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RESPONSE TO COMMENTS ON THE OFFSHORE ECOLOGICAL RISK ASSESSMENT FIELD SAMPLING AND ANALYSIS PLAN AND QUALITY ASSURANCE PROJECT PLAN

MARE ISLAND
VALLEJO, CALIFORNIA

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RESPONSE TO COMMENTS ON THE OFFSHORE ECOLOGICAL RISK ASSESSMENT DRAFT FIELD SAMPLING AND ANALYSIS PLAN AND QUALITY ASSURANCE PROJECT PLAN MARE ISLAND, VALLEJO, CALIFORNIA

This report provides the Department of the Navy, Naval Facilities Engineering Command, Engineering Field Activity West (EFA WEST) response to comments on the "Offshore Ecological Risk Assessment Draft Final Field Sampling and Analysis Plan, Mare Island, Vallejo, California," dated May 19, 1997, and the "Offshore Ecological Risk Assessment Draft Final Quality Assurance Project Plan, Mare Island, Vallejo, California," dated May 20, 1997. Comments were received from the U.S. Environmental Protection Agency (EPA), and the Department of Toxic Substances Control (DTSC) on May 30, 1997, and the San Francisco Regional Water Quality Control Board (RWQCB) on June 4, 1997. EFA WEST will revise the draft final field sampling and analysis plan (FSAP) in accordance with the following responses. The location of text changes to the original document has been identified, where appropriate.

COMMENTS FROM THE DEPARTMENT OF TOXIC SUBSTANCES CONTROL

GENERAL COMMENTS

Comment: **The responses to most of the comments are acceptable. The changes in the text in response to comments regarding fish sampling (Specific Comment 6) and presentation of the San Francisco Regional Water Quality Control Board draft sediment ambient concentrations (Specific Comment 2) are the main issues remaining.**

Response: The changes requested by DTSC in the specific comments regarding the fish sampling and presentation of the RWQCB draft sediment ambient concentrations have been incorporated into the final field sampling and analysis plan (FSAP).

SPECIFIC COMMENTS

1. **Comment:** **The response to DTSC comment number 2 (page 2), regarding the different ecological concerns for areas of unexploded ordnance (UXO) as compared to other areas, and the changes made in section 2.0 of the Draft Final Field Sampling and Analysis Plan (FSAP) are acceptable.**

   Response: The comment is noted; no changes are required.

2. **Comment:** **In general, the response to DTSC comments number 6, 15, and 23 regarding use of the San Francisco Regional Water Quality Control Board (SFRWQCB) sediment ambient values is acceptable. However, please revise Table 3 to indicate that the sediment ambient values presented are draft and not final and replace the column heading "Cleanup Standard" with a column heading such as "Draft Sediment Ambient Concentration" as these values may not be the final San Francisco sediment ambient values nor the recommended remediation concentration.**

Response: Table 3 and the text in Sections 2.2.3, 2.2.5, and 8.5 of the final FSAP will be revised to indicate that the sediment ambient values represented are draft and not final. The column heading "Cleanup Standard," in Table 3, will be changed as well.

3. **Comment:** **The response to DTSC comment number 1 (page 5), regarding the different lists of potential contaminants, and the changes made in the sections of the Draft Final FSAP listed on page 6 of the response to comments are acceptable.**

Response: The comment is noted; no changes are required.

4. **Comment:** **The response to DTSC comments number 8 and 13 (page 8 and 9), regarding the differing sampling strategies for areas of UXO and areas without UXO, and the changes made in the Draft Final FSAP are generally acceptable. The table on page 35 of the Draft Final FSAP for areas with UXO does not indicate substitution of the 0 to 2 foot bgs core with 0 to 5 foot bgs as the shallow core depth. This appears to be a merely typographic error as all other shallow core depths are indicated as 0 to 5 feet bgs. Make the appropriate change to 0 to 5 feet bgs in the Final FSAP. All the new references are correctly included in the reference section of the Draft Final FSAP beginning on page 67.**

Response: The table listing the incorrect sample depth in the draft final FSAP will be revised to show the 0 to 5 foot bgs sampling depth interval.

5. **Comment:** **The response to DTSC comment number 17 (page 10), regarding the proposed reference station sites on the east side of the Mare Island Strait, is not logically coherent. First, selection of the reference stations and sampling is defended as useful in providing information regarding the condition of Mare Island as a whole. Then, without indicating the discussion among the Navy, PRC and regulatory agencies, the reference stations are removed from the sampling plan. The response to comments should be amended to indicate that the Navy, PRC Environmental, and the regulatory agencies agreed that selection and interpretation of reference stations on the east side of Mare Island Strait would be time intensive and not necessarily provide information more useful than that available from the**

SFRWQCB and Carquinez disposal sites already included in the FSAP sampling. The changes to the Draft Final FSAP can then remain as submitted.

Response: Analysis and interpretation of samples collected at the reference stations on the east side of Mare Island Strait may or may not provide information more useful than that available from the RWQCB Island #1 and the Carquinez Strait disposal area already included in the FSAP sampling. Regardless of the information obtainable for these sites, it remains Navy policy not to sample outside of Navy property, and this led to an administrative decision not to collect samples on the east side of Mare Island Strait.

6. **Comment:** **The response to DTSC comment number 14 (page 12), regarding collection of fish tissue samples, is acceptable. However, the statement in the text of the Draft Final FSAP (Section 2.2.4, page 23) does not contain the complete response as contained in the response to comments. Please include in the text the statement made in the response to comments that the decision to collect fish tissue will be based on the results of the *Macoma nasuta* bioaccumulation testing currently contained in the Draft Final FSAP.**

Response: The additional text regarding the collection of fish or benthic invertebrate tissue samples will be added to the final FSAP.

The decision point for collecting fish or benthic invertebrate tissue will be the comparison of the bioaccumulation test results for samples collected in Mare Island Strait to the samples collected at RWQCB Island #1. The chemicals that were observed to bioaccumulate and the extent to which they bioaccumulated will be evaluated. The analysis is part of the process for determining a technical recommendation for additional biological sampling, if it is suggested as part of the conclusions in the ecological risk assessment.

7. **Comment:** **HERD agrees to await completion of the ecological risk assessment (ERA) report to review the data evaluation report as presented in the response to DTSC comment number 10 (page 18 and 19).**

Response: The comment is noted; no changes are required.

8. **Comment:** **The response to DTSC comment number 5 (page 19), regarding the comparison between the reference locations and the study area, and the changes made in section 2.1 of the Draft Final FSAP are acceptable. The comparison methodology was further clarified at the May 5, 1997 meeting at PRC.**

Response: The comment is noted; no changes are required.

9.	**Comment:**	**The response to DTSC comment number 29 (page 20) and the further clarification provided regarding statistical testing at the May 5, 1997 meeting are acceptable.**
	Response:	The comment is noted; no changes are required.
10.	**Comment:**	**Please include the molar concentration of each divalent cation in addition to the total molar concentration of the divalent cations in reporting the simultaneously extracted metal (SEM) acid volatile sulfide (AVS) ratios in tabular form in the ERA report as indicated in the response to DTSC comment number 26 (page 22).**
	Response:	Both the molar concentration of each divalent cation and the total molar concentration of the divalent cations will be included in the reporting of the SEM AVS ratios.
11.	**Comment:**	**Figure 8 has been amended in response to DTSC comment number 3 (page 25).**
	Response:	The comment is noted; no changes are required.
12.	**Comment:**	**The response to DTSC comment number 9 (page 25) and DTSC comment number 11 (page 26) and changes in the Draft Final FSAP are acceptable.**
	Response:	The comment is noted; no changes are required.
13.	**Comment:**	**Changes in Section 4.2.3 and 4.2.4 of the Draft Final FSAP in response to DTSC comment 18 (page 26) are acceptable.**
	Response:	The comment is noted; no changes are required.
14.	**Comment:**	**The response to DTSC comment number 21 (page 26) and the changes made in section 6.1.2 of the Draft Final FSAP are acceptable.**
	Response:	The comment is noted; no changes are required.
15.	**Comment:**	**The response to DTSC comments number 27 and 28 (page 27) and the changes made to Section 8.2 are acceptable.**
	Response:	The comment is noted; no changes are required.

CONCLUSIONS

Comment: **Specific Comments 2, 4, and 6 require changes in the Final FSAP. Specific Comment 5 requires a change in the response to comments. No response is required for the other comments.**

Once the comments listed above are addressed, the investigations which are outlined in the Draft Final Offshore Field Sampling and Analysis Plan (FSAP) should provide information sufficient to make an initial determination of the potential ecological hazards to receptors associated with offshore contamination. Additional sampling and analysis may, however, be necessary to address data gaps and further refine the conclusions of this investigation.

Response: The comment is noted. The changes requested regarding specific comments 2, 4, 5, and 6 have been incorporated into the Final FSAP.

COMMENTS FROM THE SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD

GENERAL COMMENTS

Comment: **[These] comments should not affect the schedule for field work, but should be addressed in the final Offshore Ecological Risk Assessment (ERA) Field Sampling and Analysis Plan (FSAP). RWQCB staff have identified some areas which may indicate data gaps at the end of Phase I for being able to fully characterize the ecological risk at mare Island. However, we approve of the FSAP as proposed, with the additional modifications as described below and with the acknowledgment that a Phase II ERA may likely be required. We are accommodating a compressed schedule at the request of the Navy by performing our review of this FSAP and related documents for both onshore and offshore field efforts so that CTOs can be completed as needed by Navy.**

Response: The Navy appreciates the willingness of the RWQCB and the other regulatory agencies to accommodate a compressed schedule. The Navy believes that judgment about potential data gaps should be withheld until the ERA report has been completed. The Navy does understand the potential for such data gaps and the impact they may have on the conclusions of the ERA.

SPECIFIC COMMENTS

RWQCB comments on the Navy's Response to Comments on the Offshore ERA FSAP.

1. **Comment:** **Page 13, Navy's response to RWQCB comments 4 and 5**

RWQCB staff still believes that a survey of the benthic organisms in Mare Island Strait should be performed, at least at the level of identifying the types (to Family or Order) of organisms present. Given the fact that the Navy is evaluating exposure to benthic receptors as part of the ERA, the relevance becomes apparent when determining what receptors we are concerned about, as well as what may be prey for higher trophic level receptors. However, we are willing to consider what information the Navy can obtain from a literature review, prior to formally requesting additional field work at this time.

We also recognize that there are difficulties with performing a full benthic community analysis in San Francisco Bay at a contaminated site without being able to identify an unimpacted reference site. However, the Navy should be aware that the San Francisco Estuary Institute, as part of the Regional Monitoring Program, is currently attempting to characterize "normal" benthic assemblages in the Bay. Depending upon their results, RWQCB staff may consider requiring this type of characterization in the future, as part of the Sediment Quality Triad approach to evaluation sites.

Response: The Navy recognizes the possible limitations of obtaining community matrix information from the literature. However, it will provide a first step that can be incorporated into the ERA report. The "normal" benthic community information from the San Francisco Estuary Institute may prove to be very useful. No changes to the FSAP text or the response to comments are required.

2. **Comment:** **Page 28, Navy's response to RWQCB comment 3**

In the meeting of May 5, 1997 with the Navy, PRC, and the agencies, we discussed the merits of evaluating the hydrology and bathymetry of Mare Island Strait in interpreting the results of the offshore sampling effort and the exploring remedial alternatives. My notes from that meeting indicated that the Navy and PRC agreed that although this work was outside of the scope of the FSAP, it would be useful information for data interpretation in the ERA report and FS. Given the compressed time schedule for the current field effort, RWQCB requests that the Navy include discussion of the hydrologic system and historical bathymetric records as part of the ERA report. Please refer to our comment #3 for specific types of topics to be covered.

The agencies and the Navy can negotiate any further level of effort for understanding sediment transport after the ERA report is submitted. Similar discussions are currently taking place with USGS and the agencies for Hunter's Point sediment sites in the context of the FS. The Navy should modify the text in the FSAP to indicate that there will be some evaluation and discussion of the hydrology of the river system in the ERA report.

Response: The Navy agrees to include additional information about the physical characteristics of the offshore areas in Mare Island Strait in the ERA. The descriptions will include an analysis of the hydrogeology and geomorphology as well as more specific information regarding the dredging history and bathymetry.

RWQCB Comments on the Offshore ERA FSAP

3. **Comment:** **Page 4, section 1.2.3, Evaluation of Ecological Risk in Onshore, Wetland, and Offshore Areas, second paragraph**

This modified section more clearly states the integration of the offshore and onshore sampling efforts, specifically noting IR04, North Building Ways area, and the Fleet Reserve Piers. However, we request that the Navy expand the description of how IR04 will be evaluated, as presented by PRC in the meeting with Navy, PRC, and the agencies of May 27, 1997.

In that meeting, we were informed of a series of steps that the Navy intends to perform in order to evaluate the ecological risk at IR04, and that this site is on a separate schedule from that of the rest of the ERA described in the current offshore and onshore FSAPs. There was significant discussion on this topic; the agencies presented to us verbally on May 27th. As page 4 of this document currently reads, it is not evident that IR04 will not be dealt with in the June 1997 onshore field effort. The Navy must be specific in when and how IR04 will be integrated into the rest of the ERA for Mare Island.

Response: Because IR04 is an important ecological concern and because a large portion of IR04 exists in the offshore area, the following information is presented to clarify how the sample collection projects will be integrated for this site.

Four sample collection projects currently are planned for the IR04 area:

1. The offshore ERAsampling will collect sediment core samples in two sampling cells directly offshore from IR04. These samples will be analyzed for sediment chemistry, elutriate chemistry, sediment and elutriate bioassays, and bioaccumulation testing.

The results of this sampling may be used to determine the extent of the green sand contamination; however, these samples will not specifically target the green sand area. These samples will be collected in June 1997.

2. The Group 2/3 remedial investigation field work will include collection of samples in the inter-tidal and offshore areas. Samples cores will be collected from approximately 30 locations. The samples will be inspected visually for the presence of green sand and analyzed by an on-site laboratory for metals. Selected samples will also be analyzed by an off-site analytical laboratory for metals, polychlorinated biphenyls (PCB), and organotins. The results will be used to determine the extent of the green sand contamination. This field work is scheduled to begin in August 1997.

3. The characterization of the onshore sandblast abrasive will be performed in July 1997. The purpose of this characterization is to provide data for a revised human health risk assessment for IR04 and to characterize the sand for potential disposal options for a scheduled removal. Sixteen samples of the green sand will be analyzed for metals, PCBs, organotins, and toxicity characteristic leaching procedure metals.

4. A removal of the green sand located above the water table is planned for 1997. Confirmation samples will be collected at the edge of the removal to determine the boundary conditions at the site following the removal. Samples will be analyzed for metals to characterize the remaining green sand. The data collected during the post-removal confirmation sampling will be used for a revised human health risk assessment for IR04.

4. **Comment:** **Page 13, section 2.1.1, State of the Problem, last paragraph**

The Navy has modified the assessment endpoint for the offshore ERA as being the "maintenance of a benthic community at low risk from contaminants." We find this proposed assessment endpoint unacceptable; it is vague and may be interpreted different ways. It appears to indicate that the presence of contamination is acceptable. RWQCB staff typically evaluate exposure to contaminants based on impact to the most sensitive receptors. Indeed, ambient water quality criteria are also based, in part, on exposure to sensitive receptors. The Navy should modify the assessment endpoint.

In addition, we still believe that higher trophic level assessment endpoints should also be considered for the ERA. We will likely be raising this point again as a possible data gap for Phase II then the ERA report is issued.

Response: The assessment endpoint for the offshore ecological risk assessment will be "to assess whether exposure of benthic invertebrates to concentrations of contaminants in sediments is associated with short-term effects related to acute and chronic toxicity, and long-term effects related to bioaccumulation."

A food chain analysis based on the bioaccumulation testing results could be used to assess potential risks to shore birds in appropriate areas; however, the risk to fish in Mare Island Strait cannot be assessed due to a lack of toxicity information (toxicity reference values) for these species.

COMMENTS FROM THE U.S. ENVIRONMENTAL PROTECTION AGENCY

FSAP COMMENTS

1. **Comment:** **The FSAP states that the decision to collect fish tissue samples will be based on results of the bioaccumulation and ecological testing. Please provide additional details about the decision process. What is the decision point for determination of the need to collect and analyze fish tissue samples?**

Response: The decision point for collecting fish or benthic invertebrate tissue will be the comparison of the bioaccumulation test results for samples collected in Mare Island Strait to the samples collected at RWQCB Island #1. The chemicals that were observed to bioaccumulate and the extent to which they bioaccumulated will be evaluated. The analysis is part of the process for determining a technical recommendation for additional biological sampling, if it is suggested as part of the conclusions in the ecological risk assessment.

1. **Comment:** **Responses to Comments, Topic 7, page 13. Please clarify what literature data will be used to identify the benthic community and higher trophic-level receptors present in Mare Island Strait. Will these literature sources be able to provide information about density and production of invertebrates, and recolonization rates and potential reproduction rates for these species?**

Response: Research into the available literature has not been performed at this time, so the type of information available has not been determined. If the data are sufficient, a discussion of the density and production of invertebrates and the recolonization rates and potential reproduction rates for these species will be included. Alternatively, the natural history literature would provide information about invertebrates that would most likely be

present in the sediments and would discuss the adverse effects associated with sediment concentrations of chemicals of potential ecological concern (COPEC).

QAPP COMMENTS

1. **Comment:** **The response to EPA comment 1B on the draft quality assurance project plan (QAPP) discusses changes for Tables 3-2 and 3-3. The holding time for elutriate samples was clarified in Table 3-3, but not in Table 3-2. Please clarify this discrepancy in Table 3-2.**

   Response: Table 3-2 lists the holding times sediment samples only and does not deal with the holding time for elutriate samples. Table 3-2 should not have been mentioned in the response to EPA comment 1B on the draft QAPP. The sediment holding times are correct in Table 3-2.

DATA EVALUATION VALUES

Media	Criteria/Screening Levels
Pore water	• Marine chronic AWQC (EPA 1992) (see Table 1)
Offshore sediment	• ER-L and ER-M (Long and Morgan 1990, Long and others 1995) (see Table 2)
Tests	**Criteria/Screening Levels**
Bioassay	• > 20 % mortality than the laboratory control (pore water and whole-sediment)
Bioaccumulation	• statistical comparison of tissue concentrations in exposed and unexposed test organisms
Media	**Comparison Values**
Offshore sediment	• RWQCB draft ambient values for fine-grained sediments (1996)

DTSC Comment 2

2.2.4 Definition of Study Boundaries

North Mare Island Strait area is bounded by Berth 24 and the southern end of Berth 2. The area covers about 350,000 square yards and is divided into 19 sampling cells (19,000 square yards per cell) (see Figure 7). The North Building Ways area is bounded by the causeway and the southern end of the Fleet Reserve Area. The area covers about 110,000 square yards and is divided into six sampling cells (18,000 square yards per cell) (see Figure 6). For both areas, surface sediments will be sampled from 0- to 12-cm bgs by a grab sampler. Sections 1.2 and 3.2 describe the geographic area and the rationale for selecting sampling locations. Sampling is scheduled to take place in late summer or early fall. Therefore, samples collected will characterize the condition for the offshore areas during the dry part of the year.

RWQCB Comment 4

Populations of interest are the benthic community, and because the area is offshore, the assessment endpoint is to evaluate whether exposure of benthic invertebrates to concentrations of contaminants in sediments is associated with short-term effects related to acute and chronic toxicity, and long-term effects related to bioaccumulation. Imminent dredging is not proposed for these areas. Receptors that would be potentially exposed to the sediments are aquatic organisms. Shore birds and wading birds may also be exposed to shallow sediments, but will be evaluated in the onshore ecological risk assessment. Organisms that live directly in the sediment (benthic organisms and bottom dwelling fish) contribute to the diet of larger migratory fish; however, the risk to fish cannot be assessed due to the lack of toxicity reference values for these species.

Quantifying the contribution of chemical impacts from sediments in specific geographic areas of the Bay to tissue concentrations in migratory fish species is difficult , particularly because there is no defensible way to determine the fraction of contaminant in the tissue related to a specific area in comparison to the entire range of the migratory fish. As a result, collection of fish tissue will not be performed at this time and bioaccumulation tests will be used to evaluate the presence of bioaccumulating compounds. This test will evaluate the bioaccumulation of sediment-associated contaminants from Mare Island Strait and compare them to those in laboratory control sediments. The assessment of the benthic community more accurately indicates the toxicity of sediments to organisms in direct contact with the sediments. The acute toxicity of nonbioaccumulating contaminants in the sediments will drive a site to cleanup, which would also potentially protect the migratory or benthic fish receptors. Bioaccumulation tests will provide information on the potential bioaccumulation of sediment contaminants in potential prey of migratory or benthic fish receptors. The decision point for collecting fish or benthic invertebrate tissue will be the comparison of the bioaccumulation test results for samples collected in Mare Island Strait to the samples collected at RWQCB Island #1. The chemicals that were observed to bioaccumulate and the extent to which they bioaccumulated will be evaluated as discussed in Sections 6.1 and 6.2.

Additional information about the physical characteristics of the offshore areas in Mare Island Strait will be evaluated in the ecological risk assessment. The descriptions will include an analysis of existing information regarding the hydrogeology and geomorphology of the area as well as specific information regarding the dredging history and bathymetry of Mare Island Strait.

Table 3
San Francisco Bay Ambient Sediment Comparison Values

Analyte	Draft Ambient Sediment Concentration (mg/kg)
Metals	
Arsenic	16.1
Cadmium	0.4
Chromium	212
Copper	63
Lead	35
Mercury	0.41
Nickel	11.5
Selenium	1.0
Silver	0.56
Zinc	156
Organic Compounds	
Total Polynuclear Aromatic Hydrocarbons (PAH)	5
Total Polychlorinated Biphenyls (PCB)	0.05

Note: The sediment ambient values are draft and are subject to change.
Source: RWQCB 1995

DTSC Comment 2