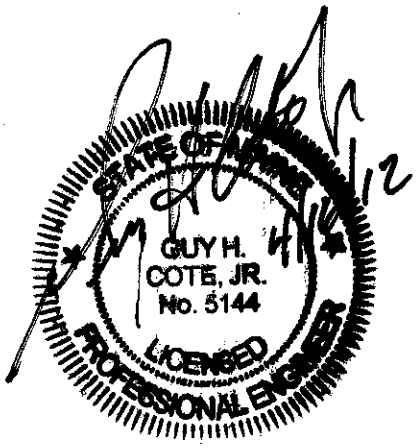
# ENVIRONMENTAL MONITORING PLAN
# FOR
# DOLBY LANDFILL
# EAST MILLINOCKET, MAINE

## PREPARED FOR

## MAINE STATE PLANNING OFFICE
## AUGUSTA, MAINE

**Revised April 2012**

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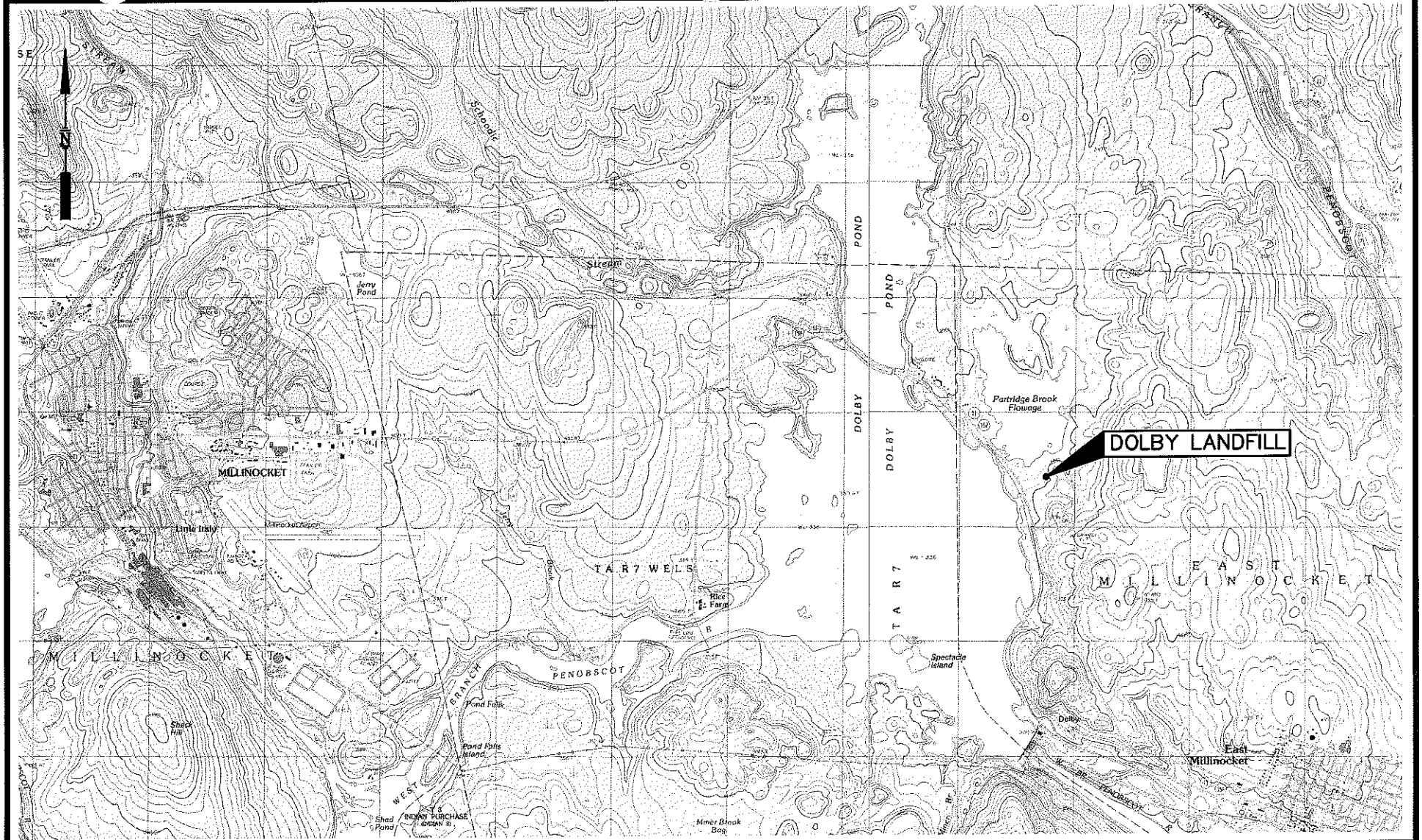
**MAINE STATE PLANNING OFFICE**
**AUGUSTA, MAINE**
**DOLBY LANDFILL ENVIRONMENTAL MONITORING PLAN**

## 1.0 INTRODUCTION

The State Planning Office (SPO) owns and operates the Dolby Solid Waste Landfill in East Millinocket, Maine (see Figure 1-1). The operating license issued by the Maine Department of Environmental Protection (MEDEP) requires SPO to monitor the groundwater, surface water, and leachate in the vicinity of the landfill. This Environmental Monitoring Plan summarizes the sampling procedures and analytical techniques that are used for the groundwater, surface water and gas detection monitoring programs at the Dolby Landfill in East Millinocket, Maine.




BASE MAP ADAPTED FROM 7.5 MIN
USGS TOPOGRAPHIC QUADRANGLES
MILLINOCKET, ME – 1988
EAST MILLINOCKET, ME – 1988

2000 0 4000 FEET

DWG: SITE LMN: CTB: SME-STD REV: 1/20/12

FIGURE 1–1
SITE LOCATION MAP
DOLBY LANDFILL
EAST MILLINOCKET, MAINE
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## 2.0 OBJECTIVES OF THE ENVIRONMENTAL MONITORING PROGRAM

The purpose of the Environmental Monitoring Program (EMP) is to detect any potential impacts of the landfill on the groundwater, surface water, and ambient air in the vicinity of the site. Previous mill owners and SPO have conducted water quality monitoring programs at the landfill since 1982 and have compiled a comprehensive database on the groundwater and surface water quality at the site. In July 2000, the groundwater sampling program was revised to include low-flow sampling techniques. SPO purchased the Dolby Landfill in 2011.

## 3.0 SELECTION OF MONITORING PARAMETERS

This section describes the analytical parameters and parameter groupings used to monitor water quality at the site. The analysis of water quality at the selected sampling locations is the primary method to evaluate the Landfill's performance and its influence on the surrounding groundwater and surface waters. Three separate programs have been established to evaluate site water quality. These programs include: (1) site characterization; (2) detection; and (3) assessment monitoring programs. The site characterization program is intended to quantify existing water quality at the various sampling locations and follows the requirements set forth in Maine Solid Waste Management Rules (SWMR) Chapter 405.2.C(1). The detection monitoring program includes a list of parameters that will be sampled three times per year and used to evaluate changes in site water quality. The detection monitoring program is discussed in further detail in the next section. The assessment monitoring program will be used to further evaluate water quality at a particular monitoring location when evaluation of the detection monitoring results suggest significant changes in site water quality in accordance with the requirements set forth in SWMR Chapter 405.2.C(2)(i).

### 3.1 Detection Monitoring Program

A detection monitoring program has been implemented to detect trends and reflect changes in water quality in relation to the established site characterization and/or existing water quality. This plan must be carried throughout the active life of the facility and through the closure and post-closure periods. Samples will be obtained and analyzed three times per year from the monitoring points described in Section 4.0 of this report. Water quality parameters, analytical method references, and method reporting limits for the site are presented on Table 3-1.

If results of the detection monitoring program indicate possible deterioration in water quality at one or more groundwater monitoring wells or surface water monitoring sites, an evaluation of the cause(s) must be initiated within thirty days of receipt of the laboratory results. A report of the evaluation will be prepared by a qualified professional and submitted to the MEDEP for approval within ninety days of the evaluation. The evaluation will include the following:

1. A statistical analysis of the data from the monitoring report.

2. Evaluation of the source(s) that may have caused the groundwater deterioration.

3. Evaluation of possible errors with the groundwater monitoring program (i.e., sampling or analysis error).

## 3.2 Assessment Monitoring

Assessment monitoring will be initiated within ninety days of the date the report required by SWMR Chapter 405.2.C(2)(i) is submitted. The assessment monitoring plan will be submitted to the MEDEP for approval prior to plan initiation and include the following elements:

1. Proposed changes to the water quality monitoring plan will be submitted to the MEDEP at least fifteen days prior to the first sampling event.

2. The plan will include three sampling events per year on groundwater wells that had a statistically significant change in concentration of a parameter.

3. Samples taken during the first two rounds will be analyzed for SWMR Chapter 405, Appendix A, Column 3 parameters. Requests for elimination of parameters based on the results of the first two rounds will be submitted to the MEDEP for approval.

## 3.3 Corrective Action Plan

Upon verification through statistical analysis and assessment monitoring that significant deterioration has occurred to one or more groundwater monitoring wells, a corrective action plan will be submitted to the MEDEP for approval within ninety days of that verification. The plan will include an evaluation of corrective action(s) and a proposal to initiate the corrective action(s). These actions will be performed to minimize the impact of the contaminants on the groundwater. The evaluation plan will be updated and resubmitted annually until successful

corrective action has been demonstrated. The action plan will include the five elements outlined in SWMR Chapter 405.2.D.

**TABLE 3-1**

**ANALYTICAL PROGRAM**

Detection Monitoring Program Test Parameters:

| Water Quality Parameters | Method | Reporting Limit (mg/l) | Groundwater | Surface Water | Leachate |
|---|---|---|---|---|---|
| Field Parameters | | | | | |
| Dissolved Oxygen (D.O.) | Field Parameter | | X | X | |
| Field Observations | Field Parameter | | X | X | X |
| Monitoring Well Pump Rate | Field Parameter | | X | | |
| pH | Field Parameter | | X | X | X |
| Turbidity | Field Parameter | | X | X | |
| Specific Conductance | Field Parameter | | X | X | X |
| Static Water Elevations | Field Parameter | | X | | |
| Surface Water Flow Rates | Field Parameter | | | X (1) | |
| Temperature | Filed Parameter | | X | X | X |
| Indicator Parameter | | | | | |
| Alkalinity | SM 2320B | 1.0 | X | X | X |
| Bicarbonate | SM 2320B | 1.0 | X | X | X |
| Chloride | EPA 9056 | 2.0 | X | X | X |
| Nitrogen, Ammonia | EPA 350.1 | 0.2 | X | X | X |
| Nitrogen, Nitrate | EPA 9056/300.0 | 2.0 | X | X | X |
| Phosphorous, Total | EPA 6010 | 0.1 | | X | X |
| Sulfate | EPA 9056/300.0 | 1.0 | X | X | X |
| Total Dissolved Solids (TDS) | SM 2540C | 1.0 | X | X | X |
| Total Organic Carbon (TOC) | EPA 9060 | 1.0 | X | X | X |
| Total Suspended Solids (TSS) | EPA 160.2 | 1.0 | X | X | X |
| Inorganic Parameters | | | | | |
| Arsenic (Total) | EPA 200.7/6010 | 0.008 | X | X | X |
| Calcium (Total) | EPA 6010B | 1.0 | X | X | X |
| Hardness (Mg & Ca) | Calculation | NA | X | X | X |
| Iron (Total) | EPA 6010B | 0.01 | X | X | X |
| Magnesium (Total) | EPA 6010B | 1.0 | X | X | X |
| Manganese (Total) | EPA 6010B | 0.01 | X | X | X |
| Potassium (Total) | EPA 6010B | 1.0 | X | X | X |
| Sodium | EPA 6010B | 1.0 | X | X | X |

**TABLE 3-1**

**ANALYTICAL PROGRAM (cont'd)**

Assessment Monitoring Program Test Parameters:

| Water Quality Parameters | Method | Reporting Limit (mg/l) | Groundwater | Surface Water | Leachate |
|---|---|---|---|---|---|
| Inorganic Parameters | | | | | |
| Aluminum (Total) | EPA 6010B | 0.020 | | | X [2] |
| Antimony (Total) | EPA 6010B | 0.003 | | | X [2] |
| Barium (Total) | EPA 6010B | 0.010 | | | X [2] |
| Beryllium (Total) | EPA 6010B | 0.002 | | | X [2] |
| Cadmium (Total) | EPA 6010B | 0.0004 | | | X [2] |
| Chromium (Total) | EPA 6010B | 0.005 | | | X [2] |
| Cobalt (Total) | EPA 6010B | 0.050 | | | X [2] |
| Copper (Total) | EPA 6010B | 0.003 | | X [1] | X [2] |
| Lead (Total) | EPA 6010B | 0.003 | | | X [2] |
| Nickel (Total) | EPA 6010B | 0.003 | | | X [2] |
| Selenium (Total) | EPA 6010B | 0.005 | | | X [2] |
| Silver (Total) | EPA 6010B | 0.007 | | | X [2] |
| Thallium (Total) | EPA 6010B | 0.0028 | | | X [2] |
| Zinc (Total) | EPA 6010B | 0.010 | | | X [2] |
| Organic Parameters | | | | | |
| Volatile Petroleum Hydrocarbons (VPH) | MADEP VPH Method | (4) | X [3] | | X [2] |
| Extractable Petroleum Hydrocarbons (EPH) | MADEP EPH Method | (5) | X [3] | | X [2] |

Notes:
1. Only measured at PBFR (Partridge Brook Flowage).
2. The leachate pond (LP) is sampled for the detection monitoring parameters every monitoring event and sampled for assessment parameters once a year (as per Chapter 405 leachate sampling requirements).
3. Monitoring wells MW-301, MW-302B, and MW-302C sampled for VPH and EPH once a year (fall).
4. The individual compounds reported for the VPH analysis have reportable detection limits (RDLs) from 0.2 to 5.0 µg/L.
5. The individual compounds reported for the EPH analysis have reportable detection limits (RDLs) from 0.2 to 1.0 µg/L.

## 4.0 SAMPLE LOCATIONS AND FREQUENCY

Samples will be collected from 21 groundwater monitoring wells, two surface water locations, one ditch location (when flowing), three siltation pond outlets (when discharging), two leachate pond sites, and one leachate pond leak detection site, as summarized on Table 4-1. The monitoring well, surface water and leachate sampling locations are shown on Figure 4-1. Groundwater, surface water, and leachate samples will be collected during the second, third, and fourth quarters.

**TABLE 4-1**

**SAMPLING LOCATIONS**

GROUNDWATER MONITORING WELLS

DOLBY III

| | | |
|---|---|---|
| MW-107A | MW-304A | MW-402A |
| MW-301 | MW-304B | MW-402B |
| MW-302B | MW-401A | |
| MW-302C | MW-401B | |

DOLBY II

| | | |
|---|---|---|
| MW-104B | MW-205B | MW-303B |
| MW-202AR | MW-206A | |
| MW-202B | MW-206B | |
| MW-205A | MW-303A | |

DOLBY I

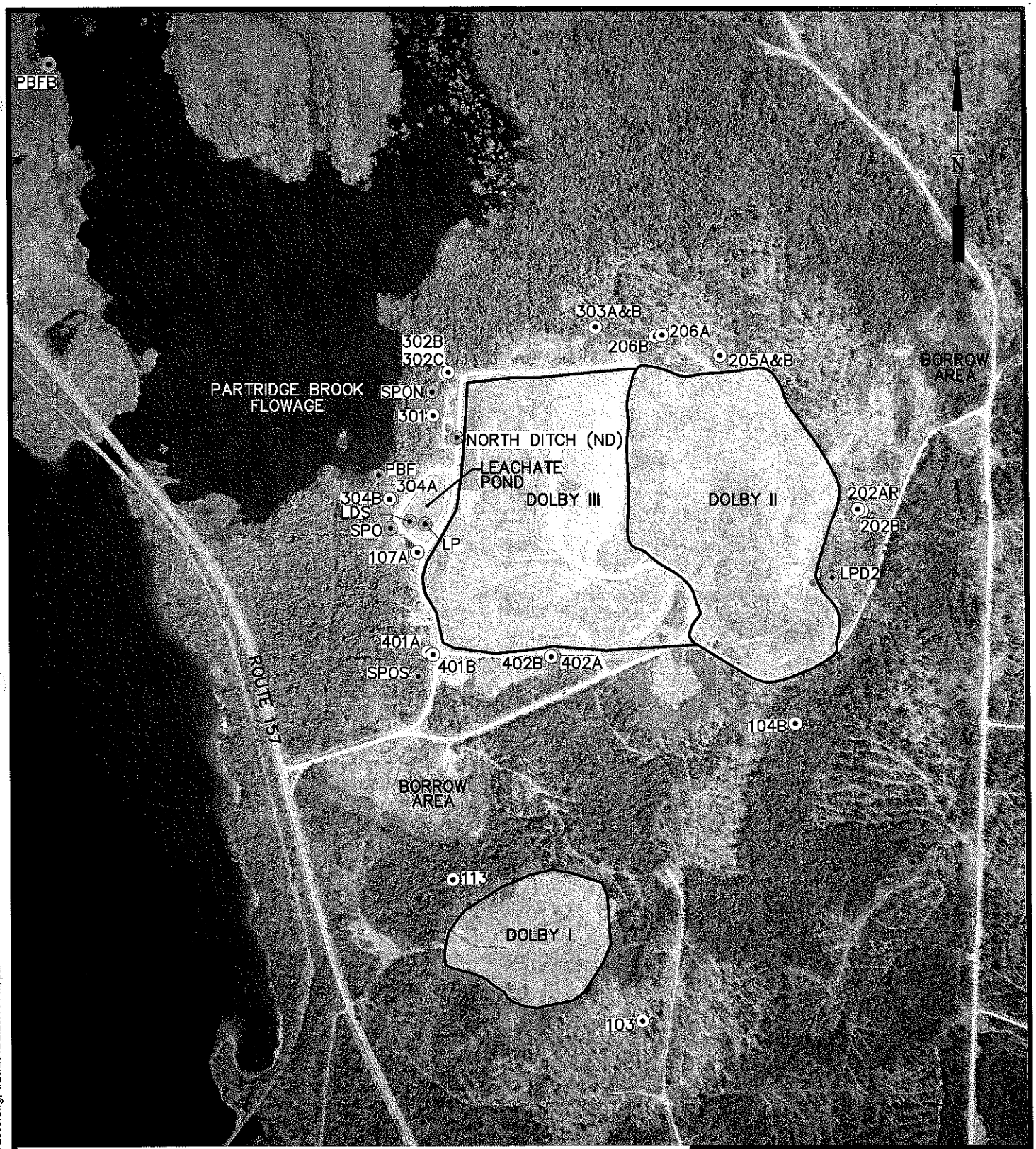
| | |
|---|---|
| MW-103 | MW-113 |

SURFACE WATER SAMPLING LOCATIONS

| | |
|---|---|
| PBFB | Partridge Brook Flowage – Background |
| PBFR | Partridge Brook Flowage – Revised location beginning 2012 |
| ND | North Ditch |
| SPO | Siltation Pond Outlet |
| SPON | Siltation Pond North |
| SPOS | Siltation Pond South |

LEACHATE SAMPLING LOCATIONS

| | |
|---|---|
| LP | Leachate Pond South of Dolby III |
| LPD2 | Leachate Pond East of Dolby II |
| LDS | Leachate Pond Leak Detection Sump |




AERIAL PHOTO DATED JULY 8, 2008

LEGEND

- GROUNDWATER WELLS
- SURFACE WATER SITES

500 0 1000 FEET

DWG: AERIAL-2008 LMN: WAT SAMPL SITES CTB: SME-STD REV: 1/20/12

FIGURE 4-1
WATER SAMPLE SITES
DOLBY LANDFILL
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## 4.1 Monitoring Wells

Dolby I reached the end of its post 30-year closure monitoring requirement during 2010. Historic monitoring wells MW-103 and MW-113 were removed from the monitoring program in 2011 by KPC. In an agreement with the MEDEP, the SPO will continue to monitor field parameters at these two locations. Monitoring wells will be sampled at 19 locations around the Dolby II and Dolby III Landfills and include nine wells for Dolby II (MW-104B, MW-202AR, MW-202B, MW-205A, MW-205B, MW-206A, MW-206B, MW-303A, and MW-303B), and ten wells for Dolby III (MW-107A, MW-301, MW-302B, MW-302C, MW-304A, MW-304B, MW-401A, MW-401B, MW-402A, and MW-402B). Monitoring well MW-104B is up gradient of the landfill and is used as a background monitoring location.

Monitoring wells will be sampled using the low flow sampling technique as required in SWMR Chapter 405.2.A(2)(b).

## 4.2 Surface Water

Surface water samples will be collected in six locations. One stormwater ditch along the northwest side of Cell 9 (ND), three stormwater siltation basins (SPO, SPON and SPOS), and two locations on Partridge Brook Flowage (PBFR and PBFB). PBFR will be collected east of the landfill, downgradient of level spreader at a location west of likely drainage; and PBFB will be collected as a sample unaffected by discharge north of PBFR. Prior to 2012, Partridge Brook flowage was sampled at a location west of the leachate pond underdrain outlet. Sampling of that location was discontinued at the end of 2011, since the pond underdrain no longer discharges to Partridge Brook Flowage. Water from the underdrain is collected and treated with the leachate..

## 4.3 Leachate

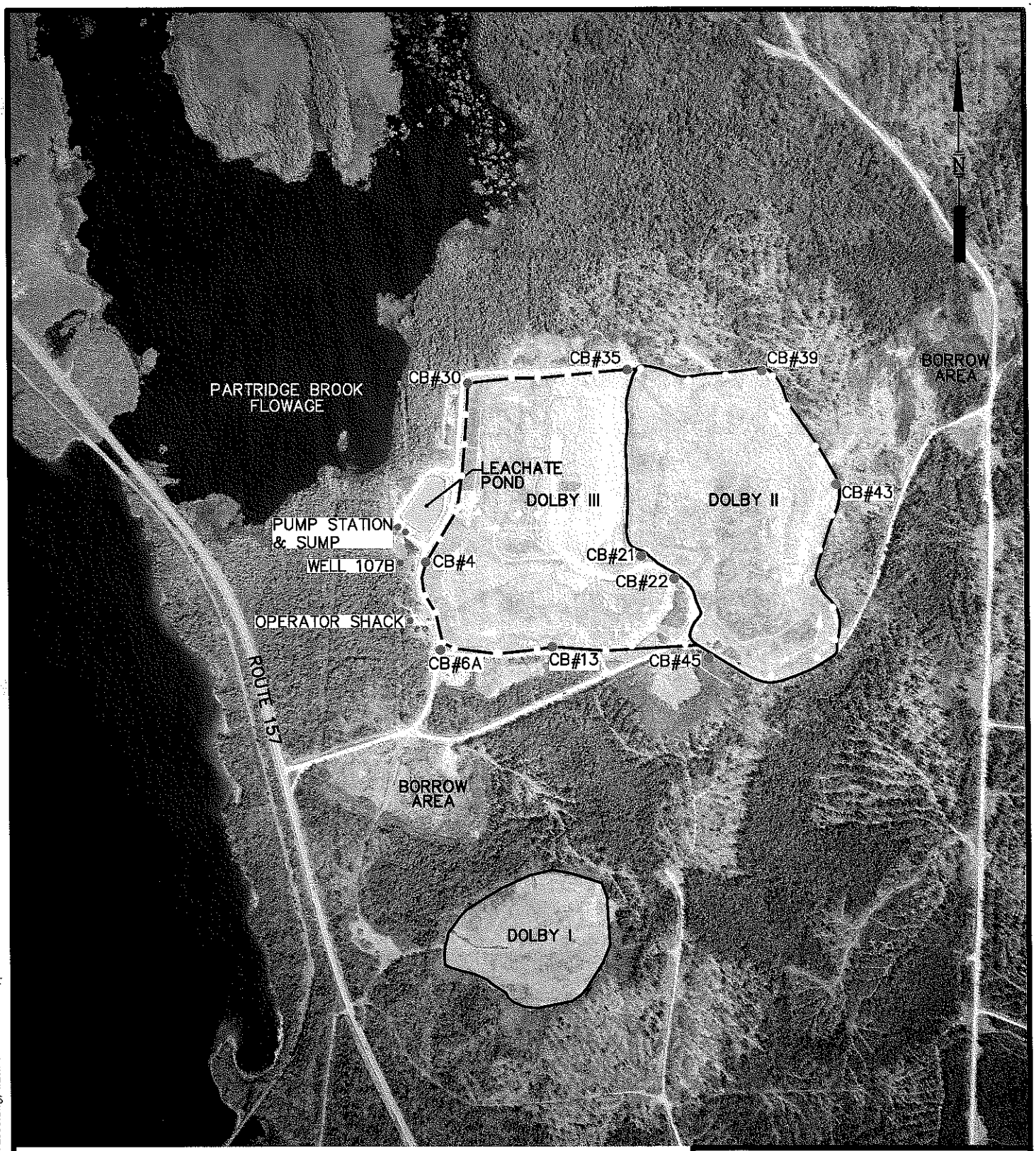
The leachate pond (LP) will be sampled for the detection monitoring program test parameters every monitoring event and sampled for assessment monitoring parameters once a year. Parameters consistently undetected in the leachate sample will be deleted from the leachate

monitoring program upon approval by the MEDEP. The detection monitoring program test parameters will not be removed from the leachate sampling program.

Since the spring of 2005, the small leachate collection pond (LPD2), East of Dolby II, is sampled for detection monitoring parameters. Since the spring of 2008, the leachate pond leak detection sump (LDS) is sampled for detection monitoring parameters.

## 4.4 Gas Monitoring

The purpose of gas testing at Dolby Landfill is to ensure that operators, transient employees, and contractors are not being exposed to harmful levels of Hydrogen Sulfide ($H_2S$) or explosive gases. Gas monitoring at Dolby Landfill is conducted to protect workers. There are 14 gas monitoring locations that are tested during each quarter at Dolby Landfill. The locations consist of 10 catch basin locations (#4, #6A, #13, #21, #22, #30, #35, #39, #43 and #45), one converted groundwater well (107B), the operators shack, pump station and leachate pump sump. Each location will be tested for $H_2S$ and explosive gases as methane equivalent. The MEDEP is notified within 24 hours of any readings greater than 25% LEL. The gas monitoring sampling locations are shown on Figure 4-2.




AERIAL PHOTO DATED JULY 8, 2008

500 0 1000 FEET

LEGEND

- SAMPLE LOCATIONS
- EXISTING MANHOLE/CATCH BASIN
- FLOW DIRECTION OF LEACHATE COLLECTION SYSTEM

DWG: AERIAL-2008 LMN: CB GAS MONITOR CTB: SME-STD REV: 1/20/12

FIGURE 4-2
GAS MONITORING LOCATIONS
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## 5.0 GROUNDWATER MONITORING STAGING PROCEDURE

The following section outlines procedures used prior to groundwater, surface water, and leachate sampling at the beginning of each year.

### 5.1 Groundwater Sampling Procedure

Important to the success of the groundwater monitoring program is the preparation of all groundwater sampling equipment. The staging phase of the groundwater monitoring program gives SPO a two-month timeframe prior to sampling, to order QA standards, sampling equipment, and/or have instrumentation repaired. The following are the steps performed to accomplish this.

1. Sample Containers. New sample containers are received from the contracted laboratory prior to each sampling event.

2. Tubing. Due to biological contamination and iron staining over time, tubing at each well must be inspected and replaced if necessary every two years.

3. pH Meters. The portable pH meters (Hach One and Hach EC10) are checked using pH buffers and a certified known. This information is recorded in the Groundwater Staging Notebook. The pH buffer supply and expiration dates are inventoried at this time.

4. Conductivity Meters. The portable conductivity meter (Hach Sension5) is checked using purchased conductivity standard in the range of groundwater conductivities. The results are entered in the Groundwater Staging Notebook. The conductivity standards and expiration dates are inventoried at this time.

5. Water Level Meters. The batteries of the water level meter (Solinst Model 101) are checked by pressing the meter's battery test button and listening for the buzzer to sound. During sampling the water level readings are compared to past

levels to ensure the accuracy of the meter. If this reading is questionable, the meter will be checked for accuracy in a container of water.

6. D.O. Meters. The batteries and probe membrane of the DO meters (YSI 58) are checked prior to each sampling event.

7. Turbidimeter. Prior to the first sampling event of each year, the meter's calibration is checked using primary turbidity standards. Adjustments are made if necessary. Additionally, a certified known sample is analyzed to check the accuracy of the calibration curve. Secondary turbidity standards are used in checking for calibration drift prior to subsequent groundwater sampling events during that year.

8. Certified Known. A yearly inventory of certified known samples used for quality assurance purposes is performed prior to the first sampling event.

9. Documentation. Records of these procedures are kept in the Groundwater Staging Notebook.

10. Sample Collection. Samples will be collected in the following order:

    (1) VPH,
    (2) TOC and Ammonia Nitrogen Bottle,
    (3) EPH,
    (4) Metals and Total Phosphorous,
    (5) Chloride, Nitrate, Sulfate, and Alkalinity, and
    (6) TSS and TDS.

## 6.0 SAMPLING PROCEDURES

The following sections describe the protocols involved in the sampling of groundwater monitoring wells and surface water sample locations.

### 6.1 Groundwater Sampling Procedure

The following low-flow sampling procedure is used for the monitoring wells at the Dolby Landfill.

1. Using the water level meter, obtain a static water level.

2. Begin pumping each well at a flow rate of approximately 100 ml/min. Measure the water level at one minute intervals over the next three minutes. Perform adjustments to the pump rate to obtain water level stabilization.

3. After the first 3-minutes and at subsequent 3-minute intervals, a set of field parameters including water level is performed. The well will be purged until one of the four conditions listed below are met. After the well is stabilized, a complete set of field measurements will be obtained (pH, D.O., specific conductance, temperature, and turbidity) followed by filling the sample bottles. These measurements will be recorded on the Low Flow Sample Purge Form (refer to Attachment A). All samples will be obtained through the peristaltic pump with no sample filtration.

   A. Condition 1

   Both field parameters and water levels stabilize within 30 minutes. The stabilization criteria are listed below.

   Complete stabilization is defined as three successive field parameter and water level measurements at 3-minute intervals, which must meet the following criteria.

| | |
|---|---|
| pH | +/- .1 standard pH unit with respect to previous pH measurement |
| Specific conductance | +/- 5 % of previous measurement |
| Turbidity | +/- 10 % of previous measurement when turbidity is above 10 nephelometer turbidity units (NTU)<br>+/- 1 NTU with respect to previous measurement when turbidity is below 10 NTU |
| Dissolved Oxygen | +/- 1 mg/L when D.O. is greater than 1 mg/L<br>+/- .1 mg/L when D.O. is less than 1 mg/L |
| Maximum Drawdown | 0.0 feet over a six-minute period |

B. Condition 2

A drawdown of 3 feet from the static water level has occurred.

C. Condition 3

A time period of 30 minutes has elapsed without water level stabilization, however the field parameters have stabilized as listed in Condition 1.

D. Condition 4

Well recharge is not sufficient to perform field parameter stabilization. In this instance, the amount of water contained in the sample tubing will be removed followed by the collection of water quality samples followed by one complete set of field readings.

## 6.2 Surface Water and Leachate Sampling Procedure

Surface water and leachate samples must be analyzed using unfiltered samples and collected in the following manner:

1. Collect the sample by immersing the sample bottle not more than 1 foot below the water surface. The sample will be collected upstream of the sampler with the opening of the sampling device oriented upstream but avoiding floating debris. Extreme care should be taken to avoid including bottom sediment in shallow water sampling sites. Surface water sample locations will always be less than 10 feet deep, therefore no stratification will occur. The Dolby III leachate pond sample will be collected from the leachate pond. Extreme care should be taken to avoid including solids that have been deposited onto the leachate pond liner. The leak detection sump sample will be collected using a peristaltic pump and tubing. A separate bottle is used to perform field parameter analyses.

2. Directly fill the appropriate sample containers from the sampling device.

3. Measure the following parameters, if possible, in the water body, not the sample:

    - Temperature;
    - pH;
    - Specific conductance;
    - Turbidity; and
    - Dissolved oxygen.

    If direct measurement is not possible, these parameters will be measured from a container separate from the sample collection container used for performing the laboratory analysis. This information will be recorded on the Surface Water Sampling Sheet, sample labels will be completed and chain-of-custody procedures will be initiated.

4. Estimate surface water flow rate. The surface water flow rate will be measured, when possible, at four of the surface water sample locations. The flow rate of SPO, SPON, SPOS and ND will be determined by using an H-flume, calculating flow in a discharge pipe or floating a chip. The flow rate measurement will be recorded on the Surface Water Sampling Sheet. If the water flow cannot be measured at a location, a note will be placed on the Surface Water Sampling Sheet.

## 7.0 FIELD TEST PROCEDURES

Due to the instability of certain test parameters, some field testing is necessary for accurate results. Below are the field tests and their corresponding procedures.

### 7.1 Conductivity

1. Discussion. Conductivity measurements are useful indicators in detecting inorganic contamination. It is a numerical expression of the ability of an aqueous solution to carry an electrical current and is expressed as μmhos/cm.

2. Sampling and Preservation. Conductivity measurements are made continuously prior to sample collection to determine well water stabilization.

3. Methodology. Specific conductance, μmhos at 25°C – Method 120.1.

4. Reference Literature. U.S.EPA "Methods for Chemical Analysis of Water and Wastes" (EPA-600/4-79-20), revised March 1983.

5. Apparatus.

    a. Conductivity Meter (Hach Sension5)

6. Reagents.

    a. Primary Calibration Standards (purchased)
    b. Water (distilled)

7. Procedure.

    a. Place the conductivity probe into the flow through sampling cell.

b. To measure conductivity, press the on/off button and allow time for the Automatic Temperature Compensator to correct for solution temperature changes. Start recording the conductivity readings, on the Low Flow Sample Purge Form, every three minutes until one of the four sampling conditions are met. The conductivity readings for surface water and leachate samples will be taken once a stable reading is obtained.

8. Notes.

a. Replace all batteries when the "bat" error message is displayed.
b. To improve performance, clean the stainless steel electrodes by rinsing them in alcohol for 10 – 15 minutes.
c. Remove batteries if long-term storage is anticipated (2 to 3 months).

7.2 pH

1. Discussion. pH is a measure of the activity of hydrogen ions by potentiometric measurements using a hydrogen and reference electrode. A pH shift in the groundwater is an important indicator of groundwater contamination.

2. Sampling and Preservation. pH measurements are made continuously prior to sample collection to determine well water stabilization. If a problem should arise with the field pH meter, a backup meter will be used.

3. Methodology. Electrometric – Method 150.1.

4. Reference Literature. U.S.EPA "Methods for Chemical Analysis of Water and Wastes" (EPA-600/4-79-020), revised March 1983.

5. Apparatus.

   a. pH meter with combination electrode – portable (Hach One pH Meter).
   b. pH meter with combination electrode – portable (Hach Model EC10).

6. Reagents.

   a. Buffers (various – purchased).
   b. Water (distilled).

7. Procedure.

   a. Press the "POWER" button to turn meter on (display will light).
   b. To perform pH measurements, insert the electrode into the groundwater sampling flow through cell and press the "pH" key. Start recording the pH readings, on the Low Flow Purge Form; every three minutes until one of the four sampling conditions are met. The pH readings for surface water and leachate samples will be taken once a stable reading is obtained.

8. Notes.

   a. Rinse electrode with distilled water between measurements to avoid sample contamination.
   b. Refer to operator's manual for error code information.
   c. Remove batteries for long-term storage (three or more months).

## 7.3 Temperature

1. Sampling and Preservation. Temperature measurements must be performed immediately.

2. Methodology. Thermometric – Method 170.1.

3. Reference Literature. U.S.EPA "Methods for Chemical Analysis of Water and Wastes" (EPA-600/4-79-020), revised March 1983.

4. Apparatus.

   a. Temperature readings are conducted using the temperature readings from the pH meter.
   b. Thermometers (NBS traceable).

5. Procedure.

   a. Temperature measurements are made utilizing the temperature readings on the pH meter.
   b. Start recording the temperature readings, on the Low Flow Purge Form; every three minutes until one of the four sampling conditions are met. The temperature readings for surface water and leachate samples will be taken once a stable reading is obtained.

6. Notes.

   a. NBS traceable thermometers are used to ensure the accuracy of the digital thermometer. The results of these checks are kept in a laboratory bound notebook.

## 7.4 Water Level

1. Discussion. Water level measurements are critical to low flow sampling to ensure water column draw down does not occur, thus allowing the field technician the ability to collect only the groundwater flowing past the screened interval of the well.

2. Sampling and Preservation. Water level readings must be taken immediately.

3. Apparatus.

   a. Soil Test Water Level Indicator (DR-760A) is used for piezometric readings.
   b. Solinst Water Level Indicator (Model 101) is used for groundwater well readings

4. Groundwater and Piezometric Measurement Procedure.

   a. Turn toggle switch to the "on" position (for the DR-760A) or turn the switch to the "on" position (for the Solinst). Make sure the meter is working by pressing the test button on the front of the meter.
   b. Slowly lower the probe down the well until the needle deflects from left to right on the front of the meter (for the DR-760A) or the horn sounds on the front of the meter (for the Solinst).
   c. Record the depth to the water from the top of the PVC pipe to within 0.01 feet on the Low Flow Sample Purge Form.
   d. Record the water level depth every minute, for the first three, on the Low Flow Sample Purge Form. Then record the water level every three minutes along with the other field meter readings.
   e. Remove cable and rinse with deionized water.

5. Notes.

   a. The static water level must be taken before there is any disturbance to the water in the well.

## 7.5 Dissolved Oxygen

1. Discussion. Dissolve Oxygen (D.O.) measurements are important in a groundwater monitoring program in indicating when well water stabilization has occurred.

2. Sampling and Preservation. Samples must be analyzed continuously throughout the low flow sampling event.

3. Methodology. Oxygen, Dissolved – Method 360.1 (Membrane Electrode)

4. Reference Literature. U.S. EPA "Methods for Chemical Analysis of Water and Wastes" (EPA-600/4-79-20), revised March 1983.

5. Apparatus.

   a. D.O. Meters (YSI Model 58)
   b. Accessories and replacement parts

6. Reagents.

   a. KCl electrolyte solution
   b. Distilled water

7. Procedure.

   a. Prior to performing D.O. measurements, check to ensure no air bubbles are present at the membrane interface. If a bubble is present, the membrane must be reconditioned as prescribed in the instrument's instruction manual.

b. Set the function switch to % mode. Place the end of the probe in a plastic bottle containing a wetted sponge. This will expose the membrane to a constant temperature and 100 % relative humidity.

c. Set the function switch to "zero" and readjust the display to read 0.00 if necessary. Switch back to % air saturation mode.

d. When the display reading has stabilized, unlock the "$O_{2\ Calib}$" control locking ring, adjust the display to read 98.6, and relock the ring.

e. Insert the probe's membrane in the groundwater flow through cell (water must be flowing through the cell) and the function switch should be set to the 0.1 mg/L range.

f. Start recording the D.O. readings, on the Low Flow Purge Form, every three minutes until one of the four sampling conditions are met. The D.O. readings for surface water samples will be taken once a stable reading is obtained.

8. Notes.

a. Meter must be turned on at least one half hour prior to performing D.O. measurements to ensure probe stabilization.

b. Batteries should be removed from meter during long periods of storage (more than three months).

c. Refer to operator's manual for measurement errors.

## 7.6 Turbidity

1. Discussion. An important field test parameter in determining well water stabilization is turbidity, since suspended matter can affect other test parameters (i.e., metals).

2. Sampling and Preservation. Samples are analyzed every three minutes throughout the low flow sampling event.

3. Methodology. Turbidity, Method 180.1 (Nephelometric).

4. Reference Literature. U.S.EPA "Methods for Chemical Analysis of Water and Wastes" (EPA-600/4-79-20), revised March 1983.

5. Apparatus.

   a. Turbidimeter (Hach 2100P)
   b. Cells

6. Reagents.

   a. Primary Turbidity Standards
   b. Secondary Turbidity Standards
   c. Distilled Water

7. Procedure.

   a. Press the power button (I/O) to activate instrument. Rinse a clean sample cell with dilution water several times. Fill the cell to the line with the groundwater sample and wipe the cell with a lint-free cloth to remove water and fingerprints.
   b. Insert the sample cell into the cell compartment by aligning the orientation mark on the cell with the mark on front of the cell compartment and close the lid.
   c. Select the automatic range selection by pressing the "Range" key. The display will show "Auto RNG" when the instrument is in the automatic range selection. This option will automatically be selected for subsequent samples.
   d. Select the signal averaging mode by pressing the "Signal Average" key. The display will show SIG AVG when the instrument is using signal

averaging. This option will automatically be selected for subsequent samples.

e. Press the "READ" button. The display will show ---- NTU, then the turbidity of the sample in NTU. Record the turbidity on the groundwater field data sheet.

f. For additional sample measurements, repeat steps a, b, and e.

8. Notes.

a. Avoid entrained air bubbles by pouring the sample slowly down the side of the cell.

b. Make sure cold samples do not fog the sample cell.

c. Do not leave the sample cell in the sample compartment for extended periods of time, since this may compress the spring in the cell holder.

d. When taking measurements make sure instrument is on a level, stationary surface.

e. Remove sample cell and batteries from instrument if storing for an extended period of time.

f. Avoid settling of sample prior to measurement.

g. Wipe outside of sample cell prior to performing measurement with lint free cloth or paper.

## 7.7 $H_2S$ Gas Testing

1. Discussion. The purpose of the testing for Hydrogen Sulfide gas ($H_2S$) is to ensure that operators and transient employees are not being exposed to harmful levels.

2. Sampling and Preservation. Sampling must be performed at the landfill.

3. Methodology. Single Sensor Gas Detector

4. Reference Literature. Refer to Biosystems Inc. Reference Manual.

5. Apparatus.

   a. Toxi Plus Gas Detector
   b. Aspirator and tygon tubing

6. Reagents.

   a. Calibration gas

7. Procedure.

   a. Turn meter on by depressing large black button. The display will flash between 0 and $H_2S$.
   b. Measurements are made at the operator's building and leachate pumping station by aspirating the surrounding air for two to three minutes.
   c. Measurements are performed on the leachate sump and catch basins by aspirating the air inside the structures for approximately two to three minutes.
   d. Measurements are performed at the well (107B) via a capped tubing connection from the well to the meter's sensor. Sample collection involves aspirating the air inside the well for approximately two to three minutes.
   e. The highest value obtained over this two to three minutes is recorded on the Dolby Landfill Gas Monitoring Field Sheet (refer to Attachment A) at each location.

8. Notes.

a. Replace the batteries when a "B" appears in the lower left hand corner of the display screen. Additionally the audible alarm will beep one per minute until the batteries are replaced.

b. Refer to the Biosystems Inc. reference manual for troubleshooting meter.

## 7.8 LEL/Gas Testing

1. Discussion. The purpose of LEL/Gas testing is to determine the concentration of combustible gases at the landfill.

2. Sampling and Preservation. Samples must be analyzed in the field.

3. Methodology. Combustible Gas Indicator.

4. Reference Literature. Refer to Gascope Combustible Gas Indicator Instruction Manual.

5. Apparatus.

a. Combustible Gas Indicator (Gascope MSA Model 62S).

b. Aspirator and tygon tubing.

6. Reagents. (None)

7. Procedure.

a. Open cover and set "RANGE" switch to LEL.

b. Set "ON/OFF" switch to ON. READY indicator light should turn on within 4 seconds. BATT indicator pointer should be a least halfway into white zone.

c. Squeeze aspirator bulb eight to ten times to purge instrument with fresh air. Permit bulb to inflate completely after each squeeze.

d. Lift and adjust "LEL/ZERO" control to obtain zero indication on meter.

e. Set "RANGE" switch to GAS. The READY indicator should momentarily turn off and then turn on within 4 seconds.

f. Lift and adjust "GAS ZERO" control to obtain zero indication on meter.

g. Measurements are performed at the leachate pump station and operator's building by aspirating the surrounding air for two to three minutes.

h. Measurements are performed on the leachate sump and catch basins by aspirating the air inside the structures for approximately two to three minutes.

i. Measurements are performed at the well (107B) via a capped tubing connection from the well to the meter's sensor. Sample collection involves aspirating the air inside the well for a two to three minute time period.

j. The highest measurement read at these four sample locations is recorded on the Dolby Landfill Gas Monitoring Field Sheet.

8. Notes.

a. Due to potential high concentration of combustible gas, set the function switch to GAS, rather than LEL, at the catch basin locations only. An extremely high concentration using the GAS mode could potentially ruin the sensor.

b. Refer to operator's manual for maintenance and troubleshooting issues.

## 7.9 Quality Assurance

SPO recognizes the importance of a quality assurance plan to ensure:

1. A representative sample has been collected from each well.

2. The samples collected are properly labeled and preserved.

3. The groundwater field tests are performed accurately.

This is accomplished by technicians trained in field testing and sample collection. This portion of the Quality Assurance Program deals specifically with field collection and test procedures. The quality control measures implemented are as follows:

1. Sample Containers. New sample containers are received from the contracted laboratory prior to each sampling event.

2. Field Instrumentation. All probes (i.e., pH, temperature, D.O., and conductivity) and sample cells (i.e., turbidity) are rinsed thoroughly with distilled water between well sampling events to avoid contamination problems.

3. Field Instrument Calibration. Prior to performing field test measurements, instrument calibrations must be performed. The following steps are taken to ensure accurate and precise measurements are made:

    a. pH Meter.
        (1) A two-point calibration curve is performed using pH buffers bracketing the anticipated well water pH measurement following the manual's calibration procedure.
        (2) A known pH buffer solution is measured at the beginning and end of the sampling event. This serves as the precision and accuracy check for the instrument.
        (3) A certified known is measured annually for verification of proper instrument and electrode operation.

(4) If a malfunction occurs with the field pH meter, the second portable pH meter will be utilized.

(5) The following information is recorded on the Groundwater Well Sampling Meter Check Form (refer to Attachment A).

- Accuracy and precision check;
- Buffers used to calibrate pH meter; and
- Make and model number of pH meter used.

b. Conductivity Meter.

(1) A purchased conductivity standard is measured before and after the sampling event. The results of these measurements serve as the precision and accuracy check.

(2) If the conductivity reading is not within the tolerance range as specified on the conductivity standard's label, corrective steps are taken as outlined in the instruction manual.

(3) A check of the temperature compensator performance is performed by measuring a cooled conductivity standard at the anticipated well water temperature. If inaccurate readings are observed, temperature measurements must be made using an NBS traceable thermometer and corrections in measured conductivities made.

(4) The following information is recorded on the Groundwater Well Sampling Meter Check Form:

- Accuracy and precision check;
- Conductivity of standard used; and
- Type and model number of instrument used.

c. Temperature Meter.

(1) Before the first round of sampling, an annual accuracy check of the temperature portion of the pH meter probe is performed by checking the field temperature probe in the range of the expected groundwater temperatures versus an NBS traceable thermometer. If the probe temperatures are not within the tolerance limits, a correction factor is applied.

(2) This information is recorded in the staging notebook along with the analyst's signature. The type and model number of the temperature meter used is recorded on the Groundwater Well Sampling Meter Check Form.

d. Water Level Meter.

(1) Before sampling the meter is checked to determine battery performance. If the meter does not respond, the battery is replaced and the meter rechecked.

(2) If there is any doubt the meter is not reading correctly, the operator may check the probe in a container of water to confirm that it is working properly.

(3) The type and model # of the water level meter being used is recorded on the Groundwater Well Sampling Check Form.

e. D.O. Meter.

(1) Check membrane of probe for bubble(s). If bubble(s) are present, remove membrane, refill the probe with electrolyte, and install a new membrane (refer to instruction manual).

(2) Replace batteries when "LOBAT" warning is displayed.

(3) An air calibration is performed by first placing a plastic bottle containing a wetted sponge over the probe. This subjects the membrane to a known oxygen concentration at 100 % relative humidity. The function switch is set to % mode and after reading stabilization, the $O_2$ knob is adjusted to 100.0 % and then locked in place.

(4) The function switch is then set to the proper concentration mode to perform D.O. measurements.

(5) The type and model # of the meter being used is recorded on the Groundwater Well Sampling Meter Check Form.

f. Turbidity Meter.

(1) An annual calibration check is performed prior to the first sampling event of each year using four primary standards. Follow the

calibration procedure outline in the operator's manual (Section 3.6.7, pages 30 – 33).

(2) After primary standard calibration, three secondary standards (gel filled) are measured. The values are recorded on a label and affixed to the cap of each secondary standard. The secondary standard is read prior to and after the subsequent groundwater monitoring event to ensure the instrument's calibration hasn't drifted. If a difference of more than +/- 10 % has occurred the instrument must be recalibrated.

(3) The following information is recorded on the Groundwater Well Sampling Meter Check Form.

a. Type and model # of meter used.

b. Turbidity value of known secondary standard used.

c. Turbidity reading before and after sampling event.

g. $H_2S$ Meter.

(1) The $H_2S$ meter is calibrated prior to each sampling event using a known standard gas in approximately the same range as the anticipated air samples. The calibration procedure used is in Chapter 3 (pages 31 – 46) of the meter's reference manual.

h. LEL/Gas Meter.

(1) The LEL/Gas meter is calibrated periodically by the manufacturer.

4. Standards. Purchased conductivity standards and pH buffers are dated when received and discarded before the expiration date.

5. Duplicate Sampling. Duplicate samples are collected randomly on 10 percent of the total number of wells sampled at each groundwater facility. This verifies uniformity of well water quality and field collection techniques.

6. Equipment Blanks. If non-dedicated sampling equipment is used, field equipment blanks will be collected. A field blank will be prepared using analyte-free water. This water will be passed through the sampling equipment and

collected in an empty sample container for analysis. The field blank will be analyzed for the same sample parameters as the groundwater.

7. Chain-of-Custody. The contracted laboratory will supply a Chain-of-Custody form.

8. Trip Blanks. A VPH trip blank will accompany all VPH samples from sample collection to analysis to ensure airborne contamination has not occurred.

## 7.10 Piezometric Readings

There are three wells (P-301, P-403, and P-404) located at Dolby Landfill dedicated for performing piezometric readings during each sampling event. These reading are recorded on the Piezometer Well Sampling Sheet (refer to Attachment A). The purpose of these measurements is to track seasonal fluctuations in water level and to estimate horizontal and vertical water flow patterns.

## 7.11 Well Maintenance

In order to maintain well integrity, a program was implemented, to perform annual well inspections. The inspection includes examination of:

1. The steel guard pipe;
2. Inner PVC pipe;
3. Bentonite seal around base of guard pipe; and
4. Ensure wells are locked.

If any damage is noticed (i.e., broken lock or PVC pipe), the following steps are taken:

1. The information is noted on the Groundwater Well Maintenance Form (refer to Attachment A) and a follow up entry is made when the repair work is completed.

2. The damage is reported immediately to the Landfill Operator, who is responsible for the repair work; and

3. All well maintenance work performed throughout the year is summarized in the yearend report sent to the MEDEP.

Annual well depth determinations are performed to monitor any sediment build-up. If significant build-up has occurred (>1 foot), the build-up must be pumped out. Well depths used for comparison will be the well depths in 1994. The depths recorded on the well logs were not used because the readings taken in 1994 varied by as much as four feet. The wells were cleaned in 1994 with no change in well depth. Therefore, the depths recorded in 1994 are considered baseline for the well depths. This information is recorded and kept on file at the Landfill Operator's office.

Additionally, the surface seal and protective casing is inspected during each sampling event. The condition of each well is recorded on the Low Flow Sample Purge Form.

## 7.12 Site Location Maps

Site location maps showing monitoring well locations for Dolby I, II, and III and gas monitoring locations are included in sampling event reports to the MEDEP (Figure 4-1 and Figure 4-2). This provides a visual picture with regard to:

1. Groundwater, surface water and gas monitoring sampling locations;

2. Locations of potential impact areas; and

3. Drawing conclusions on analytical test results performed on ground and surface water.

## 7.13 Sample Volume, Preservation, and Holding Times

All sample volumes, preservation, and holding times will be set by the contracted laboratory and will follow required standard and EPA methods.

7.13.1 Sample Volume. The contracted laboratory will determine the needed sample size for each analysis.

7.13.2 Sample Preservation. The contracted laboratory will set the sample preservation for each sample.

7.13.3 Holding Times. The contracted laboratory will follow the holding times set forth in each analytical method.

## 8.0 DECONTAMINATION OF EQUIPMENT

Decontamination of sampling equipment is required both prior to initiation of sampling and between each sample location to eliminate the potential for cross contamination of samples with the analytes of interest.

### 8.1 Field Instrumentation

Field instrumentation, i.e., pH and specific conductance probes will, under no circumstances, be introduced into a sampling device or sample bottle. However, to minimize latent influences between sampling locations, the probes will be rinsed with clean water and, when appropriate, wiped dry with clean paper towels.

## 9.0 SAMPLE CHAIN OF CUSTODY

Chain-of-Custody forms supplied by the contracted laboratory will be utilized.

### 9.1 Sample Monitoring Form

The use of this form accomplishes one or more of the specific objectives of sample custody, identification, control, and written documentation that the Dolby Landfill EMP is being followed. The forms that have been mentioned in previous sections are discussed below and include:

1. Low Flow Sample Purge Forms;
2. Surface Water Sampling Sheet;
3. Piezometer Well Sampling Sheet;
4. Groundwater Well Sampling Meter Checks;
5. Groundwater Well Maintenance Form; and,
6. Dolby Landfill Gas Monitoring Field Sheet.

A copy of these sample forms is provided in Attachment A.

9.1.1 Low-Flow Sample Purge Form. The function of this form is to note weather conditions, conditions of the well's surface seal and protective casing, field test measurements, and the sampling conditions met prior to sample collection.

9.1.2 Surface Water Sampling Sheet. The Surface Water Sample Data Sheet will be completed by the field technicians. The function of this form is to note weather conditions, date and time sample collected, flow at sample location (if applicable) and field test measurements.

9.1.3 Piezometer Well Sampling Sheet. This field sheet contains required information for the three piezometer wells. This information includes the water level, weather conditions, date of site visit, and field technician involved.

9.1.4 Groundwater Well Sampling Meter Checks Form. The purpose of this form is to document that the field instrumentation has been properly calibrated prior to the sampling event. This ensures accurate groundwater measurements are taken. The form is completed in the laboratory and signed by the field technician performing the calibration checks.

9.1.5 Groundwater Well Maintenance Form. The purpose of this form is to inspect the condition of each well, document any needed repair, and report this information to the Landfill Operator, who will oversee the repair work. This preventive maintenance schedule will help avoid any well water contamination problems. The form has a check list of critical items to inspect, any helpful comments describing the maintenance problem, and a follow-up section outlining what and when the repair work was performed. These forms are kept on file at the Landfill Operator's office. The maintenance work performed during the year is summarized in the yearend report sent to the MEDEP.

9.1.6 Dolby Landfill Gas Monitoring Field Sheet. The purpose of the sheet is to document gas testing performed by the field technicians at the landfill. The sheet contains information on the sample location, meters used, technician performing tests, and $H_2S$ (ppm) and LEL (%) levels.

9.2 Packing and Shipping

In addition to sample collection and preservation requirements, especially the maintenance of sample temperature at four degrees centigrade until extraction or analysis, samples will be so packed and shipped as to maintain the sample container integrity and the health and safety of sample transporters.

9.2.1 Packing. Sample containers are generally packed in picnic coolers for shipment. Bottles are to be packed tightly, with ice, so that no motion is possible. All chain of custody forms are placed into a "Ziploc" bag and placed into the cooler. The cooler top is then taped shut. Custody seals and taping of coolers may be required for certain samples.

9.2.2 Shipping. The standard procedure followed for shipping environmental samples to the analytical laboratory is:

1. All shipping to outside laboratories of environmental samples collected by field personnel must be done through Federal Express or equivalent overnight delivery service.

2. If prompt shipping and laboratory receipt of the samples cannot be guaranteed (i.e., Sunday arrival), the samplers will be responsible for proper storage of the samples until suitable transportation arrangements can be made.

## 10.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

QA/QC is an integral part of this sampling and analytical program to allow assessment of the adequacy of analytical results for their intended use. QA/QC activities associated with sampling include the utilization of standardized collection procedures and sample data records (as described above), calibration of field instruments, and the use of chain-of-custody procedures. Analytical QA/QC involves the use of approved analytical protocols by qualified laboratories. Assessment of analytical data quality is performed through review of method-specified quality control data, to be delivered along with the analytical results.

### 10.1 Data Validation

The following data validation methods will be used to verify the accuracy and precision of the reported results:

- Verification of continuous chain-of-custody for each sample;
- Verification that sample holding times were met;
- Total dissolved solids/specific conductivity ratio calculation and tabulation;
- Duplicate sample Relative Percent Difference (RPD) calculation and tabulation;
- Evaluation of duplicate analysis performance;
- Comparison of current data with historical data and identification of anomalous results; and
- Identification of any parameter in field equipment blanks.

## 10.2 Statistical Analyses

Where data is sufficient, statistical analysis of the sample data from each monitoring well will be completed annually and reported. Statistical analysis will be conducted in accordance with the July 1992 Addendum to Interim Final Guidance for Statistical Analysis of Groundwater Monitoring at RCRA Facilities and/or other approved procedures that are appropriate for the database.

## 11.0 REPORTING REQUIREMENTS

Monitoring data will be submitted to the MEDEP within 30 days of SPO's receipt and evaluation of laboratory results. A report including the following will be submitted to the MEDEP on an annual basis:

- Map showing the licensed facility, waste handling boundaries, and location of each monitoring point;
- Summary of results of the environmental monitoring program;
- Historical data summary;
- Statistical analysis;
- Data validation results;
- Table of current and historical data (including field parameters and groundwater elevation levels);
- Identification of elevation reference datum;
- Exceedance of MCL/MEGs;
- Copies of laboratory data sheets, chain of custody forms, all field data sheets, and recommendations for any proposed changes are kept on file for at least two years after sampling event.

# ATTACHMENT A

# FIELD DATA SHEETS

**FIELD INSTRUMENT CALIBRATION**
**DAILY OPERATING LOG**

| | |
|---|---|
| CLIENT: | DATE/TIME: |
| PROJECT SITE: | JOB NUMBER: |

| Meter Set | INSTRUMENT | MODEL ID NUMBER | UNIT ID NUMBER | UNITS OF MEASURE | STANDARD(S) USED IN CALIBRATION | CALIBRATION OR OFFSET CALCULATED | OPERATOR INITIALS |
|---|---|---|---|---|---|---|---|
| A | pH | Cole Palmer Acorn pH 6 | Box: | pH | | NA | |
| | Specific Conductivity | Cole Palmer Acorn Con 5 | Box: | Microsiemens | | NA | |
| | Turbidity | LaMotte 2020 Turb.Meter | Box: | NTU | | NA | |
| | ORP | Cole Palmer pH Series 20 | Probe:<br>Box: | mV | 4 -<br>7 –<br>Quinhydrone | | |
| B | pH | Cole Palmer Acorn pH 6 | Box: | pH | | NA | |
| | Specific Conductivity | Cole Palmer Acorn Con 5 | Box: | Microsiemens | | NA | |
| | Turbidity | LaMotte 2020 Turb.Meter | Box: | NTU | | NA | |
| | ORP | Cole Palmer pH Series 20 | Probe:<br>Box: | mV | 4 -<br>7 -<br>Quinhydrone | | |
| | | | | | | | |
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ADDITIONAL NOTES:

## FLOW CELL METERS

MONITORING WELL SAMPLE PURGING FORM

(page ___ of ___)

SITE: _____ PROJECT NO: _____ DATE: _____

SAMPLE LOCATION: _____ WEATHER: _____

SAMPLE ID: ___ _____ __ _____ START TIME: _____ END: _____

(DUPS) ___ _____ __ _____ TRIP BLANK ID: ___ _____ __ _____

___ _____ __ _____

WELL DEPTH: _____ FT
( ) TOP OF WELL ( ) TOP OF CASING
( ) MEASURED ( ) HISTORICAL

WATER DEPTH: _____ FT
( ) TOP OF WELL ( ) TOP OF CASING
( ) MEASURED ( ) HISTORICAL

CONDITION OF WELL:
SURFACE SEAL: ( )GOOD ( )CRACKED
( )OTHER: _____
PROTECTIVE CASING: ( )LOCKED
( )NO LOCK
( )SECURE
( )NEEDS REPAIR(ABLE TO MOVE)

TUBING INLET (TPVC) _____
TUBING DIAMETER _____ (ID)
SCREENED INTERVAL (TPVC) _____ TO _____

WELL: ( )CAP ( )NO CAP
WELL MATL: ( )PVC ( )SS ( )OTHER: _____

PUMPING START TIME: _____ PUMPING END TIME: _____

EQUIPMENT DECONTAMINATION

| PURGING | SAMPLING | |
|---|---|---|
| ( ) | ( ) | PERISTALTIC PUMP ISCO |
| ( ) | ( ) | PERISTALTIC PUMP GEOTECH |
| ( ) | ( ) | SUBMERSIBLE PUMP |
| ( ) | ( ) | BLADDER PUMP |
| ( ) | ( ) | AIR LIFT PUMP |
| ( ) | ( ) | BAILER I.D._____ |
| ( ) | ( ) | LDPE/SILICON TUBING |
| ( ) | ( ) | TEFLON/SILICON TUBING |
| ( ) | ( ) | IN-LINE FILTER |
| ( ) | ( ) | DEDICATED SIL. TUBING |
| ( ) | ( ) | DEDICATED POLY. TUBING |

DECONTAMINATION FLUIDS USED

( ) DISTILLED/DEIONIZED WATER
( ) TAP WATER
( ) NON-PHOSPHATE DETERGENT
( ) 10% NITRIC ACID
( ) HIGH-PRESSURE STEAM CLEAN
( ) _____

AMOUNT OF WATER CONTAINED IN DEDICATED SYSTEM: _____
AMOUNT OF WATER PURGED PRIOR TO GRAB SAMPLE COLLECTION: _____

NOTES: _____

**SAMPLED BY:** _____

# MONITORING WELL SAMPLE PURGING FORM - PART II



SITE: _____ DATE: _____

SAMPLE LOCATION: _____ ORP OFFSET: _____ mV

| Elapsed Time (min) | Liters Pumped | Flow Rate (ml/min) | WL TPVC (ft) | WL Top of Casing (ft) | Turb (1) | pH (2) | Spec Cond (3) | Temp °C (4) | DO (5) | ORP (6) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit ID Number: | | | | | | | | | | | |
| Model ID : | | | | | | | | | | | |
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NOTES:

(1) TURBIDITY (NTU)
(2) pH (STD UNITS)
(3) SPECIFIC CONDUCTANCE (umhos/cm @25C)
(4) TEMPERATURE (C)
(5) DISSOLVED OXYGEN (ppm)
(6) UNADJUSTED OXIDATION REDUCTION POTENTIAL (+- mV)

SEVEE & MAHER ENGINEERS, INC.
SAMPLE DATA RECORD
SURFACE WATER

SITE ID: _____ SAMPLE DATE / TIME : _____

SAMPLE LOCATION: _____ SAMPLER : _____

SAMPLE ID _____ WATER BODY SAMPLED _____

SAMPLE COLLECTION METHOD DEPTH @ SAMPLE SITE _____

_____ DEPTH OF SAMPLE _____

DECON (Y/N) _____ FLOW RATE/VELOCITY _____

SAMPLE APPEARANCE/ODOR _____

TEMPERATURE _____C $E_H$ _____mV

CONDUCTIVITY _____µmhos/cm $E_H$ OFFSET _____mV

DISS. OX. _____mg/L PHENOLTHALIEN ALKALINITY _____ (# of drops) x
_____ (mg/L per drop) =
_____ mg/L

TURBIDITY _____NTU

TOTAL ALKALINITY _____ (# of drops) x
_____ (mg/L per drop) =
_____ mg/L

pH _____

INSTRUMENTS CALIBRATED (date) _____

DUPLICATE SAMPLE COLLECTED (Y/N) _____ IF YES, SAMPLE ID _____

SAMPLE BOTTLES FILLED (ID) _____(SEE COC)

NOTES:

LOCATION SKETCH:

# CHAIN–OF–CUSTODY RECORD

PAGE ____ OF ____

SEVEE & MAHER ENGINEERS, INC. • P.O. BOX 85A • 4 BLANCHARD ROAD • CUMBERLAND CENTER, MAINE 04021 • (207)829–5016 • FAX (207)829–5692

| | | |
|---|---|---|
| CLIENT: | PROJECT NAME: | PROJECT/ P.O. #: |
| REPORT TO: | ADDRESS: | |
| INVOICE TO: | ADDRESS: | |
| SAMPLED BY: (PRINT) | SAMPLER SIGNATURE: | |

FILTERED (Y/N)
PRESERVED
ANALYSIS REQUIRED

LEGEND FOR PRESERVATIVE
1 – 4° CELSIUS
2 – HCl
3 – $HNO_3$
4 – $H_2SO_4$
5 – $Na_2SO_3 + H_2SO_4$
6 – NaOH

| ITEM NO. | SAMPLE IDENTIFICATION | DATE | TIME | COMPOSITE OR GRAB | W–WATER L–LIQUID S–SOLID | TOTAL NUMBER OF CONTAINERS | REMARKS | LAB SAMPLE # |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
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| RELINQUISHED BY: | DATE: | TIME: | RECEIVED BY: | DATE: TIME: |
| RELINQUISHED BY: | DATE: | TIME: | RECEIVED BY: | DATE: TIME: |
| RELINQUISHED BY: | DATE: | TIME: | RECEIVED BY: | DATE: TIME: |

D:\FORM\ACAD\SME11 REV.7/13/2009

A CHAIN OF CUSTODY IS REQUESTED WITH EACH SET OF SAMPLES

| WATER LEVEL OBSERVATIONS<br>FIELD DATA SHEET | | | | | |
|---|---|---|---|---|---|
| **Project: MSPO – DOLBY LANDFILL** | | | | **Date:** | |
| **Field Personnel:** | | | | **Job Number:** | |
| **Well Number** | **Time of Reading** | **Stickup PVC (ft)** | **Water Depth From Top of PVC (ft)** | **Bottom Depth From Top of PVC (ft)** | **Comments (Condition of Well)** |
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# MAINE STATE PLANNING OFFICE
# GAS MONITORING FORM

SITE: DOLBY LANDFILL GAS MONITORING PROJECT NO.:_____

DATE: _____ WEATHER:_____

METER ID:_____ CALIBRATION GAS:_____

| LOCATION IDENTIFICATION NUMBER | TIME FOR READING | METHANE EQUIVALENT | | METHANE EQUIVALENT AMBIENT | | $H_2S$ PPM | $H_2S$ AMBIENT PPM | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | % LEL | % VOLUME | % LEL | % VOLUME | | | |
| Catch Basin #4 | | | | | | | | |
| Catch Basin #6A | | | | | | | | |
| Catch Basin #13 | | | | | | | | |
| Catch Basin #21 | | | | | | | | |
| Catch Basin #22 | | | | | | | | |
| Catch Basin #30 | | | | | | | | |
| Catch Basin #35 | | | | | | | | |
| Catch Basin #39 | | | | | | | | |
| Catch Basin #43 | | | | | | | | |
| Catch Basin #45 | | | | | | | | |
| Well 107B | | | | | | | | |
| Operators Shack | | | | | | | | |
| Leachate Pump Station | | | | | | | | |
| Leachate Sump | | | | | | | | |

LEL CONVERSION: (%LEL/100) x 5 = %VOLUME

Sampler Signature:_____

**Ambient readings for % LEL and $H_2S$ should be taken next to the sample site prior to the reading taken at the sample site**
**Attention: If your % Methane reading equals 0, please write 0.1US as your reading**

US – Not detected above the reported reporting limit determined by interpreted instrument specification

# *Maine State Planning Office*
# *Dolby Landfill*

Groundwater Well Maintenance Form

**Facility Location:** _____ **Well No.** _____

**Date:** _____

**Performed By:** _____

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**Well Depth:** _____ (measure to top of PVC pipe)

**Top of PVC pipe to ground:** _____

**Well Condition:**

| | | | | |
|---|---|---|---|---|
| **Surface Seal:** | ( ) Good | ( ) Cracked | ( ) Other (See Comments) | |
| **Protective Casing:** | ( ) Good | ( ) Locked | ( ) Unlocked | ( ) Needs Repair |
| **PVC Pipe Conditions:** | ( ) Good | ( ) Cracked | ( ) Other (See Comments) | |

**Comments:** _____

_____

_____

_____

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**Completed Well Work:** _____

_____

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_____

_____

_____