SCS ENGINEERS















Comprehensive Monitoring Plan

SIOUX FALLS REGIONAL SANITARY LANDFILL

Presented to:



Sioux Falls Regional Sanitary Landfill 26750 464th Avenue P.O. Box 7402 Sioux Falls, SD 57117-7402

Presented by:

SCS ENGINEERS

14755 Grover Street Omaha, NE 68144 (402) 884-6202

February 2016 File No. 27213335.13

Offices Nationwide www.scsengineers.com

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COMPREHENSIVE MONITORING PLAN SIOUX FALLS REGIONAL SANITARY LANDFILL SIOUX FALLS, SOUTH DAKOTA FEBRUARY 2016

1.0 INTRODUCTION

This Comprehensive Monitoring Plan (CMP) presents the procedures for environmental monitoring at the Sioux Falls Regional Sanitary Landfill (Site). The Site is owned and operated by the City of Sioux Falls, South Dakota (City), pursuant to a Permit to Operate a Solid Waste Disposal Facility Permit Number 09-08B (Solid Waste Permit), issued by the South Dakota Department of Environment and Natural Resources (DENR). The Site is located approximately 5 miles west of the City of Sioux Falls, near the intersection of 267th Street and 464th Avenue in Sections 34 and 35, Township 101 North, Range 51 West, Minnehaha County, South Dakota, and Section 12, Township 100 North, Range 52 West, Turner County, South Dakota, and Section 7, Township 100 North, Range 51 West, Lincoln County, South Dakota. The Site location is shown on **Figure 1 in Appendix A**.

Operations at the Site began in 1979 and currently the Site has a total permitted area of 709 acres which includes a municipal solid waste (MSW) disposal area, construction and demolition (C&D) disposal area, a composting operation, an asbestos disposal area, and a wood/tree/brush pile area.

This CMP presents the general procedures for sampling, analysis, and reporting for the following:

- Leachate Monitoring
- Methane Gas Monitoring
- Landfill Gas Monitoring
- Surface Emissions Monitoring
- Groundwater Monitoring
- Compost Leachate Monitoring
- Compost Monitoring
- Storm Water Discharge Sampling
- Storm Water Inspections

There are four different reports, State Annual Report, City Supplemental Report, City Quarterly Report and City Monthly Report, associated with the monitoring of the items listed above.

The State Annual Report details the groundwater monitoring (State Monitoring Network) and methane monitoring. This report will be submitted to the DENR by April 1st for the previous calendar year.

The City Supplemental Report details the monitoring, as applicable, of leachate, methane gas, landfill gas, surface emissions, groundwater monitoring (City Monitoring Network), compost and compost leachate. Also, included is a discussion on the storm water discharge sampling and

storm water inspections. The report will be submitted to the City Landfill Division by April 1st for the previous calendar year.

The City Quarterly Report includes cursory discussion and transmittal of data, as applicable, on the monitoring of leachate, methane gas, landfill gas, surface emissions, groundwater monitoring (City Monitoring Network), compost and compost leachate. Also, included is a discussion on the storm water discharge sampling on an as needed basis. The report will be submitted to the City Landfill Division within 30 days of the end of the quarter.

The City Monthly Report includes cursory discussion and transmittal of data, as applicable, on the monitoring for leachate and storm water inspections. This report will be submitted to the City Landfill Division no later than the 15th of the month following sample collection.

2.0 LEACHATE SAMPLING PLAN

The Leachate Sampling Plan presents the procedures to be used for obtaining leachate quality measurements. There are three sources of leachate that are collected and temporarily stored at the Site. The Emergency Cell Leachate Holding Tank (RL01), East Area Leachate (RL02) and West Area Leachate (RL03). The Emergency Cell Leachate Holding Tank, East Area Leachate (Ponds 1-3) and West Area Leachate (Ponds 1-3) locations are shown on **Figure 2 in Appendix A**. Leachate sampling will be performed in accordance with the City's Specialty Wastewater Discharge Permit Number RL04A (SWDP) or applicable current version. A copy of the SWDP is included in **Appendix E**.

2.1 EQUIPMENT

Sampling equipment may include the following:

- Nitrile gloves
- Disposable HDPE bailers
- Twine or string
- Field pH meter
- Sample bottles with labels and preservatives
- Shipping container and packing materials
- Permanent marking pen
- Field Data Sheet
- Chain of Custody (CoC)

2.2 MONITORING SCHEDULE AND LOCATIONS

Leachate sampling is performed at the East (Pre-Subtitle D) and West (Subtitle D) Area leachate collection pond(s) which are located south of the pre-Subtitle D landfill area across Highway 41. Leachate Ponds 1 through 3 have the capability of storing leachate from either the East Area or West Area. Alternatively, leachate may be sampled at the leachate loadout area provided the source (e.g. Subtitle D area) is known. Additionally, leachate sampling is performed at the Emergency Cell Leachate Holding Tank (RL01).

Leachate sampling events are performed as required by the SWDP. Currently, the sampling frequency is one sampling event for every period (e.g. monthly) in which leachate is discharged to the Publicly Owned Treatment Works (POTW).

2.3 DETERMINATION OF LEACHATE DISPOSAL VOLUME

Determination of the leachate disposal volume will be made for each disposal event. The volume may be determined by the methods below:

- Flow meter operated in accordance with manufacturer instructions; or
- Volume of the waste hauler tanker. The waste hauler must demonstrate that the tanker is empty upon arrival at the Site and provide documentation of the volume disposed to the

City Public Works Department.

2.4 ANALYTICAL PARAMETERS

The analytical parameters required by the SWDP are listed in **Table 1 in Appendix B** for the monthly monitoring events. The analytical parameters required by the SWDP are listed in **Table 2 in Appendix B** for the semiannual and annual monitoring events. The sampling containers, preservatives, analytical methods, and holding times to be used for each parameter group are provided in **Tables 1 and 2 in Appendix B**.

2.5 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

The Quality Assurance/Quality Control (QA/QC) for leachate sampling events is the collection of a trip blank if volatile organic compounds (VOCs) are being analyzed. A trip blank is prepared by the laboratory and must accompany the sample containers during the entire sample bottle cycle (laboratory, field, and transport to and from the laboratory). Trip blanks will be analyzed for VOCs only. Required VOCs are listed on **Table 2 in Appendix B.**

2.6 SAMPLING PROCEDURES

This section presents the procedures for sampling from the leachate collection ponds and emergency cell leachate tank. Field Data Sheets will be completed to document sampling events. An example form is included in **Appendix C**.

2.6.1 Sample Collection

2.6.1.1 Leachate Pond Sample Collection Procedures

The purpose of the procedures in this section is to obtain a sample that is representative of the leachate within the collection pond. Twine or similar will be tied to a disposal HDPE bailer. The bailer will be tossed towards the middle of the pond. Allow the bailer to fill with leachate and then retrieve the bailer minimizing contact with the sides of the leachate pond, appurtenant structures (e.g. aerators) and the ground. Prior to filling the sample bottles, leachate from the bailer will be transferred to a clean container so that the pH of the leachate can be measured with a field meter. The pH reading will be recorded on the Field Data Sheet. The sampling bottles, as applicable, should be filled in the order of most volatile to least volatile as listed below:

- VOCs
- SVOCs
- Pesticides
- Dioxins/Furans
- Perfluorochemicals
- Preserved inorganics
- Total metals
- Oil and grease
- Non-preserved inorganics

Labels should be filled out using a waterproof marking pen. Sample labels will contain the site name, sample location identification, sample collection date, sample collection time, parameters to be analyzed, and preservative used.

Alternative sampling procedures may be used so long as they are equivalent and are documented on the Field Data Sheet

2.6.1.2 Emergency Cell Leachate Holding Tank Sample Collection Procedures

The purpose of the procedures in this section is to obtain a sample that is representative of the leachate within the holding tank. Twine or similar will be tied to a disposal HDPE bailer. The bailer will be gently lowered into the holding tank. Allow the bailer to fill and then slowly remove the bailer and visually observe the leachate for the presence of stratification. If stratification is not observed, then leachate may be collected by slowly lowering the bailer into the holding tank and slowly removing the bailer to collect a sufficient volume of leachate to fill the applicable bottles. Prior to filling the sample bottles, leachate from the bailer will be transferred to a clean container so that the pH of the leachate can be measured with a field meter. The pH reading will be recorded on the Field Data Sheet. The sampling bottles, as applicable, should be filled in the order of most volatile to least volatile as listed below:

- VOCs
- SVOCs
- Pesticides
- Dioxins/Furans
- Perfluorochemicals
- Preserved inorganics
- Total metals
- Oil and grease
- Non-preserved inorganics

Labels should be filled out using a waterproof marker and contain the site name, sample location identification, sample collection date, sample collection time, parameters to be analyzed, and preservative used.

Alternative sampling procedures may be used so long as they are equivalent and are documented on the Field Data Sheet

Although stratification is not expected, if stratification is noted in the bailer sample upon withdrawal from the collection tank, the bailer should be emptied and composite samples will be taken. The HDPE disposable bailer equipped with the retrieval line should be gently lowered into the leachate and allowed to fill. The bailer will be slowly removed from the leachate and the contents transferred to a clean bottle large enough to handle one bailer volume. The bottle should be agitated slowly and then the contents placed into the appropriate sampling bottles for the required parameters. The sampling bottles should be filled in the order of most volatile to least volatile as listed below:

- VOCs
- SVOCs
- Pesticides
- Dioxins/Furans
- Perfluorochemicals
- Preserved inorganics
- Total metals
- Oil and grease
- Non-preserved inorganics

2.6.1.3 Sample Collection During Loadout

The purpose of the procedures in this section is to obtain a sample that is representative of the leachate from one of the permitted discharges. Samples may be collected from the sample port located at the leachate load out area. Prior to filling the sample bottles, leachate will be transferred to a clean container so that the pH of the leachate can be measured with a field meter. The pH reading will be recorded on the Field Data Sheet. The sampling bottles, as applicable, should be filled in the order of most volatile to least volatile as listed below:

- VOCs
- SVOCs
- Pesticides
- Dioxins/Furans
- Perfluorochemicals
- Preserved inorganics
- Total metals
- Oil and grease
- Non-preserved inorganics

Labels should be filled out using a waterproof marking pen. Sample labels will contain the site name, sample location identification, sample collection date, sample collection time, parameters to be analyzed, and preservative used.

Alternative sampling procedures may be used so long as they are equivalent and are documented on the Field Data Sheet

2.6.2 Equipment Decontamination Procedures

The following procedures will be followed to reduce the potential for sample contamination. Disposable equipment such as bailers or gloves will be properly disposed after each monitoring location. New disposable equipment will be used for each monitoring location. If non-disposable, non-dedicated, sample-contacting equipment is used, it must be thoroughly decontaminated prior to its use at each sampling location. Decontamination procedures for such equipment must, at a minimum, consist of washing with a non-phosphate detergent solution followed by a series of rinses with control water (i.e., water of a known chemistry) and one rinse with deionized water.

2.6.3 Sample Preservation, Handling, and Transport

Samples should be preserved as described in **Tables 1 and 2 in Appendix B**. Samples will be preserved by promptly placing in a cool location (e.g. placing the samples in an insulated cooler on ice).

2.6.3.1 Chain of Custody

A CoC form must accompany samples from the field to the laboratory. The CoC will contain the following information:

- Site identification
- Laboratory name
- Signature of sampler
- Unique sample ID
- Sample matrix
- Date and time of sample collection
- Number of containers
- Requested analysis
- Name of person for analytical report
- Date and time of sample transfer

2.6.3.2 Sample Shipping Requirements

Samples will be transported to the laboratory in a manner that maintains sample preservation and hold time requirements. Samples will be packaged in a manner that maintains sample integrity (e.g. prevent bottle breakage, maintain temperature requirements, maintain legibility of CoC, etc.).

2.7 REPORTING

Laboratory analytical results will be submitted to the City via a City Monthly Report or other agreed upon mechanism. The data will be included in the Monthly Self-Monitoring Reports (MSMR) and submitted to the City Environmental Division no later than the 15th of the month following sample collection. The laboratory data and a discussion of the data will be included in the City Quarterly Report and City Supplemental Report.

3.0 METHANE GAS MONITORING PLAN

The Methane Gas Monitoring Plan presents the procedures to be used for the collection of methane gas measurements at monitoring wells.

3.1 EQUIPMENT

Methane gas monitoring equipment may include the following:

- Landtec GEM2000 or equivalent
- Landfill gas monitoring field sheet

3.2 MONITORING SCHEDULE AND LOCATIONS

The Solid Waste Permit requires quarterly monitoring. Quarterly monitoring events are typically performed in February, May, August, and November of each calendar year. Methane monitoring will be performed at the monitoring wells and building locations presented on **Table 3 in Appendix B**. These locations are presented on **Figure 2 in Appendix A**.

3.3 MONITORING PROCEDURES

The Landtec GEM2000 or equivalent will be calibrated according to manufacturer instructions prior to measurement collection. Measurements from monitoring wells will be obtained from the well headspace inside the well casing approximately 1-2 feet from the top of casing. Measurements from buildings will be obtained from locations were methane gas is more likely to occur (e.g. cracks in floors, sumps/pits, and utility corridors). Allow the readings on the Landtec GEM2000 or equivalent to stabilize and then record the percent methane on the Landfill Gas Monitoring Field Sheet.

3.4 REPORTING

Methane measurement data will be included in the City Quarterly Report or other agreed upon mechanism. A summary and discussion of the data will be included in the State Annual Report.

4.0 LANDFILL GAS SAMPLING PLAN

The Landfill Gas Sampling Plan presents the procedures to be used for the sampling of landfill gas from the landfill gas collection system.

4.1 EQUIPMENT

Landfill gas sampling equipment may include the following:

- Nitrile gloves
- Tubing and connectors
- Sample containers
- Digital pressure gauge
- Vacuum gauge and flow controller
- Wrenches
- Shipping materials
- Permanent marking pen
- Chain of Custody (CoC)
- Field notebook

4.2 MONITORING SCHEDULE

The agreement between the City and Poet Biorefining (Poet) requires semiannual monitoring. The semiannual monitoring events are performed in the first half and second half of the year.

4.3 ANALYTICAL PARAMETERS

The analytical parameters outlined by the agreement between the City and Poet include the following:

- Natural gases
- Volatile organic compounds (VOCs)
- Sulfur gases
- Siloxanes

A list of the required parameters is shown on **Table 4 in Appendix B**.

4.4 SAMPLING CONTAINERS AND PRESERVATIVES

The sample containers, methods, and holding times to be used are identified in **Table 4 in Appendix B**.

4.5 EQUIPMENT DECONTAMINATION

Disposable equipment such as gloves and disposable tubing will be properly disposed after each

sample.

4.6 SAMPLING PROCEDURES

This section presents the procedures for the sampling landfill gas from the landfill gas collection system. A field notebook will be used to document sampling events.

4.6.1 Sample Collection

Landfill gas is typically sampled using the following methods:

- 1-Liter Tedlar bag for Sulfur compounds
- 6-Liter Glass-lined Summa canister for VOCs, natural gases and siloxanes

Alternative methods (e.g. sampling siloxanes using methanol impingers) may be used if equivalent and approved by the laboratory performing the analysis.

4.6.1.1 Summa Canister

The sampling train will consist of various fittings and tubing suitable for use with landfill gas, a laboratory provided vacuum gauge with flow controller, and a laboratory provided Summa canister appropriate for requested analysis. The flow controller should be set by the laboratory to collect a sample at approximately 100 to 300 mL/min. Ensure that the valve on the Summa canister is in the off position. Unscrew the cap on the top of the canister. Connect the vacuum gauge and flow controller to the sample port. Within the sample train, a digital pressure gauge should be connected. Open the sample port to purge ambient air from the sampling train from the sample port to the valve on the Summa canister. Connect the laboratory provided vacuum gauge and flow controller to the top of the Summa canister. Apply vacuum to the sampling train using a pump (e.g. GEM2000 or vacuum pump). Cease applying vacuum. Promptly read the pressure on the gauge and record in a field notebook. After five minutes, check the pressure again and record the value in a field notebook. If the pressure reading is the same, proceed to collecting a sample. If the pressure has changed, check the sampling train connections and make corrections as necessary. Recheck the integrity of the sampling train following the procedures above until the sampling train meets the pressure requirements described above.

A sample may be collected by opening the valve on the Summa canister. Promptly read and record the initial pressure of the Summa canister using the laboratory provided vacuum gauge and the time the reading was taken. Allow the Summa canister to fill until the laboratory provided vacuum gauge indicates that there are 5 inches of Hg remaining. Immediately prior to closing the valve on the Summa canister, read and record the final pressure and time the pressure reading was taken. Disconnect the sampling train and screw the cap back on the Summa canister.

4.6.1.2 Tedlar Bag

The sampling train will consist of various fittings and tubing suitable for use with landfill gas and the Tedlar bag. The sampling train will be connected to the sample port and ambient air should be purged from the sampling line without opening the valve on the Tedlar bag. Open the Tedlar

bag valve and fill the bag approximately half full and the close the valve on the Tedlar bag. The sample start and finish times should be noted on the Field Data Sheet.

4.6.2 Sample Preservation, Handling, and Transport

No preservation is required for the Tedlar bags or Summa canisters. If alternative methods are used and preservation is required, preservation requirements will be followed.

4.6.3 Chain of Custody

A CoC must accompany samples from the field to the laboratory. The CoC should include the following information:

- Site identification
- Laboratory name
- Signature of sampler
- Unique sample ID
- Sample matrix
- Date and time of sample collection
- Number of containers
- Requested analysis
- Initial Summa canister vacuum, if applicable
- Final Summa canister vacuum, if applicable
- Name of person for analytical report
- Date and time of sample transfer

4.6.4 Sample Shipping Requirements

Samples will be transported to the laboratory in a manner that maintains sample preservation and hold time requirements. Samples will be packaged in a manner that maintains sample integrity (e.g. prevent damage, maintain legibility of CoC, etc.).

4.7 REPORTING

Landfill gas measurement data will be transmitted via City Quarterly Report or other agreed upon mechanism. A summary and discussion of the data will be included in the City Supplemental Report.

5.0 SURFACE EMISSIONS MONITORING PLAN

The Surface Emissions Monitoring Plan presents the procedures to be used for the measurement of surface emissions of methane at applicable portions of the Site.

5.1 EQUIPMENT

Monitoring equipment may include the following:

- Portable analyzer (should meet criteria in 40 CFR 60, Appendix A, Method 21, except that "methane" shall replace all references to volatile organic compound)
- Monitoring log
- Traverse grid map

5.2 MONITORING SCHEDULE AND LOCATIONS

Quarterly events are typically performed in February, May, August, and November of each year. The surface testing will be performed around the perimeter of the collection area and along a pattern that traverses the applicable portions of the Site at 30 meter intervals and where visual observations, such as distressed vegetation and cracks or seeps in the cover, indicate elevated concentrations of landfill gas. A map of the traverse pattern is presented on **Figure 3 in Appendix A**.

5.3 MONITORING PROCEDURES

The portable analyzer will be calibrated in accordance with manufacturer's instructions. The analyzer must go through procedures identified on the form included in **Appendix C**. Methane concentrations will be measured within 5 to 10 centimeters (2 to 4 inches) of the landfill surface at the locations identified in Section 5.2.

5.4 CORRECTIVE ACTION

If a methane concentration of 500 ppm or more in excess of background is observed at the surface of the landfill, corrective action should be taken. The location of each exceedance will be marked and recorded. 40 CFR 60.755 (c) should be used as a guideline for implementing corrective action.

5.5 REPORTING

Monitoring data will be transmitted via City Quarterly Report or other agreed upon mechanism. A summary and discussion of the data will be included in the City Supplemental Report.

6.0 GROUNDWATER MONITORING PLAN

6.1 HYDROGEOLOGIC SETTING

The physical setting for the Site is in the Coteau des Prairies division of the Central Lowland Physiographic Province. The Coteau des Prairies consists of a highland or plateau of thick glacial deposits underlain by a small ridge of resistant shale and quartzite. The topography near the landfill is characterized by poorly drained uplands. An unnamed intermittent stream that carries drainage from Wall Lake (located about 2 miles northwest of the Site) crosses the southwestern corner of the Site and continues drainage toward the east along the southern boundary of the landfill.

The geologic setting for the Site consists of approximately 150 to 200 feet of glacial deposits overlying 30 to 50 feet of interbedded sands, siltstone, claystone, sandstone, bentonite, and lignite of the Split Rock Creek Formation. Below the Split Rock Creek Formation is the Sioux Quartzite with an unknown thickness exceeding 1,000 feet.

The glacial deposits are primarily pre-Illinois and late Wisconsin-aged till consisting of a very dense clay-rich matrix with silt, sand, and pebbles and occasional sand seams. It is difficult to distinguish the pre-Illinoisan till from the Wisconsinan till. The surficial late Wisconsin-aged till in the area of the Site occurs in three distinct zones: a weathered, highly-fractured, oxidized yellowish-brown to reddish-brown zone; an intermediate transition zone represented by varying degrees of mottling and decreasing fracture density with depth; and, an unweathered, unfractured, unoxidized gray to gray-blue zone.

The hydrogeology at the Site consists of a shallow, unconfined, low permeability, low flow groundwater zone within the Wisconsin-aged glacial till. The water table typically ranges from 5 to 15 feet below ground surface (bgs) and exhibits a predominantly southern gradient. This is the uppermost groundwater encountered and is the groundwater zone that is monitored for the landfill. Near the bottom of the glacial deposits and on top of the Split Rock Creek Formation, is a pre-Illinoisan outwash deposit, designated the Wall Lake Aquifer, consisting of fine to coarse-grained sand and fine pebble gravel. The Wall Lake Aquifer is confined by the overlying low permeability clay till and the underlying Split Rock Creek Formation. Below the Split Rock Creek Formation is the Sioux Quartzite Aquifer. The Sioux Quartzite Aquifer is confined and is locally well-fractured and jointed. The confining and artesian conditions of the Sioux Quartzite and the Wall Lake Aquifers locally protects them from near surface impacts in the vicinity of the Site.

6.2 GROUNDWATER MONITORING

This section presents the groundwater monitoring plan (GMP) well networks, sampling schedule, and monitoring parameters for the Site.

6.2.1 Groundwater Monitoring Network

The existing State Monitoring Network consists of 31 groundwater monitoring wells. Static water levels and groundwater samples are collected from 19 of the wells. Static water level measurements only are collected from the remaining 11 wells. The existing City Monitoring Network consists of four groundwater wells which are gauged for water levels only.

Hydraulic gradient status of the monitoring wells has been previously determined based on the configuration of the Site, construction of the monitoring wells and progression of waste placement. The upgradient wells are considered to be background wells and the downgradient wells are considered to be detection and/or compliance monitoring wells.

Based on current conditions at the Site there are five upgradient monitoring wells and 14 downgradient wells in the existing State Monitoring Network. Wells included in the State Monitoring Networks include:

State Upgradient Groundwater Monitoring Wells

MW-11, MW-21ox, MW-23ox, MW-25ox, and MW-61ox

State Downgradient Groundwater Monitoring Wells

MW-13R, MW-39ox, MW-42ox, MW-44ox, MW-45ox, MW-47ox, MW-48ox, MW-53ox, MW-54ox, MW-56ox, MW-57ox, MW-58Rox, MW-59ox, and MW-60ox

State Water Level Only Wells

MW-1, MW-5, MW-7R, MW-19, MW-46ox, P-1S, SDGS-28, SDGS-45, SDGS-57, SDGS-68, and SDGS-77

The four wells in the City Monitoring Network are considered to be located hydraulically downgradient from the Site and include the following wells:

City Water Level Only Wells

MW-15, MW-18R, MW-19i, and MW-43ox

Figure 2 in Appendix A shows the locations of the groundwater monitoring network wells. A summary of the groundwater wells is provided in **Table 5 in Appendix B**. Boring logs and well construction details are provided in **Appendix D**.

6.2.2 Groundwater Monitoring Parameters and Schedule

Groundwater sampling at the Site occurs on a semiannual basis in the spring and fall, typically in May and November. Wells in the State Monitoring Network will be sampled for RCRA Subtitle D (RCRA) Appendix I volatile organic compounds (VOCs), alkalinity, ammonia, nitrate/nitrite, chloride, sulfate, sulfide, biochemical oxygen demand (BOD), chemical oxygen demand (COD), total organic carbon (TOC), total metals (iron, manganese, calcium, sodium, and potassium), and dissolved metals (iron and manganese).

State network monitoring wells MW-13R and MW-44ox are in assessment monitoring due to low-level detections of Appendix I VOCs. Therefore, these wells are also sampled for RCRA Appendix II Organic Parameters (VOCs, semi-volatile organic compounds [SVOCs], pesticides, polychlorinated biphenyls [PCBs], and herbicides) and cyanide during the spring sampling events. A schedule for sampling is included in **Table 5 in Appendix B.** The parameters, bottles, preservatives and methods are presented in **Table 6 in Appendix B.**

6.2.3 Static Groundwater Level Monitoring

In addition to collection of groundwater samples, static groundwater level monitoring will be performed during each monitoring event to allow development of potentiometric surface maps for each sampling event. Static groundwater level measurements will be collected at the initiation of each sampling event. Groundwater levels will be measured in all monitoring wells in the network shown on **Figure 2 in Appendix A**. A monitoring well summary is provided in **Table 5 in Appendix B**.

6.3 SAMPLING PLAN

Groundwater sampling will be performed by personnel trained in proper sampling protocol. As Site conditions change, sampling activities at the Site will be reviewed.

6.3.1 Equipment

Groundwater sampling equipment may include the following:

- Water level indicator, precise to 0.01 ft.
- Nitrile gloves
- Multi-parameter meter equipped with a flow-through cell or equivalent
- Peristaltic pump (for shallow wells)
- Portable bladder pump with controller (for deep wells) and disposable bladders
- Tubing
- 0.45 micron filters
- Alconox
- Deionized water
- Spray bottles
- Sampling bottles with labels and preservatives as necessary
- Shipping container, label, and packing materials
- Permanent marking pen
- Chain of Custody (CoC)
- Field data sheets

6.3.2 Recording Information

The following information will be included on the Field Data Sheets for each sampling event. An example form is included in **Appendix C**. The Field Data Sheet should provide space for necessary information and include:

- Weather conditions (air temperature and wind direction)
- Date and time of water level measurements
- Total depth of each well (measured if well is not equipped with a dedicated pump)
- Static water level
- Date and time of purging
- Actual purge volume (and pumping rate if applicable)
- Field parameter stability measurements
- Sample date and time
- Sample field parameter measurements
- Field observations (e.g. well recharge rates, equipment malfunction, possible sample contamination, or sampling rates)
- Well observation information (e.g. condition of the well pad, protective casing, well casing, elevation reference mark, well identification, and locks)

6.3.3 Static Groundwater Level Measurements

Static groundwater levels will be measured at the State Monitoring Network and City Monitoring Network wells prior to sample collection, if applicable. An electronic water level indicator, or equivalent, will be used to collect groundwater level measurements to the nearest 0.01 foot. Groundwater levels will be measured to the surveyed reference mark on the top of the well casing and recorded on a Field Data Sheet. Groundwater levels should be measured from upgradient to downgradient wells in order to limit potential cross-contamination. If groundwater contamination has occurred, groundwater levels should be measured from least to most contaminated.

Decontaminate the cable and probe of the water level indicator by rinsing the equipment once with deionized or laboratory reagent-quality water, brushing or spraying the equipment with a laboratory-quality, non-phosphate soap, and rinsing the equipment with deionized or laboratory reagent quality water.

Groundwater levels should be compared with historic groundwater levels whenever possible. If a large difference in groundwater levels from the previous sampling event is noted, the groundwater level should be re-measured. If the re-measurement gives the same result, the inconsistency should be noted on the Field Data Sheet.

6.3.4 Purging Procedures

Procedures are included in this section for low-flow purging with either a peristaltic pump or with a non-dedicated bladder pump. Purge water that is generated during purging activities shall be handled in one of the following ways. If groundwater has not shown signs of organic contamination (i.e. no detections of VOCs at or above the detection limit) during recent sampling events, the purge water may be discharged to the ground surface. If groundwater shows signs of

potential contamination or has been suspected of contamination during the past two sampling events, the purge water will be disposed in the leachate collection system.

Purging by use of low-flow techniques generally consists of clearing the stagnant water from the tubing, limiting drawdown of the water column, and stabilizing field parameters. The following procedures will be used when completing purging activities using a non-dedicated low-flow bladder or peristaltic pump.

- 1. Calculate the water column (WC) height. This can calculated by subtracting the depth to water (measured) from the depth to pump inlet.
- 2. Calculate one tube volume. This volume can be calculated as follows:

For 3/8-inch tubing

1 tube volume is equal to 22 milliliters per foot of WC (mL/ft. WC)

For ¼-inch tubing:

1 tube volume is equal to 10 mL/ft. WC

- 3. The total volume purged will be noted on the sample collection form.
- 4. The non-dedicated bladder pump and peristaltic pump will be assembled according to manufacturer's instructions. Dedicated or disposable tubing will be used for each well. For the non-dedicated bladder pump, the dedicated tubing consists of an airline and a water discharge line. The airline and water discharge line will be connected to the pump, and slowly lowered into the well down to the screened interval or depth allowed by the dedicated tubing. The airline will be connected to the flow controller and purging will be initiated.
- 5. Purge a minimum of 1 tubing volume by using a pumping rate of approximately 100 milliliters per minute (mL/min) to 500 mL/min. The monitoring well should be purged at a rate that does not exceed the yield of the well and does not dewater the screened interval of the well. Although some drawdown may be noted at the beginning of purging, draw down should slow and the water level should stabilize as purging continues. If the water level continues to draw down and does not stabilize, cease purging and allow the well to recharge. Resume purging at a slower rate.
- 6. Following removal of 1 tube volume, monitor the purge water for stabilization of field parameters. Measure the purge water for pH, temperature, specific conductivity, dissolved oxygen, oxidation/reduction potential (ORP), and turbidity and record measurements on a Field Data Sheet approximately every 3 to 5 minutes until the parameters stabilize. Stabilization has occurred when the field parameters meet the following criteria between two readings:
 - pH varies by no more than 0.2 standard units (S.U.);
 - temperature is within ± 0.5 degrees Celsius ($^{\circ}$ C);
 - specific conductivity is within ± 10%;
 - dissolved oxygen is within \pm 10% of reading or \pm 0.2 milligrams per liter (mg/L), whichever is greater,
 - ORP is within \pm 10%, and
 - depth to water not decrease more than 10% of the WC.

7. Once sampling is complete, the pump will be removed from the well, disconnected from the tubing, and the dedicated tubing will be bagged and labeled for storage or carefully placed in the well for use during future sampling events. Disposable tubing will be disposed properly. The non-dedicated bladder pump will be disassembled and the cap, body, and bladder (if being reused) will be decontaminated according to procedures outlined in Section 6.3.7.

6.3.5 Field Measurements

Field measurements of temperature, pH, specific conductivity, dissolved oxygen, and ORP will be collected and recorded on a Field Sheet during well purging and before the collection of samples for laboratory analysis using a flow through cell equipped with a multi-meter. The multi-meter will be calibrated according to manufacturer instructions.

Calibration and calibration checks will be recorded in the field logbook or Field Data Sheet. Extreme cold or hot weather is known to affect pH and conductivity meters. In these cases, the meters should be checked for calibration more frequently.

6.3.6 Sampling Procedure

Samples will be collected using the same rate used for purging. Gloves will be worn during all purging and sampling procedures.

Wells should be sampled from upgradient to downgradient, or, if impacts to groundwater are known to have occurred from least contaminated to most contaminated. The sampling bottles, as applicable, should be filled in the order of most volatile to least volatile as listed below:

- VOCs
- SVOCs
- Pesticides
- PCBs
- Herbicides
- Preserved inorganics
- Total metals
- Non-preserved Inorganics
- Dissolved metals

Samples collected for dissolved metals will be field-filtered through a 0.45 micron filter prior to filling the sample bottle.

Table 6 in Appendix B presents a list of sampling parameters and reporting limits, analytical methods, preservatives, containers, and holding times.

When filling the sample bottles, samplers should adhere to the following precautions:

1. Immediately prior to sample collection, measure and record field parameters.

- 2. Bottle caps should be removed carefully so that the inside of the cap is not touched. Caps must never be put on the ground.
- 3. Pump tubing should never touch or enter sample bottles.
- 4. The sampling team must wear appropriate gloves. Gloves should be changed between wells or on a more frequent basis.
- 5. VOC vials must be filled so that they are headspace-free.
- 6. If an insufficient volume of water exists for collection of the requisite suite of samples, samples will be collected in the applicable order specified above.
- 7. Samples will be preserved by promptly placing in a cool location (e.g. placing the samples inside an insulated cooler on ice) after sample collection.
- 8. Sample bottles must not be opened after collection and preservation of the sample.
- 9. Each bottle for sample collection from the laboratory should be pre-preserved with the appropriate amount of preservative for the particular analysis. Alternatively, the laboratory may ship pre-measured amounts of preservative for addition to the sample in the field. Bottles should not be overfilled as this may cause loss of some of the preservative.
- 10. Each sample bottle should be clearly labeled with the sample point number, sample date and time, sampler's initials, and selected parameters.
- 11. A chain of custody (CoC) is to be filled out for each sampling event and is to accompany the shipment of samples to the laboratory. The CoC will contain the following information:
 - Site Identification
 - Laboratory Name
 - Signature of Sampler
 - Unique Sample ID
 - Sample Matrix
 - Date and Time of Sample Collection
 - Number of Containers
 - Requested Analysis
 - Name of Person for Analytical Report
 - Date and Time of Sample Transfer
- 12. Samples will be transported to the laboratory in a manner that maintains sample preservation and hold time requirements. Samples will be packaged in a manner that maintains sample integrity (e.g. prevent bottle breakage, maintain temperature requirements, maintain legibility of CoC, etc.).

6.3.7 Decontamination Procedures

Non-dedicated, sample-contacting equipment must be thoroughly decontaminated prior to its use at the site. This includes groundwater level measurement devices and the non-dedicated bladder pump.

Decontamination procedures for down-hole equipment such as the non-dedicate bladder pump must, at a minimum, consist of washing with a non-phosphate detergent solution followed by a series of rinses with control water (i.e., water of a known chemistry) and one rinse with deionized water. Other non-dedicated equipment (e.g., field parameter meters) should be triple rinsed with deionized water before and after each use.

6.4 LABORATORY ANALYSIS PLAN

This section presents the procedures for laboratory analyses of groundwater samples collected from the Site.

6.4.1 Quality Assurance/Quality Control Procedures

Trip blanks, equipment rinsate blanks, and duplicates provide quality assurance/quality control (QA/QC) measures for the monitoring program. The laboratory used for analysis of samples collected from the Site will be accredited by the National Environmental Laboratory Accreditation Program (NELAP).

6.4.1.1 Trip Blanks

Trip blanks are prepared by the laboratory and must accompany the sample containers during the entire sample bottle cycle (laboratory, field, and back to the laboratory). Trip blank sample bottles must not be opened at any time during this process. Trip blanks will be analyzed for VOCs only. Trip blank results will be reported in the laboratory results as separate samples, using the designation "TB-(date)," or a similar identifier, as their sample point designation.

6.4.1.2 Equipment Rinsate Blank Samples

Equipment rinsate blank samples will be collected by field personnel by pouring deionized water over non-dedicated sample collection equipment (such as the non-dedicated bladder pump). Equipment rinsate blank samples will be collected at a rate of one for each 20 groundwater samples collected using non-dedicated or non-disposable sample-contacting equipment. Equipment rinsate blank samples will be submitted for analysis of RCRA Appendix I VOCs, non-preserved inorganics, preserved inorganics and total metals. Equipment rinsate blank results will be reported in the laboratory results as separate samples, using the designation "equipment rinsate blank" or a similar identifier.

6.4.1.3 Duplicate Samples

A duplicate sample is a second sample from a well. Duplicate samples are to be obtained at the same time and analyzed for the same parameters as the sample it is intended to duplicate. One duplicate will be collected during each sampling event. The well where the duplicate was sampled from must be identified on the Field Data Sheet, but not indicated on the CoC sent to the laboratory. The duplicate sample is called "dup," or an equally non-descriptive name.

The purpose of a duplicate sample is to determine the precision of the analyzing laboratory. The following calculation for relative percent difference (RPD) is performed during review of the laboratory data. An RPD of \pm 20% is typically acceptable.

$$RPD = \frac{\left(original\ value - duplicate\ value\right)}{\left(original\ value + duplicate\ value\right)\frac{1}{2}}*100$$

6.4.2Laboratory Quality Assurance Procedures

The quality assurance program for the selected analytical laboratory is described in their Quality Assurance Plan (QAP), and is available from the laboratory. The QAP describes mechanisms the laboratory employs to ensure that all data reported meets or exceeds all applicable requirements. It describes the laboratory's experience, its organizational structure, and procedures in place to ensure quality of the analytical data. The QAP outlines the analytical and reporting procedures used by the laboratory. The laboratory is responsible for the implementation of and adherence to the quality assurance and quality control requirements outlined in the QAP.

Audits are conducted as an important component of the quality assurance program at the laboratory. Internal system and performance audits are conducted periodically to ensure adherence by all laboratory departments to the QAP. External audits are conducted by accrediting agencies or states. These reports are transmitted to department managers for review and response. Corrective measures must be taken for any finding or deficiency found in an internal or external audit.

Data quality reviews are requests submitted to the laboratory to formally review results that differ from historical results or exceed permit requirements or quality control criteria. This review is the first line of investigation following any anomalous result.

6.4.3 Analytical Methodologies

Table 6 in Appendix B presents the analytical methodologies to be used by the laboratory for the parameters required in the monitoring program. Methods will be EPA approved, or equivalent, and be described in the laboratory method and standard operating procedure documents.

The analytical method for analysis will be such that appropriate reporting limits can be achieved by the laboratory. The reporting limit should not deviate $\pm 25\%$ from its most common level. This consistency allows the statistical analysis presented in Section 6.5 to be more effective in detecting a potential release from the Site.

6.5 STATISTICAL ANALYSIS PLAN

The objective of detection monitoring is to evaluate potential changes in groundwater quality and assess if these changes are the result of an impact by the Site. Evaluation of groundwater monitoring data is accomplished by selecting sample locations and identifying an appropriate "background" to which compliance (new) data will be statistically compared. Ideally, the

background data is compiled from a location or time that has not been affected by the Site. Once an appropriate background database has been established, new data are compared to it using statistical analysis.

Inorganic constituents will be analyzed using interwell statistical analysis, with intrawell statistical analysis being used as an additional tool to evaluate potential statistically significant increases (SSIs) identified during interwell statistical analysis. An interwell statistical analysis approach has been recommended because with two exceptions, the groundwater wells were not installed prior to placement of waste at the Site. Therefore, it cannot be shown that samples from the downgradient compliance wells have not been impacted by the Site. The two exceptions are wells MW-7R (installed December 1997 and replaces MW-7 which was installed in 1991) and MW-39ox. Well MW-39ox was installed in 1994. Waste was not placed in Cell 1 until 2004, and therefore "pre-waste" groundwater data exists for this well prior to 2004.

VOCs are not naturally occurring and, therefore, a verified VOC detection is considered an SSI. SSI verification procedures are discussed in Section 6.5.3

6.5.1 Statistical methodology for Inorganic Compounds

The proposed statistical methods are appropriate for monitoring the Site and are consistent with United States Environmental Protection Agency guidance document: "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance" dated March 2009 (Unified Guidance). Computer software which allows for statistical testing according to the 2009 Unified Guidance will be used for the analysis.

6.5.1.1 Background Data and Outlier Evaluation

Existing data will be used to establish background. The data will be examined for outliers, anomalies, and trends. Outliers and anomalies are inconsistently large or small values that can occur due to sampling, laboratory, transportation, or transcription errors, or even by chance alone. Significant trends may indicate a source of systematic error or an actual contamination occurrence, and must be evaluated and corrected before the detection monitoring program can be implemented. The inclusion of such anomalous values in the historical background database used for statistical evaluation could cause misinterpretation of the data set. However, trending data sets may be used in a background data set as they may accurately represent true trending data independent of possible Site impacts.

When creating the background database, data for each well and constituent will be tested for the existence of outliers prior to implementing the background data set. Statistical outliers will only be removed from the data set if sufficient evidence exists to determine that the outlier is a likely error. The background data set for statistical analysis should be evaluated every one to two years.

6.5.1.2 Interwell Prediction Limit Analysis

As discussed previously, interwell prediction limit analysis has been chosen for the Site because a majority of the groundwater wells were installed after waste placement. An interwell prediction

limit analysis compares data collected from compliance (downgradient) monitoring wells with data collected from background (upgradient) monitoring wells. Laboratory data is used to calculate the interwell prediction limit and is used to determine if a single data point is statistically representative of a group of data points. If a data point exceeds the calculated interwell prediction limit, then a statistically significant exceedance is noted. For interwell prediction limit analysis, monitoring wells MW-11, MW-21ox, MW-23ox, and MW-25ox, and MW-61ox will be designated as the background (upgradient) monitoring wells.

The distribution of the data will be calculated by applying the Shapiro-Wilk/Francia test for normality on the raw or, if necessary, the Ladder of Powers (Helsel & Hirsh, 1992) transformed data. A parametric prediction limit will be constructed for data determined to have a normal or transformed normal distribution. A non-parametric prediction limit will be calculated for data not transformed normal or containing 51 percent to 90 percent non-detect results. A Poisson based prediction limit will be calculated for data with greater than 90 percent non-detect results.

6.5.1.3 Intrawell Prediction Limit Interval Testing

Intrawell prediction interval testing will be performed as needed to supplement the interwell analysis described in Section 6.5.1.2. The intrawell prediction limit will be determined by comparing the most recent constituent value for each well to its most recently calculated upper prediction limit (UPL) based on the last background update. If the compared value exceeds the UPL, there is possible evidence of an SSI over background.

6.5.2 Statistical Methodology for Organic Compounds

Since VOCs are rarely detected in background groundwater samples, establishing monitoring well-specific limits is generally not an option. Therefore, detection rules based on laboratory-specific reporting limits will be used. An exceedance for a VOC is defined as a result at or above its reporting limit. If the exceedance occurs at a downgradient well, it is identified as an SSI. If the exceedance occurs at an upgradient well, it is identified as an area of concern (AOC). An initial SSI of a VOC will follow the verification procedure outlined in Section 6.5.3.

6.5.3 Statistically Significant Increase Verification Procedure

If an initial SSI is detected in a downgradient monitoring well for either an inorganic parameter or a VOC, the reported result will be reviewed and checked for QA/QC consistency. For inorganic parameters, evaluation of the SSI via additional statistical testing is recommended. Although interwell statistical testing has been chosen as the main statistical analysis tool to identify potential SSIs at the Site, interwell statistical analysis does not fully account for the natural and spatial variability of groundwater. Therefore, it is recommended that for identified interwell SSIs, that intrawell statistical testing methodologies including Sen's Slope/Mann-Kendall testing, intrawell prediction limit analysis, and/or other methods as applicable, also be performed to provide further information by which to evaluate a potential SSI.

According to the objectives of 40 CFR Part 258.53, verification resampling is to occur within 90 days of the determination of a SSI. Verification resampling is an integral part of the statistical methodology described by EPA's March 2009 Unified Guidance.

Within 90 days of detecting the initial exceedance, the monitoring point will be resampled for the specific parameter which indicates an SSI. If the statistical analysis of the resample result does not verify the initial exceedance, no SSI will be determined. If VOCs are typically and/or consistently detected at particular monitoring wells (e.g. MW-13R and MW-44ox), no additional notification or sampling will occur.

The State Annual Report will be submitted and will include applicable descriptions of potential causes of the exceedance. If the verification resampling result confirms the initial statistical exceedance, the detection will be considered a verified SSI. Operational and procedural aspects of the Site will be considered, some of which may include:

- Field sampling procedures
- Sample quality and turbidity
- Laboratory analytical methods
- Acceptable cation/anion balance
- Temporal groundwater gradient changes
- Effects of engineered hydraulic controls
- Natural spatial and temporal variability
- Berm failure
- Surface water re-routing and potential impacts
- Surface water run-off

If the data appear to be explained by one of these procedural, operational, or natural aspects, the monitoring report will be submitted with explanations that support the report conclusions. It is not the intent of this plan to require the resampling for each and every inorganic constituent which exhibits a statistical exceedance. Therefore in general, statistical exceedances will be evaluated at the next regularly scheduled sampling event. Some instances where immediate resampling may be warranted would be in cases of U.S. Environmental Protection Agency (EPA) drinking water maximum contaminant level (MCL) exceedances or high detected levels of particularly concerning constituents. If the verified SSI is for a VOC, the DENR will be notified within 14 days of receipt of the written laboratory results.

6.6 REPORTING

6.6.1 Groundwater Monitoring Reports

Upon completion of the two semiannual sampling events, a State Annual Report summarizing the sampling events at wells in the State Monitoring Network will be submitted to the DENR by April 1st of the following year. The report will include the following:

- The purpose of sampling (i.e., detection or assessment)
- A copy of field notes and/or data sheets
- Deviations from the GMP during sampling and the reasons for the change
- A potentiometric surface map, including direction of groundwater flow, compiled from measurements taken during the sampling event
- Summary of the analytical results (text and table)
- Laboratory data validation summary

- A copy of laboratory analytical results
- A copy of CoC records
- Statistical analysis results including the identification of SSIs over background values

7.0 COMPOST LEACHATE SAMPLING PLAN

The Compost Leachate Sampling Plan presents the procedures to be used for compost leachate quality measurements.

7.1 EQUIPMENT

Sampling equipment may include the following:

- Nitrile gloves
- Disposable HDPE bailer or equivalent
- String (for bailer retrieval)
- Sampling bottles with labels and preservatives
- Shipping materials
- Permanent marking pen
- Chain of Custody (CoC)
- Field data sheet

7.2 SAMPLING SCHEDULE AND LOCATIONS

Sampling is performed annually prior to the use of the compost leachate as an irrigation source. Additionally, once during the life of each five-year Solid Waste Permit, a five-year sampling event is performed and covers the annual event for that year. The compost leachate sample is collected from the compost leachate pond shown on **Figure 2 in Appendix A**.

7.3 ANALYTICAL PARAMETERS

The analytical parameters required are listed in **Tables 7 and 8 in Appendix B** for the appropriate sampling event.

7.4 SAMPLING CONTAINERS AND PRESERVATIVES

The sampling containers, preservatives, methods, and holding times to be used for each parameter and parameter group are identified in **Tables 7 and 8 in Appendix B**.

7.5 SAMPLING PROCEDURES

7.5.1 Sample Collection

The purpose of the procedures identified in this section is to obtain a sample that is representative of the fluid within the compost leachate pond. Twine or similar will be tied to a disposable HDPE bailer. The HDPE bailer will be tossed towards the middle of the pond. Allow the bailer to fill with leachate and then retrieve the bailer minimizing contact with the sides of the leachate pond and the ground. Prior to filling the sample bottles, leachate from the bailer will be transferred to a clean container so that the pH of the leachate can be measured with a field meter. The pH reading

will be recorded on the Field Data Sheet. The sampling bottles, as applicable, should be filled in the order of most volatile to least volatile as listed below:

- Pesticides
- Herbicides
- Metals (hexavalent chromium)
- Preserved inorganics
- Total metals
- Oil & grease
- Non-preserved inorganics

Sample bottles will be labeled and the label will include the site name, sample location identification, sample collection date, sample collection time, analytical requirements and preservative used.

7.5.2 Equipment Decontamination

The following procedures will be followed to reduce the potential for sample contamination. Disposable equipment such as bailers or gloves will be properly disposed after each sampling event. New disposable equipment will be used for each monitoring event. If non-disposable, non-dedicated, sample-contacting equipment is used, it must be thoroughly decontaminated prior to its use. Decontamination procedures for such equipment must, at a minimum, consist of washing with a non-phosphate detergent solution followed by a series of rinses with control water (i.e., water of a known chemistry) and one rinse with deionized water.

7.5.3 Sample Preservation, Handling, and Transport

Samples shall be preserved as described in **Tables 7 and 8 in Appendix B**. Samples will need to be preserved by promptly placing in a cool location (e.g. placing the samples inside an insulated cooler on ice) after collection.

7.5.4 Chain of Custody

A Chain of Custody (CoC) form must accompany samples from the field to the laboratory. The CoC will contain the following information:

- Site Identification
- Laboratory Name
- Signature of Sampler
- Unique Sample ID
- Sample Matrix
- Date and Time of Sample Collection
- Number of Containers
- Requested Analysis
- Name of Person for Analytical Report
- Date and Time of Sample Transfer

7.5.5 Sample Shipping Requirements

Samples will be transported to the laboratory in a manner that maintains sample preservation and hold time requirements. Samples will be packaged in a manner that maintains sample integrity (e.g. prevent bottle breakage, maintain temperature requirements, maintain legibility of CoC, etc.).

7.6 REPORTING

Compost leachate data will be included in the City Quarterly Report or other agreed upon mechanism. A summary and discussion of the data will be included in the City Supplemental Report.

8.0 COMPOST SAMPLING PLAN AND PROCEDURES

The Compost Sampling Plan presents the procedures to be used for the collection of finished compost samples.

8.1 EQUIPMENT

Sampling equipment may include the following:

- Nitrile gloves
- Shovel
- Bucket(s)
- Garbage bags
- Isopropyl alcohol
- Deionized water
- Spray bottles
- Permanent marking pen
- Sample containers and labels
- Chain of Custody (CoC) form
- Field notebook

8.2 SAMPLING SCHEDULE

A compost sample will be collected from a finished lot prior to distribution. If a new type of raw material (e.g. grass from a substantially unique source) is added to the compost, this is considered a new lot and should be stored in a separate location from previously finished lots and should be sampled prior to distribution. Lots that are not distributed within 120 days of sampling should be re-sampled prior to distribution.

8.3 ANALYTICAL PARAMETERS

The analytical parameters required are listed in **Table 9 in Appendix B**.

8.4 SAMPLING PROCEDURES

8.4.1 Sample Collection

The finished compost lot will be identified and generally is located along the eastern edge of the compost area as shown on attached **Figure 2 in Appendix A**. Fifteen random sample aliquots will be collected from various depths and locations of the lot. The aliquots will be mixed together in a garbage bag lined bucket or similar to create a composite sample that is representative of the lot. Sample containers will be filled using the composite sample material. Labels should be filled out using a waterproof marking pen and contain the site name, sample location identification, sample collection date, sample collection time and parameters to be analyzed.

8.4.2 Equipment Decontamination Procedures

The following procedures will be followed to reduce the potential for sample contamination. Disposable equipment such as gloves or garbage bags will be properly disposed after each sampling event. If non-disposable, non-dedicated, sample-contacting equipment is used, it must be thoroughly decontaminated prior to each sampling event. Decontamination procedures for such equipment must, at a minimum, consist of washing with a non-phosphate detergent solution followed by a series of rinses with control water (i.e., water of a known chemistry) and one rinse with deionized water.

8.4.3 Sample Preservation

Samples should be preserved as described in **Table 9 in Appendix B**. Samples will be preserved in the field by promptly placing in a cool location (e.g. placing the samples in an insulated cooler on ice).

8.4.4 Chain of Custody

A CoC form must accompany samples from the field to the laboratory. The CoC will contain the following information:

- Site identification
- Laboratory name
- Signature of sampler
- Unique sample ID
- Sample matrix
- Date and time of sample collection
- Number of containers
- Requested analysis
- Name of person for analytical report
- Date and time of sample transfer

8.4.5 Sample Shipping Requirements

Samples will be transported to the laboratory in a manner that maintains sample preservation and hold time requirements. Samples will be packaged in a manner that maintains sample integrity (e.g. prevent bottle breakage, maintain temperature requirements, maintain legibility of CoC, etc.).

8.5 REPORTING

Compost data will be included in the City Quarterly Report or other agreed upon mechanism. A summary and discussion of the data will be included in the City Supplemental Report.

9.0 STORM WATER DISCHARGE SAMPLING PLAN

The Storm Water Discharge Sampling Plan presents the procedures to be used for the sampling of storm water runoff and discharges. Sampling of discharges from the compost leachate pond associated with storm water events will be performed in accordance with the DENR General Permit for Temporary Discharge Activities Permit No. SDG070944. Other storm water discharges from the Site will be sampled in accordance with the DENR General Permit for Storm Water Discharges Associated with Industrial Activities. Copies of each permit are included in **Appendix E**.

9.1 EQUIPMENT

Sampling equipment may include the following:

- Nitrile gloves
- HDPE bailers
- Transfer bottle
- Twine
- Sampling bottles with labels and preservatives
- Shipping container, label and packing materials
- Ice
- Permanent marking pen
- Chain of Custody form
- Field data sheet

9.2 MONITORING SCHEDULE & LOCATIONS

The General Permit indicates that samples should be taken as often as necessary to provide representative information on the nature of the discharge. At a minimum, samples will be collected once per calendar week in which discharge occurred from a permitted location. Locations in which discharge might be occurring are shown on **Figure 2 in Appendix A**.

9.3 ANALYTICAL PARAMETERS

The analytical parameters required are on **Table 10** in **Appendix B**.

9.4 SAMPLING CONTAINERS AND PRESERVATIVES

The sampling containers, preservatives, methods, and holding times to be used for each parameter and parameter group are identified on **Table 10 in Appendix B**.

9.5 SAMPLING PROCEDURES

9.5.1 Sample Collection

The purpose of the procedures identified in this section is to obtain a sample that is representative of the fluid that is being discharged. The locations for sampling will be identified by City personnel and samples will be collected using a transfer bottle (i.e. unpreserved sample bottle or disposable HDPE bailer) or similar device. The sampler will position the transfer bottle so the opening faces downstream and gently submerge the bottle to avoid touching the bottom or sides of the storm water conveyance and agitating stream sediment or debris. If the sampler must enter the water, he or she should remain downstream of the sampling location. If problems exist accessing the identified storm water monitoring point (e.g. access is too far or dangerous), the sampler will use an extendable pole or other appropriate sampling apparatus. Prior to filling the sample containers, a field pH sample will be collected by pouring the contents from the bailer or the transfer bottle into a clean plastic cup. Measure the pH of the sample with a pH meter. Record the field measurement on the Field Data Sheet. An example form is included in **Appendix C**. Fill the sample bottles, as applicable, in order of volatilization sensitivity as listed below:

- VOCs
- Preserved inorganics
- Oil and grease
- Non-preserved inorganics

Sample bottles will be labeled and the label will include the site name, sample location identification, sample collection date, sample collection time, analytical requirements and preservative used.

9.5.2 Equipment Decontamination

Disposable equipment such as bailers or gloves will be properly disposed after each sampling location. New disposable equipment will be used for each monitoring location. If non-disposable, non-dedicated, sample-contacting equipment is used, it must be thoroughly decontaminated prior to its use at each sampling location. Decontamination procedures for such equipment must, at a minimum, consist of washing with a non-phosphate detergent solution followed by a series of rinses with control water (i.e., water of a known chemistry) and one rinse with deionized water.

9.5.3 Sample Preservation, Handling, and Transport

Samples will be transported to the laboratory in a manner that maintains sample preservation and hold time requirements. Samples will be packaged in a manner that maintains sample integrity (e.g. prevent bottle breakage, maintain temperature requirements, maintain legibility of CoC, etc.).

A Chain of Custody (CoC) form must accompany samples from the field to the laboratory. The CoC will contain the following information:

- Site Identification
- Laboratory Name
- Signature of Sampler
- Unique Sample ID
- Sample Matrix
- Date and Time of Sample Collection
- Number of Containers
- Requested Analysis
- Name of Person for Analytical Report
- Date and Time of Sample Transfer

9.6 REPORTING

Storm water discharge data will be included in the City Quarterly Report or other agreed upon mechanism. A summary and discussion of the data will be included in the City Supplemental Report.

10.0 STORM WATER INSPECTION PLAN

The Storm Water Inspection Plan presents the general procedures to be used for the inspections of storm water runoff and surface discharges. The inspections will be performed in accordance with the Sioux Falls Regional Sanitary Landfill Storm Water Pollution and Prevention Plan and Comprehensive Surface Water Management Plan (SWPPP) dated June 2011.

10.1 EQUIPMENT

Equipment may include the following:

- Digital Camera
- Site Inspection Form
- Best Management Practice ID form

10.2 INSPECTION EVENT FREQUENCY

The SWPPP requires semiannual and annual inspection events. A comprehensive site evaluation is performed during the annual inspection. One semiannual inspection should be performed during a period when storm water is discharging from the site, if possible.

10.3 MONITORING REQUIREMENTS

Storm water sampling is currently not required by the SWPPP. Sampling may be performed if required by the DENR or voluntarily by the City. The SWPPP identified several areas of potential surface discharges which are shown on **Figure 2 in Appendix A.** Additional activities or facilities that may impact storm water runoff that are added to the Site should be added to the inspection location list.

10.4 INSPECTION PROCEDURES

10.4.1 Inspection Criteria

The inspection will include an examination and assessment of areas identified in the SWPPP as potential pollutant sources where industrial materials or activities are exposed to storm water, areas where spills and leaks have occurred in the past three years, and where storm water control measures are located. Pictures should be taken with a digital camera, as necessary, to provide additional documentation. Identify implemented best management practices and record the information on the Best Management Practice ID form and on the Site Inspection Form. These forms are included in **Appendix C**. As part of the annual inspection, the Site Inspection Form should be completed and be signed by designated permit reporting officer.

10.5 REPORTING

Observations made during the inspections will be incorporated into the City Monthly Report or other agreed upon mechanism. The reports should include any incidences of non-compliance, a

description of potential pollution sources, and recommendations for changes to the SWPPP. Within 12 weeks of the report, changes to the SWPPP should be implemented. A brief discussion of the inspection activities will be included in the City Supplemental Report.

11.0 HEALTH AND SAFETY

Field activities associated with this CMP will be performed under the direction of a site-specific health and safety plan (HASP). The purpose of the HASP will be to establish guidelines for maintaining a safe and healthful work environment while performing the duties in Section 2.0 through Section 10.0. The employer of the personnel performing the work under this CMP will be responsible for developing and implementing the HASP to be used by their personnel based upon the degree of risk posed by the hazards at the site.

12.0 GENERAL COMMENTS

This CMP presents required analytical parameters for various monitoring events (e.g. groundwater, leachate, landfill gas). The CMP also lists sample containers, preservatives, analytical methods, reporting limits and holding times associated with the analytical parameters. The analytical parameters will not change unless the CMP is modified in writing. However, sample containers, preservatives, analytical methods and holding times may change so long as they are generally equivalent to what is listed in the CMP. Reporting limits may vary due to many factors such as dilutions required for analysis, improved laboratory procedures and methods.

SCS Engineers does not warrant the work of third parties supplying information used in the assimilation of this document. This document has been prepared using the level of care and skill ordinarily exercised, under similar circumstances, by environmental professionals currently practicing in this locality. No other representation, express or implied, and no warranty or guarantee is included or intended.

13.0 REFERENCES

ASTM International, Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations, D 6671-02.

ASTM International, Standard Guide for Purging Methods for Wells Used for Groundwater Quality Investigations, D6452-99 (Reapproved 2005).

Earth Tech and R.W. Beck, City of Sioux Falls Regional Solid Waste Master Plan, October 2003

Leggette, Brashears & Graham, Inc., Expansion Area Hydrogeologic Assessment Sioux Falls Regional Sanitary Landfill, July 2008.

Leggette, Brashears & Graham, Inc., Hydrogeologic Assessment Expansion Area Sioux Falls Sanitary Landfill, January 1996.

Leggette, Brashears & Graham, Inc., Hydrogeologic Assessment Northeast Area Sioux Falls Sanitary Landfill, January 1996.

Leggette, Brashears & Graham, Inc., Sioux Falls Regional Sanitary Landfill 2011 Annual Groundwater Monitoring and Statistical Analysis Report, February 2012.

Leggette, Brashears & Graham, Inc., Sioux Falls Regional Sanitary Landfill Comprehensive Monitoring Plan, September 2011 and November 2011.

Leggette, Brashears & Graham, Inc., Sioux Falls Regional Sanitary Landfill Monitoring Well Network Evaluation, July 2005.

R.W. Beck, Sioux Falls Regional Sanitary Landfill Storm Water Pollution Prevention Plan and Comprehensive Surface Water Management Plan, June 2011.

U.S. Army Corps of Engineers – Kansas City District, Revised SOP for Low-flow Groundwater Purging and Sampling, Version 1.3, August 2002.

U.S. EPA, 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance.

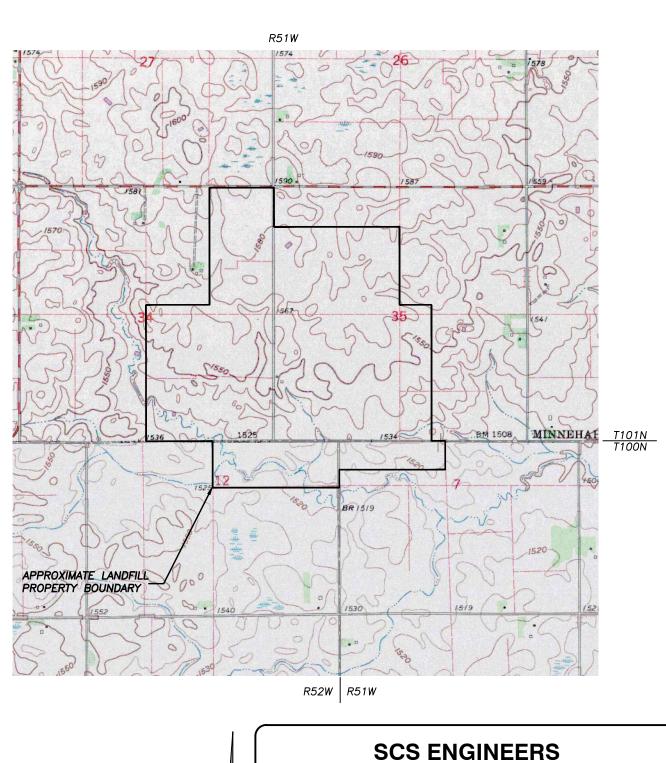
U.S. EPA, Federal Register, 1991, Code of Federal Regulations (CFR) Parts 257 and 258: Solid Waste Disposal Facility Criteria; Final Rule.

* * * * *



APPENDIX A

Figures



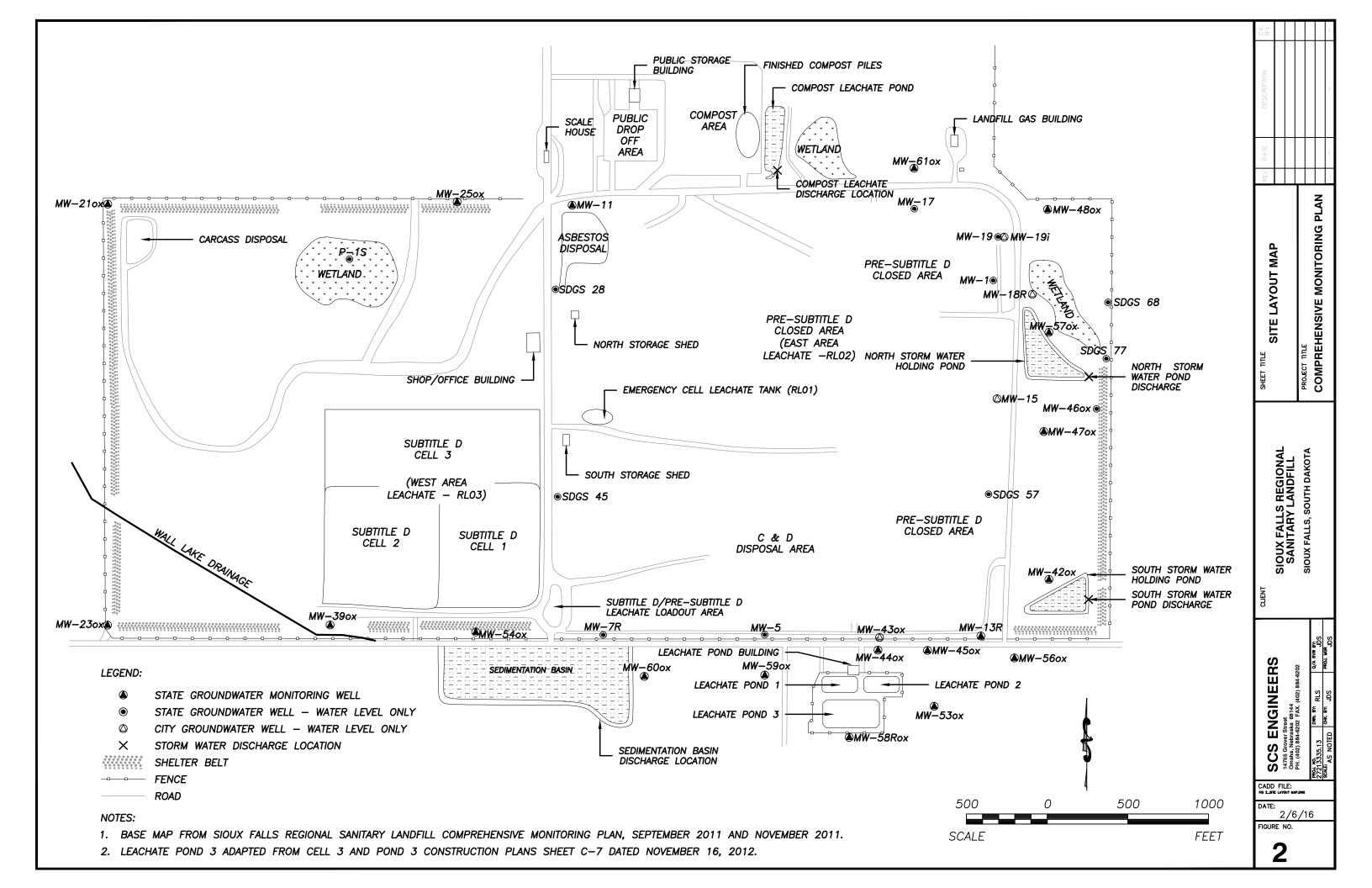


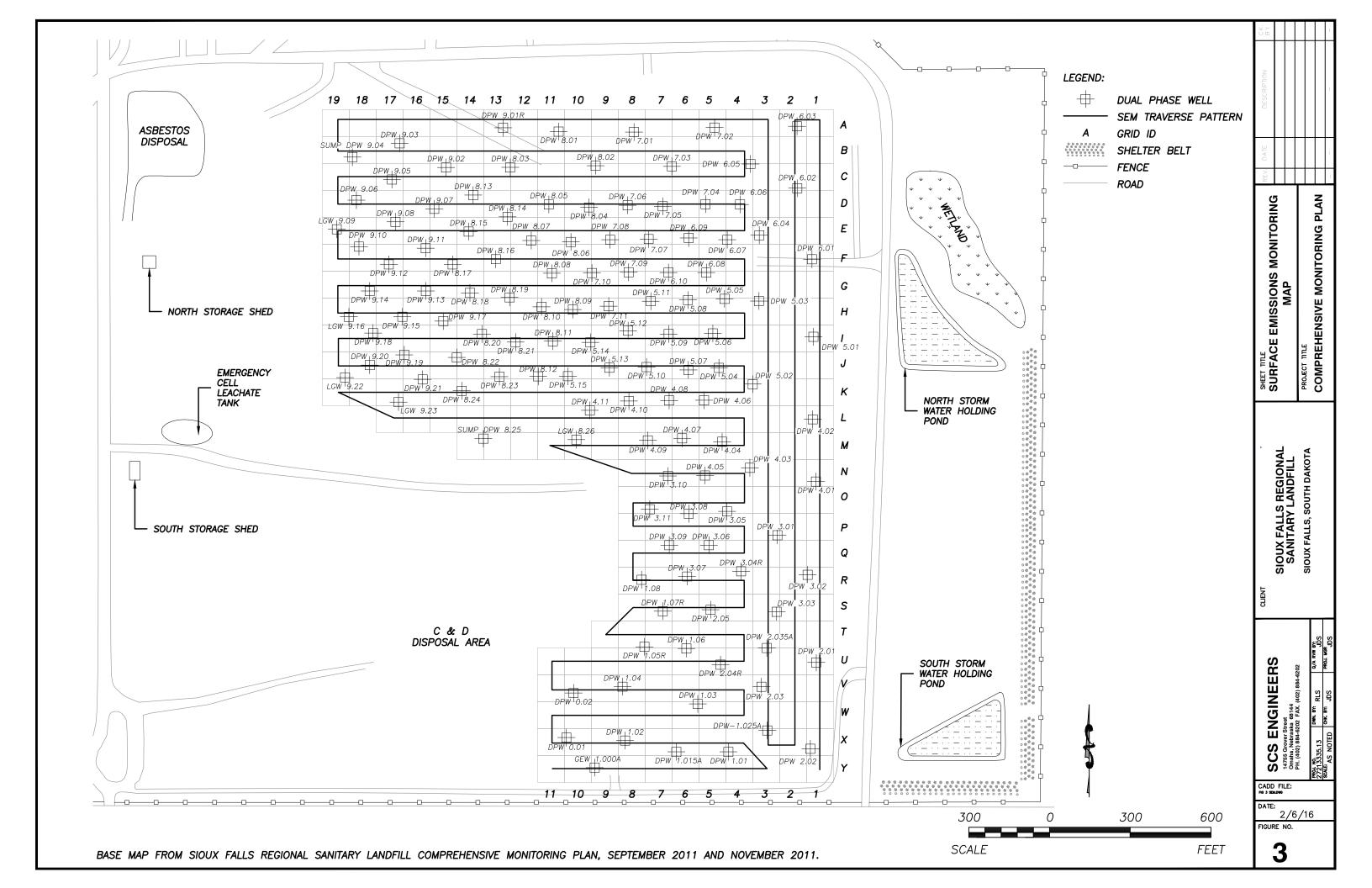
14755 Grover Street Omaha, Nebraska 68144 PH. (402) 884-6202 FAX. (402) 884-6203

SITE LOCATION MAP

SIOUX FALLS REGIONAL SANITARY LANDFILL SIOUX FALLS, SOUTH DAKOTA

CHK. BY: JDS	DWN. BY: J[OS PROJ. MGR: JD	S PROJ. NO. 272	13335.13
SCALE: N	rs DATE: 2/5	CADD FILE: 5/16 FIG 1_SITE LOCATION MA	P.DWG FIGURE 1	NO. 1







APPENDIX B

Tables

Table 1
Monthly Leachate Monitoring Parameters
Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Method	Laboratory Reporting Limits ²	Holding Time
Non-Preserved Inorganics - 2-1 Liter Plastic	;			
BOD	Cool < 4°C	SM 5210B	3.00 mg/L	48 Hours
TSS	Cool < 4°C	USGS I-3765-85	60.0 mg/L	7 Days
TDS	Cool < 4°C	SM 2540C	SM 2540C 30.0 mg/L	
pH	Cool < 4°C	SM 4500 H+	0.1 S.U.	taken immediately
Preserved Inorganics - 2-500 mL Plastic				
Ammonia Nitrogen	H_2SO_4 , Cool < 4°C	EPA 350.1	0.5 mg/L	28 Days
TKN	H_2SO_4 , Cool < 4°C	EPA 351.2	1.00 mg/L	28 Days
COD	H_2SO_4 , Cool < 4°C	SM 5520D	25.0 mg/L	28 Days
тос	H ₂ SO ₄ , Cool < 4°C	SM 5310C	40.0 mg/L	28 Days
Volatile Organics - 3-40mL VOA Vials				
BTEX ³	HCI, Cool < 4°C	EPA 624	0.5 mg/L	14 Days

Table adapted from Sioux Falls Regional Sanitary Landfill Comprehensive Monitoring Plan, September and November 2011 mg/L - milligrams per liter

S.U. - standard units

¹Use SWDP #RL03A or current for required parameters and frequency. Container listed is typical. Container selected for sample collection to be approved by laboratory performing analysis for the parameter listed.

²Laboratory reporting limit with no dilutions

³If visible petroleum sheen is observed, the monitoring should be performed daily

Table 2
Semiannual and Annual Leachate Monitoring Parameters
Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Method	Laboratory	Holding Time
rarameters & Sample Container	1 TOSCI VALIVOS	Metriou	Reporting Limits ²	Troiding Time
Non-Preserved Inorganics - 2-1 Liter Plasti	<u>c</u>			
BOD	Cool < 4°C	SM 5210B	3.00 mg/L	48 Hours
TSS	Cool < 4°C	USGS I-3765-85	60.0 mg/L	7 Days
TDS	Cool < 4°C	SM 2540C	30.0 mg/L	7 Days
рН	Cool < 4°C	SM 4500 H+	0.1 S.U.	taken immediately
Preserved Inorganics - 2-500 mL Plastic				
Ammonia Nitrogen	H ₂ SO ₄ , Cool < 4°C	EPA 350.1	0.5 mg/L	28 Days
TKN	H ₂ SO ₄ , Cool < 4°C	EPA 351.2	1.00 mg/L	28 Days
COD	H ₂ SO ₄ , Cool < 4°C	SM 5520D	25.0 mg/L	28 Days
TOC	H ₂ SO ₄ , Cool < 4°C	SM 5310C	40.0 mg/L	28 Days
Total Metals - 1-500 mL Plastic				
Arsenic (As)	HNO ₃ , Cool < 4°C	EPA 200.8	0.001 mg/L	6 Months
Cadmium (Cd)	HNO ₃ , Cool < 4°C	EPA 200.8	0.0005 mg/L	6 Months
Chromium (Cr)	HNO ₃ , Cool < 4°C	EPA 200.8	0.005 mg/L	6 Months
Copper (Cu)	HNO₃, Cool < 4°C	EPA 200.8	0.0005 mg/L	6 Months
Lead (Pb)	HNO ₃ , Cool < 4°C	EPA 200.8	0.0005 mg/L	6 Months
Mercury (Hg)	HNO ₃ , Cool < 4°C	EPA 245.2	0.0002 mg/L	28 Days
Molybdenum (Mo)	HNO ₃ , Cool < 4°C	EPA 200.8	0.001 mg/L	6 Months
Nickel (Ni)	HNO ₃ , Cool < 4°C	EPA 200.8	0.0005 mg/L	6 Months
Selenium (Se)	HNO ₃ , Cool < 4°C	EPA 200.8	0.005 mg/L	6 Months
Silver (Ag)	HNO₃, Cool < 4°C	EPA 200.8	0.0005 mg/L	6 Months
Zinc (Zn)	HNO ₃ , Cool < 4°C	EPA 200.8	0.005 mg/L	6 Months
Oil and Grease - 2-1 Liter Glass				
Oil & Grease (HEM)	H2SO4, Cool < 4°C	EPA 1664A	4.85 mg/L	28 Days
Oil & Grease (HEM-SGT)	H2SO4, Cool < 4°C	EPA 1664A	4.85 mg/L	28 Days
VOCs - 5-40 mL VOA Vials				
Acetone	HCI, Cool < 4°C	EPA 624	10.0 ug/L	14 Days
Benzene	HCI, Cool < 4°C	EPA 624	0.5 ug/L	14 Days
Bromobenzene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
Bromochloromethane	HCI, Cool < 4°C	EPA 624	5.0 ug/L	14 Days
Bromodichloromethane	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
Bromoform	HCI, Cool < 4°C	EPA 624	5.0 ug/L	14 Days
Bromomethane	HCI, Cool < 4°C	EPA 624	4.0 ug/L	14 Days
2-Butanone (MEK)	HCI, Cool < 4°C	EPA 624	10.0 ug/L	14 Days
Carbon Tetrachloride	HCI, Cool < 4°C	EPA 624	2.0 ug/L	14 Days
Chlorobenzene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
Chlorodibromomethane	HCI, Cool < 4°C	EPA 624	5.0 ug/L	14 Days
2-Chloroethylvinyl ether	HCI, Cool < 4°C	EPA 624	2.0 ug/L	14 Days
Chloroethane	HCI, Cool < 4°C	EPA 624	4.0 ug/L	14 Days
Chloroform	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
Chloromethane	HCI, Cool < 4°C	EPA 624	3.0 ug/L	14 Days
2-Chlorotoluene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
4-Chlorotoluene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
1,2-Dibromoethane	HCI, Cool < 4°C	EPA 624	10.0 ug/L	14 Days
Dibromoethane	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
1,2-Dichlorobenzene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
1,3-Dichlorobenzene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
1,4-Dichlorobenzene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days

Table 2 (cont) Semiannual and Annual Leachate Monitoring Parameters Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Method	Laboratory Reporting Limits ²	Holding Time
VOCs - 5-40 mL VOA Vials			nopoliting	
Dichlorodifluoromethane	HCI, Cool < 4°C	EPA 624	3.0 ug/L	14 Days
1.1-Dichloroethane	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
1.2-Dichloroethane	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
1,1-Dichloroethene	HCI, Cool < 4°C	EPA 624	2.0 ug/L	14 Days
cis-1,2-Dichloroethene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
trans-1,2-Dichloroethene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
1,2-Dichloropropane	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
1,3-Dichloropropane	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
2,2-Dichloropropane	HCI, Cool < 4°C	EPA 624	4.0 ug/L	14 Days
1,1-Dichloropropene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
cis-1,3-Dichloropropene	HCI, Cool < 4°C	EPA 624	5.0 ug/L	14 Days
trans-1,3-Dichloropropene	HCI, Cool < 4°C	EPA 624	5.0 ug/L	14 Days
Ethylbenzene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
4-Methyl-2-pentanone (MIBK)	HCI, Cool < 4°C	EPA 624	10.0 ug/L	14 Days
Methylene Chloride	HCI, Cool < 4°C	EPA 624	5.0 ug/L	14 Days
Styrene	HCI, Cool < 4°C	EPA 624		14 Days
1,1,1,2-Tetrachloroethane	<i>'</i>	EPA 624 EPA 624	1.0 ug/L	-
1,1,2,2-Tetrachioroethane	HCI, Cool < 4°C		1.0 ug/L	14 Days
Tetrachloroethene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
Toluene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
1,1,1-Trichloroethane	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
1,1,2-Trichloroethane	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
Trichloroethene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
Trichlorofluoromethane	HCI, Cool < 4°C	EPA 624	4.0 ug/L	14 Days
1,2,3-Trichloropropane	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
Vinyl chloride	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
m+p-Xylenes	HCI, Cool < 4°C	EPA 624	2.0 ug/L	14 Days
o-Xylene	HCI, Cool < 4°C	EPA 624	1.0 ug/L	14 Days
Total BTEX ³	HCI, Cool < 4°C	EPA 624	2.0 ug/L	14 Days
SVOCs - 2-1 Liter Glass	1			
Acenaphthene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
Acenaphthylene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
Anthracene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
Benzidine	Cool < 4°C	EPA 625	100 ug/L	7 Days
Benzo(a)anthracene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
Benzo(b)fluoranthene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
Benzo(k)fluoranthene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
Benzo(a)pyrene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
Benzo(g,h,i)perylene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
Disulfoton	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
Butyl benzyl phthalate	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
ois(2-chloroethyl)ether	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
ois(2-chloroethoxy)methane	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
ois(2-ethylhexyl)phthalate	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
ois(2-chloroisopropyl) ether	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
4-Bromophenyl phenylether	Cool < 4°C	EPA 625	10.0 ug/L	7 Days
2-Chloronaphthalene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days

Table 2 (cont) Semiannual and Annual Leachate Monitoring Parameters Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Method	Laboratory Reporting Limits ²	Holding Time	
SVOCs - 2-1 Liter Glass		I.	, , ,		
4-Chlorophenyl phenyl ether	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Chrysene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Dibenzo(a,h)anthracene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Di-n-butyl phthalate	Cool < 4°C	EPA 625	20.0 ug/L	7 Days	
1,4 Dioxane	Cool < 4°C	EPA 625	10.0 ug/L	14 Days	
3,3'-Dichlorobenzidine	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Diethyl phthalate	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Dimethyl phthalate	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
2,4-Dinitrotoluene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
2,6-Dinitrotoluene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Di-n-octyl phthalate	Cool < 4°C	EPA 625	20.0 ug/L	7 Days	
Fluoranthene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Fluorene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Hexachlorobenzene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Hexachlorobutadiene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Hexachlorocyclopentadiene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Hexachloroethane	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Indeno(1,2,3-c,d)pyrene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Isophorone	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Naphthalene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Nitrobenzene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
n-Nitrosodimethylamine	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
n-Nitrosodiphenylamine	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
n-Nitroso-di-n-propylamine	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Phenanthrene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Pyrene	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Benzoic Acid	Cool < 4°C	EPA 625	100 ug/L	7 Days	
4-Chloro-3-methylphenol	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
2-Chlorophenol	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
2,4-Dichlorophenol	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
2,4-Dimethylphenol	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
2,4-Dinitrophenol	Cool < 4°C	EPA 625	20.0 ug/L	7 Days	
4.6-Dinitro-2-methylphenol	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
2-Nitrophenol	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
4-Nitrophenol	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Pentachlorophenol	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Phenol	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
o-Cresol (2-Methylphenol)	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
m+p-Cresol (3/4-Methylphenol)	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
2,4,6-Trichlorophenol	Cool < 4°C	EPA 625	10.0 ug/L	7 Days	
Dioxins/Furans - 2 - 1 Liter Glass ⁴					
1,2,3,4,6,7,8-HpCDD	Cool < 4°C	EPA 1613B	52.6 pg/L	7 Days	
OCDD	Cool < 4°C	EPA 1613B	105 pg/L	7 Days	

Table 2 (cont) Semiannual and Annual Leachate Monitoring Parameters Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Method	Laboratory Reporting Limits ²	Holding Time	
Pesticides - 2-1 Liter Glass					
Aldrin	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
alpha-BHC	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
beta-BHC	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
gamma-BHC	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
delta-BHC	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
Chlordane	Cool < 4°C	EPA 608	2.00 ug/L	72 Hours	
Alpha-Chlordane	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
gamma-Chlordane	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
4,4'-DDD	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
4,4'-DDE	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
4,4'-DDT	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
Dieldrin	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
Endosulfan I	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
Endosulfan II	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
Endosulfan sulfate	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
Endrin	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
Endrin Ketone	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
Endrin Aldehyde	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
Hepachlor	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
Hepachlor Epoxide	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
Methoxychlor	Cool < 4°C	EPA 608	0.032 ug/L	72 Hours	
Toxaphene	Cool < 4°C	EPA 608	2.00 ug/L	72 Hours	
Perfluorochemicals (PFCs) 2 - 1-Liter Glass	4				
Perfluorobutane Sulfonate (PFBS)	Cool < 4°C	DV-LC-0012 ⁵	0.02 ug/L	7 Days	
Perfluorobutanoic Acid (PFBA)	Cool < 4°C	DV-LC-0012 ⁵	0.02 ug/L	7 Days	
Perfluorodecane Sulfonate (PFDS)	Cool < 4°C	DV-LC-0012 ⁵	0.02 ug/L	7 Days	
Perfluorodecanoic Acid (PFDA)	Cool < 4°C	DV-LC-0012 ⁵	0.02 ug/L	7 Days	
Perfluorododecanoic Acid (FPDoA)	Cool < 4°C	DV-LC-0012 ⁵	0.03 ug/L	7 Days	
Perfluoroheptanoic Acid (PFHpA)	Cool < 4°C	DV-LC-0012 ⁵	0.03 ug/L	7 Days	
Perfluorohexane Sulfonate (PFHxS)	Cool < 4°C	DV-LC-0012 ⁵	0.03 ug/L	7 Days	
Perfluorohexanoic Acid (PFHxA)	Cool < 4°C	DV-LC-0012 ⁵	0.02 ug/L	7 Days	
Perfluorononanoic Acid (PFNA)	Cool < 4°C	DV-LC-0012 ⁵	0.04 ug/L	7 Days	
Perfluorooctanoic Acid (PFOA)	Cool < 4°C	DV-LC-0012 ⁵	0.02 ug/L	7 Days	
Perfluorooctane Sulfonate (PFOS)	Cool < 4°C	DV-LC-0012 ⁵	0.03 ug/L	7 Days	
Perfluoropentanoic Acid (PFPA)	Cool < 4°C	DV-LC-0012 ⁵	0.03 ug/L	7 Days	
Perfluorotetradecanoic Acid (PFTeA)	Cool < 4°C	DV-LC-0012 ⁵	0.03 ug/L	7 Days	
Perfluorotridecanoic Acid (PFTriA)	Cool < 4°C	DV-LC-0012 ⁵	0.04 ug/L	7 Days	
Perfluoroundecanoic Acid (PFUnA)	Cool < 4°C	DV-LC-0012 ⁵	0.02 ug/L	7 Days	

Table adapted from Sioux Falls Regional Sanitary Landfill Comprehensive Monitoring Plan, September and November 2011

mg/L - milligrams per liter

ug/L - micrograms per liter

S.U. - standard units

¹Use SWDP #RL03A or current for required parameters and frequency. Container listed is typical. Container selected for sample collection to be approved by laboratory performing analysis for the parameter listed.

²Laboratory reporting limits with no dilutions

³If visible petroleum sheen is observed, the monitoring should be performed daily

⁴Analysis on annual basis

⁵TestAmerica Laboratories SOP based on EPA DW methods

Table 3 Methane Monitoring Locations Sioux Falls Regional Sanitary Landfill

Buildings & Structures
Landfill Gas Building (East)
Landfill Gas Building (North)
Scale House (South)
Scale House (North)
Public Storage Building (South)
Public Storage Building (North)
N. Storage Shed
Shop Building (NE)
Shop Building (S)
S. Storage (NW)
S. Storage (SW)
Leachate Pond Building (Middle)
Monitoring Wells and Piezometers
MW-1
MW-5
MW-7R
MW-11
MW-13R
MW-15 (City)
MW-17
MW-18R (City)
MW-19
MW-19i (City)
MW-21ox
MW-23ox
MW-250x
MW-390x
MW-42ox
MW-43ox (City)
MW-44ox
MW-45ox
MW-46ox
MW-47ox
MW-48ox
MW-53ox
MW-54ox
MW-56ox
MW-57ox
MW-58Rox
MW-59ox
MW-60ox
MW-61ox
P-1S
SDGS-28
SDGS-26 SDGS-45
SDGS-57
SDGS-68
SDGS-77

Table 4
Landfill Gas Monitoring Parameters
Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Method	Laboratory Reporting Limits ²	Holding Time	
Natural Gas - 6L Summa Canister	•	•			
Oxygen	None	ASTM D-1945	0.10%	30 days	
Nitrogen	None	ASTM D-1945	0.10%	30 days	
Carbon Monoxide	None	ASTM D-1945	0.10%	30 days	
Methane	None	ASTM D-1945	0.00010%	30 days	
Carbon Dioxide	None	ASTM D-1945	0.10%	30 days	
Ethane	None	ASTM D-1945	0.00010%	30 days	
Ethene	None	ASTM D-1945	0.00010%	30 days	
Acetylene	None	ASTM D-1945	0.00010%	30 days	
Propane	None	ASTM D-1945	0.00010%	30 days	
Isobutane	None	ASTM D-1945	0.00010%	30 days	
Butane	None	ASTM D-1945	0.00010%	30 days	
Neopentane	None	ASTM D-1945	0.00010%	30 days	
Isopentane	None	ASTM D-1945	0.00010%	30 days	
Pentane	None	ASTM D-1945	0.00010%	30 days	
C6+	None	ASTM D-1945	0.00010%	30 days	
Hydrogen	None	ASTM D-1945	2.5%	30 days	
Sulfur Gases - 1L Tedlar Bag					
Hydrogen Sulfide	None	ASTM D-5504	10 ppbv	24 hours	
Carbonyl Sulfide	None	ASTM D-5504	10 ppbv	24 hours	
Methyl Mercaptan	None	ASTM D-5504	10 ppbv	24 hours	
Ethyl Mercaptan	None	ASTM D-5504	10 ppbv	24 hours	
Dimethyl Sulfide	None	ASTM D-5504	10 ppbv	24 hours	
Carbon Disulfide	None	ASTM D-5504	10 ppbv	24 hours	
Isopropyl Mercaptan	None	ASTM D-5504	10 ppbv	24 hours	
tert-Butyl Mercaptan	None	ASTM D-5504	10 ppbv	24 hours	
n-Propyl Mercaptan	None	ASTM D-5504	10 ppbv	24 hours	
Ethyl Methyl Sulfide	None	ASTM D-5504	10 ppbv	24 hours	
Thiophene	None	ASTM D-5504	10 ppbv	24 hours	
Isobutyl Mercaptan	None	ASTM D-5504	10 ppbv	24 hours	
Diethyl Sulfide	None	ASTM D-5504	10 ppbv	24 hours	
n-Butyl Mercaptan	None	ASTM D-5504	10 ppbv	24 hours	
Dimethyl Disulfide	None	ASTM D-5504	10 ppbv	24 hours	
3-Methylthiophene	None	ASTM D-5504	10 ppbv	24 hours	
Tetrahydrothiophene	None	ASTM D-5504	10 ppbv	24 hours	
2-Ethylthiophene	None	ASTM D-5504	10 ppbv	24 hours	
2,5-Dimethylthiophene	None	ASTM D-5504	10 ppbv	24 hours	
Diethyl Disulfide	None	ASTM D-5504	10 ppbv	24 hours	

Table 4 (cont) Landfill Gas Monitoring Parameters Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Method	Laboratory Reporting Limits ²	Holding Time	
VOCs - 6L Summa Canister	1	ı	reporting Limits		
Freon 12	None	EPA TO-15	0.5 ppbv	30 days	
Freon 114	None	EPA TO-15	0.5 ppbv	30 days	
Chloromethane	None	EPA TO-15	0.5 ppbv	30 days	
Vinyl Chloride	None	EPA TO-15	0.5 ppbv	30 days	
1,3-Butadiene	None	EPA TO-15	0.5 ppbv	30 days	
Bromomethane	None	EPA TO-15	0.5 ppbv	30 days	
Chloroethane	None	EPA TO-15	0.5 ppbv	30 days	
Freon 11	None	EPA TO-15	0.5 ppbv	30 days	
Ethanol	None	EPA TO-15	2.0 ppbv	30 days	
Freon 113	None	EPA TO-15	0.5 ppbv	30 days	
1,1-Dichloroethene	None	EPA TO-15	0.5 ppbv	30 days	
Acetone	None	EPA TO-15	2.0 ppbv	30 days	
2-Propanol (Isoproyl Alcohol)	None	EPA TO-15	2.0 ppbv	30 days	
Carbon disulfide	None	EPA TO-15	0.5 ppbv	30 days	
3-Chloropropene (Ally Chloride)	None	EPA TO-15	0.5 ppbv	30 days	
Methylene Chloride	None	EPA TO-15	1.0 ppbv	30 days	
Methyl tert-butyl ether	None	EPA TO-15	0.5 ppbv	30 days	
trans-1,2-Dichloroethene	None	EPA TO-15	0.5 ppbv	30 days	
Hexane	None	EPA TO-15	0.5 ppbv	30 days	
1,1-Dichloroethane	None	EPA TO-15	0.5 ppbv	30 days	
2-Butanone (Methy Ethyl Ketone)	None	EPA TO-15	1.0 ppbv	30 days	
cis-1,2-Dichloroethene	None	EPA TO-15	0.5 ppbv	30 days	
Tetrahydrofuran	None	EPA TO-15	0.5 ppbv	30 days	
Chloroform	None	EPA TO-15	0.5 ppbv	30 days	
1,1,1-Trichloroethane	None	EPA TO-15	0.5 ppbv	30 days	
Cyclohexane	None	EPA TO-15	0.5 ppbv	30 days	
Carbon Tetrachloride	None	EPA TO-15	0.5 ppbv	30 days	
2,2,4-Trimethylpentane	None	EPA TO-15	0.5 ppbv	30 days	
Benzene	None	EPA TO-15	0.5 ppbv	30 days	
1,2-Dichloroethane	None	EPA TO-15	0.5 ppbv	30 days	
Heptane	None	EPA TO-15	0.5 ppbv	30 days	
Trichloroethene	None	EPA TO-15	0.5 ppbv	30 days	
1,2-Dichloropropane	None	EPA TO-15	0.5 ppbv	30 days	
1,4-Dioxane	None	EPA TO-15	0.5 ppbv	30 days	
Bromodichloromethane	None	EPA TO-15	0.5 ppbv	30 days	
cis-1,3-Dichloropropene	None	EPA TO-15	0.5 ppbv	30 days	
4-Methyl-2-pentanone (MIBK)	None	EPA TO-15	0.5 ppbv	30 days	
Toluene	None	EPA TO-15	0.5 ppbv	30 days	
trans-1,3-Dichloropropene	None	EPA TO-15	0.5 ppbv	30 days	
1,1,2-Trichloroethane	None	EPA TO-15	0.5 ppbv	30 days	
Tetrachloroethene	None	EPA TO-15	0.5 ppbv	30 days	
2-Hexanone (MBK)	None	EPA TO-15	0.5 ppbv	30 days	

Table 4 (cont) Landfill Gas Monitoring Parameters Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Methods	Laboratory Reporting Limits ²	Holding Time	
VOCs - 6L Summa Canister					
Dibromochloromethane	None	EPA TO-15	0.5 ppbv	30 days	
1,2-Dibromoethane	None	EPA TO-15	0.5 ppbv	30 days	
Chlorobenzene	None	EPA TO-15	0.5 ppbv	30 days	
Ethyl Benzene	None	EPA TO-15	0.5 ppbv	30 days	
m,p-Xylene	None	EPA TO-15	1.0 ppbv	30 days	
o-Xylene	None	EPA TO-15	0.5 ppbv	30 days	
Styrene	None	EPA TO-15	0.5 ppbv	30 days	
Bromoform	None	EPA TO-15	0.5 ppbv	30 days	
Cumene	None	EPA TO-15	0.5 ppbv	30 days	
1,1,2,2-Tetrachloroethane	None	EPA TO-15	0.5 ppbv	30 days	
Propylbenzene	None	EPA TO-15	0.5 ppbv	30 days	
4-Ethyltoluene	None	EPA TO-15	0.5 ppbv	30 days	
1,3,5-Trimethylbenzene	None	EPA TO-15	0.5 ppbv	30 days	
1,2,4-Trimethylbenzene	None	EPA TO-15	0.5 ppbv	30 days	
1,3-Dichlorobenzene	None	EPA TO-15	0.5 ppbv	30 days	
1,4-Dichlorobenzene	None	EPA TO-15	0.5 ppbv	30 days	
alpha-Chlorotoluene (Benzyl Chloride)	None	EPA TO-15	0.5 ppbv	30 days	
1,2-Dichlorobenzene	None	EPA TO-15	0.5 ppbv	30 days	
1,2,4-Trichlorobenzene	None	EPA TO-15	0.5 ppbv	30 days	
Hexachlorobutadiene	None	EPA TO-15	0.5 ppbv	30 days	
Siloxanes - 6L Summa Canister ³					
Octamethylcyclotetrasiloxane (D4)	None	EPA TO-15 mod	50 ppbv	30 days	
Decamethylcylopentasiloxane (D5)	None	EPA TO-15 mod	50 ppbv	30 days	
Dodecamethylcyclohexasiloxane (D6)	None	EPA TO-15 mod	50 ppbv	30 days	
Hexamethyldisiloxane	None	EPA TO-15 mod	50 ppbv	30 days	
Octamethyltrisiloxane	None	EPA TO-15 mod	50 ppbv	30 days	

Table adapted from Sioux Falls Regional Sanitary Landfill Comprehensive Monitoring Plan, September and November 2011 ppbv - parts per billion by volume

¹Container listed is typical. Container selected for sample collection to be approved by laboratory performing analysis for the parameter listed.

²Laboratory reporting limits with no dilutions

³Specially lined summa canister compatible with siloxanes to be used

Table 5
Groundwater Well Summary
Sioux Falls Regional Sanitary Landfill

							Sampling Parameters ³										
Well Name		toring Network nd Purpose	Gradient Location	Top of Casing Elevation ¹	Well Depth ²	Pump Type	Non-preserved Inorganics	Preserved Inorganics	Total Metals	Dissolved Metals	RCRA App I VOCs	RCRA App II Inorganics	RCRA App II VOCs	RCRA App II SVOCs	RCRA App II Pesticides	RCRA App II PCBs	RCRA App II Herbicides
MW-11	State	Monitored	Upgradient	1568.75	35.00	Peristaltic ⁵	Χ	Χ	X	Χ	X						
MW-13R	State	Monitored	Downgradient	1537.37	20.00	Peristaltic	Χ	Χ	Χ	Χ	Χ	X^6	X^6	X^6	X^6	X^6	X^6
MW-21ox	State	Monitored	Upgradient	1561.23	20.00	Peristaltic	Χ	Χ	Χ	Χ	Χ						
MW-23ox	State	Monitored	Upgradient	1541.56	20.00	Peristaltic	Χ	Χ	Х	Х	Χ						
MW-25ox	State	Monitored	Upgradient	1564.25	20.00	Peristaltic	X	X	Χ	Х	Х						
MW-39ox	State	Monitored	Downgradient	1528.50	15.00	Peristaltic	X	X	Χ	Х	Х						
MW-42ox	State	Monitored	Downgradient	1534.09	20.00	Peristaltic	Χ	Χ	Χ	Х	Χ						
MW-44ox	State	Monitored	Downgradient	1533.09	20.00	Peristaltic	Χ	Χ	Χ	Χ	Χ	X^6	X^6	X^6	X^6	X^6	X^6
MW-45ox	State	Monitored	Downgradient	1535.52	25.00	Peristaltic	Χ	Χ	Χ	Χ	Χ						
MW-47ox	State	Monitored	Downgradient	1547.08	20.00	Peristaltic	Х	Х	Χ	Χ	Х						
MW-48ox	State	Monitored	Downgradient	1561.53	26.00	Peristaltic	X	Х	Χ	Х	Х						
MW-53ox	State	Monitored	Downgradient	1530.91	24.50	Peristaltic	Χ	Χ	Χ	Χ	Χ						
MW-54ox	State	Monitored	Downgradient	1525.71	16.00	Peristaltic	Χ	Χ	Χ	Χ	Χ						
MW-56ox	State	Monitored	Downgradient	1527.00	25.00	Peristaltic	Χ	Χ	Χ	Χ	Χ						
MW-57ox	State	Monitored	Downgradient	1551.15	22.33 ⁷	Peristaltic	Χ	Χ	Χ	Χ	Χ						
MW-58Rox ⁸	State	Monitored	Downgradient	1522.71 ⁸	33.00 ⁸	Peristaltic ⁵	Χ	Χ	Χ	Χ	Χ						
MW-59ox ⁹	State	Monitored	Downgradient	1528.22 ⁹	41.00 ⁹	Peristaltic ⁵	Χ	Χ	Χ	Χ	Χ						
MW-60ox ⁹	State	Monitored	Downgradient	1531.67 ⁹	42.05	Peristaltic ⁵	Χ	Χ	Χ	Χ	Χ						
MW-61ox ⁹	State	Monitored	Upgradient	1563.52 ⁹	22.50	Peristaltic	Х	Х	Χ	Х	Х						
MW-1	State	Water Level Only	Downgradient	1563.54	50.00	NA											
MW-5	State ⁴	Water Level Only	Downgradient	1533.71	30.00	NA											
MW-7R	State ⁴	Water Level Only	Downgradient	1530.80	25.00	NA											
MW-17	State ⁴	Water Level Only	Upgradient	1559.27	19.50	NA											
MW-46ox	State	Water Level Only	Downgradient	1550.95	30.00	NA											
P-1S	State	Water Level Only	Downgradient	1553.04	15.00	NA											
SDGS-28	State	Water Level Only	Downgradient	1562.52	16.50	NA											
SDGS-45	State	Water Level Only	Downgradient	1547.08	17.50	NA											
SDGS-57	State	Water Level Only	Downgradient	1546.76	17.00	NA											
SDGS-68	State	Water Level Only	Downgradient	1554.00	18.00	NA											
SDGS-77	State	Water Level Only	Downgradient	1545.38	13.50	NA				<u> </u>							
MW-15	City	Water Level Only	Downgradient	1557.15	15.00	NA											
MW-18R	City	Water Level Only	Downgradient	1551.18	18.00	NA											
MW-19i	City	Water Level Only	Downgradient	1557.05	16.00	NA											
MW-43ox	City	Water Level Only enewal (88 Datum)		1537.52	25.00	NA											

¹From 2013 permit renewal (88 Datum) except where notec

NA - not applicable

²From 2011 annual groundwater monitoring and statistical report field sheets except where noted

³Sampled during the spring and fall except where noted

⁴MW-5 and MW-7R replaced with MW-59ox, MW-60ox, and MW-61ox. Only water levels taken at wells MW-5 and MW-7R.

⁵Peristaltic pump unless water level is too low, then a bladder pump should be used

⁶Sampled during the spring only

⁷From 2011 annual groundwater monitoring and statistical report field geologist log

⁸Installed October 22, 2015; TOC elevation estimated from previous well; total depth from log of monitoring well construction

⁹Installed October 2, 2014; TOC elevation from City survey; total depth from log of monitoring well construction

Table 6
Semiannual Groundwater Monitoring Parameters
Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Method	Laboratory Reporting Limits ²	Holding Time
Non-Preserved Inorganics - 2-1 Liter P	lastic	•	,	
Alkalinity	Cool < 4°C	SM 2320B	5.0 mg/L	14 Days
Chloride	Cool < 4°C	SW 9056	1.0 mg/L	28 Days
Sulfate	Cool < 4°C	SW 9056	1.0 mg/L	28 Days
Biochemical Oxygen Demand (BOD)	Cool < 4°C	SM 5210B	3.0 mg/L	48 Hours
Preserved Inorganics - 1-500 mL Plast		•	Ŭ	
Nitrate+Nitrite	H ₂ SO ₄ , Cool < 4°C	SM 4500 NO3 E	0.1 mg/L	28 Days
Ammonia	H₂SO₄, Cool < 4ºC	EPA 350.1	0.2 mg/L	28 Days
Total Organic Carbon (TOC)	H_2SO_4 , Cool < $4^{\circ}C$	SM 5310C	1.0 mg/L	28 Days
Chemical Oxygen Demand (COD)	H_2SO_4 , Cool < $4^{\circ}C$	SM 5220D	5.0 mg/L	28 Days
Preserved Inorganics - 1-500 mL Plast	ic	•		
Sulfide	NaOH & Zn Acetate, Cool < 4°C	SM 4500 S2 C,F	2.0 mg/L	7 Days
Total Metals - 1-500 mL Plastic				
Iron	HNO ₃ , Cool < 4°C	SW 6010C	0.1 mg/L	6 Months
Manganese	HNO ₃ , Cool < 4°C	SW 6010C	0.01 mg/L	6 Months
Calcium	HNO ₃ , Cool < 4°C	SW 6010C	1.0 mg/L	6 Months
Potassium	HNO ₃ , Cool < 4°C	SW 6010C	1.0 mg/L	6 Months
Sodium	HNO₃, Cool < 4°C	SW 6010C	1.0 mg/L	6 Months
Dissolved Metals - 1-250 mL Plastic				
Iron	HNO ₃ , Cool < 4°C	SW 6010C	0.1 mg/L	6 Months
Manganese	HNO ₃ , Cool < 4°C	SW 6010C	0.01 mg/L	6 Months
RCRA App I VOCs - 3-40 mL VOA Vials	3	•		
Acetone	HCI, Cool < 4°C	SW 8260B	10.0 ug/L	14 Days
Acrylonitrile	HCI, Cool < 4°C	SW 8260B	10.0 ug/L	14 Days
Benzene	HCI, Cool < 4°C	SW 8260B	0.5 ug/L	14 Days
Bromochloromethane	HCI, Cool < 4°C	SW 8260B	5.0 ug/L	14 Days
Bromodichloromethane	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
Bromoform	HCI, Cool < 4°C	SW 8260B	5.0 ug/L	14 Days
Bromomethane	HCI, Cool < 4°C	SW 8260B	4.0 ug/L	14 Days
2-Butanone (MEK)	HCI, Cool < 4°C	SW 8260B	10.0 ug/L	14 Days
Carbon disulfide	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
Carbon tetrachloride	HCI, Cool < 4°C	SW 8260B	2.0 ug/L	14 Days
Chlorobenzene	HCl, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
Chlorodibromomethane	HCI, Cool < 4°C	SW 8260B	5.0 ug/L	14 Days
Chloroethane	HCI, Cool < 4°C	SW 8260B	4.0 ug/L	14 Days
Chloroform	HCl, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
Chloromethane	HCl, Cool < 4°C	SW 8260B	3.0 ug/L	14 Days
1,2-Dibromo-3-chloropropane	HCI, Cool < 4°C	SW 8260B	10.0 ug/L	14 Days
1,2-Dibromoethane	HCl, Cool < 4°C	SW 8260B	10.0 ug/L	14 Days
Dibromomethane	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
1,2-Dichlorobenzene	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
1,4-Dichlorobenzene	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
1,1-Dichloroethane	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
1,2-Dichloroethane	HCl, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
1,1-Dichloroethene	HCI, Cool < 4°C	SW 8260B	2.0 ug/L	14 Days
cis-1,2-Dichloroethene	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
trans-1,2-Dichloroethene	HCl, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
trans-1,4-Dichloro-2-butene	HCI, Cool < 4°C	SW 8260B	10.0 ug/L	14 Days

1 of 6

Parameters & Sample Container ¹	Preservatives	Methods	Laboratory Reporting Limits ²	Holding Time
RCRA App I VOCs - 3-40 mL VOA Vials		•		•
1,2-Dichloropropane	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
cis-1,3-Dichloropropene	HCI, Cool < 4°C	SW 8260B	5.0 ug/L	14 Days
trans-1,3-Dichloropropene	HCI, Cool < 4°C	SW 8260B	5.0 ug/L	14 Days
Ethylbenzene	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
2-Hexanone	HCI, Cool < 4°C	SW 8260B	10.0 ug/L	14 Days
Iodomethane	HCI, Cool < 4°C	SW 8260B	10.0 ug/L	14 Days
4-Methyl-2-pentanone (MIBK)	HCI, Cool < 4°C	SW 8260B	10.0 ug/L	14 Days
Methylene chloride	HCI, Cool < 4°C	SW 8260B	5.0 ug/L	14 Days
Styrene	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
1,1,1,2-Tetrachloroethane	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
1,1,2,2-Tetrachloroethane	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
Tetrachloroethene	HCl, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
Toluene	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
1,1,1-Trichloroethane	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
1,1,2-Trichloroethane	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
Trichloroethene	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
Trichlorofluoromethane	HCI, Cool < 4°C	SW 8260B	4.0 ug/L	14 Days
1,2,3-Trichloropropane	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
Vinyl Acetate	HCI, Cool < 4°C	SW 8260B	2.0 ug/L	14 Days
Vinyl Chloride	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
m+p-Xylenes	HCI, Cool < 4°C	SW 8260B	2.0 ug/L	14 Days
o-Xylene	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
RCRA App II Inorganics - 1-500 mL Pla	stic			
Cyanide	NaOH, Cool < 4°C	SW 9012A	0.01 mg/L	14 Days
RCRA App II VOCs - 3-40mL VOA Vials	i			
Acetonitrile	Cool < 4°C	SW 8015m	10.0 mg/L	14 Days
Acrolein	HCI, Cool < 4°C	SW 8260B	10.0 ug/L	14 Days
Ally chloride	HCI, Cool < 4°C	SW 8260B	2.0 ug/L	14 Days
Chloroprene	HCl, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
1,3-Dichlorobenzene	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
Dichlorodifluoromethane	HCI, Cool < 4°C	SW 8260B	3.0 ug/L	14 Days
1,3-Dichloropropane	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
2,2-Dichlororpropane	HCI, Cool < 4°C	SW 8260B	4.0 ug/L	14 Days
1,1-Dichloropropene	HCI, Cool < 4°C	SW 8260B	1.0 ug/L	14 Days
Ethyl methacrylate	HCI, Cool < 4°C	SW 8260B	2.0 ug/L	14 Days
Hexachlorobutadiene	HCI, Cool < 4°C	SW 8260B	5.0 ug/L	14 Days
Isobutanol	Cool < 4°C	SW 8015	10.0 ug/L	14 Days
Methacrylonitrile	HCl, Cool < 4ºC	SW 8260B	1.0 ug/L	14 Days
Methyl methacrylate	HCl, Cool < 4°C	SW 8260B	5.0 ug/L	14 Days
Naphthalene	HCl, Cool < 4°C	SW 8260B	5.0 ug/L	14 Days
Propionitrile	HCl, Cool < 4°C	SW 8260B	10.0 ug/L	14 Days

Parameters & Sample Container ¹	Preservatives	Methods	Laboratory Reporting Limits ²	Holding Time
RCRA App II SVOCs - 2-1 Liter Glass		l .	J	
Acenaphthene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Acenaphthylene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Acetophenone	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2-Acetylaminofluorene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
4-Aminobiphenyl	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Anthracene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Benzo(a)anthracene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Benzo(b)fluoranthene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Benzo(k)fluoranthene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Benzo(g,h,i)perylene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Benzo(a)pyrene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Benzyl alcohol	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
bis(-2-chloroethoxy)Methane	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
bis(-2-chloroethyl)Ether	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
bis(2-chloroisopropyl)Ether	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
bis(2-ethylhexyl)Phthalate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
4-Bromophenyl phenyl ether	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Butyl benzyl phthalate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
4-Chloroaniline (p-Chloroaniline)	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Chlorobenzilate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
4-Chloro-3-methylphenol	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2-Chloronaphthalene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2-Chlorophenol	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
4-Chlorophenyl phenyl ether	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Chrysene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
3/4-Methylphenol (m+p-Cresols)	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2-Methylphenol (o-Cresol)	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Diallate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Dibenzo(a,h)anthracene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Dibenzofuran	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Di-n-butyl phthalate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
3,3'-Dichlorobenzidine	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2,4-Dichlorophenol	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2,6-Dichlorophenol	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Diethyl phthalate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Thionazin	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
7,12-Dimethylbenz(a)anthracene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Dimethoate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
p-(dimethylamino)Azobenzene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
3,3'-Dimethylbenzidine	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2,4-Dimethylphenol	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Dimethyl phthalate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
1,3-Dinitrobenzene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
4,6-Dinitro-2-methylphenol	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2,4-Dinitrophenol	Cool < 4°C	SW 8270C	20.0 ug/L	7 Days
2,4-Dinitrotoluene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2,6-Dinitrotoluene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days

Parameters & Sample Container ¹	Preservatives	Methods	Laboratory Reporting Limits ²	Holding Time
RCRA App II SVOCs - 2-1 Liter Glass				
Di-n-octyl phthalate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Diphenylamine	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Disulfoton	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Ethyl methanesulfonate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Famphur	Cool < 4°C	SW 8270C	20.0 ug/L	7 Days
Fluoranthene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Fluorene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Hexachlorobenzene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Hexachlorocyclopentadiene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Hexachloroethane	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Hexachloropropene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Indeno(1,2,3-cd)pyrene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Isodrin	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Isophorone	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Isosafrole	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Kepone	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Methapyrilene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
3-Methylcholanthrene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Methyl methanesulfonate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2-Methylnaphthalene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Methyl parathion	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
1,4-Naphthoquinone	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days 7 Days
1-Naphthylamine	Cool < 4°C	SW 8270C	10.0 ug/L	
2-Naphthylamine	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days 7 Days
2-Nitroaniline	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days 7 Days
3-Nitroaniline	Cool < 4°C	SW 8270C	10.0 ug/L	
4-Nitroaniline	Cool < 4°C	SW 8270C	10.0 ug/L 10.0 ug/L	7 Days 7 Days
Nitrobenzene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days 7 Days
	Cool < 4°C	SW 8270C		
2-Nitrophenol	Cool < 4°C		10.0 ug/L	7 Days
4-Nitrophenol	Cool < 4°C	SW 8270C SW 8270C	10.0 ug/L	7 Days
n-Nitroso-di-n-butylamine			10.0 ug/L	7 Days
n-Nitrosodiethylamine	Cool < 4°C Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
n-Nitrosodimethylamine		SW 8270C	10.0 ug/L	7 Days
n-Nitrosodiphenylamine	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
n-Nitroso-di-n-propylamine	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
n-Nitrosomethylethylamine	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
n-Nitrosopiperidine	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
n-Nitorospyrrolidine	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
5-Nitro-o-toluidine	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Parathion	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Pentachlorobenzene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Pentachloronitrobenzene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Pentachlorophenol	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Phenacetin	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Phenanthrene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Phenol	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
1,4-Phenylenediamine	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days

Parameters & Sample Container ¹	Preservatives	Methods	Laboratory Reporting Limits ²	Holding Time
RCRA App II SVOCs - 2-1 Liter Glass				
Phorate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Pronamide	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Pyrene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Safrole	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
1,2,4,5-Tetrachlorobenzene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2,3,4,6-Tetrachlorophenol	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
o-Toluidine	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
1,2,4-Trichlorobenzene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2,4,5-Trichlorophenol	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
2,4,6-Trichlorophenol	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
o,o,o-Triethyl phosphorothioate	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
1,3,5-Trinitrobenzene	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
Dinoseb	Cool < 4°C	SW 8270C	10.0 ug/L	7 Days
RCRA App II Pesticides - 2-1 Liter Glass				
Aldrin	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
alpha-BHC	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
beta-BHC	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
delta-BHC	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
gamma-BHC (Lindane)	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
alpha-Chlordane	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
gamma-Chlordane	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
Chlordane	Cool < 4°C	SW 8081A	2.00 ug/L	7 Days
Dieldrin	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
4,4'-DDD	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
4,4'-DDE	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
4,4'-DDT	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
Endosulfan I	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
Endosulfan II	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
Endosulfan sulfate	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
Endrin	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
Endrin aldehyde	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
Heptachlor	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
Heptachlor epoxide	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
Methoxychlor	Cool < 4°C	SW 8081A	0.032 ug/L	7 Days
Toxaphene	Cool < 4°C	SW 8081A	2.0 ug/L	7 Days

Parameters & Sample Container ¹	Preservatives	Methods	Laboratory Reporting Limits ²	Holding Time
RCRA App II PCBs - 1-1 Liter Glass				
PCB 1016	Cool < 4°C	SW 8082	0.8 ug/L	7 Days
PCB 1221	Cool < 4°C	SW 8082	0.8 ug/L	7 Days
PCB 1232	Cool < 4°C	SW 8082	0.8 ug/L	7 Days
PCB 1242	Cool < 4°C	SW 8082	0.8 ug/L	7 Days
PCB 1248	Cool < 4°C	SW 8082	0.8 ug/L	7 Days
PCB 1254	Cool < 4°C	SW 8082	0.8 ug/L	7 Days
PCB 1260	Cool < 4°C	SW 8082	0.8 ug/L	7 Days
RCRA App II Herbicides - 2-1 Liter Glass				
2,4-D	Cool < 4°C	SW 8151A	1.0 ug/L	7 Days
2,4,5-T	Cool < 4°C	SW 8151A	1.0 ug/L	7 Days
2,4,5-TP (Silvex)	Cool < 4°C	SW 8151A	1.0 ug/L	7 Days

Table adapted from Sioux Falls Regional Sanitary Landfill Comprehensive Monitoring Plan, September and November 2011

mg/L - milligrams per liter

ug/L - micrograms per liter

S.U. - standard units

¹Container listed is typical. Container selected for sample collection to be approved by laboratory performing analysis for the parameter listed.

²Laboratory reporting limits with no dilutions

Table 7
Annual Compost Leachate Monitoring Parameters
Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Methods	Laboratory Reporting Limits ²	Holding Time
Total Metals - 1-500 mL Plastic				
Boron	HNO ₃ , Cool < 4°C	EPA 200.7	0.1 mg/L	6 Months
Cadmium	HNO ₃ , Cool < 4 ^o C	EPA 200.7	0.002 mg/L	6 Months
Chromium	HNO ₃ , Cool < 4 ^o C	EPA 200.7	0.02 mg/L	6 Months
Copper	HNO₃, Cool < 4°C	EPA 200.7	0.02 mg/L	6 Months
Iron	HNO₃, Cool < 4°C	EPA 200.7	0.1 mg/L	6 Months
Manganese	HNO ₃ , Cool < 4 ^o C	EPA 200.7	0.01 mg/L	6 Months
Potassium	HNO₃, Cool < 4ºC	EPA 200.7	1.0 mg/L	6 Months
Zinc	HNO ₃ , Cool < 4 ^o C	EPA 200.7	0.02 mg/L	6 Months
Total Metals - 1-500 mL Plastic				
Hexavalent Chromium (Cr ⁺⁶)	Cool < 4°C	SM 3500 Cr B	0.02 mg/L	24 Hours
Preserved Inorganics - 1-1 Liter Plastic				
Ammonia as N	H ₂ SO ₄ , Cool < 4°C	EPA 350.1	0.5 mg/L	28 Days
Nitrate + Nitrite as N	H ₂ SO ₄ , Cool < 4°C	SM 4500 NO3 E	0.1 mg/L	28 Days
Total Kjeldahl Nitrogen	H ₂ SO ₄ , Cool < 4°C	EPA 351.2	2.5 mg/L	28 Days
Total Phosphorus	H ₂ SO ₄ , Cool < 4°C	EPA 365.1	0.10 mg/L	28 Days
Non-Preserved Inorganics - 2-1 Liter Plastic				
BOD	Cool < 4°C	SM 5210B	3.0 mg/L	48 Hours
Nitrite as N	Cool < 4°C	SM 4500 NO3 E	0.1 mg/L	48 Hours
рН	Cool < 4°C	SM 4500B	0.1 s.u.	Immediately
TSS	Cool < 4°C	USGS I-3765-85		7 Days

Table adapted from Sioux Falls Regional Sanitary Landfill Comprehensive Monitoring Plan, September and November 2011 mg/L - milligrams per liter

S.U. - standard units

¹Container listed is typical. Container selected for sample collection to be approved by laboratory performing analysis for the parameter listed.

²Laboratory reporting limits with no dilutions

Table 8
Five-Year Compost Leachate Monitoring Parameters
Sioux Falls Regional Sanitary Landfill

	1	Analytical	Laboratory	
Parameters & Sample Container ¹	Preservatives	Method	Reporting Limits ²	Holding Time
Total Metals - 1-500 mL Plastic	•	•	,	•
Aluminum	HNO ₃ , Cool < 4°C	EPA 200.7	0.1 mg/L	6 Months
Arsenic	HNO ₃ , Cool < 4°C	EPA 200.7	0.08 mg/L	6 Months
Beryllium	HNO ₃ , Cool < 4°C	EPA 200.7	0.001 mg/L	6 Months
Boron	HNO ₃ , Cool < 4°C	EPA 200.7	0.1 mg/L	6 Months
Calcium	HNO ₃ , Cool < 4°C	EPA 200.7	0.1 mg/L	6 Months
Cadmium	HNO ₃ , Cool < 4°C	EPA 200.7	0.02 mg/L	6 Months
Chromium	HNO ₃ , Cool < 4 ^o C	EPA 200.7	0.02 mg/L	6 Months
Cobalt	HNO ₃ , Cool < 4°C	EPA 200.7	0.02 mg/L	6 Months
Copper	HNO ₃ , Cool < 4°C	EPA 200.7	0.02 mg/L	6 Months
Iron	HNO ₃ , Cool < 4°C	EPA 200.7	0.1 mg/L	6 Months
Lead	HNO ₃ , Cool < 4°C	EPA 200.7	0.004 mg/L	6 Months
Lithium	HNO ₃ , Cool < 4°C	EPA 200.7	0.05 mg/L	6 Months
Magnesium	HNO ₃ , Cool < 4°C	EPA 200.7	1.0 mg/L	6 Months
Manganese	HNO ₃ , Cool < 4°C	EPA 200.7	0.01 mg/L	6 Months
Mercury	HNO ₃ , Cool < 4°C	EPA 245.1	0.0002 mg/L	6 Months
Molybdenum	HNO ₃ , Cool < 4°C	EPA 200.7	0.05 mg/L	6 Months
Nickel	HNO ₃ , Cool < 4°C	EPA 200.7	0.05 mg/L	6 Months
Potassium	HNO ₃ , Cool < 4°C	EPA 200.7	1.0 mg/L	6 Months
Selenium	HNO ₃ , Cool < 4°C	EPA 200.7	0.15 mg/L	6 Months
Sodium	HNO ₃ , Cool < 4°C	EPA 200.7	1.0 mg/L	6 Months
Vanadium	HNO ₃ , Cool < 4°C	EPA 200.7	0.05 mg/L	6 Months
Zinc	HNO ₃ , Cool < 4°C	EPA 200.7	0.02 mg/L	6 Months
Total Metals - 1-500 mL Plastic	•			
Hexavalent Chromium (Cr ⁺⁶)	Cool < 4°C	SM 350 CrB	0.02 mg/L	24 Hours
Preserved Inorganics - 1-1 Liter Plastic				
Ammonia as N	H ₂ SO ₄ , Cool < 4 ^o C	EPA 350.1	0.5 mg/L	28 Days
Nitrate + Nitrite as N	H_2SO_4 , Cool < $4^{\circ}C$	SM 4500 NO3 E	0.1 mg/L	28 Days
Total Kjeldahl Nitrogen	H_2SO_4 , Cool < $4^{\circ}C$	EPA 351.2	1.0 mg/L	28 Days
Total Phosphorus	H_2SO_4 , Cool < $4^{\circ}C$	EPA 365.1	1.0 mg/L	28 Days
Non-preserved Inorgaincs - 2-1 Liter Plast	ic			
Alkalinity	Cool < 4°C	SM 2320B	5.0 mg/L	14 Days
Bicarbonate as HCO3	Cool < 4°C	SM 2320B	5.0 mg/L	14 Days
BOD	Cool < 4°C	SM 5210B	3.0 mg/L	48 Hours
Conductivity	Cool < 4°C	SM 2510B	1.0 mg/L	28 Days
рН	Cool < 4°C	SM 4500B	0.1 s.u.	Immediately
Nitrite as N	Cool < 4°C	EPA 353.2	0.1 mg/L	48 Hours
Chloride	Cool < 4°C	EPA 300.0	1.0 mg/L	28 Days
Fluoride	Cool < 4°C	EPA 300.0	0.1 mg/L	28 Days
Sodium Adsportion Ratio	Cool < 4°C	Calculation	N/A	N/A
TSS	Cool < 4°C	USGS I-3765-85	10.0 mg/L	7 Days

Table 8 (cont) Five-Year Compost Leachate Monitoring Parameters Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Analytical	Laboratory	Holding Time
Parameters & Sample Container	Freservatives	Method	Reporting Limits ²	riolaling rillie
Oil and Grease - 2-1 Liter Glass				
Non-Polar Materials	H2SO4, Cool <4°C	SW 1664A	4.8 mg/L	28 Days
Oil & Grease	H2SO4, Cool <4°C	SW 1664A	4.8 mg/L	28 Days
Pesticides & Herbicides - 3-1 Liter Glass				
2,4-D	Cool < 4°C	EPA 615	0.21 ug/L	7 Days
4,4-DDE	Cool < 4°C	EPA 608	0.032 ug/L	7 Days
Alachlor	Cool < 4°C	EPA 8270C	5.0 ug/L	7 Days
Atrazine	Cool < 4°C	EPA 8270C	5.0 ug/L	7 Days
Chlorodane	Cool < 4°C	EPA 608	2.0 ug/L	7 Days
Diazinon	Cool < 4°C	EPA 8270C	5.0 ug/L	7 Days
Dieldren	Cool < 4°C	EPA 608	0.032 ug/L	7 Days
Dicamba	Cool < 4°C	EPA 615	0.21 ug/L	7 Days
MCPA	Cool < 4°C	EPA 615	0.21 ug/L	7 Days
Pendimethalin	Cool < 4°C	EPA 8270C	5.0 ug/L	7 Days
Simazine	Cool < 4°C	EPA 8270C	5.0 ug/L	7 Days
Trifuralin	Cool < 4°C	EPA 8270C	5.0 ug/L	7 Days

Table adapted from Sioux Falls Regional Sanitary Landfill Comprehensive Monitoring Plan, September and November 2011

mg/L - milligrams per liter

ug/L - micrograms per liter

S.U. - standard units

N/A - not applicable

¹Container listed is typical. Container selected for sample collection to be approved by laboratory performing analysis for the parameter listed.

²Laboratory reporting limits with no dilutions

Table 9
Compost Monitoring Parameters
Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Method	Laboratory Reporting Limits ²	Holding Time			
PCBs - 1-4 oz. Glass							
PCB 1016	Cool < 4°C	SW 8082A	0.050 mg/kg dry wt	365 Days			
PCB 1221	Cool < 4°C	SW 8082A	0.050 mg/kg dry wt	365 Days			
PCB 1232	Cool < 4°C	SW 8082A	0.050 mg/kg dry wt	365 Days			
PCB 1242	Cool < 4°C	SW 8082A	0.050 mg/kg dry wt	365 Days			
PCB 1248	Cool < 4°C	SW 8082A	0.050 mg/kg dry wt	365 Days			
PCB 1254	Cool < 4°C	SW 8082A	0.050 mg/kg dry wt	365 Days			
PCB 1260	Cool < 4°C	SW 8082A	0.050 mg/kg dry wt	365 Days			
PCB 1268	Cool < 4°C	SW 8082A	0.050 mg/kg dry wt	365 Days			
Total Metals - 1-4 oz Glass							
Arsenic	Cool < 4°C	SW 6010C	4.00 mg/kg dry wt	180 Days			
Cadmium	Cool < 4°C	SW 6010C	1.00 mg/kg dry wt	180 Days			
Chromium	Cool < 4°C	SW 6010C	1.00 mg/kg dry wt	180 Days			
Cobalt	Cool < 4°C	SW 6010C	1.00 mg/kg dry wt	180 Days			
Lead	Cool < 4°C	SW 6010C	5.00 mg/kg dry wt	180 Days			
Mercury	Cool < 4°C	SW 7471B	0.020 mg/kg dry wt	28 Days			
Molybdenum	Cool < 4°C	SW 6010C	2.50 mg/kg dry wt	180 Days			
Nickel	Cool < 4°C	SW 6010C	2.50 mg/kg dry wt	180 Days			
Selenium	Cool < 4°C	SW 6010C	7.50 mg/kg dry wt	180 Days			
Herbicides 1-4oz. Glass							
Clopyralid	Cool < 4°C	EPA 8321	100 ug/kg dry wt	14 Days			
2,4-D	Cool < 4°C	EPA 8321	80 ug/kg dry wt	14 Days			
Dicamba	Cool < 4°C	EPA 8321	80 ug/kg dry wt	14 Days			
MCPA	Cool < 4°C	EPA 8321	100 ug/kg dry wt	14 Days			
Picloram	Cool < 4°C	EPA 8321	40 ug/kg dry wt	14 Days			
Non-Preserved Inorganic Parameters - 1-4 oz Glass							
Chloride	Cool < 4°C	SM 4500 CI C	50.0 mg/kg dry wt	28 Days			
Non-preserved Inorganic Parameters - 1	-500 mL Plastic						
Nutrients ³	Cool < 4°C	Varies	Varies	Varies			

Table adapted from Sioux Falls Regional Sanitary Landfill Comprehensive Monitoring Plan, September and November 2011 mg/kg - milligrams per kilogram

ug/kg - micrograms per kilogram

¹Container listed is typical. Container selected for sample collection to be approved by laboratory performing analysis for the parameter listed.

²Laboratory reporting limits with no dilutions

³Nutrients includes nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, boron, copper, iron, manganese, sodium, zinc, solids and pH.

Table 10 Storm Water Monitoring Parameters Sioux Falls Regional Sanitary Landfill

Parameters & Sample Container ¹	Preservatives	Methods	Laboratory Reporting Limits ²	Holding Time
Preserved Inorganics - 1-500 mL Plastic				
Ammonia as N	H_2SO_4 , Cool < $4^{\circ}C$	EPA 350.1	0.5 mg/L	28 Days
Non-preserved Inorganics - 1-1 Liter Plastic				
BOD	Cool < 4°C	SM 5210B	3.0 mg/L	48 Hours
pH	Cool < 4°C	Field Reading	0.01 s.u.	Immediately
TSS	Cool < 4°C	USGS 1-3765-85	10.0 mg/L	7 Days
VOCs - 3-40 mL VOA ³				
Benzene	HCI, Cool < 4°C	EPA 624	0.50 ug/L	14 Days
Toluene	HCI, Cool < 4°C	EPA 624	1.00 ug/L	14 Days
Ethylbenzene	HCI, Cool < 4°C	EPA 624	1.00 ug/L	14 Days
Xylenes	HCI, Cool < 4°C	EPA 624	3.00 ug/L	14 Days
Oil and Grease - 2-1 Liter Glass ⁴				
Oil & Grease (HEM)	H2SO4, Cool < 4°C	EPA 1664A	4.85 mg/L	28 Days
Oil & Grease (HEM-SGT)	H2SO4, Cool < 4°C	EPA 1664A	4.85 mg/L	28 Days

Table adapted from Sioux Falls Regional Sanitary Landfill Comprehensive Monitoring Plan, September and November 2011

mg/L - milligrams per liter

ug/L - micrograms per liter

S.U. - standard units

N/A - not applicable

¹Container listed is typical. Container selected for sample collection to be approved by laboratory performing analysis for the parameter listed.

²Laboratory reporting limits with no dilutions

³Benzene, toluene, ethylbenzene and xylenes (BTEX) monitoring only required if petroleum contamination is expected in the water being discharged.

⁴Oil and grease will be visually monitored daily. If a visible sheen is observed, a sample must be taken and analyzed. An oil and grease sample must be taken during the first day of discharge if petroleum contaminated groundwater is expected.



APPENDIX C

Field Forms and Sampling Documentation

Landfill Gas Monitoring Data

Monitoring Device:

Site: Sioux Falls Regional

Field Work Performed By:

Sanitary Landfill Project No.

CH₄

				CH ₄		-
Measurement Location	Date	Time	% by Volume	% LEL	% UEL	Bar. Pres. (in Hg)
Calibration Check In			-			
Ambient						
Calibration Check Out						
Buildings & Structures						
Landfill Gas Building (East)						
Landfill Gas Building (North)						
Scale House (South)						
Scale House (North)						
Public Storage Building (South)						
Public Storage Building (North)						
N. Storage Shed						
Shop Building (NE)						
Shop Building (S)						
S. Storage (NW)						
S. Storage (SW)						
Leachate Pond Building (Middle)						
Monitoring Wells and Piezometers						
MW-1						
MW-5						
MW-7R						
MW-11						
MW-13R						
MW-15 (City)						
MW-17						
MW-18R (City)						
MW-19						
MW-19i (City)						
MW-20						
MW-21ox						
MW-23ox						
MW-250x						
MW-39ox						
MW-42ox						
MW-43ox (City)						
MW-440x						
MW-450x						
MW-460x						
MW-470x						
MW-480x						
MW-530x						
MW-54ox						
MW-56ox MW-57ox						
MW-580x						
MW-59ox						
MW-60ox						
MW-61ox						
P-1S						
apag as						
SDGS-28						
SDGS-45						
SDGS-45 SDGS-57						
SDGS-45						

 CH_4 is in % Volume

LEL is 5% by Volume; UEL is 15% by Volume

SURFACE EMISSION MONITORING CALIBRATION AND RESPONSE TIME DETERMINATION

Landfill Name:	Sioux	Falls Regional San	itary Landfill				
Date:	Field Technician:						
WEATHER OBS	ERVATION	ıs					
Wind Speed:	mph	n Wind Direc	tion (from):	Barometric	Pressure:		
Air Temperature: deg F General Weather Conditions:							
CALIBRATION I	NFORMAT	ION					
Instrument Ma	ke:		Model:		S/N:		
Pre-monitoring Calibration Check Procedure: Calibrate the instrument. Make a total of three measurements by alternating zero air and the calibration gas. Record the readings and calculate the average algebraic difference between the instrument reading and the calibration gas as a percentage. The calibration percentage must be less than or equal to 10% of the calibration gas value. Note time to reach 90% of Cal Gas Reading should be measured after switching from Zero Air to Calibration Gas. Response Time is calculated as the average of the three measurements.							
Inst	rument ID:		Cal (Gas Concentration:		ppm	
Measurement #	Time	Zero Air Reading (ppm)	Cal Gas Reading (ppm)	Cal Gas Conc Cal Gas Reading (ppm)	90% of Cal Gas Reading (ppm)	Time to reach 90% Cal Gas Reading (sec)	
1 2							
3							
Averag	je						
		Calibration Precisi	on = Avg. Difference	/Cal Gas Conc. X 10 =%	00%		
_				FID Fuel cell	(Hydrogen) pre	essure	
Response Time: (Must be less that		sec		Initial:	psig		
				Final:	psig		
Post-monitoring	g Calibrati	on Check					
Zero Air Reading	j:	ppm		Cal Gas Rea	ding:	ppm	
BACKGROUND	CONCENT	RATION CHECKS					
Upwind Location	Description	n:		Reading:		ppm	
Downwind Locati	ion Descrip	tion:		Reading:		ppm	
	Cal	culated Background	d Concentration:	ррі	m		
NOTES:							

SCS ENGINEERS

Field Data Sheet

	roject Name:				Monitoring Point:									
Proje	ect Location:	Sioux Falls F	Regional L	.andfill										
Pro	ject Number:						Date (s):							
Field Tea	m Members													
					Affiliation:									
	Name:				Affiliation:									
Weather (<u>Conditions</u>													
	Mean Temp:		°F (Mean)	Wind	Direction:	ΝE			if needed)					
	Precipitation:	None	Light	Heavy	Sky:	Cloudy	Sunny	Partly						
Well Obse	arvations													
well Obse	ervations	Well Pad					Locks	Yes	No					
		Casing				Protocti	ve Casing	163	INO					
	Protect	tive Casing				•	Well							
Refe	rence Mark/Id	~ _				•			<u> </u>					
		_												
Groundw	ater Level Me				Static V	/ater Level:		feet below	TOC					
	Date/Time M	leasured:			7	otal Depth:		feet below	TOC					
<u> </u>														
Purging A						Purao Dato:								
Б	Purged By: Purge Method:				Г	-uige Date.			•					
	Vell Diameter:			-inch 4-inc	ch Othe	r	(bold one)							
P	urge Volume	Calculation:					ge Volume:							
Ir	nitial Paramete	er Readings:		рН		Spec. Con-			Temp (°C)					
	Physical appe	arance of pu	rge water:				DO		ORP					
	1					1	1	T	٦					
				Specific				Water						
	Cumulative			Conduct-		Dissolved		Level						
Purge	Purge Vol.	Purge Rate		ivity	Temp	Oxygen		(ft below						
Time	(mL)	(mL/m)	рН	(mS/cm)	(°C)	(mg/L)	ORP (mV)	TOC)						
									-					
	+								1					
									†					
									1					
]					
]					
Sampling	Activities													
	Sampled By:				Date/Time:			T (0.6)	-					
Sample	Parameters:		pH		Spec. Con			Temp (°C)						
	Water Level:		feet below	, 100		DO		ORP						

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

SITE INSPECTION FORM

Regional Sanitary Landfill Sioux Falls, South Dakota

111 17121	5 General Storm	Water Permit SRR00	for Industrial Activ	vity
Date/Time		Name of Authorized SWPI	P Inspector:	
condition (no	o cracks, erosion, v	uctures at the waste oil AST valves functioning etc.).		
Final Cover	Condition <u>Acceptable</u> <u>Yes</u> <u>No</u>	Comments/Location	Corrective Action	Date <u>Complete</u>
. Settlement 2. Slope Erosion	•			
Seeps				
Vegetative Stress			,	
Vegetative Growth				
omfana Makan Onaka I E				
urface Water Control Fe	atures			
Berm Erosion Free Flowing Ditches				
Sediment				<u> </u>
Accumulation				
Sedimentation				
Treatment Basin				
eneral Site				
Silt Fencing				
Litter				
Access Road Condition				
Condition				

3. If this inspection was conducted while storm w pollutants were visible in the runoff (oil sheens where spills have occurred and note the condition	vater runoff was leaving the site, indicate if any s, sediment, or other discoloration). Check all areas ion or runoff:
Describe any new significant materials that are indicated in the plan:	exposed to storm water on the site that were not
5. Describe any changes to the plan that will be ne	ecessary as a result of the inspection findings:
6. Has the site been evaluated for the presence of non-s wastewater).	storm water discharges? (e.g. process water,
Non-Structural BMP's (check occurrence during inspection period and describe below)	Structural BMP's (check occurrence during
1. employee training 2. purchase of spill containment and control material 4. general clean-up of waste and traffic area 5. removal of discarded equipment 6. moving significant material into a building 7. covering significant material with cover material 8. changes in material handling practices to reduce exposure to runoff 9. installation and maintenance of silt fence, seeding and mulching or sodding of bare soil areas to prevent erosion 10. other non-structural measures were taken, please list:	inspection period and describe below) 1. installation of curbs, swales, or other measures to divert storm water away from significant material 2. installation of containment areas around aboveground storage tanks or waste areas 3. storm water detention/retention pond or infiltration basin in good condition and sufficient for current surface water discharge 4. other structural measures were taken, please list:
Describe corrective actions needed to correct non-functionin	ng BMP's:

losed waste areas including associated storm water conveyance structures for erosion and sediment accumulation oads for erosion and sediment accumulation ehicles and vehicle parking areas for evidence of leaking fluids (e.g. staining)	Actions to be taken	
Authorized Permit Recorder Having NPDES Signatory Authority:		•
Authorized Permit Recorder Having NPDES Signatory Authority:	*** ** * ** ** ** ** ** ** ** ** ** **	
Authorized Permit Recorder Having NPDES Signatory Authority:		
Authorized Permit Recorder Having NPDES Signatory Authority:		
Authorized Permit Recorder Having NPDES Signatory Authority:		
Authorized Permit Recorder Having NPDES Signatory Authority:		
Authorized Permit Recorder Having NPDES Signatory Authority:		
Printed Name: Title:		
Printed Name: Title:		
Signature:	Authorized Permit Recorder Having N	NPDES Signatory Authority:
Additional Inspections: losed waste areas including associated storm water conveyance structures for erosion and sediment accumulation oads for erosion and sediment accumulation ehicles and vehicle parking areas for evidence of leaking fluids (e.g. staining) pill kits for proper supplies hop floor drains and holding tank for possible back-up conditions	Printed Name:	Title:
losed waste areas including associated storm water conveyance structures for erosion and sediment accumulation oads for erosion and sediment accumulation ehicles and vehicle parking areas for evidence of leaking fluids (e.g. staining) pill kits for proper supplies hop floor drains and holding tank for possible back-up conditions	Signature:	Date Signed:
oads for erosion and sediment accumulation ehicles and vehicle parking areas for evidence of leaking fluids (e.g. staining) pill kits for proper supplies hop floor drains and holding tank for possible back-up conditions	Additional Inspections:	
ehicles and vehicle parking areas for evidence of leaking fluids (e.g. staining) pill kits for proper supplies hop floor drains and holding tank for possible back-up conditions	losed waste areas including associated storm	water conveyance structures for erosion and sediment accumulation
pill kits for proper supplies hop floor drains and holding tank for possible back-up conditions	toads for erosion and sediment accumulation	
pill kits for proper supplies hop floor drains and holding tank for possible back-up conditions	ehicles and vehicle parking areas for evidence	e of leaking fluids (e.g. staining)
	pill kits for proper supplies	
	hop floor drains and holding tank for possible	back-up conditions

	BMP IDENTIFICATION
BMP's, describe action that will be in	gement Practices that you have selected to include in your plan. For each of the baseline corporated into facility operations. Also describe any additional BMP's (activity-specific, sited. Attached additional sheets if necessary.
BMP's	Brief Description of Activities
Good Housekeeping	·
Preventative Maintenance	
Source Reductions	
Diversions	
Sediment and erosion Control	

Additional BMP's



APPENDIX D

Boring Logs and Well Construction Diagrams

County: MINNEHAHA Location: 101N-51W-35CBBC 1

Longitude: 96.5547

Map Location: SOGS-28

Legal Location: SW NW NW SW SEC. 35, T. 101 N., R. 51 W.

Latitude: 43.3021

Land Owner: SIOUX FALLS
Project: SIOUX FALLS LANDFILL

Drilling Company: SDGS

Driller: L. HELSETH Driller's Log: X
Geologist: D. ILES Geologist's Log:

Date Drilled: 07-19-1984 Drilling Method: AUGER

Ground Surface Elevation: 1560.00 I

Total Drill Hole Depth: 17.0 Test Hole Number: R20-84-187 Water Rights Well: SDGS Well Name: R20-84-187

Other Well Name: Basin: BIG SIOUX

Basin: BIG SIOUX Aquifer: TILL

Management Unit:

Screen Type: PVC, MFG., 18 SLOT

Casing Type: PVC, SCH. 40

Screen Length: 2.0

Casing Diameter: 2.0

Casing Top Elevation: 1562.46 I

Casing Stick-up: 2.50 Total Casing and Screen: 19.0

Well Maintenance Date:

USGS Hydrological Unit Code: 10170203

Electric Log Information:

Spontaneous Potential: Single Point Resistivity:

Natural Gamma: Extra:

Samples:

BOTTOM OF WELL IS AT 16.5 FEET. AUGER DIAMETER WAS 10 INCHES. 15 GALLONS OF GRAVEL PACK AND 5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 4.0 CLAY, GRAY, PEBBLY (TILL)

4.0 - 13.0 CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)

13.0 - 17.0 CLAY, GRAY-BROWN, PEBBLY (TILL)

* * * *

* * *

Driller's Log: X

Aquifer: TILL

Screen Length:

Casing Diameter:

Total Casing and Screen:

Test Hole Number: R20-84-172

SDGS Well Name: R20-84-172

2.0

2.0

18.5

County: MINNEHAHA Location: 101N-51W-35CCBC 1

Map Location: 45 SDGS-45

Legal Location: SW NW SW SW SEC. 35, T. 101 N., R. 51 W.

Latitude: 43.3008 Longitude: 96.5547

Land Owner: SIOUX FALLS

Project: SIOUX FALLS LANDFILL

Drilling Company: SDGS
Driller: L. HELSETH
Geologist: D. ILES
Data Drilled: 07,18,1084

Geologist: D. ILES

Date Drilled: 07-18-1984

Drilling Method: AUGER

Ground Surface Elevation: 1544.00 I
Total Drill Hole Depth: 17.0

Water Rights Well: Other Well Name: Basin: BIG SIOUX Management Unit:

Screen Type: PVC, MFG., 18 SLOT Casing Type: PVC, SCH. 40 Casing Top Elevation: 1545.97 I

Casing 1 op Elevation: 1545,97
Casing Stick-up: 1.50

Well Maintenance Date:

USGS Hydrological Unit Code: 10170203

Electric Log Information: Spontaneous Potential:

Spontaneous Potential: Single Point Resistivity:

Natural Gamma: Extra:

Samples:

BOTTOM OF WELL IS AT 17 FEET. AUGER DIAMETER WAS 10 INCHES. 13 GALLONS OF GRAVEL PACK AND 5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 17.0 CLAY, YELLOW-BROWN, SILTY, PEBBLY; THE LOWER 7 FEET SEEMED SLIGHTLY SATURATED (TILL)

* * * *

Location: 101N-51W-35CDAD 2 County: MINNEHAHA

Map Location: # 5065-57

Legal Location: SE NE SE SW SEC. 35, T. 101 N., R. 51 W.

Latitude: 43.3007 Longitude: 96.5512

Land Owner: SIOUX FALLS

Project: SIOUX FALLS LANDFILL

Drilling Company: SDGS Driller: L. HELSETH

Geologist: D. ILES

Date Drilled: 07-17-1984 Ground Surface Elevation: 1541.00 I

Total Drill Hole Depth:

Water Rights Well:

Other Well Name:

Basin: BIG SIOUX

Management Unit:

Screen Type: PVC, MFG., 18 SLOT

Casing Type: PVC, SCH. 40

Casing Top Elevation: 1543.31 I

Casing Stick-up: 2.00

Well Maintenance Date: USGS Hydrological Unit Code: 10170203

Electric Log Information:

Natural Gamma:

Spontaneous Potential:

Samples:

Driller's Log: X

Geologist's Log:

Drilling Method: AUGER

Test Hole Number: R20-84-168

SDGS Well Name: R20-84-168

Aquifer: TILL

Screen Length: 2.0

Casing Diameter: 2.0

Total Casing and Screen: 19.0

Single Point Resistivity:

Extra:

BOTTOM OF WELL IS AT 17 FEET. AUGER DIAMETER WAS 10 INCHES. 13 GALLONS OF GRAVEL PACK AND 5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

2.0 TOPSOIL, BLACK

2.0 -17.0 CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)

Location: 101N-51W-35DBAC 2 County: MINNEHAHA

Map Location: 🚜 SDGS - 68

Legal Location: SW NE NW SE SEC. 35, T. 101 N., R. 51 W.

Latitude: 43.3020 Land Owner: N. MILLER

Project: SIOUX FALLS LANDFILL

Drilling Company: SDGS Driller: A. MACDONALD

Geologist: D. ILES

Date Drilled: 07-25-1984

Ground Surface Elevation: 1552.00 I Total Drill Hole Depth:

Water Rights Well: Other Well Name: Basin: BIG SIOUX

Management Unit:

Screen Type: PVC, MFG., 18 SLOT Casing Type: PVC, SCH. 40

Casing Top Elevation: 1554.07 I

Casing Stick-up: 2.00 Well Maintenance Date:

USGS Hydrological Unit Code: 10170203

Electric Log Information:

Spontaneous Potential:

Natural Gamma: Samples:

Longitude: 96.5502

Driller's Log: X

Geologist's Log:

Drilling Method: AUGER

Test Hole Number: A1-84-235 SDGS Well Name: A1-84-235

Aquifer: TILL

Screen Length: 2.1 Casing Diameter: 2.0

Total Casing and Screen: 20.0

Single Point Resistivity:

Extra:

BOTTOM OF WELL IS AT 18 FEET. AUGER DIAMETER WAS 6 INCHES. 5 GALLONS OF GRAVEL PACK AND 2.5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

0 -5.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)

5.0 -9.0 CLAY, BROWN, SILTY, VERY SANDY, VERY

PEBBLY; MOIST (TILL) 9.0 -18.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; SATURATED (TILL)

County: MINNEHAHA

Map Location: M 6065-77

Legal Location: NE SW NW SE SEC. 35, T. 101 N., R. 51 W.

Latitude: 43.3017

Land Owner: N. MILLER

Project: SIOUX FALLS LANDFILL

Drilling Company: SDGS Driller: A. MACDONALD Geologist: D. ILES

Date Drilled: 07-25-1984

Ground Surface Elevation: 1543.00 I Total Drill Hole Depth:

Location: 101N-51W-35DBCA 2

Longitude: 96.5502

Driller's Log: X Geologist's Log:

Drilling Method: AUGER

Test Hole Number: A1-84-230

SDGS Well Name: A1-84-230 Water Rights Well:

Other Well Name:

Basin: BIG SIOUX

Management Unit:

Screen Type: PVC, MFG., 18 SLOT Casing Type: PVC, SCH. 40 Casing Top Elevation: 1545.49 I

Casing Stick-up: 2.00

Well Maintenance Date:

USGS Hydrological Unit Code: 10170203

Electric Log Information:

Spontaneous Potential:

Natural Gamma:

Samples:

Aquifer: TILL

Screen Length: 2.1 Casing Diameter:

Total Casing and Screen: 14.5

Single Point Resistivity:

Extra:

BOTTOM OF WELL IS AT 12.5 FEET. AUGER DIAMETER WAS 6 INCHES. THE HOLE CAVED IN UP TO 12.5 FEET PRIOR TO INSTALLATION OF CASING. 9 GALLONS OF GRAVEL PACK AND 2.5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

5.0 CLAY, BLACK, SILTY; MOIST (TOPSOIL)

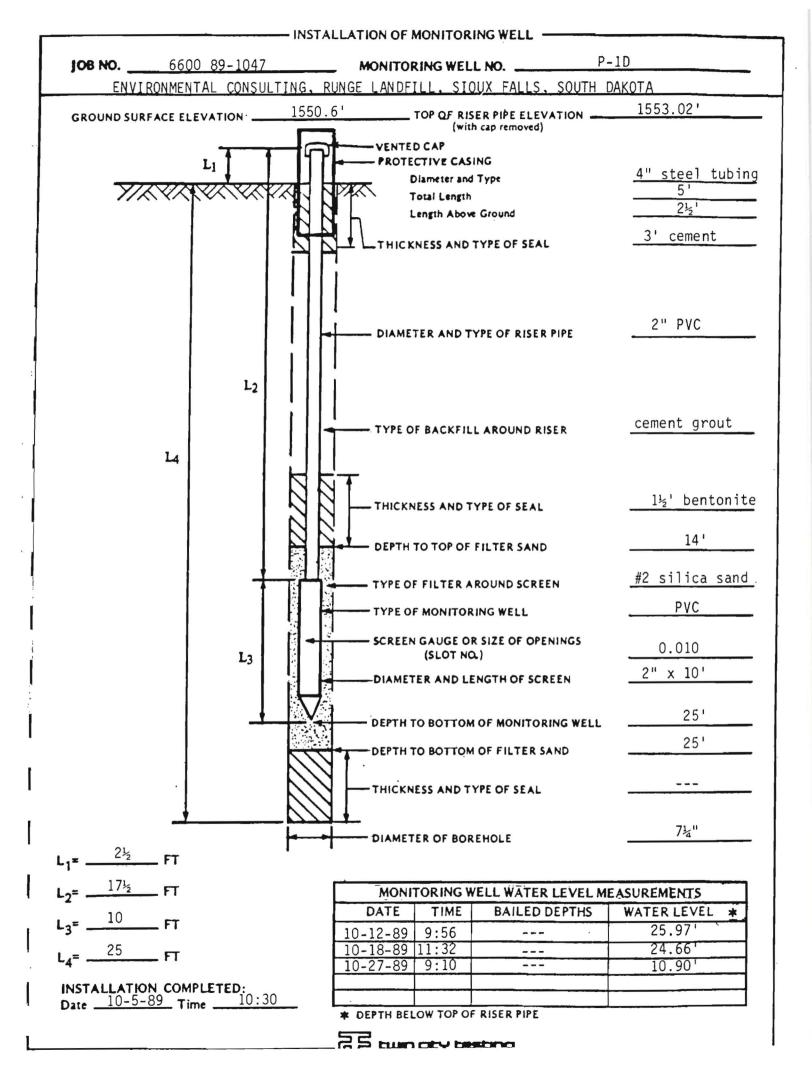
5.0 -18.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)

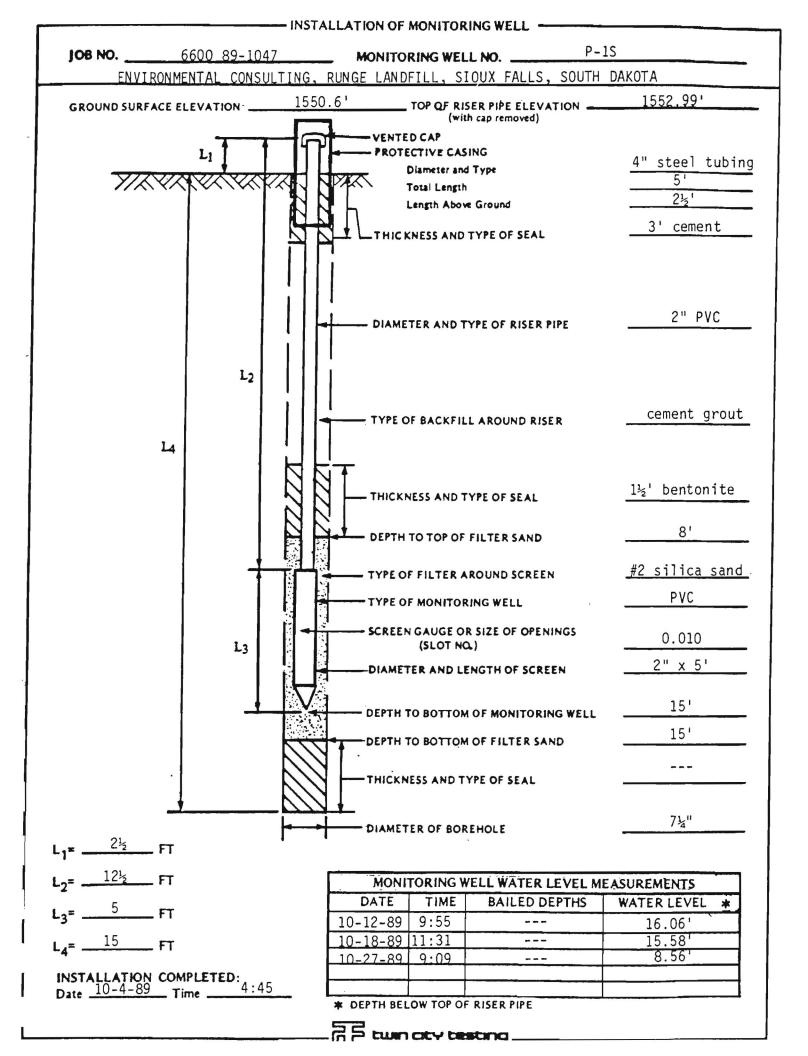
6600 92-16 BORING NO. VERTICAL SCALE 1" = 4" JOB NO. RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA PROJECT SAMPLE TESTS ORGANIC VAPOR DESCRIPTION OF MATERIAL GEOLOGIC DEPTH IN FEET CR hNu (ppm) bkgd (pps) SURFACE ELEVATION TYPE YL. NO. ORIGIN NO SAMPLES TAKEN 19.5 MIXED CLAYEY SAND, fine grained, brownish gray, SB 13 1 ALLUVIUM waterbearing, medium dense (SC) 24.0 SANDY SILT, grayish brown, medium (ML) 2 SB 8 * See report for additional water level information. BORING CONTINUED ON NEXT PAGE 29.0 10-14-91 10-14-91 COMPLETE START WATER LEVEL MEASUREMENTS WATER METHOD SAMPLED CASING CAVE-IN BAILED DEPTHS DATE TIME 4" DC 0-15 1/2', DM 15 1/2' - 49 1/2' LEVEL DEPTH DEPTH DEPTH 13' 15.5' 10-14 1:55 R. Hanson CREW CHIEF

LOG OF TEST BORING

LOG OF TEST BORING 2/3 JOB NO. 6600 92-16 VERTICAL SCALE BORING NO. CONTINUED PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA SAMPLE TESTS ORGANIC VAPOR DESCRIPTION OF MATERIAL DEPTH IN FEET 29 GEOLOGIC or CR hMu (ppm) bkgd (ppm) ORIGIN ¥Ļ HO. TYPE O SAME AS PREVIOUS PAGE SILTY SAND, fine grained, gray, waterbearing, 15 3 SB MIXED medium dense (SM) ALLUVIUM 15 SB 4 38.5 SAND, fine to medium grained, with a little COARSE ALLUVIUM gravel, gray, waterbearing, dense (SP) 5 SB 20 21 6 SB 50.0 TILL LEAN CLAY, with a little gravel, gray, rather stiff (CL) 7 SB 12 8 SB 9 59.5 END OF BORING NOTE: Boring completed as TCT-1. mw-1

				L	OG OF T	EST	BORIN	G								-
JOB NO		6600 89-			VERTIC	AL SCAL	ε					BORING			P-1D	
PROJE	CT ENV				RUNGE LA	NDFIL	L. SIOU	<u>X. F</u>	ALL	S.		ITH D			===	
DEPTH			15	N OF MATER	IAL	GEO	DLOGIC RIGIN				\vdash	MPLE			TORY TE	
FEET	SURFA	CE ELEVATIO	N	30.0		0	AIGIN	1	N 	WL	NO	TYPE	.w	0	L.L. P.L.	Ou
	LEAN C	LAY, dar	k brown	, rather	stiff	TOP	SOIL				1	HSA				
				(C	L-0L)			-			1	1157				
									11		2	SB				
1							5,									
5											2.8		2,		45/20	
	SANDY	LEAN CLA	Y, with	a little	e	TIL	L				3A 3B	3T	31 29			*
1	gravel	, brown	mottled	, soft t	0										46/26	
-	medium			(C	L)				_							
									5		4	SB				
-								ſ			5A	~~	23		43/ ₁₈	
-								Γ			5B	3T	22		43/17	*.*
-															,	
-																
-								†	7		6	SB				
-								t							12/	
_								 			7 A 17B	3T	20 22		42/17	*
-								 			/b	200	22		45/18	
17	CANDY	LEAN CLA	V	- 1:++1				ŀ								
-	SANDY gravel	LEAN CLA , gray,	rather s	stiff to	e			H	14		.8	SB			İ	
	medium	, 55,		(C	L)		*	}							43/17	
_								-			9A 9B	3T	19 16		43/	** .
								-			130		10		43/15	
								ŀ								
								-	10		10	SB				
								F	10		10	30				
								-								
0.51								-	7		11	SB				
26½		END	OF BORIN	NG				-								
		attached	grain s	size dis	tribu-			-								
	tion **See	curves. attached	grain s	size dis	tribu-			L								
Ī	tion a	nd perme	ability	data sh	eet.			L								
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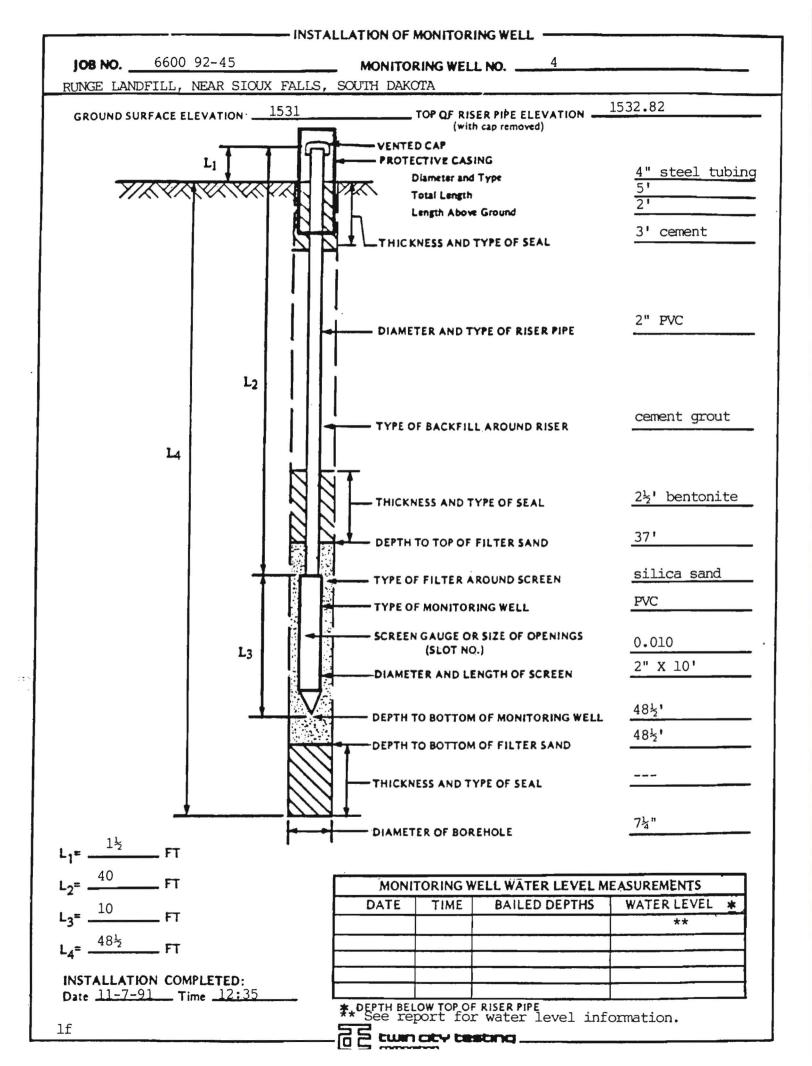


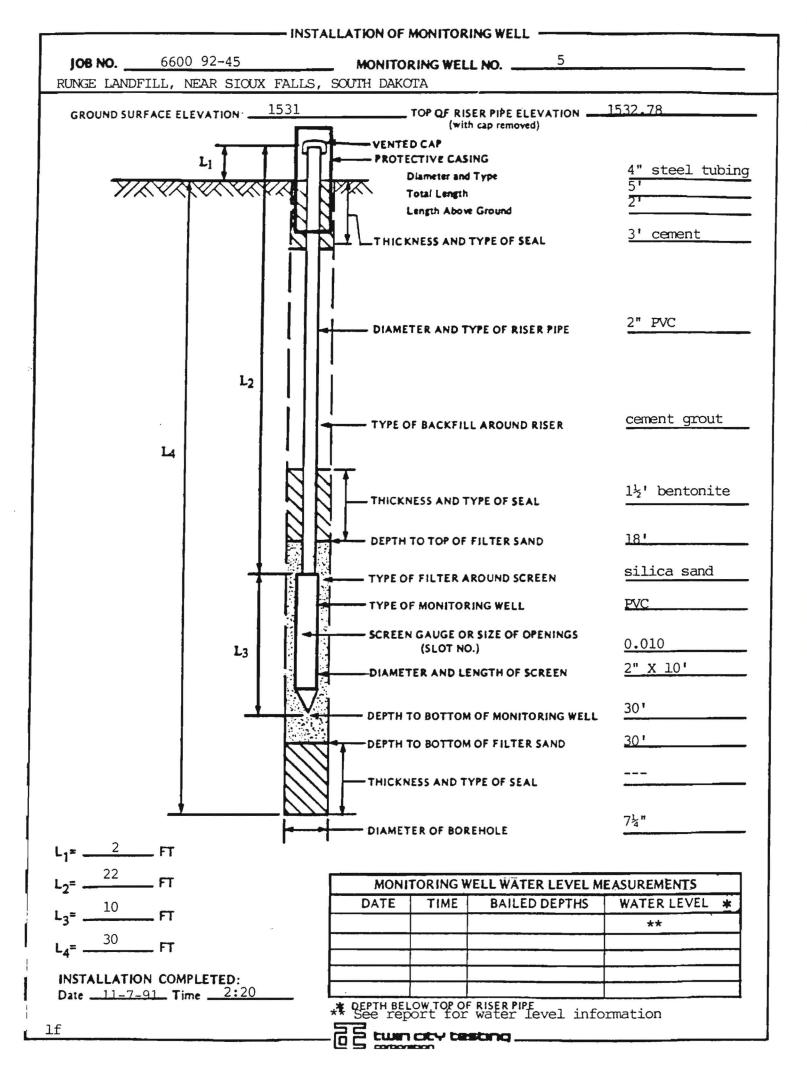
LOG OF TEST BORING 6600 92-45 BORING NO. 1'' = 4'JOB NO. VERTICAL SCALE PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA TESTS ORGANIC VAPOR SAMPLE DESCRIPTION OF MATERIAL GEOLOGIC DEPTH I**N** FEET OF hNu (ppm) -SURFACE ELEVATION 1531 CR WL NO. TYPE ORIGIN (ppm) SB ND*/ND TOPSOIL 1 LEAN CLAY, dark brown (CL) 2.0 LEAN CLAY, brown mottled (CL) FINE ND/ND 2 SB **ALLUVIUM** SB ND/ND 3 SB Tr**/Tr 4 SB ND/ND 5 12.0 TILL LEAN CLAY, with a little gravel, brown ND/ND 6 SB mottled, a lamination of sand at 13' (CL) 7 SB ND/ND 19.0 ND/ND LEAN CLAY, with a little gravel, gray and 8 SB brown mottled, lenses of waterbearing sand at ND/ND 9 SB 25' and 34' (CL) ND/ND 10 SB SB ND/ND 11 * Not detected ** Trace ND/ND 12 SB *** See report for water level information. ND/ND BORING CONTINUED ON NEXT PAGE 13 SB COMPLETE 11-7-91 11-7-91 START WATER LEVEL MEASUREMENTS a 11:50 WATER METHOD CAVE - IN SAMPLED CASING BAILED DEPTHS TIME DATE 3 1/4" HSA 0-48 1/2' LEVEL DEPTH DEPTH DEPTH *** R. Hanson

> twin city testing corporation

CREW CHIEF

LOG OF TEST BORING 4 CONTINUED JOB NO. 6600 92-45 VERTICAL SCALE $1^{H} = 4$ BORING NO. RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA PROJECT SAMPLE TESTS ORGANIC VAPOR DESCRIPTION OF MATERIAL GEOLOG1C DEPTH IN FEET hNu (ppm) bkga (ppm) ORIGIN WL NO. TYPE D 31 TILL SAME AS PREVIOUS PAGE 14 SB ND*/ND 35.0 ND/ND 15 SB LEAN CLAY, with a little gravel, gray (CL) SB ND/ND 16 17 ND/ND SB ND/ND SB 18 19 SB ND/ND ND/ND 20 SB 48.5 **OBSTRUCTION** * Not detected NOTE: Boring completed as MW-4.





LOG OF TEST BORING

JOB NO. 660

6600 92-45 VERTICAL SCALE

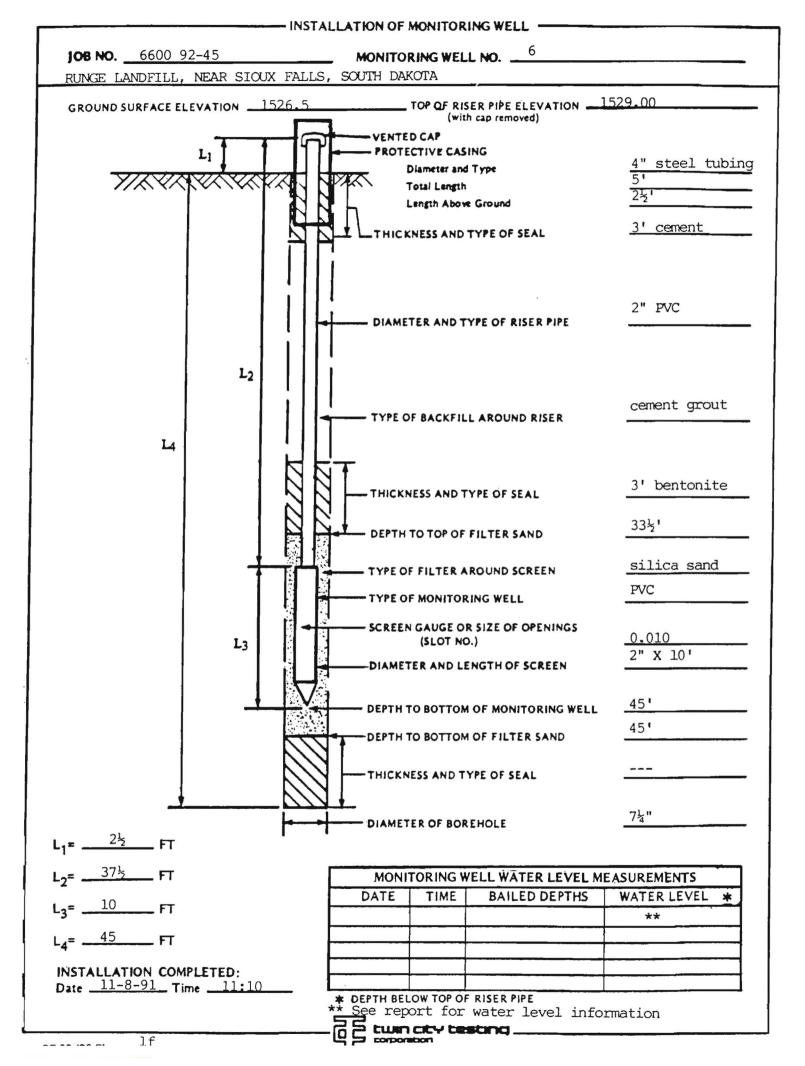
1'' = 4'

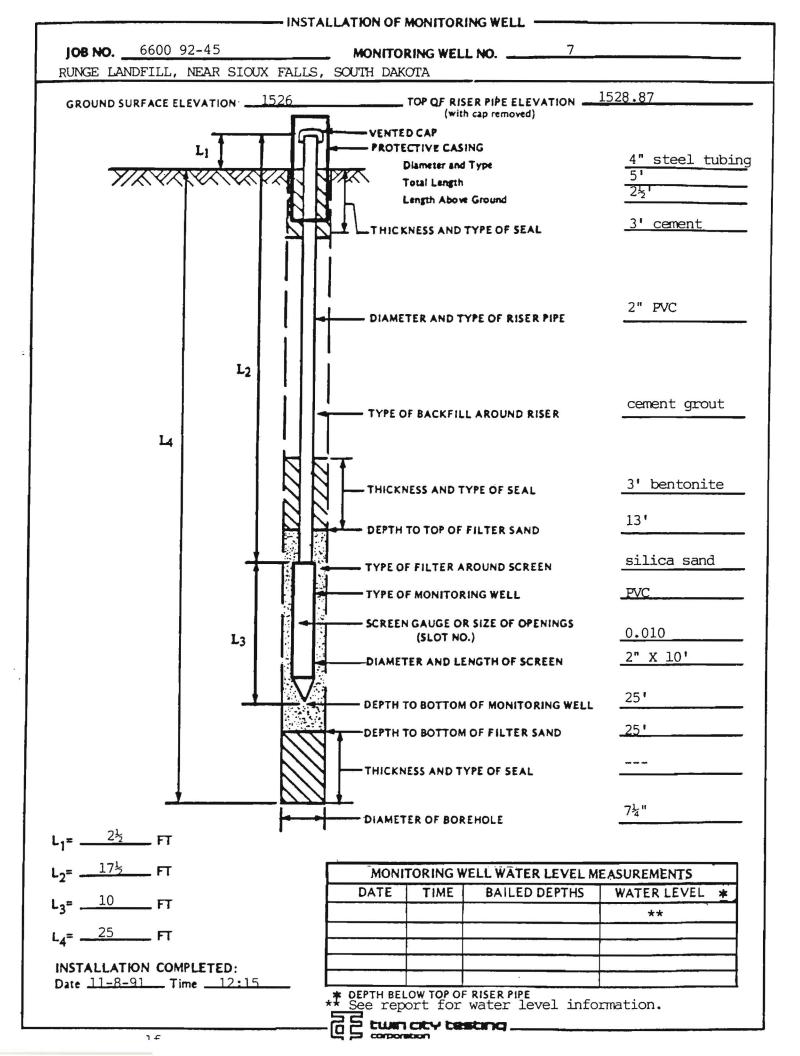
BORING NO.

_ 4

RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA PROJECT TESTS ORGANIC VAPOR SAMPLE DESCRIPTION OF MATERIAL GEOLOGIC DEPTH hNu bkgd SURFACE ELEVATION 1526.5 FEET CR TYPE D ORIGIN WL NO. (ppm) (ppm) SB **ND**** 1 LEAN CLAY, dark brown (CL) 0.5 TILL 2 SB ND LEAN CLAY, with a little gravel, brown mottled (CL) ND/ND 3 SB 4 SB ND/ND ND/ND 5 SB SB ND/ND 6 7 SB ND/ND 15.0 ND/ND 8 SB LEAN CLAY, with a little gravel, brown and gray mottled, a lamination of wet sand at 20' (CL) ND/ND 9 SB \overline{A} 10 SB ND/ND SB ND/ND 11 25.0 ND/ND 12 SB LEAN CLAY, with a little gravel, gray, laminations of sand at 34 1/2' and 38' (CL) * TOPSOIL ** Not detected ND/ND SB 13 *** See report for additional water level information. ND/ND BORING CONTINUED ON NEXT PAGE 14 SB COMPLETE 11-8-91 11-7-91 START WATER LEVEL MEASUREMENTS 10:20 WATER METHOD CAVE-IN SAMPLED CASING BAILED DEPTHS DATE TIME DEPTH LEVEL 3 1/4" HSA 0-45' DEPTH DEPTH 18.5 9:15 20' 20' 20' 11-18 None 45' 11-18 10:21 45' 45' R. Hanson CREW CHIEF

LOG OF TEST BORING 6600 92-45 6 CONTINUED BORING NO. JOB NO. VERTICAL SCALE $1^n = 4$ RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA PROJECT SAMPLE TESTS ORGANIC VAPOR DESCRIPTION OF MATERIAL DEPTH IN FEET GEOLOGIC or CR bkgd (ppm) hNu (ppm) WL NO. TYPE ORIGIN 31 SAME AS PREVIOUS PAGE TILL ND*/ND 15 SB ND/ND SB 16 17 SB ND/ND ND/ND 18 SB SB ND/ND 19 45.0 END OF BORING * Not detected NOTE: Boring completed as MW-6.



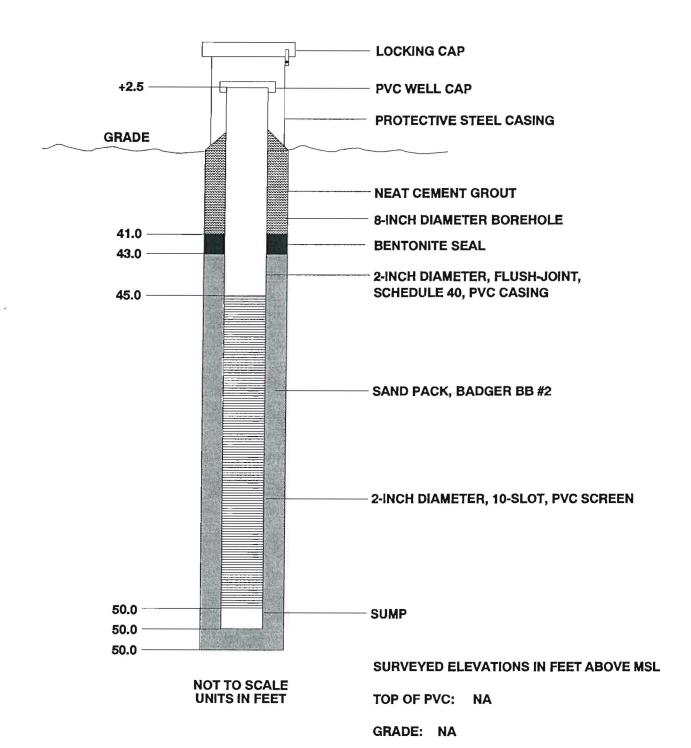


OWNER: City of Sioux Falls **GEOLOGIC LOG** LEGGETTE, BRASHEARS & GRAHAM, INC. WELL NO.: MW-6R SIOUX FALLS, SOUTH DAKOTA PAGE 1 OF 1 PAGE(S) SITE LOCATION: Sioux Falls Sanitary Landfill SCREEN SIZE & TYPE: 2-inch PVC **SETTING:** 50 to 45 fbg Sioux Falls, South Dakota **SLOT NO.:** 10 DATE COMPLETED: 12-16-97 SAND PACK SIZE & TYPE: Badger BB #2 DRILLING COMPANY: American Technical Services, Inc. **SETTING:** 50 to 43 fbg CASING SIZE & TYPE: 2-inch PVC DRILLING METHOD: Hollow-Stem Auger **SETTING:** 45 fbg to +2.5 ftSEAL TYPE: Bentonite -Econoplug medium SAMPLING METHOD: CSTS OBSERVER: B. Peschong **SETTING:** 43 to 41 fbg REFERENCE POINT (RP): Grade BACKFILL TYPE: Neat Cement Grout ELEVATION OF RP: NM STATIC WATER LEVEL: NM STICK-UP: Approximately 2.5 ft DEVELOPMENT METHOD: SURFACE COMPLETION: Above Grade DURATION: YIELD: REMARKS: Unoxidized Till Well **ABBREVIATIONS:** SS = SPLIT SPOON G = GRABST = SHELBY TUBE W = WASHC = CUTTINGS RFC ≈ RFCOVERY FAG = FEET ABOVE GRADE FBG = FEET BELOW GRADE

REC ≈ RECC	OVERY	PPM = P	ARTS PER MILLION	I FA	G = FEET ABOVE	GRADE FBG = FEET BELOW GRADE					
DEPTH (TEET)	SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION					
0	3	CSTS		5		Clay with sand, dark brown-black; organic.					
3	5	CSTS				Clay with sand and pebbles, tan-gray mottled.					
5	10	CSTS		5		Clay, with sand and pebbles, tan-gray mottled.					
10	15	CSTS		5		Clay, with sand and pebbles, tan-gray mottled.					
15	20	CSTS		5		Clay, with sand and pebbles, gray and brown mott a lens of sand at 17½ ft.					
20	25	CSTS		3		Clay, with sand and pebbles, gray and brown mottled.					
25	27	CSTS		5		Clay, with sand and pebbles, gray and brown mottled.					
27	30	CSTS				Clay, with sand and pebbles, gray.					
30	35	CSTS		5		Clay, with sand and pebbles, gray.					
35	40	CSTS		5		Clay, with sand and pebbles, gray; oxidized fracture at 39½ ft., 4-inch lens of silty sand at 37 ft.					
40	45	CSTS		5		Clay, with silt, sand and pebbles, gray; lens of sand, medium grained at 42 ft					
45	50	CSTS		5		Clay, with sand and pebbles, gray.					
						END OF BORING					

SIOUX FALLS REGIONAL SANITARY LANDFILL SIOUX FALLS, SOUTH DAKOTA

CONSTRUCTION DIAGRAM FOR MW-6R



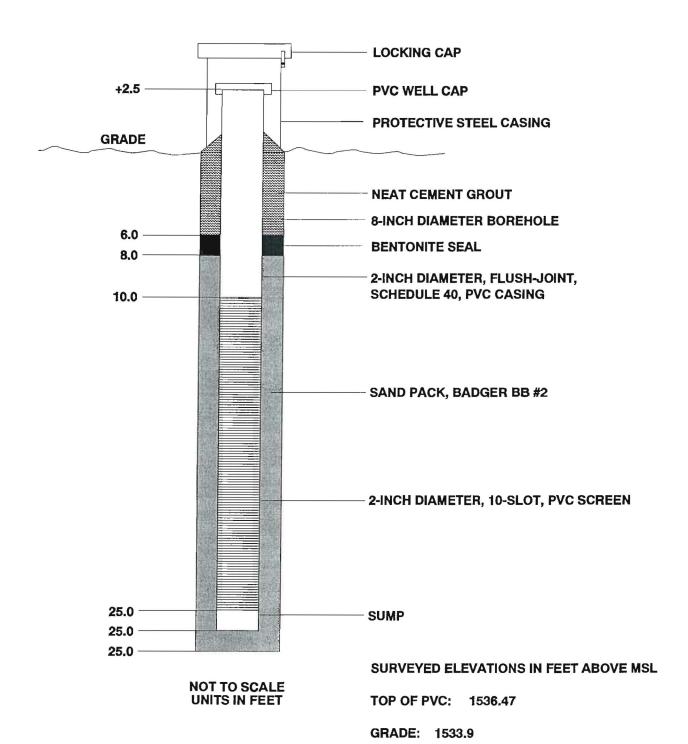
INSTALLATION DATE: DECEMBER 16, 1997

LEGGETTE, BRASHEARS & GRAHAM, INC.

OWNER: City of Sioux Falls **GEOLOGIC LOG** LEGGETTE, BRASHEARS & GRAHAM, INC. WELL NO.: MW-7R SIOUX FALLS, SOUTH DAKOTA PAGE 1 OF 1 PAGE(S) SITE LOCATION: Sioux Falls Sanitary Landfill SCREEN SIZE & TYPE: 2-inch PVC **SETTING:** 25 to 10 fbg Sioux Falls, South Dakota **SLOT NO.:** 10 DATE COMPLETED: 12-16-97 SAND PACK SIZE & TYPE: Badger BB #2 DRILLING COMPANY: American Technical Services, Inc. **SETTING:** 25 to 8 fbg CASING SIZE & TYPE: 2-inch PVC DRILLING METHOD: Hollow-Stem Auger **SETTING:** 10 fbg to +2.5 ftSAMPLING METHOD: CSTS SEAL TYPE: Bentonite OBSERVER: B. Peschong **SETTING:** 8 to 6 fbg REFERENCE POINT (RP): Grade BACKFILL TYPE: Neat Cement Grout ELEVATION OF RP: NM STATIC WATER LEVEL: NM DEVELOPMENT METHOD: STICK-UP: Approximately 2.5 ft SURFACE COMPLETION: Above Grade DURATION: YIELD: REMARKS: Oxidized Till Well ABBREVIATIONS: SS = SPLIT SPOON W = WASHC = CUTTINGS G = GRABST = SHELBY TUBE REC = RECOVERY PPM = PARTS PER MILLION FAG = FEET ABOVE GRADE FBG = FEET BELOW GRADE DEPTH (FEET) SAMPLE **BLOW** PID REC. READING DESCRIPTION TYPE COUNT (FEET) **FROM** то (PPM) Not Logged. See MW-6R.

SIOUX FALLS REGIONAL SANITARY LANDFILL SIOUX FALLS, SOUTH DAKOTA

CONSTRUCTION DIAGRAM FOR MW-7R



INSTALLATION DATE: DECEMBER 16, 1997 LEGGETTE, BRASHEARS & GRAHAM, INC.

LOG OF TEST BORING

PROJECT RINGE LANDFILL, NEAR STOUX FAILS, SOUTH DAKEN Company Compan	JOB NO	The second secon										•	0	_		4
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twin city testing corporation

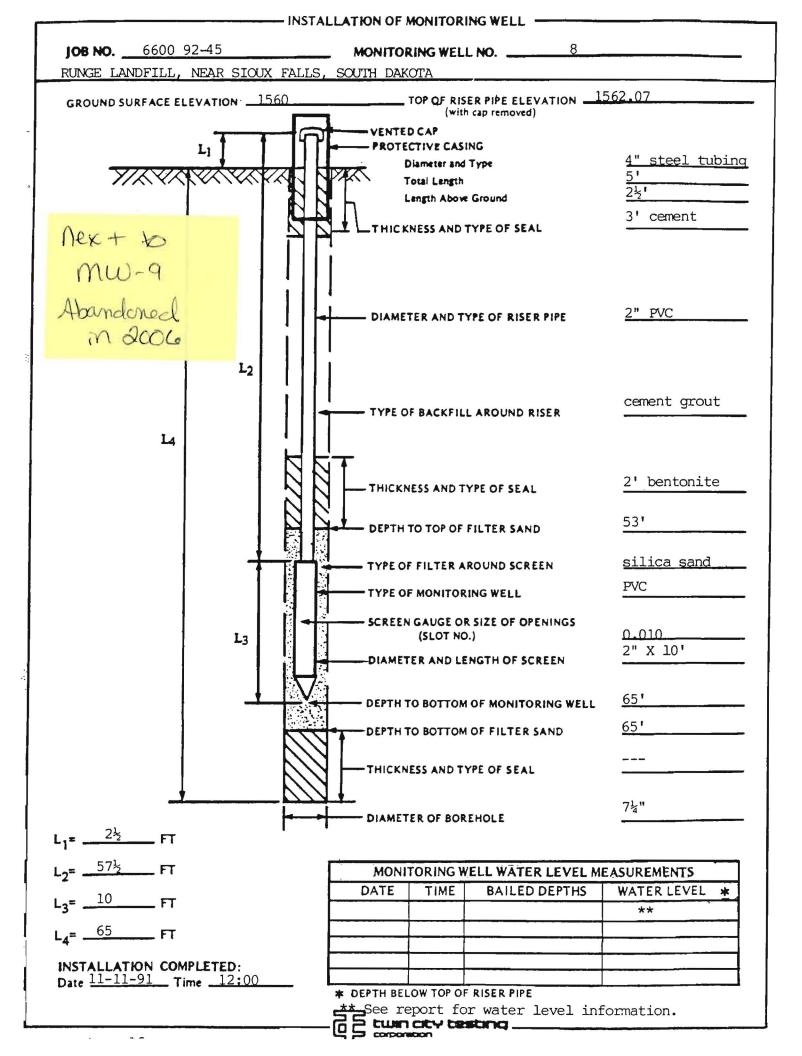
LOG OF TEST BORING

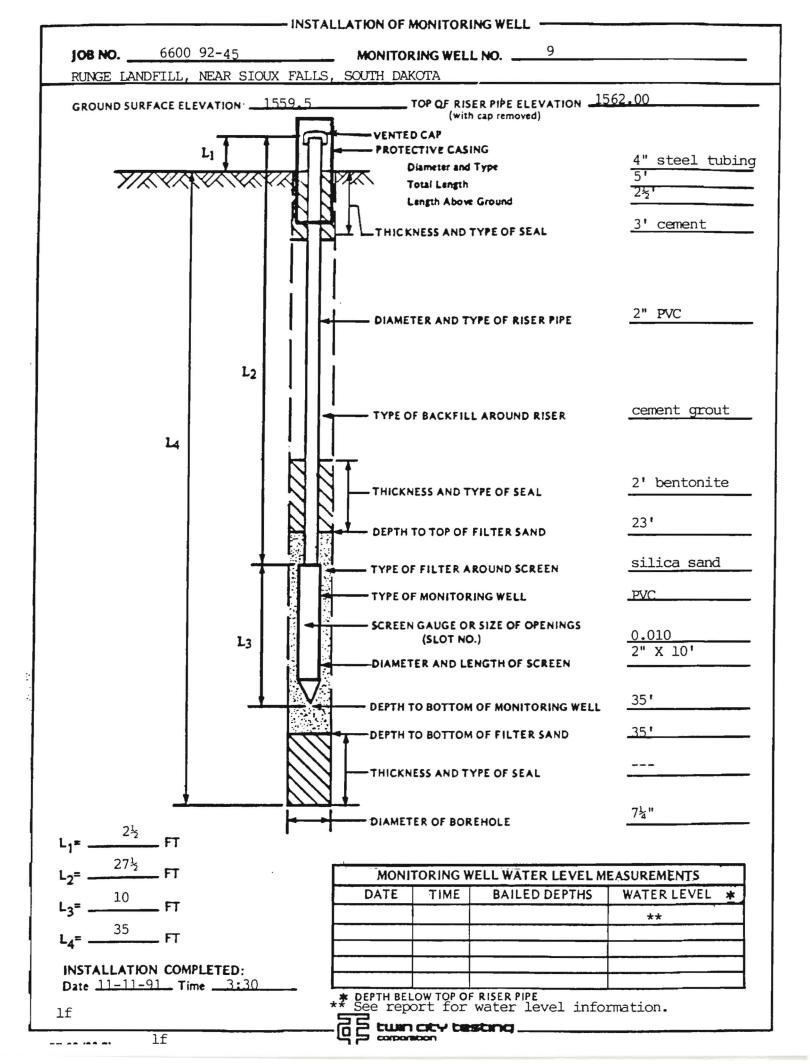
VERTICAL SCALE 1" = 4' BORING NO. 8 CONTINUED

JOB NO.

6600 92-45

PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA SAMPLE TESTS ORGANIC VAPOR DESCRIPTION OF MATERIAL GEOLOGIC DEPTH IN FEET or hNu (ppm) bkgd (ppm) WL NO. TYPE ORIGIN 31 TILL SAME AS PREVIOUS PAGE 32.5 MIXED 15 SB ND*/ND SANDY LEAN CLAY, brown, lenses of sand **ALLUVIUM** (CL) 16 SB ND/ND 17 SB ND/ND ND/ND 18 SB 42.5 1517.50 ND/ND 19 SB SILTY SAND, fine grained, brown, waterbearing, lenses of clay (SM) 20 SB ND/ND ND/ND 21 SB SB ND/ND 22 52.5 23 SB ND/ND LEAN CLAY, with a little gravel, dark gray TILL 1507.50 (CL) ND/ND 24 SB * Not detected NOTE: Boring completed as MW-8. 25 SB ND/ND 26 NSR 65.0 END OF BORING





SOUTH DAKOTA WELL AND TEST HOLE PLUGGING REPORT 11-02

Location NW 1/4	SW 1/4 Sec	_35_ _{Twp} _1	01 Rg <u>51</u>	<u>W_</u>	Well Owner: Ci	ty of Sioux Fal	1s
County		Nor	th		Name:	Sioux Falls Regiona	al Landfill
Minnehaha						224 W. 9th Street	
Please mark w location with an "X"	vell W	x		E	Address: City, State, Zip: Comments: Plugged wel		SD 57104
		<u> </u>	i ile——▶				
Plugging Completio	n Date 12	2/8/2014	•				
				_			
		CH	IECK API	PR	OPRIATE B	OX	
	EXISTING	G WELL 🚺				TEST HOLE	
Well depth	17'				Hole depth		
Casing material	PVC				Hole size		<u> </u>
Casing size(s)	2"						
Casing condition	Good		_				
Describe plugging p	procedure:						
Backfilled with be asphalt/concrete Describe grout or pl	patch at th	e surface wh				sing; fill upper 3' witl	h native materials;
<u> </u>	ogging Malo	<u>Iwa</u>					
Type of non-slip plu	g:						
Th	nis well or test	t hole was plug	ged under lice	ense	#552	and this rep	ort is true and accurate.
Dr	rilling firm: <u>G</u>	eoTek Engir	neering & Te	stir	ig Services, Inc	C	
Si	gnature of Lic	ensed Repres	entative:				
Si	gnature of W	ell Owner:	Dl	¥			
		-12-14					

LOG OF TEST BORING 6600 92-45 BORING NO. 10 JOB NO. VERTICAL SCALE PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA SAMPLE TESTS ORGANIC VAPOR DESCRIPTION OF MATERIAL GEOLOGIC DEPTH or hNu bkgd SURFACE ELEVATION 1565 WL NO. FEET ORIGIN CR TYPE D (ppm) (ppm) TOPSOIL ND* SB LEAN CLAY, dark brown (CL) 1 1.0 TILL 2 SB ND LEAN CLAY, with a little gravel, brown mottled, laminations of sand at 6' and 11' (CL) 3 SB ND/ND ND/ND SB 4 5 SB ND/ND SB ND/ND 6 7 SB ND/ND SB ND/ND 8 SB ND/ND 9 20.0 SB ND/ND 10 LEAN CLAY, with a little gravel, dark brown mottled, a lens of waterbearing sand at 33' (CL) SB ND/ND 11 SB ND/ND 12

** See report for additional water level information.

* Not detected

BORING CONTINUED ON NEXT PAGE

START 11-12-91

R METHOD
L 3 1/4" HSA 0-65'

13

14

SB

SB

ND/ND

ND/ND

11-12-91

12:00

COMPLETE

R. Hanson

CAVE - IN WATER SAMPLED CASING BAILED DEPTHS DATE TIME DEPTH DEPTH LEVEL DEPTH 34.5 35' 35' 11-12 10:50 35'

11-12 10:50 35' 35' 35' 34.5' **

CREW CHIEF

WATER LEVEL MEASUREMENTS

twin city testing corporation

LOG OF TEST BORING

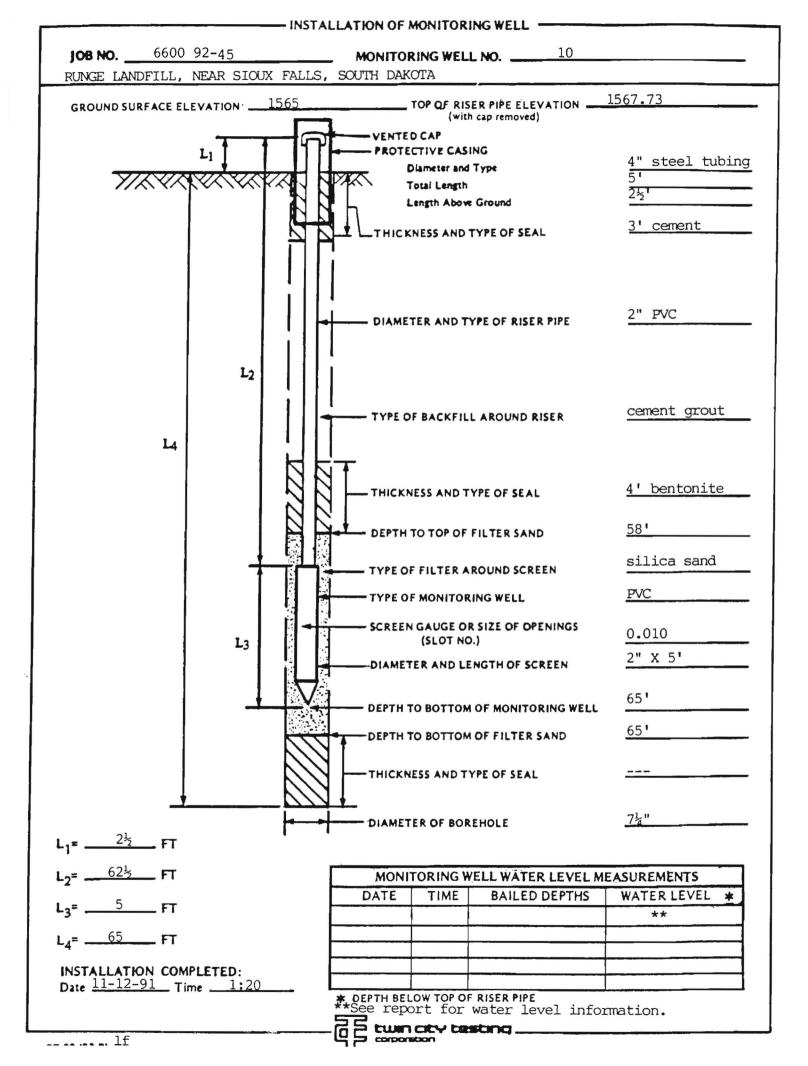
JOB NO. 6600 92-45 VERTICAL SCALE 1" = 4'

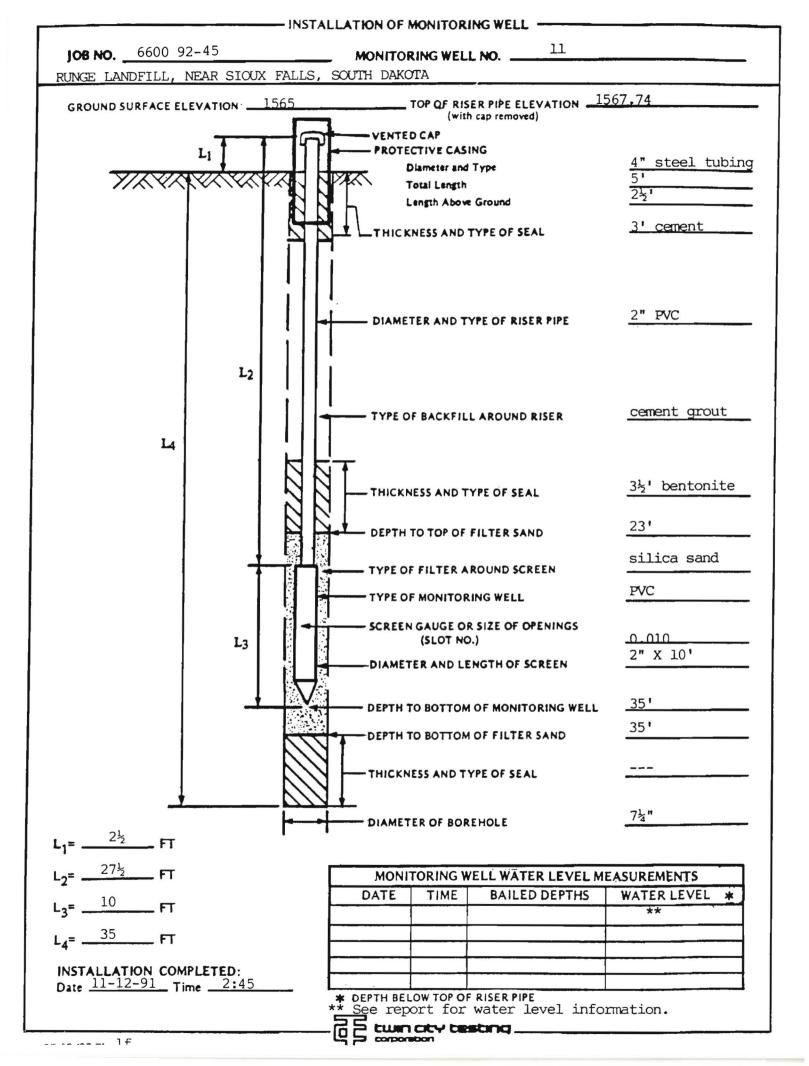
PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA

BORING NO.

10 CONTINUED

PTH	DESCRIPTION OF MATERIAL		GEOLOGIC	N		SAI	MPLE	1			IC VAPOR	
PTH N ET			ORIGIN	CR	WL	NO.	TYPE	W	D	hNu (ppm)	bkg (pp	
31	SAME AS PREVIOUS PAGE	7/	TILL									
-				-								
-				-		15	SB		N	D*/ND		
4				-]		
				_	Ā	16	CD			ND/ND		
						16	SB			עאועא		
7										[[
7						17	SB			ND/ND		
1												
7										ĺ		
-				-		18	SB			ND/ND		
-				-						}		
4				_								
1				-		19	SB		1	ND/ND		
				_]		
				_								
						20	SB		-	ND/ND		
7												
1						21	SB			ND/ND		
1						21			ĺ	LD/IVD		
+				-								
-				-		22	SB		,	ND/ND		
4				-								
_				-								
1				-		23	SB]	ND/ND		
						;	1					
				L]		
7						24	SB	1]	ND/ND		
- 1										[[
-				•		25			,	NID (NID)		
.5 -				-		25	SB			ND/ND		
LE	EAN CLAY, with a little gravel, gray (CL)			-						[]		
- *	Not detected			-		26	SB			ND/ND		
	OTE: Boring completed as MW-10.			}			~					
1,40	OID. Doing completed as 11111-10.			-								
				-		27	SB			ND/ND		
									ĺ			
.0												
-	END OF BORING	11		T		l ſ	7 I					





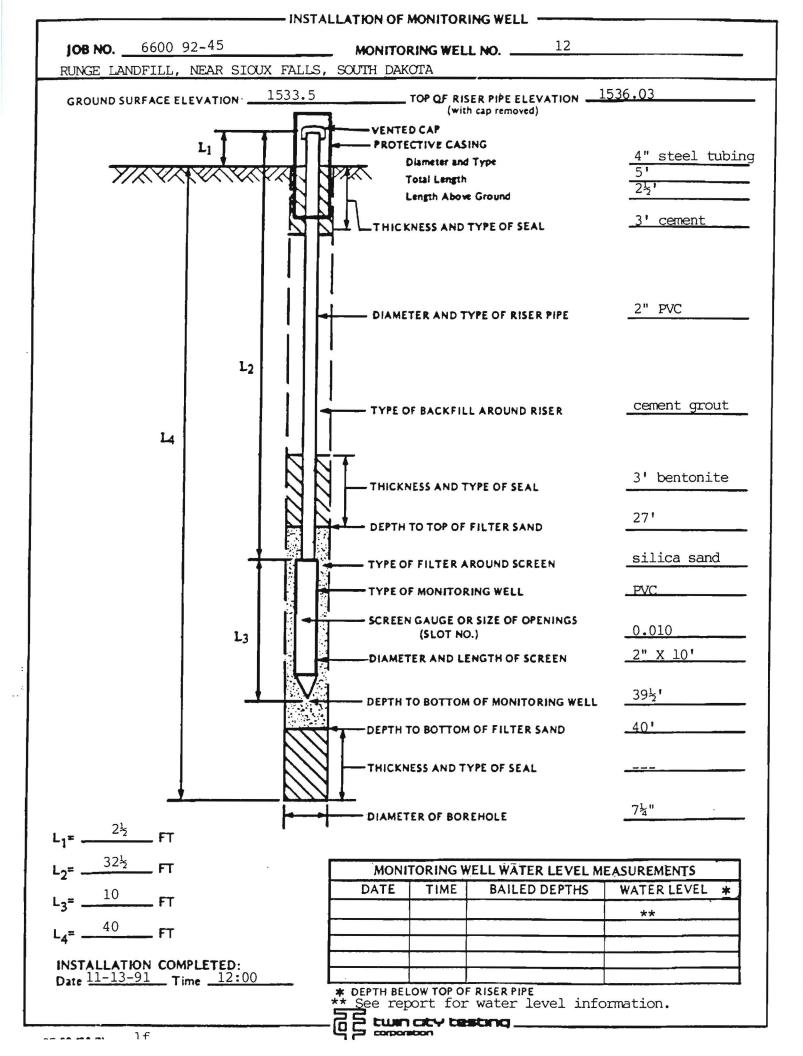
LOG OF TEST BORING 12 6600 92-45 JOB NO. BORING NO. VERTICAL SCALE PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA SAMPLE TESTS ORGANIC VAPOR DESCRIPTION OF MATERIAL GEOLOGIC DEPTH or CR hNu (ppm) bkgd SURFACE ELEVATION 1533.5 FEET ٧L NO. TYPE D ORIGIN (ppm) ND*/ND TOPSOIL SB 1 LEAN CLAY, dark brown (CL) 1.5 TILL LEAN CLAY, with a little gravel, brown mottled (CL) SB ND/ND 2 SB ND/ND 3 ND/ND SB 4 SB ND/ND 5 11.5 LEAN CLAY, with a little gravel, brown and gray mottled (CL) ND/ND 6 SB ND/ND 7 SB 8 SB ND/ND ND/ND 9 SB 10 ND/ND SB 23.5 ND/ND SB 11 LEAN CLAY, with a little gravel, gray, a lens of waterbearing sand at 34' (CL) SB ND/ND 12 * Not detected ** See report for additional water level 13 SB ND/ND information. ND/ND BORING CONTINUED ON NEXT PAGE 14 SB

11-13-91 11-13-91 COMPLETE START WATER LEVEL MEASUREMENTS 11:30 METHOD WATER CAVE-IN SAMPLED CASING DATE TIME BAILED DEPTHS LEVEL 3 1/4" HSA 0-40' DEPTH. DEPTH DEPTH 40' None 40' 40' 11-13 11:30 R. Hanson CREW CHIEF

twin city testing

LOG OF TEST BORING 12 CONTINUED 6600 92-45 BORING NO. JOB NO. 1'' = 4'VERTICAL SCALE RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA PROJECT SAMPLE TESTS ORGANIC DESCRIPTION OF MATERIAL DEPTH IN FEET GEOLOGIC or CR hNu (ppm) bkgd (ppm) ORIGIN WL TYPE D NO. TILL SAME AS PREVIOUS PAGE SB 15 ND*/ND 16 SB ND/ND 17 ND/ND SB 40.0 END OF BORING * Not detected NOTE: Boring completed as MW-12.

twin city testing



	INSTALLATION O	F MONITORING WE		
JOB NO. 6600 92-45	34.76 - 336.3	TORING WELL NO.	13	
RUNGE LANDFILL, NEAR SIC			1	535.94
GROUND SURFACE ELEVATION	533.5	TOP QF RISER PIPE (with cap ren	ELLIATION -	.333.94
. 1		TED CAP		
L ₁	,,,	Diameter and Type		4" steel tubing
7/2/4/4/4/		Total Length		2½'
1	BLB h	Length Above Ground		3' cement
	D D THI	ICKNESS AND TYPE O	FSEAL	
L ₂	DIA	METER AND TYPE OF	RISER PIPE	2" PVC
L ₄	TYP	E OF BACKFILL AROL	IND RISER	cement grout
	ТНІС	CKNESS AND TYPE OF	SEAL	1' bentonite
	DEP	TH TO TOP OF FILTER	SAND	5½'
· -	TYPI	E OF FILTER AROUND	SCREEN	silica sand
		E OF MONITORING WE		PVC
	3 3	EEN GAUGE OR SIZE (
1.3	3	(SLOT NO.)	or ENINGS	0.010
	DIAM	METER AND LENGTH	OF SCREEN	2" X 10'
	DEPT	TH TO BOTTOM OF MO	NITORING WELL	175'
	DEPT	TH TO BOTTOM OF FIL	TER SAND	17½'
	ТНІС	KNESS AND TYPE OF	SEAL	
		45750 OF DORFIGE		7¼"
L ₁ = 2½ FT	NAME OF TAXABLE PARTY.	METER OF BOREHOLE		
L ₂ = 10 FT	<u> </u>	WITODING WELL !	Tippe I person	ACUPEARTE
=	DATE	NITORING WELL W	ILED DEPTHS	WATER LEVEL *
L ₃ =FT				**
$L_4 = \frac{17\frac{1}{2}}{}$ FT				
INSTALLATION COMPLETED:				
Date 11-13-91 Time 1:40	* DEPTH	BELOW TOP OF RISER	PIPE	
	** See r	report for wate	r level infor	mation.
7.0		MU CITA DISECNO Compour		

OWNER: City of Sioux Falls **GEOLOGIC LOG** LEGGETTE, BRASHEARS & GRAHAM, INC. WELL NO.: MW-12R SIOUX FALLS, SOUTH DAKOTA PAGE 1 OF 1 PAGE(S) SITE LOCATION: Sioux Falls Sanitary Landfill SCREEN SIZE & TYPE: 2-inch PVC SLOT NO.: 10 SETTING: 50 to 45 fbg Sioux Falls, South Dakota SAND PACK SIZE & TYPE: Badger BB #2 DATE COMPLETED: 9-8-97 DRILLING COMPANY: American Technical Services, Inc. **SETTING:** 50 to 43 fbg CASING SIZE & TYPE: 2-inch PVC DRILLING METHOD: Hollow-Stem Auger **SETTING:** 45 fbg to +2.5 ft SEAL TYPE: Bentonite - Econoplug medium SAMPLING METHOD: CSTS OBSERVER: B. Peschong **SETTING:** 43 to 36 fbg REFERENCE POINT (RP): Grade BACKFILL TYPE: Neat Cement Grout **ELEVATION OF RP**: Approximately 1533.9 STATIC WATER LEVEL: NM STICK-UP: Approximately 2.5 ft DEVELOPMENT METHOD: SURFACE COMPLETION: Above Grade YIELD: DURATION:

REMARKS:

ABBREVIATIONS: SS = SPLIT SPOON

W = WASH

C = CUTTINGS

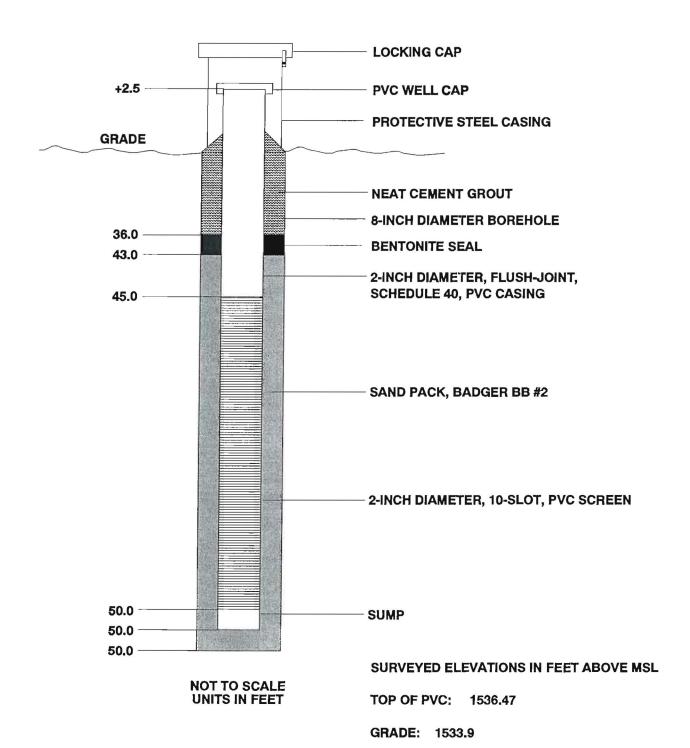
G = GRAB

ST = SHELBY TUBE

REC = REC	OVERY	PPM = P	ARTS PER MILLION	Į FA	G = FEET ABOVE	GRADE FBG = FEET BELOW GRADE
DEPTH	(FEET)	SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROW	10				(1111)	
0	5	CSTS		4		Clay with sand and pebbles, gray and brown mottled; lens of sand at 4.5 ft; fractures, 60° to vert.
5	10	CSTS		5		Clay, with sand and pebbles, brown and gray mottled; 6-inch lens of sand with abundant clay at 5.5 fbg.
10	13	CSTS		5		Clay, with a little sand, dark brown and gray mottled.
13	15	CSTS				Clay, with silt and sand, tan, moist.
15	17	CSTS		5		Clay, with a little sand, tan and gray mottled.
17	20	CSTS				Clay, with gravel, gray, streaks of redish-brown
20	25	CSTS	***	5		Clay, with sand, gray, streaks of redish-brown.
25	30	CSTS		5		Clay, with sand and gravel, gray.
30	35	CSTS		5		Clay, with sand, gray, 4-inch lens of sand at 33 ft, medium grained.
35	40	CSTS		5		Clay, with sand, gray; lamination of fine sand, with silt at 39 ft.
40	45	CSTS		5		Clay, with sand, gray; gravelly at 44 ft.
45	50	CSTS		5		Clay, with abundant sand and silt, gray; 3-inch lens of medium to coarse grained sand with clay at 49 ft.
						END OF BORING.

SIOUX FALLS REGIONAL SANITARY LANDFILL SIOUX FALLS, SOUTH DAKOTA

CONSTRUCTION DIAGRAM FOR MW-12R



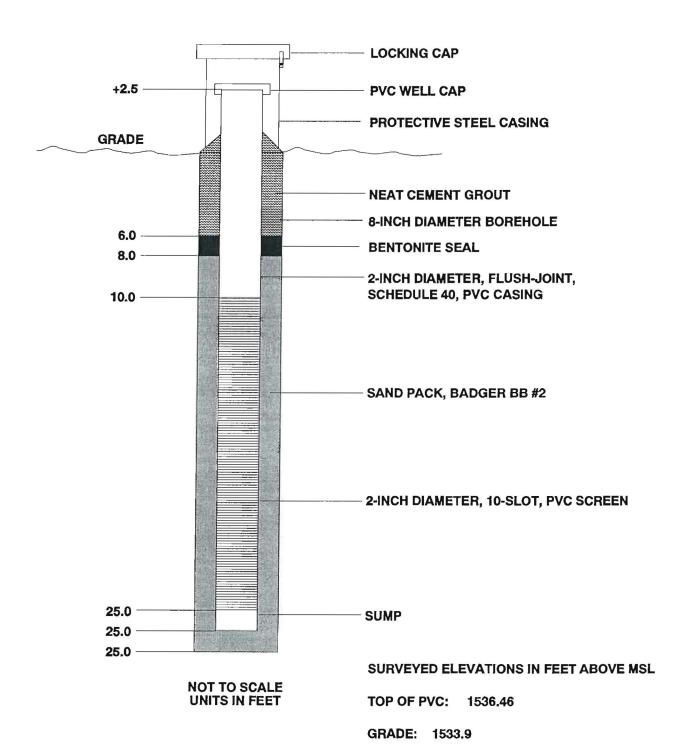
INSTALLATION DATE: SEPTEMBER 8, 1997

LEGGETTE, BRASHEARS & GRAHAM, INC.

OWNER: City of Sioux Falls **GEOLOGIC LOG** LEGGETTE, BRASHEARS & GRAHAM, INC. WELL NO.: MW-13R SIOUX FALLS, SOUTH DAKOTA PAGE 1 OF 1 PAGE(S) SITE LOCATION: Sioux Falls Sanitary Landfill SCREEN SIZE & TYPE: 2-inch PVC Sioux Falls, South Dakota **SETTING:** 25 to 10 fbg SLOT NO.: 10 DATE COMPLETED: 9-9-97 SAND PACK SIZE & TYPE: Badger BB #2 DRILLING COMPANY: American Technical Services, Inc. **SETTING:** 25 to 8 fbg CASING SIZE & TYPE: 2-inch PVC **SETTING:** 10 fbg to +2.5 ftDRILLING METHOD: Hollow-Stem Auger SAMPLING METHOD: ---SEAL TYPE: Bentonite OBSERVER: B. Peschong **SETTING:** 8 to 6 fbg REFERENCE POINT (RP): Grade BACKFILL TYPE: Neat Cement Grout **ELEVATION OF RP**: Approximately 1533.9 STATIC WATER LEVEL: NM STICK-UP: Approximately 2.5 ft DEVELOPMENT METHOD: SURFACE COMPLETION: Above Grade DURATION: YIELD: REMARKS: G = GRABABBREVIATIONS: SS = SPLIT SPOON ST = SHELBY TUBE W = WASHC = CUTTINGS REC = RECOVERY PPM = PARTS PER MILLION FAG = FEET ABOVE GRADE FBG = FEET BELOW GRADE DEPTH (FEET) SAMPLE **BLOW** REC. PID READING DESCRIPTION TYPE COUNT (FEET) **FROM** TO (PPM) Not Logged. See MW-12R.

SIOUX FALLS REGIONAL SANITARY LANDFILL SIOUX FALLS, SOUTH DAKOTA

CONSTRUCTION DIAGRAM FOR MW-13R



INSTALLATION DATE: SEPTEMBER 9, 1997 LEGGETTE, BRASHEARS & GRAHAM, INC.

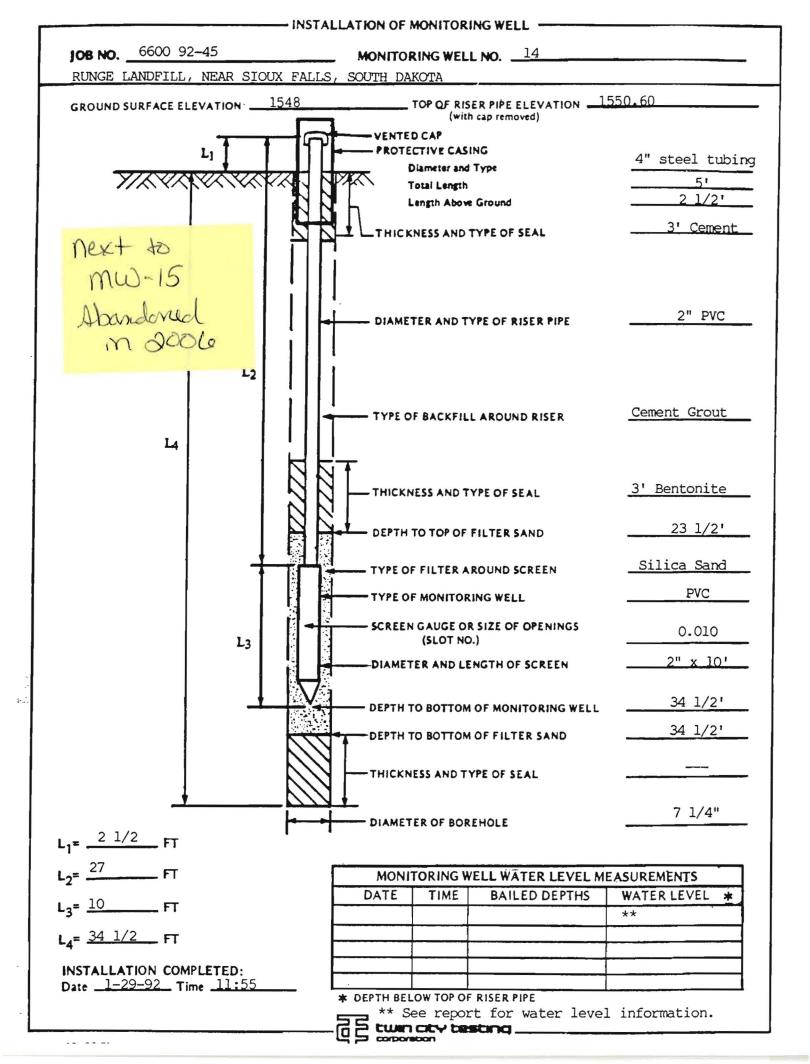
LOG OF TEST BORING 6600 92-45 1'' = 4'BORING NO. 14 JOB NO. VERTICAL SCALE PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA SAMPLE TESTS ORGANIC VAPOR DESCRIPTION OF MATERIAL **GEOLOGIC** DEPTH or CR hNu (ppm) bkgd (ppm) FEET SURFACE ELEVATION 1531 WL. TYPE ORIGIN NO. FILL FILL, mostly CLAYEY SAND, brown ND*/ND SB 1 6.5 FINE LEAN CLAY, brown (CL) ALLUVIUM ND/ND 2 SB 12.0 TILL LEAN CLAY, with a little gravel, brown mottled (CL) ND/ND 3 SB 19.0 FAT CLAY, with a little gravel, gray (CH) SB ND/ND 4 ND/ND SB 5 * Not detected ** See report for additional water level information. BORING CONTINUED ON NEXT PAGE 1-29-92 1-29-92 COMPLETE START WATER LEVEL MEASUREMENTS a 11:30 METHOD WATER CAVE - IN SAMPLED CASING BAILED DEPTHS TIME DATE 3 1/4" HSA 0-34 1/2' DEPTH LEVEL DEPTH DEPTH 34.5' 36.5 34.5' 1-29 11:33 36.5'

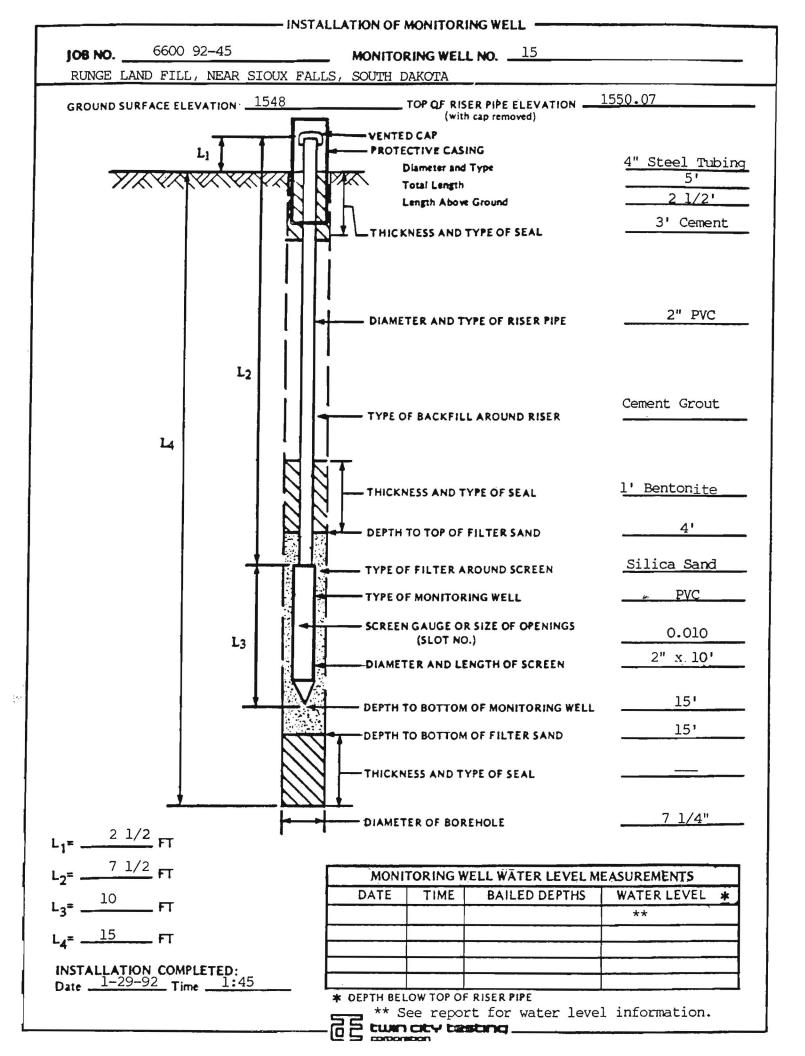
twin city testing

CREW CHIEF

R. Hanson

LOG OF TEST BORING JOB NO. 14 CONTINUED 6600 92-45 VERTICAL SCALE 1'' = 4'BORING NO. PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA ORGANIC VAPOR SAMPLE TESTS DESCRIPTION OF MATERIAL DEPTH IN FEET **GEOLOGIC** or CR hNu (ppm) bkgd (ppm) ORIGIN WL NO. TYPE 30 SAME AS PREVIOUS PAGE TILL 6 SB ND*/ND 7 SB ND/ND 36.5 **END OF BORING** NOTE: Boring completed as MW-14. * Not detected twin city testing



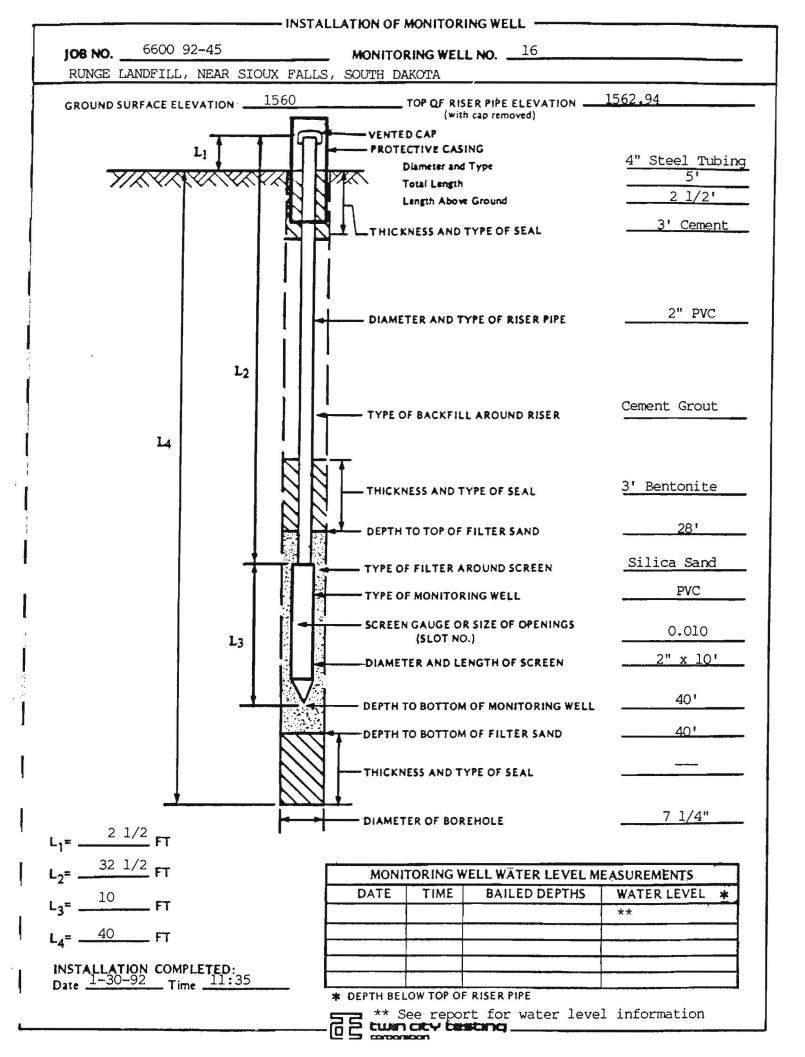


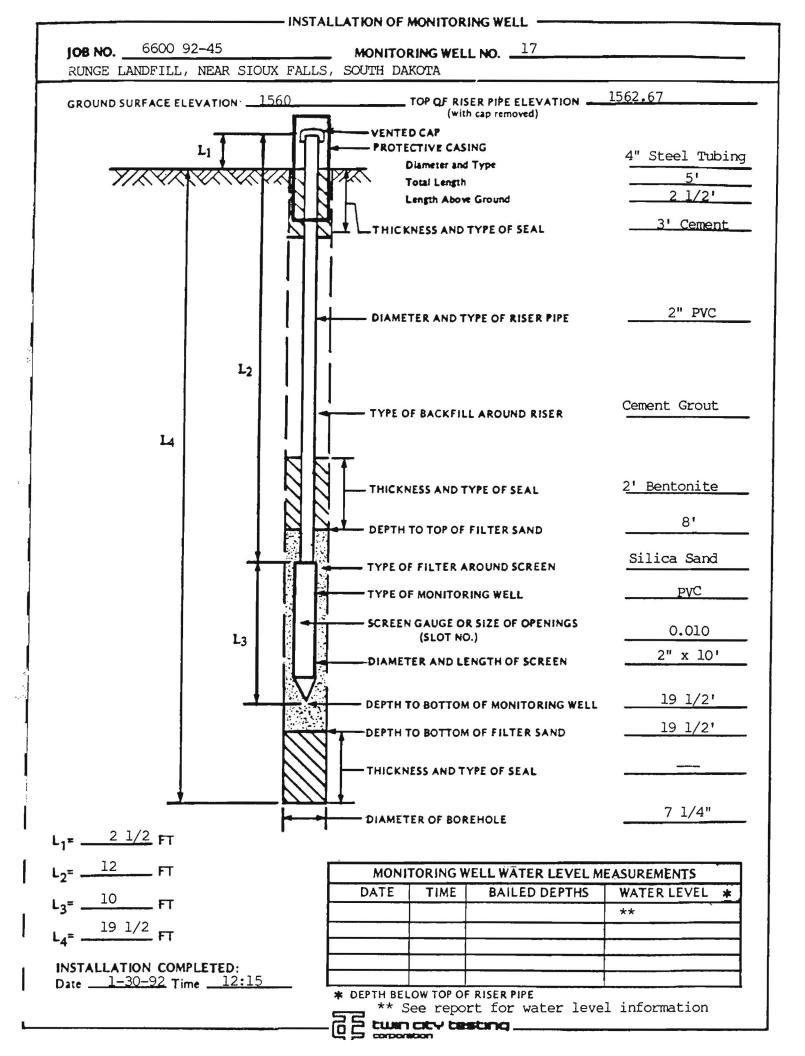
LOG OF TEST BORING 6600 92-45 16 BORING NO. JOB NO. VERTICAL SCALE 1'' = 4'RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA PROJECT SAMPLE TESTS ORGANIC VAPOR DESCRIPTION OF MATERIAL GEOLOGIC DEPTH IN FEET OF CR hNu (ppm) bkgd SURFACE ELEVATION 1560 WL NO. TYPE D ORIGIN (ppm) NO SAMPLES TAKEN 4.5 SB ND*/ND TILL 1 LEAN CLAY, with a little gravel, brown and gray mottled (CL) 9.0 LEAN CLAY, with a little gravel, brown ND/ND SB 2 mottled (CL) ND/ND 3 SB SB ND/ND 4 24.5 ND/ND 5 SB FAT CLAY, with a little gravel, gray (CH) * Not detected ** See report for additional water level information. BORING CONTINUED ON NEXT PAGE 1-30-92 1-30-92 COMPLETE WATER LEVEL MEASUREMENTS START 11:05 METHOD 3 1/4" HSA 0-40' WATER CAVE-IN SAMPLED CASING BAILED DEPTHS DATE TIME DEPTH LEVEL DEPTH DEPTH 42' None 11:06 42' 40' 1-30 CREW CHIEF R. Hanson

twin city testing

LOG OF TEST BORING 16 6600 92-45 BORING NO. CONTINUED JOB NO. VERTICAL SCALE $1^{H} = 4^{\circ}$ PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA SAMPLE TESTS ORGANIC VAPOR DESCRIPTION OF MATERIAL DEPTH IN FEET GEOLOGIC or CR hNu (ppm) bkgd (ppm) NO. ORIGIN WL TYPE -30-TILL SB ND*/ND SAME AS PREVIOUS PAGE 6 7 SB ND/ND 8 SB ND/ND 42.0 END OF BORING NOTE: Boring completed as MW-16. * Not detected

twin city testing

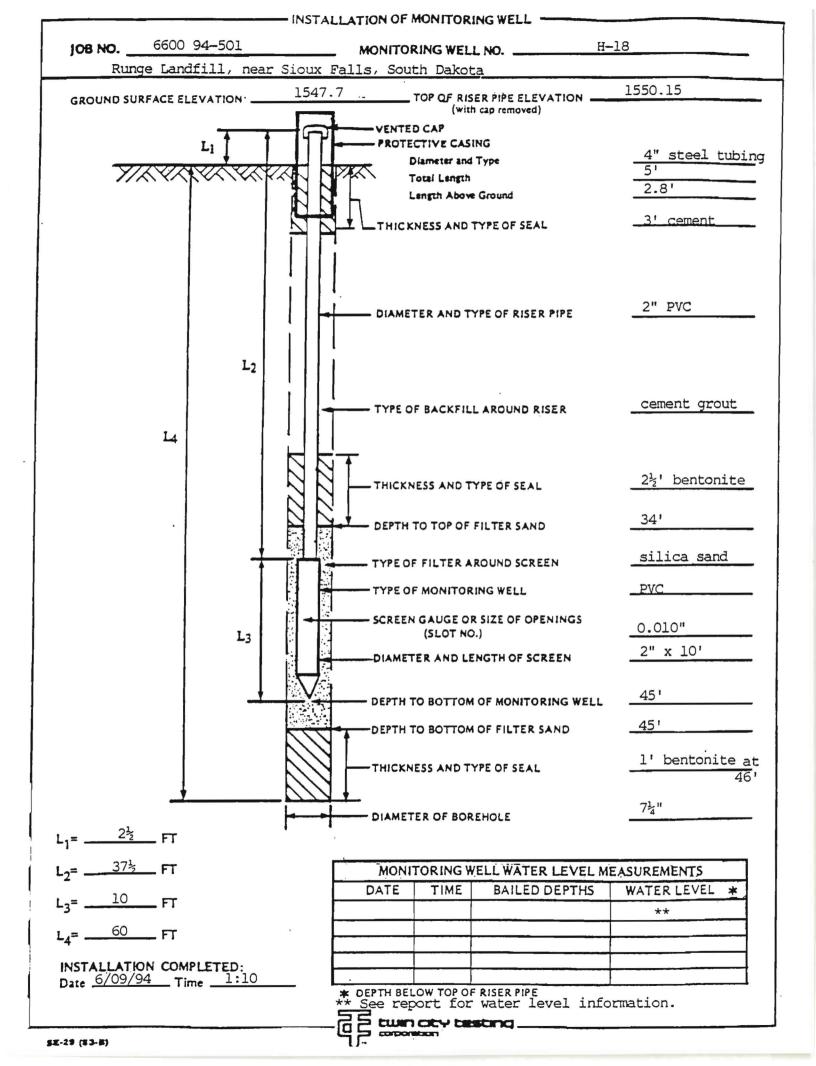




6600 94-501 BORING NO. H-18JOB NO. VERTICAL SCALE 1'' = 6'RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA PROJECT SAMPLE LABORATORY TESTS DESCRIPTION OF MATERIAL GEOLOGIC DEPTH or CR SURFACE ELEVATION 1547.7 TYPE LL PL FEET WL NO. ORIGIN TOPSOIL 1 SB SILTY CLAY, black (CL-OL) 2.0 SANDY LEAN CLAY, with a little gravel, TILL 2 SB brown mottled, a 1/2" lens of waterbearing sand at 11 1/2', a few cobbles at 5' (CL) 3 SB SB 4 5 SB 6 SB 15.0 1532.7 SB 7 SANDY LEAN CLAY, with a little gravel, gray, a lamination of fine grained sand at 30', a 1/2" lens of waterbearing sand at 47' SB 8 9 SB SB 10 11 SB 12 SB 13 SB 14 SB 15 SB SB 16 SB 17 *see report for additional water level SB 18 information BORING CONTINUED ON NEXT PAGE 6-9-94 COMPLETE START 6-8-94 WATER LEVEL MEASUREMENTS a 10:55 WATER METHOD SAMPLED CASING CAVE-IN BAILED DEPTHS TIME DATE 3 1/4" HSA 0 - 60' LEVEL DEPTH DEPTH DEPTH 39' 37' 39.5 6-9 9:05 39.5 2' NONE 60' 10:59 60' 6-9 R. HANSON CREW CHIEF Huntingdon

LOG OF TEST BORING

LOG OF TEST BORING JOB NO. 6600 94-501 1'' = 6'VERTICAL SCALE BORING NO. H-18CONTINUED PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA LABORATORY TESTS SAMPLE DESCRIPTION OF MATERIAL DEPTH IN FEET GEOLOGIC OF CR Qu or RQD ORIGIN WL NO. TYPE LL 45 SAME AS PREVIOUS PAGE TILL 19 SB 20 SB 21 SB 22 SB SB 23 SB 24 60.0 END OF BORING NOTE: Boring completed as well H-18 Huntingdon





LEGGETTE, BRASHEARS & GRAHAM, INC. 140 East Hinks Lane, Suite 126

Sioux Falls, SD 57104

(605) 334-6000 or Fax (605) 334-1850

GEOLOGIST LOG

WELL NO.: GP18-1s

Page 1 of 1

OWNER: LOCATION: City of Sioux Falls

Sioux Falls Sanitary Landfill

DATE COMPLETED: DRILLING CO.:

June 20, 2011 M.E.S.A.

SAMPLING METHOD:

Macrocore

GEOLOGIST: REFERENCE POINT (RP):

Melissa Fahy Grade

ELEVATION OF RP: SURFACE COMPLETION: 1548.10

TOC ELEVATION:

Above Grade

1548.30

		Direct Push		STATIC WATER LEVEL: 1546.90					
DEPTH IN FEET	WELL	CONSTRUCTION	GRAPHIC	LITHOLOGIC DESCRIPTION	FROM	TO	SAMPLE TYPE	REC (FEET)	DEPTH IN FEET
0-	See	Stick-up		SILT: with some clay, black, very soft, moist	0	2.5	МС	2.5	0-
-		Bentonite		@ 2.5 fbg, with clay, some fine sand, brown, soft, moist					-
					2.5 3.5	3.5 5	MC MC	1.5	
-5				OVETV CLEAVE in the self fire self-self-self-self-self-self-self-self-	5	10	МС	5	-5 -
-		l" ID Sch 40 PVC		SILTY-CLAY: with sand, fine grained, brown with gray mottling, soft, moist	orde.	727/465	500 50000		
				@ 5 fbg, dense, moist					
-10		Native Backfill			10	13	MC	3	-10 -
-									
				@ 13 fbg, dark brown, very dense	13	15	МС	1.5	
-15 —					15		MC	3.5	-15 -
-									-
-		- 1" ID Sch 40 PVC Slotted 0.010"		CLAY: with silt and sand, pebbles, dark brown to gray, very dense	18.5	20	MC	1	-
-20 -		Siotled 0.010		SILTY-CLAY: with sand, brownish-gray, soft, wet	20	23	MC	3	-20 -
	83 83								
-				CLAY: with silt and sand, pebbles, gray, very dense	23	25	MC	2	
-25									-25

NOTES: TOC = Top of Casing



LEGGETTE, BRASHEARS & GRAHAM, INC. 140 East Hinks Lane, Suite 126 Sioux Falls, SD 57104

(605) 334-6000 or Fax (605) 334-1850

GEOLOGIST LOG

WELL NO.: GP18-1d

Page 1 of 1

OWNER: LOCATION: City of Sioux Falls

Sioux Falls Sanitary Landfill

DATE COMPLETED: DRILLING CO.:

June 20, 2011

M.E.S.A.

GEOLOGIST: REFERENCE POINT (RP):

Grade

ELEVATION OF RP:

1548.20

Melissa Fahy

SURFACE COMPLETION:

Above Grade

	PRODUCTION AND AND AND AND AND AND AND AND AND AN	FOC ELEVATION: 1548.50 STATIC WATER LEVEL: 1509.11					
DEPTH IN FEET	WELL CONSTRUCTION WELL CONSTRUCTION	LITHOLOGIC DESCRIPTION	FROM	TO	SAMPLE TYPE	REC (FEET)	DEPTH IN FEET
0-	Stick-up	ILT: with some clay, black, very soft, moist	0	2.5	МС	2.5	0-
-	Bentonite@	2.5 fbg, with clay, some fine sand, brown, oft, moist	2.5 3.5	3.5	MC MC	1	-
-5 -	1" ID Sch 40 PVC	ILTY-CLAY: with sand, fine grained, rown with gray mottling, soft, moist	5	10	МС	5	-5 -
	 	5 fbg, dense, moist					-
-10 -			10	13	МС	3	-10
-	Native Backfill @	13 fbg, dark brown, very dense	13	15	мС	1.5	-1
-15 —	Native Backilli		15	18.5	МС	3.5	-15 -
-	CL	LAY: with silt and sand, pebbles, dark rown to gray, very dense	18.5	20	МС	1	_
-20 -	SII	ILTY-CLAY: with sand, brownish-gray, off, wet	20	23	MC	3	-20 -
-	CL	LAY: with silt and sand, pebbles, gray, very	23	25	MC	2	-
-25 -		25 fbg, dense	25	30	MC	5	-25
-							-
-30 -) 31 to 33 fbg, soft	30	35	МС	5	-30
-							-
-35) 36 to 37 fbg, soft	35	40	MC	5	-35 -
	1" ID Sch 40 PVC Slotted 0.010"	, 30 to 37 tog, soft					
-40 -			40	45	MC	4	-40 -
							1
-45							-45 🗆

NOTES: TOC = Top of Casing



LEGGETTE, BRASHEARS & GRAHAM, INC.

140 East Hinks Lane, Suite 126 Sioux Falls, SD 57104

(605) 334-6000 or Fax (605) 334-1850

GEOLOGIST LOG

WELL NO.: GP18-2

Page 1 of 1

OWNER: LOCATION: City of Sioux Falls

Sioux Falls Sanitary Landfill

June 21, 2011

DATE COMPLETED: DRILLING CO.:

M.E.S.A.

SAMPLING METHOD: DRILLING METHOD:

Macrocore Direct Push **GEOLOGIST:**

Melissa Fahy

REFERENCE POINT (RP):

Grade

ELEVATION OF RP:

1547.60

SURFACE COMPLETION:

Above Grade

TOC ELEVATION:

1548.00

STATIC WATER LEVEL:

1547.20

DICILLI	Sind METHOD.	nicot i usii		STATIC WATER LEVEL. 1347.20					
DEPTH IN FEET	WELL (CONSTRUCTION	GRAPHIC	LITHOLOGIC DESCRIPTION	FROM	TO	SAMPLE	REC (FEET)	DEPTH IN FEET
0-	3333	Stick-up		SILT: with some clay, black, soft, moist	0	1.5	МС	1.5	0-
		Bentonite		SILTY-CLAY: gray with brown mottling, soft, moist SAND: medium to coarse grained, brown,	1.5	2.5	MC MC	1	-
				wet, large rock in tip of sampler	4	8	MC	1	-
-5 -		1" ID Sch 40 PVC							-5 -
-10				SILTY-CLAY: with sand, pebbles, brown, soft, moist	8	12	МС	2	-10 -
-		Native Backfill		@ 12 fbg, dense, moist	12	14	MC	2	-
-				SAND: medium to coarse grained, with	14	15.5	мс	I	-
-15		1" ID Sch 40 PVC Slotted 0.010"		pebbles, brown, very dense	15.5	18	мс	2	-15 -
-			N. C. S. C. S.	CLAY: with silt and sand, pebbles, gray, very					J

dense

NOTES: TOC = Top of Casing



LEGGETTE, BRASHEARS & GRAHAM, INC.

140 East Hinks Lane, Suite 126 Sioux Falls, SD 57104

(605) 334-6000 or Fax (605) 334-1850

GEOLOGIST LOG

WELL NO.: GP18-3

Page 1 of 1

OWNER: LOCATION: City of Sioux Falls

Sioux Falls Sanitary Landfill

DATE COMPLETED: DRILLING CO.:

June 21, 2011 M.E.S.A.

SAMPLING METHOD: Macrocore

ELEVATION OF RP: SURFACE COMPLETION: TOC ELEVATION:

REFERENCE POINT (RP):

GEOLOGIST:

1548.70

Grade

1548.10

Above Grade

Melissa Fahy

		ect Push		STATIC WATER LEVEL: 1546.58					
DEPTH IN FEET	WELL CO	ONSTRUCTION	GRAPHIC	LITHOLOGIC DESCRIPTION	FROM	TO	SAMPLE	REC (FEET)	DEPTH IN FEET
7	1666	Stick-up							
0-		Bentonite		SILT: with some clay, black, soft, moist	0	3	MC	3	0-
-		Bentonite		SILTY-CLAY: with some sand, grayish-brown, soft, wet	3	4 8	MC MC	1 4	- 1
-5 -		1" ID Sch 40 PVC		@ 4 fbg, brown with gray mottling, dense, moist	4	0	MC	4	-5 -
					8	12	MC	3.5	-
-10 -		Native Backfill		@ 9 fbg, 2-inch sand lens				il i	-10 -
-				@ 11 fbg, 2-inch sand lens SAND: fine to medium grained, some clay, brown, soft, wet	12	15.5	МС	3.5	-
-15 —		1" ID Sch 40 PVC							-15 —
		Slotted 0.010"		CLAY: with silt and sand, pebbles, gray, very dense	15.5 16	16 20	MC MC	0.5	-
-20									-20

NOTES: TOC = Top of Casing



LEGGETTE, BRASHEARS & GRAHAM, INC. 140 East Hinks Lane, Suite 126 Sioux Falls, SD 57104

(605) 334-6000 or Fax (605) 334-1850

GEOLOGIST LOG

WELL NO.: MW-18R

Page 1 of 1

OWNER:City of Sioux FallsGEOLOGIST:Brad PeschongLOCATION:Sioux Falls Sanitary LandfillREFERENCE POINT (RP):Grade

 DATE COMPLETED:
 October 19, 2011
 ELEVATION OF RP:
 1548.96

 DRILLING CO.:
 American Technical Services
 SURFACE COMPLETION:
 Above Grade

SAMPLING METHOD: Macrocore SURFACE COMPLETION: Above G

TOC ELEVATION: 1551.18

DRILLING METHOD: Hollow Stem Auger STATIC WATER LEVEL: Approximately 2.5 fbg

DKILLI	NG METHOD: H	ollow Stem Auger		STATIC WATER LEVEL: Approximately	7 2.5 fbg				
DEPTH IN FEET	WELL CONSTRUCTION AAA OH OH OH OH OH OH OH OH O		GRAPHIC	LITHOLOGIC DESCRIPTION	FROM	TO	SAMPLE TYPE	REC (FEET)	DEPTH IN FEET
-	10000	Stick-up							
0-				SILT: with some clay, black, soft, moist	0	1.5	МС	1.5	0-
-		- Portland Cement		SILTY-CLAY: gray with brown mottling, soft, moist	1.5	2.5	MC	1	
-				SAND: medium to coarse grained, brown, wet, large rock in tip of sampler	2.5	4	MC	1.5	
-5-		- Econoplug Bentonite			4	8	МС	1	-5-
-		- 2" ID Sch 40 PVC							
-10 -		– Dakota Gold Silica Sand		SILTY-CLAY: with sand, pebbles, brown, soft, moist	8	12	МС	2	-10 -
- - -				@ 12 fbg, dense, moist	12	14	MC	2	
-15 —				SAND: medium to coarse grained, with pebbles, brown, very dense	14	15.5	МС	1	-15 -
-		- 2" ID Sch 40 PVC Slotted 0.010"		CLAY: with silt and sand, pebbles, gray, very dense	15.5	18	МС	2	

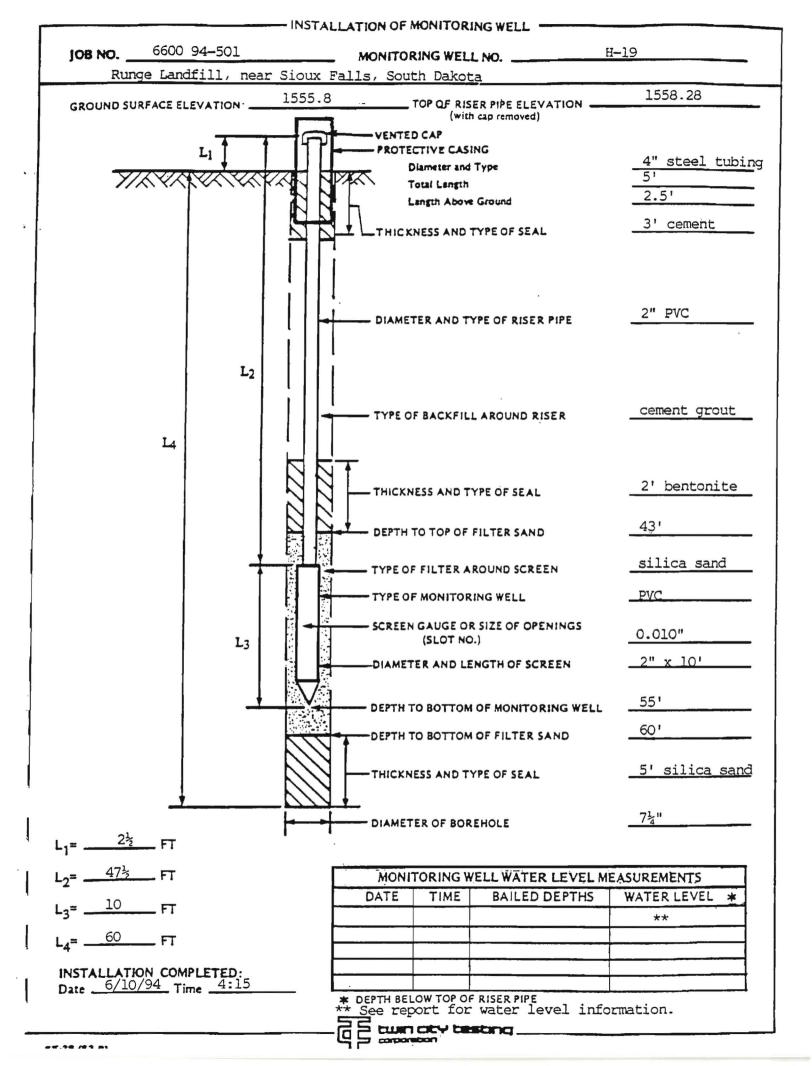
NOTES: TOC = Top of Casing

Lithologic information taken from GP18-2

6600 94-501 BORING NO. H-19 JOB NO. VERTICAL SCALE 1'' = 6'PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA SAMPLE LABORATORY TESTS DESCRIPTION OF MATERIAL GEOLOGIC DEPTH or CR SURFACE ELEVATION 1555.8 FEET WL NO. TYPE LL PL ORIGIN or RQD TOPSOIL SANDY SILTY CLAY, dark brown (CL-OL) 1 SB 1.5 TILL SANDY LEAN CLAY, with a little gravel, gray SB 2 mottled, lenses of waterbearing sand at 6' (CL) 3 SB 4 SB 9.0 MIXED SILTY SAND, medium grained, brown, 5 SB waterbearing, lenses of sandy clay at 9 1/2' ALLUVIUM to 10 1/2' (SM) 6 SB SB 7 16.5 15 71.3 SANDY LEAN CLAY, with a little gravel, gray TILL 8 SB (CL) 9 SB SB 10 SB 11 12 NSR 13 SB 14 SB * See report for additional water level information. BORING CONTINUED ON NEXT PAGE 6-10-94 COMPLETE START 6-10-94 WATER LEVEL MEASUREMENTS 3:00 CAVE-IN WATER CASING SAMPLED BAILED DEPTHS DATE TIME LEVEL 3 1/4" HSA 0 - 60' DEPTH DEPTH DEPTH R. HANSON CREW CHIEF Huntingdon

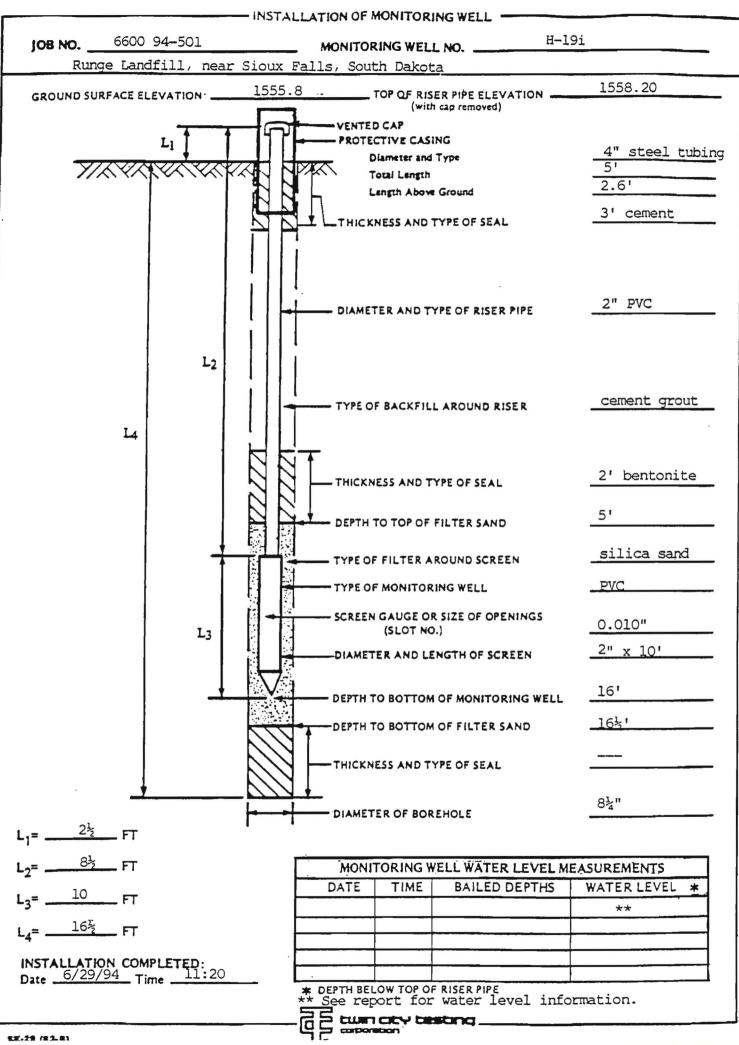
LOG OF TEST BORING

LOG OF TEST BORING $\frac{6600\ 94-501}{\text{RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA}}$ BORING NO. H-19__ CONTINUED JOB NO. PROJECT LABORATORY TESTS SAMPLE DESCRIPTION OF MATERIAL DEPTH IN FEET 45 GEOLOGIC ORIGIN WL NO. TYPE W LL PL TILL 15 SB SAME AS PREVIOUS PAGE 16 SB 17 SB 60.0 END OF BORING NOTE: Boring completed as well H-19. Huntingdon



BORING NO. H-19I 6600 94-501 JOB NO. 1'' = 6'VERTICAL SCALE PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA LABORATORY TESTS SAMPLE DESCRIPTION OF MATERIAL GEOLOGIC DEPTH IN FEET QU or RQD or SURFACE ELEVATION NO. TYPE W LL PL ORIGIN CR Boring not logged, refer to soil boring #H-19 16.5 END OF BORNG * See report for addition water level information. NOTE: Boring completed as well H-19I 6-29-94 6-29-94 COMPLETE START WATER LEVEL MEASUREMENTS a WATER SAMPLED CASING CAVE-IN BAILED DEPTHS TIME DATE LEVEL 4 1/4" HSA 0-16.5' DEPTH DEPTH DEPTH R. HANSON CREW CHIEF Huntingdon

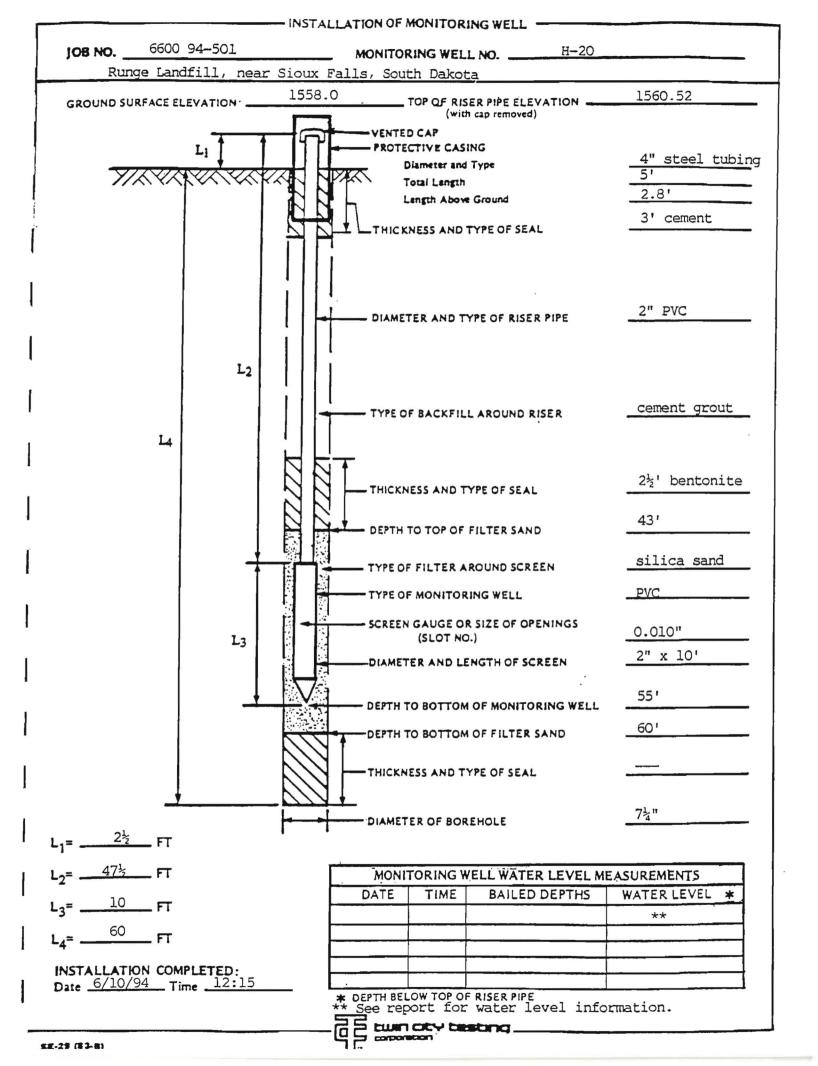
LOG OF TEST BORING



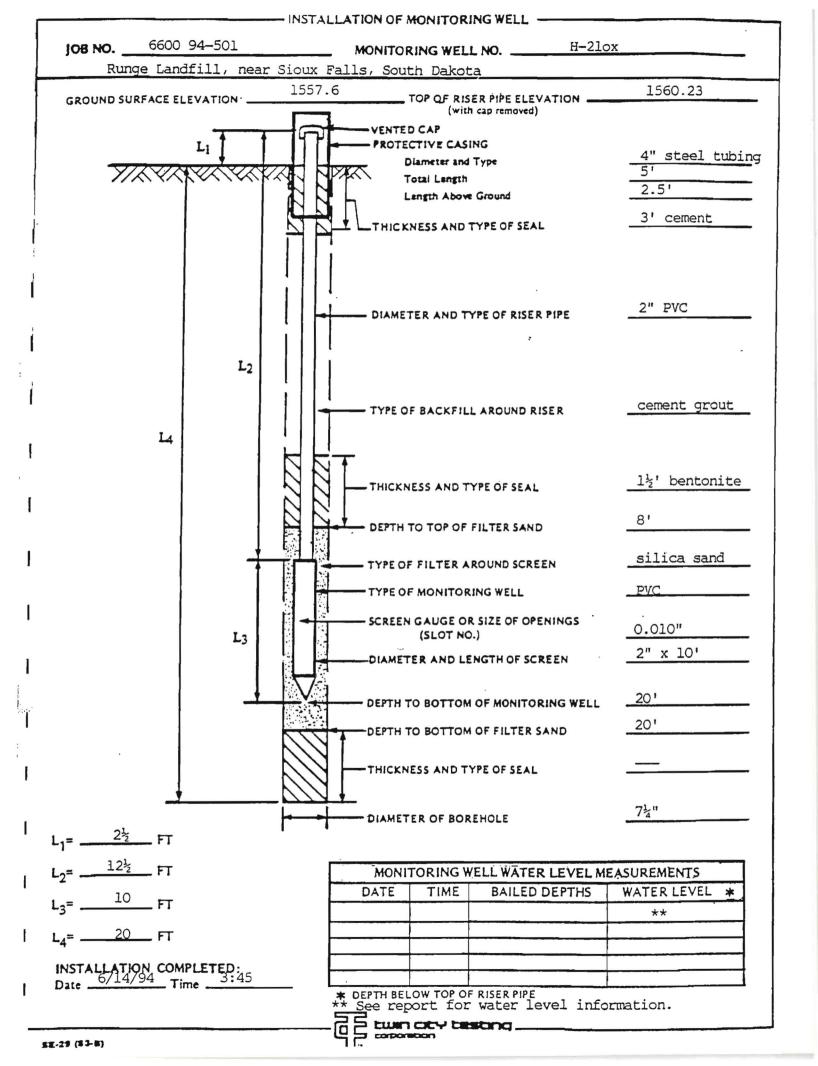
LOG OF TEST BORING H-20JOB NO. 6600 94-501 1" = 6'BORING NO. VERTICAL SCALE PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA LABORATORY TESTS SAMPLE DESCRIPTION OF MATERIAL DEPTH GEOLOGIC Qu or RQD SURFACE ELEVATION 1558.0 FEET ORIGIN NO. TYPE D LL PL SANDY SILTY CLAY, dark brown, some TOPSOIL 1 SB cobbles (CL-OL) 2.0 TILL SB SANDY LEAN CLAY, with a little gravel, brown mottled (CL) 3 SB 4 SB 5 SB6 SB 7 SB SB 8 20.0 9 SB SANDY LEAN CLAY, with a little gravel, dark gray mottled (CL) SB 10 SB 11 28.0 SANDY LEAN CLAY, with a little gravel, gray SB 12 30.0 SB 13 SANDY LEAN CLAY, with a little gravel, dark brown mottled, a 6" lens of waterbearing sand at 32 1/2' (CL) 14 SB 35.0 1523.0 15 SB SANDY LEAN CLAY, with a little gravel, gray (CL) SB 16 17 SB *See report for additional water level information SB 18 BORING CONTINUED ON NEXT PAGE 6-10-94 COMPLETE WATER LEVEL MEASUREMENTS START 6-9-94 11:04 WATER METHOD CASING CAVE-IN SAMPLED BAILED DEPTHS TIME DATE 3 1/4" HSA 0 - 60' LEVEL DEPTH DEPTH DEPTH 32.5' 40' 40' 40' 6-10 9:36 R. HANSON CREW CHIEF Huntingdon

LOG OF TEST BORING 6600 94-501 H-20 CONTINUED JOB NO. VERTICAL SCALE 1'' = 6'BORING NO. PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA LABORATORY TESTS SAMPLE DESCRIPTION OF MATERIAL DEPTH IN FEET GEOLOGIC or CR Qu or RQD ORIGIN WL NO. TYPE PL 45 SAME AS PREVIOUS PAGE TILL 19 SB 20 SB SB 21 22 SB 23 SB SB 24 60.0 END OF BORING * NOTE: Boring completed as well H-20.

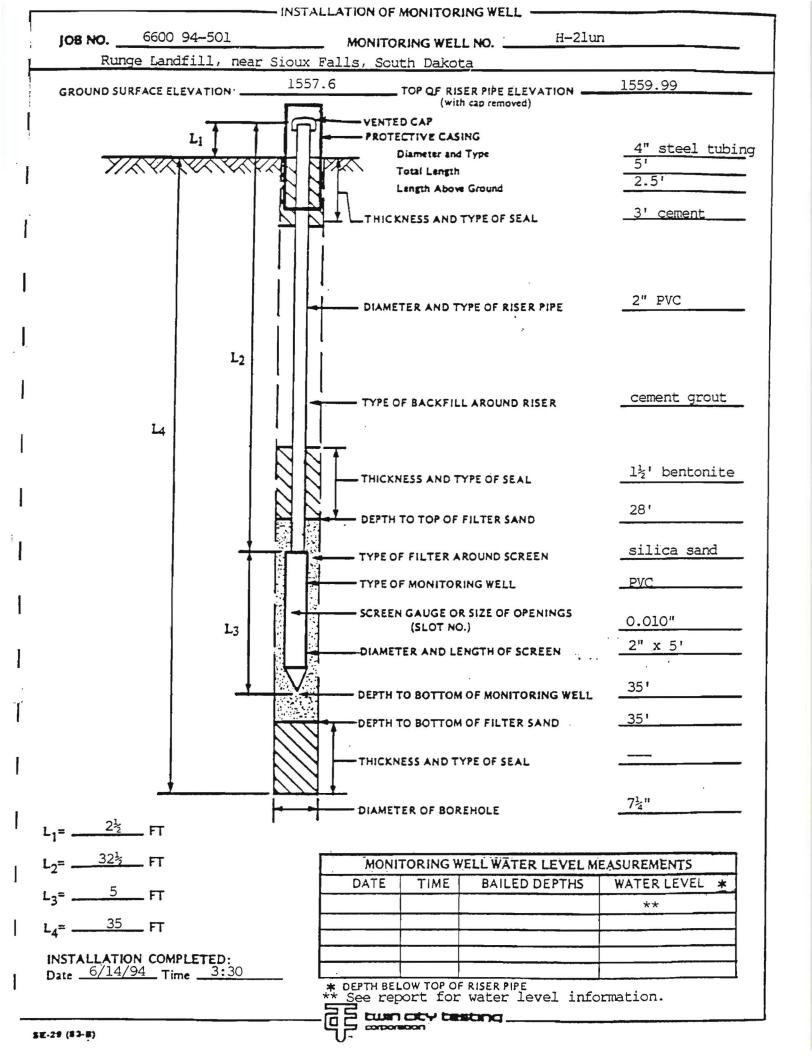
Huntingdon



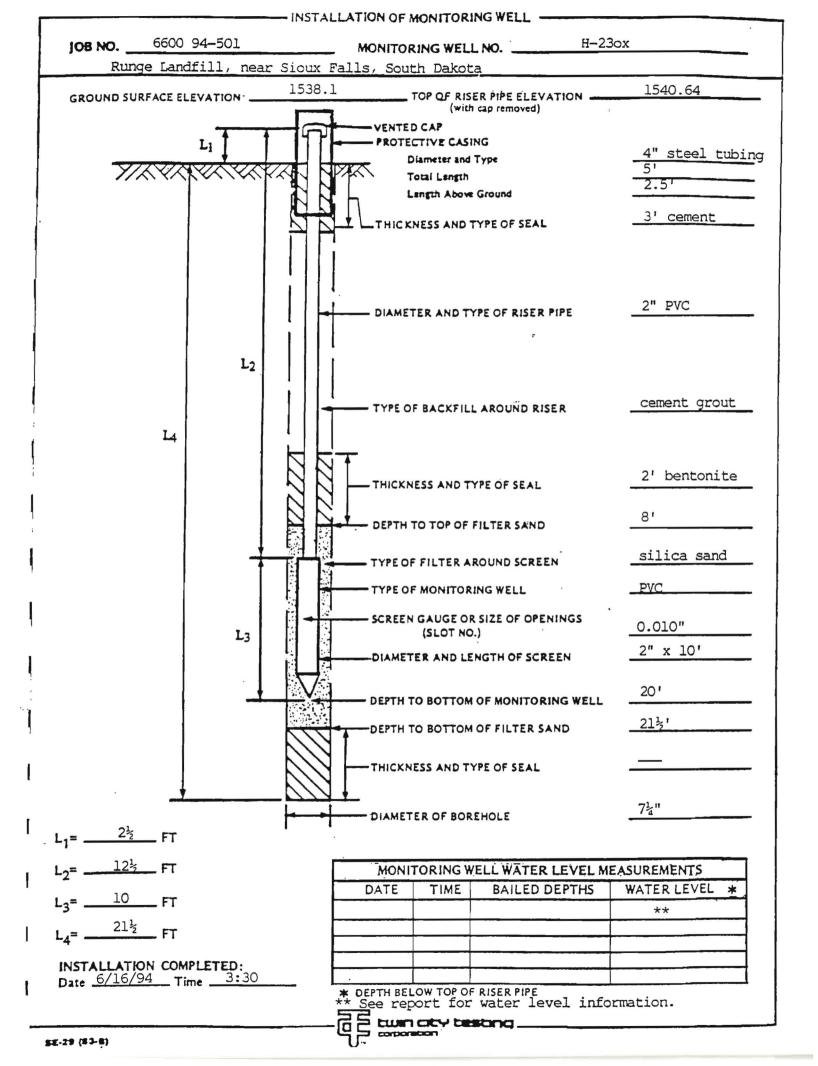
LOG OF TEST BORING 6600 94-501 BORING NO. H-21OX 1'' = 6'JOB NO. VERTICAL SCALE PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA LABORATORY TESTS SAMPLE DESCRIPTION OF MATERIAL GEOLOGIC DEPTH or CR Qu or RQD SURFACE ELEVATION 1557.6 FEET WL NO. TYPE LL ORIGIN Boring not logged, refer to soil boring #H-21un 20.0 END OF BORING * See report for additional water level information. NOTE: Boring completed as well H-21ox 6-14-94 COMPLETE 6-14-94 START WATER LEVEL MEASUREMENTS 1:00 METHOD CAVE-IN WATER SAMPLED CASING BAILED DEPTHS TIME DATE 3 1/4" HSA 0 - 20' LEVEL DEPTH DEPTH DEPTH P. OLLERICH CREW CHIEF Huntingdon



LOG OF TEST BORING JOB NO. 6600 94-501 VERTICAL SCALE 1'' = 6'BORING NO. H-21UN PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA SAMPLE DEPTH IN FEET DESCRIPTION OF MATERIAL LABORATORY TESTS GEOLOGIC or SURFACE ELEVATION 1557.6 ORIGIN CR WL NO. TYPE LL PL SANDY LEAN CLAY, with a little gravel, TILL SB brown, lenses of sand from 10' to 15' (CL) 2 SB 3 SB 4 SB 5 SB 25.0 1532.6 SANDY LEAN CLAY, with a little gravel, light 6 SB gray (CL) 7 SB 35.0 END OF BORING * See report for additional water level information NOTE: Boring completed as well H-21un. 6-14-94 WATER LEVEL MEASUREMENTS START 6-14-94 COMPLETE a 12:00 SAMPLED CASING CAVE-IN WATER METHOD DATE TIME BAILED DEPTHS DEPTH DEPTH DEPTH LEVEL 3 1/4" HSA 0 - 35' P. OLLERICH CREW CHIEF Huntingdon



LOG OF TEST BORING JOB NO. BORING NO. H-23OX 6600 94-501 VERTICAL SCALE PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA LABORATORY TESTS SAMPLE DESCRIPTION OF MATERIAL DEPTH IN FEET **GEOLOGIC** or CR QU or ROD SURFACE ELEVATION 1538.1 ORIGIN WL NO. TYPE LL PL Boring not logged, refer to soil boring #3 (6600 19 1 **3T** 41 21.5 END OF BORING * See report for permeability & proctor test results. NOTE: Boring completed as well H-23ox. ** See report for additional water level information. COMPLETE 6-16-94 6-16-94 START WATER LEVEL MEASUREMENTS WATER SAMPLED CASING CAVE-IN BAILED DEPTHS TIME DATE 3 1/4" HSA 0 - 21 1/2' LEVEL DEPTH DEPTH DEPTH P. OLLERICH CREW CHIEF

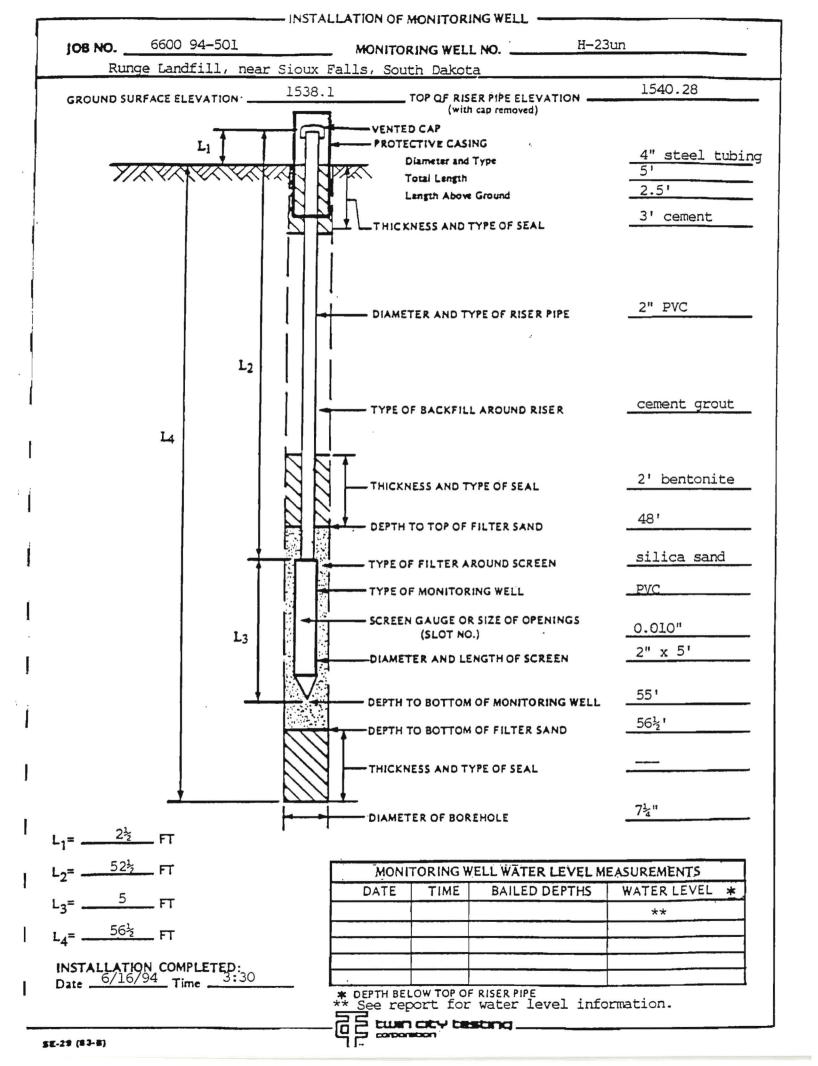


LOG OF TEST BORING 6600 94-501 JOB NO. BORING NO. H-23UN VERTICAL SCALE 1'' = 6'PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA SAMPLE LABORATORY TESTS DESCRIPTION OF MATERIAL GEOLOGIC DEPTH or CR SURFACE ELEVATION FEET 1538.1 WL NO. TYPE LL PL ORIGIN or RQD Boring not logged, refer to soil boring #3 (6600 TILL (508.1 30.0 1 SB SANDY LEAN CLAY, with a little gravel, gray, a lens of sand at 45' (CL) NSR 2 * See report for additional water level information BORING CONTINUED ON NEXT PAGE 6-15-94 COMPLETE 6-16-94 START WATER LEVEL MEASUREMENTS 10:30 METHOD CAVE-IN WATER SAMPLED CASING BAILED DEPTHS TIME DATE 3 1/4 HSA 0 - 56 1/2' LEVEL DEPTH DEPTH DEPTH 30' 55' 10:30 56.5' 6-16 P. OLLERICH CREW CHIEF

LOG OF TEST BORING

JOB NO. 6600 94-501 VERTICAL SCALE 1" = 6'
PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA BORING NO. $\underline{H-23UN}$ CONTINUED

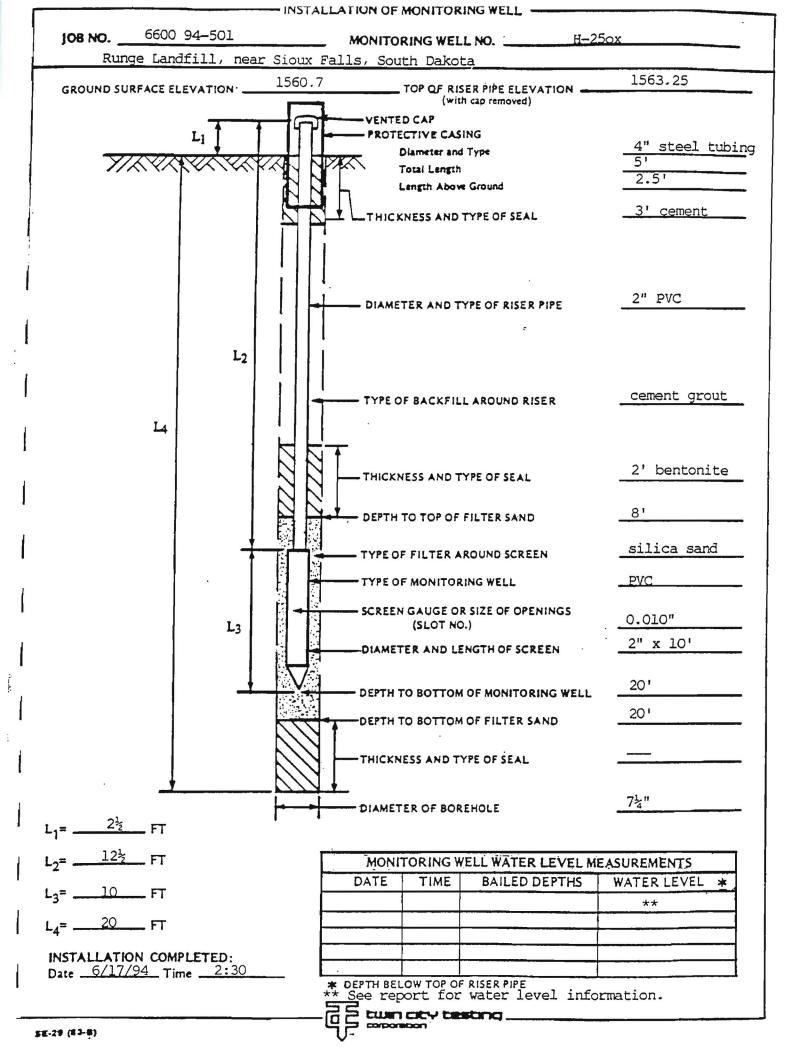
DEPTH	DESCRIPTION OF MATERIAL		GEOLOGIC	N		ŞA	MPLE		LABOR	ATORY	TEST	S
DEPTH IN FEET 45			ORIGIN	or CR	WL	NO.	TYPE	w	D	LL	PL	Qu or RQD
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4	* See report for permeability and proctor test		}	-			1 1		1		1	
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1	NOTE: Boring completed as well H-23un.	1	[1						
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LOG OF TEST BORING BORING NO. H-25OX6600 94-501 VERTICAL SCALE 1'' = 6'PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA TESTS SAMPLE ORGANIC VAPOR DESCRIPTION OF MATERIAL GEOLOGIC DEPTH IN FEET hNu (ppm) bkgd (ppm) SURFACE ELEVATION 1560.7 ORIGIN WL NO. TYPE SANDY LEAN CLAY, black (CL-OL) SB TOPSOIL 1 4.0 SANDY LEAN CLAY, with a little gravel, TILL SB 2 brown mottled (CL) 3 SB 1545.7 15.0 **3T** SANDY LEAN CLAY, with a little gravel, gray (CL) 5 SB* 20.0 END OF BORING * Sample obtained from 15' to 20' ** See report for additional water level information. NOTE: Boring completed as H-25ox. 6-17-94 6-17-94 COMPLETE START WATER LEVEL MEASUREMENTS а

DATE TIME SAMPLED CASING DEPTH DEPTH BAILED DEPTHS WATER LEVEL 3 1/4" HSA 0 - 20'

CREW CHIEF P. OLLERICH



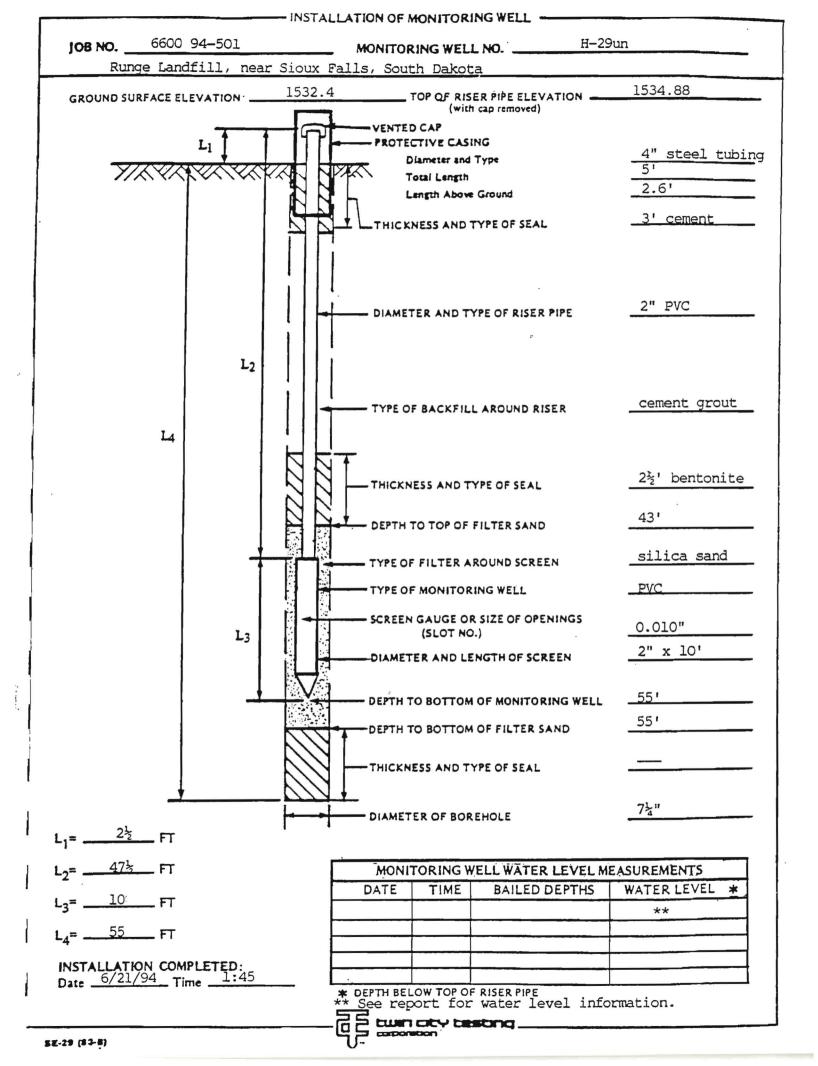
LOG OF TEST BORING BORING NO. H-29UN 6600 94-501 VERTICAL SCALE 1'' = 6'JOB NO. RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA PROJECT SAMPLE LABORATORY TESTS DESCRIPTION OF MATERIAL GEOLOGIC DEPTH or CR SURFACE ELEVATION FEET 1532.4 ORIGIN WL NO. TYPE LL PL OF LEAN CLAY, dark brown (CL-OL) TOPSOIL SB 1 1.0 TILL SANDY LEAN CLAY, with a little gravel, brown mottled, a 3" lens of wet sand at 17 1/2', a SB 1' layer of waterbearing sand at 20' (CL) 3 SB 4 SB 5 SB SB 6 SB 8 SB \subseteq 9 SB 21.0 SANDY LEAN CLAY, with a little gravel, dark brown mottled (CL) 10 SB SB 11 SB 12 SB 13 1498.9 33.5 SB SANDY LEAN CLAY, with a little gravel, gray 14 SB 15 16 SB 17 SB * See report for additional water level 18 SB information BORING CONTINUED ON NEXT PAGE 6-21-94 COMPLETE WATER LEVEL MEASUREMENTS START 6-21-94 a 11:55 METHOD SAMPLED CAVE-IN WATER CASING BAILED DEPTHS DATE TIME LEVEL 3 1/4" HSA 0 - 55' DEPTH DEPTH DEPTH 25' 20' 25' 25' 6-21 10:14 50' 55' 55' 55' 11:57 6-21 R. HANSON CREW CHIEF Huntingdon

LOG OF TEST BORING

JOB NO. 6600 94-501 VERTICAL SCALE 1" = 6' BORING NO. H-29UN CONTINUED

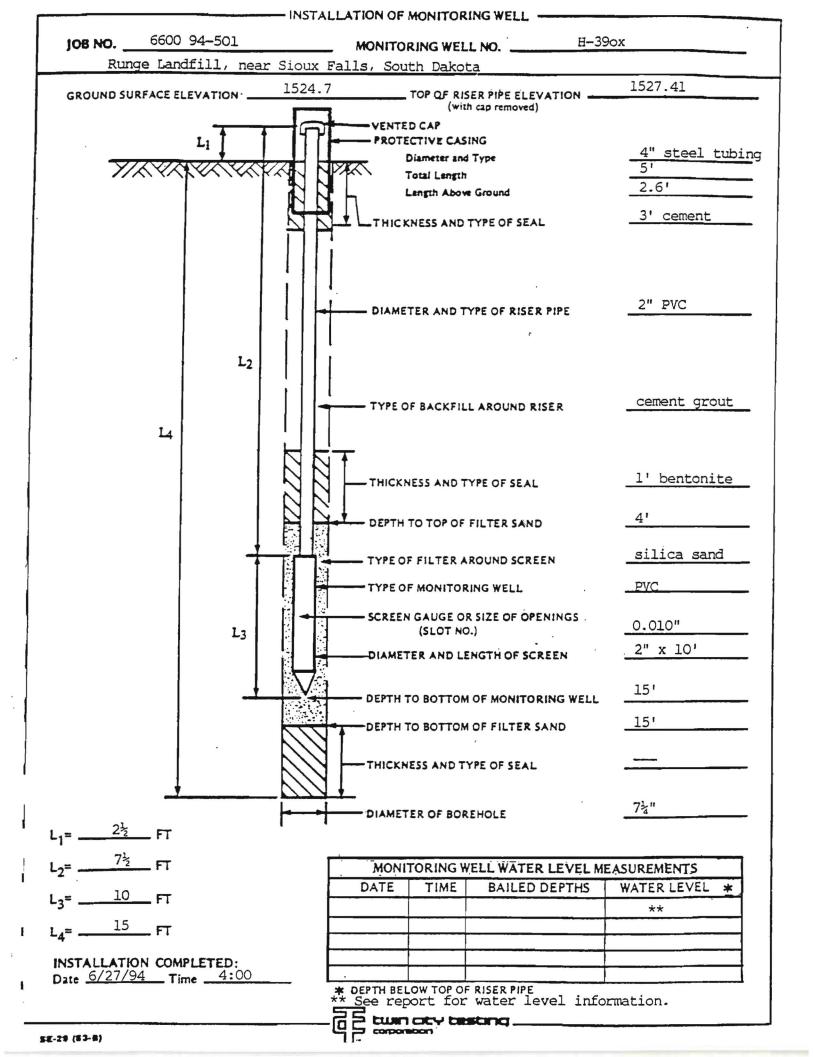
PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA

SAMPLE LABORATORY TESTS N or CR DESCRIPTION OF MATERIAL DEPTH IN FEET GEOLOGIC QU or RQD ORIGIN WL NO. TYPE 45 SAME AS PREVIOUS PAGE TILL 19 3T 20 SB* * Sample taken from 45' to 47 1/2' 21 SB 22 SB 23 SB 55.0 END OF BORING NOTE: Boring completed as well H-29un.

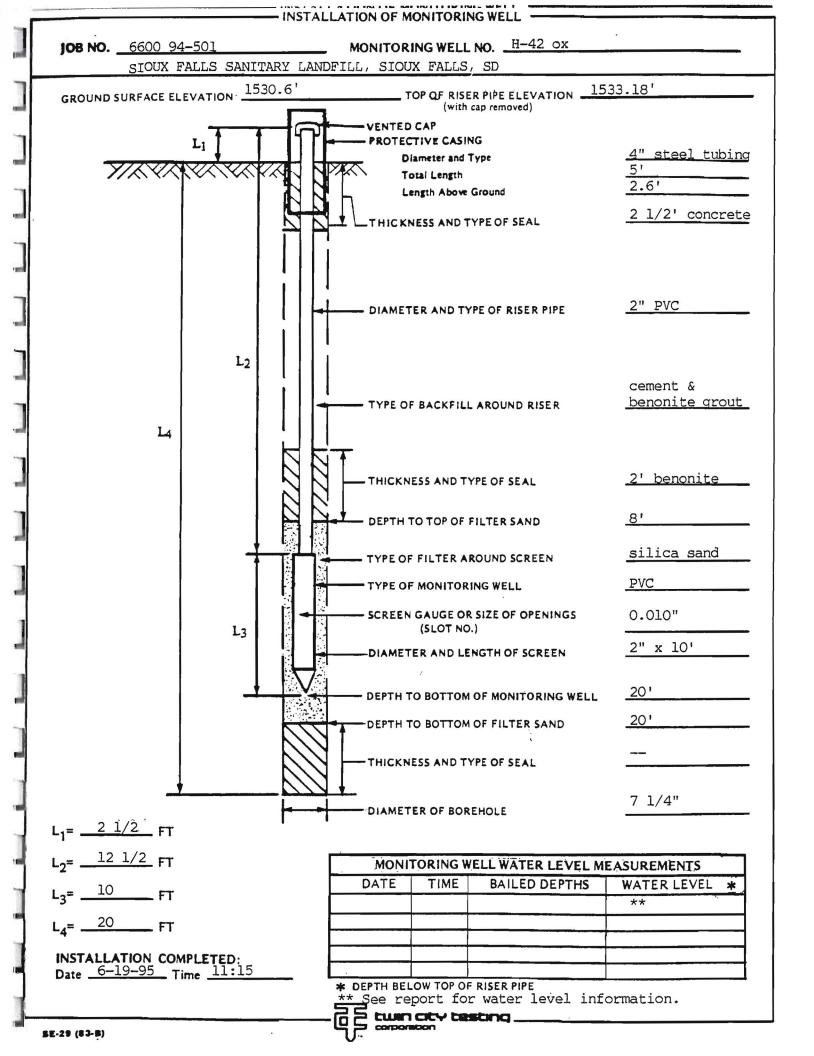


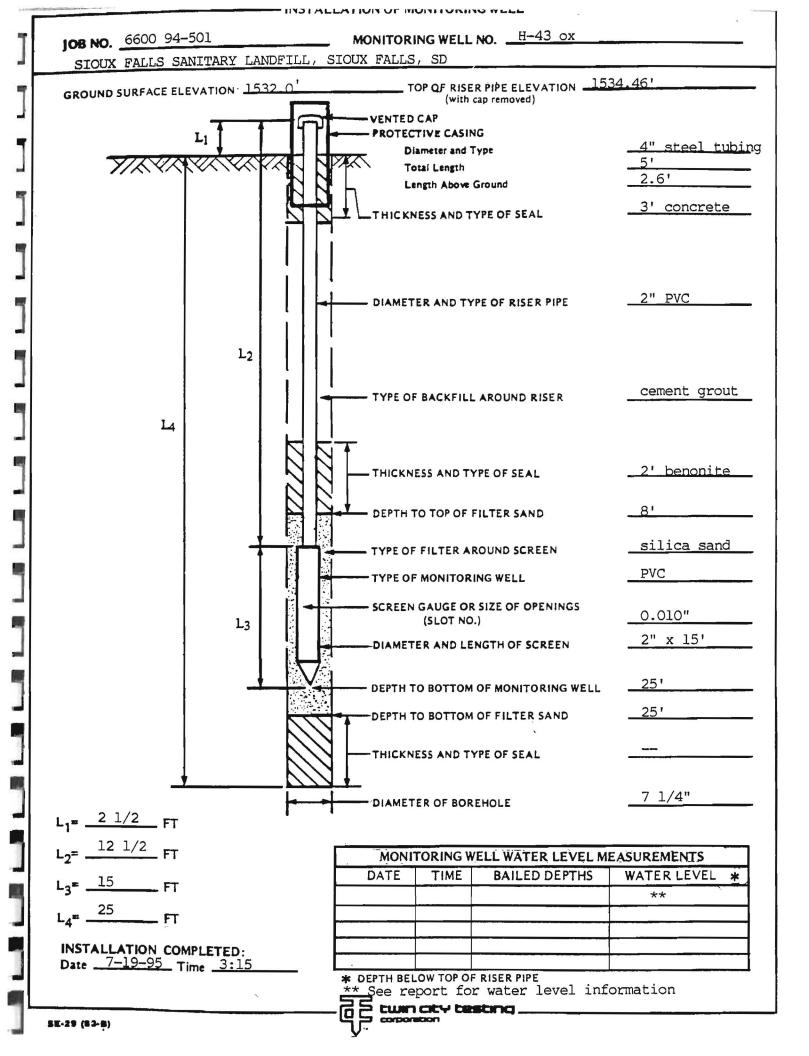
LOG OF TEST BORING JOB NO. 6600 94-501 VERTICAL SCALE 1" = 6BORING NO. H-39OX PROJECT RUNGE LANDFILL, NEAR SIOUX FALLS, SOUTH DAKOTA LABORATORY TESTS DESCRIPTION OF MATERIAL SAMPLE DEPTH GEOLOGIC Or CR FEET SURFACE ELEVATION 1524.7 Qu ORIGIN WL NO. TYPE W D LL PL or RQD SILTY CLAY, black (ML-OL) 1.0 TOPSOIL SB 1 SANDY LEAN CLAY, with a little gravel, TILL brown, a 1' layer of sand at 3' (CL) 2 SB 3 SB 4 SB 10.5 SANDY LEAN CLAY, with a little gravel, dark 5 SB brown mottled (CL) 6 SB 15.0 END OF BORING * See report for additional water level information NOTE: Boring completed as well H-39ox. WATER LEVEL MEASUREMENTS 6-27-94 COMPLETE 6-27-94 START 3:20 SAMPLED CASING CAVE-IN WATER METHOD DATE TIME BAILED DEPTHS DEPTH 3 1/4" HSA 0 - 15' DEPTH DEPTH LEVEL 6-27 3:00 10' 10' 4' 10' 6-27 3:22 15' 15' 15' 3.5' CREW CHIEF R. HANSON Huntingdon

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LOG OF TEST BORING BORING NO. H-42 OX 6600 94-501 JOB NO. 1'' = 6'VERTICAL SCALE PROJECT SIOUX FALLS SANITARY LANDFILL, SIOUX FALLS, SOUTH DAKOTA ORGANIC VAPOR SAMPLE TEGTO DESCRIPTION OF MATERIAL DEPTH IN FEET GEOLOGIC OF. (mdd) bkgd (ppm) SURFACE ELEVATION ______1530.62 WL NO. TYPE ORIGIN LEAN CLAY, dark brown (CL-OL) CS A TOPSOIL ī LEAN CLAY, with a little gravel, light gray TILL 2 CS mottled, a lamination of wet sand at 3' (CL) 5.0 CS LEAN CLAY, with a little gravel, brown 3 mottled (CL) CS 4 5 CS CS 6 7 CS NOTE: Boring completed as H-42 ox. * See report for additional water level 8 CS information. 20.0 END OF BORING WATER LEVEL MEASUREMENTS 6-19-95 COMPLETE 6-19-95 START a 10:40 SAMPLED DEPTH CAVE- IN DEPTH CASING WATER METHOD DATE TIME BAILED DEPTHS DEPTH LEVEL. 3 1/4" HSA 0-20' 6-19 10:42 20' 20' 20' 17' CREW CHIEF K. Hanson





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DEPTH IN FEET	SUF سے	RFACE ELEVA		1532.0		I	GEOLOGIC ORIGIN	0	r	WL	NO.	TYPE	w	t	ካዞሀ (ppm)	bkgd (ppm)
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7-19	1:45 10' 10' 10'						9,						`			
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								ÇR	EW (HIE	F	•	R.	Hans	son	
	Huntingdon CREW CHIEF R. Hanson															

OWNER: City of Sioux Falls **GEOLOGIC LOG** LEGGETTE, BRASHEARS & GRAHAM, INC. WELL NO.: MW-440x SIOUX FALLS, SOUTH DAKOTA PAGE 1 OF 1 PAGE(S) SITE LOCATION: Sioux Falls Sanitary Landfill SCREEN SIZE & TYPE: 2-inch PVC Sioux Falls, South Dakota SLOT NO.: 10 SETTING: 20.0 to 5.0 fbg DATE COMPLETED: 10-6-99 SAND PACK SIZE & TYPE: Badger BB #2 DRILLING COMPANY: American Technical Services, Inc. **SETTING: 20.0 to 4.0 fbg** CASING SIZE & TYPE: 2-inch PVC DRILLING METHOD: Hollow-Stem Auger SETTING: 5.0 fbg to 3.0 ft SEAL TYPE: Bentonite SAMPLING METHOD: CSTS OBSERVER: B. Peschong SETTING: 5.0 to 4.0 fbg REFERENCE POINT (RP): Grade BACKFILL TYPE: Concrete ELEVATION OF RP: NM STATIC WATER LEVEL: 6.5 fbg STICK-UP: 2.5 feet DEVELOPMENT METHOD: SURFACE COMPLETION: Above Grade DURATION: YIELD: REMARKS: South of MW43ox. ABBREVIATIONS: SS = SPLIT SPOON W = WASHC = CUTTINGS G = GRABST = SHELBY TUBE REC = RECOVERY PPM = PARTS PER MILLION FAG = FEET ABOVE GRADE FBG = FEET BELOW GRADE DEPTH (FEET) SAMPLE **BLOW** REC. PID (FEET) READING TYPE COUNT DESCRIPTION **FROM** TO (PPM) 0 CLAY, with sand, black (Topsoil). 2 **CSTS** 2 5 CSTS CLAY, with sand, tan/reddish brown mottled, 5 pebbles, 1/2" lens of sand, very coarse grained at 4.5 fbg. 5 10 CSTS CLAY, with sand, tan/reddish brown mottled, 5 15 CLAY, 2" lens of sand at 12 fbg, medium grained, 10 CSTS 5 brown, wet 15 20 **CSTS** 5 CLAY, with sand and pebbles, brown. END OF BORING

OWNER: City of Sioux Falls **GEOLOGIC LOG** LEGGETTE, BRASHEARS & GRAHAM, INC. WELL NO.: MW-450x SIOUX FALLS, SOUTH DAKOTA PAGE 1 OF 1 PAGE(S) SITE LOCATION: Sioux Falls Sanitary Landfill SCREEN SIZE & TYPE: 2-inch PVC Sioux Falls, South Dakota SLOT NO.: 10 **SETTING: 25.0 to 5.0 fbg** DATE COMPLETED: 10-6-99 SAND PACK SIZE & TYPE: Badger BB #2 DRILLING COMPANY: American Technical Services, Inc. **SETTING: 25.0 to 4.0 fbg** CASING SIZE & TYPE: 2-inch PVC DRILLING METHOD: Hollow-Stem Auger SETTING: 5.0 fbg to 2.8 ft SAMPLING METHOD: CSTS SEAL TYPE: Bentonite OBSERVER: B. Peschong SETTING: 4.0 to 2.0 fbg REFERENCE POINT (RP): Grade BACKFILL TYPE: Concrete ELEVATION OF RP: NM STATIC WATER LEVEL: 8 fbg STICK-UP: 2.5 feet DEVELOPMENT METHOD: SURFACE COMPLETION: Above Grade DURATION: YIELD: REMARKS: Midway between MW12R and MW-43ox ABBREVIATIONS: SS = SPLIT SPOON W = WASHC = CUTTINGS G = GRABST = SHELBY TUBE BEC = BECOVEDVDDM = DARTS DER MILLION EAC = EEET ABOVE CRADEERG = EEET RELOW GRADE

REC = REC	OVERY	PPM = I	PARTS PER MILLIO	ON FA	<u>.G = FEET ABOVI</u>	E GRADE FBG = FEET BELOW GRADE
DEPTH FROM	(FEET) TO	SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
0	5	CSTS	_	5		CLAY, with sand and gravel, brown/gray mottled
5	10	CSTS	-	5	-4	CLAY, with sand and gravel, brown/gray mottled, 6" lens of sand at 8 fbg, medium grained, brown.
10	15	CSTS	-	5		CLAY, with sand and gravel, brown/gray mottled, 1/8" lens of sand at 14.5 fbg, wet.
15	18	CSTS	_	5	-	CLAY, with sand and gravel, brown/gray mottled, vertical fracture, sand, medium to very coarse grained, manganese crystals.
18	19	CSTS	_	5		SILT, tan, moist.
19	20	CSTS		5		CLAY, with sand and gravel, tan/gray mottled.
20	25	CSTS	_	5		CLAY, with sand and gravel, tan/gray mottled.
						END OF BORING

OWNER: City of Sioux Falls **GEOLOGIC LOG** LEGGETTE, BRASHEARS & GRAHAM, INC. WELL NO.: MW-460x SIOUX FALLS, SOUTH DAKOTA PAGE 1 OF 1 PAGE(S) SITE LOCATION: Sioux Falls Sanitary Landfill SCREEN SIZE & TYPE: 2-inch PVC Sioux Falls, South Dakota SLOT NO.: 10 SETTING: 30 to 10 fbg DATE COMPLETED: 7-12-01 SAND PACK SIZE & TYPE: Badger BB #2 DRILLING COMPANY: American Technical Services, Inc. SETTING: 30 to 8 fbg CASING SIZE & TYPE: 2-inch PVC DRILLING METHOD: Hollow-Stem Auger **SETTING:** 10 fbg to grade SAMPLING METHOD: CSTS SEAL TYPE: Bentonite OBSERVER: Tim Kenyon SETTING: 8 to 6 fbg REFERENCE POINT (RP): BACKFILL TYPE: Grout **ELEVATION OF RP:** STATIC WATER LEVEL: STICK-UP: DEVELOPMENT METHOD: SURFACE COMPLETION: Above Grade DURATION: YIELD: REMARKS: ABBREVIATIONS: SS = SPLIT SPOON C = CUTTINGS G = GRABST = SHELBY TUBE W = WASHREC = RECOVERY PPM = PARTS PER MILLION FAG = FEET ABOVE GRADE FBG = FEET BELOW GRADE DEPTH (FEET) SAMPLE **BLOW** REC. PID READING TYPE COUNT (FEET) DESCRIPTION **FROM** TO (PPM) 0 0.5 **CSTS** SILTY CLAY, with some sand (Topsoil). 5 0.5 5 **CSTS** CLAY, with silt, sand and gravel, brown, dry. 5 10 **CSTS** CLAY, with silt, sand and gravel, brown with 5 some gray mottling and becoming moist. 10 15 **CSTS** CLAY, with silt, sand and gravel, brown with 5 increasing gray content. 15 20 **CSTS** 5 CLAY, with silt, sand and gravel, brown with increasing gray content. 20 25 **CSTS** CLAY, with silt, sand and gravel, brown with increasing gray content. 25 30 CSTS CLAY, with silt, sand and gravel, brown with increasing gray content; 1" sand lenses at 29 and 29.5 fbg, moist. END OF BORING

	GEO)LOG	IC LOG	OWNER: City of Sioux Falls
LEG	GETTE,	BRASHEAR	S & GRAHAM, INC.	well no.:MW-47ox
	siou	X FALLS, SOU	TTII DAKOTA	PAGE 1 OF 1 PAGE(S)
SITE LOC	ATION: Sid	oux Falls Lanc	lfill	SCREEN SIZE & TYPE: 2" PVC
		_		SLOT NO.: 10 SETTING: 20 fbg to 10 fbg
DATE CO	MPLETED:	December 1	5, 2002	SAND PACK SIZE & TYPE: Silica Sand 8/12
DRILLING	COMPAN	y: Maxim Te	echnologies	SETTING: 20 fbg to 8 fbg
				CASING SIZE & TYPE: 2" PVC
DRILLING	метнор	: Hollow Sten	n Auger	SETTING: 10 fbg to grade
SAMPLING	G METHOD	: CSTS		SEAL TYPE: Enviro-plug
OBSERVE	R: Tim K	enyon		SETTING: 8 fbg to 5 fbg
REFEREN	CE POINT ((RP): Grade		BACKFILL TYPE: grout
ELEVATIO	ON OF RP:			STATIC WATER LEVEL: N/A
STICK-UP	2 feet			DEVELOPMENT METHOD:
SURFACE COMPLETION:				DURATION: YIELD:
REMARKS	i:			
ABBREVIA	TIONS: SS	= SPLIT SPOO	W = WASH	C = CUTTINGS $G = GRAB$ $ST = SHELBY TUBE$
REC = REC	OVERY	PPM = 1	PARTS PER MILLION	FAG = FEET ABOVE GRADE FBG = FEET BELOW GRADE
DEPTH	(FEET)	REC.		DESCRIPTION
FROM	то	(FEET)		
0	2.5		CLAY, with silt, black, org	ganic (Topsoil).
2.5	5	2.5	CLAY, with silt, sand and p	pebbles, tan to brown, moist (oxidized till).
5	10	5	CLAY, with silt, sand and p	pebbles, tan to brown, sand laminations at 6.5 fbg and 9 fbg.
10	15	5	CLAY, with silt, sand and place.	pebbles, tan to brown, sand laminations at 12.5 fbg, 13.5 fbg and 14
15	17	_	CLAY, with silt, sand and p	pebbles, tan to brown.
17	20	5	SAND, fine to coarse grain	ned, brown, waterbearing.
			END OF BORING	

OWNER: City of Sioux Falls **GEOLOGIC LOG** LEGGETTE, BRASHEARS & GRAHAM, INC. WELL NO.: MW-480x SIOUX FALLS, SOUTH DAKOTA PAGE 1 OF 1 PAGE(S) SITE LOCATION: Sioux Falls Landfill SCREEN SIZE & TYPE: 2" PVC SLOT NO.: 10 SETTING: 25 fbg to 15 fbg DATE COMPLETED: December 16, 2002 SAND PACK SIZE & TYPE: Silica sand 8/12 DRILLING COMPANY: Maxim Technologies **SETTING:** 25 fbg to 13 fbg CASING SIZE & TYPE: 2" PVC DRILLING METHOD: Hollow Stem Auger **SETTING:** 15 fbg to surface SAMPLING METHOD: CSTS SEAL TYPE: Enviro-plug OBSERVER: Tim Kenyon **SETTING:** 30 fbg to 25 fbg; 13 fbg to 10 fbg REFERENCE POINT (RP): Grade BACKFILL TYPE: Grout **ELEVATION OF RP:** STATIC WATER LEVEL: N/A STICK-UP: 2 feet **DEVELOPMENT METHOD:** SURFACE COMPLETION: DURATION: YIELD: REMARKS: **ABBREVIATIONS:** SS = SPLIT SPOON C = CUTTINGS ST = SHELBY TUBE W = WASHG = GRABREC = RECOVERYPPM = PARTS PER MILLION FAG = FEET ABOVE GRADE FBG = FEET BELOW GRADE DEPTH (FEET) REC. DESCRIPTION (FEET) FROM TO 2.5 CLAY, with silt, black, organic (Topsoil). 2.5 5 2 CLAY, with silt and sand, tan, dry (oxidized till). 5 8 CLAY, with silt and sand, tan, dry. 8 9 5 CLAY, with silt and sand, tan, moist; 2" lens of sand at 8.5 fbg. 9 10 SILT, with sand, tan to brown, moist. 10 15 5 CLAY, with silt, sand and pebbles, tan to dark brown, moist (oxidized till). 15 17 CLAY, with silt, sand and pebbles, tan to dark brown, moist (oxidized till). 17 18.5 5 SILT, with sand, dark brown, moist. 18.5 20 CLAY, with silt, sand and pebbles, dark brown, moist (oxidized till). 20 24.5 CLAY, with silt, sand and pebbles, dark brown, moist (oxidized till). 5 24.5 25 SILT, with sand, dark gray, moist. 25 27 SILT, with sand, dark gray, moist; sand lamination at 27 fbg. 5 27 30 CLAY, with silt, sand and pebbles, dark gray, stiff (unoxidized till). END OF BORING

OWNER: City of Sioux Falls **GEOLOGIC LOG** LEGGETTE, BRASHEARS & GRAHAM, INC. **BORING NO.:** MW-52ox SIOUX FALLS, SOUTH DAKOTA PAGE 1 OF 1 PAGE(S) SITE LOCATION: Sioux Falls Sanitary Landfill SCREEN SIZE & TYPE: 2" PVC Schedule 40 Sioux Falls, South Dakota SLOT NO.: 10 SETTING: 23 fbg to 8 fbg DATE COMPLETED: July 27, 2005 SAND PACK SIZE & TYPE: 16-30 Silica Sand DRILLING COMPANY: Maxim Technologies, Inc. **SETTING:** 23 fbg to 7 fbg CASING SIZE & TYPE: 2" PVC Schedule 40 DRILLING METHOD: Hollow Stem Auger **SETTING:** 8 fbg to 2.5 feet SAMPLING METHOD: CSTS SEAL TYPE: Wyo-ben Grout-well DF **OBSERVER**: B. Peschong **SETTING:** 7 fbg to 3 fbg REFERENCE POINT (RP): Grade BACKFILL TYPE: Concrete **ELEVATION OF RP:** STATIC WATER LEVEL: NM STICK-UP: **DEVELOPMENT METHOD:** SURFACE COMPLETION: **DURATION:** YIELD: **REMARKS**: West boring SB = SPLIT BARREL ABBREVIATIONS: CSTS = CONTINUOUS SAMPLE TUBE SYSTEM ND = NOT DETECTED G = GRAB

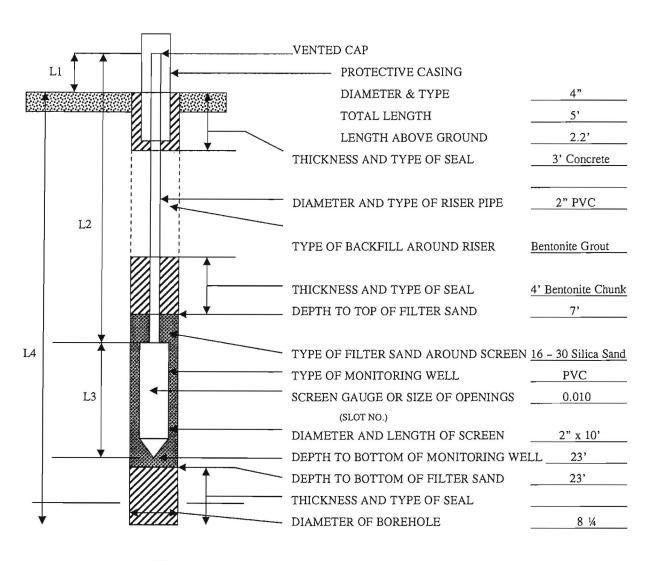
HA = HAN	D AUGER	REC = RE	COVERY	PPM = PART	S PER MILLION FBG = FEET BELOW GRADE
DEPTH FROM	(FEET)	SAMPLE TYPE	RECOVERY (FEET)	PID READING (PPM)	DESCRIPTION
0	3.5	CSTS			SILT, with clay, black (Topsoil).
3.5	5		4		CLAY, with silt, brown and gray mottled, some iron staining.
5	7	SB			CLAY, with silt, brown and gray mottled, some iron staining.
7	7.5	SB	2.5		CLAY, with silt and sand, some pebbles, gray with brown mottling, some iron staining.
7.5	10	SB	NSR		
10	12.5	SB	2.5		CLAY, with silt and sand, some pebbles, gray with brown mottling, some iron staining.
12.5	15	SB	2.5		CLAY, with silt and sand, some pebbles, gray with brown mottling, some iron staining.
15	20	CSTS	5		CLAY, with silt and sand, some pebbles, gray with brown mottling, some iron staining, ¼" seam of sand, medium, very fine grained at 19.5 fbg, wet.
20	21	CSTS	1		CLAY, with silt and sand, some pebbles, gray with brown mottling, some iron staining, wet.
21	23	SB	2		CLAY, with silt and sand, some pebbles, gray with brown mottling, some iron staining, wet.
				_	END OF BORING

Poblic SIOUX FALLS STATE SOUTH DAKOTA								EST BOF	RIN	G							
DEPTH NET SURFACE ELEVATION SURFACE ELEVATION SURFACE ELEVATION GEOLOGICAL ORIGIN WL or NO. TYPE W D LL. PL or NO. TYPE LEAN CLAY, dark brown, moist (CL-OL) LEAN CLAY, dark brown, moist (CL-OL) LEAN CLAY, gray mottled, moist, cobbles at 7.5' (CL) SAMPL LABORATORY TESTS TOPSOIL LEAN CLAY, dark brown, moist (CL-OL) TOPSOIL LEAN CLAY, gray mottled, moist, cobbles at 7.5' (CL) TILL TILL 4 CS SANDY LEAN CLAY, with a little gravel, brown mottled, moist, a lamination of wet sand at 19' (CL) SANDY LEAN CLAY, with a little gravel, gray and brown mottled, moist (CL) TILL TILL 4 CS SANDY LEAN CLAY, with a little gravel, gray and brown mottled, moist (CL) END OF BORING					_				BORIN	NG NO.	5	2OX	_				
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EEAN CLAY, dark brown, moist (CL-OL) DEAN CLAY, dark brown, moist (CL-OL) DEAN CLAY, dark brown, moist (CL-OL) DEAN CLAY, gray mottled, moist, cobbles at 7.5' CL ALLUVIUM B SANDY LEAN CLAY, with a little gravel, brown mottled, moist, a lamination of wet sand at 19' (CL) SANDY LEAN CLAY, with a little gravel, gray and brown mottled, moist (CL) DEAN CLAY, with a little gravel, gray and brown mottled, moist (CL) DEAN CLAY, with a little gravel, gray and								GEOLOGICAL	wī.								Qu
3.5 LEAN CLAY, gray mottled, moist, cobbles at 7.5' CCL) SANDY LEAN CLAY, with a little gravel, brown mottled, moist, a lamination of wet sand at 19' (CL) SANDY LEAN CLAY, with a little gravel, gray and brown mottled, moist (CL) ACS TILL CS CS ALLUVIUM TILL CS CS CS CS ANDY LEAN CLAY, with a little gravel, gray and brown mottled, moist (CL) END OF BORING	FEET	¥		_				217270000000000000000000000000000000000	2		NO.	TYPE	W	D	LL	PL	or
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20 SANDY LEAN CLAY, with a little gravel, gray and brown mottled, moist (CL) SANDY LEAN CLAY, with a little gravel, gray and some mottled, moist (CL) SANDY LEAN CLAY, with a little gravel, gray and some mottled, moist (CL) END OF BORING											1	CS					
EAN CLAY, gray mottled, moist, cobbles at 7.5' FINE										_	1						
8 SANDY LEAN CLAY, with a little gravel, brown mottled, moist, a lamination of wet sand at 19' (CL) TILL 4 CS 5 CS 6 CS 7 CS SANDY LEAN CLAY, with a little gravel, gray and brown mottled, moist (CL) END OF BORING ALLUVIUM 7 TILL 9 CS 10 CS	3.5	TDAN	OX 1X/	(1.1			11/	777		-							
SANDY LEAN CLAY, with a little gravel, brown mottled, moist, a lamination of wet sand at 19' (CL) TILL 4 CS 5 CS 6 CS 7 CS SANDY LEAN CLAY, with a little gravel, gray and brown mottled, moist (CL) END OF BORING		(CL)	CLAY, gray	y mottled, r	noist, cobbl	les at 7.5'				-	2	CS					
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SANDY LEAN CLAY, with a little gravel, gray and brown mottled, moist (CL) END OF BORING OCS 10 CS										-							
SANDY LEAN CLAY, with a little gravel, gray and brown mottled, moist (CL) 9 CS 10 CS END OF BORING									_	-	8	CS					
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	25									-							
WATER LEVEL MEASUREMENTS START 7/27/05 COMPLETE 7/27/05	5		v	VATERIEVE	I. MFASI IRF	MENTS			C.T.	ADT	7/25	1/05		NADI ET	E.	7/27	/05
WATER LEVEL MEASUREMENTS START 7/27/05 COMPLETE 7/27/05 DATE TIME SAMPLED CASING HOLE/ DATE TIME DEPTH CAVE BY BAILED DEPTHS WATER METHOD @ 1:35	E DATE	TIME	SAMPLED	CASING	HOLE/	5-5 AS 10-7-1 30.00	DEDTU		_		1121	103	CC	wure i	Ľ		
DEPTH DEPTH CAVE-IN BAILED DEPTHS LEVEL 3 1/4" HSA 0-23' 7-27 1:36 23' 23' 23' 19.5 ▼	7-27					DAILED	חדום	LEVEL		/4" HS	A 0-2	3'					
17.3 ±	727	1.50	23	23	23			17.0 -									
CREW CHIEF: Roger Hanson	ž 								CB	EW CHI	EF:	Roger	Hanso	n			
601 E. 48th Street N. Movim Toohnologies Sioux Falls, SD 57104	715				1						⊿. .	110601			601 E	. 48th	Street N.
Maxim Technologies Sloux Falls, SD 57104 Telephone: (605) 332-5371 Fax:	5					Maxi	m T	Fechnolog	gies					Telepl	none:	(605) 3	332-5371

INSTALLATION OF MONITORING WELL

JOB NO. <u>543-1377</u> MONITORING WELL NO. <u>52-OX</u> BORING NO. <u>52-OX</u>

PROJECT: SIOUX FALLS LANDFILL



DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL FROM GROUND SURFACE	WATER LEVEL FROM TOP OF RISER	DEPTH TO CAVE IN
7/27	1:36	23'		19.5'		23'
		_				

L1	=	2'	
	_		

$$L3 = 10$$

INSTALLATION COMPLETED:

DATE: 7/27/05 TIME: 2:30

Location SE 4 4 Sec 32 Twp 101 N Rg 5	TIW	Well Owner:
County North		Business Name: Sivnx Falls Landfill
Minnehaba		Address: 224 W. 9th Street
Please mark well location with an "X"	_	Sionx Falls SD 57102
w	E	WELL LOG: DEPTH
" ×	- '	FORMATION FROM TO
Well Completion Date	-	See attached sheet
7/27/05 1 Mile	→	
LOCATION:		
Distance from nearest potential pollution source (septic tank, abandoned we		
feed lot, etc.)?ft. from(identify	/ source).	
PROPOSED USE:		
□ Domestic/Stock □ Municipal □ Business □ Test Holes	-	
☐ Irrigation ☐ Industrial ☐ Institutional ☑ Monitoring	well	
METHOD OF DRILLING:		STATIC WATER LEVEL 19.5 Feet
Hollow-stem auger		STATIC WATER LEVEL Feet If flowing: closed in pressure NAPSI
CASING DATA: Steel Plastic Dther		GPM flowthrough /Ainch pipe
If other describe		Controlled by Valve Reducers Other
PIPEWEIGHT DIAMETER FROM TO HOLE DIA		Reduced Flowrate
LB/FT	25 IN	Can well be completely shut in?
LB/FTINFTFT		WELL TEST DATA: NA
LB/FTINFTFT	IN	- Pumped Describe:
GRDUTING DATA		Bailed
Grout Type No. of Sacks Grout Weight From Bentonite 2lb./gal 3_ft_	7° #	100 (100 (100 (100 (100 (100 (100 (100
		Pumping Level Below Land Surface
Describe grouting procedure Bentonite gout from b		, -
of cement to top of filter sand		ft. After Hrs. pumpedGPM
SCREEN: 🔀 Perforated pipe 🗆 Manufactured		If pump installed, pump rateGPM
Diameter 2 IN Length 15	FEET	REMARKS
Material PVC		Monitoring well 520x
Slot Size O. DID" Set From 8 Feet to 23 Feet		
Other information		
		This well was drilled under license # 530
WAS A PACKER OR SEAL USED? ☑ YES ☐ NO		This well was drilled under license # 5.30 And this report is true and accurate.
If so, what material? Bentonite		Drilling firm Maxim Technologies
Describe packer(s) and location? 4 of bentonite		Signature of License Representative:
		- B - m 11
DISINFECTION: Was well disinfected upon completion?YES, How:		
Laboratory sent to for water XNO, Why Not? Monited	inc	Signature of Well Owner or Equitable Property Holder:
quality analysis well, not for consum	\sim	
		Date: 8/29(.5

OWNER: City of Sioux Falls **GEOLOGIC LOG** LEGGETTE, BRASHEARS & GRAHAM, INC. BORING NO.: MW-53ox SIOUX FALLS, SOUTH DAKOTA PAGE 1 OF 1 PAGE(S) Sioux Falls Sanitary Landfill SCREEN SIZE & TYPE: 2" PVC Schedule 40 SITE LOCATION: Sioux Falls, South Dakota SLOT NO.: 10 SETTING: 22 fbg to 7 fbg DATE COMPLETED: July 27, 2005 SAND PACK SIZE & TYPE: 16-30 Silica Sand DRILLING COMPANY: Maxim Technologies, Inc. SETTING: 22 fbg to 6 fbg CASING SIZE & TYPE: 2" PVC Schedule 40 DRILLING METHOD: Hollow Stem Auger SETTING: 7 fbg to 2.5 feet SAMPLING METHOD: CSTS SEAL TYPE: Wyo-ben Grout-well DF OBSERVER: B. Peschong SETTING: 6 fbg to 3 fbg REFERENCE POINT (RP): Grade BACKFILL TYPE: Concrete **ELEVATION OF RP:** STATIC WATER LEVEL: NM STICK-UP: DEVELOPMENT METHOD: SURFACE COMPLETION: DURATION: YIELD: REMARKS: ABBREVIATIONS: CSTS = CONTINUOUS SAMPLE TUBE SYSTEM G = GRABSB = SPLIT BARREL ND = NOT DETECTED HA = HAND AUGER REC = RECOVERYPPM = PARTS PER MILLION FBG = FEET BELOW GRADE DEPTH (FEET) SAMPLE RECOVERY PID DESCRIPTION READING TYPE (FEET) (PPM) FROM TO 0.5 CLAY, with a little sand, black (Topsoil). **CSTS** 3 0.5 3 SB CLAY, with silt and sand, pebbles, brown, with calcareous nodules, soft, white. 3 5 SB **NSR** 5 6 **CSTS** SILT, with clay, brown and gray mottled. 6 7.5 **CSTS** CLAY, with silt and sand, pebbles, brown. 7.5 8 **CSTS** SAND, very fine grained, brown to gray mottled, some silt. 8 9 **CSTS** CLAY, with silt and some sand, brown. 9 10 **CSTS** SILT, brown and gray mottled. 10 12 SB --SILT, brown and gray mottled. 12 14 SB CLAY, with sand and pebbles, brown to gray, sand filled fracture at 12.5 fbg to 13.5 fbg, moist. 14 15 SB SAND, very fine grained, brown, with silt, moist. 15 17 SB CLAY, with silt and sand, pebbles, moist. --17 20 SB SILT, with sand, very fine grained, brown with gray mottles, moist. 20 22 SB SILT, with sand, very fine grained, brown with gray mottled, wet. END OF BORING

LOG OF TEST BORING VERTICAL SCALE _____1" = 4' ____ 53**O**X JOB NO. 543-1377 BORING NO. SIOUX FALLS LANDFILL, SIOUX FALLS, SOUTH DAKOTA **PROJECT** SHEET 1 OF 1 SAMPLE LABORATORY TESTS DEPTH DESCRIPTION OF MATERIAL GEOLOGICAL or SURFACE ELEVATION ORIGIN PL NO. TYPE W D LL or RQD FEET CR LEAN CLAY, dark brown, moist (CL-OL) TOPSOIL CS 0.5 SANDY LEAN CLAY, with a little gravel, brown TILL mottled, moist, a layer of silty clay from 5'-6', lenses 2 CS of moist silt, laminations of silty sand from 10'-11.5' and 14'-14.5' (CL) O NSR CS 4 5 CS CS 6 7 CS 8 CS 17 SILTY CLAY, brown mottled, moist to wet, a lens MIXED of waterbearing silty sand at 21.5' (CL-ML) **ALLUVIUM** 9 CS 10 CS 22.5 END OF BORING WATER LEVEL MEASUREMENTS 7/27/05 COMPLETE 7/27/05 START SAMPLED **METHOD** CASING HOLE/ WATER @ 10:30 DATE TIME BAILED DEPTHS DEPTH DEPTH CAVE-IN LEVEL 3 1/4" HSA 0-22 1/2' 7-27 22' 22' 22' 10:31 19 ▼

Maxim Technologies

CREW CHIEF:

Roger Hanson

543-1377.GPJ MAMIMLOG.GDT 8/14/05

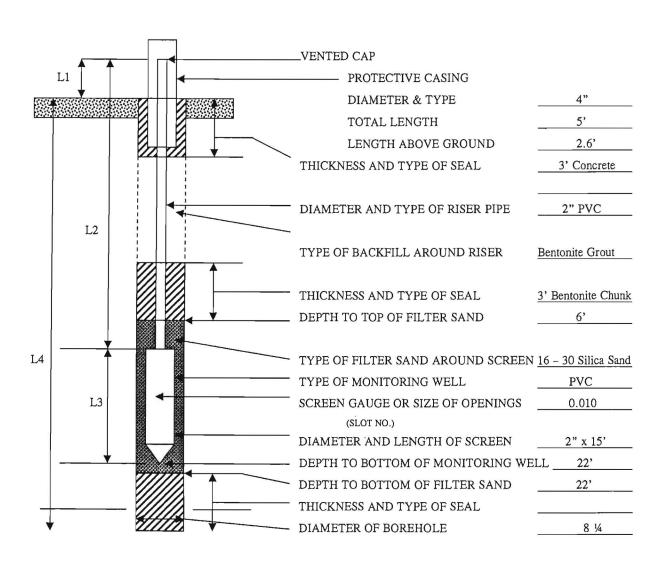
601 E. 48th Street N. Sioux Falls, SD 57104 Telephone: (605) 332-5371

Fax:

INSTALLATION OF MONITORING WELL

JOB NO	543-1377	MONITORING WELL NO.	53-OX	BORING NO.	53-OX	

PROJECT: _____ SIOUX FALLS LANDFILL



DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL FROM GROUND SURFACE	WATER LEVEL FROM TOP OF RISER	DEPTH TO CAVE IN
7/27	10:31	22		19'		22'
						, , , , , , , , , , , , , , , , , , ,

Ll	=_	2.5'	_
L2	=_	9.5'	

L3 = 15'

 $L4 = _{22}$

INSTALLATION COMPLETED:

DATE: <u>7/27/05</u> TIME: 12:50

Location SE 14 14 Sec 32 Twp 101N Rg 51W	Well Owner:				
County North	Business Name: Sionx Falls Landfill				
Minnehaha	Address: 224 W. 9th Street				
Please mark well location with an "X"	Sionx Falls 50 57102				
1 1 -	WELL LOG: DEPTH				
W X E	FORMATION FROM TO				
	See attached sheet				
Well Completion Date	see aracreex sheet				
7/27/05 1 Mile>					
LOCATION:					
Distance from nearest potential pollution source (septic tank, abandoned well,					
feed lot, etc.)?ft. from Unknow)n(identify source).					
PROPOSED USE:					
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes					
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well					
METHOD OF DRILLING:	STATIC WATER LEVEL 19				
Hollow - Stem Anger	STATIC WATER CEVEL				
CASING DATA: Steel Plastic Other	If flowing: closed in pressure NAPSI GPM flow through NAinch pipe				
If other describe	Controlled by Valve Reducers Other				
PIPEWEIGHT DIAMETER FROM TO HOLE DIAMETER	Reduced Flowrate A GPM				
LB/FT 2 IN -2.5 FT 9.5 FT 8.25 IN	Can well be completely shut in?				
LB/FTINFTFTIN					
LB/FTINFTFTIN	WELL TEST DATA:				
GROUTING DATA	Bailed				
Grout Type No. of Sacks Grout Weight From To Bentonite 2 Ib./gal 3 ft. 6 ft					
	Pumping Level Below Land Surface				
Describe grouting procedure Bentonite arout from bottom					
of cement to top of filter sand	ft. After Hrs. pumpedGPM				
SCREEN: SCAPERITE Manufactured	If pump installed, pump rateGPM				
Diameter IN Length FEET	REMARKS				
Material PVC	Monitoring well 530x				
Slot Size 0.010" Set From 7 Feet to 22 Feet	~				
Other information					
	This well was drilled under license #530				
WAS A PACKER OR SEAL USED? ⊠ YES □ NO	And this report is true and accurate.				
If so, what material? Bentonite	Drilling firm Maxin Technologies				
Describe packer(s) and location? 3 of Bentanite	Signature of Ligense Representative:				
	- B In Cl				
DISINFECTION: Was well disinfected upon completion?YES, How:	Signature of Wall Dunar or Equitable Proporty Holder				
Laboratory sent to for water X NO, Why Not? Mounitoring	Signature of Well Owner or Equitable Property Holder:				
quality analysis well, not for consumption					
,	Date: 8/24/05				

	GEO	DLOG	IC LOG	OWNER: City of Sioux Falls				
LEGGETTE, BRASHEARS & GRAHAM, INC.		S & GRAHAM, INC.	WELL NO.: MW-540x					
SIOUX FALLS, SOUTH DAKOTA		TH DAKOTA	PAGE 1 OF 1 PAGE(S)					
SITE LOCATION: Sioux Falls Regional Landfill		gional Landfill	SCREEN SIZE & TYPE: 2" PVC					
	Si	ioux Falls, So	uth Dakota	SLOT NO.: 10 SETTING: 16 fbg to 6 fbg				
DATE COM	MPLETED:	July 24, 200	6	SAND PACK SIZE & TYPE: Red Flint Sand and Gravel				
DRILLING	COMPANY	r: Thein Well	Company	SETTING: 16 fbg to 4 fbg				
				CASING SIZE & TYPE: 2" PVC				
DRILLING	METHOD:	Hollow-Stem	Auger	SETTING: 6 fbg to approximately 2 feet				
SAMPLING	G METHOD	: Split Spoon		SEAL TYPE: Pure Gold Medium Bentonite Chips				
OBSERVE	R: M. Kars	tens		SETTING: 4 fbg to 2 fbg				
REFEREN	CE POINT (RP): Grade		BACKFILL TYPE: Cement grout				
ELEVATIO	ON OF RP:			STATIC WATER LEVEL:				
STICK-UP:	Approx	imately 2 feet		DEVELOPMENT METHOD:				
SURFACE	COMPLET	ION:		DURATION: YIELD:				
REMARKS	:							
ABBREVI <i>A</i>	ATIONS: SS	= SPLIT SPOOR	W = WASH	C = CUTTINGS G = GRAB ST = SHELBY TUBE				
REC = RECOVERY PPM = PARTS PER MILLION			PARTS PER MILLION	FBG = FEET BELOW GRADE				
DEPTH (FEET) REC.				DESCRIPTION				
FROM	то	(FEET)						
0	2	1	SILT, with clay and sand, i	SILT, with clay and sand, fine grained, black to dark brown, soft (Topsoil).				
2	3.5		SILT, with clay and sand, i	fine grained, dark brown, soft.				
3.5	4	1.5	SILTY CLAY, with some	sand, fine grained, brown with gray mottling, soft.				
4	6	1.5	SILTY CLAY, with some	sand, fine grained, brown with gray mottling, soft, moist.				
6	7.5		SILTY CLAY, with some	sand, fine grained, brown with gray mottling, soft, moist.				
7.5	8	2	SAND, very fine to medium	m grained, with some silty clay, brown, wet.				
8	10	2	SAND, fine to coarse grained, some pebbles, brown to light brown, wet.					
10	12	1.5	SAND, medium to very co	arse grained, with pebbles, brown with rust staining, wet.				
12	13		SAND, medium to very co	arse grained, with pebbles, brown with rust staining, wet.				
13	14	1.5	CLAY, with silt and sand,	pebbles, dark brown with gray mottling, very dense.				
14	16	0.5	CLAY, with silt and sand, present).	dark brown with gray mottling, very dense (lots of rocks and boulders				
16	18	1.5	CLAY, with silt and sand, pebbles, gray with brown mottling, very dense. Clay, gray in tip of sampler.					
			END OF BORING					
			1					

	GEO)[\UC	IC LOG	OWNER: City of Sioux Falls					
GEOLOGIC LOG			WELL NO - MIN 55						
LEGGETTE, BRASHEARS & GRAHAM, INC. SIOUX FALLS, SOUTH DAKOTA		•	WELL NO.: MW-550x						
			PAGE 1 OF 1 PAGE(S)						
SITE LOC		_	gional Landfill	SCREEN SIZE & TYPE: 2" PVC					
	S	ioux Falls, So	uth Dakota	SLOT NO.: 10 SETTING: 20 fbg to 10 fbg					
DATE CO	MPLETED:	October 25,	2007	SAND PACK SIZE & TYPE: Silica Sand					
DRILLING	COMPAN	r: Geotek		SETTING: 20 fbg to 9 fbg					
				CASING SIZE & TYPE: 2" PVC					
DRILLING	METHOD:	Hollow-Sten	n Auger	SETTING: 20 fbg to approximately 3 feet					
SAMPLIN	G METHOD	: Split Spoon		SEAL TYPE: Bentonite Chips					
OBSERVE	R: K. Heck			SETTING: 9 fbg to 6 fbg					
REFEREN	CE POINT (RP): Grade		BACKFILL TYPE: Cement grout					
ELEVATIO	ON OF RP:	N/A		STATIC WATER LEVEL:					
STICK-UP	Approx	. 3 feet		DEVELOPMENT METHOD:					
SURFACE	COMPLET	ION:		DURATION: YIELD:					
REMARKS	: :								
ABBREVIA	ATIONS: SS	= SPLIT SPOOT	N W = WASH	C = CUTTINGS G = GRAB ST = SHELBY TUBE					
REC = REC	OVERY	PPM = 1	PARTS PER MILLION	FBG = FEET BELOW GRADE					
DEPTH (FEET) REC.				DESCRIPTION					
FROM	то	(FEET)							
0	2.5	0	SILT, with organics, black	SILT, with organics, black, slightly moist (Topsoil).					
2.5	4	2		CLAY, with silt, brown, slightly moist, stiff.					
4.5	6.25		CLAY, with silt, brown, sl	<u></u>					
6.25	6.5	2	SAND, coarse grained, wit						
7	9	2		•					
9.5	11.5	2		CLAY, with some silt and sand, brown, slightly moist, stiff. CLAY, with some silt and sand, brown, slightly moist, stiff.					
12	14	2							
				sand, brown, slightly moist, stiff; 2 inch sand lens present @ 13.5 fbg					
14.5	16.5	2		sand, brown, slightly moist, very stiff.					
17	19	2		sand, brown, slightly moist, very stiff.					
19	20		No sample recovered						
		-	END OF BORING						
		-							



LEGGETTE, BRASHEARS & GRAHAM, INC.

140 East Hinks Lane, Suite 126 Sioux Falls, SD 57104

(605) 334-6000 or Fax (605) 334-1850

GEOLOGIST LOG

WELL NO.: MW-56ox

Page 1 of 1

OWNER: LOCATION: City of Sioux Falls

Sioux Falls Sanitary Landfill

7/8/08

DATE COMPLETED: DRILLING CO.: SAMPLING METHOD: Continuous Sample Tube System

American Technical Services

GEOLOGIST:

Wendy Stiernagle

REFERENCE POINT (RP): Grade

ELEVATION OF RP:

SURFACE COMPLETION: Stick-up

REMARKS:

100 000 0000		ollow Stem Auger		REMARKS: STATIC WATER LEVEL:						
DEPTH IN FEET	WELL CONSTRUCTION BY BY BY BY BY BY BY BY BY BY BY BY BY			LITHOLOGIC DESCRIPTION	FROM	TO	SAMPLE TYPE	REC (FEET)	DEPTH IN FEET	
ן חר										
0-		Stick-up		SILT: with some clay and sand, black to	0	4	CSTS	4	0-	
-		Portland Cement		brown organics (Topsoil)					-	
-		2" ID Sch 40 PVC		SILT: with some clay and sand, pebbles, brown, soft	4	5	CSTS	1		
-5 -		Econoplug Bentonite		SILTY-CLAY: with sand, pebbles, brown with gray mottling, soft	5	9	CSTS	3	-5 -	
				OV TV OV VV - in L - C - L - L - L - L - L - L - L - L -	9	10	CSTS	1		
-10				SILTY-CLAY: with lots of sand and pebbles, brown	10	14	CSTS	1	-10 -	
-		Dakota Gold Silica Sand		SAND: very coarse grained, with silt, clay, lots of pebbles, brown, wet	14	15	CSTS	1	-	
-15				SILTY-CLAY: with sand and pebbles, brown, wet	15	18	CSTS	3	-15 -	
-				Hit refusal at 18 fbg. Moved over 5 feet to the south.	18	20	CSTS	2	-	
-20 -		2" ID Sch 40 PVC		SILTY-CLAY: with sand, pebbles, gray with brown mottling, wet, dense 1 inch coarse grained sand lens at 20 fbg	20	25	CSTS	5	-20 -	
-		Slotted 0.010"		SILTY-CLAY: with sand, pebbles, gray, wet, dense	20		6515	Ü	-	
-25 JL									-25]	

NOTES: CSTS = Continuous Sample Tube System



LEGGETTE, BRASHEARS & GRAHAM, INC. 140 East Hinks Lane, Suite 126 Sioux Falls, SD 57104

(605) 334-6000 or Fax (605) 334-1850

GEOLOGIST LOG

WELL NO.: MW-57ox

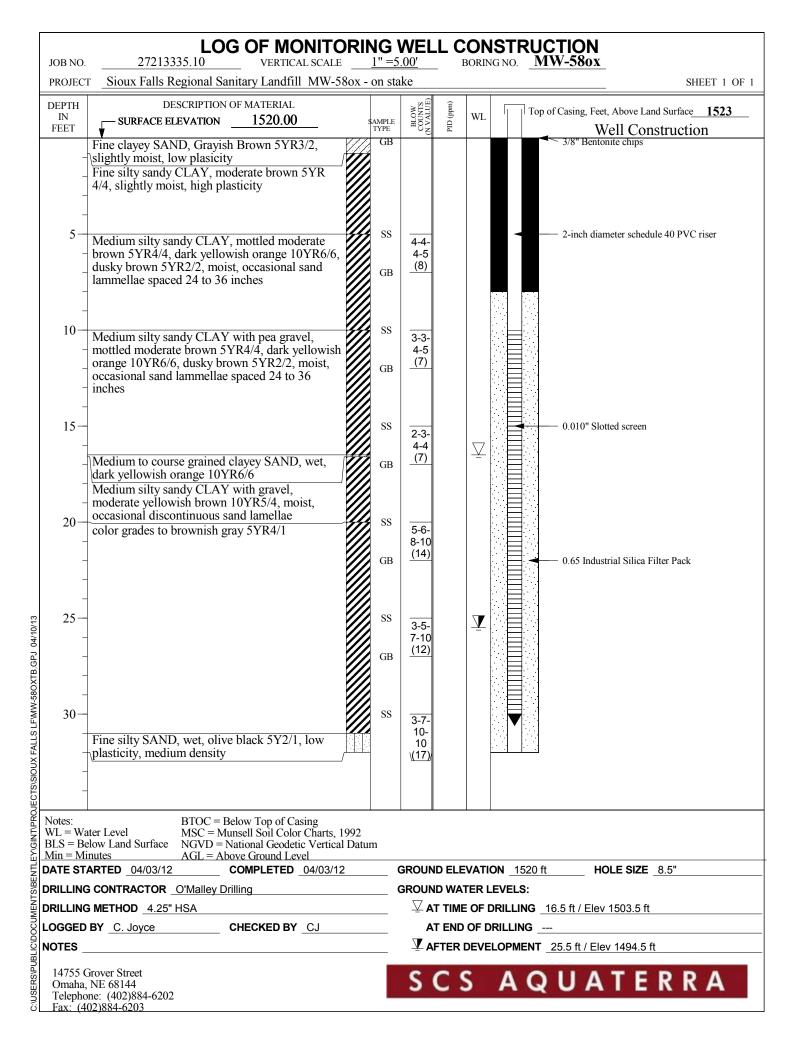
Page 1 of 1

OWNER:City of Sioux FallsGEOLOGIST:Brad PeschongLOCATION:Sioux Falls Sanitary LandfillREFERENCE POINT (RP):Grade

DATE COMPLETED:October 19, 2011ELEVATION OF RP:1548.82DRILLING CO.:American Technical ServicesSURFACE COMPLETION:Stick-up

SAMPI	American Technical Services LING METHOD: Continuous Sample Tube System Hollow Stem Auger	TOC ELEVATION: Stick-up TOC ELEVATION: 1551.15 STATIC WATER LEVEL: NA						
DEPTH IN FEET	WELL CONSTRUCTION	GRAPHIC	LITHOLOGIC DESCRIPTION	FROM	OT	SAMPLE TYPE	REC (FEET)	DEPTH IN FEET
0-	Portland Cement 2" ID Sch 40 PVC Econoplug Bentonite		TOPSOIL: clay, with silt and sand, dark brown CLAY: with sand and gravel, brown and tan mottled @ 5 fbg, with silt, sand and pebbles, brown with gray mottling @ 7 fbg, some reddish brown mottling	0 0.5	0.5 5	CSTS CSTS	0.5	0-
-10 -			@ 10-13 fbg, brown with gray mottling @ 13-15 fbg, gray and brown mottling	10	15	CSTS	5	-10 -
-15 -	Dakota Gold Silica Sand 2" ID Sch 40 PVC		@ 15.5 fbg, with silt, sand and pebbles, gray, moist	15 15.5	15.5	CSTS CSTS	0.5	-15 — - -
-20	Slotted 0.010"							-20

NOTES: CSTS = Continuous Sample Tube System



	JOB NO.	LOG OF MONITO 27213335.11 VERTICAL SCALE		WEL . <u>86'</u>	L C	ON BORIN	NSTRUCTION ng no. MW-590x	
	PROJECT	Sioux Falls Regional Sanitary Landfill			-		SHEI	ET 1 OF 1
	DEPTH IN FEET	DESCRIPTION OF MATERIAL SURFACE ELEVATION 1532.00	\$AMPLE TYPE	BLOW COUNTS N VALUE)	PID (ppm)	WL		
C:USERSIPUBLICIDOCUMENTSIBENTLEY/GINTIPROJECTS\SIOUX FALLS LFIMM-590X, 610X, GPJ 12/17/14	FEET	Grass and Roots top 2" Lean CLAY, Dark Yellowish Brown, Moist, low plasticity Sandy lean CLAY, Moderate yellowish brown, slightly moist, medium to coarse grained sand seam at 3.5'bgs ~1/4" thick subrounded clasts Sandy lean CLAY with gravel, slightly moist, motteled dark yellowish orange, light olive gray, moderate yellowish brown. coarsely mottled at 6.5' bgs cobbles encountered at 8.5'bgs. No recovery from 8.5 to 10' bgs. TILL-sandy gravely lean CLAY, moderate yellowish brown, thinly bedded with coarse sand seams with gravel, subrounded moist, stiff. 15'bgs Saturated sand seams spaced approximately 2.5 feet apart, Occasional 10-12" near vertical sand seams composed of dark yellowish brown medium grained sand. discontinuous noted at 14.5 to 15.5' bgs and 17.5 to 18.0' bgs Blocky sandy lean CLAY with gravel, moderate yellowish brown to dark yellowish brown, moderately bedded with medium grained sand seams ~1/4 inch thick spaced approximately 3 feet apart, discontinuous and irregularly bedded bedding plane ranges from approximately horizontal to near vertical. Blocky lean CLAY with gravel, moderate yellowish brown to dark yellowish brown, moderately bedded. Clayey silty SAND, moderate olive brown, moist stiff, slightly plastic, no sand seams. Clayey silty SAND with gravel, moderate olive brown, moist stiff, slightly plastic. Irregular med grained sand seam at 33'bgs medium to medium dark gray	SS SS SS SS SS SS SS SS SS SS SS SS SS	2333 3435 4566 4579 950 2346 3667 3457 4447 3357 2356 36810 3579 791111 9879 5466 451010 3467 341012			Well Construction Schedule 40 PVC riser BH 20 High solids bentonite grout Filter pack seal - Hydrated 3/8" bentochips-Enviroplug 0.65mm industrial silica filter pack (approximately 20/25 mesh sand) 0.010" slotted schedule 40 PVC scre	onite
JECTS\SIOUX FA	40—		SS	6876				
ITLEY/GINT/PRO	BLS = Be $Min = Mi$	BTOC = Below Top of Casing ster Level SS = Split Spoon Sample NGVD = National Geodetic Vertical AGL = Above Ground Level COMPLETED 10/01/14		GROUN	D ELF	VATI	ION 1532 ft MSL HOLE SIZE 8.5-inch	
SIBEN		CONTRACTOR O'Malley Drilling Inc.					LEVELS:	
/ENT		METHOD 4.25" HSA					DRILLING 13.0 ft / Elev 1519.0 ft	
OCU		BY C. Joyce CHECKED BY C. Joyc	e				DRILLING	
LIC\D	NOTES _	Partly Cloudy, elevation approximate		AF	TER	DEVE	ELOPMENT	
C:\USERS\PUB	Omaha, Telepho	Grover Street NE 68144 ne: (402)884-6202 02)884-6203		S	C S	S	AQUATERR	A

BORING NUMBER MW-59ox

PAGE 1 OF 1

DATE STARTED 10/01/14 COMPLETED 10/01/14	GROUND ELEVATION 1532 ft MSL HOLE SIZE 8.5-inch						
DRILLING CONTRACTOR O'Malley Drilling Inc.	GROUND WATER LEVELS:						
DRILLING METHOD 4.25" HSA	$\overline{2}$ AT TIME OF DRILLING 13.0 ft / Elev 1519.0 ft						
LOGGED BY _C. Joyce CHECKED BY _C. Joyce	AT END OF DRILLING						
NOTES Partly Cloudy, elevation approximate	AFTER DEVELOPMENT						

					T		I	1	_ <u>^ -</u> -		-00	
			PE	%		ż	F	ш [%]	1	ERBE IMITS		FINES CONTENT (%)
Ħ(GRAPHIC LOG		SAMPLE TYPE NUMBER	RECOVERY (RQD)	BLOW COUNTS (N VALUE)	T PEN.	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)		С	T	IN (
DEPTH (ft)	RAF	MATERIAL DESCRIPTION	PLE	SS	BLC OUI	POCKET (tsf)	<u>5</u> 8	ISE TE	LIQUID	PLASTIC LIMIT	PLASTICITY INDEX	0%
_	O		SAN	REC	OS	<u> </u>	NY.	ĕö	= =	PLA LI	LAS I	NE S
0	3\1/23\	Grass and Roots top 2"	1 1	 							<u>Ф</u>	ഥ
		Lean CLAY, Dark Yellowish Brown, Moist, low plasticity	ss	42	2-3-3-3 (6)							
		Sandy lean CLAY, Moderate yellowish brown, slightly moist,			3-4-3-5							
		medium to coarse grained sand seam at 3.5'bgs ~1/4" thick subrounded clasts	SS	50	(7)							
5		Sandy lean CLAY with gravel, slightly moist, motteled dark yellowish orange, light olive gray, moderate yellowish brown.	\bigvee ss	75	4-5-6-6							
		coarsely mottled at 6.5' bgs		-	(11)							
		cobbles encountered at 8.5'bgs. No recovery from 8.5 to 10' bgs.	ss	92	4-5-7-9 (12)							
				+	` ′							
_ 10			SS	25	9-50							
				92	2-3-4-6							
		TILL-sandy gravely lean CLAY, moderate yellowish brown, thinly		1	(7)							
		bedded with coarse sand seams with gravel, subrounded moist,	ss	83	3-6-6-7 (12)							
 15		stiff. 15'bgs Saturated sand seams spaced approximately 2.5 feet			3-4-5-7							
		apart, Occasional 10-12" near vertical sand seams composed of dark	SS	96	(9)							
		yellowish brown medium grained sand. discontinuous noted at	\bigvee ss	100	4-4-4-7							
		14.5 to 15.5' bgs and 17.5 to 18.0' bgs		-	(8)							
- 20			ss	92	3-3-5-7 (8)							
				1.00	2-3-5-6							
			SS	100	(8)							
			\bigvee ss	100	3-6-8-10							
		Blocky sandy lean CLAY with gravel, moderate yellowish brown to dark yellowish brown, moderately bedded with medium grained	\longrightarrow	-	(14)							
25		sand seams ~1/4 inch thick spaced approximately 3 feet apart, discontinuous and irregularly bedded bedding plane ranges from	ss	100	3-5-7-9 (12)							
		approximately horizontal to near vertical.		400	7-9-11-11							
			SS	100	(20)							
		Blocky lean CLAY with gravel, moderate yellowish brown to dark yellowish brown, moderately bedded.		100	9-8-7-9							
30		Clayey silty SAND, moderate olive brown, moist stiff, slightly	+	-	(15)							
		plastic, no sand seams.	X ss	100	5-4-6-6 (10)							
		Clayey silty SAND with gravel, moderate olive brown, moist stiff,	00	92	4-5-10-10							
		slightly plastic. Irregular med grained sand seam at 33'bgs medium to medium	SS	92	(15)							
35		dark gray	ss	75	3-4-6-7 (10)							
			+									
			ss	92	3-4-10-12 (14)							
			ss	100	6-8-7-6							
40			\bigwedge 33	100	(15)							
		Bottom of hole at 40.0 feet.										

	JOB NO.	LOG OF MONITO 27213335.11 VERTICAL SCALE	RIN	IG \	WEL I	L C	ON	ISTRUC	CTION W-60ox
	PROJECT			1 3	.00_	,	BOKIIV	MONO	SHEET 1 OF 1
ŀ	DEPTH	DESCRIPTION OF MATERIAL			E) ZS	Ê			
	IN FEET	SURFACE ELEVATION1527.00	\$Ą	AMPLE TVPE	BLOV	PID (ppm)	WL		Wall Construction
-	TEET	Top 2 inches grass and roots	11/11	SS	36	ш.			Schedule 40 PVC riser
12/17/14	5— 10— 15— 20— 25—	Top 2 inches grass and roots Sandy lean CLAY, moderate yellowish brown, slightly moist, firm, low plasticity Coarse sandy lean CLAY, moderate yellowish brown, slightly moist, firm, low plasticity color grades to mottled medium gray, dark yellowish orange and dark yellowish brown at 4'bgs Sandy lean CLAY with gravel, moist, moderate to dark olive brown, stiff to very stiff plastic. 8.5'bgs medium grained sand seam ~1/4-inch thick moderate dark brown 18.5'bgs Iron nodules 21-21.5'bgs discontinuous near vertical sand seam 28.5'bgs color grades sharply to medium dark gray 31.5'bgs medium grained sand seam ~1/4-inch thick moderate dark brown		ss ss ss ss ss ss ss ss ss	3455 —4664 —4535 —4567 —5666 —2335 —4779 —3567 —8878 —5677 —91011 —910111 —9101113 —9101113				Well Construction Schedule 40 PVC riser BH 20 High solids bentonite grout Filter pack seal - Hydrated 3/8" bentonite chips-Enviroplug 0.65mm industrial silica filter pack (approximately 20/25 mesh sand) 0.010" slotted schedule 40 PVC screen
K.GPJ	30-			SS	4555				
, 610	-			55	4566				
X009	-			SS	0507				
590X,				SS	3567				
F\MW-	35—			GB	44				
TST									
UX FA	_								
S\SIO	_								
JECT	40		v+V/\					V	
-EY/GINT/PRC	Min = Mi	low Land Surface NGVD = National Geodetic Vertical nutes AGL = Above Ground Level							
BENT		ARTED 10/02/14 COMPLETED 10/02/14						ON 1527 ft N	MSL HOLE SIZE 8.5-inch
ENTS/		G CONTRACTOR O'Malley Drilling Inc. G METHOD 4.25" HSA		_ '	GROUNE AT			.evels: Drilling	_
COMI		BY C. Joyce CHECKED BY C. Joyce						ORILLING	
LIC\DC		Rain, elevation approximate						LOPMENT	
C:USERSIPUBLICIDOCUMENTSIBENTLEY/GINTIPROJECTSISIOUX FALLS LF/MW-590X, 600X, 610X.GPJ 12/17/14	Omaha, Telephor	Grover Street NE 68144 ne: (402)884-6202)2)884-6203			S	C :	S	A Q	UATERRA

Telephone: (402)884-6202 Fax: (402)884-6203

BORING NUMBER MW-60ox

PAGE 1 OF 1

DATE STARTED 10/02/14 COMPLETED 10/02/14	GROUND ELEVATION 1527 ft MSL HOLE SIZE 8.5-inch						
DRILLING CONTRACTOR O'Malley Drilling Inc.	GROUND WATER LEVELS:						
DRILLING METHOD 4.25" HSA	AT TIME OF DRILLING						
LOGGED BY C. Joyce CHECKED BY C. Joyce	AT END OF DRILLING						
NOTES Rain, elevation approximate	AFTER DEVELOPMENT						

			ш	%		_:				ERBE		F
o DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC WI	PLASTICITY INDEX	FINES CONTENT (%)
		Top 2 inches grass and roots	Mag		3-4-5-5							
		Sandy lean CLAY, moderate yellowish brown, slightly moist, firm, _ low plasticity	SS	75	(9)							
		Coarse sandy lean CLAY, moderate yellowish brown, slightly moist, firm, low plasticity	ss	50	4-6-6-4 (12)							
_ 5		color grades to mottled medium gray, dark yellowish orange and dark yellowish brown at 4'bgs	ss	92	4-5-3-5 (8)							
		Sandy lean CLAY with gravel, moist, moderate to dark olive brown, stiff to very stiff plastic.	ss	100	4-5-6-7 (11)							
 		8.5'bgs medium grained sand seam ~1/4-inch thick moderate dark brown	ss	100	5-6-6-6 (12)							
10		18.5'bgs Iron nodules	ss	100	2-3-3-5 (6)							
		21-21.5'bgs discontinuous near vertical sand seam 28.5'bgs color grades sharply to medium dark gray	ss	100	4-7-7-9 (14)							
_ 15		31.5'bgs medium grained sand seam ~1/4-inch thick moderate dark brown	ss	100	3-5-6-7 (11)							
		dark blowii	ss	100	8-8-7-8 (15)							
			ss	100	5-6-7-7 (13)							
20			ss	100	3-7-10-11 (17)							
			ss	100	8-9-13-12 (22)							
_ 25			ss	100	2-9-10-11 (19)							
			ss	100	6-10-11-13							
			ss	100	(21) 4-5-5-5							
_ 30			ss	100	(10) 4-5-6-6 (11)							
			ss	100	3-5-6-7							
_ 35			SS	100	(11)							
			™ GB	100								
_ 40		Bottom of hole at 40.0 feet.										

JOB NO.	LOG OF MONITO 27213335.11 VERTICAL SCALE	RIN(G \ '=5	WEL	LC	ON	STR G NO.	UCT MW	TION -610x
PROJECT							_		SHEET 1 OF
	DESCRIPTION OF MATERIAL			, <u>G</u>					
DEPTH IN FEET	Surface elevation 1564.00	\$AM TY	MPLE PE	BLOW COUNTS (N VALUE)	PID (ppm)	WL			Well Construction
	Lean CLAY, dark yellowish brown, moist, stiff		SS						Schedule 40 PVC riser
			GG.	2354					
			SS	4465]	Filter pack seal - Hydrated 3/8" bentonite chips-Enviroplug
_	Coarse sandy lean CLAY, mottled, dark		ss					'	emps-Enviroping
5—	yellowish orange, olive brown, pale olive gray, moist, elastic			3454					
-	11.5'bgs Iron nodules, sand absent		SS						
-	-			5655				T.	
			SS	4652					
10-			ss	4052					0.65mm industrial silica filter pack
_				3357					(approximately 20/25 mesh sand)
-	Sandy lean CLAY, moderate brown, moist.		SS						
-	medium sand with gravel stringers spaced six to			3467					
-	eight inches apart		SS						
15—			GG.	6578					0.010" slotted schedule 40 PVC screen
	Till - sandy gravely lean CLAY, moderate		SS	371211					
	brown, slightly moist. color grades to dark brown at 17bgs		ss	07 12 11					
_	Till - medium to coarse grained sand with silty			2337					
20-	clay, dark brown Till - lean blocky CLAY, medium dark GRAY,							<u>il</u>	
-	stiff						•		
25-									
-									
-									
30— 35— 35— 40— Notes: WL = Wa BLS = Be Min = Mi									
20									
30-									
_									
_									
-									
35—									
40-									
Notes:	BTOC = Below Top of Casing					1			
WL = Wa	ter Level SS = Split Spoon Sample	Dotor							
Min = Mi		Datum							
DATE ST	ARTED _10/01/14		_ (GROUN	D ELE	VATIO	ON 156	4 ft MS	SL HOLE SIZE 8.5-inch
	CONTRACTOR O'Malley Drilling Inc.		_ (EVELS:		
DRILLING	METHOD 4.25" HSA		_) ft / Elev 1554.0 ft
	BY C. Joyce CHECKED BY C. Joyce	!	_	Α٦	END	OF D	RILLING		
NOTES _	Mostly Cloudy, elevation approximate			AF	TER	DEVE	LOPMEN	NT	
	Grover Street NE 68144			5	C (ς	Δ	O I	JATERRA
Telepho	ne: (402)884-6202			<u> </u>	- .	,	77 \	~ '	JAILKKA
Fax: (40	02)884-6203								

BORING NUMBER MW-61ox

PAGE 1 OF 1

DATE STARTED 10/01/14 COMPLETED 10/01/14	GROUND ELEVATION 1564 ft MSL HOLE SIZE 8.5-inch						
DRILLING CONTRACTOR O'Malley Drilling Inc.	GROUND WATER LEVELS:						
DRILLING METHOD 4.25" HSA	∑ AT TIME OF DRILLING 10.0 ft / Elev 1554.0 ft						
LOGGED BY C. Joyce CHECKED BY C. Joyce	AT END OF DRILLING						
NOTES Mostly Cloudy, elevation approximate	AFTER DEVELOPMENT						

			111		%						ERBE		늘
o DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	LIQUID	PLASTIC WE LIMIT	PLASTICITY INDEX	FINES CONTENT (%)
		Lean CLAY, dark yellowish brown, moist, stiff		SS	75	2-3-5-4 (8)							
				SS	63	4-4-6-5 (10)							
_ 5		Coarse sandy lean CLAY, mottled, dark yellowish orange, olive brown, pale olive gray, moist, elastic 11.5'bgs Iron nodules, sand absent		SS	92	3-4-5-4 (9)							
		•		SS	96	5-6-5-5 (11)							
				SS	92	4-6-5-2 (11)							
10		<u>√</u>		SS	92	3-3-5-7 (8)							
		Sandy lean CLAY, moderate brown, moist. medium sand with gravel stringers spaced six to eight inches apart		SS	92	3-4-6-7 (10)							
_ 15				SS	63	6-5-7-8 (12)							
		Till - sandy gravely lean CLAY, moderate brown, slightly moist. color grades to dark brown at 17'bgs		SS	83	3-7-12-11 (19)							
		Till - medium to coarse grained sand with silty clay, dark brown		SS	100	2-3-3-7							
20	<i>37.47.8</i> 3	Till - lean blocky CLAY, medium dark GRAY, stiff Bottom of hole at 20.0 feet.	μ			(6)							



APPENDIX E

Permits

SPECIALTY WASTEWATER DISCHARGE PERMIT (SWDP)

RL04A SWDP Number

Sioux Falls Regional Landfill (hereinafter referred to as PERMITTEE)

Sioux Falls Landfill, Sioux Falls, SD Address of Industry or Location of Sewer Service

PERMITTEE is authorized to discharge wastewater into the City of Sioux Falls Publicly Owned Treatment Works (POTW) at locations designated herein in accordance with the terms and conditions set forth herein.

This Specialty Wastewater Discharge Permit (SWDP) is granted in conformance with plans, specifications, and/or other data submitted in support of the WASTEWATER DISCHARGE PERMIT APPLICATION, all of which are made a part of this SWDP.

PERMITTEE shall reapply for a SWDP a minimum of thirty (30) days prior to expiration of the existing SWDP. All applications shall be in the form prescribed by the City of Sioux Falls.

This SWDP becomes effective on January 1st, 2016 and shall expire on December 31st, 2018.

Andrew Berg Environmental/Stormwater Manager
Date Signed

I. INSPECTION AND SAMPLING FACILITIES

Approved inspection and sampling facilities shall be installed at each discharge point into the City sanitary sewer system, unless otherwise specified. Sampling facilities will allow representative flow-proportionate monitoring of the total wastewater discharged. Sampling equipment is recommended and may be required by the City. The sampling facilities shall be maintained substantially as approved at all times.

II. DISCHARGE POINT(S)

Permitted discharge must be transported by an approved Liquid Waste Hauler to the City of Sioux Falls Equalization Basin for disposal.

III. ACCIDENTAL DISCHARGES

The PERMITTEE shall notify the Wastewater Superintendent, Environmental Manager, or Pretreatment Coordinator at 367-8276 or 367-8198 immediately upon becoming aware of the occurrence of a "slug" or accidental discharge of prohibited materials as established by City regulations. The notification shall include location, date, and time of discharge, type of material, concentration, volume, and proposed or implemented corrective actions.

IV. PERMIT TRANSFER

This Specialty Wastewater Discharge Permit is issued to the PERMITTEE for a specific operation and location. This SWDP is not transferable to any other location. This SWDP may be transferred to a new owner or operator if all requirements established in Sub-Chapter 53.063 of the Code of Ordinances of Sioux Falls are complied with.

V. REVOCATION OR MODIFICATION OF PERMIT

- A. The Environmental Manager may **MODIFY** this SWDP for good cause, including, but not limited to, the following reasons:
 - 1. To incorporate any new or revised federal, state, or local pretreatment standards or requirements;
 - To address significant alterations or additions to the user's operation, processes, or wastewater volume or character since the time of wastewater discharge permit issuance;
 - 3. A change in the POTW that requires either a temporary or permanent reduction or elimination of the authorized discharge;
 - 4. Information indicating that the permitted discharge poses a threat to the City's POTW, City personnel, or the receiving waters;
 - 5. To address any approved modification requests submitted by the PERMITTEE;
 - 6. Violation of any terms or conditions of the wastewater discharge permit;
 - 7. Misrepresentations or failure to fully disclose all relevant facts in the wastewater discharge permit application or in any required reporting;
 - 8. Revision of or a grant of variance from categorical pretreatment standards pursuant to 40 CFR 403.13;
 - 9. To correct typographical or other errors in the wastewater discharge permit.

- B. The Environmental Manager may **REVOKE** SWDP for good cause, including, but not limited to, the following reasons:
 - 1. Failure to notify the Environmental Manager of significant changes to the wastewater prior to the changed discharge;
 - 2. Failure to provide prior notification to the Environmental Manager of changed conditions pursuant to Sub-Chapter 53.070 of City Ordinance;
 - 3. Misrepresentation or failure to fully disclose all relevant facts in the wastewater discharge permit application;
 - 4. Falsifying self-monitoring reports;
 - 5. Tampering with monitoring equipment;
 - 6. Refusing to allow the Environmental Manager or authorized representative timely access to the facility premises and records;
 - 7. Failure to meet effluent guidance levels;
 - 8. Failure to pay fines;
 - 9. Failure to pay sewer charges;
 - 10. Failure to meet compliance schedules;
 - 11. Failure to complete a wastewater survey or the wastewater discharge permit application;
 - 12. Failure to provide advance notice of the transfer of business ownership of permitted facility; or
 - 13. Violation of any terms of the SWDP.

VI. DISCHARGE ACTION LEVELS

A. Action Levels

These action levels apply at *Monitoring Point(s) RL01, RL02* and RL03, described in Section VII. A. of this SWDP.

1. Specific Action Levels:

Specific Action Levels.							
•		Daily ¹	Instantaneous ²				
Parameter 3	<u>Units</u>	<u>Maximum</u>	<u>Maximum</u>				
a. Arsenic	mg/L	0.23	0.46				
b. Cadmium	mg/L	0.06	0.12				
c. Copper	mg/L	2.71	5.42				
d. Lead	mg/L	1.00	2.00				
e. Molybdenum	lbs/day	4	4				
f. Nickel	mg/L	0.79	1.58				
g. Selenium	mg/L	0.15	0.30				
h. Silver	mg/L	3.38	6.76				
i. Zinc	mg/L	10.00	20.00				
j. pH	SU		5.0-12.0				
k. Flow	GPD^5	140,000					
I. BTEX ⁶	mg/L	N/A	0.75				

Daily maximum is a limit indicating the maximum allowable discharge of a pollutant, monitored by a composite sample, during a 24-hour period which corresponds to the designated monitoring period.

Instantaneous maximum is a limit indicating the maximum concentration of a pollutant, monitored by a grab sample, allowed to be discharged at any specific time.

³ All limits apply at the point where the wastewater is discharged to the POTW. All concentrations and limits for metallic substances are for "total" metal unless indicated otherwise.

There will be no mass based limit for Molybdenum for this permit, although any detection of molybdenum during future monitoring may cause a modification of permit.

⁵ Flow limits are in gallons per day (GPD) for daily maximum.

⁶ BTEX shall mean the total of Benzene, Toluene, Ethylbenzene, and Xylene found in any given sample.

2. Prohibitive Discharges

- a. General Prohibitions: PERMITTEE shall not introduce or cause to be introduced into the POTW any pollutant or wastewater which causes pass through or interference. These general prohibitions apply to all users of the POTW whether or not they are subject to categorical pretreatment standards or any other national, state, or local pretreatment standards or requirements.
- b. Specific Prohibitions: PERMITTEE shall not introduce or cause to be introduced into the POTW the following pollutants, substances, or wastewater:
 - (1) Pollutants which create a fire or explosive hazard in the POTW, including, but not limited to, waste streams with a closed-cup flash point of less than 140 °F (60 °C) using the test methods specified in 40 CFR 261.21;
 - (2) Wastewater having a pH less than 5.0 or more than 12 or otherwise causing corrosive structural damage to the POTW or equipment;
 - (3) Solid or viscous substances in amounts which will cause obstruction of the flow in the POTW resulting in interference;
 - (4) Pollutants, including oxygen-demanding pollutant (BOD, etc.), released in a discharge at a flow rate and/or pollutant concentration which, either singly or by interaction with other pollutants, will cause interference with the POTW;
 - (5) Wastewater having a temperature which will inhibit biological activity in the treatment plant resulting in interference, but in no case wastewater which causes the temperature at the introduction into the treatment plant to exceed 104 °F (40 °C):
 - (6) Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin, in amounts that will cause interference or pass through;
 - (7) Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems;
 - (8) Trucked or hauled pollutants, except at discharge points designated by the Director of Water/Wastewater;
 - (9) Noxious or malodorous liquids, gases, solids, or other wastewater which, either singly or by interaction with other wastes, are sufficient to create a public nuisance or a hazard to life or to prevent entry into the sewers for maintenance or repair;
 - (10) Wastewater which imparts color which cannot be removed by the treatment process, such as, but not limited to, dye wastes and vegetable tanning solutions, which consequently imparts color to the treatment plant's effluent;
 - (11) Wastewater containing any radioactive wastes or isotopes except in compliance with applicable state or federal regulations;
 - (12) Sludges, screenings, or other residues from the pretreatment of industrial wastes:
 - (13) Wastewater causing, alone or in conjunction with other sources, the treatment plant's effluent to fail a toxicity test; or
 - (14) Fats, oils, or greases of animal or vegetable origin in amounts which will cause obstruction of the flow in sanitary sewers.
 - (15) Light water foaming agents in quantities that will cause foaming problem in POTW.

c. Pollutants, substances, or wastewater prohibited by this section shall not be processed or stored in such a manner that they could be discharged into the POTW.

VII. MONITORING REQUIREMENTS

A. Monitoring Point(s):

PERMITTEE is authorized to discharge wastewater into the City of Sioux Falls sanitary sewer system through the monitoring points listed below:

Monitoring Point	Location and Description
MPRL01	Monitoring Point RL01 will consist of the Emergency Cell Holding Tank Leachate. The monitoring point will be prior to loading leachate into an approved Liquid Waste Hauler.
MPRL02	Monitoring Point RL02 will consist of the leachate from the East Area Leachate Pre-Subtitle D Pond. The monitoring point will be prior to loading leachate into an approved Liquid Waste Hauler.
MPRL03	Monitoring Point RL03 will consist of the leachate from the West Area Leachate Subtitle D Pond. The monitoring point will be prior

to loading leachate into an approved Liquid Waste Hauler.

B. General Self-Monitoring Requirements

- 1. From the period beginning on the effective date of the SWDP until the SWDP expires, the PERMITTEE shall monitor each of the Monitoring Point(s) for the listed parameters. At a minimum, the PERMITTEE is required to perform collection and analysis of wastewater samples with the frequency and type of measurement indicated. Samples or measurements shall be representative of the discharge during normal operating conditions and shall be taken at the monitoring points specified in this SWDP. Equipment or instrumentation used for self-monitoring must be maintained and calibrated according to the manufacturer's specifications. Maintenance and calibration records must be retained on site and be available for inspection.
- All sampling, handling and preservation of samples and laboratory analysis of samples shall be performed in accordance with 40 CFR Part 136 and amendments thereto unless specified otherwise in the monitoring requirement of this permit or by Environmental Manager.
- 3. Permittee must maintain records documenting all sampling activities including proper sample labeling, log book sampling, chain of custody procedures, and other documentation related to sampling.

4. Sampling, analysis, and the collection of other information shall be performed with sufficient care to produce evidence admissible in enforcement proceedings or in judicial actions.

C. Self-Monitoring Requirements for Monitoring Point RL01, RL02 and RL03

1. Action Level Monitoring:

			Monitoring	
<u>Parameter</u>		<u>Units</u>	Frequency	Sample Types
a.	Total Metals 1	mg/L	1/6 Months	Grab ²
b.	BTEX 3	mg/L	1/6 Months ⁴	Grab
c.	VOC's 5	mg/L	1/6 Months	Grab
d.	Semi-VOC's 6	mg/L	1/6 Months	Grab
e.	Dioxins/Furans 7	mg/L	1/Year	Grab
f.	Pesticides ⁸	mg/L	1/Year	Grab
g.	TSS	mg/l	1/ Month	Grab
h.	BOD	mg/L	1/ Month	Grab
i.	COD	mg/L	1/ Month	Grab
j.	NH-3	mg/L	1/ Month	Grab
k.	TKN	mg/L	1/ Month	Grab
l.	TDS	mg/L	1/ Month	Grab
m.	TOC	mg/L	1/ Month	Grab
n.	рН	SU	1/ Month	Grab
0.	HEM	mg/L	1/6 Months	Grab
p.	HEM-SGT	mg/L	1/6 Months	Grab
q.	Flow 9	gpd	Continuous	Meter
r.	PFC's 10	ug/l	1/Year	Grab

Total Metals include: As, Cd, Cr, Cu, Pb, Hg, Mo, Ni, Se, Ag, Zn

Grab sample means a discrete sample collected or measured from a wastewater stream over a period of time not to exceed 15 minutes.

BTEX shall be measured as the sum of benzene, toluene, ethylbenzene, and xylenes.

If any visible petroleum sheen is observed in treatment system the monitoring should be performed daily.

VOC's means Volatile Organic Compounds and shall be monitored by EPA Method 624.

Semi VOC's means Semi Volatile Organic Compounds and shall be monitored by EPA Method 625.

Dioxins and Furans shall be monitored by EPA Method 1613.

Pesticides shall be monitored by EPA Method 608.

PERMITTEE shall monitor for Total Flow from all monitoring points each month. Flows must be monitored continuously by the PERMITTEE using a totalizing flow meter or other acceptable method approved by Environmental Manager. The meter or other approved method shall be installed, calibrated, and maintained to ensure its accuracy is consistent with accepted engineering standards and capabilities.

¹⁰ PFC's means Perfluorochemicals.

VIII. EMERGENCY: IMMEDIATE CESSATION OF DISCHARGE AND NOTIFICATION REQUIREMENT

- A. If at any time the PERMITEE has knowledge of one of the following, the PERMITTEE must immediately cease discharge and immediately notify the Industrial Pretreatment Program at 367-8276, 367-8198 or 911.
 - a. Visual discharge of free petroleum product
 - b. Prohibitive Discharge as described in Section VI. A. 2 of SWDP occurs
 - c. Action levels established in Section VI. A. 1. of SWDP is exceeded
- B. PERMITTEE shall post a permanent notice on an employee bulletin board or other prominent place advising employees how to notify the Industrial Pretreatment Program in the event of an emergency discharge described in VIII. A. of this part.

IX. REPORTING REQUIREMENTS

A. Self-Monitoring Reports

PERMITTEE shall report all self-monitoring sampling results for the pollutant parameters monitored during the preceding month. Forms provided by the Environmental Division shall be used for reporting. Equivalent forms may be used if approved by the Environmental Manager.

If the PERMITTEE monitors any regulated pollutants at designated permit sampling point(s) more frequently than required by this permit, using test procedures prescribed in 40 CFR Part 136 or amendments thereto, or otherwise approved by EPA, or as specified in this permit, the results of such monitoring shall be included with the self-monitoring report. If there is no discharge during the entire reporting period, monitoring reports shall be submitted designating "NO DISCHARGE."

B. Submittal of Reports

PERMITTEE shall submit reports to the following address:

Environmental/Stormwater Manager City of Sioux Falls Environmental Division 1017 East Chambers Street Sioux Falls, SD 57104-1201

C. Report Due Dates

- Monitoring results obtained during any month shall be reported on the following Monthly Self-Monitoring Reports. PERMITTEE shall use forms provided by the CITY. Equivalent forms may be used if approved by Environmental Manager.
 - a. Monthly Self-Monitoring Report must be received or postmarked no later than the **15th** of the following month.
 - b. If there is no discharge during the entire monitoring period, monitoring reports shall still be submitted designating "no discharge" and any available results or data.

D. Certification

All applications and reports submitted to the City of Sioux Falls must contain the following certification statement and be signed by an Authorized Representative of the PERMITTEE as required within this section:

"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 submitted 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."

E. Authorized Representative

- 1. For the purpose of this section, an authorized representative shall be defined as follows:
 - A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or.
 - b. The manager of one or more manufacturing, production, or operation facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- 2. A general partner or proprietor if the Industrial User submitting the reports is a partnership or sole proprietorship respectively.
- 3. The principal executive officer or director having responsibility for the overall operation of the discharging facility if the Industrial User submitting the reports is a Federal, State, or local governmental entity, or their agents.
- 4. A duly authorized representative of the individual designated in paragraph (1), (2), or (3) of this section if:
 - a. The authorization is made in writing by the individual described in paragraph (1), (2), or (3);
 - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the facility from which the Industrial Discharge originates, such as the position of plant manager, operator of a well, or a well field superintendent, or a position of equivalent responsibility, or having overall responsibility for environmental matters for the company; and
 - c. The written authorization is submitted to the City.
- 5. If an authorization under paragraph (4) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, or overall responsibility for the environmental matters for the company, a new authorization satisfying the requirements of paragraph (4) of this section must be submitted to the City prior to or together with any reports to be signed by an authorized representative.

X. OTHER CONDITIONS AND REQUIREMENTS

A. Records Maintenance

- 1. PERMITTEE must maintain records of all information resulting from any monitoring activities for a minimum period of **three years**. All calibration, maintenance records, and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and all data used to complete the permit must be maintained by the PERMITTEE. All records subject to Administrative enforcement or litigation activities shall be retained and preserved by the PERMITTEE until all enforcement activities have concluded and all periods of limitation with respect to any and all appeals have expired. Such record will include for all samples:
 - a. The date, exact place, method, and time of sampling and the names of person or persons taking the samples;
 - b. The date the analyses were performed;
 - c. Who performed the analyses;
 - d. Analytical technique/methods used; and
 - e. The results of such analysis.
- 2. Records shall be made available for inspection and copying by the City or its representatives at any time.

B. Hazardous Waste Notification

The PERMITTEE shall notify the POTW, the EPA Regional Waste Management Division Director, and State hazardous waste authorities in writing of any discharge into the POTW of a substance, which, if otherwise disposed of, would be a hazardous waste under 40 CFR Part 261. Such notification must include the name of the hazardous waste as set forth in 40 CFR Part 261, the EPA hazardous waste number, and the type of discharge (continuous, batch, or other). If the PERMITTEE discharges more than 100 kilograms of such waste per calendar month to the POTW, the notification shall also contain the following information to the extent such information is known and readily available to the Industrial User: An identification of the hazardous constituents contained in the wastes, an estimation of the mass and concentration of such constituents in the waste stream discharged during that calendar month, and an estimation of the mass of constituents in the waste stream expected to be discharged during the following 12 months. All notifications must take place within 180 days of the effective date of the rule. Industrial users who commence discharging after the effective date of the rule shall provide the notification no later than 180 days after the discharge of the listed or characteristic hazardous waste. Any notification under this paragraph need be submitted only once for each hazardous waste discharged. However, notifications of changed discharges must be submitted under 40

CFR 403.12 (j). The notification requirement in this section does not apply to pollutants already reported under self-monitoring requirements of 40 CFR 403.12 (b), (d), and (e). Time limits for notification and other regulatory requirements are contained in 40 CFR Part 403.12 (p) (1), (2), (3), and (4).

C. Bypass of Treatment Facilities

1. Bypass not exceeding action levels. The PERMITTEE may allow any bypass to occur which does not cause effluent action levels in this SWDP to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2. and 3. of this section.

2. Notice:

- a. Anticipated bypass. If the PERMITTEE knows in advance of the need for a bypass, it shall submit prior notice at least 30 days before the date of the bypass to the Environmental Manager.
- b. Unanticipated bypass. The PERMITTEE shall submit notice of an unanticipated bypass to the Environmental Manager within 24 hours after becoming aware of it.

3. Prohibition of bypass:

- a. Bypass is prohibited. However, the Environmental Manager may defer enforcement action against a PERMITTEE if the following conditions are met:
 - (1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage.
 - (2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. Potential economic loss will not necessarily render an alternative infeasible. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
 - (3) PERMITTEE submitted notices as required under Sec. X.C.2.
- b. The Environmental Manager may approve an anticipated bypass, after considering its adverse effects, if it is determined the bypass meets the three conditions listed above in paragraph 3.a. of this section.

D. Proper Operation and Maintenance

The PERMITTEE shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the PERMITTEE to achieve compliance with the conditions of this SWDP. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a PERMITTEE only when the operation is necessary to achieve compliance with the conditions of the SWDP.

E. Notification of Process Changes

PERMITTEE shall notify the Environmental Manager immediately upon becoming aware of any process change, whether same be a termination of an existing process or addition of a new process, that affects the volume or the characteristics of the wastewater discharged.

F. Right of Entry

Duly authorized employees of the City shall be permitted to enter all properties for the purpose of inspection, observation, measurement, sampling and testing pertinent to discharges entering the sanitary sewer system. Authorized employees may obtain information concerning industrial processes which have a direct bearing on the kind and source of discharge to the wastewater collection system.

G. **Dilution Prohibition**

Industrial user shall not increase the use of process water or in any manner dilute a discharge as a substitute for adequate treatment to achieve meet any Action Levels.

H. Industrial Pretreatment Fees

Industrial user is subject to the fees established in Sub-Chapter 110.036 of the Code of Ordinances of Sioux Falls

I. Reapplication

If user desires to continue discharge after expiration of this SWDP, reapplication shall be made at least 30 days before this SWDP expires. During the interim period between expiration of this SWDP and the reissuance of a new SWDP (if such period should occur) all requirements and conditions contained in this SWDP shall remain fully in effect until the next SWDP is issued.

J. Federal and/or State Laws

Nothing in this SWDP is intended to affect any pretreatment standards or prohibitions established by State or Federal Law.

L. Confidentiality

Information and data on a user obtained from reports, surveys, wastewater discharge permit applications, wastewater discharge permits, and monitoring programs, and from manager's inspections and sampling activities, shall be available to the public without restriction, unless the user specifically requests, and is able to demonstrate to the satisfaction of manager, that the release of such information would divulge trade secrets entitled to protection under applicable state law. Effluent monitoring data shall be available to the public without restriction.

M. Severability

If any provision, paragraph, word or section of this SWDP is invalidated by any court of competent jurisdiction, the remaining provisions, paragraphs, words or sections shall not be affected and shall continue in full force and effect for life of SWDP.

XI. COMPLIANCE SCHEDULE

A. There is no compliance schedule for this PERMITTEE.

XII. SPECIAL CONDITION(S)

- A. Daily Observation Records Required
 - PERMITTEE is required to observe wastewater daily for changed conditions, presence or absence of sheen, free product or any other visual or physical evidence of possible contamination or non-compliance issues.
 - 2. PERMITTEE is required to keep written daily logs documenting these observations.

B. Action Levels

 Any exceedance of the Action Levels set forth in this SWDP will not result in a violation of that parameter. Action Levels will be used to determine whether the City of Sioux Falls may need to cease the discharge, modify conditions of the discharge to the City of Sioux Falls or categorize the PERMITTEE as a Significant Industrial User which would require formal permitting in accordance with Sub-Chapters 53.050 and 53.051 of the Code of Ordinances of Sioux Falls.



DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

February 1, 2012

Mark Cotter City of Sioux Falls 224 West 9th Street Sioux falls, SD 57104-6407

Re: General Permit for Temporary Discharge Activities: (SDG070944)

Dear Mr. Cotter:

Your request meets the application requirements of the *South Dakota Surface Water Discharge System General Permit for Temporary Discharge Activities in South Dakota*. Sioux Falls Regional Sanitary Landfill has been assigned the permit number listed above.

With the submission of your application, you are hereby granted authorization to discharge as described in the Notice of Intent form. The discharge authorization provided under this permit extends only to the location and activities specifically described in the Notice of Intent form that you have submitted.

Please thoroughly read over the permit before beginning to discharge. The permit requires ongoing monitoring. You are also required to submit a **Notice of Termination** form located in Attachment B upon the completion of your project.

As stated in the permit, this approval does not convey any property rights of any sort, nor does it authorize any injury to private property. These issues must be settled with the affected landowners.

Thank you for your interest in protecting the natural resources of South Dakota. If you have any questions, please contact me at (605) 773-3351.

Sincerely,

Bret C. Graves

Natural Resource Project Scientist

SDDENR/Surface Water Quality Program

Enclosure

Permit No.: SDG070944

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES JOE FOSS BUILDING 523 EAST CAPITOL AVENUE PIERRE, SOUTH DAKOTA 57501-3181

AUTHORIZATION TO DISCHARGE UNDER THE

SURFACE WATER DISCHARGE SYSTEM

In compliance with the provisions of the South Dakota Water Pollution Control Act and the Administrative Rules of South Dakota (ARSD), Chapters 74:52:01 through 74:52:11,

City of Sioux Falls

is authorized to discharge from the Sioux Falls Regional Sanitary Landfill

to Cherry Creek

in accordance with discharge point(s), effluent limits, monitoring requirements and other conditions set forth herein. Authorization for discharge is limited to those outfalls specifically listed in the permit.

This permit shall become effective September 1, 2011.

This permit and the authorization to discharge shall expire at midnight, August 31, 2016.

Signed this 30th day of August, 2011

Steven M. Pirner

Secretary

Department of Environment and Natural Resources

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DEFINITIONS

30-day (and monthly) average means the arithmetic average of all samples collected during a consecutive 30-day period or calendar month, whichever is applicable. The calendar month shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms.

7-day (and weekly) average means the arithmetic mean of all samples collected during a consecutive 7-day period or calendar week, whichever is applicable. The calendar week which begins on Sunday and ends on Saturday, shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms. Weekly averages shall be calculated for all calendar weeks with Saturdays in the month. If a calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for that calendar week shall be included in the data for the month that contains the Saturday.

ARSD means the Administrative Rules of South Dakota.

An Authorized Release is a discharge from a permitted outfall that meets all permit conditions and effluent limits.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the state. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage, or leaks, sludge, or waste disposal, or drainage from raw material storage.

BTEX means the sum of the concentrations of benzene, ethyl benzene, toluene, and xylene.

A **Bypass** is the intentional diversion of waste streams from any portion of a treatment facility.

Composite samples shall be flow proportioned. The composite sample shall contain at least four samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample shall not be less than six hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:

- a. Constant time interval between samples, sample volume proportional to flow rate at time of sampling;
- b. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time the sample was collected may be used;
- c. Constant sample volume, time interval between samples proportional to flow (i.e. sample taken every "X" gallons of flow); and
- d. Continuous collection of sample, with sample collection rate proportional to flow rate.

Daily Maximum (Daily Max.) is the maximum value allowable in any single sample or instantaneous measurement.

DMR means Discharge Monitoring Report.

EPA or **U.S. EPA** means United States Environmental Protection Agency.

Existing Source means any building, structure, facility or installation from which there is or may be a discharge of pollutants, which is not considered a New Source.

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A **grab** sample, for monitoring requirements, is a single "dip and take" sample collected at a representative point in the discharge stream.

gpm means gallons per minute.

An **instantaneous** measurement, for monitoring requirements, is a single reading, observation, or measurement either taken at the facility or within 15 minutes of the sample.

New Source means any building, structure, facility or installation from which there is or may be a discharge of pollutants, the construction of which commenced after the publication of proposed Pretreatment Standards under Section 307(c) of the Federal Clean Water Act which will be applicable to such source if such Standards are thereafter promulgated in accordance with that section, provided that:

- a. The building, structure, facility or installation is constructed at a site at which no other source is located; or
- b. The building, structure, facility or installation totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or
- c. The wastewater generating processes of the building, structure, facility, or installation are substantially independent of an existing source at the same site. In determining whether these are substantially independent, factors such as the extent to which the new facility is integrated with the existing plant, and the extent to which the new facility is engaged in the same general type of activity as the existing source should be considered.

Construction on a site at which an existing source is located results in a modification rather than a new source if the construction does not create a new building, structure, facility or installation meeting the criteria of (b.) or (c.) of this section but otherwise alters, replaces, or adds to existing process or production equipment. Construction of a new source has commenced if the owner or operator has:

- a. Begun, or caused to begin as part of a continuous onsite construction program:
 - (1) Any placement, assembly, or installation of facilities or equipment; or
 - (2) Significant site preparation work including clearing, excavation, or removal of existing buildings, structures, or facilities which is necessary for the placement, assembly, or installation of new source facilities or equipment.
- b. Entered into a binding contractual obligation for the purchase of facilities or equipment which are intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts of feasibility, engineering, and design studies do not constitute a contractual obligation under this paragraph.

pH is the measure of the hydrogen ion concentration of water or wastewater; expressed as the negative log of the hydrogen ion concentration. A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic.

Process Wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product.

SDDENR means the South Dakota Department of Environment and Natural Resources.

Secretary means the Secretary of the South Dakota Department of Environment and Natural Resources, or authorized representative.

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Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

Sewage Sludge is any solid, semi-solid or liquid residue that contains materials removed from domestic sewage during treatment. Sewage sludge includes, but is not limited to, primary and secondary solids and sewage sludge products.

TSS means **Total Suspended Solids**. TSS is a measure of the filterable solids present in a sample.

An **Unauthorized release** is a discharge from the lower end of the treatment or containment system through a release structure or over or through retention dikes that does not meet all permit conditions or effluent limits.

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

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Permit No: SDG070944

1.0 COVERAGE UNDER THIS PERMIT

1.1 Applicability of the General Permit

This general permit is potentially applicable to all facilities conducting temporary discharge activities within the State of South Dakota. The water discharged from these activities must be relatively uncontaminated and must not cause a violation of the South Dakota Surface Water Quality Standards.

1.2 Discharges Covered

The following types of discharges may be covered under this general permit:

- 1. Discharges of storm water and ground water from construction dewatering activities.
- 2. Discharges of water used for hydrostatic testing of vessels and pipelines.
- 3. Discharges of water from pump testing of wells.
- 4. Discharges of water from swimming pools, hot tubs, and other similar structures.
- 5. Discharges of petroleum contaminated ground water.
- 6. Discharges of ground water with other contaminants. The limits for these contaminants will be set on a case by case basis at the Surface Water Quality Standard for that pollutant.
- 7. Other short term discharges of relatively uncontaminated water.

1.3 Discharges Not Covered

The following discharges are not authorized by this general permit:

- 1. **Section 404 Permitted Discharges.** This general permit does not authorize a permittee to discharge fill material into waters of the state. Such discharges are required to obtain a Section 404 federal Clean Water Act permit from the U.S. Army Corps of Engineers.
- 2. **Discharges Threatening Water Quality.** This general permit does not authorize discharges the Secretary determines will cause, or have reasonable potential to cause or contribute to, violations of water quality standards. In such cases, the Secretary may deny coverage under the general permit or require the permittee to obtain an individual Surface Water Discharge permit.
- 3. **Discharges of Regulated Substances.** This general permit does not authorize the discharge of regulated substances, hazardous substances, or oil resulting from on-site spills. Permittees are subject to federal reporting requirements of 40 CFR Part 110, Part 117, and Part 302 relating to spills or other releases of oils or hazardous substances. Spills in excess of reportable quantities shall be immediately reported. Spills resulting in a sheen to water bodies must be immediately reported to the National Response Center at 800-424-8802.

1.4 Request for Authorization

In order to be considered eligible for authorization to discharge wastewater under the terms and conditions of this permit, the owner, operator, and/or authorized agent of any facility desiring to discharge must complete and submit, a Notice of Intent form and a Certification of Applicant form (located in Attachment A at the end of this permit) at least thirty days prior to the first anticipated date of discharge. This submittal shall also be considered a request for a temporary water use permit, if required.

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Such information shall be submitted to the following address:

original to: South Dakota Department of Environment and Natural Resources

Surface Water Quality Program

Joe Foss Building

PMB2020

523 East Capitol

Pierre, South Dakota 57501-3182 Telephone: (605) 773-3351

The permit issuing authority shall have up to thirty days after receipt of the Notice of Intent form to request additional data and/or deny the authorization under this general permit for any particular discharge. For existing individually authorized discharges, coverage under the general permit will not be effective unless and until the individual permit is either revoked or inactivated. SDDENR may waive, at its discretion, the thirty-day period.

1.5 Terminating Coverage

- 1. Permittees wishing to terminate coverage under this general permit shall submit a Notice of Termination (NOT) signed in accordance with Section 4.14. The NOT form is found in Attachment B. Compliance with this general permit is required until a NOT is submitted and general permit coverage has been terminated.
- 2. Permittees shall not submit a NOT until all discharges authorized by this general permit are eliminated.
- 3. Permittees shall submit a NOT within thirty (30) days after all authorized discharges have ceased.

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2.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

2.1 Effluent Limits

Effective immediately and lasting through the life of this permit, the quality of effluent discharged by the facility shall, as a minimum, meet the limits as set forth below:

- 1. There shall be no discharge of any process-generated wastewater except wastewater resulting from activities described in the Notice of Intent Form and authorized by the Secretary.
- 2. Collected screenings, grit, solids, sludges, or other pollutants removed in the course of treatment shall be disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard. Sludge/digestor supernatant and filter backwash shall not be directly blended with or enter either the final plant discharge and/or waters of the State.
- 3. There shall be no discharge of sanitary wastewater from toilets or related facilities.
- 4. There shall be no discharge of floating solids or visible foam in other than trace amounts.
- 5. There shall be no discharge of toxic pollutants in toxic amounts.
- 6. No chemical may be added to the discharge unless prior permission for the use of the additive is specifically granted by the SDDENR.
- 7. The permittee shall take such steps as are necessary to prevent or minimize stream scouring or bank erosion caused by the discharge.

Limits for Oil and Grease

8. The concentration of Oil and Grease in any single sample shall not exceed 10 mg/L nor shall there be a visible sheen in the discharge OR

Limits for pH

9. The pH of the discharged water shall not be less than 6.5 standard units nor greater than 9.0 standard units at all times.

Limits for TSS

10. The Total Suspended Solids concentration shall not exceed 90 mg/L in any single sample.

Limits for potentially petroleum contaminated water

- 11. The total BTEX concentration shall not exceed 100 μg/L in any single sample. BTEX shall be measured as the sum of benzene, ethyl benzene, toluene, and xylene.
- 12. The benzene concentration shall not exceed 5 μ g/L in any single sample.

Limits for potentially toxics contaminated water

13. The individual toxics concentrations shall not exceed the values established on a case by case basis from the acute aquatic life water quality standards in any single sample.

Limits for potentially chlorinated water

14. The total residual chlorine concentration shall be non-detectable at the point the discharge enters the receiving waters in all samples. SDDENR considers the analytical detection limit for total

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residual chlorine to be $0.05\ mg/L$. Any sample results less than $0.05\ mg/L$ will be considered non-detectable.

2.2 Self-Monitoring and Reporting Requirements

- 1. Daily logs. The permittee shall maintain a daily log relating to any discharge(s). The log shall contain:
 - a. flow information and data:
 - b. sample results;
 - c. records of visual observations; and
 - d. notations of any problems relating to treatment of the discharge.
- 2. Samples shall be taken as often as necessary to provide representative information as to the nature and volume of the discharge(s). At a minimum, samples of each discharge shall be taken as follows:

Parameter	Sample Frequency ¹	Sample Type ²
Flow Rate (gpm)	Daily	Measure or Estimate
Total Flow Volume (gallons)	Monthly	Measure or Estimate
pH (s.u.)	Weekly	Instantaneous ³
Oil and Grease	Daily	Visual
Oil and Grease (mg/L)	Contingent	Grab ^{4,5}
Total Suspended Solids ⁶ (mg/L)	Weekly	Visual/Grab
Benzene ⁷ (µg/L)	Weekly	Grab
Total BTEX ⁷ (µg/L)	Weekly	Grab
Toxics ⁸ (µg/L)	Weekly	Grab
Total Residual Chlorine ⁹ (mg/L)	Daily	Grab

¹ If the duration of the discharge is shorter than the required sample frequency, a minimum of one sample shall be taken for all parameters.

3. If sampling performed by the permittee indicates a violation, the permittee shall notify SDDENR in accordance with the provisions in **Part 4.8** of this permit. The permittee shall also repeat the sampling and analysis and submit the results of the repeat analysis to the department within thirty days after becoming aware of the violation.

² See definitions section of permit for definitions.

³ pH shall be taken within 15 minutes of sample collection with a pH meter. The pH meter must be capable of simultaneous calibration to two points on the pH scale that bracket the expected pH and are approximately three standard units apart. The pH meter must read to 0.01 standard units and be equipped with temperature compensation adjustment.

⁴ Oil and grease shall be visually monitored daily. If a visual sheen is observed, an oil and grease sample shall be taken and analyzed using SM5520 hexane extractable materials. An oil and grease sample shall be taken during the first day of the discharge if petroleum contaminated groundwater is expected.

⁵ An oil and grease sample shall be taken during the first day of the discharge if petroleum contaminated ground water is expected.

⁶ In lieu of sampling for this parameter, the secretary may allow the facility to implement a pollution prevention plan that includes best management practices to prevent total suspended solids and other pollutants from entering the waters of the state.

⁷ Benzene and BTEX monitoring is only required if petroleum contamination is expected in the water being discharged. This monitoring will be required by the department on a case by case basis.

⁸ The specific toxics to be monitored for will be determined on a case by case basis based on the potential contamination at that site.

⁹ Total Residual Chlorine monitoring is only required for the discharge of potentially chlorinated water. This monitoring will be required by the department on a case by case basis.

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There shall be no discharge of floating solids or visible pollutants in more than trace amounts.

There shall be no discharge of process wastewater not identified in NOI or sanitary wastewater.

No chemicals shall be added to the discharge without prior approval of SDDENR.

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3.0 POLLUTION PREVENTION PLANS

3.1 Deadlines for Plan Preparation and Compliance

If the permittee develops a pollution prevention plan instead of TSS sampling, the plan must be developed and implemented prior to discontinuing TSS sampling.

3.2 Contents of the Plan

The plan shall include, at a minimum, the following items:

1. Site Description

Each plan shall provide a description of pollutant sources and other information as indicated below:

- a. The type of temporary discharge activity;
- b. Estimates of the total volume of water to be discharged;
- c. The name of the receiving waters; and
- d. A Site map indicating:
 - (1) Drainage patterns;
 - (2) Location of major structural and nonstructural controls identified in the plan;
 - (3) Location of areas where stabilization practices are expected to occur;
 - (4) Surface waters and extent of wetland acreage; and
 - (5) Location of discharge point(s).

2. Best Management Practices

The plan shall describe appropriate best management practices and when and where they will be implemented for each temporary discharge activity identified in the Notice of Intent.

3. **Inspection Requirements**

The permittee shall ensure that qualified personnel inspect the site on a daily basis. The inspection shall include the temporary discharge site, areas where the best management practices are being implemented, and the discharge location. These areas shall be inspected to ensure that the best management practices are operating correctly and for evidence of, or the potential for, pollutants entering the receiving waters. If any pollutants are suspected of being discharged, a sample must be taken for those parameters listed in **part 2.2** of this permit.

The permittee shall maintain a notebook recording information obtained during the inspection. At a minimum, the notebook shall include the following:

- a. Date and time of the inspection;
- b. Name of the inspector(s);
- c. Identification of operational problems and/or maintenance problems;
- d. Recommendations, as appropriate, to remedy identified problems;
- e. A brief description of any actions taken with regard to problems identified; and
- f. Other information, as appropriate.

The permittee shall maintain the notebook in accordance with proper record-keeping procedures and shall make the notebook available for inspection, upon request, by the Secretary or the U.S. Environmental Protection Agency.

3.3 Signature and Plan Review

1. The plan shall be signed in accordance with the signatory requirements and retained at the site where the temporary discharge is occurring.

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2. The permittee shall make plans available upon request to the Secretary and in the case of a discharge through a municipal separate storm sewer system, to the operator of the municipal system.

3. The Secretary may notify the permittee at any time that the plan does not meet the minimum requirements of this part. Such notification shall identify those provisions of the permit which are not being met by the plan and identify which provisions require modifications in order to meet the minimum requirements. Within seven days of notification, the permittee shall make the required changes to the plan and shall submit to the Secretary a written certification that the requested changes have been made.

3.4 Keeping Plans Current

The permittee shall amend the plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to the waters of the state. The plan shall also be amended if the plan proves to be ineffective in eliminating or significantly minimizing pollutants present in the temporary discharge.

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4.0 MONITORING, RECORDING AND REPORTING REQUIREMENTS

4.1 Representative Sampling

Samples taken in compliance with the monitoring requirements established under **Part 2.2** shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge.

4.2 Monitoring Procedures

Monitoring must be conducted according to test procedures approved under ARSD 74:52:03:06, a.b.r. 40 CFR, Part 136, unless other test procedures have been specified in this permit.

4.3 Reporting of Monitoring Results

Effluent monitoring results obtained during the previous month shall be summarized and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. If no discharge occurs during the reporting period, "no discharge" shall be reported. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the **Signatory Requirements** (see Part 4.14), and submitted to the Secretary at the following address:

original to: South Dakota Department of

Environment and Natural Resources Surface Water Quality Program

PMB 2020 Joe Foss Building 523 East Capitol Avenue

Pierre, South Dakota 57501-3182

4.4 Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

4.5 Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under ARSD 74:52:03:06, a.b.r. 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.

4.6 Records Contents

Records of monitoring information shall include:

- 1. The date, exact place, and time of sampling or measurements;
- 2. The initials or name(s) of the individual(s) who performed the sampling or measurements;
- 3. The date(s) analyses were performed;
- 4. The time analyses were initiated;
- 5. The initials or name(s) of individual(s) who performed the analyses;
- 6. References and written procedures, when available, for the analytical techniques or methods used; and,

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7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

4.7 Retention of Records

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Secretary at any time. Data collected on site, copies of Discharge Monitoring Reports, and a copy of this permit must be maintained on site during the duration of activity at the permitted location.

4.8 Twenty-four Hour Notice of Noncompliance Reporting

- 1. The permittee shall report any noncompliance which may endanger health or the environment as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of the circumstances. The report shall be made to the State of South Dakota at (605) 773-3231 and the EPA, Region VIII, Emergency Response Branch at (303) 293-1788.
- 2. The following occurrences of noncompliance shall be reported by telephone to the Secretary at (605) 773-3351 by the first workday (8:00 a.m. 5:00 p.m. Central Time) following the day the permittee became aware of the circumstances:
 - a. Any unanticipated bypass which exceeds any effluent limit in the permit (See Part 5.6 Bypass of Treatment Facilities);
 - b. Any upset which exceeds any effluent limit in the permit (See Part 5.7 Upset Conditions); or
 - c. Violation of a maximum daily discharge limit for any of the pollutants listed in the permit to be reported within 24 hours.
- 3. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:
 - a. A description of the noncompliance and its cause;
 - b. The period of noncompliance, including exact dates and times;
 - The estimated time noncompliance is expected to continue if it has not been corrected;
 and,
 - d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
- 4. The Secretary may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Surface Water Quality Program, South Dakota Department of Environment and Natural Resources, Pierre. (605) 773-3351.
- 5. Reports shall be submitted to the addresses in **Part 4.3 Reporting of Monitoring Results**.

4.9 Other Noncompliance Reporting

Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for **Part 4.3** are submitted. The reports shall contain the information listed in **Part 4.8.3**.

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4.10 Changes in Discharge of Toxic Substances

Notification shall be provided to the Secretary as soon as the permittee knows of, or has reason to believe that any activity has occurred or will occur which would result in the discharge of a toxic pollutant, as defined in ARSD 74:52:01:01, which is not limited in the permit and if that discharge will exceed the highest of the following notification levels:

- 1. One hundred micrograms per liter (100 μ g/L);
- 2. Two hundred micrograms per liter (200 μg/L) for acrolein and acrylonitrile;
- 3. Five hundred micrograms per liter (500 μ g/L) for 2,4-dinitrophenol and for 2-methyl-4, 6-dinitrophenol;
- 4. One milligram per liter (1 mg/L) for antimony; or
- 5. Five (5) times the maximum concentration value reported for that pollutant in the permit application.

4.11 Planned Changes

The permittee shall give notice to the Secretary as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when the alteration or addition could significantly change the nature or increase the quantity of pollutant discharged. This notification applies to pollutants which are not subject to effluent limits in the permit. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source (see ARSD, Chapter 74:52:01:01(30)).

4.12 Duty to Provide Information

The permittee shall furnish to the Secretary, within a reasonable time, any information which the Secretary may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Secretary, upon request, copies of records required to be kept by this permit.

4.13 Other Information

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Secretary, it shall promptly submit such facts or information.

4.14 Signatory Requirements

All applications, reports or information submitted to the Secretary shall be signed and certified.

- 1. All permit applications shall be signed as follows:
 - a. For a corporation: by a responsible corporate officer;
 - b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively;
 - c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.
- 2. All reports required by the permit and other information requested by the Secretary shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by a person described above and submitted to the Secretary; and,

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b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

- 3. Changes to authorization. If an authorization under paragraph 2 of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph 2 of this section must be submitted to the Secretary prior to or together with any reports, information, or applications to be signed by an authorized representative.
- 4. Certification. Any person signing a document under this section shall make the following certification:

"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 submitted 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."

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Permit No: SDG070944

5.0 COMPLIANCE RESPONSIBILITIES

5.1 Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give the director advance notice of any planned changes at the permitted facility or of an activity which may result in permit noncompliance.

5.2 Continuation of the Expired General Permit

- 1. An expired general permit continues in force and effect until a new general permit is issued. Any permittee with coverage under the general permit at the time of expiration will continue to have coverage until a new general permit is issued.
- 2. If the permittee wishes to continue an activity regulated by this general permit after its expiration date, the permittee must submit a Notice of Intent. Periodically during the term of this permit and at the time of reissuance, the permittee may be requested to reaffirm its eligibility to discharge under this general permit.

5.2 Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

5.3 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. However, the permittee shall operate, as a minimum, one complete set of each main line unit treatment process whether or not this process is needed to achieve permit effluent compliance.

5.4 Need to Halt or Reduce Activity not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

5.5 Inspection and Entry

The permittee shall allow the Secretary or EPA, upon the presentation of credentials and other documents as may be required by law, to:

- 1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- 2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- 3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,
- 4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

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Permit No: SDG070944

5.6 Bypass of Treatment Facilities

1. Bypass not exceeding limits. The permittee may allow any bypass to occur which does not cause effluent limits to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2 and 3 of this section.

2. Notice:

- a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 60 days before the date of the bypass.
- b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under **Part 4.8 Twenty-four Hour Notice of Noncompliance Reporting**.
- 3. Prohibition of bypass.
 - a. Bypass is prohibited and the Secretary may take enforcement action against a permittee for a bypass, unless:
 - (1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
 - (2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,
 - (3) The permittee submitted notices as required under paragraph 2. of this section.
 - b. The Secretary may approve an anticipated bypass, after considering its adverse effects, if the Secretary determines that it will meet the three conditions listed above in paragraph 3.a. of this section.

5.7 Upset Conditions

- 1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limits if the requirements of paragraph 2. of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review (i.e., Permittees will have the opportunity for a judicial determination on any claim of upset only in an enforcement action brought for noncompliance with technology-based permit effluent limits).
- 2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - a. An upset occurred and that the permittee can identify the cause(s) of the upset;
 - b. The permitted facility was at the time being properly operated;
 - c. The permittee submitted notice of the upset as required under **Part 4.8 Twenty-four Hour Notice of Noncompliance Reporting**; and

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d. The permittee complied with any remedial measures required under Part 5.2 – Duty to Mitigate.

3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

5.8 Toxic Pollutants

The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Federal Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

5.9 Anticipated Noncompliance

The permittee shall give advance notice to the Secretary of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

5.10 Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

5.11 Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application should be submitted at least 180 days before the expiration date of this permit.

5.12 Availability of Reports

Except for data determined to be confidential under ARSD 74:52:02:17, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of SDDENR and EPA. Permit applications, permits and effluent data shall not be considered confidential.

5.13 Property Rights

The Secretary's issuance of this permit, adoption of design criteria, and approval of plans and specifications, does not convey any property rights of any sort, any exclusive privileges, any authorization to damage, injure or use any private property, any authority to invade personal rights, any authority to violate federal, state or local laws or regulations, or any taking, condemnation or use of eminent domain against any property owned by third parties. The State does not warrant that the permittee's compliance with this permit, design criteria, approved plans and specifications, and operation under this permit, will not cause damage, injury or use of private property, an invasion of personal rights, or violation of federal, state or local laws or regulations. The permittee is solely and severally liable for all damage, injury or use of private property, invasion of personal rights, infringement of federal, state or local laws and regulations, or taking or condemnation of property owned by third parties, which may result from actions taken under the permit.

5.14 Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

5.15 Requiring an Individual Permit or an Alternative General Permit

The Secretary may either deny coverage or require any person requesting coverage under the general permit to apply for, and obtain, an individual Surface Water Discharge permit or an alternative general permit. Cases where an individual or alternative general permit may be required include, but are not limited to the following:

1. The permittee is not incompliance with the conditions of the general permit;

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2. A change has occurred in the availability of demonstrated technologies or practices for the control or abatement of pollutants applicable to construction sites;

- 3. Effluent limitation guidelines are promulgated for point sources covered by this general permit;
- 4. A water quality management plan containing requirements applicable to discharges covered by this general permit is approved;
- 5. The discharge is a significant contributor of pollution to waters of the state or it presents a health hazard; or
- 6. The discharge is to an impaired water body where the best management practices are not sufficient to implement the assigned waste load allocations.

5.16 Transfers

This permit may be automatically transferred to a new permittee if:

- 1. The current permittee notifies the Secretary at least 30 days in advance of the proposed transfer date:
- 2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,
- 3. The Secretary does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2. above.

5.17 Reopener Provision

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limits (and compliance schedule, if necessary), or other appropriate requirements if one or more of the following events occurs:

- 1. <u>Water Quality Standards</u>: The water quality standards of the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.
- 2. <u>Total Maximum Daily Load</u>: Additional controls in the permit are necessary to implement a total maximum daily load approved by the Secretary and/or EPA.
- 3. <u>Water Quality Management Plan</u>: A revision to the current water quality management plan is approved and adopted which calls for different effluent limits than contained in this permit.

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Permit No: SDG070944

6.0 PENALTIES FOR NONCOMPLIANCE

6.1 Penalties for Violations of Permit Conditions

Any person who violates a permit condition shall, upon conviction, be punished by a Class 1 misdemeanor. In addition to a jail sentence authorized by SDCL 22-6-2, a Class 1 misdemeanor imposed by SDCL, Chapter 34A-2, is subject to a criminal fine not to exceed ten thousand dollars per day of violation. The violator is also subject to a civil penalty not to exceed ten thousand dollars per day of violation, for damages to the environment of this state. Except as provided in permit conditions on Part 5.6 – Bypass of Treatment Facilities and Part 5.7 – Upset Conditions, nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

6.2 Penalties for Tampering

Any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit is in violation of the provisions of SDCL 34A-2-77, and is subject to penalties under SDCL 34A-2-75. In addition to a jail sentence authorized by SDCL 22-6-2, such violators are subject to a criminal fine not to exceed ten thousand dollars per day of violation. The violator is also subject to a civil penalty not to exceed ten thousand dollars per day of violation, or for damages to the environment of this state.

6.3 Penalties for Falsification of Reports

Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a Class 1 misdemeanor. In addition to a jail sentence authorized by SDCL 22-6-2, a Class 1 misdemeanor imposed by SDCL, Chapter 34A-2, is subject to a criminal fine not to exceed ten thousand dollars per day of violation. The violator is also subject to a civil penalty not to exceed ten thousand dollars per day of violation, for damages to the environment of this state, or both.

6.4 Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Federal Clean Water Act.



DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES



NOTICE OF INTENT & CERTIFICATE OF APPLICANT FORM TO RECEIVE COVERAGE UNDER THE GENERAL PERMIT FOR TEMPORARY DISCHARGES AND A TEMPORARY WATER USE PERMIT

and Natural Resources

This form is provided by the Secretary of the South Dakota Department of Environment and Natural Resources in accordance with §74:52:02:09 of the Administrative Rules of South Dakota. No South Dakota Surface Water

Discharge Permit will be issued except under completion and submittal of this form to the following addresses: original to: South Dakota Department of Environment

> Surface Water Quality Program Joe Foss Building PMB2020 523 East Capitol Avenue

Primary Cont	tact Information				
☐ Owner	Operator		Contractor		
Name				Phone	
Responsible C	ontact Person				
Street					
City		State _	County		Zip Code
Secondary Co	ontact Information	ı (If diffe	rent from above)	
☐ Owner	Operator		Contractor		
Name				Phone	
Responsible C	ontact Person				
Street					
City		State_	County		Zip Code
Facility/Site I	Location				
Name				Phone	
Responsible C	ontact Person				
Street					
City		State	County		Zip Code
Is this facility	located in Indian C	ountry? [□Yes □ N	lo	
Section	Quarter		Township		Range
Latitude	Long	gitude			
Standard Ind	ustrial Classificat	ion (SIC)	Code of facility		

FOR SDDENR USE ONLY		
Permit Number:	Date Received:	
Date Permitted:	PCS:	
	<u> </u>	

V.		e list all the activities which require the applicant to obtain a discharge permit. (Attach onal sheets if necessary.)				
_						
VI.	Disch	arge Information				
	A.	Estimate the following:				
		Date water withdrawal will commence:				
		Date for commencement of discharge:				
		Termination date of withdrawal:				
		Termination date of discharge:				
		Total volume of withdrawal:				
		Total volume of discharge:				
		Average flow rate of withdrawal:				
		Average flow rate of discharge:				
	B.	Source of water which is to be discharged:				
	C.	Name of Receiving Waters:				
	D. Brief description of water treatment processes employed, if any:					
		E. Describe the discharge and the type of wastewater from each discharge location. Include all overflows, bypasses, or discharges from holding ponds, trenches, excavations, vessels,				
		pipelines, etc.: Discharge 1				
		Discharge 2				
		Discharge 3				
	Attac	h additional sheets if necessary.				
	topog bound water	E: Please place points of withdrawal and discharge on a topographic map, or other map if a raphic map is unavailable. This map should extend to one (1) square mile beyond the property laries of the facility and each of its discharge facilities, and those wells, springs, and other surface bodies, drinking water wells, and surface water intake structures listed in public records, or wise known to the applicant in the map area.				
		F. Is there any reason to believe that the discharge may contain any pollutant other than those limited in the permit (i.e. TSS, pH, BTEX, Benzene, and TPH)? Yes No If yes, list any pollutants that may be present:				
	NOT	E: Attach any analytical data which indicate levels of pollutants present in water to be discharged.				
VII.	Pollu	tion Prevention Plan				
	A.	Has the facility written a pollution prevention plan in lieu of sampling for TSS? ☐ Yes ☐ No				
	B.	Brief description of best management practices being used in lieu of sampling:				

VIII.	Hydro	ostatic Testing						
	A.	Type of vessel being tested:						
	B.	Material from which vessel is constructed:						
	C.	Check appropriate box: Vessel has been previously used Uessel is virgin material						
	D.	Description of fluid material normally contained/transported through the vessel:						
IX.		ther information which you feel should be brought to the attention of the SDDENR regarding age under this general permit.						
Х.		additional sheets if necessary. Tication – authorized representative should initial the check box.						
	I cert	ify under penalty of law that this document and all attachments were prepared under my						
proper manage to the l penalti	ly gathone the system of the store of the st	cal) or supervision in accordance with a system designed to assure that qualified personnel er and evaluate the information submitted. Based on my inquiry of the person or persons who stem, or those directly responsible for gathering the information, the information submitted is, my knowledge and belief, true, accurate, and complete. I am aware that there are significant ubmitting false information, including revocation of the permit and the possibility of fine and for knowing violations.						
		ation must be signed by the authorized chief elective or executive officer of the applicant, or by the individual.						
		affirm under the penalties of perjury that this claim (petition, application, information) has l by me, and to the best of my knowledge and belief, is in all things true and correct.						
Name _		Title						
Date								

Surface Water Quality Program Joe Foss Building 523 East Capitol Pierre, SD 57501-3182

the United States; or

permit holder; or

Telephone: (605) 773-3351

STATE OF SOUTH DAKOTA

BEFORE THE SECRETARY OF

THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

	ATTER OF THE) CERTIFICATION OF
	TION OF) APPLICANT
STATE OF	(FACILITY NAME)	
COUNTY (OF) SS)
I,being duly application:	sworn upon oath hereby certify the	, the applicant in the above matter after e following information in regard to this
South Dako	ta Codified Laws Section 1-40-27 pr	ovides:
45, includi	ing any application by any cond	any permit filed pursuant to Titles 34A or centrated swine feeding operation for upon making a specific finding that:
permit hold		ualified to perform the obligations of a oplicant, any officer, director, partner or the application has been made:
(a)	Has intentionally misrepresented	a material fact in applying for a permit;
<i>(b)</i>	Has been convicted of a felony or	r other crime involving moral turpitude;
<i>(c)</i>		violated environmental laws of any state have caused significant and material
(d)	Has had any permit revoked und	er the environmental laws of any state or

Has otherwise demonstrated through clear and convincing evidence of (e) previous actions that the applicant lacks the necessary good character and competency to reliably carry out the obligations imposed by law upon the

(2) The application substantially duplicates an application by the same applicant denied within the past five years which denial has not been reversed by a court of competent jurisdiction. Nothing in this subdivision may be construed to prohibit an applicant from submitting a new application for a permit previously denied, if the new application represents a good faith attempt by the applicant to correct the deficiencies that served as the basis for the denial in the original application.

All applications filed pursuant to Titles 34A and 45 shall include a certification, sworn to under oath and signed by the applicant, that he is not disqualified by reason of this section from obtaining a permit. In the absence of evidence to the contrary, that certification shall constitute a prima facie showing of the suitability and qualification of the applicant. If at any point in the application review, recommendation or hearing process, the secretary finds the applicant has intentionally made any material misrepresentation of fact in regard to this certification, consideration of the application may be suspended and the application may be rejected as provided for under this section.

Applications rejected pursuant to this section constitute final agency action upon that application and may be appealed to circuit court as provided for under chapter 1-26."

Pursuant to SDCL 1-40-27, I certify that I have read the forgoing provision of state law, and that I am not disqualified by reason of that provision from obtaining the permit for which application has been made.

I declare and affirm under the penalties of perjury that this claim (petition, application, information) has been examined by me, and to the best of my knowledge and belief, is in all things true and correct.

NOTE: Notice of Intent/Certificate of Applicant form must be signed by the authorized chief elective or executive officer of the applicant, or by the applicant, if an individual.

Dated this day of	
Applicant Signature	
Applicant Name (print)	

PLEASE ATTACH SHEET DISCLOSING ALL FACTS PERTAINING TO SDCL 1-40-27 (1) (a) THROUGH (e).
ALL VIOLATIONS MUST BE DISCLOSED, BUT WILL NOT AUTOMATICALLY RESULT IN THE REJECTION OF AN APPLICATION.





DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

NOTICE OF TERMINATION OF COVERAGE UNDER THE GENERAL PERMIT FOR TEMPORARY DISCHARGES

This form is required to be submitted when a discharge permit is no longer required or necessary. Submission of this form shall in no way relieve the permittee of permit obligations required prior to submission of this form. Please submit this form to the following addresses:

original to: South Dakota Department of Environment

and Natural Resources

Surface Water Quality Program Joe Foss Building 523 East Capitol Avenue

Pierre, South Dakota 57501-3182 Telephone: (605) 773-3351 FAX: (605) 773-5286

PLEASE PRINT OR TYPE

r LLA	SE PRINT OR TIPE			
I.	Permittee Information			
	Name			Phone
	Responsible Contact Person			
	Street			
	City	State	County	Zip Code
П.	Mailing Address of Facility/Site Location	n		
	Name			Phone
	Responsible Contact Person			
	Street			
	City	State	County	Zip Code
II. Pe	rmit Number:			
V. Ch	eck the reason for termination of permit co	verage:		
	☐ Temporary discharge is no longer occur.	ring	☐ You are no l	onger the operator of the facility
	☐ Other reason(s):			
OTE	2: Attach any Discharge Monitoring Reports (I	OMRs) w	hich indicate pollut	ants in exceedance of permit limits.
ermit Fermit Polluta Pot au Potilit	t have been eliminated or that I am no I nation, I am no longer authorized to dischar ants from temporary discharge activities is thorized by a SWD permit. I also understa	onger the ge from unlawful and that South I	ne operator of the temporary dischant I under the South the submittal of the Dakota Water Poll	the identified facility that are authorized by a SWD ge of facility. I understand that by submitting the Noting activities under this general permit, and that dischaus Dakota Water Pollution Control Act where the dischaus Notice of Termination does not release an operator lution Control Act. I am aware that there are signification disconnected for knowing violations.
NOTE	: NOT must be signed by the authorized chief	elective o	or executive officer	of the applicant, or by the applicant, if an individual.
Na	me (print)			Title
Sig	gnature			Date

Permittee: City of Sioux Falls

SOUTH DAKOTA SURFACE WATER DISCHARGE SYSTEM

DISCHARGE MONITORING REPORT

Permittee should complete all unshaded portions of this form

	_								
Permit #		Monitoring Period							
SDG070944	From	Year	Mo	Day	To	Year	Mo	Day	
	=								

Outfall #	

Check Box if No Discharge Occurred During Monitoring Period

PARAMETER		Quanti	ty or Concentr	ation	No. of Exceedences	Frequency of Analysis	Sample Type
		Minimum	Maximum	Units			
Flow Rate 74060	Sample Measurement						
	Permit Limit		Report	GPM		Daily	Instantaneous
Flow Volume 74076	Sample Measurement						
	Permit Limit		Report	gallons		Monthly	Measure or Estimate
рН 00400	Sample Measurement						=======================================
	Permit Limit	6.5	9.0	units		Weekly	Grab
TPH(Visual) 84066 "0" if no sheen observed	Sample Measurement						
"1" if sheen is observed	Permit Limit			=		Daily	Visual
TPH 82180	Sample Measurement						
	Permit Limit		90	mg/L		See permit	Grab
Total Suspended Solids 00530	Sample Measurement						
	Permit Limit		90	mg/L		Weekly	Grab
	I certify under penalty of law direction or supervision in ac properly gather and evaluate persons who manage the syst information submitted is, to t am aware that there are signi	cordance with a system the information submit em, or those directly res he best of my knowledge	designed to assure that of tted. Based on my inqui sponsible for gathering the	qualified personnel ry of the person or ne information, the			
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (PRINT)	submitting false information, imprisonment for knowing vi		SIGN	NATURE	DATE		

Permittee: City of Sioux Falls

SOUTH DAKOTA SURFACE WATER DISCHARGE SYSTEM

DISCHARGE MONITORING REPORT

Permittee should complete all unshaded portions of this form

	_							
Permit #				Monito	ring I	Period		
SDG070944	From	Year	Mo	Day	To	Year	Mo	Day
	n n							

utian #	
	Check Box if No Discharge Occurred
	During Monitoring Period

PARAMETER		Quantity or Concentration			No. of Exceedences	Frequency of Analysis	Sample Type
		Minimum	Maximum	Units			
Benzene 34030	Sample Measurement						
	Permit Limit		N/A	μg/L		Weekly	Grab
Total BTEX 30383	Sample Measurement						
	Permit Limit		N/A	μg/L		Weekly	Grab
Toxics	Sample Measurement						
	Permit Limit		N/A	μg/L		Weekly	Grab
Total Residual Chlorine 50060	Sample Measurement						
	Permit Limit		N/A	mg/L		Daily	Grab
	Sample Measurement						
	Permit Limit						
	Sample Measurement						
	Permit Limit						
	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 directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for						
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (PRINT)	submitting false information, including revocation of the permit and the possibility of fine and imprisonment for knowing violations.			SIGN	NATURE	DATE	



REPORT

SIOUX FALLS REGIONAL SANITARY LANDFILL

Storm Water Pollution Prevention Plan and Comprehensive Surface Water Management Plan

City of Sioux Falls

June 2011



STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND COMPREHENSIVE SURFACE WATER MANAGEMENT PLAN CITY OF SIOUX FALLS SIOUX FALLS REGIONAL SANITARY LANDFILL

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R. W. BECK, An SAIC Company Sioux Falls Regional Landfill 2010 Storm Water Pollution Prevention Plan and Comprehensive Surface Water Management Plan

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This report has been prepared for the use of the client for the specific purposes identified in the report. The conclusions, observations and recommendations contained herein attributed to R. W. Beck, Inc. (R. W. Beck) constitute the opinions of R. W. Beck. To the extent that statements, information and opinions provided by the client or others have been used in the preparation of this report, R. W. Beck has relied upon the same to be accurate, and for which no assurances are intended and no representations or warranties are made. R. W. Beck makes no certification and gives no assurances except as explicitly set forth in this report.

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Section 1 Introduction

1.1 Background

The Sioux Falls Regional Sanitary Landfill (SFRSL or Landfill) is owned and operated by the City of Sioux Falls, South Dakota. The Sioux Falls Public Works Department currently manages the operation of the facility. The facility is charged with the proper management of solid waste materials generated by a five county service area of approximately 250,000 citizens. The five counties include Lake, Lincoln, McCook, Minnehaha and Turner. The Landfill started operations in 1979 and was known at that time as the "Runge Landfill."

The Landfill is currently permitted for stormwater discharge under the South Dakota Department of Natural Resources (DENR) National Pollution Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Industrial Activity (Permit No. SDR00A056). Compliance with the Permit requires the City to follow the Landfill's site Stormwater Pollution Prevention Plan (SWPPP), which was originally prepared as part of the initial NPDES permit application process in December 2003.

1.2 Purpose

The purpose of this SWPPP and Comprehensive Surface Water Management Plan (CSWMP) is to provide surface water control guidance to the City for current and future operations at the Sioux Falls Regional Sanitary Landfill. This CSWMP includes measures for the City to stay in compliance with the guidelines outlined in the SWPPP. Specifically, the CSWMP considers three phases of the landfill expansion and determines the surface water needs for each of those phases. Based on those needs, this plan provides:

- Routing of flow through ditches and culverts around the site based on worse case conditions;
- Stormwater detention requirements;
- Sediment and Erosion Control water quality treatment requirements;
- Schedule of implementation; and,
- Permitting steps as they are currently understood.



The routing analysis was based on worst case (i.e. largest) flows. Ditches and culverts sized for this condition should not need to be resized later as the landfill expands. Routing analysis and sizing are discussed in detail in Section 3.

1.3 Site Description

The City of Sioux Falls owns and operates the 709-acre Sioux Falls Regional Sanitary Landfill (Landfill) facility. A map of the landfill showing the various facility operations is presented in Figure 1. The Landfill is located at 26750 464th Avenue, County Highway 148, Sioux Falls, South Dakota 57106, which is approximately 5 miles west of the City of Sioux Falls in Minnehaha County. The Landfill is situated in portions of Section 34 and Section 35, Township 101 North, Range 51 West and a portion of Section 12 Township 100 North, Range 52 West. The facility consists of a 160-acre Pre-Subtitle D unlined landfill Municipal Solid Waste (MSW) and Construction and Demolition Debris (C&D) area (East Area), a 160-acre lined West Area (West Area), and surrounding property devoted to facility operations, stormwater management, and buffer. Approximately 100 acres of the 160-acre East Area is utilized for the disposal of MSW. The remainder is devoted to disposal of C&D debris, asbestos, tree and wood waste stockpile, and yard waste composting. Placement of MSW in the East Area reached its permitted capacity in mid-2010 and is currently being capped with the last portion of the final cap and landfill gas collection system (note that the west sideslopes of East MSW Area are covered with intermediate cover until C&D is piggy backed against it). The portion of the East Area devoted to C&D has approximately 30 years of remaining capacity.

In anticipation of future final closure of the East Area, the first phase of the West Area (Cell 1), was constructed in 2001. Limited disposal of MSW began in Cell 1 between January and July 2004 to provide an MSW layer to protect the cell base. After July 2004, MSW disposal was transferred back to the East Area and continued until final grades were reached in 2010. The second phase of the West Area (Cell 2), west of Cell 1, was constructed in 2009.

The reader should note while reading this report that the East Area Landfill was formerly called the Active Area Landfill; and West Area Landfill was formerly called the Expansion Area Landfill. Old documents refer to the areas as Active Area Landfill and Expansion Area Landfill.

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Section 2 Existing and Future Landfill Phases

The Landfill is expected to go through several steps of expansion and development over the next 50+ years. As of the Spring of 2010, waste is being filled in Cell 1 of the West Area landfill. Waste placements will move into Cell 2 later in 2010. After Cell 1 and 2 reach capacity, waste will be filled in up to seven successive cell expansions and is anticipated to reach ultimate capacity in approximately 2070.

This comprehensive plan assesses the stormwater related aspects through three stormwater phases of development. These three phases represent:

- 1. The 2004 baseline scenario (Phase 1);
- 2. The Spring 2010 scenario (Phase 2); and,
- 3. Closure of the eastern cells of the West Area Landfill (Phase 3).

The comprehensive plan does not look beyond Phase 3 because the development of Cells 6 through 9 is estimated to be over 20 years in the future. In the next 20 years the landfill expansion plan could vary depending on waste receipts, permitting, and changes in engineering design philosophy such that it would be premature, and possibly unproductive, to perform detail analyses on phases beyond Phase 3.

These three phases of stormwater development are discussed in the following subsections.

2.1 Stormwater Development Phase 1 – 2004 Baseline Scenario

Figure 1 shows the 2007 baseline conditions for the landfill facility. This figure is based on existing conditions as of December 7, 2004 (i.e. the date of the project kick-off meeting at which it was determined that existing conditions would be as of that date).

The landfill facility has greatly altered the topography and use of the land from prior to the opening of the landfill in 1979. Prior to the landfill, surface water from the site generally drained to the south and southeast into either the Wall Lake Drainage Way or into wetlands in closed depressions with no drainage outlet.

The following sections describe the flow of stormwater as shown on Figure 1.



2.1.1 East MSW Area

Stormwater flow within the East Landfill and around the perimeter of the East Landfill is described in the following subsections. Note that the East C & D Area is located directly west of the East MSW Area, therefore a subsection describing the C & D area is not included in the following subsections.

2.1.1.1 Within the Permitted Waste Boundary of the MSW Landfill

Runoff within the permitted waste boundary is handled in one of two ways. If the water comes in contact with refuse, such as in the area where waste is being placed on the day of a particular storm event, it is contained within the permitted waste boundary of the landfill and is infiltrated into the landfill. If the water does not come in contact with refuse, but either runs across areas of final cover or intermediate cover, it is discharged off the landfill and treated as normal stormwater from the facility.

The northeast corner of the landfill has been closed (or capped), as shown on Figure 1. What this means is that the refuse in this area has been capped with a soil liner system.

2.1.1.2 North of the East Landfill

On the north side of the East MSW Landfill, stormwater flow is either into isolated wetlands located on open areas north of the East MSW Area, or stormwater collected on the old compost pad is collected in the compost leachate pond located on the east side of the compost pad. Water collected in the compost leachate pond is used for landfill facility services (e.g. dust control). If water levels in the compost leachate pond reached a high enough level, overflow discharged to the north landfill perimeter ditch that ultimately drained into the east perimeter ditch. If compost pond water is discharged, sampling is performed.

2.1.1.3 East of the East MSW Landfill

On the northeast side of the East MSW Landfill, stormwater flow is in the east perimeter ditch to the area east of the landfill.

On the southeast side of the East MSW Landfill, stormwater flow is south through the perimeter ditch and into a culvert discharging to the area east of the landfill.

2.1.1.4 South of the East MSW Landfill

The perimeter ditch on the south side of the East MSW Area collects stormwater off the south slope of the East MSW Landfill and directs it to the south sedimentation basin. A lack of elevation change through this area has caused stormwater flow problems on the south side of the East MSW Area in the past.

2.1.2 East C & D Area

Within the permitted East C&D area, in 2004, there were several landfill facility activities, including the following:

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- C&D Disposal Area for Public Drop-off
- C&D Disposal Area for Commercial Drop-off
- Existing Compost Pad Facility
- Emergency MSW Cell
- MSW Asbestos Area
- Wood Waste Recycling Area

2.1.2.1 East C&D Disposal Area for Public Drop-Off

The 2004 East C & D area where fill is being placed includes the area on the south side East Area adjacent to the East Landfill. This area is where the City has the public drop-off C&D waste. The City keeps the public separate from the commercial vehicles for safety reasons.

Similar to stormwater in the East Landfill, runoff within the permitted waste boundary is handled in one of two ways. If the water comes in contact with C&D waste, such as in the area where waste is being placed on the day of a particular storm event, it is contained within the permitted waste boundary and is infiltrated into the landfill. If the water does not come in contact with C&D waste, but either runs across areas of final cover or intermediate cover, it is discharged off the landfill and treated as normal stormwater from the facility.

2.1.2.2 East C&D Disposal Area for Commercial Drop-Off

The East C&D Disposal Area for Commercial Drop-Off area is located in the southwest corner of the East Area landfill. It consists of a large excavation, approximately 35 feet deep. All stormwater collected in this area is collected in the low lying areas of the excavation. This water eventually infiltrates into the ground or is evaporated off.

2.1.2.3 Old Compost Pad Facility

Stormwater collected on the old compost pad drains off the pad to the south (note that this compost pad is located within the footprint of the C & D Landfill and has been excavated for C & D airspace). This water collects in a ditch that runs along the south side of the old compost pad and into a compost leachate pond. Water within the compost pond is not allowed to discharge to surrounding surface water. Under the facility's solid waste permit, the City is allowed to use water from the compost leachate pond for activities within the facility (e.g. dust control and soil moisture content optimization during construction projects).

2.1.2.4 Emergency MSW Cell

The Emergency MSW Cell has been used in the past when weather conditions are such that it is not possible to place waste in any other location. The area is still permitted for emergency MSW placement in the event that waste cannot be placed in any other location of the landfill. Stormwater in this area is directed to the south along

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the east side of the central north-south access road that splits the East Area and West Area. This water is ultimately discharged into the south sedimentation pond.

2.1.2.5 MSW Asbestos Area

Stormwater is not allowed to infiltrate into the MSW Asbestos Area. It is instead routed off the surface of the area and into an isolated pond located directly to the south of the MSW Asbestos Area.

2.1.2.6 Wood Waste Recycling Area

Stormwater in the wood waste area drains to the isolated pond located directly to the west of the area.

2.1.2.7 North of the East C & D Area

Stormwater directly north of the East C & D Area, including stormwater from the Public Drop-Off Area, drains into a 36- and 48-inch-diameter storm drain system (North Culvert) that routes flow westerly and then southerly around the maintenance facility. The flow from the North Culvert is then diverted through culvert 1.5 under the main north-south access road and into a ditch on the west side of the C & D area, ultimately discharging into the existing Sedimentation Pond.

2.1.2.8 West of the East C & D Area

West of the Active C & D Area, stormwater flows along the north-south access road that runs between the West Area and the East Area. Stormwater on the east side of the north-south access road flows due south through a series of ditches and culverts and ultimately into the south sedimentation pond. Stormwater on the west side of the north-south access road flows south either around Cell 1 and into the Wall Lake Drainage Way or through the north culvert storm drain system.

2.1.2.9 South of the Fast C & D Area

South of the Active C & D Area, stormwater is collected in a perimeter ditch that runs from east to west. This ditch discharges into the south sedimentation basin. Due to the relatively low change in elevation across the south side of the active C & D area, there has been a problem with stormwater ponding and not flowing out of this area in the past.

2.1.3 Scale House Area

Stormwater in the scale house area flows into the north culvert drain system. It enters the drain system in two different areas. On the east side of the scale house it enters it through a culvert located directly north of the MSW asbestos area. On the west side of the scale house it enters through a culvert located southwest of the scale house.

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2.1.4 West Area

The 2004 baseline stormwater flow in the West Area is described in the following sections.

2.1.4.1 Cell 1

Precipitation that lands in the Cell 1 area is either treated as leachate or collected in the stormwater basin located on the west side of the Cell 1.

Stormwater that comes in contact with waste is not allowed to leave the permitted waste area and is collected in the landfill's leachate collection system. The leachate from the collection system is pumped to the underground storage tank located directly southeast of Cell 1. From the underground storage tank, leachate can be hauled to the City of Sioux Falls wastewater treatment facility.

Stormwater collected in the Cell 1 stormwater basin is pumped to the south sedimentation pond on an as needed basis.

2.1.4.2 Cell 1 Stockpile

In the southwest quadrant of the West Area a stockpile of soil from the Cell 1 excavation had been placed. The stockpile was vegetated in all areas accept on the top and east sides where soil could be borrowed from it for monthly cover and various construction projects. Stormwater on the south and west sides of the stockpile flowed off the stockpile and into the Wall Lake Drainage Way. Stormwater on the east side of the stockpile flowed into a ditch system that ran north-south along the west side of Cell 1. On the north side of the stockpile, stormwater flowed off the stockpile and either into adjacent wetlands or to the north-south ditch system that ran along the west side of Cell 1.

2.1.4.3 North Side of West Area

On the middle and eastern thirds of the north half of the West Area, stormwater flowed into the north-south ditch system that runs along the east side of the West Area and on the west side of Cell 1. This stormwater ditch system discharged into the Wall Lake Drainage Way. The western third of the north half of the West Area flowed off the area to the west and into the Wall Lake Drainage Way.

2.1.5 Wetlands

Figure 2 shows the wetlands identified in a series of wetland investigations including the Wetland Delineation, Mitigation for Sioux Falls Regional Landfill study (HDR, April 2003) (HDR 2003 Report), Landfill Road Reconstruction Wetland Delineation Report (HDR, January, 2002) (HDR January 2002 Report) and Proposed Landfill Expansion and Wetland Mitigation Area Wetland Mitigation Report, (HDR, July 2002) (HDR July 2002 Report). These studies indicate that several wetlands are isolated. That is, the wetlands are in a depression and any runoff that enters the isolated wetlands tends to remain in the wetlands.

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2.2 Stormwater Development Phase 2 – Spring 2010 Scenario

This phase of development was chosen for detailed stormwater analysis because it represents a critical point in the development of the landfill as identified in the prior plan.

Phase 2 includes the construction of Cell 2 and as needed excavation of Cell 3. It also includes the completion of the East Area's sideslope closure, partial crown closure, and related stormwater upgrades which have been completed. Figure 3 shows the topography of the facility during this Phase. The following sections describe the changes from the 2004 Baseline Scenario Phase.

2.2.1 East MSW Area

2.2.1.1 Within the Permitted Waste Boundary of the MSW Landfill

Runoff within the permitted waste boundary is handled in one of two ways. If the water comes in contact with refuse, such as in the area where waste is being placed on the day of a particular storm event, it is contained within the permitted waste boundary of the landfill and is infiltrated into the landfill. If the water does not come in contact with refuse, but either runs across areas of final cover or intermediate cover, it is discharged off the landfill and treated as normal stormwater from the facility.

The northeast corner of the landfill has been closed (or capped), as shown on Figure 3. What this means is that the refuse in this area has been capped with a soil liner system. Diversion berms were built into the cap to collect stormwater and direct it to the existing let down structure.

The north let down structure directs stormwater down the north slope of the closed area and ultimately into the Northeast Extended Detention Basin (EDB, described in section 3.3.1). It should be noted that this area of the landfill was closed prior to reaching final elevations, and the City decided to reopen it to access the remaining permitted airspace. Upon capping it again (discussed in section 2.2.2), stormwater flow patterns were revised in this area. It should also be noted that in 2003 the City received approval from SD DENR to increase the crown slope from 2% to 5% as well as filling the notch of the landfill where the east let down structure is located, which was completed in 2009.

2.2.1.2 North of the East Landfill

Overflow discharged from the compost leachate pond, if high enough water level is reached, is routed through the north and east perimeter ditches to the Northeast EDB.

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2.2.1.3 East of the East MSW Landfill

On the northeast side of the East MSW Landfill, stormwater flow is in the east perimeter ditch and ultimately into the Northeast EDB for water quality treatment prior to being discharged into a wetland mitigation site on the east side of the landfill.

On the southeast side of the East MSW Landfill, stormwater flow is south through the perimeter ditch into the Southeast EDB.

2.2.1.4 South of the East MSW Landfill

No change in flow description from 2004 Baseline Scenario.

2.2.2 East C&D Area

2.2.2.1 East C&D Disposal Area for Public Drop-Off

No change in flow description from 2004 Baseline Scenario.

2.2.2.2 East C&D Disposal Area for Commercial Drop-Off

The East C&D Disposal Area for Commercial Drop-Off area is located in the southwest corner of the East Area landfill. It consists of a large excavation, approximately 45 feet deep. All stormwater collected in this area is collected in the low lying areas of the excavation. This water eventually infiltrates into the ground, is evaporated off, or is pumped to the South Sedimentation Basin.

2.2.2.3 Old Compost Pad Facility

The compost pad located within the footprint of the C & D Landfill has been removed and replaced with C&D waste. Also, the areas around and between the Emergency MSW cell and MSW asbestos area will eventually be filled with C&D waste.

2.2.2.4 Emergency MSW Cell

No change in flow description from 2004 Baseline Scenario.

2.2.2.5 MSW Asbestos Area

Stormwater in the asbestos area drains into the ditch and culvert infrastructure, eventually reaching the South Sedimentation Basin.

2.2.2.6 Wood Waste Recycling Area

Stormwater in the wood waste area drains into the ditch and culvert infrastructure, eventually reaching the South Sedimentation Basin.

2.2.2.7 North of the East C & D Area

Stormwater directly north of the East C & D Area, including stormwater from the Public Drop-Off Area, drains into a storm drain system (North Culvert) that routes

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flow westerly and then southerly around the maintenance facility. The flow from the North Culvert is then diverted through culverts 1.5 and 4 under the main access road, ultimately discharging into the existing Sedimentation Pond.

The North Culvert entrance is actually located inside the permitted waste boundary of the East C&D Area. In the future the City may want to move this culvert to the north in order to fill in this area; however, current waste receipt projections do not predict this area being filled in until sometime after the year 2030.

2.2.2.8 West of the East C & D Area

No change in flow description from 2004 Baseline Scenario.

2.2.2.9 South of the East C & D Area

No change in flow description from 2004 Baseline Scenario.

2.2.3 Scale House Area

No change in flow description from 2004 Baseline Scenario

2.2.4 West Area

The 2010 stormwater flow in the West Area is described in the following sections.

2.2.4.1 Cells 1 and 2

Where Cell 1 and Cell 2 are in operation, stormwater that discharges out of the south end of the north culvert is diverted to the east side of the north-south access road that runs down the middle of the landfill facility. This diversion was done with a new culvert that runs under the north-south access road. The sizing of this culvert is discussed in Section 3.

Precipitation that lands in Cell 2 area is either collected within the waste or the sedimentation ponds. Stormwater flowing directly to Cell 2 from the north and west slopes will be collected in a temporary sedimentation basin to the north side of the cell, and pumped to the culvert system, ultimately discharging to the south sedimentation basin. Stormwater in the waste area is contained in the waste area and infiltrates into the waste. A leachate collection system at the bottom of the waste area collects stormwater that infiltrates through the waste.

To the north and west of Cell 1 and Cell 2, stormwater that flows toward the area from undisturbed areas is collected in a ditch system that directs the "clean" stormwater directly into the Wall Lake Drainage Way.

2.2.4.2 Cell 1 Stockpile

In the southwest quadrant of the West Area a stockpile of soil from the Cell 1 excavation had been placed. Soil has been excavated from this area as well as the area just west of Cell 2. Stormwater on the south and west sides of the stockpile area flows

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the Wall Lake Drainage Way. Stormwater on the east side of the stockpile area flows either into a ditch south to Wall Lake Drainage Way or into the stormwater basin on the west side of Cell 2. On the north side of the stockpile area, stormwater flows either into adjacent low areas or into the ditch system to Wall Lake Drainage Way.

2.2.4.3 North Side of West Area

The area to the North of Cells 1, 2, including the excavation area for Cell 3 flows, or is pumped, to the ditch and culvert system running south, between the East and West MSW areas, to the South Sedimentation Basin. In the area to the northwest of Cells 1 and 2 flow, the middle third of the north half of the West Area, stormwater flows into the stormwater ditch system discharged into the Wall Lake Drainage Way. The western third of the north half of the West Area flows off the area to the west and into the Wall Lake Drainage Way.

2.2.5 Wetlands

No change in description from 2004 Baseline Scenario.

2.2.6 East Area Sideslope Closure

The sideslopes as well as approximately 60% of the crown of the East MSW Area (known as Area C) were capped. Diversion berms, as described in section 3.3.2, were installed on top of the final cover soils to intercept and transport water that falls onto the capped areas to the perimeter channels located at the toe of the landfill. The perimeter channels on the north and east sides of the East Area, shown as NE Channel and East Channel on Figure 9B, will continue to discharge to the EDBs as described in section 2.1.1. Improvements were made on the south side by building up fill as part of the southeast corner of the landfill cover and creating a new channel (South Channel) with the adequate fall to properly drain that area of the site to the west. Stormwater ultimately discharges to the south sedimentation pond via culvert upgrades described below.

Water that currently flows in the channel on the east side of the north-south access road, shown as the Central Channel on Figure 9, will continue to flow to the south towards the sedimentation pond. However, the culverts shown as Culverts 2 and 4 on Figure 1 were removed and replaced with culverts that will allow direct discharge under 268th Street and into the pond, as shown on Figure 3. The new South Channel also ties into this system on the north side of 268th Street. This will ultimately reduce the loading on Culvert 5, alleviate some of the local flooding issues to the south of Cell 1 and, for the most part, keep stormwater from the Active and West Areas separated into their own distinct drainage systems.

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2.3 Stormwater Development Phase 3 – West Area Landfill Closure through Cell 5

Phase 3 of the Stormwater Development includes the addition of Cells 3, 4 and 5 to the West Area. The period in time in which this Phase exists assumes final cover on the north, east, and south sides of West Area Cells 1 trough 5. The west face is assumed to be capped with intermediate cover, which drains into the excavation of the landfill and will need to be pumped out of this area and into the South Sedimentation Pond.

Stormwater draining from the north towards Cells 1 through 5 will be routed around the west side of the landfill. This water will be from non-disturbed land and will be allowed to flow directly into the Wall Lake Drainage Way.

In addition, a new ditch will be required on the north and west sides of Cells 1 through 5 in order to divert stormwater off the north side of Cells 1 through 5 to the south. As part of this new ditch system, a new Extended Detention Basin will be required to treat the stormwater prior to discharging into the Wall Lake Drainage Way.

Note that as part of construction Cells 3, 4, and 5, wetlands will be filled. These wetlands have already been mitigated as discussed in Section 5.

The compost pad will be expanded in late 2010 to include a screening area to the north of the compost leachate pond, with runoff going to the compost leachate pond. The pad will also be changed to an asphalt surface. These changes will add impervious area and more stormwater flow to the compost pond and should be evaluated in the future to ensure proper capacities in the ditch infrastructure.

A Biomass Processing Area will be added in 2011 to the area where cells 4 and 5 will be. Topsoil has been removed in this area and replaced with clay, and will drain to the existing conveyance system. Stormwater in this area will be treated with a compost berm before it enters the ditch system and drains to the South Sedimentation Basin.

In 2013, a third leachate pond will be constructed south of leachate ponds 1 and 2.

Other future projects include:

- A potential land application area on the West MSW area in the Ph2-3 area; this area will be bermed off and no runoff will be allowed:
- A potential land application area on the East Close Area with Phytoremediation;
- A potential C&D/MRF in the Ph2-2 area or Ph2-14/Ph2-15 area;
- A potential compressor building and possible air compressor building in the Ph2-15 area;
- And placement of cell excavation spoils north of cells 1-5.

The impacts of future projects should be evaluated as necessary to ensure proper drainage and treatment of stormwater.

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Section 3 Hydrologic and Hydraulic Analyses

Hydrologic and hydraulic analyses were conducted as part of this study in order to assess the quantity of runoff from the site for all stormwater related phases and to determine conveyance, detention and water quality improvements required for the ultimate Phase 3 condition.

3.1 Design Criteria

The design criteria used for the hydrologic and hydraulic analyses of the existing conditions and the various phases of the landfill were based on the City of Sioux Falls Engineering Design Standards for Public Improvements, chapters 11 and 12, South Dakota Solid Waste Rules (South Dakota Administrative Rules 74:27:12) and discussions with City staff. Some of the main criteria for sizing conveyance, detention and water quality facilities include:

- 25-year 24-hour design storm event for perimeter conveyance ditch and culvert sizing. The ditches and culverts were sized with 1 foot of freeboard.
- Match the existing conditions 100-year 24-hour design storm event for detention.
- The guidelines outlined in Chapter 11 Drainage Analysis of the City of Sioux Falls Engineering Design Standards for water quality treatment sizing.

3.2 Hydrologic Analysis

Originally the hydrology for this project was developed using StormShed Release 6.1.6.0 computer program developed by Engenious Systems and available through Boss International. StormShed uses SCS methodology to determine runoff from catchment areas (subbasins). Figures 5, 6 and 7 show the subbasins for the area under Phase 1, 2, and 3 conditions. The parameters used for developing the hydrology are tabulated in Table 1A-C.

Note that Subbasins EX-17 and EX-41, as shown in the 2004 baseline scenario, discharge into isolated wetlands. The wetlands were identified as isolated (HDR, April 2003 Report) and as such have no hydraulic connection with other water bodies such as streams, creeks or other wetlands. A field visit was performed and the Landfill staff was consulted in an attempt to confirm that flow does not discharge to the south from these wetlands. No indication of a flow path was found and the Landfill staff reported that they have never observed flow discharging south from these wetlands. This provides some additional validation that Ex-17 and EX-41 discharge to isolated



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wetlands. Based on this information, these subbasins were truncated at the wetland locations.

3.2.1 Precipitation

The precipitation used was based on precipitation maps developed by Natural Resource Conservation Service (NRCS) and are as follows:

2-year, 24-hour: 2.7 inches
 25-year, 24-hour: 4.7 inches
 100-year, 24-hour: 6 inches

Please refer to the isopluvial maps in Appendix A.

3.2.2 Soils

The hydrologic soil types for the site are shown in Figure 8. The soil types were determined using the *Soil Survey of Minnehaha County, South Dakota* prepared by the Natural Resources Conservation Service (NRCS).

Note that for the various phases, the portions of the landfill that have been closed will be capped with a low-permeability soil. Under these conditions, a Type D soil was assumed.

A copy of the NRCS soils map is included in Appendix B.

3.2.3 Land Use

The existing land use for the site is primarily pasture grass lands with some paved and gravel roads and operational buildings. The future capped landfill areas will be hydroseeded such that they will also become grasslands. The curve numbers used based on the land use and soil types are listed in Tables 1A, 1B and 1C.

3.2.4 Hydrologic Results

The hydrologic results for the 2004 conditions and Phases 2 and 3 are presented in Tables 1A, 1B and 1C, respectively. Note that the results are listed for the individual subbasins and for cumulative subbasins for use in the hydraulic analysis described in Section 3.3. The model output for each subbasin is shown in Appendix C.

3.3 Hydraulic Analysis for Phase 3

In order to size facilities so that they will not need to be upgraded as the landfill expands, the hydraulic analysis was performed for the worst case scenario. When Phase 3 is implemented, it will generate the most stormwater runoff from the landfill. Therefore, the hydrology for Phase 3 conditions was used to size detention and water quality features as well as the perimeter conveyance ditches and culverts.

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3.3.1 Detention and Water Quality Facilities

Before flow can exit the site, water quality treatment is required. In addition, if the future predicted 100-year peak flow is greater than the 100-year peak flow under baseline conditions, detention is required. Flow exits the site at four locations. These locations include:

- The southwest corner of the West Area where flow enters the Wall Lake Drainage Way.
- The south side of the facility where the existing Sedimentation Pond discharges into the Wall Lake Drainage Way.
- The northwest corner of the West Area where the flow enters existing wetlands. This runoff will eventually flow west to Wall Lake Drainage Way.
- The southeast corner of the facility adjacent to the SE EDB. This runoff will also eventually feed a wetland mitigation site in this area.

Note that because both the southwest corner of the West Area and the existing Sedimentation Pond discharge to the Wall Lake Drainage Way, a point of compliance for monitoring was established down-gradient of both these locations.

3.3.1.1 Extended Detention Basins

Of the water quality treatment best management practices (BMPs) listed in the City of Sioux Falls Engineering Design Standards, Extended Detention Basins appear to be the most appropriate method for treating runoff from the landfill prior to discharging it from the site. An EDB is a sedimentation basin designed to drain totally dry over an extended time after stormwater runoff ends. The extended drainage time of the more frequently occurring runoff events helps facilitate sediment removal. In addition, detention storage can be added to an EDB so that flow can be detained in the same facility if needed.

Conceptual sizes for the EDBs on the west side (West EDB), northeast side (NE EDB) and southeast side (SE EDB) were determined to treat the runoff from the landfill before it exits the site (refer to Figure 9). The NE and SE EDBs were subsequently designed by DeWild Grant Reckert and construction completed in 2009. The existing Sedimentation Pond serves to treat any flow exiting the landfill site to the south.

EDBs have a two-stage design with a pool that fills often with frequently occurring runoff. The two stages include a top stage that has a minimum depth of 2 feet and a bottom stage that has a minimum depth of 1 foot, for a total minimum depth of 3 feet. For conceptual sizing, it was assumed that the EDB's would have 3 feet for water quality treatment. If detention was required, it was assumed to be in addition to the 3 feet of water quality treatment volume.

Detention volume was added to the EDBs if expansion or modification of the landfill generated an increase in surface water runoff. In these instances, detention is required to detain the 100-year peak flow exiting the site so it matches existing 100-year peak

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flow. Table 2 shows the assessment used to determine if detention was required at each facility.

In the northeast and southeast corners of the landfill, the 100-year flow exiting the site does increase as a result of landfill modifications. Therefore, both NE EDB and SE EDB were sized for detention as well as water quality treatment in accordance with the requirements at the time of design and construction. A routing analysis was performed to determine the water surface elevations in the extended detention basins for the Phase 3 100-year conditions to be used in the HEC-RAS analyses for the ditches. The HEC-RAS analyses are discussed in Section 3.3.2. The routing analysis is shown in Appendix D and the resulting water surface elevations are shown in Table 3

3.3.1.2 South Sedimentation Pond

Most of the area that will become the West Area Landfill currently drains directly to the Wall Lake Drainage. As expansions occur, more flow will be routed away from a direct discharge into Wall Lake Drainage to the existing Sedimentation Pond for treatment and detention. In order to determine the detention effects of the south sedimentation pond, a routing analysis should be performed.

The existing Sedimentation Pond provides water quality treatment. At the time of analysis, the permanent storage volume provided below the outlet weir elevation acted as a wetpond. A wetpond is a pond that, like the Sedimentation Pond, has storage below the pond outlet. The volume of permanent storage contains the flow allowing for particulate pollutants to settle out. Either the stored flow evaporates leaving the pollutants behind or the next storm event displaces the volume stored in the pond. Typically a wetpond is designed for a treatment volume that would occur frequently, such as the volume of a 6-month storm event. The permanent pool volume in the Sedimentation Pond is about 15 acre-feet. The volume of the 25-year storm event for the Phase 3 conditions is about 8.6 acre-feet. Therefore, it appears that the Sedimentation Pond has sufficient capacity to provide water quality treatment for Phase 2 and Phase 3 conditions.

There is an outlet structure provided for the South Sedimentation Pond that was not evaluated at the time of this analysis. Better water quality treatment for this pond can be achieved by evaluating the effectiveness of this outlet structure and making possible modifications in the future to accommodate flow volumes and elevations in the pond. To gain better water quality treatment using this existing structure, the following recommendations can be followed: ensure the gravel cone around the riser pipe is not clogged with sediment and that it is placed to the elevation designed for filtering water to the riser pipe; ensure the riser pipe is not clogged with sediment, including the 12 inch outlet pipe from the perforated riser; ensure that sediment within the pond has not exceeded the recommended 10% of storage depth of the pond (as described in Section 6, Storm Water Pollution Prevention Plan). With the riser pipe operating properly, and frequent removal of sediment, water quality treatment for the first flush is achieved and prevents sediment from discharging.

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3.3.2 Conveyance System

3.3.2.1 Perimeter Conveyance System

HEC-RAS Water Surface Profiles Version 3.1 computer model (Corps of Engineers) was originally used to size the perimeter conveyance ditches and culverts for Phase 3 conditions (i.e., the worst case conditions). It was noted that many of the perimeter ditches were not always constructed to the parameters in the 2006 CSWMP. Therefore, the HEC-RAS models were updated to reflect the actual ditches where they had been constructed. In addition, the models were updated with the updated flows developed for Phase 3 conditions. The perimeter conveyance systems are shown on Figure 9.

The perimeter conveyance system includes the ditches and culverts that convey water around and in between the Active and West Areas. The HEC-RAS model calculates water surface profiles for steady, gradually varied flow by using a standard step backwater method that applies a one-dimensional energy equation with the energy loss due to friction calculated using Manning's equation. The HEC-RAS cross sections for the perimeter conveyance systems are included in Appendix F.

The perimeter ditches were separated into different reaches for analysis. The reaches with "inside" in the description denote reaches that are located on the landfill side of an access road such that they collect runoff from the landfill. The reaches with "outside" in the description denote the reaches that are located on the outside of an access road and collect runoff from offsite catchments. The reaches include:

- Central Channel
- Culvert 3 Channel
- Culvert 3 West Channel
- South Channel
- Inside NW Channel
- Outside NW Channel
- Inside NE Channel
- Outside NE Channel
- East Channel

All of the channels except for the Outside NE Channel were updated either with new cross section information or updated flows.

The perimeter channels on the north and east sides of the East Area, shown as NE Channel and East Channel on Figure 9B, will continue to discharge to the EDBs. Improvements were made on the south side, however, by building up fill as part of the southeast corner of the landfill cover and creating a new channel (South Channel) with the adequate fall to properly drain that area of the site to the west. Stormwater will ultimately discharge to the south sedimentation pond via culvert upgrades described

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below. The resulting simulated maximum 25-year water surface elevations were used as the tailwater elevations for the HEC-RAS analyses and are listed in Table 3.

The Inside NW Channel is proposed to discharge into West EDB. As discussed in Section 3.3.1, a conceptual-level layout was prepared for this facility. The tailwater elevation for the Inside NW Channel conveyance analysis was approximated assuming the minimum 3 feet of water quality storage depth and is listed in Table 3.

The Outside NE Channel discharges into an existing wetland and the Outside NW Channel discharges into the Wall Lake Drainage. Tailwater elevations for these reaches were approximated based on the contours shown on the topographic maps.

3.3.2.2 Landfill Cover and Diversion Berms

Landfill diversion berms are the ditches that convey flow off of the landfill cover. These berms were evaluated as part of the Sioux Falls Regional Landfill Permit Modification and Revised Closure Plan (2004) and designed as part of the East Area sideslope closure design. A discussion of the analysis used and design calculations are located in Appendix E.

3.3.2.3 Results

In previous editions of the CSWMP, conceptual ditch and culvert sizes were proposed for the perimeter conveyance system. Since most of these ditches have been constructed and the culverts installed, only the sizes for the ditches not constructed yet are shown (Outside NW Channel and Inside NW Channel). Table 4 includes ditch bottom width, invert, side slopes, depth and design flow for the future ditches. Table 5 includes the number of culverts at each crossing, the culvert type or shape, material type, size, length and inverts for both existing and Phase 3 conditions.

Note that analysis of the central ditch indicates that, for the 25-year storm event, the roadway over Culvert 1.5 will overtop as will the channel immediately upstream. The resulting overflow will likely drain to and be contained in the East C&D Area. The City could consider adding additional capacity to this culvert crossing in the future if the overtopping proves to be problematic.

Refer also to Figure 9 for culvert and cross section locations. Complete HEC-RAS results and revised culvert sizing calculations are presented in Appendix F.

3.3.3 Piped Storm Drain System

The piped storm drain system (North Culvert System) that runs along the north and west side of the maintenance building was evaluated using simple step backwater model. The input parameters and resulting output are included in Appendix G. The results of the analysis showed that the existing storm drain has sufficient capacity to convey the flow from Phase 3 future land use conditions.

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3.4 Schedule of Improvements

This section provides general guidelines recommending when the various improvements should be implemented.

3.4.1 Spring 2010 Scenario

The following improvements are recommended to be constructed during current conditions:

- Culvert 3 (as shown on Figure 9) will be constructed later in 2010 and the E Culvert 3 Channel (as shown on Figure 9) and should be constructed as cells 1-5 close.
- Modified versions of the Outside NW Channel and Inside NW Channel (as shown on Figure 9) that wrap around Cell 1 and Cell 2 should be constructed along with the West EDB as part of the ongoing West Area development.

3.4.2 West Area Prior to Phase 3

The following improvements are recommended to be constructed prior to Phase 3.

- Outside NW Channel and Inside NW Channel (as shown on Figure 9) should be extended around Cells 1 through 5 prior to closing Cells1 through 5.
- WCulvert3 Channel (as shown on Figure 9) should be constructed to convey the flow routed to the south from Cells 1 through 5 prior to closing Cell 2.

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4.1 Environmental Regulations related to Surface Water Management

This section includes a review of the existing state and federal regulations relevant to surface water management at the existing landfill.

4.1.1 Section 404 Army Corps of Engineers

The Corps under Section 404 of the Clean Water Act regulates all discharges of dredged or fill material into waters of the United States including most wetlands and the Wall Lake Drainage. The Corps jurisdiction is limited by the Supreme Court ruling Supreme Court in the matter of Solid Waste Agency of Northern Cook County v U. S. Army of Corps of Engineers, No 99-1178 (January 9, 2001) which eliminated the Corps jurisdiction over isolated, non-navigable, intrastate waters if the sole nexus (connection or link) to interstate commerce is use of the water by migratory birds. Therefore only the filling of wetlands which show linkage to waters of the U.S. (i.e., wetlands that are not isolated) require a Section 404 Permit. This linkage is determined by way of a wetland delineation report.

Both the US Fish and Wildlife Service and South Dakota Game Fish and Parks have important advisory roles in the Section 404 Permit review process. Application for a Section 404 Permit will also trigger regulatory review by the South Dakota State Historic Preservation Office (SHPO) under Section 106 of the National Historical Preservation Act. SHPO will be part of the regulatory review process and will review cultural resources affected by a project.

4.1.2 National Pollution Discharge Elimination System (NPDES) Permit

In South Dakota, the NPDES program is administered by the South Dakota Department of Environment and Natural Resources (SD DENR). The City submitted a Notice of Intent for the General Permit for Stormwater Discharges Associated with Industrial Activity and was granted coverage under this permit (Permit No. SDR00A056) for the Sioux Falls Regional Landfill.

To be in compliance with the permit, a Stormwater Pollution Prevent Plan (SWPPP) is included as part of this Plan in Section 6.



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4.1.3 Water Quality Certification South Dakota Department of Environment and Natural Resources

If a federal permit, such as a Section 404 Permit, is required, or dredging or fill activities that may result in a discharge to U.S. surface waters and/or "Waters of the State", a Clean Water Act (CWA) Section 401 Water Quality Certification from SD DENR is required to be obtained. Legislative authority for water quality certification can be found in South Dakota Codified Law 34A-2-33 and 34. Regulations pertaining to the water quality certification process are located in Administrative Rules of South Dakota 74:51:02:63-65.

4.1.4 Administrative Rules of South Dakota – Wetland Jurisdiction

It has been determined that South Dakota Game, Fish and Parks (SD GFP) and US Fish and Wildlife (USFW) do not have jurisdiction of the isolated wetlands, but will provide recommendations to SD DENR with regards to mitigation. Please refer to the documents in Appendix H for the letters with SD DENR discussing jurisdiction of isolated wetlands.

4.1.5 Minnehaha County

The following permitting requirements for Minnehaha County apply to the landfill facility.

4.1.5.1 Floodplain Development Permit

Any project working in the Wall Lake Drainage Floodplain requires a floodplain permit from Minnehaha County. A copy of the floodplain map and the Floodplain Development Permit Application are in Appendix H.

4.1.5.2 Solid Waste Permit

The landfill facility has an operating permit with the Minnehaha County Planning and Zoning Department that requires the facility to submit a copy of the stormwater management plan. The Minnehaha County Planning and Zoning Department should receive copies of plans identifying means employed to minimize potential impacts to surface or groundwater.

4.1.6 Lincoln and Turner County

The planning and zoning departments for both Lincoln County and Turner County have indicated that they require a letter describing a proposed construction project submitted to their respective planning and zoning departments prior to a construction in their county. The planning and zoning departments will review the letters, respond with requests for additional information if necessary, and will approve the construction project if found to be acceptable.

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4.2 Permits Related to Future Expansion

4.2.1 Phase 2

Construction of the Public-Dropoff Area and the Compost Pad required filling of isolated wetlands. Mitigation requirements were negotiated with the DENR (see Appendix J). The City agreed to construct the wetland mitigation for the Composting Pad in 2008. This schedule was approved by the DENR. New wetlands were constructed in 2009.

Prior to 1984 the original Wall Lake Drainage Way meandered across the southwest corner of the current Landfill property. Prior to the City's ownership of the property in 1990, however, the drainage way was straightened to its current configuration. The floodplain map has identified the area as a Zone A floodplain which means there has not been a formal survey of the drainage way to identify the elevation of the 100 year flood at this location.

A survey and hydraulic analysis to identify the elevation of the 100 year flood has been performed by the City to determine the potential impacts of previous stockpiling activities. The flood plain analysis showed that the stockpiling activities within the floodplain have had only a minor affect on the backwater elevation of the flood elevation (100-year floodplain elevation increased by a maximum of 1.31 inches). A technical memorandum describing the analysis was submitted to Minnehaha and Turner Counties for their comment.

Rerouting of the Wall Lake Drainage would require a Section 404 Permit from the Corps, a Section 401 Water Quality Certification from SD DENR and review by US Fish and Wildlife, South Dakota Game, Fish and Parks, and the State Historical Preservation Office. In addition, mitigation would likely be required and it is possible that the Corps may request a buffer along Wall Lake Drainage. It should also be noted that any construction in the floodplain would require a Floodplain Development permit from Minnehaha County.

Cell 2 has been designed and constructed to remain out of the 100 year floodplain and rerouting of the Wall Lake Drainage way is not anticipated for Phases 2 or 3.

4.2.2 Phase 3

Phase 3 of the development will include filling of wetlands in the West Area. The wetlands that will be filled have been delineated and were not identified as waters of the U.S. It appears that these wetlands are isolated wetlands and therefore will be under the jurisdiction of the DENR. A copy of the wetland delineation report was submitted to the Army Corps of Engineers to ensure that these wetlands are isolated wetlands.

In addition, the wetlands that were constructed in 2009 as part of the mitigation plan for the wetlands being filled as part of the Compost Pad project were designed and constructed large enough to include the mitigation of the wetlands in the West Area. Correspondence related to the approval of this mitigation are included in Appendix I.

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4.2.3 Beyond Phase 3

Beyond Phase 3, the landfill expansion will include the construction of landfill Cells 6 through 9 that will require additional wetlands to be filled. As discussed in the sections above, the wetlands that were constructed in 2009 as part of the mitigation plan for the wetlands being filled as part of the Compost Pad project were designed and constructed large enough to include the mitigation of the wetlands in the West Area. Correspondence related to the approval of this mitigation are included in Appendix I.

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Section 5 Wetland Mitigation

Multiple wetlands have been delineated at the landfill facility. As part of the future phased development of the landfill facility, several wetlands will be filled.

As described in Section 4, wetland jurisdiction is dependent on whether the wetlands can be defined as a water of the U.S. Isolated wetlands fall under the jurisdiction of South Dakota Department of Environment and Natural Resources (DENR), while the wetlands connected to waters of the U.S. fall under the jurisdiction of the Army Corps of Engineers and the DENR. In both cases, the U.S. Fish and Wildlife, South Dakota Game, Fish and Parks and State Historical Preservation Office have advisory capacity.

Several reports have been prepared regarding the wetlands at the landfill site, including:

- The HDR December 2000 Report describing the wetland delineation in the West Area;
- The HDR January 2002 Report describing the wetlands south of 41st Street along the access road to the landfill; and,
- The HDR July 2002 Report describing the wetlands in the vicinity of the proposed Public Drop-off Area and Compost Pad.

Each of these reports has been submitted to the Corps for a jurisdictional determination. Note that some of the wetlands delineated as part of the HDR December 2000 report were not reviewed by the Corps because they were not in areas that were to be filled. These wetlands will need to be reviewed by the Corps for a jurisdictional determination prior to being filled. Figure 2 identifies the existing wetlands.

The following subsections describing previous and future wetland mitigation activities related to the above referenced reports.

5.1 Cell 1 Construction

The HDR December 2000 Report describes the wetland mitigation proposed for filling of a wetland as the result of the creation of Cell 1. The Corps determined that this wetland was a Water of the US such that a Section 404 Permit would be required. The mitigation proposed in the report is located on property adjacent to South Western Avenue in the SW quarter of Section 15, Township 100 N, Range 50 W, in Lincoln County, South Dakota. The mitigation site is adjacent to an existing NRCS determined wetland within a drainage swale. The mitigation plan was submitted to the Corps as part of a 404 Permit Application for Cell 1 construction.



In addition to the wetlands filled in as part of the Cell 1 construction, several other wetlands identified in the HDR December 2000 Report were filled with Cell 1 excavation material. In a May 2001 letter from the Corps, it is stated that these wetlands were isolated and therefore were not under the jurisdiction of the Corps.

5.2 Compost Pad Construction

The construction of the Compost Pad in 2006 resulted in filling wetlands as described in HDR July 2002 Report. The Corps has determined that these wetlands are non-jurisdictional and filling them did not require a Section 404 Permit (See Appendix I). However, the DENR required mitigation (See Appendix G). Wetlands were constructed in 2009 to the east of the landfill to mitigate the wetlands taken as part of the compost pad project. Correspondence related to the approval of this mitigation are included in Appendix I.

5.3 Future Landfill Expansion

As the landfill expands further to the west, additional wetland loss will need to be mitigated. As discussed above and in Section 4, the wetlands that were constructed in the 2009 as part of the mitigation plan for the wetlands as part of the compost pad project were designed and constructed large enough to include the mitigation of the wetlands in the West Area. Correspondence related to the approval of this mitigation are included in Appendix I.

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Storm Water Pollution Prevention Plan Prepared for the City of Sioux Falls, South Dakota Regional Sanitary Landfill June 2011

Landfill Management Certification

Sioux Falls Regional Sanitary Landfill is committed to the prevention of discharges of polluted storm water and maintains a high standard of responsibility through regular review, updating, and implementation of this Storm Water Pollution Prevention Plan. It is the responsibility of the person designated below with permit responsibility to keep the SWPPP updated, on file and available upon request by authorized officials. 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 gathered and evaluated 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 submitted 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.

Name: Dave McElroy

Title: Landfill Superintendent

Signature: 6/20/2611

R.W. Beck, An SAIC Company, Certification

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 gathered and evaluated 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 submitted 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.

Name:	FRED J. DOMAN	
Title:	SENIOR ENVIRONMENTAL ENGINEER	
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Date:	6/17/2011	
Registration	#/State: PE # 4828 SOUTH DAKOTA	



Storm Water Pollution Prevention Plan Prepared for the City of Sioux Falls, South Dakota Regional Sanitary Landfill Updated October 2011

Landfill Management Certification

Sioux Falls Regional Sanitary Landfill is committed to the prevention of discharges of polluted storm water and maintains a high standard of responsibility through regular review, updating, and implementation of this Storm Water Pollution Prevention Plan. It is the responsibility of the person designated below with permit responsibility to keep the SWPPP updated, on file and available upon request by authorized officials. 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 gathered and evaluated 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 submitted 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.

Initials/Date:

R.W. Beck, An SAIC Company, Certification

10/24/2011

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 gathered and evaluated 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 submitted 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.

Initials/Date: u/4/u



Section 6 Storm Water Pollution Prevention Plan (SWPPP)

This Section includes the Storm Water Pollution Prevention Plan (SWPPP) as required by the DENR as part of the current general industrial storm water discharge permit. The purpose of this section is to provide practices that minimize pollutants in storm water discharged from the Landfill.

6.1 Introduction

The National Pollutant Discharge Elimination System (NPDES) storm water permit program set requirements for storm water discharges. In South Dakota, the NPDES storm water program is administered by the South Dakota Department of Environment and Natural Resources (DENR) which has NPDES permitting authority. Regulated facilities requiring a permit must prepare a SWPPP identifying and documenting storm water structures and management practices to minimize impacts. The Landfill is required to have a permit under the following category: landfills, land application sites, and open dumps that have received industrial waste including those that are subject to regulation under South Dakota Codified Law 34A-6, ARSD Article 74:27, or RCRA Subtitle D. The original general permit was effective on November 15, 2003 with an expiration date of November 14, 2008. The DENR has since extended the permit. A copy of the current discharge permit is presented in Appendix J.

6.2 Facility Background

Facility background, site conditions and drainage conditions can be seen in the prior sections of this Plan document. Existing wetlands, waters of the US and non-waters of the US on site can be seen in Figure 2. Current Drainage conditions and stormwater controls can be seen in Figure 6. Conveyance Systems can be seen in Figure 9.

6.3 Potential Sources of Storm Water Contamination

The materials inventory in Appendix K lists all materials identified on site that meet the criteria as pollutant in the 40CFR122.2 as significant materials; they are not regulated substances as defined in ARSD S 74:52:01(35). Oil regulated gasoline are regulated by 40CFR112 and are controlled at this site with a Spill Prevention Control and Countermeasures Plan. Significant Materials identified under this plan are those that have the potential to pollute stormwater, but are not regulated as a hazardous waste. These materials are regulated by a separate Solid Waste Permit No. 09-08A.



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The form also identifies whether those significant materials have potential to come into contact with stormwater discharge.

6.3.1 Significant Materials

There are no significant materials stored on the site which are currently exposed to storm water discharge. A materials inventory form is included in Appendix K. Materials identified at the site in the future should be included on the form.

6.3.2 Materials Inventory

The primary industrial materials handled at the facility and the potential sources of storm water pollution are:

- 1. Petroleum distillates (fuels, lubricants, etc.) related to the maintenance of waste transportation vehicles. Most of these materials are stored inside the vehicle maintenance garage, and are not subject to storm water contact. Insignificant amounts of grease, transmission fluid, and hydraulic oil are stored indoors away from any contact of storm water.
- 2. Fueling activities.
 - a. On-site fueling depot is located to the north of the scale house. The depot consists of two 12,000 gallon double walled fiberglass tanks, one containing E10 and one containing diesel. Commercial spill kits are located at the fueling station and the gas pumps are covered with a canopy to prevent contact with storm water.
 - b. Fuel is dispensed from a 2100-gallon fuel truck to landfill vehicles. The truck is equipped with a commercial spill kit, and the operator is trained to take precautionary measures when fueling.
 - c. Waste oil collection from a 560-gallon waste oil collection tank on site.
- 3. Erosion and runoff from areas utilized for waste disposal.

6.3.3 Non-Storm Water Discharge Certification

The storm water drainage outfalls have been evaluated for the presence of non-storm water discharge. No spills or leaks of toxic or hazardous substances have occurred at the site. Based on a review of the drainage system, one potential significant source of non-storm water discharge might exist if a spill occurred while fueling equipment during a rain event.

The landfill does hold a permit to discharge from the compost leachate pond if necessary, which is permit number SDG070869.

If fire-fighting activities are needed onsite, water discharged on the fire will be restricted to the fill area. If discharge off site becomes necessary, it will be routed through the stormwater sedimentation basin. Water from truck washing and other

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periodic site activities will be restricted from leaving the activity area or entering stormwater conveyances.

6.3.4 Sampling Data

Storm water sampling data from the site has been reviewed. Sampling of the landfill sedimentation basin is performed voluntarily. Sampling analysis have been included in Appendix L from 2008-2010 sampling events. Analytical results showed no signs of pollutants but increasing total suspended solids. If high suspended solids are being discharged, the amount of sedimentation deposited in the pond may need to be evaluated and excavated as described in Section 6.4.1. Sampling analysis for the SE Extended Detention Basin is also included for 2010. Results showed no signed of pollutants and low suspended solids.

6.3.5 Risk Identification and Summary of Potential Pollutant Sources

As previously discussed in this Plan, significant materials associated with equipment maintenance are located in the vehicle maintenance garage and sealed containers. Significant risks of pollutant discharges at the facility involve fueling vehicles onsite and collection of waste oil and leachate at the site. Leachate seeps and exposed waste are also of significant concern. Best management practices have been developed for the facility in order to eliminate and/or minimize impacts to storm water and are discussed in the following section.

6.4 Best Management Practices

The following BMPs are both structural and non-structural practices that shall aid landfill staff in maintaining an effective stormwater collection system and prevent pollutants impacts on the stormwater. As other BMP's are determined, they should be documented and included on BMP identification worksheets. An example BMP worksheet is included in Appendix M.

6.4.1 Sedimentation Pond and EDB Maintenance

The Sedimentation Pond and EDBs should be inspected once a year to check for sediment accumulation. When sediment accumulation exceeds 10 percent of the storage depth, the facility should be cleaned out to the designed pond shape and depth. After the ponds are cleaned, they should be reseeded if the bottom of the pond is bare. In addition, all accumulating vegetation should be removed as part of the pond cleanings.

6.4.2 Intermediate Cover Care

Solid waste shall be covered with approved daily cover. Any areas where no additional solid waste will be placed within 30 days shall be covered with an

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intermediate cover. Intermediate cover shall consist of 12 inches of compacted earth and may be mixed with compost to enhance its organic content. It shall be seeded on an on-going basis in order to maintain slope stability and reduce infiltration.

Landfill staff shall inspect the intermediate cover on a monthly basis and after a ½ inch or more rain storm to ensure the integrity of the intermediate cover. If erosion in the intermediate cover is identified, Landfill staff shall repair the eroded area as soon as possible.

6.4.3 Final Cover Care

Final cover shall be inspected by landfill staff twice a year. The inspection shall include the vegetative growth, evidence of erosion, and the workability of the diversion berms. Any damage to the final cover shall be repaired as soon as possible after the inspection.

6.4.4 Perimeter Conveyance System Maintenance

The perimeter conveyance system should be inspected at least once a year to determine if maintenance is required. Culverts and pipes shall be cleaned of all sediment if it is observed that accumulated sediment exceeds 20 percent of the diameter. If it is observed that a dent decreases the cross section area of the pipe by more than 20 percent, the pipe should be repaired or replaced. If accumulated sediment in a ditch is observed to be more than 20 percent of the design depth, the ditch shall be cleaned of all sediment and debris so that it matches the design.

6.4.5 Stockpile Erosion Control

All stockpiles, including those created during the excavation of a future cell, shall be seeded to prevent soil erosion. Prior to the establishment of vegetation, stormwater off stockpiles shall be routed through a sediment pond prior to discharge to existing surface water (e.g. the Wall Lake Drainage Way). After vegetation is established, stormwater may be routed to existing surface water without treatment through a sediment pond.

6.5 Construction Best Management Practices

For every construction project that is anticipated to disturb over 1 acre of soil, a SWPPP specific to the construction project shall be prepared in accordance with the site's General Permit for Stormwater Discharges Associated with Industrial Activity. The following BMPs are recommended as controls at the landfill facility during construction activities.

Perimeter berms of clean soil around areas where refuse is exposed shall be placed in order to minimize stormwater coming in contact with refuse. Stormwater that comes in contact with refuse shall be contained within the

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- permitted waste footprint of the landfill and allowed to evaporate or infiltrate into the landfill.
- Intermediate cover and refuse excavated as part of construction activities outside the working face of the landfill shall be hauled to the working face in a timely manner. Workers shall not create large stockpiles of intermediate cover and refuse during construction.
- All construction activities outside the landfill footprint that consist of earthwork shall stockpile soils in a manner that minimizes the potential for sediment to run off the construction area of the site.
- Temporary silt fencing and straw bale barriers shall be installed between construction activities and downstream surface water or wetlands/critical areas.
- Temporary cover measures shall be implemented on unworked soils. Temporary or permanent cover measures shall be placed on all disturbed areas and stockpiles.
- After a construction project begins, soil surface stabilization shall be applied within 14 days to all disturbed areas that may not be at final grade but will remain dormant (undisturbed) for periods longer than an additional 21 calendar days. Within 14 days after final grade is reached on any portion of the site, permanent or temporary soil surface stabilization shall be applied. When the initiation of stabilization measures are stopped due to snow cover or arid conditions, stabilization measures shall be initiated as soon as possible.
- Temporary cover measures include surface roughening, mulching, temporary seeding, establishment of vegetative cover, and the early application of gravel base on areas to be paved. Temporary soil surface stabilization measures to be used shall be appropriate for the time of year, site conditions, and estimated duration of use. The maximum time limits of land exposure for selection of erosion controls are summarized in the following Table.

Maximum Time Limits of Land Exposures For Selection of Erosion Controls

Erosion Control Method	Maximum Allowable Period of Exposure (Months)
Surface Roughening	1
Mulching	12
Temporary Revegetation	12—24
Permanent Revegetation	24 or more
Soil Stockpile Revegetation	2
Early Application of Road Base	1

■ Permanent cover measures shall be completed as soon as possible after areas of construction are completed, and at a minimum within the time frame outlined on the table above.

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- Provide storm drain inlet protection for catch basins and inlets in order to prevent sediment laden runoff from entering the storm drain system.
- Direct dewatering water to sediment traps, ponds, or vegetated areas unless it can be shown that dewatering water is clean.
- Maintain erosion control facilities.
- Keep paved roads clean, by implementing temporary vehicle tracking controls. If deemed necessary, wash racks shall be installed to remove mud and dirt from the vehicle and its tires before it enters onto public roads.
- Whenever sediment is transported onto a public road, regardless of the size of the site, the road shall be cleaned at the end of the day. Sediment shall be removed from roads by shoveling or sweeping and be transported to a controlled sediment disposal area.
- Using the existing sediment basin to provide sediment control for the portions of the landfill draining to the sediment basin.

6.5.1 Leachate Spill Contingency Action

Any water that comes in contact with excavated refuse shall remain within the landfill permit waste boundary or pumped to the site underground storage tank, temporary leachate tank or leachate ponds. If the volume of water is more than can be contained within the landfill and no corrective actions can be taken to stop the flow of refuse impacted water from leaving the permitted landfill area, all water shall be contained within the perimeter ditches of the landfill and shall be directed to the South Sedimentation Pond or nearest EDB. The South Sedimentation Pond has an approximate capacity of 15 acre-ft, and should be able to contain all impacted stormwater. In the event that the water can not be contained within the pond(s) and spills over the outfall of the pond(s), samples shall be collected to determine if contaminants are present in the discharging water.

6.5.2 General Spill Prevention and Control Practices

The following general spill prevention and control practices shall be implemented during construction projects.

- Onsite construction equipment shall be monitored for leaks and receive regular preventive maintenance.
- Asphalt substances used onsite will be applied according to City of Sioux Falls Specifications.
- The use of fertilizers shall be according to the manufacturer's recommendations.
- Concrete trucks will not be allowed to wash out or discharge surplus concrete on the site.

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- Storage of chemicals shall be done in such a way as to reduce the potential for spills.
- Spills of toxic or hazardous material, including leachate, shall be reported to the appropriate state or local government agency. All spills shall be cleaned up immediately after discovery.
- Off-tracking of sediments from construction vehicles shall be minimized.

6.6 Self Monitoring Requirements

The Landfill will be responsible for maintaining all storm water discharge controls. This includes training of landfill staff and completing preventative maintenance. In addition, regular inspections and correction of any issues noted during inspections will ensure compliance and prevent unwanted stormwater discharges.

6.6.1 Inspections and Reporting Requirements

Site inspections will reveal situations in need of repair and will improve the success of a preventative maintenance program. If additional site activities or structures are added to the landfill over time, the inspection list will have to be increased to accommodate future additions.

Site inspections will be conducted on at least a semi-annual schedule. An appropriately trained person, familiar with the permit conditions and the SWPPP, must conduct the inspections. The goals of the inspections are to: 1) determine whether structural or nonstructural BMPs and self monitoring requirements require maintenance or changes, and 2) evaluate the completeness and accuracy of the plan.

Once a year a comprehensive site compliance evaluation must be performed and a written report made of the results. The results need to be included in the SWPPP. The Site Inspection Form presented in Appendix M can be used for the annual documentation record. Within two weeks of the annual inspection, the description of potential pollutant sources identified in the plan shall be revised based on the results of the inspection. Within 12 weeks after the annual inspection, the changes to the plan shall be implemented. When a report does not identify any incidents of noncompliance, the landfill stormwater compliance manager needs to certify the facility is in compliance with the SWPPP and the permit.

If any plans or reports are submitted to the DENR secretary because of their request, they need to be signed and certified in accordance with the general permit signatory requirements. The inspection forms must be signed by the person having NPDES permit reporting authority. This authority must be provided in writing by an executive officer or ranking elected official of the City.

Annual inspections should be documented on the "Site Inspection Form" included in Appendix M and signed by the designated permit reporting officer. All inspection reports shall be retained as part of the plan for a period of three years and maintained as part of this document following the appendices.

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Inspection and testing of equipment at the site should be performed to identify breakdowns that could result in the discharge of pollutants having the potential to impact surface waters. The following inspections should be completed on at least a biannual basis and as major storm occurrences dictate.

- Inspect closed waste areas including associated berms and ditches, sedimentation basin and gravel access roads for signs of erosion, channeling and washboarding. Remove gravel and sediment accumulations that may develop.
- Inspect vehicles and vehicle parking areas to identify and eliminate leaking fluids.
- Inspect spill kits to be sure they are fully stocked.
- Inspect and test shop floor drains, and holding tank cleaning as necessary, to ensure that back-ups that could impact surface waters do not occur.
- Other inspections listed in the "Site Inspection Form" in Appendix M.

At least one inspection should be conducted each year during a period when storm water is discharging from the site. Run-off should be observed during this inspection to determine if it is discolored or visibly contaminated. These inspections should be documented on the "Site Inspection Form" in Appendix M.

If an inspection indicates that BMPs are not meeting the objectives of the Storm Water Pollution Prevention Plan, corrective action must be completed within 12 weeks.

As changes in BMP's and site inspection items are required, the BMP Form should be updated and kept in Appendix N. Copies of these forms are included in Appendix M.

6.6.2 Preventative Maintenance Program

Visually inspect the fuel truck and document any deficiencies to make sure the spill response kit is stocked and that all hose and fittings are well maintained and free of leaks. Maintain all site vehicles to prevent hydraulic and lubricant oil leaks.

Site erosion control structures and conveyances should be inspected and maintained after each major rainfall or snowmelt event.

Site inspections are part of the preventative maintenance program and will reveal areas that are in need of preventative and immediate maintenance. Rapid response in correcting those deficiencies is crucial to preventive maintenance.

6.6.3 Employee Training

The storm water pollution prevention plan training program will inform employees and the site managers of components of the Storm Water Pollution Prevention Plan. Annual training sessions will be organized by the SWPPP Manager, and conducted at regular intervals. Training sessions will include a review of the pollution prevention plan, any changes in the plan, and the level of compliance over the past year period.

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6.6.4 Monitoring

Monitoring is not required at the facility. If sampling is required by the DENR, that data will become part of this report. Some voluntary sampling has been performed and data are provided in Appendix L.

6.7 Spill Prevention and Response

Any spill of petroleum or landfill leachate at the landfill discovered by an employee shall be immediately reported to the landfill manager or supervisor. The spill will be handled in accordance with the following recommendations as well as South Dakota DENR and EPA regulations. The spill event will be documented in the annual inspection report.

Petroleum spills and spill prevention are discussed in the site Spill Prevention Control and Countermeasures (SPCC) Plan. Precautions shall be taken to prevent petroleum spills and to handle a spill event.

Herbicides and pesticides will be stored inside. Application of herbicides and pesticides will be performed in accordance with applicable state and federal regulations.

Other concerns on site are related to leachate loading of a tanker truck from the MSW Emergency Cell catch basin and leachate collection from the Cell 1 expansion leachate collection tank. As discussed previously, leachate discharges are regulated under the facility's Solid Waste Permit No. 09-08A. The leachate collection and loadout area for Cell 1 expansion is protected from stormwater discharge events by the secondary containment pad over which the leachate collection tanker parks during loading. The following precautions shall be taken to prevent a spill during loading: the driver will remain with the vehicle at all times; A visual or mechanical measurement of the level of leachate within the tanker during loading will be performed during the loading process; when the tanker is full and ready for departure, the hoses will be drained properly into the leachate collection area or to the tanker; and valves will be properly closed and the tanker will not leave the loading pad until any dripping from valves stops.

If spillage does occur, use the spill kit at the leachate loadout area to collect excess leachate from the ground. If a major spill occurs at the leachate loadout area or from a seep out of a waste sidehill, berm the spill with impermeable soils with the front end loader and use absorbent materials (e.g., sand, gravel and other sorbents) to minimize the runoff potential of the spill. If possible, divert the spill into the leachate collection pad or back into the waste fill area. The fill area should be immediately repaired to prevent infiltration from precipitation causing stormwater discharge impacts.

Landfill staff should follow landfill permit reporting requirements for spill reporting and corrective actions to eliminate the source of the spill from the ground prior to subsequent rain events. After the spill event, re-evaluate the SWPPP to determine if it was successful in handling the spill and whether it provided adequate precautions for

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predicting the spill. The event and response actions shall be documented in the Corrective Action Record worksheets provided in Appendix O.

Maintain a copy at the end of the appendices to evaluate the future BMP's at the site.

6.8 Discharge Conveyances

The treatment sedimentation basin overflow spillway and the extended detention basins are the discharge conveyances on site. Storm water moves across the majority of this site as overland flow.

6.9 Plan Implementation Responsibilities

The General Storm Water Permit requires that all personnel responsible for managing and implementing the SWPPP and those responsible for reporting requirements under this permit be identified. These individuals are listed below:

Permit Reporting Responsibilities – Dave McElroy

605.367.8163 (work) 605.941.2351 (mobile)

SWPPP Management and Inspection – Dustin Hansen 605.367.8166 (work) 605.261.2980 (mobile)

6.10 Other Environmental Management Plans

The Landfill has a Spill Prevention Control and Countermeasure Plan (SPCC) in place for this facility.

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Appendix K MATERIALS INVENTORY – DESCRIPTION OF EXPOSED SIGNIFICANT MATERIALS



Material Inventory and Potential Stormwater Impacts								
runoff. Add additional materials as they are brought on site.								
Significant Materials Exposed to Precipitation	Purpose/Location	Quantity Stored or Area	Likelihood of contact with stormwater discharge					
Diesel Fuel	Vehicle fueling Filling equipment on site	300 gallons	No, in secondary containment; adequate precautions taken during fueling					
Diesel and Unleaded Fuel	Onsite fueling depot	12,000 gal - Diesel 12,000 gal - E10	No, dual containment storage tanks; fueling area covered with canopy; adequate precautions taken during fueling					
Diesel and Unleaded Fuel	Onsite vehicle fueling	1800 gal - Diesel 300 gal - Unleaded	No, vehicle parked on secondary containment; adequate precaution taken during fueling operations					
Waste Oil	AST adjacent to maintenance building	560 gallons	No, secondary containment					
Construction, Demolition and Industrial Waste	Disposal Area	160 acres	No, runoff contained within waste area					
Petroleum Contaminated Soils	Soil Disposal	Volumes Vary	No, area is fully bermed					
Municipal Solid Waste	MSW Disposal	91 acres	No, runoff contained within waste area					
Compost and Compost Leachate		6 acres	No, area is bermed					
Asbestos	Asbestos disposal	2 acres	No, runoff is contained within disposal area					
Recycling and white goods	Temporary Storage	0.5 acres	Yes, runoff not contained					
Animal Carcasses	Seasonal game carcass disposal	10 acres	No, carcasses are received during times of low precipitation and freezing conditions. Area is bermed and backfilled.					
Leachate	Collection of leachate for off-site disposal	Volumes Vary	No, secondary containment; gravity drains back to collection tank					

Appendix L SAMPLING DATA



TABLE 1 SIOUX FALLS REGIONAL SANITARY LANDFILL SIOUX FALLS, SOUTH DAKOTA

Compost Leachate Analytical Results

			r -														r	1000
		Compost		Compost	Compost	Compost	Compost	Compost	Compost	Compost	Compost	Compost	Compost	Compost	Compost	Compost	Compost	Compost
		Leachate Pond 5	Compost	Leachate Pond	Leachate Pond	Leachate Pond	Leachate Pond	Leachate Pond	Leachate Pond	Leachate Pond	Leachate Pond	Leachate Pond	Leachate Pond	Leachate Pond	Leachate Pond	Leachate Pond	Leachate Pond	Leachate Pond
187		Year Event	Leachate Pond	Discharge	Discharge	Discharge	Discharge	Annual Event	Discharge	Discharge	Annual Event	Discharge	Discharge	Discharge	Discharge	Discharge	Discharge	Discharge
Parameters	Units	4-9-07	5-29-07	10-19-07	11-28-07	4-30-08	6-3-08	9-24-08	10-24-08	10-29-08	11-10-09	3-16-10	3-23-10	3-29-10	7-22-10	7-30-10	8-3-10	4-22-11
Alkalinity	mg/L	178	3 25 07	10 17 07	11 20 07	13000	0 5 00	72.00	10 21 00	10 27 00	11 10 07	3 10 10	3 23 10	3 23 10	1-22 10	7-50-10	0510	7.22.11
Bicarbonate as HCO ₃	mg/L	217																
BOD	mg/L		<8	23	7,6	13	8,6	<6	12	12	34.3	12	9	10	18	23	20	11
Specific Conductance	umhos/cm	1560			7,0	10	0.0	-						10	10	23		
pH*	s.u.	7.44		7.66	7.24	7.24	7.87	8.10	7.70	7.80	7.70	7.20	7.90	7.80	7.62	7.63	7.62	8.16
Total Suspended Solids	mg/L	7,44		21	5,6	12	41	0.10	20	12	444	13	18	46	7.02	61	24	26
Ammonia as N	mg/L	2.31		5.2	5.8	3.3	3.9	1.44	8.2	9.2	4.34	3.9	3.9	4	6.6	9.6	2.0	1.6
Sodium Adsorption Ratio	meq/L	0.62		5.2	5.0			2.44			4.54	3.7	3,5		0.0	7.0	2.0	1.0
TKN as N	mg/L	12						9.01			104							+
Nitrate + Nitrite as N	mg/L	<0.014						0.24			0.538							<u> </u>
Nitrite as N	mg/L	<0.014						<0.08			0.396							
Phosphorus	mg/L	1.46						1.5			10.1							+
Chloride	mg/L	51.8						1.5			10.1							
Aluminum	mg/L	0.46																+
Arsenic	mg/L	<0.00306		1						:								
Beryllium	mg/L	<0.00303															-	
Boron	mg/L	<0.09		1				0.146			0.148							<u> </u>
Cadmium	mg/L	<0.00061			····			<0.00119			0.00295							+
Calcium	mg/L	143						40.0011			0.00273					-	· · · · · · · · · · · · · · · · · · ·	
Chromium	mg/L	0.005 (J)						<0.00271			0.00444							
Hexavalent Chromium	mg/L	0.003 (J)		 				0.0235			< 0.0077							
Cobalt	mg/L	0.006 (J)		1				0.0233			<0.0077							
	mg/L	0.00						<0.00542			0.00546							
Copper Fluoride	mg/L	0.36		 				\0.0034Z			0.00340							
Iron	mg/L	1.84						0.655			8.43							
Lead	mg/L	<0.00191						0.033			0.43							
Lithium	mg/L	0.06																
Magnesium	mg/L	76.5		1														-
Manganese	mg/L	3.51		<u> </u>				2.81			4.83							
Mercury	mg/L	<0.000056		<u> </u>				2.01			4.03							
Molybdenum	mg/L	<0.00707																
Nickel	mg/L	0.03	-	1														-
Potassium	mg/L	59.4						126			195							
Selenium	mg/L	<0.0009		 		<u> </u>		120			173							
Sodium	mg/L	36.9								-								
Vanadium	mg/L	<0.00599																
Zinc	mg/L	0.02		 				0.013			0.106							
Non-polar materials	mg/L	1.7						0.013			0.100							<u> </u>
Oil and Grease	mg/L	3.8																
4,4' - DDE	ug/L	<0.00767		<u> </u>														
Chlordane	ug/L	<0.48		†													-	
Dieldrin	ug/L	<0.0055		 											0.0			
2,4-D	ug/L	3.4		 													-	-
Dicamba	ug/L	0.72		 														-
MCPA	ug/L	<19.4958																
Alachlor	ug/L ug/L	<0.04		 														
Atrazine	ug/L	<0.04		 				-										
Diazinon	ug/L ug/L	<0.05		 														
Pendimethalin	ug/L ug/L	<0.03		 				-	*****					· · ·				
Simazine		<0.06																
Simazine Trifluralin	ug/L	<0.04																-
Benzene	ug/L	~0.04		<1.0														
Toluene	ug/L			<1.0														-
Ethyl Benzene	ug/L			<1.0 <1.0							·							-
	ug/L			<1.0 <3.0														
Xylenes	ug/L			<3.U														
ТРН	mg/L			 	-													-

Detections are in **BOLD**(J) - Estimated value. Analyte was present, but less than the laboratory reporting limit
* - pH results were recorded in the field during sampling.

TABLE 2 SIOUX FALLS REGIONAL SANITARY LANDFILL SIOUX FALLS, SOUTH DAKOTA

South Stormwater Sediment Basin Discharge Results

Parameters	Units	South Stormwater Sediment Basin 6-3-08	South Stormwater Sediment Basin 10-29-08	South Stormwater Sediment Basin 3-16-10	South Stormwater Sediment Basin 7-22-10	South Stormwater Sediment Basin 7-30-10
BOD	mg/L	4.9	3	52	6.8	3.3
Total Suspended Solids	mg/L	18	4	18	69	120
Ammonia as N	mg/L	0.47	0.29	2.4	0.1	0.17
pH*	s.u.	7.58	7.50	7.80	7.90	7.76

Detections are in BOLD

^{* -} pH results were recorded in the field during sampling.

TABLE 3 SIOUX FALLS REGIONAL SANITARY LANDFILL SIOUX FALLS, SOUTH DAKOTA

Southeast Holding Pond Discharge Results

	300000	15011
Units	SE Holding Pond 3-16-10	SE Holding Pond 7-30-10
mg/L	3	3
mg/L	4.8	16
mg/L	0.35	0.11
s.u.	8.00	7.75
	mg/L mg/L	Pond 3-16-10 mg/L 3 mg/L 4.8 mg/L 0.35

Detections are in **BOLD**

^{* -} pH results were recorded in the field during sampling.



Report Number 01-089-2031

13611 B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121 www.midwestlabs.com

REPORT OF ANALYSIS

For: (2299) H D R ENGINEERING (605)338-2660

Date Reported: 04/02/01 Date Received: 03/21/01 Date Sampled: 03/20/01

Mail to:

H D R ENGINEERING 600 S CLIFF AVE #106 SIOUX FALLS SD 57104SIOUX FALLS LANDFILL SPRING 2001

Lab number, 627180

Sample ID TIDR 2299 SFLS01

Analysis Ammoniacal nitrogen Arsenic (total) Barium (total) Cadmium (total) Chemical oxygen demand Cyanide (Total) Hexane extractable materials Lead (total) Magnesium (dissolved) Magnesium (total recoverable) Mercury (total) Nitrate nitrogen Selenium (total) Silver (total) Total dissolved solids Total organic carbon Total suspended solids	39 n.d. n.d. 34.3 34.3 n.d. 1.5 0.002 n.d. 505 19.0	mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L	Detection Limit 0.10 0.001 0.005 0.002 5 0.002 5 0.005 0.01 0.01 0.004 0.2 0.001 0.001 10 1.0 4	Method EPA 350.2 EPA 200.8 EPA 200.7 EPA 200.7 ASTM D 1252-88 EPA 335.2 EPA 1664-SPE EPA 200.8 EPA 200.7 EPA 200.7 EPA 245.1 EPA 353.2 EPA 200.8 EPA 200.7 EPA 200.8 EPA 200.7 EPA 200.8 EPA 200.7 EPA 200.7 EPA 200.7 EPA 200.7	Analyst- Date als-03/26 kkh-03/27 kkh-03/27 kkh-03/27 rdh-03/26 rdh-03/27 bmr-03/23 kkh-03/27 hmg-03/27 rdz-03/27 rdz-03/27 ssr-03/23 kkh-03/27 kkh-03/27 rmm-03/24 rmm-03/28 jmm-03/23
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Notes:

n.d. - Not Detected.

Respectfully Submitted

Heather Ramig/Suc Ann Seitz

The above analytical results apply only to the sample(s) submitted. Client Services

Appendix M BEST MANAGEMENT PRACTICES AND SITE INSPECTION FORMS



BMP IDENTIFICATION

Instructions: Describe the Best Management Practices that you have selected to include in your plan. For each of the baseline BMP's, describe action that will be incorporated into facility operations. Also describe any additional BMP's (activity-specific, site-specific BMP's that you have selected. Attached additional sheets if necessary.

BMP's	Brief Description of Activities
Good Housekeeping	
Preventative Maintenance	
Source Reductions	
Diversions	2
Sediment and erosion Control	
Additional BMP's	

SITE INSPECTION FORM

Regional Sanitary Landfill Sioux Falls, South Dakota

Name of Authorized SWPP Inspector:				
o cracks, er	osion, v	alves functioning etc.).		
Accepta	ıble	Comments/Location	Corrective Action	Date Complete
				
				
-				· · · · ·
eatures			**	
			.**	
				6
	Conditi Accepta Yes	Condition Acceptable Yes No	Condition Acceptable Yes No Pattures Acatures	Condition Acceptable Yes No Patures Patures Acatures

3. If this inspection was conducted while storm wa pollutants were visible in the runoff (oil sheens, where spills have occurred and note the condition———————————————————————————————————	ster runoff was leaving the site, indicate if any sediment, or other discoloration). Check all areas on or runoff:
Describe any new significant materials that are e indicated in the plan:	exposed to storm water on the site that were not
5. Describe any changes to the plan that will be nec	cessary as a result of the inspection findings:
6. Has the site been evaluated for the presence of non-s wastewater).	torm water discharges? (e.g. process water,
Non-Structural BMP's (check occurrence during inspection period and describe below)	Structural BMP's (check occurrence during inspection period and describe below)
1 employee training 2 employee spills training 3 purchase of spill containment and control material 4 general clean-up of waste and traffic area 5 removal of discarded equipment 6 moving significant material into a building 7 covering significant material with cover material 8 changes in material handling practices to reduce exposure to runoff 9 installation and maintenance of silt fence, seeding and mulching or sodding of bare soil areas to prevent erosion 10 other non-structural measures were taken, please list:	1. installation of curbs, swales, or other measures to divert storm water away from significant material 2. installation of containment areas around aboveground storage tanks or waste areas 3. storm water detention/retention pond or infiltration basin in good condition and sufficient for current surface water discharge 4. other structural measures were taken, please list: BMP Description
Describe corrective actions needed to correct non-functioning	ng BMP's:

		-1
Authorized Permit Recorder Havin	g NPDES Signatory Authority:	
Printed Name:	Title:	
Signature:	Date Signed:	······
Additional Inspections:		-
Additional Inspections:		
Additional Inspections:		

Appendix N COMPLETED ANNUAL INSPECTION DOCUMENTATION



Appendix O LIST OF SIGNIFICANT LEAKS AND SPILLS CORRECTIVE ACTIONS RECORD



WORKSHEET 5 - STORM WATER POLLUTION PREVENTION PROGRAM SIOUX FALLS REGIONAL SANITARY LANDFILL

CORRECTIVE ACTIONS RECORD

The purpose of this form is to provide a record of corrective actions taken to assure adherence to the Storm water Pollution Prevention Plan (SWPPP). Instruction: Complete this form for each corrective action required from the semi-annual site inspection to assure adherence to the SWPPP. Describe in detail the action taken within 12 weeks of inspection. Facility: ______ Date: Completed by: Area of Concern: Observations: Action taken:

Permit No.: SDR00XXXX

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES JOE FOSS BUILDING 523 EAST CAPITOL AVENUE PIERRE, SOUTH DAKOTA 57501-3181

GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITIES

AUTHORIZATION TO DISCHARGE UNDER THE SURFACE WATER DISCHARGE SYSTEM

In compliance with the provisions of the South Dakota Water Pollution Control Act and the Administrative Rules of South Dakota (ARSD) Chapters 74:52:01 through 74:52:11, contact of **industrial** activity, located in the State of South Dakota, are authorized to discharge storm water associated with industrial activities in accordance with the conditions and requirements set forth herein.

This general permit shall become effective on October 1, 2012.

This general permit and the authorization to discharge shall expire at midnight, **September 30**, 2017.

Signed this 26th day of September, 2012

Note – This page will be replaced with a copy containing the assigned permit number once coverage is authorized.

Authorized Permitting Official

Steven M. Pirner Secretary

Department of Environment and Natural Resources

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1.0 **DEFINITIONS**

"ARSD" means the Administrative Rules of South Dakota.

"Best Management Practices" ("BMPs") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the state. BMPs also include treatment requirements, operating procedures, and practices to control industrial site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

"Coal Pile Runoff" means the runoff from or through any coal storage pile.

"Concrete Washout" as used in the General Permit refers to any wash waters derived from the cleaning of concrete trucks and/or equipment.

"Construction Activity" means activities including clearing, grading, and excavating, which result in the disturbance of one or more acres of total land area. See the General Permit for Storm Water Discharges Associated with Construction Activities for more information.

"Control Measures" as used in this general permit, refers to any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to waters of the state.

"DENR" means the South Dakota Department of Environment and Natural Resources.

"Discharge" as used in the General Permit is an addition of any pollutant or combination of pollutants to surface waters of the state from any point source.

"EPA" or "U.S. EPA" means United States Environmental Protection Agency.

"Land Application System" means an operation that places solid wastes onto or incorporates solid wastes into the soil surface.

"Landfill" means a solid waste disposal facility or section of a facility where solid waste is permanently placed in or on land.

"Materials" include, but are not limited to: raw materials; fuels; solvents; detergents; any chemical the facility is required to report pursuant to Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA); fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

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"Material handling activities" include the storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, final product, or waste product. A storm resistant shelter is not required for the following industrial materials and activities:

- Drums, barrels, tanks, and similar containers that are tightly sealed, provided those containers are not deteriorated and do not leak. "Sealed" means banded or otherwise secured and without operational taps or valves;
- Adequately maintained vehicles used in material handling; and
- Final products intended for outdoor use, other than products that would be mobilized in storm water discharges (e.g., rock salt).

"Minimize" means to reduce and/or eliminate to the extent achievable using control measures (including Best Management Practices) that are technologically available and economically achievable and practicable in light of best industry practice.

"MS4" or "Municipal Separate Storm Sewer System" is defined at 40 CFR §122.26(b)(8) to mean a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

- 1. Owned and operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
- 2. Designed or used for collecting or conveying storm water;
- 3. Which is not a combined sewer; and
- 4. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2.

"Municipality" means a city, town, county, district, sanitary district, or other public body created by or under state law with jurisdiction over the disposal of sewage, industrial wastes, or other wastes.

"No Exposure" exists at an industrial facility when all industrial materials and activities are protected to prevent exposure to rain, snow, snowmelt, and/or runoff. Industrial materials or activities such as material handling equipment or activities, industrial machinery, raw materials, intermediate products, by-products, final products, or waste products must be protected by a storm resistant shelter.

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"NOI" means Notice of Intent to be covered by this general permit. (See Attachment A.)

"Nonpoint Source" means a source of pollution that is not defined as a point source.

"NOT" means Notice of Termination of coverage under this general permit. (See Attachment B.)

"Operator" means the owner, party, person, general contractor, corporation, or other entity that has day-to-day operational control over the facility. The operator, along with the owner, is responsible for ensuring compliance with all conditions of the General Permit and with development and implementation of the "Storm Water Pollution Prevention Plan".

"Point Source" means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, animal feeding operation, vessel, or other floating craft from which pollutants are or may be discharged.

"Pollutant" is defined at ARSD Section 74:52:01:01(35) and is any dredged spoil, solid waste, incinerator residue, sewage, sewage sludge, garbage, trash, munitions, chemical wastes, biological material, radioactive material, heat, wrecked or discarded equipment, rock, sand, cellar dirt, or any industrial, municipal, or agricultural waste discharged into waters of the state. This term does not mean sewage from watercraft; or water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the state after it is determined that such injection or disposal will not result in the degradation of ground or surface water resources.

"Process Wastewater" means water which, during manufacturing or processing, comes into direct contact with or results from the production or use of a raw material, intermediate product, finished product, by-product, or waste product.

"Publicly Owned Treatment Works" or "POTW" means any device or system used in a treatment, including recycling and reclamation, of municipal sewage or industrial waste of a liquid nature which is owned by the state or a municipality. This term includes sewers, pipes, or other conveyances only if they convey wastewater to a publicly owned treatment works providing treatment.

"Regulated Substance" means the compounds designated by SDDENR under South Dakota Codified Law, Sections 23A-27-25, 34A-1-39, 34A-6-1.3(17), 34A-11-9, 34A-12-1 to 34A-12-15, inclusive, 38-20A-9, 45-6B-70, 45-6C-45, 45-6D-60, and 45-9-68, including pesticides and fertilizers regulated by SDDENR of Agriculture, the hazardous substances designated by the EPA pursuant to section 311 of the Federal Water Pollution Control Act Amendments of 1972, Pub.L. 92-500 as amended by the Clean Water Act of 1977, Pub.L. 95-217, the toxic pollutants designated by Congress or the EPA pursuant to

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section 307 of the Toxic Substances Control Act, Pub.L. 99-519, the hazardous substances designated by the EPA pursuant to section 101 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, Pub.L. 96-510, and petroleum, petroleum substances, oil, gasoline, kerosene, fuel oil, oil sludge, oil refuse, oil mixed with other wastes, crude oils, substances, or additives to be utilized in the refining or blending of crude petroleum or petroleum stock, and any other oil or petroleum substance. This term does not include sewage and sewage sludge.

"Runoff" is a storm water discharge that enters waters of the state.

"Secretary" means the Secretary of the Department of Environment and Natural Resources or an authorized representative.

"Storm Water" means, for the purposes of this General Permit, storm water runoff, snow melt runoff, or surface runoff and drainage.

"Storm Water Associated with Construction Activity" means the discharge of storm water runoff from construction activities including, but not limited to, clearing, grading, and excavating, that result in land disturbance of one or more acres of total land area, or which may be part of a larger common plan of development or sale if the larger common plan will ultimately disturb one or more acres of land.

"Storm Water Discharge Associated with Industrial Activity" is defined as storm water runoff, snow melt runoff, or surface runoff and drainage from industrial activities as defined in 40 C.F.R. Section 122.26(b)(14) (July 1, 2001).

"Storm Water Pollution Prevention Plan", "SWPPP", "Plan" identifies potential sources of storm water pollution at an industrial facility and specifies structural and non-structural control measures that will be in place to minimize negative impacts caused by storm water discharges associated with industrial activity. See Section 4.0 for details on the requirements for a SWPPP.

"SWD" means Surface Water Discharge.

"Temporarily inactive site" means a site that is owned and operated as an industrial site but is not operating or staffed for at least half of the year. Monitoring and inspection requirements do not apply during the temporary inactivity, as long as steps have been taken to ensure the facility meets No Exposure requirements during the time of temporary inactivity. All other permit conditions remain in force.

"TMDL" or "Total Maximum Daily Load" means the sum of the individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background. If a receiving water has only one point source discharger, the TMDL is the sum of that point source WLA plus the LAs for any nonpoint sources of pollution and natural background sources, tributaries, or adjacent segments. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure.

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"Treatment Works Treating Domestic Sewage" means a Publicly Owned Treatment Works or any other sewage sludge or wastewater treatment devices or systems, regardless of ownership (including federal facilities), used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated for the disposal of sewage sludge. This definition does not include septic tanks or similar devices. For purposes of this definition, "domestic sewage" includes waste and wastewater from humans or household operations that are discharged or otherwise enter a treatment works.

"Waste Pile" means any noncontainerized accumulation of solid, nonflowing waste that is used for treatment or storage.

"Waters of the State" means all waters within the jurisdiction of this state, including all streams, lakes, ponds, impounding reservoirs, marshes, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, situated wholly or partly within or bordering upon the state, but not waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA.

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2.0 COVERAGE UNDER THIS GENERAL PERMIT

2.1 Permit Area.

This general permit shall apply to storm water discharges associated with industrial activities located within the state of South Dakota into waters of the state.

2.2 Discharges Covered.

- 1. This general permit shall authorize all new and existing discharges of storm water associated with industrial activity within the state of South Dakota for any of the categories of industries identified below. Discharges identified under Section 2.3, 2.4, and 2.5 are excluded from coverage.
 - a. Facilities classified as Standard Industrial Classifications 20 through 39 (See Attachment C for more information on Standard Industrial Classification codes);
 - b. Facilities classified as Standard Industrial Classifications 10 through 14 (mineral industry). This includes active or inactive mining operations, and oil and gas exploration, production, processing, treatment, or transmission facilities discharging storm water that has come into contact with any overburden, raw material, intermediate products, finished products, byproducts, or waste products located on the site of such operations. Inactive mining operations are mining sites that are not being actively mined but have an identifiable owner/operator;
 - c. Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under SDCL 34A-11, ARSD Article 74:28, or RCRA Subtitle C;
 - d. Landfills, land application sites, and open dumps that have received industrial wastes (waste that is received from any of the facilities described under this subsection) including those that are subject to regulation under SDCL 34A-6, ARSD Article 74:27, or RCRA Subtitle D;
 - e. Facilities involved in the recycling of materials including metal scrap yards, battery reclaimers, salvage yards, and automobile junkyards classified as Standard Industrial Classification 5015 and 5093;
 - f. Steam electric power generating facilities, including coal handling sites;
 - g. Transportation facilities classified as Standard Industrial Classifications 40, 41, 42 (except 4221-25), 43, 44, 45, and 5171 that have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility that are involved in vehicle maintenance (such as vehicle rehabilitation, mechanical repairs, painting,

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fueling, and lubrication), equipment cleaning operations, airport deicing operations, or other industrial activities are subject to this general permit;

- h. Treatment works treating domestic sewage with a design flow of 1.0 million gallons per day or more. This does not include farm lands, domestic gardens, lands used for sludge management where sludge is beneficially reused and lands are not physically located in the confines of the facility, or other areas that are in compliance with 40 CFR 503;
- i. Oil and gas exploration, production, processing, treatment operations, or transmissions facilities that have had a discharge of a reportable quantity of oil or a hazardous substance (40 CFR 110.6, 117.21, or 302.6); and,
- j. Discharges from industrial facilities that have been designated by the Secretary as needing a permit.
- 2. Storm water construction discharges mixed with a storm water discharge from an industrial source may be covered where:
 - a. The industrial source is located on the same site as the construction activity; and
 - b. The storm water discharges from construction sources are covered by a separate surface water discharge general permit or individual permit.
- 3. The following non-storm water discharges may be authorized by this general permit provided the non-storm water component of the discharge is identified in the storm water pollution prevention plan, with an explanation of pollution prevention measures to be implemented:
 - a. Discharges from firefighting activities;
 - b. Routine external building washdown that does not use detergents or other compounds;
 - c. Pavement wash waters where detergents are not used and where spills or leaks of toxic or hazardous materials have not occurred;
 - d. Air conditioning condensate;
 - e. Uncontaminated ground water; and
 - f. Waters used as a best management practice to wash vehicles or control dust.

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2.3 No Exposure.

1. If a facility listed in Section 2.2 has taken steps to ensure there is no exposure to storm water, the facility may be eligible for an exemption from permit coverage. To qualify, the facility must submit a "No Exposure Certification form" provided by SDDENR (Attachment D) and must be approved by the Secretary for exemption from the permitting requirements. A written approval letter from the Secretary will be sent after receiving the form.

2. For facilities already covered under this general permit, coverage is automatically terminated once the Secretary approves the no exposure exemption. No Notice of Termination is required for this.

2.4 Temporary Shutdown.

- 1. If a facility listed in Section 2.2 is temporarily inactive, and has taken steps to ensure the facility meets No Exposure requirements (see the checklist in Attachment D, part C), the facility may be eligible for a temporary exemption from monitoring and inspection requirements (Sections 3.7, 3.8, and 5.1). To qualify, the facility must submit a "Temporary Shutdown Notice" form provided by SDDENR (Attachment E) and must be approved by the Secretary for exemption from the monitoring and inspection requirements. A written approval letter from the Secretary will be sent after receiving the form.
- 2. Facilities which cease to be temporarily inactive are immediately subject to the monitoring and inspection requirements. The facility shall notify the SDDENR either in writing or by phone at (605) 773-3351 of the temporary shutdown, including dates, within 5 business days of resuming activity.

2.5 Discharges Not Covered.

This general permit does not authorize storm water discharges that are:

- 1. mixed with sources of non-storm water, other than discharges that are identified in Section 2.2 of this general permit or that are authorized under a separate discharge permit;
- 2. the Secretary determines will cause, or have reasonable potential to cause or contribute to, violations of water quality standards;
- 3. process waters, including those from truck wash-outs and concrete wash water;
- 4. discharges that contain leachate;
- 5. discharges that contain regulated substances, hazardous substances, or oil resulting from on-site spills. Permittees are subject to federal reporting requirements of 40 CFR Part 110, Part 117, and Part 302 relating to spills or other

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releases of oils or hazardous substances. Spills in excess of reportable quantities shall be properly reported as stated in Section 6.17.; or

6. discharges of fill material into waters of the state. Such discharges are required to obtain a Section 404 federal Clean Water Act permit from the U.S. Army Corps of Engineers.

2.6 Obtaining Authorization.

- 1. A Notice of Intent (NOI) form, found in Attachment A, must be signed in accordance with Section 6.8 and submitted to the address indicated on the NOI form to request coverage under this general permit for storm water discharges from industrial sites. This information must be submitted at least 15 days prior to commencing any industrial activity at the site.
- 2. Upon receipt of a complete NOI, the Secretary shall make the decision to grant or deny coverage, or request additional information. The applicant will receive a letter of authorization from the department once permit coverage is granted for storm water discharges from the industrial site(s).
- 3. Operators are not prohibited from submitting late NOIs. When a late NOI is submitted, authorization is only for discharges that occur after permit coverage is granted. The Secretary reserves the right to take appropriate enforcement action for any unpermitted activities that may have occurred between the time industrial activity commenced and authorization of storm water discharges is granted.
- 4. SDCL 1-40-39 authorizes SDDENR to accept a document with an electronic signature. SDDENR shall provide for the authenticity of each electronic signature by adhering to any standards established by the South Dakota Bureau of Information and Telecommunications pursuant to SDCL Section 53-12-47 and 53-12-50 or any other standards established by rules promulgated pursuant to SDCL Chapter 1-26. Any entity submitting a report to SDDENR as required by EPA may satisfy reporting requirements by cross-media electronic reporting in lieu of paper-based reporting as provided for by the EPA pursuant to the standards promulgated in the Federal Register, Vol. 70, No. 197 (October 13, 2005--40 CFR Parts 3, 9, 51 et al.--Cross-Media Electronic Reporting; Final Rule).
- 5. Upon the effective date of the new General Permit, the existing General Permit will be terminated. If permittees authorized under the existing General Permit need to continue coverage under the new General Permit, an updated Notice of Intent and Certification of Applicant shall be submitted prior to the issuance of the new General Permit, and shall include the permittee's current permit number.

2.7 Additional Notification.

Facilities that discharge storm water to a permitted municipal separate storm sewer system (MS4) shall submit signed copies of the NOI form to the municipal operator. At

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the time of this writing, the permitted MS4s are: Aberdeen, Brookings, Huron, Mitchell, North Sioux City, Pierre, Rapid City, Sioux Falls, Spearfish, Sturgis, Vermillion, Watertown, Yankton, Meade County, and Pennington County.

2.8 Transfer of Ownership.

If the owner or operator of a permitted facility changes, the new owner or operator of the facility must submit a Transfer of Ownership form (Attachment F) to the Secretary at least 30 working days prior to the change.

This general permit may be automatically transferred to a new permittee if:

- 1. The current permittee notifies the Secretary at least 30 days in advance of the proposed transfer date using the form in Attachment F;
- 2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of general permit responsibility, coverage, and liability between them; and,
- 3. If the operation of the facility will essentially remain unchanged and no action is taken by the secretary, the transfer is effective on the date specified in the agreement. If changes are planned, the permit must be transferred as set forth in ARSD Section 74:52:04:01.

2.9 Terminating Coverage.

- 1. Permittees wishing to terminate coverage under this general permit must submit a Notice of Termination that is signed in accordance with Section 6.8.3 of this general permit. Compliance with this general permit is required until a Notice of Termination is submitted and approved by the Secretary.
- 2. Facilities meeting the criteria in Section 2.2 must maintain coverage under this general permit until all storm water discharges authorized by this general permit are eliminated, or the facility qualifies for a no exposure exemption (see Section 2.3).

2.10 Unauthorized Release of Regulated Substances.

This general permit does not authorize the discharge of any regulated substance listed in ARSD Section 74:34:01:03, including, but not limited to, fertilizers, pesticides, and petroleum substances such as oil and gasoline. If a release occurs, the storm water pollution prevention plan shall be modified and changes implemented, as appropriate. The plan must identify and address the following measures:

- 1. Ways to prevent the reoccurrence of such releases;
- 2. The proper response to such releases if and when they do occur; and

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3. Steps to prevent pollutants from contaminating storm water runoff.

If a release occurs, the permittee is also required to notify the SDDENR Ground Water Quality Program at (605) 773-3296 or Emergency Management at (605) 773-3231 (during non-business hours). The permittee may be required to sample the discharge. Releases resulting in oil sheens must immediately be reported to the National Response Center at 1-800-424-8802. All notifications must be made as soon as reasonably practicable, but in no case greater than 24 hours after the release.

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3.0 EFFLUENT LIMITS

Effective immediately and lasting through the life of the General Permit, all permittees shall comply with the effluent limits below. All permittees shall meet the following effluent limits to minimize the pollutants present in the discharges associated with industrial activity.

3.1 Implement Control Measures.

All necessary storm water control measures shall be implemented to eliminate or minimize contact of storm water with materials or activities that may result in pollution of the runoff. If contact cannot be eliminated or reduced, storm water should be treated before it is discharged from the site.

3.2 Precipitation Design Event.

All storm water control measures shall be selected, designed, and installed to minimize the pollutants present in runoff from a rainfall event of up to two (2) inches in a 24-hour period or snowmelt large enough to cause runoff.

3.3 Maintenance of Control Measures.

- 1. The permittee shall maintain all storm water control measures in effective working order. If any control measures are not operating effectively, the permittee shall perform maintenance on the control measures as necessary to maintain the continued effectiveness of the storm water control measures and before the next anticipated storm event or within seven (7) days of identifying the need for maintenance, whichever comes first.
- 2. At a minimum, the permittee shall remove sediment from controls when design capacity has been reduced by 50%.
- 3. All control measures and other protective measures identified in the SWPPP shall be maintained in effective operating condition. If the site inspections required by Sections 3.7 or 3.8 identify control measures that are not operating effectively, maintenance shall be performed as stated above.

3.4 Off-Site Pollutant and Dust Control.

- 1. The permittee shall minimize dust generation and vehicular tracking of soil or other pollutants off-site. At a minimum, street sweeping shall be performed if other best management practices are not adequate to minimize pollutants from being tracked on to the street.
- 2. If pollutants escape the industrial site, the permittee shall remove the off-site accumulations of pollutants at a frequency sufficient to minimize impacts.
- 3. The permittee shall revise the SWPPP and implement control measures to minimize further off-site track-out or sedimentation.

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3.5 Erosive Velocity Control.

The permittee shall place velocity dissipation devices at discharge points and along the length of a runoff conveyance, as necessary, to provide a non-erosive flow and protect the receiving waters of the state's natural uses and characteristics; both physical and biological.

3.6 Storage of Materials.

The permittee shall properly handle, store, and dispose of litter, chemicals, scrap material, raw material, fuel, and other materials to minimize pollutants entering storm water discharges. Final products intended for outdoor use, other than products that would be mobilized in storm water discharges (e.g., rock salt) are exempt from this requirement. Permittees are required to minimize the discharge of solid materials to waters of the state (except where authorized by a Section 404 permit from the United States Army Corps of Engineers).

3.7 Spills / Releases in Excess of Reportable Quantities.

- 1. The permittee shall have the capacity to control, contain, and remove spills at the site. If spills do occur, the permittee shall implement control measures to minimize the potential for contamination of the storm water and modify the SWPPP with the location of the spill and any new control measures.
- 2. Spills in excess of reportable quantities shall be properly reported as stated in Section 2.10.

3.8 Comprehensive Site Compliance Evaluations.

The permittee shall conduct a comprehensive site compliance evaluation at least once a year as part of one of the two semiannual site inspections required in Section 3.9. The results of the evaluation shall be summarized in a written report. In addition to the normal site inspection information, the evaluations shall include:

- 1. Areas contributing to a storm water discharge shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Measures to reduce pollutant loadings shall be evaluated to determine if they are adequate and properly implemented or if additional control measures are needed. Structural control measures, storm water control measures, and other structural pollution prevention measures identified in the plan shall be observed to ensure they are operating correctly. The permittee shall visually inspect equipment needed to implement the SWPPP, such as spill response equipment.
- 2. Within two weeks of the inspection, the description of potential pollutant sources identified in the Plan shall be revised based on the results of the inspection. Within 12 weeks after the inspection, the changes to the plan shall be implemented. Upon request from a permittee, he Secretary may approve an

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additional time to modify or implement the plan. The permittee shall submit the request for an extension in writing and shall document the changes that are proposed, along with the need for the time extension.

- 3. Where a report does not identify any incidents of non-compliance, the permittee shall certify the facility is in compliance with the plan and this general permit. The certification shall be in accordance with Section 6.8.3.
- 4. The report shall summarize the scope of the inspection, personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Plan, actions taken, and identification of any incidents of non-compliance. The report shall be signed in accordance with Section 6.8. All inspection reports shall be retained with the SWPPP.

3.9 Inspections.

- 1. In addition to or as part of, the comprehensive site compliance evaluations described above, site inspections shall be conducted by the permittee at least semi-annually. An appropriately trained person familiar with the general permit conditions and the SWPPP must conduct the inspections. The purpose of inspections is to:
 - a. determine if structural and non-structural control measures require maintenance or changes and
 - b. evaluate the completeness and accuracy of the plan.
- 2. At least one inspection each calendar year must be conducted within 24 hours of a storm event greater than 2 inches or snowmelt large enough to cause runoff.
- 3. Monitoring shall be performed in accordance with Section 5.1 for the following parameters at least once per calendar year. Monitoring must be conducted within 24 hours of a storm event greater than 2 inches or snowmelt large enough to cause runoff. If an oil sheen is visible, a grab sample for Oil and Grease shall be taken immediately, analyzed, and reported.

Effluent Characteristic	Reporting Values	Sample Type
Oil and Grease	Presence or Absence of Sheen	Visual ¹
Oil and Grease, mg/L ²	Daily Maximum	Grab ¹
Visible Pollutants	Presence or Absence of Visible	Visual
	Pollutants, Discoloration, Etc.	

¹ The presence or absence of an oil sheen shall be visually monitored. In the event that an oil sheen or floating oil is observed during discharge, a grab sample for Oil and Grease shall be taken immediately, analyzed, and reported.

² Use Standard Methods 1664A – hexane extraction.

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4. When a facility is unable to collect a sample due to adverse climatic conditions (e.g., local flooding, high winds, tornadoes, electrical storms, extended frozen conditions, etc.), the facility must include a description of why samples could not be taken. The permittee may use this sampling waiver only once during a two-year period.

5. Inspection results and corrective actions taken in response to any deficiencies or opportunities for improvement identified during the inspection must be documented in the Plan.

3.10 Additional Requirements for Salt Storage.

Storage piles of salt that generate a storm water discharge to waters of the state shall be enclosed or covered to prevent exposure to precipitation, except when adding or removing materials from the pile.

3.11 Additional Requirements for Coal Pile Runoff.

The Total Suspended Solids (TSS) shall not exceed 50 mg/L at any time, and the pH shall be maintained between 6.0 standard units and 9.0 standard units at all times. Monitoring shall be conducted as required in Section 5.1.1 to ensure these limits are met.

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4.0 STORM WATER POLLUTION PREVENTION PLAN

4.1 Storm Water Pollution Prevention Plan.

- 1. The permittee shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP), also referred to as "the Plan," to address specific conditions at the permitted site. The goal of the Plan is to eliminate or minimize contact of storm water with materials or activities that may result in pollution of the runoff.
- 2. The Plan is not submitted to the SDDENR unless requested by the Secretary, but it must be retained at the permitted site. The general requirements of the Plan are included below.

4.2 Deadlines for Plan Preparation and Implementation.

- 1. New facilities. The Plan must be developed prior to the submittal of the NOI form. The Plan must be implemented before initiating any industrial activity.
- 2. Existing facilities. For sites covered under the current General Permit and reauthorized under this General Permit, the SWPPP shall be updated to reflect the conditions and requirements of this General Permit by **February 1, 2013.**

4.3 Keeping Plans Current.

- 1. The permittee shall modify the Plan whenever there is a change in design, construction, operation, or maintenance that changes the potential for the discharge of pollutants to waters of the state. The plan shall also be modified if it proves to be ineffective in eliminating or minimizing pollutants present in storm water.
- 2. The Secretary may notify the permittee at any time the Plan does not meet one or more of the minimum requirements of the general permit. This notification will identify the provisions of the general permit that are not being met by the Plan and identify which provisions require modifications to meet the minimum requirements. Within thirty (30) days of notification, the permittee shall make the required changes to the Plan and shall submit to the Secretary a written certification that the requested changes have been made. The Secretary may take appropriate enforcement action for the period of time the permittee was operating under a Plan that did not meet the minimum requirements of this general permit.

4.4 Contents of the Plan.

The Plan shall include, at a minimum, the following items:

1. Personnel Responsibilities. Each Plan shall identify personnel responsible for implementing, maintaining, and revising the Plan and those responsible for the reporting requirements of this general permit. This should include the facility contact person indicated on the NOI. The plan shall clearly identify the

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responsibilities of personnel. All aspects of the facility's plan must be addressed in the personnel activities and responsibilities.

- 2. Site Map. The Plan shall contain a site map indicating the following, if applicable:
 - a. Drainage areas and directions of storm water runoff (indicated by arrows);
 - b. Discharge outfalls from the site (structures that carry storm water runoff from the facility such as floor drain systems, ditches, culverts, or storm sewers);
 - c. The name and location of waters of the state that receive facility storm water runoff (if waters of the state are too distant from the facility to be indicated on the site map. indicate the name, direction of flow, and identify the water of the state that would receive runoff from the site);
 - d. Areas where materials are exposed to storm water;
 - e. Locations of storm sewer inlets (such as municipal storm sewers) and an indication of which structures, if any, have floor drains or loading dock drains that are connected to storm sewers;
 - f. Locations and types of control measures currently installed at the facility to reduce or eliminate pollutants to storm water
 - g. Locations where spills or leaks have occurred; and
 - h. Areas of concern, including but not limited to: fueling stations; vehicle and equipment maintenance and/or cleaning areas; locations used for the treatment, storage, or disposal of wastes; liquid storage tanks; processing areas; and storage areas.
- 3. Inventory of Exposed Materials. Each plan shall identify and describe all activities and materials that may be potential pollutant sources. The plan shall include an inventory of the types of materials handled at the site that are potentially exposed to precipitation and potential pollutant sources. This inventory shall include:
 - a. A narrative description of materials that have been handled, treated, stored, or disposed of in a manner allowing exposure to storm water during the past three years and the likelihood of their contact with storm water;
 - b. The method(s) and location(s) of on-site storage or disposal;
 - c. Practices employed to minimize contact of materials with storm water runoff between the time of three years prior to the date of coverage under this general permit and the present;
 - d. A prediction of the direction of flow and an identification of the types of pollutants that are likely to be present in storm water discharges;
 - e. The toxicity of chemicals used, produced, or stored;
 - f. A history of significant leaks or spills of toxic or hazardous pollutants;
 - g. The location and a description of existing control measures to reduce pollutants in storm water runoff;

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h. Risk Identification and Summary of Potential Pollutant Sources. In creating the inventory of exposed materials, the permittee must, at a minimum, evaluate the following areas at the industrial site (and other areas where appropriate) to determine whether or not materials are exposed in these areas:

- i. Vehicle and equipment maintenance, parking and storage areas, fueling areas, and washing/cleaning areas to determine if there is discolored soil evident as a result of fuel and lubricant leaks and spills;
- ii. Liquid storage tanks and other bulk material stockpile areas;
- iii. Loading and unloading areas;
- iv. Outdoor manufacturing, processing or storage areas, and industrial plant yards to determine if there is discolored soil in these areas as a result of leaked or spilled solvents, fuels, or lubricants;
- v. Dust or particulate generating areas, including dust collection devices that may release dust;
- vi. Rooftops contaminated by industrial activity or operation of a pollution control device;
- vii. On-site waste disposal areas, such as waste ponds, dumpsters, solid waste storage or management areas; and
- viii. Exposed (non-vegetated) soil areas where there is a potential for erosion to occur.
- 4. Sampling Data. A summary of all sampling data describing pollutants in storm water discharges from the facility. This includes a summary of any voluntary sampling data collected during the past 3 years or sampling performed under Section 5.1.4 or 5.1.7 of this general permit.
- 5. Non-Storm Water Discharges. The plan shall include a certification the discharge has been tested or evaluated for the presence of non-storm water discharges. The evaluation should be performed during dry weather as described in paragraph 6 of this Section. A discharger that is unable to provide the certification required by this paragraph must notify the Secretary. The certification shall be as follows:

"I certify under penalty of law that the storm water drainage system in this SWPPP has been tested or evaluated for the presence of non-storm water discharges either by me, or under my direction and supervision. To the best of my knowledge and belief, the information submitted is true, accurate, and complete. At the time this plan was completed no unauthorized discharges were present. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations."

6. Dry Weather Screening. Evaluate all discharge conveyances from the site (storm sewers, pipes, tile lines, ditches, etc.) to determine if liquids other than storm water are being discharged from these devices. This should be done during dry

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weather when storm water discharge is not occurring. The evaluation should cover sewer inlets and floor drains to determine which inlets/drains are connected to sanitary sewer lines, storm sewer lines, or septic tanks/drain fields. Appropriate methods such as dye or smoke testing or video imaging should be used to determine the source of discharges. Discharge of non-storm water (such as sanitary sewer or floor drain connections to storm sewers) is not authorized by this permit. Before such discharge may continue, authorization under an appropriate discharge permit must be obtained.

4.5 Storm Water Controls.

The permittee shall develop, describe, prioritize, and implement appropriate control measures for the permitted site, as required in Section 4.0. The description of the control measures shall address the following minimum components, including a schedule for implementing the control measures:

- 1. Control Measures. Describe appropriate control measures including structural and non-structural control measures that will be used at the facility to minimize or eliminate pollution of storm water at the site. The description must include an objective for each control measure and a description of how to evaluate proper functioning and any maintenance requirements of the control measure. Control measures should target materials and pollutant sources. The following general categories of control measures shall be considered and incorporated as appropriate into the plan if materials are exposed to storm water on-site:
 - a. Source reduction: Reduce or eliminate the materials that are exposed to storm water. Materials management practices should be evaluated to determine if and how exposed materials can be reduced or eliminated. This can include clean-up of old equipment yards, periodic checking of dust control equipment to ensure there is no accumulation of dust in the area, removal and treatment of petroleum contaminated soil, consolidation of materials from many different areas into one area, and training employees regarding proper handling and disposal of materials. Materials may also be moved indoors or covered with a tarp or structure to eliminate contact with precipitation.
 - b. Diversion: Divert storm water drainage away from exposed materials through use of curbing, berms, sewers, or other forms of drainage control or elevate exposed significant material above surrounding drainage.
 - c. Treatment: Where contact of storm water with materials is unavoidable, the permittee shall use treatment devices to reduce the concentration and amount of pollutants in the discharged storm water. Such devices include but are not limited to oil/water separators, storm water detention/retention ponds, and vegetated swales.

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2. Good Housekeeping. Good housekeeping requires maintaining in a clean orderly manner any areas that may contribute pollutants to storm water discharges. A maintenance schedule shall be developed for these areas.

- 3. Preventive Maintenance. A preventive maintenance program must require regular inspections and maintenance of storm water management devices (e.g., cleaning oil/water separators, catch basins, etc.) and testing facility equipment and systems to uncover and prevent conditions that could cause breakdowns or failures (such as hydraulic leaks, torn bag-house filters, etc.) resulting in discharges of pollutants to surface waters.
- 4. Spill Prevention and Response Procedures. The plan shall clearly identify areas with potential for spills that can contribute pollutants to storm water discharges, and their accompanying drainage points. Where appropriate, the plan should specify material handling procedures, storage requirements, and use of equipment such as diversion valves. Procedures for cleaning up spills shall be identified in the plan and made available to the appropriate personnel. The equipment necessary to implement a clean-up shall be available to personnel. The plan shall designate a person who is accountable for spill prevention at the facility and who will set up the necessary spill emergency procedures and reporting requirements so that spills and emergency releases of chemicals can be isolated and contained. Sampling of discharges may also be required as a result of a spill. Required reporting and emergency procedures shall be included with the SWPPP.
- 5. Employee Training. All personnel shall be trained on their role in implementing activities identified in the plan. Training should address topics such as spill response, good housekeeping, material management practices, truck wash out procedures, and equipment washdown procedures. The plan shall identify periodic dates for such training. Contractor or temporary personnel shall also be informed of facility operation and design features in order to prevent discharges or spills from occurring.
- 6. Recordkeeping Procedures. The plan shall include a description of incidents (such as spills or other discharges) and any other information describing the quality and quantity of storm water discharges. Inspections and maintenance activities shall be documented and records of such activities shall be incorporated into the plan.
- 7. Potential Exposures. The plan shall identify areas that have a high potential for significant soil erosion due to topography, contamination from activities or storage, or other factors. The plan must also identify the structural, vegetative, or other measures used to reduce or eliminate contamination of storm water.

4.6 Additional Requirements for Discharges to Municipal Storm Sewer Systems.

1. Facilities discharging into any municipal separate storm sewer system (MS4) may also have to comply with additional requirements, as outlined within a municipal operator's storm water management program or ordinance.

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2. Any permittee that discharges storm water into a municipal separate storm sewer system shall make the pollution prevention plan available to the municipality upon request.

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5.0 MONITORING REQUIREMENTS

5.1 Monitoring.

- 1. Sampling and testing of storm water shall be performed in accordance with the EPA industrial storm water sampling guide at http://www.epa.gov/npdes/pubs/msgp monitoring guide.pdf, except where there are conflicts with this permit.
- 2. When a facility is unable to collect a sample due to adverse climatic conditions (e.g., local flooding, high winds, tornadoes, electrical storms, extended frozen conditions, etc.), the facility must include a description of why samples could not be taken. The permittee may use this sampling waiver only once during a two-year period.
- 3. Sampling must be conducted within 24 hours of a storm event greater than 2 inches or snowmelt large enough to cause runoff.
- 4. Sampling and testing of storm water for specific parameters is required at least once during the first year of coverage under the general permit, with additional semiannual monitoring for facilities with coal pile runoff. Sampling results shall be reported on a copy of the form in Attachment G. The Secretary reserves the right to require further sampling and testing, on a case-by-case basis, in the event there is reason to suspect that compliance with the SWPPP is a problem, or to measure the effectiveness of the control measures in removing pollutants in the effluent.
- 5. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity and must be conducted according to test procedures approved under 40 CFR Section 136 (adopted by reference in ARSD 74:51:01:22).
- 6. Any discharge of storm water associated with industrial activity from coal pile runoff shall be addressed in accordance with the following provisions:
 - a. The facility is required to collect and analyze at least one sample of a storm water runoff event semi-annually for the following:

Effluent Characteristic	Reporting Values	Sample Type
Oil and Grease, mg/L	Daily Maximum	Grab
pH (standard units)	Daily Maximum	Instantaneous
Total Suspended Solids, mg/L	Daily Maximum	Grab
Total Recoverable Copper, mg/L	Daily Maximum	Grab
Total Recoverable Nickel, mg/L	Daily Maximum	Grab
Total Recoverable Zinc, mg/L	Daily Maximum	Grab

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7. Sampling shall be conducted for the parameters applicable to the industry type as set forth below:

a. **Air Transportation Facilities** (SIC beginning 45; NAICS beginning 481, and NAICS 487990, 488190, 488119, 492110, 561720, 621910) that are involved in vehicle maintenance (mechanical repairs, painting, fueling, lubrication, etc.):

Effluent Characteristic	Reporting Values	Sample Type
Oil and Grease	Presence or Absence of Sheen	Visual ¹
Oil and Grease, mg/L ²	Daily Maximum	Grab if Oil is Observed
5-day Biochemical Oxygen Demand, mg/L	Daily Maximum	Grab
Visible Pollutants	Presence or Absence of Visible Pollutants	Visual

¹ The presence or absence of an oil sheen shall be visually monitored. In the event that an oil sheen or floating oil is observed during discharge, a grab sample for Total Petroleum Hydrocarbons shall be taken immediately, analyzed, and reported.

b. **Food Manufacturing** (SIC beginning 20; NAICS beginning 311):

Effluent Characteristic	Reporting Values	Sample Type
Oil and Grease	Presence or Absence	Visual ¹
	of Sheen	
Oil and Grease, mg/L ²	Daily Maximum	Grab if Oil is
		Observed
5-day Biochemical Oxygen	Daily Maximum	Grab
Demand, mg/L		
Total Suspended Solids, mg/L	Daily Maximum	Grab

¹ The presence or absence of an oil sheen shall be visually monitored. In the event that an oil sheen or floating oil is observed during discharge, a grab sample for Oil and Grease shall be taken immediately, analyzed, and reported.

c. **Lumber and wood products except furniture** (SIC beginning 24; NAICS 113310 or beginning 321):

Effluent Characteristic	Reporting Values	Sample Type
5-day Biochemical Oxygen	Daily Maximum	Grab
Demand, mg/L		

² Use Standard Methods 1664A – hexane extraction.

² Use Standard Methods 1664A – hexane extraction.

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Effluent Characteristic	Reporting Values	Sample Type
Total Suspended Solids, mg/L	Daily Maximum	Grab
Visible Pollutants	Presence or Absence of Visible Pollutants	Visual

d. **Scrap Yards and Metal Salvage** (SIC 5015 and 5093; NAICS 421140, 441310, or 421930):

Effluent Characteristic	Reporting Values	Sample Type
Oil and Grease	Presence or Absence	Visual ¹
	of Sheen	
Oil and Grease, mg/L ²	Daily Maximum	Grab
Total Suspended Solids, mg/L	Daily Maximum	Grab

¹ The presence or absence of an oil sheen shall be visually monitored. In the event that an oil sheen or floating oil is observed during discharge, a grab sample for Oil and Grease shall be taken immediately, analyzed, and reported.

e. **Landfills** (SIC 4953; NAICS 562211, 562212, 562213, 562219, and 562920):

Effluent Characteristic	Reporting Values	Sample Type
pH^1	Daily Maximum;	Instantaneous
	Daily Minimum	
Five-Day Biochemical Oxygen	Daily Maximum	Grab
Demand (BOD ₅), mg/L		
Total Suspended Solids, mg/L	Daily Maximum	Grab

pH is to be taken within 15 minutes of sample collection with a pH meter. The pH meter must be capable of simultaneous calibration to two points on the pH scale that bracket the expected pH and are approximately three standard units apart. The pH meter must read to 0.01 standard units and be equipped with temperature compensation adjustment.

f. Ethanol Manufacturing and similar Industrial Organic Chemical Manufacturing, (SIC 2869):

Effluent Characteristic	Reporting Values	Sample Type
pH ¹	Daily Maximum; Daily	Instantaneous
	Minimum	

pH is to be taken within 15 minutes of sample collection with a pH meter. The pH meter must be capable of simultaneous calibration to two points on the pH scale that bracket the expected pH and are approximately three standard units apart. The pH

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² Use Standard Methods 1664A – hexane extraction.

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Effluent Characteristic	Reporting Values	Sample Type
Oil and Grease	Presence or Absence of	Visual ²
	Sheen	
Oil and Grease, mg/L ³	Daily Maximum	Grab
Five-Day Biochemical Oxygen	Daily Maximum	Grab
Demand (BOD ₅), mg/L		
Total Suspended Solids, mg/L	Daily Maximum	Grab
Visible Pollutants	Presence or Absence of	Visual
	Visible Pollutants,	
	Discoloration, Etc.	

meter must read to 0.01 standard units and be equipped with temperature compensation adjustment.

- 8. If the sample results show pollutant levels that could cause or contribute to exceedances of water quality standards, the SWPPP must be modified to prevent future occurrences.
- 9. Sample results along with the facility's industrial category must be submitted to the address in section 5.3.
- 10. If storm water from a containment structure (pond, secondary containment, etc.) needs to be discharged, monitoring shall be performed in accordance with section 5.1 of this permit.

5.2 Retention of Records.

- 1. If the No Exposure exemption has been approved, a copy of the No Exposure Certification form and approval letter must be made available.
- 2. The permittee shall retain records of the SWPPP, a copy of the general permit, SDDENR's letter granting coverage under this general permit, inspection records, all monitoring information, including all calibration and maintenance records, and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this general permit, and records of all data used to complete the application for this general permit, for a period of at least three (3) years from the date of the sample, measurement, report, or application.

Records of monitoring information shall include:

a. The date and exact place and time of sampling or measurements;

² The presence or absence of an oil sheen shall be visually monitored. In the event that an oil sheen or floating oil is observed during discharge, a grab sample for Oil and Grease shall be taken immediately, analyzed, and reported.

³ Use Standard Methods 1664A – hexane extraction.

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- b. The initials or name(s) of the individual(s) who performed the sampling or measurements;
- c. The date(s) and time(s) analyses were performed;
- d. The initials or name(s) of the individual(s) who performed the analyses;
- e. References and written procedures, when available, for the analytical techniques or methods used;
- f. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results;
- g. The date and duration of the storm event sampled;
- h. An estimate of the amount of rainfall;
- i. The number of days since the last measurable rain event; and
- j. The estimated total volume discharged at that outfall during the monitored event.
- 3. All reports and documents required by this general permit shall, upon request of the Secretary, be submitted to the South Dakota Department of Environment and Natural Resources at the address in Section 5.3.

5.3 Reporting of Monitoring Results

Effluent monitoring results obtained during the permit period shall be submitted to SDDENR within one month of the end of the year the samples were taken. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with Section 6.8.3 and submitted to the Secretary at the following address:

Department of Environment & Natural Resources Surface Water Quality PMB 2020 Joe Foss Building 523 East Capitol Pierre SD 57501-3182

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6.0 STANDARD PERMIT CONDITIONS

6.1 Duty to Comply.

- 1. The permittee shall comply with all conditions of this general permit. Any permit noncompliance constitutes a violation of the South Dakota Water Pollution Control Act and the federal Clean Water Act and is grounds for enforcement action; for termination of permit coverage, revocation and reissuance, or modification; or for denial of a permit renewal. The permittee shall give the Secretary advance notice of any planned changes at the permitted facility or of an activity that may result in permit noncompliance.
- 2. Any person who violates a permit condition or makes any false statement, representation, or certification, may be subject to enforcement action under South Dakota Codified Law (SDCL), Chapter 34A-2.
- 3. The permittee is responsible for complying with all local ordinances and requirements. Local governments may have additional or more stringent requirements than those included in this general permit.

6.2 Continuation of the Expired General Permit.

- 1. An expired general permit continues in full force and effect until a new general permit is issued. Coverage under the continued general permit will be issued to new applicants submitting a NOI in compliance with Section 2.6. Any permittee already covered under the general permit at the time of expiration will continue to have coverage until a new general permit is issued.
- 2. To obtain coverage under the new general permit, a Notice of Intent for Reauthorization and Certification of Applicant must be submitted in accordance with information provided with the renewal notice. Upon the effective date of the new general permit, the existing general permit will be terminated.

6.3 Need to Halt or Reduce Activity Not a Defense.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this general permit.

6.4 Duty to Mitigate.

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this general permit which has a reasonable likelihood of adversely affecting human health or the environment.

6.5 Removed Substances

Collected screenings, grit, solids, sludges, or other pollutants removed in the course of treatment shall be disposed of in such a manner so as to prevent any pollutant from

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entering any waters of the state or creating a health hazard in accordance with applicable requirements of SDCL 34A-2, -6, and -11.

6.6 Duty to Provide Information.

- 1. The permittee shall furnish to the Secretary, within a reasonable time, any information which the Secretary may request to determine if cause exists for modifying, revoking and reissuing, or terminating this general permit, or to determine compliance with this general permit. The permittee shall also furnish to the Secretary, upon request, copies of records required to be kept by this general permit.
- 2. The permittee shall make the SWPPP available upon request to the Secretary, EPA, and, in the case of storm water that discharges through a municipal separate storm sewer system, to the operator of the municipal system.

6.7 Other Information.

When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI or in any other report to the Secretary, he or she shall promptly submit such facts or information.

6.8 Signatory Requirements.

All Notices of Intent and Termination, plans, reports, certifications, or information submitted to the Secretary shall be signed and certified.

- 1. All Notices of Intent and Termination shall be signed as follows:
 - a. For a corporation: by a responsible corporate officer;
 - b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or
 - c. For a municipality, state, federal, or other public agency: by either a principal executive officer or ranking elected official.
- 2. All reports required by the general permit and other information requested by the Secretary shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by a person described above and submitted to the Secretary. The authorization shall specify either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company.
 - b. If an authorization under this section is no longer accurate because a different operator has responsibility for the overall operation of the

Permit No.: SDR0 Page 32 of 34

industrial site, a new letter of authorization satisfying the requirements of this section must be submitted to the Secretary prior to, or together with, any reports, information, or applications to be signed by an authorized representative.

3. The following certification statement must be included with any documents signed under this section:

"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 gathered and evaluated 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 submitted 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."

6.9 Oil and Hazardous Substance Liability.

Nothing in this general permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the federal Clean Water Act.

6.10 Property Rights.

The Secretary's issuance of this general permit does not convey any property rights of any sort, any exclusive privileges, any authorization to damage, injure or use any private property, any authority to invade personal rights, any authority to violate federal, state or local laws or regulations, or any taking, condemnation or use of eminent domain against any property owned by third parties. The State does not warrant that the permittee's compliance with this general permit and operation under this general permit will not cause damage, injury or use of private property, an invasion of personal rights, or violation of federal, state or local laws or regulations. The permittee is solely and severably liable for all damage, injury or use of private property, invasion of personal rights, infringement of federal, state, or local laws and regulations, or taking or condemnation of property owned by third parties which may result from actions taken under the general permit.

6.11 Severability.

Any portion of this general permit that is found to be void, or is challenged, shall not affect the validity of the various permit requirements that are not void or challenged.

6.12 Requiring an Individual Permit or an Alternative General Permit.

The Secretary may either deny coverage or require any person requesting coverage under the general permit to apply for, and obtain, an individual Surface Water Discharge permit

Permit No.: SDR0 Page 33 of 34

or coverage under an alternative general permit. Cases where an individual permit may be required include the following:

- 1. The permittee is not in compliance with the conditions of the general permit;
- 2. A change has occurred in the availability of demonstrated technologies or practices for the control or abatement of pollutants applicable to industrial sites;
- 3. Effluent limitation guidelines are promulgated for point sources covered by this general permit;
- 4. A TMDL is developed and implemented for a waterbody into which the industry discharges, and the plan is not modified to meet the waste load allocations; or
- 5. The discharge is a significant contributor of pollution to waters of the state or it presents a health hazard.

6.13 Proper Operation and Maintenance.

The permittee shall at all times properly operate and maintain all systems of treatment and control that are used to achieve compliance with the conditions of this general permit. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the general permit.

6.14 Inspection and Entry.

The permittee shall allow the Secretary, the EPA Regional Administrator, or the operator of a municipal separate storm sewer system receiving discharges from the site, upon the presentation of credentials and other documents as may be required by law, to:

- 1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this general permit;
- 2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this general permit;
- 3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this general permit; and
- 4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the South Dakota Water Pollution Control Act (SDCL 34A-2), any substances or parameters at any location.

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6.15 Permit Actions.

This general permit may be modified, revoked and reissued, or terminated by the Secretary for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

ATTACHMENT A

Notice of Intent

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES



NOTICE OF INTENT (NOI)

to Obtain Coverage Under the SWD General Permit for Storm Water Discharges Associated with Industrial Activities

Return to: SD Department of Environment and Natural Resources

Surface Water Quality Program

523 East Capitol Avenue

Pierre, South Dakota 57501-3181

Telephone: (605) 773-3351 or 1-800-SDSTORM

PLEASE PRINT OR TYPE

I.	App	olicant Informatio	n				
	Nam	e				Phone	
	Resp	onsible Contact P	erson				
	Stree	et					
	City				State	Zip Code	
II.	Faci Nam	ility/Site Informa e				Phone	
	Resp	onsible Contact P	erson				
	Stree	et					
	City				State Z	Zip Code	
III.	Тур	e of Ownership:	☐ Priv	vate ite	Federal Public (Other	er than Federal or State)	
III.	Тур	e of Permit Requ	e sted: Cl	heck (X) the	appropriate respon	se:	
		Industrial A	ctivity	Sand/	Gravel Mining Ac	tivity Construction Activ	vity
IV.	Poll	ution Prevention	Plan				
	A.	Has the Pollution	Prevent	tion Plan bee	n developed as req	uired? Yes	No 🗌
		If No, when will Please note:			eveloped before p	ermit coverage begins	
	B.	Please include a being used at the			est management pr	actices (pollution control me	asures)

	FOR DENR USE ONLY		
Postmark Date:	Permit Number:	Date Permitted:	

V.Fa	cility	y/Site Location:					
	A.	Quarter	Section		Township	Ran	ge
		County	[If available:	Latitude		Longitude]
	B.	Site/Project Na	ame:				
,	C.	What is the total	al area covered by the	e site (in a	acres)		
VI.	Reco	eiving Waters:					
			e receiving waters of e which municipality				ng to a Municipal
							_
VII.	Natı	ure of Discharge	2				
	A. Standard Industrial Classification (SIC) codes of this facility (Include at least one, and up to four, SIC or 6-digit North American Industry Classification (NAIC) codes which best describe the facility. For example, the SIC Code for a sand/gravel pit is 1442 . For construction activities, no codes are assigned; therefore, indicate CO):						es which best
	В.	Please include a	a brief description of	the activi	ties conducted	l at this facility	or construction site:
	_	rational History el mining)	y (Industrial Only)	Constru	ıction Proje	ect History	(Construction or
	-	-					
	Estir	mated Completio	n Date (MM/DD/YY	´):			
IX.	Exis	ting Environme	ental Permits				
			other Environmenta	l Permits	which are he	eld by this facil	ity/activity. Include
	permit numbers in the space provided: SWD or NPDES (Discharges to Surface Water)						
			und Injection of Flui				
	1 1	THE CHIMPING					

	PSD (Air Emissions from Proposed Sources)
	Other (please specify)
X.	Certification (Authorized representative should <i>initial</i> the box)
	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 directly responsible for gathering the information, the information submitted 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 revocation of the permit and the possibility of fine and imprisonment for knowing violations. In addition, I certify that I am aware of the terms and conditions of the General Storm Water permit and I agree to comply with those requirements.

CERTIFICATION OF APPLICANT (COA)

I,	, the applicant in the above matter after being duly sworn upon oath hereby
certi	fy the following information in regard to this application:

South Dakota Codified Laws Section 1-40-27 provides:

"The secretary may reject an application for any permit filed pursuant to Titles 34A or 45, including any application by any concentrated swine feeding operation for authorization to operate under a general permit, upon making a specific finding that:

- (1) The applicant is unsuited or unqualified to perform the obligations of a permit holder based upon a finding that the applicant, any officer, director, partner or resident general manager of the facility for which application has been made:
 - (a) Has intentionally misrepresented a material fact in applying for a permit;
 - (b) Has been convicted of a felony or other crime involving moral turpitude;
 - (c) Has habitually and intentionally violated environmental laws of any state or the United States which have caused significant and material environmental damage;
 - (d) Has had any permit revoked under the environmental laws of any state or the United States; or
 - (e) Has otherwise demonstrated through clear and convincing evidence of previous actions that the applicant lacks the necessary good character and competency to reliably carry out the obligations imposed by law upon the permit holder; or
- (2) The application substantially duplicates an application by the same applicant denied within the past five years which denial has not been reversed by a court of competent jurisdiction. Nothing in this subdivision may be construed to prohibit an applicant from submitting a new application for a permit previously denied, if the new application represents a good faith attempt by the applicant to correct the deficiencies that served as the basis for the denial in the original application.

All applications filed pursuant to Titles 34A and 45 shall include a certification, sworn to under oath and signed by the applicant, that he is not disqualified by reason of this section from obtaining a permit. In the absence of evidence to the contrary, that certification shall constitute a prima facie showing of the suitability and qualification of the applicant. If at any point in the application review, recommendation or hearing process, the secretary finds the applicant has intentionally made any material misrepresentation of fact in regard to this certification, consideration of the application may be suspended and the application may be rejected as provided for under this section.

Applications rejected pursuant to this section constitute final agency action upon that application and may be appealed to circuit court as provided for under chapter 1-26."

Pursuant to SDCL 1-40-27, I certify that I have read the forgoing provision of state law, and that I am not disqualified by reason of that provision from obtaining the permit for which application has been made.

NOTE: The Notice of Intent must be signed by the authorized chief elective, an executive officer or a corporate responsible official of the applicant, or by the applicant, if an individual.

I declare and affirm under the penalties of perjury that this certification has been examined by

me, and to the best of my knowledge and belief, is in all things true and correct.			
Name (print)			
Title			
Signature			
Date			

PLEASE ATTACH SHEET DISCLOSING ALL FACTS PERTAINING TO SDCL 1-40-27 (1) (a) THROUGH (e).

ALL VIOLATIONS MUST BE DISCLOSED, BUT WILL NOT AUTOMATICALLY RESULT IN THE REJECTION OF AN APPLICATION.

ATTACHMENT B

Notice of Termination

South Dakota Great Faces Great Places.

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

NOTICE OF TERMINATION (NOT)

of Coverage Under the SWD General Permit for Storm Water Discharges Associated with Industrial or Construction Activities

This form is required to be submitted when a discharge permit is no longer required or necessary. Submission of this form shall in no way relieve the permittee of permit obligations required prior to submission of this form. Please submit this form to the following address:

original to: SD Department of Environment and Natural Resources

Surface Water Quality Program

PMB 2020

523 East Capitol Avenue

Pierre, South Dakota 57501-3181

Telephone: (605) 773-3351 or 1-800-SDSTORM

PLEASE PRINT OR TYPE

I.	Applicant/Owner Information					
	Name	Phone				
	Street					
	City					
II.	Facility/Site Information					
	Name	Phone				
	Responsible Contact Person					
	Street					
		Zip Code				
III.	Permit Number:	Site/Project Name:				
IV.	Check the reason for termination	on of permit coverage:				
	☐ Storm Water Discharge associated with permitted activity is no longer occurring. If construction					
	has the area been restabilized? Please explain:					
		-				
	You are no longer the operato	of the facility/site. Please explain:				
		· · · · · · · · · · · · · · · · · · ·				

I certify under penalty of law that all storm water discharges associated with industrial or construction activity from the identified facility that are authorized by a SWD general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting the Notice of Termination, I am no longer authorized to discharge storm water associated with industrial or construction activity under this general permit, and that discharging pollutants in storm water associated with industrial or construction activity to waters of the state is

unlawful under the federal Clean Water Act, where the discharge is not authorized by a SWD permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the South Dakota Water Pollution Control Act. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

NOTE: NOT must be signed by the authorized chief elective or executive officer of the applicant, or by the applicant, if an individual.

Name (print)		Title	
Signature		Date	_
	FOR DENR USE ON	ILY	
ermit Number:	Postmark Date:	Date Terminated:	

ATTACHMENT C

List of Standard Industrial Classification Codes

The **Standard Industrial Classification (SIC) Code(s)** for a facility usually determines if general permit coverage is required. The 4-digit SIC Codes are assigned according to the primary activities performed by a company. They are often assigned for insurance purposes or when a business registers as a corporation. Industries can also determine their SIC Code by checking with their trade association, Chamber of Commerce, legal counsel, or library for the SIC Manual.

The industrial categories requiring storm water permit coverage are listed here by their SIC Code. The manufacturing industries are generally represented by SIC Codes 20-39. (A two-digit code, such as 42, means that **all** industries under that heading, from 4200 to 4299, are covered. Some common SIC codes are listed in italics.)

Below is a list of Industrial Facilities that are required to obtain a storm water discharge permit.

I

SIC	
Code	Industry Type Notes
10	Metal mining and milling
1041	Gold Ores
12	Coal mining
13	Oil and gas extraction
20	Food and kindred products
2041	Flour and Other Grain Mill Products
	Prepared feed and feed ingredients for animals & fowl, except cats &
2048	dogs
21	Tobacco products
22	Textile mills
23	Apparel and other finished products made from fabric and similar material
24	Lumber and wood products except furniture
2421	Sawmills & Planing Mills
2491	Wood Preserving
25	Furniture and fixtures
26	Paper and allied products
27	Printing, publishing, and allied products
28	Chemicals and allied products
29	Petroleum refining and related industries
2951	Asphalt Paving Mixtures and Blocks
30	Rubber and miscellaneous plastics products
31	Leather Products
3111	Leather tanning and finishing
32	Stone, clay, glass and concrete products
3273	Ready mix concrete facilities
33	Primary metals industries
2.4	Fabrication of metal products, except machinery and transportation
34	equipment
35	Industrial and commercial machinery and computer equipment Electronic and other electrical equipment and components, except computer
36	equipment

SIC		
Code	Industry Type	Notes
37	Transportation equipment	
3715	Truck Trailers	
38	Measuring, analyzing, and controlling instruments: photographic, medical, and optical goods, watches and clocks	
39	Miscellaneous manufacturing industries	
40	Railroad transportation	(a)
	Local and suburban transit and interurban highway passenger	
41	transportation	(a)
42	Motor freight transportation and warehousing (except)	(a)
	Farm Product warehousing and storage	
	4222 Refrigerated warehousing and storage	
	4225 General warehousing and storage	
43	US Postal Facilities	(a)
44	Water Transportation	(a)
45	Transportation by Air	(a)
4911	Steam electric power generation (all fuel types)	
4952	Wastewater treatment facilities with a design flow of 1.0 MGD or more	
4953	Hazardous waste treatment, storage or disposal facilities; incinerators	
	(including boilers and industrial furnaces) that burn hazardous waste; and	
	active or inactive landfills, land application sites, or open dumps with	
	industrial waste and without a stabilized final cover	
5015	Motor vehicle parts, used	
5093	Scrap and waste materials	
5171	Petroleum bulk stations and terminals	(a)

Notes:

(a) In this SIC Code, only facilities that are involved in vehicle maintenance (such as vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, or airport deicing need a storm water permit.

ATTACHMENT D

No Exposure Certification



Activities that take place at industrial facilities are often exposed to storm water, and runoff from these sites has the potential to discharge pollutants into nearby storm sewer systems and surface waters, and may adversely impact water quality. In an attempt to limit the amount of pollutants in those discharges, the U.S. Environmental Protection Agency (EPA) developed a federal program to regulate certain storm water discharges, particularly those associated with industrial activity.

The federal storm water regulations identify eleven categories of industrial activity that must obtain a storm water permit. The industrial categories are listed either by reference to a Standard Industrial Classification (SIC) code, a North American Industry Classification (NAIC) code, or by a short narrative description of the activity at the industrial site.

The regulations provide an exemption from the storm water permitting requirements for those facilities whose industrial materials or activities are not exposed to precipitation or runoff. If there is **no exposure** to storm water at an industrial facility, then a storm water permit is not required for that facility.

Industrial facilities wishing to be conditionally excluded from permitting requirements must submit a certification form to the South Dakota Department of Environment and Natural Resources (DENR). By submitting this form, the facility is certifying there is a condition of no exposure to storm water at the site. The form must be signed by an executive officer or owner of the facility/corporation.

There is no exposure at an industrial facility when all industrial materials and activities are protected to prevent exposure to rain, snow, snowmelt, and/or runoff. Industrial materials or activities such as material handling equipment or activities, industrial machinery, raw materials, intermediate products, by-products, final products, or waste products must be protected by a storm resistant shelter. Material handling activities include the storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, final product or waste product. A storm resistant shelter is not required for the following industrial materials and activities:

- drums, barrels, tanks, and similar containers that are tightly sealed, provided those containers are not deteriorated and do not leak. "Sealed" means banded or otherwise secured and without operational taps or valves;
- adequately maintained vehicles used in material handling; and
- final products, other than products that would be mobilized in storm water discharges (e.g., rock salt).

A No Exposure Certification form must be provided for each facility that wishes to be conditionally excluded from the permitting requirements. The exemption from storm water permitting is available on a facility-wide basis only, not for individual outfalls or points of runoff. If any industrial activities or materials are or will be exposed to precipitation, the entire facility is not eligible for the no exposure exemption. If changes at a facility result in industrial activities or materials becoming exposed to storm water, the no exposure exemption no longer applies. If DENR determines that a facility's storm water discharges have a reasonable potential to cause or contribute to a violation of applicable water quality standards, the no exposure exemption can be denied.

Please feel free to contact the SD Department of Environment and Natural Resources with any questions or comments regarding the No Exposure exemption and/or the Storm Water Program at 1-800-SDSTORM (737-8676).

Detailed instructions for completing this form and obtaining the no exposure exemption are included with the form.





STORM WATER NO EXPOSURE CERTIFICATION

For Exclusion from Permitting Requirements for Storm Water Discharges Associated with Industrial Activities Under the Surface Water Discharge Program

One **original copy** of this form shall be submitted to:

SD Department of Environment and Natural Resources Surface Water Quality Program 523 East Capitol Avenue Pierre, South Dakota 57501-3181 Telephone: (605) 773-3351 or 1-800-SDSTORM

Upon request, an additional copy of this form must be mailed to the municipality within which the facility is located, or county if the facility is located in an unincorporated area.

ALL INFORMATION MUST BE PROVIDED ON THIS FORM.

A.	Ap	plicant Information	
	1.	Company Name:	2. Phone:
	3.	Contact Person: a. Name:	b. Title:
	4.	Mailing Address: a: Street:	
		b. City:	c: State: d: Zip Code:
	5	The applicant requesting a conditional '	"No Exposure" Exclusion is: Owner Operator
	٦.	11	The Emposure Emeration is:
В.		cility/Site Location Information	Tro Emposure Emeration for the owner to experience
В.	Fa	cility/Site Location Information	
B. 3.	Fa 1.	cility/Site Location Information Facility Name:	2. Phone
	Fa 1.	cility/Site Location Information Facility Name: a. Street Address: b. City: c: Co	2. Phone
	Fa 1. 4.	cility/Site Location Information Facility Name:	2. Phone unty: d. State: e: Zip Code:

No Exposure Certification

7	. ;	a: Was the facility or site previously covered under a storm water permit? Yes \square No \square				
		b: If yes, enter permit number:				
8		SIC/NAICS Activity Codes: a: Primary: b: Secondary (if applicable):				
9	.]	Please describe the industrial activities which take place at this site.				
1	0. <i>'</i>	Total size of site associated with industrial activity: acres				
1		a. Have you paved or roofed over a formerly exposed, pervious area in order to qualify for the nexposure exemption? Yes \square No \square				
]	b. If yes, please indicate approximately how much area was paved or roofed over. Completing thi question does not disqualify you for the no exposure exemption. However, DENR may use thi information in considering whether storm water discharges from your site are likely to have an adverse impact on water quality, in which case you could be required to obtain permit coverage. Less than one acre One to five acres More than five acres				
1:		a. Does the storm water from this facility enter a Municipal Separate Storm Sewer System? Yes \[\subseteq \text{No} \subseteq \]				
	1	b. If yes, name of Municipal Separate Storm Sewer System				
1:	3. ;	a. Does the storm water from this facility enter a natural surface drainage? Yes _ No _				
	(c. If yes, name or description of the receiving water(s):				
C. E	Exp	oosure Checklist				
A	Add	ase respond to the following questions by checking either "Yes" or "No" in the appropriate box ditional information ssist in answering these questions is included in the instructions.				
1	•	Yes No Is there now, or in the foreseeable future, any use, storage or cleaning of industrial machinery or equipment where storm water exposure can occur; or, are there areas where residuals from using, storing or cleaning industrial machinery or equipment remain and are exposed to storm water?				
2		Are there now, or in the foreseeable future, any materials or residuals, including spills/leaks, on the ground or within the storm water collection system or inlets that are exposed to storm water?				

No Exposure Certification Page 2 of 4

3. Are there now, or in the foreseeable future, any materials or products from past industrial activity

	exposed to storm water?
4.	Is there now, or in the foreseeable future, any material handling equipment (except adequately maintained vehicles) that is exposed to storm water?
5.	Are there now, or in the foreseeable future, any materials or products that are exposed to storm water during loading, unloading or transporting activities?
6.	Are there now, or in the foreseeable future, any materials or products stored outdoors (except final products intended for outside use where exposure does not result in the discharge of pollutants)?
7.	Are there now, or in the foreseeable future, any materials contained in open, deteriorated or leaking storage drums, barrels, tanks, and similar containers?
8.	Are there now, or in the foreseeable future, any materials or products handled/stored on roads or railways owned or maintained by the discharger that are exposed to storm water?
9.	Are there now, or in the foreseeable future, any industrial waste materials (except waste in covered, non-leaking containers) that are exposed to storm water?
10.	Is there now, or in the foreseeable future, any application or disposal of process wastewater exposed to storm water (unless otherwise permitted)?
11.	Is there now, or in the foreseeable future, any particulate matter or visible deposits of residuals from roof stacks and/or vents not otherwise regulated (i.e., under an air quality control permit) and evident in the storm water outflow?

No Exposure Certification Page 3 of 4

D. Certification Statement

I certify under penalty of law that I have read and understand the eligibility requirements for claiming a condition of "no exposure" and obtaining an exemption from storm water SWD permitting.

I certify under penalty of law that there are no discharges of storm water contaminated by exposure to industrial activities or materials from the industrial facility or site identified in this document (except as allowed under 40 CFR 122.26(g)(2)).

I understand that I am obligated to submit a no exposure certification form once every five years to SDDENR and, if requested, to the operator of the local municipal separate storm sewer system (MS4) into which the facility discharges (where applicable). I understand that I must allow SDDENR, or the MS4 operator where the discharge enters into the local MS4, to perform inspections to confirm the condition of no exposure and to make such inspection reports publicly available upon request. I understand that I must obtain coverage under a storm water SWD permit prior to any point source discharge of storm water from the facility.

Additionally, 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 gathered and evaluated 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 submitted 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.

Print Name:
Print Title:
Signature:
Date:
Subscribed and sworn before me this day of, 20
Notary Public
My commission expires:
(SEAL)

No Exposure Certification Page 4 of 4

Who May File a No Exposure Certification

Federal law at 40 CFR Part 122.26 prohibits point source discharge of storm water associated with industrial activity to waters of the state without a storm water Surface Water Discharge (SWD) permit. However, industrial activities identified at 40 CFR 122.26(b)(14)(i) through (ix) and (xi) may be conditionally excluded from storm water permitting requirements if the discharger can certify that a condition of "no exposure" exists at the industrial facility or site.

Storm water discharges from construction activities identified in 40 CFR 122.26(b)(14)(x) and (b)(15) are not eligible for the no exposure exemption.

Obtaining and Maintaining the No Exposure Exemption

This form is used to certify that a condition of no exposure exists at the industrial facility or site described herein. This certification must be resubmitted at least **once every five years.**

The industrial facility operator must maintain a condition of no exposure at its facility or site in order for the no exposure exemption to remain applicable. If conditions change resulting in the exposure of materials and activities to storm water, the facility operator must obtain coverage under a storm water permit immediately.

Where to File the No Exposure Certification Form

Mail the completed no exposure certification form to:

SD Department of Environment and Natural Resources Surface Water Quality Program 523 East Capitol Avenue Pierre, SD 57501

Completing the Form

You <u>must</u> type or print. One form must be completed for each facility or site for which you are seeking to

certify a condition of no exposure. Please make sure you have addressed all applicable questions and have made a photocopy for your records before sending the completed form to the above address.

Section A. Facility Operator Information

- 1. Provide the legal name of the person, firm, public organization, or other entity submitting certification. The name of the applicant may or may not be the same as the name of the facility.
- 2. Provide the telephone number of the applicant.
- 3. Provide the contact person's name and title.
- 4. Provide the mailing address of the operator (P.O. Box numbers may be used). Include the city, state, and zip code. **All correspondence will be sent to this address.**
- 5. Indicate whether the applicant is the owner and/or operator of the facility.

No Exposure Certification Page 1 of 4

Section B. Facility/Site Location Information

- 1. Enter the official or legal name of the facility or site.
- 2. Enter the phone number for the facility.
- 3. Enter the complete street address (if no street address exists, provide a geographic description [e.g. intersection of Routes 9 and 55]), city, county, state, and zip code. Do not use a P.O. Box number.
- 4. Indicate the type of entity that owns/operates the industrial facility.
- 5. Enter the latitude and longitude of the approximate center of the facility or site in degrees/minutes/seconds. Latitude and longitude can be obtained from a US Geological Survey (USGS) quadrangle or topographic map, or from various internet mapping web pages.
- 6. Enter the legal description of the facility location, listed by Quarter, Section, Township and Range. Include the North, South, East, or West reference with the Township and Range.
- 7. Indicate whether the facility was previously covered under a SWD storm water permit. If so, include the permit number.
- 8. Enter the 4-digit Standard Industrial Classification (SIC) code or the 6-digit North American Industry Classification System (NAICS) which identifies the facility's primary activity. Also include a second 4-digit SIC code or 6-digit NAICS code identifying the facility's secondary activity, if applicable. These codes can be obtained from the US Census Bureau's web page http://www.census.gov/epcd/www/naicstab.htm
- 9. Please provide a description of any and all industrial activities taking place at the site now and in the foreseeable future.

10. Enter the total size of the site associated with industrial activity in acres. Acreage may be determined by dividing square footage by 43,560, as demonstrated in the following example.

Example: Convert 54,450 ft² to acres

Divide $54,450 \text{ ft}^2 \text{ by } 43,560 \text{ square feet per acre:} 54,450 \text{ ft}^2/43,560 \text{ ft}^2/\text{acre} - 1.25 \text{ acres.}$

- 11. Check "Yes" or "No" as appropriate to indicate whether you have paved or roofed over a formerly exposed, pervious area (i.e., lawn, meadow, dirt or gravel road/parking lot) in order to qualify for no exposure. If yes, also indicate approximately how much area was paved or roofed over and is now impervious area.
- 12. Identify the Municipal Separate Storm Sewer System (MS4) in which the non-exposed storm water enters, if applicable.
- 13. Identify and/or describe the receiving water(s) in which the non-exposed storm water enters, if natural surface drainage occurs.

No Exposure Certification Page 2 of 4

Section C. Exposure Checklist

Check "Yes" or "No" as appropriate to describe the exposure conditions at your facility. DENR will evaluate the responses to these questions in order to determine eligibility for the "No Exposure" exemption.

The following information is provided as additional information to be used in answering the questions in this Section. Paragraph numbers correspond to the questions numbers.

1. Industrial Machinery and Equipment

Industrial machinery and equipment may not be stored where exposed to storm water. In addition, areas with residuals from using or storing or cleaning industrial machinery or equipment must not remain and be exposed to storm water. The following exceptions are allowed:

- a. Drums, barrels, tanks, and similar containers intended for the outdoor storage of the contained material or previously contained material. These must be tightly sealed ("sealed" means banded or otherwise secured and without operational taps or valves), and cannot be deteriorated or leaking, and are not otherwise a sources of pollutants. The addition of material to or withdrawing of material from these containers while outside is deemed exposure, and as such, not allowed under the exemption provisions. Containers, racks and other transport platforms used with the drums, barrels, etc., can be stored outside providing they are contaminant-free.
- b. Adequately maintained vehicles used in material handling may be exposed to storm water. This also includes vehicles such as trucks, automobiles, forklifts, pallet jacks, carts, dollies, or other such general-purpose vehicles at the industrial site that are not industrial machinery, and that are not leaking

contaminants or are not otherwise a source of industrial pollutants.

2. Materials and Residuals

Industrial materials and residuals may not exist on the ground or within the storm water collection system (i.e. storm water inlets and storm sewers). Residuals include any material that may be mobilized by storm water, such as oil and chemical stains, and contaminated soils.

3. <u>Industrial Waste Material</u>

Industrial waste material, like other industrial materials, may not be stored where exposed to storm water. However, if the material is stored in a sealed container, such as those allowed for Question 1 or in a covered, non-leaking container such as a lidded dumpster, that does not allow exposure to storm water, outdoor storage is allowed.

Lidded dumpsters must be completely covered and materials must not be allowed to drain from any holes in the bottom, or be lost in loading onto a garbage truck. Industrial refuse and trash that is stored uncovered is considered exposed.

No Exposure Certification Page 3 of 4

Waste materials that are not related to an industrial activity, such as office supplies and cafeteria wastes, are not included in the definition of industrial waste materials, and although such wastes should be managed to prevent water quality impacts, are not included in this certification.

Section D. Certification Statement

State statutes provide for severe penalties for submitting false information on this application form. State regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means:

- (i) president, secretary, treasurer, or vicepresident of the corporation in charge of principal business function, or any other person who performs similar policy or decision making functions for the corporation, or
- (ii) the manager of one or more manufacturing, production, or operation facilities, provided the manager is

authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and directing initiating and other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

This certification must be signed in the presence of a certified notary public.

No Exposure Certification Page 4 of 4

ATTACHMENT E

Temporary Shutdown Form



DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

TEMPORARY SHUTDOWN NOTICE

for Coverage Under the SWD General Permit for Storm Water Discharges Associated with Industrial Activities

General Permit Number:	
Company/Operator Name:	
Contact Person:	
Email Address:	
Mailing Address:	
Facility Address:	
Latitude, Longitude:	
Storm Water Receiving Waters: _	
Municipal Storm Sewer/City:	
Surface Water Quali 523 East Capitol Pierre, SD 57501-31 ** NOTE: Any change in location	•
direction or supervision in accordar properly gathered and evaluated the persons who manage the system, or information, the information submit and complete. I am aware that there including the possibility of fine and and I,	this document and all attachments were prepared under my nee with a system designed to assure that qualified personnel information submitted. Based on my inquiry of the person or those persons directly responsible for gathering the tted is, to the best of my knowledge and belief, true, accurate, are significant penalties for submitting false information, imprisonment for knowing violations." , the applicant in the above matter after being duly
sworn upon oath hereby certify the	following information in regard to this application:

NOTE: The Temporary Shutdown Form must be signed by the authorized chief elective, an executive officer, or a corporate responsible official of the applicant, or by the applicant, if an individual. I declare and affirm under the penalties of perjury that this certification has been examined by me, and to the best of my knowledge and belief, is in all things true and correct.

Name (print)	
Title	
Signature	
Date	

PLEASE ATTACH SHEET DISCLOSING ALL FACTS PERTAINING TO SDCL 1-40-27 (1) (a) THROUGH (e).ALL VIOLATIONS MUST BE DISCLOSED, BUT WILL NOT AUTOMATICALLY RESULT IN THE REJECTION OF AN APPLICATION.

ATTACHMENT F

Transfer of Ownership

South Dakota Great Flaces, Great Places, Gr

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

TRANSFER OF OWNERSHIP

for Coverage Under the SWD General Permit for Storm Water Discharges Associated with Industrial Activities

General Permit Number:					
Company/Operator Name:					
Contact Person:					
Email Address:					
Mailing Address:					
Facility Address:					
Latitude, Longitude:					
Storm Water Receiving Waters:					
Municipal Storm Sewer/City:					
Please include a brief description	of activities conducted at the site, noting any changes:				
	lity, coverage, and liability becomes effective*: ment between the two facilities which includes this date.				
Send to: Department of Environment & Natural Resources Surface Water Quality PMB 2020 Joe Foss Building					

** NOTE: Any change in location and/or operation requires that the facility's Storm Water Pollution Prevention Plan be updated and revised to reflect all operational changes.

"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 gathered and evaluated 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 submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are

523 East Capitol Pierre SD 57501-3182 significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

and I, the applicant in the above matter after being duly sworn upon oath hereby certify the following information in regard to this application:

South Dakota Codified Laws Section 1-40-27 provides:

"The secretary may reject an application for any permit filed pursuant to Titles 34A or 45, including any application by any concentrated swine feeding operation for authorization to operate under a general permit, upon making a specific finding that:

- (1) The applicant is unsuited or unqualified to perform the obligations of a permit holder based upon a finding that the applicant, any officer, director, partner or resident general manager of the facility for which application has been made:
 - (a) Has intentionally misrepresented a material fact in applying for a permit;
 - (b) Has been convicted of a felony or other crime involving moral turpitude;
 - (c) Has habitually and intentionally violated environmental laws of any state or the United States which have caused significant and material environmental damage;
 - (d) Has had any permit revoked under the environmental laws of any state or the United States; or
 - (f) Has otherwise demonstrated through clear and convincing evidence of previous actions that the applicant lacks the necessary good character and competency to reliably carry out the obligations imposed by law upon the permit holder; or
- (2) The application substantially duplicates an application by the same applicant denied within the past five years which denial has not been reversed by a court of competent jurisdiction. Nothing in this subdivision may be construed to prohibit an applicant from submitting a new application for a permit previously denied, if the new application represents a good faith attempt by the applicant to correct the deficiencies that served as the basis for the denial in the original application.

All applications filed pursuant to Titles 34A and 45 shall include a certification, sworn to under oath and signed by the applicant, that he is not disqualified by reason of this section from obtaining a permit. In the absence of evidence to the contrary, that certification shall constitute a prima facie showing of the suitability and qualification of the applicant. If at any point in the application review, recommendation or hearing process, the secretary finds the applicant has intentionally made any material misrepresentation of fact in regard to this certification, consideration of the application may be suspended and the application may be rejected as provided for under this section.

Applications rejected pursuant to this section constitute final agency action upon that application and may be appealed to circuit court as provided for under chapter 1-26."

Pursuant to SDCL 1-40-27, I certify that I have read the forgoing provision of state law, and that I am not disqualified by reason of that provision from obtaining the permit for which application has been made.

NOTE: The Notice of Intent must be signed by the authorized chief elective, an executive officer, or a corporate responsible official of the applicant, or by the applicant, if an individual.

I declare and affirm under the penalties of perjury that this certification has been examined by me, and to the best of my knowledge and belief, is in all things true and correct.

	NEW OWNER/OPERATOR		PREVIOUS OWNER/OPERATOR
Name		Name	
(print)		(print)	
Title		Title	
Signature		Signature	
Date	_	Date	

PLEASE ATTACH SHEET DISCLOSING ALL FACTS PERTAINING TO SDCL 1-40-27 (1) (a) THROUGH (e).

ALL VIOLATIONS MUST BE DISCLOSED, BUT WILL NOT AUTOMATICALLY RESULT IN THE REJECTION OF AN APPLICATION.

ATTACHMENT G

Monitoring Report

DISCHARGE MONITORING SUMMARY FORM

Permit Name: Outfall Number:					
Permit No.:					
Address:					
Facility Contact:		Phone:			
		Approximate inches of rainfall/snow melt:			
Date and time of sample:					
Describe any adverse effects, such as fish kills, etc. (if any):					
If there is a visible change to the storm water, was there a visible change to the receiving waters? Describe the changes.					
ANALYTICAL RESULTS, ADD IN If more s	N NAMES OF PAR RESULTS space is required, atta		IEASURED I	FOR AND	
Parameter	Sample 1	Sample 2	Sample 3	Sample 4	
I certify under penalty of law that the direction or supervision in accordance properly gather and evaluate the inforpersons who manage the system, or those the information submitted is, to the best am aware that there are significant possibility of fine and imprisonment for	with a system desi rmation submitted. se persons directly ro t of my knowledge a penalties for subm	igned to assur Based on my esponsible for nd belief, true	re that qualify inquiry of the gathering the contract of the c	fied personne the person o e information nd complete.	
Name (print):					
Signature:		Date:			
If the facility feels there is any other rele attach it to this report. All information wi		any facts that	are relevant to	the sampling	

Amended: August 27, 2012 Effective: October 1, 2012

ATTACHMENT H

Permit Reauthorization Form

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

NOTICE OF INTENT (NOI) for REAUTHORIZATION

of Coverage Under the SWD General Permit for Storm Water Discharges Associated With Industrial Activities

The following facility currently has coverage under the General Permit for Storm Water Discharges Associated with Industrial Activities. *This form must be submitted if you wish to continue coverage under the General Permit.* Submission of this form shall in no way relieve the permittee of permit obligations required prior to submission of this form. Please submit this form to the following address:

original to: SD Department of Environment and Natural Resources

Surface Water Quality Program

PMB 2020

523 East Capitol Avenue

Pierre, South Dakota 57501-3181 Telephone: (605) 773-3351

PLEASE PRINT OR TYPE (Update Information below as needed)

I.	Permittee Information	•			
	Permittee Name:				
	Company Name:				
	Mailing Address:				
	City:	_ County:	State:	Zip Code:	
II.	Facility Information				
	Facility Name:				
	Facility Contact:				
	Facility Description:				
	D 4.37				
By si you v		eral Permit and update your		ned General Permit. You are certify n Prevention Plan if necessary to n	
a syst perso best d inform	em designed to assure that qualij n or persons who manage the syst of my knowledge and belief, tru	fied personnel properly gather tem, or those directly responsibe, accurate, and complete. I are permit and the possibility of	and evaluate the informat le for gathering the inforn im aware that there are fine and imprisonment fo	lirection or supervision in accordance vion submitted. Based on my inquiry of nation, the information submitted is, to significant penalties for submitting for knowing violations. In addition, I century with those requirements.	the the
	OTE: NOI must be signed the applicant, if an indiv		ief elective or exec	utive officer of the applicant,	O
Nan	ne (print)	Title			
Sign	ature	Date			

Permit #:

28.1101-01

Effective Date:

February 26, 2015

Expiration Date:

February 26, 2020



ENVIRONMENT AND NATURAL RESOURCES

TITLE V AIR QUALITY PERMIT



Steven M. Pirner, P.E., Secretary
Department of Environment and Natural Resources

Under the South Dakota Air Pollution Control Regulations

Pursuant to Chapter 34A-1-21 of the South Dakota Codified Laws and the Air Pollution Control Regulations of the State of South Dakota and in reliance on statements made by the owner designated below, a permit to operate is hereby issued by the Secretary of the Department of Environment and Natural Resources. This permit authorizes such owner to operate the unit(s) at the location designated below and under the listed conditions:

A. Owner

1. Company Name and Address

Sioux Falls Regional Sanitary Landfill 224 West 9th Street P.O. Box 7402 Sioux Falls, SD 57104

- Actual Source Location and Mailing Address if Different from Above
 26750 464th Avenue, Sioux Falls, South Dakota
- 3. Permit Contact

Matt Gedney, Environmental Analyst (605) 367-8280

4. Facility Contact

Dave McElroy, Landfill Superintendent (605) 367-8163

Responsible Official

Mark D. Kotter, Director of Public Works (605) 367-8163

B. Permit Revisions or Modifications

Not applicable

C. Type of Operation

Existing municipal solid waste landfill.

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1.0 STANDARD CONDITIONS

1.1 Operation of source.

In accordance with Administrative Rules of South Dakota (ARSD) 74:36:05:16.01(8), the owner or operator shall operate the units, controls, and processes as described in Table 1-1 in accordance with the statements, representations, and supporting data contained in the complete permit application submitted and dated September 24, 2013, unless modified by the conditions of this permit. Except as otherwise provided herein, the control equipment shall be operated in a manner that achieves compliance with the conditions of this permit at all times. The application consists of the application forms, supporting data, and supplementary correspondence. If the owner or operator becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in an application, such information shall be promptly submitted.

Table 1-1 - Description of Permitted Units, Operations, and Processes

Unit	Description	Maximum Operating Rate	Control Device
#1	Municipal Solid Waste Landfill with a total capacity of 22.4 megagrams (24.7 million tons)	Not Applicable	Flare
#2	2011 LFG Specialties Landfill Gas Utility Flare	120 HP	Not Applicable

1.2 Duty to comply.

In accordance with ARSD 74:36:05:16.01(12), the owner or operator shall comply with the conditions of this permit. An owner or operator who knowingly makes a false statement in any record or report or who falsifies, tampers with, or renders inaccurate, any monitoring device or method is in violation of this permit. A violation of any condition in this permit is grounds for enforcement, reopening this permit, permit termination, or denial of a permit renewal application. The owner or operator, in an enforcement action, cannot use the defense that it would have been necessary to cease or reduce the permitted activity to maintain compliance. The owner or operator shall provide any information requested by the Secretary to determine compliance or whether cause exists for reopening or terminating this permit.

1.3 Property rights or exclusive privileges.

In accordance with ARSD 74:36:05:16.01(12), the State's issuance of this permit, adoption of design criteria, and approval of plans and specifications does not convey any property rights of any sort, any exclusive privileges, any authorization to damage, injure or use any private property, any authority to invade personal rights, any authority to violate federal, state or local laws or regulations, or any taking, condemnation or use of eminent domain against any property owned by third parties. The State does not warrant the owner's or operator's compliance with this permit, design criteria, approved plans and specifications, and operation under this permit, will not cause damage, injury or use of private property, an invasion of personal rights, or violation of federal, state or local laws or regulations. The owner or operator is solely and severally liable for all damage, injury or use of private property, invasion of personal rights, infringement of federal, state or local laws and regulations, or taking or condemnation of property owned by third parties, which may result from actions taken under the permit.

1.4 Penalty for violating a permit condition.

In accordance with South Dakota Codified Laws (SDCL) 34A-1-39 and 34A-1-47, a violation of a permit condition may subject the owner or operator to civil or criminal prosecution, a state penalty of not more than \$10,000 per day per violation, injunctive action, administrative permit action, and other remedies as provided by law.

1.5 <u>Inspection and entry.</u>

In accordance with SDCL 34A-1-41, the owner or operator shall allow the Secretary, upon presentation of credentials, to:

- 1. Enter the premises where a regulated activity is located or where pertinent records are stored;
- 2. Have access to and copy any records that are required under this permit;
- 3. Inspect operations regulated under this permit; and/or
- 4. Sample or monitor any substances or parameters for the purpose of assuring compliance.

1.6 Severability.

In accordance with ARSD 74:36:05:16.01(11), any portion of this permit that is void or challenged shall not affect the validity of the remaining permit requirements.

1.7 Permit termination, modification, or revocation.

In accordance with ARSD 74:36:05:46, the Secretary may recommend the Board of Minerals and Environment terminate, modify, or revoke this permit for violations of SDCL 34A-1 or the federal Clean Air Act or for nonpayment of any outstanding fee or enforcement penalty.

1.8 Credible evidence.

In accordance with ARSD 74:36:13:07, credible evidence may be used for the purpose of establishing whether the owner or operator has violated or is violation of this permit. Credible evidence may consist of the following:

- 1. Information from the use of the following methods is presumptively credible evidence of whether a violation has occurred:
 - a. A monitoring method approved pursuant to 40 CFR § 70.6(a)(3) and incorporated in this permit; or
 - b. Compliance methods specified in an applicable plan;
- 2. The following testing, monitoring, or information gathering methods are presumptively credible testing, monitoring, or information-gathering methods:
 - a. Any monitoring or testing methods approved in this permit, including those in 40 CFR Parts 51, 60, 61, and 75; or
 - b. Other testing, monitoring, or information-gathering methods that produce information comparable to that produced by any method in paragraph (1) or (2)(a).

2.0 PERMIT FEES

2.1 Annual air fee required.

In accordance with ARSD 74:36:05:06.01, the owner or operator shall submit an annual administrative fee and an annual fee. The fee is based on actual emissions in accordance with ARSD 74:37.

2.2 Annual operational report.

In accordance with ARSD 74:37:01:06, the Secretary will supply the owner or operator with an annual operational report in January of each year. The owner or operator shall complete and submit the operational report to the Secretary by March 1 of each year. The responsible official shall sign the operational report in the presence of a notary public.

2.3 Annual air fee.

In accordance with ARSD 74:37:01:08, the Secretary will notify the owner or operator of the required annual air emission fee and administrative fee by June 1 of each year. The fees shall accrue on July 1 and are payable to the Department of Revenue by July 31 of each year.

3.0 PERMIT AMENDMENTS AND MODIFICATIONS

3.1 Permit flexibility.

In accordance with ARSD 74:36:05:30, the owner or operator shall have the flexibility to make changes to the source during the term of this permit. The owner or operator shall provide the Secretary written notice at least seven days in advance of the proposed change (NOTE: The Secretary will forward a copy of the written notice to EPA). The written notice shall include a brief description of the change, the date on which the change is to occur, any change in emissions, the proposed changes to the permit, and whether the requested revisions are for an administrative permit amendment, minor permit amendment, or permit modification.

The Secretary will notify the owner or operator whether the change is an administrative permit amendment, a minor permit amendment, or a permit modification. A proposed change that is considered an administrative permit amendment or a minor permit amendment can be completed immediately after the Secretary receives the written notification. The owner or operator must comply with both the applicable requirements governing the change and the proposed permit terms and conditions until the Secretary takes final action on the proposed change.

A proposed change that is considered a modification cannot be implemented until the Secretary takes final action on the proposed change or the owner or operator was issued an air quality construction permit. Permit modifications are subject to the same procedural requirements, including public comment, as the original permit issuance except that the required review shall cover only the proposed changes.

3.2 Administrative permit amendment.

In accordance with ARSD 74:36:05:33, the Secretary has 60 days from receipt of a written notice to verify the proposed change is an administrative permit amendment. As provided in ASRD 74:36:01:03, the Secretary considers a proposed change an administrative permit amendment if the proposed change accomplishes one of the following:

- 1. Corrects typographical errors;
- 2. Changes the name, address, or phone number of any person identified in this permit or provides a similar minor administrative change;

3. Requires more frequent monitoring or reporting;

- 4. The ownership or operational control changes and the Secretary determines no other change in this permit is necessary. However, the new owner must submit a certification of applicant form and a written statement specifying the date for transfer of operating permit responsibility, coverage, and liability; or
- 5. Any other changes the Secretary and the administrator of EPA determines to be similar to those requirements in this condition.

3.3 Minor permit amendment.

In accordance with ARSD 74:36:05:38, the Secretary has 90 days from receipt of a written notice or 15 days after the end of EPA's 45-day review period, whichever is later, to take final action on a minor permit amendment. Final action consists of issuing or denying a minor permit amendment or determining the proposed change is a permit modification. As provided in ASRD 74:36:05:35, the Secretary considers a proposed change to be a minor permit amendment if the proposed change:

- 1. Does not violate any applicable requirements;
- 2. Does not involve significant changes to existing monitoring, reporting, or record keeping requirements;
- 3. Does not require or change a case-by-case determination of an emission limit or other standard, a source-specific determination for temporary sources of ambient impacts, or a visibility or increment analysis; or
- 4. Does not seek to establish or change a permit term or condition for which the source has assumed to avoid an applicable requirement, a federally enforceable emission cap, or an alternative emission limit. An alternative emission limit is approved pursuant to regulations promulgated under section 112(i)(5) of the federal Clean Air Act.

3.4 Permit modification.

In accordance with ARSD 74:36:05:39, an owner or operator may apply for a permit modification. A permit modification is defined in ARSD 74:36:01:10 as a physical change in or change in the operation of a source that results in at least one of the following:

- 1. An increase in the amount of an air pollutant emitted by the source or results in the emission of an air pollutant not previously emitted;
- 2. A significant change to existing monitoring, reporting, or recordkeeping requirements in the permit;

3. The change requires or changes a case-by-case determination of an emission limit or other standard, a source-specific determination for temporary sources of ambient impacts, or a visibility or increment analysis; or

4. The change seeks to establish or change a permit term or condition for which there is a corresponding underlying applicable requirement that the source has assumed to avoid an applicable requirement, a federally enforceable emissions cap assumed to avoid classification as a modification under a provision of the Title I of the Clean Air Act, or an alternative emissions limit approved pursuant to regulations promulgated under section 112(i)(5) of the Clean Air Act.

Permit modifications are subject to the same procedural requirements, including public comment, as the original permit issuance except that the required review shall cover only the proposed changes.

3.5 Permit revision.

In accordance with ARSD 74:36:05:40, the Secretary may reopen and revise this permit to meet requirements of SDCL 34A-1 or the federal Clean Air Act. In accordance with ARSD 74:36:05:41, the Secretary shall notify the owner or operator at least 30 days before reopening this permit. The 30-day period may be less in the case of an emergency.

3.6 Testing new fuels or raw materials.

In accordance with ARSD 74:36:11:04, an owner or operator may request permission to test a new fuel or raw material to determine if it is compatible with existing equipment before requesting a permit amendment or modification. A complete test proposal shall consist of the following:

- 1. A written proposal that describes the new fuel or raw material, operating parameters, and parameters that will be monitored and any testing associated with air pollutant emissions during the test;
- 2. An estimate of the type and amount of regulated air pollutant emissions resulting from the proposed change; and
- 3. The proposed schedule for conducting the test. In most cases the owner or operator will be allowed to test for a maximum of one week. A request for a test period longer than one week will need additional justification. A test period shall not exceed 180 days.

The Secretary shall approve, conditionally approve, or deny in writing the test proposal within 45 days after receiving a complete proposal. Approval conditions may include changing the test schedule or pollutant sampling and analysis methods. Pollutant sampling and analysis methods may include, but are not limited to performance testing, visible emission evaluation, fuel analysis, dispersion modeling, and monitoring of raw material or fuel rates.

If the Secretary determines that the proposed change will result in an increase in the emission of a regulated air pollutant or result in the emission of an additional regulated air pollutant, the Secretary shall give public notice of the proposed test for 30 days. The Secretary shall consider

all comments received during the 30-day public comment period before making a final decision on the test.

The Secretary will not approve a test if the test would cause or contribute to a violation of a national ambient air quality standard.

4.0 PERMIT RENEWAL

4.1 Permit effective.

In accordance with ARSD 74:36:05:07, this permit shall expire five years from date of issuance unless reopened or terminated for cause.

4.2 <u>Permit renewal.</u>

In accordance with ARSD 74:36:05:08, the owner or operator shall submit an application for a permit renewal at least 180 days before the date of permit expiration if the owner or operator wishes to continue to operate an activity regulated by this permit. The current permit shall not expire and shall remain in effect until the Secretary takes final action on the timely permit renewal application.

4.3 Permit expiration.

In accordance with ARSD 74:36:05:28, permit expiration terminates the owner's or operator's right to operate any unit covered by this permit.

5.0 RECORDKEEPING AND REPORTING

5.1 Recordkeeping and reporting.

In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall maintain all monitoring data, records, reports, and pertinent information specified by this permit for five years from the date of sample, measurement, report, or application unless otherwise specified in this permit. The records shall be maintained on site for the first two years and may be maintained off site for the last three years. All records must be made available to the Secretary for inspection. All notifications and reports shall be submitted to the following address:

South Dakota Department of Environment and Natural Resources PMB 2020, Air Quality Program 523 E. Capitol, Joe Foss Building Pierre, SD 57501-3182

5.2 Signatory requirements.

In accordance with ARSD 74:36:05:12 and 74:36:05:16.01, all applications, reports, or other information submitted to the Secretary shall be signed and certified by a responsible official or a duly authorized representative. A responsible official for a corporation is a responsible corporate

officer and for a partnership or sole proprietorship is a general partner or the proprietor, respectively. A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described above and submitted to the

Secretary; and

2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters.

The duly authorized representative must be designated prior to or together with any reports or information to be signed by a duly authorized representative. The responsible official shall notify the Secretary if an authorization is no longer accurate.

5.3 Certification statement.

In accordance with ARSD 74:36:05:16.01(14)(a), all documents required by this permit, including application forms, reports, and compliance certification, must be certified by a responsible official or a duly authorized representative. The certification shall include the following statement:

"I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this document and all attachments are true, accurate, and complete."

Annual compliance certification. 5.4

In accordance with ARSD 74:36:05:16.01(14), the owner or operator shall submit an annual compliance certification letter to the Secretary by March 1 of each year this permit is in effect (NOTE: The Secretary will forward a copy of the certification letter to EPA). The certification shall contain the following information:

1. Methods used to determine compliance, including: monitoring, record keeping, performance testing and reporting requirements;

2. The source is in compliance and will continue to demonstrate compliance with all applicable

requirements;

3. In the event the source is in noncompliance, a compliance plan that indicates how the source has or will be brought into compliance; and

4. Certification statement required in permit condition 5.3.

Reporting permit violations. 5.5

In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall report all permit violations. A permit violation should be reported as soon as possible, but no later than the first business day following the day the violation was discovered. The permit violation may be reported by telephone to the South Dakota Department of Environment and Natural Resources at (605) 773-3151 or by FAX at (605) 773-4068.

A written report shall be submitted within five days of discovering the permit violation. Upon prior approval from the Secretary, the submittal deadline for the written report may be extended up to 30 days. The written report shall contain:

- 1. Description of the permit violation and its cause(s);
- 2. Duration of the permit violation, including exact dates and times; and
- 3. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the permit violation.

6.0 40 CFR Part 60 Subpart Cc

6.1 Nonmethane organic compound emission rate report.

In accordance with ARSD 74:36:07:42.01, as referenced to 40 CFR § 60.757(b), the owner or operator shall submit an annual nonmethane organic compound emission rate report. The nonmethane organic compound emission rate report shall contain the following:

- 1. An annual estimate of the nonmethane organic compound emission rate; and
- 2. The report shall include all the data, calculations, sample reports and measurements used to estimate the annual emissions.

The owner or operator may elect to submit one report that contains an estimate of the nonmethane organic compound emission rate for a 5-year period in lieu of the annual report. The owner or operator is eligible for this option if the estimated nonmethane organic compound emission rate as reported in the annual report is less than 50 megagrams per year for five consecutive years. The estimate shall include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the five years for which a nonmethane organic compound emission rate is estimated. All data and calculations upon which this estimate is based shall be submitted in the 5-year estimate report. The 5-year estimate report shall be revised if the actual waste acceptance rate exceeds the estimated waste acceptance rate. The revised 5-year estimate report shall cover a 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate.

The annual or 5-year estimate report shall be submitted by March 1 and may be submitted with the compliance certification report.

The owner or operator is exempt from this permit condition after the installation of a collection and control system and during such time as the collection and control system is in operation and in compliance with this permit.

6.2 Estimating annual nonmethane organic compound emission rate.

In accordance with ARSD 74:36:07:34, as referenced to 40 CFR § 60.752(b)(1), § 60.754, and § 60.757(c)(1) and (2), the owner or operator shall estimate the annual nonmethane organic compound emission rate using the following Tiers:

- Tier 1. Calculate the nonmethane organic compound emission rate using the default values in permit condition 6.3. If the result rate is greater than 50 megagrams per year, the owner or operator shall recalculate the emission rate using Tier 2 or install collection system as outlined in permit condition 6.13;
- Tier 2. Calculate the nonmethane organic compound emission rate using a site specific nonmethane organic compound concentration as determined by permit condition 6.4. If the resulting rate is less than 50 megagrams per year, the owner or operator shall submit a revised nonmethane organic compound emission rate report with the recalculated emission rate based on the site specific nonmethane organic compound concentration within 180 days of the first calculated exceedance of 50 megagrams per year. In addition, the owner or operator shall resume annual reporting of the nonmethane organic compound emission rate using the site specific nonmethane organic compound concentration. If the result rate is greater than 50 megagrams per year, the owner or operator shall recalculate the emission rate using Tier 3 or install collection system as outlined in permit condition 6.13; or
- Tier 3. Calculate the nonmethane organic compound emission rate using a site specific methane generation rate as determined by permit condition 6.6. If the resulting rate is less than 50 megagrams per year, the owner or operator shall submit a revised nonmethane organic compound emission rate report with the recalculated emission rate based on the site specific methane generation rate within one year of the first calculated exceedance of 50 megagrams per year. In addition, the owner or operator shall resume annual reporting of the nonmethane organic compound emission rate using the site specific methane generation rate. If the result rate is greater than 50 megagrams per year, the owner or operator shall install the collection system as outlined in permit condition 6.13

6.3 Tier 1 - Nonmethane organic compound emission rate based on default values.

In accordance with ARSD 74:36:07:34, as referenced to 40 CFR § 60.754(a)(1) and (2), the owner or operator may calculate the annual nonmethane organic compound emission rate based on Equation 6-1 and/or 6-2.

Equation 6-1
$$M_{NMOC} = \sum_{i=1}^{n} 2kLoMi(e^{-kt_i})(C_{NMOC})(3.6x10^{-9})$$
Equation 6-2
$$M_{NMOC} = L_a R(e^{-kc} - e^{-kt})(C_{NMOC})(3.6x10^{-9})$$

The following default values shall be used in Equation 6-1 and 6-2:

- M_{NMOC} = mass emission rate of nonmethane organic compound, megagrams per year;
- k = 0.05 per year, methane generation rate constant. For landfills located in geographical areas with a thirty year annual average precipitation of less than 25 inches, as measured at the nearest representative official meteorological site, the k value to be used is 0.02 per year;
- Lo = 170 cubic meters per megagram solid waste, methane generation potential;
- Mi = mass of solid waste in the i th section, megagrams;
- t_i = age of the i th section, years;
- C_{NMOC} = 4,000 parts per million by volume as hexane, concentration of nonmethane organic compounds;

- R = average annual acceptance rate, megagrams per year;
- c = time since closure, years. For active landfill c = 0 and $e^{-kc} = 1$; and
- t = age of landfill, years.

Equation 6-1 shall be used if the actual year-to-year solid waste acceptance rate is known. Equation 6-2 shall be used if the actual year-to-year solid waste acceptance rate is unknown. Both equations may be used if the actual year-to-year solid waste acceptance rate is known for part of the life of the landfill and the actual year-to-year solid waste acceptance rate is unknown. The mass of nondegradable solid waste may be subtracted from the average annual acceptance rate when calculating a value for "R", if documentation of the nature and amount of such wastes in maintained.

6.4 <u>Tier 2 – Site specific nonmethane organic compound concentration.</u>

In accordance with ARSD 74:36:07:34, as referenced to 40 CFR § 60.754(a)(3)(i), (ii), and (iii), the owner or operator may use a site specific nonmethane organic compound concentration to calculate the annual nonmethane organic compound emission rate. The average nonmethane organic compound concentration from the collected samples shall be used in Equation 6-1 or 6-2 instead of the "C_{NMOC}" default value to calculate the nonmethane organic compound emission rate.

If the nonmethane organic compound emission rate is less than 50 megagrams per year, the owner or operator shall retest the site specific nonmethane organic compound concentration every five years using the testing methods required in this permit.

6.5 Site specific testing for nonmethane organic compound concentration.

In accordance with ARSD 74:36:07:34, as referenced to 40 CFR § 60.754(a)(3), the owner or operator may determine the nonmethane organic compound concentration "C_{NMOC}" by the one of the following testing methods:

- 1. The owner or operator shall install at least two sample probes per hectare of landfill surface that has retained waste for at least two years. If the landfill is larger than 25 hectares in area, only 50 samples are required. Sampling methods are as follows:
 - A. The sample probes shall be located to avoid known areas of nondegradable solid waste;
 - B. Collect and analyze one sample of landfill gas from each probe to determine the nonmethane organic compound concentration using 40 CFR Part 60, Appendix A, Method 25 or 25C. The concentrations measured from Method 25 or 25C shall be converted to concentration of nonmethane organic compounds as hexane by multiplying by the ratio of its carbon atoms divided by six;
 - C. A composite sample from different probes collected in a single cylinder is allowed provided equal sample volumes are taken from each probe. Composite sample volumes should not be less than one liter unless evidence can be provided to substantiate the accuracy of smaller volumes. Composite sampling should be

- terminated before the cylinder approaches ambient pressure where measurement accuracy diminishes; and
- D. If using 40 CFR Part 60, Appendix A, Method 18, the owner or operator must identify all compounds in the sample and, as a minimum, test for those compounds published in the most recent Compilation of Air Pollutant Emission Factors, minus carbon monoxide, hydrogen sulfide, and mercury. As a minimum, the instrument must be calibrated for each of the compounds on the list. Convert the concentration of each Method 18 compound to concentration of nonmethane organic compounds as hexane by multiplying by the ratio of its carbon atoms divided by six; or
- 2. If the landfill has an active or passive gas removal system in place, 40 CFR Part 60, Appendix A, Method 25 or 25C samples may be collected from these systems instead of surface probes provided the removal system can be shown to provide sampling as representative as the two sampling probe per hectare requirement. For active collection systems, samples may be collected from the common header pipe before the gas moving or condensate removal equipment. For these systems, a minimum of three samples must be collected from the header pipe.

If more than the required number of samples is taken, all samples must be used in the analysis.

6.6 Tier 3 – Site specific methane generation rate.

In accordance with ARSD 74:36:07:34, as referenced to 40 CFR § 60.754(a)(4)(i) and (ii), the owner or operator may use a site specific methane generation rate to calculate the annual nonmethane organic compound emission rate. The site specific nonmethane organic compound concentration and the site specific methane generation rate "k" shall be used in Equation 6-1 or 6-2 instead of the default values to calculate the nonmethane organic compound emission rate. The site specific methane generation rate test is only performed once and the value obtained from this test shall be used in all subsequent annual nonmethane organic compound emission rate calculations.

6.7 Site specific testing for methane generation rate.

In accordance with ARSD 74:36:07:34, as referenced to 40 CFR § 60.754(a)(4), the owner or operator may determine the site specific methane generation rate "k" by using 40 CFR Part 60, Appendix A, Method 2E.

6.8 Alternative methods.

In accordance with ARSD 74:36:07:34, as referenced to 40 CFR § 60.754(a)(5), the owner or operator may use other methods to determine the site specific nonmethane organic compound concentration or methane generation rate if the method has been approved by the Secretary and EPA.

6.9 Submittal of collection and control system design plan.

In accordance with ARSD 74:36:07:34, as referenced to 40 CFR § 60.752(b)(2)(i) and 40 CFR § 60.757(c), the owner or operator shall submit a collection and control system design plan

prepared by a professional engineer within one year of the first annual report in which the nonmethane organic compound emission rate equals or exceeds 50 megagrams per year. The design plan shall include the following:

- 1. A description of the collection and control system as outlined in permit condition 6.13;
- 2. A description of any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions outlined in permit chapter 6.0;
- 3. If the collection and control system does not conform with permit condition 6.10, the plan must include a demonstration of the sufficiency of the alternative provisions.

The Secretary will review the design plan and either approve it, disapprove it, or request additional information. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only, leachate collection components, and passive systems.

The owner or operator may elect to recalculate the nonmethane organic compound emission rate after Tier 2 sampling and analysis. If the resulting rate is less than 50 megagrams per year, the owner or operator shall submit a revised nonmethane organic compound emission rate report with the recalculated emission rate based on the site specific nonmethane organic compound concentration within 180 days of the first calculated exceedance of 50 megagrams per year. In addition, the owner or operator shall resume annual reporting of the nonmethane organic compound emission rate using the site specific nonmethane organic compound concentration.

The owner or operator may elect to recalculate the nonmethane organic compound emission rate after Tier 3 sampling and analysis. If the resulting rate is less than 50 megagrams per year, the owner or operator shall submit a revised nonmethane organic compound emission rate report with the recalculated emission rate based on the site specific methane generation rate within one year of the first calculated exceedance of 50 megagrams per year. In addition, the owner or operator shall resume annual reporting of the nonmethane organic compound emission rate using the site specific methane generation rate.

6.10 Specifications for the collection system.

In accordance with ARSD 74:36:07:36, as referenced to 40 CFR § 60.759(a), the owner or operator that installs a collection and control system shall site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using the following procedures unless alternative procedures have been approved by the Secretary:

1. The collection devices within the interior and along the perimeter areas shall be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues shall be addressed in the design: depth of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations,

- integration with closure end use, air intrusion control corrosion resistance, fill settlement, and resistance to the refuse decomposition heat;
- 2. The sufficient density of gas collection devices determined in section 1 of this permit condition shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior;
- 3. The placement of gas collection devices determined in section 1 of this permit condition shall control all gas producing areas, except as provided below:
 - A. Any segregated area of asbestos or nondegradable material may be excluded from collection if documented. The documentation shall provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area;
 - B. Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than one percent of the total amount of nonmethane organic compound emissions from the landfill. The amount, location, and age of the material shall be documented. A separate nonmethane organic compound emissions estimate shall be made for each section proposed for exclusion, and the sum of all such sections shall be compared to the nonmethane organic emissions estimate for the entire landfill. Emissions from each shall be computed using Equation 6-3; and

Equation 6-3
$$Q_i = 2kL_o M_i (e^{-kt_i}) (C_{NMOC}) (3.6x10^{-9})$$

Where:

- Q_i = Nonmethane organic compound emission rate from the ith section, megagrams per year;
- k = methane generation rate constant, year -1;
- Lo = methane generation potential, cubic meters per megagram solid waste;
- Mi = mass of the degradable solid waste in the ith section, megagram;
- ti = age of the solid waste in the ith section, years; and
- C_{NMOC} = concentration of nonmethane organic compounds, parts per million by volume.
- C. The values for k and C_{NMOC} determined in field testing shall be used if field testing has been performed in determining the nonmethane organic compound emission rate or the radius of influence. The radius of influence is the distance from the well center to a point in the landfill where the pressure gradient applied by the blower or compressor approached zero. If field testing has not been performed, the default values for k, L₀ and C_{NMOC} provide in permit condition 6.3 shall be used. The mass of nondegradable solid waste contained within the given section may be subtracted from the total mass of the section when estimating emissions provided the nature, location, age, and amount of the nondegradable material is documented as provided in subsection 3(A) of this permit condition.

6.11 Construction requirements for the collection system.

In accordance with ARSD 74:36:07:36, as referenced to 40 CFR § 60.759(b), the owner or operator that installs a collection system shall construct the gas collection devices using the following equipment or procedures:

- 1. The landfill gas extraction components shall be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system shall extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors shall be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations shall be situated with regard to the need to prevent excessive air infiltration:
- 2. Vertical wells shall be placed so as not to endanger underlying liners and shall address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors shall be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices shall be designed so as not to allow indirect short circuiting of air into the cover or refuse into the collection system or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations; and
- 3. Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.

6.12 Construction requirements for conveying landfill gas.

In accordance with ARSD 74:36:07:36, as referenced to 40 CFR § 60.759(c), the owner or operator installing a collection and control system shall convey the landfill gas to a control system through the collection header pipe(s). The gas mover equipment shall be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures:

- 1. For existing collection systems, the flow data shall be used to project the maximum flow rate; and
- 2. If no flow data exists, the maximum flow rate shall be in accordance with permit condition 6.18(1).

6.13 Installation of collection system.

In accordance with ARSD 74:36:07:36, as referenced to 40 CFR § 60.752(b)(2)(ii), the owner or operator shall install and operate one of the following collection systems:

1. An active collection system:

- A. Designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment;
- B. That collects gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of five years or more if active or two years or more if closed or at final grade;
- C. That collects gas at a sufficient extraction rate; and
- D. Designed to minimize off-site migration of subsurface gas.
- 2. A passive collection system:
 - A. That complies with subsection 1(A), 1(B), and 1(D) of this permit condition; and
 - B. That is installed with liners on the bottom and all sides in all areas in which gas is to be collected. The liners shall be installed as required under 40 CFR § 258.40.

6.14 Installation of wells.

In accordance with ARSD 74:36:07:40, as referenced to 40 CFR § 60.755(b), the owner or operator of a controlled landfill shall install each well or design component as specified in the approved design plan. Each well shall be installed no later than 60 days after the date on which the initial solid waste has been in place for a period of:

- 1. Five years or more if active; or
- 2. Two years or more if closed or at final grade.

6.15 Installation of control system.

In accordance with ARSD 74:36:07:37, as referenced to 40 CFR § 60.752(b)(2)(iii), the owner or operator shall route all the collected gas to a control system that meets the specifications in permit condition 6.31, 6.36, or route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be controlled by an open flare, enclosed combustor, boiler, or process heater that meets the specifications in permit condition 6.31 or 6.36.

6.16 Schedule for installing collection and control system.

In accordance with ARSD 74:36:07:38 and 74:36:05:16.01(8), the owner or operator shall install the collection and control system within the timelines listed below:

- 1. Award contracts within 15 months of the first annual report showing the nonmethane organic compound emissions equal or exceed 50 megagrams per year;
- 2. Begin construction within 18 months of the first annual report showing the nonmethane organic compound emissions equal or exceed 50 megagrams per year;
- 3. Complete construction within 30 months of the first annual report showing the nonmethane organic compound emissions equal or exceed 50 megagrams per year; and

4. Demonstrate compliance with all applicable requirements within 180 days of completing construction.

6.17 <u>Initial startup of gas collection system.</u>

In accordance with ARSD 74:36:07:01, as referenced to 40 CFR § 60.5, the owner or operator shall notify the Secretary in writing of the initial startup of the gas collection system. The written notification will identify the facility name, permit number, this permit condition, and the initial startup date of the gas collection system. The written notification shall be postmarked within 15 days after the initial startup date.

6.18 Initial compliance determination for gas collection system.

In accordance with ARSD 74:36:07:01, as referenced to 40 CFR § 60.8, the owner or operator shall demonstrate compliance with the gas collection system specifications within 180 days of installing the gas collection system. In accordance with ARSD 74:36:07:43, as referenced to 40 CFR § 60.755(a), the owner or operator shall demonstrate compliance using the following methods:

1. Equation 6-4 or 6-5 shall be used to calculate the maximum expected gas generation flow rate from the landfill.

Equation 6-4
$$Q_m = 2L_o R(e^{-kc} - e^{-kt})$$
 Equation 6-5 $Q_m = \sum_{i=1}^n 2kL_o M_i(e^{-kt_i})$

Where:

- Q_m = maximum expected gas generation flow rate, cubic meters per year;
- L_0 = methane generation potential, cubic meters per megagram solid waste;
- R = average annual acceptance rate, megagrams per year;
- k = methane generation rate constant, year¹;
- t = age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed after closure, t is the age of the landfill at installation, years;
- c = time since closure, years (for an active landfill c = 0 and $e^{-kc} = 1$);
- M_i = mass of solid waste in the ith section, megagrams; and
- t_i = age of the i^{th} section, years.

The k and L_o kinetic factors should be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42) or other site specific values demonstrated to be appropriate and approved by the Secretary. If k has been determined as specified in permit condition 6.7, the value of k determined from the test shall be used. A value no more than 15 years shall be used for the intended use period of the gas mover equipment. The active life of the landfill is the age of the landfill plus the estimated number of years until closure. Equation 6-4 shall be used for sites with unknown year-to-year solid waste acceptance rate. Equation 6-5 shall be used with known year-to-year solid waste acceptance rate.

If a collection and control system has been installed, actual flow data may be used to project the maximum expected gas generation flow rate instead of or in conjunction with Equation 6-

- 4 and 6-5. If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using Equation 6-4 or 6-5 or other methods shall be used to predict the maximum expected gas generation rate over the intended period of use of the gas control system equipment;
- 2. For the purposes of determining sufficient density of gas collectors, the owner or operator shall design a system of vertical wells, horizontal collectors, or other collection devices capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards;
- 3. For the purpose of demonstrating if the gas collection system flow rate is sufficient, the owner or operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within five calendar days, except when there is a fire or increased well temperature, a geomembrane or synthetic cover is installed, or it is a decommissioned well. If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of the other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Secretary for approval;
- 4. Owners or operators are not required to expand the system as required in section 3 of this permit condition during the first 180 days after gas collection system startup;
- 5. For the purpose of identifying if excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen. If a well exceeds one of the operating parameters listed in permit condition 6.19(3), action shall be initiated to correct the exceedance within five calendar days. If correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Secretary for approval; and
- 6. An owner or operator seeking to minimize off-site migration of subsurface gas through the use of a collection system not conforming to the specifications provided in this permit shall provide sufficient information that demonstrates off-site migration is being controlled to the satisfaction of the Secretary.

6.19 Operational requirements for collection and control system.

In accordance with ARSD 74:36:07:39, as referenced to 40 CFR § 60.753, the owner or operator of a gas collection and control system shall operate the collection and control system as follows:

- 1. Operate the collection system such that gas is collected from each area, cell or group of cells in the municipal solid waste landfill in which solid waste has been in place for five years or more if active or two years or more if closed or at final grade;
- 2. Operate the collection system with negative pressure at each wellhead except under the following conditions:

- A. During a fire or increased well temperature, the owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire;
- B. When the collection system includes a geomembrane or synthetic cover, the owner or operator shall develop acceptable pressure limits in the design plan; and
- C. A decommissioned well. A well may experience a static pressure after shut down to accommodate for declining flows. All design changes shall be approved by the Secretary;
- 3. Operate each interior wellhead in the collection system with a landfill gas temperature less than 55 degrees Celsius and with a nitrogen level less than 20 percent or an oxygen level less than five percent. The owner or operator may establish a higher operating temperature, nitrogen value, or oxygen value at a particular well if it can be demonstrated that the higher operating value does not cause fire or significantly inhibit anaerobic decomposition by killing methanogens. The nitrogen level shall be determined using 40 CFR Part 60, Appendix A, Method 3C. The oxygen level shall be determined by an oxygen meter using 40 CFR Part 60, Appendix A, Method 3A or 3C, except the span shall be set so that the regulatory limit is between 20 and 50 percent of the span; a data recorder is not required; only two calibration gases are required, a zero and span, and ambient air may be used as the span; a calibration error check is not required; and the allowable sample bias, zero drift and calibration drift are plus or minus 10 percent. An alternative test method for the nitrogen or oxygen levels may be established after receiving written approval from the Secretary;
- 4. Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill;
- 5. Operate the system such that all collected gases are vented to a control system. In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within one hour; and
- 6. Operate the control or treatment system at all times when the collected gas is routed to the system.

If monitoring demonstrates that the operational requirements in section 2, 3, and 4 of this permit condition are not met, corrective action shall be taken as specified in permit condition 6.18(3), (4), and (5) or 6.46. If corrective actions are taken in a timely manner, the monitored exceedance is not considered a violation of this permit condition.

6.20 Monitoring active gas collection systems.

In accordance with ARSD 74:36:07:41, as referenced to 40 CFR § 60.756(a), the owner or operator of an active gas collection system shall install a sampling port and a thermometer, other temperature measuring device, or an access port for temperature measurements at each wellhead. The owner or operator shall monitor the following:

- 1. Measure the gauge pressure in the gas collection header on a monthly basis;
- 2. Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis; and
- 3. Monitor temperature of the landfill gas on a monthly basis.

6.21 Monitoring other approved devices.

In accordance with ARSD 74:36:07:41, as referenced to 40 CFR § 60.756(d), the owner or operator using a device other than an open flare or an enclosed combustor shall provide information which describes the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Secretary shall approve the plan, request additional information be submitted, or specify additional monitoring procedures.

6.22 Monitoring other approved collection systems.

In accordance with ARSD 74:36:07:41, as referenced to 40 CFR § 60.756(e), the owner or operator that installs a collection system that does not meet the specifications in this permit or monitors alternative parameters to those required in this permit shall describe the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Secretary shall approve the plan, request additional information be submitted, or specify additional monitoring procedures.

6.23 General records for collection and control system.

In accordance with ARSD 74:36:07:42, as referenced to 40 CFR § 60.758(a) and (e), the owner or operator shall maintain the following records for at least five years:

- 1. The design capacity report which triggered the installation and operation of a collection and control system;
- 2. The current amount of solid waste in-place;
- 3. The year-by-year waste acceptance rate;
- 4. All collection and control system exceedances of the operational standards in permit condition 6.19, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.

In accordance with ARSD 74:36:07:42, as referenced to 40 CFR § 60.758(d), the owner or operator shall maintain the following for the life of the collection system:

- 1. A plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector, records of the installation date, and location of all newly installed collectors; and
- 2. Records of the nature, date of deposition, amount, and location of asbestos containing or nondegradable waste excluded from collections as well as any nonproductive areas excluded from collection.

In accordance with ARSD 74:36:07:42, as referenced to 40 CFR § 60.758(b), the owner or operator shall maintain the following data for the life of the control system as measured during the initial performance test or compliance determination:

1. The maximum expected gas generation flow rate as calculated in permit condition 6.18(1); and

2. The density of wells, horizontal collectors, surface collectors, or other gas extraction devices.

Records of subsequent tests or monitoring shall be maintained for five years.

6.24 Initial performance test report.

In accordance with ARSD 74:36:07:42, as referenced to 40 CFR § 60.757(g), the owner or operator that uses a control device shall submit the following information with the initial performance test results required in permit conditions 6.33 and 6.38:

- 1. A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the location of any areas excluded from collection and the proposed sites for the future collection system expansion;
- 2. The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;
- 3. The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;
- 4. The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area;
- 5. The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and
- 6. The provisions for the control of off-site migration.

6.25 Semiannual report for an active collection system.

In accordance with ARSD 74:36:07:42, as referenced to 40 CFR § 60.757(f), and ARSD 74:36:08:30, as referenced to 40 CFR § 63.1980, the owner or operator of an active collection system shall submit a semiannual report of the following information:

- 1. Value and length of time for exceedance of applicable parameters monitored in accordance with permit conditions 6.20, 6.21, 6.32, and 6.37;
- 2. Description and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow;
- 3. Description and duration of all periods when the control device was not operating for a period of one hour and length of time the control device was not operating;
- 4. All periods when the collection system was not operating in excess of five days;
- 5. The location of each exceedance of the 500 parts per million methane concentration at the surface of the landfill and the concentration recorded at each location for which an exceedance was recorded in the previous month;
- 6. The date of installation and the location of each well or collection system expansion; and
- 7. Instances when positive pressure occurs at a wellhead in efforts to avoid a fire;

- 8. Confirm that actions taken during the relevant reporting period during periods of startup, shutdown, and malfunctions were consistent with the startup, shutdown, and malfunction plan;
- 9. Revisions to the startup, shutdown, and malfunction plan during the relevant reporting period;

The initial semiannual report shall be submitted within 180 days of installation and startup of the collection and control system, and shall include the initial performance test report. For enclosed combustion devices and flares, reportable exceedances are defined in permit conditions 6.35 and 6.40.

6.26 Periods of startup, shutdown, or malfunctions.

In accordance with ARSD 74:36:07:40, as referenced to 40 CFR § 60.755(e), the provisions of this permit apply at all times, except during periods of startup, shutdown, or malfunctions, provided that the duration of startup, shutdown, or malfunction shall not exceed five days for collection systems and shall not exceed one hour for treatment or control devices.

6.27 Develop and implement a startup, shutdown, and malfunction plan.

In accordance with ARSD 74:36:08:03, as referenced to 40 CFR § 63.6(e)(3)(i), (ii), and (vi), the owner or operator shall develop a written startup, shutdown and malfunction plan and implement the plan by the initial startup date of the collection system. The startup, shutdown, and malfunction plan shall:

- 1. Describe the procedures for operating and maintaining the collection and control system in a manner consistent with safety and good air pollution control practices for minimizing emissions to the levels required by the relevant standards during periods of startup, shutdown, and malfunction;
- 2. Describe a program to correct malfunctions as soon as practicable after its occurrence in order to minimize excess emissions of hazardous air pollutants;
- 3. Describe the procedures for operating and maintaining an air pollution control device and associated monitoring device in a manner consistent with safety and good air pollution control practices for minimizing emissions to the levels required by the relevant standards; and
- 4. Reduce the reporting burden associated with periods of startup, shutdown, and malfunction including the corrective action taken to restore a malfunction to its normal or usual manner of operation.

During periods of startup, shutdown, or malfunction, the owner or operator shall operate and maintain the collection and control system and associated monitoring equipment in accordance with the procedures specified in the startup, shutdown and malfunction plan.

6.28 Records of startup, shutdown, and malfunction.

In accordance with ARSD 74:36:08:03, as referenced to 40 CFR § 63.6(e)(3)(iii) and (iv), the owner or operator shall maintain records that demonstrate the owner or operator followed the startup, shutdown, and malfunction plan during startup, shutdown, or a malfunction. The records

may take the form of a "checklist," or other effective form of record keeping that confirms conformance with the startup, shutdown, and malfunction plan for that event. In addition, the owner or operator must keep records of the occurrence and duration of each startup, shutdown, or malfunction.

6.29 Maintaining a startup, shutdown, and malfunction plan.

In accordance with ARSD 74:36:08:03, as referenced to 40 CFR § 63.6(e)(3)(v), (vii), and (viii), the owner or operator shall maintain a current startup, shutdown, and malfunction plan at the municipal solid waste landfill. The owner or operator shall revise the startup, shutdown, and malfunction plan for the following reasons:

- 1. The plan does not address a startup, shutdown, or malfunction event that has occurred;
- 2. The plan fails to provide for the operation of the collection and control system and associated monitoring equipment during a startup, shutdown, or malfunction event in a manner consistent with safety and good air pollution control practices for minimizing emissions to the levels required by the relevant standards;
- 3. The plan does not provide adequate procedures for correcting malfunction process and/or air pollution control and monitoring equipment as quickly as practicable. In this case, the startup, shutdown, and malfunction plan shall revised within 45 days after the event;
- 4. The plan includes an event that does not meet the definition of startup, shutdown, or malfunction; or
- 5. Periodical revisions are necessary to reflect changes in equipment or procedures at the municipal solid waste landfill.

If the startup, shutdown, and malfunction plan is revised, the owner or operator must maintain each previous version of the startup, shutdown, and malfunction plan at the municipal solid waste landfill. If at any time after adoption of the startup, shutdown, or malfunction plan the municipal solid waste landfill ceases operation or is otherwise no longer subject to operating a collection and control system, the owner or operator must retain a copy of the most recent plan for five years from the date the source ceases operation or is no longer required to operate a collection and control system.

6.30 <u>Deviations from control device operating parameters.</u>

In accordance with ARSD 74:36:08:30, as referenced to 40 CFR §§ 63.1960, 63.1965, and 63.1975, the continuous parameter monitoring data required in permit conditions 6.21, 6.32, and 6.37 shall be used to demonstrate compliance with the operating conditions for the control system. The 3-hour block average used for compliance shall not include data collected during a monitoring system breakdown, repair, calibration check, and zero and high-level adjustment; startups, shutdowns, or malfunctions. A deviation occurs when:

- 1. The control device operating parameter required to be recorded in permit condition 6.40(2) is exceeded;
- 2. One hour or more of the hours during the 3-hour block averaging period does not constitute a valid hour of data. A valid hour of data must have measured values for at least three 15-minute monitoring periods within the hour; and
- 3. A startup, shutdown, and malfunction plan is not developed, implemented, or maintained on site.

6.31 Open flare specifications.

In accordance with ARSD 74:36:07:37, as referenced to 40 CFR § 60.752(b)(2)(iii)(A), a steam assisted, air assisted, or non-assisted open flare used to control nonmethane organic compound emissions shall be designed and operated in accordance with 40 CFR §60.18 except as noted in 40 CFR §60.754(e):

- 1. The flare shall be designed for and operated with no visible emissions as determined by 40 CFR Part 60, Appendix A, Method 22, except for periods not to exceed a total of five minutes during any two consecutive hours. The observation period for the visible emission evaluation shall be two hours;
- 2. A flare shall be operated with a flame present at all times. The presence of a flare pilot flame shall be monitored using a thermal couple or any other equivalent device to detect the presence of a flame;
- 3. The heat content and maximum tip velocity specifications shall be determined by one of the following:
 - A. Flares shall be used that have a diameter of three inches or greater, are non assisted, have a hydrogen content of 8.0 percent by volume or greater and are designed for and operated with an exit velocity less than 37.2 meters per second (122 feet per second) and less than the velocity, Vmax, as determined by Equation 6-6.

Equation 6-6
$$V_{\text{max}} = (X_{H2} - 6.0)x3.9$$

Where:

- Vmax = Maximum permitted velocity, meters per second; and
- X_{H2} = The volume-percent of hydrogen on a wet basis as calculated by using the American Society for Testing and Materials (ASTM) Method D1946-77.

The exit velocity of the flare shall be determined by subsection 5 of this permit condition; or

B. Flares shall be used only when the net heating value of the gas being combusted is 300 British thermal units per standard cubic foot or greater if the flare is steam or air assisted or 200 British thermal units per standard cubic foot or greater if the flare is non assisted. The net heating value of the gas being combusted shall be calculated using Equation 6-7:

Equation 6-7
$$H_T = (1.74 \times 10^{-7}) \sum_{i=1}^{n} C_i H_i$$

Where:

• H_T = Net heating value of the sample, mega joules per standard cubic meter, where the net enthalpy per mole of off gas is based on combustion at 25 degrees Celsius and 760 millimeters mercury, but the standard temperature for determining the volume corresponding to one mole is 20 degrees Celsius;

- C_i = the concentration of methane in the landfill gas, in accordance with 40 CFR §60.754(e), as measured by 40 CFR Part 60, Appendix A, Method 3C. A minimum of three 30-minute Method 3C samples are determined;
- H_i = Net heat of combustion of sample component I, kcal/gram mole at 25 degrees Celsius or less and 760 millimeters mercury. The heats of combustion may be determined using ASTM D2382-76 or 88 or D4809-95 if published values are not available or cannot be calculated.
- 4. The steam assisted and non assisted flares shall be designed for and operated with an exit velocity, as determined by subsection 5 of this permit condition, less than 18.3 meters per second (60 feet per second), except as provided below:
 - A. Steam assisted and non assisted flares designed for and operated with an exit velocity, as determined by subsection 5 of this permit condition, equal to or greater than 18.3 meters per second but less than 122 meters per second (400 feet per second) are allowed if the net heating value of the gas being combusted is greater than 37.3 Mega joules per standard cubic meter (1,000 Btus per standard cubic foot); and
 - B. Steam assisted and non assisted flares designed for and operated with an exit velocity, as determined by subsection 5 of this permit condition, less than the velocity, V_{max} , as determined by Equation 6-8 and less than 122 meters per second are allowed.

Equation 6-8
$$Log_{10}(V_{\text{max}}) = (H_T + 28.3)/31.7$$

Where:

- V_{max} = Maximum permitted velocity, meters per second; and
- H_T = Net heating value as determined by Equation 10-2; and
- 5. The actual velocity of a flare shall be determined by dividing the volumetric flow rate, in units of standard temperature and pressure, as determined by 40 CFR Part 60, Appendix A, Methods 2, 2A, 2C, or 2D as appropriate; by the unobstructed cross sectional area of the flare tip; and
- 6. Air assisted flares shall be designed and operate with an exit velocity less than the velocity, V_{max} , as determined by Equation 6-9.

Equation 6-9
$$V_{\text{max}} = 8.706 + 0.7084xH_T$$

Where:

- V_{max} = Maximum permitted velocity, meters per second; and
- H_T = The net heating value as determined by Equation 10-2.

6.32 Monitoring an open flare.

In accordance with ARSD 74:36:07:41, as referenced to 40 CFR § 60.756(c), the owner or operator that uses an open flare shall install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment:

1. A heat sensing device such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame; and

2. The owner or operator shall install one of the following devices to record flows to or

bypasses of the control device:

A. Install, calibrate, and maintain a gas flow rate measuring device that records the flow to the control device at least every 15 minutes; or

B. Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

Initial performance test for open flare. 6.33

In accordance with ARSD 74:36:07:01, as referenced to 40 CFR § 60.8, the owner or operator that uses an open flare to control nonmethane organic compound emissions shall demonstrate compliance with the visibility limit in permit condition 6.31(1) within 180 days of initial startup of the open flare. In accordance with ARSD 74:36:07:43, as referenced to 40 CFR § 60.752(b)(2)(iii), the owner or operator shall use 40 CFR Part 60, Appendix A, Method 22 to determine visible emissions. The observation period for the visible emission evaluation shall be two hours. The flow rate or bypass flow rate shall be measured during the initial performance test. In addition, the exit velocity shall be determined during the initial performance test.

Initial startup of open flare. 6.34

In accordance with ARSD 74:36:07:01, as referenced to 40 CFR § 60.5, the owner or operator shall notify the Secretary in writing of the initial startup of the open flare. The written notification will identify the facility name, permit number, this permit condition, and the initial startup date of the open flare. The written notification shall be postmarked within 15 days after the initial startup date.

Records maintained for open flares. 6.35

In accordance with ARSD 74:36:07:42, as referenced to 40 CFR § 60.758(c), the owner or operator shall maintain the following records for at least five years:

1. Continuous records of the equipment operating parameters specified to be monitored in

permit condition 6.32;

2. Records of the flame or flare pilot flame monitoring specified in permit condition 6.32 and records of all periods of operation in which the flame or flare pilot flame is absent;

3. Continuous records of the indication of flow to the control device or the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines.

In accordance with ARSD 74:36:07:42, as referenced to 40 CFR § 60.758(b), the owner or operator shall maintain the following data for the life of the open flare as measured during the initial performance test:

- 1. The flare type (i.e., steam assisted, air assisted, or non assisted);
- 2. All visible emission readings;
- 3. Heat content determination;
- 4. Flow rate or bypass flow rate measurements and exit velocity determinations made during the initial performance test: and
- 5. Flame or flare flame monitoring and records of all periods of operations during which the flame of the pilot fame is absent.

Records of the open flare vendor specifications shall be maintained until the removal of the open flare.

6.36 Control system or enclosed combustor specifications.

In accordance with ARSD 74:36:07:37, as referenced to 40 CFR § 60.752(b)(2)(iii)(B), the control system shall meet the following specifications:

- 1. Designed and operated to reduce nonmethane organic compounds by 98 weight percent, or,
- 2. When an enclosed combustion device is used for control to either reduce nonmethane organic compounds by 98 weight percent or reduce the outlet nonmethane organic compound concentration to less than 20 parts per million by volume, dry basis as hexane at three percent oxygen. An enclosed combustor means an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare, boiler, and process heater are considered an enclosed combustor.

If a boiler or process heater is used as the control device, the landfill gas stream shall be introduced into the flame zone.

The control device or enclosed combustor shall be operated within the parameter ranges established during the initial or most recent performance test.

6.37 Monitoring an enclosed combustor.

In accordance with ARSD 74:36:07:41, as referenced to 40 CFR § 60.756(b), the owner or operator that uses an enclosed combustor shall calibrate, maintain, and operate according to the manufacturer's specifications, the following equipment:

- 1. A temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of plus or minus one percent of the temperature being measured expressed in degrees Celsius or plus or minus 0.5 degrees Celsius, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity equal to or greater than 44 megawatts;
- 2. A device that records flow to or bypass of the control device. The owner or operator shall either:

- A. Install, calibrate, and maintain a gas flow rate measuring device that records the flow to the enclosed combustor at least every 15 minutes; or
- B. Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

6.38 Initial performance test for enclosed combustors.

In accordance with ARSD 74:36:07:37, as referenced to 40 CFR § 60.752(b)(2)(iii)(B) and 40 CFR § 60.754(d), the owner or operator shall demonstrate compliance with the enclosed combustor specifications within 180 days of initial startup of the enclosed combustor. The owner or operator shall use 40 CFR Part 60, Appendix A, Method 25, 25C, or 18 to determine compliance with the 98 weight percent efficiency or 20 parts per million by volume outlet concentration level unless another method to demonstrate compliance has been approved by the Secretary. The owner or operator shall use 40 CFR Part 60, Appendix A, Method 3 or 3A to determine oxygen for correcting the nonmethane organic compound concentration as hexane to three percent. In cases where the outlet concentration is less than 50 parts per million nonmethane organic compound as carbon (8 parts per million nonmethane organic compound as hexane), 40 CFR Part 60, Appendix A, Method 25A should be used in place of 40 CFR Part 60, Appendix A, Method 25. If using 40 CFR Part 60, Appendix A, Method 18, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air pollutant emission Factors (AP-42). Equation 6-10 shall be used to calculate the efficiency.

Equation 6-10 $Control Efficiency = (NMOC_{in} - NMOC_{out})/(NMOC_{in})$

Where:

- NMOC_{in} = mass of nonmethane organic compound entering control device; and
- NMOC_{out} = mass of nonmethane organic compound exiting control device.

6.39 <u>Initial startup of enclosed combustor.</u>

In accordance with ARSD 74:36:07:01, as referenced to 40 CFR § 60.5, the owner or operator shall notify the Secretary in writing of the initial startup of the enclosed combustor. The written notification will identify the facility name, permit number, this permit condition, and the initial startup date of the enclosed combustor. The written notification shall be postmarked within 15 days after the initial startup date.

6.40 Records maintained for enclosed combustors.

In accordance with ARSD 74:36:07:42, as referenced to 40 CFR § 60.758(c) and (e), the owner or operator shall maintain the following records for at least five years:

- 1. Continuous records of the equipment operating parameters specified to be monitored in permit condition 6.37;
- 2. Continuous temperature records for periods of operation during which the parameter boundaries established for an enclosed combustor during the most recent performance

test are exceeded. An exceedance is all 3-hour block average periods of operation during which the average combustion temperature was more than 28 degrees Celsius below the average combustion temperature during the most recent performance test at which compliance with the control system specifications were demonstrated. Continuous temperature records are not required for a boiler or process heater with a designed heat input capacity of 44 megawatts or greater;

- 3. For boilers and process heaters, any change to the location at which the vent stream is introduced into the flame zone;
- 4. Continuous records of the indication of flow to the enclosed combustor or the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines; and
- 5. If a boiler or process heater with a designed heat input capacity of 44 megawatts or greater is used to control nonmethane organic compound emissions, the owner or operator shall maintain records of the boiler's or process heater's operating rate during all periods of operation of the boiler or process heater.

In accordance with ARSD 74:36:07:42, as referenced to 40 CFR § 60.758(b), the owner or operator shall maintain the following data for the life of the enclosed combustor as measured during the initial performance test:

- 1. For enclosed combustors and boilers and process heaters with a design heat input capacity less than 44 megawatts, the average combustion temperature during the performance test, measured at least every 15 minutes and average over the same time period of the performance test;
- 2. The percent reduction of nonmethane organic compounds achieved by the enclosed combustor as determined in permit condition 6.38; and
- 3. A description of the location at which the collected gas vent stream is introduced into the boiler or process heater during the initial performance test.

Records of the enclosed combustor vendor specifications shall be maintained until the removal of the control device.

6.41 Surface emission monitoring limit.

In accordance with ARSD 74:36:07:39, as referenced to 40 CFR § 60.753(d), the owner or operator of a gas collection and control system shall operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator shall conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route, and the rationale for any site-specific deviations from the 30 meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.

6.42 Surface emission monitoring specifications.

In accordance with ARSD 74:36:07:40, as referenced to 40 CFR § 60.755(d), surface emission monitoring equipment shall meet the following instrumentation specifications and procedures:

1. The portable analyzer shall meet the instrument specifications provided in section 3 of 40 CFR Part 60, Appendix A, Method 21, except that "methane" shall replace all reference to volatile organic compound;

2. The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per

million in air;

3. To meet the performance evaluation requirements in section 3.1.3 of 40 CFR Part 60, Appendix A, Method 21, the instrument evaluation procedures of section 4.4 of 40 CFR Part 60, Appendix A, Method 21shall be used; and

4. The calibration procedures provide in section 4.2 of 40 CFR Part 60, Appendix A, Method 21 shall be followed immediately before commencing a surface monitoring

survey.

6.43 Surface emission monitoring.

In accordance with ARSD 74:36:07:40, as referenced to 40 CFR § 60.755(c) and § 60.756(f), the following procedures shall be used for monitoring and determining compliance with the surface methane operational standard:

1. After installation of the collection system, the owner or operator shall monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals or a site-specific established spacing for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specification in permit condition 6.42;

2. The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the

perimeter wells;

3. Surface emission monitoring shall be performed in accordance with section 4.3.1 of 40 CFR Part 60, Appendix A, Method 21, except that the probe inlet shall be placed within five to 10 centimeters of the ground. Monitoring shall be performed during typical meteorological conditions;

4. Any reading of 500 parts per million or more above background at any location shall be recorded as a monitored exceedance and the actions specified below shall be taken. As long as the actions specified below are taken, the exceedance is not considered a violation

of this permit:

A. The location of each monitored exceedance shall be marked and the location recorded:

B. Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within 10 calendar days of detecting the exceedance;

- C. If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again with 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in subsection 4(E) of this permit condition shall be taken. No further monitoring of that location is required until the action specified in subsection 4(E) of this permit condition is taken;
- D. Any location that initially showed an exceedance but has a methane concentration less than 500 parts per million above background at the 10-day re-monitoring specified in subsection 4(B) or 4(C) of this permit condition shall be re-monitored one month from the initial exceedance. If the 1-month re-monitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month re-monitoring shows an exceedance, the action specified in subsection 4(C) or 4(E) of this permit condition shall be taken; and
- E. For any location where monitored methane concentration equals or exceeds 500 parts per million above background three times within a quarterly period, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Secretary for approval; and
- 5. The owner or operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

The first quarterly monitor surface testing shall occur during the quarter in which the gas collection system was activated. Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane readings of 500 parts per million or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

6.44 Closure notification.

In accordance with ARSD 74:36:07:42, as referenced to 40 CFR § 60.757(d), the owner or operator shall submit a closure report within 30 days of waste acceptance cessation. Once a closure report has been submitted, no additional waste may be placed in the landfill without submitting an application to modify this permit 60 days before adding waste to the landfill.

6.45 Capping collection and control system.

In accordance with ARSD 74:36:07:34, as referenced to 40 CFR § 60.752(b)(2)(v), the owner or operator may cap or remove the collection and control system provided the following requirements are met:

- 1. The landfill shall be a closed landfill and a closure notification has been submitted;
- 2. The collection and control system shall have been in operation a minimum of 15 years; and

3. The calculated nonmethane organic compound gas produced by the landfill shall be less than 50 megagrams per year on three successive test dates. The test dates shall be no less than 90 days apart and no more than 180 days apart.

6.46 Calculating nonmethane organic compound gas production rate.

In accordance with ARSD 74:36:07:34, as referenced to 40 CFR § 60.754(b), the owner or operator shall calculate the nonmethane organic compound gas production rate for purposes of determining when the collection and control system can be removed. The calculation shall be based on Equation 6-11.

Equation 6-11

$$M_{NMOC} = 1.89 \times 10^{-3} Q_{LFG} C_{NMOC}$$

Where:

- M_{NMOC} = mass emission rate of nonmethane organic compounds, megagrams per year;
- Q_{LFG} = flow rate of landfill gas, cubic meters per minute; and
- C_{NMOC} = nonmethane organic compound concentration, parts per million by volume as hexane.

The flow rate of landfill gas shall be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control device using a gas flow measuring device calibrated according to the provisions of section 4 of 40 CFR Part 60, Appendix A, Method 2E. The average nonmethane organic compound concentration shall be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate removal equipment using the procedures in 40 CFR Part 60, Appendix A, Method 25C or 18. If using 40 CFR Part 60, Appendix A, Method 18, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air pollutant emission Factors (AP-42). The sample location on the common header pipe shall be before any condensate removal or other gas refining units. The landfill owner or operator shall divide the nonmethane organic compound concentration from 40 CFR Part 60, Appendix A, Method 25C by six to convert from nonmethane organic compound concentration as carbon to hexane. The owner or operator may use another method to determine landfill gas flow rate and nonmethane organic compound concentration after receiving written approval from the Secretary.

6.47 Control equipment removal notification.

In accordance with ARSD 74:36:07:42, as referenced to 40 CFR § 60.757(e), the owner or operator shall submit an equipment removal report within 30 days prior to removal or cessation of operation of the control equipment. The equipment removal report shall contain the following:

- 1. A copy of the closure notification;
- 2. A copy of the initial performance test report, which demonstrates that the 15 year minimum control period has expired; and
- 3. Dated copies of three successive nonmethane organic compound emission rate reports demonstrating that the landfill is no longer producing 50 megagrams or greater of nonmethane organic compounds per year.

6.48 Permit termination.

In accordance with ARSD 74:36:07:34, as referenced to 40 CFR § 60.752(d), when the municipal solid waste landfill is closed, the owner or operator is no longer subject to the requirement to maintain this permit if the landfill meets one of the following conditions:

- 1. The landfill never met the requirement to install a collection and control system; or
- 2. The owner or operator has capped or removed the collection and control system.

To terminate this permit, the owner or operator must submit a copy of the closure notification and include the appropriate documentation that demonstrates that the landfill meets one of the above conditions.

7.0 PERFORMANCE TESTS

7.1 Performance test may be required.

In accordance with ARSD 74:36:11:02, the Secretary may request a performance test during the term of this permit. A performance test shall be conducted while operating the unit at or greater than 90 percent of its maximum design capacity, unless otherwise specified by the Secretary. A performance test conducted while operating less than 90 percent of its maximum design capacity will result in the operation being limited to the percent achieved during the performance test. The Secretary has the discretion to extend the deadline for completion of performance test required by the Secretary if circumstances reasonably warrant but will not extend the deadline past a federally required performance test deadline.

7.2 Test methods and procedures.

In accordance with ARSD 74:36:11:01, the owner or operator shall conduct the performance test in accordance with 40 CFR Part 60, Appendix A, 40 CFR Part 63, Appendix A, and 40 CFR Part 51, Appendix M. The Secretary may approve an alternative method if a performance test specified in 40 CFR Part 60, Appendix A, 40 CFR Part 63, Appendix A, and 40 CFR Part 51, Appendix M is not federally applicable or federally required.

7.3 Representative performance test.

In accordance with ARSD 74:36:07:01, as referenced to 40 CFR § 60.8(c), performance tests shall be conducted under such conditions as the Secretary shall specify to the owner or operator based on the representative performance of the unit being tested. The owner or operator shall make available to the Secretary such records as may be necessary to determine the conditions of the performance tests. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a performance test nor shall emissions in excess of the level of the applicable emission limit during periods of startup, shutdown, and malfunction be considered a violation of the applicable emission limit unless otherwise specified in this permit.

7.4 Submittal of test plan.

In accordance with ARSD 74:36:11:01, the owner or operator shall submit the proposed testing procedures to the Secretary at least 30 days prior to any performance test. The Secretary will notify the owner or operator if the proposed test procedures are approved or denied. If the proposed test procedures are denied, the Secretary will provide written notification outlining what needs to be completed for approval.

7.5 Notification of test.

In accordance with ARSD 74:36:07:01, as referenced to 40 CFR § 60.8(d), the owner or operator shall notify the Secretary at least 30 days prior to the start of a performance test to afford the Secretary the opportunity to have an observer present. If there is a delay in conducting the scheduled performance test, the owner or operator shall notify the Secretary as soon as possible of any delay in the original test date, either by providing at least 7 days prior notice of the rescheduled date of the performance test, or by arranging a rescheduled date with the Secretary by mutual agreement.

7.6 Performance test report.

In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall submit a performance test report to the Secretary within 60 days after completing the performance test or by a date designated by the Secretary. The performance test report shall contain the following information:

1. A brief description of the process and the air pollution control system being tested;

2. Sampling location description(s);

- 3. A description of sampling and analytical procedures and any modifications to standard procedures;
- 4. Test results represented in the same terminology as the permit limits;

5. Quality assurance procedures and results;

- 6. Records of operating conditions during the test necessary for demonstrating compliance with the permit limits, preparation of standards, and calibration procedures;
- 7. Raw data sheets for field sampling and field and laboratory analyses;

8. Documentation of calculations;

- 9. All data recorded and used to establish parameters for compliance monitoring; and
- 10. Any other information required by the test method.

8.0 Flare Operational Requirements

8.1 Flare operational limits

In accordance with ARSD 74:36:20:15(9), as referenced to 40 CFR § 60.18(c), (e), (f), the owner or operator shall design and operate the flare as follows:

1. The flare shall be steam-assisted, air-assisted, or non-assisted;

- 2. The flare shall be designed and operated with no visible emissions as determined by permit condition 8.2, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours;
- 3. The flare shall be operated with a flame present at all times as determined by permit condition 8.3 when air emissions are vented to the flare;
- 4. For a non-assisted flare, the owner or operator shall adhere to one of the following:
 - a. The flare shall have a diameter of 3 inches or greater, have a hydrogen content of 8.0 percent by volume or greater and designed and operated with an exit velocity less than 37.2 meters per second (122 feet per second) and less than the maximum permitted velocity as determined by permit condition 8.7. The actual exit velocity of the flare shall be determined by permit condition 8.5; or
 - b. The flare shall be used only with the net heating value of the gas being combusted being 7.45 Mega Joules per standard cubic meter (200 Btus per standard cubic foot) or greater. The net heat value shall be determined by permit condition 8.4; and
 - c. The flare shall be designed for and operated with an exit velocity, as determined by permit condition 8.5, less than 18.3 meters per second (60 feet per second), except as provided as follows:
- i. The flare shall be designed for and operated with an exit velocity, as determined by permit condition 8.5, equal to or greater than 18.3 meters per second (60 feet per second) but less than 122 meters per second (400 feet per second) if the net heating value of the gas being burned is greater than 37.3 Mega Joules per standard cubic meter (1,000 Btus per standard cubic foot); or
- ii. The flare shall be designed for and operated with an exit velocity, as determined by permit condition 8.5, less than permitted maximum velocity, as determined by permit condition 25.8, and less than 122 meters per second (400 feet per second);
- 5. For a steam-assisted or air-assisted flare, operate only with the net heating value of the gas being combusted being 11.2 Mega Joules per standard cubic meter (300 Btus per standard cubic foot) or greater. The net heating value shall be determined by permit condition 8.4;
- 6. For a non-assisted or steam-assisted flare, operate with an exit velocity of 18.3 meters per second (60 feet per second) or greater as determined by permit condition 8.5 with the following two exceptions:
 - a. The exit velocity is greater than 18.3 meters per second (60 feet per second) but less than 122 meters per second (400 feet per second) and the gas being burned is greater than 37.3 Mega Joules per standard cubic meter (1,000 Btus per standard cubic foot).
 - b. The exit velocity is less than the maximum permitted velocity as determined by permit condition 25.8 and less than 122 meters per second (400 feet per second); and
- 7. For air-assisted flares, the flare shall be designed and operated with an exit velocity as determined by permit condition 8.5 less than the maximum permitted velocity as determined by permit condition 8.6.

8.2 Monitoring visible emissions

In accordance with ARSD 74:36:20:15(9), as referenced to 40 CFR § 60.18(f)(1), the owner or operator shall monitor the visible emissions from the flare in accordance with 40 CFR Part 60, Appendix A, Method 22.

8.3 Monitoring for a flame

In accordance with ARSD 74:36:20:15(9), as referenced to 40 CFR § 60.18(f)(2), the owner or operator shall monitor the presence of a pilot flame for the flare using a thermocouple or any other equivalent device to detect the presence of a flame.

8.4 Monitoring net heating value

In accordance with ARSD 74:36:07:01, as referenced to 40 CFR § 60.18(f)(3), the owner or operator shall monitor the net heating value of the gas being combusted by using Equation 8-1.

Equation 8-1 - Calculating net heating value of gas

$$H_{t} = K \sum_{i=1}^{n} C_{i} H_{i}$$

Where:

- H_t = Net heating value of the sample, in mega joules per standard cubic meters;
- C_i = Concentration of sample component I, in parts per million on a wet basis;
- H_i = Net heat of combustion of sample component I, in kilocalories per gram mole at 25 degrees Celsius and 760 millimeters of mercury; and
- K = Constant of 0.000000174 gram mole-mega joules per part per million standard cubic meters kilocalorie.

8.5 Determining actual exit velocity

In accordance with ARSD 74:36:20:15(9), as referenced to 40 CFR § 60.18(f)(4), the owner or operator shall determine the actual exit velocity by dividing the volumetric flow rate (in units of standard temperature and pressure) as determined by 40 CFR Part 60, Appendix A, Methods 2, 2A, 2C or 2D, as appropriate, by the unobstructed (free) cross sectional area of the flare tip.

8.6 Monitoring maximum permit velocity for air-assisted flares

In accordance with ARSD 74:36:20:15(9), as referenced to 40 CFR § 60.18(f)(6), the owner or operator shall monitor the maximum permit velocity for air-assisted flares using Equation 8-2.

Equation 8-2 – Calculating maximum permit velocity for air-assisted flares $V_{\rm max} = 8.706 + (0.7084)(H_{\rm t})$

Where:

- $V_{max} = Maximum permit velocity; and$
- H_T = Net heating value as determined by permit condition 8.4.

8.7 Determining maximum permit velocity for non-assisted flares

In accordance with ARSD 74:36:20:15(9), as referenced to 40 CFR § 60.18(c)(3)(i)(A), the maximum permit velocity for non-assisted flares shall be determined using Equation 8-3.

Equation 8-3 - Calculating maximum permit velocity for non-assisted flares

$$V_{\text{max}} = (X_{H2} - K_1)(K_2)$$

Where:

- V_{max} = Maximum permit velocity, in meters per second;
- X_{H2} = Volume percent of hydrogen on a wet basis as calculated using American Society for Testing and Materials (ASTM) Method D1946-77;
- K_1 = Constant, 6.0 volume percent hydrogen; and
- K_2 = Constant, 3.9 meters per second per volume percent hydrogen.

8.8 Determining maximum permit velocity for non-assisted flares

In accordance with ARSD 74:36:20:15(9), as referenced to 40 CFR § 60.18(f)(5), the owner or operator shall determine the maximum permit velocity for non-assisted flares complying with subparagraph (4)(c)(ii) using Equation 8-4.

Equation 8-4 - Calculating maximum permit velocity for non-assisted flares

$$Log_{10}(V_{\text{max}}) = \frac{(H_t + 28.8)}{31.7}$$

Where:

- V_{max} = Maximum permit velocity, in meters per second;
- 28.8 = Constant;
- 31.7 = Constant; and
- H_T = Net heating value as determined by permit condition 8.4.

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