HAND DELIVERED

PERMIT APPLICATION
PARTS I (GENERAL DATA)
AND II (GENERAL REPORT)
SALT LAKE VALLEY SOLID WASTE
MANAGEMENT FACILITY
6030 WEST CALIFORNIA AVENUE
SALT LAKE CITY, UTAH

March 28, 2005

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY

DIVISION OF SOLID AND HAZARDOUS WASTE

APPLICATION FOR A PERMIT TO OPERATE A CLASS I LANDFILL

Submitted in duplicate to: Dennis R. Downs, Director
Division of Solid and Hazardous Waste
Utah Department of Environmental Quality
P.O. Box 144880
Salt Lake City, Utah 84114-4880

PART I - GENERAL DATA

1. Name of Facility: Salt Lake Valley Solid Waste Management Facility

2. Site Location: 6030 West California Avenue, Salt Lake City, Utah

3. Facility Owner: Salt Lake City and Salt Lake County

4. Facility Operator: Salt Lake Valley Solid Waste Management Facility

5. Contact Person: Daniel Bauer or Thomas Burrup
   Address: 6030 West California Avenue
   Salt Lake City, Utah 84104
   Telephone: (801) 974-6920

6. Type of Facility:

   ( ) Class I Landfill ( ) Initial Application

   ( ) Class V Landfill (X) Permit Renewal
   Original Permit Number: 9429

7. Property Ownership

   (X) Presently owned by applicant

   ( ) To be purchased by applicant

   ( ) To be leased by applicant

Property Owner (if different from applicant)

Name _____
Address _____
_____
_____
Telephone _____

8. Certification of submitted information

Romney M. Stewart, Solid Waste Director
(Name of Official) (Title)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature _____ Date April 11, 2005

SUBSCRIBED AND SWORN to before This 11 day of April, 2005.

My commission expires on the 12 day of December, 2007.

Daniel R Davies The State of Utah
Notary Public in and for

(SEAL) _____ Salt Lake County County, Utah.

DANIEL R DAVIES
NOTARY PUBLIC • STATE of UTAH
6030 WEST CALIFORNIA AVE
SALT LAKE CITY UT 84104
MY COMMISSION EXPIRES: 12-04-2007

PART II

GENERAL REPORT
IN SUPPORT OF PERMIT APPLICATION
SALT LAKE VALLEY SOLID WASTE MANAGEMENT FACILITY
SALT LAKE CITY, UTAH

March 28, 2005

A Report Prepared For Submittal To:

State of Utah Department of Environmental Quality
Division of Solid and Hazardous Waste
288 North 1460 West
Salt Lake City, UT 84114-4880

File No.: 17677.009

GENERAL REPORT
IN SUPPORT OF PERMIT APPLICATION
SALT LAKE VALLEY SOLID WASTE MANAGEMENT FACILITY
SALT LAKE CITY, UTAH

Prepared by:

KLEINFELDER, INC.
849 West LeVoy Drive
Taylorsville, UT 84123

Mark Wilson, E.I.T.
Staff Engineer

Renee Zollinger, R.G.
Regional Manager

SALT LAKE VALLEY SOLID WASTE MANAGEMENT FACILITY
6030 West California Avenue
Salt Lake City, UT 84047

Daniel Bauer
Associate Director

Romney Stewart
Director

March 28, 2005

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1. FACILITY DESCRIPTION

1.1 LOCATION

The Salt Lake Valley Solid Waste Management Facility ("Facility" or "SLVSWMF") is located approximately 9 miles west of the center of Salt Lake City, within the incorporated limits of Salt Lake City, as shown on Figure 1. The site lies adjacent to and north of California Avenue, west of 5600 West Street, south of and adjacent to the Union Pacific and Western Pacific Railroad right of way, and east of 8000 West Street as shown on Figure 2. The latitude and longitude coordinates of the entrance facilities are approximately 40° 44' 25" North, 112° 1' 57" West.

In July 1993, the Facility began accepting waste. The SLVSWMF is designed to cover approximately 455 acres along the north side of California Avenue. The solid waste cells occupy parts of Sections 10 and 11, Township 1 South, Range 2 West, Salt Lake Base and Meridian.

1.2 LEGAL DESCRIPTION

The legal description for the SLVSWMF is as follows:

> Beginning at the south quarter corner of Section 11, Township 1 South, Range 2 West, Salt Lake Base Meridian; thence N0°01'29"W along the quarter section line a distance of 3633.55 feet to southerly right of way line of the Union Pacific Railroad; thence along said right of way N87°09'39" W 1334.75 feet and S0°05'04"E 25.00 feet and N87°09;39"W 3970.81 feet to the quarter section line of Section 10, Township 1 South Range 2 West, Salt Lake Base and Meridian; thence S0°08'18"W along said quarter section line a distance of 3882.75 feet to the south quarter corner of said Section 10; thence N89°51'59"E along section line a distance of 2658.36 feet to the southeast corner of said Section 10; thence

N89°53'15"E along the section line a distance of 2651.59 feet to the point of beginning.

Less and excepting Union Pacific Railroad 3.083-acre, parcel contains 453.786 acres.

Begin 1533.02 feet west of the southeast corner of Section 11, Township 1 South Range 2 West, SLBM; thence N 89°55'44" West 1125.35 feet, then N 0°04'54" East a distance of 3589.73 feet; then N 77°33' East for a distance of 1155.38 feet, then South 0°00'51" East for a distance of 1645.68 feet, then South 2°55'05" West for 176.08 feet; then South 0°01' East for 2018.68 feet to beginning. Less the Union Pacific Railroad R-O-W. Parcel contains 89.26 acres.

The SLVSWMF is owned jointly by Salt Lake City and Salt Lake County. It is a non-profit facility; proof of ownership and non-profit status are provided in Appendix A.

1.3 AREA SERVED

The SLVSWMF will accept waste from all of Salt Lake County. Approximately 65 percent of the municipal and industrial solid waste generated in the County is currently taken to the SLVSWMF or to the SLVSWMF Transfer Station. The remaining waste goes to the Trans Jordan Cities Landfill in South Jordan due to its proximity to the southwestern part of the County. Construction and demolition wastes generally go to appropriate construction waste landfills such as the Mountain View or Macky Landfills located near the SLVSWMF. Generally, waste received at the SLVSWMF Transfer Station is shipped by rail to the East Carbon Development Company (ECDC) Landfill, located near Price, Utah.

1.4 WASTE STREAM VOLUME AND COMPOSITION

The amount of waste accepted by the Facility since 1993 is as follows:

Year	Total Waste Brought to Facility (tons)	Waste Diverted (tons)*	Waste Landfilled (tons)
1993	820,000	131,000	689,000
1994	915,428	252,545	662,883
1995	984,876	256,881	727,995
1996	977,676	244,102	733,574
1997	1,074,582	313,775	760,807
1998	1,354,878	571,453	783,425
1999	1,240,645	533,298	707,367
2000	1,382,844	770,419	612,424
2001	1,107,679	500,608	607,071
2002	1,120,875	524,346	596,529
2003	1,067,769	498,521	569,248
2004	1,092,987	459,536	633,451

*Diversions include composting, recycling, and soil amendment/reuse.

These figures indicate a relatively steady total waste stream over the past few years and a decline from the late 1990s.

The SLVSWMF accepts only non-hazardous solid waste including all wastes defined in UAC R315-2-2 except:

1. Hazardous waste defined in UAC R315-2-3

2. PCBs as defined in UAC R315-301-2

3. Radioactive materials which equal or exceed classification as low-level radioactive waste as defined in UAC R315-12-3

The composition of the Salt Lake County waste stream, which was estimated by site observations and photographic analysis, was found to be similar to the EPA's national average waste composition study (EPA, 2001). Since 1991, the Facility has utilized an on-site citizen unloading facility for disposal of waste organic material. A percentage of yard and wood wastes (prior to recycling) are recycled into mulch and compost. The national average waste composition listed by the EPA for 2000 are presented below (EPA, 2001).

NATIONAL AVERAGE WASTE COMPOSITION
(in percent by weight)

Year	2000
Paper	35.7
Yard Waste	12.2
Food Waste	11.4
Plastics	11.1
Other Metals	7.9
Rubber/Leather/Textiles	7.1
Wood	5.7
Glass	5.5
Other	3.4

Asbestos and infectious waste are currently accepted for disposal at the site according to Salt Lake County Valley Health Permit #PT0010038. Infectious waste is largely contributed by the University of Utah Medical Center and a few small clinics. New sources of infectious treatment waste are currently being considered for acceptance. Asbestos waste is brought to the landfill in proper containment by licensed asbestos contractors. Approximately 107 tons of friable asbestos-containing wastes were landfilled in 2004.

Household hazardous waste (paint, household chemicals, etc.) is diverted from the landfill through the Household Hazardous Waste Facility (HHWF) located at the Facility and operated by Salt Lake County Health Department. This facility collects small containers of waste that would probably otherwise be mixed with municipal loads.

Materials are also received at the site as part of the non-hazardous soils regeneration site (SRS) program conducted by E.T. Technologies. E.T. Technologies uses approximately 40 acres of land within the active landfill. The SRS was designed to process various types of non-hazardous industrial wastes in an environmentally sound manner to produce a nutrient enriched soil product for use at the landfill. Incoming waste streams are blended with native soils within lined blending parcels. The SRS process is designed to optimize the microbial degradation of undesirable constituents contained in the industrial waste streams received. Enhanced conditions for microbial activity are obtained by controlling environmental factors such as soil moisture, nutrient concentrations and contaminant loading rates. SRS operations currently are fully permitted and monitored by E.T. Technologies. As the active landfill is filled, the area used by E.T. Technologies (Module 10) will be incorporated into construction by the SLVSWMF and the soils regeneration program will be closed or relocated.

Material accepted by E.T. Technologies includes wastewater sludge from the Central Valley Water Reclamation Project, and materials from various sources that generate waste products consisting of diesel storage tank sludge, kitchen grease, refinery catalysts, and contaminated soil from underground tank removal. The SRS has three key acceptance criteria for incoming waste streams. The first and most important requires that the waste streams are not hazardous waste as defined by federal, state, and local regulations. This identification system requires extensive characterization and analytical testing to determine the regulatory status of the incoming waste streams. The second criterion requires that the incoming waste streams are not acutely toxic to vegetation.

Since the final soil product will be used at the landfill to promote vegetative growth, the acceptance of materials that are acutely plant toxic would be detrimental to the soil product. Third, incoming waste streams must be capable of being incorporated into a soil matrix. For example, soil mixed with construction debris would not be suitable for the intended use of the soil product. Approximately 49,760 tons of non-hazardous material were accepted by E.T. Technologies in 2004.

1.5 RELATIONSHIP TO SALT LAKE COUNTY SOLID WASTE MANAGEMENT PLAN

Conclusions and recommendations of the Plan depend on the continued operation of SLVSWMF and encourage increased cooperative community agreements, consistent with county-wide record keeping, increased solid waste diversions through recycling and composting, and possible operation of a construction/demolition area at SLVSWMF. The currently remaining waste capacity of the SLVSWMF for future disposal is 22 years.

2. OPERATION PLAN

2.1 CONSTRUCTION SCHEDULE

The active landfill will be expanded sequentially in 11 modules. When complete, the 11 modules will form one single landfill with a uniform liner sloped to the center of the landfill. The locations of the 11 modules are shown on Figure 3.

The current schedule for construction of the 11 modules is as follows:

Expected Year of Construction	Module	Notes
1993	2	Module prepared, receiving waste
1993 - 94	1	Module prepared, receiving waste
1994 - 95	3	Module prepared, receiving waste
1996	4	Module prepared, receiving waste
1997	5	Module prepared, receiving waste
2001	6	Module prepared, receiving waste
2003	7	Module prepared, receiving waste
2010	8	
2014	9	
2017	10	
2020	11	

This schedule may change in the future, depending on actual waste stream growth and diversions.

2.2 WASTE HANDLING PRACTICES

2.2.1 Hours of Site Operations

The site is presently open to the general public for solid waste disposal Monday through Saturday from 7:00 a.m. to 5:00 p.m., October 1 through March 31, and 7:00 a.m. to 6:00 p.m., April 1 through September 31. The site is closed Thanksgiving, Christmas, New Year's Day, and Sundays.

2.2.2 Record Keeping

All vehicles delivering wastes to the site are stopped at the scalehouse. Scalehouse personnel weigh the load and enter into the computer the vehicle license number, material type, gross weight, tare weight*, date, time, scalehouse attendant's code number, transaction number, and fee collected. Average loads brought by the general public are entered at a weight of 900 pounds, based on past studies of general public loads. This information is then stored in the computer and can be output at any time. An example of the output forms generated by the computer is included in Appendix B.

After the load has been inspected and recorded at the scalehouse, vehicles are routed to the active disposal area and directed to the appropriate discharge location by site personnel. No hazardous waste or materials will be permitted to enter the landfill (see Section 2.11). Friable asbestos wastes are directed to a separate disposal area within the facility. The current location of the friable asbestos disposal area on Module 1 is shown on Figure 3. Non-friable asbestos is buried within the active tipping cell. Infectious wastes are unloaded where they can be immediately covered after tipping.

The general public is routed to the public unloading center located on the southwest side of Module 9 (see Figure 3). The public unloading facility provides a place for the general public to drop off recyclables and to dispose of refuse. Several roll-off bins are provided for various recyclable materials, including newspaper, foam rubber, and several types of ferrous and non-ferrous metals (including aluminum). The refuse brought to the landfill site by the general public is discharged into a concrete-lined pit, where wastes are inspected closely by landfill personnel. Public loads consisting of only yard waste are directed to and unloaded at the composting area in Module 11. Yard wastes (green wastes) in mixed loads at the public unloading facility are not segregated. Potentially hazardous wastes, such as household chemicals and batteries, are directed to and unloaded at the covered HHWF until they can be properly disposed at an appropriate off-site facility. Once all loads have been inspected, segregated, or redirected as

* The tare weight of vehicles that come to the site frequently is maintained by the computer, based on the vehicle license number. First-time users must return to the scalehouse after tipping to obtain tare weight.

described, a loader operating in the pit at the public unloading area then pushes the remaining refuse into an open-top roll-off container for transport to the active face of the landfill.

2.2.3 Landfilling

The landfill will be constructed by the area fill method. For new modules, a defined area will be excavated, lined, and covered with a protective operations layer. After the operations layer has been placed, the initial 12- to 20-foot-thick lift of refuse is pushed onto the operations layer. The spreading and compacting equipment will always be on a layer of refuse, not directly on the operations layer. Once the initial lift is completed, landfilling will proceed as described below.

Refuse will be placed in lifts up to 20 feet thick. Refuse will be spread and compacted in 2- to 4-foot-thick layers on a working face that is a maximum of 300 feet wide and sloped at 3:1 (horizontal:vertical) or flatter. Wastes may be deposited at either the base or top of the working face, and then spread and compacted over the face. The compaction equipment will make several passes over each layer of refuse spread across the working face to obtain adequate compaction of all wastes. To prevent bridging of the surrounding refuse, large or bulky wastes will be separated and placed in the lower portion of the advancing lift, and thoroughly crushed by compacting equipment. Open burning of the refuse will not take place at the landfill.

Temporary berms will be placed on lifts as necessary to divert surface water away from the active working face. Working faces advanced upslope will be aligned as necessary to avoid trapping runoff.

The landfill will be covered daily with a combination of a 6-inch-thick layer of soil, automotive shredder fluff, compost, mulch, foam, a geosynthetic blanket, or other approved alternative daily cover, depending on conditions and available materials, unless extreme seasonal climatic conditions prevent the placement of daily cover. When used, the geosynthetic blanket is removed prior to landfilling the next morning. Alternative daily covers are described in more detail in Addendum 9.

2.2.4 Landfill Equipment

The following equipment currently is kept and used at the landfill to spread and compact waste, control dust, and perform other landfill operations.

2	Caterpillar Scrapers	3	Rolloff Trucks
3	Caterpillar Dozers	1	Service Truck
2	Caterpillar Compactors	1	Tub Grinders
1	Bomag Compactor	1	Trommel Screen
1	John Deere Grader	2	John Deere Loader
1	Caterpillar Water Wagon	1	Caterpillar Loaders
2	John Deer TCE Tool Carrier	1	Leachate Tanker

An inventory of equipment with similar or more capabilities will be maintained at the landfill throughout its operational life.

2.2.5 Composting

Beginning in 1994, yard waste was diverted from the landfill to a composting area. The on-site citizen unloading facility also provides the public with a convenient place to dispose of their recyclable yard and wood wastes. Recycling these wastes provides an inexpensive means of generating compost and mulching materials. Composting conserves nutrients and reduces the need for fertilizer. Yard waste, such as twigs, leaves, and grass clippings, are shredded into mulch for ground cover. After shredding, which allows for faster decomposition, the compost piles are windrowed and allowed to sit. The piles are turned every two weeks and sprayed with water for dust control. The resulting compost is sold to the public. Wood waste, such as larger tree branches and pallets, are shredded into mulch and into three different grades of chips for residential and commercial use. The mulching, composting, and SRS operations are located in the last area scheduled for development (Modules 10 and 11, see Figure 3). Composting operations are further described in Addendum 10.

2.3 SURFACE WATER CONTROL AND TREATMENT

The location of the working face moves daily as each landfill module is filled in sequential refuse lifts. Stormwater run-on is diverted around the working face to the extent possible by temporary berms and "V" ditches. The berms and ditches direct surface water away from the exposed refuse and prevent surface water from ponding against the refuse.

To reduce the potential for stormwater to come in contact with waste, the SLVSWMF maintains as small a working face as possible, usually about 150 feet wide by 20 feet tall. The maximum working face is 300 feet wide by 30 feet tall. The working face is sloped toward the interior of the landfill cell, such that stormwater runoff generally flows to the middle of the cell, percolates through waste in the cell, and is captured in the leachate collection system for the cell. There it is treated like landfill leachate (see Section 2.4). Any stormwater run-on or run-off that does run off of a module is captured in drainage swales that encircle each module. These swales drain to the landfill perimeter drainage swale (see Figure 4). Water that flows in the perimeter drainage swale runs to one of three treatment ditches on the north side of California Avenue (Figure 4). There, the water flows through five stages that restrict the flow to encourage settlement. The treatment ditches are lined with specialized vegetation to encourage biological activity. The water subsequently flows out of the treatment ditches, under California Avenue, to flood control ponds along Lee Drain. For details of the treatment ditches, see Figures 5 and 6.

A second area where precipitation can contact waste is the public unloading facility. The public unloading facility is a concrete-lined collection point where wastes brought in by the public are screened, separated if necessary, and then hauled to the active face for disposal. Covered collection bins for recyclable metals are present at the unloading facility. This area is maintained constantly when open, and wastes are not allowed to collect or sit. Runoff from this area flows into the treatment ditch on the south side of the cell (see Figure 4) where sediments can settle out and vegetation promotes biological activity prior to the water flowing into the flood control ponds south of the landfill.

Stormwater runoff from the SLVSWMF is permitted to flow to the flood control ponds, which eventually discharge to Lee Drain, under Storm Water Permit No. UTR000074 issued by the State of Utah Department of Environmental Quality, Division of Water Quality (Utah DEQ/DWQ, 1999). Stormwater is managed according to the Stormwater Pollution Prevention Plan for SLVSWMF (Kleinfelder, 1994).

2.4 LEACHATE HANDLING

The active landfill cell is equipped with a leachate collection and recovery system (LCRS). The LCRS contains a network of horizontal leachate inspection/cleanout pipes to ensure that the LCRS functions correctly. Additionally, each landfill module is equipped with one or more leachate collection sumps at the lowest point(s) of the module. The sumps have leachate risers through which leachate can be removed from the LCRS. The locations of leachate sumps and inspection/cleanout risers for the completed modules 1 through 7 are shown on Figure 7.

If more than 1 foot of standing leachate is found above the liner floor, the leachate will be pumped out of the LCRS. The removed leachate may either be: 1) sprayed back on the surface of a lined cell of the landfill to suppress fugitive dust, 2) is pumped into treatment ponds where it is treated either by evaporation/infiltration or by enhanced macrophyte treatment, or 3) is re-injected into the landfill waste to enhance waste degradation and methane production. The leachate treatment process is described in Addendum 12.

2.5 LANDFILL GAS COLLECTION SYSTEM

The active landfill is equipped with a landfill gas collection system (LGCS), which was brought online in December 2000. The LGCS incorporates a network of vertical and horizontal gas collection wells through which landfill gas is collected. These collection wells are connected to lateral lines, which in turn bring the gas into a main header pipeline. The header pipeline is designed to ring the perimeter of the landfill, and includes a series of condensate knockout units where condensate is removed from the gas and returned to the landfill via leachate collection

system lines. The main header pipeline terminates at the flare station, where gas is fed into a large, internal combustor flare, and is incinerated to remove hazardous organic materials. Gas moving equipment, which consists of large blower fans that move gas from the landfill into the flare, is considered as part of the flare station operation. The LGCS is shown on Figure 8.

The SLVSWMF is considering development of landfill gas as a renewable energy resource. Gas collected would be combusted in either a reciprocal engine or microturbine that would generate electrical power as a product of gas combustion. Development of a gas-to-energy project such as this is likely during the proposed permit period.

The LGCS was designed, installed, and is operated in accordance to regulations found in the Clean Air Act (CAA), which are enforced by the Utah Division of Air Quality, and encompassed in the facility's Title V Operating Permit. These regulations specify operating conditions for the LGCS, including wellhead function, flare function and gas destruction, surface emissions monitoring, future expansion of the system in correlation to landfill growth, how to resolve process upsets to the system, and finally, when the LGCS can ultimately be removed following landfill closure. Specific operational requirements relating to the LGCS are specified in Addendum 8 of this Permit Application.

2.6 SCHEDULE FOR MONITORING AND SELF INSPECTION

The landfill will perform the following monitoring and inspections:

Type of Monitoring/Inspection	Frequency	Description of Monitoring
Groundwater	Semi-annual	Collect and laboratory-analyze samples from monitoring wells MW-1 through MW-10 (see Groundwater Monitoring Plan, Addendum 2).
(1) Landfill gas	Quarterly	Field analyze samples of landfill gas from monitoring probes and landfill structures with combustible gas meter. For probe locations, see Figure 9.

Type of Monitoring/Inspection	Frequency	Description of Monitoring
(2) Landfill gas	Quarterly	Conduct surface emission monitoring with combustible gas meter to verify efficacy of LGCS (see Air Emissions Compliance Plan, Addendum 8).
(3) Landfill gas	Monthly	Monitor temperature, oxygen/nitrogen, and flow levels at each landfill gas wellhead (see Air Emissions Compliance Plan, Addendum 8).
Leachate	Bi-weekly	Monitor sumps for presence of leachate.
Surface Water	Semi-annual	Collect and laboratory-analyze samples of storm-water runoff (see Surface Water Monitoring Plan, Addendum 2).
Disease Vectors	Monthly	Visual survey for signs of vector or rodent activity.
Drainages, Roads and final cover areas	Monthly (weekly*)	Visual inspection for needed repairs due to erosion, etc.
(1) Opacity	Daily	Visual observation for opacity to see that fugitive dust control procedures are controlling fugitive dust.
(2) Opacity	Monthly	Certified observation conducted by EPA Method 9 for opacity to verify that procedures are controlling fugitive dust.

Examples of the inspection/monitoring logs that will be maintained are contained in Appendix B. A proposed schedule of monitoring and self-inspection over the next five years is presented in Addendum 1.

2.7 CORRECTIVE ACTION PLAN

A corrective action program, consistent with Utah Administrative Code R315-308-3, will be initiated in the event that monitoring indicates groundwater has been impacted. A general schedule for the program is presented in Addendum 3.

* Weekly during high-intensity rainfall periods.

2.8 CONTINGENCY PLANS

2.8.1 Potential Contingency Situations

Although Salt Lake County will conduct operations at the site to preclude the potential for emergency situations or occurrences, it is possible for events to occur that are beyond the control of landfill personnel. The SLVSWMF has an established Emergency Preparedness Plan, dated October 7, 2004, which describes the responsibilities of landfill personnel in the event that an emergency or major disaster occurs (See Appendix C). Addendum 4 describes response procedures for the following situations or occurrences:

- Earthquakes;
- Significant failure of refuse fill or excavation slopes;
- Fires within the landfill site boundary, including landfill areas, and structures;
- Explosions within the landfill site boundary;
- Release of explosive gases;
- Presence of fluid/leachate seeps from the side slopes of the refuse fill areas;
- Unauthorized discharge of hazardous or toxic materials, including accidental spills of materials authorized on site, and illegal discharges by waste haulers;
- Failure of temporary or permanent drainage facilities;
- Loss of equipment or personnel; and
- Loss or failure of general on-site facilities.

2.9 ALTERNATIVE WASTE HANDLING/DISPOSAL

Alternative waste handling practices or disposal areas may be required when wet weather or unforeseen events prevent the landfill from disposing of wastes as planned.

A wet-weather disposal area will be provided within the active module for landfill operations during periods of extremely heavy or sustained rainfall. The wet-weather disposal area will be designed to provide an adequate tipping area for refuse collection vehicles. This area will be accessed by an all-weather road. Gravel, crushed stone, or demolition rubble may be applied on the surface to prevent refuse vehicles from picking up mud or refuse from the active area. The wet-weather disposal area will be relocated, as necessary, to facilitate site operations.

In addition to wet weather, there are several potential scenarios that could disrupt vehicle traffic to the landfill and/or prevent tipping at the planned sites. Scenarios that could disrupt vehicle traffic include fires, traffic accidents, and chemical spills on the approach to the landfill. If the usual approach to the landfill becomes impassible, vehicles traveling to the landfill could use two alternative routes (Figure 10).

Scenarios that could prevent tipping at the planned sites include fire and chemical spills. If the normal modules were not available for tipping, refuse would be unloaded at the active (primary) composting area (Figure 3). The primary composting area is surrounded by a run-off containment berm, so is well suited to temporary storage of solid waste.

2.10 MAINTENANCE OF INSTALLED EQUIPMENT

The condition of landfill monitoring wells, gas wells and lines, leachate risers, and the flare station will be assessed during each monitoring event. The schedule for monitoring is presented in Addendum 1. Inspection records will be filled out and retained to document the condition of equipment.

If needed maintenance or repairs are identified during the monitoring event, landfill personnel will arrange to have the work performed as soon as possible. Documentation of repair or maintenance will be filed with the inspection report.

2.11 PROCEDURES TO CONTROL NUISANCES AND DISEASE VECTORS

2.11.1 Unsightliness, Dust, and Odor

Unsightliness, dust, and odor will be controlled by (1) timely placement of daily, intermediate, and final cover over the refuse fill; (2) proper maintenance of haul roads (grading and watering); (3) application of fine water spray or dust palliative on soil-covered work areas, soil excavation areas, and soil stockpile areas where conditions may result in fugitive dust; (4) application of water or planting of temporary vegetation on intermediate soil cover when conditions might create fugitive dust; and (5) planting and maintenance of vegetated cover on completed fill slopes. A soil cover will be placed on the top of refuse piles on a daily basis. Soil or alternate daily cover will be placed on the vertical sides of refuse piles. Daily cover will control dust and odors and improve aesthetics. A Dust Control Plan is discussed in Addendum 8 and additional information on alternate daily cover is shown in Addendum 9.

2.11.2 Litter

The site operator will use a litter collection program to minimize the impacts of litter on site and in the area surrounding the site. This program consists of various activities designed to reduce windblown litter, as well as other site features and operations that inadvertently help to reduce windblown litter. Activities specifically designed to reduce amounts of windblown litter include minimizing the size of the active face to reduce the area of wastes exposed to wind, erecting litter fences downwind from the active face, and adjusting the height and length of litter fences to maximize their effectiveness in trapping windblown litter.

Features and operating techniques that reduce windblown litter include a 35-foot-high perimeter fence around the landfill site to back up the litter fences, applying daily and intermediate cover, and compacting refuse layers to hold freshly deposited refuse to underlying landfill layers. Site and surrounding area inspections will be conducted routinely, and any windblown litter that is found will be collected. Temporary employees will be utilized in an active litter cleanup program at the landfill and along perimeter properties as needed.

2.11.3 Disease Vectors

A properly operated solid waste management facility does not present health hazards because today's waste management practices do not create conditions that attract and allow the breeding of such potential disease vectors as rodents and flies. Timely placement of daily soil and alternate daily cover on the refuse, and intermediate and final cover placement will prevent birds and rodents from using refuse for food and habitat. Daily and intermediate cover is also effective in preventing the emergence of flies from eggs which were laid in household refuse before it was collected and brought to the site for disposal. Site personnel will inspect site areas weekly for any signs of vector or rodent activity. If such activity is observed, site personnel will contact pest control specialists for professional advice and any services needed to ensure that a vector nuisance does not develop.

2.11.4 Noise

Noise levels of on-site equipment will be controlled by properly maintaining equipment mufflers.

2.11.5 Fire

Equipment operators and maintenance personnel will frequently remove debris and dust from undercarriages and engine compartments, check for and repair fuel and oil leaks, and provide portable fire extinguishers on landfill equipment to protect landfill equipment and vehicles from

fire danger. The entrance facilities and maintenance buildings will be equipped with fire extinguishers for controlling minor fires and maintaining personnel safety.

Open burning will not take place at the landfill site. Fire protection for the refuse fill will be provided by minimizing the size of the tipping face, and by preventing deposition of or removing burning material. Any fire that occurs on the landfill will be extinguished by trained landfill personnel using appropriate site equipment, stockpiled soil cover, and when necessary, a water truck or auxiliary fire truck (see Addendum 4). Water will be supplied by the on-site water well. If additional fire fighting resources are needed, the Salt Lake City Fire Department will be summoned.

2.12 HAZARDOUS WASTE EXCLUSION PLAN

A "Prohibited Waste" control program designed to detect and deter attempts to dispose of hazardous and other unacceptable wastes is in place at the SLVSWMF. The program is designed to protect the health and safety of employees, customers, and the general public, as well as protect against contamination of the environment. The Environmental Compliance Supervisor will be in charge of hazardous waste activities. The complete program, developed by EMCON/OWT, is included in Addendum 5.

The site is open for public and private disposal. Signs posted near the site entrance clearly indicate (1) the types of wastes that are accepted; (2) that hazardous wastes are not accepted at the site; and (3) the penalty for illegal disposal. All vehicles delivering wastes to the site will be stopped at the scalehouse. Scalehouse personnel will, to the extent possible, visually inspect incoming waste for hazardous materials. Any vehicle suspected of carrying unacceptable materials (liquid waste, sludges, or hazardous waste) will be prevented from entering the disposal site area. Vehicles carrying hazardous materials will be required to exit the site without tipping their loads. If a load contains or is suspected of containing hazardous materials, the Waste Inspector will be notified and the following information will be recorded: date, name of hauler, and license plate number.

After the load has been inspected at the scalehouse, the vehicle will be routed to the active disposal area and directed to the appropriate discharge location by site personnel. Loads will be randomly inspected at the tipping face by landfill personnel. If a discharged load contains hazardous material, the discharger will be required to reload the material and remove it from the landfill site. The discharger will be instructed on how to dispose of the wastes. A rejected load form will be completed and provided to the Salt Lake Valley Health Department.

If the discharger is not identified, the area where the hazardous material was discharged will be cordoned off. The hazardous material will be moved to a designated area for identification and preparation for proper disposal. For a detailed description of acceptable and prohibited wastes, the incoming load inspection plan, site control measures, storage requirements, and management requirements, see Addendum 5.

2.13 RECYCLING/RESOURCE RECOVERY

Current waste diversion programs at the SLVSWMF include salvage contracts for resalable recyclable materials, a soils regeneration site contract for blending waste materials into native soils to produce a final cover able to sustain vegetation, a mulching and composting operation for yard and wood waste, and a household hazardous waste facility.

The SLVSWMF's on-site citizen unloading facility provides residents a convenient means of recycling their yard and wood wastes and other recyclables. Several bins are provided for various recyclable materials including newspaper, foam rubber, and metals including aluminum cans. Yard waste (leaves, grass clippings) are windrowed and turned periodically to promote composting. The resulting compost is sold to the public. Wood wastes are chipped to provide landfill cover, and mulch/compost for landscaping. The design and operations of the public unloading facility do not allow for public scavenging of discharged materials, including recyclables. The Facility's Recycling and Composting Plan is included as Addendum 10.

The Salt Lake Valley Health Department operates a Household Hazardous Waste Facility (HHWF) at the SLVSWMF. The HHWF's goal is to reduce the amount of hazardous wastes disposed in the landfill cells, thereby reducing the risk of future impact to soil and groundwater. The HHWF accepts wastes from private homeowners and businesses that are conditionally-exempt, small-quantity generators. Materials accepted include aerosol cans, non-halogenated flammables (mostly fuels), oil, oil-based paint, latex-based paint, lab packs, and other materials such as anti-freeze, dioxins, and automobile batteries. Wastes are segregated by HHWF personnel, manifested, and transported to an off-site hazardous waste disposal facility. Antifreeze, batteries, and used oil are picked up by registered recyclers. Further information on HHWF operations and staffing is included in Addendum 11.

A Recycling Information Office, which is located at the Facility, responds to recycling questions concerning topics such as local recycling centers, drop-off points, and curbside programs as well as grass recycling, home composting, office paper recycling and ways to reduce, reuse, and recycle. SWMF tours and presentations concerning recycling and waste reduction are given to school, church, and civic groups by members of the Recycling Office Staff. A recycling resource library that contains videotapes, books, magazines, trade journals, and newsletters is also available for public use at the Recycling Information Office.

3. FINANCIAL ASSURANCE PLAN

3.1 COST ESTIMATES FOR CLOSURE/POST-CLOSURE

Updated cost estimates for closure and post-closure of the entire landfill area were developed by EMCON/OWT, Inc. The costs are based on a modified cover design and are in 2005 dollars. To obtain cost estimates for each module, the total cost has been proportionally allocated based on the size of each landfill module.

Estimated closure costs for each module are summarized below. Detailed closure costs for each module are presented in Tables D-1 and D-2 in Appendix D.

Module	Estimated Size (acres)	Expected Year of Construction	Estimated Closure Cost (2005 Dollars)
1	28	1993-1994	$2,113,887
2	25	1993	$1,887,399
3	33	1994-1995	$2,491,367
4	37	1996	$2,793,351
5	33	1997	$2,491,367
6	36	2001	$2,717,855
7	39	2003	$2,944,342
8	33	2010	$2,491,367
9	28	2014	$2,113,887
10	41	2017	$3,095,334
11	47	2020	$3,548,310
Total	**380**		**$28,688,465**

Closure and post-closure costs for all modules will be fully financed by revenues generated at the operating landfill. The estimated total closure cost for the entire landfill cell, Modules 1 through 11, is approximately $28.7 million. Detailed cost estimates are presented in Table D-1 in Appendix D. Post-closure maintenance costs are estimated at $540,000 per year in 2005 dollars. Over 30-years, post-closure maintenance costs for the entire landfill are calculated at $16.2 million (2005 dollars). Detailed post-closure costs are summarized on Table D-3 in Appendix D.

The eleven modules will be closed sequentially throughout the life of the landfill. It is anticipated that Modules 1 through 7 will be open over the next 5-year permit period and no other modules will receive waste during that time. Portions of Modules 1 through 5, totaling 48 acres, have already received temporary, low-permeability cover and revegetation. It is anticipated that the intermediate cover placed during normal operations on the inactive portions of the landfill will serve as a suitable low-permeability layer that will underlie the geomembranes. It is estimated that approximately 20 acres does not have intermediate cover in place at any one time. Costs for the intermediate, low-permeability cover will not affect the closure / post-closure fund.

The estimated closure and post-closure costs for Modules 1 through 7, the area of the landfill that will be open over the next 5-year permit period, are summarized in Table D-4 in Appendix D. All costs are expressed in 2005 dollars. Closure costs for Modules 1 through 7 are estimated at $16.9 million. The annual post-closure cost for Modules 1 through 7 is estimated at $328,000. In order to fund post-closure costs over a 30-year period, a fund of $6.4 million would be required assuming a discount rate of 3 percent (return on essentially risk-free investments). Therefore, the amount needed during the upcoming 5-year period is estimated at $23.4 million, as shown on Table D-4. The value of the closure / post-closure fund at the end of 2004 was $11.5 million. Therefore, the projected increase in the fund required over the next five years is $11.9 million.

3.2 FINANCIAL ASSURANCE

The SLVSWMF has established a Closure/Post-Closure Fund account in accordance with Government Accounting Standards Board (GASB) recommendations for municipally owned solid waste landfills. Additionally, Salt Lake County meets the financial assurance criteria for municipalities, maintaining an AAA bond rating and a very low debt ratio. Details of the financial assurance plan are presented in Addendum 7 and comply with the current State of Utah regulations R315-309-1(1) and R315-309-2(2).

Additions to the closure/post-closure fund will be made annually and are based on the percent of landfill capacity used and total closure/post-closure costs. The SLVSWMF will annually adjust the final closure and post-closure costs for inflation or facility modifications that would affect closure or post-closure care costs in accordance with R315-309-2(2). More details on the Financial Assurance Plan are presented in Addendum 7.

4. CLOSURE PLAN

4.1 FINAL COVER

The landfill area will be closed sequentially. Intermediate cover will be placed during operation in advance of closure. The final cover will be applied according to the closure schedule discussed in Section 4.3, below.

The final cover will consist of:

- A low-permeability layer of 18 inches of soil with a hydraulic conductivity of $\leq 1 \times 10^{-5}$ cm/sec overlying the intermediate cover or a geosynthetic clay liner, overlying the intermediate cover;
- A geomembrane;
- A geonet; and
- A minimum of 12 inches of soil suitable for plant growth.

Each soil layer shall be compacted as required by a dozer or compactor to provide a stable foundation layer and a cap capable of supporting vegetation.

The final surface grades (Drawing 1, Part III, Appendix B) are designed to provide minimum slopes of 5 percent to maintain the drainage of the completed landfill after settlement and to minimize erosion of the final cover. To verify the integrity of the final cover, a program of periodic observation and maintenance will be instituted. The site currently has one established permanent survey point. At least one more permanent survey control monument will be established and maintained to provide reference points for future settlement measurements.

Final cover will be vegetated with compatible plant species to limit erosion, provide evapotranspiration of precipitation moisture, and enhance the expected end use for the site. Hay and straw will be used as needed on steep grades to reduce soil erosion during seed germination. The site may require revegetation over a long period of time. Vegetation should be restored in phases. Revegetating plant species using seed collected from the areas surrounding the landfill is ultimately desirable.

As depicted in the End Use Plan in the master plan (EMCON/OWT, 1991), the intent is to enhance the site with native vegetation resembling that of the existing habitat, in order to encourage wildlife at the site, and to introduce passive recreation and environmental awareness through trails and educational signage.

4.2 SITE CAPACITY

The estimated total waste capacity of the landfill (Modules 1 through 11) is 49,510,000 cubic yards (EMCON/OWT, 2005). Based on an estimated initial refuse density of 0.58 tons per cubic yard, the estimated total waste tonnage capacity is 29 million tons. The projected refuse settlement after closure, due to consolidation, decomposition, etc., is from 5 ft to 15 ft. (Part III, Appendix E). Therefore, the in-place estimated total waste capacity assumes the landfill will be overfilled to account for the anticipated settlement. We assume 10 percent of the landfill capacity will be consumed by daily cover volumes.

4.3 CLOSURE SCHEDULE

The eleven modules of the active cell will be closed sequentially as they are filled to final grade. Final closure of Modules 1 through 6 is expected to occur starting in 2011. Modules 7 through 11 will be closed sequentially between 2016 and 2027.

4.4 CLOSURE COSTS

Closure cost estimates for each of the 11 modules are summarized in Section 3.1. For all modules, the closure costs will be paid in full from revenues generated by the landfill. The projected year for completing closure is 2027.

4.5 FINAL INSPECTION

The Solid Waste Executive Director will notify the Division of Solid and Hazardous Waste of the intention to close the landfill at least 60 days prior to the final receipt of waste. Final cover will be initiated within 30 days of final receipt of waste, and completed within 180 days of initiation. Closure plans and drawings documenting the as-built construction will be prepared and certified by the landfill manager and a Utah certified professional engineer.

Once the active SLVSWMF has received final cover and been revegetated in accordance with the provisions of Section 4.1, the Solid Waste Executive Director will contact the Division of Solid and Hazardous Waste and Salt Lake Valley Health Department to arrange a final inspection of the facility.

5. POST-CLOSURE PLAN

5.1 MONITORING

Groundwater monitoring, leachate collection and treatment, and landfill gas monitoring will be performed for 30 years after landfill closure to assess potential impacts of the landfill on the environment. The monitoring programs are described below.

5.1.1 Groundwater Monitoring

Groundwater samples will be collected semi-annually from ten wells surrounding the closed landfill cell. Three of the wells, located along the south and east sides of the cell, will provide background/upgradient water quality information. The remaining seven wells, located along the north and west sides of the cell, will provide downgradient monitoring of potential impacts of the landfill cell on groundwater.

The groundwater samples will be analyzed for the detection monitoring constituents listed in R315-308-4 of the Utah Solid Waste Permitting and Management Rules, plus nitrite and phenols. Metal concentrations will be analyzed as dissolved, rather than total concentrations, due to the high turbidity of the water from the silty upper aquifer.

The detailed groundwater monitoring plan is included in Addendum 2.

5.1.2 Leachate Collection and Treatment

During the post-closure period, the leachate risers will be inspected for the presence of leachate on a monthly basis during the wet season (November through April) and twice during the dry season (June through September). If more than one foot of standing leachate is present above the liner, the leachate will be pumped and properly treated and/or disposed (see Addendum 12).

5.1.3 Landfill Gas Monitoring

Following closure of the landfill cell, the facility will continue to be subject to the Title V air quality operating permit until emissions from the landfill are demonstrated to less than 50 metric tons of NMOC, at which time gas collection equipment can be removed. Until this point is reached, the landfill will continue to perform monitoring and reporting as required by the operating permit. These conditions are discussed more fully in Addendum 8.

Possible lateral migration of landfill gases will be monitored quarterly during the operating permit period at four gas monitoring probes located around the perimeter of the closed landfill and in facility structures, as detailed in Addendum 8. The locations of the probes are shown on Figure 9. The facility structures and probes will be monitored with a hand-held field explosive gas meter calibrated against a methane standard. The percent of explosive gas (expressed as a percent of the lower explosive limit (LEL) for methane) will be recorded at each location. If readings exceeding 25 percent of the LEL are recorded in any structure, or if readings exceed 100 percent of the LEL in any probe, the regulatory agencies will be notified and corrective action will be initiated.

5.2 MAINTENANCE OF MONITORING SYSTEMS AND FACILITY STRUCTURES

5.2.1 Groundwater Monitoring System

All groundwater monitoring wells will be inspected for signs of disrepair, failure, or deterioration during each sampling event. Bollards around each well will help protect the exposed well casing from damage. If damage is discovered, the nature and extent of the problem will be recorded, and a decision will be made to replace or repair the well. Possible repairs include redevelopment, chemical treatment, partial casing replacement or repair, resealing the annulus, or pumping and testing. If a well needs to be replaced, it will first be properly abandoned. Damaged wells will be scheduled for repair or replacement within one month after the problem is identified.

5.2.2 Leachate Control System

The LCRS must be maintained so that it operates effectively during the post-closure maintenance period. Bollards around each riser will help protect the exposed casing from damage. The system will be inspected during each monitoring event (see Section 5.1.3) for signs of disrepair or deterioration. Needed repairs will be made after the need is identified.

5.2.3 Landfill Gas Monitoring System

The landfill gas monitoring system will be maintained as part of the gas collection system as discussed in Section 5.4.

5.2.4 Facility Structures

The current facility structures located near the entrance gate will be maintained during the post-closure period to provide a base for post-closure maintenance operations. These facilities may also be used by City or County personnel for continued equipment storage or maintenance, and possibly for future solid waste support operations. The facilities will be visually inspected monthly for signs of disrepair, such as leaking walls/roof, broken windows/doors/locks, etc. Needed repairs will be made as necessary.

5.3 MAINTENANCE OF COVER AND DRAINAGE SYSTEMS

5.3.1 Final Cover

A post-closure maintenance program will be implemented at the landfill in order to maintain the integrity of the landfill's final cover. The final cover areas will be inspected quarterly for evidence of erosion, ponded water, odor, exposed refuse, cracks, settlement, slope failure, and leachate seeps. The landfill's final grades will be inspected and maintained in order to maintain

their integrity. Areas where water has collected (ponded) will be regraded. Erosion damage resulting from heavy rainfall will be repaired.

Cracks in the final cover will be scarified and recompacted or sealed with a bentonite slurry. Any erosion damage, which may be caused by extremely heavy rainfall, will be repaired. Temporary berms, ditches, and straw mulch will be used to prevent further erosion damage to soil cover areas until site conditions permit the final cover to be re-established and vegetation to be reseeded. Preventative maintenance for the final cover should preclude problems regarding leachate generation from infiltration of surface water, gas venting through the cover, and vectors attracted by exposed refuse.

During the post-closure maintenance period, a topographic map will be prepared every five years to evaluate landfill settlement. Iso-settlement maps will be produced for calculating differential settlement on the landfill by comparing the elevations on the topographic map produced at closure and the most recently compiled topographic map.

5.3.2 Drainage System

The integrity of the final drainage system will be maintained throughout the post-closure period. The final drainage system will be evaluated and inspected for ponded water and blockage of and damage to drainage structures and swales on a quarterly basis, and monthly between December and March. Where erosion problems are noted or drainage control structures need repair, proper maintenance procedures will be implemented as soon as site conditions permit so that further damage is prevented. Damaged drainage pipes and broken ditch linings will be removed. Temporary repairs will be made until permanent repairs can be scheduled. The County or a licensed general contractor will repair or replace drainage facilities.

5.4 OPERATION AND MAINTENANCE OF GAS COLLECTION SYSTEM

Following closure of the landfill, the facility will continue to be subject to the Title V air quality operating permit until emissions from the landfill are demonstrated to less than 50 metric tons NMOC. During that time, the landfill gas collection system, including gas collection wells, piping and the flare or other suitable means of gas destruction, will be operated, inspected and maintained to keep the landfill in continuous compliance with permit conditions. Operation and maintenance of the gas collection system is discussed in further detail in Addendum 8.

5.5 CHANGES IN RECORDS/ZONING

Salt Lake City adopted a landfill overlay zone for the SLVSWMF in October 1994. The area has been zoned A-1 (agricultural) and M-1A (light industrial) in the past. The overlay zone is designed to acknowledge existence of the landfill and make provisions for ongoing operations.

According to Mr. Wilde, Deputy Director of Planning for Salt Lake City, once the landfill is closed, the land it is on will likely be rezoned as Open Space or as Public Land in order to preserve the designed end use.

5.6 SCHEDULE OF POST-CLOSURE CARE

After closure, the landfill will be monitored and maintained according to the schedules discussed in Section 5.1 through Section 5.4.

5.7 POST-CLOSURE COSTS AND PROJECTED FUND WITHDRAWALS

The estimated annual post-closure maintenance cost for the entire closed landfill is $540,000 in 2005 dollars. The total estimated 30-year post-closure maintenance cost is $16.2 million. Costs are discussed in detail in Section 3.

5.8 CONTACT PERSON/OFFICE

During the post-closure period, correspondence should be directed to:

Executive Director
Salt Lake Valley Solid Waste Management Facility
6030 West California Avenue
Salt Lake City, UT 84104

6. REFERENCES

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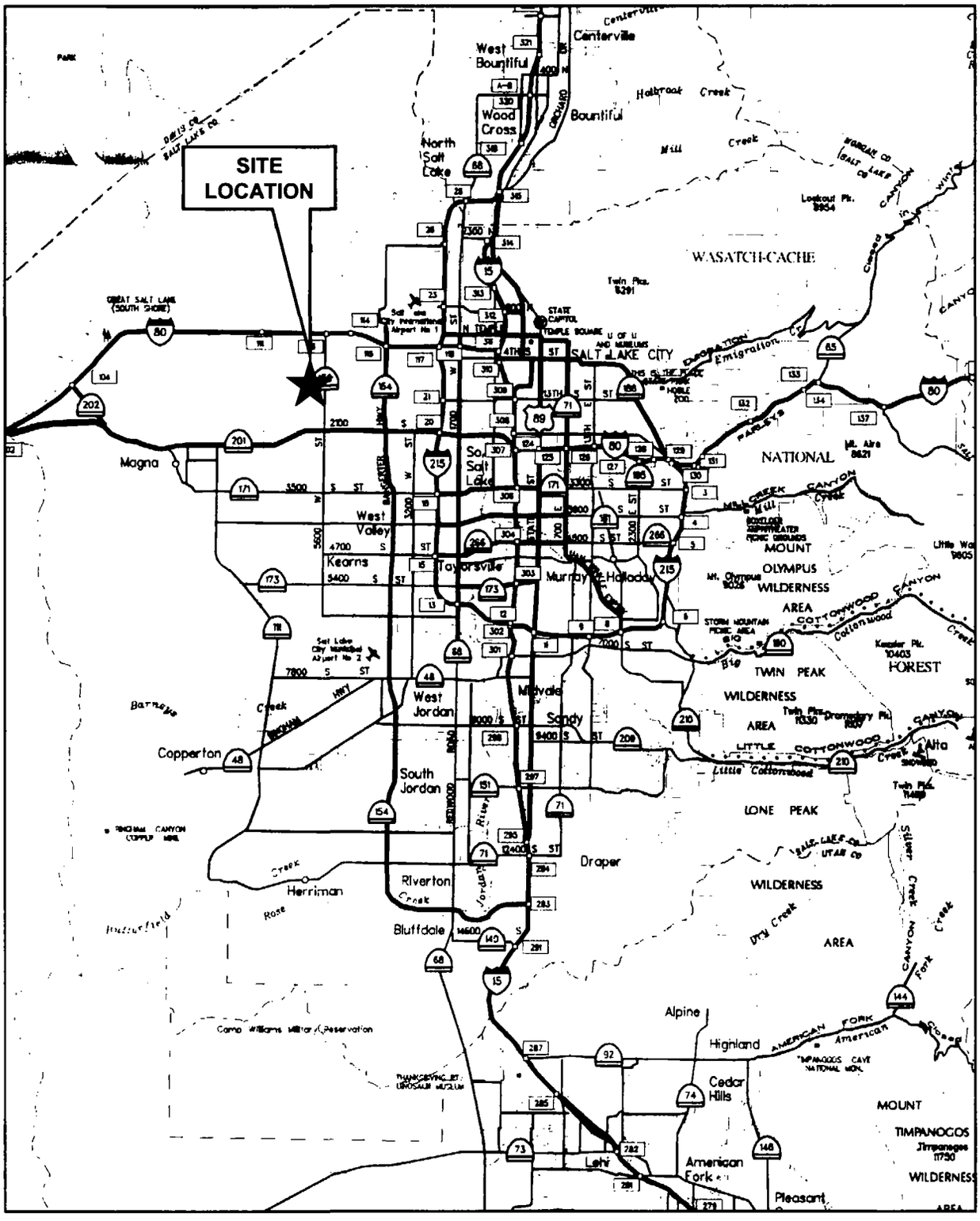
FIGURES



BASE MAP:
Utah Atlas & Gazetteer
DeLorme 2002

0' 2 4

APPROX. SCALE: 1" = 4 MILES

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KLEINFELDER

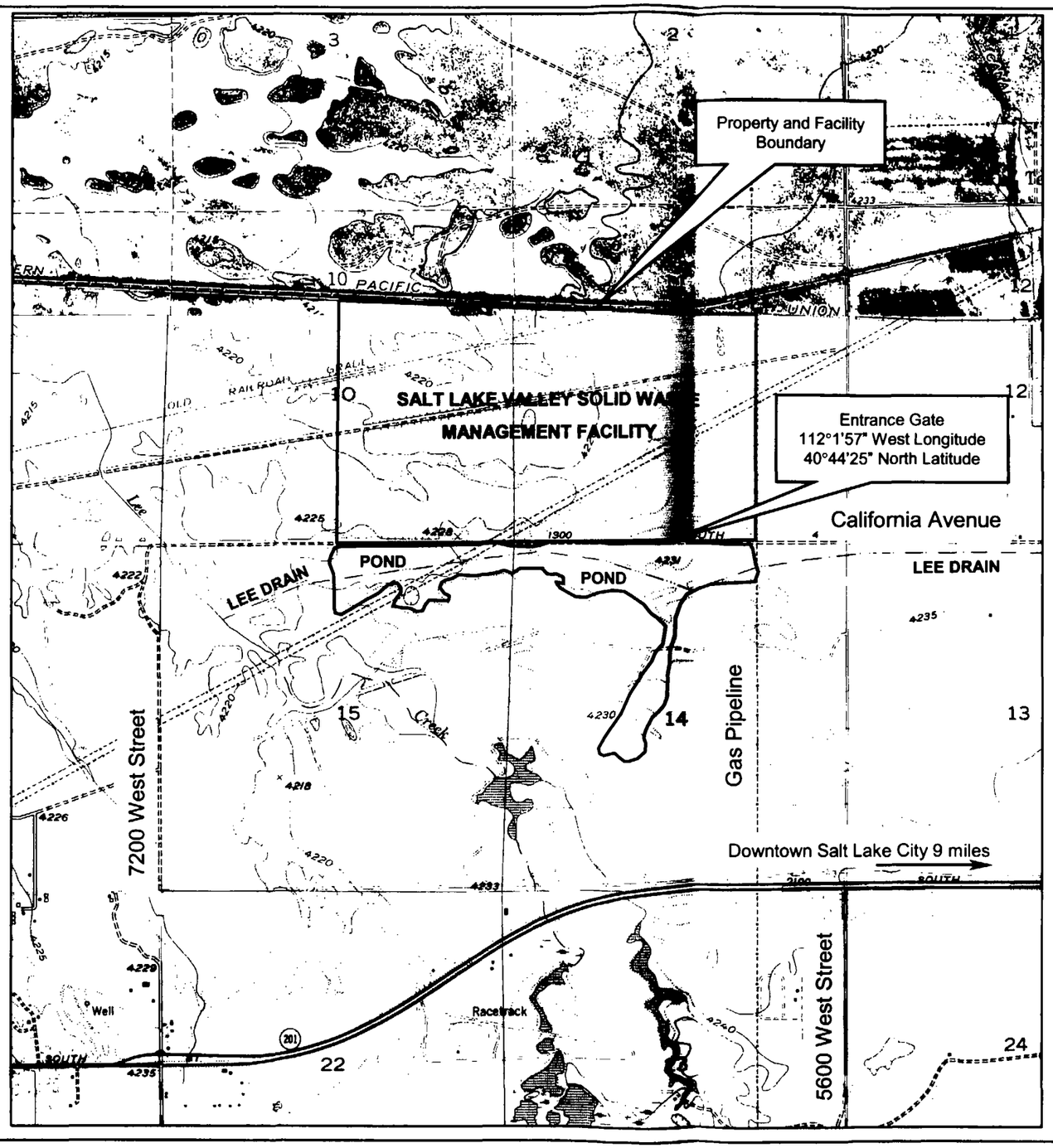
Date: 02/07/2005
Project Number 17677.009

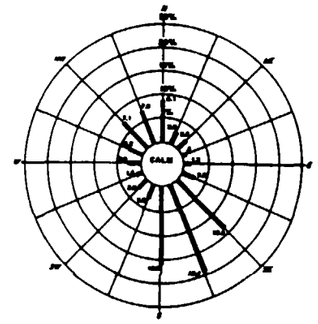
Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

SITE VICINITY MAP

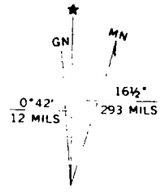
FIGURE

1





Directional Wind Rose
Salt Lake City, Utah



UTM GRID AND 1972 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

BASE MAP:
SALTAIR AND MAGNA, UTAH
U.S.G.S. 7.5 MINUTE QUADRANGLE
PHOTOREVISED 1972 and 1975

0' 1000' 2000'

SCALE 1:24,000
1" = 2000'
CONTOUR INTERVAL 5 and 20 FEET
SUPPLEMENTAL CONTOUR INTERVAL 5 FEET

QUADRANGLE LOCATION

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Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

SITE MAP

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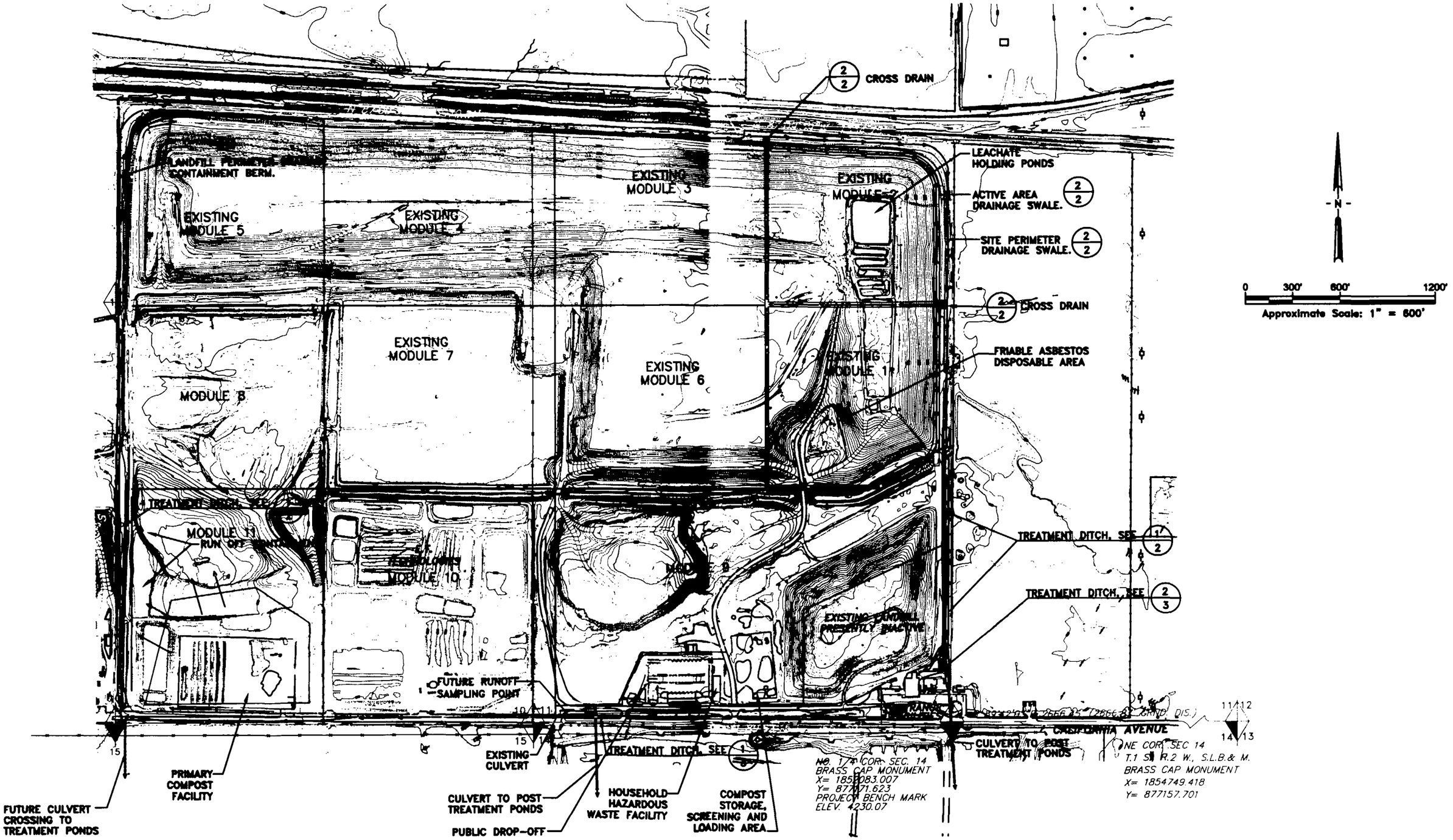
FIGURE
2



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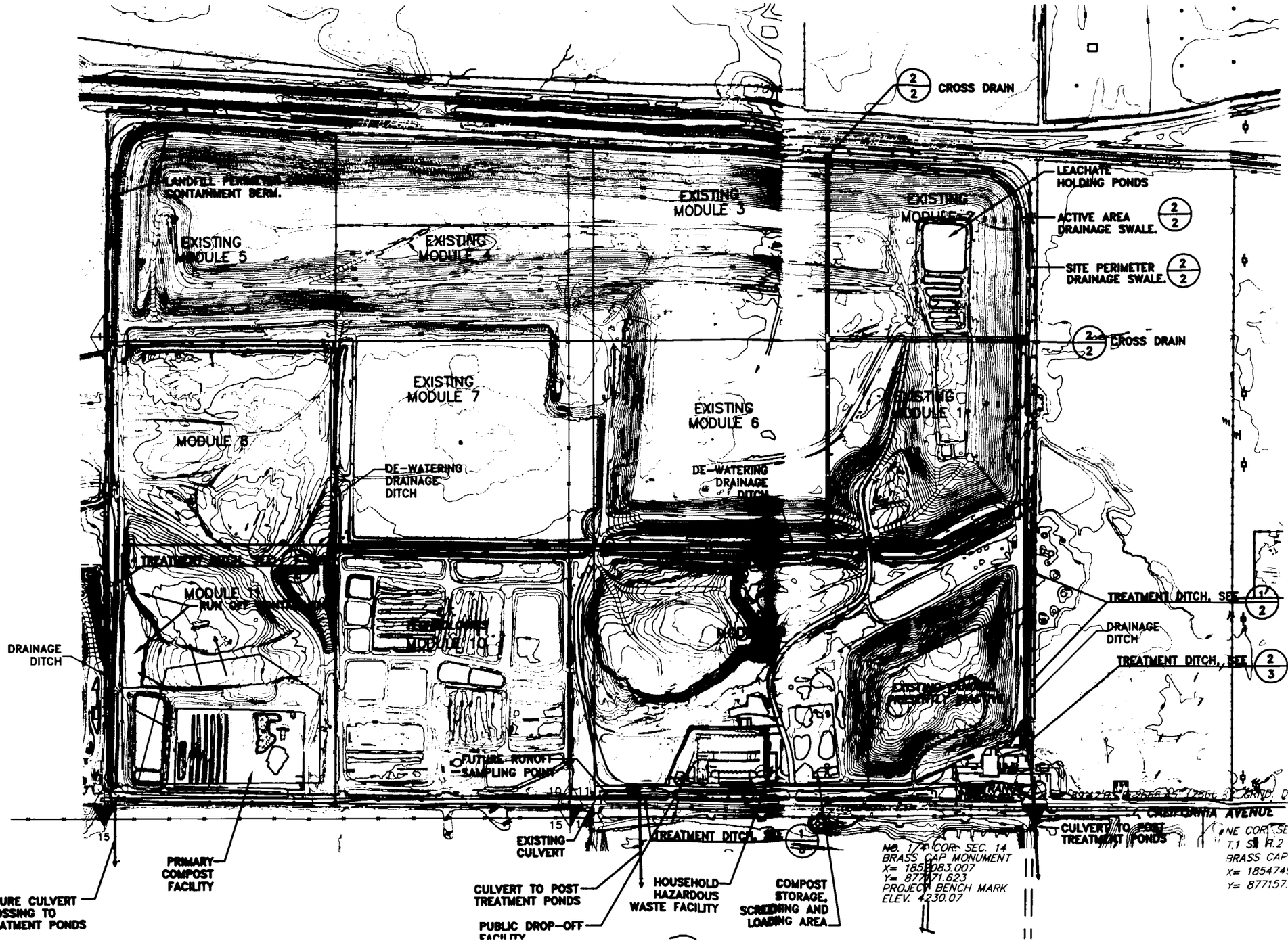
Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

LANDFILL CELLS

FIGURE
3



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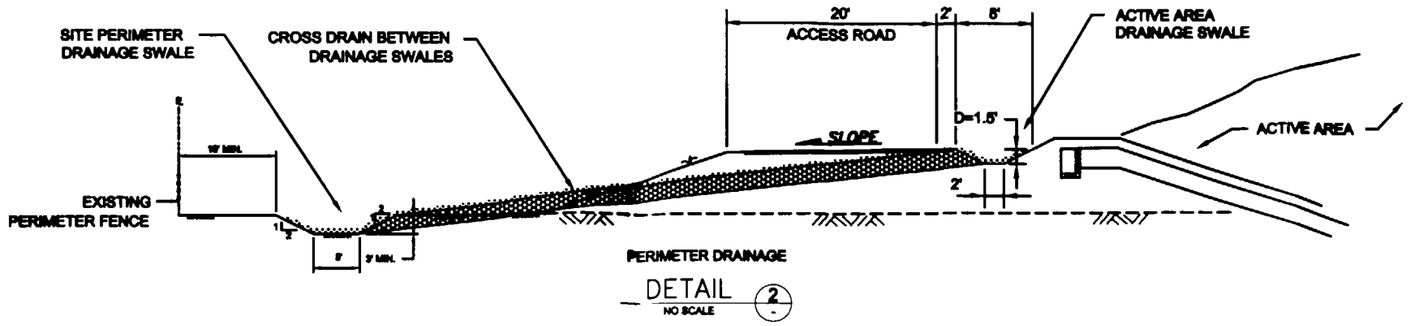
Project Number 17677.009

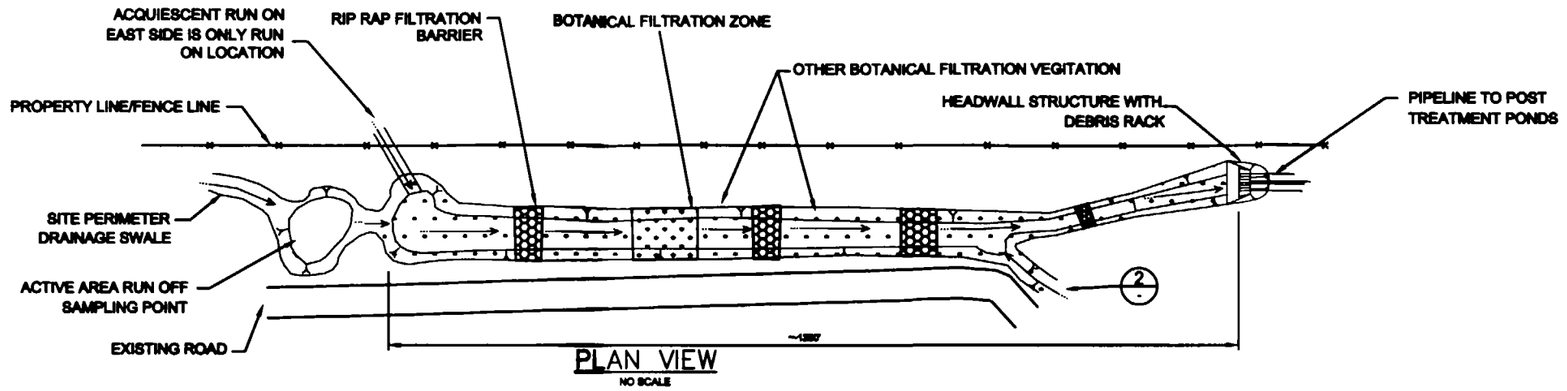
Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

LANDFILL DRAINAGE PLAN

FIGURE
4



DETAIL 2
NO SCALE



PLAN VIEW
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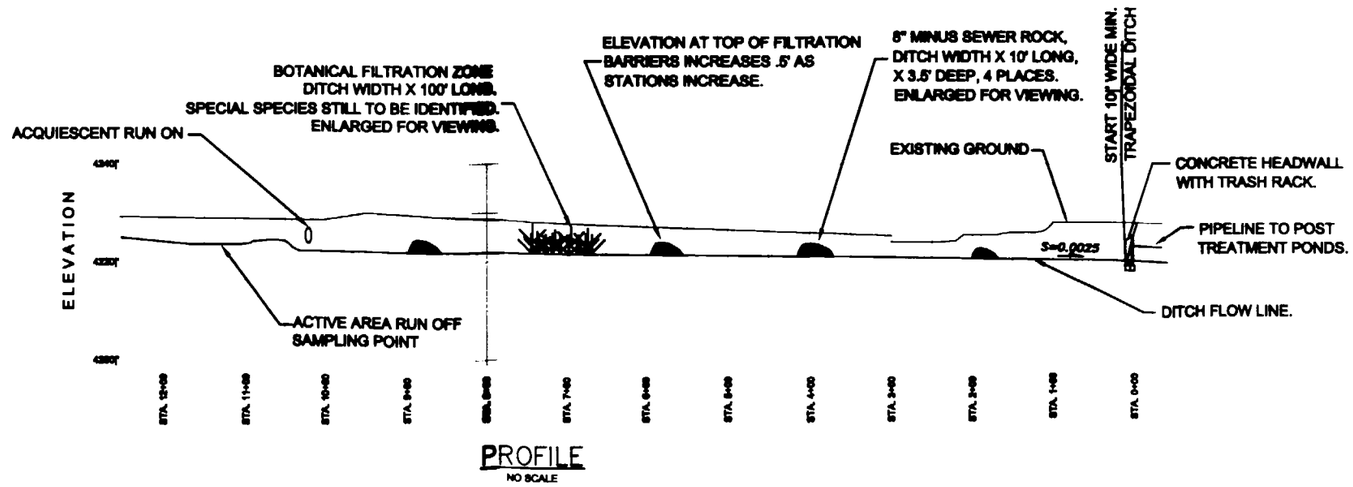

PROFILE
NO SCALE

SITE DRAINAGE TREATMENT DITCH
DETAIL 1
NO SCALE

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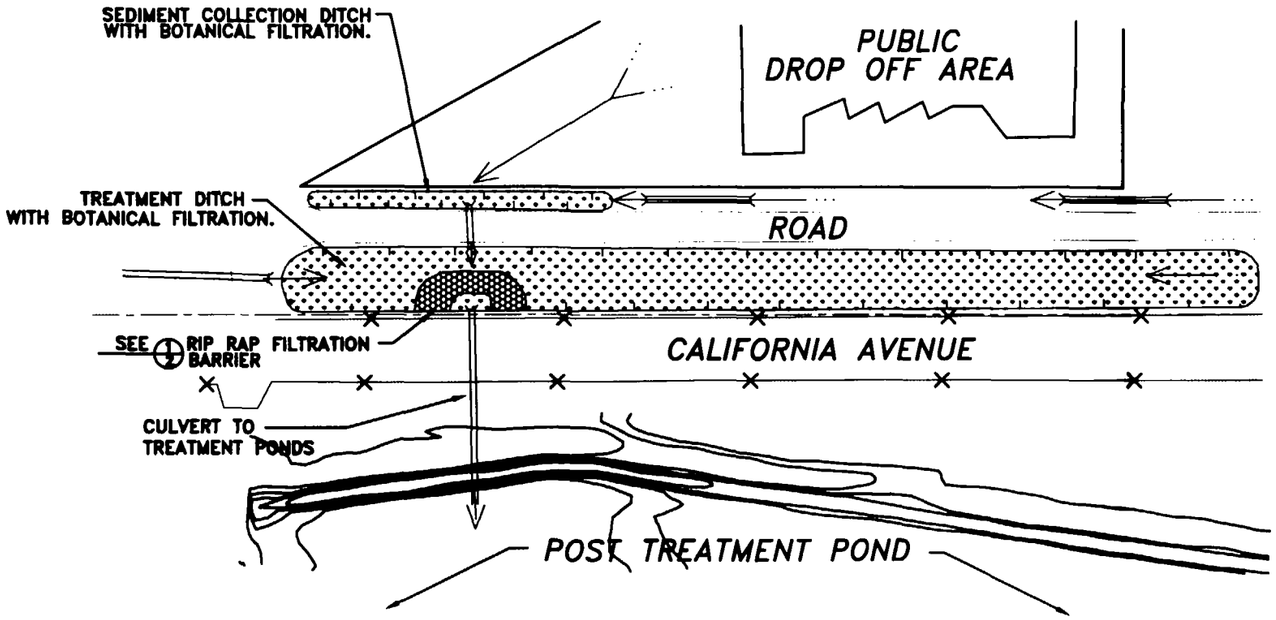
Date: 02/07/2005
Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

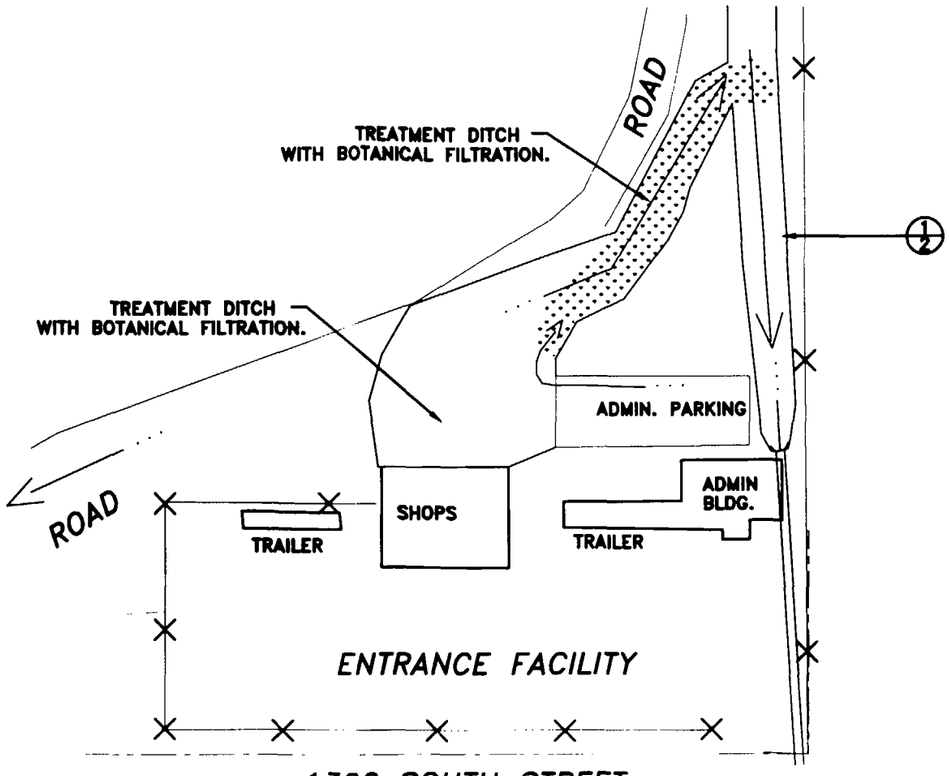
LANDFILL DRAINAGE PLAN DETAILS (1 OF 2)

FIGURE
5



SITE DRAINAGE TREATMENT DITCH

DETAIL ½ NO SCALE



FACILITIES DRAINAGE TREATMENT DITCH

DETAIL 2 NO SCALE

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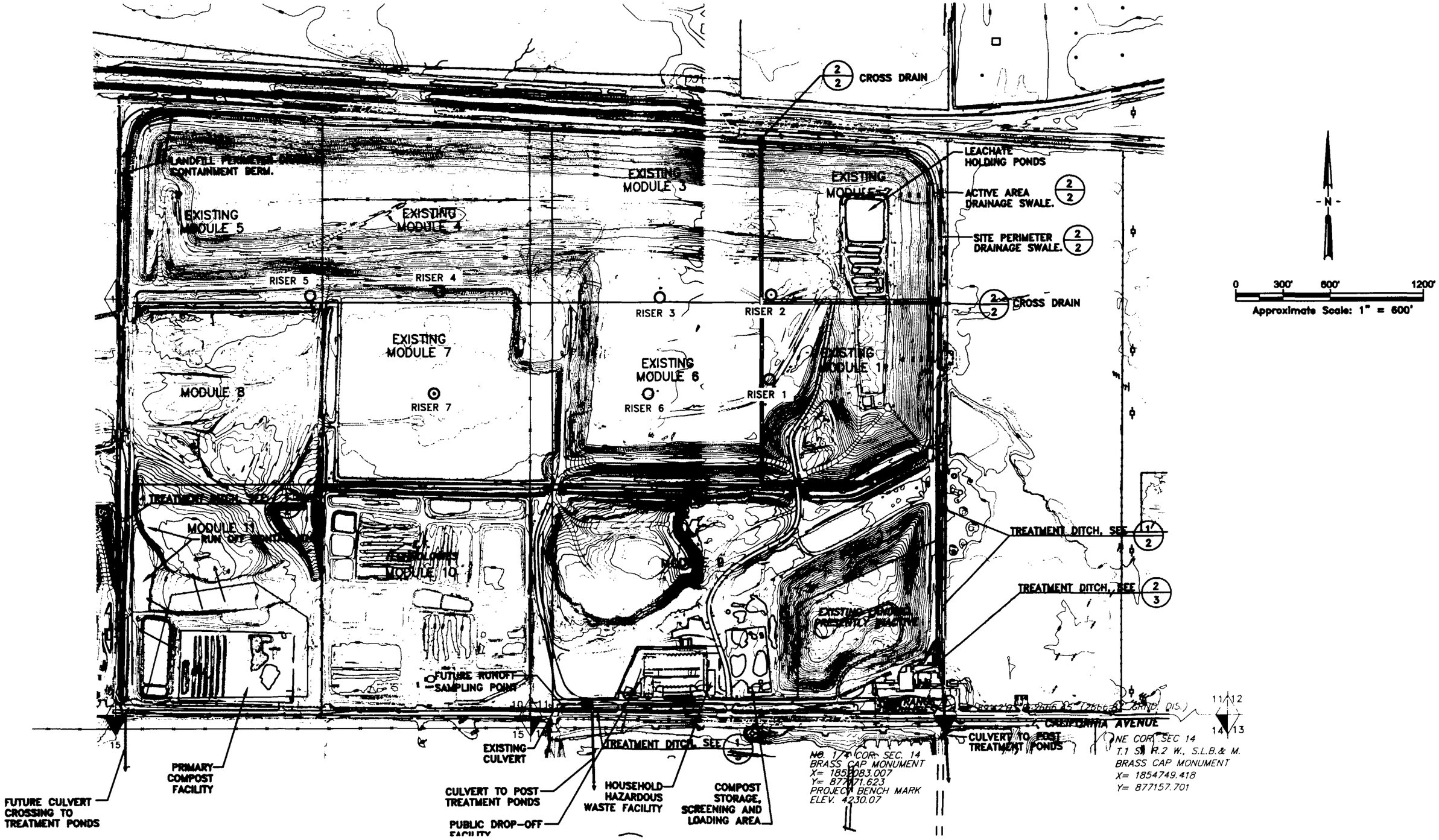
Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

LANDFILL DRAINAGE PLAN DETAILS (2 OF 2)

FIGURE **6**



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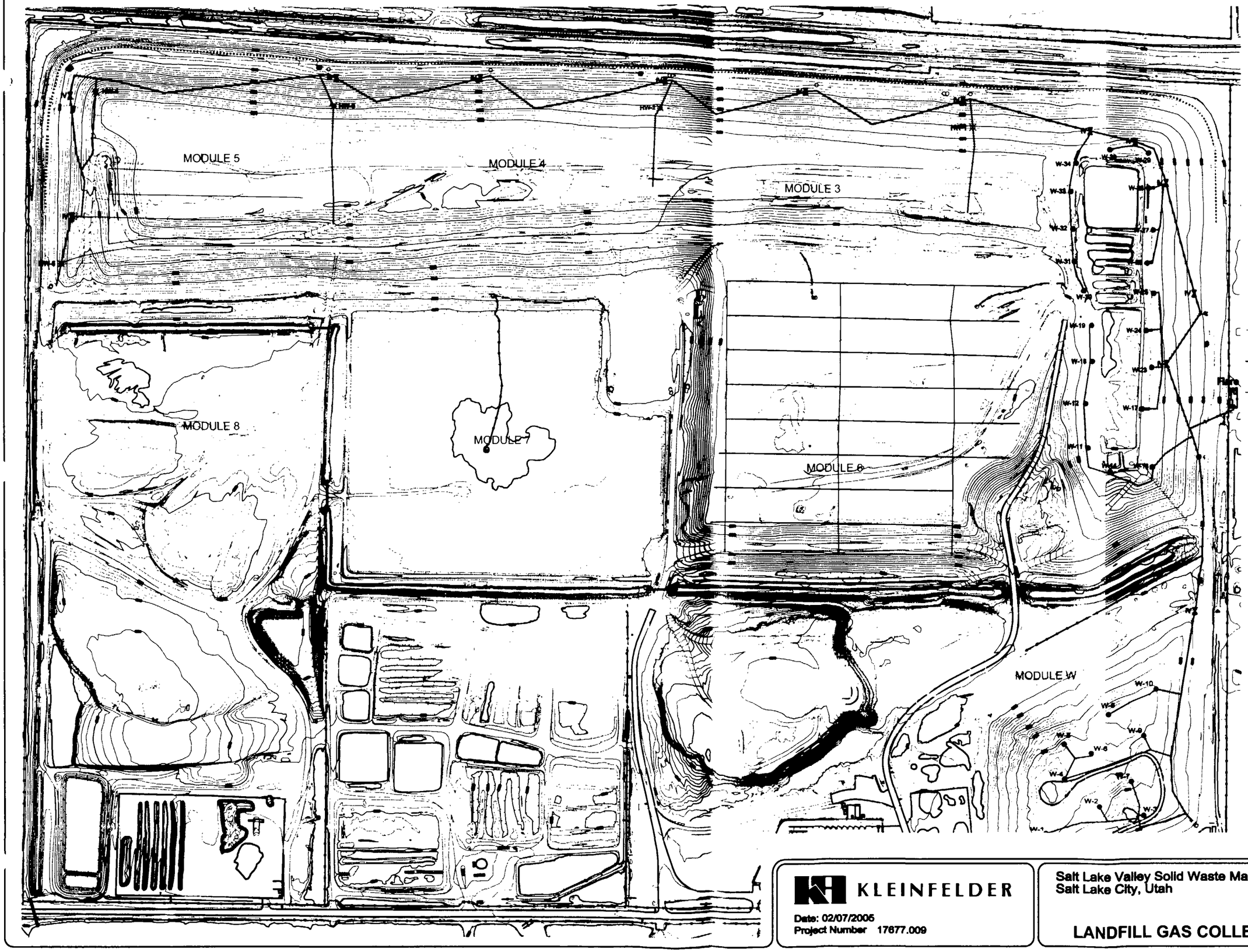
Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

LEACHATE MONITORING PLAN
RISER LOCATIONS

FIGURE
7



LEGEND

- EXISTING HEADER (APPROXIMATE LOCATION)
- EXISTING LATERAL PIPING
- EXISTING HORIZONTAL WELL
- EXISTING VERTICAL WELL
- EXISTING LEACHATE RISER
- ISOLATION VALVE - EXISTING
- HORIZONTAL WELL PIPING LAYER 1 (ESTIMATED LOCATION)
- HORIZONTAL WELL PIPING LAYER 2 (ESTIMATED LOCATION)
- MODULE 6 TIER 1 COLLECTOR (INSTALLED DEC. 2002)
- MODULE 6 LATERAL COLLECTOR (INSTALLED DEC. 2002)

0 200' 400' 800'

Approximate Scale: 1" = 400'

SLC5d062.dwg

KLEINFELDER

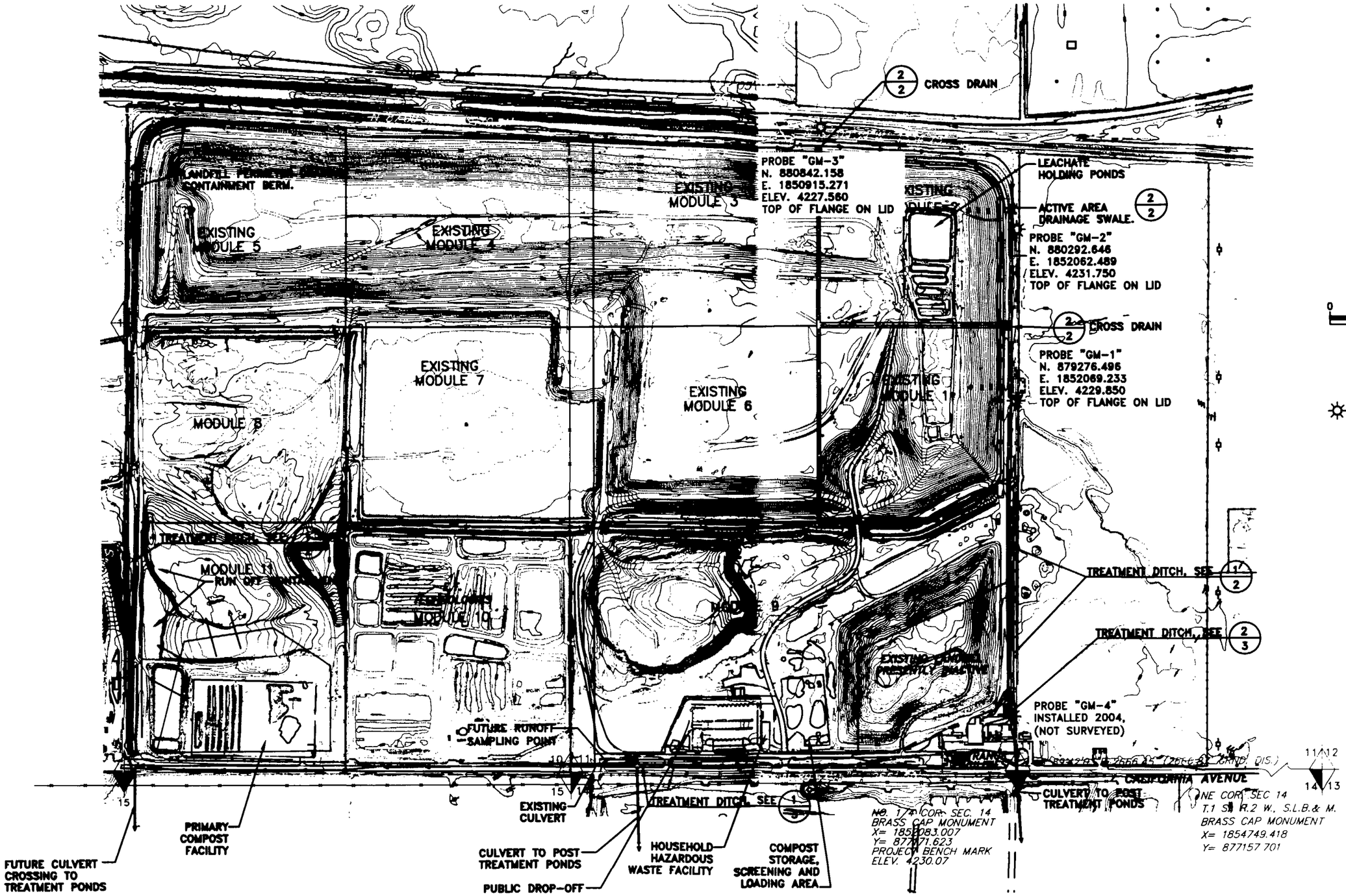
Date: 02/07/2005
Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

LANDFILL GAS COLLECTION SYSTEM

FIGURE

8



SLC5d048.dwg

KLEINFELDER

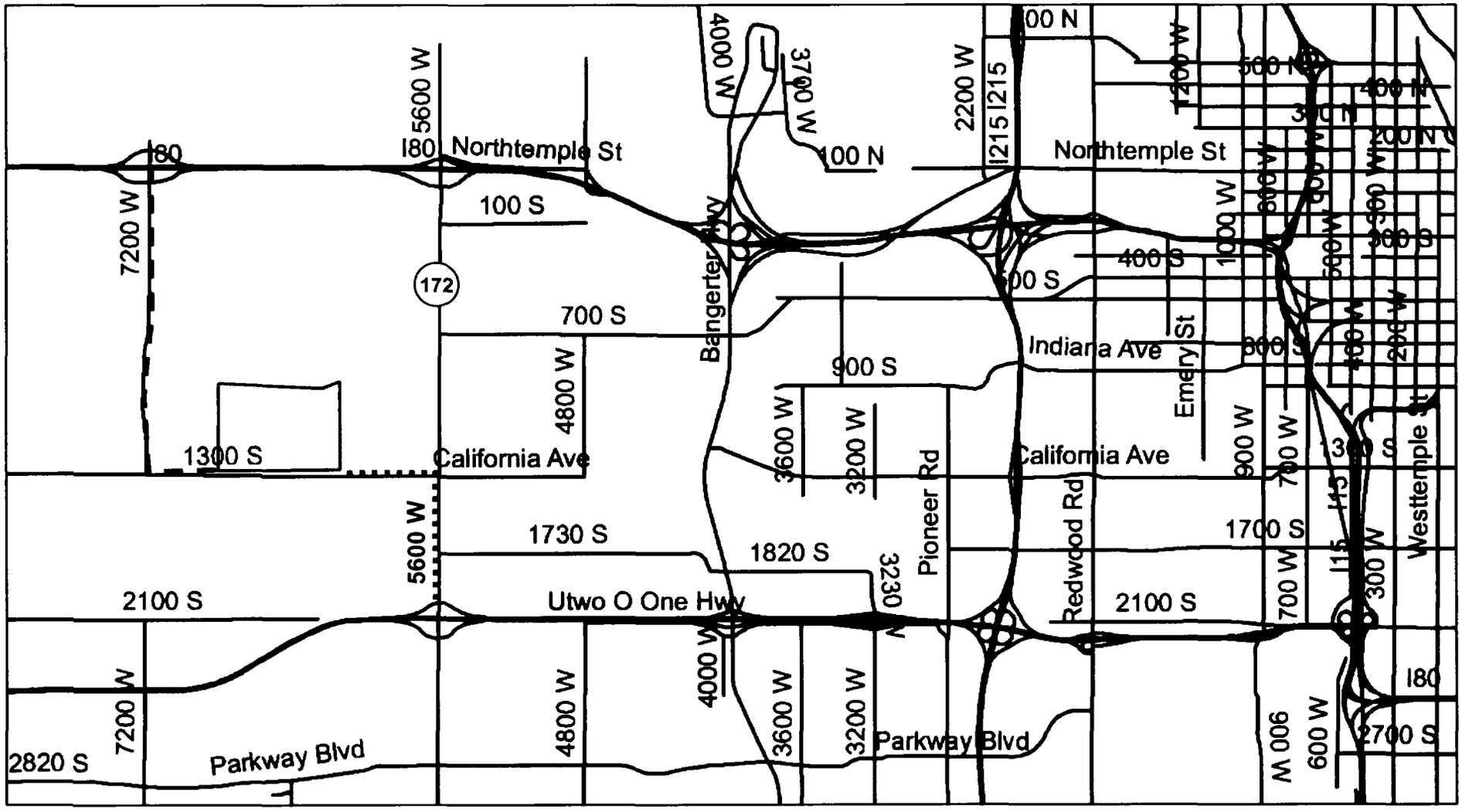
Date: 02/07/2005
Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

LANDFILL GAS MONITORING PROBE LOCATIONS

FIGURE

9



Normal approach to the landfill

Alternative approach to the landfill

SLC5Q048.ppt

KLEINFELDER

Date: 02/07/2005
Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

NORMAL AND ALTERNATE ROUTES TO THE FACILITY

FIGURE

10

APPENDIX A

SALT LAKE VALLEY SOLID WASTE MANAGEMENT COUNCIL

6030 West California Ave (1400 South)
Salt Lake City, Utah 84104
(801) 974-6920
FAX (801) 974-6936
www.slvswmf.net

Romney M. Stewart
Executive Director

March 11, 2005

Utah Department of Environmental Quality,
Division of Solid & Hazardous Waste:
288 North 1460 West
Salt Lake City, UT 84114-4880

Subject: Non-Profit Status, Salt Lake Solid Waste Management Facility

Dear Sirs,

The SLVSWMF serves the municipal and industrial solid waste disposal needs of approximately 65 percent of the businesses and residents of Salt Lake County. The Facility is a non-profit facility; the tipping fees charged by the Facility are used to pay for the construction and operation of the Facility.

The SLVSWMF is jointly owned and operated by Salt Lake City and Salt Lake County. The City provides support engineering services. The County provides accounting and legal support services and manages and operates the Facility. The Salt Lake Valley Solid Waste Management Council, a Facility management council made up of five members from governing and regulating agencies and an outside technical expert, develops policy, rules and regulations to promote safe and efficient solid waste disposal. The Council plans, establishes, and approves all construction and expansion projects and prepares budgets for operation and maintenance of the Facility.

Sincerely,

SALT LAKE VALLEY
SOLID WASTE MANAGEMENT COUNCIL

Romney Stewart
Solid Waste Director

451 S STATE ST # 345 EDIT 1 FACTOR DETAILS TOTAL VALUE 0

LOC: ATOE W 1500 S EDIT 1 PROP EDIT PAGE 0014 DATE 12/30/1998

SUB: TYPE UNKN PLAT

1998 PROPERTY DESCRIPTION FOR TAXATION PURPOSES ONLY

E 1/2 OF NE 1/4 & S 1/2 OF SE 1/4 W OF SE 1/4 EXCEPT R OF W OF

O S L & WESTERN PACIFIC RR SEC 10 T 1S R 2W SL MER 93.78 AC.

[illegible]

451 S STATE ST # 345 EDIT 1 FACTOR BYPASS TOTAL VALUE 0

[illegible] 3N1113104E1

LOC: 6702 W 1300 S EDIT 1 BOOK 0155 PAGE 1589 DATE 04/05/1990

SUB: TYPE UNIT PLAT

12/04/1990 PROPERTY DESCRIPTION FOR TAXATION PURPOSES ONLY

[illegible] 1/2 OF [illegible] 1/4 OF NE 1/4 & THE NW 1/4 OF NE 1/4 & THE W
1/2 OF SE 1/4 OF SEC 10. T 1S. R 2W. S L M. LESS RAIL ROAD.
[illegible] OF M OR ..

[illegible] TOTAL ACRES 193.89
[illegible] LAND VALUE 1154230
LEGAL BUILDINGS 772000
[illegible] TAX CLASS 0E MOTOR VEHIC 0
2001 S STATE ST # N4300 EDIT 1 FACTOR BYPASS TOTAL VALUE 0
[illegible] 2719000001
LOC: 6030 W 1300 S EDIT 1 BOOK 7008 PAGE 0162 DATE 08/31/1994
SUB: TYPE UNKN PLAT

12/06/1997 PROPERTY DESCRIPTION FOR TAXATION PURPOSES ONLY

BEG AT SW COR OF SEC 11, T 1S, R 2W, S L M; N 0-08'30" E 2648.56 FT; N 0-08'30" E 1095.08 FT; S 86-59'13" E 1328.96 FT [illegible] S 0-06'20" W 1026.76 FT; S 89-55'31" E 1327.83 FT; S 0-[illegible]'54" W 2648.[illegible] FT; N 89-55'44" W 2658.42 FT TO BEG [illegible] 443. 5107-581

VTDI 14-11-400-004-0000 DIST 13E TOTAL ACRES 39.26
SALT LAKE COUNTY PRINT V UPDATE REAL ESTATE 541000
LEGAL BUILDINGS 0
% S L COUNTY REAL ESTATE TAX CLASS OE MOTOR VEHIC 0
2001 S STATE ST # N4500 EDIT 1 FACTOR BYPASS TOTAL VALUE 0
SALT LAKE CITY UT 84190000201
LOC: 920 S 5600 W #APXBT EDIT 1 BOOK 7157 PAGE 2328 DATE 06/16/1995
SUB: TYPE UNKN PLAT

12/04/1997 PROPERTY DESCRIPTION FOR TAXATION PURPOSES ONLY

BEG N 89¬55'44" W 1533.02 FT & N 0¬01' W 33 FT FR SE COR SEC 11. T 1S. R 2W. SLM; N 89¬55'44" W 1125.35 FT: N 0¬04'54" E 3589.73 FT: N 77¬33' E 1155.38 FT: S 0¬00'51" E 1645.68 FT: S 2¬55'05" W 176.09 FT: S 0¬01' E 2016.68 FT TO BEG. LESS RR & U P & L. 89.26 AC M OR L.

14-11-100-006

WHEN RECORDED RETURN TO:
SALT LAKE COUNTY
REAL ESTATE SECTION

4252486

QUIT CLAIM DEED

SALT LAKE COUNTY, a body corporate and politic of the State of Utah, GRANTOR, hereby quit claims to SALT LAKE COUNTY and SALT LAKE CITY CORPORATION, as tenants in common, with an undivided interest, GRANTEES, for the sum of Ten Dollars ($10.00) and other good and valuable consideration, the following described parcel of real property in Salt Lake County, Utah, to-wit:

That portion of land located in the Southeast Quarter of the Northwest Quarter of Section 11, Township 1 South - Range 2 West, described as follows:

Beginning at the center of Section 11, Township 1 South - Range 2 West, Salt Lake Meridian; thence North 0°04'54" East along section line 985.86 feet to an old existing fence line; thence North 87°08'26" West 1328.38 feet along said fence line; thence South 0°03'21" West 1052.07 feet to the 1/16 section corner; thence South 89°59'51" East along the section line 1326.35 feet to point of beginning. (Contains 1,351,733.66 square feet or 31.03 acres).

IN WITNESS WHEREOF, GRANTOR has caused this Quit Claim Deed to be signed and its official seal to be affixed hereto by its duly authorized officer this 12th day of May, 1986.

SALT LAKE COUNTY

BY _____
H. DIXON HINDLEY
Salt Lake County Clerk

KATIE L. DIXON
RECORDER
SALT LAKE COUNTY, UTAH

REQ OF SALT LAKE COUNTY
MAY 29 2 48 PM '86
$ ____ DEP ____
Fee Paid
Deputy

5772 PAGE 1178

WHEN RECORDED RETURN TO:
SALT LAKE COUNTY
REAL ESTATE SECTION

STATE OF UTAH)
: ss.
County of Salt Lake)

On this 12th day of May, 1986, personally appeared before me H. Dixon Hindley, who being by me duly sworn, did say and acknowledge that he is the County Clerk of Salt Lake County, and that the within and foregoing Quit Claim Deed was signed by him on behalf of Salt Lake County by authority of a Resolution of the Board of County Commissioners of Salt Lake County.

Isabelle H. Hodgson
NOTARY PUBLIC, Residing in
Salt Lake County, Utah

My Commission Expires:
Aug 29, 1988
272G

APPROVED AS TO FORM
DAVID E. YOCOM
Salt Lake County Attorney's Office
By: Deputy County Attorney
Date: 5-2-86

BOOK 5772 PAGE 1179

ORIGINAL

14-11-300-002

RE 1208

WHEN RECORDED RETURN TO:
SALT LAKE COUNTY
REAL ESTATE SECTION

UIC LAW DEPARTMENT
DOCUMENT NO. 1-1832-2
Page 1

4191840

QUITCLAIM DEED

KNOW ALL MEN BY THESE PRESENTS:

That, UNION PACIFIC LAND RESOURCES CORPORATION, a corporation of the State of Nebraska, Grantor, in consideration of the sum of TEN DOLLARS ($10.00) to it duly paid, the receipt whereof is hereby acknowledged, has remised, released and quitclaimed, and by these presents does REMISE, RELEASE and forever QUITCLAIM to SALT LAKE COUNTY, a body politic and political subdivision of the State of Utah, whose postal address is County Real Estate Department, 151 East 2100 South Street, Building 4, Salt Lake City, Utah 84115 and SALT LAKE CITY CORPORATION, a municipal corporation of the State of Utah, whose postal address is 451 South State Street, Salt Lake City, Utah 84111, Grantees, in equal shares as tenants in common, and not as joint tenants, their successors and assigns, forever, all of Grantor's right, title, interest, estate, claim and demand, both at law and in equity, of, in and to the real estate situate in the County of Salt Lake, State of Utah, described in Exhibit A hereto attached and hereby made a part hereof.

EXCEPTING from this quitclaim and RESERVING into Grantor, its successors and assigns, forever, all minerals and all mineral rights of every kind and character now known to exist or hereafter discovered, including, without limiting the generality of the foregoing, oil and gas and rights thereto, together with the sole, exclusive and perpetual right to explore for, remove and dispose of, said minerals by any means or methods suitable to Grantor, its successors and assigns, but without entering upon or using the surface of the lands hereby quitclaimed, and in such manner as not to damage the surface of said lands or to interfere with the use thereof by Grantees, their successors and assigns.

TOGETHER with all and singular, the hereditaments and appurtenances thereunto belonging; TO HAVE AND TO HOLD the lands described in Exhibit A, subject to the aforesaid exception and reservation, unto the Grantees, their successors and assigns, forever.

BK 5729 PG 1701

WHEN RECORDED RETURN TO
SALT LAKE COUNTY
REAL ESTATE SECTION

UTC LAW DEPARTMENT
DOCUMENT NO. 7-1822-2

Grantor, Federal Identification Number 13-2678586, is not a foreign corporation and withholding of Federal Income Tax from the amount realized will not be made by Grantees. An Affidavit and Certification prepared in conformance with IRS regulations under Section 1445 of the Internal Revenue Code is attached as Exhibit B.

IN WITNESS WHEREOF, Grantor has caused this instrument to be executed by its proper officers this 12th day of December, 1985.

In Presence of

UNION PACIFIC LAND RESOURCES CORPORATION

By _____
Vice President

Attest:

_____ (SEAL)
Assistant Secretary

BOOK 5729 PAGE 1702

WHEN RECORDED RETURN TO:
SALT LAKE COUNTY
REAL ESTATE SECTION

STATE OF NEBRASKA)
) ss.
COUNTY OF DOUGLAS)

On this 12th day of December, 1985, before me, a Notary Public in and for said County in the State aforesaid, personally appeared L.E. Olson, to me personally known, and to me personally known to be Vice President of UNION PACIFIC LAND RESOURCES CORPORATION, and to be the same person whose name is subscribed to the foregoing instrument, and who, being by me duly sworn, did say that he is Vice President of UNION PACIFIC LAND RESOURCES; that the seal affixed to said instrument is the corporate seal of said corporation; and that said instrument was signed and sealed on behalf of said corporation by authority of its board of directors; and the said L.E. Olson acknowledged said instrument to be his free and voluntary act and deed and the free and voluntary act and deed of said corporation, by it voluntarily executed, for the uses specified therein.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year last above written.

My commission expires 9-22-89.

S.A. Hroneh
Notary Public

Residing at Omaha, Ne.

(S E A L)

GENERAL NOTARY-State of Nebraska
S. A. HRONEK
My Comm. Exp. Sept. 22, 1989

BOOK 5729 PAGE 1703

WHEN RECORDED RETURN TO:
SALT LAKE COUNTY
REAL ESTATE SECTION

EXHIBIT A
UIC LAW DEPARTMENT
DOCUMENT NO. 1-1832-2

A tract of land situate in the Northeast Quarter of the Southwest Quarter (NE¼SW¼) of Section 11, Township 1 South, Range 2 West of the Salt Lake Meridian in Salt Lake County, State of Utah, being all of Parcel 3, as conveyed by Union Pacific Railroad Company to Union Pacific Land Resources Corporation by Quitclaim Deed recorded as No. 2796247, March 22, 1976, in Book 4140, pages 443 through 447, in the Records of said County, said Parcel 3 more particularly described as follows:

Commencing at the northwest corner of said Section 11;

thence along the west line of said Section 11, S. 0 degrees 31 minutes E., a distance of 3139.37 feet, more or less, to a point which is 50.0 feet northwesterly, measured at right angles, from the centerline of the abandoned main track of the Las Vegas to Salt Lake City main line of the Los Angeles and Salt Lake Railroad Company, as formerly constructed and operated;

thence along a line parallel with and 50.0 feet distant northwesterly, measured at right angles, from said centerline of abandoned main track, N. 80 degrees 24 minutes E., a distance of 1336.76 feet, more or less, to the true point of beginning, which is a point in the west line of said NE¼SW¼ of Section 11;

thence continuing along a line parallel with said centerline of abandoned main track, N. 80 degrees 24 minutes E., a distance of 1336.76 feet, more or less, to a point in the north-south centerline of Section 11;

thence along said north-south centerline, S. 0 degrees 31 minutes E., a distance of 101.27 feet to a point 50.0 feet southeasterly, measured at right angles, from said centerline of abandoned main track;

thence along a line parallel with and 50.0 feet distant southeasterly, measured at right angles, from said abandoned main track, S. 80 degrees 24 minutes W., a distance of 1336.76 feet, more or less, to a point in said west line of the NE¼SW¼ of said Section 11;

thence along said west line of the NE¼SW¼, N. 0 degrees 31 minutes W., a distance of 101.27 feet to the true point of beginning.

Containing an area of 133,676 square feet, more or less, or 3.07 acres.

BOOK 5729 PAGE 1704

14-11-300-003

WHEN RECORDED, MAIL TO:

Mr. Roger B. Hillam
County Real Estate Department
County Complex
135 East 2100 South
Salt Lake City, Utah 84115

Space Above for Recorder's Use

Warranty Deed

(Corporate Form)

3139854

Intermountain Development, INC., a corporation organized and existing under the laws of the State of Utah, with its principal office at Salt Lake City, of County of Salt Lake, State of Utah, grantor, hereby conveys and warrants to SALT LAKE COUNTY, special Service District #1

Grantee of Salt Lake City, County, Utah for the sum of Ten Dollars and other good and valuable consideration----------DOLLARS, the following described tract of land in Salt Lake County, State of Utah:

Beginning at the SW corner of Section 11, T1S, R2W, SLB&M and running thence along the Section line N 0°08'30" E 2648.56 ft to the West quarter corner of said Section 11, thence N 0°08'30" E 1095.08 ft to the South right of way fence line of the Los Angeles and Salt Lake Railroad, thence along said right of way fence S 86°59'13" E 1328.96 ft more or less to the East line of the West half of the West half of said Section 11, thence S 0° 06'20" W along said line 1026.96 ft to the South line of the Northwest quarter of said section 11, thence S 89°55'31" E 1327.83 ft to the center of said Section 11, thence S 0°04'54" W 2648.39 ft and N 89°55'44" W 2658.42 ft to the point of beginning, less 3.087 acres owned in fee title by Union Pacific Land Resource Company and 3.543 acres owned by fee title by Utah Power Company, both parcels being in the East half of the Southwest quarter of said Section 11, Containing 8,446,027 square feet = 193.894 acres.

less (Total of 6.63 acres) Bal. = 8,156,787 sq.ft.
= 187.254 acres

The officers who sign this deed hereby certify that this deed and the transfer represented thereby was duly authorized under a resolution duly adopted by the board of directors of the grantor at a lawful meeting duly held and attended by a quorum.

In witness whereof, the grantor has caused its corporate name and seal to be hereunto affixed by its duly authorized officers, this 26th day of September A. D., 1978

Attest: [signature] Secretary

(Corporate Seal)

INTERMOUNTAIN DEVELOPMENT, INC., a Utah Corporation
By [signature] President

STATE OF UTAH)
: ss.
County of Salt Lake)

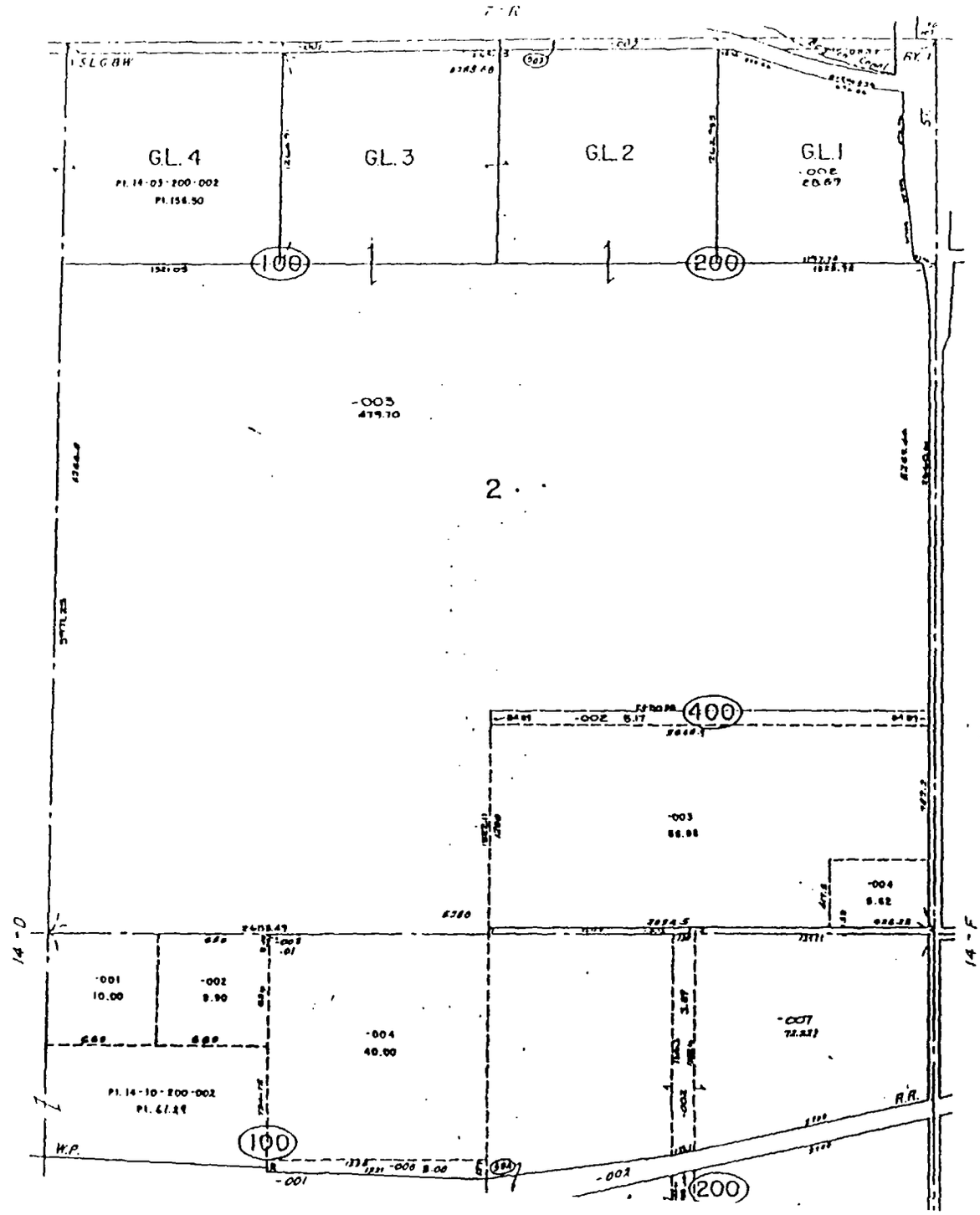
On the 26th day of September A. D. 1978 personally appeared before me WILLIAM D. CALLISTER and MARVIN A. MELVILLE, who being by me duly sworn, did say, each for himself, that he, the said William D. Callister is the president, and he, the said Marvin A. Melville is the secretary of INTERMOUNTAIN DEVELOPMENT, INC., and that the within and foregoing instrument was signed in behalf of said corporation by authority of a resolution of its board of directors and said William D. Callister and Marvin A. Melville duly acknowledged to me that said corporation executed the same and that the seal affixed is the seal of said corporation.

[signature] Notary Public.

My Commission expires 9-30-79 My residence Salt Lake City, Utah

FORM 181C—WARRANTY DEED, CORP. FORM—PRATT-[illegible] SOUTH, SALT LAKE CITY, UTAH

BOOK 5107 PAGE 581


G.L. 4
G.L. 3
G.L. 2
G.L. 1
100
200
400
-003
479.70
2
-004
9.62
-001
10.00
-002
9.90
-004
40.00
-007
14 - D
14 - F
W.P.
R.R.
100
200

14-10-400-001

UPC LAW DEPARTMENT
DOCUMENT NO. 1-7567
Page 1

SALT LAKE COUNTY
REAL ESTATE SECTION

4367726

QUITCLAIM DEED

KNOW ALL MEN BY THESE PRESENTS:

That, UNION PACIFIC LAND RESOURCES CORPORATION, a corporation of the State of Nebraska, Grantor, in consideration of the sum of One Dollar ($1.00) to it duly paid, the receipt whereof is hereby acknowledged, has remised, released and quitclaimed, and by these presents does REMISE, RELEASE and forever QUITCLAIM unto SALT LAKE COUNTY, a body politic and political subdivision of the State of Utah, whose post office address is County Real Estate Department, 151 East 2100 South Street, Building 4, Salt Lake City, Utah 84115 and SALT LAKE CITY CORPORATION, a municipal corporation of the State of Utah, whose postal address is 451 South State Street, Salt Lake City, Utah 84111, (hereinafter "Grantees"), as tenants in common, and their successors and assigns, forever, all its right, title, interest, estate, claim and demand, both at law and in equity, of, in and to the real estate situate in the County of Salt Lake, State of Utah, described in Exhibit A hereto attached and hereby made a part hereof.

EXCEPTING from this quitclaim and RESERVING unto Grantor, its successors and assigns, forever, all minerals and all mineral rights of every kind and character now known to exist or hereafter discovered, including, without limiting the generality of the foregoing, oil and gas and rights thereto, together with the sole, exclusive and perpetual right to explore for, remove and dispose of, said minerals by any means or methods suitable to Grantor, its successors and assigns, but without entering upon or using the surface of the lands hereby quitclaimed, and in such manner as not to damage the surface of said lands or to interfere with the use thereof by Grantees, Grantees' successors and assigns.

BOOK 5853 PG 709

TOGETHER with all and singular the hereditaments and appurtenances thereunto belonging; TO HAVE

AND TO HOLD the lands described in Exhibit A, subject to the aforesaid exceptions and reservations, unto the Grantees, their successors and assigns, forever.

IN WITNESS WHEREOF, the Grantor has caused these presents to be signed by its Executive Vice President and attested by its Assistant Secretary, and its corporate seal to be hereunto affixed the tenth day of August, 1984.

In Presence of:

A. A. Burnside

By J. P. Watson
Executive Vice President

Attest:

Assistant Secretary (Seal)

STATE OF NEBRASKA)
) ss
COUNTY OF DOUGLAS)

On this tenth day of August 1984, before me, a Notary Public in and for said County in the State aforesaid, personally appeared A P Vicars to me personally known, and to me personally known to be Executive Vice President of UNION PACIFIC LAND RESOURCES CORPORATION, and to be the same person whose name is subscribed to the foregoing instrument, and who, being by me duly sworn, did say that he is Executive Vice President of UNION PACIFIC LAND RESOURCES COPPORATION; that the seal affixed to said instrument is the corporate seal of said corporation; and that said instrument was signed and sealed on behalf of said corporation by authority of its board of directors; and the said A P Vicars acknowledged said instrument to be his free and voluntary act and deed, and the free and voluntary act and deed of said corporation, by it voluntarily executed for the purposes specified therein.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year last above written.

My commission expires: 11-28-86

GENERAL NOTARY - State of Nebraska
C.L. JANSEN
My Comm. Exp. Nov. 28, 1986

C L Jansen
Notary Public

Residing at:

Omaha, NE

(S E A L)

5853 711

EXHIBIT A

A tract of land situate in the Northeast Quarter of the Southeast Quarter (NE¼SE¼) of Section 10, Township 1 South, Range 2 West of the Salt Lake Meridian in Salt Lake County, State of Utah, being all of Parcel 2, as conveyed by Union Pacific Railroad Company to Union Pacific Land Resources Corporation by Quitclaim Deed recorded as No. 2796247, March 22, 1976, in Book 4140, pages 443 through 447 in the Records of said County, said Parcel 2 more particularly described as follows:

Commencing at the northeast corner of Section 10;

thence along the east line of said Section 10, South 0 degrees 31 minutes East, 3139.37 feet, to THE TRUE POINT OF BEGINNING, said point being 50.0 feet distant northwesterly, measured at right angles, from the centerline of the abandoned main track of the Las Vegas to Salt Lake City main line of the Los Angeles and Salt Lake Railroad Company, as formerly constructed and operat

thence along a line parallel with and 50.0 feet distant northwesterly, measured at right angles, from said centerline of abandoned main track, South 80 degrees 24 minutes West, 1336.76 feet to a point in the west line of said Northeast Quarter of the Southeast Quarter of Section 10;

thence along said west line of said Northeast Quarter of the Southeast Quarter, South 0 degrees 31 minutes East, 101.27 feet to a point which is 50.0 feet distant southeasterly, measured at right angles, from said centerline of the abandoned main track;

thence along a line parallel with and 50.0 feet distant southeasterly, measured at right angles, from said centerline of abandoned main track, North 80 degrees 24 minutes East, 1336.76 feet, to the east line of said Section 10;

thence along said east line of Section 10, North 0 degrees 31 minutes West, 101.27 feet to THE TRUE POINT OF BEGINNING.

Said parcel contains 133,676 square feet, more or less, (3.07 acres).

BK 5853 PG 713

DEC 15 4 10 PM '86
SL Co Rial
REQ OF Suzette
$ _____ JC

Rebecca Gray
REBECCA GRAY

14-10-400-002

Recorded at Request of

M. Fee Paid $

Bk Book Page Ref

Mail tax notice to

4867727

WARRANTY DEED

SALT LAKE COUNTY
REAL ESTATE SECTION
RECEIVED

PROGRESS INVESTMENT, A PARTNERSHIP, Grantor of Salt Lake County, State of Utah, hereby CONVEYS AND WARRANTS to SALT LAKE COUNTY, a body politic and political subdivision of the State of Utah, and SALT LAKE CITY, a municipal corporation of the State of Utah, Grantees of Salt Lake County, State of Utah, for the sum of TEN DOLLARS and other good and valuable consideration, the following described tracts of land in Salt Lake County, State of Utah

Being all of the South 1/2 of the Southeast 1/4 of the Northeast 1/4, and the East 1/2 of the Southeast 1/4 of Section 10, Township 1 South, Range 2 West, Salt Lake Base and Meridian.

Less and excepting the following described property: A parcel of land situate in the NE 1/4 SE 1/4 of Section 10, T1S, R2W, of the Salt Lake Meridian, Salt Lake County, State of Utah, more particularly described as follows: Commencing at the Northeast corner of Section 10, thence along the East line of said Section 10, South 0°31' East, a distance of 3139.37 feet, more or less, to the true point of beginning, said point being 50.0 feet distant Northwesterly, measured at right angles, from the centerline of the abandoned main track of the Las Vegas to Salt Lake City main line of the Los Angeles and Salt Lake Railroad Company, as formerly constructed and operated; thence along a line parallel with and 50.0 feet Northwesterly, measured at right angles, from said centerline of abandoned main tract, South 80°24' West, a distance of 1336.76 feet, more or less, to a point in the West line of said NE 1/4 SE 1/4 of Section 10; thence along said West line of the NE 1/4 SE 1/4 South 0°31' East a distance of 101.27 feet to a point which is 50.0 feet distant Southeasterly, measured at right angles, from said center line of the abandoned main track; thence along a line parallel with and 50.0 feet Southeasterly, measured at right angles, from said centerline of abandoned main track North 80°24' East a distance of 1336.76 feet, more or less, to the East line of said Section 10, thence along said East line of Section 10, North 0°31' West a distance of 101.27 feet to the true point of beginning.

Also excepting therefrom minerals and mineral rights without surface entry to the following described parcel (methane gas generated by Buyer's use of the real property shall not be considered "minerals" for purposes of this exception) A strip of land 100 feet in width being 50 feet wide on each side of the center line of the Union Pacific main line of railway as the same is surveyed, located and being constructed along, over and acrosss said East half of the Northeast quarter of said Section 10, which said center line of said railway is particularly described as follows: Beginning at a point which is 2189 feet South of the Northeast corner of said Section, and running thence in a straight line South 77°33' West 1350.5 feet to a point on the West line of said East half of the Northeast quarter of said Section 10 which is 2480 feet South from the North line of said Section, said strip of land containing 3.11 acres, more or less.

WITNESS the hands of said grantor this 17th day of August, 1984

PROGRESS INVESTMENT, A PARTNERSHIP

By John A. Rokich
John A. Rokich
General Partner

By Edwin L. Stromberg
Edwin L. Stromberg
General Partner

Dec 15 4 10 PM '86
SLCo Recorder
REQ OF

5853 711

STATE OF UTAH
County of Salt Lake ss

On the 17th day of August, 1984, personally appeared before me John A. Rokich and Edwin L. Stromberg, known to me to be two General Partners of PROGRESS INVESTMENT, A PARTNERSHIP, and the partners who subscribed said partnership name to the foregoing instrument, and acknowledged to me that they executed the same in behalf of said partnership

NOTARY PUBLIC
Residing in Salt Lake City
Salt Lake County, Utah

My Commission expires.
8/20/87

RICHARD G. MAC DONALD NOTARY PUBLIC

5853 745

14-10-400-003

15.00

4866945
03 JANUARY 90 03:03 PM
KATIE L. DIXON
RECORDER, SALT LAKE COUNTY, UTAH
METRO NATIONAL TITLE
REC BY: BEVERLY CARTER , DEPUTY

Recorded at Request of: METRO NATIONAL TITLE
File Number: 89011846

When Recorded Return to:
SALT LAKE COUNTY
2001 SOUTH STATE #N4500
SALT LAKE CITY, UTAH 84190-3100

4866945

WARRANTY DEED

KENNECOTT UTAH COPPER CORPORATION, a Delaware corporation, successor in interest by merger with GAZELLE CORPORATION, a Delaware corporation, doing business as KENSALT, INC., GRANTOR, of 8362 West 10200 South, Bingham Canyon, Utah 84006-0525, County of Salt Lake, State of Utah, hereby conveys and warrants to SALT LAKE COUNTY, a body corporate and politic and SALT LAKE CITY CORPORATION, a municipal corporation, GRANTEES, of 2001 South State, #N4500, Salt Lake City, Utah 84190-3100 for the sum of TEN and 00/100 DOLLARS AND OTHER GOOD AND VALUABLE CONSIDERATION, the following described tracts of land in Salt Lake County, State of Utah:

PARCEL NO. 1

That portion of land located in the East half of Section 10, Township 1 South, Range 2 West and described as follows:

The North half of the Southeast quarter of the Northeast quarter of Section 10, Township 1 South, Range 2 West, Salt Lake Base and Meridian, less and excepting the Western Pacific and Union Pacific Railroad property.

PARCEL NO. 2

That portion of land located in the East half of Section 10, Township 1 South, Range 2 West and described as follows:

The Southwest quarter of the Northeast quarter and the West half of the Southeast quarter of Section 10, Township 1 South, Range 2 West, Salt Lake Base and Meridian, less and excepting the Western Pacific and Union Pacific Railroad property.

SUBJECT TO: County and/or City Taxes not delinquent; Bonds and/or Special Assessments not delinquent; and Covenants, Conditions, Restrictions, Rights-of-Way, Easements and Reservations now of Record.

WITNESS the hand of said grantor this 28th day of December, 1989.

KENNECOTT UTAH COPPER CORPORATION

By _____
Roderick K. Davey
Vice President and General Manager

Signed in the Presence of:

_____

5188 1599

STATE OF UTAH)
:ss
County of Salt Lake)

On this 28th day of December, 1989, personally appeared before me Roderick K Davey, who being by me duly sworn did say, that he is the Vice President and General Manager of KENNECOTT UTAH COPPER CORPORATION, the successor in interest by merger with GAZELLE CORPORATION dba KENSALT, INC., that the foregoing instrument was signed in behalf of said corporation by authority and said Roderick K. Davey acknowledged to me that said corporation executed the same.

NOTARY PUBLIC:
Beverly E. Seal

Residing in:
Salt Lake City Utah

My Commission Expires:
June 2, 1992

NOTARY PUBLIC
My Commission Expires June 2, 1992
BEVERLY E. SEAL
36 South State, #2200
Salt Lake City, UT 84111
STATE OF UTAH

1816641 BOOK 1871 PAGE 492

Recorded at Request of SALT LAKE COUNTY Clerk DEC 13 1961

at 9:21 M. Fee Paid $ No fee NELLIE M. JACK, Recorder Salt Lake County, Utah

by Geo Fredekamp Dep. Book Page Ref.

Mail tax notice to Address

WARRANTY DEED

JAMES VAGENAS, a widower grantor
of Salt Lake City, County of Salt Lake, State of Utah, hereby
CONVEYs and WARRANTs to

SALT LAKE COUNTY, a body politic

grantee
of for the sum of
One Dollar and other good and valuable consideration DOLLARS,

the following described tract of land in Salt Lake County,
State of Utah:

The Northeast 1/4 of the Northwest 1/4 and the Northwest 1/4 of the Northeast 1/4 of Section 16, Township 1 South, Range 2 West, Salt Lake Base and Meridian, containing an area of 80 acres

WITNESS, the hand of said grantor, this 7th day of December, A. D. 19 61.

Signed in the Presence of

James Vagenas

Joan P. Funaro

David Hansen

STATE OF UTAH,
County of Salt Lake } ss.

On the 7th day of December, A. D. 1961
personally appeared before me James Vagenas, a widower

the signer of the within instrument, who duly acknowledged to me that he executed the same.

Notary Public.
3610 AURORA DR.
SALT LAKE CITY 17

My commission expires 6-19-1963 Residing in

BLANK #101—WARRANTY DEED SALT LAKE CITY

Recorded AUG 11 1977 at 11:53 a.m.
Request of Salt Lake County Comm. Clerk
KATIE L. DIXON, Recorder
Salt Lake County, Utah
By Cheryl Warrington Deputy
REF. _____ 2991589

RESOLUTION NO. 475

A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF SALT LAKE COUNTY, UTAH, AUTHORIZING THE CONVEYANCE OF REAL PROPERTY

BE IT KNOWN AND REMEMBERED:

THAT, WHEREAS, the Board of County Commissioners on April 4, 1977 approved a Lease Agreement between Salt Lake County and Kennecott Copper Corporation whereby Salt Lake County leased from Kennecott Copper Corporation approximately 84 acres located at approximately 8000 West 900 South, Salt Lake County, Utah, and

WHEREAS, by the terms of said Lease Agreement Salt Lake County agreed as consideration for the property leased to transfer and convey to Kennecott Copper Corporation fee title to the following described real property situate in Salt Lake County and more particularly described as follows:

Commencing at a point which is North 89°54'53" East 1315.46 feet along the section line and South 0°06'09" West 33.0 feet from the Northwest corner of Section 16, Township 1 South, Range 2 West, Salt Lake Base and Meridian, and running thence North 89°54'53" East 334.85 feet; thence South 0°06'09" West 1301.47 feet; thence North 89°54'53" West 334.85 feet; thence North 0°06'09" East 1300.86 feet to the point of beginning, containing 10.9 acres.

NOW, THEREFORE, IT IS HEREBY RESOLVED that the property described above be conveyed as heretofore approved by the Board and that the County Clerk is hereby authorized and directed to execute the attached Quit Claim Deed for and in behalf of the County, and to deliver the same to the Grantee therein named.

APPROVED and ADOPTED this 8th day of August, 1977.

BOARD OF COUNTY COMMISSIONERS
OF SALT LAKE COUNTY

By _____
Chairman

ATTEST:

W. STERLING EVANS
Salt Lake County Clerk

BOOK 4531 PAGE 921

2991589

QUIT CLAIM DEED

SALT LAKE COUNTY, a body corporate and politic of the State of Utah, grantor, of SALT LAKE CITY, County of SALT LAKE, State of Utah, hereby Quit-Clair to KENNECOTT COPPER CORPORATION, Grantees of Salt Lake County, for the sum of One and no/.00 Dollars ($ 1.00) and other good and valuable consideration, the following described tract of land in Salt Lake County, State of Utah:

Commencing at a point which is North 89°54'53" East 1315.46 feet along the section line and South 0°06'09" West 33.0 feet from the Northwest corner of Section 16, Township 1 South, Range 2 West, Salt Lake Base and Meridian, and running thence North 89°54'53" East 334.85 feet; thence South 0°06'09" West 1301.47 feet; thence North 89°54'53" West 334.85 feet; thence North 0°06'09" East 1300.86 feet to the point of beginning, containing 10.0 acres.

IN WITNESS WHEREOF, the Grantor has caused its name and seal to be hereunder affixed by its duly authorized officer this 8th day of August, 1977

SALT LAKE COUNTY,
A County of the State of Utah

By _____
W. STERLING EVANS
County Clerk of Salt Lake County

STATE OF UTAH)
: ss.
County of Salt Lake)

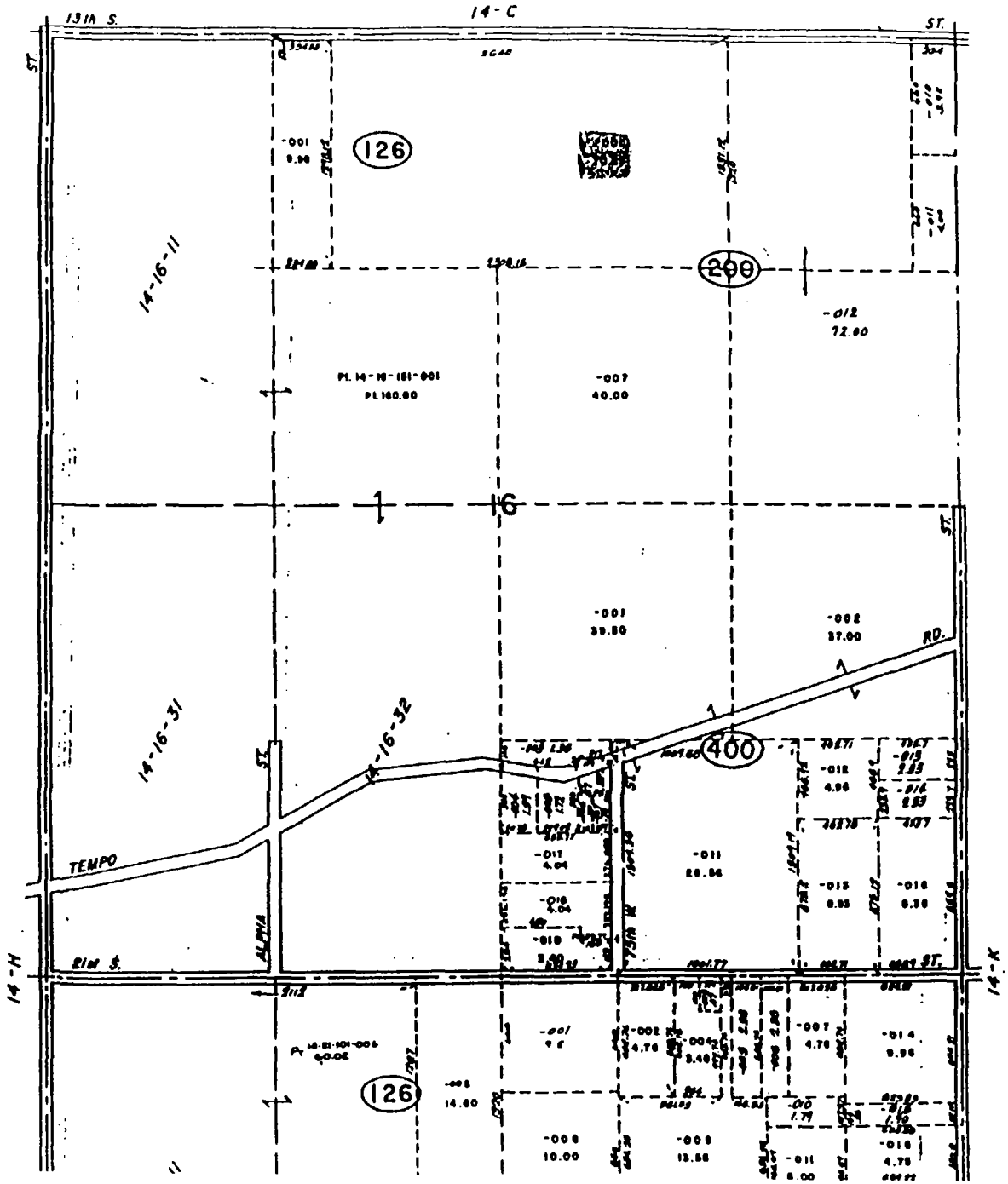
On this 8th day of August, 1977, personally appeared before me, W. Sterling Evans, who being by me duly sworn did say that he is the County Clerk of Salt Lake County, and that the within and foregoing instrument was signed in behalf of Salt Lake County by authority of a Resolution of the Board of County Commissioners of Salt Lake County and he duly acknowledged to me that said Salt Lake County executed the same.

My commission expires:
MY COMMISSION EXPIRES AUG. 31, 1980

Notary Public
Residing in Salt Lake County, Utah

Recorded AUG 11 1977 at 1154 a
Request of Salt Lake County Comm. Clerk
KATIE L. DIXON, Recorder
Salt Lake County, Utah
$ No Fee by _____ Deputy
Cheryl Warrington
REF. _____

4534 PG 922


131st S.
14 - C
ST.
126
200
400
14-16-11
14-16-31
14-16-32
TEMPO
ALPINE
RD.
14 - H
14 - K
1
6

APPENDIX B

Summary Report:

Scalehouse Daily Total

SOLID WASTE DISPOSAL DIVISION
SALT LAKE VALLEY LANDFILL

03/17/1995
3:33 PM

METER
TRANSACTION SUMMARY REPORT
Wednesday March 15, 1995

	LOADS	NET WT	COST
CASH	334	506550	3408.90
CREDIT CARD	365	5058440	42842.66
MANAGER ACCT	9	304780	0.00
P.O.	2	0	0.00
TOTAL	710	5869770	46251.56

========== CASH ACCOUNTS ==========

State (22100)	214	196300	1505.00
Special (00122)	114	528670	1740.45
Self Limit Accts	15	86460	153.45

TOTAL: LOADS: 710 NET WEIGHT: 5869770 LOAD COST: 37032.34 HEALTH COST: 1656.72 COUNTY FEE: 3756.23 CITY FEE: 3756.23

SALT LAKE VALLEY SOLID WASTE

6030 WEST 1300 SOUTH
SALT LAKE CITY UTAH 84104

SITE	TICKET	GRID

WEIGHMASTER

DATE IN	TIME IN

DATE OUT	TIME OUT

VEHICLE	ROLL OFF

REFERENCE	ORIGIN

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	FEE	TOTAL

NET AMOUNT
TENDERED
CHANGE
CHECK NO.

INDIVIDUAL VEHICLE RECEIPT

Field Data Sheet
GAS MONITORING

DATE_____

OFFICE %LEL_____ COMMENTS_____

N.SCALE %LEL_____ COMMENTS_____

S.SCALE %LEL_____ COMMENTS_____

S.SCALE %LEL_____ COMMENTS_____

W.WING %LEL_____ COMMENTS_____

SHOP %LEL_____ COMMENTS_____

EDD BLD %LEL_____ COMMENTS_____

STORAGE BLD %LEL_____ COMMENTS_____

WILDLIFE

WELL_____ %LEL_____ COMMENTS_____

WELL_____ %LEL_____ COMMENTS_____

WELL_____ %LEL_____ COMMENTS_____

WELL_____ %LEL_____ COMMENTS_____

WELL_____ %LEL_____ COMMENTS_____

ACTIVE

WELL_____ %LEL_____ COMMENTS_____

WELL_____ %LEL_____ COMMENTS_____

WELL_____ %LEL_____ COMMENTS_____

INSPECTOR_____

Salt Lake Valley
Solid Waste Management Facility
Material Types

Code	Material Type
0	Clean Fill
1	Residential
2	Tires Non-shredded (established criteria)
3	Concrete/Asphalt (smaller than 12 inches)
4	Building Materials
6	Special Handling i.e. (Non-friable Asbestos, Business Records, Barrels, Drums, Animal Carcasses, etc.)
9	Concrete/Asphalt (larger than 12 inches)
10	Shredded Tires, Solid Rubber Tires
11	Infectious Waste
14	Commercial/Industrial
15	Asbestos
17	Clean Yard/Wood Waste (Commercial)
21	Non business (Single Unit)
27	Non business (Double Unit)
28	Clean Yard/Wood Waste (Single Unit)
29	Clean Yard/Wood Waste (Double Unit)
31	Resalable Material (Single Unit)
37	Resalable Material (Double Unit)

LANDFILL INSPECTION

Date

Inspector Time

Daily Cover

Litter

Public Access

Liquid Waste

Hazardous Waste

Asbestos Site

Transfer Station

Leachate

Storm Water

Roads

Intermediate Cover

Erosion

Other

Repairs or Corrections

Signed

WASTE INSPECTION REPORT
SALT LAKE VALLEY LANDFILL

DATE

TIME

INSPECTOR

LOCATION

HAULER	LICENSE #	TIME\TRANS #	VEHICLE	MATERIAL

WASTE INSPECTION NOTIFICATION REPORT
SALT LAKE VALLEY LANDFILL

DATE

TIME

INSPECTOR

LOCATION

HAULER	LICENSE/TRUCK #	TRANS #	VEHICLE	MATERIAL

	CONTACT	PHONE #	ADJUST (Y/N)	TIP FEE
HEALTH DEPT				
HAULER				
DISPOSER				
SCALEHOUSE				

PICTURES (Y/N)

COMMENTS

ASBESTOS WASTE SHIPMENT RECORD

GENERATOR			
1 WORK SITE NAME AND MAILING ADDRESS	OWNER'S NAME	OWNER'S TELEPHONE NO	
2 OPERATOR'S NAME AND ADDRESS			OPERATOR'S PHONE #
3 WASTE DISPOSAL SITE (WDS) NAME, MAILING ADDRESS AND PHYSICAL SITE LOCATION			WDS PHONE #
4 NAME AND ADDRESS OF RESPONSIBLE AGENCY			
5. DESCRIPTION OF MATERIALS	6 CONTAINERS, NO., TYPE		7 TOTAL QTY M3 (YD3)
8. SPECIAL HANDLING INSTRUCTIONS AND ADDITIONAL INFORMATION			
9 OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and governmental regulations.			
PRINTED/TYPED NAME & TITLE	SIGNATURE		DATE
TRANSPORTER			
10 TRANSPORTER ONE (ACKNOWLEDGMENT OF RECEIPT OF MATERIALS)			
PRINTED/TYPED NAME & TITLE	SIGNATURE		DATE
ADDRESS AND TELEPHONE NO			
11. TRANSPORTER TWO			
PRINTED/TYPED NAME & TITLE	SIGNATURE		DATE
ADDRESS AND TELEPHONE NO			
DISPOSAL SITE			
12 DISCREPANCY INDICATION SPACE			
Certification of receipt of asbestos materials covered by this manifest except as noted in discrepancy			
13 WASTE DISPOSAL SITE OWNER/OPERATOR **Salt Lake Valley Landfill 6030 West 1300 South SLC, UT 84104**		MANIFEST NO	
PRINTED/TYPED NAME & TITLE	SIGNATURE		DATE

WELL NO.: F			**Sample Date:**	
Sampler:				
Field Observations:				
Well Information:				
Total depth: 19.5 ft				
Casing Diameter: 4 in.				
Casing Stick-up:				
Static depth-to-water:			Measured on:	
Measuring method: Conductivity-based water level meter.				
Immiscible layer information:				
Thickness top (in.):				
Thickness bottom (in.):				
Detection method: Conductivity-based interface probe				
Sample Collection method:				
Sample Number:				
Field Analyses				
Well headspace OVM (ppm):				
Water Quality Parameters			Instrument	
pH:			Horiba U-10 Water Quality Checker	
Temp.:			Horiba U-10 Water Quality Checker	
Conductivity:			Horiba U-10 Water Quality Checker	
Turbidity			Horiba U-10 Water Quality Checker	
Dissolved Oxygen:			Horiba U-10 Water Quality Checker	
Well Purge Information:				
Purge method: 3" PVC bailer				
Purge volume:				
Recovery data (if purged dry):				
Water Sample Information:				
Sample method:	Disposable bailer			
Sample number:				
Time of collection:				
Laboratory:	American West			
Transporter:				
Sample sequence:				
Sample order	Analysis	Container	Preservative	
1	VOC	40 mL glass	HCl	
2	TOC, Nutrients	500 mL amber glass	4C	
3	Dissolved metals, TDS, BOD, Boron	64 oz. plastic	4C	

MODULE NO.: 1			Sample Date:	
Sampler:				
Field Observations:				
Leachate Riser Information				
Riser #:	1-1	1-2	1-3	1-4
Total depth:				
Static depth to leachate:				
Total depth of leachate:				
OVM				
Immiscible layer information:				
Riser #:				
Thickness top (in.):				
Thickeness bottom (in.):				
Detection method:	Interface probe			
Sample coll. Method:				
Sample number:				
Field Tested Water Parameters:			**Instrument**	
pH:			Horiba U-10 Water Quality Checker	
Temp.:			Horiba U-10 Water Quality Checker	
Conductivity:			Horiba U-10 Water Quality Checker	
Turbidity			Horiba U-10 Water Quality Checker	
Dissolved Oxygen:			Horiba U-10 Water Quality Checker	
Leachate Sample Information:				
Sample Method:	Disposable bailer			
Sample Number:				
Risers Sampled for Composite:				
Time of collection:				
Laboratory:	American West Analytical			
Transporter:				
Sample sequence:				
Sample order	Analysis		Container	Preservative
1	VOC		40 mL clear glass	HCl
2	TOX		500 mL amber glass	4 C
3	TOC		500 mL amber glass	4C
4	Metals		8 oz. Plastic	Nitric acid
5	Dissolved Metals		8 oz. Plastic	Nitric acid
6	TDS, Min., BOD, Boron		64 oz. Plastic	4 C

SUMP NO.: 1			**Sample Date:**	
Sampler:				
Field Observations:				
Leachate Riser Information				
Riser #:				
Total depth: 39.3				
Static depth to leachate:				
Total depth of leachate:				
OVM				
Immiscible layer information:				
Riser #:				
Thickness top (in.):				
Thickeness bottom (in.):				
Detection method:	Interface probe			
Sample coll. Method:				
Sample number:				
Field Tested Water Parameters:			**Instrument**	
pH:			Horiba U-10 Water Quality Checker	
Temp.:			Horiba U-10 Water Quality Checker	
Conductivity:			Horiba U-10 Water Quality Checker	
Turbidity			Horiba U-10 Water Quality Checker	
Dissolved Oxygen:			Horiba U-10 Water Quality Checker	
Leachate Sample Information:				
Sample Method:	Disposable bailer			
Sample Number:				
Risers Sampled for Composite:				
Time of collection:				
Laboratory:	American West Analytical			
Transporter:				
Sample sequence:				
Sample order	Analysis		Container	Preservative
1	VOC		40 mL clear glass	HCl
2	TOX		500 mL amber glass	4 C
3	TOC		500 mL amber glass	4C
4	Metals		8 oz. Plastic	Nitric acid
5	Dissolved Metals		8 oz. Plastic	Nitric acid
6	TDS, Min., BOD, Boron		64 oz. Plastic	4 C

Sample Site: S-1		**Date:**	
Sampler:			
Field Observations:			
Site Information:			
Lee Drain, on the east side of the Facility			
Immiscible layer information:			
Thickness top (in.):			
Thickness bottom (in.):			
Detection method:			
Sample Collection method			
Sample Number			
Water Quality Parameters		Instrument	
pH:		Horiba U-10 Water Quality Checker	
Temp.:		Horiba U-10 Water Quality Checker	
Conductivity:		Horiba U-10 Water Quality Checker	
Turbidity		Horiba U-10 Water Quality Checker	
Dissolved Oxygen:		Horiba U-10 Water Quality Checker	
Water Sample Information:			
Sample method:	Sterile plastic bottle		
Sample number:			
Time of collection:			
Laboratory:	American West		
Transporter:			
Sample sequence:			

Sample order	Analysis	Container	Preservative
1	VOC	40 mL glass	HCl
2	TOC, Nutrients	500 mL amber glass	4C
3	Dissolved metals, TDS, BOD, Boron	64 oz. plastic	4C

APPENDIX C

10-07-04

SOLID WASTE MANAGEMENT DIVISION

EMERGENCY PREPAREDNESS PLAN

EMERGENCY SUPPORT FUNCTION – STANDARD OPERATING PROCEDURES

The following procedures should be followed in the event of an earthquake, tornado, fire, flood, explosion, etc. causing significant damage and/or injury in Salt Lake County. This plan has been developed in accordance with information from the Salt Lake County Emergency Operation Plan.

Landfill:

1. Regularly scheduled working hours should be maintained at the Landfill. Landfill operations will be minimally affected by most major disasters because of the Landfill's location, the structure of its modules, and the single story buildings at the site. Personnel and equipment will be needed for ongoing operations and the disposal of debris and green waste brought in from the disaster site. Landfill labor and equipment may not be available for usage elsewhere during normal business hours.

2. The Landfill should be a priority for the delivery and dispensing of fuels in order to sustain essential operations. Fueling of equipment can continue to be accomplished if telephone lines and the generator are operational when electrical power is shut off. In the event telephone lines are also shut down, the generator can still be used to deliver fuel from the tank. If the Landfill has sufficient fuel for its operation, it can also serve as a fueling location for Salt Lake City and County diesel trucks and equipment involved with disaster response within the vicinity of the Landfill. Fuel tank levels should be closely monitored. The fueling truck and all equipment items should be filled up daily.

3. The Landfill may be able to supply labor and equipment (see attached listing), if available and transportable, for rescue and cleanup operations in other areas of the County. Dozers, loaders, excavators, light plants, fuel truck, pumps, and generators operated by our staff may be assigned by management for rescue operations or clean up in impacted areas of the

County. Such staff may be unable to report to the Landfill until rescue and cleanup is accomplished.

4. The permitted Landfill tipping face, clean green area, recycle bins, household hazardous waste facility, the western portion of the closed 70 acre landfill, and/or the transfer station will be utilized for disposal depending on the nature and volume of the incoming waste from the disaster. Management may seek a variance from Utah DEQ for a demolition disposal site. To minimize the consumption of permitted landfill capacity, alternative means of disposal or recycling will be used whenever possible. Concrete, lumber, green waste, metal, household hazardous waste, and appliances should be sorted from incoming demolition waste (Refer to Disaster Debris Recycling Management Plan).

5. The Landfill will be heavily impacted within 72 hours after an emergency when the cleanup, removal, and disposal of rubble, trees, and demolition begin. The Landfill may need to be open around the clock as a 24 hr. operation. All Landfill personnel and equipment will likely be needed to run the operation. 72hr. food and water emergency kits are located in the south scalehouse. If there is a power failure, the standby generator should be used. Service Attendants need to ensure it has fuel and is oiled for proper operation. The generator fuel tank has 335 gallons and will run about 4 days. Two 55 gallon drums of diesel are in the storage shed at the northwest corner of the shop facility.

6. During the cleanup and disposal, Waste Inspectors must be available at the disposal site to determine if the incoming materials are hazardous waste.

7. Landfill staff must keep track of costs directly related to the disaster, e.g. labor, OT, fuel, equipment, etc. Also, all inbound loads of debris resulting from the disaster should be weighed and identified in transaction documentation at the scalehouse.

8. In the event the Salt Lake Valley Landfill is not accessible from 56th West and California Ave. there is an alternative access route from 72nd West off I-80. Direct haul of non-hazardous disaster materials to the landfill is encouraged rather than temporary storage elsewhere.

9. Building floor plans are attached showing where fire extinguishers are located.

Transfer Station:

1. In the event of a disaster, management may decide to use the Transfer Station, if rail-haul is still operational, for the disposal of residential and commercial packer truck waste normally going to the Landfill so that Landfill operations can focus on handling bulky debris resulting from an earthquake.

2. Management may close the Transfer Station facility to inbound waste and make it available as a staging area for emergency operations, disbursement of supplies or food, fueling location, or a shelter for disaster victims or equipment needed for disaster relief. Equipment from the Transfer Station may be used for rescue and clean up operations within the vicinity of the facility. Transfer Station staff may be reassigned to the Landfill as needed.

3. In the event the Transfer Station is not accessible from I-15 and westbound 33rdSouth there are alternative access routes from I-215 and 9th West to eastbound 33rd South. The Transfer Station can also be accessed from 39thSouth by proceeding north on 5th West. Direct haul of non-hazardous disaster materials to the landfill is encouraged rather than temporary storage elsewhere.

4. A map is attached showing the location of fire extinguishers and where employees are to meet after an emergency exit of the buildings. 72hr. food and water emergency kit are located in the scalehouse. The generator will run for about two days on its 150 gallon diesel fuel tank.

ALL EMPLOYEES:

1. The Equipment Training Coordinator annually instructs Landfill and Transfer Station employees in emergency first aid and assembling a 72 hour kit for their use at home and for emergency first aid. Employees are to insure their immediate family members are accounted for and safe before reporting to work in the event of a disaster. Current phone numbers of employees and an emergency contact person's phone number must be available to management so employees can be reached when a disaster occurs. Employees should plan for alternative routes of travel to and from work.

2. Management will determine employee work assignments when the disaster occurs depending on employee and equipment resources available. The landfill has 72 hr. emergency food and water kits available in the records trailer. The transfer station has 72 hr. emergency food and water kits available in the scalehouse.

3. There will be annual walk-through employee training on the location of turn off and on shut downs of utility and support systems.

FIRST RESPONSE

DURING WORKING HOURS:

1. Remain calm and reassure others. Avoid objects that could fall. Do not touch downed power lines or objects touching downed power lines at the landfill, transfer station, or any other location.

2. Report your location, physical condition, and any damage in your work area to your Supervisor.

3. If the landfill and transfer station areas are not severely damaged and are accessible, continue to perform your normal work responsibilities. In the event the landfill or transfer station is severely damaged, perform other duties as assigned by your Supervisor.

4. Supervisors should utilize the attached Building Inspection Checklist for landfill and transfer station structures to determine the extent of damage. Also check utilities (power, sewer, gas, water, and phone lines). If necessary, turn these off (see attached maps). Call Midvale Public Works dispatch (562-6418) or the Valley Emergency Communications Center (840-4100).

5. All efforts will be made to contact Landfill and Transfer Station employee families and others listed on the Emergency Notifications List. Employees will be notified of their family's status as soon as possible.

6. At a minimum the following essential personnel are required to conduct landfill operations during or outside normal working hours:

   a. One office person to answer telephones and distribute information

b. One Scalehouse Operator
c. Two Traffic Controllers
d. One Waste Inspector
e. Three Heavy Equipment Operators
f. One Supervisor

AFTER WORKING HOURS:

1. Secure your home and family first!

2. After determining that your family is OK, contact the landfill or transfer station and report your status, location, and availability to your Supervisor.

3. The first person to arrive at the landfill or transfer station should utilize the attached Building Inspection Checklist for buildings and structures. Utilities (power, sewer, gas, water, and phone lines) should be checked for damage. If necessary, turn utilities off. Call Midvale Public Works dispatch (562-6418), Valley Emergency Communications Center (840-4100), Emergency Operations Center (743-7100) and report findings.

4. After all structures and utilities have been inspected, perform normal duties unless otherwise assigned by your Supervisor.

Line of Succession

Name & Title	Work Phone	Cellular	Home Phone
1. Romney M. Stewart Director	974-6909	209-9498	277-4967
2. Daniel L. Bauer Associate Director	974-6910	971-6241	944-9400
3, Bud Stanford Operations Manager	974-6920	971-7432	298-5392
4. Stuart Palmer Fiscal Mgr.	974-6920		571-1203

8-24-2004

LANDFILL

EQUIPMENT LIST

D9R Dozer	3
836 Compactor	2
Bomag Compactor	1
Scraper	2
Water Tanker	1
Leachate Tanker	1
Pick up Trucks	9
Explorers	3
Rolloff Trucks	3
Fuel Truck	1
Road Grader	1
Rubber Tired Loaders	5
Skid Steer	1
Light Plant	2
High Pressure Steamer	3
Sm. Portable Compressor	1
Air Compressor	1
Portable Generators	6
Water Pump	3
Portable Trash Pump	3
Trommel Screen	1
Tub Grinder	1
Rolloff Containers	39

EMPLOYEES BY CLASSIFICATION

Lead Heavy Equipment Operators	2
Heavy Equipment Operators	17
Service Attendants	2
Traffic Controllers	7
Material Hauler	2
Ecology Specialist	1
Security	2
Training/Safety Coordinator	1
Operation Supervisor	1
Scalehouse Operators	4

8-24-2004

TRANSFER STATION

EQUIPMENT LIST

Hydraulic Excavator	1
826 Compactor	1
Rubber Tired Loaders	2
Mobile Rail Car Mover	1
Skid Steer	1
High Pressure Steamer	1
Air Compressor	1
Transfer Truck	3
Walking Floor Trailer	3
Pick up Trucks	
Man Lift	
Rolloff Containers	

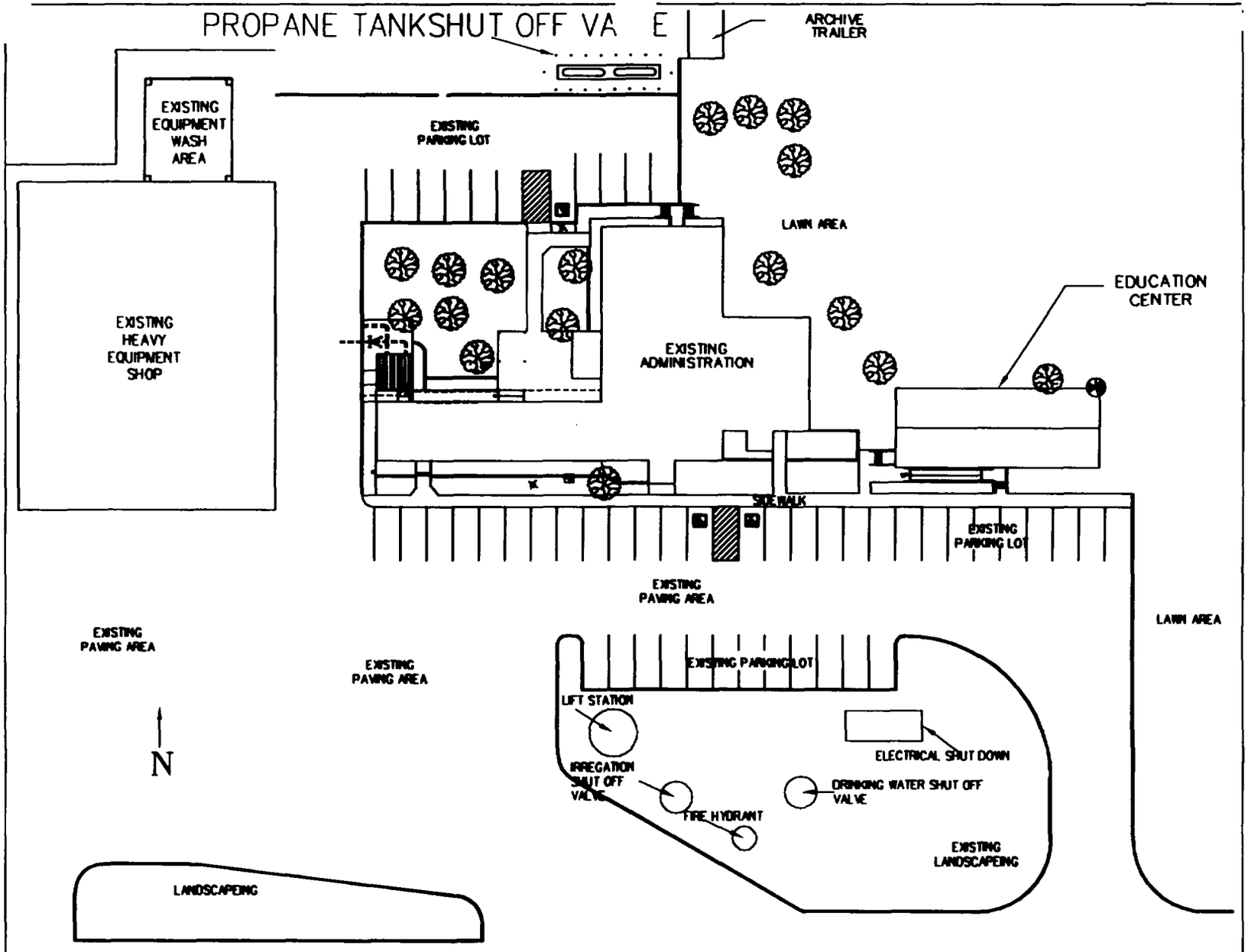
EMPLOYEES BY CLASSIFICATION

Lead Heavy Equipment Operator	1
Heavy Equipment Operators	4
Material Transport Specialist	3
Operations Supervisor	1
Traffic Controller	1
Scalehouse Operator	1

SALT LAKE VALLEY SOLID WASTE MANAGEMENT

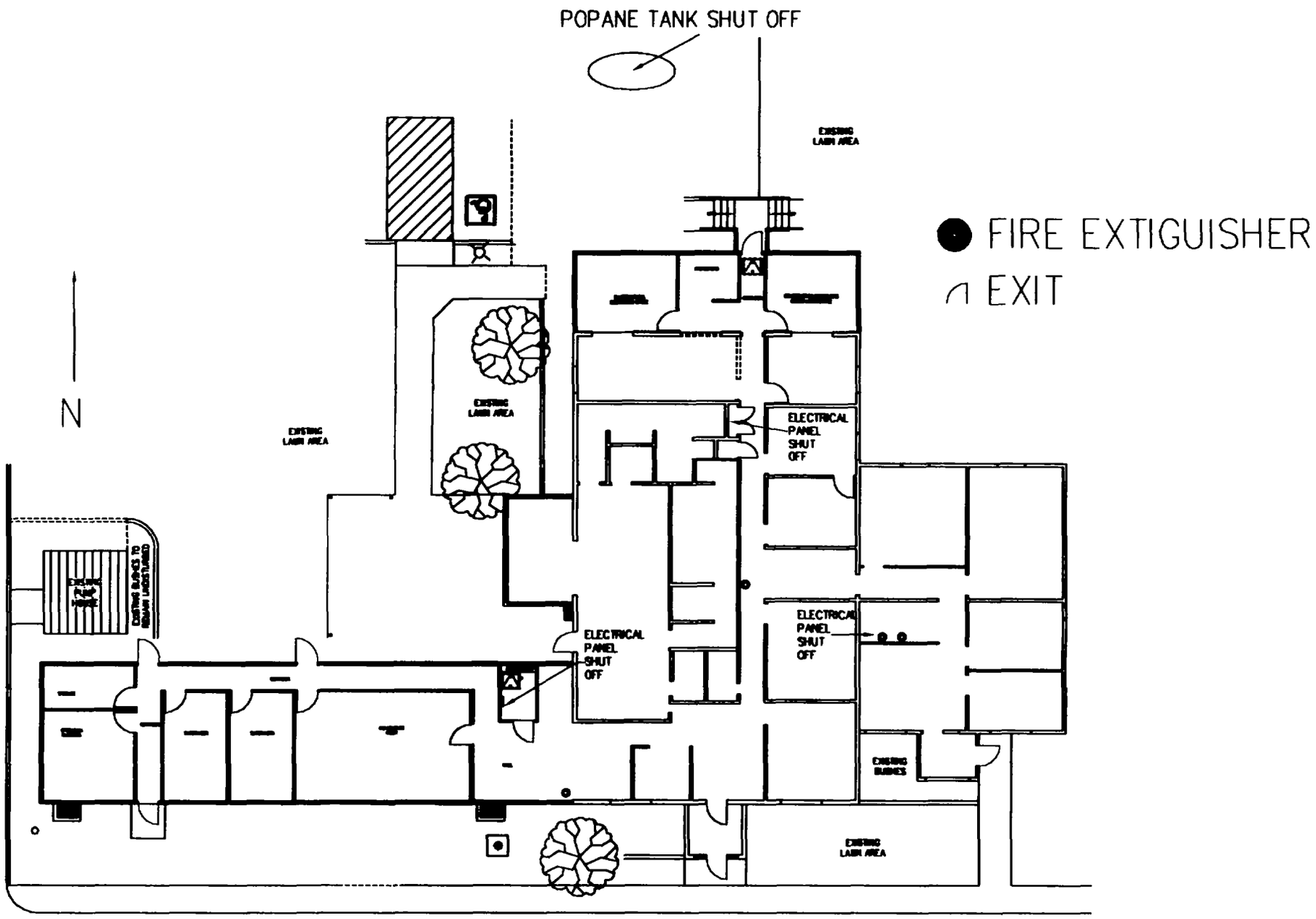
Building inspection checklist

1) On arrival to the facility check for fallen power lines, broken water lines, gas lines or propane lines. If there is a fallen power line, **do not exit vehicle**, leave the site and call for help. Before exiting vehicle, roll down window and check for odors like sulfur or propane. If odors are detected, use caution and turn off supply lines only if the units are not damaged. If the units are damage leave the area and call for help. If there are broken water lines, turn water supply off; but if valves are damaged, call for help.
2) Before entering the building, check the exterior of the building for cracks, separation, fallen or missing sections of building. While checking exterior of building, check for odors of gas or propane, turn off supply lines and do not enter building until building is vented out. If the exterior of the building fells extremely hot and you smell or see smoke coming from the building don't enter the building and stay clear from windows. Turn off power and fuel to building and call the fire department.
3) Before going inside the building check the operation of doors. Make sure they operate correctly as not to get trapped in building. Check and make sure exits are clear of debris. Check for odors of sulfur or propane before entering. If odors are present, turn off fuel and power supply lines and let building vent our before entering. Notify the Construction/Contracts Coordinator 580-9025 or the Associate Director 971-6241 of any damages.
4) If the doors operate safely and there are no odors, you may start checking buildings interior for signs of damage. Use caution to check the following items, trip hazards, separation, and fallen or missing sections of building and hanging power lines. If Power Lines are hanging turn off power to building and call for help.
5) Check the operation of the utilities, phone and computers; use caution at all times.



SALT LAKE VALLEY SOLID WASTE MANAGEMENT

6030 WEST 1300 SOUTH—SALT LAKE CITY, UTAH 84104

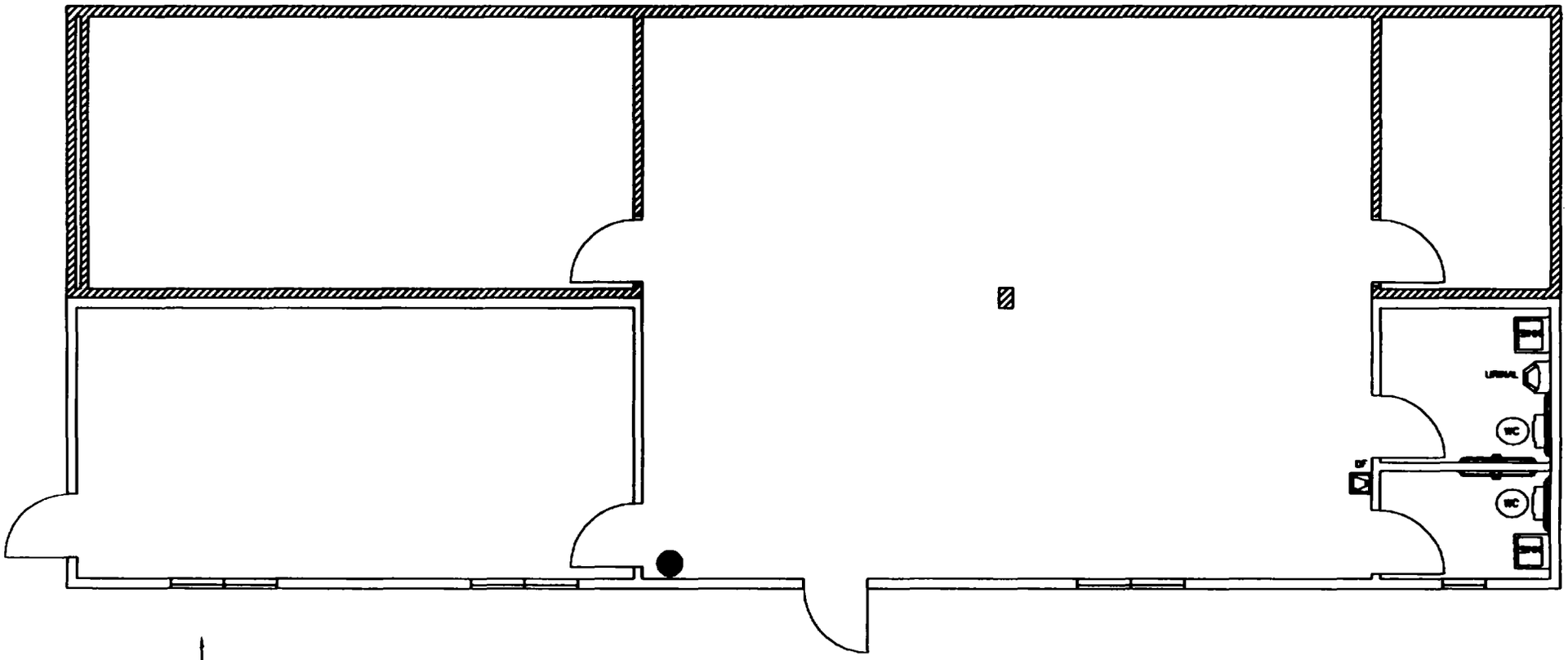


LANDFILL ADMINISTRATION BUILDING

ELECTRICAL SHUT DOWN

FIRE EXTIGUISHER

EXIT



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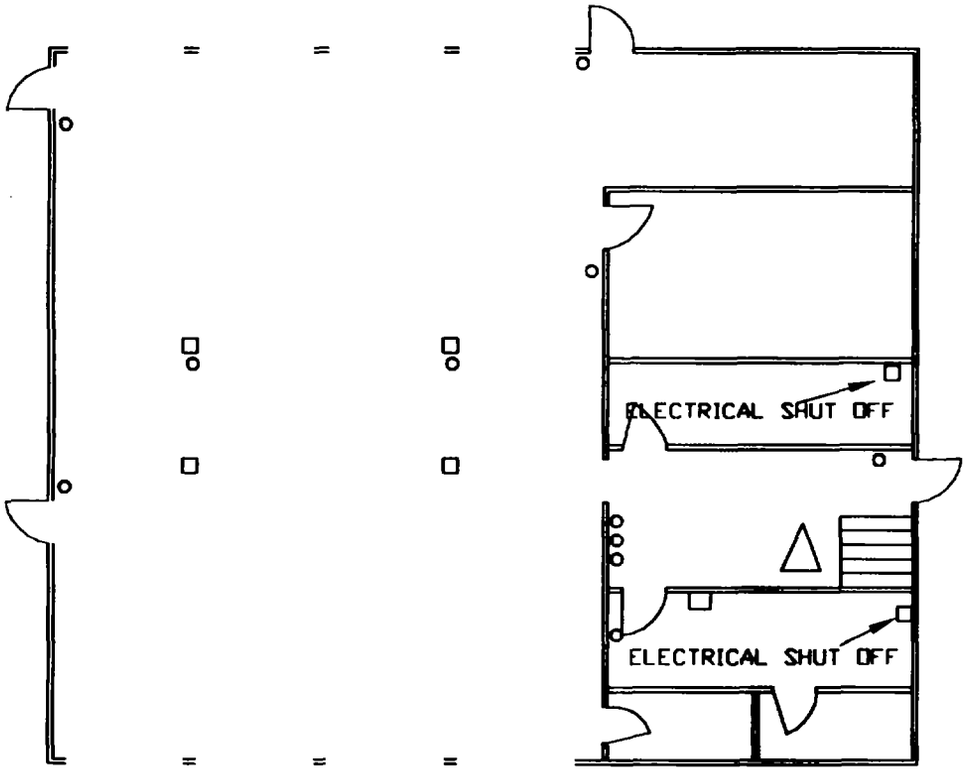
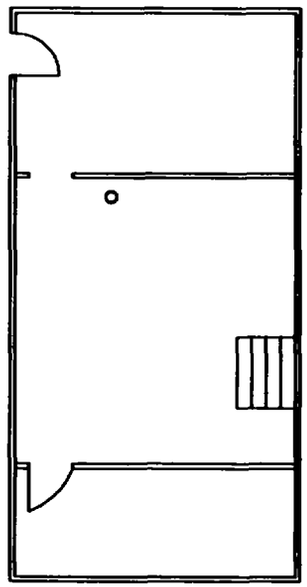
LANDFILL EDUCATION/TRAINING CENTER

LANDFILL
HEAVY EQUIPMENT SHOP



UPPER LEVEL



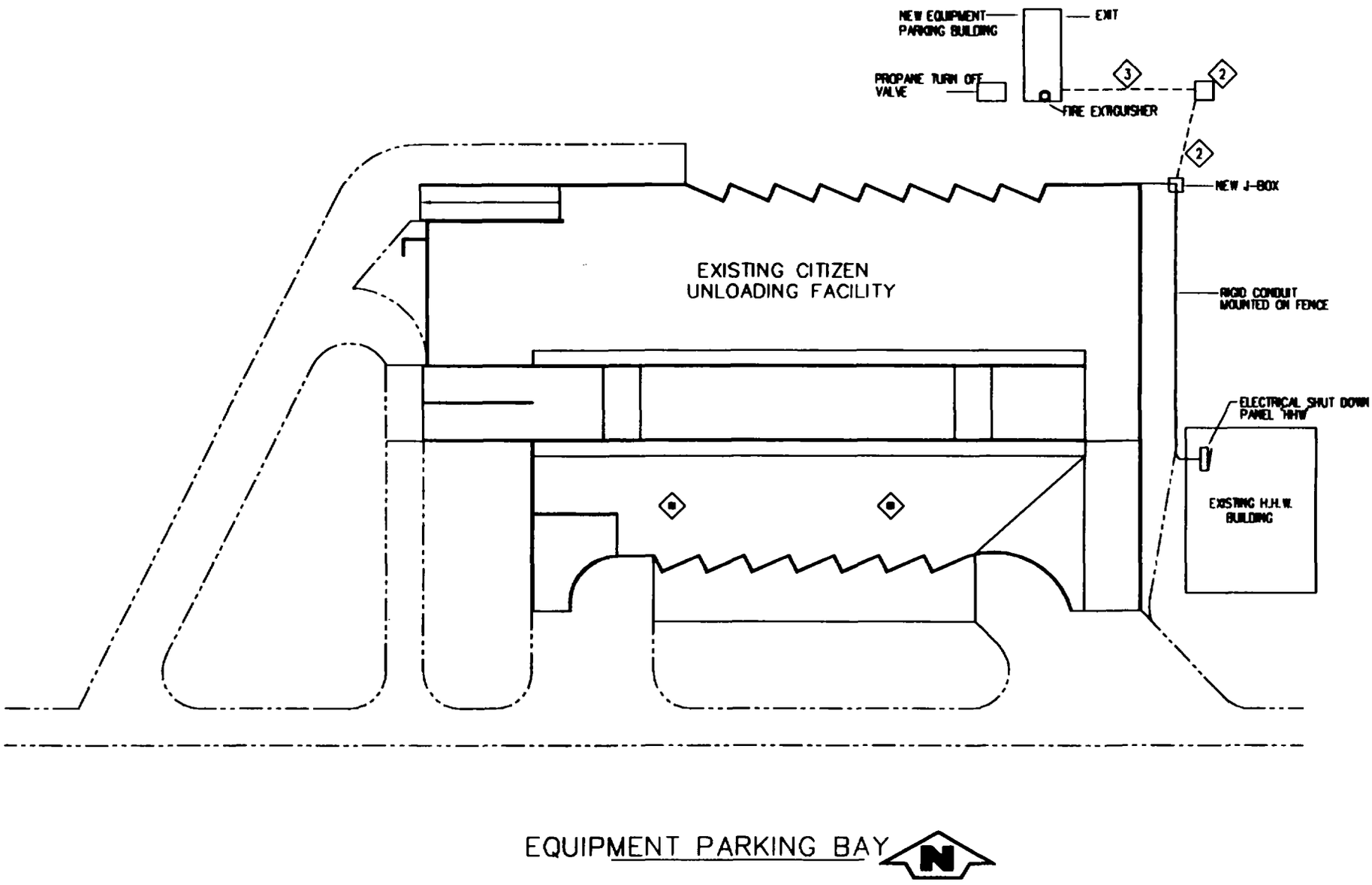
N

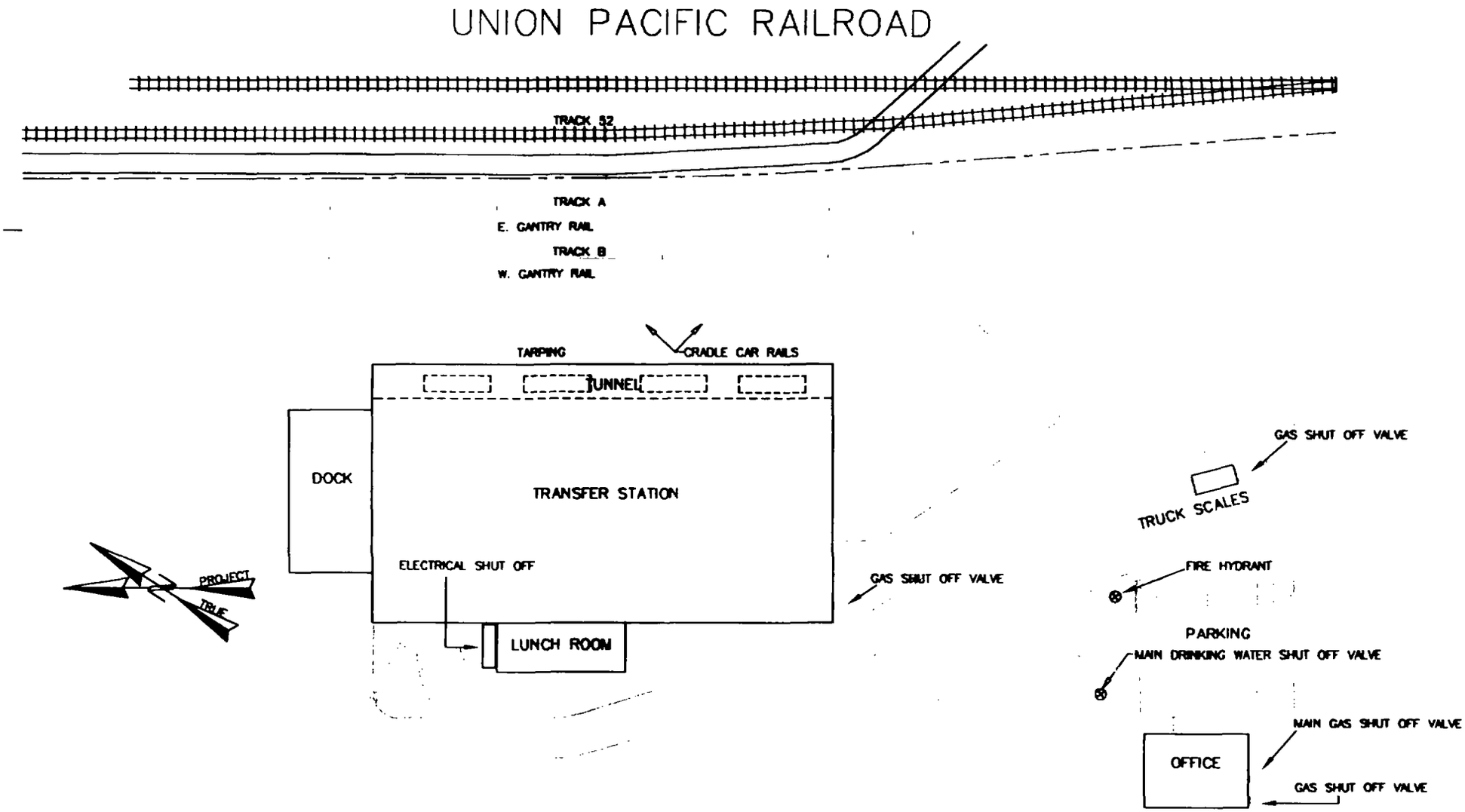
FIRE EXTINGUISHER

EXIT

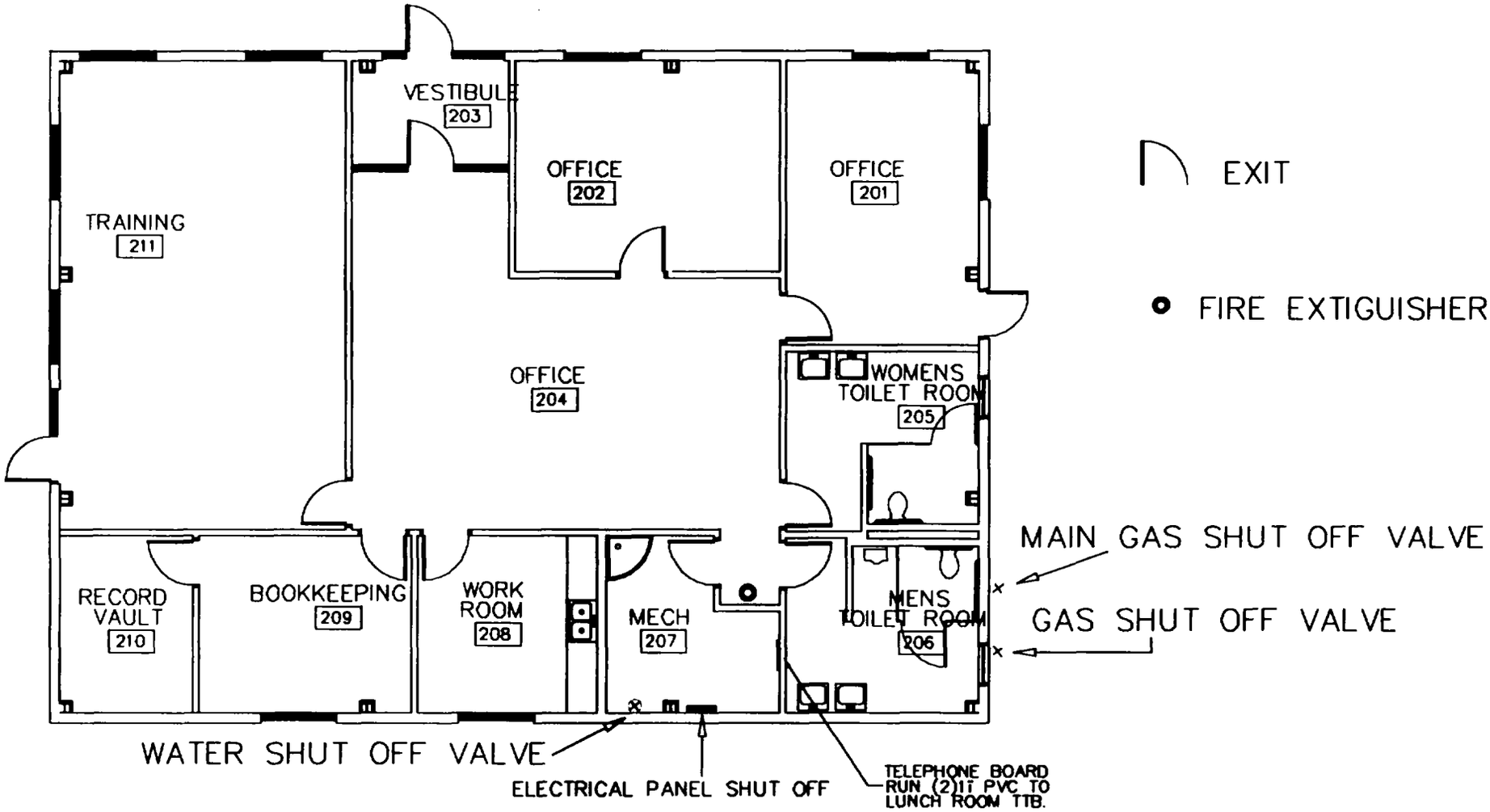
FIRE SPRINKLER STOP

FIRE ALARM


NEW EQUIPMENT PARKING BUILDING
EXIT
PROPANE TURN OFF VALVE
FIRE EXTINGUISHER
3
2
2
NEW J-BOX
EXISTING CITIZEN UNLOADING FACILITY
RIGID CONDUIT MOUNTED ON FENCE
ELECTRICAL SHUT DOWN PANEL "HHW"
EXISTING H.H.W. BUILDING
EQUIPMENT PARKING BAY
N

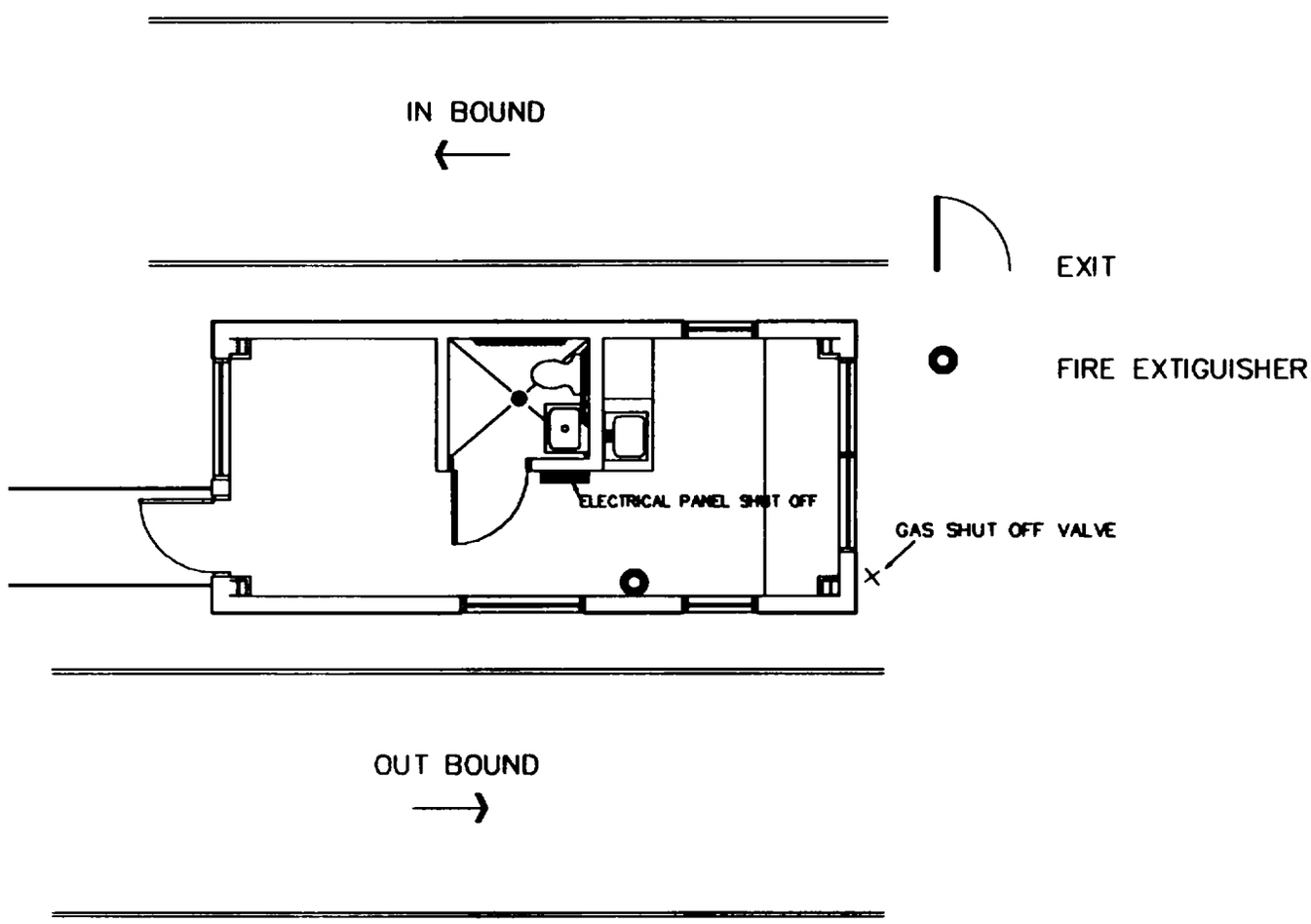


SALT LAKE VALLEY TRANSFER STATION
502 WEST 3300 SOUTH



TRANSFER STATION
OFFICE

N

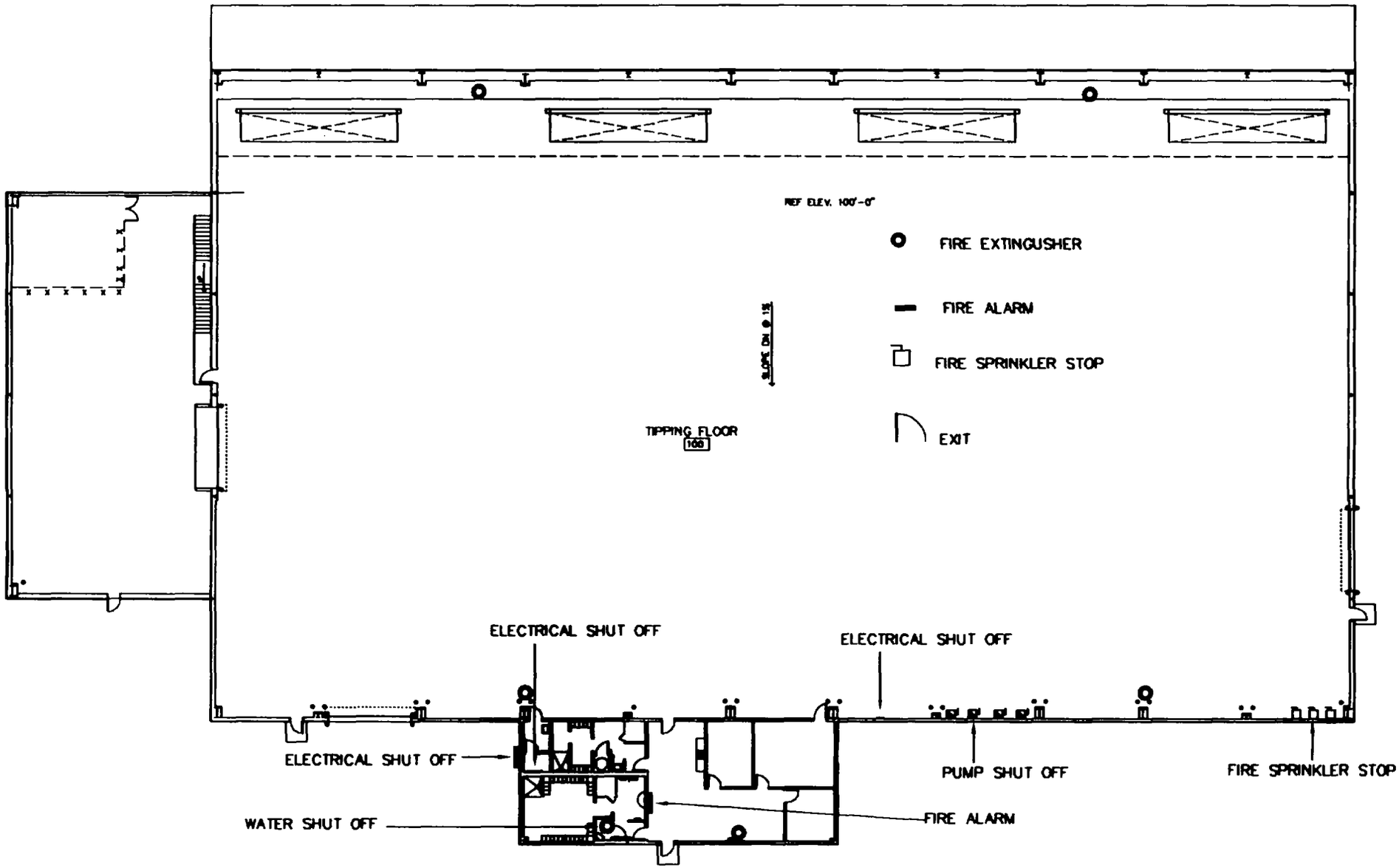


TRANSFER STATION

SCALEHOUSE

N

TRANSFER STATION
MAIN BUILDING



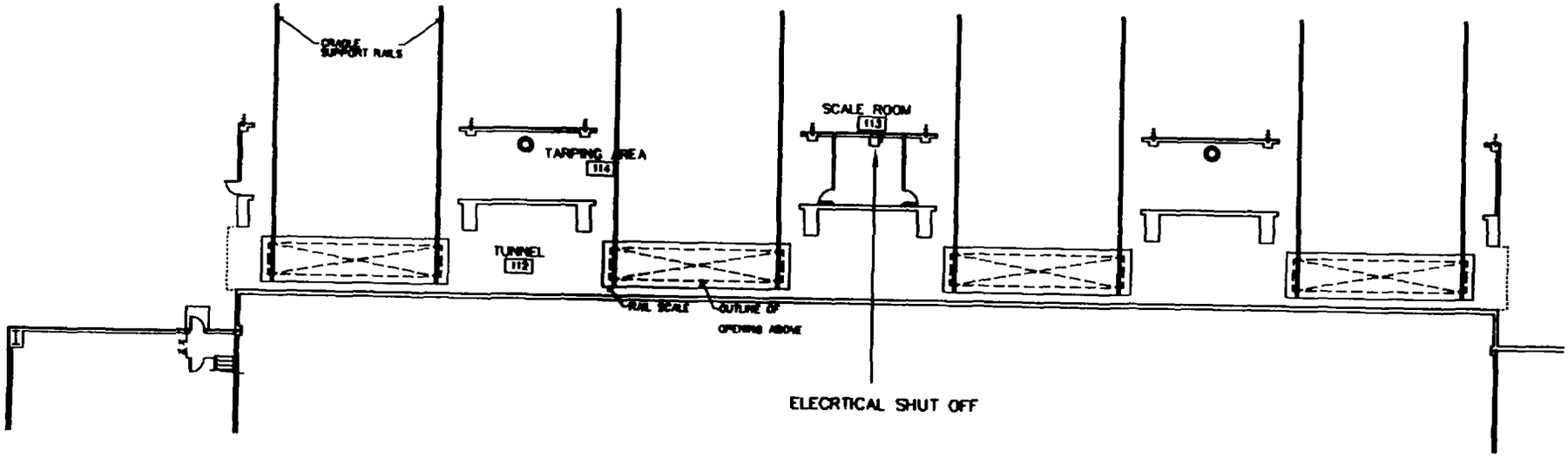
TRANSFER STATION

MAIN BUILDING/TUNNEL

N

FIRE EXTIGUISHER

EXIT



APPENDIX D

Table D-1
Closure Cost Estimate
Salt Lake Valley Solid Waste Management Facility

Item	Unit	Unit Cost	Quantity	Cost
Final Cover				
Low-permeability layer (1.5 feet) [1]	cy	$ 9.00	48,400	$ 435,600
Geomembrane	sf	$ 0.45	17,141,000	$ 7,713,450
Geonet	sf	$ 0.40	17,141,000	$ 6,856,400
Vegetative layer	cy	$ 9.00	610,000	$ 5,490,000
Revegetation	ac	$ 2,400	380	$ 912,000
Drainage System	ls	$ 225,000	1	$ 225,000
			Subtotal	$ 21,632,450
Engineering and CQA (10%)				$ 2,163,245
Contingency (20%)				$ 4,326,490
			Total	$ 28,122,185

Notes:

cy = cubic yards
sf = square foot
ls = lump sum
Costs are in 2005 US dollars

[1] Low Permeability layer is assumed to be placed as intermediate cover during landfill operations. Quantity assumes 20 acres does not have intermediate cover at any one time.

Source: EMCON/OWT Inc. (2005) modified by Kleinfelder, Inc.

Table D-2
Closure Cost Estimate by Module
Salt Lake Valley Solid Waste Management Facility

Module	Size (acres)	Estimated Closure Cost (2005 $)
1	28	$ 2,072,161
2	25	$ 1,850,144
3	33	$ 2,442,190
4	37	$ 2,738,213
5	33	$ 2,442,190
6	36	$ 2,664,207
7	39	$ 2,886,224
8	33	$ 2,442,190
9	28	$ 2,072,161
10	41	$ 3,034,236
11	47	$ 3,478,270
Total	380	$ 28,122,185

Note:
Assumes costs per module are proportional to area of each module.

Table D-3
Post-Closure Maintenance Cost Estimate
Salt Lake Valley Solid Waste Management Facility

Item	Unit	Unit Cost	Quantity	Cost
Revegetation	ac	$ 2,200	13	$ 28,600
Environmental Monitoring				
Groundwater	ls	$ 65,000	1	$ 65,000
Landfill Gas	ls	$ 16,800	1	$ 16,800
Leachate Management				
Monitoring	ls	$ 25,000	1	$ 25,000
Landfill Gas Collection System	ls	$ 250,000	1	$ 250,000
Inspection	ls	$ 5,000	1	$ 5,000
Maintenance	ls	$ 25,000	1	$ 25,000
			Subtotal	$ 415,400
Engineering and CQA (10%)				$ 41,540
Contingency (20%)				$ 83,080
			Annual Total	$ 540,020
			30-year Total	$ 16,200,600

Notes:

ac = acres
ls = lump sum
Costs are in 2005 US dollars

[1] Revegetation costs are based on 10 percent of site needing revegetation every 3 years.

[2] Leachate quantity based on approximately 25 percent of current leachate generation prorated over entire landfill.

[3] Assumes operation and maintenance of landfill gas collection and control system by County.

[4] Operation and maintenance of landfill gas collection system will continue until emissions are demonstrated to be less than 50 metric tons NMOC per year as required by the landfill permit. Costs include Title V recordkeeping and reporting.

Source: EMCON/OWT Inc. (2005) modified by Kleinfelder, Inc.

Table D-4
Estimated Closure / Post-Closure Cost Liability
Next 5-Year Permit Period
Salt Lake Valley Solid Waste Management Facility

Closure Cost Modules 1 - 7

Item	Unit	Unit Cost	Quantity	Cost
Final Cover				
Low-permeability layer (1.5 feet) [1]	cy	$ 9.00	48,400	$ 435,600
Geomembrane	sf	$ 0.45	10,062,360	$ 4,528,062
Geonet	sf	$ 0.40	10,062,360	$ 4,024,944
Vegetative layer	cy	$ 9.00	372,680	$ 3,354,120
Revegetation	ac	$ 2,400	231	$ 554,400
Drainage System	ls	$ 135,000	1	$ 135,000
			Subtotal	$ 13,032,126
Engineering and CQA (10%)				$ 1,303,213
Contingency (20%)				$ 2,606,425
			Total	**$ 16,941,764**

Post-closure costs Modules 1 - 7 (in terms of present value)

Annual post-closure cost for Modules 1-7 is	$	328,275
Assumed discount rate is		3%
The term (in years) is		30
Post-closure cost liability for Modules 1 - 7 is	**$**	**6,434,341**
Total Closure / Post-Closure Cost Estimate (Modules 1 -7)	**$**	**23,376,105**

Closure / post-closure fund analysis

Amount currently in closure / post-closure fund is	$	11,511,132
Projected increase in fund required over next 5 years is	$	11,864,973

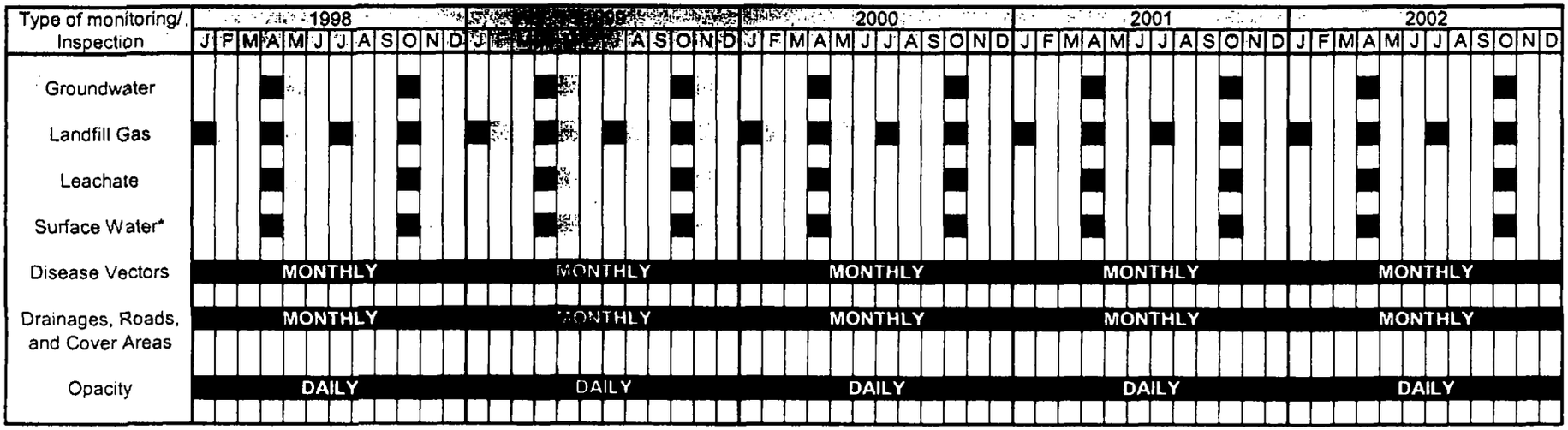
Notes:

cy = cubic yards
sf = square foot
ls = lump sum
Costs are in 2005 US dollars

[1] Low Permeability layer is assumed to be placed as intermediate cover during landfill operations. Quantity assumes 40 acres does not have intermediate cover at any on etime

ADDENDUM 1

SCHEDULE FOR MONITORING AND SELF INSPECTION
SALT LAKE VALLEY LANDFILL



* Surface water samples will be collected **after** signficant storm events, as close as possible to the target month.

■ Field and laboratory work

Reporting

ADDENDUM 2

ADDENDUM 2A

GROUNDWATER MONITORING PLAN
SALT LAKE VALLEY SOLID WASTE MANAGEMENT FACILITY
SALT LAKE COUNTY, UTAH

March 11, 2005

A Report Prepared For:

Salt Lake City Corporation
Salt Lake City Public Works
324 South State Street
Salt Lake City, UT 84111

File No.: 17677.009

GROUNDWATER MONITORING PLAN
SALT LAKE VALLEY SOLID WASTE MANAGEMENT FACILITY
SALT LAKE COUNTY, UTAH

Prepared by:

for

LeeAnn Diamond
Staff Geologist

Renee Zollinger, R.G.
Regional Manager

KLEINFELDER, Inc.
849 West LeVoy Drive
Salt Lake City, UT 84123
(801) 261-3336

March 11, 2005

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FIGURES

1. EXECUTIVE SUMMARY

The Salt Lake Valley Solid Waste Management Facility is a municipal landfill in Salt Lake City, Utah, that is jointly owned and operated by Salt Lake City and Salt Lake County. The Facility began accepting waste in 1993 and is scheduled to close in approximately 2027. The Facility is permitted and operated under the State of Utah Solid Waste Permitting and Management Rules, including the rules for groundwater monitoring (UAC R315-308). *Detection monitoring requirements of the Division of Solid and Hazardous Waste (DSHW) Solid Waste Rules, and Salt Lake Valley Health Department Regulation #1.*

There are currently eight detection monitoring wells around the facility boundary (MW-1A through MW-8A). In addition, a ninth well (well F) currently is being monitored as required by Salt Lake County, but is not considered part of the long-term detection monitoring network.

The regional groundwater gradient is north to northwest in the vicinity of the landfill. Shallow groundwater varies from 0 to 19 feet below grade in the area. The soils are generally fine silts and clays, resulting in very slow groundwater velocities in the area. Groundwater quality in the shallow aquifer is generally very poor, with extremely high TDS, sodium and chloride concentrations, as well as other salts and metals. This is probably due to the influence of the Great Salt Lake, located approximately 3 miles north of the site.

No evidence of an impact to groundwater in this area from the landfill has been observed. Three metals (arsenic, iron, and manganese) have consistently exceeded drinking water standards in this area since before the landfill operations began.

The monitoring network for the landfill will eventually consist of 10 wells; the existing eight wells (MW-1A through MW-8A) and two wells that will be constructed when Modules 8 and 11 are built (MW-9A and MW-10A). Well F is not considered part of the established monitoring network because it is an interior well and will eventually be abandoned and covered with waste.

These wells will be sampled semiannually, in the spring and fall, for the analytes required in R315-308. Due to the fine-grained soils and resulting groundwater turbidity, dissolved metals will be reported rather than total metals for this site.

Because the groundwater velocities are very slow and the shallow groundwater quality varies significantly across the landfill, intra-well comparisons will be used to detect statistically significant changes in groundwater quality. For analytes that are detected more than 25% of the time, control limits are established using Shewart-CUSUM control charts. For analytes that are detected between 0% and 25% of the time, the highest concentration detected during the background monitoring period will be the control limit. For analytes not detected to date, the control limit will be established at halfway between the detection limit and the Solid Waste Ground Water Quality Protection Standard.

2. BACKGROUND

2.1 INTRODUCTION

The Salt Lake Valley Solid Waste Management Facility is located approximately 9 miles west of downtown Salt Lake City (Figure 1). The facility currently receives municipal and industrial solid waste from approximately 66 percent of the businesses and residents of Salt Lake County. The facility is jointly owned and operated by Salt Lake City Corporation and Salt Lake County. The active landfill portion of the facility is being constructed sequentially and will eventually include 11 modules, encompassing approximately 455 acres. This Groundwater Monitoring Plan was designed to use historical data to develop a cost-effective plan that is able to detect a potential release from the facility, and that is compatible with the waste management rules.

The facility will be permitted and operated in compliance with the State of Utah Solid Waste Permitting and Management Rules effective July 15, 1993. These rules include requirements for groundwater monitoring, per R315-308. Since 1982, twelve groundwater monitoring wells have been installed around the active landfill; three of these wells were abandoned during site development. There are currently eight long-term detection monitoring wells (MW-1A through MW-8A) around the active landfill area (Figure 2). Since 1993, most of these wells have been sampled semi-annually to monitor groundwater quality. A ninth well, Well F, is monitored as required by Salt Lake County and is located within Module 10. When Module 10 is constructed, Well F will be abandoned. Therefore, Well F is not considered part of the detection monitoring network.

2.2 GROUNDWATER LEVEL MEASUREMENTS, ELEVATIONS, AND GRADIENT

Depth-to-water measurements were made in existing wells on several occasions from January 1994 through November 2004. The depth-to-water measurements were made from the top of the PVC well casing with a conductivity-based water level meter. Depth-to-groundwater readings

were converted to groundwater elevations above mean sea level by subtracting them from the surveyed well casing elevations provided by Salt Lake City Public Works. Groundwater elevations for the wells have been contoured for several monitoring rounds (Appendix A). In general, the groundwater gradient has varied from approximately 0.002 ft/ft to 0.003 ft/ft towards the northwest for the past several years.

This groundwater gradient is generally consistent with the regional groundwater flow pattern indicated by Seiler and Waddell (1984), who show groundwater flow direction toward the northwest near the facility.

2.2.1 Groundwater Velocity

Using the above groundwater gradients and an estimate of the hydraulic conductivity, it is possible to roughly estimate the groundwater velocity in the active landfill area. According to EMCON (1970, Drawing No. B-4), near-surface soils at the Facility consist of clay with inter-bedded silty sand. The majority of groundwater flow is likely to occur within the silty sand. Freeze and Cherry (1979) list 10^{-3} to 10^{-4} cm/sec (0.3 to 3 ft/day) as average hydraulic conductivities for silty sand, and 40% as an average porosity. Using these values for hydraulic conductivity and porosity, and 0.0025 ft/ft for the hydraulic gradient, the velocity of groundwater flow at the landfill is given by:

$$\text{Velocity} = \frac{\text{(conductivity) (Gradient)}}{\text{(porosity)}} = \frac{\text{(0.3 to 3 ft/day) (0.0025) ft}}{\text{0.4 ft}}$$

$$\text{Velocity} = 0.0019 \text{ to } 0.019 \text{ ft/day} = 0.684 \text{ to } 6.84 \text{ feet/yr}$$

Given this value for groundwater flow velocity, and given that wells are at least 50 feet from the buried refuse, it would likely take approximately seven years for water from beneath the active landfill modules to reach the down-gradient wells. The landfill began receiving solid waste approximately 11.5 years ago (July 1993). Based on these calculations, it is likely the wells contain groundwater that has flowed under a portion of the landfill.

2.3 SUMMARY OF EXISTING MONITORING WELLS

Nine existing groundwater wells (MW-1A, MW-2A, MW-3A, MW-4A, MW-5A, MW-6A, MW-7A, MW-8A, and F) are currently sampled and analyzed to assess groundwater quality around the active landfill. The locations of these wells are shown on Figure 2. These wells are 23 to 29 feet deep, and the bottoms are 15 to 20 feet below the typical groundwater level. Construction details for the wells, where known or estimated, are summarized on Table 1.

Based on the regional groundwater gradient to the northwest, six of the existing wells are expected to be downgradient of the active landfill area (MW-4A, MW-5A, MW-6A, MW-7A, MW-8A, and F) and three of the existing wells are expected to be upgradient (MW-1A, MW-2A, and MW-3A).

2.4 SUMMARY OF EXISTING DATA

The results of recent groundwater analyses are shown on Table 3. The data indicate that groundwater quality is generally poor, and that the water quality varies significantly across the active landfill area. For example, reported TDS concentrations during a single monitoring round have ranged from 7,700 mg/L in MW-1A to 19,000 mg/L in MW-3A. Sodium and chloride are the dominant anions present in the groundwater, indicating that the shallow groundwater is influenced by saline soil. Sulfates are also present at relatively high concentrations. Arsenic, iron, and manganese concentrations consistently exceed federal drinking water standards in both upgradient and downgradient wells.

No evidence of an impact to groundwater in this area from landfill operations has been observed.

3. SAMPLING AND ANALYSIS PLAN

3.1 MONITORING NETWORK

Currently, eight detection monitoring wells exist around the active landfill (MW-1A, MW-2A, MW-3A, MW-4A, MW-5A, MW-6A, MW-7A, and MW-8A). Several of these wells had different number designations prior to 1993 (see Table 1). Any well (MW-1A through MW-8A) that is replaced in the future (e.g., due to damages) will receive the next sequential letter designation (e.g., MW-1B will replace MW-1A).

Wells MW-1A, MW-2A, MW-3A, MW-4A, MW-6A, MW-7A, AND MW-8A have been part of the monitoring system since December 1993. Well MW-5A was constructed in 1994, and was first sampled in May 1994. A ninth well (well F) will be properly abandoned at a future date, but has been sampled semi-annually since April 1996 to provide supplemental data. The final monitoring network will include wells MW-1A through MW-8A, along with two new wells (MW-9A and MW-10A).

The existing monitoring well network is shown on Figure 2. Based on an assumed hydraulic gradient to the northwest, three of the wells will monitor up-gradient groundwater quality (MW-1A, MW-2A, and MW-3A) and seven wells will monitor down-gradient water quality (MW-4A through MW-10A). These well locations are selected to provide consistent long-term points-of-compliance.

Two of the southern-most new monitoring wells, MW-9A and MW-10A, will not be included in the monitoring program until after the development of cells on the south side of the landfill, unless observed groundwater gradients become southwesterly.

When excavation for Module 8 is initiated, MW-9A and MW-10A will be added to the program so that several years of data will exist for these two wells by the time Modules 8, 10 and 11 (the modules most likely to affect MW-9A and MW-10A) are built.

3.2 FREQUENCY OF MONITORING

The groundwater around the active landfill cell will be monitored semi-annually, in the spring and fall.

3.3 DETECTION MONITORING ANALYTES

Prior to 1993, groundwater samples from the active landfill wells had been analyzed for the constituents listed in "Salt Lake County Landfill Groundwater Monitoring Quality Assurance Project Plan" prepared by the Salt Lake City-County Health Department.

The list of analytes in the Quality Assurance Project Plan is similar to the constituents for detection monitoring contained in Section 315-308-4 of the Solid Waste Permitting and Management Rules. To be consistent with monitoring under the rules at the active landfill cells, the groundwater samples from the wells around the active landfill area will be analyzed for the list of constituents shown on Table 2, "Laboratory Analysis for Groundwater Monitoring" included in this report. Metals analyses are performed for dissolved metals concentrations rather than total metals concentrations due to high natural turbidity of groundwater. This exception was approved by the executive secretary of UDSHW in 1996.

3.4 SAMPLING PROTOCOL

The wells will be sampled using currently accepted and approved technology or approved equivalent techniques. The protocol for sampling the wells is described below.

3.4.1 Water Level Measurements

Water level measurements will be made with a conductivity-based water level meter or equivalent instrument capable of obtaining readings to the nearest 0.01-foot. Washing with a non-phosphate detergent and rinsing with distilled water will clean the probe prior to use in each well.

3.4.2 Detection of Immiscible Layers

The well headspace will be screened using an organic vapor monitor prior to any evacuation of water. An interface probe will be lowered into the well to detect immiscible layers, light and/or dense. Careful recording of the depths of the air/floater and floater/water interfaces establishes a measurement of the thickness of the light phase immiscible layer. The device will be lowered to the bottom of the well where the interface probe will register the presence of dense organic liquids. If immiscible layers are found, they will be sampled by carefully lowering a bailer and retrieving the sample.

3.4.3 Purging Activates

A "low-flow" purging and water sample collection procedure will be used, if possible, for all monitoring wells. Purging and groundwater sample collection at compliance monitoring wells shall be conducted using an electric, submersible, U.S. Environmental Protection Agency (EPA) VOC-approved groundwater pump. The pump will be carefully and thoroughly decontaminated before and after sampling the first well and then after sampling each subsequent well. The

polyethylene tubing used to collect the sample will either be dedicated to that well, or it will be new and disposed of after each use.

Purging and sampling should be performed at a rate between approximately 0.1 to 0.5 liters/min. A flow-through-cell with probes for pH, temperature, conductivity, dissolved oxygen, and turbidity measurements shall be used during purging to determine when a "representative" sample can be collected. All of these parameters should be stable prior to collecting the sample. Purging shall be considered to have stabilized when all of the following parameters vary less than the limits stated below after three successive measurements taken every three to five minutes:

pH: ± 0.2 pH units
Temperature: ±1.0°C
Conductivity: ± 5%
Dissolved Oxygen: ± 10%
Turbidity : ± 10 NTU
Water level in well: <0.3 foot change using 0.1 to 0.5 liters/min flow rate.

If the parameters do not stabilize to within these limits after 30 minutes of purging, a sample shall be taken after five more sets of parameter readings have been taken and recorded.

3.4.4 Monitoring Well Sample Collection

After well purging is completed, groundwater samples will be collected directly from the pump's discharge into the appropriate sampling containers. Groundwater samples will be analyzed in the parts-per-billion (ppb) range; therefore, extreme care must be exercised to prevent contamination of samples. For VOC samples, it is important to use caution to assure that the samples are not exposed to the atmosphere unnecessarily.

3.4.5 Equipment Decontamination

During sampling activities, appropriate decontamination measures will be taken to reduce sample contamination between samples. Decontamination will be consistent with those outlined in "Test Methods for Evaluating Solid Waste-Physical/Chemical Methods" (U.S. EPA SW-846, 3rd Ed.). The electric water level sounder and the electric submersible pump are the only non-dedicated and non-disposable pieces of equipment used for sampling at all three landfill sampling areas.

Non-disposable sampling equipment will be decontaminated before being used during the collection of samples. Decontamination shall be executed immediately prior to equipment use, if possible; whenever this is not possible or practical, appropriate measures will be taken to ensure that contamination of clean equipment will not occur. Field personnel will wear clean, disposable gloves while decontaminating sampling equipment and tools. Clean sampling equipment will not be placed on the ground or other contaminated surfaces prior to use. The waste decontamination fluids will be collected and disposed of at the facility decontamination wash pad.

The decontamination procedure is as follows:

Step 1	Rinse or wash with approved source water (commercially bottled distilled water).
Step 2	Wash in water with approximately 0.01% laboratory grade, non-phosphate detergent (e.g., Liquinox®).
Step 3	Triple rinse with distilled water.

3.4.6 Sampling Handling

Once collected, each sample will be immediately labeled, recorded in the field logbook, and placed in a sample cooler. The sample will be recorded on a chain-of-custody and will remain in the possession of the sampler until custody is formally released to another individual.

3.4.7 Documentation

The sampler will keep a field log, which will contain the following documents:

- Well identification;
- Well depth, well casing stick up;
- Static water level depth and measurement technique;
- Presence of immiscible layers and detection method;
- Well yield;
- Sample collection methods;
- Sample identification numbers;
- Preservatives and containers used;
- Parameters requested for analysis;
- Field analysis data and methods;
- Sample distribution and transporter;
- Field observations including weather; and
- Name of collector.

3.4.8 Sample Custody

Samples will remain in the custody of the sampler until they are checked in and relinquished to the laboratory or until they are relinquished to a qualified individual for transport to the laboratory. If, after samples are collected, the laboratory is closed, sample personnel will have 24-hour access to a "Laboratory Secure Area" (equipped with a refrigerator) for storing samples

until regular laboratory hours, when sample custody can be transferred. Custody will be documented on the chain of custody form.

3.5 QA/QC SAMPLES

A minimum of three quality assurance/quality control (QA/QC) samples will be collected during each sampling round to assess measurement accuracy and precision. These three samples will include a trip blank, an equipment blank, and one blind duplicate sample.

3.5.1 Trip Blanks

One laboratory-prepared trip blank per each day of sampling will be used to assess the potential for contamination introduced from the sampling bottles or during sample transport. The trip blank will be handled and transported along with the other samples.

3.5.2 Equipment Blanks

If any non-dedicated or non-disposable sampling equipment is used (pumps, bailers, filtering pumps, etc.), an equipment blank will be prepared to assess the potential for cross contamination due to incomplete decontamination. The blank will be prepared by pouring distilled rinse water over or through the equipment after it is decontaminated, and collecting the rinse water in laboratory-prepared sampling containers. The equipment blank must be analyzed for the same set of analyses as the primary samples.

The equipment blank will be labeled, stored, handled, and transported with the primary samples.

3.5.3 Blind Duplicates

A least one blind duplicate sample will be collected during each sampling round to assess data precision. Precision is a measure of the agreement of a set of replicate results (i.e., how closely the results match regardless of whether the results are correct). The relative percent difference (RPD) between the two results (A and B) will be calculated for each analyte as follows:

$$RPD = \frac{(A-B)}{\frac{(A+B)}{2}} * 100\%$$

A quality control chart will be maintained over time for each parameter analyzed. The standard deviation of the accumulated data for each parameter will be twice the standard deviation of the quality control samples collected to date.

4. DATA ANALYSIS PLAN

4.1 DATA VALIDATION

When the laboratory data is received, it will be reviewed to assess data validity. The data package will be checked to ensure that:

- Sample IDs match chain-of-custody and field notes and can be matched to sample location, date, and time.
- Samples were analyzed by requested methods.
- Samples were analyzed within holding times.
- Analysis reporting limits are acceptable.
- Laboratory method blank results are included and acceptable.
- Laboratory MS/MSD results for representative analytes are included and acceptable.
- Field QA/QC sample results (trip and equipment blanks and blind duplicates) are included and acceptable.

If the listed checks indicate potential problems or discrepancies, the laboratory will be notified and requested to help resolve the question. If the cause of the problem cannot be located, the affected data will be qualified or the affected wells will be resampled, depending on the severity of the problem.

4.2 DATA ANALYSIS

The data will be analyzed by:

- Looking for the presence of non-naturally occurring compounds in the sample (such as volatile organic compounds), and

- Plotting the concentrations of naturally occurring constituents (metals and minerals) in each well on control charts for that well.

If non-naturally occurring compounds are reported by the laboratory, the validity of the result(s) will be assessed by reviewing method blank results, raw laboratory data, the compound's potential status as a common laboratory contaminant, and the reported concentration relative to the method detection limit. If the positive results appear potentially valid, the affected well will be resampled to verify the result.

The relative concentrations of naturally occurring constituents will be analyzed to assess whether the groundwater is impacted. The spatial distribution of naturally occurring constituents is highly variable in site groundwater. This is probably due, in part, to local influences from the Great Salt Lake and from intermittent ponds around the site. As shown on Table 3, total dissolved solids concentrations observed in existing wells range from 3,100 to 32,000 mg/L and chloride ranges from 1,400 to 18,000 mg/L. Significant differences exist in neighboring wells.

Control Limits for Analytes Detected > 25% Of the Time

ASTM Designation D6312-98, *Standard Guide for Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs*, states that if a facility has no definable hydraulic gradient, has no existing contamination, or has significant natural variations in water quality between up-gradient and down-gradient wells, then the preferred method of statistical analysis for detection monitoring is Shewart-CUSUM control charts. Each of these

conditions exists at the Salt Lake Valley Solid Waste Management Facility; the groundwater gradient at the Facility is very shallow, and it is poorly defined in the western part of the facility (Section 2.2). It is likely that by the year 2000, water from the landfill cells would have reached the monitoring wells (Section 2.2). There also appears to be significant variations in water quality across the facility (Section 2.4). Shewart-CUSUM control charts will, therefore, be used for detection monitoring at the Facility.

Prior to using Shewart-CUSUM control charts for a well, the background conditions for that well must first be established (i.e., the natural water quality and variability of water quality). The background water quality is established by analysis of at least eight independent samples from the well. The background data are required to satisfy the assumptions of the control chart method, i.e.:

1) The data are expected to represent uncontaminated wells;

2) The data are expected to be independent and normally distributed based on the types of constituents targeted; and

3) The sample mean is fixed and the standard deviation is constant.

Once the initial data was obtained, a combined Shewhart-CUSUM control chart was constructed for constituents detected at least 25% of the time, as per recommendations in the Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (EPA, 1989) and ASTM Designation D6312-98. Control charts show the standardized concentration (Z_i) and the cumulative sum (CUSUM) for each parameter. These parameters are described below:

The standardized concentration for each parameter for each well is calculated from:

$$Z_i = (X_i - m)/S$$

Where X_i equals the measured parameter concentration for the sampling period; m equals the mean concentration of that parameter during the "background" sampling period; and S equals the standard deviation of that parameter in that well during the background sampling period. The Z_i is thus a measure of how a given parameter concentration compares with the mean "background" concentration for that parameter.

The cumulative sum is calculated from:

$$CUSUM = \max \{0, (Z_i\text{-}1 + S_{i-1})\}$$

Where S_{i-1} equals the cumulative sum from the previous sampling period. The CUSUM tracks increases in concentration greater than one standard deviation above the mean. The function of the CUSUM is to track small but persistent increases in concentration (increases that would not appear significant based on results of single sampling events).

Kleinfelder conducted initial background water quality monitoring from December 1993 through August 1994. Over that period, each of the existing wells in the Active Landfill monitoring network (MW-1A, MW-2A, MW-3A, MW-4A, MW-6A, MW-7A, and MW-8A) was sampled eight times. The monitoring data obtained during the eight rounds were used to establish the "background" water conditions for these wells, i.e., to establish the groundwater conditions prior to potential impacts from activities at the Landfill. The background data were used to construct Shewart-CUSUM control charts for intra-well detection monitoring of several parameters in each well. In October 1994, Kleinfelder began semiannual detection monitoring of the groundwater at the Active Landfill in accordance with Kleinfelder's Groundwater Monitoring Plan dated November 2, 1993.

In the Fall 1994 through Spring 1996 monitoring rounds, concentrations of several parameters increased relative to the earlier established background conditions. The increases were most pronounced in up-gradient well MW-1A (e.g. barium, calcium, magnesium, manganese, potassium, sodium, alkalinity, bicarbonate, sulfate, chloride, and TDS). Several of those parameters that showed increases occur naturally at relatively high concentrations in shallow groundwater in the Salt Lake Valley (e.g. calcium, magnesium, potassium, sodium, chloride, and TDS) (Thiros, 1995). Furthermore, the down-gradient wells that did show increases are too far from any buried refuse to have been impacted by the landfill. These increases thus appear to have resulted from natural variations in water quality. Standardized concentrations and cumulative sums for some analytes exceeded decision interval values in Spring 1996. In the Fall 1996 monitoring round, some of the trends of increasing concentration continued, especially in up-gradient well MW-1A. Because the increases appear to represent natural variations in groundwater conditions, and because none of the wells was thought to be close enough to be impacted by the landfill, data collected through Fall 1996 was incorporated into the background data analysis for detection monitoring for wells MW-1A, MW-2A, MW-3A, MW-4A, MW-6A, MW-7A, MW-8A.

Well MW-5A was installed in the Fall 1995 monitoring round. From Fall 1995 through Spring 1997, eight groundwater samples were collected from well MW-5A. Initially, the data from these eight samples were used to establish the background groundwater conditions for well MW-5A. However, per our recommendations the statistics were reevaluated for this well. Specifically, we incorporated all data collected from Fall 1995 through Fall 1999 to establish a greater and more representative background. The statistics using the data from Fall 1995 through Fall 1999 better characterize the variability of the groundwater conditions in this well.

Beginning in Spring 1997, the CUSUM were set to zero. A significant trend of increasing concentration will be indicated if the CUSUM value at any time exceeds 4.5, as suggested by ASTM Designation D6312-98. Plate 4 shows the Z_i and CUSUM based on the background data for the parameters detected over 25% of the time from Fall 1993 through Fall 1996.

Control Limits for Analytes Detected < 25% Of the Time

For those parameters that were detected between 0% and 25% of the time, ASTM Designation D6312-98 suggests that the maximum detected value be used as the nonparametric prediction limit. If all background samples are non-detects, then ASTM Designation D6312-98suggests that the quantification limit should be used as the nonparametric prediction limit. Alternatively, an appropriate limit between the quantification limit and the Solid Waste Ground Water Quality Protection Standard (SWGWQPS) may be proposed. For the Salt Lake Landfill, the control limit for analytes not previously detected will be halfway between the detection limit and the SWGWQPS. If a given concentration exceeds the established limit, the well should be re-sampled twice prior to reporting the result. If either of the re-samples is negative (lower concentration than the nonparametric prediction limit), then the original result should be considered a false positive.

4.3 DATA REPORTING

Semi-annual monitoring reports will be prepared. Each report will include:

- Description of Sampling Activities;
- Discussion of Data Validity;
- Discussion of Laboratory QA/QC;
- Presentation of Water Elevation Measurements and a Contour Map;
- Presentation of Field and Laboratory Data in Tables;
- Graphical Presentation of Trends in Analyte Concentrations Over Time; and
- Contours of TDS, TOC, and Arsenic Concentrations for the Sampling Event.

TABLES

TABLE 1
WELL CONSTRUCTION DETAILS
ACTIVE SALT LAKE VALLEY LANDFILL

OLD WELL NUMBER	NEW WELL NO.	YEAR INSTALLED	X COORDINATE (EASTINGS)	Y [illegible]DINATE [illegible]THINGS)	CASING ELEVATION (FT,MSL)	TOTAL WELL DEPTH (FEET)	SCREEN INTERVAL (FT,BGS)	CASING DIAMETER (INCHES)	SCREEN SLOT SIZE (INCHES)	SAND PACK
F		~1982	1849447.18	878223.51	4228.65	19.7	NA	4	NA	NA
ET-0	MW-1A		1849769.20	877224.18	4227.85					
EE	MW-2A	1993	1852069.38	879167.89	4229.73	25	15-25	4	0.01	#20/40
2	MW-3A	Nov. 1992	1852073.88	879924.18	4231.46	25	15-25	4	0.02	#10/20
1A	MW-4A	Aug. 1993	1850784.48	880847.13	4226.82	25	15-25	4	0.01	#20/40
	MW-5A	Sep. 1995	1849702.95	880890.46	4226.16	29	24-29	4	0.02	#10/20
E-26	MW-6A	July 1990	1848587.03	880947.68	4225.90	29	24-29	4	0.02	#10/20
E-25	MW-7A	July 1990	1846925.26	880957.42	4222.34	24.5	19.5-24.5	4	0.02	#10/20
E-27	MW-8A	July 1990	1846909.13	879719.65	4226.09	23	13-23	4	0.02	#10/20

Table 2
Laboratory Analysis for Groundwater Monitoring

General Minerals
Alkalinity as $CaCO_3$
Bicarbonate as $CaCO_3$
Carbonate as $CaCO_3$
Sulfate
Chloride
Calcium
Potassium
Sodium
Magnesium
Metals
Antimony (Dissolved)
Arsenic (Dissolved)
Barium (Dissolved)
Beryllium (Dissolved)
Cadmium (Dissolved)
Chromium (Dissolved)
Cobalt (Dissolved)
Copper (Dissolved)
Iron (Dissolved)
Iron (Total)
Lead (Dissolved)
Manganese (Dissolved)
Mercury (Dissolved)
Nickel (Dissolved)
Selenium (Dissolved)
Silver (Dissolved)
Thallium (Dissolved)
Vanadium (Dissolved)
Zinc (Dissolved)
Other
Total Organic Carbon (TOC)
Ammonia as N
Nitrate as N
Nitrite as N
Phenols
Sulfate
Total Dissolved Solids (TDS)
Chemical Oxygen Demand (COD)
Organics
Volatile Organics (EPA 8260, EPA 504 for EDB and DBCP)

Table 2
Laboratory Analysis for Groundwater Monitoring

General Minerals
Alkalinity as $CaCO_3$
Bicarbonate as $CaCO_3$
Carbonate as $CaCO_3$
Sulfate
Chloride
Calcium
Potassium
Sodium
Magnesium
Metals
Antimony (Dissolved)
Arsenic (Dissolved)
Barium (Dissolved)
Beryllium (Dissolved)
Cadmium (Dissolved)
Chromium (Dissolved)
Cobalt (Dissolved)
Copper (Dissolved)
Iron (Dissolved)
Iron (Total)
Lead (Dissolved)
Manganese (Dissolved)
Mercury (Dissolved)
Nickel (Dissolved)
Selenium (Dissolved)
Silver (Dissolved)
Thallium (Dissolved)
Vanadium (Dissolved)
Zinc (Dissolved)
Other
Total Organic Carbon (TOC)
Ammonia as N
Nitrate as N
Nitrite as N
Phenols
Sulfate
Total Dissolved Solids (TDS)
Chemical Oxygen Demand (COD)
Organics
Volatile Organics (EPA 8260, EPA 504 for EDB and DBCP)

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
DISSOLVED METALS											
Antimony	05 25 90										
	06 04 92										
	09 30 92										
	04 28 93										
	12 03 93	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	01 07 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	02 04 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	03 10 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 19 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	05 31 94	< 0.005	< 0.005	(10 9 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 22 94	< 0.005	< 0.005	(11 8 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	07 27 94	< 0.005	< 0.005	(12 11 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 10 94	< 0.005	< 0.005	(1 2 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 13 95	< 0.005	< 0.005	(4 29 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 04 95	< 0.005	< 0.1	(6 10 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 29 96	< 0.005	< 0.005	(7 2 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	11 08 96	< 0.005	< 0.005	(11 8 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	05 09 97	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 21 97	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	05 04 98	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 07 98	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	05 27 99	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 13 99	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	04 17 00	< 0.005	< 0.005		< 0.005	<	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 19 00	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0053
	04 27 01	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 11 01	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	06 06 02	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 18 02	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 24 03	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 14 03	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	04 20 04	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	11 18 04	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	% detects	-3	-4		-3	-3	-3	-3	-3	-3	0.000
	Coeff. of Var(s.d./mean)	ND	ND		ND	ND	ND	ND	ND	ND	ND
Arsenic	05 25 90				< 0.005	< 0.005	0.007				
	05 28 92							0.010			
	06 04 92								0.184		0.020
	09 30 92								0.029		0.019
	11 19 92							0.005			
	04 28 93	0.006							0.005	< 0.005	< 0.005
	12 03 93	< 0.005			< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	
	01 07 94	< 0.005			< 0.005	< 0.005	0.005	0.011	< 0.005	< 0.005	
	02 04 94	< 0.005			< 0.005	< 0.005	0.005	0.011	< 0.005	< 0.005	
	03 10 94	< 0.005			< 0.005	< 0.005	< 0.005	0.009	< 0.005	< 0.005	
	04 19 94	< 0.005			< 0.005	< 0.005	< 0.005	0.009	< 0.005	< 0.005	
	05 31 94	< 0.005	< 0.005	(10 9 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 22 94	< 0.005	< 0.005	(11 8 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	07 27 94	< 0.005	< 0.005	(12 11 95)	< 0.005	< 0.005	< 0.005	0.008	< 0.005	< 0.005	
	10 10 94	< 0.005	< 0.005	(1 2 96)	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	
	06 13 95	< 0.005	< 0.005	(4 29 96)	< 0.005	< 0.005	< 0.005	0.009	< 0.005	< 0.005	
	10 04 95	< 0.005	< 0.005	(6 10 96)	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	
	04 29 96	< 0.005	< 0.005	(7 2 96)	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005
	11 08 96	< 0.005	< 0.005	(11 8 96)	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005
	05 09 97	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	0.014	< 0.005	< 0.005	< 0.005
	10 21 97	< 0.005	< 0.005		< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	0.006
	05 04 98	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005
	10 07 98	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	0.017
	05 27 99	< 0.005	0.013		0.011	0.012	< 0.005	0.012	0.013	0.009	0.012
	10 13 99	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	0.008
	04 17 00	< 0.005	< 0.005		< 0.005		< 0.005	0.009	< 0.005	< 0.005	0.008
	10 19 00	< 0.005	< 0.005		< 0.005	0.008	< 0.005	0.008	< 0.005	< 0.005	0.008
	04 27 01	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	0.014	< 0.005	< 0.005	0.0063
	10 11 01	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	0.012	< 0.005	< 0.005	0.0071
	06 06 02	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	0.0094	< 0.005	< 0.005	0.0060
	10 18 02	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	0.0130	< 0.005	< 0.005	
	04 24 03	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	0.0110	< 0.005	< 0.005	< 0.005
	10 14 03	< 0.005	< 0.005		< 0.005	0.0071	< 0.005	0.014	< 0.005	< 0.005	< 0.005
	04 20 04	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	0.009	< 0.005	< 0.005	< 0.005
	11 18 04	< 0.005	< 0.005		< 0.005	0.0099	< 0.005	0.015	< 0.005	< 0.005	0.005
	% detects	-3	0		0	14	7	83	3	0	50
	Coeff. of Var(s.d./mean)	ND	ND		ND	ND	ND	0.348	ND	ND	0.458

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Barium	05 25 90				0.078	0.088	0.140				
	05 28 92							0.095			
	06 04 92								0.110		0.070
	09 30 92								0.108		0.075
	11 19 92							0.056			
	04 28 93	0.098							0.099	0.075	0.057
	12 03 93	0.14			0.008	0.086	0.073	0.096	0.13	0.062	
	01 07 94	0.13			0.074	0.076	0.058	0.095	0.110	0.060	
	02 04 94	0.14			0.082	0.082	0.068	0.096	0.073	0.11	
	03 10 94	0.13			0.073	0.740	0.065	0.091	0.11	0.071	
	04 19 94	0.14			0.077	0.075	0.059	0.11	0.12	0.032	
	05 31 94	0.14	0.10	(10 9 95)	0.081	0.080	0.065	0.10	0.11	0.044	
	06 22 94	0.14	0.11	(11 8 95)	0.076	0.079	0.062	0.093	0.11	0.045	
	07 27 94	0.15	0.08	(12 11 95)	0.760	0.077	0.060	0.093	0.11	0.051	
	10 10 94	0.14	0.093	(1 2 96)	0.077	0.071	0.060	0.089	0.092	0.048	
	06 13 95	0.150	0.13	(4 29 96)	0.071	0.067	0.058	0.120	0.089	0.032	
	10 04 95	0.13	0.12	(6 10 96)	0.086	0.100	0.085	0.085	0.076	0.033	
	04 29 96	0.18	0.13	(7 2 96)	0.087	0.088	0.064	0.14	0.084	0.058	0.057
	11 08 96	0.17	0.092	(11 8 96)	0.073	0.076	0.063	0.16	0.084	0.053	0.051
	05 09 97	0.16	0.17		0.076	0.079	0.08	0.14	0.062	0.06	0.043
	10 21 97	0.18	0.10		0.081	0.510	0.07	0.11	0.095	0.07	0.069
	05 04 98	0.13	0.19		0.060	0.240	0.05	0.13	0.034	0.02	0.036
	10 07 98	0.14	0.09		0.051	0.190	0.04	0.13	0.066	0.09	0.014
	05 27 99	0.110	0.075		0.010	0.120	0.003	0.096	< 0.002	0.099	0.050
	10 13 99	0.180	0.099		0.080	0.190	0.066	0.12	0.081	0.097	0.100
	04 17 00	0.190	0.130		0.098		0.051	0.088	0.053	0.110	0.064
	10 19 00	0.17	0.098		0.080	0.25	0.065	0.11	0.068	0.086	0.077
	04 27 01	0.16	0.130		0.082	0.32	0.070	0.07*	0.061	0.093	0.071
	10 11 01	0.17	0.100		0.081	0.28	0.068	0.097	0.076	0.089	0.081
	06 06 02	0.17	0.11		0.091	0.23	0.067	0.100	0.058	0.086	0.073
	10 18 02	0.15	0.094		0.078	0.17	0.064	0.091	0.050	0.082	
	04 24 03	0.14	0.100		0.078	0.16	0.061	0.110	0.050	0.092	0.092
	10 14 03	0.14	0.097		0.080	0.15	0.063	0.120	0.054	0.100	0.110
	04 20 04	0.13	0.11		0.086	0.17	0.063	0.09	0.047	0.13	0.091
	11 18 04	0.11	0.085		0.077	0.15	0.092	0.13	0.043	0.092	0.12
	% detects	97	96		97	97	97	97	93	97	94
	Coeff. of Var(s.d./mean)	0.140	0.245		1.330	0.851	0.247	0.186	0.386	0.385	0.390
Beryllium	05 25 90										
	06 04 92										
	09 30 92										
	04 28 93										
	12 03 93	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	01 07 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	02 04 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	03 10 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 19 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	05 31 94	< 0.005	< 0.005	(10 9 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 22 94	< 0.005	< 0.005	(11 8 95)	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	07 27 94	< 0.005	< 0.005	(12 11 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 10 94	< 0.005	< 0.005	(1 2 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 13 95	< 0.005	< 0.005	(4 29 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 04 95	< 0.005	< 0.005	(6 10 96)	0.009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 29 96	< 0.004	< 0.004	(7 2 96)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	11 08 96	< 0.001	< 0.001	(11 8 96)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	05 09 97	< 0.001	< 0.001		< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 21 97	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	05 04 98	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 07 98	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	0.003	< 0.001	< 0.001	< 0.001
	05 27 99	< 0.002	< 0.001		< 0.001	< 0.001	0.003	< 0.002	< 0.001	< 0.001	< 0.002
	10 13 99	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	04 17 00	< 0.001	< 0.001		< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 19 00	< 0.001	< 0.002		< 0.002	< 0.001	< 0.002	< 0.001	< 0.002	< 0.001	< 0.001
	04 27 01	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 11 01	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	06 06 02	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 18 02	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
	04 24 03	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 14 03	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	04 20 04	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	11 18 04	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	% detects	0	0		7	14	7	3	10	3	6
	Coeff. of Var(s.d./mean)	ND	ND		ND	ND	ND	ND	ND	ND	ND

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (3A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Cadmium	05 25 90				0.003	< 0.002	< 0.002				
	05 28 92							< 0.004			
	06 04 92								< 0.001		< 0.001
	09 30 92								< 0.003		< 0.003
	11 19 92							< 0.004			
	04 28 93	< 0.004							< 0.004	< 0.004	< 0.004
	12 03 93	0.011			< 0.004	0.021	0.016	< 0.004	0.018	0.006	
	01 07 94	0.006			0.012	0.010	0.007	< 0.004	0.011	< 0.004	
	02 04 94	< 0.004			0.004	< 0.004	< 0.004	< 0.004	< 0.004	0.004	
	03 10 94	< 0.004			< 0.004	< 0.004	< 0.004	< 0.004	0.005	0.004	
	04 19 94	< 0.004			< 0.004	0.005	< 0.004	< 0.004	0.010	0.013	
	05 31 94	< 0.004	< 0.004	(10 9 95)	0.007	0.008	0.007	< 0.004	0.009	< 0.004	
	06 22 94	< 0.004	< 0.004	(11 8 95)	< 0.004	< 0.004	< 0.004	< 0.004	0.009	< 0.004	
	07 27 94	< 0.004	< 0.004	(12 11 95)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	
	10 10 94	< 0.004	< 0.004	(1 2 96)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	
	06 13 95	< 0.004	< 0.004	(4 29 96)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	
	10 04 95	< 0.004	< 0.004	(6 10 96)	0.008	0.005	< 0.004	< 0.004	< 0.004	< 0.004	
	04 29 96	< 0.004	< 0.004	(7 2 96)	0.005	0.005	< 0.004	< 0.004	0.006	< 0.004	< 0.004
	11 08 96	< 0.004	< 0.004	(11 8 96)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	05 09 97	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	10 21 97	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	05 04 98	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	10 07 98	0.006	0.004		0.005	0.008	0.012	< 0.004	< 0.004	0.006	0.011
	05 27 99	< 0.004	0.006		< 0.004	0.005	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	10 13 99	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	0.005
	04 17 00	< 0.004	< 0.004		< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	10 19 00	0.012	0.016		0.015	0.008	0.013	0.007	0.006	0.006	0.015
	04 27 01	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	10 11 01	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	06 06 02	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	10 18 02	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	
	04 24 03	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	10 14 03	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	04 20 04	< 0.004	0.00448		0.00450	0.0048	0.0041	< 0.004	0.0047	0.0053	0.0052
	11 18 04	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	% detects	10	21		28	38	17	0	28	24	22
	Coeff. of Var(s.d./mean)	ND	ND		0.513	0.636	ND	ND	0.575	ND	ND
Calcium	05 25 90				297	657	421				
	06 04 92								611.8		287.1
	09 30 92								668		342
	04 28 93	450							840	220	380
	12 03 93	450			740	700	520	190	880	230	
	01 07 94	530			760	780	580	180	960	220	
	02 04 94	430			680	700	490	170	200	890	
	03 10 94	410			710	720	520	170	1100	270	
	04 19 94	430			860	860	630	240	1400	400	
	05 31 94	470	780	(10 9 95)	820	820	580	200	820	270	
	06 22 94	430	750	(11 8 95)	780	820	600	160	1300	230	
	07 27 94	500	710	(12 11 95)	790	770	560	210	1300	280	
	10 10 94	550	720	(1 2 96)	760	820	580	190	950	190	
	06 13 95	490	830	(4 29 96)	740	770	610	180	1100	340	
	10 04 95	430	710	(6 10 96)	710	720	590	190	950	240	
	04 29 96	510	800	(7 2 96)	820	820	680	240	1000	300	430
	11 08 96	500	730	(11 8 96)	720	730	610	290	1300	210	350
	05 09 97	450	650		620	620	560	240	920	270	290
	10 21 97	470	680		710	650	560	210	1200	220	440
	05 04 98	480	760		690	700	580	280	560	360	310
	10 07 98	420	660		620	650	540	380	930	350	74
	05 27 99	440	690		630	670	570	260	780	500	350
	10 13 99	410	610		620	800	530	320	1200	250	370
	04 17 00	380	640		590		540	260	760	240	320
	10 19 00	400	690		680	140	660	290	1200	250	320
	04 27 01	470	780		750	800	1100	210	1500	360	370
	10 11 01	400	670		680	610	560	270	1200	260	400
	06 06 02	370	660		640	620	550	240	890	290	370
	10 18 02	380	730		690	710	530	220	880	230	
	04 24 03	370	690		650	670	520	270	610	240	480
	10 14 03	350	650		630	650	550	310	610	250	540
	04 20 04	340	660		640	640	480	220	570	500	510
	11 18 04	380	730		710	730	520	190	660	330	490
	% detects	97	96		97	97	97	97	97	97	94
	Coeff. of Var(s.d./mean)	0.125	0.078		0.098	0.187	0.188	0.225	0.309	0.440	0.286

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS[1]					UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A	MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Chromium	05 25 90			< 0.005	< 0.005	< 0.005				
	05 28 92						< 0.01			
	06 04 92							< 0.007		< 0.007
	09 30 92							< 0.030		< 0.030
	11 19 92						< 0.010			
	04 28 93	< 0.03						< 0.05	< 0.020	< 0.020
	12 03 93	< 0.04		< 0.01	0.07	0.06	< 0.02	< 0.07	< 0.02	
	01 07 94	< 0.03		< 0.04	< 0.05	< 0.03	< 0.02	< 0.05	< 0.01	
	02 04 94	< 0.02		< 0.03	< 0.03	< 0.03	< 0.01	< 0.01	< 0.04	
	03 10 94	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	04 19 94	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	05 31 94	< 0.02	< 0.01 (10 9 95)	< 0.04	< 0.04	< 0.03	< 0.02	< 0.05	< 0.02	
	06 22 94	< 0.01	< 0.02 (11 8 95)	< 0.01	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	
	07 27 94	< 0.01	< 0.01 (12 11 95)	< 0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	10 10 94	< 0.01	< 0.01 (1 2 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	06 13 95	< 0.01	< 0.03 (4 29 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	10 04 95	< 0.01	< 0.01 (6 10 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	04 29 96	< 0.02	< 0.01 (7 2 96)	< 0.03	< 0.03	< 0.03	< 0.02	< 0.05	< 0.02	< 0.02
	11 08 96	< 0.01	< 0.01 (11 8 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	05 09 97	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 21 97	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.22	< 0.02	< 0.01
	05 04 98	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01
	10 07 98	< 0.03	< 0.03	< 0.04	< 0.05	< 0.05	< 0.02	< 0.04	< 0.03	< 0.03
	05 27 99	< 0.02	< 0.04	< 0.04	< 0.04	< 0.02	< 0.01	< 0.03	< 0.03	< 0.01
	10 13 99	< 0.01	< 0.01	< 0.01	< 0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	04 17 00	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 19 00	< 0.03	< 0.04	< 0.04	< 0.04	< 0.04	< 0.02	< 0.02	< 0.03	< 0.04
	04 27 01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 11 01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	06 06 02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.023	< 0.01	< 0.01	< 0.01	< 0.02
	10 18 02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	04 24 03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 14 03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	04 20 04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	11 18 04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	% detects	34	25	34	45	38	21	34	31	33
	Coeff. of Var(s.d./mean)	0.571	0.670	0.723	0.839	0.767	ND	1.604	0.559	0.616
Cobalt	05 25 90									
	06 04 92									
	09 30 92									
	04 28 93									
	12 03 93	< 0.01		< 0.01	< 0.03	< 0.03	< 0.01	< 0.03	< 0.01	
	01 07 94	< 0.01		< 0.02	< 0.02	< 0.01	< 0.01	< 0.02	< 0.01	
	02 04 94	< 0.01		< 0.01	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	
	03 10 94	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	04 19 94	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	05 31 94	< 0.01	< 0.01 (10 9 95)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	06 22 94	< 0.01	< 0.01 (11 8 95)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	07 27 94	< 0.01	< 0.01 (12 11 95)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	10 10 94	< 0.01	< 0.01 (1 2 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	06 13 95	< 0.01	< 0.01 (4 29 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	10 04 95	< 0.01	< 0.01 (6 10 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	04 29 96	< 0.01	< 0.01 (7 2 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	11 08 96	< 0.01	< 0.01 (11 8 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	05 09 97	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 21 97	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.03	< 0.01	< 0.01
	05 04 98	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 07 98	< 0.01	< 0.01	< 0.01	< 0.02	< 0.02	< 0.02	< 0.01	< 0.01	< 0.02
	05 27 99	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 13 99	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	04 17 00	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 19 00	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	04 27 01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 11 01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	06 06 02	0.014	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 18 02	0.010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	04 24 03	< 0.010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 14 03	< 0.010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	04 20 04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	11 18 04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	% detects	10	0	7	21	10	0	21	3	11
	Coeff. of Var(s.d./mean)	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Copper	05 25 90				<0.01	< 0.01	< 0.01				
	05 28 92							< 0.004			
	06 04 92								<0.01		< 0.010
	09 30 92								0.040		< 0.050
	11 19 92							< 0.004			
	04 28 93	0.008							0.019	0.018	0.009
	12 03 93	0.019			0.005	0.029	0.024	< 0.004	0.027	0.010	
	01 07 94	0.010			0.020	0.020	0.010	0.007	0.019	< 0.004	
	02 04 94	0.013			0.023	0.022	0.018	0.005	0.006	0.022	
	03 10 94	0.006			0.010	0.013	0.007	< 0.004	0.023	0.012	
	04 19 94	0.007			0.007	0.014	0.007	< 0.004	0.020	0.014	
	05 31 94	0.009	< 0.004	(10 9 95)	0.019	0.021	0.019	0.009	0.022	0.009	
	06 22 94	0.011	0.017	(11 8 95)	0.016	0.032	0.015	0.009	0.023	0.006	
	07 27 94	< 0.004	< 0.004	(12 11 95)	0.006	0.009	0.004	< 0.004	< 0.004	< 0.004	
	10 10 94	< 0.004	< 0.004	(1 2 96)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	
	06 13 95	< 0.004	< 0.004	(4 29 96)	0.012	0.008	0.012	< 0.004	< 0.004	< 0.004	
	10 04 95	< 0.004	< 0.004	(6 10 96)	0.004	0.005	< 0.004	< 0.004	0.005	< 0.004	
	04 29 96	< 0.004	< 0.004	(7 2 96)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	11 08 96	< 0.004	< 0.004	(11 8 96)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	05 09 97	0.016	0.019		0.015	0.016	0.01	< 0.004	0.015	0.006	< 0.004
	10 21 97	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	05 04 98	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
	10 07 98	0.008	0.008		0.010	0.016	0.021	< 0.004	0.010	0.009	0.018
	05 27 99	0.005	0.005		< 0.004	0.004	0.006	< 0.004	< 0.004	< 0.004	0.005
	10 13 99	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.005
	04 17 00	< 0.004	< 0.004		0.004		< 0.004	< 0.004	0.009	< 0.004	< 0.004
	10 19 00	0.010	0.016		0.010	0.010	0.016	0.005	0.010	0.007	0.014
	04 27 01	< 0.004	< 0.004		< 0.004	< 0.004	< 0.004	< 0.004	0.0061	< 0.004	< 0.004
	10 11 01	0.0088	0.0092		0.009	0.0084	0.0061	0.0056	0.0150	0.0076	0.0056
	06 06 02	0.0042	0.0059		< 0.004	0.0048	0.0110	< 0.0040	0.0170	0.0047	0.0350
	10 18 02	0.0068	0.0110		0.0066	0.0330	0.0069	< 0.0040	0.0110	< 0.0040	
	04 24 03	0.0048	0.0059		0.0055	0.0054	0.0068	0.0058	0.0120	0.0056	< 0.004
	10 14 03	0.0088	0.0110		0.0090	0.0071	< 0.0040	< 0.0040	< 0.0040	0.0073	< 0.004
	04 20 04	0.0061	0.0074		0.0091	0.012	0.0054	0.0076	0.019	0.015	0.0064
	11 18 04	0.0068	0.011		< 0.004	< 0.004	0.0048	0.0079	0.04	< 0.004	0.0051
	% detects	62	46		62	69	62	28	62	45	44
	Coeff. of Var(s.d./mean)	0.552	0.636		0.664	0.784	0.688	0.327	0.758	0.642	1.054
Iron	05 25 90				0.140	3.12	0.53				
	05 28 92							0.850			
	06 04 92								1.960		0.250
	09 30 92								2.020		0.420
	11 19 92							0.590			
	04 28 93	0.70							0.25	0.300	0.210
	12 03 93	0.08			0.84	2.3	0.68	0.02	1.2	0.29	
	01 07 94	0.02			0.21	0.19	0.03	< 0.01	0.48	0.01	
	02 04 94	0.02			0.21	0.30	0.04	0.02	0.02	0.19	
	03 10 94	0.04			0.21	0.16	0.02	0.01	0.05	0.03	
	04 19 94	0.02			0.03	0.11	0.03	0.02	0.05	0.05	
	05 31 94	0.03	< 0.01	(10 9 95)	0.78	0.45	0.05	0.04	0.51	0.03	
	06 22 94	0.02	0.04	(11 8 95)	0.91	0.66	0.02		0.56	0.02	
	07 27 94	< 0.01	0.67	(12 11 95)	0.42	0.30	< 0.01	< 0.01	< 0.01	< 0.01	
	10 10 94	< 0.01	< 0.01	(1 2 96)	< 0.01	0.35	< 0.01	< 0.01	0.21	< 0.01	
	06 13 95	< 0.01	0.06	(4 29 96)	0.130	0.520	0.030	< 0.01	0.010	0.010	
	10 04 95	< 0.01	0.01	(6 10 96)	1.3	1.6	0.47	< 0.01	0.03	0.02	
	04 29 96	0.02	0.07	(7 2 96)	0.26	0.88	0.09	0.02	0.07	0.03	0.03
	11 08 96	< 0.01	0.15	(11 8 96)	0.07	1.10	0.47	< 0.01	0.11	< 0.01	< 0.01
	05 09 97	0.03	0.03		0.26	0.32	0.05	0.02	0.04	0.02	0.02
	10 21 97	< 0.01	< 0.01		0.82	0.01	0.19	< 0.01	< 0.01	< 0.01	0.07
	05 04 98	< 0.01	< 0.01		0.53	0.13	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 07 98	< 0.01	< 0.01		0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	05 27 99	0.02	0.03		0.58	0.51	0.03	< 0.01	0.05	0.03	0.02
	10 13 99	0.02	0.02		0.03	0.02	0.02	< 0.01	0.02	0.02	0.02
	04 17 00	< 0.01	< 0.01		< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 19 00	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02
	04 27 01	< 0.01	0.019		0.45	0.019	0.053	0.043	< 0.01	0.03	< 0.01
	10 11 01	0.011	0.036		0.95	0.49	0.099	0.013	0.81	0.018	0.016
	06 06 02	< 0.01	< 0.01		0.7	0.047	< 0.01	< 0.010	< 0.01	< 0.01	< 0.01
	10 18 02	< 0.01	< 0.01		0.21	0.47	0.063	0.018	0.026	< 0.01	
	04 24 03	< 0.01	< 0.01		0.34	1.9	0.012	0.018	< 0.01	< 0.01	< 0.01
	10 14 03	0.012	0.09		0.86	1.3	< 0.01	0.092	< 0.01	< 0.01	0.16
	04 20 04	0.13	< 0.01		0.034	0.8	0.013	0.021	< 0.01	< 0.01	< 0.01
	11 18 04	< 0.01	0.011		0.38	0.74	0.073	< 0.01	< 0.01	< 0.01	< 0.01
	% detects	48	50		93	90	72	55	59	55	50
	Coeff. of Var(s.d./mean)	1.156	2.350		0.893	1.067	1.817	0.927	1.910	1.851	1.428

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(I))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Lead	05 25 90				< 0.002	0.004	< 0.002				
	05 28 92							< 0.050			
	06 04 92								0.004		< 0.001
	09 30 92								0.002		< 0.001
	11 19 92							< 0.050			
	04 28 93	< 0.05							< 0.05	< 0.05	< 0.05
	12 03 93	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	01 07 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	02 04 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	03 10 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 19 94	< 0.005			0.007	< 0.005	< 0.005	< 0.005	0.009	< 0.005	
	05 31 94	< 0.005	< 0.005	(10 9 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 22 94	< 0.005	< 0.005	(11 8 95)	< 0.005	0.007	< 0.005	< 0.005	< 0.005	< 0.005	
	07 27 94	< 0.005	< 0.005	(12 11 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 10 94	< 0.005	< 0.005	(1 2 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 13 95	< 0.005	0.007	(4 29 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 04 95	< 0.005	< 0.050	(6 10 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 29 96	0.009	< 0.005	(7 2 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.013	< 0.005
	11 08 96	< 0.005	< 0.005	(11 8 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	05 09 97	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 21 97	< 0.005	0.014		0.010	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005
	05 04 98	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 07 98	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	05 27 99	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 13 99	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	04 17 00	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 19 00	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	04 27 01	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 11 01	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	06 06 02	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 18 02	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 24 03	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 14 03	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	04 20 04	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	11 18 04	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	% detects	0	4		3	0	0	3	3	0	6
	Coeff. of Var(s.d./mean)	ND	ND		ND	ND	ND	ND	ND	ND	ND
Magnesium	05 25 90				99	201	142				
	05 28 92							100			
	06 04 92								183.6		145.3
	09 30 92								194		157.0
	11 19 92							52			
	04 28 93	170							300	100	170
	12 03 93	180			230	230	160	100	290	110	
	01 07 94	190			240	240	190	98	330	100	
	02 04 94	160			210	230	170	93	99	340	
	03 10 94	160			220	220	170	91	380	230	
	04 19 94	170			250	250	200	130	510	550	
	05 31 94	170	240	(10 9 95)	230	240	190	110	560	220	
	06 22 94	160	230	(11 8 95)	230	240	180	85	480	150	
	07 27 94	190	220	(12 11 95)	250	240	190	110	460	230	
	10 10 94	170	220	(1 2 96)	240	260	190	98	330	81	
	6 13 1995	190	250	(4 29 96)	230	240	200	130	500	400	
	10 04 95	170	220	(6 10 96)	220	220	190	100	370	210	
	04 29 96	200	250	(7 2 96)	240	240	220	170	510	230	210
	11 08 96	190	230	(11 8 96)	220	230	200	130	670	89	170
	05 09 97	170	200		210	220	180	170	470	150	140
	10 21 97	160	210		200	200	190	110	580	81	170
	05 04 98	190	220		220	230	200	210	290	190	180
	10 07 98	170	200		200	210	190	270	500	160	40
	05 27 99	170	220		200	220	190	190	470	240	140
	10 13 99	170	210		200	210	190	210	810	100	160
	04 17 00	140	200		180		180	180	480	90	130
	10 19 00	150	200		200	44	190	190	690	92	130
	04 27 01	160	200		200	200	230	130	890	140	150
	10 11 01	170	220		210	180	190	180	600	94	160
	06 06 02	130	200		190	190	190	160	420	210	140
	10 18 02	150	230		220	230	190	160	400	99	
	04 24 03	140	200		210	210	170	190	230	98	170
	10 14 03	130	200		200	200	180	220	240	99	190
	04 20 04	130	210		210	200	170	160	270	490	190
	11 18 04	140	230		230	230	180	150	270	150	180
	% detects	97	96		97	97	97	97	97	97	94
	Coeff. of Var(s.d./mean)	0.120	0.074		0.083	0.179	0.077	0.313	0.390	0.650	0.241

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Manganese	05 25 90				0.326	0.731	0.972				
	05 28 92							0.380			
	06 04 92								0.750		0.340
	09 30 92								0.720		0.530
	11 19 92							0.190			
	04 28 93	0.640							0.530	0.330	0.150
	12 03 93	0.74			0.64	0.79	0.83	0.35	0.96	0.28	
	01 07 94	0.65			0.69	0.74	0.74	0.34	0.87	0.23	
	02 04 94	0.60			0.72	0.77	0.79	0.37	0.28	0.96	
	03 10 94	0.53			0.68	0.72	0.73	0.35	0.94	0.42	
	04 19 94	0.62			0.73	0.76	0.80	0.41	1.10	0.41	
	05 31 94	0.57	0.76	(10 9 95)	0.71	0.73	0.78	0.38	0.98	0.30	
	06 22 94	0.58	0.75	(11 8 95)	0.71	0.77	0.80	0.39	1.10	0.24	
	07 27 94	0.57	0.64	(12 11 95)	0.71	0.75	0.76	0.36	1.10	0.34	
	10 10 94	0.52	0.65	(1 2 96)	0.71	0.76	0.75	0.37	0.93	0.22	
	06 13 95	0.48	0.84	(4 29 96)	0.60	0.61	0.71	0.35	0.71	0.17	
	10 04 95	0.44	0.76	(6 10 96)	0.67	0.69	0.83	0.33	0.77	0.22	
	04 29 96	0.62	0.71	(7 2 96)	0.74	0.97	0.86	0.56	0.74	0.30	0.074
	11 08 96	0.59	0.77	(11 8 96)	0.68	0.78	0.91	0.67	1.20	0.20	0.35
	05 09 97	0.55	0.68		0.68	0.74	0.86	0.66	0.76	0.30	0.14
	10 21 97	0.57	0.76		0.72	1.10	0.87	0.49	1.20	0.25	0.73
	05 04 98	0.45	0.66		0.71	0.95	0.83	0.66	0.56	0.084	0.006
	10 07 98	0.51	0.63		0.62	0.80	0.71	0.90	0.88	0.430	0.066
	05 27 99	0.5	0.66		0.68	0.87	0.79	0.67	0.74	0.61	0.61
	10 13 99	0.55	0.72		0.68	0.86	0.88	0.61	1.2	0.34	0.94
	04 17 00	0.57	0.85		0.82		0.7	0.56	0.74	0.36	0.59
	10 19 00	0.56	0.78		0.77	0.77	0.92	0.77	0.78	0.30	0.91
	04 27 01	0.51	0.71		0.72	0.93	0.84	0.43	1.0	0.30	0.56
	10 11 01	0.52	0.74		0.73	1.0	0.88	0.62	1.4	0.27	0.91
	06 06 02	0.44	0.64		0.66	0.81	0.85	0.57	0.61	0.30	0.4
	10 18 02	0.47	0.7		0.71	0.87	0.83	0.55	2.50	0.27	
	04 24 03	0.48	0.72		0.75	0.96	0.84	0.75	0.63	0.31	0.89
	10 14 03	0.49	0.74		0.76	0.92	0.88	0.91	0.58	0.34	1.5
	04 20 04	0.42	0.67		0.72	0.96	0.77	0.56	0.34	0.45	0.57
	11 18 04	0.35	0.56		0.62	0.79	0.88	0.64	0.28	0.29	1
	% detects	97	96		97	97	97	97	97	97	94
	Coeff. of Var(s.d./mean)	0.147	0.095		0.067	0.134	0.076	0.317	0.466	0.477	0.670
Mercury	05 25 90				< 0.0005	< 0.0005	< 0.0005				
	05 28 92							< 0.001			
	06 04 92								< 0.0005		< 0.0005
	09 30 92								< 0.0005		< 0.0005
	11 19 92							< 0.001			
	04 28 93	< 0.001							< 0.001	< 0.001	< 0.001
	12 03 93	< 0.001			< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
	01 07 94	< 0.001			< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
	02 04 94	< 0.001			< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
	03 10 94	< 0.001			< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
	04 19 94	< 0.001			< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
	05 31 94	< 0.001	< 0.001	(10 9 95)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
	06 22 94	< 0.001	< 0.001	(11 8 95)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
	07 27 94	< 0.001	< 0.001	(12 11 95)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
	10 10 94	< 0.001	< 0.001	(1 2 96)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
	06 13 95	< 0.001	< 0.001	(4 29 96)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
	10 04 95	< 0.001	< 0.001	(6 10 96)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
	04 29 96	< 0.001	< 0.001	(7 2 96)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	11 08 96	< 0.001	< 0.001	(11 8 96)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	05 09 97	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 21 97	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	05 04 98	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 07 98	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	05 27 99	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 13 99	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	04 17 00	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 19 00	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	04 27 01	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 11 01	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	06 06 02	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 18 02	< 0.0002	< 0.0002		< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	
	04 24 03	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 14 03	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	04 20 04	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	11 18 04	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	% detects	<3	4		<3	<3	<3	<3	<3	3	<6
	Coeff. of Var(s.d./mean)	ND	ND		ND	ND	ND	ND	ND	ND	ND

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Nickel	05 25 90				< 0.020	0.020	< 0.020				
	05 28 92							< 0.005			
	06 04 92								< 0.010		< 0.010
	09 30 92								< 0.030		< 0.030
	11 19 92							< 0.005			
	04 28 93	< 0.005							0.013	< 0.005	0.005
	12 03 93	0.027			< 0.005	0.062	0.052	0.009	0.055	0.012	
	01 07 94	0.012			0.034	0.029	0.014	0.012	0.035	0.005	
	02 04 94	< 0.005			0.012	0.010	0.009	< 0.005	< 0.005	0.017	
	03 10 94	< 0.005			< 0.005	0.006	< 0.005	< 0.005	0.019	0.017	
	04 19 94	< 0.005			< 0.005	0.015	0.007	< 0.005	0.031	0.043	
	05 31 94	0.006	< 0.005	(10 9 95)	0.024	0.025	0.022	< 0.005	0.034	0.012	
	06 22 94	0.007	< 0.005	(11 8 95)	0.011	0.015	0.011	< 0.005	0.031	< 0.005	
	07 27 94	< 0.005	0.008	(12 11 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 10 94	< 0.005	< 0.005	(1 2 96)	0.019	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 13 95	< 0.005	0.014	(4 29 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 04 95	< 0.005	< 0.005	(6 10 96)	0.008	< 0.005	< 0.005	< 0.005	0.008	< 0.005	
	04 29 96	< 0.005	< 0.005	(7 2 96)	0.013	0.017	0.013	0.007	0.022	0.011	0.01
	11 08 96	0.014	0.011	(11 8 96)	0.005	0.010	0.008	0.016	0.014	< 0.005	0.011
	05 09 97	0.032	0.034		0.029	0.033	0.02	0.012	0.039	0.019	0.012
	10 21 97	0.019	0.011		0.011	0.013	0.02	0.022	0.040	0.009	0.015
	05 04 98	0.009	0.011		0.008	< 0.005	0.012	< 0.005	< 0.005	0.010	0.006
	10 07 98	0.020	0.013		0.018	0.036	0.049	0.013	0.013	0.021	0.052
	05 27 99	0.006	0.012		0.008	0.016	0.011	< 0.005	0.007	0.007	0.011
	10 13 99	0.007	0.013			0.008	< 0.005	< 0.005	0.007	< 0.005	0.009
	04 17 00	0.005	< 0.005		< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 19 00	0.020	0.040		0.034	0.035	0.023	0.009	0.010	0.010	0.025
	04 27 01	< 0.005	< 0.005		< 0.005	0.00054	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 11 01	< 0.005	0.00056		0.00058	0.006	< 0.005	< 0.005	0.0081	< 0.005	0.013
	06 06 02	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 18 02	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 24 03	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 14 03	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	04 20 04	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	11 18 04	0.015	0.025		0.027	0.021	0.027	0.015	0.026	0.012	0.036
	% detects	48	46		55	66	48	31	55	41	56
	Coeff. of Var(s.d./mean)	0.785	0.880		0.814	0.930	0.979	0.592	0.924	0.832	0.953
Potassium	05 25 90				24	49	40				
	06 04 92								56		54
	09 30 92								57		56
	04 28 93	57							68	44	57
	12 03 93	59			60	67	45	30	74	56	
	01 07 94	59			62	69	56	32	78	52	
	02 04 94	59			69	64	57	36	53	80	
	03 10 94	46			68	58	47	26	63	67	
	04 19 94	61			130	130	120	44	140	150	
	05 31 94	48	70	(10 9 95)	61	58	47	36	120	61	
	06 22 94	53	63	(11 8 95)	61	61	52	33	83	57	
	07 27 94	46	60	(12 11 95)	59	55	47	31	77	61	
	10 10 94	47	61	(1 2 96)	64	57	47	38	78	44	
	06 13 95	63	69	(4 29 96)	85	74	71	75	110	120	
	10 04 95	56	58	(6 10 96)	67	65	59	35	89	80	
	04 29 96	59	60	(7 2 96)	67	64	52	69	98	79	67
	11 08 96	50	58	(11 8 96)	64	60	51	54	100	44	60
	05 09 97	52	59		59	56	55	69	84	56	54
	10 21 97	50	56		56	55	50	43	84	42	56
	05 04 98	49	66		62	59	54	38	67	65	62
	10 07 98	49	58		60	56	46	27	86	56	35
	05 27 99	46	53		53	50	49	75	70	62	50
	10 13 99	47	53		57	54	49	68	120	43	54
	04 17 00	48	49		48		45	66	80	37	46
	10 19 00	47	56		59	28	56	67	120	45	52
	04 27 01	49	59		61	67	69	62	150	54	48
	10 11 01	45	54		57	49	49	57	110	41	50
	06 06 02	32	51		49	57	64	54	84	66	38
	10 18 02	27	59		45	29	13	29	57	25	
	04 24 03	53	67		64	61	57	85	110	53	56
	10 14 03	44	55		57	54	54	79	61	44	52
	04 20 04	44	57		61	55	50.0	78	68	130	52
	11 18 04	48	61		63	61	48	80	74	55	46
	% detects	97	96		97	97	97	97	97	97	94
	Coeff. of Var(s.d./mean)	0.158	0.091		0.235	0.293	0.299	0.360	0.275	0.441	0.154

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Selenium	05 25 90				< 0.005	< 0.005	< 0.005				
	05 28 92							< 0.005			
	06 04 92								< 0.002		0.004
	09 30 92								< 0.002		< 0.002
	11 19 92							< 0.005			
	04 28 93	< 0.005							< 0.005	< 0.005	< 0.005
	12 03 93	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	01 07 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	02 04 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	03 10 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 19 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	05 31 94	< 0.005	< 0.005	(10 9 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 22 94	< 0.005	< 0.005	(11 8 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	07 27 94	< 0.005	< 0.005	(12 11 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 10 94	< 0.005	< 0.005	(1 2 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 13 95	< 0.005	< 0.005	(4 29 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 04 95	< 0.005	< 0.005	(6 10 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 29 96	< 0.005	< 0.005	(7 2 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006
	11 08 96	< 0.005	< 0.005	(11 8 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	05 09 97	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 21 97	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	05 04 98	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.016
	10 07 98	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	05 27 99	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 13 99	< 0.005	0.030		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.029
	04 17 00	< 0.005	< 0.005		< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 19 00	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	04 27 01	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 11 01	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	06 06 02	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 18 02	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 24 03	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 14 03	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	04 20 04	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.029	< 0.005
	11 18 04	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	% detects	-3	0		-3	0	-3	-3	0	0	17
	Coeff. of Var(s.d./mean)	ND	ND		ND	ND	ND	ND	ND	ND	ND
Silver	05 25 90				< 0.01	< 0.01	< 0.01				
	05 28 92							< 0.01			
	06 04 92								0.010		< 0.001
	09 30 92								< 0.01		< 0.010
	11 19 92							< 0.01			
	04 28 93	< 0.01							0.03	< 0.01	0.010
	12 03 93	< 0.01			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	01 07 94	< 0.01			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	02 04 94	< 0.01			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	03 10 94	< 0.01			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	04 19 94	< 0.01			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	05 31 94	< 0.02	< 0.01	(10 9 95)	< 0.03	< 0.01	< 0.01	< 0.01	< 0.05	< 0.02	
	06 22 94	< 0.01	< 0.01	(11 8 95)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	07 27 94	< 0.01	< 0.01	(12 11 95)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	10 10 94	< 0.01	< 0.01	(1 2 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	06 13 95	< 0.01	< 0.01	(4 29 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	10 04 95	< 0.01	< 0.01	(6 10 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	04 29 96	< 0.01	< 0.01	(7 2 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	11 08 96	< 0.01	< 0.01	(11 8 96)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	05 09 97	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 21 97	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	05 04 98	< 0.03	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01
	10 07 98	< 0.01	< 0.01		< 0.01	< 0.02	< 0.03	< 0.01	< 0.01	< 0.01	< 0.03
	05 27 99	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 13 99										
	04 17 00	< 0.01	< 0.01		< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 19 00	< 0.01	< 0.02		< 0.01	< 0.01	< 0.03	< 0.01	< 0.01	< 0.01	< 0.03
	04 27 01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 11 01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	06 06 02	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 18 02	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
	04 24 03	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	10 14 03	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	04 20 04	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	11 18 04	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	% detects	7	4		7	10	7	7	3	7	22
	Coeff. of Var(s.d./mean)	ND	ND		ND	ND	ND	ND	ND	ND	ND

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (Z)	F
Sodium	05 25 90				1490	3080	2300				
	05 28 92							930			
	06 04 92								3244.9		3691.4
	09 30 92								3620		3020.0
	11 19 92							590			
	04 28 93	2700							5100	1800	3200
	12 03 93	2600			4100	3800	2900	880	4000	1800	
	01 07 94	2600			3900	3900	2900	1100	4600	1600	
	02 04 94	1700			2500	2600	1900	590	1100	3300	
	03 10 94	2300			3700	3600	2700	900	5500	2600	
	04 19 94	2600			3900	3900	2900	1100	6300	6200	
	05 31 94	2500	3900	(10 9 95)	4100	4000	3000	980	7300	2800	
	06 22 94	2400	3800	(11 8 95)	3900	4000	3000	930	6900	2100	
	07 27 94	2700	3800	(12 11 95)	4100	4100	3300	980	6300	2900	
	10 10 94	2500	3800	(1 2 96)	4200	4300	3200	920	5100	1600	
	06 13 95	2700	4200	(4 29 96)	4000	4200	3300	1600	6400	4500	
	10 04 95	2300	3700	(6 10 96)	3700	3600	3000	910	5100	2700	
	04 29 96	2800	3800	(7 2 96)	4200	4100	3300	1600	7100	3000	4200
	11 08 96	2600	3600	(11 8 96)	3700	3500	2900	1400	7400	1500	3100
	05 09 97	2100	3300		3300	3000	2500	1500	5600	2200	3000
	10 21 97	2100	3100		3200	2800	2500	960	6300	1300	2700
	05 04 98	2400	3700		3500	3400	2900	1900	3700	2300	3900
	10 07 98	2200	3400		3200	3200	2900	1700	6000	1900	2000
	05 27 99	2200	3400		3200	3300	2900	1900	5300	2300	2800
	10 13 99	2200	3400		3400	3400	2900	1900	8900	1500	3100
	04 17 00	2000	3200		2900		2700	1600	5400	1400	2900
	10 19 00	2100	3300		3100	710	2800	1600	7600	1400	2700
	04 27 01	2200	3400		3300	2900	2800	1500	5900	1700	2500
	10 11 01	2200	3400		3300	2700	2700	1300	7000	1400	2400
	06 06 02	2100	3400		3200	3100	2800	1500	5300	2600	2400
	10 18 02	2000	3500		3300	3200	2600	1500	5100	1400	
	04 24 03	2100	3400		3200	3200	2700	1800	3,700	1600	2400
	10 14 03	2000	3400		3100	3300	2700	1900	3,900	1500	2500
	04 20 04	2000	3400		3200	3100	2500	1900	3900	4600	2300
	11 18 04	2300	3800		3600	3500	2800	1800	4300	1800	2200
	% detects	97	96		97	97	97	97	97	97	94
	Coeff. of Var(s.d./mean)	0.117	0.073		0.124	0.211	0.098	0.288	0.282	0.390	0.208
Thallium	05 25 90										
	06 04 92										
	09 30 92										
	04 28 93										
	12 03 93	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	01 07 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	02 04 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	03 10 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 19 94	< 0.005			< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	05 31 94	< 0.005	< 0.005	(10 9 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 22 94	< 0.005	< 0.005	(11 8 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	07 27 94	< 0.005	< 0.005	(12 11 95)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 10 94	< 0.005	< 0.005	(1 2 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 13 95	< 0.005	< 0.005	(4 29 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 04 95	< 0.005	< 5	(6 10 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 29 96	< 0.002	< 0.002	(7 2 96)	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
	11 08 96	< 0.001	< 0.001	(11 8 96)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	05 09 97	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 21 97	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	05 04 98	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 07 98	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	05 27 99	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 13 99	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	04 17 00	< 0.001	< 0.001		< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 19 00	< 0.0012	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	04 27 01	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 11 01	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	06 06 02	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	10 18 02	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
	04 24 03	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
	10 14 03	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
	04 20 04	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
	11 18 04	< 0.003	< 0.003		< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
	% detects	3	4		3	0	3	3	3	3	0
	Coeff. of Var(s.d./mean)	ND	ND		ND	ND	ND	ND	ND	ND	ND

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(I))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (Z)	F
Vanadium	05 25 90										
	06 04 92										
	09 30 92										
	04 28 93										
	12 03 93	0.024			0.005	0.036	0.031	0.009	0.038	0.013	
	01 07 94	0.019			0.027	0.026	0.018	0.009	0.027	<0.005	
	02 04 94	0.013			0.020	0.019	0.018	0.006	0.007	0.026	
	03 10 94	0.008			0.012	0.015	0.010	< 0.005	0.024	0.017	
	04 19 94	0.011			0.014	0.015	0.012	< 0.005	0.026	0.027	
	05 31 94	0.012	0.010	(10 9 95)	0.020	0.039	0.018	0.008	0.027	0.013	
	06 22 94	0.012	0.017	(11 8 95)	0.016	0.018	0.014	< 0.005	0.026	0.007	
	07 27 94	< 0.005	0.012	(12 11 95)	0.007	0.008	0.005	< 0.005	0.015	< 0.005	
	10 10 94	< 0.005	< 0.005	(1 2 96)	0.009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	06 13 95	< 0.005	0.019	(4 29 96)	0.007	0.005	0.007	< 0.005	0.011	0.010	
	10 04 95	0.008	0.014	(6 10 96)	0.019	0.016	0.010	< 0.005	0.016	0.009	
	04 29 96	0.01	0.016	(7 2 96)	0.018	0.018	0.012	< 0.005	0.023	0.011	0.012
	11 08 96	0.016	0.016	(11 8 96)	0.013	0.016	0.014	< 0.005	0.022	< 0.005	0.014
	05 09 97	0.021	0.024		0.020	0.024	0.019	< 0.005	0.029	0.012	0.01
	10 21 97	0.006	< 0.005		< 0.005	< 0.005	0.006	< 0.005	0.010	< 0.005	< 0.005
	05 04 98	0.012	< 0.005		< 0.005	< 0.005	0.005	< 0.005	0.005	0.013	< 0.005
	10 07 98	0.016	0.017		0.015	0.025	0.026	0.011	0.017	0.016	0.026
	05 27 99	0.012	0.024		0.020	0.022	0.017	0.005	0.017	0.016	0.011
	10 13 99	0.011	0.016		0.013	0.014	0.012	< 0.005	0.016	0.008	0.011
	04 17 00	< 0.005	< 0.005		< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 19 00	0.012	0.025		0.025	0.025	0.020	0.010	0.014	0.011	0.020
	04 27 01	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 11 01	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	06 06 02	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 18 02	0.0067	< 0.005		< 0.005	< 0.005	< 0.005	0.0072	< 0.005	< 0.005	
	04 24 03	0.0066	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 14 03	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	04 20 04	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	11 18 04	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	% detects	62	46		59	59	59	28	62	52	39
	Coeff. of Var(s.d./mean)	0.540	0.638		0.614	0.661	0.644	0.306	0.659	0.672	0.683
Zinc	05 25 90				0.030	0.010	0.040				
	05 28 92							< 0.005			
	06 04 92								< 0.001		< 0.001
	09 30 92								0.007		< 0.005
	11 19 92							0.031			
	04 28 93	0.029							0.040	0.031	0.027
	12 03 93	0.011			0.064	0.022	0.016	< 0.005	0.011	0.010	
	01 07 94	< 0.005			< 0.005	< 0.005	< 0.005	0.007	< 0.005	0.005	
	02 04 94	0.007			0.009	0.007	0.008	0.008	0.009	0.015	
	03 10 94	0.008			0.010	0.009	0.007	0.010	0.015	0.017	
	04 19 94	0.012			0.009	0.010	0.022	0.008	0.024	0.032	
	05 31 94	0.010	< 0.005	(10 9 95)	0.009	0.016	0.019	0.019	0.024	0.008	
	06 22 94	< 0.005	< 0.005	(11 8 95)	< 0.005	0.008	< 0.005	< 0.005	< 0.005	< 0.005	
	07 27 94	0.034	< 0.005	(12 11 95)	< 0.005	0.031	0.007	0.060	0.020	0.007	
	10 10 94	0.017	< 0.005	(1 2 96)	0.081	0.006	< 0.005	< 0.005	< 0.005	< 0.005	
	06 13 95	< 0.005	0.006	(4 29 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	10 04 95	< 0.005	0.022	(6 10 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
	04 29 96	< 0.005	< 0.005	(7 2 96)	< 0.005	< 0.005	< 0.005	< 0.005	0.006	0.009	0.005
	11 08 96	< 0.005	< 0.005	(11 8 96)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	05 09 97	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 21 97	0.008	0.026		0.016	0.038	0.013	0.013	0.020	0.007	0.012
	05 04 98	< 0.005	0.008		< 0.005	0.006	0.008	0.006	< 0.005	< 0.005	0.009
	10 07 98	0.008	< 0.005		< 0.005	< 0.005	< 0.005	0.009	< 0.005	0.013	0.008
	05 27 99	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 13 99	< 0.005	< 0.005		0.011	0.014	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	04 17 00	0.028	0.033		0.032		0.027	0.022	0.050	0.025	0.029
	10 19 00	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	04 27 01	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	10 11 01	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	06 06 02	0.032	0.040		0.035	0.040	0.031	0.030	0.048	0.031	0.034
	10 18 02	0.025	0.029		0.031	0.045	0.031	0.020	0.050	0.023	
	04 24 03	0.035	0.041		0.041	0.044	0.037	0.036	0.053	0.031	0.033
	10 14 03	0.046	0.050		0.055	0.055	0.050	0.042	0.065	0.035	0.053
	04 20 04	0.06	0.08		0.075	0.099	0.077	0.056	0.084	0.091	0.072
	11 18 04	0.017	0.017		0.01	0.022	0.033	0.11	0.037	0.016	0.043
	% detects	55	46		55	62	52	55	52	55	56
	Coeff. of Var(s.d./mean)	0.993	1.122		1.188	1.185	1.089	1.313	1.094	1.174	1.060

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]					UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
MINERALS											
Alkalinity	05 25 90				95	60	66				
	05 28 92							160			
	06 04 92								126		173
	09 30 92								134		154
	11 19 92							180			
	04 28 93	170							140	200	140
	12 03 93	190			120	110	130	180	220	240	
	01 07 94	140			120	120	120	150	170	200	
	02 04 94	150			120	130	120	140	190	170	
	03 10 94	150			110	110	100	150	190	190	
	04 19 94	140			140	130	140	220	210	200	
	05 31 94	120	120	(10 9 95)	110	100	110	150	230	180	
	06 22 94	160	130	(11 8 95)	120	120	120	160	220	210	
	07 27 94	160	120	(12 11 95)	120	120	120	160	200	200	
	10 10 94	160	130	(1 2 96)	120	120	120	240	170	200	
	06 13 95	150	120	(4 29 96)	130	130	95	290	330	200	
	10 04 95	150	120	(6 10 96)	120	120	120	160	210	200	
	04 29 96	150	110	(7 2 96)	120	120	130	290	310	200	240
	11 08 96	140	130	(11 8 96)	120	120	120	200	200	200	200
	05 09 97	140	130		120	120	120	290	320	210	190
	10 21 97	150	120		120	120	120	190	210	200	160
	05 04 98	150	120		120	120	120	360	290	200	260
	10 07 98	150	130		120	130	120	250	260	190	390
	05 27 99	140	98		110	120	120	430	330	170	230
	10 13 99	140	120		120	120	110	320	290	190	170
	04 17 00	140	120		120		120	460	260	200	190
	10 19 00	160	130		120	160	120	480	310	210	190
	04 27 01	150	130		130	140	140	600	320	210	180
	10 11 01	160	140		130	140	130	480	280	210	160
	06 06 02	160	120		130	120	120	500	300	220	140
	10 18 02	140	130		130	120	120	540	270	200	
	04 24 03	160	140		140	140	130	480	220	220	120
	10 14 03	160	130		120	120	120	420	220	200	120
	04 20 04	160	130		130	130	130.0	530	400	220	130
	11 18 04	150	120		130	120	140	470	310	200	120
	% detects	100	100		100	100	100	100	100	100	100
	Coeff. of Var(s.d./mean)	0.081	0.073		0.063	0.091	0.083	0.463	0.228	0.071	0.358
Ammonia	05 25 90				0 73	2 17	1.92				
	05 28 92							2 1			
	06 04 92								0 840		0.060
	09 30 92								2 000		0.320
	11 19 92							1.1			
	04 28 93	1.40							1.40	1.200	0.130
	12 03 93	1.4			1 8	1.8	1.2	1 0	1.5	1.2	
	01 07 94	1.5			1.8	1.8	1.2	0.97	1.2	1.2	
	02 04 94	1.6			2.0	1.8	1.4	0.97	0.66	1.2	
	03 10 94	1.5			2 0	1.9	1 3	1 1	1 2	1.3	
	04 19 94	1 4			1.9	1.8	1.3	1 0	1 2	0 84	
	05 31 94	1.4	2 0	(10 9 95)	1.9	1.8	1.3	1.0	1 1	0.98	
	06 22 94	1.6	1 9	(11 8 95)	2 0	1 8	1 3	1 0	1 2	1 2	
	07 27 94	1 5	0 84	(12 11 95)	1 9	1 8	1 4	1 1	1 4	1 2	
	06 13 95	1.6	1 9	(4 29 96)	1.9	1.8	1 4	0.86	1 2	0 98	
	10 04 95	1 6	1 9	(6 10 96)	2 0	1 9	1.6	1 2	1 6	1 3	
	04 29 96	1 5	1 8	(7 2 96)	1 8	1 7	1 5	0 88	0 5	1 1	< 0 05
	11 08 96	1 5	1 8	(11 8 96)	1 7	1 7	1 4	1 1	1 4	1 2	0 05
	05 09 97	1 5	1 7		1 8	1 6	1 5	0 98	0 87	1 3	0 07
	10 21 97	1.6	1 9		1 8	1.7	1 5	0.95	1.40	1.3	0.46
	05 04 98	1 5	1 8		1 8	1 7	1 5	0 92	0 88	1 3	< 0 05
	10 07 98	1 6	1 8		1 6	1.8	1 8	1.30	1 60	1 7	< 0.05
	05 27 99	1.3	1.5		1.8	1.6	1.5	0.85	1	1.5	0.26
	10 13 99	1.7	2.0		1.9	1 8	1.6	1 2	1 5	1.6	0 62
	04 17 00	1.5	1.6		1 7		1.4	0 45	0.93	1.4	0.3
	10 19 00	2.9	1.7		1 7	0.86	1.4	1.4	0 78	1.3	0.39
	04 27 01	1.1	1 3		1 3	1.3	1.2	0.62	0.83	1 0	0 098
	10 11 01	1 5	1 9		1.8	1 7	1.5	1 1	1.5	1 4	0.6
	06 06 02	1.3	1 9		1 7	1.2	1.6	0 96	1	1.2	0.2
	10 18 02	1 4	1 9		1 7	1 6	1 5	1 2	1 5	1 5	
	04 24 03	1.4	1 9		1.9	1.8	1 2	1.3	0 86	1.4	0 80
	10 14 03	1.3	1.7		1 7	1.6	1 2	1 1	1.1	1.5	0.75
	04 20 04	1 10	1 50		1 40	1 30	1 4	0 78	0 74	0 94	0.39
	11 18 04	1 10	1.30		1 60	1 50	1 10	0 75	0 88	1.40	0 68
	% detects	97	96		97	97	97	97	97	97	83
	Coeff. of Var(s.d./mean)	0 209	0.157		0.093	0 142	0.112	0.201	0.275	0.159	0.821

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Bicarbonate	05 25 90				95	60	66				
(as CaCO3)	05 28 92							160			
(as CaCO3)	06 04 92								126		172.5
	09 30 92								134		153.6
	11 19 92							180			
	04 28 93	170							140	200	140
	12 03 93	190			120	110	130	180	220	240	
	01 07 94	140			120	120	120	150	170	200	
	02 04 94	150			120	130	120	140	190	170	
	03 10 94	150			110	110	100	150	190	190	
	04 19 94	140			140	130	140	220	210	200	
	05 31 94	120	120	(10 9 95)	110	100	110	150	230	180	
	06 22 94	160	130	(11 8 95)	120	120	120	160	220	210	
	07 27 94	160	120	(12 11 95)	120	120	120	160	200	200	
	10 10 94	160	130	(1 2 96)	120	120	120	240	170	200	
	06 13 95	150	120	(4 29 96)	130	130	95	290	330	200	
	10 04 95	150	120	(6 10 96)	120	120	120	160	210	200	
	04 29 96	150	110	(7 2 96)	120	120	130	290	310	200	240
	11 08 96	140	130	(11 8 96)	120	120	120	200	200	200	200
	05 09 97	140	130		120	120	120	290	320	210	190
	10 21 97	150	120		120	120	120	190	210	200	160
	05 04 98	150	120		120	120	120	360	290	200	260
	10 07 98	150	130		120	130	120	250	260	190	390
	05 27 99	140	98		110	120	120	430	330	170	230
	10 13 99	140	120		120	120	110	320	290	190	170
	04 17 00	140	120		120		120	460	260	200	190
	10 19 00	160	130		120	160	120	480	310	210	190
	04 27 01	150	130		130	140	140	600	320	210	180
	10 11 01	160	140		130	140	130	480	280	210	160
	06 06 02	160	120		130	120	120	500	300	220	140
	10 18 02	140	130		130	120	120	540	270	200	
	04 24 03	160	140		140	140	130	480	220	220	120
	10 14 03	160	130		120	120	120	420	220	200	120
	04 20 04	160	130		130	130	130	530	400	220	130
	11 18 04	180	140		140	140	170	580	380	240	150
	% detects	100	100		100	100	100	100	100	100	100
	Coeff. of Var(s.d./mean)	0.088	0.076		0.066	0.094	0.107	0.474	0.240	0.079	0.346
Carbonate	05 25 90										
(as CaCO3)	05 28 92							< 10			
	06 04 92								< 0.01		0.5
	09 30 92								0.3		0.5
	11 19 92							< 10			
	04 28 93	< 10	0						< 10		< 10
	12 03 93	< 10	0		10	< 10	< 10	< 10	10	< 10	0
	01 07 94	< 10	0		< 10	< 10	< 10	< 10	< 10	< 10	0
	02 04 94	< 10	0		< 10	< 10	< 10	< 10	< 10	< 10	0
	03 10 94	< 10	0		< 10	< 10	< 10	< 10	< 10	< 10	0
	04 19 94	< 10	0		< 10	< 10	< 10	< 10	< 10	< 10	0
	05 31 94	< 10	< 10	(10 9 95)	< 10	< 10	< 10	< 10	< 10	< 10	0
	06 22 94	< 10	< 10	(11 8 95)	< 10	< 10	< 10	< 10	< 10	< 10	0
	07 27 94	< 10	< 10	(12 11 95)	< 10	< 10	< 10	< 10	< 10	< 10	0
	10 10 94	< 10	< 10	(1 2 96)	< 10	< 10	< 10	< 10	< 10	< 10	0
	06 13 95	< 10	< 10	(4 29 96)	< 10	< 10	< 10	< 10	< 10	< 10	0
	10 04 95	< 10	< 10	(6 10 96)	< 10	< 10	< 10	< 10	< 10	< 10	0
	04 29 96	< 10	< 10	(7 2 96)	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	11 08 96	< 10	< 10	(11 8 96)	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	05 09 97	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	10 21 97	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	05 04 98	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	10 07 98	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	05 27 99	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	10 13 99	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	04 17 00	< 10	< 10		< 10	0	< 10	< 10	< 10	< 10	< 10
	10 19 00	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	04 27 01	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	10 11 01	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	06 06 02	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	10 18 02	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	0
	04 24 03	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	10 14 03	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	04 20 04	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10
	11 18 04	< 1	< 1		< 1	< 1	< 1	< 1	< 1	< 1	< 1
	% detects	0	0		0	3	0	0	0	0	6
	Coeff. of Var(s.d./mean)	ND	ND		ND	ND	ND	ND	ND	ND	ND

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]					UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A	MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (Z)	F
Chloride	05 25 90			2670	6580	5280				
	05 28 92						1900			
	06 04 92							6875		5340
	09 30 92							7080		5180
	11 19 92						1700			
	04 28 93	4600						8600	2800	5100
	12 03 93	4100		6700	6400	4800	1500	6400	2700	
	01 07 94	4100		6100	6600	4500	1600	7300	2300	
	02 04 94	3400		5400	6100	4300	1500	2300	7900	
	03 10 94	4800		7300	7300	4700	1400	13000	4100	
	04 19 94	4000		6600	6400	4500	1800	15000	7900	
	05 31 94	3900	6300 (10 9 95)	6400	6400	4500	1500	10000	3600	
	06 22 94	3800	6600 (11 8 95)	6600	6700	4900	1500	11000	2900	
	07 27 94	4300	6400 (12 11 95)	6400	6600	4800	1500	10000	3900	
	10 10 94	3800	6500 (1 2 96)	6600	6600	4600	1400	8200	2200	
	06 13 95	4000	7400 (4 29 96)	6200	6300	5100	2100	9400	5700	
	10 04 95	3900	7000 (6 10 96)	6200	6200	5000	1500	8300	3800	
	04 29 96	5000	7700 (7 2 96)	7400	7300	6100	3100	9400	5200	6300
	11 08 96	4600	6800 (11 8 96)	7000	6800	5800	2700	14000	2600	5600
	05 09 97	4900	7200	7000	7100	5900	3200	11000	3800	5300
	10 21 97	4500	7000	7000	7000	5700	2100	13000	2600	5100
	05 04 98	4600	7600	7500	6700	5500	3100	7200	3600	6000
	10 07 98	4700	7500	6900	6900	6000	3900	12000	3900	2800
	05 27 99	3700	7500	6400	6500	5500	3400	9900	4600	4100
	10 13 99	3500	5800	6000	6000	5000	2600	14000	2300	4900
	04 17 00	5000	7300	6100		6700	3600	12000	3500	6000
	10 19 00	4200	7000	6500	1900	5600	2700	15000	2400	4700
	04 27 01	5600	8900	8200	7400	7000	2900	18000	4000	5900
	10 11 01	5700	9200	8600	7400	8500	4400	17000	3800	6500
	06 06 02	4100	6400	6600	7000	5200	2800	9400	4700	4300
	10 18 02	3700	5700	5500	5500	5700	2000	9500	2600	
	04 24 03	4200	7000	7100	6400	5200	2800	6900	2600	5900
	10 14 03	3600	6400	6100	6300	5100	3300	6500	2500	5100
	04 20 04	4000	7000	6800	6500	5800	3400	6700	8300	5200
	11 18 04	4900	7800	6400	7400	4400	2600	9500	3900	4600
	% detects	97	96	97	97	97	97	97	97	94
	Coeff. of Var(s.d./mean)	0.138	0.117	0.104	0.156	0.167	0.349	0.338	0.428	0.177
COD	06 04 92									225
	09 30 92									35
	04 28 93									< 5.0
	05 09 97	< 5.0	100	120	99	45	< 5.0	250	31	< 5.0
	10 21 97	100.0	260	240	230	150	88.0	520	70	120
	05 05 98	160	360	290	390	230	140	330	140	260
	10 07 98	38	120	110	110	89	40	88	34	62
	05 28 99	130	99	150	100	740	120	< 5	54	790
	10 13 99	52	400	97	93	100	34	1500	29	110
	04 17 00	680	960	2600		1500	630	2800	300	1400
	10 19 00	1000	1100	1400	250	1400	150	3000	110	540
	04 27 01	130	360	300	440	390	95	1600	96	130
	10 11 01	170	440	390	310	76	43	1000	100	45
	06 06 02	89	310	300	280	280	67	770	110	< 10
	10 18 02	40	560	300	280	71	35	940	19	
	04 24 03	150	360	310	330	60	110	330	110	35
	10 14 03	36	120	120	110	70	33	360	28	78
	04 20 04	38	97	120	120	83	38	330	520	70
	11 18 04	15	130	120	140	69	24	130	20	54
	% detects	100	100	100	100	100	100	93	100	93

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS[1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Nitrate	05 25 90				3	1.0					
	05 28 92							0.01			
	06 04 92								< 0.1		0.100
	09 30 92								0.1		0.100
	11 19 92							0.01			
	04 28 93	0.24							0.24	0.11	0.18
	12 03 93	0.01			0.01	0.01	0.01	0.01	0.09	0.01	
	01 07 94	0.04			0.02	0.01	0.03	0.02	0.01	0.02	
	02 04 94	0.04			0.01	0.01	0.01	0.01	0.01	0.01	
	03 10 94	0.02			0.01	0.01	0.01	0.01	0.01	0.01	
	04 19 94	0.02			0.01	0.01	0.01	0.01	0.01	0.01	
	05 31 94	0.01	0.02	(10 9 95)	0.01	0.01	0.01	0.01	0.01	0.01	
	06 22 94	0.01	0.01	(11 8 95)	0.01	0.01	0.01	0.01	0.01	0.01	
	07 27 94	0.03	0.76	(12 11 95)	0.01	0.01	0.03	0.01	0.03	0.01	
	10 10 94	0.02	0.01	(1 2 96)	0.01	0.01	0.01	0.01	0.01	0.01	
	06 13 95	0.01	0.02	(4 29 96)	0.01	0.01	0.01	0.01	0.18	0.01	
	10 04 95	0.02	0.02	(6 10 96)	0.03	0.03	0.03	0.02	0.02	0.03	
	04 29 96	0.03	0.02	(7 2 96)	0.01	0.01	0.02	0.01	0.22	0.02	0.25
	11 08 96	0.02	0.01	(11 8 96)	0.03	0.02	0.01	0.02	0.06	0.02	0.03
	05 09 97	0.02	0.02		0.01	0.01	0.01	0.02	0.80	0.01	0.05
	10 21 97	0.03	0.01		0.02	0.02	0.03	0.02	0.15	0.03	0.02
	05 04 98	0.03	0.04		0.34	0.02	0.01	0.03	0.06	0.04	3.20
	10 07 98	0.01	0.01		0.01	0.01	0.01	0.01	0.02	0.01	0.52
	05 27 99	0.02	0.06		0.02	0.01	0.01	0.01	0.01	0.12	0.17
	10 13 99	0.01	0.02		0.05	0.02	0.03	0.01	0.05	0.01	0.07
	04 17 00	0.093	0.056		0.11		0.018	0.49	0.068	0.05	0.13
	10 19 00	0.10	0.099		0.19	0.08	0.14	0.092	0.010	0.072	0.26
	04 27 01	0.034	0.017		0.07	0.14	0.03	0.01	0.071	0.027	0.34
	10 11 01	0.020	0.022		0.013	0.014	0.01	0.01	0.029	0.022	0.016
	06 06 02	0.050	0.01		0.01	0.16	0.02	0.06	0.100	0.030	0.300
	10 18 02	0.01	0.01		0.01	0.01	0.01	0.01	0.01	0.01	
	04 24 03	0.01	0.01		0.010	0.020	0.030	0.01	0.010	0.01	0.090
	10 14 03	0.01	0.04		0.01	0.01	0.013	0.01	0.020	0.01	0.060
	04 20 04	0.17	0.10		0.23	0.02	0.01	0.02	0.27	0.08	0.24
	11 18 04	0.093	0.14		0.063	0.053	0.01	0.01	0.1	0.082	0.12
	% detects	69	71		45	41	41	34	62	45	94
	Coeff. of Var(s.d./mean)	1.064	2.381		1.681	1.406	1.204	2.642	1.820	1.019	2.169
Nitrite	05 25 90										
	05 28 92							0.01			
	06 04 92								0.05		0.05
	09 30 92								0.020		0.01
	11 19 92							0.01			
	04 28 93	0.01			0.01	0.01	0.01	0.01	0.01	0.01	0.01
	12 03 93	0.01			0.01	0.01	0.01	0.01	0.01	0.01	
	01 07 94	0.01			0.01	0.01	0.01	0.01	0.01	0.01	
	02 04 94	0.01			0.01	0.01	0.01	0.01	0.01	0.01	
	03 10 94	0.01			0.01	0.01	0.01	0.01	0.01	0.01	
	04 19 94	0.01			0.01	0.01	0.01	0.01	0.01	0.01	
	05 31 94	0.01	0.01	(10 9 95)	0.01	0.01	0.01	0.01	0.01	0.01	
	06 22 94	0.01	0.01	(11 8 95)	0.01	0.01	0.01	0.01	0.01	0.01	
	07 27 94	0.01	0.01	(12 11 95)	0.01	0.01	0.01	0.01	0.01	0.01	
	10 10 94	0.01	0.01	(1 2 96)	0.01	0.01	0.01	0.01	0.01	0.01	
	06 13 95	0.01	0.01	(4 29 96)	0.01	0.01	0.01	0.01	0.01	0.01	
	10 04 95	0.02	0.01	(6 10 96)	0.01	0.01	0.01	0.01	0.01	0.01	
	04 29 96	0.01	0.01	(7 2 96)	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	11 08 96	0.02	0.02	(11 8 96)	0.01	0.01	0.01	0.01	0.01	0.02	0.01
	05 09 97	0.01	0.01		0.01	0.01	0.01	0.01	0.01	0.01	0.01
	10 21 97	0.02	0.01		0.01	0.01	0.01	0.01	0.04	0.01	0.01
	05 04 98	0.03	0.01		0.02	0.01	0.02	0.01	0.01	0.01	0.01
	10 07 98	0.04	0.03		0.02	0.01	0.04	0.02	0.04	0.07	0.09
	05 27 99	0.02	0.01		0.01	0.02	0.04	0.01	0.09	0.01	0.01
	10 13 99	0.02	0.01		0.03	0.01	0.01	0.01	0.01	0.03	0.02
	04 17 00	0.03	0.08		0.01		0.01	0.01	0.02	0.09	0.01
	10 19 00	0.01	0.01		0.01	0.01	0.01	0.01	0.01	0.01	0.01
	04 27 01	0.01	0.01		0.01	0.01	0.01	0.01	0.01	0.01	0.01
	10 11 01	0.015	0.012		0.01	0.01	0.015	0.01	0.01	0.01	0.022
	06 06 02	0.01	0.01		0.01	0.01	0.01	0.01	0.01	0.01	0.012
	10 18 02	0.01	0.01		0.01	0.01	0.01	0.01	0.01	0.01	
	04 24 03	0.01	0.01		0.010	0.01	0.01	0.01	0.010	0.01	0.010
	10 14 03	0.01	0.01		0.01	0.01	0.01	0.01	0.01	0.60	0.060
	04 20 04	0.01	0.01		0.01	0.01	0.023	0.01	0.01	0.01	0.052
	11 18 04	0.01	0.01		0.01	0.01	0.065	0.034	0.01	0.01	0.083
	% detects	38	29		7	21	21	14	10	17	44
	Coeff. of Var(s.d./mean)	0.535	0.978		ND	ND	ND	ND	ND	ND	1.060

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(I))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Phenolics	05 25 90				< 0.01	< 0.01	< 0.01				
	05 28 92							< 0.05			
	06 04 92								< 0.02		< 0.020
	09 30 92								0.180		0.610
	11 19 92							< 0.05			
	04 28 93	< 0.05							< 0.05	< 0.05	< 0.05
	12 03 93	< 0.05				< 0.05	< 0.05	< 0.05	0.05	< 0.05	
	01 07 94										
	02 04 94										
	03 10 94										
	04 19 94	< 0.05			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
	05 31 94		< 0.05	(10 9 95)							
	06 22 94		< 0.05	(11 8 95)							
	07 27 94			(12 11 95)							
	10 10 94	< 0.05		(1 2 96)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
	06 13 95	< 0.05		(4 29 96)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
	10 04 95	< 0.05		(6 10 96)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
	04 29 96	< 0.05		(7 2 96)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	11 08 96	< 0.05	< 0.05	(11 8 96)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	05 09 97	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	10 21 97	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	05 04 98	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	10 07 98	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05
	05 27 99	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	10 13 99	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	04 17 00	< 0.05	< 0.05		< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	10 19 00	0.33	0.26		< 0.05	< 0.05	0.25	0.052	0.05	< 0.05	0.22
	04 27 01	< 0.05	< 0.05		0.41	0.07	< 0.05	< 0.047	0.06	< 0.05	< 0.052
	10 11 01	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	06 06 02	< 0.05	< 0.05		< 0.05	0.078	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	10 18 02	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
	04 24 03	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	10 14 03	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	04 20 04	< 0.05	< 0.05		0.095	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	11 18 04	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	% detects	4	5		5	9	4	4	4	0	6
	Coeff. of Var(s.d./mean)	ND	ND		ND	ND	ND	ND	ND	ND	ND
Sulfate	05 25 90				198	346	248				
	05 28 92							66			
	06 04 92								360		475
	09 30 92								358		533
	11 19 92							180			
	04 28 93	300							680	290	510
	12 03 93	230			480	430	350	160	700	200	
	01 07 94	330			400	450	360	150	680	170	
	02 04 94	340			400	390	330	130	360	900	
	03 10 94	230			360	340	290	130	1200	830	
	04 19 94	290			430	390	340	330	3400	2600	
	05 31 94	300	350	(10 9 95)	450	450	350	190	1800	880	
	06 22 94	300	430	(11 8 95)	400	450	310	150	1600	550	
	07 27 94	260	450	(12 11 95)	350	400	350	150	1200	900	
	10 10 94	350	430	(1 2 96)	450	450	450	160	880	200	
	06 13 95	350	480	(4 29 96)	430	400	400	480	1600	1800	
	10 04 95	330	210	(6 10 96)	350	330	390	140	1100	730	
	04 29 96	350	380	(7 2 96)	430	430	380	550	2600	890	1300
	11 08 96	160	210	(11 8 96)	230	260	180	220	1100	95	460
	05 09 97	230	290		310	310	290	350	1600	430	600
	10 21 97	240	330		300	300	290	150	1600	200	550
	05 04 98	300	430		450	430	380	700	1500	630	1500
	10 07 98	300	350		330	330	330	380	1700	350	750
	05 27 99	300	350		350	380	330	750	2000	700	630
	10 13 99	300	380		350	350	330	590	2300	280	600
	04 17 00	280	380		350		320	620	2200	250	720
	10 19 00	240	320		320	150	600	580	2200	220	560
	04 27 01	240	300		300	300	340	520	2500	420	520
	10 11 01	260	410		400	320	380	500	2200	250	550
	06 06 02	270	350		390	340	250	420	1800	750	380
	10 18 02	250	420		340	340	300	600	1,600	300	
	04 24 03	260	380		380	380	320	680	1,000	390	350
	10 14 03	250	380		360	310	310	700	1,100	370	370
	04 20 04	180	300		240	240	220	550	1600	2000	270
	11 18 04	260	360		360	320	360	570	1400	480	290
	% detects	97	96		97	97	97	97	97	97	94
	Coeff. of Var(s.d./mean)	0.176	0.189		0.165	0.201	0.219	0.535	0.409	0.900	0.539

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
TDS	05 28 92				5910	12900	9300				
	06 04 92							3600			9440
	09 30 92								12478		9320
	11 19 92								12500		
	04 28 93	8500							16000	5500	8900
	12 03 93	8100			13000	13000	9500	3300	15000	5100	
	01 07 94	8600			13000	13000	9500	3400	16000	5000	
	02 04 94	8300			13000	12000	9500	3100	5100	18000	
	03 10 94	7500			12000	12000	9100	3200	18000	8600	
	04 19 94	7800			13000	12000	9300	3700	20000	18000	
	05 31 94	7600	12000	(10 9 95)	12000	12000	9100	3100	21000	7600	
	06 22 94	7400	12000	(11 8 95)	12000	12000	9000	3300	20000	5800	
	07 27 94	8600	11000	(12 11 95)	13000	13000	9800	3400	21000	8500	
	10 10 94	7400	12000	(1 2 96)	13000	12000	9200	3100	16000	4500	
	06 13 95	8200	13000	(4 29 96)	12000	13000	10000	4600	20000	12000	
	10 04 95	7700	14000	(6 10 96)	12000	12000	9900	3100	17000	8300	
	04 29 96	8300	13000	(7 2 96)	13000	12000	11000	5200	21000	8500	12000
	11 08 96	8400	13000	(11 8 96)	12000	12000	10000	5300	25000	4500	10000
	05 09 97	8100	13000		12000	12000	10000	6000	21000	6900	10000
	10 21 97	8000	13000		12000	12000	10000	4300	25000	4600	9400
	05 04 98	7900	13000		12000	12000	9600	6500	13000	7100	11000
	10 07 98	7700	12000		11000	12000	10000	7100	20000	6600	5700
	05 27 99	8300	12000		12000	12000	11000	6700	19000	9300	8900
	10 13 99	8500	13000		11000	12000	10000	6200	29000	5000	10000
	04 17 00	8500	11000		10000		9600	5800	20000	4500	9300
	10 19 00	8200	11000		11000	4400	11000	5800	29000	4400	8000
	04 27 01	8900	13000		13000	13000	12000	5600	31000	7000	9200
	10 11 01	7900	15000		13000	12000	11000	5900	32000	5000	9400
	06 06 02	8800	11000		11000	10000	9200	5900	18000	9600	1100
	10 18 02	7800	13000		13000	12000	10000	6600	20000	5400	
	04 24 03	8300	13000		13000	13000	13000	6600	14000	5300	13000
	10 14 03	7600	16000		16000	14000	13000	7400	16000	5600	12000
	04 20 04	7900	15000		15000	13000	12000	7700	13000	19000	10000
	11 18 04	7000	13000		13000	12000	9900	5400	13000	5700	8800
	% detects	97	96		97	97	97	97	97	97	94
	Coeff. of Var(s.d./mean)	0.056	0.100		0.095	0.137	0.097	0.299	0.301	0.529	0.279
TOC	05 25 90				2 4	1.2	0 6				
	05 28 92							30			
	06 04 92								0 53		1.270
	09 30 92								0.390		1.210
	11 19 92							1.0			
	04 28 93	5 1							10.0	8.0	1.0
	12 03 93	1.0			1.0	1.0	1.0	1.0	1.0	1.0	
	01 07 94	1.0			1.0	1.0	1.0	1.0	1.0	1.0	
	02 04 94	1.0			1.0	1.0	1.0	1.0	1.0	1.0	
	03 10 94	1.0			1.0	1.0	1.0	1.0	1.0	1.3	
	04 19 94	1.0			1.0	1.0	1.0	1.7	1.0	1.5	
	05 31 94	1.0	1.0	(10 9 95)	1.0	1.0	1.0	1.0	1.0	1.0	
	06 22 94	1.0	1.0	(11 8 95)	1.0	1.0	1.0	1.0	1.0	1.0	
	07 27 94	1.0	1.0	(12 11 95)	1.0	1.0	1.0	1.0	1.0	1.0	
	10 10 94	1.0	1.0	(1 2 96)	1.0	1.0	1.0	1.0	1.0	1.0	
	06 13 95	1.0	1.0	(4 29 96)	1.0	1.0	1.0	2.8	2.7	1.8	
	10 04 95	1.0	1.0	(6 10 96)	1.0	1.0	1.0	1.0	1.0	1.0	
	04 29 96	1.0	1.0	(7 2 96)	1.0	1.0	1.0	1.0	8.0	1.0	4.1
	11 08 96	1.0	1.0	(11 8 96)	50	2.0	1.0	2.3	1.0	1.0	3.2
	05 09 97	1.0	1.0		1.2	1.4	1.0	2.6	3.8	1.0	3.9
	10 21 97	1.0	1.0		1.0	1.0	1.0	1.0	2.4	1.0	1.9
	05 04 98	1.0	1.0		1.0	1.0	1.0	6.0	40.7	1.0	2.1
	10 07 98	1.0	1.0		1.0	1.0	1.0	1.4	3.5	1.0	18.0
	05 27 99	1	2***		1***	1***	4***	13***	6***	2***	5.0
	10 13 99	10.0	2.0		15.0	2.0	1.0	6.0	5.0	1.0	4.0
	04 17 00	1.0	1.8		2.5	1.4	1.0	5.4	3.6	1.0	3.1
	10 19 00	1.0	1.0		1.0	1.0	1.0	1.1	1.0	1.0	2.0
	04 27 01	1.2	1.0		1.0	1.7	1.4	9.3	9.3	1.2	3.1
	10 11 01	5.8	1.0		1.0	1.5	1.0	2.9	2.2	6.4	5.9
	06 06 02	7.5	1.0		1.0	1.0	1.0	1.2	5.7	7.0	1.3
	10 18 02	4.1	1.1		1.0	1.1	1.0	4.6	2.6	1.0	
	04 24 03	7.6	1.9		1.9	1.9	1.2	9.1	7.3	9.0	1.2
	10 14 03	2.8	1.0		1.0	1.0	1.9	14.0	13.0	10.0	1.8
	04 20 04	4.2	1.5		1.0	2.8	1.0	12	6.5	8.9	3.9
	11 18 04	1.1	1		1	1	1	2.9	3.3	1	1
	% detects	31	21		14	31	10	66	55	34	89
	Coeff. of Var(s.d./mean)	1.111	ND		ND	0.415	ND	1.090	1.676	1.250	1.013

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]					UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A	MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
VOC's	05 25 90	all ND		all ND	all ND	all ND				
	05 28 92						all ND			
	06 04 92							all ND		all ND
	09 30 92							all ND		all ND
	11 19 92						all ND			
	04 28 93							all ND	all ND	all ND
	12 03 93	all ND			all ND	all ND	all ND	all ND	all ND	
	01 07 94									
	02 04 94									
	03 10 94									
	04 19 94	all ND		all ND	all ND	all ND	all ND	all ND	all ND	
	05 31 94		all ND (10 9 95)							
	06 22 94		(11 8 95)							
	07 27 94		(12 11 95)							
	10 10 94	all ND	(1 2 96)	all ND	all ND	all ND	all ND	all ND	all ND	
	06 13 95	all ND	(4 29 96)	all ND	all ND	all ND	all ND	all ND	all ND	
	10 04 95	all ND	(6 10 96)	all ND	all ND	all ND	all ND	all ND	all ND	
	04 29 96	all ND	(7 2 96)	all ND	all ND	all ND	all ND	all ND	all ND	all ND
	11 08 96	all ND	all ND (11 8 96)	all ND	all ND	all ND	all ND	all ND	all ND	all ND
	05 09 97	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND
	10 21 97	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND
	05 04 98	all ND	all ND	all ND	all ND	all ND	all ND	all ND	**	all ND
	10 07 98	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND
	05 27 99	all ND	all ND	all ND	all ND	all ND	all ND	all ND****	all ND	all ND
	10 13 99	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND
	04 17 00	all ND	all ND	all ND		all ND	all ND	all ND	all ND	all ND
	10 19 00	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND
	04 27 01	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND
	10 11 01	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND
	06 06 02	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND
	10 18 02	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	NA
	04 24 03	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	toluene
	10 14 03	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND
	04 20 04	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	toluene
	11 18 04	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND	all ND
FIELD MEASUREMENTS										
pH	05 25 90			7.18	7.10	7.08				
	05 28 92						7.5			
	06 04 92							7.2		7.500
	09 30 92							7.5		7.500
	11 19 92						7.8			
	04 28 93	7.5						7.4	7.5	7.5
	12 03 93	7.6		7.1*	7.5	7.5	7.5	7.0	7.4	
	01 07 94	7.6		6.9	7.2	7.2	7.6	6.8	7.4	
	02 04 94	7.5		7.3	7.4	7.4	7.6	6.9	7.6	
	03 10 94	7.6		7.6	7.5	7.5	7.6	6.9	7.5	
	04 19 94	7.3		7.3	7.4	7.4	7.3	6.9	7.3	
	05 31 94	7.5	7.3 (10 9 95)	7.2	7.3	7.4	7.5	6.4	7.4	
	06 22 94	7.3	7.4 (11 8 95)	7.4	7.1	7.4	7.4	6.8	7.5	
	07 27 94	7.4	7.2 (12 11 95)	7.3	7.4	7.4	7.6	6.9	7.5	
	10 10 94	7.4	7.5 (1 2 96)	7.1	7.4	7.3	6.6	6.6	7.1	
	06 13 95	NA	7.3 (4 29 96)	7.3	7.4	7.4	7.4	NA	NA	
	10 04 95	7.5	7.3 (6 10 96)	7.4	7.4	7.4	7.4	6.8	7.5	
	04 29 96	7.5	7.4 (7 2 96)	7.3	7.2	7.3	7.4	6.8	7.4	7.2
	11 08 96	7.6	7.5 (11 8 96)	7.6	7.3	7.3	7.5	6.7	7.7	7.3
	05 09 97	7.5	7.5	7.2	7.2	7.1	7.4	6.9	7.2	7.3
	10 21 97	7.3	6.7	6.9	7.0	7.1	7.2	6.6	7.2	7.1
	05 04 98	6.7	6.9	6.7	6.9	6.9	7.1	6.5	6.8	6.9
	10 07 98	7.0	7.1	6.6	6.8	6.9	6.9	6.6	6.8	7.3
	05 27 99	7.62	7.82	7.33	7.28	7.22	7.42	7.04	7.34	7.49
	10 13 99	7.82	7.6	7.62	7.44	7.39	7.25	7.02	7.72	7.31
	04 17 00	7.64	7.42	6.91		7.09	7.11	6.88	6.84	6.89
	10 19 00	7.5	7.32	7.27	7.37	7.39	7.43	6.63	7.56	7.35
	04 27 01	7.1	6.8	6.8	6.7	6.7	6.6	6.5	7.0	6.7
	10 11 01	8.53	7.75	8.11	8.44	8.69	8.74	7.52	8.75	8.84
	06 06 02	5.89	7.38	7.38	7.29	7.57	5.81	5.41	6.02	6.31
	10 18 02	7.87	7.8	7.77	7.72	7.91	7.95	7.39	7.91	
	04 24 03	7.5	7.37	7.33	7.25	7.2	7.57	7.11	7.64	7.33
	10 14 03	7.32	7.24	7.22	7.37	7.34	7.2	6.81	7.39	6.62
	04 20 04	8.43	8.24	8.12	8.13	8.25	7.56	6.89	7.33	7.93
	11 18 04	8.01	7.74	7.8	8.09	7.18	7.37	7.43	8.12	7.01

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS[1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (1A(1))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Temperature	05 25 90				14.0	14.0	16.0				
	04 28 93	11.8							13.9	14.4	11.1
	12 03 93	13.0			16.9*	12.0	12.0	12.6	15.8	13.9	
	01 07 94	12.7			11.4	12.3	11.2	12.1	16.0	13.9	
	02 04 94	13.0			11.5	11.8	10.7	11.3	14.6	14.0	
	03 10 94	14.1			10.6	11.1	10.4	12.1	16.0	15.8	
	04 19 94	15.9			16.6	15.4	14.2	14.8	19.1	16.7	
	05 31 94	15.0	15.0	(10 9 95)	14.4	15.0	14.8	14.3	16.4	15.3	
	06 22 94	16.9	14.7	(11 8 95)	16.2	15.4	15.0	14.6	19.3	18.4	
	07 27 94	16.2	13.7	(12 11 95)	16.5	16.9	16.6	15.3	18.8	16.7	
	10 10 94	15.8	12.8	(1 2 96)	14.8	15.8	16.9	15.2	17.3	16.1	
	06 13 95	NA	13.6	(4 29 96)	16.0	15.9	16.3	14.7	NA	NA	
	10 04 95	13.0	16.1	(6 10 96)	12.9	13.7	13.4	14.3	17.1	14.8	
	04 29 96	14.7	18.4	(7 2 96)	13.7	13.3	14.6	12.9	17.4	16.0	12.5
	11 08 96	15.8	14.4	(11 8 96)	14.0	14.6	13.6	14.1	17.2	15.3	14.1
	05 09 97	15.8	14.8		14.6	13.5	13.8	13.1	16.6	16.7	13.0
	10 21 97	15.8	14.4		15.1	15.9	15.5	14.7	19.2	17.2	14.6
	05 04 98	14.9	13.2		13.2	14.3	14.0	11.7	16.4	15.6	11.1
	10 07 98	15.4	15.3		15.2	16.0	15.1	13.8	17.6	14.8	14.6
	05 27 99	16.7	16.3		16.6	14.9	15.3	13	17	16.5	14.4
	10 13 99	18.1	16.6		15.4	16.6	15.5	14.7	21.2	19.6	15.0
	04 17 00	12.9	12.2		14.8		12.3	12.9	14.6	15	13.7
	10 19 00	15.3	17.1		18.7	16.9	18.7	17.7	16.1	17.1	18.4
	04 27 01	20.14	18.02		18.12	17.76	16.84	13.12	20.14	18.58	15.25
	10 11 01	13.6	14.6			14.4	14.7	14.2	16.4	14.7	13.7
	06 06 02	20.9	17.8		18.6	18.1	19.1	16.5	21	20.2	17.9
	10 18 02	19.2	17.7		16.9	19.6	21.9	17.3	22	18.3	
	04 24 03	19.6	16.6		16.7	14.6	16.4	13.6	16.6	17.1	12.2
	10 14 03	17.9	17.9		17.0	16.5	18.4	17.0	20.5	18.3	15.3
	04 20 04	17.4	16.3		15.4	13.1	13.1	13.5	16.4	17.0	15.0
	11 18 04	15.81	13.13		14.65	8.60	15.80	16.35	16.69	17.16	15.91
Conductivity	05 25 90				20223	20358	15408				
	05 28 92							5500			
	11 19 92							5300			
	04 28 93	15400							26000	8800	16200
	12 03 93	14.0			22.4*	22.0	17.0	5.6	24.0	9.8	
	01 07 94	15.4			22.3	22.9	17.1	5.7	24.7	9.8	
	02 04 94	14.1			21.8	21.9	16.9	5.5	28.1	9.6	
	03 10 94	13.7			21.9	21.8	16.7	5.6	31.6	16.0	
	04 19 94	14.9			22.1	22.4	16.8	6.4	35.2	29.9	
	05 31 94	15.2	23.8	(10 9 95)	22.7	21.8	16.6	5.5	36.2	15.1	
	06 22 94	14.4	23.9	(11 8 95)	22.8	22.7	16.8	5.4	35.1	12.1	
	07 27 94	15.3	21.2	(12 11 95)	22.7	22.6	17.3	5.6	32.5	14.4	
	10 10 94	14.1	21.4	(1 2 96)	22.4	22.3	16.9	5.6	27.4	8.0	
	06 13 95	NA	21.5	(4 29 96)	22.9	22.8	19.5	8.0	NA	NA	
	10 04 95	14.7	22.1	(6 10 96)	22.1	21.9	18.5	5.7	29.7	15.4	
	04 29 96	14.5	21.6	(7 2 96)	21.1	21.0	17.7	9.8	29.0	14.3	19.9
	11 08 96	14.7	21.6	(11 8 96)	20.7	20.9	17.4	9.4	39.9	7.6	17.9
	05 09 97	12.4	18.3		17.6	17.8	15.1	7.7	26.9	10.6	14.3
	10 21 97	17.2	25.4		25.0	24.1	20.8	6.5	44.4	10.5	19.7
	05 04 98	16.7	26.2		23.6	24.5	20.8	14.0	26.7	15.5	23.6
	10 07 98	21.1	31.1		29.4	30.1	26.2	18.0	47.6	18.4	15.4
	05 27 99	20.8	29.3		29.2	29.2	26.9	17.7	41.2	22.8	24
	10 13 99	19.9	29.6		29.8	29.7	25.6	17.0	63.4	13.8	25.1
	04 17 00	21.4	31.7		12.62		36.7	46.1	49	8.43	19.7
	10 19 00	20.6	30		29.4	0.016	25.3	15.6	63.7	13	22.3
	04 27 01	15.5	23.5		22.6	18.8	19.9	9.24	46.4	12.4	17.3
	10 11 01	20.3	30.1		28.8	25.9	25.1	14.3	54.5	13.2	21.4
	06 06 02	13.8	29.7		28.5	28.2	24.7	8.91	30.9	17.3	21.2
	10 18 02	14.6	23.5		20.6	21.5	19.5	11.2	29.9	9.06	
	04 24 03	14.5	23.2		22.3	21.7	18	12.2	23.3	10.2	15.4
	10 14 03	14.8	23.6		22.5	21.0	17.9	13.6	23.4	10.9	17.1
	04 20 04	13.6	21.7		21.0	20.8	17.5	11.8	22.9	30.8	16.5
	11 18 04	14.1	23.1		22.4	23	20.3	12.7	23.9	11.7	15.4

TABLE 3
SUMMARY OF RECENT ANALYTICAL RESULTS (mg/L)
May 1990 through November 2004

		DOWNGRADIENT WELLS [1]						UPGRADIENT WELLS			
ANALYTE	DATE	MW-4A (IA(I))	MW-5A		MW-6A (E-26)	MW-7A (E-25)	MW-8A (E27)	MW-1A (ET-O)	MW-2A (EE(E))	MW-3A (2)	F
Turbidity	05 25 90				5.2	3.8	11.5				
	06 04 92								34.6		1.91
	09 30 92								30.1		3.19
	04 28 93	-999					311.0		450.0	110.0	70.0
	12 03 93	-999			800*	940	490	466	-999	-999	
	01 07 94	475			155	970	655	456	-999	-999	
	02 04 94	110			860	240		240	-999	675	
	03 10 94	10			185	558	822	342	-999	624	
	04 19 94	230			300	220	650	700	-999	750	
	05 31 94	50	311	(10 9 95)	350	697	795	880	-999	800	
	06 22 94	720	160	(11 8 95)	470	-999	-999	-999	-999	870	
	07 27 94	108	519	(12 11 95)	60	102	318	481	875	888	
	10 10 94	150	20	(1 2 96)	81	542	450	370	540	350	
	06 13 95	NA	255	(4 29 96)	600	219	-999	400	NA	NA	
	10 04 95	10	685	(6 10 96)	20	133	400	70	170	600	
	04 29 96	40	347	(7 2 96)	285	783	530	723	275	200	315
	11 08 96	4	200	(11 8 96)	134	92	129	315	59	369	8
	05 09 97	598	560		476	422	554	9	702	931	409
	10 21 97	228	49		140	999	999	147	197	257	220
	05 04 98	157	297		40	305	467	350	351	386	59
	10 07 98	23	58		7	143	205	153	23	66	7
	05 27 99	126	281		121	189	784	219	156	160	43
	10 13 99	10	5		69	8	95	25	2	3	10
	04 17 00	36	30		660		475	23	41	32	88
	10 19 00	2	7		70	2	303	6	96	213	1
	04 27 01	**260**	**65**		**25**	**-990**	**>990**	**210**	**150**	**990**	**150**
	10 11 01	5	15		0	-10	148	40	7	61	90
	06 06 02	15 8	7 98		27.1	47 8	134	5 59	3 96	13.6	7 29
	10 18 02	1 9	2 95		9.08	10	26 2	53 9	63 3	5 6	
	04 24 03	22 3	12		5.5	21.7	204	3 3	14 8	10 9	9
	10 14 03	61	0		2 0	20	360	0	0	0	44
	04 20 04	**49.7**	**30.4**		**58.2**	**119**	**305**	**199**	**86.1**	**46.2**	**72.2**
	11 18 04	51.1	13		50	1 4	390	10	34	21	1.4
D.O.	05 25 90										
	04 28 93	11.4							10 8	7 9	9.9
	12 03 93	6.0			1 6*	3.0	2.6	1.1	2.3	8.0	
	01 07 94	6 5			3 1	3 2	3.2	1.9	1.8	8.0	
	02 04 94	6.0			1.2	9 4	2 2	2 1	6 5	2.0	
	03 10 94	5.3			4 5	6.0	3 1	3.0	3.9	1.9	
	04 19 94	5 9			2 0	0.9	1 6	2.4	2 0	1.6	
	05 31 94	5.6	1 4	(10 9 95)	1 3	2 4	2 8	2 3	0 9	1 5	
	06 22 94	6.6	1 7	(11 8 95)	1 7	2.0	1 4		1.4	1.4	
	07 27 94	5 2	1 6	(12 11 95)	2.5	2.5	2.3	1.6	1 7	2.1	
	10 10 94	3.8	1 5	(1 2 96)	1.7	1.5	2 0	2.1	1 6	0 9	
	06 13 95	NA	1.4	(4 29 96)	1.3	0.5	1.5	1.7	NA	NA	
	10 04 95	5.6	2.0	(6 10 96)	1.5	1 5	2.0	0.8	2 2	1.8	
	04 29 96	4.5	2.4	(7 2 96)	0.7	2 0	1 6	1 8	1 8	1.4	4.2
	11 08 96	4.5	3.3	(11 8 96)	3 9	1 3	0 9	1 3	1.5	2.3	2.1
	05 09 97	5.1	2 4		1 4	1 5	2 1	2 0	2 3	1 9	3 4
	10 21 97	4 8	1.7		1 6	1 1	1 4	1 0	2 2	1 0	1 4
	05 04 98	5 7	2 8		2 5	2 4	1 6	2 1	2 9	1 8	5.6
	05 27 99	7 55	2 47		2.5	1 57	0 74	2 87	1 47	2 41	3 46
	10 13 99	7.25	1 65		1 89	1 78	5.15	1 24	5 75	5.85	1 66
	04 17 00	6.2	2		1 2		3 1	2 3	2 8	7 7	1 9
	10 19 00	0 94	0 86		0 8	0 88	0 79	0 84	0 89	0 86	0 81
	04 27 01	8 7	2 4		1 8	3 8	2 0	3 8	4 0	2 5	2 5
	10 11 01	8 98	9 66		10 6	11	10 82	11 05	7 73	8 44	11 44
	06 06 02	1 4	11 48		10 91	11 37	8 65	1 7	3 00	2 4	12.23
	10 18 02	2.41	1.04		1 07	1 30	1 48	1 96	1 63	2 19	
	04 24 03	2.46	2 41		2 47	3.56	1.98	5.75	5.69	5.24	6.37
	10 14 03	0.0	6 09		5.89	2.84	0.0	8 65	0 21	5.26	5 26
	04 20 04	0.71	5 21		6.31	1.78	0.0	0.0	4.09	2.67	3.57
	11 18 04	3.06	2.75		2.84	2 34	2 93	2 85	3 51	2.26	8 24

*Well MW-6A was not accessible on 12 03 93 Because eight samples were required to establish the naturally-occuring concentrations of several parameters in each well, a sample was collected from Well MW 6A on 08 26 94

**Well MW-3 The following volatile organic compounds were detected: Acetone (22 ug l) and 2-Butanone (13 ug l)

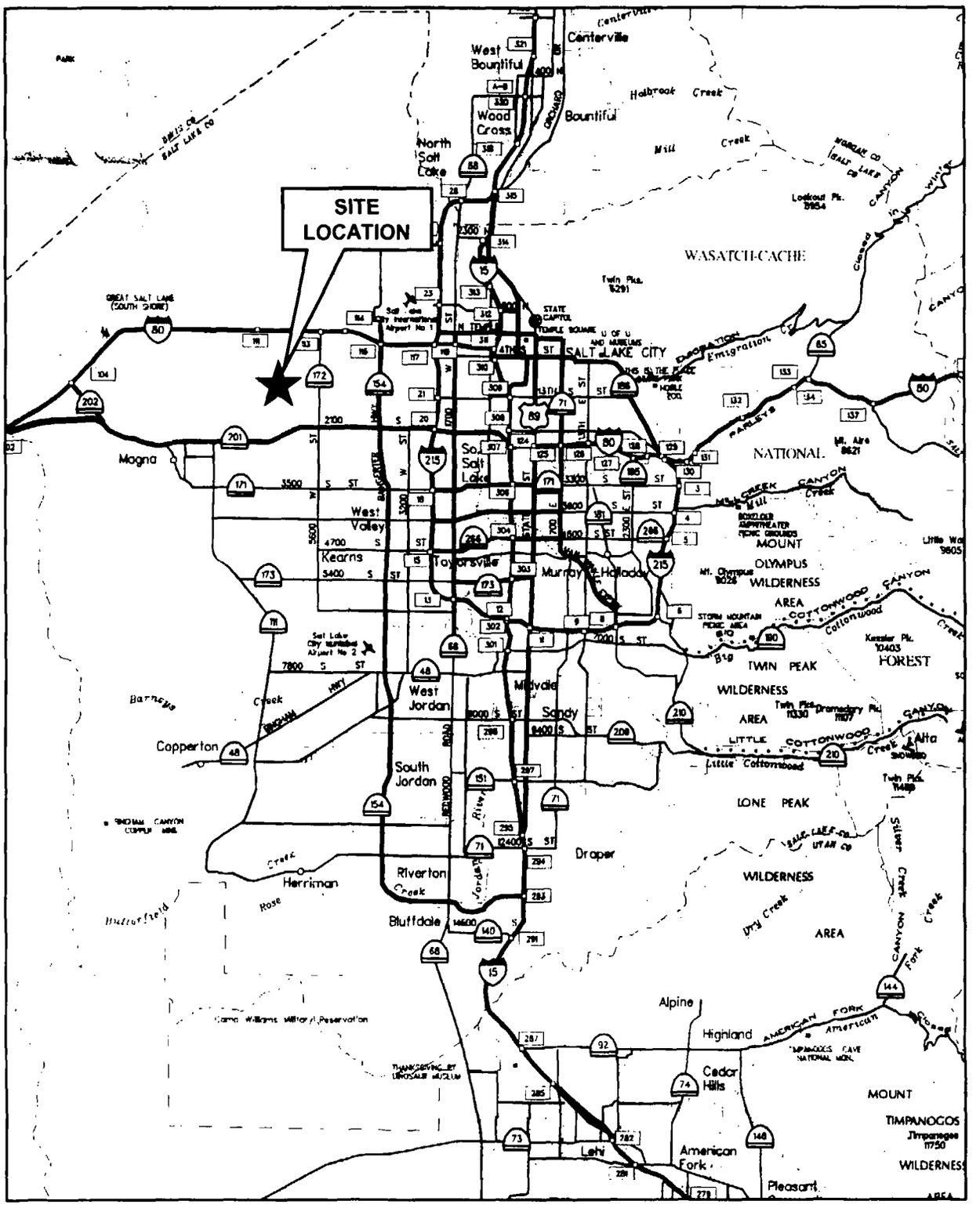
***Sample was analyzed outside of holding times

****Well MW-2A Benzene was detected at concentration of 2 ug l

[1] Well MW-7A Spring 2000 data are not representative due to possible surface water contamination and are therefore not included

[2] Well MW -5A: Toluene was detected at the reporting limit of 2 ug l A1142

FIGURES



BASE MAP:
Utah Atlas & Gazetteer
DeLorme 2002

0' 2 4

APPROX. SCALE: 1" = 4 MILES

SLC5Q056.ppt

KLEINFELDER

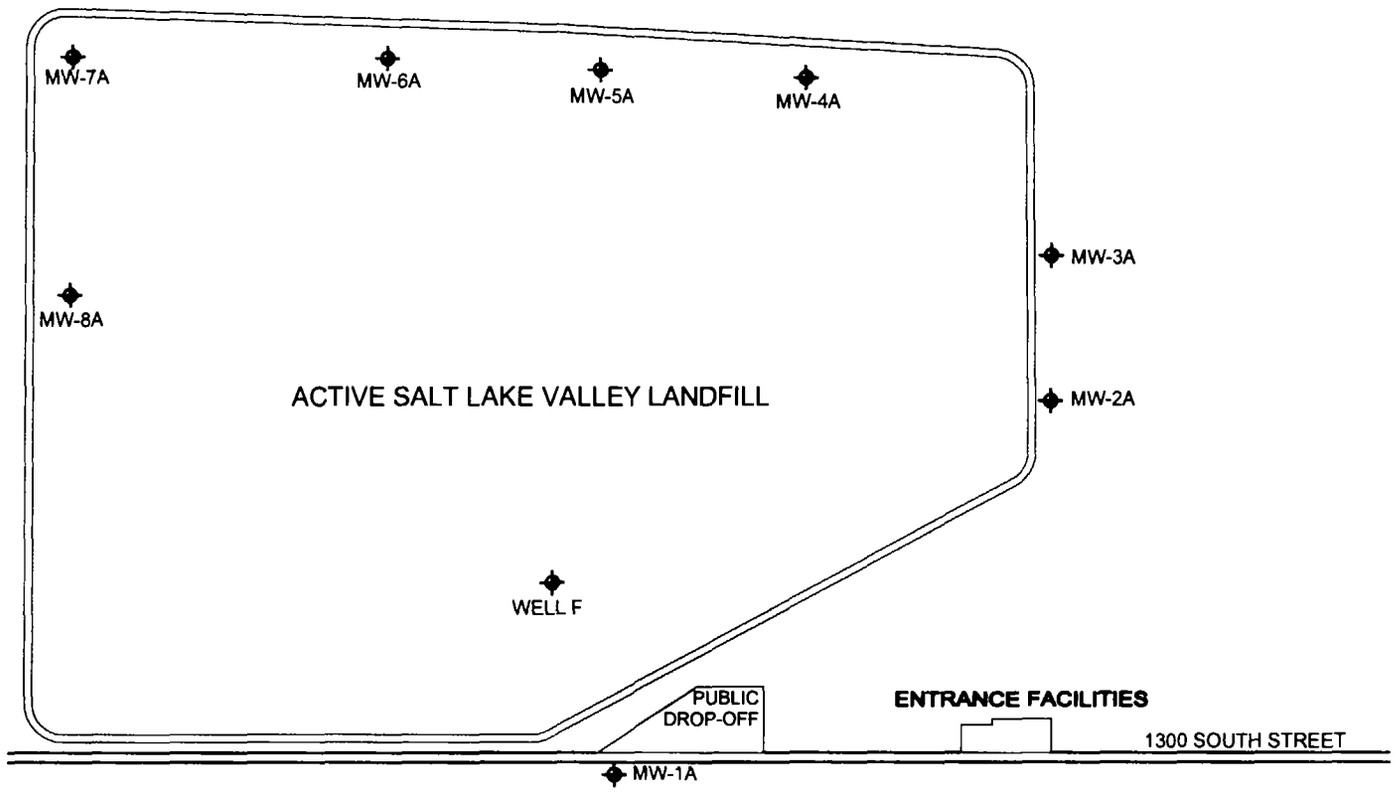
Date: 02/08/2005
Project Number 17677.009

Salt Lake Valley Landfill
Active Area
Salt Lake City, Utah

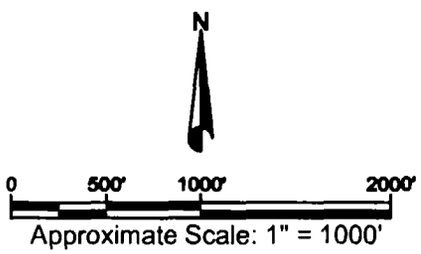
SITE VICINITY MAP

FIGURE

1



NOTE: All elevations are feet above mean sea level.



Approximate Scale: 1" = 1000'

SLC5d063.dwg

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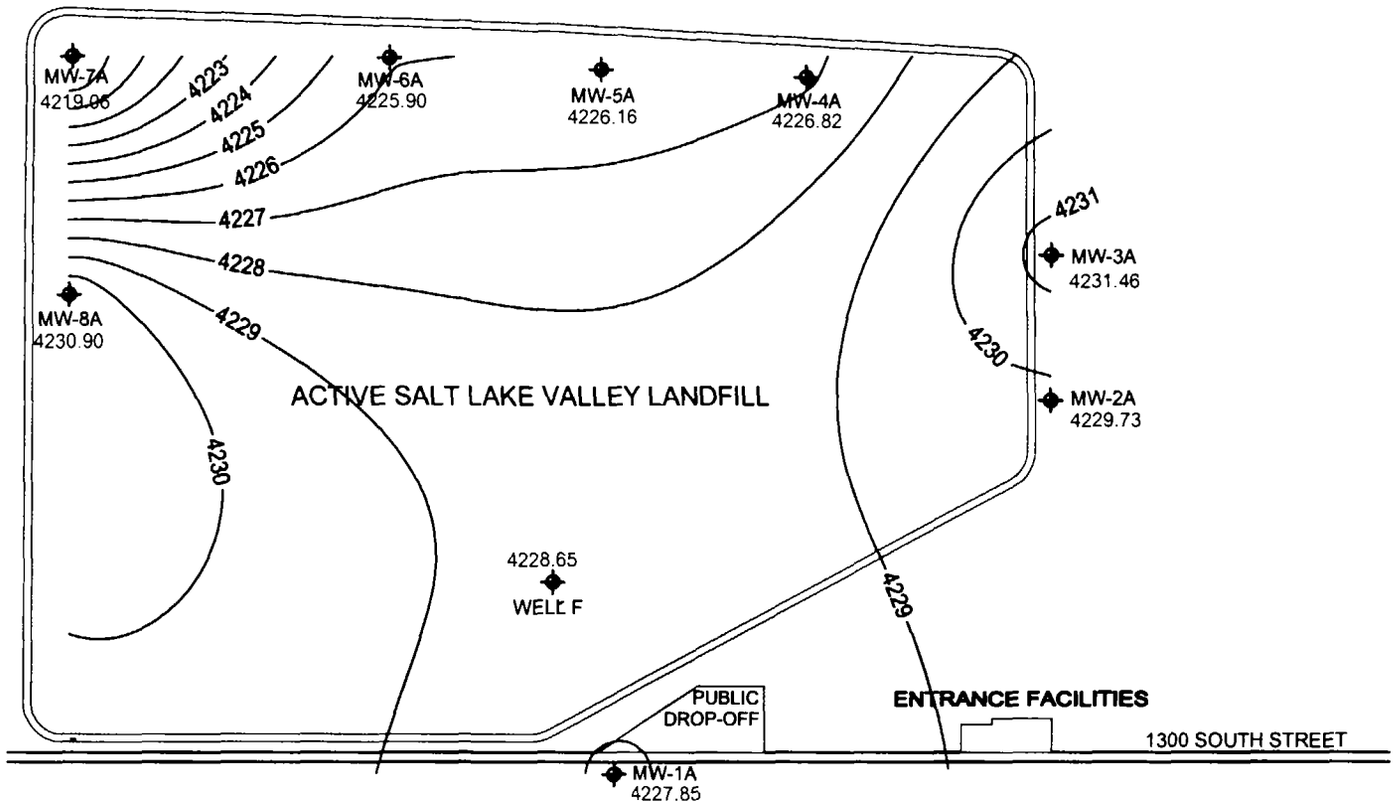
Date: 02/08/2005
Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Active Area
Salt Lake City, Utah

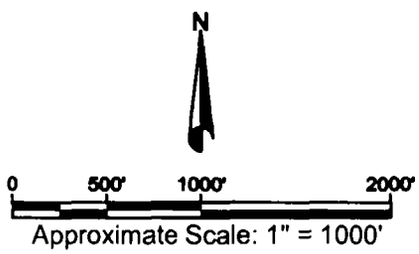
MONITOR WELL LOCATION MAP

FIGURE

2



NOTE: All elevations are feet above mean sea level.



Approximate Scale: 1" = 1000'

SLC5d063.dwg

KLEINFELDER

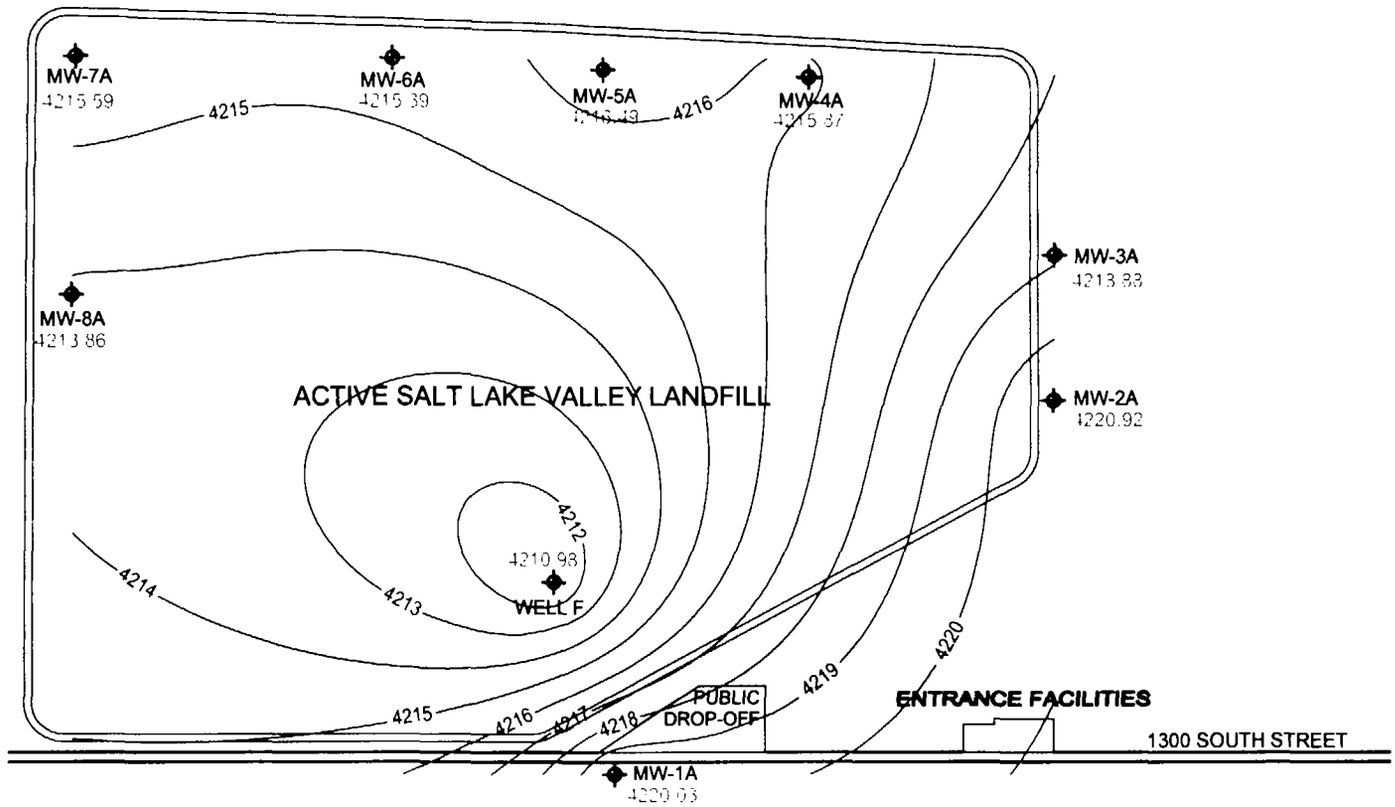
Date: 02/08/2005
Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Active Area
Salt Lake City, Utah

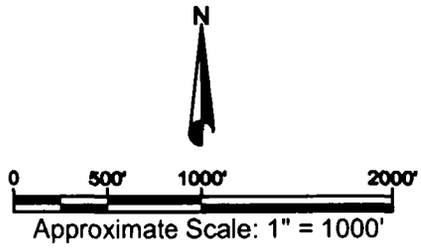
APRIL 5, 2004
GROUNDWATER ELEVATIONS

FIGURE

3



NOTE: All elevations are feet above mean sea level.



Approximate Scale: 1" = 1000'

SLC5d063.dwg

KLEINFELDER

Date: 02/08/2005
Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Active Area
Salt Lake City, Utah

NOVEMBER 1, 2004
GROUNDWATER ELEVATIONS

FIGURE

4

ADDENDUM 2B

SURFACE WATER MONITORING PLAN
ACTIVE SALT LAKE VALLEY LANDFILL
SALT LAKE CITY, UTAH

March 11, 2005

A Report Prepared For:

Salt Lake City Corporation
Salt Lake City Public Works
324 South State Street
Salt Lake City, UT 84111

File No.: 17677.009

SURFACE WATER MONITORING PLAN
ACTIVE SALT LAKE VALLEY LANDFILL
SALT LAKE CITY, UTAH

Prepared by:

for

LeeAnn Diamond
Staff Geologist

Rence Zollinger, R.G.
Regional Manager

KLEINFELDER, Inc.
849 West LeVoy Drive
Salt Lake City, UT 84123
(801) 261-3336

March 11, 2005

TABLE OF CONTENTS

1. BACKGROUND

1.1 INTRODUCTION

The Salt Lake Valley Solid Waste Management Facility is located in the northwest part of Salt Lake County at 6030 West 1300 South, West Valley City, Utah. In June 1993, Kleinfelder assumed responsibility for semi-annual monitoring of surface water within and around the facility. Prior to 1993, the Salt Lake City-County Health Department conducted monitoring activities.

Surface water monitoring is performed in accordance with the Salt Lake Valley Health Department's Regulation #1 and provisions of the facility's General Permit for Storm Water Discharges associated with Industrial Activity, Permit No. UTR000074. The surface water samples are collected during or immediately after a significant storm event, where "significant" is defined as a storm that results in 0.1 inch or more of rainfall and that occurs at least 72 hours after a previous rainfall event of 0.1 inches magnitude or greater.

1.2 SUMMARY OF EXISTING DATA

In general, metals concentrations in the upstream site (S-1) and in the downstream site (S-2) have similar analytical results. This indicates little or no metals concentration impact to the Lee Drain from the landfill. Mineral concentrations (e.g., magnesium, chloride, sodium, and total dissolved solids (TDS)) increase from the upstream S-1 site to the downstream S-2 site, indicating an influx of salts entering the Lee Drain. Run off from the Public Drop-Off Area (S-3) is also generally similar to the water in the Lee Drain upstream from the landfill. Therefore, runoff from the facility through sample location S-3 does not appear to impact the surface water in the Lee Drain. Figure 1 shows the locations of the surface water sample sites.

The major source of water from the landfill entering the Lee Drain is groundwater pumped from the dewatering trench (sites S-6 and S-7). Samples S-6 and S-7 are relatively saline, containing elevated concentrations of sodium, magnesium, chloride, and TDS. Increases in the observed mineral concentrations may be the result of the run off and dewatering activities. This is similar to historical results and appears to be a function of the saline groundwater in the vicinity of the Great Salt Lake.

2. SAMPLING AND ANALYSIS PLAN

2.1 MONITORING LOCATIONS

Surface water samples are collected from six locations, as follows:

- S-1, Lee Drain where flow enters the landfill;
- S-2, Lee Drain where flow exists the landfill;
- S-3, Runoff from the Public Drop-Off area;
- S-5, Runoff from active landfill area (if any);
- S-6, East end of de-watering trench; and
- S-7, West end of de-watering trench.

Site S-4 is no longer an active sampling site due to the lack of runoff from the adjacent field to the east. The surface water sample locations are shown on Figure 1. Sample S-5 placement will vary depending on the active landfill tipping face location.

2.2 FREQUENCY OF MONITORING

To satisfy requirements of Storm Water Permit #UTR000074 and City-County Health Regulation #1, surface water will be monitored semi-annually, in the spring and fall. The samples will be collected during or immediately after a significant storm event, where "significant" is defined as a storm that results in 0.1 inch or more of rainfall and that occurs at least 72 hours after a previous rainfall event of 0.1 inches magnitude or greater.

2.3 MONITORING ANALYTES

Based on the requirements of City-County Health Department Regulation #1 and Storm Water Permit #UTR000074, the surface water samples will be analyzed for the compounds and constituents listed in Table 1.

2.4 SAMPLING PROTOCOL

2.4.1 Sample Collection

Surface water samples are collected as follows:

1. Water samples S-1, S-2, S-3, S-5, and S-7 are collected by dipping a sterile 500-milliliter (ml) plastic cup connected to an extendable 12-foot rod approximately 4 inches below the water surface in the middle of the channel being sampled (or at least 1 foot from the edge of the channel in Lee Drain). Water sample S-6 is collected with a set of three plastic bailers due to being sampled from within the vault on the east end of the de-watering trench.

2. Once collected, samples are immediately labeled and placed in an iced sample container. Samples for metals analysis are collected unfiltered and unpreserved. The laboratory is requested to immediately filter and preserve samples for metals analysis. At the end of the day, the samples are delivered to a state-certified analytical laboratory under chain-of-custody control.

3. Temperature, pH, dissolved oxygen, conductivity, and turbidity are measured in the field and recorded on the Field data sheets.

2.4.2 Field Measurements

Several parameters that are unstable are measured in the field: pH, temperature, conductivity, turbidity, and dissolved oxygen. A sample is collected into a clean beaker for measurement of pH, electrical conductivity, temperature, turbidity, and dissolved oxygen. These readings are recorded, along with the sample location and time, in the field notebook. To reduce the potential for cross-contamination, monitoring probes are never to be placed in containers to be sent to the laboratory for analysis.

The instrument(s) used to make field measurements are calibrated at the beginning and the end of each day, at a minimum.

2.4.3 Documentation

The sampler will keep a field logbook, which documents:

Sample location identification
Sample collection methods
Sample identification numbers
Preservatives and containers used
Parameters requested for analysis
Field analysis data and methods
Sample distribution and transporter
Field observations including weather
Name of collector

2.4.4 Sample Custody

Samples will remain in the custody of the sampler until they are checked in and relinquished to the laboratory or until they are relinquished to a qualified individual for transport to the laboratory. If after samples are collected, the laboratory is closed, sample personnel will have 24-hour access to a "Laboratory Secure Area" (equipped with a refrigerator) for storing samples until regular laboratory hours, when sample custody can be transferred. Custody will be documented on the chain of custody form.

3. DATA ANALYSIS PLAN

3.1 DATA VALIDATION

When the laboratory data is received, it will be reviewed to assess data validity. The data package will be checked to insure that:

- Sample I.D.s match chain-of-custody and field notes and can be matched to sample location, date, and time;
- Samples were analyzed by requested methods;
- Samples were analyzed within holding times;
- Analysis reporting limits are acceptable;
- Laboratory method blank results are included and acceptable; and
- Laboratory MS/MSD results for representative analytes are included and acceptable.

If the listed checks indicate potential problems or discrepancies, the laboratory will be notified and requested to help resolve the question. If the cause of the problem cannot be located, the affected data will be qualified or the affected wells will be resampled, depending on the severity of the problem.

3.2 DATA ANALYSIS

The data will be analyzed by:

- Looking for the presence of non-naturally occurring compounds in the sample (such as volatile organic compounds);

- Comparing the concentrations of naturally occurring constituents (metals and minerals) in surface water upstream and downstream of the landfill; and

- The relative concentrations of naturally occurring constituents will be analyzed to assess whether the water is impacted. The concentrations of naturally occurring constituents are highly variable. This is probably due, in part, to variations in the amount and type of exposed soils on and around the site.

3.3 DATA REPORTING

Semi-annual monitoring reports will be prepared. Each report will include a:

- Description of Sampling Activities
- Discussion of Data Validity
- Discussion of Laboratory QA/QC
- Presentation of Field and Laboratory Data in Tables

TABLES

Table 1
Laboratory Analysis for
Surface Water Monitoring
Active Salt Lake Valley Landfill

General Minerals

Alkalinity as $CaCO_3$
Bicarbonate as $CaCO_3$
Carbonate as $CaCO_3$
Sulfate
Chloride
Sodium

Metals

Arsenic (Dissolved)
Barium (Dissolved)
Boron (Dissolved)
Cadmium (Dissolved)
Chromium (Dissolved)
Copper (Dissolved)
Iron (Dissolved)
Iron (Total)
Lead (Dissolved)
Magnesium (Dissolved)
Manganese (Dissolved)
Mercury (Dissolved)
Selenium (Dissolved)
Silver (Dissolved)
Zinc (Dissolved)

Other

Total Organic Carbon (TOC)
Ammonia as N
Nitrate as N
Nitrite as N
Ortho-Phosphate
Total Dissolved Solids (TDS)
Total Suspended Solids (TSS)
Total Organic Halides (TOX)
Oil and Grease
Chemical Oxygen Demand (COD)
Cyanide (CN)

Organics

Volatile Organics (EPA 8260)

FIGURES

N

0 300' 600' 1200'

Approximate Scale: 1" = 600'

LEGEND

S-5 Surface Water Sample Location

Mod. 5

Mod. 4

Mod. 3

Mod. 2

S-5 (Mobile Sampling Location)

S-7

Mod. 7

Mod. 6

Mod. 1

S-6

Tipping Face

E. T. Technologies

Public Drop-Off Facility

Mod. W

S-3

Pond

Pond

Pond

Pond

S-2

Lee Drain

Lee Drain

S-1

SLC5d065.dwg

KLEINFELDER

Date: 02/09/2005

Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

SURFACE WATER SAMPLE LOCATIONS

FIGURE

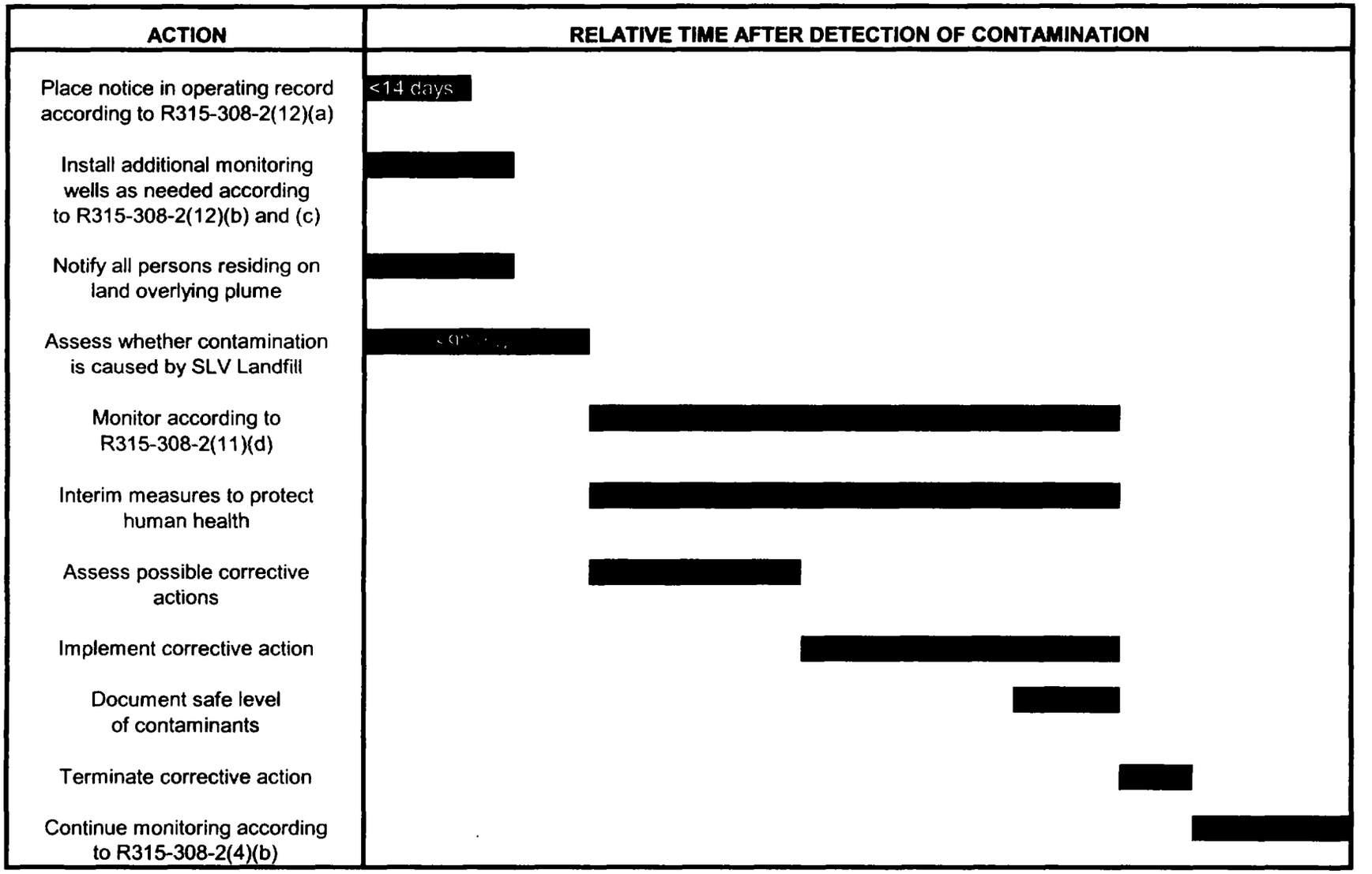
1

ADDENDUM 3

Corrective Action Plan

In Event of Groundwater Contamination

The following table is a summary of steps to be taken in the vent of a statistically significant increase in the concentration of one or more constituents.



ADDENDUM 4

Contingency Plans

Contingency Plans

Although Salt Lake County will conduct operations at the site to preclude the potential for emergency situations or occurrences, it is possible for events to occur that are beyond the control of landfill personnel to prevent. The Salt Lake Valley Landfill has an established Emergency Operations Plan, dated February 1994, which describes the responsibilities of landfill personnel in the event that an emergency or major disaster occurs (See Appendix D). Section 2.6.2 describes response procedures for the following sitiuations or occurances:

- Earthquakes
- Significant failure of refuse fill or excavation slopes
- Fires within the landfill site boundary, including landfill areas, and structures
- Explosions within the landfill site boundary
- Release of explosive gasses
- Presence of fluid/leachate seeps from the side slopes of the refuse fill areas
- Unauthorized discharge of hazardous or toxic materials, including accidental spills of materials authorized on site, and illegal discharges by waste haulers
- Failure of temporary or permanent drainage facilities
- Loss of equipment or personnel
- Loss of failure of general on-site facilities

This plan is intended to address those contingency situations which are reasonably foreseeable. This plan should be amended as follows whenever a failure or release occurs for which the plan did not provide an appropriate response.

Emergency Response Procedures/Contingency Plans

This section presents the landfill operator's emergency response procedures for situations identified in Section 2.4.1, Potential Contingency Situations.

Earthquakes

The Landfill is expected to continue normal operations after an earthquake in order to handle the disposal of emergency non-hazardous rubble material, as well as normal refuse loads. The Landfill will be most heavily impacted approximately 72 hours after an emergency, and may need to be open for 24-hour operation at that time.

Numerous emergency situations, depending on the size and location of the earthquake, could also result at the landfill. Situations may include slope failures (refuse fill or excavation), fires, drainage structure failure, and problems associated with the loss of utilities (gas, electricity, and communication).

Salt Lake County will take the following actions immediately after an earthquake to evaluate the level of damage, if any:

1. Conduct a visual survey of the site to identify any slope failures, fires, drainage structure failures, and any problems associated with utility outage.

2. Follow the procedures set forth under Slope Failures, below, if any slope failures are detected.

3. Follow the procedures set forth under On-Site Fires, below, if any fires occur.

4. Follow the procedures set forth under Drainage Facility Failure, below, if any drainage facility failures are identified.

5. Follow the procedures set forth under General Facilities, below, should scales malfunction, or if they are inoperable due to loss of power.

In the event telephone systems are inoperable, notification of the appropriate agencies/ businesses will be accomplished in the most expedient manner available (person to person, overnight mail, etc.).

Slope Failures

Slope failures may results from earthquakes, extremely heavy rainfall, or failed drainage facilities.

Salt Lake County will take the following actions immediately in the event of any slope failure occurring within the active or inactive landfill area (particularly in refuse fill areas):

1. Close the area of the slope failure, and if possible, move landfill operations to another location within the site.

2. Notify the site engineers, Salt Lake City, in order to conduct an analysis of the failure's extent.

3. Analyze the failure and determine if operations can continue safely, either in the failure location or elsewhere on site.

Any slope failure that threatens the integrity of refuse fill areas will be promptly corrected, after approval of the method and schedule by regulatory agencies.

The ability to continue landfill operations in the event of a earthquake induced slope failure is of particular importance since considerable amounts of demolition debris from the earthquake may be expected.

On-Site Fires

The following actions will be taken if a fire occurs in a refuse fill area:

1. Burning refuse will be excavated and separated from the fill area and covered immediately with on-site soil.

2. If necessary, water will be applied to the burning refuse using the on-site water truck.

3. The Salt Lake City Fire Department will be summoned if site personnel and equipment can not extinguish the fire.

Salt Lake County maintains a caterpillar 613 water wagon and three bulldozers on-site that are available 24-hours per day. An on-site water well is capable of supplying 500 gallons of water per minute.

The following actions will be taken if a fire occurs in a site structure:

1. Notify the Salt Lake City Fire Department

2. Site personnel will prevent fire from spreading to surrounding area by using on-site equipment to construct fire breaks, on-site fire extinguishers, and by using the on-site water truck to wet down threatened areas.

On-Site Explosion

An on-site explosion could occur if methane gas accumulated in explosive concentrations, or if an explosive material was illegally disposed of at the landfill. In the event of an on-site explosion, all sources of ignition at the landfill will be immediately extinguished (e.g.; welding torches, cigarettes, and lighters) and all non-essential mechanical equipment will be shut off to reduce the potential for generating sparks. All members of the public and landfill personnel will be evacuated from the area, the area will be secured, and the Salt Lake City Fire Department will be immediately notified. The area will not be reopened until the cause of the explosion has been determined and corrective action has been taken.

Release of Explosive Gasses

A release of explosive gasses could occur if an area where methane accumulated (such as a pocket in the waste) was suddenly vented to the atmosphere. If such a release is detected, either due to associated odors or in the course of routine monitoring, all sources of ignition in the vicinity of the release will be extinguished and all mechanical equipment in the area will be shut off to prevent sparking. The area will be secured and the Salt Lake City Fire Department will be notified. The area will not be reopened until corrective action has been taken.

Presence of Fluid/Leachate Seeps

Expansion areas of the landfill will incorporate a base liner and, thus, will contain an LCRS. Any leachate production should first be noticed in a collection sump of the LCRS.

Leachate that accumulates during the operating life of the landfill will be removed and, if appropriate, applied as water for dust control on landfill areas. After closure of landfill areas, leachate collection sumps will continue to be monitored. If necessary, leachate will be removed from collection sumps and disposed of in accordance with applicable regulations and site permits.

In the unlikely event leachate should seep from the landfill side slopes, the following actions will be taken:

1. Leachate seepage shall be contained immediately by constructing a temporary berm/sump in the vicinity of the seeps.

2. Samples of the leachate will be taken for immediate analysis of chemical constituents.

Based on sampling and analysis results of the leachate, a remediation program and schedule will be developed.

Discharge of Hazardous/Toxic Materials

If the discharge is a result of an accidental spill, site personnel will not attempt to clean up a spilled material if its identity is unknown, or if it is known to be hazardous. In such a case, Salt Lake County will contact a company specializing in hazardous waste handling to clean up the spill.

The following actions will be taken if an on-site spill of suspected hazardous or toxic material occurs in any area of the landfill site:

1. Cordon off area where spill occurred. Relocate the working face as required.

2. If possible, identify the spilled material. If the spilled material can be identified as nonhazardous, site personnel will dispose of the material in the landfill.

3. If appropriate, contact a company specializing in hazardous/toxic waste disposal to remove spilled material.

In some instances, such as a fuel spill, impacted soil may be treated on site to reduce contaminants to acceptable levels. In this case, methods of treating the on-site soil will be discussed with appropriate regulatory agencies.

The following actions will be taken if an illegal discharge of hazardous wastes or designated wastes occurs at the landfill:

1. Immediately cordon off area where discharge occurred.

2. Notify discharger, if discharger can be identified, to remove the waste.

3. If discharger can not be identified, identify the discharged material, if possible. If hazardous/toxic, contact a company that manages hazardous/toxic materials to remove the material.

4. Apply absorbent to the material, if necessary.

5. Pack discharged material into 55-gallon drums approved for disposal.

6. Prepare manifest, if required.

7. Contact licensed hauler to transport material to an approved disposal facility.

Drainage Facility Failure

The following actions will be taken if blockage or failure of any temporary drainage facility occurs, including diversion berms and ditches:

1. Repair failure immediately using on-site soil, hay bales, temporary drainline, or other available materials.

2. When site conditions permit, make permanent repairs to the failed facility, replace or relocate the facility, or install permanent facilities per the site operations plan to prevent future failure.

Failure of temporary drainage facilities is most likely to occur during heavy, storm-water runoff. Repair of failed facilities is very important in areas where erosion of cover atrial, or runoff contact with refuse may occur.

The following actions will be taken if blockage or failure of any permanent drainage facility occurs, including overside drains, culverts, and lined ditches:

1. Immediately attempt to remove the blockage to restore normal drainage.

2. Repair failure immediately by using on-site soils, hay bales, temporary drainline, or other available materials.

General Facilities

The following actions will be taken in the event of a scale malfunction at the landfill entrance:

1. If the scale malfunction is temporary, the scale attendant will estimate the weight of the incoming waste based on historic weight records or volume calculations.

2. In case of a long-term scale malfunction, a portable scale will be rented.

The following actions will be taken in the event of a computer malfunction at the landfill entrance:

1. The scale attendant will record by hand the vehicle licence number and gross weight, date, time, fee collected and transaction number.

2. When the computer is brought on line, the hand written records will be entered into the computer data base.

The following actions will be taken if there is blockage or failure of an on-site haul road, including vehicle breakdown or accident, waste spill, or roadbed failure:

1. Immediately re-route landfill traffic over another existing haul road to facilitate continued landfill operations.

2. Repair or remove blockage from haul road. If roadbed failure has occurred, contact engineer to determine necessary repairs.

If necessary, refuse can be stockpiled in an alternative permitted area while the haul road is being repaired. Once the haul road is repaired allowing access to the active fill area, site personnel can transfer wastes from a temporary storage area to the designated active fill area.

ADDENDUM 5

Hazardous Waste Exclusion Plan
Salt Lake Valley Landfill
Salt Lake County, Utah

Hazardous Waste Exclusion Plan
Salt Lake Valley Landfill
Salt Lake County, Utah

Prepared for

Salt Lake Valley
Solid Waste Management Council

November 1991

Prepared by

EMCON Associates
1921 Ringwood Avenue
San Jose, California 95131

Project 344-02.16

1.0 INTRODUCTION

This document presents the Hazardous Waste Exclusion Plan for the Salt Lake Valley Landfill. This program has been prepared in conjunction with the Master Plan for the landfill site. This section describes the background for this program, and the regulations that require it.

1.1 Background

The County of Salt Lake and Salt Lake City Corporation jointly own and operate the Salt Lake Valley Landfill (SLVL), located approximately 9 miles west of the City of Salt Lake. The landfill accepts municipal solid waste from businesses and residents of Salt Lake County for disposal. Hazardous and other unauthorized wastes, except those generated from households, are prohibited from disposal at the landfill site. The problems associated with processing, hauling, and disposal of hazardous and other prohibited in refuse include (1) injuries to refuse collectors and landfill equipment operators; (2) damage to collection and landfill equipment; and (3) potential ground-water contamination due to leachate migration from the landfill. Worker injuries and equipment damage from hazardous wastes in refuse have been documented by the National Solid Waste Management Association.

1.2 Regulatory Requirements

In response to the hazards posed by indiscriminate disposal of prohibited wastes at solid waste landfills, the Salt Lake City-County Health Department (Health Department) has included the requirement for a hazardous waste exclusion program in Health Regulations #1, Solid Waste Management Facilities, Section 6.5(a). The regulations were adopted by the Health Department on September 7, 1989, and amended October 5, 1989.

In addition, State and Federal regulations governing solid waste disposal facilities, require a program designed to detect and prevent disposal of regulated quantities of hazardous wastes at solid waste landfills.

The intent of such a program is to detect and prevent the disposal of hazardous or other unauthorized solid waste at a landfill. Specific elements of the program, as required by the regulations, include;

- Inspecting incoming loads
- Record keeping of inspections
- Notifying the Health Department of violations of the hazardous waste prohibition.

Details of the program for the SLVL are presented in the following sections.

2.0 DESCRIPTION OF ACCEPTABLE AND PROHIBITED WASTES

This section describes the types of wastes that are accepted at the SLVL and those that are prohibited. In addition, the characteristics of hazardous and other unauthorized wastes are described.

2.1 Permissible Wastes:

The landfill accepts the following wastes:

- Residential waste, including garbage and rubbish.
- Nonhazardous solid waste from industrial sources
- Construction and demolition waste
- Other nonhazardous solid wastes not prohibited from being accepted for at the landfill under its operating permits or under applicable law

2.2 Prohibited Wastes

The SLVL shall not accept any hazardous or liquid waste, except if such waste is generated from households, is not septic tank wastes, and the containers are small (the size normally found in households and normally less than 1 gallon). Common examples of prohibited wastes include paints, solvents, other flammables, pesticides, asbestos, acid and alkaline solutions, PCBs, inks, photographic and pool chemicals, oxidizers, gasoline, explosives, and water reactives. Compressed gas cylinders, pharmaceuticals, and radioactive wastes are also of prohibited wastes.

2.3 Characteristics of Hazardous and Liquid Wastes

2.3.1 Hazardous Wastes

Hazardous wastes are defined in the Health Regulations #1 as solid waste, or a combination of solid wastes which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious or incapacitating irreversible illness, or pose a substantial present or potential hazard to human health or the environment if improperly treated, stored, transported, disposed, or other waste listed as a hazardous waste listed as a hazardous waste by the Federal or State (Utah) Government.

2.3.2 Liquid Wastes

Liquid waste, as defined by the Health Regulations #1, is and solid waste material that contains"free liquids" as defined by Method 9095 (Paint Filter Liquids Test), as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Method" (EPA pub. no. SW-846, latest edition).

3.0 INCOMING LOAD INSPECTION PLAN

The objective of inspecting incoming loads and deter attempts to dispose of prohibited wastes. The incoming load inspection plan is designed in accordance with the requirements of Health Regulations #1, Section 6.5 (a) (-3) and Subtitle D. In accordance with the regulations, the inspection plan at the SLVL will entail inspecting at least 10 percent of incoming loads. The load checks will be of "variable frequency". The varying schedule will serve to make the load checks unpredictable to facility users and therefore deter attempts to conceal prohibited waste in incoming loads. In addition, all suspicious loads shall be inspected. Methods to determine waste acceptability are described in Section 4.0 The procedures for the inspection plan are described below.

3.1 Load Screening

The initial step in the inspection plan is to review incoming loads at the main scalehouse.
The weighmaster will observe incoming loads for any indication of prohibited wastes. As needed, the weighmaster will question the driver about the contents of the load. If suspicious looking loads are observed, the weighmaster will summon the load inspector so that the load can be inspected accordingly (see Section 3.2). If prohibited wastes are identified during the inspection of a load, the driver will be notified that the wastes must be removed from the facility premises and arrangements made for their proper disposal.

At the active landfill area, trained work crews will survey the loads during and after discharge. Equipment operators will also survey the waste as it being spread and compacted. If further assessment of any load is needed, the load inspector will be notified.

3.2 Load Inspection

In addition to inspecting suspicious looking loads, on a random basis, a trained load checker will select a load for inspection. The driver of the vehicle will be asked to unload the wastes at a designated location on the landfill site. The load inspector will record as much of the following information as needed to identify the responsible party: (1) date,(2) the hauling firm or vehicle owner's name. (3) vehicle's license plate number.

The driver will be instructed discharge the load. The discharged material will be carefully observed for the presence of any prohibited wastes in the load. If necessary, photographs and samples will be taken. The waste load will be taken to the active landfill area if no prohibited wastes are identified. If the load contains prohibited wastes, the hauler will be required to remove the wastes from the site and arrange for proper disposal.

3.3 Waste Handling Requirements

The load checker will be trained in hazardous materials management and will be given the responsibility of identifying and characterizing any waste considered hazardous based on its appearance or container labeling. If the generator is present when prohibited wastes are identified, the load inspector will inform the responsible party that the wastes must be removed from the facility premises and arrangements made for their proper disposal. If the generator is not present when prohibited wastes are identified, the load inspector will remove the wastes from the municipal waste stream and attempt to ascertain the identity of the generator. Hazardous wastes that have been removed from the active landfill area may be temporarily stored. (see Section 6) The load inspector will arrange for proper transport and disposal of the collected wastes to a waste facility permitted to accept hazardous materials. Whenever possible, generators will be asked to assist with the proper disposal of prohibited wastes.

3.4 Follow Up Procedures

One of the primary objectives of the Hazardous Waste Exclusion Program is to deter attempts to dispose of prohibited wastes at the landfill. A key element in achieving in achieving this objective is to identify the generators and to enlist their assistance in proper management and disposal of these wastes. In cases where prohibited wastes are identified after the generator has left the landfill site, and the generator is known, the load inspector will contact the generator by either telephone, or letter. Alternatively, the load inspector will inform the Health Department of the improper disposal and will request appropriate follow up. The purpose of contacting the generator is to engage his or her assistance in arranging for proper transportation and disposal of the prohibited wastes.

Records will be maintained of generators who repeatedly deliver or attempt to deliver prohibited wastes to the landfill. Waste loads delivered to the landfill by these generators will be subjected to increased surveillance by landfill staff. If improper disposal is repeated by these generators, the Health Department will by notified of the need for further action.

4.0 METHODS TO DETERMINE WASTE ACCEPTABILITY

4.1 Initial Assessment

One practical means for determining the acceptability of a suspicious waste is to examine a product label. In some cases, the label may identify the chemical contents of the waste. Warning labels such as "harmful if inhaled", "flammable" or "use only in a well-ventilated area" are often useful in identifying the waste type. In some cases,physical signs (odor, color)of a prohibited waste are detected. This observation, coupled with a hauler's response to questions, often provides sufficient data to identify a prohibited waste.

When physically assessing a waste load, the inspector may note an incompatibility in waste type that draws attention to the part of the load that seems out of place; an example would be one or more 55 gallon drums within a load. Once noted, the hauler would be questioned, and, if needed, additional assessment undertaken. The hauler will be required to remove any prohibited wastes from the landfill site.

4.2 Additional Assessment

In some cases, the steps outlined above may be insufficient to identify whether the waste can be accepted at the facility. Since it is the hauler's responsibility to ensure that a waste is permissible, the inspector may require that additional measures be undertaken by the hauler at the hauler's expense before the waste can be accepted for disposal. The hauler will be advised to exercise one or more of the following options;

- Written clarification by regulatory agencies
- Analysis by a state-certified laboratory

Ultimately, the responsibility for obtaining any laboratory analysis and the related costs lies with the hauler.

5.0 SITE CONTROL MEASURES

This section describes measures in addition to the load inspections plan that will be implemented at the site in order to prevent disposal of hazardous wastes.

5.1 Signs

Signs will be posted near the landfill entrance that clearly state the types of waste not accepted. One will be posted at the site entrance stating that a random load inspection program is in effect at the site.

5.2 Source Control

Salt Lake County will send regular commercial and industrial customers notices in the mail that contain the following general information:

- Hazardous wastes and certain other types of wastes (to be described in the notice) are not accepted at the landfill and may not be placed in refuse container
- A load inspection program is in effect at the disposal site for detecting hazardous and other unacceptable wastes.
- If hazardous or other unacceptable wastes are delivered to the landfill, the waste hauler will be billed for the removal and proper disposal of such wastes
- There are federal and state penalties for the improper disposal of prohibited wastes

5.3 Known Offenders

Special caution will be taken when accepting wastes from sources that have previously attempted to deliver prohibited was to the site. Precautionary measures may include (1) questioning of the vehicle driver by the weigh station attendant concerning the contents of the load, (2) visually inspecting the load before discharging, when feasible, (3) additional record keeping at the weigh station regarding the delivery of wastes from such sources, and (4) additional efforts by site personnel to observe the wastes discharged from such sources Repeat offenders will be banned from the site.

6.0 MANAGEMENT REQUIREMENTS

Employee training, record keeping, and basic support equipment are necessary components of an effective hazardous waste exclusion program.

6.1 Employee Training

Site personnel responsible for load inspections will be identified by the County and provided with adequate training and appropriate protective clothing and safety equipment. Facility personnel will complete a program to classroom instruction or on-the-job training that instructs them on how to perform their duties(including contingency plan implementation). The load inspector will be trained to identify, properly segregate, and compatibly store waste within a hazardous waste storage facility. The appropriate training received by each employee will be documented.

6.2 Health and Safety Requirements

All personnel involved in the SLVL's waste exclusion program will have immediate access to equipment specified below unless the Health Department rules it unnecessary:

- Internal communication or alarm system
- A telephone or hand-held two was radio capable of summoning emergency equipment
- portable fire extinguisher, spill containment equipment, and decontamination equipment

Additional equipment may include disposable protective suits, rubber aprons, vinyl boots, rubber or plastic gloves, safety goggles, hard hats with face shields, and chemical cartridge half-face respirators. A first aid kit and portable eyewash will be made available to site personnel.

Arrangements with the following organizations will be made by the waste control program manager to ensure that adequate response is available if the need for such services arise

- Police, fire departments, and emergency response teams
- Emergency response contractors, and equipment suppliers

All landfill personnel will play a role in preventing prohibited wastes from entering the site. An alert, well-trained staff is the foundation of a successful waste exclusion program. For example, the scale house operator is in an excellent position to scan incoming loads, while the equipment operator can spot prohibited wastes as they are spread and exposed during processing. Periodic formal inspections of selected loads are the responsibility of the inspector. Basic components of a waste exclusion program course are(1) methods of recognizing prohibited wasted and (2) proper handling and record keeping procedures.

The following elements will be included in a training course:

- Definitions and examples of prohibited wastes
- Methods for identifying prohibited wastes
- In-field load checking procedures
- Recommended actions if prohibited wastes are identified
- Hazardous waste handling

. Safety

. Emergency response

. Record keeping requirements

6.3 Record keeping

Given the liabilities associated with the improper disposal of prohibited wastes, a record keeping program will be implemented at the SLVL. Documentation of the results of load inspections is particularly important, since local and federal regulations are placing increasing emphasis on the control of incoming wastes. Data sheets are used to (1) summarize the results of each load check. (2) describe the discovery of any prohibited wastes, and (3) document any incidents (spills, fires, etc.) that might result from attempts to dispose of prohibited wastes at the transfer station.

The load checking data sheet lists at least the following:

. date

. location

. name of hauling firm or vehicle identification

A separate form will be used for any emergency or special incident and typically records the above and in addition:

. type of incident

. action taken

Incident logs will be generally completed monthly and summarized annually. The load checking data sheets and the incident loge will be kept on file for 3 years.

Another important component of the record keeping program is the manifest that accompanies prohibited wastes shipped to hazardous waste treatment or disposal facilities. In accordance with regulatory requirements, copies of manifests will be maintained for 3 years.

A record of training courses taken by each employee will also maintained. Training records will be maintained for 3 years.

6.4 Support Equipment

The following basic items are suggested to support the program

- shovels
- rakes
- protective coveralls, gloves, and boots
- safety glasses
- first aid kit

ADDENDUM 6

GENERAL TRAINING AND SAFETY PLAN

In the interest of maximizing efficiency and minimizing work-related accidents, the following courses are required of landfill personnel:

PROGRAM: SWANA LANDFILL OPERATORS TRAINING PROGRAM

Description: General review of landfill operations, including traffic systems for refuse trucks and heavy equipment, excavation and preparation of landfill cells, unloading and compaction of refuse, excavation and transport of cover material, and placement of daily and final cover.

Targeted Employees: All employees.

Frequency of Course Completion: Required for new employees prior to beginning work; repeated yearly.

PROGRAM: BI-MONTHLY SAFETY MEETING

Description: A different topic is presented every other month. Topics cover safety concerns in all aspects of landfill operation, including first aid, defensive driving, work on and around heavy equipment, and working on or near steep and potentially unstable slopes.

Targeted Employees: All employees.

Frequency of Course Completion: Bi-Monthly.

PROGRAM: SWANA Waste Inspector Course

Description: Identification of hazardous, potentially hazardous, and prohibited material that may be transported to the landfill. Methods for safe handling of hazardous and potentially hazardous material.

Targeted Employees: Waste inspectors, employees working in the active cell area.

Frequency of Course Completion: Required for new employees prior to beginning work; repeated yearly for waste inspectors and other employees working in the active cell area.

PROGRAM: HAZARDOUS WASTE OPERATIONS (HAZWOPER) AND EMERGENCY RESPONSE COURSE

Description: Overview of different classes of hazardous materials, pathways of exposure, personal protective equipment for working with hazardous materials, physical hazards, creating and maintaining a safe working environment.

Targeted Employees: Waste inspectors and employees working in the active cell area.

Frequency of Course Completion: 40-hour course required for new employees prior to beginning work; 8-hour refresher course repeated yearly.

ADDENDUM 7

CLOSURE/POST CLOSURE FINANCIAL ASSURANCE PLAN

FINANCIAL ASSURANCE

Closure/Post Closure Funds

Each year, the SLVSWMF sets aside a portion of the revenues generated by tipping fees to fund the final closure of the facility and the 30-year post-closure maintenance program. The amount set aside each year is based on the percentage of total capacity used in that year, such that the cumulative amount deposited over the life of the facility will equal the estimated cost* of final closure/post-closure. These funds are accounted for by the County auditor. They are shown in the Salt Lake County Comprehensive Annual Financial Report, which undergoes review by an independent certified public accounting firm, thereby assuring that these funds will be available for, and only used for, closure and post-closure care. Salt Lake County and Salt Lake City, on behalf of the SLVSWMF (Trustor) appointed the Salt Lake County Treasurer as Trustee to hold in trust the monies for the use and benefit of the Trustor and for the closure and post-closure care of the SLVSWMF.

Other Financial Mechanisms

In addition to establishing funds for closure and post-closure care, Salt Lake County also meets the Financial Test requirements for Solid Waste facilities proposed in the Federal Register (Vol. 58, No. 246, December 27, 1993). The County maintains an AAA bond rating and a very low debt ratio, which both attest to the ability of the County to meet the future obligations of closure and post-closure. These proposed regulations are designed to allow municipalities to manage their funds in accordance with standard government practices.

Projected Withdrawals

The SLVSWMF's Master Plan is designed to allow for simultaneous closure of some areas while other areas are actively accepting waste and new modules are under construction. Revenues from tipping fees will cover both the construction cost of new modules and the cost of ongoing closure in old modules. Therefore, no withdrawals from the fund are planned until the Facility stops accepting waste and stops generating revenue. This is currently projected to occur in the year 2027, by which time the landfill will be substantially covered with the exception of Module 11.

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* Adjusted for inflation (assume 6%)

ADDENDUM 8

AIR EMISSIONS COMPLIANCE PLAN

1. INTRODUCTION

In 1998 the State of Utah adopted new federal regulations under the Clean Air Act (CAA) regarding air emissions from municipal solid waste landfills. Under these regulations, the Salt Lake Valley Solid Waste Management Facility (SLVSWMF) is classified as a major emissions source for non-methane organic compounds (NMOCs), which comprise a small component of landfill gas. Implementation and adherence to these regulations has required SLVSWMF to install and operate a landfill gas collection system (LGCS) to collect and destroy NMOCs by incineration in a combustor flare. A figure illustrating the layout of the current LGCS is provided as Figure 8 of Part II, General Report, in SLVSWMF's Permit Application. The SLVSWMF is also subject to other air emission rules as specified in Utah State rules, including both air quality regulations as well as solid waste regulations pertaining to air quality and control of explosive gas migration. These regulations are discussed in the following sections below.

2. REGULATORY REVIEW

2.1. CLEAN AIR ACT REGULATIONS

2.1.1 40 CFR 60, Subpart WWW

The SLVSWMF is subject to federal new source performance standards (NSPS) under Title I of the CAA; 40 CFR Part 60, Subpart WWW, "Standards of Performance For Municipal Solid Waste Landfills." This regulation, commonly referred to as "Subpart WWW," contains provisions that have required SLVSWMF to construct and maintain the LGCS for control of NMOC emissions. In addition, operational requirements, monitoring, record keeping, and reporting are all addressed and specified by this regulation. These requirements are written into the facility's Title V operating permit, as discussed in Section 3.0 of this addendum.

2.1.2 40 CFR Part 63, Subpart AAAA

The SLVSWMF is subject to national emission standards for hazardous air pollutants (NESHAPs) under Title III of the CAA. This regulation requires that sources implement Maximum Available Control Technology (MACT) for emission sources to reduce hazardous air pollutant emissions. Monitoring, recordkeeping, and reporting requirements (separate from those required by Subpart WWW) are prescribed through an approved startup, shutdown, and malfunction (SSM) plan filed on January 16, 2004, with UDAQ by the SLVSWMF. This plan has been approved by UDAQ.

2.1.3 40 CFR Part 70 & 71

The SLVSWMF is subject to federal Operating Permit rules as prescribed under Title V of the CAA. Under this provision, all regulatory requirements discussed above are consolidated into an overall facility air permit, commonly referred to as a "Title V permit". Operating Permits are issued and overseen by UDAQ, who operates the Part 70 program as allowed by the CAA, and administers it under UAC-307-415. The SLVSWMF holds a Title V permit (No. 3500536001) issued by UDAQ in May 2002. This permit must be renewed every five years.

2.2 STATE AIR RULES

Many portions of the State Air Rules apply to the facility. The significant ones that affect daily operations (versus administrative rules) are discussed below, however, this is not an exhaustive list of all rules that apply to SLVSWMF.

2.2.1 Emission Rules for Municipal Solid Waste Landfills.

The SLVSWMF is subject to general air rules as found in UAC R-307-221. These rules parallel Subpart WWW regulations, and are incorporated into the facility's Title V permit.

2.2.2 Emission Inventories

The SLVSWMF is subject to periodically completing air emission inventories or statements under UAC R-307-150, 155, and 158. The most recent year that air emission inventories were required by UDAQ is 2002. SLVSWMF submitted the required inventory to UDAQ on April 15, 2003, and updated it for additional parameters requested by UDAQ in 2004.

2.2.3 Fugitive Dust

The SLVSWMF must control fugitive dust from general landfilling operations as required by UAC R307-205 and 309. A current fugitive dust control plan for the SLVSWMF is on file with UDAQ, and is updated periodically as needed. The plan has been approved by UDAQ.

2.2.4 Sulfur Content of Fuels

SLVSWMF must use low-sulfur fuel as required by UAC R307-203-1.

2.3 SOLID WASTE RULES

SLVSWMF must control migration of landfill gas at the perimeter boundaries of the landfill as well as into permanent structures on the landfill. Monitoring of landfill gas methane concentrations as percent of lower explosive limit, and mitigation of excessive gas is required under federal solid waste rules as found in 40 CFR Part 258, Section 23, and in Utah rules in UAC R-315-303-2. Compliance with these rules is described in Part II of the facility's operating permit application.

3. COMPLIANCE PLAN

All Federal and most of the State regulations specific to SLVSWMF have been compiled into the Title V Operating Permit held by the facility. The Title V permit has become the compliance guide by which the SLVSWMF operates; as conditions or regulations change, these changes are reflected in permit modifications submitted to UDAQ, which reviews and incorporates them into the permit. The remainder of this section deals with monitoring requirements at the SLVSWMF.

3.1 MONITORING REQUIREMENTS

3.1.1 LGCS

Gas Wellfield. Once per calendar month, each gas well at the SLVSWMF must be monitored for percent oxygen/nitrogen, temperature, and flow. If parameters indicate that oxygen/nitrogen levels exceed 5%/20% respectively, if temperature exceeds 50° C, or if positive wellhead pressure is recorded, then corrective action must be taken in accordance with Subpart WWW. This monitoring is performed to assess if there is a sufficient density of gas collectors placed in the landfill, and to determine if excess ambient air is infiltrating into the waste.

Flare Station. Recordings of gas flow levels to the flare in standard cubic feet per minute (scfm) must be taken at least once every 15 minutes of flare operation. Additionally, the internal temperature of the combustion gas within the flare must be monitored and recorded continuously. The flare station is equipped with a disc-chart datalogger that records these parameters continuously. Temperature must maintain a range within 28° C of the tested destruction efficiency capability of the flare.

3.1.2 Landfill Surface Emissions Monitoring

Once per quarter, the landfill surface must be monitored using a handheld instrument to assess methane levels and confirm the efficacy of the control system. Readings exceeding 500 parts per million (ppm) methane require corrective action as prescribed by Subpart WWW. If corrective action is not effective, then the wellfield must eventually be expanded into the affected area.

3.1.3 Fugitive Dust Monitoring

Fugitive dust is generated by vehicular and heavy equipment (trucks, front-end loaders, bulldozers, road graders, etc.) traffic on roads and other areas, and also by wind erosion from open areas and storage piles, grading activities and module closures. Monitoring of fugitive dust is performed by landfill staff that are trained to survey fugitive dust. At a minimum of once per month, an observer trained in opacity observation by EPA Method 9 will perform a certified observation of dust conditions. Visible emissions shall not exceed 10% at the property boundary and 20% onsite except during periods when wind speeds exceed 25 miles per hour and control measures in the most recently approved fugitive dust control plan are being taken.

Dust control measures included in the Fugitive Dust Control Plan on file with UDAQ include traffic and speed control, watering of roadways, daily covering of waste, and erection of wind fences along landfill perimeter.

3.1.4 Explosive Gas Migration Monitoring

Once per quarter all structures on the landfill are monitored with a handheld instrument to determine the LEL of methane under and within structures on the landfill. If LEL exceeds 25%, corrective action will be initiated as prescribed by regulations. In addition, monitoring locations along the landfill perimeter are monitored once per quarter to determine if LEL exceeds 100% at the facility boundary. If this condition is observed, mitigation will be performed as required by regulations.

3.2 REPORTING REQUIREMENTS

3.2.1 Title V Requirements

Unavoidable Breakdown Reports. If a component of the LGCS breaks down or does not function properly to an unforeseen and unavoidable event (i.e. power outage, catastrophic equipment failure, etc.), the SLVSWMF must report this event to UDAQ with seven days of occurrence.

Source Deviation Reports. If the SLVSWMF deviates from conditions specified by the Title V Operating Permit, a Source Deviation Report must be filed with UDAQ within seven days of occurrence.

Semiannual Monitoring Reports. The Title V Operating Permit requires semiannual monitoring reports be submitted to UDAQ every six months. These reports review and summarize all conditions discussed above. All data generated from monitoring is included in report appendices. In addition, they also discuss instances of deviation with permit requirements, system upgrades or significant repairs, and system expansion, if applicable.

Annual Compliance Certification. Title V requires an annual certification of facility compliance with Operating Permit and Subpart WWW and AAA requirements. This report is submitted to UDAQ and EPA Region VIII.

3.2.2 Utah Air Rule Requirements

General Emission Inventory. A full inventory of all facility emissions, including mobile sources, is generally required of Title V sources once per year by UDAQ, however, this yearly requirement is at discretion of UDAQ.

Hazardous Air Pollutant Inventory. Upon discretion and request of UDAQ, SLVSWMF must prepare a specialized inventory to report only defined hazardous air pollutant emissions from the facility.

Emission Statement Inventory. If requested by UDAQ, SLVSWMF must prepare a specialized inventory to report volatile organic compound and nitrogen oxides emissions from the facility. These compounds are precursors to low-level formation of ozone, a regulated air pollutant of concern to UDAQ. Because ozone levels fluctuate from year to year, this statement is only prepared at the discretion of UDAQ.

3.2.3 Solid Waste Rule Requirements

Reporting of routine explosive gas monitoring is included in the annual operating report submitted to the DSHW by the SLVSWMF. If exceedences of gas are observed beyond regulatory limits, DSHW is notified immediately as required by regulation.

3.3 RECORDKEEPING REQUIREMENTS

Records of all required monitoring data and support information are maintained at SLVSWMF for a minimum of five years from the date of monitoring, measurement, reporting, or application. Support information includes all calibration and maintenance records, continuous monitoring strip charts, and all reports required by regulatory agencies.

4. FUTURE ISSUES

4.1 GAS-TO-ENERGY DEVELOPMENT

The SLVSWMF is anticipating that landfill gas, a renewable resource, will be developed and utilized for electrical energy production within this permit period. Most likely, this will involve the placement of combustion turbines or reciprocal electrical generating engines on the landfill site. This type of facility, when designed, will be permitted and operated in accordance to federal and state air quality regulations as required by UDAQ and EPA.

ADDENDUM 9

ALTERNATIVE DAILY COVERS

COVER SYSTEM

The SLVSWMF uses soil and Posi-Shell® as daily cover. The facility is also considering the use of another similar product called ProGuard SB® Both Posi-Shell and ProGuard are thin, cementitious coatings applied to the vertical sides of refuse piles at the Active Landfill. They are used as a daily side cover to control odors, dust, erosion, and to enhance aesthetics. Both Posi-Shell and ProGuard are 100% recycled, non-flammable and non-toxic, and provides maximum utilization of airspace by reducing the need for additional soil layers on the sides of refuse piles. Further detail on both products is provided on the following pages. A letter of approval from DSHW for use of ProGuard SB is also provided.

OLENE S. WALKER
Governor

GAYLE F. McKEACHNIE
Lieutenant Governor

State of Utah

Department of Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF SOLID & HAZARDOUS WASTE
Dennis R. Downs
Director

January 13, 2005

Romney M. Stewart, Executive Director
Slat Lake Valley Solid Waste Management Council
6030 West California Ave.
Salt Lake City, Utah 84104

Subject: Alternative Daily Cover Approval

Dear Mr. Stewart:

The Division of Solid and Hazardous Waste has reviewed you request to use ProGuard SB supplied by New Waste Concepts, Inc. as an alternative daily cover. ProGuard SB is approved for use as an alternative daily cover at the Salt Lake Valley Landfill facility with the following conditions:

ProGuard SB must be applied according to the manufacture's specifications;

A minimum thickness of ¼ inch over all waste;

A standard six inch soil cover will be applied no less frequently than once each seven calendar days;

Any waste that is covered with ProGuard SB must be covered with a six inch soil cover within seven calendar days; and

ProGuard SB may not be used when weather conditions, such as wind or rain, prevent proper application or when ProGuard is not providing proper litter control.

If you have any questions, please contact Roy Van Os or Ralph Bohn at 801/538-6170

Sincerely,

Dennis R. Downs, Executive Secretary
Utah Solid and Hazardous Waste Control Board

DRD/rtb/kk

c: Health Officer/Director, Salt Lake Valley Health Dept.

file: Salt Lake Valley Landfill

TN:2005000039.doc

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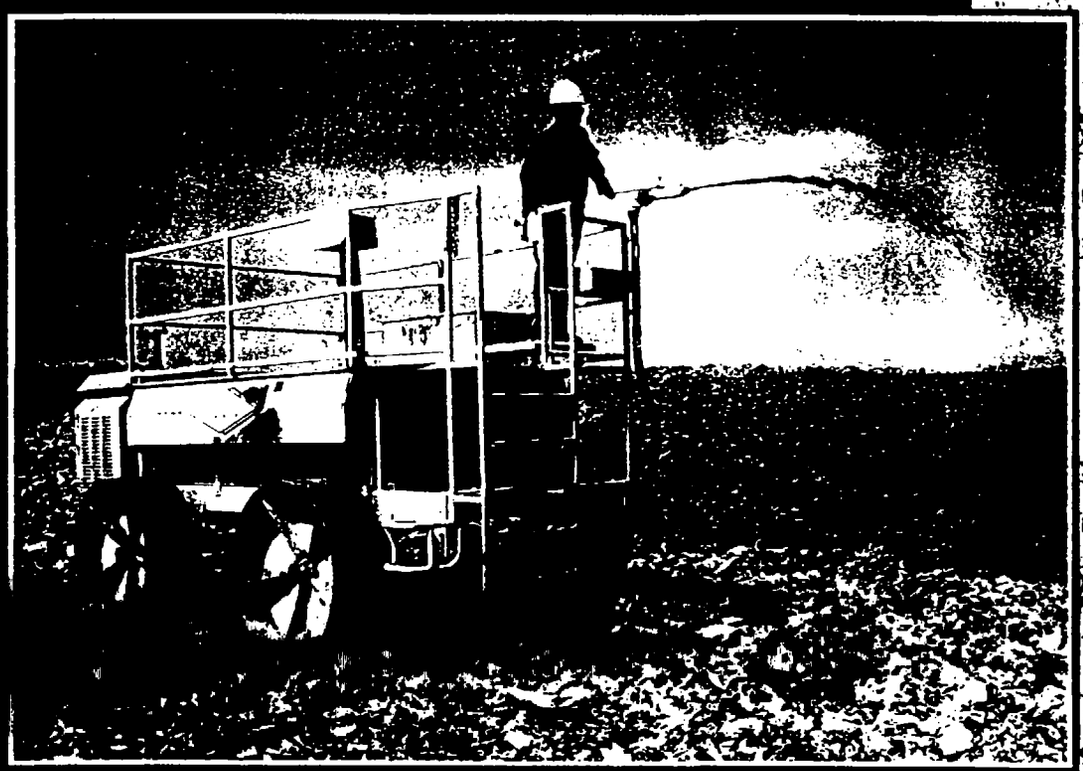
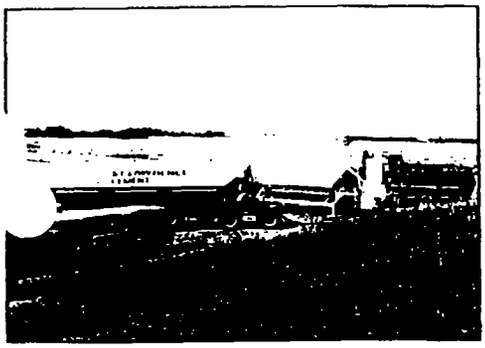
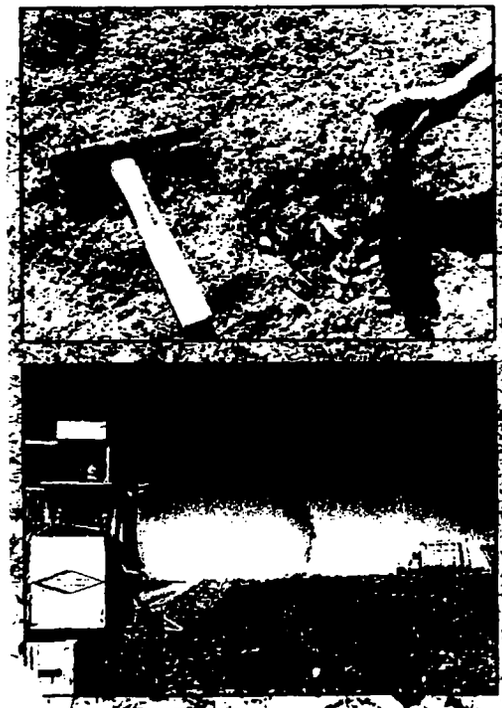


LSC

LANDFILL SERVICE
CORPORATION

POSI-SHELL® APPLICATION





Composition

Posi-Shell® is 100% recycled alternative to traditional, costly soil layering. It has met the rigorous standards required for approval by numerous state regulatory agencies and has been favorably evaluated for Superfund use by the USEPA.

Made entirely of non-flammable, non-toxic recycled materials, Posi-Shell is an environmentally compatible combination of: Cementitious Mineral Binder, Liquid (Water or Leachate) and Posi-Pak® with Fibers.

Mineral Binder: The cementitious mineral binder component also acts to neutralize odors and contaminants present in leachate. It is comprised of recycled by-products now put to good use in the Posi-Shell® formula.
Liquid: Posi-Shell® has been formulated to use either water or landfill leachate as its liquid base. For landfill owners, this means that you can now use leachate as part of your daily cover process rather than transporting it offsite for treating.
Posi-Pak®: Lightweight, easy to handle and ready to use Posi-Paks® contain a mixture of materials including recycled plastic and cellulose fibers.

After application, the Posi-Shell® slurry hardens to a non-flammable and highly impermeable coating that easily conforms to the irregular contours of your landfill. Its color and texture provide a uniform appearance that is aesthetically appealing to nearby residents.

Application

Applying Posi-Shell cover is a simple one-man operation. Once the ten-minute process of mixing the dry components with a liquid is completed, the mobile applicator is moved to the working face. The specially designed applicator provides exceptional ability to access difficult, steep or muddy areas. High pressure slurry pumping capability [illegible] from a single station.

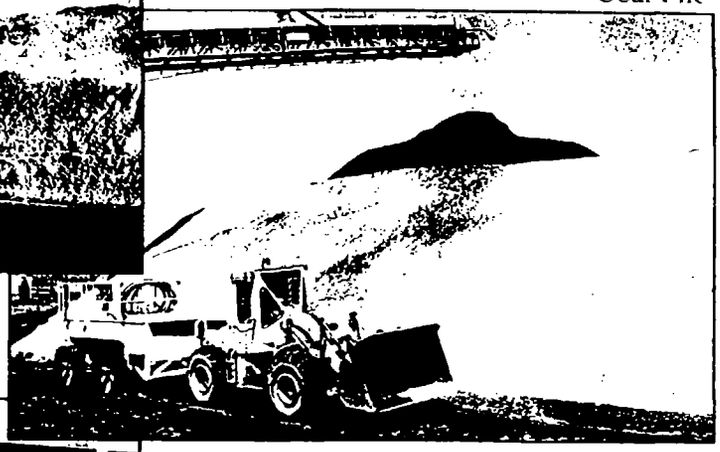
Posi-Shell® has been approved [illegible] cover for landfills [illegible]

[illegible] space • Mitigates odors • Reduces vector population • Increases safety through non-flammability • Cures to form a concealing, earthtone crust which discourages scavenging • Reduces airborne debris • Posi-Shell synthetic cover for waste piles is patented technology in the U.S. and Internationally

SPECIALTY APPLICATIONS

Erosion Control

Coal Pile



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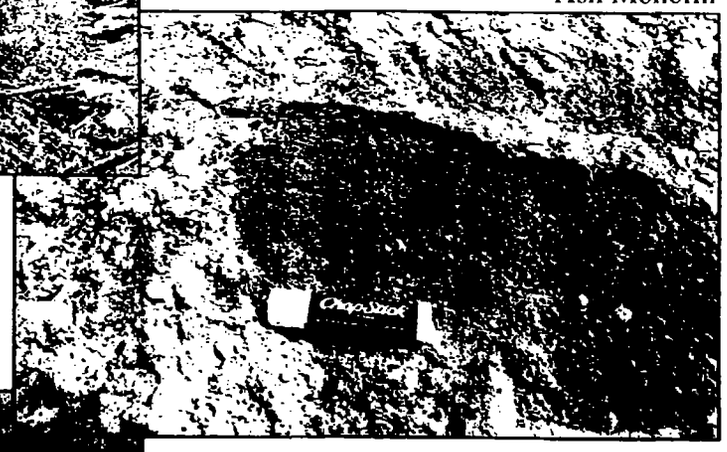
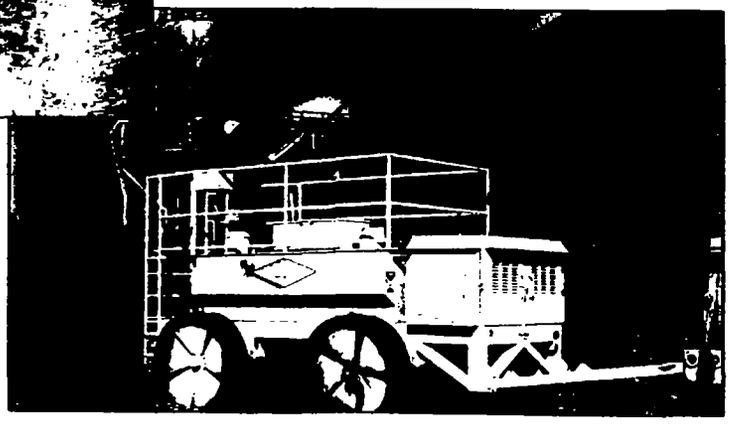
Ash Monofill

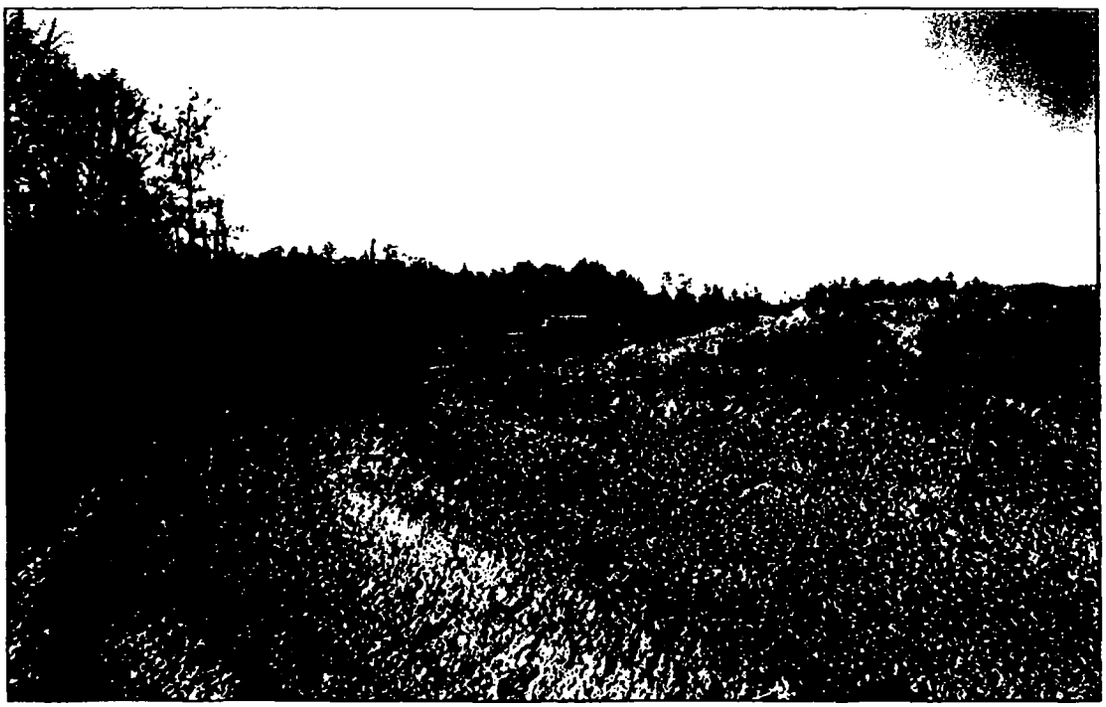


Compost Pile

Cement Clinker Pile



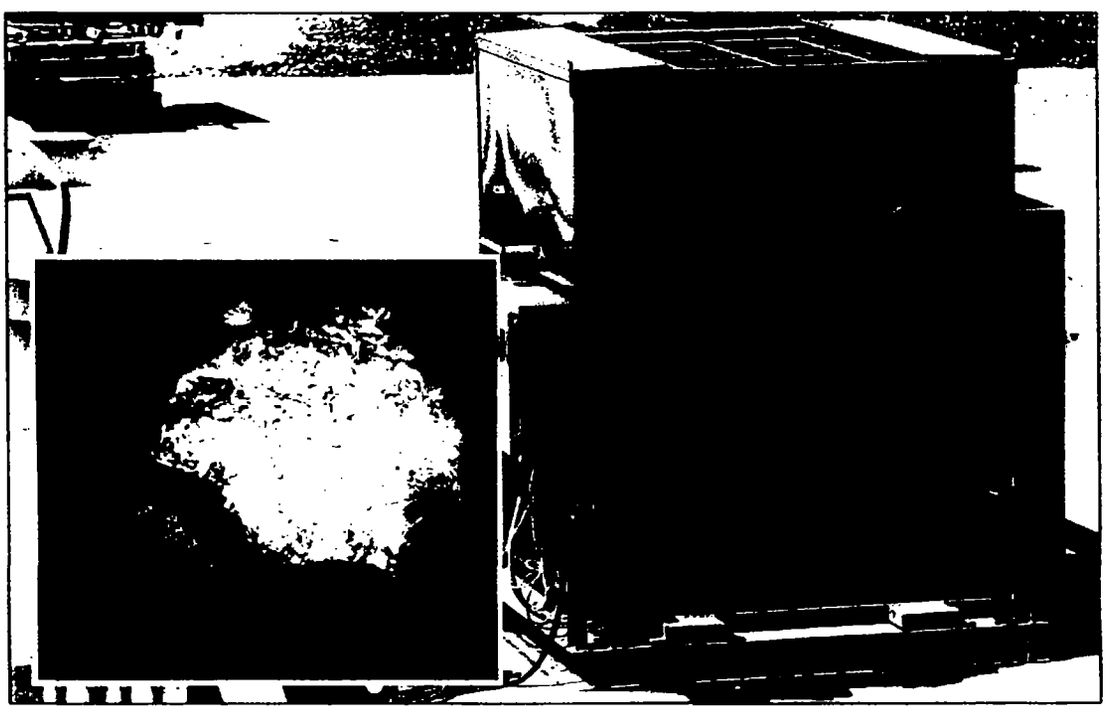
EROSION CONTROL



Posi-Shell® Cover provides a hard-shell coating to effectively protect against wind and water erosion. Typical applications are on intermediate and preclosure areas of landfills and other large sloping soil surfaces.

LSC
LANDFILL SERVICE
CORPORATION

CUSTOM BLENDED BINDERS AND FIBERS



Landfill Service Corporation has the technology to produce custom-blended, cementitious mineral binders and special fiber mixtures required to suit specific projects. Typical projects have involved various combinations of cements, flyashes, lime by-products, latex materials and cellulose and plastic fibers.

LSC

LANDFILL SERVICE
CORPORATION

Landfill Products from New Waste Concepts

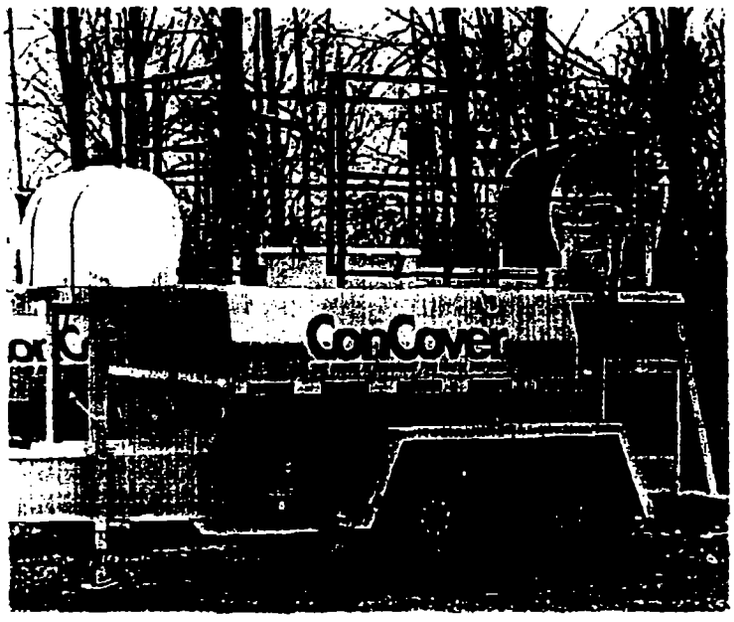
ProGuard SB
Single Bag System

"...ProGuard SB eliminates dust and powders, and delivers effective over-night cover for *pennies a square foot.*"

The newest, easiest, most cost effective alternative daily cover material is here. ProGuard SB offers the quality you have come to expect from New Waste Concepts, with the added ease of a single component system. Just mix the single bag blend of recycled fiber and polymers with water in the ConCover All Purpose Sprayer (CAPS) and apply.

Cost Effective
ProGuard SB is formulated to cost just ***pennies* a square foot.** Once you've tried ProGuard SB, you'll agree, there is no better ADCM. Let New Waste Concepts put ProGuard SB to work for you.

Easy To Use
ProGuard SB alternative daily cover is a blend of polymers and recycled fiber that provides reliable overnight protection, without the hassle of two dry components. ProGuard SB is unique in that the engineered polymers and recycled fibers are combined into one dry component which eliminates fine powders and dust.



Site Support and Evaluation
Our knowledgeable staff will train your operators on product applications and usage, and then follow up with routine visits to insure you are getting the maximum benefit from ProGuard SB.

If you'd like to experience superior overnight coverage at an affordable rate, give us a call. A New Waste Concepts representative will be happy to discuss how we can put ProGuard SB to work for you.

NWC
NEW WASTE CONCEPTS

New Waste Concepts, Inc.
160 C. Lavoy Rd.
Erie, Michigan, USA 48133
Phone (734) 847-8997 or (800) 359-2783
Fax (734) 847-9008
Email: info@nwci.com
www.nwci.com

Fewer Bags.

More Coverage.

Lower Cost.

Count the Square Feet!

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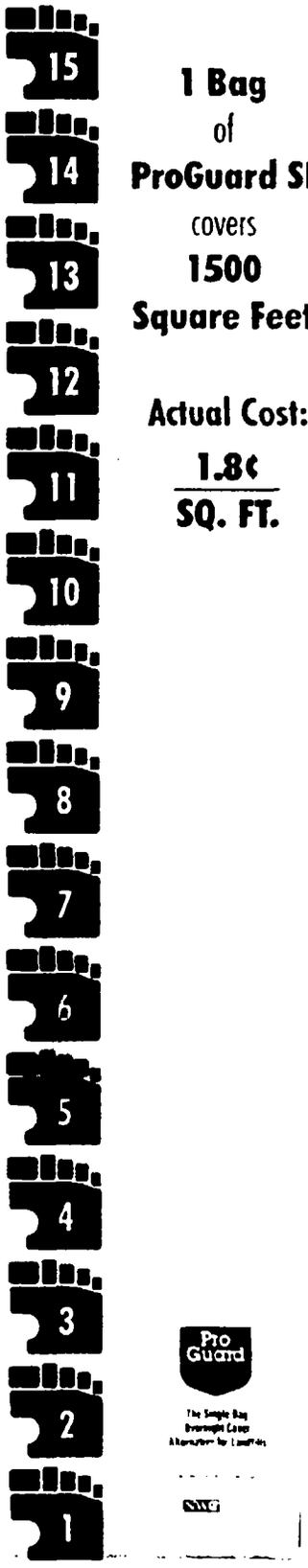
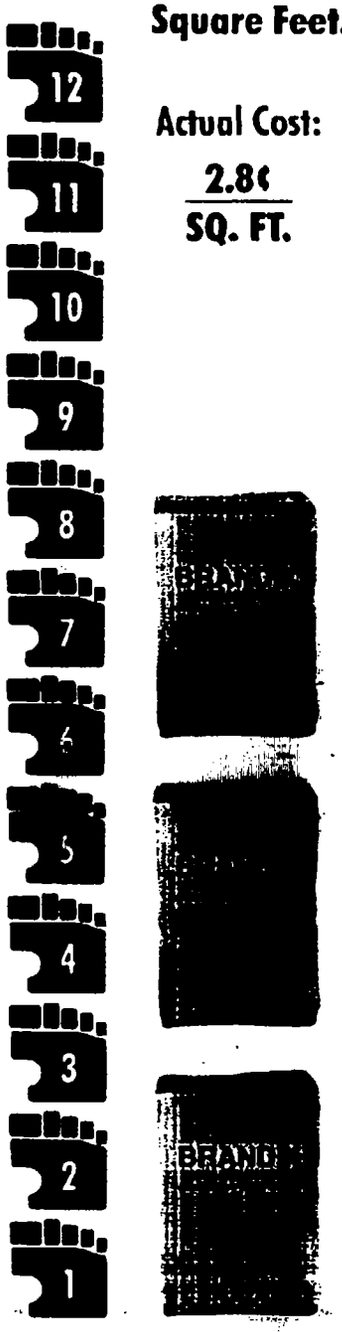


1 Bag
of
ProGuard SB
covers
1500
Square Feet.

Actual Cost:
1.8¢
SQ. FT.



3 Bags
of
Brand X
cover
1200
Square Feet.

Actual Cost:
2.8¢
SQ. FT.

MATERIAL SAFETY DATA SHEET

Trade Name: *ProGuard Single Bag® ProGuard SB®*

Section I - General Information

Product Name:	ProGuard Single Bag® / ProGuard SB®
Manufacturer:	New Waste Concepts, Inc. 26624 Glenwood Road Perrysburg, Ohio 43551 (419) 872-2190
Date MSDS Prepared:	August 29, 2003
Last Review Date:	August 29, 2003
MSDS Preparer's Name/Address:	Prepared by manufacturer
Unit of Issue/Container Type:	Plastic bag/ 40 lb bales
Product Description:	Recycled paper fiber and polymer

Section II - Ingredient/Identity Information

Proprietary (Y/N):	Y

Section III - Physical/Chemical Characteristics

Appearance and Odor:	Fiberous with brown or natural green color
Boiling Point:	N/A
Melting Point:	N/A
Vapor Pressure:	N/A
Vapor Density:	N/A
Specific Gravity:	N/A
Decomposition Temperature:	N/A
Evaporation Rate:	N/A
Solubility (H_20):	Slightly Soluble
Percent Volatiles by Volume:	N/A
Viscosity:	N/A
pH:	N/A

Section IV - Fire and Explosion Hazard Data

Flash Point:	>525 F°
Lower Explosive Limit:	N/A
Upper Explosive Limit:	N/A
Extinguishing Media/Methods:	Use CO_2, dry chemical foam, or water
Special Fire Fighting Methods:	None
Unusual Fire/Explosive Hazards:	As supplied, if ignited, dry bales will burn

Section V - Reactivity Data

Stable (Y/N):	Y
Conditions To Avoid:	Heat/fire
Materials To Avoid:	None known
Hazardous Decomposition Products:	CO_2, CO,

Section VI - Health Hazard Data

Routes of Entry:

Inhalation (Y/N):	Y
Skin (Y/N):	N
Ingestion (Y/N):	N
Other:	N
Contact Eye/Skin Hazards:	N/A
Acute Overexposure Symptoms:	Avoid prolonged inhalation of fiber material
Chronic Overexposure Symptoms:	None known

Emergency Treatment/ First Aid Procedures:

Gross Inhalation:	Move victim to fresh air environment. Seek medical attention
Gross Ingestion:	No oral toxicity known
Skin Contact:	Wash affected areas with soap and water
Severe Eye Contact:	Flush eyes with water for 15 minutes. Seek medical attention if irritation persists

Section VII - Precautions For Safe Handling and Use

Personal Protective Equipment (Routine Use):

Respirator Protection:	Face shield recommended but not required
Gloves:	Recommend latex, butyl rubber, or nitrile gloves
Eye Protection:	Safety goggles or glasses recommended
Other:	None
Work Practices:	This product is to be used in outdoor environments. Do not use in the presence of ignition sources.
Ventilation:	Use outdoors
Spill/Release Procedures:	Sweep material into drums and dispose of in accordance to local, state, and federal laws. Does not need to be reported to CERCLA or RCHA.
Neutralization Procedures:	N/A
Waste Disposal Procedures:	This material is not hazardous, nor does it exhibit any hazardous waste characteristics
Storage/Handling Procedures:	Store product in a dry environment
Other Health Hazard Precautions:	Use proper lifting procedures when attempting to dispense product from 40 lb. bales

Flammability Test

Abstract
Solid waste to be disposed of in a landfill is required to be characterized as non-hazardous according to the definitions set forth in 40 CFR 261. Solid waste placed in a landfill must not exhibit the following characteristic: ignitability, reactivity, corrosivity or toxicity. New Waste Concepts, Inc. contracted Smith and Associates Laboratories to test the ignitability of ConCover® and ConCover-180™ as well as 30 geotextile (tarp) samples. Flammability was tested using the protocol required by ASTM Method D 4982-89 entitled *Standard Methods for Flammability Potential Screening Analysis of Waste.*

Procedure
Samples identified as ConCover®, ConCover-180™, and 30 different tarp composites were submitted for flammability potential as specified under ASTM D 4982-89 protocol. A Bunsen burner fueled by natural gas was ignited and the fuel/air ratio was adjusted to produce a blue flame approximately one and one quarter inch in height to test the samples.

ConCover®
A 2 inch square by 1/4 inch dried sample of ConCover® was placed in an aluminum weighing dish and the flame of the burner was held directly above the sample with no ignition. The same sample was then held directly at the tip of the flame for 15 seconds. The flame turned from blue to yellow indicating ionization but did not cause ignition. The sample, after 15 seconds was removed from the flame and showed scorching.

ConCover-180™
A 2 inch square by 3/4 inch dried sample of ConCover-180™ was placed in an aluminum weighing dish and the flame of the burner was held directly above the sample with no ignition. The same sample was then held directly at the tip of the flame for 15 seconds. The flame turned from blue to yellow indicating ionization but did not cause ignition. The sample, after 15 seconds was removed from the flame and showed scorching.

Geotextile Fabrics (Tarps)
A 1 inch square cut piece of each submitted sample was placed in an aluminum weighing dish and the flame of the burner was held directly above the sample for 15 seconds and observed for ignition. The same sample was then held directly at the tip of the flame for 15 seconds and observed for ignition and/or combustion. The results of these tests are summarized in Table 1.

Results
Both ConCover® and ConCover-180™, prepared according to manufacturers specifications, demonstrate a "None-Extremely Low" flammability potential as tested under ASTM D 4982-89 protocol.

None of the tarp samples tested ignited due to gas formation caused by mild heating. All samples tested by contact of an open flame did melt within 1 to 3 seconds of contact and all acted as a fuel source to support combustion even after removing from the flame until all material was consumed. All of the tarp samples tested are rated as flammable as tested under ASTM D 4982-89 protocol.

Flammability Test For Geotextile Tarp Samples

Sample	Vapor Ignition	Flame Ignition
Amoco Style 2006	Negative	Melt & Burn Completely
Amoco Style 9298	Negative	Melt & Burn Completely
Amoco Non-Woven Style 9298	Negative	Melt & Burn Completely
Amoco Woven CEF Style 2006	Negative	Melt & Burn Completely
Aqua-Shed Ultra-Thin .75 mil	Negative	Melt & Burn Completely
Aqua-Shed Seller 6 mil	Negative	Melt & Burn Completely
Aqua-Shed Seller 10 mil	Negative	Melt & Burn Completely
Aqua-Shed Seller 20 mil	Negative	Melt & Burn Completely
Cormier WP-1440 BK	Negative	Melt & Burn Completely
Cormier WP-640	Negative	Melt & Burn Completely
Cormier C1-6	Negative	Melt & Burn Completely
Cormier WP-2200 BK	Negative	Melt & Burn Completely
Cormier RBG 16-6HD	Negative	Melt & Burn Completely
Exxon Typar 3151	Negative	Melt & Burn Completely
Exxon Typar 3201	Negative	Melt & Burn Completely
Exxon Typar 3301	Negative	Melt & Burn Completely
Exxon Typar 3341	Negative	Melt & Burn Completely
Exxon Typar 3401	Negative	Melt & Burn Completely
Exxon Typar 3601	Negative	Melt & Burn Completely
Exxon Typar 3801	Negative	Melt & Burn Completely
Fabrene	Negative	Melt & Burn Completely
GeoCover 4oz Woven	Negative	Melt & Burn Completely
GeoCover 6oz Woven	Negative	Melt & Burn Completely
Griffolyn Type TX-1200	Negative	Melt & Burn Completely
Griffolyn Type 85	Negative	Melt & Burn Completely
Hoechst Celanese Type 1120	Negative	Melt & Burn Completely
Phillips 66 Fabrisoil #1	Negative	Melt & Burn Completely
Phillips 66 Fabrisoil #2	Negative	Melt & Burn Completely
Polyfelt (Sewer) Model: TS-700	Negative	Melt & Burn Completely
SpaceSaver (James Clem Corp)	Negative	Melt & Burn Completely

Table 1

Landfill Stabilization Test

Abstract

The waste stream deposited in nearly all solid waste landfills consists largely of organic wastes which degrade over time through biologic processes. The activity of microorganism found within the landfill consume organic matter as a source of energy and dictate the rate and stage of degradation of the organic waste materials. The products of the degradation can be monitored for key indicator parameters in landfill gas and leachate to identify the level of degradation. Monitoring the indicator parameters provides the landfill operator with a tool to identify the level of degradation taking place within the landfill and to evaluate the quality of the landfill gases produced. Methane produced in the later stages of degradation may be utilized as an energy source. If the methane levels in the landfill are present at an acceptable concentration and will continue to be a reliable source over a specified interval of time, it is a viable resource.

The steady anaerobic methanogenic phase is the final stage of waste degradation in a landfill, and can be identified as the stage in which the concentration of methane and carbon dioxide stabilize in the landfill gas. Prior to reaching tabilization, the waste passes through three general phases, starting with the aerobic phase, then the non-methanogenic anaerobic phase, which are followed by the unsteady methanogenic phase. Each of the phases can be identified by the relative concentrations of methane, oxygen, nitrogen, carbon dioxide, hydrogen, water, and other indicator parameters in landfill gas. High levels of biochemical oxygen demand (BOD) and chemical oxygen demand (COD) in the leachate samples may also be used as indicators of the level of bioactivity, as these parameters are a measure of the dissolved oxygen used by the microorganisms in the biochemical oxidation of the organic matter.

The daily cover material applied at a landfill facility can play a role in the rate at which sections of the landfill will reach stabilization. Nutrients within the landfill that feed the indigenous microorganisms are transported through moisture migrating through the waste. If the pathway for moisture migration through the waste is inhibited, the rate and uniformity of degradation will decrease. The use of alternative daily cover materials may allow for a more rapid rate of moisture migration through the waste pile as compared to soil. New Waste Concepts, Inc. contracted Hull and Associates, Inc. of Toledo, Ohio to investigate the effects of daily cover materials on the initial phases of waste stabilization in a typical solid waste landfill. The following report is taken from that investigation.

Apparatus

Two separate test columns were constructed using different daily cover materials containing a homogeneous mixture of solid waste that is representative of a typical waste stream and layered with daily cover materials placed in vertical columns designed to simulate typical landfill conditions. The test columns were constructed of a 1/8" thick by three feet high clear acrylic column with an eight inch outer diameter. The inner-top and bottom pieces were secured to the columns using steel rods with an O-ring placed between the inner-top and bottom of the column. The rods were tightened to create an air tight seal in the test column. A valve was constructed at the base of the apparatus to allow for the collection of leachate samples from the test column. The inner-top piece was cut out in the center to allow for waste placement in the test column. An outer-top piece was designed to fit directly above the inner top, after the waste was placed in the test column, with the inner-top and outer-top pieces fitting together with an O-ring and the two pieces were connected to form an air tight seal using several bolts. Attached to the outer-top of the test column was a pressure gauge, a temperature gauge for the probe that was to be placed in the center of the test column, a valve for the collection of air samples and a chamber to introduce rainwater into the test column.

The test columns were scaled to approximate a landfill in which four layers of typical solid waste are placed at 5 foot lifts, and each layer topped with daily cover. The material was mixed and placed in layers in the test column. The composition was 36.5% paper and paper board, 31.2% food and yard wastes, 10.4% metals, 8.9% glass, 4.0% plastics, 3.4% wood, 2.6% rubber and leather, 1.8% textiles, and 1.2% of miscellaneous material. The volume of waste placed within each column was scaled to represent the same volume of waste that would be

Summary of Laboratory Analytical Data for Landfill Stabilization Experiment

		Week 0*		Week 1		Week 2		Week 3	
Parameter	Units	Soil	ConCover	Soil	ConCover	Soil	ConCover	Soil	ConCover
Methane	ppm	1.5	1.5	17	68	24,861	48,896	40,464	55,804
BOD	mg/L	< 4	< 4	N/A	15,200	18,100	23,200	34,000	37,000
COD	mg/L	< 5	< 5	N/A	21,800	32,000	36,000	40,000	58,000

*The values for BOD and COD for Week 0 represent rainwater used in experiment.
The values for methane for Week 0 represent atmospheric air.

Table 1

placed within a landfill using the different daily cover materials. Water was added to each of the wastes to achieve a moisture content of approximately 1500 pounds per cubic yard, which is typical for solid waste. Three hundred milliliters of leachate was added to the bottom layer of waste in each test column to simulate typical conditions within the fill area. A few grams of compost starter was also added to each layer placed in the columns, to stimulate bioactivity in each of the test columns.

Procedure

After the test columns were constructed, the columns were placed in an insulated box with a heat source attached to a thermostat designed to sustain a temperature of 110°F within the box. Temperature and pressure readings were recorded for each of the test columns throughout the duration of the project. To simulate rainfall and induce leachate generation, an average of 300 milliliters of rain water was added through the test chamber on a daily basis.

Leachate samples were collected from each of the test columns on a weekly basis and analyzed for BOD and COD to provide an indication of the bioactivity within the test column. Air samples were collected on a weekly basis, and these were analyzed for methane to serve as an indicator of the stage of waste degradation.

Results

A review of the laboratory analytical data for the landfill gas and leachate samples collected over the one month test period is provided in Table 1. The results illustrate the effect of daily cover material on the initial phases of degradation of the waste. Methane concentrations were reported to be significantly lower in the soil test column compared to the test column with ConCover® used as daily cover. After one week, the methane concentration in the soil test column was reported at 17 parts per million (ppm), while the ConCover® was 68 ppm. At the end of the test period, the methane concentrations increased to 40,464 ppm in the soil test column and 55,804 ppm in the ConCover® test column.

The leachate samples collected from the test columns support the findings of the landfill gas samples, with the BOD and COD readings being higher in the samples collected from the ConCover® test column than those reported for the soil test column. The leachate sample collected after one week from the ConCover® materials was reported at 15,200 ppm for BOD and 21,800 ppm for COD, while no sample was collected from the soil test column due to the lack of leachate at the bottom of the test column. The final leachate sample collected from the soil test column was reported to contain BOD at 34,000 ppm and COD at 40,000 ppm. The final leachate sample collected from the ConCover® test column reported 37,000 for BOD and 57,000 for COD.

Evaluation of the laboratory analytical data for the landfill gas and leachate samples provides a demonstration of the effect of daily cover material on the degradation of waste. The results indicate that the bioactivity, and methane generation, was reported lower in the soil test column than in the ConCover® test column. These findings are supported by the temperature readings collected throughout the duration of the project, as the internal temperature readings for the ConCover® test column were consistently reported to be 1-2°F higher than in the soil test column.

The apparent differences in the bioactivity in the different test columns can be attributed to the daily cover materials. The soil in the soil test column inhibits or slows the migration through the test column of the rain water and leachate, both of which contain nutrients and microorganisms. This is illustrated by the fact that no leachate was present in the base of the soil test column at the end of the first week of the experiment, although leachate was present in the other test columns.

ENVIRONMENTAL IMPACT REPORT OF THE USE OF CONCOVER®

Toxicity Characteristic Leaching Procedure

Abstract

Solid waste to be disposed of in a landfill is required to be characterized as non-hazardous according to the definitions set forth in 40 CFR 261. Solid waste placed in a landfill must not exhibit the following characteristic: ignitability, reactivity, corrosivity or toxicity. To predict the potential toxic chemical constituents contributed by solid waste disposed in landfills, the Toxicity Characteristic Leaching Procedure (TCLP) was designed to emulate the climatic leaching action expected to occur between precipitation percolating into a landfill and fill materials disposed of in a landfill. To evaluate the maximum contribution of leachable contaminants to a solid waste landfill from the use of ConCover® and ConCover-180™, New Waste Concepts, Inc. contracted Jones and Henry Laboratories to conduct an experiment in which samples were analyzed using TCLP methodology. The results indicate that ConCover® and ConCover-180™ do not contribute constituents listed under the toxicity characteristic definition.

Because ConCover® is a non-removable cover, it is intended to remain in the landfill and will be subjected to the leaching effects that are known to occur to solid waste. Leachate is generated by infiltration of surface water and natural moisture through solid waste materials. As this water percolates through the material in a landfill, it removes soluble constituents from the waste. The TCLP was designed to determine the maximum concentration of toxic contaminants that a waste could contribute when exposed to leachate in a landfill setting. Limits of toxicity were established by the U.S. Environmental Protection Agency (EPA) based on the threat of a specific contaminant to human health and the environment. If the TCLP extract of a sample contains constituents (listed under the toxicity characteristic) equal to or greater than the established regulatory levels, it is considered a characteristic hazardous waste. By estimating the maximum concentration of leachable contaminants that are contained in a test material, the TCLP can prevent the land disposal of hazardous waste. Since ConCover® is not removed after it is used as a daily cover material, the volume of ConCover® or ConCover-180™ accumulating in the fill will increase, to some extent, over time even though the material is composed of biodegradable components. The objective of completing this experiment is to evaluate the potential constituents that could be leached from ConCover® and ConCover-180™ when applied at a landfill. ConCover® and ConCover-180™ were subjected to the TCLP to predict its maximum toxic contribution during its life in a landfill.

Procedure

In 1990, the EPA established the TCLP in what is now referred to as the Toxicity Characteristic Rule. A sample of ConCover® and ConCover-180™ was extracted according to the Toxicity Characteristic Leaching Procedure (TCLP) methodology stated in the Federal Register Vol. 55, No. 126, Friday, June 29, 1990. The extract was analyzed for established toxicity characteristic parameters according to the methodologies listed in ***Test Methods for Evaluating Solid Wastes Physical/Chemical Methods*** **(SW-846)**.

Results

The analytical reports for extract analysis from the TCLP are presented in Table 1. The results are listed along side their respective laboratory detection limits. Included on the table is the regulatory limits established under the toxicity characteristic (40 CFR 261.24).

The extracts from the TCLP were reported as less than the laboratory detection limits for the analytical method for all parameters. These results indicate that none of the parameters listed as hazardous by toxicity are present in significant leachable quatities.

TCLP Zero Headspace Extraction ConCover® & ConCover-180™

Parameter	Units	ConCover® Results	ConCover-180™ Results	Detection Limit	TCLP # Limit
METALS					
Arsenic	mg/L	Not Detected	Not Detected	0.04	1.0
Barium	mg/L	Not Detected	Not Detected	4.0	100.0
Cadmium	mg/L	Not Detected	Not Detected	0.1	1.0
Chromium	mg/L	Not Detected	Not Detected	0.2	5.0
Lead	mg/L	Not Detected	Not Detected	0.2	5.0
Mercury	mg/L	Not Detected	Not Detected	0.004	0.2
Selenium	mg/L	Not Detected	Not Detected	0.04	1.0
Silver	mg/L	Not Detected	Not Detected	0.2	5.0
VOLATILE COMPONENTS					
Benzene	mg/L	Not Detected	Not Detected	0.0006	0.5
Carbon Tetrachloride	mg/L	Not Detected	Not Detected	0.002	0.5
Chlorobenzene	mg/L	Not Detected	Not Detected	0.0006	100.0
Chloroform	mg/L	Not Detected	Not Detected	0.0006	6.0
1,4-Dichlorobenzene	mg/L	Not Detected	Not Detected	0.002	7.5
1,2-Dichloroethane	mg/L	Not Detected	Not Detected	0.001	0.5
1,1-Dichloroethene	mg/L	Not Detected	Not Detected	0.0008	0.7
Methyl Ethyl Ketone	mg/L	Not Detected	Not Detected	0.002	200.0
Tetrachloroethene	mg/L	Not Detected	Not Detected	0.001	0.7
Trichloroethene	mg/L	Not Detected	Not Detected	0.001	0.5
Vinyl Chloride	mg/L	Not Detected	Not Detected	0.001	0.2
BASE/NEUTRALS COMPONENTS					
1,4-Dichlorobenzene	mg/L	Not Detected	Not Detected	0.001	7.5
2,4-Dinitrotoluene	mg/L	Not Detected	Not Detected	0.005	0.1
Hexachlorobenzene	mg/L	Not Detected	Not Detected	0.002	0.1
Hexachlorobutadiene	mg/L	Not Detected	Not Detected	0.002	0.5
Hexachloroethane	mg/L	Not Detected	Not Detected	0.002	3.0
Nitrobenzene	mg/L	Not Detected	Not Detected	0.001	2.0
Pyridine	mg/L	Not Detected	Not Detected	0.001	5.0
PHENOLIC COMPONENTS					
o-Cresol	mg/L	Not Detected	Not Detected	0.001	200.0
m+p-Cresol	mg/L	Not Detected	Not Detected	0.001	200.0
Pentachlorophenol	mg/L	Not Detected	Not Detected	0.004	100.0
2,4,5-Trichlorophenol	mg/L	Not Detected	Not Detected	0.003	400.0
2,4,6-Trichlorophenol	mg/L	Not Detected	Not Detected	0.002	2.0
PESTICIDE COMPONENTS					
Chlordane	mg/L	Not Detected	Not Detected	0.02	0.03
Endrin	mg/L	Not Detected	Not Detected	0.04	0.02
Heptachlor	mg/L	Not Detected	Not Detected	0.008	0.008
Heptachlor Epoxide	mg/L	Not Detected	Not Detected	0.008	0.008
Lindane	mg/L	Not Detected	Not Detected	0.005	0.04
Methoxychlor	mg/L	Not Detected	Not Detected	0.001	10.0
Toxaphene	mg/L	Not Detected	Not Detected	0.06	0.5
HERBICIDE COMPONENTS					
2,4-D	mg/L	Not Detected	Not Detected	0.1	10.0
2,4,5-TP (Silvex)	mg/L	Not Detected	Not Detected	0.02	1.0

Table 1

Water Permeation Test

Abstract
New Waste Concepts, Inc. contracted Hull and Associates, Inc. of Toledo, Ohio to develop a test that would demonstrate the effectiveness of ConCover® in comparison to soil cover for promoting water run-off. Water permeation of ConCover® at a landfill will depend largely on the application surface. Flat surfaces are ideal for water run-off while irregular surfaces can trap water and voids between cover can compromise the cover's ability to shed water. The objective of this test was to evaluate the ability of a ConCover® and soil to inhibit water permeation.

Apparatus
The apparatus consisted of a three gallon plastic container with sixty 1/8" diameter holes on the bottom in a uniform pattern (see figure 1). Two inches of coarse, clean sand was placed into the container on top of a fitted geotextile drainage fabric which prevented the sand from passing through the holes. The contact between the fabric edges and the bucket sidewalls was sealed with a bead of silicone caulk and the sand was leveled to form a simulated waste surface. The specimen of the ConCover® slurry was prepared and placed above the sand layer. It was allowed to setup for a time period similar to that experienced on the waste surface. The specimen of six inches of daily soil cover was placed on a similar apparatus above the sand layer. This apparatus was mounted under a rainfall simulator with a large funnel under the apparatus to collect water passing through the specimen. The funnel drained into a 500 ml. graduated cylinder through a clear flexible hose.

Procedure
The test specimen was subjected to a simulated downpour by dropping 500 ml. of water uniformly onto the cover surface from a approximately two feet, over a period of one minute. This was equivalent to approximately 0.4 inches of rainfall distributed over the cover

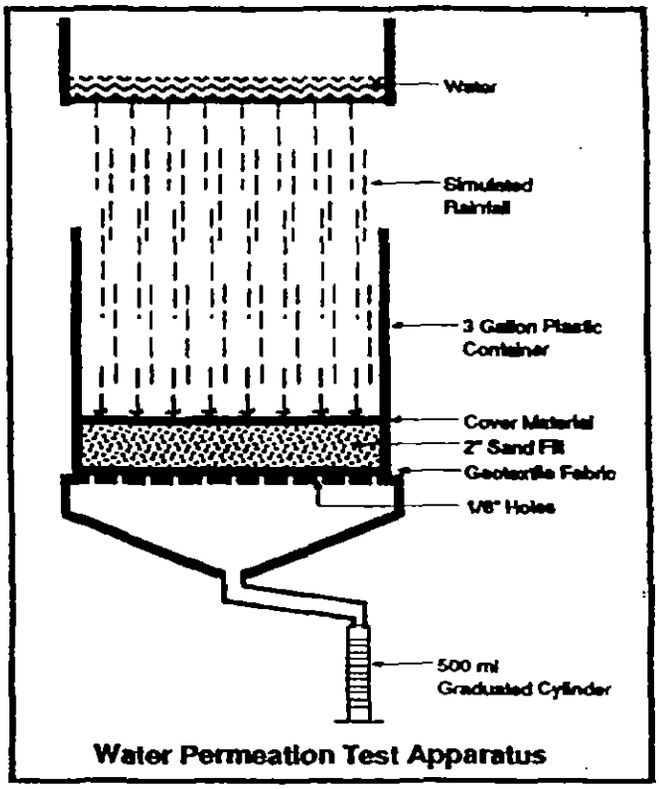


Figure 1

area. The water drained through the specimen, into the funnel, through a flexible hose, and into a 500 ml. graduated cylinder. The cumulative water permeation measurements versus time are a relative indication of how effectively the two types of cover prevent water from infiltration into the simulated waste.

Results
Results from the two runs of this test are presented graphically in figures 2 and 3. ConCover® was generally more effective than the soil cover in preventing water from infiltrating into the simulated waste. ConCover® allowed no permeation for 30-35 minutes after which it allowed no more than 30ml of water to pass. The soil cover allowed relatively constant infiltration of water up to approximately 400ml at 30-35 minutes and leveled off for the rest of the test. This test demonstrates ConCover's superior impermeability on surfaces.

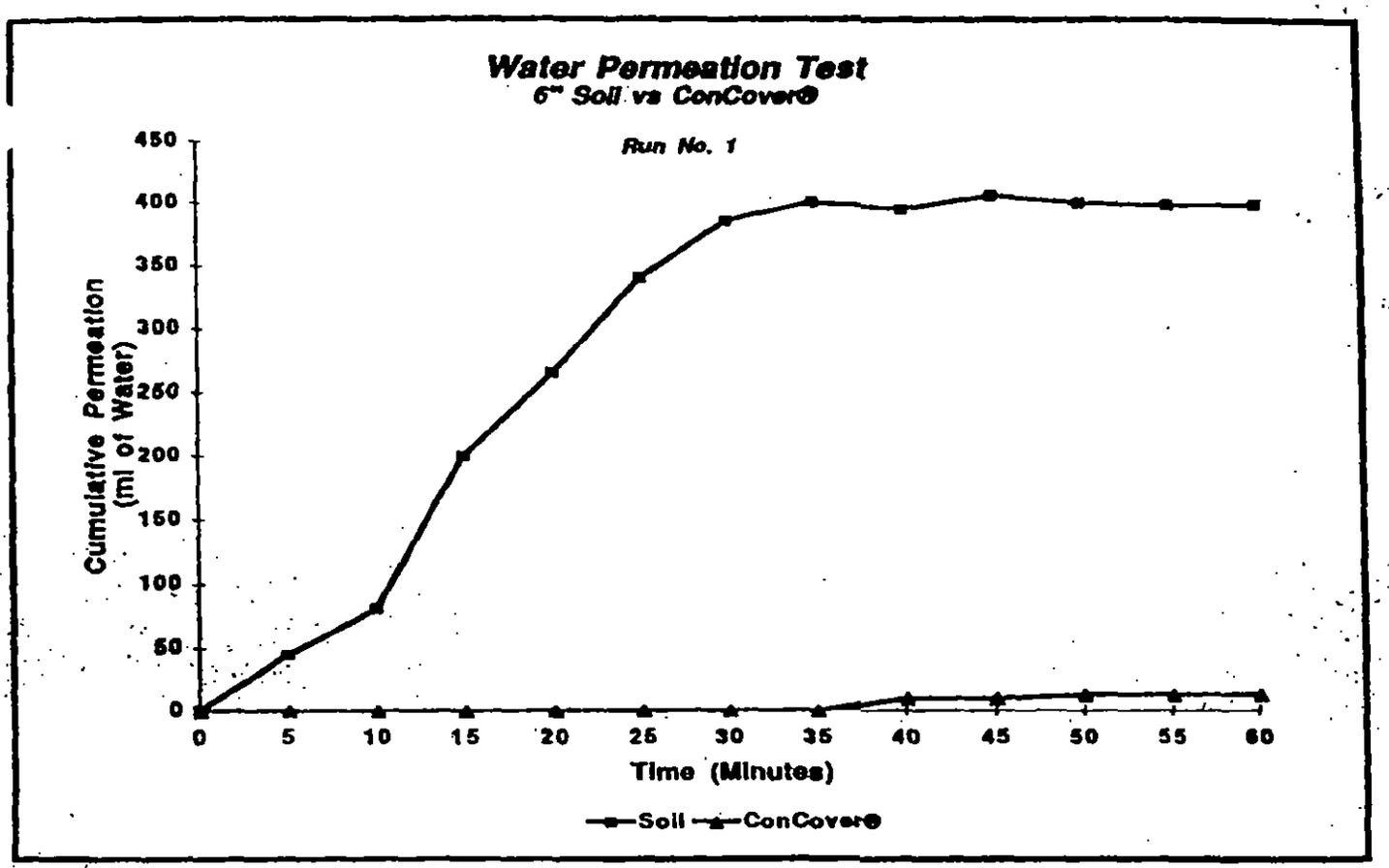


Figure 2

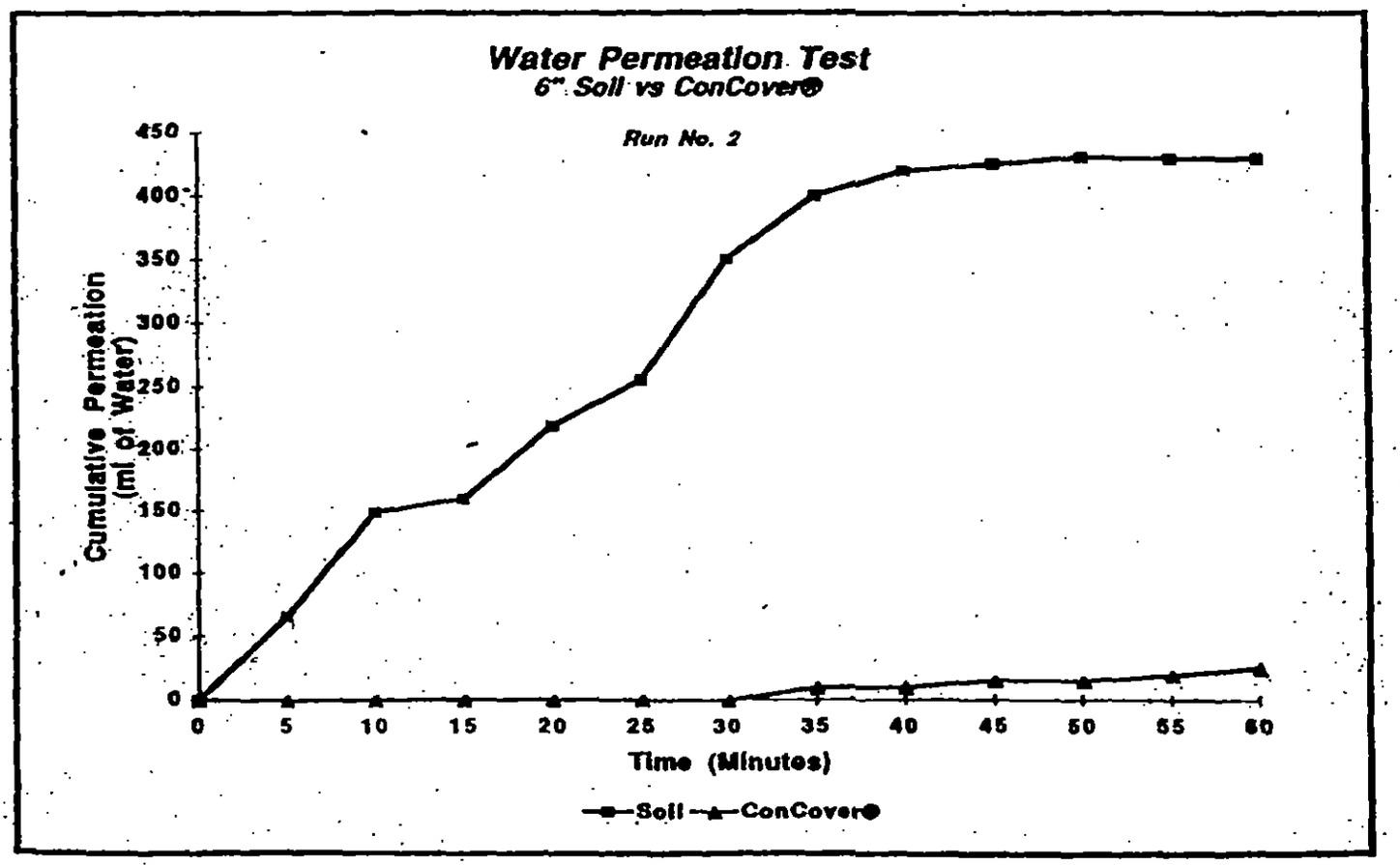


Figure 3

Water Run-Off Quality Test

Abstract

The implementation of a storm water run-off management program is required by US regulatory agencies to permit and operate a landfill facility. Elaborate drainage systems are designed and installed to manage the quantity of run-off resulting from storm events, with the goal of minimizing infiltration into the fill areas and reducing stagnation of ponded water. The quality of the storm water run-off that eventually is discharged to surface water bodies or to sewer systems is also required to meet specific regulatory standards. New Waste Concepts, Inc. contracted Hull and Associates, Inc. of Toledo, Ohio to design an experiment that evaluates the effect of daily cover materials on the quality of storm water run-off.

Apparatus

The apparatus used in this experiment was designed to simulate the effects of a typical storm event on the quality of run-off from the working face of a landfill to which a daily cover material has been applied. Figure 1 provides an illustration of the test apparatus. The apparatus was constructed of four corner posts attached to a base elevated several feet above the ground surface. A spray nozzle connected to a hose was suspended six feet above the base of the apparatus to serve as the rainfall source. The apparatus was lined with an inert plastic material with a two inch diameter hole in the base to allow for the simulated rainfall to flow into a sample container. A 2' x 2' testing platform was attached above the center of the base, which was situated at a 4:1 slope.

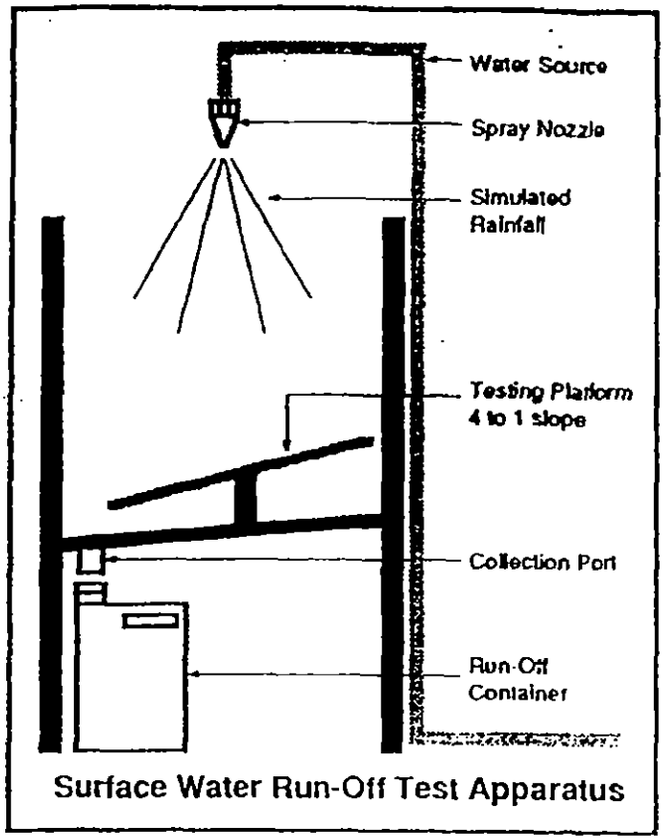


Figure 1

Procedure

To evaluate the quality of the city water used in this experiment, a field blank was collected by running 6 gallons of city water over the test apparatus prior to applying the cover material. The daily cover materials were applied to 2' x 2' x 1/4" plywood boards and attached to the testing platform. ConCover® was applied to the test board in the field, by spraying a 3/8" layer of the material onto the board from the mixing unit and allowed to set. Three inches of clayey soil were placed on the soil test board, and a fine mesh (#40 sieve) was placed at the base of the down slope side of the board, so that the soil remained on the board through the duration of the test.

A two-year, one hour storm event was simulated by adjusting the flow from the source so that six gallons of water were collected in the sample container over a forty-minute period of time, to represent a two-year, one-hour duration storm event for Toledo, Ohio. Water was sprayed through the nozzle onto each board attached to the test platform. The run-off from each of the trials was collected and submitted for laboratory analysis.

Results

The samples were analyzed for general water quality parameters that are typically required to be monitored for run-off discharges from a landfill facility. Table 1 provides a summary of the results of the laboratory analysis of the samples collected, along with the analysis of the field blank sample.

In order to investigate the effect of ConCover® on run-off, it is important to consider the results of this

experiment respective to the quality of the field blank (city water). This test shows that ConCover® does not introduce a significant amount of chemical constituents to the surface water run-off. All of the values reported by the laboratory for the run-off samples for metals were reported to be below the primary and secondary Drinking Water Standards, and appear to be unchanged when corrected by the field blank results. The run-off, for all purposes, was found to be relatively unaffected by the presence of ConCover®.

Surface water runoff, from the soil daily cover simulation, on the other hand, was reported by the laboratory to yield significant amounts of selected metals. The iron content of soil runoff was reported at 263,000 ug/l, over one thousand times higher than value from ConCover®, 180 ug/l. Although iron is naturally occurring and a relatively high value is expected from soil, the fate of the runoff must be considered. Although common practice is to restrict surface water at the active working area from reaching surface drainage discharges, some runoff can be anticipated. Discharge from a sedimentation basin at a landfill is permitted by a National Pollutant Discharge Elimination System (NPDES) Permit. This permit requires baseline testing and continued monitoring. The parameters monitored depend on the typical constituent levels of the runoff and the quality of the receiving waters. This test shows that using ConCover® introduces much less iron into the water system. In fact, the level reported for ConCover® is lower than the secondary Drinking Water Standard of 300 ug/l. Thus, using ConCover® may eliminate the need to monitor iron for NPDES discharges.

Similar to the above, the laboratory reported levels of other parameters in the surface water runoff produced from soil relative to that from ConCover®. Water runoff from soil contained higher total amounts of various components as compared to ConCover®; phosphorus (5.62 vs 0.14 mg/l), calcium (1020 vs 36.6 mg/l), chromium (198 vs < 50 ug/l), copper (313 vs <20 ug/l), lead (120 vs < 50 ug/l), magnesium (275 vs 5.0 mg/l) nickel (200 vs < 50 ug/l), and zinc (703 vs 50 ug/l). By comparing the laboratory results of the

Summary of Laboratory Analytical Data
Water Run-Off Quality Experiment

Parameter	Units	Soil	ConCover®	City Water Blank
pH, field	s.i.u.	8.26	9.29	-
Conductivity	µ mhos/cm	222.86	423	-
Solids, Susp. at 104° C	mg/l	248	300	2
Solids, Diss. at 180° C	mg/l	11200	310	2
Calcium	mg/l	1020	36.6	1
Magnesium	mg/l	275	5	0.5
Arsenic	ug/l	< 40	< 4	4
Beryllium	ug/l	< 5	< 5	5
Cadmium	ug/l	< 2	< 2	2
Chromium	ug/l	198	< 50	50
Hexavalent Chromium	ug/l	< 15	< 15	15
Copper	ug/l	313	< 20	20
Iron	ug/l	263000	200	20
Lead	ug/l	120	< 50	50
Mercury	ug/l	0.5	< 0.2	0.2
Nickel	ug/l	200	< 50	50
Selenium	ug/l	< 8	< 8	8
Zinc	ug/l	703	50	20
TOC	mg/l	34.2	40.3	1
BOD	mg/l	3	34	1
COD	mg/l	142	82	5
Chloride	mg/l	19	28	1
Cyanide	mg/l	< 0.01	< 0.01	10
Nitrogen Ammonia	mg/l	< 0.2	< 0.2	0.2
Phosphorus	mg/l	5.62	0.14	0.02
Phenols	mg/l	0.017	0.052	0.005

Table 1

U.S. EPA Drinking Water Standards, results for all metals analyzed were reported to be below drinking water standards. Again, the results indicate that using soil as a daily cover will likely result in higher levels of chemical constituents to surface water runoff than does ConCover® materials. Soil also produces a significant amount of dissolved solids. The laboratory reported the total dissolved solids (TDS) from the soil runoff as 11,200 mg/l. This result is significantly higher compared to that from ConCover®, 310 mg/l. Suspended solid ranges were similar for all three tests.

ADDENDUM 10

RECYCLING AND COMPOSTING PLAN
SALT LAKE VALLEY SOLID WASTE MANAGEMENT

The SLVSWMF has an ongoing composting program on property owned by the facility. The purpose of the program is to remove yard and wood waste from the waste stream to extend the life of the landfill, as well as to provide a quality product to the citizens of the area. The composting facility is operated in accordance with the requirements of UAC R315-312-2.

LOCATION OF COMPOSTING OPERATIONS

The facility uses two areas for the processing and selling of the products. The main processing area is just off California Avenue and near the west property boundary of the facility; this compost area is also called the "clean green" area. The clean green area has a berm surrounding the perimeter so no run-off liquids can leave the site. A major portion of the site pad is asphalted to provide containment and to improve the driving surface. The second area, which is mainly used for screening and selling final products, is immediately east of the citizen's unloading facility. This asphalted area is located within a permitted landfill cell. No additional moisture is added to the products in this area.

OPERATION OF COMPOSTING FACILITY

Both private citizens and commercial businesses are asked when they enter the facility if their loads contain yard or wood waste; loads containing only yard and wood waste are given a discount on the disposal fee as an incentive to pre-sort the loads. Yard and wood waste received at the facility are directed to the clean green area where the load is separated into the yard waste pile or the wood waste pile. If the loads contain any other type of waste, a dumpster is provided for that material. A loader places the yard and wood waste into a large tub grinder where it is reduced to an approximate 2-inch or less size. The loader places the ground yard waste into large windrows for composting. The windrows are approximately 150-feet long, 10-feet tall and 15-feet wide. Water and ammonium nitrate fertilizer are added to the windrows to expedite the composting process. The windrows are turned weekly with the loader to keep the process aerobic. During this time the compost produces heat that varies between 140 and 160 degrees Fahrenheit. The material is allowed to cure into compost over an 8- to 16-week period. When the compost is "finished," it is hauled to the site east of the citizens unloading facility. The compost is screened into various sizes and sorted into product piles for sale. The wood waste is only ground up or chipped into pieces, then hauled to the screening area for sale; it is not composted. The goal is to have mature, quality compost and wood chip product for sale to the public.

(1) (a) The area is not wetlands, watercourses, or floodplains.

(b) It is not within 500 feet of any permanent residence, school, hospital, institution, office building, restaurant, or church.

(2) (a) Manufacturers performance data for all equipment is kept in individual files on each respective piece of equipment which is available for review.

(b) The facility scales are used to measure the inbound and outbound materials. All grinding and shredding is done in the tub grinder. All mixing of materials is done with the front-end loaders. The proportioning of input materials is done manually to keep the materials separate.

(c) All monitoring equipment is located in the on-site building near the asphalt composting pad. Monitoring is done on a regular basis.

(d) The only additive materials to the compost are ammonium sulfate fertilizer and water. The fertilizer is purchased from commercial vendors and applied to the rate of 500 pounds per windrow. This application rate fluctuates as the nitrogen content of the feedstock varies with the seasons. Water from the facility well, is added on a regular basis. The amount of water added to the windrows varies with the weather and seasons.

(e) Special precautions for the driving surface (asphalt pad) have been taken to assure year round operation. During windy weather, it may not be possible to operate the tub grinder or the trommel screen. Appropriate adjustments in operations for weather factors such as rain, snow, or freezing temperatures are made.

(f) The estimated time to complete the compost process varies from 8 to 16 weeks.

(g) A windrow system of composting is used. Windrows are approximately 150 feet long, 10 feet tall, and 15 feet wide. The composting process reduces the volume by approximately 50%, so actual sizes may vary.

(h) The windrows are aerated by turning approximately weekly with a rubber tired loader. Weather affects the turning frequency requirements.

(i) The ultimate use of the compost is a product that is sold to both private citizens and commercial companies. Any residue is used for road building purposes on the tipping face of the landfill.

(3) (a) The scale house records of incoming and out going materials are on permanent file. The temperature data is maintained in the office.

(b) All materials are processed within two years.

(c) All materials not destined for processing are disposed of within a permitted landfill module.

(d) Windrows are turned frequently enough to maintain an aerobic condition.

(e) The temperature of the in process windrows is maintained between 140 and 160 degrees Fahrenheit for not less than 7 days.

(f) Hazardous waste or waste containing PCBs is not accepted for composting. Employees are assigned to watch for, and remove any items unacceptable for the compost process. No sewage treatment sludge, water treatment sludge, or septate is used in the composting process.

(g) No sludge or septate is used in the composting process.

(i) The compost windrows are on an asphalt pad that lies on top of the natural clay soil in the area. The soil beneath the asphalt pad and the berm surrounding the area are sufficient to protect the groundwater.

(ii) The berm surrounding the area is sufficient to handle the run-off from a 25 year storm event.

(iii) Any collected water is used on site.

(iv) The dirt berms are sufficient to divert the run-on from a 25-year storm event.

(h) The finished compost does not contain any sharp inorganic objects and is sufficiently stable so that it can be applied to land without creating a nuisance, environmental threat, or hazard to the public.

(4) Closure and post closure. The facility intends to continue to operate the composting site for a number of years. Prior to closure, the facility will obtain all regulations for closure and post closure care, and follow them. The long-term plans are to use the compost locations for landfilling of municipal solid waste.

ADDENDUM 11

SALT LAKE COUNTY
HOUSEHOLD HAZARDOUS WASTE FACILITY
OPERATIONS AND STAFFING

March 11, 2005

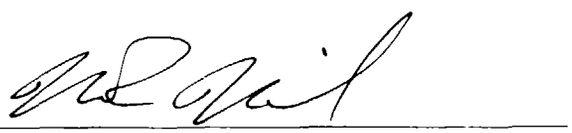
A Report Prepared For:

Salt Lake Valley
Health Department
1954 East Fort Union Blvd.
Salt Lake City, Utah 84121

SALT LAKE COUNTY
HOUSEHOLD HAZARDOUS WASTE FACILITY
OPERATIONS AND STAFFING

File No.: 17677.009

Prepared By:



Mark Wilson, E.I.T.
Staff Engineer

Renee D. Zollinger, R.G.
Regional Manager

KLEINFELDER, INC.
849 West LeVoy Drive
Taylorsville, UT 84123
(801) 261-3336

March 11, 2005

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APPENDICES

1. INTRODUCTION

In 1995, the Salt Lake County Health Department began operation of a Household Hazardous Waste Facility (HHWF). The HHWF is located at the Salt Lake Valley Solid Waste Management Facility, at approximately 6030 West California Avenue in Salt Lake County (Figure 1). The goal of operating the HHWF is to reduce the amount of hazardous wastes disposed in the landfill cells of the Solid Waste Management Facility, and thereby reduce the risk of future impact to soil and groundwater.

The HHWF is currently staffed by Salt Lake County personnel. Waste is disposed through ONYX Environmental Services. The Salt Lake County Health Department has contracted with Kleinfelder to assess the short term and long term costs and benefits of two options for staffing the HHWF. The facility has been staffed solely with personnel of Salt Lake County. The following report describes the current operation of the HHWF and will serve as the basis for assessing the number, type, and requirements of personnel at the facility.

2. DESCRIPTION OF THE HOUSEHOLD HAZARDOUS WASTE FACILITY

2.1 MATERIALS ACCEPTED

The HHWF accepts only wastes from private homeowners. Wastes collected at the HHWF are divided into seven categories (Table 1):

- Aerosol - This category includes all material stored in aerosol cans, including pesticides and paints.
- Non-halogenated flammable - This category consists mainly of fuels.
- Oil
- Oil-based paint
- Latex-based paint
- Lab Packs - This category includes liquid and solid materials that require special packaging for transport, including corrosives, poisons, caustics, and oxidizers (see Table 1).
- Other - This category includes material that does not fit with the other six categories, such as anti-freeze, dioxins, and automobile batteries.

TABLE 1
Quantities of Wastes Collected
Salt Lake County Household Hazardous Waste Facility
2003

Category	Total Quantity (lbs)
Lab Pack	255,316
Non-Halogenated Flammable	69,510
Oil and Latex Paint	241,414
Oil	59,868

2.2 PHYSICAL LAYOUT OF THE HHWF

The HHWF is located along the north side of 1300 South Street, just east of the public drop-off area within the Salt Lake Valley Solid Waste Management Facility (Figure 2). The HHWF is accessible from 1300 South or from a frontage road that leads from the scale houses at the entrance to the Solid Waste Management Facility. The HHWF consists of a driveway/drop-off area, a segregation/storage area, a shed for storage of reusable items, and a dumpster for disposal of empty containers (Figures 2 and 3; Photos 1 through 5, Appendix B)

The segregation/storage area is surrounded by an approximately 8-foot high chain link fence with two sliding gates. A third gate was installed in 1996 (Photos 1 and 2, Appendix B). The floor of fenced area is lined with concrete that slopes toward a central concrete-lined floor sump (Photo 3, Appendix B). A concrete curb borders the area. The segregation/storage area is covered by a sloping steel roof.

As shown on Figure 3, within the segregation/storage area are several tables and bulk storage drums, including:

- Tables for temporary storage of latex and oil-based paint cans, and 55-gallon drums for bulked paint;

- A table for temporary storage of oil containers and drums for bulked oil;

- A table for temporary storage of anti-freeze containers and a drum for bulked anti-freeze;

- An area for temporary storage of fuel containers and drums for bulked fuel;

- A table for temporary storage of items to be lab packed (e.g. insecticides, fertilizer, etc.);

- Locking closets for storage of materials deemed especially hazardous (e.g. dioxin) or for long-term storage of other materials.

Material that does not belong in one of the above areas is placed on the ground within the curbed area inside of the fence.

The gates in the perimeter fence of the HHWF are locked whenever no employees are present.

2.3 MATERIAL HANDLING

The handling of materials at the HHWF generally consists of the following steps:

- *Directing Homeowners to HHWF.* All private vehicles entering the Solid Waste Facility stop at the scale houses. Scale house personnel ask each driver if the load contains material appropriate for the HHWF. If there are hazardous wastes in the homeowner's load, the vehicle is directed to the HHWF. Installed signs also direct customers to the HHWF.

- *Acceptance of Material.* Homeowner vehicles stop in front of the east gate (Figures 2 and 3). HHWF employees meet each vehicle with a push cart. Material is transferred to the push cart by the homeowner and the employees. (After material is transferred

to the push cart, the homeowner should have no more contact with the material and should proceed no further toward the HHWF. Occasionally, however, homeowners do follow employees into the fenced area. If a homeowner does enter the fenced area, he/she is asked to leave immediately.) Customers are asked to complete a survey questionnaire before they leave.

Occasionally, homeowners leave materials outside the locked gates of the HHWF. When such materials are discovered by HHWF employees, they are moved to an appropriate location within the fenced area.

- *Segregation of Material.* A HHWF employee pushes each cart into the fenced area. Wastes are placed in the appropriate temporary storage areas (e.g. area for temporary storage of oil, fuel, latex paint, oil-based paint, anti-freeze, lab pack, or locking closet; Figure 3). The decision on where to place a given container is made by a HHWF employee, based on labeling of the container (or apparent content if labeling is absent or obviously incorrect) and information from the homeowner.

- *Interim Storage.* When the materials are segregated into the respective temporary storage areas, they are left in the containers in which they were received until bulking or lab packing is possible. This interim storage period, between material acceptance and bulking/lab packing, is generally one to four days. Occasionally, material is delivered to the HHWF in a badly damaged container. In such cases, the material may be re-packaged or immediately bulked.

- *Bulking of Material.* There are bulk storage drums for oil, anti-freeze, latex paint, oil-based paint, and fuel. Material is generally placed in the proper bulk storage drum as soon as possible (e.g. as soon as there is a break in the drop-off traffic). If material is delivered in an intact container and the HHWF employees are otherwise busy, however, several days may pass before material is placed in the appropriate bulk storage drum.

- *Lab Packing.* Those materials that require lab packing are segregated into several categories within the lab pack interim storage area. These materials are placed in category-specific lab packs as soon as possible.

- *Segregation of Reusable Materials.* If material is in a well-labeled, intact container, and if the material appears to be fresh, a HHWF employee may decide to segregate that material for possible reuse. Materials segregated for reuse, including paints, pesticides, and furniture polishes, are stored in a locking shed north of the fenced area (Figure 2). Those materials are available to employees of the Solid Waste Management Facility and to members of the public. Anyone interested in obtaining reusable material must receive it from a HHWF employee. In 2003, 17563 pounds of material were diverted from disposal through the reuse program.

- *Manifesting and Shipping.* Up to two days prior to a scheduled waste pickup, the wastes that have been put in bulk storage or lab packs are labeled with DOT stickers and manifested. When the waste transporter arrives, HHWF personnel load the bulk materials and lab packs into the truck for shipment to a hazardous waste disposal facility. Antifreeze, batteries, and used oil are picked up by registered recyclers.

3. HHWF PERSONNEL

3.1 PERSONNEL HOURS

The advertised business hours for the HHWF are the same as the landfill hours, from 7 am to 5 pm, Monday through Saturday. The frequency of drop-offs at the HHWF varies depending on the time of year. The period from about April to October is relatively busy, and there are relatively infrequent drop-offs from November through March. During all times of year, Saturdays are generally busier than weekdays. The number of HHWF employees required to run the facility varies depending on the day of the week and the time of year:

- Saturdays, Busy Season (April through October) - There are generally two to four HHWF employees present, with two employees present at most times during operating hours. During the peak period (10 AM to 3 PM), there are generally two employees present. Additional employees can be brought in from other parts of the Solid Waste Facility or from temporary employment contractors if the volume of traffic is anomalously high.

  Total man hours/day = 20 to 40

- Weekdays, Busy Season (April through October) - There are two to four employees present. There are generally two employees at the HHWF during business hours. During peak traffic periods, one or two additional employees may be called in.

  Total man hours/day = 20 to 40

- Saturdays, Slow Season (November through March) - There are two to four employees present. There are generally two employees at the HHWF during business hours. During peak traffic periods, one or two additional employees may be called in.

  Total man hours/day = 20 to 40

- Weekdays, Slow Season (November through March) - Traffic at the HHWF is very light and intermittent. There are fewer employee hours required to staff the HHWF. When homeowners come to drop material at the HHWF, specified employees are called from the adjacent Public Drop Off Facility.

  Total man hours/day = 15 to 30

3.2 CURRENT INVOLVEMENT OF COUNTY AND ONYX ENVIRONMENTAL SERVICES PERSONNEL

Current operation of the HHWF involves personnel of both Salt Lake County (Landfill and SLVHD) and ONYX Environmental Services, Inc.

There are currently four Salt Lake County employees whose jobs are fully devoted to the HHWF; two Landfill employees and two SLVHD employees staff the facility. Other county employees, with primary job responsibilities in other parts of the Solid Waste Management Facility, are available for work at the HHWF. For all county employees who work at the HHWF, either as their primary job responsibility or as a secondary responsibility, work at the HHWF is specified in their job description. Also, all such employees receive the same job-specific training (see Section 3.3). Salt Lake County employees who work at the HHWF are involved with acceptance, segregation, and bulking of wastes. County employees are generally involved with preparation of lab packs, with supervision from the SLVHD lab pack chemist or ONYX.

During periods of peak traffic flow, there may be as many as four employees at the HHWF. The ONYX may supply employees to prepare the lab packs when needed.

3.3. TRAINING

Both Salt Lake County (Landfill and SLVHD) employees and ONYX employees who work at the HHWF receive 40-Hour training in Hazardous Waste Operations and Emergency Response (OSHA 1910.120) (HAZWOPER) with annual 8-hour updates and 40-hour training in lab packing. Employees from temporary agencies receive 40-hour HAZWOPER training in addition to the HAZWOPER and lab pack training.

Salt Lake County employees who work at the HHWF receive on-the-job training in waste inspection, waste segregation, fire control, and landfill operations. Also, the Solid Waste Management Facility maintains a written Spill Prevention Control and Countermeasure (SPCC) plan. All County HHWF employees receive annual training in implementation of this plan.

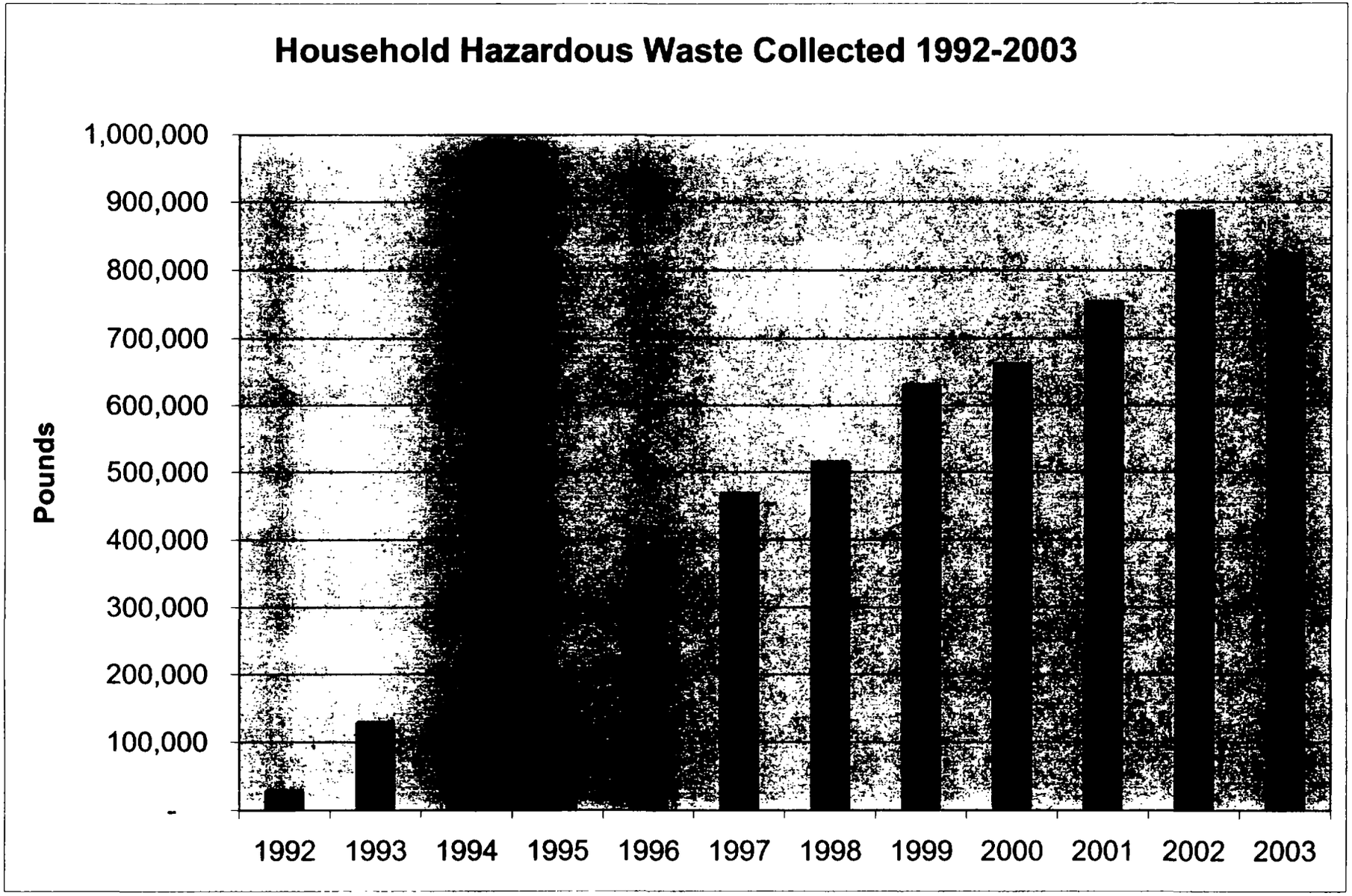
In addition to the 40-hour HAZWOPER and lab pack training, Rollins employees receive training in identification and listing of hazardous waste (40 CFR part 61).

3.4 MEDICAL SURVEILLANCE

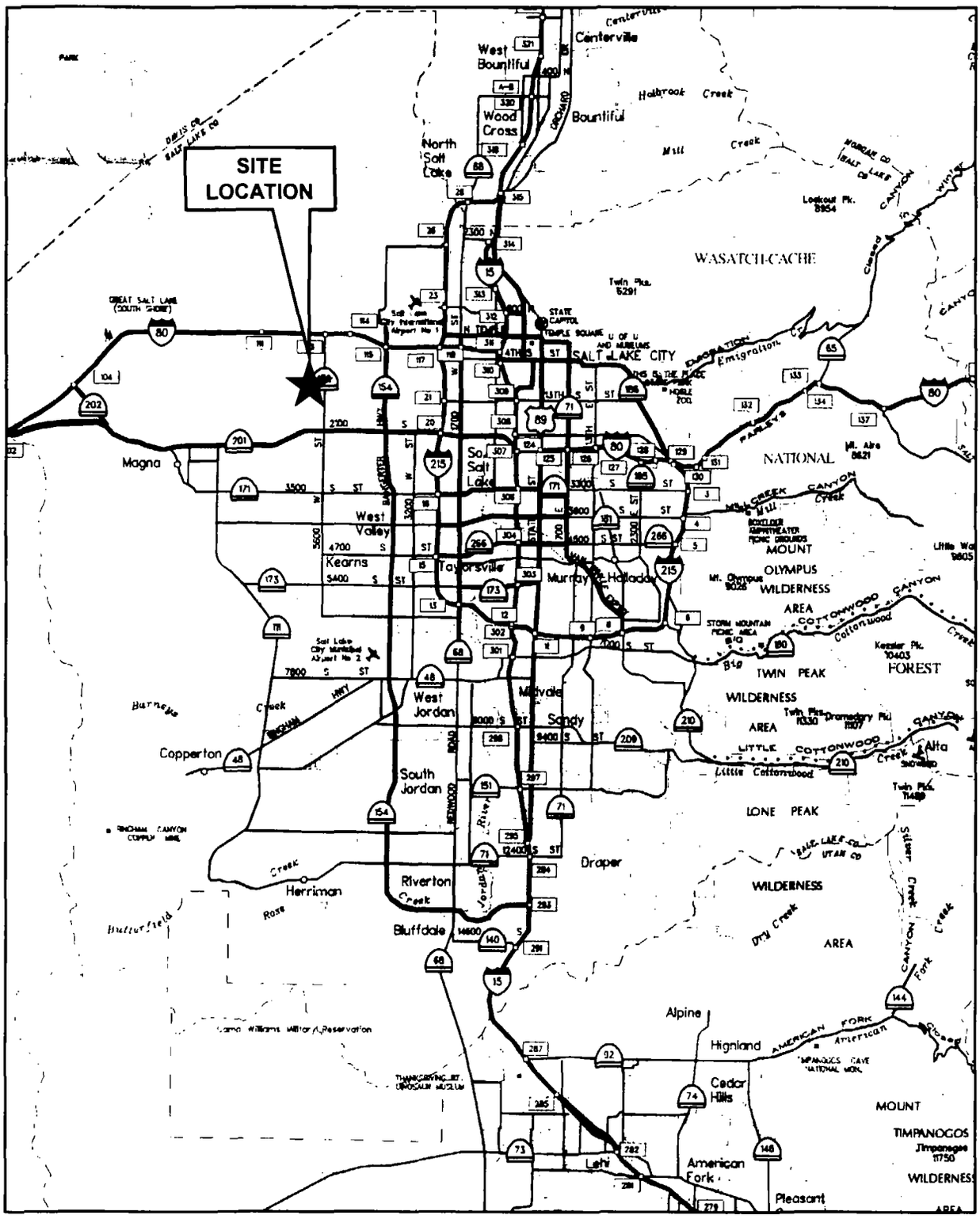
Employees of both Salt Lake County and ONYX who work at the HHWF are in medical monitoring programs consistent with 29 CFR 1910.120. County employees are examined every six months, in the same program used for the Salt Lake County Fire Department HazMat teams.

3.5 PERSONAL PROTECTIVE EQUIPMENT

Employees wear safety boots, coveralls, and nitrile gloves during acceptance and segregation of waste. Tyvek coveralls and safety glasses are worn during bulking and lab packing procedures. Half-face or full-face respirators are required for bulking of fuels and solvents, and recommended for bulking of oil-based paint. Employees performing bulking or lab packing also wear gloves appropriate for the materials being handled.


Household Hazardous Waste Collected 1992-2003
Pounds
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003

FIGURES



BASE MAP:
Utah Atlas & Gazetteer
DeLorme 2002

0' 2 4

APPROX. SCALE: 1" = 4 MILES

SLC5Q046.ppt

KLEINFELDER

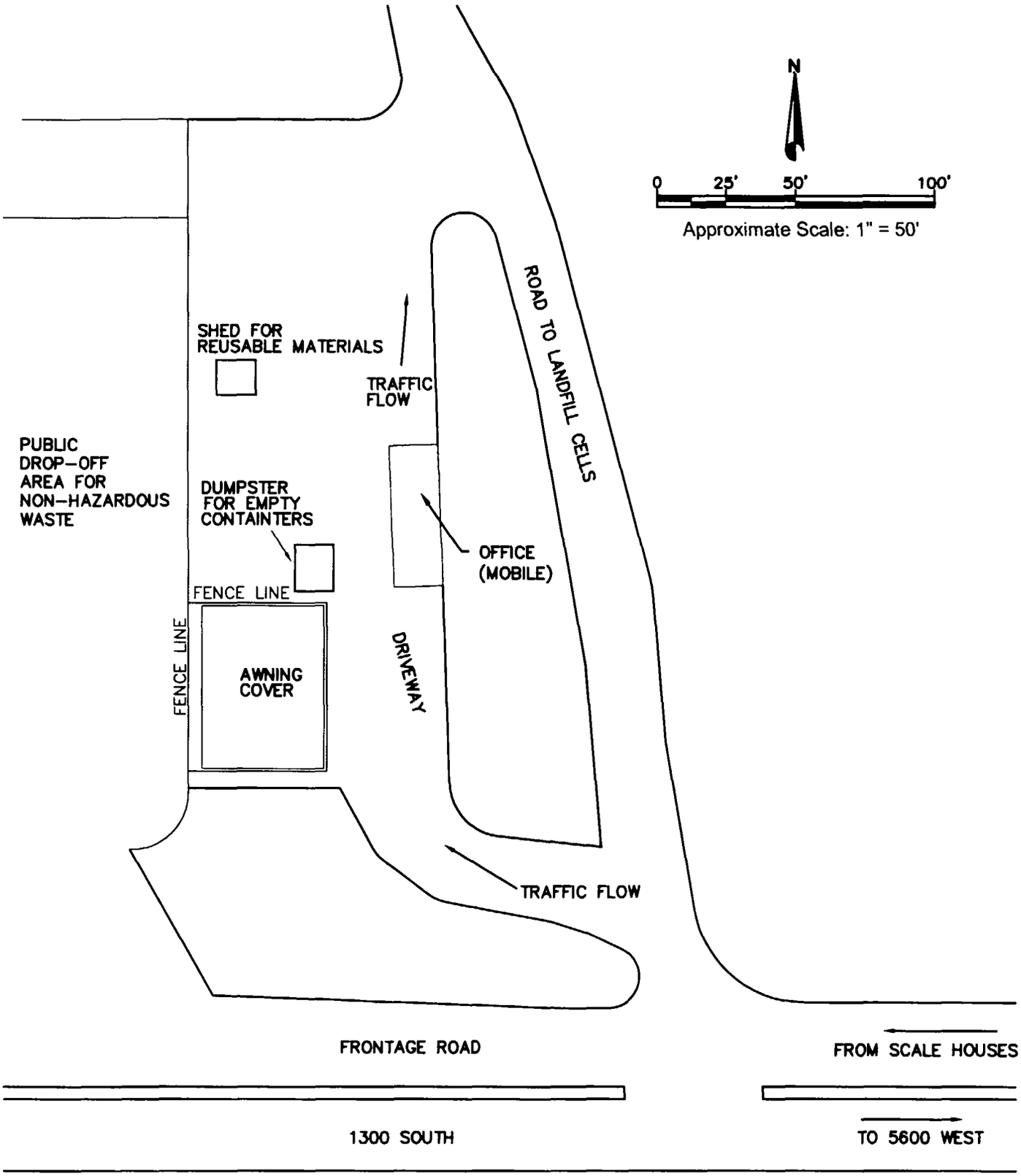
Date: 02/07/2005
Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

SITE VICINITY MAP

FIGURE

1



SLC5d058.dwg

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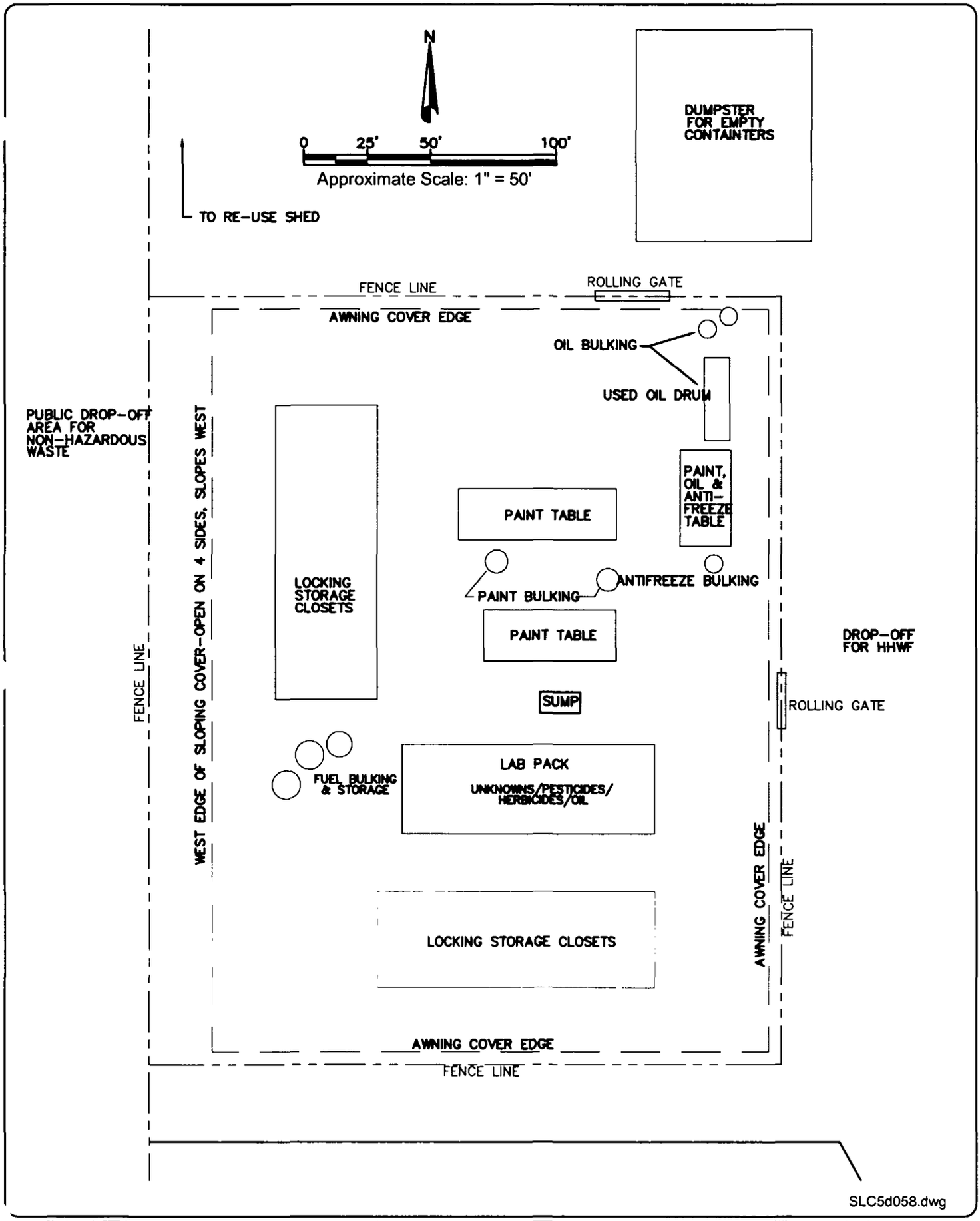
Date: 02/07/2005
Project Number 17677.009

Salt Lake Valley Solid Waste Management Facility
Salt Lake City, Utah

HOUSEHOLD HAZARDOUS WASTE FACILITY AND SITE PLAN

FIGURE

2



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Date: 02/07/2005
Project Number 17677.009

Salt Lake Valley Landfill
Salt Lake City, Utah

DETAIL OF SEGREGATION AND STORAGE AREA

FIGURE

3

Photo 1. View toward the northwest of the HHWF. The driveway used by homeowners when they deliver materials is visible in the right side of the photo. The east gate is visible near the orange cones. Vehicles stop near the cones for drop-offs.

Photo 2. View of the east gate at the HHWF. This is where vehicles stop for drop-offs. Inside the gate on the right are the anti-freeze and oil storage and bulking areas. The paint storage and bulking area is in the center of the photo. On the left are empty drums used for lab packs.

Photo 3 View toward the west through the east gate of the HHWF The floor sump is in the center of the photo In the left-center is the lab pack interim storage area Locking closets are visible in the background and on the left

Photo 4 Detail of the paint storage and bulking area from near the east gate of the HHWF Locking closets are visible in the background

Photo 5 View toward the southwest of the north gate of the HHWF. The paint storage and bulking area is in the center of the photo. The oil storage and bulking area is on the left side.

ADDENDUM 12

LEACHATE HANDLING AND TREATMENT PLAN
SALT LAKE VALLEY SOLID WASTE MANAGEMENT FACILITY

The Salt Lake Valley Solid Waste Management Facility (SLVSWMF) handles landfill leachate through a combination of re-use and treatment. There are two usage methods and two treatment plans for leachate. For usage, leachate is reapplied to the surface of landfill roadways to reduce fugitive dust emissions. In addition, leachate may be reinjected back into the landfilled waste to dampen wastes and promote degradation. Excess leachate not needed for re-use is treated in a system of lined storage and aeration retaining ponds. Biological macrophytes may be used in conjunction with aeration to remove pollutants from the leachate. All methods are acceptable in practice and comply with applicable state solid waste regulations. These methods are discussed in greater detail in the following sections.

LEACHATE USAGE

Fugitive Dust Control

Leachate has been used successfully as a dust suppressant on landfill roadways that exist on lined areas. Leachate is pumped into SLVSWMF water trucks and is transported to roads on the tipping face where surface conditions are dry and dust requires control. Leachate application is controlled through spray nozzles attached to a tanker vehicle that drives over the roadway surface.

Leachate Reinjection

Leachate reinjection may be used to introduce moisture to areas of dry waste within the landfill. Waste with a higher moisture content has been shown to degrade at a faster rate, and also produces a greater amount of methane per volume. This will be useful when the future gas-to-energy project begins to generate electricity from the combustion of the landfill gas, as additional gas will allow for a greater production of electricity.

Leachate reinjection will be performed under controlled circumstances, where volumes and rates of injection will be monitored to avoid saturating the waste, so as to reduce leachate migration to the bottom of the landfill cell. Injection techniques vary depending on site location, waste composition, and climate. As gas-to-energy projects at landfills are becoming more common, extensive research is being performed on reinjection methods that could be considered for possible use. Methods may include, but are not limited to, reinjection via a piping system, trench, conductivity blanket, or other suitable technique.

LEACHATE TREATMENT

Evaporation

The SLVSWMF facility has developed lined leachate evaporation ponds as on top of Module 2. Leachate is pumped to the ponds from the leachate collection system. Based on the season and the volumes of leachate collected, leachate is aerated to enhance evaporation of the leachate. Aeration is archived by use of an aeration pump placed into the collection pond.

Macrophyte Treatment

SLVSWMF is currently using an interim leachate treatment system to handle most of the leachate generated in the active landfill area. This interim system consists of a lined leachate evaporation/treatment pond that was constructed on the top of Module 2. This treatment pond will use aquatic macrophytes to reduce and/or remove pollutants from the landfill liquid waste stream through organic processes. Aquatic macrophyte systems (wetlands) are typically easy to apply, involve lower capital costs, and are relatively low maintenance systems that produce good-quality effluent water.

The following sections provide a brief description of the treatment system that is currently undergoing pilot testing and optimization.

The interim treatment system consists of four areas:

- The first area consists of two staging ponds where the influent waste stream is collected and metered into the treatment area;
- The second area consists of three macrophyte treatment cells, each approximately 185-feet long by approximately 25-feet wide;
- The third area consists of a final polishing area, approximately 25-feet long by 10-feet wide;
- The fourth area is an evaporation area for the treated water.

The entire system is lined with HDPE to reduce infiltration. The second area (macrophyte treatment cells) will also have 2 feet of topsoil on top of the liner to allow macrophyte growth. The staging ponds and the treatment cells will be separated by soil berms with a 3H:1V slope. The treatment area will be raised at the staging pond area to allow gravity flow of the waste stream through the system. Effluent water will be allowed to evaporate within a basin following treatment.

The following sections describe each of the system areas in more detail.

STAGING AREA

The staging area consists of two ponds, each approximately 150-feet long by 25-feet wide. This allows a storage capacity of up to 125,000 gallons of leachate between the two ponds. The base and sides of the staging ponds will be covered with approximately 6-inches of gravel material.

Leachate volumes are monitored by a volumetric totalizer that is installed in the pipe that transfers leachate from the staging ponds into the treatment cells. This design will allow precise adjustment of leachate flow into the treatment cells and allow measurement of the total flow through into the system.

PRIMARY TREATMENT AREA

The primary treatment area consists of three treatment cells, each approximately 185-feet long by 25-feet wide. The HDPE liner in these cells is covered with approximately two feet of soil to allow rooting of vegetation. With a one-foot depth of water, this area will allow for an approximate 16-day retention period within the treatment cells.

At the end of each treatment cell, an adjustable weir allows the leachate to flow into the next treatment cell. A vertical drop of about one foot between each cell was installed to increase aeration of the waste stream. Baffles in each cell run will contribute to mixing of the waste stream and reduce potential stagnant areas within the cell.

Macrophytes will be planted as soil-rooted seedlings at approximate 1-foot centers. Candidate species of macrophytes include Typha spp. (cattails), Lemna spp. (duckweed), Sagittaria spp. (arrowhead), and Scirpus spp. (bulrushs).

SECONDARY TREATMENT AREA

The secondary treatment area consists of a treatment cell approximately 25-feet long by 10-feet wide. The HDPE liner is covered with approximately one-foot of soil and one-foot of air-dried plant material. This allows for an approximate 12-hour retention time. The plant material will act as a polishing filter to remove volatile organic compounds (VOCs) from the waste stream.

OPERATION AND MAINTENANCE

Optimum planting season is either late spring or early fall. It will take approximately one to two years for the plants to reach maturation and for the treatment system to come fully on-line. Once the ponds are planted and the plant species are established, the system will be closely monitored to gauge performance. Operation and maintenance of system will include monitoring of influent and effluent waste stream, harvesting of plants to facilitate plant growth and pollutant reduction, maintenance of the final treatment area as required, and assessment of system operation with modifications as feasible.