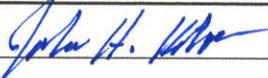
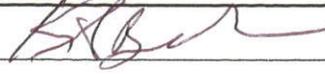


Approved by:		
	General Manager	Radiation Safety Officer

STANDARD OPERATING PROCEDURE

15.OPS.06

OPERATION OF DIGITAL WASTE MONITOR

1.0 OBJECTIVE

To describe the process to screen naturally occurring radioactive material at the generating site to ensure that it meets Clean Harbors Deer Trail (CHDT) dose rate acceptance criteria.

2.0 SCOPE

This standard operating procedure (SOP) is applicable only to site screening of waste at the generator or remediation jobsite. The policy does not guarantee waste acceptability at CHDT. This SOP is applicable to the Ludlum 375-20 Digital Wall Mount Area Monitor.

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 $\mu\text{R/hr}$. To facilitate acceptance and reduce the likelihood of waste rejection, exposure rate measurements will be collected at the generating site to approximate CHDT measurements at the point of waste acceptance.

4.0 RESPONSIBILITIES

Alarm set points and screening levels will be determined by the CHDT Radiation Safety Officer (RSO). Additional responsibilities of the CHDT RSO, management, and staff are defined in the CHDT Radiation Protection Plan (DR.RPP.01). Only workers trained in radiation safety should use this procedure.

5.0 GENERAL PROCEDURE

5.1 Instrument Description

The Ludlum 375-20 Digital Wall Mount Area Monitor consists of two 2" X 2" Sodium Iodide Scintillation Detectors and an instrument box. The detectors are equipped with lead shielding that shields them from most background radiation that is not coming directly from the front. The detectors are connected to the instrument box with cables. The instrument box is equipped with a low radiation alarm (yellow), a high radiation alarm (red), an instrument failure alarm (red), and a low battery alarm (yellow). A green status light indicates positive operation. The instrument runs on 120 AC current and can be plugged into a convenient outlet. The instrument

comes equipped with a built-in battery backup that should last for 48 hours in a non-alarm condition and 12 hours in alarm condition. When the battery is getting low a light will show in the low battery window of the instrument box.

5.2 Instrument Setup

Before attempting to use the Area Monitor, the Manufacturer's manual should be read and understood. The detectors should be mounted on the stands with the supplied U-bolts, or may be permanently mounted. The stands should be set up so that the horizontal center of the detectors is located in the approximate center of the expected types of trucks, or 82 inches above grade. The detectors on the stands should face each other and should be located so that the detector end of each detector (the end without the cable sticking out) is 10 feet 6 inches from the other one. If the stands are used, they should be stabilized by sandbags to ensure they stay in the correct position and the vertical posts should be shimmed in place so that they do not move. The instrument box should be located in a sheltered or protected area such as a vehicle. The cables should be connected to the instrument box. Always remember that the distance and geometric setup of the probes is critical to accurate measurement and they must be set up in the same configuration every day.

5.3 Alarm Setpoints

The instrument is equipped with two alarms settings that give warning by noise and indicator lights. The low alarm set point may be checked by pushing the low alarm button. The low alarm will be indicated by a yellow indicator on the low alarm window of the instrument box and by a slow beep (1 beep per second). The high alarm set point may be checked by pushing the high alarm button on the instrument box. The high alarm is indicated by a red light in the high alarm box and a fast beep (4 per second). The alarm set points were determined by the CHDT RSO to give an equivalent reading to the gate monitors at CHDT. The low alarm set point has been set at 16 uR/hr. The high alarm set point has been set at 116 uR/hr.

5.4 Daily Startup

If possible, plug the instrument into a 120 AC outlet. The unit may also be run on battery power. Turn the instrument on using the on/off switch on the side of the box. The instrument lights will flash and it will begin measuring background. When the instrument has finished measuring background, it will display the current radiation reading. Check the low alarm set point and confirm that it is 16 uR/hr. Check the high alarm set point and confirm that it is 116 uR/hr. Do not attempt to change the alarm set points without consultation. Next perform the Daily Operational Check. The operational check assures that the instrument and the detectors are working. A check source is needed in order to perform the check. A check source is an exempt quantity of radioactive material that is permanently bonded or fixed into a package so that no material can be released. The amount of radiation given off by check sources is very low and it does not present a significant hazard, but safe handling practices should be observed when using them. When not in use, always store check sources in a secure location. Do not carry them around in your pockets for extended periods of time. Do not store check sources near radiation dosimeters. Always wear your radiation dosimeter when performing the operational check. Take the check source in hand and place it near the center of the detector window. Hold it here for five seconds or so until the reading stabilizes. Take note of the displayed level of radiation.

Verify that the reading is within 20% of the last reading. Remove the source from the detector. Repeat with the second detector.

5.5 Use of the Area Monitor

Each truck will drive slowly (no more than 5 mph) past the monitors. If no alarm sounds, than the truck is cleared. If the low alarm sounds, the truck should be OK but it is an indication that the limits are being approached. If the high alarm sounds, the shipment is unacceptable and the shipment will have to be repackaged. Radiation dose rate is strongly affected by the shielding of the vehicle bed. Steel bed dump vehicles will have greater shielding than aluminum bed vehicles. In order to ensure that all vehicles will pass through the CHDT monitors, it is recommended that only trucks that do not alarm at all be shipped.

5.6 Battery Recharge

The instrument should be plugged into an outlet and recharged after operating on battery power only. If available, the instrument should be plugged into 120 AC while operating. That will provide the battery with a constant trickle charge.

5.7 Protection from Weather and Environment

The detectors are suitable for outdoor use and are sealed. The control unit is not waterproof and should be used and operated in dry conditions, or in an enclosed area or vehicle. Each detector contains a 2" by 2" sodium iodide (NaI) crystal. As the crystals are breakable, extra precautions should be taken in handling and shipping the detectors. The cables that connect the detectors to the instrument box are coaxial cables and should be protected from crushing or other breakage or excessive bending.

6.0 REFERENCES

Ludlum Measurements, Inc., 2006. *375-20, 375-30, 375-32 and 375-34 Digital Wall Mount Area Monitors*, July.