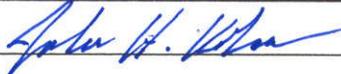


Approved by:		
	General Manager	Radiation Safety Officer

STANDARD OPERATING PROCEDURE

15.OPS.05

OPERATION OF GATE MONITOR DETECTORS

1.0 OBJECTIVE

To provide instruction for using the Clean Harbors Deer Trail (CHDT) gate monitor system to monitor incoming waste shipments.

2.0 SCOPE

This standard operating procedure (SOP) applies to the operation of the Ludlum 3502 gate monitor at CHDT. This SOP may be used for alternate or backup systems at the discretion of the CHDT Radiation Safety Officer (RSO) or designee.

3.0 POLICY

Incoming waste shipments to the CHDT landfill will be monitored for gamma radiation levels by the Ludlum 3502 gate monitor system or its equivalent. Incoming wastes not classified as radioactive will be subject to a limit of 16 microroentgens per hour ($\mu\text{R/hr}$), or another value set by the CHDT RSO equivalent to approximately twice the background levels at the CHDT gate. The system will be used to monitor incoming radioactive loads to identify any exposure concerns or noncompliance with Department of Transportation (DOT) regulations. The CHDT RSO will be notified of any incoming shipments greater than 116 $\mu\text{R/hr}$.

4.0 RESPONSIBILITIES

Responsibilities of the CHDT RSO, management, and staff are defined in the CHDT Radiation Protection Plan (DR.RPP.01).

5.0 GENERAL PROCEDURE

5.1 Instrument Description

The Ludlum 3502 gate monitor system consists of two sodium-iodide (NaI) detectors mounted approximately 6 feet above the incoming scale at CHDT. The detectors are each coupled with an alarming analog meter with in the guard house. Additional specifications are provided in Attachment A.

Quality control (QC) measurements consisting of a background check and measurement with a known cesium-137 (^{137}Cs) source will be conducted and recorded every workday. Daily measurements are expected to be within plus or minus 20% of the established background and source measurements. The CHDT RSO or designee must be notified of any deviations outside the expected parameters.

5.2 Routine Operations

Each shipment shall pass slowly (at a speed less than 5 miles per hour) between the detectors. During this time, staff within the guard house will monitor the meter displays to identify the maximum reading for each detector. The maximum results will be recorded on the weight ticket. If the shipment is a radioactive shipment, the measurements will also be recorded on an inbound shipment form.

6.0 STANDARDS AND CRITERIA

6.1 Quality Control

In addition to the daily QC measurements required by each individual instrument SOP, survey forms must be reviewed and approved by the CHDT RSO or designee. The frequency of review and approval will be dictated by the frequency of the surveys.

An annual instrument calibration must be performed by the instrument manufacturer or other qualified vendor. Copies of the instrument calibration certificates must be maintained for a period of five years. Current calibration certificates should be maintained with the instrument daily QC measurement logs.

6.2 Rejected Wastes

Any non-radioactive shipments with gate measurements at 10 μ R/hr or greater, or shipments that are not in compliance with (DOT) regulations, will be held at the gate and the following steps will be taken:

- Step 1 - Record the gate monitor measurements on a Clean Harbors Waste Discrepancy Report along with the hauler's identity and truck number. If possible, also obtain and record the generator's identity.
- Step 2 - Inform the hauler that the load he is hauling exceeds CHDT policy limits for radioactive materials and that the load is being rejected.
- Step 3 - Record the date and time that the hauler leaves with the rejected load.
- Step 4 - File all discrepancy reports for radioactivity in a designated file for future reference.

Radioactive shipments with measured exposure rates greater than 116 μ R/hr will be further inspected by the CHDT RSO or designee with handheld instruments to determine if the shipment is in compliance with the CHDT waste acceptance criteria. Additional surveys will be performed at the discretion of the CHDT RSO and may include exposure/dose rate measurements, gamma scanning, smears for removable contamination, and gamma spectroscopy measurements.

6.3 Post-Alarm Followup

It is reasonable to believe that very few incoming waste streams will fail to meet the CHDT waste acceptance criteria because of sampling controls placed on the generator/shipper under RCRA. In the event that this limit is exceeded and the load is rejected, follow-up action on the part of the landfill or hauler is advisable to prevent a reoccurrence of this problem. The

following conditions and guidelines shall be implemented if a load is rejected due to radioactivity:

Condition 1 - Outside Waste: Upon rejection of a load from a non-Clean Harbors source for exceeding the CHDT radioactive limit, the RSO shall contact the hauling company as soon as possible and give date, time, and the reason for rejecting the load. A follow-up letter to the hauling company should then be sent confirming the telephone conversation and CHDT policy on radioactive materials for RCRA shipments.

Condition 2 - CHDT-Hauled Waste: If the rejected load is hauled by Clean Harbors, the preferred approach is for the RSO to direct the District Manager or District Sales Manager to contact the generator by telephone as soon as possible after the time of load rejection. If necessary, a personal visit to the generator may be advisable to help the customer resolve the problem and prevent future loads from containing radioactive materials above the CHDT waste acceptance criteria.

Condition 3 - Notification of Customers: For the Landfill and District - It is recommended that 45 days prior to initiating the radiation screening process, that the landfill and district notify their respective customers of the CHDT policy on radioactive materials, the specific date on which radioactivity screening will begin, and the enforcement policy that will be implemented if the limits are exceeded.

7.0 REFERENCES

49 CFR 173. *Shippers – General Requirements for Shipments and Packagings*. Current Version.

ATTACHMENT 1 – GATE MONITOR SPECIFICATIONS

The Deer Trail gate monitor is a Ludlum Model 3502 Gate Monitor. It utilizes two 2" x 2" Sodium Iodide Crystals. They are located 7 feet above the ground and 12 feet apart. One points 90 degrees to the truck and one points about 70 degrees from the truck. The truck drives through the two monitors and parks on the scale. In this way, the entire truck has gone past the monitors. The monitor will be set to alarm at the specified set point.

MECHANICAL/ENVIRONMENTAL

Size: Less than 12 x 12 x 12 inch (Readout Unit); Less than 6 inch diameter x 12 inch (Detector Unit with Shield)

Operating Temperatures: 40 degrees F to 90 degrees F (Readout Unit); 30 degrees F to 120 degrees F (Detector Unit)

Radiological Shielding: At least 1 inch of lead in approximately 3π directions behind and around active detector area.

Weight: Less than 10 pounds (Readout Unit); Less than 75 pounds (Detector Unit with Shield)

Environmental: Detector, Cable, and Connector shall be water resistant in the installed configuration.

Cables: 20 foot Coaxial Cable with Connectors between Detector Unit and Readout Unit. A.C. Power Cord.

ELECTRICAL/ELECTRONIC:

Power: 115 VAC (nominal) less than 2 amps current with internal 12-hour battery reserve. (Readout Unit) Detector Unit power supplied from Readout Unit.

Meter: Counts per minute display with an analog readout. Range at least 10 to 100,000 CPM.

Alarm: Tone Alarm, non-latching, adjustable over full range of meter scale above a minimum set point of not more than 250 cpm. Set point must be displayed or displayable on the meter scale.

Accuracy: Displayed value must be accurate to within +5% of a constant input signal over the entire range of the display.

Display/Alarm Time Constant: The digital display should update at least every 6 seconds. Update times may be adjustable above or below 6 seconds.

High Voltage: Adjustable to supply Detector Unit.

Detector Failure Indicator: Readout Unit shall have a visible indicator other than the display that actuates it when the detector has not produced a signal for more than 15 seconds.

Discriminator: Readout Unit shall be able to discriminate against gamma energies below 200 keV in an adjustable manner. Readout Unit shall have a speaker with an adjustable volume that sounds with each incoming detector pulse.

RADIOLOGICAL:

Detector Type: Two 2 inch by 2 inch thallium-doped NaI(Tl) crystal scintillators.

Minimum Sensitivity: Must be photon (gamma and x-ray) sensitive. Must alarm on a 100 μCi Cs-137 source at 10 feet within 15 seconds in a constant background field of 10 $\mu\text{R/h}$ of Ra-226 in equilibrium with progeny.

False Alarms: When set for the minimum sensitivity condition above, false alarms to normal background shall be less than once every three months.