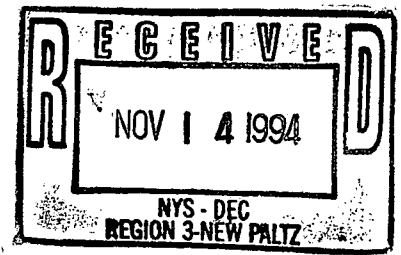


**POST-CLOSURE MONITORING AND
FACILITY MAINTENANCE MANUAL**

FOR THE

**TOWN OF GARDINER LANDFILL
TOWN OF GARDINER, ULSTER COUNTY, NEW YORK**



PREPARED FOR:

**TOWN OF GARDINER
95 MAIN STREET
P.O. BOX 1
GARDINER, NEW YORK 12525**

PREPARED BY:

**MORRIS ASSOCIATES
ENGINEERING CONSULTANTS
367 VIOLET AVENUE
POUGHKEEPSIE, NEW YORK 12601**

PROJECT NO. 30114.00

**AUGUST 1993
REVISED OCTOBER 1994**



TABLE OF CONTENTS

<u>DESCRIPTION</u>	<u>PAGE</u>
I. <u>INTRODUCTION</u>	1
II. <u>MAINTENANCE OF THE SITE</u>	2
A. <u>DRAINAGE STRUCTURES</u>	2
B. <u>COVER SYSTEM</u>	2
C. <u>GAS VENTING SYSTEM</u>	2
D. <u>VECTORS</u>	3
E. <u>OTHER FACILITIES AND STRUCTURES</u>	3
F. <u>INSPECTION REPORTS</u>	3
III. <u>ENVIRONMENTAL MONITORING PLAN</u>	4
A. <u>MONITORING POINTS</u>	4
1. Groundwater Monitoring Points	4
2. Surface Water Monitoring	5
B. <u>SAMPLING SCHEDULE</u>	5
C. <u>SAMPLING PROCEDURES</u>	5
1. Pre-Sampling Procedures	5
2. Groundwater Sample Collection	6
a) Well Evacuation	6
b) Sampling	8
c) Record Keeping	8
3. Equipment Decontamination	9
4. Equipment List	9
5. Sample Preservation and Chain of Custody	10
D. <u>ROUTINE AND BASELINE ANALYSIS TABLE</u>	11
E. <u>DATA REPORTING</u>	11
F. <u>POST-CLOSURE EXPLOSIVE GAS MONITORING</u>	12
1. Monitoring Points	12
2. Monitoring Conditions	12
3. Monitoring Procedures	12
4. Data Reporting	13

I. INTRODUCTION

This Post-Closure Monitoring and Facility Maintenance Manual has been prepared in conformance with 6 NYCRR Part 360- Solid Waste Management Facilities and the Order on Consent for the facility. This Manual describes the tasks necessary for maintenance of the site, periodic inspections and the monitoring of groundwater and explosive gas migration at the facility. This Manual will be used by municipal or contracted personnel as a guide for maintenance and facility monitoring for a minimum of thirty (30) years from the date of completion of closure construction.

In general, the following is required:

- Positive drainage away from the landfill mound shall be maintained to prevent ponding on and erosion of the cover.
- Soil cover integrity, slopes, cover vegetation, drainage structures and gas venting structures shall be maintained during the post-closure maintenance period.
- Environmental monitoring points must be maintained and sampled during the post-closure monitoring period. Annual summary and quarterly water quality reports shall be submitted to the New York State Department of Environmental Conservation (NYSDEC). Baseline and routine monitoring alternating on a semi-annual basis shall be performed on groundwater for a minimum period of four (4) years during the "contingency" post-closure monitoring period. The results of the monitoring will be reviewed with NYSDEC after this period to determine the effectiveness of the closure construction.
- Post-closure explosive gas monitoring will be affected quarterly, performed coincident with the groundwater monitoring, to monitor migration of explosive gases away from the "footprint" of the facility.
- A vegetative cover shall be established and maintained on all exposed final cover material within four (4) months after initial installation and/or repair; or adequate erosion control measures shall be taken to ensure the integrity of the final cover system.

OCTOBER 1994

II. MAINTENANCE OF THE SITE

During the first year after completion of closure construction, monthly inspections shall be performed on the facility to ensure that deficiencies with the cover, drainage structures and gas vents shall not occur.

A. DRAINAGE STRUCTURES

The inspections shall include visual checks of all culverts, rip-rap, swales, and berms/benches to ensure erosion problems are not occurring. Any problems associated with these shall be repaired immediately and restored to "new" condition. Eroded soil or displaced rip-rap shall be replaced. Exposed soil shall be reseeded, fertilized, and mulched.

B. COVER SYSTEM

Areas of concern with the cover system shall include erosion, loss of vegetative cover, settlement or cracking on the top or side slopes and vegetation "burn-out". If cracks or settlement occur, the inspector shall determine if the barrier layer is affected through excavation and visual inspection. Excavation shall be done, by hand, to prevent damage to the barrier layer and to allow for visual inspection. If the barrier layer has been damaged, it shall be repaired prior to replacing cover soils.

After repair, cover soils shall be replaced as per Specifications. Twenty-four inches (24") of barrier protection layer shall be followed by six inches (6") of vegetative support layer soil. Repaired areas shall be reseeded, fertilized and mulched. Vegetated cover shall be established within four (4) months from the date of repair or appropriate erosion control measures shall be instituted.

C. GAS VENTING SYSTEM

Visual inspections of the gas vents shall be performed. The inspector shall check for plugged vents and/or settlement around the vents. Minor settlement may be filled in with vegetative support layer soil an elevation higher than the surrounding area to facilitate drainage away from the vent and to avoid ponding.

Major settlement (greater than one foot (1') in depth) shall require additional investigation. The area around the gas vent shall be excavated down to the barrier layer. Any damage to the barrier layer shall be repaired in a manner similar to the cap repair outlined in subsection B above. Cover soils around the vents shall be replaced to an elevation above the surrounding soil to ensure drainage away from the vent is maintained.

Sensory inspections should be done on each vent to ensure that the vents are functioning properly. The inspector shall stand at least ten feet (10') away from the vent and focus on the discharge end of the vent. If gas is venting, gas "waves" will refract the light around the vent (similar to heat waves rising from a road surface in summer). Inspector should then stand approximately twenty five feet (25') downwind of the vent in order to determine if a methane gas odor can be detected. If no gas "waves" or odor are detected, the inspector shall inspect the vent for clogs or plugs and remove any located.

OCTOBER 1994

Any damaged vents shall be repaired by cutting out the damaged section with a hand saw or other appropriate means and replacing with two PVC couplings, one at each end of the repaired areas, and new piping. Severely damaged vents shall be replaced as per original Construction Specifications.

D. VECTORS

The presence of any vectors (i.e. groundhogs, woodchucks, skunks, burrowing rodents, etc.) on the mound and surrounding site shall be determined. If present and the cover system integrity is jeopardized, extermination or removal treatment using a pest control agency shall be implemented.

E. OTHER FACILITIES AND STRUCTURES

All monitoring well casings, locks, fences, gates and pipes shall be inspected to ensure that they are undamaged and functional. All damages shall be repaired immediately and all structures should be re-secured.

F. INSPECTION REPORTS

After each inspection, a report shall be prepared and submitted to the Town of Gardiner. Information about the inspection shall include the date and time of the inspection, personnel conducting the inspection, visual observations of the inspector(s), a list of items inspected and a brief description of any repair work including the nature of the damage, the repairs completed, and the estimated cost of the repairs. Also, any items that may need future attention or repairs not completed during the inspection, along with any other comments should be included. The inspection reports shall be copied and submitted to the New York State Department of Environmental Conservation, Region 3, Division of Solid Waste.

III. ENVIRONMENTAL MONITORING PLAN

A. MONITORING POINTS

1. Groundwater Monitoring Points

Eight (8) monitoring wells are presently being utilized to monitor the Town of Gardiner Landfill. These wells were installed in 1990. The location of the wells are shown on the existing Site Plan. (The abandonment procedures used for these wells to be utilized in abandoning future unserviceable wells, includes: removal and appropriate disposal of the steel guard and PVC casing pipes, well screens and backfitting/plugging the bore hole.)

Three (3) new wells will be installed subsequent to the completion of closure construction. A new well couplet (DG-4/DG-4A) will be installed within fifty feet (50') of the completed cap between existing wells DG-2/DG-2A and the cap. A new shallow well DG-5A will be installed within fifty feet (50') of the completed cap and located between existing well DG-3/DG-3A and the completed cap. The proposed location of these wells are shown on the construction drawings of the Closure Plan. Detailed installation methods for these wells are proposed within the Closure Plan.

Downgradient wells DG-1 and DG-2 will be removed and abandoned due to high pH and inadequate recharge capability. Downgradient wells DG-1A, DG-4, DG-4A and DG-5A and upgradient wells UG-1 and UG-1A will be used in the post-closure groundwater monitoring program. Downgradient wells DG-2A, DG-3 and DG-3A will remain as contingency wells to be sampled if downgradient wells (DG-4, DG-4A or DG-5A) detect leachate indicators during post-closure monitoring.

The six (6) wells noted will be sampled for "baseline" and "routine" parameters on a semi-annual basis during a four (4) year "contingency" post-closure monitoring period to track the performance of the capped facility. A down trending of leachate indicators over this four year period will evidence the effectiveness of the cap construction and may warrant a reduced scope of monitoring at the end of this four year period. A failure to reduce the leachate indicators as monitored will evidence the need for contingency measures (i.e. - toe drain installation, upgradient groundwater diversion, etc.) to be designed, if necessary, and installed at locations as determined through a review of the four years of data.

2. Surface Water Monitoring

The Wallkill River was sampled during the preparation of the Subsurface Investigation Report (SIR), however, the use of the analytic results is dubious, therefore, there is no surface water monitoring included in the present scope of monitoring nor is there any proposed for the post-closure period of the facility.

B. SAMPLING SCHEDULE

Sampling shall be performed quarterly, once for "baseline" parameters and once for "routine" parameters alternating on a semi annual basis for four (4) years. The baseline sampling event shall be rotated quarterly (i.e. - first quarter "baseline" during the first year, second quarter "baseline" during the second year, etc.), with one round performed every other quarter. This sampling schedule shall take place for an initial minimum period of four (4) years. At the end of this four year period, the Town and the NYSDEC shall evaluate the test results to date and determine if the schedule should be modified, discontinued, or left in place for a defined time frame at which time the testing results will again be evaluated.

C. SAMPLING PROCEDURES

Laboratory personnel shall carry out the procedures consistent with groundwater sampling taken at contracted facilities. Modification of protocols shall only be accomplished upon written approval of the director of the contracted laboratory and the NYSDEC, Division of Solid Waste, Region 3. The laboratory shall ensure that all personnel are technically competent and fully trained and certified for such work and shall ensure that all equipment required for these protocols is of the best available technology and appropriate for their task and properly maintained to the manufacturer's specifications.

1. Pre-Sampling Procedures

A Field Service Supervisor shall assign a sampling team of at least two (2) people to carry out the contracted work and establish a date and time agreeable with the NYSDEC Division of Solid Waste Region 3 and the Owner.

The sampling team shall be responsible for the following:

- a) Assemble and inspect all field equipment necessary for sample collection and ensure that it is clean and free of contaminants and in good working order.
- b) Ensure a good stock of all necessary items.
- c) Calibrate all equipment to manufacturing specifications.

- d) Establish a list and prepare bottles that will ensure the integrity of all groundwater samples for analysis. Sample shipping containers shall be clean and contaminant free and contain ice or freezer packs adequate to keep the samples at 4°C until the samples reach the laboratory. All bottles will be packed to prevent breakage during transportation.
- e) The exact location and proper identification of each well shall be known by the sampling team or established with a representative of the NYSDEC, Region 3, Division of Solid Waste.
- f) Schedule travel, well evacuation and sampling for the day.
- g) Arrange for proper collection of evacuated water and cleaning fluids if necessary.

2. Groundwater Sample Collection

a) Well Evacuation

Well Opening

Upon arrival the sampling team shall examine the well for any damage or tampering. They shall report any problems to the lab director who will notify the NYSDEC, Division of Solid Waste, Region 3.

Overgrowth of vegetation shall be removed or reported to the site manager. No anti-rust agents or chemicals shall be used on or near any part of the well.

It is advised that well caps be tapped slightly before opening as a check for wasp or bee nesting. At no time shall the use of insecticides be permitted around or near any part of the well.

The escaping gas from the well may be sampled with hazardous gas screening equipment such as Organic Vapor Analyzer or Combustible Gas meters, at the discretion of the sampling team or upon contracted agreement with the NYSDEC Division of Solid Waste Region 3.

The need for respiratory equipment and evacuated water treatment shall be the responsibility of the sampling team.

Any hazardous gas readings shall be reported to the lab director and noted in the field reports.

All foreign matter such as rain water, dirt or debris shall be cleared to prevent anything from dropping into the well.

Gloves appropriate for the protection of the sampling team shall be used and changed as needed and before sampling to prevent cross-contamination of the wells and samples.

Water Level Determination

All water level measurements shall be taken from the top of the well casing.

Care shall be taken so as not to confuse the security casing (typically steel) with the well casing (typically PVC) and accurate field notes shall be kept that reflect the upper level reference point.

Water level meters with electronic indicators and accurate to one hundredth of one foot (.01') or one eighth of an inch (1/8") and shall measure the distance between the top of the well casing and the top of the standing or static water level.

The well shall be sounded and the volume of water determined using Table 1.

The Water Level Indicator shall be decontaminated before it is used again.

Well Evacuation

Each monitoring well shall be evacuated and sampled using a dedicated bailer. Sampling shall be conducted from the upgradient wells UG-1 and UG-1A to the downgradient wells (DG-1A, DG-4, DG-4A, and DG-5A) in order to minimize any potential cross-contamination.

Any free product or sheening of immiscible products shall be reported to the lab director and noted in field reports. The presence of these contaminants may alter analysis and stop further sampling of the well. All evacuated water shall be properly disposed of as previous test result quality warrants.

Under some conditions the evacuated waste may be returned to the groundwater as surface runoff, within twenty-five (25) meters of the well after all sampling is complete, if it is established that the practice will not significantly alter the volume or composition of the surface runoff, percolation rate or leachate of the groundwater.

Under normal conditions the wells shall be evacuated for four (4) volumes of standing water. Wells may be evacuated five (5) volumes on agreement with the contracted facility. Wells may be evacuated using teflon bailers with teflon coated bailer wires, or submersible pumps. Wells that are less than twenty-five feet (25') in depth may be evacuated with peristaltic pumps and dedicated polyethylene tubing.

OCTOBER 1994

Wells which recover slowly and will not regenerate beyond the screen level in less than four (4) volumes of evacuated water are considered "Dry Wells". "Dry Wells" are evacuated to screen level twice after regeneration to within one foot (1') of their original static water levels.

Wells will be evacuated so as to avoid the agitation of the bottom sediments at a rate which matches the regeneration rate of the well. Wells are checked for water column height before, during and after evacuation. Wells are evacuated well enough in advance of the sampling to ensure the full recovery of the well to within six inches (6") of the standing water level at the time of sampling. Wells are evacuated to beyond the screen level only if the analysis doesn't call for the sampling of volatile compounds.

b) Sampling

Sampling begins when the well has been properly evacuated and allowed to recover to within six (6") inches of its original static. Sampling bottles are individually numbered and labeled for location, date, time, sampler's name, analysis intended, and preservatives. Teflon bailers with teflon coated wire are used for sampling.

The first bailer full of water is used as a rinse. The second bailer full of water is used for pH, temperature and conductivity readings. The pH, temperature and conductivity readings are checked again after all sampling is complete to evaluate changes of the analyte.

Volatile samples are collected first, followed by TOX organic samples, metals and the remainder of the containers are filled in an order that remains consistent for subsequent wells.

Samples are immediately sorted in coolers, packed with ice and returned to the laboratory without ever leaving the custody of the sampling team. Custody seals are used if shipping is needed.

c) Record Keeping

The sampling team will keep written record of the following:

- Day of week, date times of evacuation and sampling
- Weather conditions
- Conditions of the well (damage, foliage, outside interference, atmospheric, etc.)
- Readings of Air Monitoring Devices (if taken)
- Names of sampling teams members
- Methods of evacuation
- Water levels before, during, and after evacuation

- Depth to bottom of well (soundings)
- Physical properties of evacuated water (immiscible layers, color turbidity)
- Decontamination and cleaning procedures for well equipment used at more than one well
- Sample label information
- Complete Chain of Custody papers which contain all the information on the sample label and the samplers signature. The signature of anyone at the Landfill involved with the sampling, the time and condition of the bottles as they arrived at the laboratory and the signature of the person at the laboratory responsible for their custody.

3. Equipment Decontamination

Decontamination of equipment can be done both in the laboratory and field. Although, with groundwater sampling equipment, decontamination should be done in the laboratory and dedicated to a sampling point on that day of sampling. Other equipment used shall be cleaned in the field. The field sampling equipment cleaning and decontamination is as follows:

- a) Non-phosphate detergent plus tap water wash to remove visible particulates and oils and grease.
- b) Tap water rinse.
- c) Distilled/de-ionized water rinse.
- d) 10% Nitric acid rinse (diluted with DI Water) only if samples are being analyzed for metals.
- e) Deionized/distilled water rinse (if nitric acid rinse).
- f) Acetone (pesticide grade) rinse only if samples are being analyzed for organics.
- g) Total air dry or pure nitrogen blow out.
- h) Distilled/de-ionized water rinse.

4. Equipment List

Groundwater Sampling

Equipment used for groundwater sampling generally falls into two categories; evacuation of well casing and collection of sample.

Equipment for evacuation can include:

- Teflon bailer (bottom fill) with teflon wire
- Stainless steel bottom fill bailer with teflon wire
- Submersible pump
- Centrifugal/Diaphragm pump
- Bladder pump

Some evacuation equipment can also be used for sampling but must be dedicated to each well or have tubing dedicated for use in only one well.

Equipment for sample collection are included in the following list:

- *Teflon bottom fill bailer with teflon wire
- *Stainless steel bottom fill bailer with teflon wire
- Peristaltic pump
- Syringe sampler
- Bladder pump

NOTE: *most often used for sampling

In addition to evacuation and sampling equipment, other equipment is also necessary for a groundwater sampling project:

- Water level indicator (Electric depth meter)
- Preservatives as needed
- Ice and/or ice packs
- Field instrumentation (photovac tip, OVA, NHa, etc.)
- Field and trip blanks
- Field notebook
- Chain of custodies/field sheets
- Custody seals
- Sample labels
- Tool box
- Keys to wells
- Appropriate personal safety attire and equipment

5. Sample Preservation and Chain of Custody

To ensure sample integrity during transportation from the facility to the laboratory, the guidelines for preservatives containers and maximum holding times are shown in Table 2 should be observed:

The information below should be included on the chain of custody report which accompanies all samples:

- Project name
- Sample locations
- Number and type of containers
- Name of person(s) maintaining custody
- Dates of possession

OCTOBER 1994

D. ROUTINE AND BASELINE ANALYSIS TABLE

The field and laboratory parameters for routine and baseline analyses are listed in Table 3:

E. DATA REPORTING

The results of site monitoring shall consist of the field data sheet(s), chain of custody form(s) and the laboratory analysis results. Results shall be sent in report form as outlined by 6 NYCRR Part 360-2.11(c)(4)(IV) and 360-1.4(c) to the Regional Office of the New York State Department of Environmental Conservation (NYSDEC) no later than sixty (60) days after the last day of the quarter in question.

An annual report shall be prepared that shall analyze the results, compare background and well sampling data and discuss which parameters, if any, are contravening water quality standards and their significance. This annual report shall be sent to the NYSDEC, Division of Solid Waste, Region 3 and shall be triggered upon initiation of monitoring for "baseline" parameters.

TABLE 2

PARAMETER ¹	CONTAINER ²	PRESERVATIVE	HOLDING TIME ³
Alkalinity	P,G	Cool, 4°C	14 days
BOD ₅	P,G	Cool, 4°C	48 hrs.
COD	P,G	Cool, 4°C, H ₂ SO ₄ to pH<2	28 days
Chloride	P,G	None Required	28 days
Color	P,G	Cool, 4°C	48 hrs.
Cyanide	P,G	Cool, 4°C, NaOH to pH>12	14 days
Hardness	P,G	HNO ₃ , or H ₂ SO ₄ to pH<2	6 months
Metals	P,G	HNO ₃ , pH<2	6 months
Chromium-Hex.	P,G	Cool, 4°C	24 hrs.
Mercury	P,G	HNO ₃ , pH<2	28 days
Nitrogen			
Ammonia	P,G	Cool, 4°C, H ₂ SO ₄ to pH<2	28 days
Nitrate	P,G	Cool, 4°C	48 hrs.
TKN	P,G	Cool, 4°C, H ₂ SO ₄ to pH<2	28 days
Odor	G only	Cool, 4°C	24 hrs.
Phenols	G only	Cool, 4°C, H ₂ SO ₄ to pH<2	28 days
Sulfate	P,G	Cool, 4°C	28 days
TDS	P,G	Cool, 4°C	48 hrs.
TOC	P,G	Cool, 4°C, HCl or H ₂ SO ₄ to pH<2	28 days
Turbidity	P,G	Cool, 4°C	48 hrs.
Volatile Organics			
Method 601	G, Teflon	Cool, 4°C	14 days
	lined septum ⁴		
Method 602	G, Teflon	Cool, 4°C	7 days
	lined septum ⁴	Cool, 4°C, HCl to pH 2	14 days

Footnotes:

1. Laboratory determinations only; field determinations to be made immediately during sampling.
2. P = Plastic (polyethylene), G = Glass
3. Holding Time is defined as the length of time from collection of the sample until initiation of analysis.
4. Do not allow any head space in the container.

TABLE 3
(LABORATORY PARAMETERS FOR ANALYSIS)

<u>FIELD PARAMETERS</u>	<u>ROUTINE</u>	<u>BASELINE</u>
Static water level (in wells and sumps)	X	X
Specific Conductance	X	X
Temperature ¹	X	X
Floaters or Sinkers ¹		X

pH	X	X
Eh (Oxidation-Reduction Potential)	X	X
Dissolved Oxygen ²	X	X
Field Observations ³	X	X

<u>LEACHATE INDICATORS</u>		
Total Kjeldahl Nitrogen (TKN)		X
Ammonia	X	X
Nitrate	X	X
Chemical Oxygen Demand (COD)	X	X
Biochemical Oxygen Demand (BOD ₅)		X

Total Organic Carbon (TOC)	X	X
Total Dissolved Solids (TDS)	X	X
Sulfate	X	X
Alkalinity	X	X
Total Phenols	X	X
Chloride	X	X

Total Hardness as CaCO ₃	X	X
Turbidity	X	X
Color	X	X
Boron		X

TABLE 3 (CONT.)
(LABORATORY PARAMETERS FOR ANALYSIS)

<u>METALS</u>	<u>ROUTINE</u>	<u>BASELINE</u>
Potassium	X	X
Sodium	X	X
Iron	X	X
Manganese	X	X
Magnesium	X	X
Aluminum		X
Calcium	X	X
Lead	X	X
Cadmium	X	X
Toxic Metals		
Antimony		X
Arsenic		X
Beryllium		X
Barium		X
Cadmium	X	X
Chromium (Total and Hexavalent)*		X
Copper		X
Lead	X	X
Mercury		X
Nickel		X
Selenium		X
Silver		X
Thallium		X
Zinc		X
Cyanide		X
<u>ORGANIC PARAMETERS (Volatile Organics)</u>		
EPA Method 601 (Purgeable Halocarbons)		X
EPA Method 602 (Purgeable Aromatics)		X

Footnotes:

1. Any floaters or sinkers found must be analysed separately for baseline parameters.
2. Surface water sampling only.
3. Any unusual conditions (colors, odors, surface sheens, etc.) noticed during well development, purging, or sampling must be reported.

F. POST-CLOSURE EXPLOSIVE GAS MONITORING

Post-closure explosive gas monitoring will be conducted quarterly to ensure that explosive gas levels do not exceed twenty-five percent (25%) of the lower explosive level (LEL) within any structures on or off-site and that subsurface explosive gas levels do not exceed the lower explosive limit anywhere along the boundary of the property. If monitoring shows these levels are exceeded, the NYSDEC will be notified immediately and remedial action (such as the construction of a gas cut-off trench) will be immediately taken. Inspection of the gas vents and final landfill cover according to subsections II.B and II.C of this report will also be conducted.

1. Monitoring Points

A "variance" gas venting system in conformance with 6 NYCRR Part 360-2.13(p) per LGRI standards was installed across the landfill. As there are no on-site structures and since the closest off-site structure is located greater than one thousand feet (1,000') to the east of the facility, no monitoring of structures is proposed. Subsurface monitoring of explosive gases will be conducted as described in section 3 below.

2. Monitoring Conditions

Monitoring for explosive gases will be conducted when the ground surface has been wet or frozen for several days. All gas monitoring will be performed when the atmospheric pressure is low (below 29.92 inches of mercury). Atmospheric pressure will be recorded along with the other monitoring results.

3. Monitoring Procedures

A portable combustible gas indicator (CGI) with an aspirator will be used to sample the intragranular spaces of the vadose zone of the subsurface soils at the monitoring points. Each monitoring point will be sampled using a slidehammer with a three foot extension, a dedicated penetration tip and an appropriate length of Tygon tubing.

The slidehammer will advance the extension and dedicated tip to a depth of between two and one-half and three feet (2.5-3') below the existing grade. Tygon tubing will be inserted into the extension and the extension will be withdrawn several inches to create a soil/gas pocket between the tip and the tubing. The extension will then be repacked at the surface with excess soil to isolate the sample pocket.

Once a satisfactory point is developed, the CGI with aspirator will be used to draw a soil gas sample. The CGI will record the percent LEL, hydrogen sulfide and oxygen concentrations. A unique sample identification will be assigned to each sample location where sampling is successfully completed.

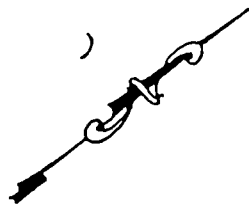
OCTOBER 1994

This procedure will be repeated until the landfill boundary has been sampled at approximate one hundred foot (100') intervals.

Future quarterly explosive gas monitoring will not utilize the locations of the previous quarter's sampling points but rather should be separated by approximately twenty-five feet (25'). This will result in the perimeter areas being sampled using a twenty-five foot spacing over the course on one year's (four quarters) monitoring.

4. Data Reporting

Explosive gas survey information will be reported in tabular form listing the sample point identification, depth of sample point below surface grade, percent LEL, hydrogen sulfide concentration in parts per million, oxygen concentration and field comments (i.e. - subsurface soil conditions encountered, air flow, etc.). Results will be sent to the Regional Office of the New York Department of Environmental Conservation (NYSDEC) coincident with submission of the water quality report.



DG-3
 GROUND ELEV. = 194.7
 TOP PVC = 202.46
 AVERAGE STATIC DEPTH = 11.1
 TOTAL DEPTH = 39.0
 DG-3A SHALLOW
 GROUND ELEV. = 194.2
 TOP PVC = 201.02
 AVERAGE STATIC DEPTH = 8.6
 TOTAL DEPTH = 31.0

DG-2A
 GROUND ELEV. = 208.2
 TOP PVC = 208.7
 AVERAGE STATIC DEPTH = 8.4
 TOTAL DEPTH = 30.0
 DG-2
 GROUND ELEV. = 206.1
 TOP PVC = 208.1
 AVERAGE STATIC DEPTH = 13.7
 TOTAL DEPTH = 36.5

DG-1A
 GROUND ELEV. = 270.5
 TOP PVC = 272.7
 AVERAGE STATIC DEPTH = 13.3
 TOTAL DEPTH = 30.0
 DG-1
 GROUND ELEV. = 272.6
 TOP PVC = 273.7
 AVERAGE STATIC DEPTH = 27.3
 TOTAL DEPTH = 103.0

UG-1A
 GROUND ELEV. = 288.5
 TOP PVC = 288.7
 AVERAGE STATIC DEPTH = 3.5
 TOTAL DEPTH = 22.0

UG-1
 GROUND ELEV. = 288.6
 TOP PVC = 288.5
 AVERAGE STATIC DEPTH = 3.5
 TOTAL DEPTH = 37.0

DG-4A/DG-4

DG-5

LANDFILL FOOTPRINT

STEVE'S LANE

REV. No.	DESCRIPTION	DATE	BY
TOWN OF GARDINER			
TOWN OF GARDINER		ULSTER COUNTY, NY	
SITE PLAN WELL LOCATIONS			
 MORRIS ASSOCIATES ENGINEERING CONSULTANTS-LAND SURVEYORS 347 Violet Avenue, Poughkeepsie, New York 12601 © Copyright 1983			
DATE	SCALE	FILE No.	DRAWING No.
JAN 1984	1" = 200'	30114.00	1 of 1

PLAT 1/21/84 DWG FILE 30114.00