

Operations and Maintenance Procedures for Acceptance of Drill Cuttings

This section of the attachment to the Operations and Maintenance Manual of the Bath Landfill sets forth protocols for acceptance of natural gas drill cuttings. General handling procedures and prescribed analytical testing and acceptance criteria are as follows.

1) Prior to Arrival

- Generators of drill cutting waste will be subject to testing requirements set forth by the Assistant Commissioner for Landfills to determine if the waste is suitable for disposal in the landfill.

2) Arrival on Site

- When drill cuttings reach the facility, each truck will pass through a scale mounted radiation detector.
 - ✓ See "*Radiation Monitor Protocol and Procedure to Reject or Accept Loads based on Radioactivity.*"

3) Arrival at the Working Face

- Working face personnel will inspect the load to make certain that the load appears to be a minimum of 20% solids, as per DEC regulations.
 - ✓ If questionable, load will be rejected and truck will not be permitted to dump.
 - ✓ Additional sampling and testing may be required. See "*Drill Cutting Radiological Sampling Protocol at Landfill.*"
 - ✓ In the case of an analytical sample being taken, pending permission from the NYSDEC, load will be staged in an out-of-the way section of the landfill until results are received and evaluated.

4) Handling at the Landfill

- Once the cuttings are off-loaded, they may be mixed in with Processed C&D, if available, and mixed in with the normal waste stream in a method that does not interfere with landfill operations or landfill gas collection.
- The cuttings will be placed at the active working face, wherever that may be at the time, with the following exceptions:
 - ✓ There will be no drill cuttings placed within 10' of the primary liner.
 - ✓ There will be no drill cuttings placed within 10' of the proposed landfill cap.
 - The County will assure that these distances are maintained by surveys done on the landfill every 6 months.
- Cuttings will be placed away from areas where potential horizontal gas collection wells will be located, to avoid clogging of perforations in pipe.

Drill Cutting Radiological Sampling Protocol at Landfill

The following sampling and program shall be in effect for the first three years in which drilling cuttings are accepted. Collection of samples shall occur from selected loads as they arrive at the landfill.

- 1) Sampling and testing will be conducted by the contract laboratory, or a qualified subcontractor, that is performing the required environmental monitoring at the Bath Landfill.
- 2) Data recorded for each sample taken will be as follows:
 - a. Driller identification.
 - b. Source Site Location.
 - c. Identify as either Oil based cuttings or Air/water based cuttings.
 - d. Portal monitor measurement.
 - e. Hauler and truck body type.
- 3) The following radiochemistry tests will be performed on each sample:
 - a. Ra-226
 - b. Th-232
 - c. K-40
 - d. Gross Alpha/Gross Beta
- 4) There will be four periods during which sampling will occur. Samples will be taken as grab samples. Sampling will occur in the following manner, with a minimum of one sample taken per period:
 - a. Period 1 (first 3 months)
One sample will be taken for every 500 tons; 6 samples maximum.
 - b. Period 2 (next 6 months)
One sample will be taken for every 1,000 tons; 6 samples maximum.
 - c. Period 3 (next 12 months)
One sample will be taken for every 5,000 tons; 4 samples maximum.
 - d. Period 4 (next 15 months)
One sample will be taken for every 15,000 tons; 4 samples maximum.

Radiation Monitor Protocol

This protocol outlines the procedures to screen loads for unacceptable levels of radioactivity. The procedures outlined in this section apply to natural gas drill cutting loads as well as other waste loads screened at the site.

Each inbound load that enters the landfill shall be screened for radioactivity using a Ludlum Model 375P Waste Monitor, or equivalent, located at the scale/weigh station. This monitor is a "drive through" system that scans the waste hauling vehicles as they pass between the two detectors at slow speed or as they stop on the scale.

A log of daily background readings will be maintained at the landfill facility. The system shall be calibrated at least annually by either a qualified contractor or a trained member of the County staff. Field checks utilizing a source sample will be performed on a weekly basis. These documented field checks will ensure that the alarm is functioning within calibration standards.

As a truck passes through the detectors at the scale, the radiation monitoring system measures the radiation level emitted by the truck in kilo counts per second (kcps). The number of kcps over the normal "background" radiation level of the area is compared to the alarm set point indicated on the digital read-out in the scale house. Backlit indicators warn of a yellow low alarm level (Investigation Level) and a red high alarm level (Rejection Level). A green status light is an indication of normal instrument operation.

In the event the alarm sounds, the scale house attendant will immediately notify the truck driver to stop. The scale house attendant shall record the reading on the Radiation Monitor Alarm Record. The driver will be instructed to pull off of the scale and park in the designated area away from the detectors.

It is possible that the driver may be the source of the radiation. The driver will be instructed to walk near one of the detectors to determine if he/she had received a recent nuclear medicine procedure. If the alarm sounds due to the driver's procedure, the driver shall pull the truck back onto the scale and park it and then walk at least 75 feet away so that the monitor reading of the truck alone can be determined (or use an alternate driver). If the truck alone does not cause an alarm, it may pass through. There is no restriction on the driver if he/she is the source of the alarm due to a medical procedure. The scale house attendant or other authorized County personnel shall complete the Radiation Monitor Alarm Record and file it.

If the alarm is due to the load, the truck will again be driven through the detectors and stopped so that the detectors are centered on the load. A stabilized reading will be obtained. If only the Sigma alarm was triggered initially (sigma alarm indicates a rapid change in radiation level), the load shall be centralized and a stabilized reading obtained. If the stabilized reading is less than the investigation level, the load will be considered acceptable and the load will be accepted at the landfill. If the initial alarm reading exceeded the investigation level and if after the stabilized reading is obtained the result still exceeds the investigation level, refer to the "***Procedure to Reject or Accept Loads based on Radioactivity.***"

All instances of alarms shall be documented in the landfill's annual 6 NYCRR Part 360 report.

Possible types of materials with elevated levels of radioactivity include:

- **NORM – Naturally-Occurring Radioactive Materials** that have not been concentrated or enhanced such as rock, non-commercial use gypsum (plaster or fertilizer), sand blast media, ceramics (firebrick or pottery), colored glass, etc. Such materials may be accepted into the landfill if the concentration of radium-226, uranium-238, and thorium-232 are all less than 25 pCi/g when averaged over all such loads received during the calendar year. Any individual truckload may be accepted if concentrations of radium-226, uranium-238, and thorium-232 are all less than 50 pCi/g. To keep the average concentration of all of these radionuclides in the landfill to less than 25 pCi/g, the landfill may accept up to 5 loads per week with concentrations between 25 and 50 pCi/g. The investigation alarm setpoint is to be set at five (5) times background radiation levels.
- **Processed and Concentrated Naturally-Occurring Radioactive Materials** such as filter or evaporator sludges, furnace slag, titanium or fertilizer purification wastes, etc. in which the concentration of radionuclides has been increased over the natural material's concentration in the environment by application of heat, filtration or chemical extraction. Such materials may **NOT** be accepted into the landfill.
- **Medical Use-Radionuclides** such as iodine-131, iodine-125, technetium-99m, thallium-204, and other short half life nuclides may be accepted into the landfill if they have been excreted from a medical patient (such as into a diaper). Such materials in vials, syringes, etc. improperly disposed of by a radiopharmacy or hospital directly into the trash may **NOT** be accepted.
- **Industrial, military or commercial use radionuclides** may **NOT** be accepted into the landfill. Examples are luminous dials or markers (radium), static eliminators or thickness gauges (strontium-90, krypton-85, etc.), non-destructive testing or medical sources (cesium-137, cobalt-60, iridium-192, etc), uranium counterweights, exit signs, commercial smoke detectors, thoriated aircraft engines, welding rods, etc. Inadvertent or purposeful disposal of such materials must be reported to the NYSDEC and NYSDOT.
- **Liquids containing elevated concentrations of radioactivity**, such as gas well brine, are **NOT** acceptable for disposal.

Immediately after the investigation, the staff member will notify the NYSDEC and the County's Assistant Commissioner or Landfill Supervisor via telephone if such officials desire such notification. The site staff will work cooperatively with the regulatory agencies to determine the best course of action at the time of the alarm notification.

If the situation arises where the drive through radiation detectors become inoperable, the facility will use hand-held meters to perform the initial scan on the inbound vehicles.

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If a driver drives away after an alarm and before the load has been investigated, County personnel shall immediately call the NYSDEC Region 8 office and New York State Police.

The County staff will receive training on an annual basis related to the radiation system operational procedures. Radiation system training will also include manufacturer provided training or equivalent in system operation and trouble shooting.

Procedure to Reject or Accept Loads based on Radioactivity

This assessment procedure is provided to guide the decision-making process in accepting or rejecting loads based on their radioactivity content.

The procedure to be used by landfill management personnel to assess a load causing an alarm condition is as follows:

- **Investigation level:** No greater than five (5) times background radiation level*, per NYSDEC guidance.
- **Rejection level:** 50 pCi/g, Ra-226 equivalent, distributed throughout load.

*Upon installation of the radiation monitor, a site background radiation level shall be established. Establishing background shall include averaging the background level over a minimum 10 working days.

1. If the investigation level is exceeded, landfill personnel will determine if that reading is diffuse throughout the load or is concentrated in one spot. This will be done via hand-held radiation detector readings, visual observation, and discussion with the generator.
2. If the monitor reading is less than the rejection level and the load is determined to be diffuse, then the load will be accepted.
3. If the monitor reading is less than the rejection level but the load is determined to have an area of concentration, then after further investigation the load may be accepted or rejected. Further investigations will include hand-held radiation detector readings, visual observation, and discussion with the generator.
4. If the monitor reading is greater than the Rejection Level, whether it is diffuse or concentrated, then the load shall be rejected.
 - a. If determined to be above the Rejection Level, the vehicle containing the radioactive material may not leave the facility without written NYSDEC approval and an authorized United States Department of Transportation exemption form obtained from the NYSDEC.
5. In the event of a load being rejected, the vehicle containing the rejected load must be staged in the designated area until the time the above condition (4a) has been met (see p. 9 for Figure A-1). Vehicles containing rejected loads must be removed from site within 1 week.
6. If either alarm sounds, the "Radiation Monitor Alarm Record" (see p. 7) must be completed.