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Command

To: Distribution

Subj: REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) FOR
NAVAL STATION TREASURE ISLAND (NAVSTA TI)

Encl: (1) Response to U.S. Environmental Protection Agency Comments on
Air Sampling Technical Memorandum dated 4 February 1997

1. Enclosure (1) is provided for your information. This document presents the Navy's responses to comments dated 10 March 1997 from U.S. Environmental Protection Agency on the air sampling technical memorandum for NAVSTA TI.
2. Thank you for your guidance and involvement in this project. For further information, please call me at (415) 244-2560.

Original signed by:

ERNESTO M. GALANG
By direction of
the Commanding Officer

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**RESPONSE TO
U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON
THE AIR SAMPLING TECHNICAL MEMORANDUM
FOR NAVAL STATION TREASURE ISLAND
DATED FEBRUARY 4, 1997**

This document presents the Navy's responses to comments dated March 10, 1997 from the U.S. Environmental Protection Agency on the air sampling technical memorandum for Naval Station Treasure Island (NAVSTA TI), dated February 4, 1997. No comments were received from the California Environmental Protection Agency (Cal/EPA).

GENERAL COMMENTS:

1. **Comment:** **The U.S. Environmental Protection Agency (EPA) understands that the air sampling results will be incorporated into the Remedial Investigation Report and the corrective active plan to evaluate the risks associated with the inhalation of volatile organic compounds (VOCs). This objective should be clearly stated.**

Response: The air sampling results will be incorporated into the remedial investigation (RI) report and the corrective Action Plan. This objective will be discussed in the Final Air Sampling Technical Memorandum presented as Appendix I of the draft final RI report.

SPECIFIC COMMENTS:

1. **Comment:** **Executive Summary, page v: In the Final Air Sampling Work Plan dated July 25, 1996, the last two paragraphs of Section 1.1 explain why VOC inhalation from groundwater and soil is being evaluated by air sampling. These paragraphs should be included in the Executive Summary and in any documents where the air sampling data is used.**

Response: These two paragraphs will be incorporated into the Final Air Sampling Technical Memorandum to be presented as Appendix I of the RI report.

2. **Comment:** **Figure 3-1 Site 6 Isolation Head Space Flux Chamber Sampling Locations: Please include the depths of the soil samples on the figure.**

Response: Soil sample depths will be added to Figure 3-1, Site 6 Isolation Head Space Flux Chamber Sampling Locations, in Appendix I of the draft final RI report.

3. **Comment:** **Figure 3-2 Site 22 Isolation Head Space Flux Chamber Sampling Locations: Please include the depths of the soil samples on the figure.**

Response: Soil sample depths will be added to Figure 3-2, Site 22 Isolation Head Space Flux Chamber Sampling Locations. in Appendix I to the draft final RI report.

4. **Comment:** **Section 4.1.2 Field Sampling, page 15: Please explain if the sampling conditions, stated in Section 4.1 of the Final Air Sampling Work Plan, were met.**

Response: The following sampling conditions were described in the work plan: (1) the ambient air temperatures will be above 60°F, (2) precipitation for the previous 24 hours will be less than 0.01 inches, and (3) no more than 0.3 inches of precipitation will have fallen during the previous week. These sampling conditions were met during sampling activities, as described in Section 4.1.2 of the technical memorandum.

5. **Comment:** **Section 4.3 Deviations from the Work Plan, page 16: The third paragraph of this section explains the third deviation from the work plan. According to the work plan, all samples should have been collected as 2-hour integrated air samples, but instead some samples were collected as 10-30 second grab samples. Since grab samples are not representative for low emission rates, EPA does not agree that grab samples are appropriate for evaluating VOC emissions at Naval Station Treasure Island (NAVSTA TI). For low emission rates, which are likely at NAVSTA TI, grab samples do not allow enough time for VOCs to build up inside the flux chamber as stated in Section 4.3.1 of the Final Air Sampling Work Plan. EPA recommends that the grab sample data not be used to evaluate VOCs in air.**

This impacts Site 22 where only grab samples were collected and where the highest concentrations of benzene were detected in soil. The use of the grab sample data at Site 22 should be discussed with the Agencies. Since Site 22 is scheduled for remediation under a corrective action, it may not be necessary to use the data from Site 22.

Response:

Although some samples were collected as grab samples, the flux chamber residence times for these samples averaged 22.25 hours. During this time, emissions were allowed to build up inside the flux chambers before samples were extracted into the SUMMA canisters. Most of the samples were extracted over a 2-hour period, after the emissions were allowed to accumulate inside the flux chambers, while the grab samples were extracted over a 10-to 30 second period. The term "grab sample" in the technical memorandum refers only to the method of extracting the samples after emissions had accumulated in the flux chambers. The four samples referred to as "grab samples," therefore, were collected only after significant time had been allowed for VOCs to build up inside the flux chambers.

In addition, the approximate 2-hour differential in collection times between the "normal" samples and the "grab" samples is accommodated in the equation that converts flux chamber concentration into emission flux. This equation, specified in Section 5.1 of the Air Sampling Technical Memorandum, is given by,

$$E_i = (C_i \cdot V_E) / (t \cdot A)$$

where,

- E_i = emission flux for component i; micrograms per square meter per second ($\mu\text{g}/\text{m}^2\text{-sec}$)
- C_i = concentration of component i; micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)
- V_E = volume of the enclosure; cubic meters (m^3)
- t = length of time enclosure is in place; seconds
- A = surface area enclosed by chamber; square meters (m^2)

The variable t is the length of time the flux chamber is in place, and includes residence time plus sample collection time. Given the above clarification, the Navy believes that the grab samples collected at NAVSTA TI are representative of the VOC emissions at the site.

6. Comment:

Section 4.3 Deviations from the Work Plan, page 16: The fourth and fifth deviations from the work plan involve purging the flux chambers and monitoring the vacuum pressure in the SUMMA canisters. Please explain how these deviations are different from the sampling method outlined in Section 4.3 of the Final Air Sampling Work Plan and whether the deviations could affect the accumulation of VOCs.

Response:

The fourth deviation from the work plan involved purging the flux chambers prior to sample collection. The work plan indicated that flux chambers would be purged with either nitrogen or clean air. However, during field activities, flux chambers were purged with ambient air before being positioned for sampling. As stated in the technical memorandum, the effect on the data is believed to be minimal. However, there is the potential that the sampling results may slightly overestimate actual emission flux if high levels of VOCs were present in the ambient air when sampling was conducted.

The fifth deviation from the work plan involved monitoring the vacuum pressure in the SUMMA canisters during sample collection. The work plan stated that canisters would be monitored to assure that the appropriate pressure differential is maintained over the sampling period. However, the sampling equipment used for sampling did not have pressure gauges, so vacuum pressure could not be monitored during sample collection. However, because the flow meters were accurately calibrated, the SUMMA canisters were always closed at the proper time during sampling. Final vacuum pressures were verified by connecting a pressure gauge to each SUMMA canister after the sample was collected and measuring the vacuum pressure. All pressure readings were within laboratory guidelines. Therefore, this work plan deviation did not effect the sampling results.

7. Comment:

Table 5-1 Site 6 Air Sampling Results, page 19: Please check the calculation for the emission flux. For benzene in sample 06-AR01, the emission flux in Table 5-1 is reported as 7.71×10^{-6} micrograms per square meter per second ($\mu\text{g}/\text{m}^2\text{-sec}$). But if the following equation is used from Section 5.1,

$$\begin{aligned} E_i &= (C_i \cdot V_E) / (t \cdot A) \\ E_{\text{benzene}} &= (1.33 \mu\text{g}/\text{m}^3 \cdot 0.1334 \text{ m}^3) / (72,000 \text{ sec} \cdot 0.2919 \text{ m}^2) \\ E_{\text{benzene}} &= 8.44 \times 10^{-6} \mu\text{g}/\text{m}^2\text{-sec} \end{aligned}$$

Response:

The variable t is compiled by adding the chamber residence time and the sample collection time. The sample collection time is added because the flux chamber is still in place and accumulating VOCs while the sample is being extracted. The total time the flux chamber is in place (residence time plus sample collection time) for Sample 06-AR01 is 79,200 seconds. When using this value for t, the resulting benzene emission flux is $7.71 \times 10^{-6} \mu\text{g}/\text{m}^2\text{-sec}$. The description for the variable t will be changed from "total residence time" to "length of time enclosure is in place" in the Final Air Sampling Technical Memorandum.

8. Comment:

Table 5-1 Site 6 Air Sampling Results, page 19: Please present the calculation that was used to convert head space concentration from parts per billion by volume (ppbv) to $\mu\text{g}/\text{m}^3$.

Response: The equation used to convert VOC head space concentrations from ppbv to micrograms per square meter ($\mu\text{g}/\text{m}^3$) will be presented in Appendix I to the draft final RI report and is given below:

$$X \mu\text{g}/\text{m}^3 = (Y \text{ ppbv}) \left(\frac{\text{VOC molecular weight}}{1 \text{ gram mole}} \right) \left(\frac{10^6 \mu\text{g}}{1 \text{ gram}} \right) \left(\frac{1 \text{ gram mole}}{0.024 \text{ m}^3} \right) \left(\frac{1}{10^9 \text{ ppbv}} \right)$$

9. **Comment:** **Section 5.2 Dispersion Modeling to Outdoor Air, page 18: Indoor air concentrations should be addressed. If indoor air concentrations are less than outdoor air concentrations, then a general statement should be made in the text. If the indoor air concentrations are greater than the outdoor air concentrations, then the calculations for indoor air should be included. This issue should be discussed with the Agencies.**

Response: During the April 4, 1997 meeting, EPA, the Department of Toxic Substances Control (DTSC), the Regional Water Quality Control Board (RWQCB), and the Navy agreed that models would not be used to calculate indoor air concentrations because the level of uncertainty associated with available models is extremely high and because the concentrations detected in outdoor air were very low. Instead, the Navy has agreed to present all available information in the draft final RI report to evaluate the inhalation of volatile compounds pathway including the results of the Air Sampling Technical Memorandum and existing site-specific environmental baseline survey documents to support findings of suitability to lease.

10. **Comment:** **Table 5-4 Site 6 Modeled Outdoor Concentrations and Preliminary Remediation Goals: Please explain that the “not applicable” notation, n/a, does not mean that the compound was not sampled, but that the compound was not detected and therefore the outdoor concentration can not be modeled.**

Response: The “not applicable” notation, n/a, in Tables 5-4, 5-5, and 5-6 of Appendix I to the RI report indicates that the compound was not detected in the sample; thus, the outdoor concentration could not be modeled. This clarification will be added to the notes in Tables 5-4, 5-5, and 5-6 in the Final Air Sampling Technical Memorandum presented as Appendix I in the draft final RI report.

11. **Comment:** **Section 5.2.2 Site 22 Results, page 26: Since only grab samples were collected at Site 22, EPA can not support the conclusions of this section (see Specific Comment #5).**

Response: Please see response to Specific Comment 5.