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POST-CLOSURE MONITORING AND MAINTENANCE
OPERATIONS MANUAL

FOR

TOWN OF BETHEL MUNICIPAL LANDFILL
OLD WHITE LAKE TURNPIKE

SULLIVAN COUNTY

*

NEW YORK

TOWN OFFICIALS:

Allan C. Scott - Supervisor
Victoria Simpson - Councilwomen
Lynden Lilley - Councilman
Robert Blaise - Councilman
Harold Russell - Councilman
Rita Sheehan - Town Clerk

DATE: April 24, 1998

JOB NO.: 94-94

Revision: 1 - Jan. 4, 1999

2 - Jan. 15, 1999

3 - Mar. 8, 1999

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* Rev. 1 - 1/4/99

** Rev. 2 - 1/15/99

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POST-CLOSURE MONITORING AND MAINTENANCE MANUAL

INTRODUCTION

In conjunction with the requirements of the New York State Department of Environmental Conservation under 6 NYCRR Part 360 regulations for "Landfills", post closure activities by the landfill operator must conform to specific guidelines and requirements. In accordance with Part 360 - 2.15 (k)(7), a Post Closure Monitoring and Maintenance Operations Manual must be prepared and submitted to NYSDEC for review and approval. The purpose of this document is to provide landfill personnel and/or future consultants with detailed instructions for insuring the proper and efficient monitoring of the site, including environmental sampling and analysis of the various groundwater monitoring wells, adjacent streams and possible leachate seeps, as well as gas venting points. The proper maintenance of all landfill facility components is necessary in order to maintain the site in accordance with local, state and federal regulations following the final closure.

POST-CLOSURE ENVIRONMENTAL MONITORING LOCATIONS

The Town of Bethel will be responsible for performing annual baseline and semi-annual routine monitoring on all groundwater monitoring wells, surface waters, curtain drains * and leachate sources where applicable for a minimum period of 5 years, 4 times each year, after which the town may request through the NYSDEC a modification of these requirements. The following summarizes existing environmental monitoring locations:

Groundwater Monitoring Wells

MW#UO-2 - This is an upgrade monitoring well constructed in June, 1996 to a depth of 49'. The well is situated adjacent to the rear wall of the town storage shed.

MW#DO-1 - This is a downgrade monitoring well of unknown age located along the easterly propertyline of the landfill. The depth is 27'.

MW#DO-2 - This is a downgrade monitoring well of unknown age, situated along the north perimeter of the landfill and constructed to a depth of 20-1/2'.

MW#DO-3S - This is a downgrade monitoring well constructed in June, 1996 adjacent to the southeast side of the landfill. This is considered a "shallow" monitoring well with a total depth of 22'.

MW#DO-3D - This is also a downgrade "deep" monitoring well constructed adjacent to DO-3S in May, 1997. The total depth is 46'.

West Branch - Mongaup River (surface water)

Upstream sample - This involves collecting a grab sample from a point in the West Branch - Mongaup River located well upstream from the town landfill property, as well as upstream of the small unnamed tributary stream that enters the river from the northerly side of the landfill site.

Downstream sample - This involves the collection of a grab sample from the West Branch - Mongaup River near the Old White Lake Turnpike (Blum Road) bridge that crosses the river.

Leachate Samples

It is anticipated that existing leachate seeps observed in the vicinity of the easterly side of the landfill adjacent to and just beyond the east propertyline of the Town of Bethel parcel will be eliminated once the landfill is capped, covered and closed. The existing "spring seep" located at the southeast corner of the existing landfill at the point where the West Branch - Mongaup River passes at its closest point, will be monitored for flow volumes, visible characteristics and quality during landfill closure operations and upon its completion during the post closure phases. Observed discharges from that spring location will periodically be collected and analysed for the same parameters as the groundwater and adjacent river samples during the post-closure monitoring period.

*** Upgrade Groundwater Curtain Drain Discharge**

Upon completion of the upgradient curtain drain trench at the westerly side of landfill, a "grab" sample of any discharge liquid shall be collected at the drain outfall to the north side stream for analysis. The first sampling of this outfall shall occur within 90 days of trench drain completion.

**** Anchor Trench Drain Discharges**

Upon completion of the Anchor trench drains around the landfill perimeter, with two separate outfall points, a "grab" sample shall be collected at each within 90 days of completion and analysed as indicated below.

SAMPLING AND ANALYSIS REQUIREMENTS

Following final closure of the landfill, the five (5) existing monitoring wells; West Branch Mongaup River; upgrade curtain drain outfall, two anchor trench drains and any leachate or spring seeps located along the easterly side of the landfill shall be initially sampled and analysed for the following "Baseline" parameters; per Part 360 - March 27, 1990 requirements:

Field Parameters

Static Water Level	Boron	Color
Specific Conductance	Turbidity	
* Dissolved Oxygen (D.O.) - (Surface Water, Leachate & Drain. Outfall Only) For D.O.		
Temperature		
Floaters and Sinkers		
pH		
Eh		
Field Observations (color, odors, etc.)		

Leachate Indicators

Total Kjeldahl Nitrogen (TKN)
Ammonia
Nitrate
Chemical Oxygen Demand (COD)
Biochemical Oxygen Demand (DOD_s)
Total Organic Carbon (TOC)
Total Dissolved Solids (TDS)
Sulfate
Alkalinity
Phenols
Chloride
Total hardness as CaCO₃

Metals

Potassium
Sodium
Iron
Manganese
Magnesium
Lead
Cadmium
Aluminum
Calcium

Toxic Metals

Antimony
Arsenic
Beryllium
Barium
Chromium
Copper
Mercury
Nickel
Selenium
Silver
Thallium
Zinc
Cyanide
Volatile Organics

In addition, all monitoring locations shall be analysed 3 times each year for the following "Routine" parameters on an annual basis, starting in the first year after final closure.

Alkalinity	BOD
Bromide	Chloride

COD	T. Hard	Nitrates (EPA Method 9200)
Ammon. Nitrogen	TKN	
T. Phenols	T.D.S.	
Sulfate	Sulfide	
Dissolved Oxy.	Cadmium	
Calcium	Iron	
Lead	Magnesium	
Manganese	Potassium	
Sodium	Total Organic Carbon	
Temp (F)	pH	
Conduct (ppm)	Turbidity (ntu)	
Color	Odor	
ORP (MV)	Floatables	

For a period of thirty (30) years following final closure all eleven (11) monitoring ** points (5 monitoring wells, 2 river samples, 3 drain trench outfall and one (1) spring seep) will be analysed annually for "Baseline" parameters and quarterly for "Routine" parameters.

All laboratory analysis results shall be submitted to the NYSDEC - Region 3 offices in New Paltz, New York, to the attention of the Solid Waste Engineer. * Environmental Monitoring Reports prepared by the Town of Bethel or its consultants, including groundwater quality, surface water quality, drainage discharges, leachate seeps, spring seeps or explosive gas samples, shall be submitted to the NYSDEC - Region 3 Solid Waste offices within 90 days of sampling or collection up until acceptance of the "Closure Certification Report" by NYSDEC.... Subsequent reports shall be compiled and submitted annually.

The following sampling methods will be utilized at groundwater monitoring wells:

1) The casing pipes will be sampled with an OVA/PID gas monitoring system in order to identify any gas vapors within the monitoring well casing. All instruments reading will be recorded by the technician sampling the groundwater.

2) A static water level reading will be taken and recorded. This shall be from a fixed reference point which is installed on the well casing.

3) The depth of the well shall be determined utilizing a water level indicator to the bottom of the well in order to determine the maximum depth of the well.

4) A clean sheet of plastic will be placed around the well to be sampled so that there is a clean working surface and to prevent contaminants from coming into contact with the sampling equipment.

5) A peristilic pump or foot pump will be utilized to purge the well. Approximately 3 to 5 well volumes will be required to be evacuated prior to taking samples.

The calculations for the well volumes will be determined utilizing the static water level and the depth of the well. At no time should less than 3 volumes of water be evacuated from the well prior to sampling events.

After the well has been purged, the static water level should be measured. The well will then be allowed to recover to within 90% of the original static water depth found prior to sampling. Once the well has recovered, sampling can proceed in accordance with protocols for the required constituents which are being sampled. Samples should be taken at two (2) locations within the water column, including the upper and middle * portions of the well column. The samples should be composited as a representative sample of the well.

6) Samples should also be observed to see if floaters, sinkers or separate phase liquids are present. Any presence of these should be noted in the sampling log. Field parameters should also be determined at this time including pH, specific conductivity, temperature and any other field measurements which may be required. Upon completion, dedicated sampling equipment should be left in the bore hole while non dedicated equipment should be removed from the site. The samples should be labelled marked as to time, date and location of sample and the person collecting samples.

In addition, Chain of Custody forms will be filled out. Samples should never be left unattended by the field personnel until turned over to another party on the Chain of Custody, or to the Laboratory.

The following will identify protocol for sampling of leachate seeps, springs or drainage * trench outfall when identified:

1) The volume of leachate identified from a leachate seep should be considered when determining the proper sampling method.

2) Dedicated sampling devices should be utilized to sample each individual leachate seep or drain outfall. Leachate seeps will be sampled utilizing teflon bailers which have been manually closed. Teflon bailers will be allowed to fill with leachate emanating from the fills on the site and utilized for sample collection. Teflon bailers will then be emptied into the sampling jars.

3) No filtering of the samples will be permitted prior to discharging to the sample containers.

4) Leachate will be sampled per Part 360 - 2.11 (c)(4) baseline parameters.

5) Care should be taken when collecting the leachate samples not to collect soil materials or debris within the leachate samples.

LANDFILL COVER AND VENTING SYSTEM

Town and landfill personnel shall perform a walking inspection of the entire landfill surface & perimeter at a minimum frequency of once each * month for the first 2 years; and then once each quarter and/or after significant storm events (i.e. - 5 year storms) after two years. The following shall be checked during these site inspections:

a - Soil Cover - Ground surfaces over the landfill shall be planted with a grass cover in conjunction with final closure. Any erosion of the cover soil shall be promptly filled in, topsoiled and reseeded. The source of water runoff shall be located and diverted as necessary to either insure a sheet flow over the area of conveyance into a lined channel or swale to prevent future occurrences. All water from the landfill mound will be directed to the perimeter footing drain trench or stonelined swales constructed around the site. Any ponded water areas must be immediately filled in with topsoil and graded to insure proper runoff. Those disturbed areas should then be seeded and mulched to insure a grass cover.

The main drainage swales and ditches located along the base and around the perimeter of the landfill shall be inspected for erosion or settlement and filled with stone tailings or rip-rap wherever any erosion or scouring has occurred within 25' of the landfill footprint.

b - Gas Venting System - Each methane gas vent pipe over the landfill surface shall be inspected for residual odors as well as stability and general integrity. Any defects found shall be promptly repaired by removing the topsoil cover and recompacting impervious materials over the existing cap layer. Topsoil should then be replaced and seeded.

c - Gas Monitoring - The explosive gas levels around the perimeter of the landfill and at the gas vent points, as well as in the town storage buildings on the property, will be monitored on a quarterly basis (i.e. - 4 times per year). This monitoring shall incorporate a combustible gas indicator and photoionization analyser to detect methane or other volatile organic compounds (V.O.C.'s). (Refer to Attachment 5 - "Post-Closure Explosive Gas Monitoring Procedures")

d - Upgrade Curtain Drain Trench - The 4" outlet pipe at the edge of the unnamed stream located at the north side of the landfill site shall be inspected to determine if any discharge is occurring and, if so, its physical characteristics (i.e. - volume, color, odor, etc.).

e - Leachate Discharges - The ground surfaces along the entire easterly side of the landfill footprint within approx. 50 Ft. of the cap toe of slope shall be visually inspected for any leachate discharges occurring on the surface.

f - Site Cleanliness - The overall town landfill site must be maintained in a clean condition, free of debris, papers or any other refuse that is blown or otherwise deposited on the surface.

Any small brush or trees that may develop on the site, must be cut to insure maintaining a grass cover without any root intrusion into the underlying cap layer. The vegetative cover over the landfill cap should be mowed at least twice each year or as necessary to prevent any heavier growth from starting.

g - Record Keeping - Accurate and up-to-date records shall be maintained for all site inspections, repair and maintenance work performed by town operating personnel at the landfill site, including an accurate description of any repair work and gas monitoring results as described above. All records shall be maintained in town files with copies submitted to the Regional Solid Waste Engineer at NYSDEC - Region 3 Offices in New Paltz, New York on an annual basis.

POST-CLOSURE DEED RESTRICTIONS

Upon completion of all closure activities, an updated "as-built" map will be filed with the Sullivan County Clerks office for the purpose of indicating the limits of the landfill area within the bounds of the towns property. The deed for the town property will be amended to describe the wastes contained within the landfill mass and period of time used as a sanitary landfill. A restriction clause will also be included in the filed revised deed indicating the fact that post-closure uses of the landfill area are not permitted that could disturb the integrity of the final cover system or any other components of the capped landfill that could potentially cause a release of contaminated materials or threaten the environment.

ESTIMATED POST-CLOSURE MONITORING & MAINTENANCE COSTS

It is anticipated that Town of Bethel will be required to maintain control and monitoring measures over the closed landfill site for a minimum 30-year post-closure period, as specified in Part 360 regulations.

The work shall basically include maintenance of the soil cover, including slopes, grass cover, drainage items, groundwater monitoring wells, gas vent structures, access drives; ground and surface water analysis; explosive gas surveys, reporting to NYSDEC, etc.. Estimated costs for the first five (5) years of the program are as follows:

1) Sampling of upgrade M.W. #UO-2 and downgrade M.W.#DO-1, DO-2, DO-3S and DO-3D; of spring seep #1 flow and West Branch - Mongaup River "upstream" and "downstream" locations; curtain drain trench outfall and two anchor trench drain outfalls, including sampling, handling, lab & processing costs, for 1st - two years:

a) Years 1 & 2: 11 samples/period x \$1,750/sample point x 4 sampling events/year x 2 years = \$154,000.00 *

b) Years 3 - 5: 11 samples x \$1,850/sample x 4 sample events per year x 3 years = \$244,200.00

2) Perform explosive gas surveys quarterly, including equipment rentals, supplies, reporting to NYSDEC, admin., etc. \$9,000.00 x 5 years = \$45,000.00 *

3) Site Maintenance - including mowing; misc. erosion control work; reseed, mulch & refertilize local areas of poor grass growth, etc.

a) year 1 - 2 men, 15 days = 240 man-hrs x \$34.50/hr =	\$8,280.00
b) year 2 - 2 men, 6 days = 96 man-hrs x \$35/hr =	\$3,360.00
c) year 3 - 1 man, 5 days = 40 man-hrs x \$36/hr =	\$1,440.00
d) year 4 - 1 man, 5 days = 40 man-hrs x \$37/hr =	\$1,480.00
e) year 5 - 1 man, 5 days = 40 man-hrs x \$38/hr =	\$1,520.00

4) Engineering Inspections for Post-Closure
Certifications and records, coordination with town & NYSDEC, etc.

Estimate 20 hrs/year for 1st - 2 years = 20 hrs x \$90/hr x 2 yrs = \$3,600.00

Estimate 10 hrs/yr. for year 3 - 5 = 10 hrs x \$100/hr x 3 years = \$3,000.00

5) Town of Bethel Admin. Expense

Estimate \$2,500/year x 5 years = \$12,500.00

Total Estimated First 5-yr Cost = \$478,380.00

Say \$480,000.00 *

(Average \$96,000/Year)

The Town of Bethel shall submit an adjusted "Post-Closure Updated Expenses Summary" to the NYSDEC Division of Solid Waste on as needed basis reflecting actual post-closure costs to date for environmental monitoring activities and any repair or maintenance functions and related costs. Each submittal shall include a comparison summary with the above cost estimates.

30 - Year Post-Closure Estimated Costs - Based upon an estimated annual expense of \$96,000.00 per year over the first 5 years and adding a 3%/year inflation for each successive year, the total estimated cost for a 30-year period of post-closure monitoring and maintenance = \$4,079,700.00.

POST-CLOSURE USE OF PROPERTY

The intent of the Town of Bethel is to allow the closed landfill site to remain undisturbed after final closure is accomplished, with only periodic mowing of the grass cover planned to inhibit heavy weeds or light brush growth. There is no intent to develop any recreational facilities, fields, structures, parking areas or storage yards on the landfill mount.

POST-CLOSURE CONTINGENCY PLAN

The following addresses the proper response actions to various emergency situations or failures that have some likelihood of occurring after the final closure of the landfill site is accomplished. The town shall immediately address any adverse actions as described and maintain records of the occurrence and the respective response activities in landfill files for yearly submittal to NYSDEC:

a - Fire - The ignition of methane gas generated within the landfill is a possibility, however remote, that would result in a fire situation either at or within one of the surface gas vents; or at a "breach" or fissure in the cap surface caused by an unanticipated gas buildup and release. Any flame condition would require a means of ignition or combustion, which is also somewhat remote, although possible. The Kauneonga Lake Fire Dept. is located within 3 miles of the landfill and response time would be within 3 - 5 minutes of being contacted. No on-site water source and hose system exists for fire fighting. Spread of a methane gas fire is of minimal concern and it would likely be of short duration, with a rapid burn-out.

Since the landfill is covered and sealed with a soil cap, internal combustion of refuse is unlikely. Any internal fire situations must be handled by the local fire department, in conjunction with town highway dept. excavation equipment to dig out and locate the fire area for proper wetting and extinguishing.

In the event of a fire in any of the adjacent town wood frame sheds, there is minimal possibility of spread to the landfill site due to the absence of combustibles. The local fire dept. must be contacted for any site structure fires.

b - Odors - Certain nuisance odors have been attributed to similar landfills in the past, especially where an alternative grading material was utilized to complete the cover surface and subsequent to final cap installation when gas venting through various surface vents was started. The vents will be monitored subsequent to landfill closure, with appropriate action taken if this proves to be a problem. The installation of activated carbon filter canisters on offending vents has been used in the past to mitigate certain gas odors, while candle flares are also acceptable for burning off any gases if determined to meet proper concentration limits for combustion.

c - Clogged Gas Vents - This is an unlikely occurrence since the 6" diameter schedule 80 PVC pipe vents will be embedded in the stone vent pockets at the top of the landfill, with some stone or gravel inside the vents themselves. This will insure a permeable media to pass all gas accumulations while preventing any clogging of the system. Gas vent clogging has not been a problem in similar landfills of this area of the state.

d - Erosion - In the event of future surface erosion of the cover material over the landfill, which will be inspected and monitored on an annual basis, the source of the runoff water will immediately be determined and redirected away from or around the problem site. Any eroded materials shall be repaired with an impervious cover soil compacted in place, followed by topsoil and reseeding.

e - Leachate Seepage - In the event of a leachate seep occurring after final closure, the cover and cap material in the vicinity of the seep will be excavated to expose the point of discharge, which shall be tightly packed and sealed with a clay type soil.

The upper surface of the landfill shall also be inspected in the vicinity of the seep to determine if and where any surface water, such as rainfall runoff or snowmelt, is entering the cap surface. Since a perimeter drain trench will be installed around the perimeter of the landfill, any "seep" shall also be checked to confirm that it is not a blockage or similar overflow from the drainage trench as opposed to an actual leachate seep itself. Any drainage trench problems shall also be immediately corrected.

f - Rodents Activity - Any burrowing animals will damage the cover cap material and could expose the debris layers within the landfill if dug deep enough. Any damaged areas shall be immediately addressed by exterminating or live trapping the animals and sealing any holes with packed clay or grout.

g - Off-site or Landfill Perimeter Gas Migration - In the event of any horizontal migration of landfill gases which are detected at the perimeter of the site, appropriate notification, monitoring and corrective actions shall be taken as indicated in Attachment 5 of this manual.

ATTACHMENTS

ATTACHMENT 1

TOWN OF BETHEL LANDFILL

CLOSURE PROJECT

EMERGENCY CONTACTS AND PHONE NUMBERS

Fire - Kauneonga Lake Fire Co.	583-7100
Swan Lake Fire Co.	583-7100
Police - Sullivan Co. Sheriff's Dept.	794-7100
N.Y. State Police - Liberty Barracks	292-6600
Ambulance - Town of Bethel Ambulance	583-7100
Poison Control Center	1-800-336-6997
Town of Bethel Contact Personnel:	
Allan C. Scott, Town Supervisor	Office: 583-4350
	Home: 583-7278
Jim Davis - Landfill Transfer Station	
Operator -	Office - 292-4505
NYSDEC Region 3 - New Paltz Solid	
Waste Engineer - Alan A. Fuchs	914-256-3137

ATTACHMENT 2
TOWN OF BETHEL MUNICIPAL LANDFILL
POST-CLOSURE SITE INSPECTION REPORTING FORM

Procedure: Town personnel responsible for landfill post-closure monitoring, operation and maintenance functions shall perform site inspections at the frequency and methodology as mandated by the manual. The perimeter and top surface of the entire landfill shall be visually inspected for erosion, bare vegetation areas, ponding of water, leaks or seeps, gas odors, heavy weeds or brush growth, rodents disturbance and overall cleanliness.

Inspector	Date	Weather Conditions	Temp.	Surface Conditions (Snow, Wet, Dry, Etc.)	Abnormal Condition	Action Taken

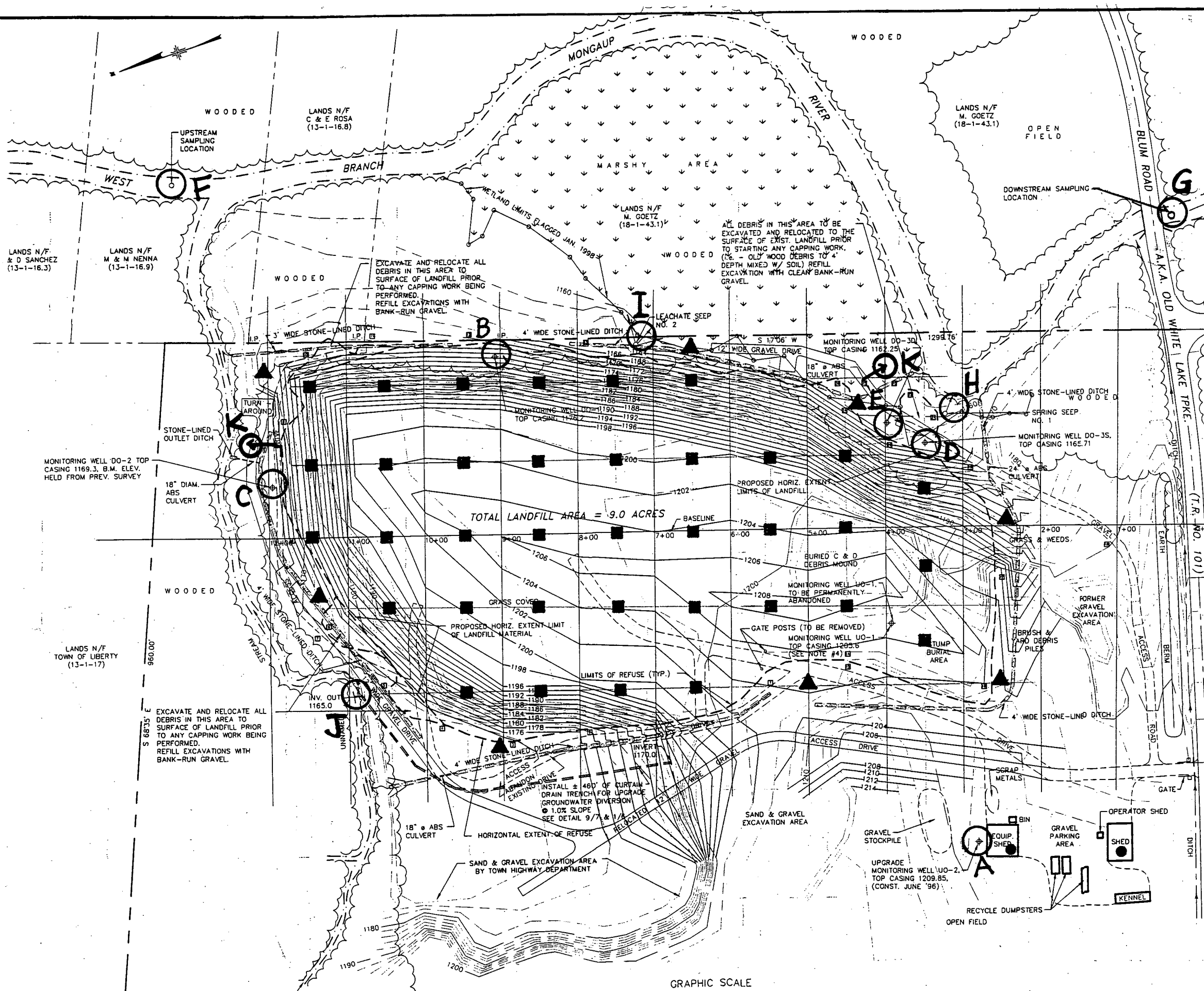
ATTACHMENT 3
PROCEDURES FOR LANDFILL POST-CLOSURE ENVIRONMENTAL DATA
REPORTING

1 - Reporting Schedule:

- a) For period up until NYSDEC accepts the towns "Closure Certification Report", environmental monitoring reports shall be submitted to DEC within 90 days of sampling.
- b) Subsequent to acceptance of the "Closure Certification" by NYSDEC, the town shall compile and submit monitoring reports annually to NYSDEC - Region 3 offices.

2 - Reporting Requirements

- a) Submit table showing:
 - Sample collection date
 - Analytical results
 - Designation of up or down gradient wells, or surface water locations
 - Applicable water quality standards
 - NYSDOH guidance values
 - QA/QC notations
 - Method detection limits
 - CAS (chem. abstract service) numbers on all compounds
- b) Submit graphical or table representations comparing current and prior water quality analytical results, both up and down gradient.
- c) Summarize all state water quality standard contraventions, including discussion of results.
- d) Report to DEC any contamination detected within 14 days of this determination.
- e) All QA/QC documentation will be made available to DEP upon request.
- f) Annual Report - Shall include a summary of water quality information, including special notations for any significant changes that have occurred during the preceding year.



SAMPLING LOCATIONS

- A- Upgrade M.W.# UO-2
- B- Downgrade M.W.# DO-1
- C- Downgrade M.W.# DO-2
- D- Downgrade M.W.# DO-3S
- E- Downgrade M.W.# DO-3D
- F- Upstream Mongaup River
- G- Downstream Mongaup River
- H- Spring Seep #1
- I- Leachate Seep #2
- J- Curtain Drain Trench Outfall
- K- Anchor Trench Drain Outfall

- - Gas Vents (36)
- ▲ - Perimeter Gas Monitor Points(8)
- - Town Building Interiors(8)

NOTES

1. SITE TOPOGRAPHIC INFORMATION, EXISTING LANDFILL BOUNDS, ADJACENT WATER COURSES AND SIMILAR PHYSICAL FEATURES ARE IN ACCORDANCE WITH A TOPOGRAPHIC MAP OF BETHEL LANDFILL SITE, DATED AUGUST 19, 1994 AND PREPARED BY JOHN W. GALLIGAN, L.S.
2. PROPERTY OWNER NAMES AND PROPERTY LINE LOCATIONS FOR ADJOINING PARCELS ARE IN ACCORDANCE WITH SULLIVAN COUNTY TAX MAPPING - BETHEL SECTIONS 13 AND 18.
3. NORTH AND EAST PROPERTY LINE INFORMATION SHOWN ON THIS PLAN IS IN ACCORDANCE WITH A "SURVEY MAP OF LANDS NEAR SWAN LAKE", DATED OCTOBER 1976, BY GEORGE H. FULTON, L.S.
4. EXCAVATE 5' DEEP AROUND M.W. #UO-1 AND CUT OFF STEEL CASING 5' BELOW EXIST. GRADE; FILL WELL WITH CONCRETE TO WITHIN 5' OF GRADE; THEN BACKFILL WITH CLEAN BANK-RUN SOIL, COMPACTED IN 12" LIFTS TO 85% DENSITY.

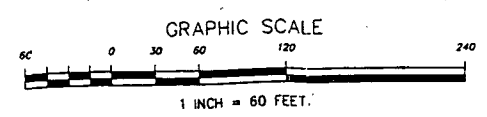
SYMBOLS LEGEND

- TEST PIT
- MONITORING WELL
- SEEP SAMPLING LOCATION
- WETLANDS BOUNDS
- PROPOSED CONTOURS
- EXISTING CONTOURS

ATTACHMENT 4

12-30-98

REV.	DR.	CK.	DATE	DESCRIPTION
GLENN L. SMITH CONSULTING ENGINEER, P.C. P.O. BOX 158 - MONTICELLO - NEW YORK - 12701 PH. 914-796-2216				
SAMPLING & MONITORING LOCATIONS				
TOWN OF BETHEL LANDFILL CLOSURE				
(T) BETHEL - SULLIVAN COUNTY - NEW YORK				
	DATE DECEMBER 30, 1998			SHEET NO.
	REVISION 0			1
	SCALE			
	DRAWN EPM			
	CHECKED GLS			
JOB NO. 94-94			OF 1 SHEETS	



SAMPLING & MONITORING LOCATIONS MAP

ATTACHMENT 5

POST-CLOSURE EXPLOSIVE GAS MONITORING PROCEDURES

1) Post-closure explosive gas monitoring and maintenance should be performed at least quarterly to ensure that:

(a) - Explosive gas levels do not exceed 25 percent of the lower explosive limit within any structures on or off the site (except gas control or recovery system components); and

(b)- The level of subsurface explosive gas does not exceed the lower explosive limit anywhere along the property boundary. If monitoring shows these levels are exceeded DEC should be notified and remedial action, such as the construction of gas cut-off trenches, should be immediately taken. In addition, this quarterly explosive gas monitoring and maintenance should assure that the gas vents are not blocked and that landfill gas has not damaged the final cover.

2) Monitoring Requirements

(a) - Post-closure explosive gas monitoring should include:

i - Subsurface monitoring along a perimeter outside the waste mass but within the property boundary; monitoring within all on-site and nearby structures; and inspection of the final cover and surrounding area. Perimeter subsurface monitoring should be performed at maximum intervals of 100 feet if a portable explosive gas detector is used. Monitoring with a portable detector should be performed when the ground surface has been wet or frozen for several days. Monitoring should be done below the wet or frozen zone.

ii - Regular inspection of the landfill final cover and surrounding area for cracks or stressed vegetation which might indicate the escape of landfill gas. Areas where there are cracks or where vegetation appears stressed should be tested with a portable explosive gas detector. Any areas of the final cover which may have been damaged should be repaired and steps should be taken, such as the installation of additional gas vents, to prevent future damage. Areas around the waste mass where gas is found to be escaping should be tested with a portable explosive gas detector to determine whether they indicate pathways by which explosive gas is migrating off-site. If so, additional measures should be taken to prevent off-site migration. The percentage of explosive gas emanating from gas vents should be measured to indicate the effectiveness of the gas vents.

iii - All gas monitoring should be performed when the atmospheric pressure is low (below 29.92 inches of mercury). Atmospheric pressure should be recorded along with the other monitoring results.