

# SURFACE EMISSION MONITORING

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# METHOD 21

## REGULATIONS

Manual Surface Emission Monitoring is governed by several federal regulations, all of which refer to US EPA Test Method 21. Together, the applicable regulation and Method 21 define how do Surface Emission Monitoring

### "WWW"

30m spacing of a serpentine pattern across the landfill; find the source location of any “increased meter readings”; inspect areas that “visually indicate” elevated methane"

### "XXX"

WWW plus monitoring all penetrations plus requirement for GPS recording of locations with an accuracy of 4m

**TABLE 1: SECTIONS OF 40 CFR PARTS 60, 62 AND 63 CONTAINING APPLICABLE REGULATIONS**

WWW (NSPS)	XXX (NSPS)	Cf (EG)	AAAA (NESHAP)	OOO (Federal Plan)
40 CFR §60.753(d)	40 CFR §60.763(d)	40 CFR §60.34f(d)	40 CFR §63.1958(d)	40 CFR §62.16716(d)
40 CFR §60.755(c) - (e)	40 CFR §60.765(c) - (d)	40 CFR §60.36f(c) - (e)	40 CFR §63.1960(c) - (e)	40 CFR §62.16720

# METHANE DETECTOR REQUIREMENTS

## THE INSTRUMENT SHALL...

- At minimum be intrinsically safe
- Have a sample flow rate of 0.10 to 3.0 l/min (0.004 to 0.1 ft<sup>3</sup> /min)
- Have a probe extension or sampling not to exceed 6.4 mm (1/4in) in outside diameter

## COMMONLY USED DETECTORS

- Flame Ionized Device (FID)
  - (Thermo Fisher, Inficon and others)
- Nondispersive Infrared Sensor (NDIR)
  - Inficon IRwin (SX)
- Tunable Diode Laser (TDL)
  - Landtec / QED SEM 5000
  - Ecotec Inspectra



# CALIBRATION PROCESS

## OBJECTIVE

- Determine the response time
- Calculate the calibration precision
- Determine the background concentration

## RESPONSE TIME

- Introduce 500ppm gas and measure the time required to attain at least 90% of the final stable reading (450ppm)
  - Perform this test 3 times
  - Must be equal to or less than 30 seconds

## CALIBRATION PRECISION

- Calculate the average difference between the meter readings and the 500ppm gas
- Cannot exceed calibration gas (500 ppm)

## BACKGROUND CONCENTRATION

- To complete the calibration procedure, Upwind and Downwind readings must be taken. These readings will be used as the baseline in determining exceedances on the monitoring path.

## APPLICABLE REGULATIONS

### STANDARDS OF PERFORMANCE FOR MUNICIPAL SOLID WASTE LANDFILLS

- Measure surface concentrations of methane along the perimeter of the landfill as well as all cover penetrations and traverse the landfill 30m intervals
- The probe inlet must be placed within 5 to 10 centimeters of the ground
- Deviate from the walking path where visual observations indicate elevated concentrations of landfill gas
- When "increased meter readings are observed", find the maximum meter reading and dwell for 2x detector response time
- Any reading of 500ppm or more above background must be recorded as a monitored exceedance

### EACH EXCEEDANCES

- Must be marked and the location and concentration recorded
- Must be re-monitored within 10 calendar days of detecting the exceedance
  - Initial, 10-Day, and 30-Day, +10 Day inspections may be required

## GREY AREAS

### REGULATIONS DO NOT SPECIFY...

- Proper technique to monitor penetrations, seeps, cracks, or geomembranes
- How to inspect existing exceedances during follow up inspections
- If your meter reports over 500 ppm, and you cannot find the source or replicate the measurement?
- What to do when a previous exceedance needs be checked for follow-up but is now in a hazardous area?
- What to do when a penetration is under construction

### LESSONS LEARNED

- If an exceedance is re-monitored during the initial inspection, then that will count as the following inspection
- When monitoring in overgrown vegetation the prob inlet cannot remain 5 to 10 centimeters above the ground
- Discuss all inspection scenarios with site management before the initial inspection date
- Sites still require to be properly maintained (for technician safety, and for proper monitoring). E.g. grass must be maintained.

THANK YOU

