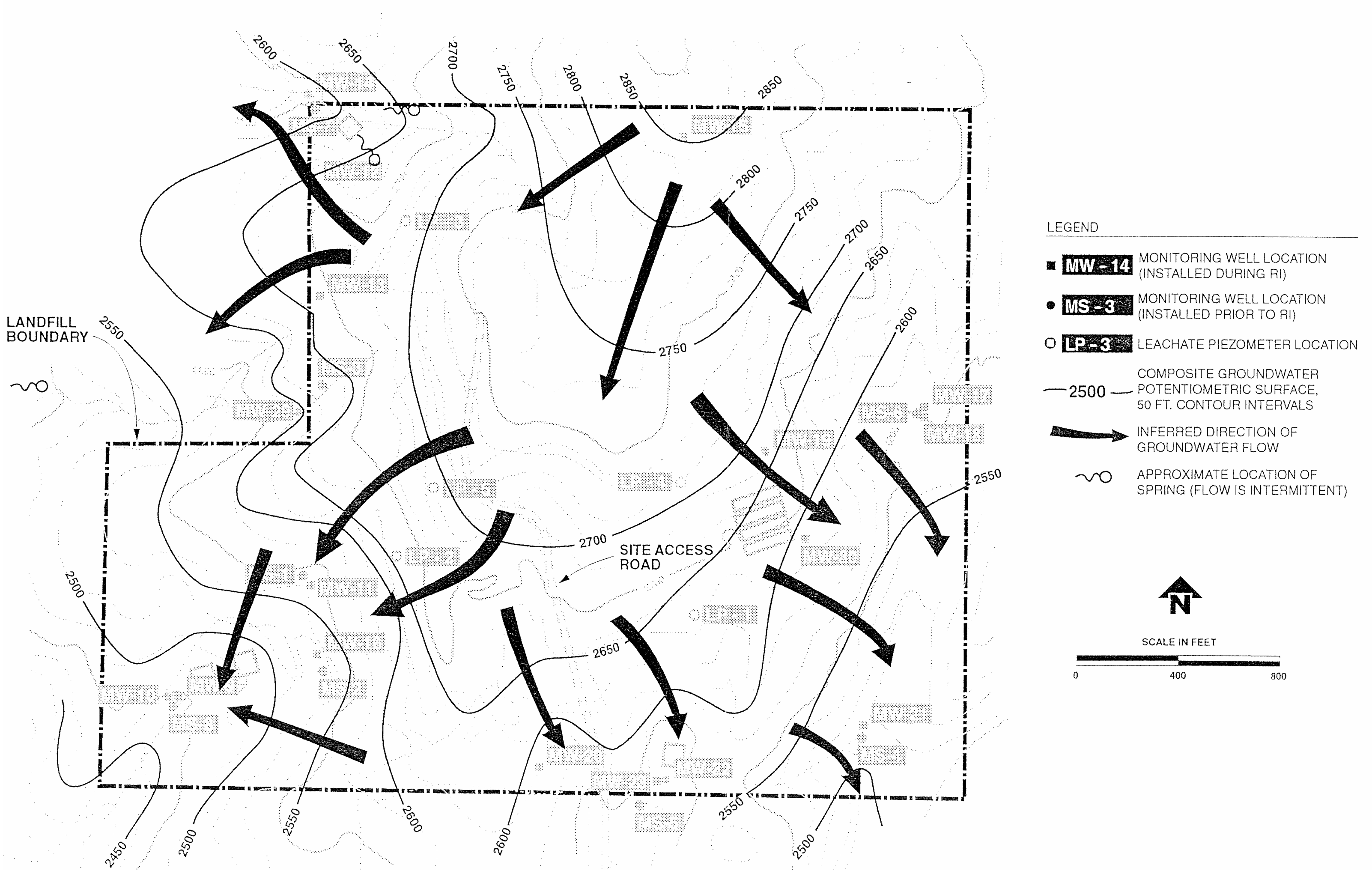

Figure 5. Groundwater Flor Directions

3.3 SURFACE WATER

Surface water was sampled at seven sites during the RI and the first year after the IA. Four locations were on or near the landfill property, two were located within Chester Creek and one was situated between the landfill and the creek. Figure 6 shows these sampling locations. The sites SW-1 through SW-4 were designed to assess direct landfill runoff, while site SW-6 was located within a Chester Creek tributary that receives a small amount of landfill runoff. Site SW-7 measured Chester Creek downstream of the landfill and SW-5 measured "background" surface water.

Surface water samples were analyzed for conventional, inorganic, volatile organic, and semi-volatile organic compounds. Several conventional and inorganic analytes were found at levels exceeding detection limits at location indicating landfill impacts. No volatile or semi-volatile compounds were detected in samples.

3.4 LANDFILL GAS

Landfill gas was measured at five gas probes and five leachate piezometers. Measurements of combustible gas and oxygen concentration and pressure were taken on a weekly and then monthly basis throughout the RI. Gas composition was measured only once at two gas probes and all five leachate piezometers. Measured combustible gas concentrations ranged from zero to above the lower explosive limit of methane (5% by volume). Gas pressures are generally low compared to other landfills, reaching a maximum of only 0.10 inches of water or 3.6×10^{-3} psi. Several different volatile organics were detected in gas samples at all measuring points at variable concentrations, but generally were low. No evidence of landfill gas migration at the property has been noted.

3.5 RISKS TO HUMAN HEALTH AND THE ENVIRONMENT

A population of less than 1,000 people is estimated to live within a 3 mile radius of the landfill, in the town of Mica and in neighboring residences. However, due to the zoning restrictions of the surrounding properties, it is not expected that the population will significantly increase.

Risks to human health and the environment include the contamination of on- and off-site groundwater, contamination of local surface water, emissions of landfill gas, and direct exposure to leachate. Contaminated groundwater has the potential to reach receptors through the contamination of surface water or the contamination of local drinking water supplies. Contaminated surface water may affect recreational users of the stream or wildlife populations that live in or around the stream. Landfill gas may affect nearby residents or create an explosive hazard. Figure 7 displays a flowchart of these pathways.

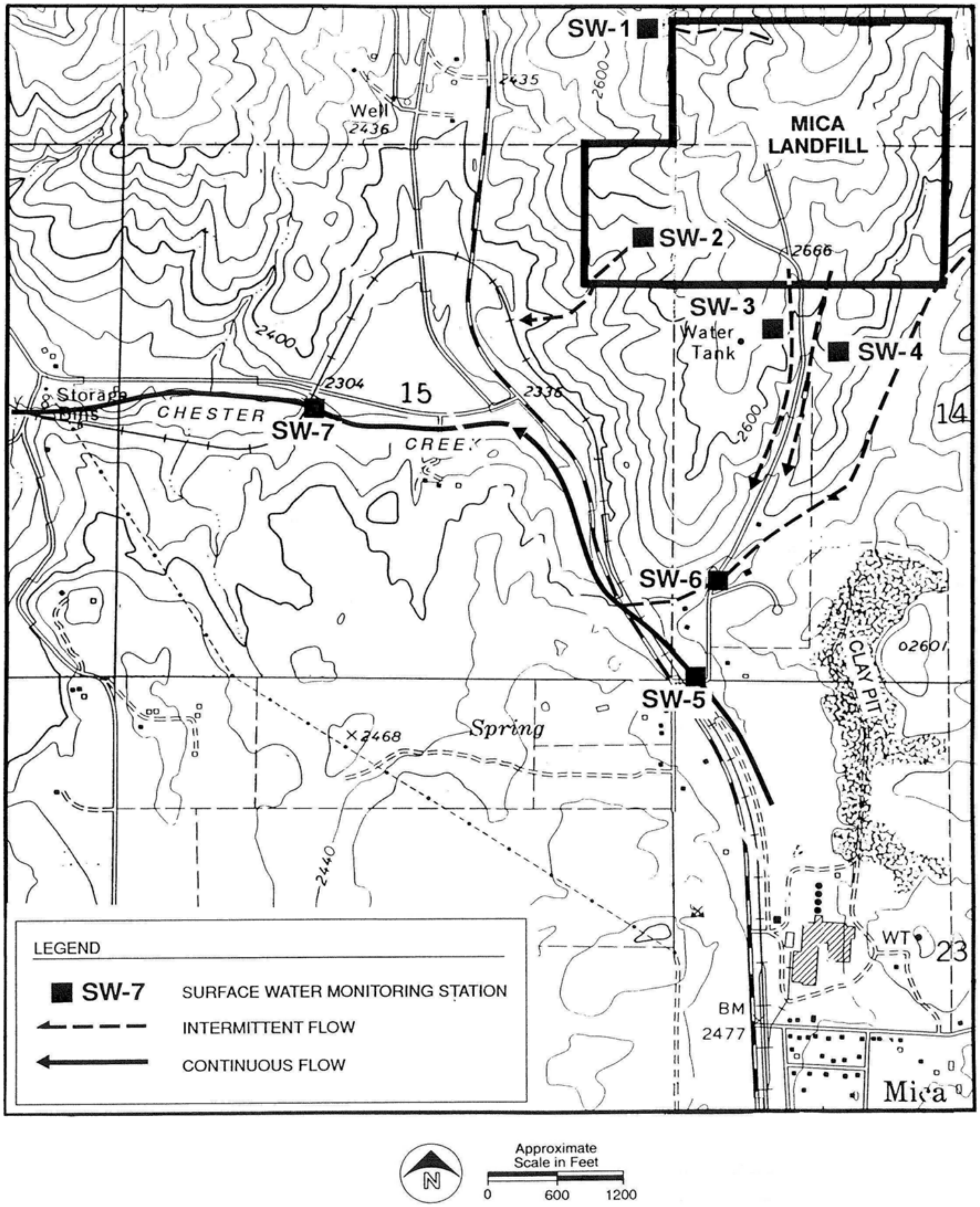

Figure 6. Surface Water Sampling Locations

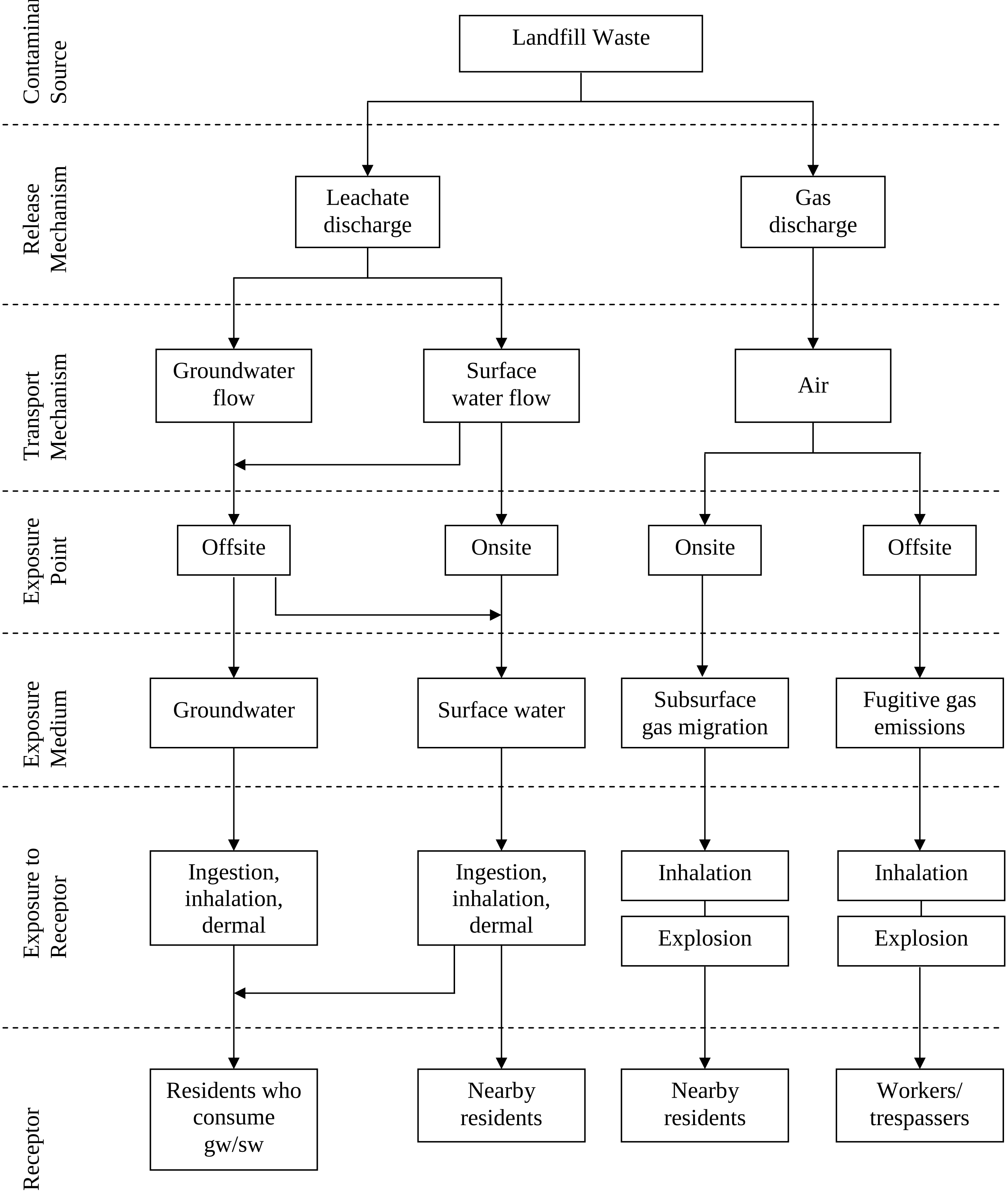

Figure 7. Exposure Pathways

4.0 CLEANUP STANDARDS

MTCA requires the establishment of cleanup standards for individual sites. The two primary components of cleanup standards are cleanup levels and points of compliance. Cleanup levels determine the concentration at which a substance does not threaten human health or the environment. All material that exceeds a cleanup level is addressed through a remedy that prevents exposure to the material. Points of compliance represent the locations on the site where cleanup levels must be met.

4.1 OVERVIEW

The process for establishing cleanup levels involves the following:

- determining which method to use;
- developing cleanup levels for individual contaminants in each media;
- determining which contaminants contribute the majority of the overall risk (indicators) in each media; and
- adjusting the cleanup levels downward based on total site risk.

The MTCA Cleanup Regulation provides three options for establishing cleanup levels: Methods A, B, and C.

- Method A may be used to establish cleanup levels at routine sites or sites with relatively few hazardous substances.
- Method B is the standard method for establishing cleanup levels and may be used to establish cleanup levels at any site.
- Method C is a conditional method used when a cleanup level under Method A or B is technically impossible to achieve or may cause significantly greater environmental harm. Method C also may be applied to qualifying industrial properties.

The MTCA Cleanup Regulation defines the factors used to determine whether a substance should be retained as an indicator for the Site. When defining cleanup levels at a site contaminated with several hazardous substances, Ecology may eliminate from consideration those contaminants that contribute a small percentage of the overall threat to human health and the environment. WAC 173-340-703(2) provides that a substance may be eliminated from further consideration based on:

- The toxicological characteristics of the substance which govern its ability to adversely affect human health or the environment relative to the concentration of the hazardous substance;
- The chemical and physical characteristics of the substance which govern its tendency to persist in the environment and to through the environment;
- The chemical and physical characteristics of the substance which govern its tendency to move into and through the environment;
- The natural background concentration of the substance;
- The concentration of the substance at the site;
- The frequency of detection;

4.2 SITE CLEANUP LEVELS

The RI and subsequent monitoring have documented the presence of contamination in groundwater and surface water at the Site. Cleanup levels will be developed for each of these media.

4.2.1 Groundwater

Table 1 shows the applicable cleanup criteria of analytes for which Site groundwater was tested. The most stringent of federal and state criteria is the selected Method B cleanup level for each substance. Method B is the appropriate method for groundwater cleanup levels because there are multiple contaminants and multiple pathways of exposure. In cases where a contaminant has no Method B cleanup level nor an ARAR, then the natural background concentration (or the practical quantitation limit if the background concentration is zero) shall be the cleanup level.

Table 2 shows the analytes detected in groundwater along with the maximum concentrations and frequencies of detection. Maximum concentrations are based on water sampling completed during three monitoring periods: RI (1988-1989), post-RI (1991-1993), and interim action (1994-2000). Appendix A outlines which analytes were sampled at each well during each monitoring period. Contaminants with concentrations less than the individual cleanup level, those with 5% or less detection frequency, and those with no toxicity data are eliminated from consideration as indicator substances. Twenty-three indicator contaminants were identified for the Site, as shown in Table 2.

Table 3 presents the calculations of cancer risk and hazard quotient for groundwater. Final Method B cleanup levels are shown, along with the noncarcinogenic hazard quotient or cancer risk for each contaminant. For contaminants with noncarcinogenic risk, each hazard quotient is listed by its toxic effect; the total for each toxic effect must be less than or equal to one. If the hazard quotient for a toxic effect is greater than one, the cleanup level for contaminants with that toxic effect must be adjusted downward. For contaminants with carcinogenic risk, no single contaminant can exceed a risk of $1x10^{-6}$, and the total of all carcinogenic risk must not exceed $1x10^{-5}$. Table 4 shows the adjusted groundwater cleanup levels for all site indicators. Analytes with cleanup levels based on Method A do not have a hazard quotient or cancer effect associated with them because, by definition, Method A values are protective. These adjusted values are the final groundwater cleanup levels for the site.

4.2.2 Surface Water

Surface water in neighboring Chester Creek was sampled during the RI and the first year after the IA. There were no detections of volatile or semi-volatile organics, which would only come directly from the landfill. There were detections of inorganic substances that exceeded the upgradient "background" stream sampling point.

Analyte	Federal	PQLs, µg/L	MTCA			
	Primary MCL, µg/L		Method A Concentration, µg/L	Basis	Method B Concentration, µg/L	Basis
Conventionals						
n-Ammonia					**272,000**	BNCAR
Chloride						
Fluoride	4,000				**960**	BNCAR
Nitrate	10,000				**1,600**	BNCAR
Nitrite	**1,000**				1,600	BNCAR
Sulfate						
Inorganics						
Aluminum						
Arsenic	50	1	**5**	background	0.058333	PQL
Barium	2,000	1			**560**	BNCAR
Beryllium	4	1			**32**	PQL
Cadmium	**5**				8	BNCAR
Calcium						
Chromium	100	1	**50**	state/fed law		
Cobalt						
Copper		1			**592**	BNCAR
Cyanide	**200**				320	BNCAR
Iron		20				
Lead		1	**15**	state/fed law		
Magnesium						
Manganese		1			**2,240**	BNCAR
Mercury	**2**	0.2			4.8	BNCAR
Nickel	**100**				320	BNCAR
Potassium						
Silicate						
Silver		1			**80**	BNCAR
Sodium						
Vanadium		3			**112**	BNCAR
Zinc		6			**4,800**	BNCAR

bold - selected cleanup criteria
italics - no cleanup levels for the analyte; these are deleted because they do not contribute significantly to overall site risk
BNCAR - MTCA Method B, non-carcinogen [WAC 173-340-720(3)]
BCAR - MTCA Method B, carcinogen [WAC 173-340-720(3)]
MCL - Federal Maximum Contaminant Level
PQL - practical quantitation limit for appropriate EPA method

Table 1. Applicable Groundwater Cleanup Criteria

Analyte	PQLs, µg/L	MCL, µg/L	MTCA	
			Method B Concentration, µg/L	Basis
Volatile Organics				
1,1,1-Trichloroethane		**200**	7,200	BNCAR
1,1,2,2-Tetrachloroethane			**0.218750**	BCAR
1,1,2,2-Tetrachloroethylene			**0.857843**	BCAR
1,1,2-Trichloroethane		5	**0.767544**	BCAR
1,1-Dichloroethane			**800**	BNCAR
1,1-Dichloroethene		7	**0.072917**	BCAR
1,2-Dichloroethane	**1.2**	5	0.480769	PQL
1,2-Dichloroethene (total)			**72**	BNCAR
1,2-Dichloropropane		5	**0.643382**	BCAR
2-Butanone	1		**4,800**	BNCAR
2-Hexanone	1			
Acetone	1		**800**	BNCAR
Benzene	0.2	5	**0.795**	BCAR
Bromodichloromethane			**0.705645**	BCAR
Bromoform	0.2		**5.537975**	BCAR
Bromomethane			**11.2**	BNCAR
Carbon Tetrachloride		5	**0.336538**	BCAR
Chlorobenzene		**100**	160	BNCAR
Chloroform			**7.172131**	BCAR
Chloromethane			**3.365385**	BCAR
cis-1,2-Dichloroethene	0.2	**70**	80	BNCAR
cis-1,3-Dichloropropene			**0.243056**	BCAR
Dibromochloromethane			**0.520833**	BCAR
Ethylbenzene	0.2	**700**	800	BNCAR
Ethyl Chloride				
m,p-Xylene	0.2		**16,000**	BNCAR
Methylene Chloride		**5**	5.83	BCAR
Methylisobutylketone			**640**	BNCAR
O-Xylene			**16,000**	BNCAR
Styrene		100	**1.458333**	BCAR
Tetrachloroethene	0.2	5	**0.857843**	BCAR
Toluene	0.2	**1,000**	1,600	BNCAR
trans-1,2-dichloroethene	0.2	**100**	160	BNCAR
Trichloroethene	0.2	5	**3.977273**	BCAR
Trichlorofluoromethane			**2,400**	BNCAR
Total Trihalomethanes				
Vinyl Acetate			**8,000**	BNCAR
Vinyl Chloride	0.2	2	**0.023026**	BCAR
Xylene (total)	0.2	**10,000**	16,000	BNCAR
Semi-Volatile Organics				
bis(2-Ethylhexyl)Phthalate	1	**6**	6.25	BCAR
Diethylphthalate			**12,800**	BNCAR
Di-n-Butylphthalate			**1,600**	BNCAR

bold - selected cleanup criteria BNCAR - MTCA Method B, non-carcinogen [WAC 173-340-720(3)]

PQL - practical quantitation limit BCAR - MTCA Method B, carcinogen [WAC 173-340-720(3)]

italics - no cleanup levels for the analyte; these are deleted because they don't contribute significantly to overall risk

Table 1. Applicable Groundwater Cleanup Criteria (continued)

Analyte	Frequency of Detection	Maximum Concentration, µg/L	Method B Cleanup Level, µg/L	Basis	Screening Results
Conventionals					
n-Ammonia	0.43	480,000	272,000	BNCAR	**indicator**
Fluoride	0.64	770	960	BNCAR	below cleanup level
Nitrate	0.80	51,000	1,600	MCL	**indicator**
Nitrite	0.21	400	1,000	MCL	below cleanup level
Inorganics					
Arsenic	0.29	46	5	A-bkgrd	**indicator**
Barium	0.81	4,800	560	BNCAR	**indicator**
Beryllium	0.02	27	32	PQL	≤5% detection freq
Cadmium	0.00	21	5	MCL	≤5% detection freq
Chromium	0.07	130	50	A	see footnote
Copper		397	592	BNCAR	below cleanup level
Cyanide		20.20	200	BNCAR	below cleanup level
Lead	0.16	81.50	15	A	**indicator**
Manganese	0.73	168,000	2,240	BNCAR	**indicator**
Mercury	0.12	5.10	2	MCL	**indicator**
Nickel		78	100	BNCAR	below cleanup level
Silver		35	80	MCL	below cleanup level
Vanadium	0.14	673	112	BNCAR	**indicator**
Zinc	0.49	15,000	4,800	BNCAR	**indicator**

BNCAR - MTCA Method B, non-carcinogen [WAC 173-340-720(3)]
BCAR - MTCA Method B, carcinogen [WAC 173-340-720(3)]
A - MTCA Method A [WAC 173-340-720(2)]
MCL - Federal Maximum Contaminant Level
SMCL - Federal Secondary Maximum Contaminant Level
PQL - practical quantitation limit for appropriate EPA method

For chromium, only one sample at one well exceeded the cleanup level. All other detections were below the cleanup level. Therefore it is not considered an indicator.

Table 2. Indicator Substance Screening, Groundwater

Analyte	Frequency of Detection	Maximum Concentration, µg/L	Method B Cleanup Level, µg/L	Basis	Screening Results
Volatile Organics					
1,1,1-Trichloroethane		1.9	200	MCL	below cleanup level
1,1,2,2-Tetrachloroethane	0.002	2.1	0.219	BCAR	≤5% detection freq
1,1,2,2-Tetrachloroethylene	0.01	7	0.858	BCAR	≤5% detection freq
1,1,2-Trichloroethane	0.002	2.1	0.768	BCAR	≤5% detection freq
1,1-Dichloroethane		700	800	BNCAR	below cleanup level
1,1-Dichloroethene	0.03	5	0.073	BCAR	≤5% detection freq
1,2-Dichloroethane	0.14	4.3	1.2	PQL	**indicator**
1,2-Dichloropropane	0.13	14	0.643	BCAR	**indicator**
2-Butanone	0.08	38,000	4,800	BNCAR	indicator
2-Hexanone		160			no toxicity data
Acetone	0.09	2,700,000	800	BNCAR	**indicator**
Benzene	0.13	26	0.795	BCAR	**indicator**
Bromodichloromethane	0.002	1.9	0.71	BCAR	≤5% detection freq
Bromoform		2.1	5.54	BCAR	below cleanup level
Bromomethane		1.5	11.2	BNCAR	below cleanup level
Carbon Tetrachloride	0.005	1.9	0.34	BCAR	≤5% detection freq
Chlorobenzene	0.03	5,140	100	MCL	≤5% detection freq
Chloroform	0.01	15	7.172	BCAR	≤5% detection freq
Chloromethane		0.6	3.365	BCAR	below cleanup level
cis-1,2-dichloroethene	0.20	85	70	MCL	**indicator**
cis-1,3-Dichloropropene	0.004	55	0.243	BCAR	≤5% detection freq
Dibromochloromethane	0.002	2	0.521	BCAR	≤5% detection freq
Ethylbenzene		170	700	MCL	below cleanup level
m,p-Xylene		52	16,000	BNCAR	below cleanup level
Methylene Chloride	0.12	560	5	MCL	**indicator**
Methylisobutylketone	0.03	3,000	640	BNCAR	≤5% detection freq
O-Xylene		23	16,000	BNCAR	below cleanup level
Styrene	0.02	160	1.458	BCAR	≤5% detection freq
Tetrachloroethene	0.21	17	0.858	BCAR	**indicator**
Toluene	0.11	2,300	1,000	MCL	**indicator**
trans-1,2-dichloroethene		3.8	100	BNCAR	below cleanup level
Trichloroethene	0.23	96	3.977	BCAR	**indicator**
Trichlorofluoromethane		1.2	2,400	BNCAR	below cleanup level
Vinyl Acetate		4.3	8,000	BNCAR	below cleanup level
Vinyl Chloride	0.07	78	0.023	BCAR	**indicator**
Xylene (total)		72	10,000	MCL	below cleanup level
Semi-Volatile Organics					
bis(2-ethylhexyl)phthalate	0.09	71	6	MCL	**indicator**
Diethylphthalate		2	12,800	BNCAR	below cleanup level
Di-n-Butylphthalate		1.2	1,600	BNCAR	below cleanup level

BNCAR - MTCA Method B, non-carcinogen [WAC 173-340-720(3)]

BCAR - MTCA Method B, carcinogen [WAC 173-340-720(3)]

PQL - practical quantitation level for appropriate EPA method

Table 2. Indicator Substance Screening, Groundwater (continued)

Indicator Analyte	Method B Cleanup Level, µg/L	Basis	Cancer Risk	Hazard Quotient					
				Taste threshold	Hemotoxicity	Cardiovascular toxicity	Neurotoxicity	Nephrotoxicity	Hepatotoxicity
Conventionals									
n-Ammonia	272,000	BNCAR		1					
Nitrate	1,600	BNCAR			1				
Inorganics									
Arsenic	5	A-bkgrd		not calculated, Method A number					
Barium	560	BNCAR				1			
Lead	15	A-blood		not calculated, Method A number					
Manganese	2,240	BNCAR					1		
Mercury	2	MCL					0.42	0.42	
Vanadium	112	BNCAR							
Zinc	4,800	BNCAR			1				
Volatile Organics									
1,2-Dichloroethane	1.2	PQL	1.00E-06						
1,2-Dichloropropane	0.643	BCAR	1.00E-06						
Acetone	800	BNCAR						1	1
Benzene	0.795	BCAR	1.00E-06						
cis-1,2-dichloroethene	70	MCL			0.88				
Methylene Chloride	5	MCL	8.57E-07						
Tetrachloroethene	0.858	BCAR	1.00E-06						
Toluene	1,000	MCL					0.63	0.63	0.63
Trichloroethene	3.98	BCAR	1.00E-06						
Vinyl Chloride	0.023	BCAR	1.00E-06						
Semi-Volatile Organics									
bis(2-ethylhexyl)phthalate	6	MCL	9.60E-07						
		Totals:	7.82E-06	1.0	2.88	1.0	2.05	2.05	1.63

Table 3. Risk/Hazard Quotient Calculations for Groundwater Indicators

Indicator Analyte	Method B Cleanup Level, µg/L	Basis	Cancer Risk	Hazard Quotient					
				Taste threshold	Hemotoxicity	Cardiovascular toxicity	Neurotoxicity	Nephrotoxicity	Hepatotoxicity
Conventionals									
n-Ammonia	272,000	BNCAR		1					
Nitrate	800	MCL			0.50				
Inorganics									
Arsenic	5	A-bkgrd		not calculated, Method A number					
Barium	560	BNCAR				1			
Lead	15	A-blood		not calculated, Method A number					
Manganese	1,926	BNCAR					0.86		
Mercury	0.4	MCL					0.08	0.08	
Vanadium	112	BNCAR							
Zinc	400	BNCAR			0.08				
Volatile Organics									
1,2-Dichloroethane	1.2	PQL	1.00E-06						
1,2-Dichloropropane	0.643	BCAR	1.00E-06						
Acetone	688	BNCAR						0.86	0.86
Benzene	0.795	BCAR	1.00E-06						
cis-1,2-dichloroethene	33	MCL			0.42				
Methylene Chloride	5	MCL	8.57E-07						
Tetrachloroethene	0.858	BCAR	1.00E-06						
Toluene	100	MCL					0.06	0.06	0.06
Trichloroethene	3.98	BCAR	1.00E-06						
Vinyl Chloride	0.023	BCAR	1.00E-06						
Semi-Volatile Organics									
bis(2-ethylhexyl)phthalate	6	MCL	9.60E-07						
		Totals:	7.82E-06	1.0	1.0	1.0	1.0	1.0	0.92

Table 4. Adjusted Final Groundwater Cleanup Levels

Besides the creek sampling stations, SW-1 and SW-2 were located within landfill runoff drainages, and SW-3 and SW-4 were within drainages that received most of their flow from the landfill. They were sampled during the RI and for the first year after the IA. Again, there were no volatile or semi-volatile organic detections but inorganic detections did exceed background. By capturing and controlling leachate with the leachate collection system installed during the IA, leachate is prevented from reaching off-site surface water. Contaminated runoff from the landfill surface is eliminated by the cap itself. Therefore, surface water was not sampled after the completion of the IA, and is not considered a contaminated media at the site.

4.3 Point of Compliance

The MTCA Cleanup Regulation defines the point of compliance as the point or points where cleanup levels shall be attained. Once cleanup levels are met at the point of compliance, the Site is no longer considered a threat to human health or the environment.

The point of compliance for groundwater is defined in WAC 173-340-720(8). Groundwater points of compliance are established for the entire Site from the top of the saturated zone to the lowest affected portion of the aquifer, which is bedrock at this Site.

5.0 Interim Action Performance Assessment

The Interim Action (IA) addressed groundwater contamination through the installation of the landfill cover system. The cover system prevents precipitation from infiltrating through the waste and becoming leachate. By significantly reducing the amount of leachate that is generated, the potential for groundwater contamination by leachate is also greatly reduced. Groundwater is still potentially impacted by upgradient groundwater moving into and through wastes, and by decomposition of the wastes directly. The monitoring program was designed to assess the amount of reduction of leachate-derived contaminants in groundwater, and therefore measure the effectiveness of the cover system.

To assess the performance of the IA, groundwater was monitored within four different geographic areas based on predominant drainages. Wells were grouped and compared based on these drainages. Each drainage was expected to have slightly different chemistry because its source leachate originates from different wastes. The four drainages are the Northwest, Southwest, South, and Southeast, as shown in Figure 8.

Wells in each drainage were evaluated for three different purposes: performance, to assess the effectiveness of the interim action in reducing contaminant load; compliance, to evaluate groundwater quality with regard to ARARs; and protection, to confirm that human health is being adequately protected. Table 5 shows “last detected” and trend data for indicators in each drainage, and provides a visual aid for the descriptions to follow.

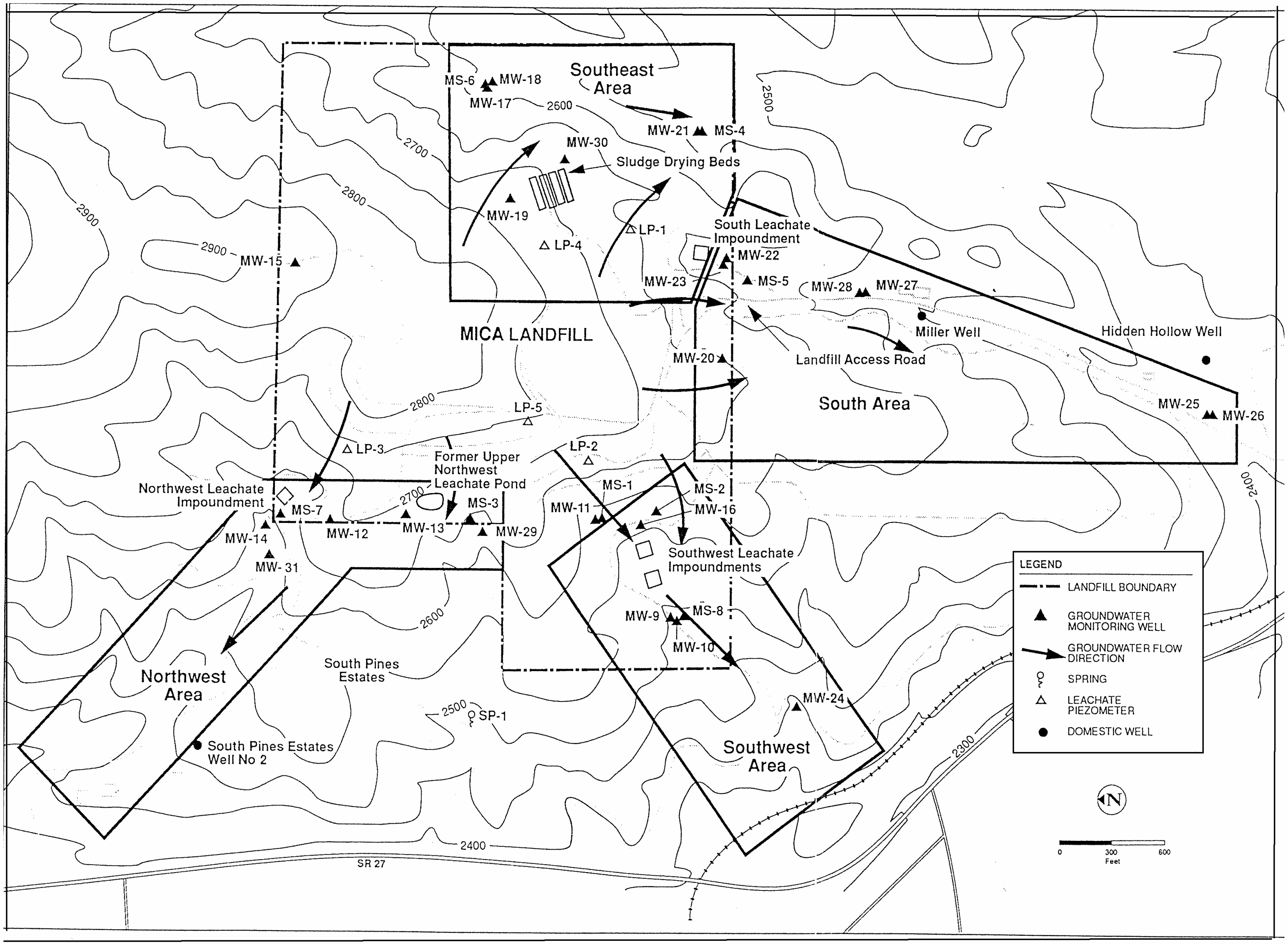

Figure 8. Drainage Subdivisions

Indicator Substance	Northwest Drainage						Southwest Drainage				South Drainage					Southeast Drainage		
	MS-7 (WB)	MW-12 (FB)	**MW-13 (FB)**	**MW-14 (FB)**	**MW-29 (FB)**	**MW-31 (WB)**	**MW-9 (WB)**	**MW-10 (FB)**	MW-11 (WB)	**MW-16 (FB)**	**MS-5 (WB)**	**MW-20 (FB)**	**MW-23 (WB)**	MW-27 (WB)	MW-28 (WB)	**MS-4 (WB)**	MW-18 (FB)	**MW-19 (FB)**
n-Ammonia									most									
Chloride									all									
Nitrate																		
Sulfate																		
Arsenic	all		1992	1992			1992	1992	all	all								
Barium									most									
Iron		1997		1991		1998			all	most ↑								
Lead	1993		1994				1992			1992			1992					
Manganese	all								all	all ↑								
Mercury														1990				1989
Vanadium									1989									
Zinc									only 1989									
1,2-dichloroethane							1995			most			most					
1,2-dichloropropane										all			most					
Acetone									1994	all ↑								
Benzene							1995		1994	all								
cis-1,2-dichloroethene										2000								
Tetrachloroethene			all							most ↓	1995		all dec					
Toluene									1994	1999								
Trichloroethene										all								
Vinyl chloride									1994	all								1994
bis(2-ethylhexyl)phthalate					2000						2000							

bold - well chosen for compliance monitoring	Year listed - the last year an indicator exceeded the cleanup level
↑ or ↓ - concentration has shown increasing or decreasing trends	all/most - all or most of the samples have exceeded the cleanup level

Table 5. Indicator Trends by Drainage

Trends are assessed using the statistical program "Sanitas for Groundwater", which incorporates Mann-Kendal/Sen's Slope Estimator for trend analysis and a combined Shewart-CUSUM method for control charts (Spokane County, 2000). Details on this method are available in the monitoring reports generated quarterly by Spokane County. The trend analyses in these monitoring reports were used to assess various analytes in each drainage, and are included in the discussions below.

5.1 NORTHWEST AREA

The northwest area includes wells MS-3, MS-7, MS-12, MS-13, MS-14, MW-29, MW-31and the South Pines Estates Well #2 (DW-1). Of these, wells 7 and 14 are performance wells, 12, 13, 14, 29, and 31 are compliance wells, and DW-1 is a protection well.

The performance and compliance wells have been sampled for various constituents at various periods throughout the monitoring history. Arsenic, iron, lead, and manganese are the inorganic contaminants which have exceeded their cleanup levels at some point during monitoring. Tetrachloroethene and bis(2-ethylhexyl)phthalate are the only organic compounds which have had exceedances. Of these detected compounds, only arsenic, manganese, and tetrachloroethene have exceeded cleanup levels throughout the entire monitoring period. Arsenic has shown a statistically significant increasing trend, manganese has shown a statistically significant decreasing trend, and tetrachloroethene has remained relatively constant at around 1 ug/L.

The protection well did not show any detections of conventional analytes or volatile organics. Zinc and bis(2-ethylhexyl)phthalate had a few detections exceeding the cleanup level but none later than 1997.

5.2 SOUTHWEST AREA

The southwest area includes wells MS-1, MS-2, MS-8, MW-9, MW-10, MS-11, MW-16, and MW-24. Of these wells, 11 and 16 are performance wells and 9 and 10 are compliance wells.

The southwest drainage appears to have the most significant impacts to groundwater on the property. Wells 11 and 16 have the highest number of indicators with exceedances, while wells 9 and 10 have significantly less. In wells 9 and 10, only arsenic, lead, 1,2-dichloroethane, and benzene have had exceedances, and none occurred later than 1995. Wells 11 and 16 have had exceedances for all indicators except nitrate, sulfate, mercury, and bis(2-ethylhexyl)phthalate. Of these, statistically significant increasing trends in well 11 are observed for barium, chloride, and ammonia, and decreasing trends were observed for arsenic, iron, and manganese. In MW-16, statistically significant increasing trends were noted for chloride, arsenic, barium, iron, manganese, 1,2-dichloroethane, 1,2-dichloropropane, acetone, benzene, toluene, trichloroethene, and vinyl chloride. Decreasing trends were only noted for tetrachloroethene. MW-16 is very close to the buried waste.

5.3 SOUTH AREA

The south area includes wells MS-5, MW-20, MW-22, MW-23, the Hidden Hollow well (DW-

2), and the Miller well (DW-3). Wells 5 and 23 are performance wells, wells 5, 20, 23, 27, and 28 are compliance wells, and DW-2 and DW-3 are protection wells.

Of the five compliance wells, MW-20 and MW-28 had no exceedances for indicator substances throughout monitoring. Wells 5, 23, and 27 had exceedances for lead, mercury, 1,2-dichloroethene, 1,2-dichloropropane, tetrachloroethene, and bis(2-ethylhexyl)phthalate. Mercury has not had an exceedance since 1990, lead since 1992, and tetrachloroethene since 1995. Increasing trends were observed for chloride and 1,2-dichloroethene. Decreasing trends were observed for tetrachloroethene.

The protection wells had no detections of conventional analytes, volatile organics, or semi-volatile organics exceeding cleanup levels. In DW-3, lead was detected once and zinc was detected several times at concentrations above cleanup levels. No exceedances have occurred beyond 1997.

5.4 Southeast Area

The southeast area includes wells MS-4, MS-6, MW-17, MW-18, MW-19, and MW-21. Well 19 is a performance well, and wells 4 and 18 are compliance monitoring wells.

Neither well 4 nor 18 exceeded standards for indicator substances during the performance monitoring period. Well 19 had one exceedance for mercury in 1989, and one exceedance for vinyl chloride in 1994.

5.5 Interim Action Performance Summary

VOCs were not detected in DW-1, DW-2, or DW-3 above cleanup levels. The interim action has achieved the goal of preventing further groundwater contamination by minimizing the generation of leachate and off-property migration. Several contaminants at monitoring wells have shown a reduction in concentration, or have not been detected since the beginning of IA monitoring. A few indicators, mainly in well MW-16, have shown increasing trends. This well appears to be the most contaminated on the site, and is situated the closest to actual waste material. Some slight increases in contaminant concentration are expected due to the loss of dilution from infiltrating surface water. Due to the relatively low permeability of the subsurface materials, it will take a longer time for concentrations to reduce. Continued monitoring should show decreasing trends over time in all contaminants.

The cover has been successful in reducing the infiltration of surface water. Leachate seeps no longer exist, and much of the generated leachate is collected and treated instead of mixing with groundwater.

6.0 Cleanup Action Selection

6.1 Remedial Action Objectives

The remedial action objectives are statements describing the actions necessary to protect human health and the environment through eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route. They are developed considering the characteristics of the contaminated medium, the characteristics of the hazardous substances present, migration and exposure pathways, and potential receptor points.

Groundwater has been contaminated by the former Site activities and is the main affected medium. People may be exposed to contaminated groundwater via ingestion, inhalation of volatile chemicals, or dermal contact. Potential populations include on-site workers, trespassers, residents of nearby neighborhoods, passersby, and off-site workers. Figure 9 illustrates these pathways, revised to reflect the actions taken as part of the IA.

Given these potential exposure pathways, the following are the remedial action objectives for the Site:

- Prevent or minimize direct contact or ingestion of contaminated groundwater by humans
- Prevent or minimize further contamination of groundwater
- Prevent or minimize the runoff of leachate and leachate-contaminated surface water
- Prevent or minimize the buildup of landfill gas pressures to explosive levels
- Prevent or minimize inhalation of landfill gas by humans

6.2 CLEANUP ACTION ALTERNATIVES

Cleanup alternatives to meet these remedial action objectives are normally evaluated as part of the RI/FS for the site. However, no FS was completed for the site and an IA was completed instead. Therefore, the cleanup action alternatives process will involve a comparison of the IA with the IA and additional groundwater treatment, consistent with the EPA Presumptive Remedy for NPL landfills (EPA, 1995).

6.2.1 Alternative 1: Interim Action

The Interim Action included a landfill cover system, leachate and gas collection systems, and stormwater controls. It also includes the maintenance and necessary system upgrades to maintain performance. Groundwater would be monitored to ensure that the cover continues to perform as expected, and to ensure that off-site water supplies are not affected. Fences and signs would be maintained around the site to deter trespassers from accessing the site. Institutional controls, including deed restrictions, would be required to limit the potential for future Site activities to interfere with the effectiveness of the cleanup action. Five-year reviews would be performed by Ecology and the EPA to ensure that the remedy remains protective of human health and the environment.

6.2.2 Alternative 2: Interim Action and Groundwater Extraction

Alternative 2 would require the same controls presented for alternative 1, but would also include a groundwater extraction system. Existing wells, and additional wells, would be utilized to withdraw contaminated groundwater from below the site, where it would be either treated on-site or pumped to an approved off-site treatment facility. Extracted groundwater would need to

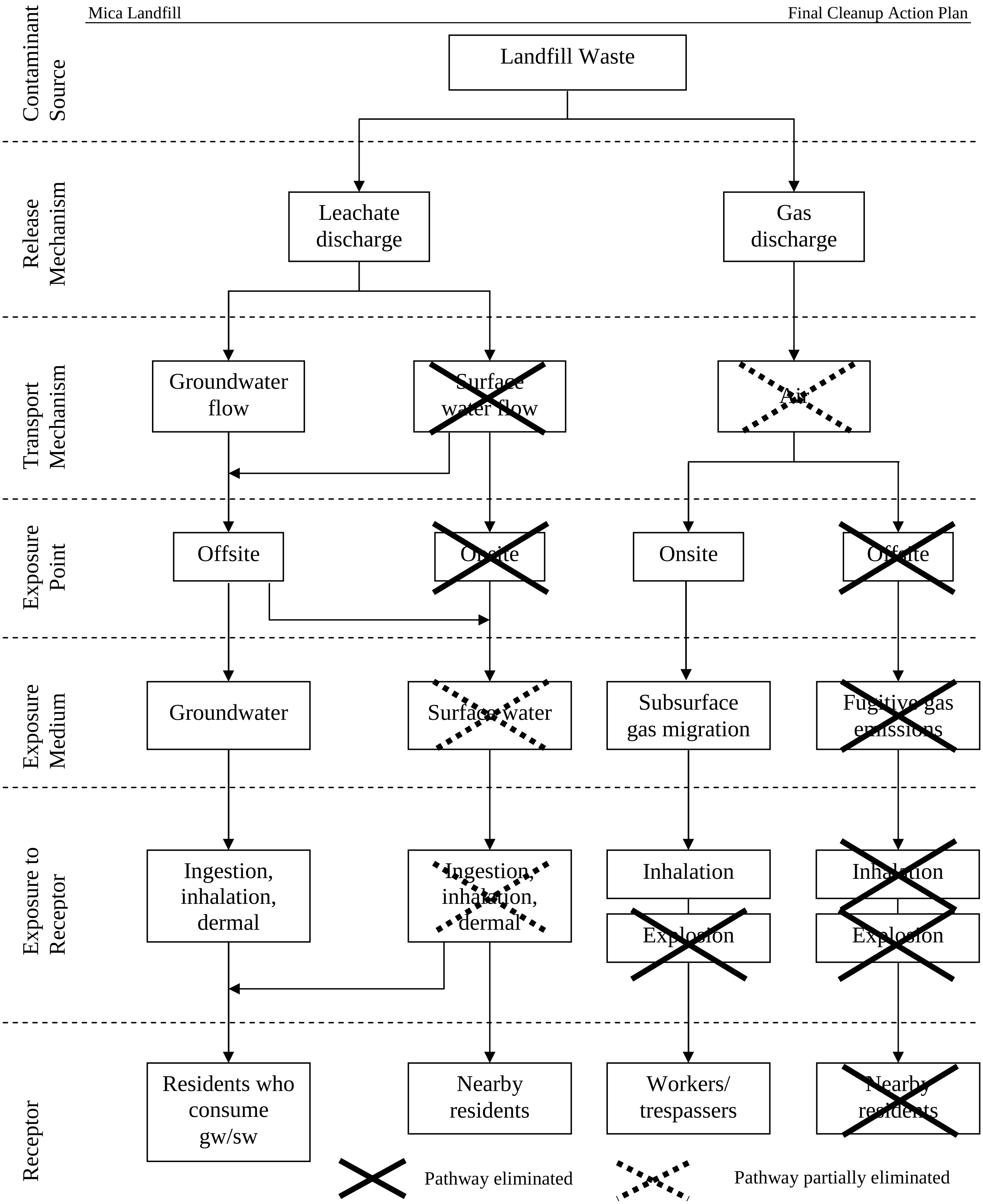

Figure 9. Revised Exposure Pathways

be tested to determine if on-site or off-site treatment would be required. Off-site treatment should be acceptable because leachate is currently treated off-site. Extracted groundwater would likely be more dilute than leachate.

6.3 Regulatory Requirements

The MTCA Cleanup Regulation sets forth the minimum requirements and procedures for selecting a cleanup action. A cleanup action must meet each of the minimum requirements specified in WAC 173-340-360(2), including certain threshold and other requirements. These requirements are outlined below.

6.3.1 Threshold Requirements

WAC 173-340-360(2)(a) requires that the cleanup action shall:

- Protect human health and the environment;
- Comply with cleanup standards (see Section 4.0);
- Comply with applicable state and federal laws (see Section 6.3.5); and
- Provide for compliance monitoring.

6.3.2 Other Requirements

In addition, WAC 173-340-360(2)(b) states that the cleanup action shall:

- Use permanent solutions to the maximum extent practicable;
- Provide for a reasonable restoration time frame; and
- Consider public concerns

WAC 173-340-360(3) describes the specific requirements and procedures for determining whether a cleanup action uses permanent solutions to the maximum extent practicable. A permanent solution is defined as one where cleanup levels can be met without further action being required at the Site other than the disposal of residue from the treatment of hazardous substances. To determine whether a cleanup action uses permanent solutions to the maximum extent practicable, a disproportionate cost analysis is conducted. This analysis compares the costs and benefits of the cleanup action alternatives and involves the consideration of several factors, including:

- Protectiveness;
- Permanent reduction of toxicity, mobility and volume;
- Cost;
- Long-term effectiveness;
- Short-term effectiveness;
- Implementability; and
- Consideration of public concerns.

The comparison of benefits and costs may be quantitative, but will often be qualitative and require the use of best professional judgment.

WAC 173-340-360(4) describes the specific requirements and procedures for determining whether a cleanup action provides for a reasonable restoration time frame.

6.3.3 Groundwater Cleanup Action Requirements

At sites with contaminated groundwater, WAC 173-340-360(2)(c) requires that the cleanup action meet certain additional requirements. For nonpermanent groundwater cleanup actions, the regulation requires that the following two requirements be met:

1) Treatment or removal of the source of the release shall be conducted for liquid wastes, areas of high contamination, areas of highly mobile contaminants, or substances that can't be reliably contained; and
2) Groundwater containment (such as barriers) or control (such as pumping) shall be implemented to the maximum extent practicable.

6.3.4 Cleanup Action Expectations

WAC 173-340-370 sets forth the following expectations for the development of cleanup action alternatives and the selection of cleanup actions. These expectations represent the types of cleanup actions Ecology considers likely results of the remedy selection process; however, Ecology recognizes that there may be some sites where cleanup actions conforming to these expectations are not appropriate.

- Treatment technologies will be emphasized at sites with liquid wastes, areas with high concentrations of hazardous substances, or with highly mobile and/or highly treatable contaminants;
- To minimize the need for long-term management of contaminated materials, hazardous substances will be destroyed, detoxified, and/or removed to concentrations below cleanup levels throughout sites with small volumes of hazardous substances;
- Engineering controls, such as containment, may need to be used at sites with large volumes of materials with relatively low levels of hazardous substances where treatment is impracticable;
- To minimize the potential for migration of hazardous substances, active measures will be taken to prevent precipitation and runoff from coming into contact with contaminated soils or waste materials;
- When hazardous substances remain on-site at concentrations which exceed cleanup levels, they will be consolidated to the maximum extent practicable where needed to minimize the potential for direct contact and migration of hazardous substances;
- For sites adjacent to surface water, active measures will be taken to prevent/minimize releases to that water; dilution will not be the sole method for demonstrating compliance;
- Natural attenuation of hazardous substances may be appropriate at sites under certain specified conditions (see WAC 173-340-370(7)); and

- Cleanup actions will not result in a significantly greater overall threat to human health and the environment than other alternatives.

6.3.5 Applicable, Relevant, and Appropriate, and Local Requirements

WAC 173-340-710(1) requires that all cleanup actions comply with all applicable state and federal law. It further states that the term "applicable state and federal laws" shall include legally applicable requirements and those requirements that the department determines "…are relevant and appropriate requirements." This section discusses applicable state and federal law, relevant and appropriate requirements, and local permitting requirements which were considered and were of primary importance in selecting cleanup requirements. If other requirements are identified at a later date, they will be applied to the cleanup actions at that time.

MTCA provides an exemption from the procedural requirements of several state laws and from any laws authorizing local government permits or approvals for remedial actions. [RCW 70.105D.090] In some cases, however, the substantive requirements of a permit must be met. The procedural requirements of the following state laws are exempted:

- Ch. 70.94 RCW, Washington Clean Air Act;
- Ch. 70.95 RCW, Solid Waste Management, Reduction, and Recycling;
- Ch. 70.105 RCW, Hazardous Waste Management;
- Ch. 75.20 RCW, Construction Projects in State Waters;
- Ch. 90.48 RCW, Water Pollution Control; and
- Ch. 90.58 RCW, Shoreline Management Act of 1971.

WAC 173-340-710(4) sets forth the criteria that Ecology evaluates when determining whether certain requirements are relevant and appropriate for a cleanup action.

Table 6 lists the state and federal laws that contain the applicable or relevant and appropriate requirements that apply to the cleanup action at Mica Landfill. Local laws, which may be more stringent than specified state and federal laws, will govern where applicable.

6.3.6 Terrestrial Ecological Evaluation

Although soil cleanup standards have not been established for this site, the cleanup action must still be protective of the environment. See WAC 173-340-360(2)(a)(i) and 173-340-740(6)(f)(iii). The terrestrial ecological evaluation process set forth in the MTCA Cleanup Regulation may be used to determine whether the cleanup action is protective of the environment. The requirements and procedures for conducting a terrestrial ecological evaluation are set forth in WAC 173-340-7490 through WAC 173-340-7494.

Cleanup Action Implementation	
Ch. 18.104 RCW; Ch. 173-160 WAC	Water Well Construction; Minimum Standards for Construction and Maintenance of Water Wells
Ch. 173-162 WAC	Rules and Regulations Governing the Licensing of Well Contractors and Operators
Ch. 70.105D RCW; Ch. 173-340 WAC	Model Toxics Control Act; MTCA Cleanup Regulation
Ch. 43.21C RCW; Ch. 197-11 WAC	State Environmental Policy Act; SEPA Rules
29 CFR 1910	Occupational Safety and Health Act
Groundwater	
42 USC 300	Safe Drinking Water Act
33 USC 1251; 40 CFR 131	Clean Water Act of 1977; Water Quality Standards
Ch. 70.105D RCW; Ch. 173-340 WAC	Model Toxics Control Act; MTCA Cleanup Regulation
40 CFR 141; 40 CFR 143	National Primary Drinking Water Standards; National Secondary Drinking Water Standards
Ch. 246-290 WAC	Department of Health Standards for Public Water Supplies
Ch. 173-154 WAC	Protection of Upper Aquifer Zones
Ch. 173-200 WAC	Water Quality Standards for Ground Waters of the State of WA
Air	
42 USC 7401; 40 CFR 50	Clean Air Act of 1977; National Ambient Air Quality Standards
Ch. 70.94 RCW; Ch. 43.21A RCW; Ch. 173-400 WAC	Washington Clean Air Act; General Regulations for Air Pollution
Ch. 173-460 WAC	Controls for New Sources of Air Pollution
Ch. 173-470 WAC	Ambient Air Quality Standards for Particulate Matter
SCAPCA Regulation 1 Article VI	Control of Fugitive Emissions
Ch. 70.105D RCW; Ch. 173-340 WAC	Model Toxics Control Act; MTCA Cleanup Regulation
40 CFR Part 28	Criteria for Municipal Solid Waste Landfills
Landfill Closure	
Ch. 70.95 RCW; Ch. 173-304 WAC	Solid Waste Management Recovery and Recycling Act; Minimum Functional Standards for Solid Waste Handling
40 CFR Part 258	Closure Requirements Criteria for Municipal Solid Waste Landfills
Ch. 173-351 WAC	Criteria for Municipal Solid Waste Landfills
Ch. 70.105D RCW; Ch. 173-340 WAC	Model Toxics Control Act; MTCA Cleanup Regulation
42 USC 9601; 40 CFR 260	CERCLA; RCRA
Ch. 173-216 WAC	State Waste Discharge Program

Table 6. Applicable or Relevant and Appropriate Requirements for the Cleanup Action

6.4 Evaluation of Cleanup Action Alternatives

The requirements and criteria outlined in Section 6.3 are used to conduct a comparative evaluation of alternatives 1 and 2 and to select a cleanup action from those alternatives.

6.4.1 Threshold Requirements

6.4.1.1 Protection of Human Health and the Environment

Both alternatives protect human health and the environment. Direct contact with or ingestion of contaminated water and inhalation of fugitive landfill gas by on-site workers are the major routes of exposure. By covering wastes with an impermeable cover system, preventing surface water from interacting with wastes or mingling with leachate, and capturing and destroying landfill gas, these pathways are eliminated. The cover system significantly reduces further contamination of the groundwater by reducing leaching through wastes. Institutional controls will prevent disruption to the cap and thereby prevent exposure to wastes or landfill gas.

6.4.1.2 Compliance with Cleanup Standards

Both alternatives achieve groundwater cleanup standards through on-site containment actions. The use of groundwater extraction under alternative 2 will speed attainment of cleanup standards, but is not necessary to achieve them.

6.4.1.3 Compliance with State and Federal Laws

Both alternatives comply with applicable state and federal laws as identified in Table 6.

6.4.1.4 Provision for Compliance Monitoring

Both alternatives provide for compliance monitoring. Under both alternatives, the compliance monitoring plan that has been operational for the IA will continue to be followed by Spokane County with results submitted to Ecology to meet regulatory requirements.

6.4.2 Other Requirements

6.4.2.1 Use of Permanent Solutions to the Maximum Extent Practicable

As discussed previously, to determine whether a cleanup action uses permanent solutions to the maximum extent practicable, the disproportionate cost analysis specified in the regulation is used. The analysis compares the costs and benefits of the cleanup action alternatives and involves the consideration of several factors. The comparison of costs and benefits may be quantitative, but will often be qualitative and require the use of best professional judgment.

Costs are disproportionate to the benefits if the incremental costs are disproportionate to the incremental benefits. Based on the analysis described below, it has been determined that alternative 1 uses permanent solutions to the maximum extent practicable. The incremental costs of the groundwater extraction system are disproportionate to the incremental benefits of that system. The cost of alternative 1 is less than alternative 2 and provides a similar level of protection for human health and the environment. The cover system will reduce potential exposure routes and limit the migration of contaminants.

- Protectiveness

Overall protectiveness addresses the degree to which existing risks are reduced, time required to reduce risk at the facility and attain cleanup standards, on-site and off-site risks resulting from implementing the alternative, and improvement of the overall environmental quality. Both alternatives will achieve groundwater cleanup standards within a reasonable restoration time frame. Alternative 2 may result in a slightly shorter restoration time frame (and thereby reduced short-term risks), additional on-site and off-site risk during implementation, and an equivalent improvement in overall environmental quality.

- Permanent Reduction of Toxicity, Mobility and Volume

Alternative 1 will provide a permanent reduction in toxicity, mobility and volume of hazardous substances to a certain degree through the covering of contaminated materials and the collection and treatment of leachate and landfill gas. Groundwater monitoring and gas measurements will confirm that this is taking place at the Site. The IA has already achieved a reduction in the volume of contaminants through a reduction in the amount of water moving through wastes. Mobility has also been significantly reduced by the installation of the cover system which prevents precipitation from mobilizing contaminants. Alternative 2 would not significantly change the mobility of contaminants, but would reduce the volume and toxicity of the groundwater in a slightly shorter time frame through removal.

- Cleanup Costs

Alternative 2 would add the additional cost of installing and maintaining a groundwater extraction system. This would be in addition to the required cover system management, system maintenance, and monitoring costs associated with both alternatives.

- Long-Term Effectiveness

Long-term effectiveness addresses the following: degree of certainty that the alternative will be successful, long-term reliability, magnitude of residual risk, and effectiveness of management controls. Alternative 1 is expected to achieve cleanup standards within a reasonable restoration time frame. The long-term effectiveness of alternative 1 is subject to some uncertainty and is dependant on the long-term integrity of the impermeable cover system and management controls. The cover system has already achieved a reduction in leachate volumes and management controls continue to be effective at the site. However, residual risk remains through the continued contamination of groundwater. Alternative 2 is expected to achieve cleanup standards within a comparatively shorter restoration time frame. The addition of a groundwater extraction system slightly increases the chances that the alternative will be successful and slightly reduces the magnitude of residual risk. While alternative 2 would increase the long-term reliability of the cleanup action as a whole, the reliability of the groundwater extraction system itself is more suspect due to the complexity of the system and the site.

- Short-Term Effectiveness

Criteria for short-term effectiveness include protection of human health and the environment during implementation, and the degree of risk prior to attainment of cleanup standards. Since the cover system under alternative 1 has already been implemented as part of the IA, there are only limited risks associated with the continued implementation of alternative 1. Risks in the short-term remain limited primarily to on-site workers who may be in contact with leachate in ponds or gas in the treatment system. These risks are managed through the routine maintenance of leachate and gas removal systems, the monitoring of site conditions before any sampling takes place, and the use of personal protective equipment during sampling at the Site. Alternative 2 would involve additional remedial action in the form of groundwater extraction and therefore a higher degree of short-term risk due to worker exposure to landfill gas and waste when the cap is disrupted.

- Implementability

Alternative 1 has already been successfully implemented. Alternative 2 would be readily implementable, as it is a known and proven technology. However, due to the nature of the competent and weathered bedrock, a groundwater extraction system might be difficult to implement at this Site.

- Consider Public Concerns

The public will have an opportunity to review the Draft Cleanup Action Plan and provide comments to Ecology. These comments will be taken into account when preparing the Final Cleanup Action Plan. A Responsiveness Summary will be prepared to address comments received on this document.

6.4.2.2 Provide a Reasonable Restoration Time Frame

WAC 173-340-360(4) describes the specific requirements and procedures for determining whether a cleanup action provides for a reasonable restoration time frame, as required under subsection (2)(b)(ii). The factors that are used to determine whether a cleanup action provides a reasonable restoration time frame are set forth in WAC 173-340-360(4)(b).

The IA has successfully reduced the amount of leachate generated, and is reducing the concentrations of contaminants reaching groundwater. Due to the uncertainties related to this type of cleanup action, a restoration time frame cannot be clearly determined. It is expected that alternative 1 would meet remedial action goals within 30 years. Alternative 2 would not enhance the actual waste degradation process, but might slightly shorten restoration time frame. Based on factors set forth in the regulation, it has been determined that the projected restoration time frame for alternative 1 is reasonable.

6.4.3 Groundwater Cleanup Action Requirements

As discussed above, a permanent groundwater cleanup action is not practicable. The hydrogeology is quite complex at the site, and as such groundwater in the fractured bedrock is impracticable to contain and/or treat. For nonpermanent groundwater cleanup actions, the regulation sets forth two specific requirements. Both Alternative 1 and 2 would meet these requirements for groundwater in the weathered bedrock. The first requirement has been satisfied since the landfill has no liquid wastes, no specific areas of high contamination or highly mobile contaminants, nor substances that cannot be contained. The second requirement is satisfied by both alternatives. Alternative 1 uses leachate trenches to intercept and contain some of the groundwater in the weathered bedrock, and alternative 2 would use a pump and treat system.

6.4.4 Terrestrial Ecological Evaluation

As noted above, both alternative 1 and alternative 2 are protective of the environment. This determination is based on a terrestrial ecological evaluation conducted under the procedures specified in the regulation.

Under the terrestrial ecological evaluation process, no further evaluation is required if Ecology determines that a site meets one of the four criteria specified in WAC 173-340-7491(1).

- All contaminated soil is below the point of compliance;
- All contaminated soil is or will be covered by buildings, pavement, or other physical barriers;
- A specific amount of contiguous undeveloped land is present on or near the site; the acreage is dependant on the types of contaminants present; or
- Concentrations of hazardous substances in soil do not exceed natural background levels.

These “exclusions” are intended to exclude from further evaluation under the terrestrial ecological evaluation process those sites that do not pose an existing or potential threat to terrestrial ecological receptors.

Ecology has determined that all soil contaminated with hazardous substances is covered by physical barriers that will prevent plants or wildlife from being exposed to the soil contamination. The physical barrier consists of a 60 mil HDPE geomembrane and 2 feet of clean soil (see Section 2.3). The geomembrane should prevent plant roots and burrowing animals from penetrating the barrier. Under both alternatives, institutional controls would be required to ensure the long-term maintenance of the physical barriers that prevent exposure to soil contamination. These controls would need to include a regular inspection program, removal of any trees, and trapping and removal of any burrowing animals. If the inspection indicates erosion damage, then the cover soil must be repaired so that the membrane does not become exposed. If the inspection indicates possible penetration, then the cover soil in the area of penetration will need to be carefully removed and the geomembrane inspected.

6.4.5 Cleanup Action Expectations

The site is adjacent to surface water and consists of large volumes of materials that are remaining on-site. Therefore, in accordance with the expectations outlined in WAC 173-340-370, the selected cleanup action should involve the consolidation of wastes, use active measures to prevent runoff from contacting waste materials, and actively prevent releases to groundwater. Both Alternative 1 and 2 would meet these expectations.

6.5 DECISION

Based on the analysis described above, alternative 1 has been selected as the proposed cleanup action for the Mica Landfill Site. The alternative meets each of the minimum requirements for cleanup actions.

Alternative 1 meets each of the threshold requirements. Furthermore, alternative 1 uses permanent solutions to the maximum extent practicable. The incremental costs of the groundwater extraction system are disproportionate to the incremental benefits of that system. The cost of alternative 1 is less than alternative 2 and provides a similar level of protection for human health and the environment. The cover system will reduce potential exposure routes and limit the migration of contaminants. Alternative 1 provides a reasonable restoration time frame.

7.0 PROPOSED CLEANUP ACTION

The proposed cleanup action for the Site includes many of the same components as the Interim Action (IA) discussed in Section 2.3. The proposed cleanup action includes a landfill cover system, leachate and gas collection systems, and stormwater controls. No additional treatment or engineered controls will be required at the site other than standard maintenance of the cover system and modifications to improve the operation of the existing system. In addition to maintenance of the current systems implemented under the IA, the following additional work will be required.

7.1 GROUNDWATER MONITORING

Groundwater monitoring will be required at the site until cleanup levels are achieved. Monitoring will take place for all 22 indicator substances listed in Table 4 at specified monitoring wells. In addition to the listed indicator substances, general groundwater quality will be monitored for the constituents set forth in WAC 173-351-990 Appendix II. Wells to be monitored are selected based on their location within a drainage, their monitoring history, and their history of contamination. The purpose is to provide adequate coverage in each drainage, provide a mix of wells in both fractured and weathered bedrock, and to ensure that contamination can be sufficiently tracked. The wells that will be monitored as part of the cleanup action are DW-1, DW-2, DW-3, MW-13, MW-14, MW-29, MW-31, MW-9, MW-10, MW-16, MS-5, MW-20, MW-23, MS-4, and MW-19R. The details of these wells, such as drainage and geologic unit, are presented in Table 5 and Section 5.0.

Groundwater monitoring shall use the Sampling and Analysis Plan as guidance. Any adjustments or changes that have been approved by Ecology since publication of that document shall apply. All groundwater samples shall be unfiltered. Specifically, the designated monitoring wells shall be sampled according to the sampling strategy presented in Table 7. After a period of three years, if there have been no exceedances of cleanup levels for bis(2-ethylhexyl)phthalate at a specific well, then Ecology may be petitioned to reduce the sampling frequency at that well to annually. Any exceedances in the neighboring drinking water wells must be reported to Ecology immediately, and appropriate action will be taken. Reports shall be submitted using the same format as the Interim Action Compliance Monitoring reports. Any additional changes to the compliance monitoring plan not already discussed in this CAP must be approved by Ecology.

7.2 INSTITUTIONAL CONTROLS

Institutional controls are measures undertaken to limit or prohibit activities that may interfere with the integrity of a cleanup action or result in exposure to hazardous substances at the site. Such measures are required to assure both the continued protection of human health and the environment and the integrity of the cleanup action whenever hazardous substances remain at the site as concentrations exceeding the applicable cleanup level. Institutional controls are also specifically required to protect terrestrial plants and animals based on the terrestrial ecological evaluation. Institutional controls can include both physical measures and legal and administrative mechanisms. WAC 173-340-440 provides additional information on institutional controls.

Institutional controls are a critical component of the cleanup action plan for Mica Landfill. Residual contamination will remain at depth below the cover system. Both physical controls and legal and administrative mechanisms will be used to ensure the current and future residents do not come into contact with residual contamination and that the integrity of the containment is maintained. Institutional controls will take the form of fences and signs at the property, and restrictive covenants placed with the deed. The restrictive covenants will limit site use with the purpose of minimizing disturbance to the cover system, and will also prevent any excavation, well installation, or withdrawal of water for any purpose other than monitoring on the property.

7.3 FINANCIAL ASSURANCES

WAC 173-340-440 states that financial assurance mechanisms shall be required at sites where the selected cleanup action includes engineered and/or institutional controls. Financial assurances are not required if a PLP can demonstrate that sufficient financial resources are available and in place to provide for long-term effectiveness of engineered and/or institutional controls required in the CAP. Spokane County presently has in place financial assurance mechanisms to provide for the long-term effectiveness of engineered and/or institutional controls within the CAP. These include dedicated funds, general obligation bonds, and various taxes.

7.4 FIVE YEAR REVIEW

WAC 173-340-420 states that at sites where a cleanup action requires an institutional control, a

Table 7. Sampling Guidance

Well ID	Conventionals								Inorganics				Volatiles				Semi-Volatiles			
	Total Organic Carbon & Ammonia				Chloride, Nitrate, Sulfate, Alkalinity, Total Dissolved Solids															
	M	J	S	D	M	J	S	D	M	J	S	D	M	J	S	D	M	J	S	D
MS-13	X		X		X		X		X		X		X		X					
MS-14	X	X	X	X	X		X		X	X	X	X	X	X	X	X				
MW-29	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X		X	
MW-31	X	X	X	X	X		X		X	X	X	X	X	X	X	X				
MW-9	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X		X	
MW-10	X	X	X	X	X		X		X	X	X	X	X	X	X	X				
MW-16	X	X	X	X	X		X		X	X	X	X	X	X	X	X				
MS-5	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X		X	
MW-20	X		X		X		X		X		X		X		X					
MW-23	X	X	X	X	X		X		X	X	X	X	X	X	X	X				
MS-4	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X		X	
MW-19	X	X	X	X	X		X		X	X	X	X	X	X	X	X				
DW-1	X	X	X	X	X*	X*	X*	X*	X	X	X	X	X	X	X	X	X		X	
DW-2	X	X	X	X	X*	X*	X*	X*	X	X	X	X	X	X	X	X	X		X	
DW-3	X	X	X	X	X*	X*	X*	X*	X	X	X	X	X	X	X	X	X		X	

M, J, S, D - March, June, September, December (months during which sampling will take place)

* - Total Dissolved Solids analysis not performed

periodic review shall be completed no less frequently than every five years after the initiation of a cleanup action. Since the waste materials will remain on-site and institutional controls will be required, five year reviews shall take place at this Site. Groundwater monitoring data shall be reviewed to continue to assess the effectiveness of the cover system in reducing leachate production. If concentrations of contaminants in groundwater are not decreasing, then further remedial action will be considered.

8.0 REFERENCES CITED

CH2MHill, 1992, Remedial Investigation Report Volume 1, Mica Landfill, Spokane County WA

CH2MHill, 1993, Interim Action Cover System Preliminary Design Report, Mica Landfill, Spokane County WA

CH2MHill, 1994, Work Plan for Interim Action Compliance Monitoring, Mica Landfill, Spokane County WA

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Spokane County, 1995, Year 1 Annual Monitoring Report, Mica Landfill, Interim Action Compliance Monitoring Program

Spokane County, 2000, Year 5 Annual Monitoring Report, Mica Landfill, Interim Action Compliance Monitoring Program

Weis, P.L., 1968, Geologic Map of the Green Acres Quadrangle, Washington and Idaho, U.S. Geological Survey May GQ-734, Washington D.C.

APPENDIX A
SCHEDULE AND FREQUENCY OF SAMPLING EVENTS AT MONITORING WELLS

For all tables, R = sampled during RI, P = sampled post-RI, I = sampled during IA

CONVENTIONAL ANALYTES

Well ID	n-Ammonia	Chloride	Fluoride	Nitrate	Nitrite	Sulfate
DW-1	R, P, I	R, P, I	R	R, I	R, I	R, P
DW-2	R, P, I	R, P, I	R	R, I	R, I	R, P
DW-3	R, P, I	R, P, I	R	R, I	R, I	R, P
MS-1	R	R	R	R	R	R
MS-2	R	R	R	R	R	R
MS-3	R	R	R	R	R	R
MS-4	R, I	R, I	R	R, I	R, I	R, I
MS-5	R, I	R, I	R	R, I	R, I	R, I
MS-6	R	R	R	R	R	R
MS-7	R, P, I	R, P, I	R	R	R	R, P, I
MS-8	R	R	R	R	R	R
MW-9	R, P, I	R, P, I	R	R, I	R, I	R, P, I
MW-010	R, P, I	R, P, I	R	R, I	R, I	R, P, I
MW-011	R, I	R, I	R	R	R	R, I
MW-012	R, I	R, I	R	R, I	R, I	R, I
MW-013	R, P, I	R, P, I	R	R, I	R, I	R, P, I
MW-014	R, P, I	R, P, I	R	R, I	R, I	R, P, I
MW-015	R, I	R, I	R	R, I	R, I	R, I
MW-016	R, I	R, I	R	R	R	R, I
MW-017	R, P	R, P	R	R	R	R, P
MW-018	R, I	R, I	R	R, I	R, I	R, I
MW-019R	R, I	R, I	R	R	R	R, I
MW-020	R, I	R, I	R	R, I	R, I	R, I
MW-021	R, P	R, P	R	R	R	R, P
MW-022	R, P	R, P	R	R	R	R, P
MW-023	R, P, I	R, P, I	R	R, I	R, I	R, P, I
MW-024	R	R	R	R	R	R
MW-025	R	R	R	R	R	R
MW-026	R, I	R, I	R	R, I	R, I	R, I
MW-027	R, I	R, I	R	R, I	R, I	R, I
MW-028	R, I	R, I	R	R, I	R, I	R, I
MW-029	R, I	R, I	R	R, I	R, I	R, I
MW-030	R	R	R	R	R	R
MW-031	I	I		R, I	R, I	I

INORGANIC COMPOUNDS

Well ID	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide	Iron
DW-1	I	P, I	I	I	R	P, I	R	R	R	R	P, I
DW-2	I	I	I	I	R	P, I	R	R	R	R	P, I
DW-3	I	I	I	I	R	P, I	R	R	R	R	P, I
MS-1					R		R	R	R	R	
MS-2					R		R	R	R	R	
MS-3					R		R	R	R	R	
MS-4	I	I	I	I	R	I	R	R	R	R	I
MS-5	I	I	I	I	R	I	R	R	R	R	I
MS-6					R		R	R	R	R	
MS-7	I	I	I	I	R	P, I	R	R	R	R	P, I
MS-8					R		R	R	R	R	
MW-9	I	I	I	I	R	P, I	R	R	R	R	P, I
MW-010	I	I	I	I	R	P, I	R	R	R	R	P, I
MW-011	I	I	I	I	R	I	R	R	R	R	I
MW-012	I	I	I	I	R	I	R	R	R	R	I
MW-013	I	I	I	I	R	P, I	R	R	R	R	P, I
MW-014	I	I	I	I	R	P, I	R	R	R	R	P, I
MW-015	I	I	I	I	R	I	R	R	R	R	I
MW-016		I	I		R	P, I	R	R	R	R	P, I
MW-017					R	P	R	R	R	R	P
MW-018	I	I	I	I	R	I	R	R	R	R	I
MW-019R		I	I		R	I	R	R	R	R	I
MW-020	I	I	I	I	R	I	R	R	R	R	I
MW-021					R	P	R	R	R	R	P
MW-022					R	P	R	R	R	R	P
MW-023	I	I	I	I	R	P, I	R	R	R	R	P, I
MW-024					R		R	R	R	R	
MW-025					R		R	R	R	R	
MW-026	I	I	I	I	R	I	R	R	R	R	I
MW-027	I	I	I	I	R	I	R	R	R	R	I
MW-028	I	I	I	I	R	I	R	R	R	R	I
MW-029	I	I	I	I	R	I	R	R	R	R	I
MW-030					R		R	R	R	R	
MW-031	I	I	I	I		I					I

INORGANIC COMPOUNDS (CONTINUED)

Well ID	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silicate	Silver	Sodium	Thallium	Vanadium	Zinc
DW-1	P, I	P, I	P, I	I	R		R	R	R	P, I	R	I	P, I
DW-2	P, I	P, I	P, I	I	R		R	R	R	P, I	R	I	P, I
DW-3	P, I	P, I	P, I	I	R		R	R	R	P, I	R	I	P, I
MS-1					R		R	R	R		R		
MS-2					R		R	R	R		R		
MS-3					R		R	R	R		R		
MS-4	I	I	I	I	R	I	R	R	R	I	R	I	I
MS-5	I	I	I	I	R	I	R	R	R	I	R	I	I
MS-6					R		R	R	R		R		
MS-7	P, I	P, I	P, I	I	R	I	R	R	R	P, I	R	I	P, I
MS-8					R		R	R	R		R		
MW-9	P, I	P, I	P, I	I	R	I	R	R	R	P, I	R	I	P, I
MW-010	P, I	P, I	P, I	I	R	I	R	R	R	P, I	R	I	P, I
MW-011	I	I	I	I	R	I	R	R	R	I	R	I	I
MW-012	I	I	I	I	R	I	R	R	R	I	R	I	I
MW-013	P, I	P, I	P, I	I	R	I	R	R	R	P, I	R	I	P, I
MW-014	P, I	P, I	P, I	I	R	I	R	R	R	P, I	R	I	P, I
MW-015	I	I	I	I	R	I	R	R	R	I	R	I	I
MW-016	P	P, I	P, I		R	I	R	R	R	P, I	R		P, I
MW-017	P	P	P		R		R	R	R	P	R		P
MW-018	I	I	I	I	R	I	R	R	R	I	R	I	I
MW-019R		I	I		R	I	R	R	R	I	R		I
MW-020	I	I	I	I	R	I	R	R	R	I	R	I	I
MW-021	P	P	P		R		R	R	R	P	R		P
MW-022	P	P	P		R		R	R	R	P	R		P
MW-023	P, I	P, I	P, I	I	R	I	R	R	R	P, I	R	I	P, I
MW-024					R		R	R	R		R		
MW-025					R		R	R	R		R		
MW-026	I	I	I	I	R	I	R	R	R	I	R	I	I
MW-027	I	I	I	I	R	I	R	R	R	I	R	I	I
MW-028	I	I	I	I	R	I	R	R	R	I	R	I	I
MW-029	I	I	I	I	R	I	R	R	R	I	R	I	I
MW-030					R		R	R	R		R		
MW-031	I	I	I	I		I				I		I	I

VOLATILE ORGANIC COMPOUNDS

Analyte	DW-1	DW-2	DW-3	MS-1	MS-2	MS-3	MS-4	MS-5	MS-6	MS-7	MS-8
1,1,1-Trichloroethane	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
1,1,2,2-Tetrachloroethane	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
1,1,2,2-Tetrachloroethylene	R	R	R	R	R	R	R	R	R	R	R
1,1,2-Trichloroethane	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
1,1-Dichloroethane	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
1,1-Dichloroethene	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
1,2-Dichloroethane	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
1,2-Dichloroethene (total)	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
1,2-Dichloropropane	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
2-Butanone	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
2-Chloroethyl Vinyl Ether	I	I	I				I	I		I	
2-Hexanone	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
4-Methyl-2-Pentanone	P, I	P, I	P, I				I	I		P, I	
Acetone	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Benzene	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Bromodichloromethane	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Bromoform	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Bromomethane	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Carbon Disulfide	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Carbon Tetrachloride	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Chlorobenzene	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Chloroethane	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Chloroform	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Chloromethane	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
cis-1,2-dichloroethene	P, I	P, I	P, I				I	I		P, I	
cis-1,3-Dichloropropene	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Dibromochloromethane	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Ethylbenzene	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
m,p-Xylene	I	I	I				I	I		I	
Methylene Chloride	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Methylisobutylketone	R	R	R	R	R	R	R	R	R	R	R
Styrene	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Tetrachloroethene	P, I	P, I	P, I				I	I		P, I	
Toluene	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Total trihalomethanes	R	R	R	R	R	R	R	R	R	R	R
trans-1,2-dichloroethene	P, I	P, I	P, I				I	I		P, I	
trans-1,3-Dichloropropene	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Trichloroethene	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Trichlorofluoromethane	I	I	I				I	I		I	
Trichlorotrifluoroethane	I	I	I				I	I		I	
Vinyl Acetate	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Vinyl Chloride	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R
Xylene (total)	R, P, I	R, P, I	R, P, I	R	R	R	R, I	R, I	R	R, P, I	R

VOLATILE ORGANIC COMPOUNDS (CONTINUED)

Analyte	MW-9	MW-010	MW-011	MW-012	MW-013	MW-014	MW-015	MW-016
1,1,1-Trichloroethane	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
1,1,2,2-Tetrachloroethane	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
1,1,2,2-Tetrachloroethylene	R	R	R	R	R	R	R	R
1,1,2-Trichloroethane	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
1,1-Dichloroethane	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
1,1-Dichloroethene	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
1,2-Dichloroethane	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
1,2-Dichloroethene (total)	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I
1,2-Dichloropropane	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
2-Butanone	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
2-Chloroethyl Vinyl Ether	I	I	I	I	I	I	I	I
2-Hexanone	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
4-Methyl-2-Pentanone	P, I	P, I	I	I	P, I	P, I	I	P, I
Acetone	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Benzene	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Bromodichloromethane	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Bromoform	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Bromomethane	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Carbon Disulfide	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Carbon Tetrachloride	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Chlorobenzene	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Chloroethane	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Chloroform	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Chloromethane	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
cis-1,2-dichloroethene	P, I	P, I	I	I	P, I	P, I	I	P, I
cis-1,3-Dichloropropene	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Dibromochloromethane	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Ethylbenzene	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
m,p-Xylene	I	I	I	I	I	I	I	I
Methylene Chloride	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Methylisobutylketone	R	R	R	R	R	R	R	R
Styrene	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Tetrachloroethene	P, I	P, I	I	I	P, I	P, I	I	P, I
Toluene	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Total trihalomethanes	R	R	R	R	R	R	R	R
trans-1,2-dichloroethene	P, I	P, I	I	I	P, I	P, I	I	P, I
trans-1,3-Dichloropropene	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Trichloroethene	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Trichlorofluoromethane	I	I	I	I	I	I	I	I
Trichlorotrifluoroethane	I	I	I	I	I	I	I	I
Vinyl Acetate	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Vinyl Chloride	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I
Xylene (total)	R, P, I	R, P, I	R, I	R, I	R, P, I	R, P, I	R, I	R, P, I

VOLATILE ORGANIC COMPOUNDS (CONTINUED)

Analyte	MW-017	MW-018	MW-019R	MW-020	MW-021	MW-022	MW-023
1,1,1-Trichloroethane	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
1,1,2,2-Tetrachloroethane	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
1,1,2,2-Tetrachloroethylene	R	R	R	R	R	R	R
1,1,2-Trichloroethane	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
1,1-Dichloroethane	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
1,1-Dichloroethene	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
1,2-Dichloroethane	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
1,2-Dichloroethene (total)	R	R, I	R, I	R, I	R	R	R, I
1,2-Dichloropropane	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
2-Butanone	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
2-Chloroethyl Vinyl Ether		I	I	I			I
2-Hexanone	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
4-Methyl-2-Pentanone	P	I	I	I	P	P	P, I
Acetone	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Benzene	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Bromodichloromethane	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Bromoform	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Bromomethane	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Carbon Disulfide	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Carbon Tetrachloride	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Chlorobenzene	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Chloroethane	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Chloroform	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Chloromethane	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
cis-1,2-dichloroethene	P	I	I	I	P	P	P, I
cis-1,3-Dichloropropene	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Dibromochloromethane	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Ethylbenzene	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
m,p-Xylene		I	I	I			I
Methylene Chloride	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Methylisobutylketone	R	R	R	R	R	R	R
Styrene	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Tetrachloroethene	P	I	I	I	P	P	P, I
Toluene	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Total trihalomethanes	R	R	R	R	R	R	R
trans-1,2-dichloroethene	P	I	I	I	P	P	P, I
trans-1,3-Dichloropropene	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Trichloroethene	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Trichlorofluoromethane		I	I	I			I
Trichlorotrifluoroethane		I	I	I			I
Vinyl Acetate	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Vinyl Chloride	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I
Xylene (total)	R, P	R, I	R, I	R, I	R, P	R, P	R, P, I

VOLATILE ORGANIC COMPOUNDS (CONTINUED)

Analyte	MW-024	MW-025	MW-026	MW-027	MW-028	MW-029	MW-030	MW-031
1,1,1-Trichloroethane	R	R	R, I	R, I	R, I	R, I	R	I
1,1,2,2-Tetrachloroethane	R	R	R, I	R, I	R, I	R, I	R	I
1,1,2,2-Tetrachloroethylene	R	R	R	R	R	R	R	
1,1,2-Trichloroethane	R	R	R, I	R, I	R, I	R, I	R	I
1,1-Dichloroethane	R	R	R, I	R, I	R, I	R, I	R	I
1,1-Dichloroethene	R	R	R, I	R, I	R, I	R, I	R	I
1,2-Dichloroethane	R	R	R, I	R, I	R, I	R, I	R	I
1,2-Dichloroethene (total)	R	R	R, I	R, I	R, I	R, I	R	I
1,2-Dichloropropane	R	R	R, I	R, I	R, I	R, I	R	I
2-Butanone	R	R	R, I	R, I	R, I	R, I	R	I
2-Chloroethyl Vinyl Ether			I	I	I	I		I
2-Hexanone	R	R	R, I	R, I	R, I	R, I	R	I
4-Methyl-2-Pentanone			I	I	I	I		I
Acetone	R	R	R, I	R, I	R, I	R, I	R	I
Benzene	R	R	R, I	R, I	R, I	R, I	R	I
Bromodichloromethane	R	R	R, I	R, I	R, I	R, I	R	I
Bromoform	R	R	R, I	R, I	R, I	R, I	R	I
Bromomethane	R	R	R, I	R, I	R, I	R, I	R	I
Carbon Disulfide	R	R	R, I	R, I	R, I	R, I	R	I
Carbon Tetrachloride	R	R	R, I	R, I	R, I	R, I	R	I
Chlorobenzene	R	R	R, I	R, I	R, I	R, I	R	I
Chloroethane	R	R	R, I	R, I	R, I	R, I	R	I
Chloroform	R	R	R, I	R, I	R, I	R, I	R	I
Chloromethane	R	R	R, I	R, I	R, I	R, I	R	I
cis-1,2-dichloroethene			I	I	I	I		I
cis-1,3-Dichloropropene	R	R	R, I	R, I	R, I	R, I	R	I
Dibromochloromethane	R	R	R, I	R, I	R, I	R, I	R	I
Ethylbenzene	R	R	R, I	R, I	R, I	R, I	R	I
m,p-Xylene			I	I	I	I		I
Methylene Chloride	R	R	R, I	R, I	R, I	R, I	R	I
Methylisobutylketone	R	R	R	R	R	R	R	
Styrene	R	R	R, I	R, I	R, I	R, I	R	I
Tetrachloroethene			I	I	I	I		I
Toluene	R	R	R, I	R, I	R, I	R, I	R	I
Total trihalomethanes	R	R	R	R	R	R	R	
trans-1,2-dichloroethene			I	I	I	I		I
trans-1,3-Dichloropropene	R	R	R, I	R, I	R, I	R, I	R	I
Trichloroethene	R	R	R, I	R, I	R, I	R, I	R	I
Trichlorofluoromethane			I	I	I	I		I
Trichlorotrifluoroethane			I	I	I	I		I
Vinyl Acetate	R	R	R, I	R, I	R, I	R, I	R	I
Vinyl Chloride	R	R	R, I	R, I	R, I	R, I	R	I
Xylene (total)	R	R	R, I	R, I	R, I	R, I	R	I

SEMI-VOLATILE ORGANIC COMPOUNDS

Analyte	DW-1	DW-2	DW-3	MS-1	MS-2	MS-3	MS-4	MS-5	MS-6	MS-7	MS-8
1,2,4-Naphthalene	R	R	R	R	R	R	R	R	R	R	R
1,2,4-Trichlorobenzene	I	I	I				I	I		I	
1,2-Dichlorobenzene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
1,3-Dichlorobenzene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
1,4-Dichlorobenzene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
2,2'-oxybis(1-chloropropane)	I	I	I				I	I		I	
2,4,5-Trichlorophenol	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
2,4,6-Trichlorophenol	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
2,4-Benzoic acid	R	R	R	R	R	R	R	R	R	R	R
2,4-Dichlorophenol	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
2,4-Dimethylphenol	I	I	I				I	I		I	
2,4-Dinitrophenol	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
2,4-Dinitrotoluene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
2,4-Trichlorobenzene	R	R	R	R	R	R	R	R	R	R	R
2,6-Dinitrotoluene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
2-Chloronaphthalene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
2-Chlorophenol	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
2-Methylnaphthalene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
2-Methylphenol	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
2-Nitroaniline	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
2-Nitrophenol	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
3,3'-Dichlorobenzidine	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
3-Nitroaniline	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
4,6-Dinitro-2-methylphenol	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
4-Bromophenyl-phenylether	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
4-Chloro-3-Methylphenol	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
4-Chloroaniline	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
4-Chlorophenyl-phenylether	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
4-Methylphenol	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
4-Nitroaniline	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
4-Nitrophenol	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
Acenaphthene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
Acenaphthylene	I	I	I				I	I		I	
Anthracene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
Benzo(a)Anthracene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
Benzo(a)Pyrene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R
Benzo(b)Fluoranthene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I	R

SEMI-VOLATILE ORGANIC COMPOUNDS (CONTINUED)

Analyte	MW-9	MW-010	MW-011	MW-012	MW-013	MW-014	MW-015	MW-016	MW-017	MW-018	MW-019R
1,2,4-Naphthalene	R	R	R	R	R	R	R	R	R	R	R
1,2,4-Trichlorobenzene	I	I	I	I	I	I	I	I		I	I
1,2-Dichlorobenzene	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
1,3-Dichlorobenzene	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
1,4-Dichlorobenzene	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
2,2'-oxybis(1-chloropropane)	I	I	I	I	I	I	I	I		I	I
2,4,5-Trichlorophenol	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
2,4,6-Trichlorophenol	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
2,4-Benzoic acid	R	R	R	R	R	R	R	R	R	R	R
2,4-Dichlorophenol	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
2,4-Dimethylphenol	I	I	I	I	I	I	I	I		I	I
2,4-Dinitrophenol	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
2,4-Dinitrotoluene	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
2,4-Trichlorobenzene	R	R	R	R	R	R	R	R	R	R	R
2,6-Dinitrotoluene	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
2-Chloronaphthalene	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
2-Chlorophenol	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
2-Methylnaphthalene	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
2-Methylphenol	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
2-Nitroaniline	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
2-Nitrophenol	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
3,3'-Dichlorobenzidine	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
3-Nitroaniline	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
4,6-Dinitro-2-methylphenol	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
4-Bromophenyl-phenylether	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
4-Chloro-3-Methylphenol	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
4-Chloroaniline	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
4-Chlorophenyl-phenylether	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
4-Methylphenol	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
4-Nitroaniline	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
4-Nitrophenol	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Acenaphthene	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Acenaphthylene	I	I	I	I	I	I	I	I		I	I
Anthracene	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Benzo(a)Anthracene	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Benzo(a)Pyrene	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Benzo(b)Fluoranthene	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I

SEMI-VOLATILE ORGANIC COMPOUNDS (CONTINUED)

Analyte	MW-020	MW-021	MW-022	MW-023	MW-024	MW-025	MW-026	MW-027	MW-028	MW-029	MW-030	MW-031
1,2,4-Naphthalene	R	R	R	R	R	R	R	R	R	R	R	
1,2,4-Trichlorobenzene	I			I			I	I	I	I		I
1,2-Dichlorobenzene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
1,3-Dichlorobenzene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
1,4-Dichlorobenzene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
2,2'-oxybis(1-chloropropane)	I			I			I	I	I	I		I
2,4,5-Trichlorophenol	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
2,4,6-Trichlorophenol	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
2,4-Benzoic acid	R	R	R	R	R	R	R	R	R	R	R	
2,4-Dichlorophenol	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
2,4-Dimethylphenol	I			I			I	I	I	I		I
2,4-Dinitrophenol	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
2,4-Dinitrotoluene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
2,4-Trichlorobenzene	R	R	R	R	R	R	R	R	R	R	R	
2,6-Dinitrotoluene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
2-Chloronaphthalene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
2-Chlorophenol	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
2-Methylnaphthalene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
2-Methylphenol	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
2-Nitroaniline	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
2-Nitrophenol	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
3,3'-Dichlorobenzidine	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
3-Nitroaniline	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
4,6-Dinitro-2-methylphenol	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
4-Bromophenyl-phenylether	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
4-Chloro-3-Methylphenol	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
4-Chloroaniline	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
4-Chlorophenyl-phenylether	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
4-Methylphenol	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
4-Nitroaniline	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
4-Nitrophenol	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Acenaphthene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Acenaphthylene	I			I			I	I	I	I		I
Anthracene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Benzo(a)Anthracene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Benzo(a)Pyrene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Benzo(b)Fluoranthene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I

SEMI-VOLATILE ORGANIC COMPOUNDS (CONTINUED)

Analyte	DW-1	DW-2	DW-3	MS-1	MS-2	MS-3	MS-4	MS-5	MS-6	MS-7
Benzo(g,h,i)Perylene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Benzo(k)Fluoranthene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Benzyl alcohol	R	R	R	R	R	R	R	R	R	R
bis(2-Chloroethoxy)Methane	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
bis(2-Chloroethyl)Ether	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
bis(2-chloroisopropyl)Ether	R	R	R	R	R	R	R	R	R	R
bis(2-Ethylhexyl)Phthalate	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Butylbenzylphthalate	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Carbazole	I	I	I				I	I		I
Chrysene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Dibenz(a,h)Anthracene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Dibenzofuran	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Diethylphthalate	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Dimethylphenol	R	R	R	R	R	R	R	R	R	R
Dimethylphthalate	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Di-n-Butylphthalate	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Di-n-Octyl Phthalate	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Di-n-Propylamine	R	R	R	R	R	R	R	R	R	R
Fluoranthene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Fluorene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Hexachlorobenzene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Hexachlorobutadiene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Hexachlorocyclopentadiene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Hexachloroethane	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Indeno(1,2,3-cd)Pyrene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Isophorone	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Napthalene	I	I	I				I	I		I
Nitrobenzene	I	I	I				I	I		I
N-Nitrosochloroethane	R	R	R	R	R	R	R	R	R	R
N-Nitroso-Di-n-Propylamine	I	I	I				I	I		I
N-Nitrosodiphenylamine (1)	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Pentachlorophenol	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Phenanthrene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I
Phenol	I	I	I				I	I		I
Pyrene	R, I	R, I	R, I	R	R	R	R, I	R, I	R	R, I

SEMI-VOLATILE ORGANIC COMPOUNDS (CONTINUED)

Analyte	MS-8	MW-9	MW-010	MW-011	MW-012	MW-013	MW-014	MW-015	MW-016	MW-017	MW-018	MW-019R
Benzo(g,h,i)Perylene	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Benzo(k)Fluoranthene	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Benzyl alcohol	R	R	R	R	R	R	R	R	R	R	R	R
bis(2-Chloroethoxy)Methane	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
bis(2-Chloroethyl)Ether	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
bis(2-chloroisopropyl)Ether	R	R	R	R	R	R	R	R	R	R	R	R
bis(2-Ethylhexyl)Phthalate	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Butylbenzylphthalate	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Carbazole		I	I	I	I	I	I	I	I		I	I
Chrysene	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Dibenz(a,h)Anthracene	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Dibenzofuran	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Diethylphthalate	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Dimethylphenol	R	R	R	R	R	R	R	R	R	R	R	R
Dimethylphthalate	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Di-n-Butylphthalate	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Di-n-Octyl Phthalate	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Di-n-Propylamine	R	R	R	R	R	R	R	R	R	R	R	R
Fluoranthene	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Fluorene	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Hexachlorobenzene	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Hexachlorobutadiene	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Hexachlorocyclopentadiene	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Hexachloroethane	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Indeno(1,2,3-cd)Pyrene	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Isophorone	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Napthalene		I	I	I	I	I	I	I	I		I	I
Nitrobenzene		I	I	I	I	I	I	I	I		I	I
N-Nitrosochloroethane	R	R	R	R	R	R	R	R	R	R	R	R
N-Nitroso-Di-n-Propylamine		I	I	I	I	I	I	I	I		I	I
N-Nitrosodiphenylamine (1)	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Pentachlorophenol	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Phenanthrene	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I
Phenol		I	I	I	I	I	I	I	I		I	I
Pyrene	R	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R, I	R	R, I	R, I

SEMI-VOLATILE ORGANIC COMPOUNDS (CONTINUED)

Analyte	MW-020	MW-021	MW-022	MW-023	MW-024	MW-025	MW-026	MW-027	MW-028	MW-029	MW-030	MW-031
Benzo(g,h,i)Perylene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Benzo(k)Fluoranthene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Benzyl alcohol	R	R	R	R	R	R	R	R	R	R	R	
bis(2-Chloroethoxy)Methane	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
bis(2-Chloroethyl)Ether	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
bis(2-chloroisopropyl)Ether	R	R	R	R	R	R	R	R	R	R	R	
bis(2-Ethylhexyl)Phthalate	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Butylbenzylphthalate	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Carbazole	I			I			I	I	I	I		I
Chrysene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Dibenz(a,h)Anthracene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Dibenzofuran	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Diethylphthalate	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Dimethylphenol	R	R	R	R	R	R	R	R	R	R	R	
Dimethylphthalate	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Di-n-Butylphthalate	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Di-n-Octyl Phthalate	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Di-n-Propylamine	R	R	R	R	R	R	R	R	R	R	R	
Fluoranthene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Fluorene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Hexachlorobenzene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Hexachlorobutadiene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Hexachlorocyclopentadiene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Hexachloroethane	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Indeno(1,2,3-cd)Pyrene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Isophorone	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Napthalene	I			I			I	I	I	I		I
Nitrobenzene	I			I			I	I	I	I		I
N-Nitrosochloroethane	R	R	R	R	R	R	R	R	R	R	R	
N-Nitroso-Di-n-Propylamine	I			I			I	I	I	I		I
N-Nitrosodiphenylamine (1)	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Pentachlorophenol	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Phenanthrene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I
Phenol	I			I			I	I	I	I		I
Pyrene	R, I	R	R	R, I	R	R	R, I	R, I	R, I	R, I	R	I

APPENDIX B
SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write “do not know” or “does not apply.” Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for nonproject proposals:

Complete this checklist for nonproject proposals, even though questions may be answered “does not apply.” IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D).

For nonproject actions, the references in the checklist to the words “project,” “applicant,” and “property or site” should be read as “proposal,” “proposer,” and “affected geographic area,” respectively.

A. BACKGROUND

1. Name of proposed project, if applicable:
   Mica Landfill Cleanup Action Plan

2. Name of applicant:
   Department of Ecology Toxics Cleanup Program

3. Address and phone number of applicant and contact person:
   Sandra Treccani, Site Manager
   4601 N. Monroe

Spokane, WA 99203
(509)456-2740

4. Date checklist prepared:
   7/30/01

5. Agency requesting checklist:
   Department of Ecology

6. Proposed timing or schedule (including phasing, if applicable):
   Finalized Cleanup Action Plan (CAP) by October 2001.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.
   Long-term monitoring of Final Cleanup Action shall take place for 30 years, with reviews taking place at five year intervals. Groundwater sampling will take place on a quarterly basis to fulfill requirements of the CAP.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.
   The only document related to this proposal is the CAP. The CAP was prepared using existing site information in the official site file at Ecology's Eastern Regional Office (see Section 10.0 of the CAP for the specific documents used).

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.
   The Final CAP will represent local, state and federal governmental approval of the proposal. Local, state and federal agencies will have opportunity to comment on both the CAP and related SEPA documents.

10. List any government approvals or permits that will be needed for your proposal, if known.
    State and local approval for the institutional controls.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)
    The proposal will require quarterly groundwater monitoring at the site and institutional controls. Quarterly groundwater monitoring will be commensurate with the Work Plan for Interim Action Monitoring. Institutional controls will require the maintenance of site fences, signs, and other access controls. All landfill gas and leachate control systems will be maintained to ensure proper performance. Deed restrictions will notify the public of the presence of the landfill cover system and related controls, and prevent any land use that will interfere with the integrity of the cap or operation of the control systems.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.
    Mica Landfill is located approximately 11 miles southeast of Spokane, WA, and 1.5 miles north of the town of Mica, as show in figure 1 of the CAP. The site occupies 161 acres east

of State Highway 27 in portions of Sections 11, 14, and 15 in Township 24N, Range 44E. In addition to the 161 acres permitted as a landfill, Spokane County owns 52 acres of land adjacent to the west side of the site.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one: rolling, hilly, steep slopes, mountainous, other)
hilly

b. What is the steepest slope on the site (approximate percent slope)?
The steepest grade is 45% on the northern boundary of the landfill.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.
The bedrock underlying the site is Precambrian Chester Creek Gneiss which is coarse-grained and mica-rich. Overlying sediments consist of partially weathered to decomposed bedrock and brown to tan loess of the Pleistocene Palouse Formation. The loess consists predominantly of silt and clay-sized particles. The landfill cover soils are characterized as primarily granular material, with variable amounts of clay and silt.

d. Are there surface indications or history of unstable soils in the immediate vicinity'? If so, describe.
No.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.
No filling or grading is proposed.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.
N/A.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?
N/A

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:
N/A

2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.
None.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.
None.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:
N/A

3. Water

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)'? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.
None. There are no perennial streams on the site and surface water flow generally occurs only during rainfall and snow melt events. With the exception of the northwest portion of the site, surface water runoff from Mica Landfill is directed to Chester Creek through drainages that radiate from the high central areas of the site. Runoff from the northwest portion of the site drains northward toward the town of Opportunity in an intermittent drainage.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.
N/A

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.
N/A

4) Will the proposal require surface water withdrawals or diversions'? Give general description, purpose, and approximate quantities if known.
N/A

5) Does the proposal lie within a 100-year floodplain'? If so, note location on the site plan.
No.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.
N/A

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.
Groundwater will be withdrawn on a quarterly basis from wells specified in the CAP for monitoring purposes. Low flow sampling techniques are used so the quantities are expected to be small.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.
N/A

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and

disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters'? If so, describe.
Stormwater runoff from both onsite and offsite tributary areas is intercepted prior to contacting any refuse, collected, and conveyed to existing stormwater discharge locations.

2) Could waste materials enter ground or surface waters? If so, generally describe.
Waste materials in the form of leachate do enter groundwater. Features of the cover system are designed to minimize this, and groundwater data shows that the cover system is achieving this goal

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:
Proposed groundwater monitoring will ensure that contaminant concentrations continue to decrease. Nearby drinking water wells are monitored specifically to ensure that these supplies are protected.

4. Plants

a. Check or circle types of vegetation found on the site:

___deciduous tree: alder, maple, aspen, other

_X_evergreen tree: fir, cedar, pine, other

_X_shrubs

_X_grass

___pasture

___crop or grain

___wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other

___water plants: water lily, eelgrass, milfoil, other

_X_other types of vegetation: *broadleaf weeds*

b. What kind and amount of vegetation will be removed or altered?
N/A

c. List threatened or endangered species known to be on or near the site.
None.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
N/A

5. Animals

a. Circle (italicize) any birds and animals which have been observed on or near the site or are known to be on or near the site:

birds: *hawk*, heron, eagle, *songbirds*, other:
mammals: *deer*, bear, *elk*, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other:

b. List any threatened or endangered species known to he on or near the site.
None.

c. Is the site part of a migration route'? If so, explain.
None known.

d. Proposed measures to preserve or enhance wildlife, if any:
N/A

6. Energy and natural resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.
Petroleum fuels to operate sampling vehicles. Battery/electricity to pumps for groundwater sampling.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
N/A

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:
N/A

7. Environmental health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.
None.

   1) Describe special emergency services that might be required.
   None.

   2) Proposed measures to reduce or control environmental health hazards, if any:
   The greatest risk for environmental health hazard occurs onsite. Proposed institutional controls are designed to control those environmental health hazards.

b. Noise

   1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)'?
   None.

   2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)'? Indicate what hours noise would come from the site.
   None.

   3) Proposed measures to reduce or control noise impacts, if any:
   N/A

8. Land and shoreline use

a. What is the current use of the site and adjacent properties?
The site is currently a landfill. The surrounding area is mostly rural, with private residences and farms scattered throughout the area. Several residences are located near the west and south boundaries of the landfill. South Pines Estates is located adjacent to the northern portion of the west property line. Several other residences are located along the county road linking the south entrance of the landfill with State Highway 27. No residence is located closer than approximately 600 feet from the landfill boundary.

b. Has the site been used for agriculture? If so, describe.
No.

c. Describe any structures on the site.
Office building (shop/garage and a two room office), two office trailers, and one large storage container.

d. Will any structures be demolished? If so, what?
N/A

e. What is the current zoning classification of the site?
The land is zoned Rural Residential – Ten, General Agriculture, and mining.

f. What is the current comprehensive plan designation of the site?
Rural.

g. If applicable, what is the current shoreline master program designation of the site?
N/A

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.
Mica Landfill is not located over the Sole Source Aquifer. However, it is identified as being in the County's designated aquifer sensitive area.

i. Approximately how many people would reside or work in the completed project?
None would reside, and no permanent operating staff would be present. County personnel would be present for groundwater sampling, any leachate or gas control system maintenance, or leachate pond maintenance. Extended work may be required for system or pond maintenance.

j. Approximately how many people would the completed project displace?
None.

k. Proposed measures to avoid or reduce displacement impacts, if any:
N/A

1. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
N/A

9. Housing

a. Approximately how many units would be provided, if any'? Indicate whether high, middle, or low-income housing.
None.

b. Approximately how many units, if any, would be eliminated'? Indicate whether high, middle, or low-income housing.
None.

c. Proposed measures to reduce or control housing impacts, if any:
N/A

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed'?
None.

b. What views in the immediate vicinity would be altered or obstructed?
None.

c. Proposed measures to reduce or control aesthetic impacts, if any:
N/A

11. Light and glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
None.

b. Could light or glare from the finished project be a safety hazard or interfere with views'?
N/A

c. What existing off-site sources of light or glare may affect your proposal?
N/A

d. Proposed measures to reduce or control light and glare impacts, if any:
N/A

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?
None.

b. Would the proposed project displace any existing recreational uses? If so, describe.
No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
N/A

13. Historic and cultural preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site'? If so, generally describe.
None known.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or

cultural importance known to be on or next to the site.
N/A

c. Proposed measures to reduce or control impacts, if any:
N/A

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.
Permanent access for the landfill will be from the existing county road linking the south entrance of the landfill with State Highway 27.

b. Is site currently served by public transit'? If not, what is the approximate distance to the nearest transit stop?
N/A

c. How many parking spaces would the completed project have? How many would the project eliminate?
N/A

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).
N/A

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.
No.

f. How many vehicular trips per day would be generated by the completed project? If known**,** indicate when peak volumes would occur.
The landfill is normally staffed full-time by two people, making one trip each per day. During quarterly sampling or system maintenance, four people will be present, making one trip each per day. Groundwater sampling normally takes 1-2 days, while system maintenance can take 1-2 weeks.

g. Proposed measures to reduce or control transportation impacts, if any:
None.

15. Public services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.
No.

b. Proposed measures to reduce or control direct impacts on public services, if any.
N/A

16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.
Electricity, telephone.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.
None.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:

Date Submitted: