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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
ENVIRONMENTAL SERVICES DIVISION
60 WESTVIEW STREET, LEXINGTON, MASSACHUSETTS 02173-3185

MEMORANDUM

DATE: August 17, 1989

SUBJ: Old Springfield Landfill Site, Springfield, Vermont
Revised Air Monitoring and Sampling Paln

FROM: Peter R. Kahn, Environmental Engineer PRK
EMA-LEX

TO: Paula Fitzsimmons, RPM
ME & VT Superfund Section, HPS-CAN1

In the absence of Jack Harvanek, Environmental Services Division air contact for this site, I have temporarily assumed the responsibility of reviewing the revised Air Monitoring and Sampling Plan for the Old Springfield Landfill Site located in Springfield, Vermont. I've had several phone conversations with Mr. Rob Markwell of Remcor, Inc.(contractor responsible for the sites air monitoring program) during the week of August 14, 1989 regarding changes to the air monitoring plan. On August 16, 1989 Mr. Markwell telefaxed the revised plan to me for review. The enclosed Air Monitoring and Sampling Plan satisfactorily describes sampling and analytical procedures and relative quality assurance/quality control criteria.

If you have any questions or need further assistance, please feel free to contact myself at 860-4392 or Jack Harvanek at 860-4391.

cc: Carol Wood, EQA-LEX
John Carlson, EQA-LEX
Jack Harvanek, EMA-LEX
Rosina Toscano, ATR-2311

enclosure

11.0 AIR MONITORING AND SAMPLING

11.1 PURPOSE

The air monitoring program for the FFS is intended to meet two objectives. The first is to monitor potential exposure levels to site personnel and local receptors during intrusive site activities in order to determine appropriate personnel protection levels and implement contingency plans. The second objective is to generate quantitative analytical data that can be used to estimate the risks associated with potential exposures to local receptors.

To meet the first objective, only real-time, direct-read monitoring will be necessary. The monitoring instruments and procedures to be used, and courses of action to be taken based on these results, are described in Chapter 7.0 of the HASP. Both non-specific and compound- or class-specific real time monitoring devices will be employed; action levels and decision steps provide specific guidance for interpretation of monitoring data. The techniques described in Chapter 7.0 of the HASP will also be used for real-time downwind perimeter monitoring in the event of upset conditions.

The second objective requires sampling and analysis that follow strict protocols and can produce precise and accurate quantitative data. These data are produced by a fixed laboratory utilizing EPA-approved methods and all accompanying quality control procedures. The production of these data also require simultaneous collection of meteorologic data during sampling.

The quantitative chemical sampling and analysis program is comprised of two phases:

- Baseline monitoring
- Activities monitoring.

The baseline-monitoring phase is intended to quantify the concentrations of VOCs emanating from the most likely source areas and toward potential receptors during conditions existing just prior to the commencement of FFS activities. The activities-monitoring phase is intended to quantify VOC concentrations migrating toward potential receptors during drilling and excavating activities on the site.

The remainder of this chapter concerns this quantitative chemical sampling and analysis.

11.2 NUMBER AND LOCATION OF SAMPLES

During the baseline monitoring, eight air monitoring stations will be constructed and monitored simultaneously. The location of these stations are shown in Figure 9. Two stations will be established at areas that represent the highest soil and ground water contamination, based on the results of earlier studies (Stations 4 and 5). Two stations will be located at the head of two of the most contaminated leachate seeps, one on the eastern side of the site and one on the western side of the site (Stations 6 and 7). Additional stations will be located at three perimeter sites nearest the closest potential human receptors (Stations 1 through 3). The eighth station will be located at a background location, upwind and off site. The location of this station will be determined by the predominant wind direction at the beginning of the baseline monitoring.

The activities-monitoring phase samples will be collected at each of the three perimeter stations (Stations 1 through 3) on a day when each of the following activities is being conducted concurrently:

- Installation of monitoring wells in Waste Area 2 east of Air Monitoring Station 1
- Excavation of test pits on the western outslope north of Air Monitoring Station 2
- Installation of exploratory test borings in Waste Area 4 east of Air Monitoring Station 3.

One additional air sample will be collected in the downwind direction from each of these activities. One upwind, off-site sample will be collected to represent background conditions. The wind-dependent sample stations are not shown in Figure 9. Thus, seven samples will be collected simultaneously during the concurrent conduct of these activities to comprise the activities-monitoring phase.

11.3 SAMPLING METHODOLOGY

Air monitoring (sampling and analysis) will be performed with reference to "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air," (EPA, 600/4-84-041, April 1984) Method TO-2. Monitoring stations at perimeter locations will be constructed on platforms to measure concentrations in the average breathing zone, approximately 5 feet above the ground surface. Monitoring stations at source locations, on-site and at seeps, will be constructed on platforms approximately 1 foot above the ground surface. Each platform will contain a vented, oilless, vacuum pump equipped with two flow orifices and sample adsorption tubes. The tubes will be positioned vertically on the platform.

At each location, a known volume of air (between 5 and 10 liters) will be drawn through Carbotrap 300 adsorption tubes. Each adsorption tube consists of a 4-millimeter (mm) inside diameter (ID) by 11.5-centimeter (cm) glass tube containing 300 milligrams (mg) of Carbotrap C, 200 mg of Carbotrap, and 125 mg of Carboseive S-III. These tubes are effective for reversibly trapping the compounds of concern and do not decompose thermally to produce products that could interfere with determination of the analytes. Flow will be controlled using a calibrated orifice and vacuum pump. The vacuum downstream of each orifice will be monitored to ensure that critical flow, a predetermined and constant flow rate, is maintained through each orifice. Flow rates will nominally be 8 milliliters per minute (mL/min). Air will be sampled at a constant

rate for eight continuous hours. The flow rate will be checked at least at the initiation of the sampling and just prior to completing the sampling. The air temperature, barometric pressure, orifice critical flow rate, sample duration time (nominally 480 minutes) and calibration data will be used to calculate the volume of air sampled.

Prior to each sampling event, Carbotrap 300 adsorption tubes will be cleaned by baking them at 350 degrees centigrade (°C) and purging with helium gas for 16 hours. During each sampling period, sample flow rates, air temperature, barometric pressure, elapsed time, location, sample identification, and field personnel initials will be recorded in a field logbook.

Flow measurement and flow control devices will be calibrated prior to the baseline-monitoring phase following procedures in the "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II," (EPA, 600/4-77/027a, September 1985). Each orifice will be calibrated with a representative adsorption tube in line. Calibrations will be completed using a stopwatch and an inverted 50-ml Class A burette that meets specification ASTM D 664. During calibration, vacuum downstream of the orifice will be maintained at 20 inches of mercury (in. Hg) to ensure critical flow through each orifice.

Air temperature and barometric pressure will be recorded and used to convert the actual critical flow rate to standard conditions (25°C and 1 atmosphere). Air temperature and barometric pressure will be measured at the start of air sampling and hourly during all air sampling. Measurements of wind direction and speed will also be made. A profile of average weather conditions at the site will be constructed from these data. This profile will include construction of a site-specific wind rose, a precipitation bar chart, and the average temperature and barometric pressures. This site-specific weather profile will then be compared to weather information obtained from regional sources. A qualitative correlation between the two sets of weather data will be made to

assess the adequacy of the site-specific weather profile for estimating average weather conditions and developing a long-term exposure scenario. Regional data will be collected from the closest full-time national climatic data center, which is in Lebanon, New Hampshire. These data will be supplemented by data from two part-time stations at Rutland, Vermont and Keene, New Hampshire.

A weather station will be constructed in the general vicinity of the field office. The station will be placed in an open unrestricted area and will be elevated at least 6 feet above the ground surface. The weather station will consist of the following equipment:

- Weathertronics Windicator, Combined Anemometer and Airfoil Vane, plus or minus 2.5 percent accuracy
- Model 4930FT Pocket Barometer
- Taylor Minimum/Maximum Thermometer, Mercury Filler.

11.4 ANALYTICAL REQUIREMENTS AND PROCEDURES

Air tube samples will be analyzed by Method TO-2 of the "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air," (EPA, 600/4-84-041, April 1984). This method utilizes thermal desorption and gas chromatography/mass spectrometry (GC/MS) analysis. The samples will be analyzed for the following compounds:

- Methylene chloride
- Carbon tetrachloride
- Trichloroethene
- Tetrachloroethene
- Benzene
- Chloroform
- 1,1-dichloroethene
- Vinyl chloride.

These compounds were selected based on their occurrence in other site media and their potential toxicity at chronic, low-level exposure.

Method TO-2 has been validated to analyze samples for methylene chloride, carbon tetrachloride, benzene, chloroform and vinyl chloride but not trichloroethene, tetrachloroethene or 1,1-dichloroethene; therefore, this method will be modified to include the latter three compounds.

During the analysis, tubes will be placed in the thermal desorber and rapidly heated to 300°C. An inert carrier gas will transfer the VOCs through heated inert tubing to the GC/MS. At the head of the gas chromatographic column, the compounds will be cryogenically focused. The compounds will then be separated by a chromatographic column and identified and quantified utilizing a mass spectrometer and instrument library. The detection limit obtained utilizing these procedures ranges between 0.1 part per billion (ppb) to 1 ppb.

Analytical reports for the air tube samples will include concentrations of the compounds of interest and percent surrogate recoveries. Calibration data and laboratory bench sheets will also be included so that the reporting criteria will be similar to EPA Level IV DQO. A final air monitoring program report will include calibration procedures utilized during laboratory analysis.

11.5 QUALITY CONTROL

Laboratory instrument calibration will include a five point calibration curve. Calibration standards will be prepared daily in a gas standards preparation bottle and will include the compounds of interest. These standards will be of the same quality as Standard Reference Materials from the U.S. Department of Commerce, National Bureau of Standards. The laboratory instrument will be calibrated for each set of samples received.

A quality control standard will be analyzed to verify the calibration curve. This quality control standard will be prepared from a gas mixture supplied by Scott Specialty Gases, Inc. (Scott Specialty Gases). This gas mixture includes vinyl chloride, methylene chloride, benzene, toluene, and o-xylene. The accuracy of this mixture, as stated by Scott Specialty Gases, is plus or minus 2 percent.

A method blank air tube will be spiked with an internal standard (ISTD) and surrogate standard (SSTD) and analyzed after the quality control standard. Air tube samples, spiked with ISTD and SSTD will be analyzed following the method blank. A check standard will be analyzed after every ten samples. Chromatographic area counts of the check standard must agree within plus or minus 20 percent of the appropriate calibration standard area counts. A closing standard will be analyzed at the end of an analytical sequence, regardless of the number of samples. Aliquots of standard gas mixtures will be injected into an air tube prior to analysis.

Duplicate air tube samples will be collected at each sampling location. One tube from each location will be held and analyzed only if high concentrations, sample problems, instrument or power problems, or breakage of the primary tube warrants its analysis. In thermal desorption analysis, the sample is lost after desorption in the event of any instrument failure; thus, collection of multiple tubes at each location minimizes the necessity of resampling.

One duplicate sample will be analyzed for both the baseline-monitoring and activities-monitoring phases, for a total of two duplicates. Duplicate samples will serve as a measure of the precision of the sampling and analysis and should agree within 20 percent.

Trip blank samples will be obtained and analyzed for the baseline-monitoring and for each of the three activities comprising the activities-monitoring phase, for a total of four trip blanks. Adsorption tube trip blank samples will be handled the same as the air tube samples, except that these adsorption tubes will remain in the sample containers at all times. The trip blank samples will serve to detect possible extraneous sources of contamination that may affect the analytical results. Trip blank VOC concentrations must be less than 25 percent of any accompanying sample amount for measured sample concentrations to be considered valid.

Duplicate and blank quality control samples will be handled, treated, and analyzed in the same manner as all other samples.

One of the cleaned sample tubes will be analyzed prior to any air sampling. This blank analysis will serve as a check on the cleanliness of the batch of tubes prior to sampling. If the blank contains more than 10 nanograms of any compound of interest, a new set of sampling tubes will be prepared.

Backup tubes to check for contaminant breakthrough will not be used. The sampling volume, which will be approximately five liters, is well below the retention volume of all contaminants of concern.