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LETTER AND NOTICE OF DEFICIENCY REGARDING GROUNDWATER MONITORING
PROGRAM AT SITE 11 NSB KINGS BAY GA
7/27/2001
GEORGIA DEPARTMENT OF NATURAL RESOURCES

Georgia Department of Natural Resources

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Environmental Protection Division

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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Commanding Officer
Naval Submarine Base, Kings Bay
1063 USS Tennessee Avenue
Kings Bay, GA 31547-2606

SUBJECT: NOTICE OF DEFICIENCY
Groundwater Monitoring Program at Old Camden County
Landfill, Naval Submarine Base, Kings Bay, Georgia

Dear Sir:

We have performed a comprehensive review, with respect to the current Facility Permit, of the groundwater-monitoring program at the Old Camden County Landfill (Site 11) at NSB. This evaluation is based on observations EPD personnel made during a Corrective Action Oversight (CAO) Inspection conducted from May 2-3, 2001; review of Quarterly Groundwater Monitoring Reports (Quarterly Reports) for July-September 2000, September-November 2000, and December 2000-February 2001; and review of the Semi-Annual Corrective Action Assessment Report (Semi-Annual Report) for October 2000-March 2001.

CAO comments and deficiencies are as follows:

1. **Period of Water-Level Measurements:** During the May 2-3 CAO Inspection, the samplers told an EPD representative that they typically collect quarterly water-level measurements over the course of two to three days. Although this is in accordance with the CAP, the CAP did not anticipate the potential significance of short-term barometric pressure effects on water levels. David C. Leeth of the USGS indicated that unpublished USGS data show that water levels in the Surficial aquifer at Site 11 respond to diurnal barometric pressure changes (7/20/01 e-mail from David C. Leeth, USGS).

The RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD), September 1986 (OSWER-9950.1) states in Section 1.3.1.1, "Generally, water level measurements from boreholes, piezometers, or monitoring wells used to construct a single potentiometric surface should have been collected within a 24-hour period. This practice is adequate if the magnitude of change is small over that period of time." It is good practice to measure all water levels during the same day to minimize the potential effects of barometric pressure, recharge from recent storms and other short-term effects. In fact, USGS measured water levels for each Site 11 potentiometric surface map in WRI Report 98-4246 within a four-hour period to minimize potential diurnal barometric effects (e-mail communication with David C. Leeth, USGS).

Please, therefore, propose a plan that adequately demonstrates that short-term effects will

not affect the precision of potentiometric measurements more than 0.01 ft. over the measurement period.

2. **Stabilization of Water Levels:** During the May 2-3 CAO Inspection, an EPD representative observed that monitoring well casings at Site 11 can contain a significant amount of pressure, as indicated by PS-2 hissing when the samplers removed the cap. However, the samplers did not appear to collect periodic water-level measurements during the time between uncapping the well and recording the water level (as Section 2.2.2 of the Groundwater Monitoring Plan requires) to verify water-level stabilization. In the future, please verify that water levels have stabilized, using the procedure in Section 2.2.2 of the Groundwater Monitoring Plan, before recording groundwater depths. Also, please propose an appropriate length of time over which to gauge for water-level stability.
3. **Documentation of Instrument Calibration:** An EPD representative observed during the CAO Inspection that the samplers did not document in their field notes how or when the instruments they used to measure groundwater indicator parameters during purging had been calibrated. These instruments included a *Horiba U-10* multi-meter for conductivity, turbidity, dissolved oxygen, and pH and an *Orion 250A* meter for redox potential. Although appropriate calibration may have been performed, in the future, please document in the field notes that each instrument used is calibrated according to manufacturer recommendations (as Section 2.2.2 of the Groundwater Monitoring Plan requires). If field calibration is not necessary for a particular instrument, a statement in the field notes such as, "a chemist at the IWTP lab calibrated the Horiba U-10 on (date), in accordance with the manufacturer's recommendations", and identification of the location of the calibration data, would be sufficient to document compliance with the calibration requirements.

Comments on and Deficiencies of Quarterly and Semi-Annual Reports are as follows:

4. **Section 1.1 (Summary of Activities, pg. 1) of each Quarterly Groundwater Monitoring Report:** The Groundwater Monitoring Plan requires (in Section 2.6) that the reports include "weather conditions". However, the Quarterly Reports only describe the general weather conditions during the quarter. Recharge from a recent rain event or a change in barometric pressure could affect the groundwater flow pattern. Therefore, please include, in future Quarterly Reports, a description of the weather conditions during and immediately preceding the period of water-level measurement.
5. **Site Map (Figure 1) and Groundwater Elevation Map (Figure 2) of each Quarterly Report:** The Site Maps and Groundwater Elevation Maps lack explanations/legends and scales; have illegible labels; lack labels for the highway, fence line, and base perimeter road; and have the same symbol (a dot) for each well type (i.e. private irrigation well, shallow-depth monitoring well, deep monitoring well...). Please include a legend, scale, and proper labeling on any maps submitted in the future. Also, please use different symbols for shallow-depth monitoring wells, intermediate-depth monitoring wells, deep monitoring wells, piezometers, and private irrigation wells.
6. **October 2000-March 2001 Semi-Annual Report:** The Semi-Annual Report is deficient

in depicting the dissolved chlorinated volatile organic compound (cVOC) plume. Specific deficiencies are as follows:

- (a) There is no figure showing the distribution of chlorinated volatile organic compounds (cVOCs) outside the source area. It is necessary to plot these chemical results to comply with Section 2.6 of the Groundwater Monitoring Plan, which states, "Maps depicting groundwater flow direction and gradient and concentration isopleths will be included". In future Semi-Annual Reports, please include, in addition to any maps detailing cVOC concentrations in the source area, cVOC concentration isopleths showing the entire affected area (i.e. using the same base map as Figure 1). These maps should show:
 - (1) the locations of and cVOC concentrations in KBA-11 Series monitoring wells, PS Series piezometers, and private irrigation wells, and
 - (2) concentration isopleths for each dissolved cVOC and total cVOCs (or indicate if none are detected).
- (b) Figure 1-3, the cVOC isopleth map of the source area, contains several variations from generally accepted contouring and mapping principles. They are as follows:
 - (1) There is no north arrow.
 - (2) The scale along the border of the map does not identify the unit of measurement.
 - (3) The map contains crossing and intersecting contours.
 - (4) The map contains closed contours without data points inside them.
 - (5) The lookup table beside the map shows cVOC concentrations for points lying outside the zero contour. These are: SP-27 (278 ppb), SP-31 (44 ppb), and SP 32 (58 ppb).
 - (6) The contours do not appear to reflect the listed chemical concentrations for each data point. For instance:
 - (i) the concentration listed for SP-41 is 1,516 ppb, but the data point is on the 4000 ppb contour;
 - (ii) SP-40 (200 ppb) is next to the 2000 ppb contour;
 - (iii) SP-29 (520 ppb), SP-26 (445 ppb), and SP-37 (190 ppb) are between the 2000 ppb and 4000 ppb contours; and
 - (iv) SP-35 (22,205 ppb) is between the 16,000 ppb and 18,000 ppb contours.

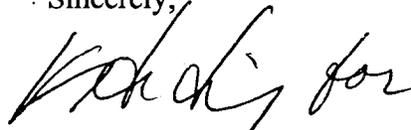
In addition to addressing these deficiencies, all future isopleth maps should be drawn using the following principles:

- individual data values should be shown next to each well;
- separate maps should depict cVOC concentrations in each aquifer or aquifer zone monitored unless they can be combined in an easily readable manner; and
- isopleths should be shown as dashed lines or left off where they are not bracketed by data points.

In an effort to reduce the reporting burden and to simplify record keeping, EPD is agreeable to combining each Semi-Annual Report with a Quarterly Report, so that two Semi-Annual/Quarterly Reports and two Quarterly Reports would be submitted each year. These expanded Semi-Annual/Quarterly Reports should combine all the reporting and interpretive elements outlined in the Groundwater Monitoring Plan for both Semi-Annual and Quarterly Reports, including the above comments on Quarterly and Semi-Annual Report deficiencies. The two remaining Quarterly Reports should address the current comments on Quarterly Report deficiencies, but be scaled back so that they exclude historical cVOC data tables, figures and interpretations. Those should be included in the Semi-Annual/Quarterly Reports instead.

It is not necessary for NSB to change previous reports to correct for these deficiencies. However, all future activities and reports should address these comments. Please contact Billy Hendricks or Larry Papetti at (404) 656-2833 if you have questions.

Sincerely,



Bruce Khaleghi, Unit Coordinator
Hazardous Waste Management Branch

cc: Ken Yargus, NSB Environmental Div.
John Garner, NSB Environmental Div.
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