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LETTER REGARDING GEORGIA DEPARTMENT OF NATURAL RESOURCES APPROVAL OF U S NAVY RESPONSES ON FINAL DRAFT INTERIM MEASURES WORK PLAN FOR SITE 11 NSB KINGS BAY GA

1/24/1994

GEORGIA DEPARTMENT OF NATURAL RESOURCES

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Georgia Department c

205 Butler Street, S.E., Suite 1252, Atlanta, Georgia 30334
Joe D. Tanner, Commissioner
Harold F. Reheis, Director
Environmental Protection Division

January 24, 1994

M.W. O'Neal
Captain, U.S. Navy
Commanding Officer
Naval Submarine Base
1063 USS Tennessee Avenue
Kings Bay, Georgia 31547-2606

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

RE: Site 11 - Old Camden County Landfill
Response to Comment No. 7, Draft Interim
Measure Workplan

Dear Captain O'Neal:

The Georgia Environmental Protection Division (EPD) has received the Navy's letter of December 30, 1993 transmitting the requested response to Comment No. 7 on the Final Draft Interim Measure Workplan for Site 11 - Old Camden County Municipal Landfill. The response submitted is satisfactory. If you have any questions or need further assistance, please contact Madeleine Kellam or Bruce Khaleghi at (404) 656-2833.

Sincerely,

Bruce Khaleghi
Unit Coordinator
Hazardous Waste Management Branch

File: NSB-Kings Bay (R)

Response to Comment No. 7 on Interim Measure Work Plan
By Georgia EPD
Naval Submarine Base, Kings Bay, Georgia

Comment No. 7

Reference: Section 3.3.3 of the Final Draft Interim Measure Work Plan of Site 11 - Old Camden County Landfill.

Comment: This section must identify a target range or other performance standards for organic vapor air emissions. Vinyl Chloride is a known human carcinogen and has been identified as a hazardous air pollutant; vapor emission testing should therefore include analyses specifically for Vinyl Chloride as the monomer. Attainment of the Lowest Achievable Emission Rate (LAER) is required.

Response:

1. Please refer also to the Response to Comments Table submitted to Georgia Environmental Protection Division (EPD) on 17 November 1993.

2. This portion of the response contains information on expected air emissions and air quality impacts from the air sparging operation. This information is also being sent to Mr. Gene Drew of the Air Protection Branch of the Department of Natural Resources for review and approval.

   We have attempted to supply all the information you need to evaluate the air quality aspects of this project. Target ranges for each constituent are presented as Acceptable Ambient Criteria (AAC) in Table 1. The performance standard for vinyl chloride has been calculated and is discussed on pages 4 and 5. The modeling for determining the performance standard for vinyl chloride is presented in Table 8. Attainment of the Lowest Achievable Emission Rate will be achieved through the proposed system.

<u>Description of Air Sparging Pilot Study</u>

Groundwater will be extracted from the area beneath the Old Camden County Landfill to prevent further migration of contaminants in the aquifer. The groundwater is known to contain volatile organic compounds (VOCs) as listed in Table 1. The VOCs will be removed from the groundwater utilizing an air stripping technology before discharge of the water to a treatment works.

The Air Sparger is a diffused aeration system where air is released into the water through diffusers that produce coarse bubbles. Mass transfer occurs across the air-water interface of the bubbles. Exhaust air exits the unit and is directed to a series of activated carbon adsorbers before being discharged through a single PVC stack to be released to the atmosphere at a minimum height of 16 feet.

Design air flow through the Air Sparger is 800 cubic feet per minute for an air to water ratio of 100 to 1 at a water feed rate of 60 gallons per minute.

The pilot study will operate up to 24 hours per day, 7 days per week, for a total of 45 days.

Figure 1 shows the approximate location of the Air Sparger, carbon adsorbers and stack.

Air Emissions

Seventeen chemicals have been identified in the groundwater which may be emitted into the air during the air sparging. These chemicals are listed in Table 1. Tables 2 and 3 provide the estimated emission rates for each chemical following vapor phase carbon adsorption (Column 3). Emission rates were calculated using the maximum groundwater concentration detected at any point in the constituent plume (Table 1, Column 1) and modeling for the Air Sparger and carbon adsorbers using the following equations:

$$C_1/C_0 = [1/(1+kt)]^N$$

Where:
- C_0 = initial concentration
- C_1 = effluent concentration from the Air Sparger
- k = Henry's Law Constant
- t = residence time
- N = number of stages

And: $R/AW \times 1.203$ = vapor effluent in mg/m^3

Where:
- R = concentration transferred to the vapor stream in micrograms per liter
- AW = air to water ratio of Air Sparger

These equations have been documented to be a conservative calculation based on actual operating data of the Air Sparger unit to be used at the site.

The vapor phase activated carbon has been documented to remove a minimum of 99 percent of each constituent of concern with a retention time of 1.7 to 2 seconds. Four parallel streams of carbon adsorbers will be used to provide a retention time of 1.8 seconds in each adsorber. Two units will be placed in series to provide a polishing stage and a sample point will be placed between the two units to monitor for breakthrough.

The maximum emission rate from the carbon adsorbers was calculated based on a 99 percent removal efficiency.

Ambient Air Quality Impacts

To estimate expected ambient air quality concentrations during the pilot test, air dispersion modeling was conducted. Maximum predicted impacts were then compared with calculated acceptable ambient concentrations to ensure public health would not be threatened during the system operation.

The United States Environmental Protection Agency (USEPA) SCREEN model was used to predict air quality impacts for each chemical of concern. SCREEN uses a number of conservative assumptions and provides conservative estimates of ambient air concentrations. This model is recommended by the USEPA for conducting dispersion modeling for air pathway analyses. Based upon discussions with staff at the Georgia Air Protection Branch, the SCREEN model is the preferred screening model for estimating air quality impacts.

The point source algorithm in SCREEN was used in the analysis. Flat terrain and rural dispersion were assumed. Concentrations were calculated for the full range of meteorological conditions available in the model. Automated receptor distances from one meter to 50 kilometers were selected for a single wind direction. One additional receptor, 200 feet from the stack, was calculated to represent the nearest public property. Because stack gas temperature is expected to be close to ambient temperature, the default ambient temperature assumed by the model, 293 Kelvin, was also used as the stack gas temperature. The stack gas velocity is based on the blower capacity (800 cubic feet per minute) and stack diameter (4 inches). To reduce the number of model runs and for ease of calculating air quality impacts for each of the chemicals, the model was conducted using a unit emission rate of one pound per hour (lb/hr).

The emission rates and modeled maximum ground level concentrations for each chemical of concern are provided in Tables 2 and 3. Table 4 presents the SCREEN model documentation for calculating the maximum ground level concentrations. Stack parameters used as input to the model are shown in Table 5.

Dimensions of the Air Sparger to be installed are approximately 14 feet long by 8 feet wide by 26 inches high. The unit on a skid will be a height of approximately 3 feet. Due to its size and the height of the stack, the Air Sparger is not expected to affect dispersion of air emissions. The tallest nearby structure to the stack is the Equalization Tank (7 feet high with a 6 foot diameter). The stack height of 16 feet follows Good Engineering Practice (GEP) for stack heights, defined as the height of a nearby structure plus 1.5 times the lesser of the height or width of the nearby structure. Because the stack height is equivalent to the GEP stack height, building downwash is not expected to occur. The Equalization Tank dimensions were input to the model to confirm that emissions will not be subject to downwash effects.

Table 3 represents the maximum one-hour concentrations that will occur during various dispersion situations following vapor treatment. Table 4 represents the maximum concentrations for a 24-hour averaging time. The maximum predicted one-hour concentration for a 1 lb/hr emission rate was 90.37 $\mu g/m^3$ (Table 4). The maximum impact for a 1 lb/hr emission rate occurred at 421 meters for F stability and a 1 meter per second wind speed. Using a factor of 0.4 to convert this one-hour impact to a 24-hour concentration, the maximum 24-hour impact for a 1 lb/hr emission rate is 36.15 $\mu g/m^3$. The USEPA recommends this 0.4 factor to be applied to one-hour results from the SCREEN model to estimate 24-hour impacts. The 24-hour concentration was multiplied by the emission rate for each chemical to obtain the maximum ambient air concentrations as presented in the tables.

Modeling of the dispersion following the Air Sparger without vapor treatment was also performed to estimate the confidence of emissions not exceeding Acceptable Ambient Concentrations (defined below). Table 6 represents the maximum one-hour concentrations that will occur during various dispersion situations following the Air Sparger without vapor treatment. Table 7 represents the maximum concentrations for a 24-hour averaging time following the Air Sparger without vapor treatment.

Acceptable Ambient Concentrations

In the telephone conversation with Ms. Gordon, Mr. Ron Methier indicated that no more recent guidance was available than the July 1984 guidance document followed in determining the Acceptable Ambient Concentrations (AAC). The basis for the calculation of the AAC comes from the toxicity data priority schedule provided in Part III, paragraph 1 of the guidance document. The American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) recommendations were converted to units of mg/m^3 for each constituent of concern. These values are included in the tables. The TLV values were adjusted for operation 24 hours a day, 7 days a week by multiplying by 40 hours per week and dividing by 168 hours per week. This is required by paragraph 2, Part III of the guidance document. The values were then adjusted by a safety factor that accounts for pollutant exposure to members of the public who may be more sensitive to pollutant effects than the average citizen, as required by paragraph 3. Table 1 indicates known carcinogens as category A, and all other pollutants as category B.

As indicated on Tables 2, 3, 6 and 7, the maximum ground level concentration calculated by the SCREEN model are well below the resulting AACs. The analysis reaffirms that air emissions will result in a negligible impact on air quality during the air sparging pilot test.

Proposed Monitoring

Daily stack monitoring for vinyl chloride will be conducted during the pilot study to collect actual air emission data. The modeling shows that a concentration of 37 mg/m^3 of vinyl chloride at the stack should not exceed a maximum ground level concentration of 0.01004 mg/m^3 (Table 8) for worst case meteorological conditions. This is less than the required AAC. ABB-ES proposes to monitor the stack and to initiate corrective action if the stack concentration exceeds 3.7 mg/m^3, providing a minimum safety factor of 10 times the AAC. If a stack concentration of 3.7 mg/m^3 of vinyl chloride is exceeded, corrective measures to reduce emissions will be initiated. Corrective measures will be defined in an Operations and Maintenance Plan. The on-site laboratory that will be used initially for this stack monitoring will use a maximum detection limit of 0.1 mg/m^3. When analytical functions are transferred to an off-site laboratory, this maximum detection limit will continue to be used.