

SCS ENGINEERS

March 4, 2010
File No. 02422209

Mr. Scott Whitehurst
Southeastern Public Service Authority
723 Woodlake Drive
Chesapeake, Virginia 23320

Subject: Odor Study for SPSA's Regional Landfill, Suffolk, Virginia

Dear Mr. Whitehurst:

SCS Engineers (SCS) is pleased to submit this proposal to conduct an odor study at SPSA's Regional Landfill in response to concerns that have been raised by the surrounding community, the City of Suffolk, and the Virginia Department of Environmental Quality. Our proposed scope of services, schedule, and fee estimate is presented in Attachment A.

This proposal supersedes our previous proposal dated March 1, 2010. The scope has been modified to remove the tracer gas studies, which we understand may be performed at a future time if needed. The scope includes field sampling, monitoring and investigations as to the source of the nuisance odors that have been observed in the surrounding community. It includes observations and monitoring using field instruments, as well as sampling and testing of the raw landfill gas and air quality where complaints have been observed in the surrounding community. The samples collected will be tested for a more extensive list of constituents to coincide when odor complaints are registered. The additional constituents to be tested will include total reduced sulfur compounds, volatile organic compounds, fatty acids, ammonia, and sulfur dioxide.

SCS understands the importance and sensitivity of this odor investigation. We have staff available in our Norfolk office to be responsive to the unique nature of this assignment, which may include quick mobilization of field sampling teams in response to odor complaints.

Please do not hesitate to call us if you have any questions.

Sincerely,



Keith T. Matteson, PE
Project Director
SCS ENGINEERS



Robert B. Gardner, PE, BCEE
Senior Vice President
SCS ENGINEERS

cc Bucky Taylor, Executive Director

Attachment



ATTACHMENT A SCOPE OF SERVICES

This scope of services outlines the tasks identified by SCS Engineers to assist with investigation of odors and implementation of an ambient air monitoring program at the Southeastern Public Service Authority's (SPSA) Regional Landfill (Landfill) located in Suffolk, Virginia. SCS understands that odors have been detected and reported in the general vicinity of the Landfill, but the facility is uncertain whether the source of the odors is related to Landfill operations or due to an unrelated off-site source.

SCS's objective for these work efforts is to assist the Landfill in evaluating whether on-site sources are contributing to nuisance odors. In the event that on-site sources do not appear to be causing or contributing to these odors, SCS's intent is to provide SPSA with documentation that attempts to identify the most likely off-site source of odor complaints so that SPSA is prepared to respond to regulatory agencies or community groups that may be involved in responding to odor complaints.

The task outlined below includes initial field monitoring, sampling, laboratory testing and odor investigation. Depending on the results of this initial investigation and potential increased regulatory scrutiny, additional field investigations and air monitoring may be required.

Task 1 – Initial Field Monitoring, Sampling & Odor Investigation

SCS work efforts under this task will focus on evaluating potential on-site sources of odors, specifically fugitive landfill gas (LFG) emissions and other aspects of the LFG collection and control system and site operations. This task will also involve ambient air sampling within the facility boundary as well as the surrounding vicinity to measure concentrations of hydrogen sulfide (H₂S) using field instrumentation as an indicator constituent for odors, and air sampling and laboratory testing to assess the presence or a wider spectrum of compounds that may be contributing to the observed odors.

H₂S is a colorless gas with a distinctive odor associated with rotten eggs, which is produced by the decomposition of waste at a landfill. Along with compounds such as mercaptans, carbonyl sulfide, and dimethyl sulfide, these reduced sulfur constituents are most commonly associated with landfill odors. Because H₂S is the sulfide which is usually measured at the highest concentration in LFG, many Landfills utilize it as an indicator for odors. Consequently, odor-related monitoring focuses on this compound, involving measurement of H₂S content of the LFG and ambient air.

SCS will finalize a monitoring and sampling work plan and review the plan with SPSA staff prior to initiating the field investigations. The sampling work plan will document the proposed sampling locations, the procedures involved in collecting field samples, and relevant protocol information such as chain-of-custody documentation. Of particular interest is where and when the odor complaints are received or noted by on-site personnel and the surrounding community. SCS will review recent monitoring data and odor complaints to assess LFG system performance and effectiveness.

Field Measurements

SCS will perform field monitoring and sampling activities at the site to measure H₂S concentrations using field instrumentation. The monitoring shall be conducted over a span of two to three days to obtain measurements during the diurnal cycle and under varying meteorological conditions, with the goal of conducting the field investigations when odors are evident in the surrounding community. Ambient air monitoring will be conducted using a Jerome 631-X H₂S Analyzer with a detection range of 1 part per billion (ppb) H₂S. The presence of offensive odors, if any, will be noted by field personnel. The sampling activities will involve the following locations:

- Ambient air at a height of 3 to 6 feet above ground surface at various locations within and along the Landfill boundary, both upwind and downwind.
- Multiple off-site locations near adjacent industrial and commercial facilities and surrounding residential neighborhoods.
- At specific intervals immediately above the landfill surface and along the perimeter of the waste disposal units.
- In proximity to LFG system infrastructure, such as the blower/flare station, condensate sumps, select wellheads, etc.
- Around other potential sources of LFG fugitive emissions (leachate manholes, etc.).

Discrete Sampling

Ambient Air Sampling and Laboratory Testing. If significant and sustained H₂S concentrations are discovered at any location during the field monitoring event, a discrete ambient air sample will be obtained from the location and submitted for laboratory analysis. SCS has budgeted for the collection and laboratory testing of 10 discrete air samples during this initial screening task (eight in impacted neighborhoods, and two upwind).

Synthetic VOCs are often present in LFG and associated with anaerobic decomposition of municipal solid wastes. However, these compounds, with a few exceptions, have odor thresholds substantially higher than natural products of anaerobic decomposition and, thus, are less likely to be detected by the general public. For purposes of this detection sampling, the focus should be on low molecular weight odorants including reduced sulfur compounds (TRS), sulfur dioxide, ammonia, and volatile fatty acids (VFAs).

The samples will be analyzed for TRS compounds using appropriate gas chromatography methods (ASTM D-5504). The collected samples may also be analyzed for other compounds which are known to be contributors to nuisance odors, such as volatile fatty acids, ammonia, and sulfur dioxide. The analytical methods for these compounds typically involve EPA Method TO-17, NIOSH 6004, and NIOSH 6016.

The ASTM-D 5504 sampling method involves collecting ambient air and analysis for hydrogen sulfide, carbonyl sulfide, carbon disulfide, methyl mercaptan, ethyl mercaptan, dimethyl sulfide,

and dimethyl disulfide. EPA Method TO-17 involves collecting volatile fatty acids in ambient air in a sorbent tube and analysis for acetic acid, propionic acid, isobutyric acid, butyric acid, and isovaleric acid. The NIOSH Method 6004 involves collecting a sample and analysis for sulfur dioxide in ambient air in accordance with a particle filter in series with a pretreated sorbent tube that adsorbs SO₂. NIOSH Method 6016 involves collecting a sample and analysis for ammonia concentration in the ambient air by linking a 37mm cassette filter with a sorbent tube in series.

Immediately after each sample is collected, it will be placed in a covered cardboard box to prevent exposure to ultraviolet light and potential sample degradation. The ambient air samples will be shipped in accordance with DOT and IATA specifications, and all applicable regulations. Chain-of-Custody documentation will be completed and the air samples will be relinquished to the laboratory in accordance with USEPA guidelines.

SCS assumes the Landfill is equipped with a weather station located on-site to provide the facility with real-time weather parameters including:

- Barometric pressure;
- Wind direction;
- Wind speed;
- Temperature; and,
- Precipitation.

This meteorological information will provide SCS and the facility with the means for evaluating whether on-site operations or off-site facilities are the most likely sources of ambient air concentrations and associated odors. Also, the information will be useful as to whether the surrounding development may be subjected to odors based on documented weather conditions, correlating laboratory analytical results with the weather data, and for analyzing the validity of odor complaints.

LFG Sampling and Laboratory Testing. SCS will also perform field sampling activities to measure concentrations of Total Reduced Sulfur (TRS) compounds present in the LFG generated at the site. At least two LFG samples will be obtained from the pressure side of the main header pipe (between blower outlet and flare inlet) at the Landfill blower/flare station.

SCS will measure and record gas quality (CH₄, CO₂, O₂, and H₂S) and pressure at the sampling port using a Landtec GEM-2000 gas analyzer before collecting each sample. The gas analyzer used to obtain field results for H₂S content in the LFG is capable of detecting H₂S in the range of 1 to 5,000 ppmv.

Each sample will be placed in a metal shipping container immediately after it is collected to prevent exposure to ultraviolet light and potential degradation of the sample. The samples will be shipped as dangerous goods in accordance with DOT and IATA specifications, and all applicable regulations. Chain-of-Custody documentation will be completed and the gas samples will be relinquished to the laboratory in accordance with USEPA guidelines. Testing will include TRS (ASTM D-5504), volatile fatty acids (EPA Method TO-17), ammonia (NIOSH 6004), and sulfur dioxide (NIOSH 6016).

Preliminary Screening Modeling

Based on the field monitoring and laboratory analytical results, SCS will perform an air dispersion modeling analysis to estimate the maximum ambient concentration of H₂S. The SCREEN3 model (Version 96043) will be used for this air dispersion modeling analysis. This model is typically considered conservative and is used as a screening tool for developing preliminary calculations and evaluating whether more refined air dispersion modeling is necessary for determining compliance with applicable standards.

Report

SCS will prepare draft and final reports summarizing the field sampling locations, field and laboratory monitoring results, laboratory data, field observations, modeling results, and findings related to our odor investigation. A draft report will be provided to SPSA approximately 3 weeks following the conclusion of all field study activity. SCS will provide supporting facts regarding the severity and sources of the odors impacts registered in the neighboring community. SCS will outline the necessary next steps that need to be taken to mitigate the odor events, if they are a result of the landfill operations. SCS will accept comments on the first draft of the project report and prepare a final report for submission to SPSA.

Schedule and Fee Estimate

The proposed project schedule and fee estimate are presented in Exhibits A-1 and A-2, respectively. This estimate includes participation in one public meeting. Additional meetings will be billed on a time and material basis. Also, the fee estimate is based on the assumed number of samples and laboratory tests indicated in the task descriptions. The fee may be more or less depending on the final number of samples collected and tested in the laboratory.

Exhibit A-1. Project Schedule, SPSA Landfill Odor Study

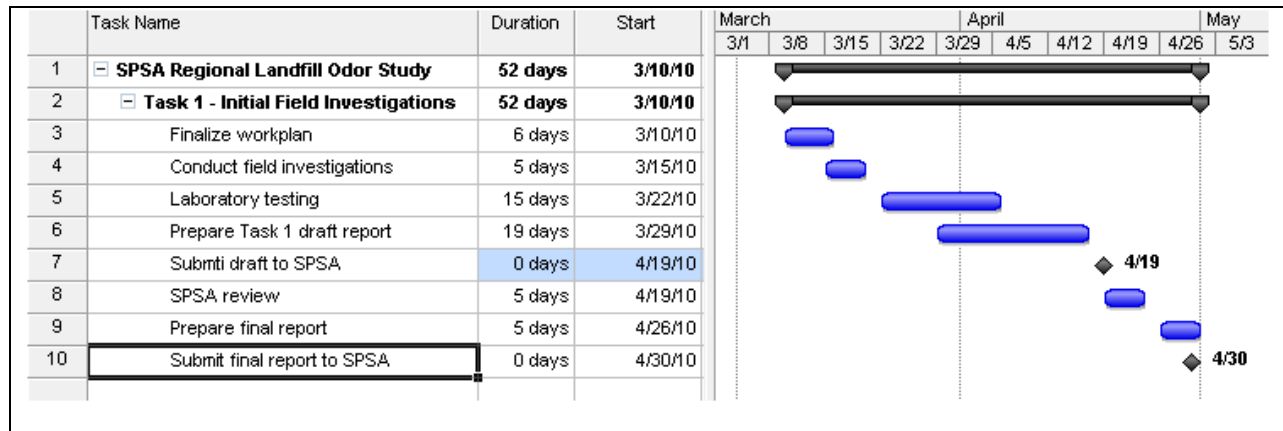


Exhibit A-2. Fee Estimate, SPSA Landfill Odor Study

	Rate \$/hr	Task 1 Initial Field Investigations	
		Hours	Cost
Labor			
Principal	\$ 250	16	\$ 4,000
Project Director	\$ 170	24	\$ 4,080
Project Advisor	\$ 130		\$ -
Sr. Project Professional	\$ 120	24	\$ 2,880
Project Professional	\$ 100		\$ -
Staff Professional	\$ 85	80	\$ 6,800
Assoc. Staff Professional	\$ 75	40	\$ 3,000
Total Labor		168	\$ 20,760
Other Direct Costs			
Auto/Mileage/Travel			\$ 500
Telephone/Facsimile			\$ 25
Postage/Freight			\$ 400
Reproduction/Printing			\$ 100
Field Equipment			\$ 600
Lab Analysis			\$ 14,340
Computer			\$ 600
Total Estimated Other Direct Costs, \$			\$ 16,565
Administrative (15%)			\$ 2,485
Total			\$ 39,810
		Say>>>>	\$ 39,900