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16 APR 1996

From: Commanding Officer, Engineering Field Activity, West, Naval Facilities
Engineering Command

To: Distribution

Subj: TRANSMITTAL OF RESPONSES TO DTSC/DHS AND RASO COMMENTS ON
THE DRAFT RADIATION SURVEY AND FIELD SAMPLING WORK PLAN,
NAVAL AIR STATION ALAMEDA, ALAMEDA, CALIFORNIA

Encl: (1) Response to DTSC/DHS comments on the Pre-Draft Radiation Survey and Field
Sampling Plan
(2) Response to RASO comments on the Pre-Draft Radiation Survey and Field
Sampling Plan

1. Enclosures (1) and (2) are the responses to comments on the Pre-Draft Radiation Survey and Field Sampling Plan. Reuse schedules for Building 400 and Pier 3 require expediting review and field surveys for this document. As a result, the next document issued will be the Draft Final which will incorporate the responses to your comments as indicated. Please review the enclosures and advise as soon as possible if there are any questions with regards to the Navy's responses. Due to the urgency of this project in getting Pier 3 and Building 400 surveyed, we desire your approval of the work plan shortly after submitting the Draft Final document.

2. If you have any questions regarding this matter, I can be reached at (415) 244-2549, FAX (415) 244-2654.

Original signed by:

GEORGE KIKUGAWA
By direction of
the Commanding Officer

Distribution:

California Department of Health Services (Attn: Deirdre Dement)
California Department of Toxic Substances Control (Attn: Tom Lanphar)
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U.S. Environmental Protection Agency (Attn: James Ricks)
Radiological Affairs Support Office (Attn: LCDR L. L. Fragoso)
NAS Alameda (Attn: LCDR Mike Petouhoff)
NAS Alameda (Attn: LCDR Steve Edde)
NAS Alameda (Attn: Darrel Roloff)
NADEP Alameda (Attn: Larry Schwab)
PRC Environmental Management, Inc. (Attn: Duane Balch/Neal Hutchison) (w/o enclosures)

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WRITER: G. Kikugawa/18312/Ext. 2549

TYPIST: Ana Bordallo

Chron, Green

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**RESPONSE TO DTSC/DHS COMMENTS ON THE PRE-DRAFT
RADIATION SURVEY AND FIELD SAMPLING PLAN,
FEBRUARY 23, 1996
NAVAL AIR STATION, ALAMEDA, CALIFORNIA**

This document presents the Navy's responses to comments from the Department of Toxic Substances Control (DTSC) and Department of Health Services, Environmental Management Branch (DHS) dated March 11, 1996, on the pre-draft radiation survey and field sampling plan for Naval Air Station Alameda, dated February 23, 1996.

RESPONSE TO COMMENTS FROM DTSC/DHS

General Comments

1. **Comment:** It is not clear to the reviewer that field sampling will occur, even though this is a "radiation survey and field sampling workplan". The only reference to collection of soil samples was found on page 23, section 5.1 under health and safety. What volume of soil is needed for each sample? Is there enough sample to split for comparative analysis with other agencies or for duplicate analysis to be performed for QA/QC verification? Will samples spiked with known quantities of the radionuclides of concern be submitted "blind" to the laboratories performing sample analysis as part of the QA/QC process?

Response: Soil and groundwater sampling is not intended to be a part of this radiation survey and field sampling work plan. However, for the surveys within Buildings 5 and 400, swipe samples will be collected and analyzed in the field for removable radioactivity, and some drain line sludge material and scrapings may be collected for off-site laboratory analysis. Due to the limited amount of removable material within the drain lines, it is likely that insufficient sample volumes will preclude the submittal of field quality control (QC) samples. However, the laboratory will be required to perform all quality assurance/quality control (QA/QC) parameters as specified for the methods requested. References to the collection of soil samples will be removed from Section 5.1, and sampling and analysis information will be included in the appropriate sections for the collection of drain line sludge material and scrapings.

Specific Comments

1. **Comment:** Page 1, Section 1.1. Will the data be sufficient to adequately assess the degree of contamination and potential hazards related to exposure to radioactive contaminants?

Response: The proposed radiological investigation is adequate to provide the data necessary to assess the potential hazards related to exposure to this contamination. However, as directed by the Navy's Radiological Affairs Support Office (RASO), additional data will be necessary to adequately assess the degree of contamination. The workplan will be revised to include a characterization survey for Building 5 and related storm sewer line F and a scoping survey for Building 400 and related storm sewer line FF. The data from the scoping survey for Building 400 will be of sufficient magnitude and quality to satisfy the requirements of a final survey.

2. **Comment:** Pages 2 and 14, Sections 1.1 and 3.1.1. Why was 18" chosen as the height to take exposure rate measurements?

Response: The height of 18 inches was chosen as a worst case scenario based on the height at which the lowest point of the whole body starts. However, as specified in NUREG/5849 and at the direction of RASO, all environmental radiation exposure rate measurements will be taken at 1 meter above ground surface. The text will be revised to include this change.

3. **Comment:** Page 3, Section 1.2.4. How will surface surveying be used to determine the extent of contamination? Are there any plans to take groundwater and soil samples for radiological analysis?

Response: Soil and groundwater sampling activities are not within the scope of this radiological survey. Soil and groundwater at NAS Alameda have been investigated for radiological contamination at Sites 1 and 2 under the remedial investigation and feasibility study (RI/FS) program. The text will be modified to clarify the purpose of this radiological survey.

4. **Comment:** Page 5, Section 1.3. If Strontium-90 (Sr-90) is not detected with the surface survey, will there be any further attempt to detect (to confute or affirm) the presence of Sr-90 with soil or water sampling.

Response: See the response to comment 3.

5. **Comment:** Page 14, Section 3.1.6. Why were a minimum of two background locations chosen for each task location? NRC NUREG/CR-5849 recommends 6 to 10 background readings. How will the background measurements be used in the analysis of results (e.g., What statistical tests will utilize the background measurements?)

Response: The work plan will be revised to include the following information.

Background will be established for exposure rate or gamma count rate to a 20 percent variance using the method outlined in NUREG/CR-5849. This may require 10 or more samples. Locations will be in unaffected areas of the base having similar soils types, ground covers, or construction materials. Background is discussed for each type of measurement in turn.

Exposure Rate: Mean background as determined from several locations is subtracted from exposure rate to determine the "net exposure rate" from contamination on site. Because of natural variability of the background radiation exposure rate, the smallest detectable difference between the mean background and any single sample location is approximately $4.65\sigma_b$, where σ_b is the standard deviation of the background.

Contamination: Background for residual contamination is presumed to be zero. All measured surface activity is considered elevated and counted against the radioactivity release criteria. The radiation counting system for background is evaluated to produce a net count rate signal from which the activity is derived.

6. Comment: Page 22, Section 4.0. Explain how "radiation levels significantly above background" will be determined?

Response: When performing a survey, PRC reports data as "significantly above background" from a statistical perspective, if the measured value is considered above the false positive threshold, or L_C , defined for the measurement process. The L_C is defined as the level of radioactivity for which there is a 50 percent chance of not reporting the activity as different from background, when it fact it is. This corresponds to a selected upper confidence interval of the distribution of the background. The L_D is defined as the level of radioactivity for which there is only a 5 percent chance of not reporting the activity as different from background, when it fact it is (i.e. 95 percent certainty).

For example, for a background distribution (normalized) of mean value 1 and a standard deviation (σ_b) of 0.2, the L_D is equal to $1 + (4.65 \times 0.2)$, or 1.93; thus, any location whose true value exceeds 1.93 will be correctly identified as "significantly above background" 95 percent of the time. For this case, the L_C is equal to $1 + (1.645 \times 0.2)$, or 1.33; thus, any location whose measured value is 1.33 or less would be considered part of the background population, without regard to the true reason for the increase in activity. Any measured value greater than 1.33 but less than 1.93 would be reported as "less than" with a magnitude between 1.33 and 1.93, depending upon the actual measured value and its error.

The text will be revised to include this information.

7. **Comment:** Page 27, Section 6.3.1. There is no mention of using a Ra-226 (the radionuclide of concern) source to determine the Ra-226 efficiencies for each instrument and probe. The efficiencies will be needed to convert counts per minute (cpm) to disintegrations per minute (dpm).

Response: All radiological measurement instrumentation proposed for this survey are calibrated on an annual basis by the vendor using National Institute of Standards and Technology (NIST) sources. Gamma survey instruments and alpha probes will be calibrated using a radium-226 source which will be directly applicable to the radiation being measured. Beta survey instruments will be calibrated using a strontium-90 source which will also be applicable to the radiation being measured. The annual calibrations will ensure that detection efficiencies are known for each instrument and are applicable to the radiation being measured at NAS Alameda. In addition, instrument calibrations will be checked on a daily basis using appropriate source check samples. The text will be revised to include this information.

**RESPONSE TO RASO COMMENTS ON THE PRE-DRAFT
RADIATION SURVEY AND FIELD SAMPLING PLAN
FEBRUARY 23, 1996
NAVAL AIR STATION ALAMEDA, CALIFORNIA**

This document presents PRC Environmental Management, Inc.'s responses to comments from the Naval Sea Systems Command Detachment, Radiological Affairs Support Office (RASO) dated March 18, 1996, on the pre-draft radiation survey and field sampling plan for Naval Air Station Alameda, dated February 23, 1996.

RESPONSE TO COMMENTS FROM NAVY RASO

Specific Comments

1. **Comment:** Page 2, Section 1.1. The statement is made that measurements made at 18 inches from the ground that exceed 50 microRoentgens per hour will be posted to alert personnel to the radiation hazard. Explain the rationale for selecting this value.

Response: As discussed with R. Lowman (RASO) on March 29, 1996, PRC will determine environmental radiation exposure rates at one meter above ground surface. PRC will recommend posting for locations at which the public dose limit (based upon an occupational occupancy of 2,000 hours per year) of 100 millirem per year could be exceeded. The Navy will review these recommendations and make the final posting decisions based upon internal Navy criteria, worker and public occupancy factors, and other criteria. The text will be revised to include these changes.

2. **Comment:** Page 2, Section 1.2. The statement that strontium-90 radioluminescent paint was commonly used, stored and disposed of at NAS Alameda is incorrect.

Response: The text will be revised to state that strontium-90 was used as the energy source in radio luminescent paint in some applications, such as ship deck markers. Although strontium-90 was used to a lesser extent than radium-226 at NAS Alameda, it is a potential radioactive contaminant on site.

3. **Comment:** Page 3, Section 1.2.2. Change "...Shop 9411.." to "...Shop 94111...".

Response: The text will be revised to include the change.

4. **Comment:** Page 4, Section 1.3. Change "emittion" to "emission".
- Response:** The text will be revised to include the change.
5. **Comment:** Page 5, Section 1.3, third sentence. Change "1-inch by 1-inch" to read "2-inch by 2-inch".
- Response:** The text will be revised to include the change.
6. **Comment:** Page 6, Section 2.1. Exposure rates should be measured at one meter from the ground and not at 18 inches.
- Response:** Refer to response to comment 1.
7. **Comment:** Page 9, Section 2.4. Change "total surface alpha activity" to "radium-226 activity".
- Response:** The text will be revised to include the change.
8. **Comment:** Page 11, Section 3.0. The critical level (L_C) and the detection limit (L_D) must be calculated in addition to the uncertainty.
- Response:** See the response to Department of Toxic Substances Control/Department of Health Services comment 6. Within the revised work plan, PRC will provide the L_C and L_D for each proposed type of measurement.
9. **Comment:** Page 11, Section 3.1. This section should be more specific on the description of the surveys that will be performed. The descriptor that the area will be "thoroughly surveyed" is not sufficient.
- Response:** The word "thoroughly" will be removed from this statement. Specific information describing the surveys is provided in Sections 3.1.1 and 3.1.2.
10. **Comment:** Page 12, Section 3.1.1. This section should be more specific on the size of the grids that will be used and the percentage of area that will be surveyed.
- Response:** The text will be revised to clearly state that the survey grid will be a 1-meter grid and that the survey methods will result in the entire area being surveyed.

11. **Comment:** Page 14, Section 3.1.2. This section should be more specific on the description of the surveys that will be performed.

Response: The following will be added to Section 3.1.2 to clarify the jogging trail survey methods.

"A grid system will not be used to survey the jogging trail. Instead, the trail will be scanned by sweeping the survey instrument in a serpentine pattern across the trail at ground surface. Each pass across the width of the trail will survey an area about 1 meter in length. The survey will be complete when the entire length of the trail within Sites 1 and 2 has been scanned."

12. **Comment:** Page 17, Section 3.2. This survey will not provide a complete picture of the extent of contamination inside the drain lines under the building. This is because the nearest manhole from building five is several hundred feet from the contaminated area. Alpha activity may not be detected inside the manholes or the outfalls because any amount of cover, from such things as humidity or dust, may attenuate alpha particles.

Response: As discussed with R. Lowman (RASO) on March 29, 1996, the following issues will be addressed in the revised work plan:

1. For Building 5, PRC will, to the extent practicable with commercially available survey instrumentation, attempt to survey the interior of building down comers and drain lines from the access points within the building to the first manhole and to subsequent manholes, consistent with the data needs to support building transfer or lease.

2. For Building 400, PRC will survey the exterior and readily accessible interior of all accessible drain lines, traps, and clean out points. PRC will also collect sludge scrapings for laboratory analysis for those materials that might contain elevated quantities of radioactivity, but were not identified because of alpha attenuation or the limited sensitivity of field screening detectors. If the building drain lines are not contaminated at accessible locations, and the first exterior access manhole is also determined to be uncontaminated, the intervening drain lines will not be surveyed. If interior building lines are determined to be contaminated or contamination is identified at the exterior access manhole, PRC will, to the extent practicable with commercially available survey instrumentation, attempt to survey the interior of building down comers and drain lines from the access points within the building to the first manhole and to subsequent manholes, consistent with the data needs to support building transfer or lease.

13. **Comment:** Page 19, Section 3.3. Cursory surveys are not appropriate for Buildings 5 and 400. Characterization surveys should be performed for Building 5 and scoping surveys should be performed in Building 400. The data from the scoping survey for Building 400 should be of sufficient magnitude and quality to satisfy the requirements of a final survey.

Response: PRC will perform a characterization survey of Building 5 of sufficient detail in order to identify areas that require remediation. The survey will include both the affected areas and, to a lesser extent, adjacent unaffected areas. PRC will provide a final survey design for Building 400 in the revised work plan. This survey will consist of essentially 100 percent survey coverage for the affected rooms and adjacent unaffected areas, with detection sensitivity capabilities as required for a final survey. The text will reflect the details and differences in survey design for the scoping and characterization surveys.

14. **Comment:** Page 20, Section 3.4. Explain the need to measure gamma exposure rates at the suspected strontium-90 release point, since the beta/gamma measurements will provide adequate data to meet release requirements.

Response: There is no need for the exposure rate measurements. References to these measurements will be removed from Section 3.4.

15. **Comment:** Page 21, Section 4.0. Exposure rate measurements do not satisfy free release requirements. It is preferable to measure gamma count rates, which will provide data suitable to document that free release limits have been met. In the event that contamination is found, then taking exposure rates is appropriate.

Response: PRC will not use exposure rate measurements to satisfy free release requirements for surface radioactivity. In the case of surface activity measurements, only alpha or beta-gamma measurements will be compared to free release criteria. The following text will be added to the work plan where appropriate.

1. Where exposure rate measurement data are required, these will be taken using either a pressurized ionization chamber (Victoreen 450P or equal), a scintillation detector system calibrated for use in a radium energy field, or a large (2 inch by 2 inch) scintillation detector correlated at the site to an ionization chamber measurement. Exposure rates are taken for purposes of comparison to an exposure or dose rate standard, or to put raw gamma count rates in perspective.

2. Raw gamma count instruments are used to locate gamma emitting sources or to screen for elevated gamma activity where direct surface activity measurements are not practicable, such as for the drain pipe surveys, or for generalized walkover surveys.