RESPONSE TO AGENCY COMMENTS ON THE DRAFT CONFIRMATION RADIATION SURVEY AND FIELD SAMPLING WORK PLAN ALAMEDA POINT, ALAMEDA, CALIFORNIA

This document presents the U.S. Department of the Navy's (Navy) responses to written and verbal comments from the regulatory agencies on the draft confirmation radiation survey and field sampling work plan for Alameda Point (formerly Alameda Naval Air Station), dated August 1998. Written comments were prepared by the California Department of Health Services (DHS) and transmitted to the Navy through the California Department of Toxics Substances Control (DTSC). The verbal comments were presented to the Navy in a meeting between the DTSC, DHS, and the Navy, including the Navy's contractor, Tetra Tech EM, Inc. (TtEMI) and the Navy Radiological Affairs Support Office (RASO), on September 23 and 24, 1998.

RESPONSE TO VERBAL COMMENTS FROM DTSC/DHS

General Comments

On September 23 and 24, 1998, the DHS representative met with the Navy and its contractor (TtEMI) to discuss the final status survey and the draft work plan. Many issues were discussed and a list of changes to the document was compiled, which are to be incorporated into the final workplan. Important issues are reiterated below to document our understanding as to their resolution.

V1. Comment: **DHS requests split samples from the first excavation and other locations as requested.**

Response: The Navy contractor, (TtEMI), will provide split samples of any sample location upon request of DHS. Samples will be held at the Alameda Point site in the New World Technology (NWT) on site laboratory facility for pickup by DHS representatives.

V2. Comment: **DHS requests the following processing of performance evaluation samples: Run background and spiked samples to lab, with results to RASO by Monday. Send samples to NWT to run on their system. If possible, keep samples sealed. DHS would like the samples rerun in 3 weeks to compare the in-growth of Bi-214, to possibly use as a verification.**

Response: Up to three DHS performance evaluation samples will be analyzed by the independent laboratory subcontractor. The sample spiked with radium will be analyzed twice: initially, and after 3 weeks (to allow for equilibrium of radon progeny). Results will be reported by the Navy contractor (TtEMI) directly to RASO.

V3. **Comment:** **Initial trench sample analytical results will be reported as wet readings as opposed to dry results.**

Response: The Navy will demonstrate the reliability of direct assessment of the radium-226 gamma emission at 186 kiloelectron volts by analysis of the DHS performance evaluation sample.

Based on the project schedule, all analyses will be performed wet. After analysis, the laboratory will dry an aliquot of each sample to determine percent moisture, then the final results will be corrected to reflect dry weight.

V4. **Comment:** **Section 3.3: Explanation is needed for DU booth use and why the Navy is surveying for Ra-226 instead of DU.**

Response: The following explanation will be added to the work plan. Depleted uranium (DU) may have been stored in this room in support of aircraft rework activity. Any other processing of DU requires a specific permit from RASO, and records indicate that no other work was authorized by permit.

By assuming the material is radium-226, a lower radioactivity criteria will apply. The same measurement approach can be applied to DU as for radium-226. This approach is conservative and health protective.

V5. **Comment:** **Why is the suspect beta spill in Building 5 to be cleaned up to Ra-226 standards.**

Response: By assuming that the material that caused the contamination was radium-226, a lower radioactivity criterion will apply. The measurement approach for this spot will be to assess both alpha and beta contamination and apply the radium-226 criterion for alpha activity and the surrogate radium-226 criterion for beta activity. This approach is conservative and health protective.

V6. **Comment:** **DHS would like to verify the Ra-226 equilibrium, beta to alpha ratio (page 24).**

Response: A decay chart for the uranium-238 series is attached. The emissions and decay frequency may be compared to the table in section 6.4.5 of the work plan.

V7. **Comment:** **Define CLEAN contractor, remedial contractor, and removal action contractor.**

Response: "CLEAN" is an acronym for Comprehensive Long-Term Environmental Action-Navy. TtEMI is the CLEAN contractor for the Navy's Engineering Field Activity West (EFA West). The CLEAN contractor performs field studies, prepares removal and remedial action documents, prepares restoration design documents, provides risk assessments, and performs confirmation sampling of response actions.

"RAC" is an acronym for Remedial Action Contract (RAC). The RAC contractor is a construction contractor and typically treats or excavates contaminated soil, constructs landfill caps, and builds treatment systems. Though "RAC" is the name of a specific Navy contract, the term may be applied to any contractor performing response actions.The RAC contractor performs remedial actions and removal actions.

Confusion may arise because under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a distinction is made between remedial actions and removal actions; however, according to the action memorandum for this project, this action is a removal action. All references to the action within the work plan will be changed to removal action.

V8. Comment: **Add class 3, 10 percent survey to the two stairwells (rubber coating removed) and the elevator in Building 5 adjacent to the bearing shops formerly used for radium work.**

Response: The rubber covering will be removed from the floor of two stairwells and one elevator nearest the bearing shop in building 5. A 10 percent coverage survey will be performed on these surfaces.

V9. Comment: **In Section 4.2.1, clarify the meaning of subsurface sampling.**

Response: Section 4.2.1 will be modified to clarify the meaning of "subsurface."

V10. Comment: **Section 4.2.1: Add 15 mrem/yr.**

Response: This section will be revised to include the 15-millirem-per-year limit of the action memorandum and technical work document. See the response to written comment 3, below.

V11. Comment: **Split text - Section 4.2.1: Clarify the meaning of inaccessible surfaces.**

Response: The text will be revised to clarify that this refers to buried pipelines.

V12. Comment: **Section 4.3.4: Add additional row to table explaining the Wilcoxon rank sum (WRS) statistical test.**

Response: The table will include an additional row that presents the DHS representative's recommendation that the data could be evaluated first without considering the contribution of background.

V13. Comment: **As a contingency, in the event dissolved solids interfere with the gross alpha test, what other test methods will be employed?**

Response: The Navy will use a laboratory certified by the State of California for drinking water analysis to analyze water collected from the excavation. The laboratory will use U.S. Environmental Protection Agency (EPA)-approved or equivalent methods, which may include gross alpha analysis, radon emanation techniques, or gamma spectroscopy for analysis of water. The detection limit or minimum detectable concentration will be less than 60 picocuries (pCi) per liter of water for any method.

V14. Comment: **Replace "Confirmatory" with "Final Status" in the title of the work plan.**

Response: The document title will be changed.

V15. Comment: **There should be 2 soil samples per trench section, for a minimum of 36 samples. Collect two composite samples per trench section, each a two-point composite.**

Response: The document will be changed to reflect that a minimum of 36 samples will be collected and analyzed by an off-site laboratory. Each sample will be a two-point composite sample or a hot spot sample (determined by the trench scan).

V16. Comment: **Collect a sample at the outfall (Seaplane Lagoon) after remediation.**

Response: A discussion will be added to the work plan identifying the sampling and analytical protocol for sediment sampling in the seaplane lagoon.

V17. Comment: **Survey 3 meters on each side of overhead piping removed in the building, unless there is a wall.**

Response: Surveys will be performed on floors below piping that has been removed. A strip of floor 3 meters wide will be surveyed on each side of the pipe run projected on the floor surfaces. All areas where removal work occured will be marked for identification later.

V18. Comment: **Make additional minor word changes in the text as suggested.**

Response: Several minor changes suggested by the DHS representative to add clarity to the document will be made. In addition to a final document, a redlined copy of the revised text will be provided to the DHS representative to identify changes.

V19. Comment: **Survey any discovered or unsurveyed laterals inside the building.**

Response: In any intersecting or crossing lateral pipelines that were not identified in the technical work document are uncovered within the buildings, they will be evaluated. As appropriate, based on external radiation surveys and the identification of the line, crossing laterals may be opened for radiation surveys.

V20. Comment: **Section 6.6.4, change this section as discussed.**

Response: The last paragraph will be revised to read as follows:

> The sensitivity achieved by these final tests will be unchanged from that achieved by the original characterization survey; that is, it will range from less than 4 to less than approximately 10 nanocuries, as a point source equivalent, depending on the detector size, counting geometry, and other factors.

V21. Comment: **Regarding the 20 nCi criteria: Survey the inside of the pipe for a surface rate (dpm/cm2) and relate it to some point source quantity.**

Response: NWT will survey a representative sample of pipe and obtain a relationship between surface activity and sodium iodide (NaI) detector response, which may then be correlated to a traceable activity standard.

V22. Comment: **Decide whether to use the 186 or 609 keV line for radium-226 analysis.**

Response: The subcontracted laboratory, Thermo-Nutech, can meet the data quality objectives for this project by directly measuring the 186.4 kiloelectronvolt photopeak. This laboratory has demonstrated the ability to distinguish this line from an adjacent line produced by uranium-235.

RESPONSE TO WRITTEN COMMENTS FROM DTSC/DHS

Written comments were received from DTSC by facsimile on September 30, 1998. Only general comments were submitted.

General Comments

1. Comment: **On September 23 and 24, 1998, the DHS representative met with the Navy and its contractors to discuss the final status survey and the draft work**

plan. Many issues were discussed and a list of changes to the document was compiled, which are to be incorporated into the next revision. Important issues are reiterated below to document our understanding as to their resolution.

Response: The Navy will incorporate the changes agreed to at the September 23 and 24 meeting into the final version of the document.

2. **Comment:** **DHS understands that for water analysis, gross alpha measurements will be used to ensure that the release limit for radium-226 is met. If the gross alpha result is suspect due to high concentrations of suspended solids, then additional analyses will be performed.**

Response: See the response to written comment 2, below.

3. **Comment:** **Concerning underground piping that does not appear to be impacted although was connected to piping that was confirmed to be contaminated; the following analyses are planned. 1. The point source equivalent activity in piping will be correlated to the actual measured surface activity of the piping. 2. A maximum surface activity in the piping will be determined that meets the 15 mrem/year limit for the most credible exposure scenario. 3. The best available information will be used to estimate the actual surface activity of inaccessible piping.**

Response: (1) The Navy will measure the point source activity in connected ("lateral") pipes and other pipes encountered outside the scope of the design documents and the project action memorandum that appear to be potentially affected in terms of point source equivalent activity. As has been discussed with DHS representatives, the Navy will perform test measurements to correlate surface activity to point-source-equivalent activity.

(2) The Navy is developing a credible exposure scenario that corresponds to the average member of the critical population group as defined by the Nuclear Regulatory Commission (NRC). For this site, based on a preliminary evaluation, that critical population group is considered to be a construction worker who is involved in excavating and removing soil and pipe from the site under uncontrolled conditions. The Navy will develop a corresponding point-source-equivalent activity that corresponds to an annual radiation dose that does not exceed 15 millirems per year.

(3) The Navy will continue to use the best available information by applying previously approved methodologies to characterize buried pipe.

4. **Comment:** **Concerning above ground piping that does not appear to be impacted although was connected to piping that was confirmed to be contaminated, the release limits of RG 1.86 will be demonstrated at an accessible pipe interior.**

Response: The Navy will make best efforts to achieve NRC regulatory guide (RG) 1.86 limits at accessible connection points before reconnecting aboveground

piping. The state will be informed in the event the Navy is unable to demonstrate that the RG 1.86 limits are met.

5. **Comment:** **DHS further understands that the hotspot limit for soil is 5 pCi/g, and that this concentration can be detected using the scanning instruments referenced.**

Response: The limit for soil is 5 picocuries per gram using the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) statistical methodology. This limit is technically referred to as the design concentration guideline limit-Wilcoxon rank sum (WRS) test or design concentration guidance limit ($DCGL_W$ in MARSSIM terminology). This concentration can be reliably detected, as stated in the work plan. using 100 percent scans of the trench bottom and lower sidewalls with a 2-inch NaI detector.

6. **Comment:** **DHS did not comment on the discussion of surveys at Site 2 because this land is to remain under federal jurisdiction.**

Response: The comment is noted.

7. **Comment:** **DHS understands that the final survey report will provide maps of building rooms and summary of results of all previous surveys where remediation was not required. In addition, data on the drain line condition, including information on as-is condition, (highest estimated concentration found, depth of excavation to remediate) will be provided in the final report.**

Response: The final survey report will include maps of all rooms surveyed. The report will include either prior results or a summary of them. The final report will include data on the condition of drain lines removed, estimated activity (if not previously provided), and depth of excavation. The work plan will be modified to reflect this change.

8. **Comment:** **The soil analysis results will be confirmed after ingrowth of the Radium daughters on about 10% of the samples collected. In addition, estimates will be made on the dry weight vs. wet weight to confirm that 5 pCi/g dry weight was met.**

Response: See the response to verbal comment 3 above.

ATTACHMENT

DECAY CHART FOR URANIUM-228

Uranium Series (4n) (Personal communication L. Slaback after Kocher 1981 and ICRP Report No. 38, 1983. In case of discrepancy, ICRP value given)

Nuclide	Historical Name	Half-Life	Major Radiation Energies (MeV) and Intensities[b]					
			α		β		γ	
			MeV	%	MeV	%	MeV	%
$^{238}_{92}U$	Uranium I	4.468×10^9 y	4.15	22.9			.0496	.07
↓			4.20	76.8				
$^{234}_{90}Th$	Uranium X_1	24.1 d			.076	2.7	.0633	3.8
					.095	6.2	.0924	2.7
					.096	18.6	.0928	2.7
					.1886	72.5	.1128	.24
$^{234m}_{91}Pa$	Uranium X_2	1.17 m			2.28	98.6	.766	.207
							1.001	.59
99.87% | 0.13%								
↓ $^{234}_{91}Pa$ ↓								
↓ $^{234}_{91}Pa$ IT ↓	Uranium Z	6.7 h			22 βs		.132	19.7
					E_{Avg} = 0.224		.570	10.7
					E_{max} = 1.26		.883	11.8
							.926	10.9
							.946	12
↓								
$^{234}_{92}U$	Uranium II	244,500 y	4.72	27.4			.053	.12
↓			4.77	72.3			.121	.04
$^{230}_{90}Th$	Ionium	7.7×10^4 y	4.621	23.4			.0677	.37
↓			4.688	76.2			.142	.07
							.144	.045
$^{226}_{88}Ra$	Radium	1600 ± 7 y	4.60	5.55			.186	3.28
↓			4.78	94.4				
$^{222}_{86}Rn$	Emanation Radon (Rn)	3.823 d	5.49	99.9			.510	.078
↓								
$^{218}_{84}Po$	Radium A	3.05 m	6.00	~100	.33	.02	.837	.0011
↓								
99.98% | 0.02%								
↓ $^{214}_{82}Pb$	Radium B	26.8 m			.67	48	.2419	7.5
					.73	42.5	.295	19.2
					1.03	6.3	.352	37.1
↓ $^{218}_{85}At$	Astatine	2 s	6.66	6.4			.786	1.1
			6.7	89.9			.053	6.6
			6.757	3.6				
↓ $^{214}_{83}Bi$	Radium C	19.9 m	5.45	.012	1.42	8.3	.609	46.1
			5.51	.008	1.505	17.6	1.12	15.0
					1.54	17.9	1.765	15.9
					3.27	17.7	2.204	5.0
↓								
99.979% | 0.021%								
↓ $^{214}_{84}Po$	Radium C′	164 μs	7.687	100			.7997	.010
↓ $^{210}_{81}Tl$	Radium C″	1.3 m			1.32	25	.2918	79.1
					1.87	56	.7997	99
					2.34	29	.860	6.9
							1.110	6.9
							1.21	17
							1.310	21
							1.410	4.9
							2.010	6.9
							2.090	4.9
↓ $^{210}_{82}Pb$	Radium D	22.3 y	3.72	.000002	.016	80	.0465	4
↓					.063	20		
$^{210}_{83}Bi$	Radium E	5.01 d	4.65	.00007	1.161	~100		
↓			4.69	.00005				
~100% | .00013%								
↓ $^{210}_{84}Po$	Radium F	138.378 d	5.305	100			.802	.0011
$^{206}_{81}Tl$	Radium E	4.20 m			1.571	100	.803	.0055
↓								
$^{206}_{82}Pb$	Radium G	stable						

Source: Handbook of Health Physics and Radiological Health, Third Edition. Shleien, B., and others. Williams and Wilkens. Baltimore. 1998.