SAMPLING AND ANALYSIS PLAN

Prepared for:

BLACK & DECKER (U.S.) INC.
Hampstead, Maryland

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SECTION 1
INTRODUCTION

Pursuant to the April 1995 Consent Order between MDE and Black & Decker (U.S.) Inc., this Sampling and Analysis Plan (SAP) provides a description of field and laboratory procedures to be followed during investigative activities at the Hampstead, Maryland facility. A description of the Field Sampling Plan is presented in Section 2. The Laboratory Quality Assurance Plan is presented in Section 3. The Site Health and Safety Plan is presented in Section 4.

SECTION 2
FIELD SAMPLING PLAN

2.1 SAMPLING LOCATIONS

Groundwater sampling will be performed on a quarterly basis. Monitor well locations to be sampled are included in Table 2-1. Surface water and sediment samples will be collected from both the east and west lagoons on a bi-annual basis for a period of one year. In addition, test pits are to be excavated in the brush pile area.

2.2 FIELD OPERATIONS

2.2.1 Soil Investigations

2.2.1.1 Test Pit Excavation

Test pit investigations will be performed using a backhoe. Test pits will be excavated to either the water table, to refusal, or to the maximum reach of the backhoe, whichever is encountered first. Test pit excavation will be supervised by a Weston geoscientist, and complete logs (including visual descriptions of lithology, observations of groundwater occurrence, and instrument readings) will be completed. All descriptions will be made by observations of downhole conditions from the surface, or by examination of material pulled to the surface by the backhoe bucket. The geoscientist will describe the soil after it has been deposited on a plastic sheet situated a minimum of 3 ft from the test pit opening. An HNu photoionization meter or OVA flame ionization detector will be used for air monitoring, and a combustible gas meter will be used to monitor gas emissions in all test pits. If entrance into test pits by Weston personnel is required for soil sampling, the excavation will be sloped or benched in compliance with OSHA requirements. Requirements for sloping are discussed in the HASP.

Table 2–1
Black and Decker
Quarterly Groundwater Sampling Locations

WELL ID NO.
EW–1
EW–2
EW–3
EW–4
EW–5
EW–6
EW–7
EW–8
EW–9
EW–10
RFW–1A
RFW–1B
RFW–2A
RFW–2B
RFW–3B
RFW–4A
RFW–4B
RFW–5A
RFW–6
RFW–7
RFW–8
RFW–9
RFW–10
RFW–11A
RFW–11B
RFW–12B
RFW–13
RFW–16
RFW–17
RFW–18
RFW–19
TOWN #22
TOWN #23
LEISTER DAIRY WELL
LEISTER RES. WELL #1
LEISTER RES. WELL #2
LEISTER RES. WELL #3
JOS. A BANK PROD. WELL #1
JOS. A BANK PROD. WELL #2
"SHOPPING CENTER" WELL*

* proposed location

Soil samples will be collected from the identified depths using the backhoe bucket. The backhoe will deposit the material to be sampled on plastic sheeting, and the geoscientist will collect samples using dedicated stainless steel trowels and/or scoopulas. Each test pit will be photographed during excavation and/or upon completion.

If field screening indicates the potential for soil contamination, excavated soils will be segregated into two separate piles, one for potentially contaminated soils and another for soils showing no signs of contamination. Samples will be collected for analysis from each of these piles.

Upon completion, test pits will be backfilled using the soil removed during test pitting pending results of laboratory analysis of those soils, and/or with clean soil from an off-site source. The fill will be compacted with the backhoe to ensure that no cave-ins occur. All test pit locations will be tied horizontally to a coordinate system and vertically to a U.S. Coast and Geodetic Survey (USCGS) or U.S. Geological Survey (USGS) benchmark.

2.2.2 Groundwater Investigation

2.2.2.1 Water Level Measurements

Groundwater level measurements will be taken in wells on a monthly basis and prior to purging or sampling, using an electric water level probe graduated to 0.01 ft. Measurements will be referenced to a surveyed point marked on the top of the PVC or steel riser. The reference point will be described in the records for each well. The total depth of the well will be available from previous measurements. These data will determine the amount of water to be evacuated from each well prior to sampling. Water level measurements will be taken three times per well or until measurements are within ±0.01 ft. Measurements will be recorded in the field notebook and on field sampling sheets.

2.2.2.2 Monitor Well Sampling

Groundwater samples will be collected from monitor wells on a quarterly basis during the months of February, May, August, and November. Upgradient wells will be sampled first and wells suspected of having low levels of contamination will be sampled prior to those suspected of having medium or high levels. Procedures for sampling monitor wells are as follows:

- Water level measurements will be taken to the nearest 0.01 ft with respect to the established survey point located on top of the well casing. All measuring devices used in the well will be decontaminated as specified in Subsection 2.2.4.1 prior to use at each well. The total depth of the well will be measured previously and recorded. The depth to the static water surface will be subtracted from the total casing depth to determine the height and, subsequently, the volume of standing water in the casing.

- To ensure that samples are representative of groundwater quality, a submersible pump will be used to remove a minimum of three times the calculated volume of water in the well casing. The pump will be equipped with a foot-operated check-valve to prevent purged water from flowing back into the well. Wells that become dewatered prior to producing three casing volumes will be sampled as soon as practical once they recover sufficiently.

- Purge water will be containerized if previous analytical data indicate that contaminant levels exceed MCLs.

- Temperature, pH, and electrical conductivity (EC) will be measured and recorded during purging. A visual observation of turbidity (i.e high, medium, low) will also be recorded. A sample will be taken after a minimum of three well volumes have been removed and when the temperature, pH, and EC have stabilized. If these parameters do not stabilize within three purge volumes, a maximum of six well volumes will be removed.

- The groundwater sample will be collected using a clean, dedicated Teflon bailer.

- All samples for chemical analysis will be placed in laboratory-prepared bottles. The bottles will be filled to the top and capped securely. The types of sample containers and preservatives required for VOC analysis are described in Subsection 2.3.1. If required, preservatives will be placed in the sample containers prior to collecting the samples. Extra care will be used in filling VOCs sample vials to ensure that the Teflon liner of the septum is facing inward and that no air bubbles are entrapped. Each sample bottle will be placed in an insulated cooler chest immediately after sampling and maintained at 4°C until extraction.

- All sample equipment will be decontaminated after sampling to prevent cross-contamination between wells, as detailed in Subsection 2.3.4.2. The bailer line will be disposed of at each well and will consist of polypropylene rope. Sampling bailers will be protected from contamination between sampling points by wrapping them in aluminum foil.

2.2.2.3 Extraction Well Sampling

The extraction wells will be sampled on a quarterly basis. Sampling of the extraction wells will be performed by running the spigot located at each well head to purge the lines between sampling. The spigot will be flushed for approximately two minutes prior to sampling. After water quality parameters (pH, temperature, and specific conductance) are measured, VOC samples will be collected directly from the spigot. Each sample bottle will be placed in an insulated cooler immediately after sampling and maintained at 4°C until extraction.

2.2.3 Surface Water and Sediment Investigation

2.2.3.1 Surface Water Sampling

A total of three surface water samples will be collected from each of the two surface impoundments located in the southern part of the site. These samples will be collected on a bi-annual basis for one year. Sampling of the impoundment will be performed by

use of a Kemmer Sampler or a similar device, permitting the collection of water samples from discrete depths in the water column. Samples will be collected at depths of approximately two-thirds of the distance from the surface to the bottom of the lagoon. Each location will be sampled for VOCs.

2.2.3.2 Sediment Sampling

Sediment samples will be collected using a Ponar dredge sampler or equivalent device. These sample devices will allow for collection of discrete samples of the sediment with minimal disturbance to the sediment. Three samples will be collected from each of the two surface impoundments. Each sample will be analyzed for VOCs.

2.2.4 Decontamination Procedures

All material and equipment will arrive at the site in clean condition. Procedures for equipment decontamination are described in the following subsections. Equipment decontamination will be performed at the wastewater treatment plant except as specified below.

2.2.4.1 Water Level Indicator Decontamination

Water level indicators used in wells will be decontaminated after use at the well location by flushing the electrical probe with ASTM Type II reagent water.

2.2.4.2 Water and Soil Sampling Equipment Decontamination

Bailers, bowls, spatulas, trowels, etc., will be decontaminated between sampling points. Pumps used for well purging will be decontaminated by submerging the pump intake in a washing solution (laboratory-grade detergent) and pumping this solution through the

pump system. The pump will then be placed in clean potable water and run until the discharge is detergent-free.

The procedure for decontaminating sampling equipment is:

- Rinse equipment in potable water to remove surface dirt and mud, if necessary.
- Scrub equipment with a bristle brush in laboratory-grade detergent and potable water.
- Rinse off soap with potable water.
- Rinse with ASTM Type II reagent water.
- Allow equipment to air dry before use.

2.3 SAMPLE HANDLING AND ANALYSES

2.3.1 Sample Containers, Sample Volumes, Preservation, and Holding Times

All samples submitted for analyses on this project will be collected by Weston personnel. Sampling containers and preservatives will be provided on request by the contracted analytical laboratory. For water samples, the specific requirements for sample containers, preservatives, and sample volumes for VOCs (Method 8260) are 40 ml clear glass vials with Teflon-lined septum caps, preserved with hydrochloric acid. For soil samples, 120 ml clear glass bottles with Teflon-lined caps, unpreserved, are required for VOC analysis.

Once samples have been collected, field personnel will return to the laboratory with the analytical samples and a completed chain-of-custody record.

The holding times for all required analyses are measured from time of sample collection. Holding time for VOC samples (Method 8260) is 14 days.

Upon sample receipt at the project laboratory, all sample collection dates are noted by the sample custodian. The required dates for completion of analyses (or extractions) are noted on the chain-of-custody record and are keyed to the holding times.

2.3.2 Sample Custody

The purpose of sample custody procedures is to document the history of sample containers and samples (and sample extracts or digestates) from the time of container preparation through sample collection, shipment, and analysis. An item is considered to be in one's custody if:

- It is in the physical possession of the responsible party.
- It is in view of the responsible party.
- It is secured by the responsible party to prevent tampering.
- It is secured by the responsible party in a restricted area.

2.3.2.1 Sample Labels

All samples will be identified with a label that will be attached directly to the container. Sample labels will be completed using waterproof ink. The labels will contain the following information:

- Sample number.
- Time and date of collection.
- Site name (Black & Decker).
- Parameters to be analyzed.
- Preservative (if any).
- Sample source/location.

As each sample is collected it will be placed in a labeled container.

2.3.2.2 Chain-of-Custody Records

To maintain a record of sample collection, transfer between personnel, shipment, and receipt by the laboratory, a chain-of-custody record will be completed for each sample at each sampling location. Each time the samples are transferred, the signatures of the persons relinquishing and receiving the samples, as well as the date and time of transfer, will be documented.

2.3.2.3 Transfer of Custody and Shipment

Prior to shipment of samples, the chain-of-custody record will be signed and dated by a member of the Weston field team who has verified that those samples indicated on the record are indeed being shipped. After packaging has been completed, custody seals, signed and dated by a member of the Weston field team, will be placed on the cooler.

2.3.3 Sampling QA/QC Protocols

Field QA/QC samples will be collected and analyzed as part of all field sampling activities, including surface and subsurface soils and groundwater sampling. The following protocols will be followed for collection of QA/QC samples.

A trip blank consists of a sample bottle filled with ASTM Type II reagent water prepared in the laboratory, brought to the site with the sample bottles, and handled as a sample. One trip blank will be sent to the laboratory each day that VOC samples are collected. The trip blank for soils is also a Type II reagent water.

One equipment blank will be collected during each sampling round for soil and groundwater and analyzed for the same parameters as the corresponding soil or

groundwater samples. These equipment blank samples will be collected by pouring ASTM Type II reagent water through the sampling device (e.g., bailer) and into the appropriate sampling container.

Field duplicates will also be collected for water samples and soil samples. The number of field duplicates collected will equal 5% of the total number of samples. A field duplicate will be collected as a separate sample immediately after collection of the field sample that it is intended to duplicate. Collection procedures for field duplicates will be identical to the original samples.

Duplicate groundwater samples will be collected from the same bailer. Duplicate surface water samples will be collected as separate grab samples from the same location, one immediately after another.

2.4 FIELD MEASUREMENTS

2.4.1 Field Parameters

Several parameters will be tested in the field as part of the analytical protocol for water samples. All liquid samples will be tested for temperature, pH, and EC. Turbidity, color and odor will also be noted on the field logs. The following subsections describe the procedures for analysis of field parameters.

2.4.1.1 pH Measurement

The pH of liquid samples will be measured using a Fisher Model No. 107 portable water pH meter (or equivalent). The pH meter will be calibrated and checked against the standard buffer solutions before analyzing a sample. The probe will then be rinsed with distilled water and placed in the sample to be tested. The meter will stabilize for 1 minute before the pH is measured. After the measurement, the probe will be rinsed with

distilled water and placed in 7.0 buffer solution until the next test. Results will be recorded in the field logbook.

2.4.1.2 Electrical Conductivity and Temperature Measurement

Measurements of EC and temperature of liquid samples will be collected using a YSI Model 33 meter (or equivalent). When not in use the meter probe will be placed in a jar of distilled water. Prior to placing the probe in the sample and after measuring the EC and temperature of the sample, the probe will be rinsed with distilled water. The temperature will be taken with the knob set on "temperature" and the EC measured using the appropriate range of the "conductance" setting. A period of 1 minute will be allowed for the instrument to stabilize prior to taking the measurement. Results will be recorded in the field logbook.

2.4.2 Equipment Calibration Procedures and Frequency

2.4.2.1 pH Meter

The Fisher Model No. 107 pH Meter, or equivalent, is a portable pH monitoring instrument for determining pH in surface water and groundwater, waste systems, and other water quality applications.

The instrument requires field calibration daily or each time the meter is turned on (if more than once per day). The calibration will be checked at mid-day and at the end of the work day if it is left on all day. Distilled water and buffer solutions (pH 7, pH 4, and pH 10) are required for field calibration. All solutions must be at the same temperature to reduce meter stabilization time and to maintain accuracy. The instrument is calibrated as follows:

1. Rinse the electrode in distilled water.

2. Place the electrode in the pH 7 buffer solution and allow the meter reading to stabilize.

3. Adjust the control using the knob on the front panel of the instrument until the meter reads pH 7.

4. Rinse the electrode in distilled water.

5. Place the electrode in pH 4 solution and allow the meter readout to stabilize.

6. Adjust the control knob until the meter reads the correct value of the pH 4 solution.

7. Place the electrode in pH 10 solution and allow meter readout to stabilize.

8. Adjust the control knob until the meter reads the correct value of the pH 10 solution.

9. Record results in logbook.

2.4.2.2 Electrical Conductivity Meter

The YSI Model 33, or equivalent, is a portable, battery-operated, transistorized instrument used to measure salinity, EC, and temperature in surface water, groundwater, and wastewater systems. The meter is calibrated daily or each time the meter is turned on (if more than once per day) by turning the MODE control to REDLINE and adjusting the REDLINE control so that the indicator lines up with the redline on the meter face. The meter will also be calibrated with two solutions with concentrations ranging from 10 to 1,000 µmhos. The calibration will also be checked at the end of the work day if the meter is left on all day.

SECTION 3

ANALYTICAL LABORATORY QUALITY ASSURANCE PROGRAM PLAN

ANALYTICAL LABORATORY QUALITY ASSURANCE PROGRAM PLAN (QAPP) ROY F. WESTON, INC.

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QUALITY ASSURANCE PLAN

FOR

ROY F. WESTON, INC.

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